

The Archaeological Survey: Methods and Uses

by:

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CDF Editorial Note: This excellent report discusses archaeological survey techniques, approaches, and issues. Although written over 25 years ago, for a different audience, it is still one of the best articles on this subject, and has great value as a teaching aid for students trying to perfect their archaeological survey skills. CDF is grateful to have received permission from Dr. King to reproduce his report for inclusion in the *Reference Manual and Study Guide for the CDF Archaeological Training Program* and for posting on CDF's Web Site. CDF retyped and reformatted the report in 2003. DF-2-21-03

Foreword

To non-archaeologists, one of the deeper “mysteries” of the historic preservation program seems to concern the methods of identification and assessment of archaeological properties and utilization of this information in project planning and compliance processes. Misunderstanding and misinformation about these activities are very common. To clarify some of these questions, we asked Dr. Thomas F. King, formerly of our staff and currently Director of the Micronesian Archaeological Survey, to prepare a manual on the methods and objectives of archaeological survey that would in large part be addressed to non-archaeologists so that they might gain a better understanding of the nature of archaeological resources. Particularly valuable in Dr. King's discussion is his description of the formation of the archaeological record in a hypothetical locality, and then, how this record might have come to be known to archaeologists today through various kinds of survey efforts. This is an excellent description of how the archaeological record actually has become known in many areas of the United States. Through this means, the reader should gain an understanding of what “existing survey data” enable us to conclude; or, better stated, what they do not permit us to conclude about the archaeological resources of an area. Numerous other topics on a wide range of archaeological subjects are in preparation for this series. Comments are welcome on the series, on specific reports, or on suggestions about topics which should be presented.

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Portions of the paper are loosely derived from an unfinished manuscript called “Archaeology Without Excavation” that I began preparing some years ago with advice and assistance first from George Jefferson and later from Robert Edwards. The base map and artist’s conception of Griffin Valley were prepared by Nicholas del Cioppo for that manuscript. Although “Archaeological Survey ...” bears very little resemblance to “Archaeology without Excavation”, I am grateful to my colleagues in the original effort, and hope they will be pleased with the product that has at last emerged.

Table of Contents

Chapter I	Introduction and Definitions	3
Chapter II	A Brief History of Archaeological Survey	4
Chapter III	The Variety of Archaeological Surveys	8
Chapter IV	Basic Archaeological Survey Methods	17
Chapter V	Special Types of Survey	26
Chapter VI	Recording and Reporting	29
Chapter VII	Predictive Survey for Comprehensive Planning	32
Chapter VIII	Conclusion	43
Appendix A	Forms Used in Recording Archaeological Survey Data	44
Appendix B	Archaeological Predictive Studies	56
Appendix C	Example of An Archaeological Review Procedure Using Predictive Data	58
Appendix D	Automated Management of Data on Archaeological Surveys	61
Appendix E	State Archaeological Co-ops: Their Evolution, Dangers, and Value	64
Author’s Afterward	67
Endnotes	69
Bibliography	71
References Cited in Author’s Afterward	77

Chapter I: Introductions and Definitions

This volume is addressed to two major audiences. One is the audience of State Historic Preservation Officers (SHPOs), Federal agency planners and administrators, and other non-archeologists who sometimes express confusion or uncertainty about what archeological survey is and what it means to them. The other audience is the archeological profession itself. To the latter audience we will be saying nothing new; we will be discussing things that everybody knows but for some reason seldom writes about. The volume may serve an archeological purpose by saying these things, as simply as possible, in a single slender volume. To the former audience we will try to convey, in reasonably plain language, the process and problems of archeological surveying. At minimum they should be able to ask better questions about the process of identifying archeological sites.

Archeological surveys are obviously necessary in order to identify those archeological properties that are eligible for inclusion in the National Register of Historic Places. SHPOs have a lead responsibility for the conduct of surveys, under the authority of section 102 of the National Historic Preservation Act. Because SHPOs have lacked the funds to undertake such surveys with much dispatch during the decade since passage of the act, however, the great majority of the nation's lands remain un-surveyed. When a Federal agency proposes to undertake a project, or assist or permit another party to undertake a project that will disturb such un-surveyed lands, it thus cannot usually receive much help from the SHPO. The agency then has no choice but to conduct a survey itself in order to obtain the data it needs for compliance with section 106 of the National Historic Preservation Act and other authorities. Basic guidelines for archeological surveys, as one aspect of general historic properties surveys, will soon be published in the "Federal Register"³. These guidelines naturally sacrifice detail for legal precision and broad applicability. The purpose of this paper is to elaborate upon the guidelines.

We have decided to use the term "archeological site" throughout this volume to refer to the object of archeological survey. This is an imprecise term, which in other contexts we have tried to avoid (36 CFR 66, and King, Hickman and Berg 1977⁴). Archeologists are concerned not only with sites but with buildings and structures, as well as objects and districts--the whole range of historic properties as defined by the National Historic Preservation Act. This concern is briefly discussed in Chapter V. We have used "site" here for two reasons: first, because we felt that a more general term like "historic property" would confuse some readers in the absence of a lengthy discourse on why we were using it, and second, because in conducting a survey it is the search for nonstructural sites that causes the most trouble to SHPO's and Federal agencies, not the identification of buildings and structures. At the same time, archeologists often have trouble dealing with the information content of buildings and structures, but that is a different issue. An archeological site, then, for purposes of this paper, is any location-on or in the ground and with or without buildings, structures, or other protuberances, that may contain information important to history or prehistory--i.e., that meets National Register Criterion d (36 CFR 60.4). Archeological survey involves seeking such locations and finding out enough about them to decide whether they really do contain important information. This is not necessarily a difficult activity, but it can be a time consuming one. Occasionally it is a dangerous one, sometimes it is an expensive one and, most of all, it is a practice that requires thoughtful planning and organization. These are the primary topics of this volume.

Chapter II: A Brief History of Archeological Survey

Modern archeology in North America has roots in the dilettantism and antiquarianism of the 19th century. Some of the earliest "archeologists" were explorers, traveling journalists, soldiers, and natural scientists who described archeological sites that they sought out or stumbled upon during travels in the little known regions of the west and Latin America (cf. Stephens 1841). In this sense, archeological survey has a long tradition in American archeology.

Some of the earliest archeological publications were essentially survey volumes, describing the ruins or mounds that had been discovered in some particular area of the country, discussing collections that had been derived from them, and speculating on their origins and functions (cf. Squier and Davis 1848). These studies were a far cry from the systematic surveys conducted by archeologists today; they were simple explorations in which the fieldworker described those phenomena that came to his attention with no pretense of identifying all the vestiges of past human activity in the area. Such full descriptions were not necessary to the authors' purposes.

As archeology became a recognized discipline in the United States in the latter part of the 19th century, such general exploratory surveys were a normal part of its research repertoire. The purposes of survey were almost totally descriptive; sites might generally be compared and contrasted with one another on the basis of survey data, but in most cases the survey was regarded primarily as a prelude to excavation. One surveyed to locate sites to dig. Survey methods were not the subjects of much concern. The archeologist presumably knew what kinds of sites he wanted to dig, and the survey simply involved looking for them. If other sorts of sites were missed in the process this was of no importance, because the archeologist did not want to dig them anyway. The survey was not itself seen as a research tool, since relationships among sites were not generally considered important.

At this time, archeology was primarily oriented toward the study of change in artifact types, structural types, and other attributes of archeological sites through time. The aims of such studies were the characterization of ethnographic groups in time-depth, the search for the origins of particular cultures, and the reconstruction of culture history (cf. Willey and Sabloff 1974: 42-64). Early studies were directed toward demonstrating what were thought to be universal patterns of human cultural evolution, showing that given societies had advanced inevitably through stages equated with "savagery" and "barbarism" to "civilization."

In the early 20th century, the concepts of unilinear cultural evolution began to go out of vogue, to be replaced with what became known as "historical particularism." Historical particularism denied the possibility of readily demonstrating large-scale evolutionary changes; particularists argued instead for the painstaking reconstruction of the histories of particular peoples and cultures. These small histories, it was thought, could eventually be synthesized to permit the development of an -understanding of cultural evolution in general. Archeologists trained in the historical particularist tradition naturally tended to direct their research toward the reconstruction of the culture-histories of particular sites or small areas. Very careful study of local culture change sequences became the rule of the day (cf. Willey and Sabloff 1974: 88-98).

The physical focus of the study for the particularist archeologist, however, was not greatly different from that for the unilinear evolutionist. Both approaches to culture-historical study caused archeologists to value large, deep sites with many strata or other indicators of change through time, and with many artifacts that could be equated with things used by ethnographic peoples. In such sites, cultures could be speculatively described through analogy with living groups that used similar artifacts, and could be seen succeeding one another in more-or-less orderly progression through the strata. When surveying an area, most archeologists sought sites of this type, and virtually or entirely ignored the small, or shallow, or recent sites that did not promise to contribute directly to culture-historical reconstruction.

During the 1930s, archeology became deeply involved in the emergency employment programs initiated by the Roosevelt Administration. Large numbers of workers could be committed to archeological activities, to do socially useful work under relatively low-cost supervision. As a result, huge crews were thrown together and sent into the field under the leadership of archeologists--themselves often young graduate students or avocationalists. While some of these projects were utter disasters, others provided extremely important bodies of data, and the exercise had profound effects on the nature of archeological practice. One such effect was on archeological survey.

Large areas were surveyed, in advance of construction projects such as reservoirs or simply in order to deploy large numbers of people in activities that would do minimum damage to archeological sites. Because the workers were unskilled, and their supervisors often not highly trained or broadly experienced either, it was necessary to develop somewhat standardized methods of recording sites. Work was usually undertaken in areas where large populations of unemployed workers existed, not necessarily where an archeologist, left to his own devices, might have chosen to work. In consequence, the archeologists often found themselves dealing with areas they did not know well, where they were not sure just what kinds of sites to seek. Thus it became necessary to think about what constituted an archeological site, what gave them importance, and to record a wider range of sites than would have been recorded by an archeologist simply seeking sites to dig for pure research purposes.

The rationale for survey remained the discovery of sites for excavation, and reconstruction of culture-history was still the main reason for excavation. Changes were in the making, however, springing in part from other effects of the depression and its archeological activity. The make-work programs had often forced archeologists into work they would not have done otherwise, at sites that would normally not have tempted them. Large work crews made possible the stripping of large site-areas, revealing the organization of entire prehistoric villages and showing that more could be studied about extinct human groups than the ways their artifacts changed through time. The Roosevelt Administration itself, with its somewhat socialistic policy overtones, may have set the stage for the rise of cultural materialism in anthropological theory, which characterized the 1960s. This in turn would contribute to a major change in the ways in which archeologists looked at their world and their research base.

Before these changes took place, however, archeology lapsed into general quiescence during World War II. After the war, with the initiation of huge water-control projects across the nation, archeology was faced with a major challenge, and the era of "salvage archeology" began in earnest. Initially, the Smithsonian Institution and the National Park Service undertook the river basin salvage program; after passage of the Reservoir Salvage

Act of 1960 (Public Law 86-523), the responsibility became more and more concentrated within the National Park Service's Interagency Archeological Salvage Program (now Interagency Archeological Services⁵) until, in 1969, the Smithsonian Institution divorced itself from the program entirely.

Surveys were obviously required as the first step in most reservoir salvage projects. These surveys were still aimed almost exclusively at locating sites to dig, and sites were still chosen for excavation primarily when it was thought that they would contribute to the construction of culture-historical sequences. The scant funds appropriated to the National Park Service for salvage were largely reserved for excavation, so surveys were done cheaply and fast. The results were sometimes appalling by modern standards. At the proposed New Melones Reservoir in California, for example, a river basin salvage program survey in 1948 resulted in the recording of only four sites, none of which was regarded as being of sufficient importance to justify expenditure of the program's limited salvage money (Frederickson 1969). Based on recent survey, the still uncompleted New Melones Reservoir is now recognized as a National Register District because of its 190 prehistoric and over 400 historic sites, structures, buildings, and objects (Moratto 1967).

When the Interstate Highway System went into construction during the 1950s, archeological surveyors faced a new set of challenges. Lacking the Congressional mandate for a salvage program like the one provided for reservoirs, archeologists developed such arrangements as they could with their state highway agencies for the conduct of surveys and salvage. Pipeline construction companies also began to make arrangements for salvage. One of the first and most successful highway and pipeline salvage programs was that developed by Fred Wendorf and his colleagues at the Museum of New Mexico. Wendorf's experiences resulted in the preparation of a manual on salvage archeology. The conditions under which many salvage surveys were done were described as follows: "The archeological teams follow as closely behind the surveyors and as far ahead of the right-of-way clearing machinery as possible. Even under ideal conditions the timing will still be close, and there may not be more than three to four weeks between the survey and dozer clearing the right-of way." (Wendorf 1962:54)

Working under such pressures, archeologists found themselves having to think in new ways about old and little considered questions: what sites were worth recording? What made a site worth digging? How could they locate, record, and excavate them most efficiently?

As the 1950s progressed, anthropologists in many of the Nation's universities had become dissatisfied with historical particularism as their basic approach to understanding human society (see Harris 1968 for an extended discussion). Generally, the construction of local culture histories had not provided the basis for syntheses that revealed much about culture-change. Some began to believe that the cart had been placed before the horse, i.e., that precise questions should be developed about culture-change and hypothetical answers proposed, before data could be collected in a fruitful manner. It was recognized that it was physically impossible to collect all the data that might exist about any living culture or any archeological site; data collection is always selective. Without having formulated questions to be answered before fieldwork began, it was unlikely that the anthropologist or archeologist in the field would select the data necessary to answer them. At the same time, with the decline of the extreme anti-communism of the mid-50's, theories that purported to explain culture-change using models derived from Marx and other materialist thinkers became popular. Testing materialist propositions about the nature and causes of culture

change required the study of relationships between human society and the material resource base--the natural environment. The rise of environmental anthropology (Steward 1955; White 1959) coincided nicely with the growing recognition among salvage archeologists that there were scientifically valuable data in sites that were not large or deeply stratified. In fact, it was clear that if one really wanted to understand the relationships between human groups and their environments, one needed to look at all kinds of sites, representing all kinds of interactions with the environment. Small sites representing a small range of activities carried out during a single season with reference to a single economic resource were at least as important to understanding human-environment relations as were big, deep sites where people lived repeatedly or year round and engaged in a diversity of activities. On the upper Texas coast for example, very small, unstratified sites provided an unequalled source of clear information about short-term activities--involving periods ranging from probably one day up to two-or-three weeks. Such information could virtually not be obtained from complex, stratified sites (Aten 1977).

Not only have small, shallow sites begun to get new attention from environmentally oriented archeologists; the relationships among sites, and between constellations of sites and the environment in which they existed, have become fruitful objects for study. The focus of archeology during the 1960s shifted rapidly, from the individual site to the regional settlement pattern (cf. Chang 1968). Archeological survey itself began to be recognized as an important research tool, one which, even without associated excavation, could show how human populations and their activities had been distributed within a natural environment. Survey was gradually redefined, no longer being viewed simply as exploration to find sites to dig but as a systematic effort to "provide information on the number, the location, and the nature of the sites within a given region" (Heizer and Graham 1967:14).

The importance of archeological survey as a research activity has continued to grow during the last decade. Strangely, however, the literature concerning survey methods remains unusually limited. In 1966, Reynold Ruppe published a case study concerned with demonstrating how well-organized, problem-oriented archeological survey could "be made to produce information that is usually considered procurable only by excavation" (Ruppe 1966:331). Many studies based on survey data have been published since (cf. Thomas 1975; Schiffer and House 1975, 1977; Matson and Lipe 1975), all devoted at least in part to the discussion of the advantages and deficiencies of particular survey strategies. Some papers have also been devoted exclusively to the discussion and, in some cases, the comparison of survey strategies (cf. Mueller 1974, 1975; Lovis 1976). These studies and discussions have all concerned themselves only with predictive sample surveys. With the exception of Lovis, all have reported on work done in the arid to semiarid west, and most have focused primarily on the problems of selecting appropriate sample areas for inspection rather than on the problems of inspection itself. These are important problems, and predictive sample survey is of great value for management purposes. Discussion of such surveys follows in Chapter VII. First, however, we need to consider some more basic questions about archeological survey from a management perspective.

Chapter III: A Variety of Archaeological Surveys

There has never been a detailed definition of the term "archeological survey" on which all archeologists--and others who use the word--have agreed. For this reason, it cannot be assumed that if an agency simply contracts with a qualified archeologist it will necessarily receive a survey report that is fully consistent with professional standards that satisfy the needs of management. What one archeologist might call a "survey," another might call a mere cursory inspection. Moreover, as noted in the last chapter, the reasons for and methods of making surveys have changed considerably during the last century and, most dramatically, during the last decade or so. As a result, it is entirely predictable that if an area surveyed 20 years ago were surveyed again today, many archeological sites not noted in the first survey would be discovered.

The situation is by no means hopeless. It certainly is possible to identify all the archeological sites in a given area, within reason, given thoughtful planning and adequate resources. There are certain predictable pitfalls to avoid in planning such a survey, and this chapter attempts to describe them.

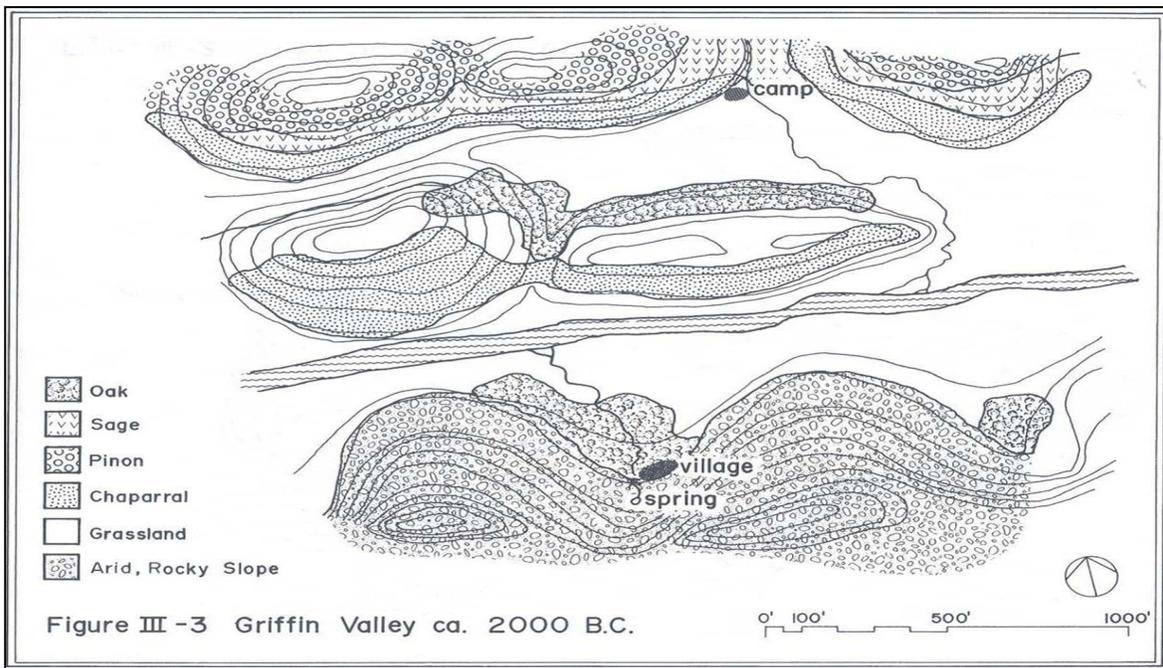
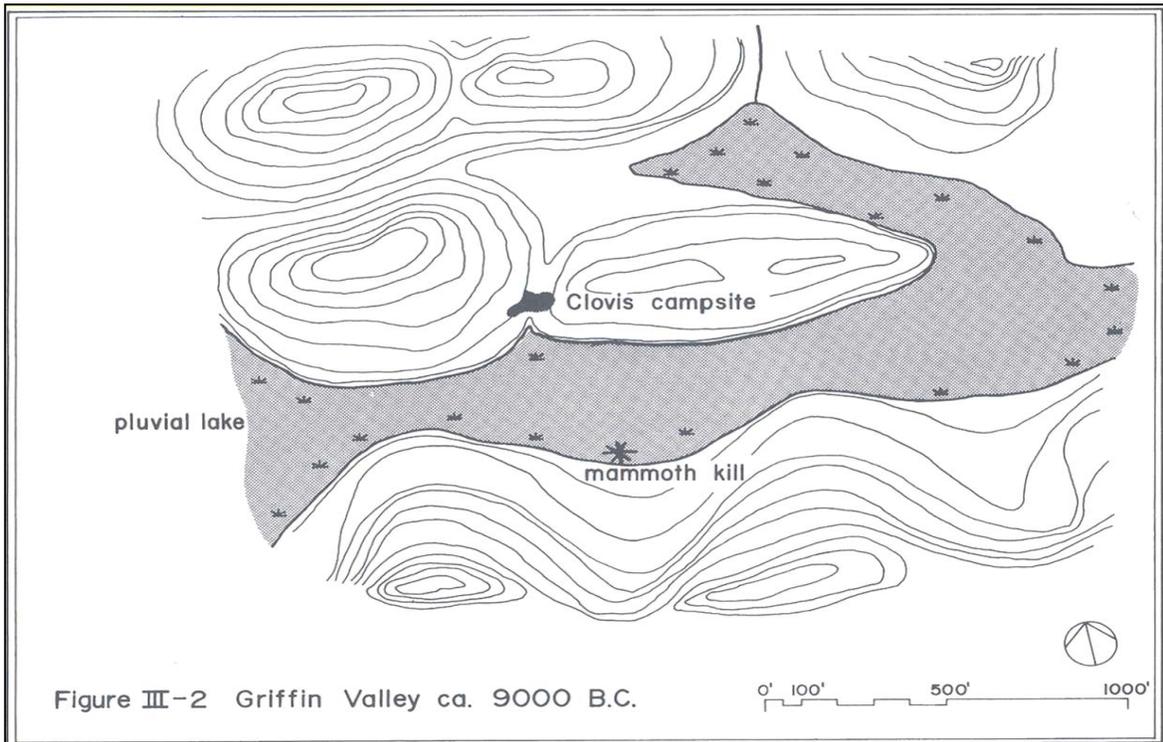
It will be easiest to describe the variety of archeological survey types and activities, and their results, against a standard environmental setting. Accordingly, we will undertake a study of Griffin Valley, in the State of Indeterminate.

Griffin Valley is shown in Figure III-1. It lies in relatively gentle, rolling country with a good deal of environmental diversity, along the Phillips River. Much of the valley is a part of the Ford Ranch, whose 75-year old buildings appear toward the left side of Figure III-1. Excluding these buildings from consideration for the moment, we can define the nature of the valley's archeological resources for the purposes of our example.

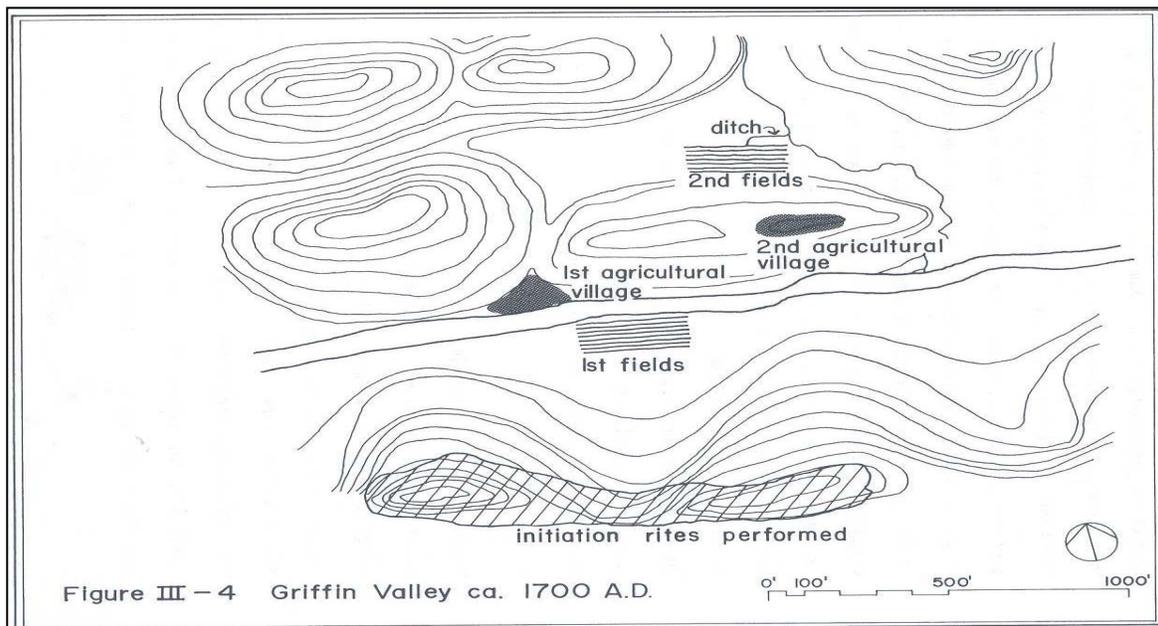
Human beings first entered Griffin Valley about 11,000 years ago. At that time, toward the end of the Pleistocene, much of the valley was covered by a pluvial lake, as shown in Figure III-2. The lake was shallow and marshy, and many large herd animals came there to drink. Waterfowl abounded. Because it was an ideal place for hunters to live, a small wandering band, manufacturers of the famous Clovis points, established a campsite at the low pass near the future location of the Ford Ranch buildings. This spot afforded them some shelter from the elements, was close enough to water to be convenient but not so near as to frighten game *away* from the shore. It commanded a view of both the lake and the small valley to the north, down which game often passed. The band visited this site recurrently for several centuries, and hunted around the lake margins. One season, three hunters from the group surprised a mammoth foraging along the south shore of the lake. Floundering around, the mammoth became mired and could not escape. The hunters waited for him to weary, and then dispatched him with many spears. The entire band then moved to the kill site and butchered the beast, leaving his bones, the spearpoints that had killed him, and their butchering tools and firepits when they moved on.

As the Pleistocene ended, a more diversified sort of hunting and gathering came to dominate the economy of the area. Now the lake was gone and grasslands covered much of the Valley. The really big game was also gone, and vegetable foods played a larger role in the diet of local people. Small hard seeds from grasses were ground on milling stones, and small game was hunted. During this period a good spring flowed out of the low rocky mountains at the south side of the valley, and it was around this spring that a good-sized semi-permanent village was established, as shown in Figure III-3. This was a very

convenient location, with easy access to fresh water and grasslands, and a short walk from the sage-covered low hills where the hunters had camped three thousand years before. During one period of about a century the climate turned arid and the available seed crop grew very sparse. Women now had to range farther afield to gather an adequate supply of seeds. A temporary overnight camp was established at the north edge of the valley, near a creek at the edge of the sage fields. Here seeds could be stockpiled and ground before being transported back to the main village; men accompanying the women could hunt in the nearby chaparral



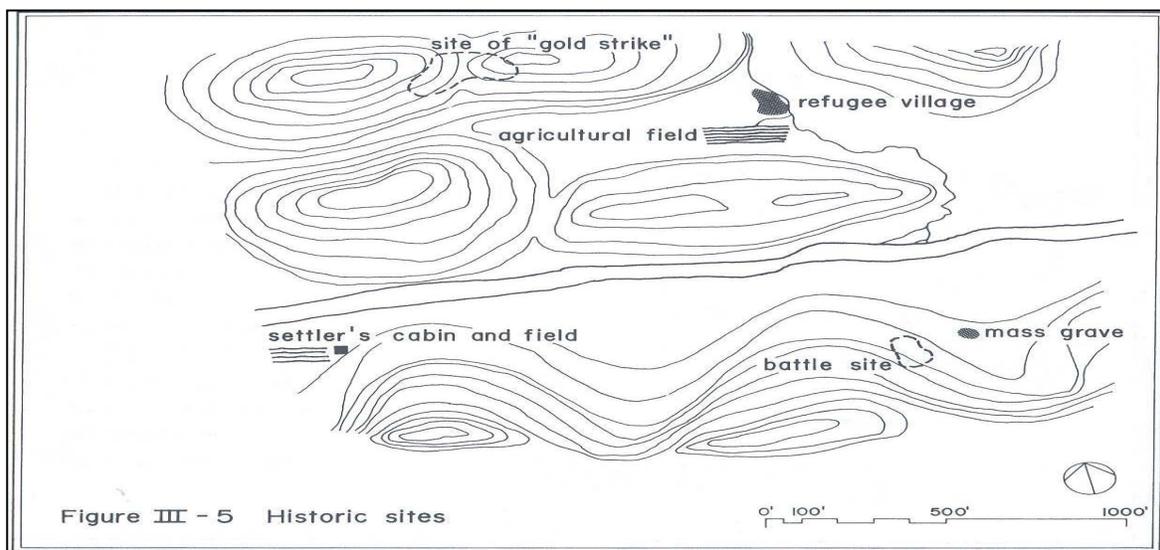
About 3000 years ago, a violent earthquake sealed up the spring, and the villagers had to move. Their new settlement was located at the foot of the pass through the Ford Ranch hills, on the bank of the Phillips River near the ecotone between grassland and chaparral communities. The oaks on the north slope of the hills were within easy reach, which was good since the people had recently developed techniques for leaching the tannic acid from acorns and making them edible. With this new source of food, and a moderating climate, the population increased rapidly and soon was in danger of exceeding the carrying capacity of the local environment. Fortunately, at this juncture, some of the people's trading partners to the south introduced them to maize, and soon they had learned to plant and grow this important crop along with beans, squash, and sunflowers. At first, crops were planted along the floodplain at the immediate margins of the river, but later gardens were extended farther across the plain to the south (Fig. III-4).

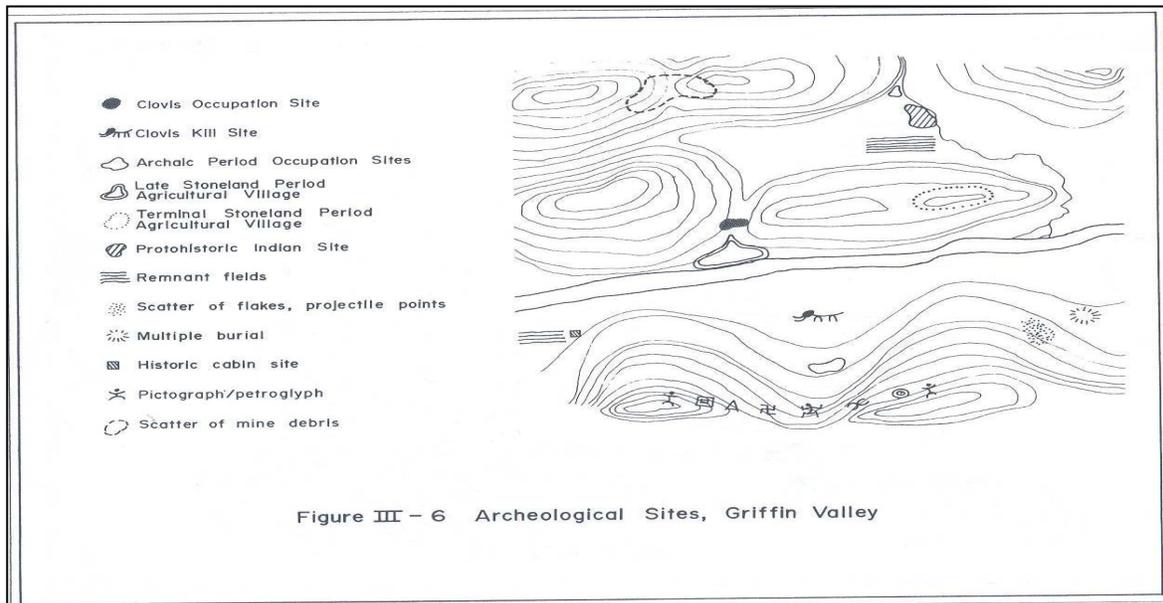


Population was now increasing elsewhere and strife inevitably followed as different groups sought to expand their territories. After being virtually wiped out twice by neighboring groups seeking their food supplies, the people of Griffin Valley reluctantly relocated their village to a less convenient but more defensible site: the crest of the ridge of hills east of the pass (Fig. III-4). Here they built a strong palisaded village. New fields were established along the north side of the hills and the small creek was diverted to irrigate them. In these times of stress, a religion developed that centered on arduous male initiation rites. Such rites prepared 10 to 12 year old boys for the rigorous, dangerous lives they would lead as men. At one point in the ritual, each boy was required to run silently to the crest of the mountains to the south, where his tutor (usually his mother's brother) awaited him. The tutor helped the boy assume a difficult position under one of the many overhanging rocks that topped the mountains, bending far over backward with his nose a few inches from the top of the overhang. With a hammerstone, the boy was then required to peck a small, cup-shaped depression in the roof of the overhang. The work had to be done in silence, and without food; it typically took 2 to 3 days, during which time the boy's tutor instructed him in the history and ethics of the tribe, and discussed what it meant to be a man. By the time the ordeal was over the boy was usually hallucinating; he was given paints and encouraged to illustrate his visions on any rock of his choosing.

In 1710 A.D., a French trapper brought the people their first iron tools and glass beads. In 1778 they were attacked, and their village was burned by a group of Seneca fleeing the decimation of their own homes by Continental troops. In 1780 a smallpox epidemic swept the community, leaving many dead. By this time the great palisaded village was no longer needed, and after the Seneca attack it had never been effectively rebuilt. The people now took up residence near their irrigated fields at the north edge of the valley. In 1820 the first white settler arrived, built a cabin and established a small farm on the south bank of the river. By 1850 the white population in the area was substantial, and settlers began to worry about the threat posed by the Indians. They petitioned the U.S. Government to rid them of the Indian peril, whereupon the Government obliged by creating a reservation to which the various scattered tribes would be relocated. Because the refugee occupants of Griffin Valley did not want to go, they were removed by force. Although one group broke away and fortified an area in the rocky slope south of the valley, they were promptly and easily overwhelmed by a troop of irregulars from the nearby town, massacred, and interred in a common grave. Once again the valley lay uninhabited. The Indians had been removed and its one white settler had abandoned his farm and fled to town during the period of unrest. It became part of a large and poorly defined cattle ranch, and no one lived there for a number of years. In 1872, a wandering miner reported finding gold in the mountains north of the valley. More than 5,000 would-be millionaires descended upon the scene of the strike, only to discover after less than a month that the gold discovery had been a hoax to divert attention from a real strike about 100 miles away. The site was immediately abandoned and promptly forgotten (Fig. III-5). In 1890 B. J. Griffin established a cattle ranch in the valley, and in 1895 sold out to A. R. Ford, who in 1890 built the house and barns that remain the ranch center today.

Eleven thousand years of human history in Griffin Valley have thus created a rich mosaic of archeological remains, shown in Figure III-6. One of the basic responsibilities of the Indeterminate State Historic Preservation Officer, in completing the comprehensive statewide survey required by Section 102 of the National Historic Preservation Act, is the identification of all these remains, and those of all other areas of the State, and nomination of those that appear eligible for the National Register of Historic Places. Should a Federal agency propose to undertake, assist, or permit an action that would modify the valley, it would be the agency's responsibility to identify such properties and determine their eligibility. What might these identifications involve?





First, we might imagine that the SHPO, like many of his or her counterparts, would try to accumulate all available data on known archeological sites in the vicinity. What data are available?

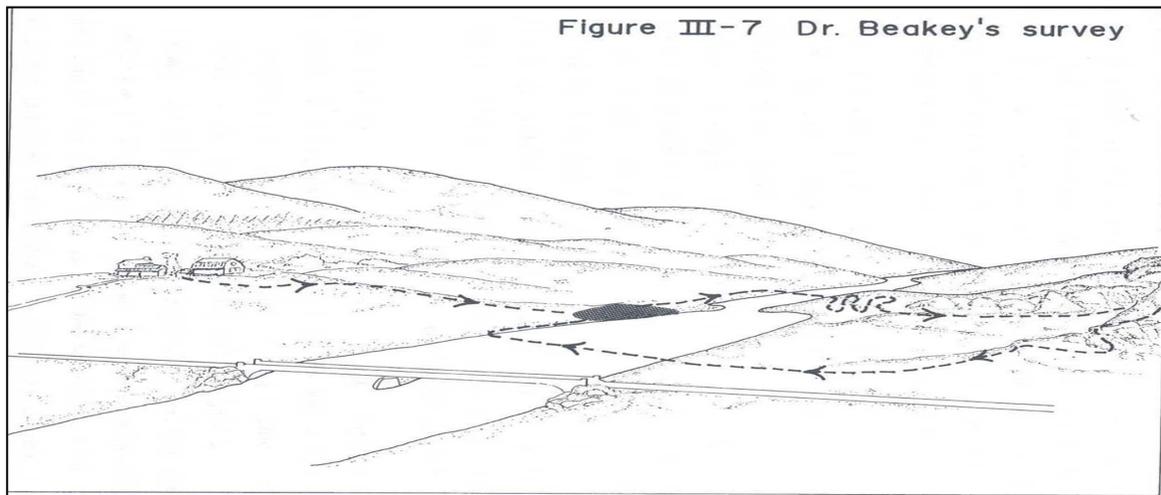
In 1932, hunters discovered elaborate polychrome paintings on certain protected overhangs in the rocky mountain south of the valley. In 1938, local enthusiasts persuaded Dr. Linford Beakey of Indeterminate University to view the pictographs. Dr. Beakey, at the direction of the locals, drove to the Ford Ranch and was warmly greeted. Mr. Ford showed Dr. Beakey the flint tools he had recovered from the field below the house. The party then walked down the hill, and Mr. Ford pointed out the spot from which the projectile points had come. Dr. Beakey noted the existence of an extensive Late Stoneland village site. Crossing the river at a low point slightly west of the site, the party crossed to the toe of the hills and began to climb. Although Dr. Beakey noticed a scatter of old glass and metal fragments at the foot of the hills, he did not make any record of this in his notebook; as a pre-historian, he had neither interest nor competence in the study of historic sites. At the crest of the ridge, Beakey photographed and sketched several polychrome panels, and pointed out to his associates that cup-shaped petroglyphs were also to be found on several overhangs; they had not noted these rather nondescript features, and were not especially impressed now. After an hour or so of inspecting the area, and eating an excellent picnic lunch, Dr. Beakey returned to the ranch house via the canyon east of the slope up which he had climbed. While so doing, with the sun's rays now slanting in low from the west, he noticed irregularities in the contours of the floodplain. These he thought might be field scars associated with the village site which had earlier attracted his attention. He made notes concerning this possibility, but could not see the ridges once he reached the floodplain. While looking for the field remnants, he failed to notice the bone fragments in the backdirt of gopher holes at the edge of the oak woods (Fig. III-7).

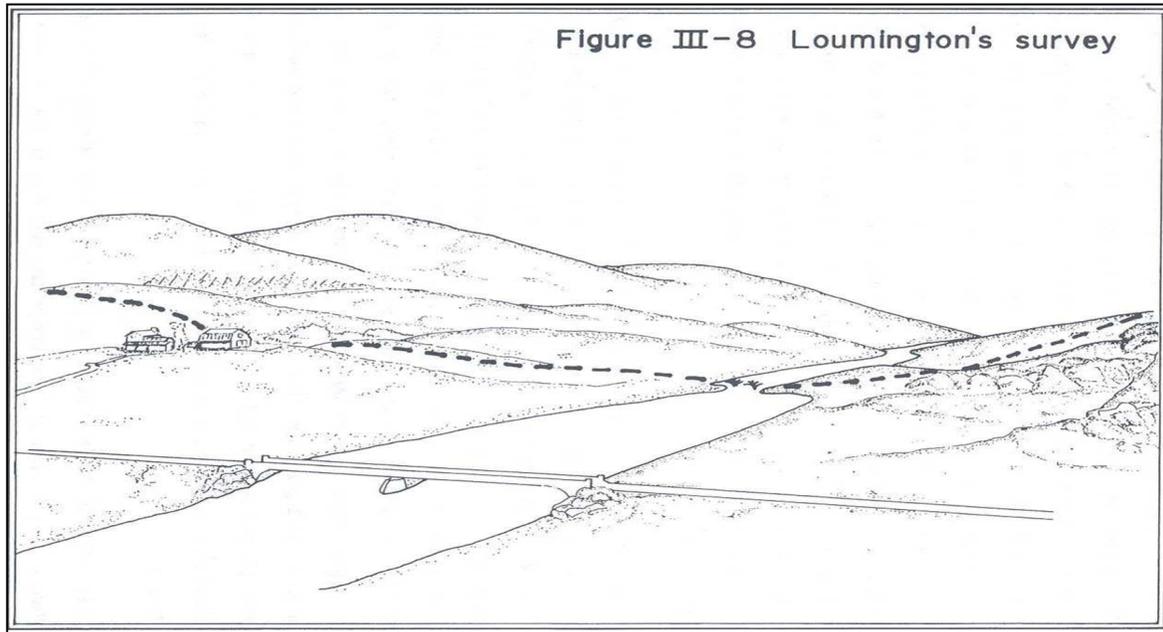
Returning to the university, Dr. Beakey typed a one-page site-survey form on the village site he had recorded, and another on the several examples of rock art. He placed these, together with his notes on the possible aboriginal field, in the university's archeological survey files. The files thus recorded that at least two prehistoric sites existed in Griffin Valley--a Late Stoneland village site and an unknown number of polychrome pictographs

and cupule petroglyphs--and that there might be some ancient field-scars. The files did not, however, record the presence of the settler's cabin site, which Beakey had noticed but had not found interesting enough to record, nor did they record the mammoth kill site which he had failed to note while concentrating on something else. Nor did they indicate the portions of the valley that he had inspected and those that he had not. They did not indicate how he had inspected the area, and they did not indicate what he had been looking for. From the files alone, it would be impossible to determine whether Dr. Beakey had simply walked across the valley on a sunny day in the pleasant company of some local hunters and ranchers--as indeed he had--or whether he had spent a month crawling over it on his hands and knees.

In 1965, the Indeterminate Highway Department proposed construction of an expressway through the valley from southeast to northwest. The project was eventually abandoned after a prolonged lawsuit by aroused local landowners, but during the planning of the project an archeological survey was conducted. While the enlightened and progressive IHD was unusual among highway agencies of the day in that it was willing to pay for surveys, it placed restrictions on its survey parties; they were not permitted to range beyond the already selected highway right-of-way, and no funds were provided for either preliminary background research or post-survey analysis and report preparation.

Constrained by a modest \$500 that had been allotted for the survey, only a brief surface inspection was possible. The Indeterminate University Anthropology Department detailed a young archeology graduate student, E. M. Loumington, to conduct the survey. Hiking down the southern mountains from the southeast, Loumington noted a peculiar, generally rectangular depression in the ground at the foot of the rocky slope. A very old, rusty and broken shovel blade was the only cultural evidence she noted in the vicinity of this depression. Concluding that it was a topsoil source used by the ranchers at some time, she proceeded with the survey without recording the discovery. Although she crossed the river east of the known Late Stoneland site and within clear view of it she disregarded the site because it was outside the highway right-of-way. Reaching the crest of the ridge she looked into the valley to see if Beaker's field scars were still visible. She discerned no evidence of cultivation because, in the light of the midday sun, telltale shadows did not reveal them. Continuing on, she crossed the north arm of the valley and climbed the northern mountains, noticing a light scatter of old tin cans and bottles but nothing of a prehistoric nature. Having been trained, like most North American archeologists, to equate archeology with prehistory, she ignored the historic trash, and recorded none of it (Fig. III-8).





Thus, Loumington's survey recorded nothing in Griffin Valley. Although she crossed the mass grave of the massacred Indians, she did not recognize it because, lacking background research, she did not know that such a thing might be expected. Restricted to the highway right-of-way, she passed close by the large palisaded village without finding it. Because of the time of day, she was unable to see the field scars. Her training as a pre-historian biased her against recognizing the remains of the abortive 1872 gold rush. Her report to the Highway Department indicated that the right-of-way had been surveyed, with negative results; maps and field notes were filed with the Indeterminate University Archeological Survey.

This, then, is the information available to the Indeterminate SHPO or a Federal project planner: two surveys have been done in the vicinity; one revealed the existence of a single Late Stoneland village site and some rock-art; the other revealed nothing. *This information is clearly insufficient as a basis for planning. It is worse than insufficient; it is patently misleading. It is, however, typical of the kind of "survey" information that is available for most portions of the country today. It is for this reason that making inventories based on available information in university, museum, organizational, or State files almost never provides a useful basis for planning.*

Having concluded that Griffin Valley must be surveyed, the Indeterminate SHPO must now decide how to survey it. There are several common approaches which yield results of varying quality⁶.

The Uncontrolled-Exclusive Survey

In an uncontrolled-exclusive survey, certain areas are excluded from inspection because it is believed that they will not contain archeological sites, and the decision to exclude such areas is made on the basis of uncontrolled--i.e., unverified--assumptions. One of the commonest uncontrolled assumptions used to structure archeological surveys is the assumption: "people always live near water." This is an intuitively attractive proposition, and it has led innumerable archeologists to walk carefully up and down stream-banks while excluding open plains, hilltops, mountainsides and other areas from consideration. There

are three general problems with this assumption. First, it is not true; second, it is vague; and third, even if it were true it would not be directly translatable into the statement "archeological sites are always near water."

People do not always live near water. If defense is a major consideration, it may be worth the trouble to carry and store water at an easily defended position rather than expose oneself near a lake or stream. Furthermore, what does "near" mean? Were the Clovis hunters in Griffin Valley camping "near" water when they carefully located their camp within sight and walking distance of the lake but not directly on it in order to avoid discouraging game? The question: "how near is near" is clearly important if one is to use this assumption as the basis for structuring a survey. The locations of water sources change: witness Griffin Valley, where the lake has dried up and the spring has closed, but archeological sites exist that represent human activities that related to these extinct water sources. Most important of all, perhaps, is the fact that human beings do more than just reside in an area, so they produce sites that are not "living" sites and hence are not necessarily oriented toward water sources. In Griffin Valley people have engaged in initiation rituals on top of mountains far from water; they have also fought a battle, been buried, and searched for gold in such places. An uncontrolled exclusive survey of Griffin Valley guided by the "near water" assumption would probably result in the identification of the first agricultural village, the historic refugee village, and the early seed-gathering camp; it might also result in the identification of the settler's cabin site if the surveyor were able to recognize and appreciate historic material. It would probably miss everything else.

The Controlled-Exclusive Survey

At the opposite end of the spectrum of survey efficiency is the controlled-exclusive survey. In such a survey, one has sufficient information on an area to make solid and defensible judgments about where archeological sites may and may not be. Taking Griffin Valley as an example:

1. If we knew there had been a pluvial lake, and could identify its shoreline elevation, and knew about hunter-gatherer hunting strategies, we would carefully search a band of territory around the shoreline, extending back into sheltered areas where camps might be located, and would probably find both the mammoth kill site and the Clovis camp.
2. If we knew the geological history of the area, and understood how to locate extinct springs and water sources, we might examine each such feature and find the early seed grinding village as well as the sites along the extant waterways.
3. If we knew that the area had experienced a period of population pressure and warfare in prehistory, and had data on the locations of other defensive sites of the period, we would explore the ridge tops and find the palisaded village.
4. If we knew about ethnographic accounts of initiation rituals, or had data on the distribution of rock-art sites from systematic sample surveys (see Chapter VII), we would realize the importance of checking the mountain tops.
5. If we had carefully studied the history of the area, we should at least have ideas about where the first settler's cabin, the Indian massacre, and the 1872 gold rush took place.

In each case, by knowing where sites are likely to be, we are able to direct our efforts to areas of high probability at the expense of those where such sites are not likely to occur. In order to do this with a reasonable assurance that we are not missing anything of substance, however, we must know our area very well and be able to demonstrate that our

assumptions are correct. This requires a solid understanding of background data on local history, prehistory, and the natural environment, a good grounding in anthropological, historical and geographical theory, from which projections can be made about the behavior of social groups in the particular area of interest, and firsthand data on a representative sample of the area's land surface. The best way to generate supportable assumptions that can serve as the basis for controlled-exclusive surveys is through the conduct of regional predictive surveys as discussed in Chapter VII.

It is sometimes assumed that after working for a long time in an area, an archeologist has automatically gained enough understanding of the area's archeology to undertake controlled-exclusive surveys. This assumption is very risky in the absence of some way to independently test and verify the archeologist's beliefs about where sites will be found. Such beliefs, when not rigorously tested, often become self-fulfilling prophecies. To return to the "near water" assumption for a moment: if one always looks for sites along streams, and never looks elsewhere, one is obviously going to find sites only along streams. However many years one spends finding sites along streams and never looking for them anywhere else, one will never prove that sites occur only along streams. Not all archeologists are particularly interested in testing their assumptions, nor should they necessarily be. If one is interested in conducting research only in types of sites that always occur along streams, there is clearly no reason to look elsewhere; it does not matter that other sites, of types irrelevant to one's research, exist elsewhere. For management purposes one cannot adopt this narrow focus; one must be concerned with identifying all types of properties that may be eligible for inclusion in the National Register. The fact that the longest-resident or most eminent archeologist in the area is not interested in some classes of sites does not necessarily mean that they are unimportant and hence ineligible for the National Register.

Non-Exclusive Survey

In a non-exclusive survey, no portion of the study area is excluded from inspection; coverage is complete. Coverage may be complete at a number of different levels of intensity, however, and the level of intensity will naturally affect the probability of identifying all archeological sites.

The most obvious distinction among non-exclusive survey types is that between non-exclusive surface survey and non-exclusive survey with subsurface exploration. In conducting a non-exclusive surface survey one simply inspects the surface of the ground wherever this surface is visible, with no substantial attempt to clear brush, turf, deadfall, leaves, or other material that may cover the surface and with no attempt to look beneath the surface beyond the inspection of rodent burrows, cut banks and other exposures that one comes upon by accident.

A non-exclusive survey with subsurface exploration involves some definite effort to expose obscured surface conditions and/or to monitor subsurface conditions in a planned fashion. Various methods for subsurface exploration will be discussed in the following chapter. Subsurface exploration may or may not be necessary in any given area, or in particular portions of an area. In planning a survey, thought should be given to what sorts of subsurface exploration may be necessary. In evaluating the results of a completed survey it is essential to be able to identify the extent and nature of subsurface exploration and to consider whether a failure to probe beneath the surface, or to have an adequate distribution of subsurface tests, may have resulted in a major failure to identify archeological sites.

Another major distinction is between non-exclusive survey with background research and non-exclusive survey without background research. Background study of environmental data, historical sources and ethnographies will generally result in special attention being given to particular portions of the study area where special types of sites are expected to occur, and may result in the employment of special detection techniques in such portions of the area. In the absence of such research, one would presumably employ uniform inspection techniques throughout the study area insofar as possible.

A third distinction is between non-exclusive deployed survey and nonexclusive gang survey. In the former type, field crew members are deployed over the landscape in accordance with some kind of plan (discussed in Chapter IV), to ensure essentially total inspection of the land surface. In a survey with subsurface exploration, subsurface tests would be deployed. In a gang survey, the field crew moves through the area as a group or gang, spreading out informally in some places, bunching up in others, splitting and segmenting to check spots on either side.

Finally, we can distinguish between non-exclusive comprehensive survey and non-exclusive special-purpose survey. The former obviously means that one surveys in order to find all the types of archeological sites present in the study area; the latter means that one surveys in order to identify some particular class of sites.

It is easy to say that for planning purposes in the absence of sufficient data to conduct a controlled exclusive survey, one should always conduct *a non-exclusive comprehensive deployed survey with background research and subsurface testing*. As a general rule this is true. In particular circumstances, however, each of the types of survey described above may be appropriate or necessary. In many areas, particularly in the arid to semiarid West, the land surface is sufficiently well exposed, and soil formation is sufficiently slow, to permit the assumption that all identifiable archeological sites can be found through surface inspection alone. Some areas may be so completely lacking in relevant documentary data that attempts at background research become exercises in futility. Under some environmental conditions (e.g., in narrow canyons or very thick brush) it may be impossible, overly hazardous, or simply unnecessary to deploy one's crew. If all the prehistoric sites in an area have already been identified, a comprehensive survey would clearly be wasteful and a special-purpose historic-site survey would be appropriate. Thus, the exact type of survey undertaken will vary with the nature of the study area, and the techniques to be employed may vary substantially from place to place within the study area. Non-exclusive comprehensive deployed survey with background research and subsurface exploration is an ideal; while it is perfectly expectable that this ideal sometimes cannot and need not be attained, *it is important for the surveyor, and the surveyor's sponsor or client, to understand and fully report deviations from the ideal (see Chapter V)*.

Chapter IV: Basic Archeological Site Survey Methods

This chapter will discuss the essential operations involved in conducting an archeological survey. In general, the discussion will focus on how to conduct a non-exclusive comprehensive deployed survey with background research and subsurface exploration, but in doing so a number of variants and special approaches will also be considered.

Bias Control and Research Design

Archeologists are not super-people. Like any other member of the human race, an archeologist's perceptions of the universe are influenced by training, interest, and values. If

a survey is to be truly comprehensive, the biases of the surveyors must be taken into account and a balance must be maintained. Some perceptual failings are obvious: one should not employ a color-blind archeologist to look for multi-color pictographs, and an archeologist trained only in prehistory should not be expected to locate and identify with accuracy many kinds of recent historic sites without assistance. Other biases are less immediately apparent and may not be recognized, or acknowledged, by the archeologist. An archeologist whose experience has been limited to sites that are indicated by surface concentrations of pottery may miss the surface of another type of site. He or she must, in a sense, recalibrate his or her perceptions. Normally, the most sensitive biases are those that relate to the research interests of the archeologist. Cases have been reported in which archeologists have recorded numerous occupation sites without ever noticing associated petroglyphs and pictographs (cf. King 1975:88). It is probable that the archeologists, whose research interests involved the study of culture-history and environmental adaptation through the excavation of occupation sites, simply kept their eyes focused on the ground rather than on the rock outcrops. Similarly, it is quite common for archeologists whose primary interests are in the reconstruction of culture-history through the study of deeply stratified sites to ignore small, shallow, or disturbed sites as "insignificant." In fact, as Talmage and Chesler (1977) have shown, such sites can and often do contain important data. Even if in a given instance they do not, it is putting the cart before the horse if one fails to record them. A survey should identify all the sites that can be found using a reasonably efficient search procedure; evaluation for National Register eligibility is a second, separate step to be applied systematically to all discovered properties (cf. OAH 1977⁷). *one of the most difficult problems facing the planner or administrator who contracts for archeological services lies in recognizing whether the archeologist has allowed his biases to narrowly determine what will be recorded. For this reason it is essential that archeologists clearly set forth their assumptions about significance prior to undertaking the survey, and justify each conclusion about the significance or insignificance of sites.*

Obviously, there is a point beyond which evidence of past human activity is too inconsequential to be noted or too nebulous to detect without inordinate expenditures of time and money. Where this point is perceived to lie will vary from archeologist to archeologist, team member to team member, and between archeologists and practitioners of other disciplines. The purpose of bias control is to reach a conclusion, understood by all concerned, about what will be regarded as important enough to search for and record, and to specify this conclusion for future reference. Bias control requires basic self-examination: the recognition of one's own interests, training and abilities, and comparing them with those likely to be necessary for the comprehensive identification of the area's resources. Where "blind spots" are recognized, survey team composition should be altered to eliminate them. If a reasonable attempt is made at bias control, there is no need to be greatly concerned about finding a single investigator with personal expertise in all anticipated aspects of the survey.

There are two catches in all this. First, if one is influenced by unrecognized bias, one by definition cannot recognize it. Second, if one is to compare what can be perceived with what may actually exist, there must be some idea about what sorts of sites the study area is likely to contain. Treating the second problem in detail is the function of background research, but both problems can partly be resolved through proper research design and review. Ideally, every State historic preservation plan should include a design or (more likely) a set of designs to guide archeological survey and the evaluation of archeological

sites. The design should be formulated and reviewed periodically by archeologists (and others) concerned with study of the State's archeological resources. It should be a collective effort that reflects the varied perceptions of a broad cross-section of the archeological community. In addition, the design should identify the basic types of sites that are likely to be of value for different research (or other) purposes, and the types of experience, training, and special expertise that may be necessary to locate and evaluate them. Any given survey, or at least any survey of substantial scale, should then be planned with reference to the general design or designs. Finally, the survey plan should be reviewed by several other archeologists before the project is initiated. Even in the absence of a general set of research designs for the State, the formulation of an explicit survey plan and its review by others will go a long way toward controlling bias and ensuring an organized approach to the study.

Background Research

Background documentary study may yield information on the specific locations of particular archeological sites, but this is not its most important purpose. The major function of background research is to allow the development of expectations about:

- A. What kinds of sites may be expected in the study area?
- B. What environmental, social, and historical factors may have influenced their distribution, and hence in what sorts of locations can they be-expected?
- C. What will they look like if and when they are found?
- D. What cultural processes and patterns do they reflect, and hence what is their possible significance for research?
- E. What other social or cultural values may be attributed to them above and beyond their research value?
- F. What special kinds of expertise, or special methods, may be required to locate, identify and evaluate them?

Background research requires the examination of many kinds of data sources, for example: 1) prehistoric groups may have responded to environments that no longer exist (e.g., the pluvial lake in Griffin Valley). As a result, knowledge of the area's geography, geology, and possible paleoenvironments is important in predicting where prehistoric sites may occur; 2) historic settlements may have been located or abandoned in response to particular historic events (e.g., the Indian "uprising" in Griffin Valley), along particular transportation corridors, or as a result of technological developments (e.g., the automobile) or large-scale patterns of social change (e.g., the immigration of Eastern Europeans). Data on historic patterns of land-use, economic change, social interaction and technological innovation are therefore important in predicting where historic sites will occur, what they will look like, and what their associations will be with the broad patterns of regional and national history.

The most general kind of background research needed for a survey project is the development of a grounding in pertinent anthropological theory. Because archeological sites are primarily valuable for the data they contain, for the surveyor to evaluate such sites he must understand how the data can be used to advance our understanding of the past. A comprehensive survey requires comprehensive understanding; the surveyor must be at least generally familiar with all types of research problems that might be addressed using the types of sites that may occur in the area. Again, such research problems are most

efficiently formulated at the level of the State historic preservation plan, but the individual leader of a survey program needs to be sufficiently familiar with them to make defensible judgments about the importance or unimportance of the sites that will be recorded.

Assuming that one is grounded in the theory appropriate to understanding the history and prehistory of the area, where does one go for area-specific background data? Experienced surveyors will develop a variety of sources in the course of their work, most of which may be peculiar to the area under study, but for those beginning in archeological survey some generally useful sources can be recommended.

For data on present and previous environments, in addition to published material in the geological, geographic, and ecological literature, one can often find unpublished studies in local university and college geography, geology, or botany departments and in county and regional planning offices. The Bureau of Land Management and the Forest Service conduct studies and compile data on past and present conditions of land under their jurisdiction. Soil Conservation Service⁸ District Offices will have detailed studies of soils from which previous environments can be reconstructed. Commercially available aerial and satellite imagery can be used to identify the distribution of present plant communities and, in some cases, to detect evidence of previous environmental conditions. For detailed discussion of the uses of such imagery see Lyons 1976.

For data on local history, published county and town histories and historical atlases provide good starting points but are seldom adequate in themselves. Academic social and economic histories may be important for establishing general patterns of social change. Most communities have historical societies or museums that maintain old maps, diaries, journals, newspapers, and similar sources of primary data. Because utilizing such sources can be a massive undertaking, one must have some definite plan in mind at the outset. *It is important to remember that one need not be concerned with everything that happened in the study area, but only with those things that might be directly or indirectly reflected in or on the ground.* On the other hand, even the most simple anecdotal accounts of life in an area may reveal important social changes, and may contain clues to locations where specific activities or events occurred. There is no escaping the fact that for any area with a substantial post-contact history, a complex history of environmental change, or a considerable body of pertinent historic, archeological, or anthropological literature, background documentary research is likely to be a complex and lengthy operation. A common weakness of archeological survey projects is the archeologist's failure to budget sufficient time and funds for such work.

It must also be recognized that not all social groups have equal representation in the written record. Published histories, in the past at least, have tended to emphasize the activities of society's dominant segments, and the generally higher literacy rate among members of the upper class means that they tended to be better represented in the documentary record as well. Often the only sources of data on less dominant social groups are oral, i.e., the first-hand accounts of the descendants of such groups. A systematic program to interview such people may be necessary to gain a full understanding of the area's social history and to identify possible sites of importance to the various segments of the community.

In the course of historical research and interviews, it is important to try to identify any types of non-archeological significance that may have accrued to sites in the study area. In Griffin Valley, for example, one might expect that the descendants of the local Indians would feel strongly about the sites of their last battle and mass grave. Their feelings would

define a critical element of significance for the sites and could also indicate that representatives of the Indian community should be involved in the survey. The background research might also indicate that some properties in the area possess architectural value, require extensive historical documentation, or are integral to the ambience of the community. As a result the composition of the survey team might include architectural historians, historians, urban geographers, anthropologists, or sociologists.

A basic understanding of the available ethnographic and archeological literature on the area is vital to the success of the survey. One need not necessarily know everything there is to know about local ethnographic groups and culture-historical sequences, but one does need to know what, if anything, can be said about local settlement patterns, patterns of social interaction, economic practices, and archeological site-types.

Background documentary research is an essential part of any survey program, but unless it reveals that the area has been subjected to highly intensive archeological survey, or that archeological sites could not exist there, it cannot eliminate the need for some type of inspection in the field. A documentary record that is really representative of all social groups, activities, and time periods in the history of an area would be a great rarity. But such a record would still require field verification because people do not always do what they say they have done. Further, the memory of historic and ethnographic informants may be incomplete or subject to unintentional bias. The archeological record in and on the ground represents a vital and independent source of data on any area's history, and a variety of methods can be used in seeking it out.

Remote Sensing

"Remote sensing" is the name given to a rapidly growing set of technologies that permit one to identify things at a distance. As a prelude or adjunct to on-the-ground field work, remote sensing can be of considerable value to the survey archeologist. The term actually applies both to methods used to identify things on the ground from a distance and to methods used to identify things in the ground from the surface.

Before fieldwork begins, or concurrent with fieldwork various forms of aerial remote sensing may be of considerable value, especially when large areas are involved. As noted above aerial and satellite imagery can be valuable as a basis for environmental reconstruction. More directly, it is possible to identify archeological sites from the air under certain circumstances. In Griffin Valley, Dr. Beakey employed a simple form of remote sensing when he caught a glimpse of the field scars on the valley floor in the slanting rays of the setting sun. Aerial photography, under differing conditions of light and vegetation, can similarly reveal phenomena invisible on the ground. More sophisticated types of sensing, such as aerial magnetometry, multispectral imaging, airborne television, thermal infrared scanning, and radar are also being employed experimentally in archeology. For detailed information on remote sensing see Lyons 1976⁹.

Fieldwork

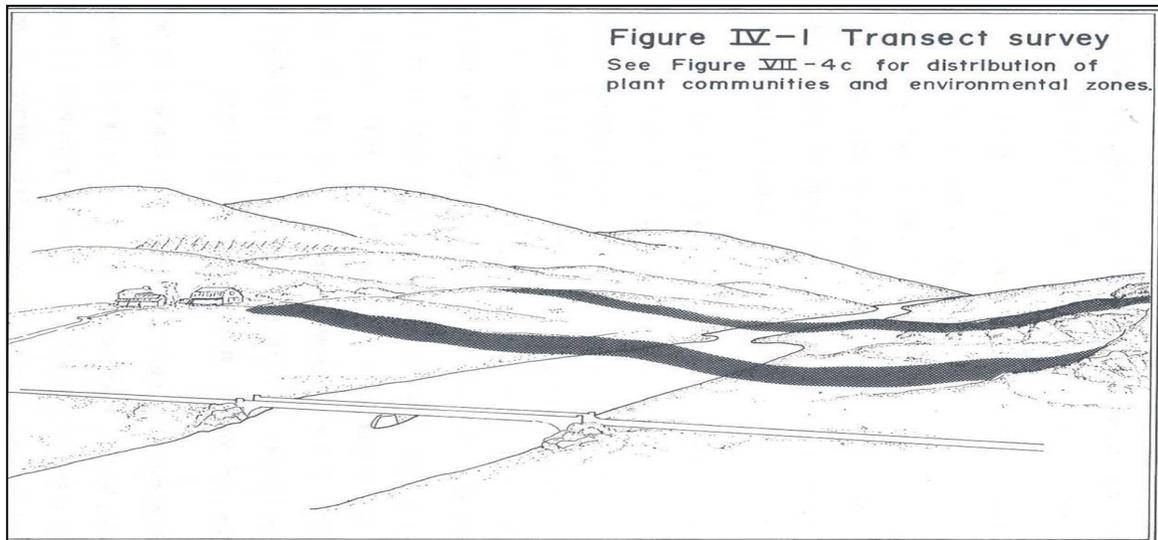
Eventually, any archeological survey must get down on, and sometimes into, the ground to look for sites. The exact methods of search in any given case are dictated by the nature of the local environment and the intensity of survey required for the kind of planning being done. Five basic points should be kept in mind in planning fieldwork:

1. *The fieldwork should make maximum use of background information.*

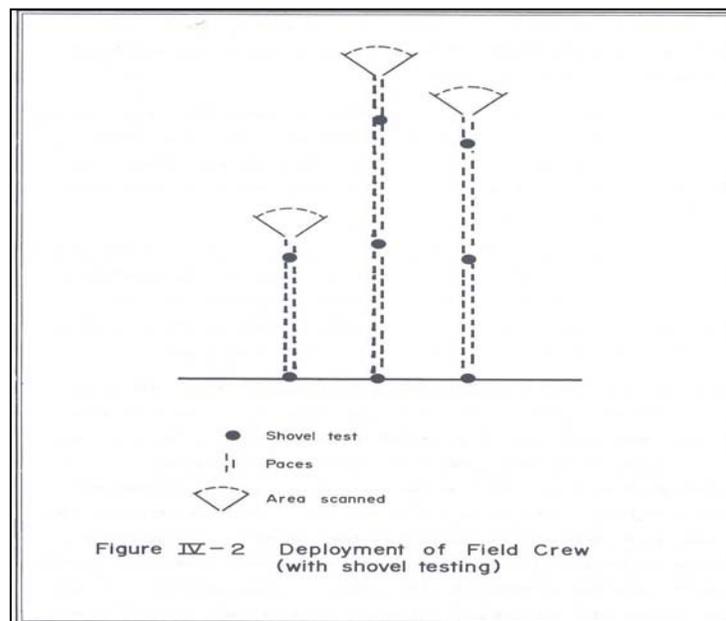
2. *The field team should include persons trained to recognize all the types of archeological phenomena that are likely to occur.*
3. *It is often most effective to conduct the fieldwork in several stages of increasing intensity.*
4. *Field methods should be planned carefully to allow for environmental diversity.*
5. *Within reason, all ground surfaces should be inspected and subsurface exploration should be done if the surface is obscured or if buried sites are thought to be present¹⁰.*

To illustrate these points, we will return to Griffin Valley, and assume that we have done enough background research to know (a) the general outline of the area's history and (b) the results of the Beakey and Loumington surveys. For an area of this size and complexity, a multi-stage approach to fieldwork is appropriate. The first stage involves consolidating and verifying the knowledge we have gained from background study, while familiarizing ourselves with the character of the valley. Knowing of Beakey's discoveries, we immediately set out to verify them and determine their present condition. We might try to round out the documentation on them in sufficient detail to form the basis for a determination of eligibility for the National Register, but more likely we will wait to do this until the survey is further advanced and we are more familiar with the comparative context in which the sites should be recorded. Because our background research has indicated the general locations of the Indian massacre and the 1872 gold rush, we initiate a cursory inspection of these locations too. We are aware of Loumington's work, but having an idea of the constraints under which she worked we do not have much confidence in her results. We begin the fieldwork with four small-scale cursory inspections of various parts of the study area, which of course require us to drive or walk through the area in general, getting a feel for it. At the same time, a flight is made over the area in a light plane, to develop a further acquaintance with it and to observe directly the field scars first noted by Beakey and subsequently seen on aerial photographs obtained from the Soil Conservation Service.

We know from our background review of soil maps that soil conditions suggest the previous existence of a lake, but no one has established the elevation of its shoreline. In consultation with a geomorphologist, we initiate as a second phase of survey two walking transects across the southern arm of the valley designed to seek out the old shoreline while verifying the locations of plant communities identified from remote sensing data (Figure IV-1). Team members are deployed about 50 feet apart. We make no pretense of seeking full ground coverage at this stage but are still seeking a general characterization of the area's key attributes. Thus deployed the team, including the geomorphologist, makes its two sweeps across the valley. In the process we discover the old village site at the closed spring but miss the mammoth kill because of the wide spacing of team members and the low visibility of the site (represented on the surface only by bone fragments in gopher runs). We fail to identify the old shoreline but do get a good idea of the distribution of plant communities.



Because we are planning to cover the entire area without exclusions, we need not be concerned with sampling (see Chapter VII) and spend no more time on preliminaries. We must, however, design a fieldwork strategy that takes account of the valley's environmental diversity. The team consists of six people: a prehistoric archeologist, a historical archeologist, two experienced students, and two experienced members of the local avocational archeological society. They have discussed the results of the background research and preliminary fieldwork in detail and know what sorts of prehistoric and historic sites are likely to occur. We form two teams of three persons each, and first attack the grasslands along the river. Because the ground surface is badly obscured by turf, subsurface exploration is necessary. To be certain that we cover the ground as thoroughly as possible, team members are deployed only 20 feet apart. Each is armed with a small shovel. Each moves forward 20 paces, scans the ground all around, then digs a small hole, clears the sod and penetrates perhaps a foot into the ground in search of flakes, pottery, artifacts, or other indicators of past human activity. When the shovel-test is completed the hole is refilled and the team member moves on another 20 paces (see Figure IV-2).



The shovel-testing described is a slow, expensive, frustrating, and often marginally effective way to locate archeological sites. Small phenomena can still escape notice. Further, the technique tends to discourage team members from closely inspecting their surroundings and forces them instead to concentrate on pacing and digging. In addition, it probably creates a mental set that is less than effective as a stimulus to discovery.

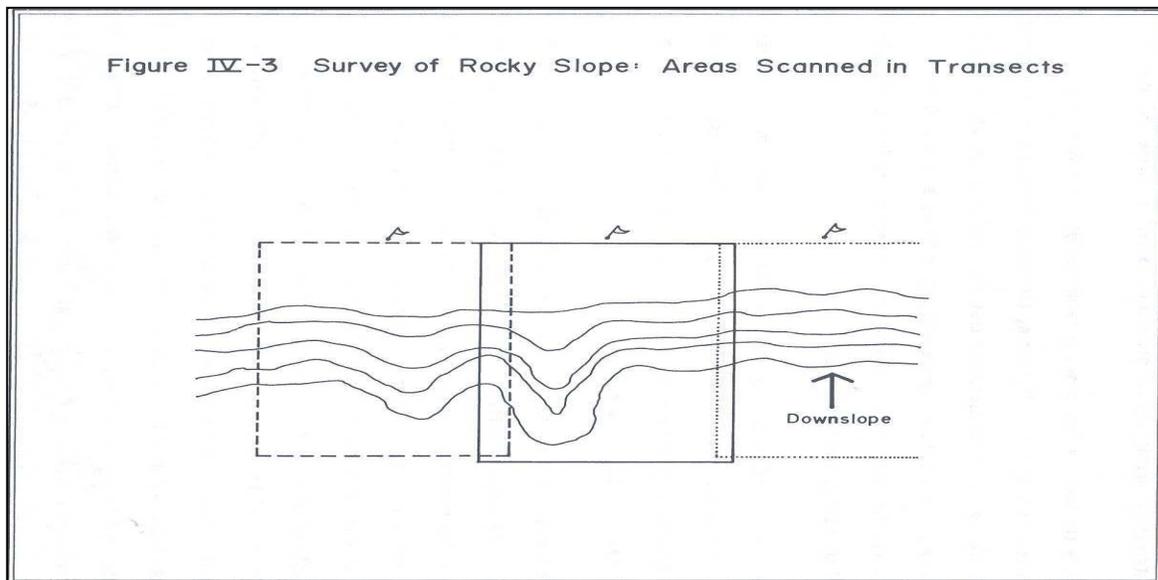
Many other methods of subsurface exploration have been and are being used by different investigators; they include the use of power and hand-driven posthole diggers, backhoes, tractor-drawn plows, road graders, hand-driven and powered cultivators, and such sophisticated remote sensing devices as ground-penetrating radar and resistively monitoring (see Lyons 1977 for detailed discussion of remote sensing methods). Many of these techniques are obviously rather destructive, both of archeological sites and of the natural environment, and the mechanized and remote sensing techniques are fairly expensive. Consequently, shovel-testing remains the most widely used technique for basic subsurface exploration while experimentation with other techniques must continue toward further refinement.

Having surveyed the grasslands (hopefully with the location of all the sites there) we can proceed to the chaparral zone on the south slope of the central hills. Here the ground is barren of grass, there is little soil development, and subsurface exploration is not necessary. On the other hand, the survey is made more difficult by the chaparral itself; crew members are now deployed only 10 to 15 feet apart and must move through the dense brush on hands and knees.

Moving to the crest of the hills, where there is little grass and no brush, we can spread out to about 30-foot separations and need not undertake shovel testing. We sweep rapidly east along the south side of the crest, record the palisaded village site, turn and sweep back to the west along the north side of the crest.

The oak and pinon forests offer special challenges; in each case the ground is obscured by leaves and needles. Here crew members are deployed about 20 feet apart and a variant on shovel testing is employed. Armed with a rake, each team member walks 20 paces, clears a portion of the surface, inspects it, then rakes the leaves or needles back into place. Finally only the rocky slopes remain uninvestigated. Because it is easy to lose track of direction, miss areas, and repeatedly inspect the same area under such conditions, a series of control stakes with colored flags is established in the grasslands below the base of the slopes. Deployed about 20 feet apart team members begin at the first stake and follow a compass bearing to the top of the rocky slope. Reaching the top the team moves over until the reverse of their original bearing brings them down on the second stake, then works its way down. Moving to the third stake, the sequence is repeated. The stakes are positioned about 50 feet apart, so that with a three-person crew, there is a small overlap between transects (Fig. IV-3). No shovel-testing is necessary here, but the survey is very time-consuming because of the need to explore the complex rock outcrops for petroglyphs and pictographs as well as occupation sites.

While the basic surface survey is being completed, one small team undertakes a special study. During the cursory inspection at the beginning of the survey, it was discovered that the vicinity of the Late Stoneland village site had changed considerably since Beakey's visit. In fact, because the area had been converted in 1968 into a feed lot, no evidence of the village could be seen at all.



To create a stable, level surface, Mr. Ford had graded down the low pass to the north and dumped fill along the riverbank. Where Beakey reported a Late Stoneland village site we find, to our astonishment, a scatter of flakes, core tools, and fragmentary Clovis points. To reconstruct what happened, and to determine the present condition of the Late Stoneland village site, detailed subsurface testing is necessary¹¹. For this purpose a backhoe is used to cut a series of carefully controlled trenches along the riverbank. These trenches reveal a dense deposit of refuse containing Late Stoneland potsherds and projectile points at a depth of six to seven feet (2 m.). Minor cuts are then made elsewhere in the feed lot (and promptly re-filled) to define the north, west, and east boundaries of the site and to determine whether its burial in 1968 has badly disturbed it. At the same time, an intensive search is made of the feed lot to locate Clovis artifacts and waste material. Although obviously removed from their original context, the Clovis material at least documents the occupation of the area during Clovis times, and the types of artifacts and waste material present provide clues as to what the Clovis people were doing there. Mr. Ford and his workmen are interviewed to determine exactly where the material came from that was dumped on the riverbank and to make certain that none of it was hauled in from distant sources. The source of the fill is closely examined and subsurface tests are made to determine whether any remnant of the Clovis site remains in its original setting.

With the completion of the surface survey, the testing, the special study, and the detailed recording of sites, we are ready to prepare a definitive report on Griffin Valley's archeological resources. No one should interpret our presentation of techniques applicable to Griffin Valley as a prescription for proper survey fieldwork; it is merely exemplary. What is important is that in Griffin Valley (a) *we have made maximum use of our background information*; (b) *the survey team drew upon specialists trained to recognize the particular phenomena likely to be present*; (c) *the fieldwork was conducted in several stages of increasing intensity*; (d) *methods of inspection were carefully planned to allow for environmental diversity*, and (e) *within reason, all ground surfaces were inspected, with subsurface testing being done where the surface was obscured and where buried sites were thought to be present*.

The caveat about surface inspection: "within reason," deserves some special attention. In some cases it is perfectly reasonable not to inspect the surface in detail. For example, slopes too steep for occupation, without rocks for rock art, and without caves or shelters or

other attractants to or evidence of human activity are often and properly not subjected to detailed inspection. If a floodplain is covered with 20 feet of alluvium accumulated during the last 50 years, and a construction project being surveyed will disturb the ground only to a depth of five feet, it is clear that neither inspection of the surface nor subsurface exploration is necessary. If an area has been so badly disturbed that a site would not likely have survived, no inspection--or only cursory inspection to verify the disturbance--may be necessary. The determination that disturbance has been total, however, must be made by someone knowledgeable about local site types. In the case of the Griffin Valley Clovis site, even to know that a site once existed, and to have a collection of disaggregated material from it, may be vital to understanding the area's history. The exercise of professional judgment and experimentation with techniques are entirely appropriate in the development and modification of survey strategies, as long as a good-faith effort is made to fulfill the basic purpose of comprehensive survey--the identification of all significant historic properties in the study area.

Field strategies, alterations in such strategies, and the justification for alterations should be carefully recorded and reported so that the context in which one's results were produced can be judged and so that later surveyors will be able to understand what has already been done. Recording methods will be discussed in Chapter VI. But first, certain special kinds of surveys must be considered.

Chapter V.: Special Types of Survey

Thus far we have discussed a relatively traditional, straightforward type of archeological survey: the search for sites in a fairly large, open area. Some variants on this theme require consideration.

Small Area Surveys

Although the rather elaborate, multi-stage methods appropriate to a large area like Griffin Valley are obviously excessive for the survey of small areas such as small housing tracts, sewage treatment plant sites, and stock pond sites, the general principles upon which they are based still apply. One needs to understand and control one's biases, do enough background research to know what to expect in the survey area, inspect the area systematically, and report carefully on what one does. It is usually not cost or results effective to develop complex research designs for small-area surveys or to engage in extensive background research. Ideally these surveys should be done with reference to a larger region of which the small survey area is part. In such instances the existence of organized archeological groups in a region can be of great importance. If the archeologists in a region can agree on a common set of research problems and procedures, can compile and share background data and establish uniform methods for conducting field survey (assuming that these are consistent with the State historic preservation plan and Federal regulations) the conduct of small area surveys should be relatively simple and orderly. At this point statewide planning can play an important role. If the SHPO has reason to believe that many small-area surveys will be required in a given region, survey and planning funds may be used to sponsor the development of research designs and compilations of background data pertinent to the region and to assist the region's archeologists in the development of procedures.

Surveys in Urban Areas

Surveys in urban areas obviously present problems not encountered in Griffin Valley. Sites are buried not only under the ground but under pavement and buildings as well. While it is impossible to make judgements about subsurface conditions from surface indications, it is difficult, disruptive, costly, and often impossible to undertake subsurface testing.

It is a mistake to assume that the mere fact of urbanization means that no archeological sites can possibly survive. Commonly cities have developed in areas where prehistoric populations were also concentrated (cf. Benchley 1976), and the development of a city itself leaves an archeological record that is of great value to understanding the processes contributing to and affecting its growth (cf. Biddle & Hudson 1973). The survival of archeological sites in an urban environment depends on the construction history of the city itself. If extensive filling has taken place, or if buildings have been constructed on shallow foundations, preservation of subsurface remains may be quite good. But if the history of city development has involved a great deal of deep-basement construction in areas that have not been deeply covered with fill, subsurface deposits may be completely disrupted.

Background research is of crucial importance in an urban survey. If there is some basis for predicting the distribution of prehistoric sites relative to their natural environment, the pre-urban environment of the city area can be reconstructed and one can then make reasonably educated guesses about where prehistoric sites will occur. In the plains bordering the south end of San Francisco Bay, for example, prehistoric sites often occur around the margins of old marshes and on fingers of land extending out into marshes. In the city of San Jose, California, built in part over drained marshes, it is possible to identify the old marsh boundaries from the modern distribution of different soil types. Most prehistoric sites thus far discovered in the city have been found along these boundaries (King & Berg 1974). While such a prediction of site distributions cannot be accepted without testing, in most cases it should be possible to test the predictions in rural zones and apply them in the urban areas where testing would be much more expensive and less likely to be successful.

Background research is even more important for urban historical archeology; a detailed study of old city maps, assessor's records, photographs and other illustrations, and written accounts should make it possible to plot the locations of previous buildings, streets, and areas of special activities. In dealing with industrial sites, knowledge of engineering principles and practices of the period under study is vital to the identification and interpretation of sites and features (cf. Rutsch et al, 1975). Information on the social history of the community or neighborhood being surveyed is essential to the evaluation of its buildings and sites. In recognition of this fact, urban archeologists are increasingly cooperating with social anthropologists, ethnohistorians, folklorists, and sociologists in studies that combine archeology with oral history, documentary research, and ethnography. (cf. Schuyler 1974, 1977).

Background research should also make it possible to sort out the developmental history of the city, distinguishing those areas that have been filled and/or built over only by light construction from those whose early subsurfaces have been subjected to extreme impacts (cf. Biddle and Hudson 1973).

With such information in hand, it should be possible to design a careful subsurface testing program that is concentrated on those locations where historic or prehistoric sites are most likely to have been and to have survived. At such a location there is almost always someplace to conduct subsurface testing. Because a mass of rubble is commonly encountered in such testing operations, and time is often short, backhoes and other mechanized tools are often used. Rutsch (in Rutsch et al, 1975) provides a good

description of the problems often encountered, and the techniques employed, in urban subsurface archeology.

Even with substantial background research and adequate subsurface testing, it remains a fact that the definition of archeological sites in an urban survey is almost always less precise than is the case in rural areas. This element of chance is a part of any urban archeological research and must be expected in surveys done for planning purposes. Interagency Archeological Services will provide more specific data on urban surveys in the near future¹².

Surveys of Buildings and Structures

So far we have treated archeological surveys as though they were exclusively concerned with sites lacking substantial structural remains. Obviously many areas surveyed do contain prominent structures, such as pueblos in the Southwest, and many recent standing structures can yield data that are important to archeologists. For example, a building in essence is a complex artifact, created and modified by people for economic, social, and cultural purposes. It is shaped by these purposes and is reflective of them. The original organization of a building reflects the builder's or architect's perceptions of how space should be organized for specific purposes that were important at the time of construction. Changes in its organization through time may reveal how purposes and perceptions have changed. Material left in a building, like the material left by the occupants of any archeological site, can reflect the activities and concerns of the building's occupants or users. All can be fruitful subjects for archeological study (see OAHF 1977, Appendix I).

It is possible to get carried away with the archeological value of buildings. Reduced to absurdity, one could argue that every building is an archeological property, and that a survey should be conducted every time anyone contemplated adding or stripping wallpaper. Such an argument would serve no useful purpose. Professional judgment must be exercised in deciding whether a given building contains sufficient information of sufficient value, to make it worthy of detailed study. In Griffin Valley, for example, the Ford house is one of the finest examples of Victorian residential architecture in the State. As such it undoubtedly qualifies for inclusion in the National Register on its architectural merits. But it has been kept very tidy over the years; all trash has been removed from the premises, no graffiti decorate the walls, paint and wallpaper have regularly been stripped and replaced. As a result, the house can yield little archeological data because little is left to record changing styles, uses of space, size and organization of the residential unit, and so on. Thus, study of the house can add little to the history of the area and can be considered to have no archeological value. Because its yard and outbuildings have been maintained in a similar fashion, they are also of little archeological value. There are only two potentially valuable features of the farmstead from an archeological standpoint. One is an abandoned well behind the barn. Household trash was discarded on and near the well between 1895 and 1927, at which time a municipal dump was established and the Fords began hauling their trash to it. The well contains a discretely stratified sequence of material representing the family's economic ties, its food, drink, and medicine consumption, and preferences in disposable merchandise during the first 32 years of the ranch's existence.

Excavation of the well could provide valuable insights into how people lived and into the dynamics of the ranch's growth during the period. If it is likely that useful research questions could be asked about such topics, the well is a legitimate archeological site and worthy of recording.

A second feature, or series of features, is represented today by shallow depressions marked in early spring by lush growths of native grass of a uniform rectangular shape and size. These phenomena indicate the precise locations of simple one or two-hole outdoor privies erected for the families who successively occupied the old Ford House. Owing to the private nature of the privies and the daily function they served, objects such as medicine and liquor bottles, tobacco smoking paraphernalia, watches and other artifacts can be expected to be found among their contents where they have long remained undisturbed. Wilson's report on privy excavations at Fort Union, New Mexico (1965) exemplifies the archeological value of such in-depth studies.

For detailed examples of archeological studies concerned with the research value of historic buildings and structures see Hickman 1977 a and 1977 b and Levine & Mobley, 1976.

Chapter VI: Recording and Reporting

As discussed earlier, one of the significant deficiencies of the data on file about Griffin Valley prior to our survey was the fact that there was no way to determine how they were gathered. We knew from Beakey's survey that there were at least two sites in the valley, but we had no way of knowing whether his survey had been so detailed as to eliminate the likelihood that there were additional sites or whether, as in fact was the case, he had merely informally visited two sites and recorded them. In recording and reporting an archeological survey it is vital to avoid this deficiency. This requires following a simple rule: *Report exactly what was done and why, and identify any uncertainties.*

Reporting the Research Design and Plan

An archeological survey report should describe the research design that guided the work, including operational definitions as to what was worth recording. Reasons for selecting the design should be discussed. For small projects, reference to a readily available regional or statewide design should be sufficient. The report should also discuss how the research design was translated into an actual survey plan--i.e., what the design meant to the archeologist in the field.

Reporting Survey Methods

Early in any survey report, the methods employed in both background research and field work should be discussed. In many cases these may be separated into "background research" and "field work" chapters of the report. However it is done, it is important to report:

1. What kinds of background data were thought to be needed, and what methods were used to find and consult them?
2. What sources of background data were actually consulted?
3. What difficulties, if any, were encountered in background research? What changes did these occasion in the research plan?
4. What new or unexpected sources were discovered? What changes did they require in the research plan?
5. What methods were employed in the field to search for sites? These should be described in sufficient detail to permit the reader to understand them fully and to appreciate the reasons for employing them.

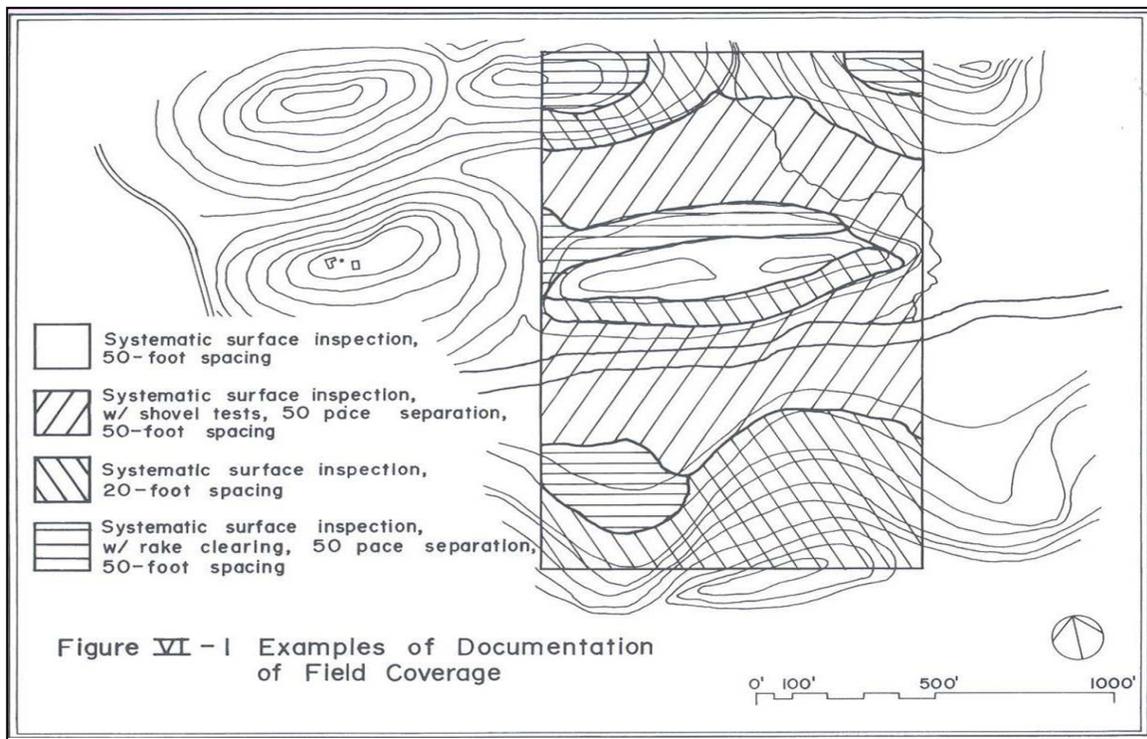
6. What variations among methods occurred at different phases of the survey or in different parts of the study area?
7. When archeological sites were discovered, what methods were used to define their boundaries and internal composition, to determine what categories of data they were likely to contain, and to define their significance?
8. What areas were examined with negative results?

The reasons for choosing one method over another should be clearly explained. Portions of the study area where different methods were used should be indicated on maps, as shown in Figure VI-1. In most cases, it is not necessary or efficient to report exactly where each team member walked or dug a shovel-test, but it should be possible for the reader of the report to reconstruct which methods were used in any given portion of the study area, to understand what these methods meant in terms of such factors as team deployment and subsurface exploration, and to understand the reasoning that went into selecting the methods employed.

Reporting Survey Results

Reporting sites: Most States and many Federal agencies, universities, museums and archeological organizations use standard forms for recording sites. These should be used if they provide adequate data for purposes of determining National Register eligibility (see 36 CFR 63 and *How to complete national register forms*, Appendix II). If they do not provide adequate data, or if the research design applicable to the survey requires additional data, they should be supplemented. It is generally helpful to the reader of the report to summarize the form-recorded data in the text of the report. If there is the probability that describing the sites in detail in the report, or providing their exact locations, might lead to their destruction or damage by vandals or treasure seekers, the report itself may present only summary data, with detailed information provided separately to those who need it for purposes of eligibility determination and planning¹³. The results of test or other excavations, and of any special analyses conducted, should be reported. If collections of archeological material were obtained, their depository should be identified, as should the depository of original field notes and associated data.

Reporting other discoveries: Discoveries that are pertinent to archeology and historic preservation, but are not archeological sites per se, should also be reported. Examples of such discoveries include but are not limited to: properties of possible architectural, cultural, or historical importance that apparently do not contain archeological data; geological and geomorphological features that may bear on local paleoenvironmental studies; relict plant communities, pack rat middens, and other biological features that may be of assistance in paleoenvironmental studies; and very recent cultural properties that may in the future be recognized as eligible for inclusion in the National Register. No one should be discouraged from reporting field information that might lead to the discovery of a previously unknown historic property. Data that are of a proprietary nature and do not directly describe archeological sites or other historic properties (e.g., proprietary information on geology received in confidence from a mineral exploration company) should not be reported without permission of the owner.



Reporting areas of uncertainty: If there are portions of the study area that appear likely to contain archeological sites which could not be identified (e.g., places where deep alluvium, very thick brush, or modern construction made it impossible to inspect a location where background research suggests the likelihood that archeological sites are present), these locations should be identified in the report. The reasons for uncertainty about their archeological potential should also be noted and if there are reasonable means of resolving this uncertainty through further work, they should be presented.

Reporting Conclusions

All discovered sites should be evaluated to determine their eligibility for inclusion in the National Register of Historic Places by following the guidelines found in *How to complete national register forms* Appendix II¹⁴. If the survey was conducted in connection with project planning, recommendations may be offered for impact mitigation with respect to any property thought to be eligible for inclusion in the National Register. The reasons for concluding that any given site is either eligible or ineligible should be clearly presented; for discussions of archeological significance see McGimsey & Davis 1977:31-34; Schiffer & House 1977:45-47; Glassow 1977 a, and 1977 b; Wildesen 1977; Schiffer S. Gumerman 1977; King, Hickman & Berg 1977, King 1977, Talmadge & Chesler 1977, and IAS 1977.

Hopefully the survey itself will have generated information that is useful to understanding local history or prehistory. Conclusions concerning local or general research problems in anthropology, history, or other sciences and humanities should be presented. Any local or other public interests that have been identified in the historic properties of the area should be discussed.

Keeping Track of Field Operations

High quality reporting demands a high level of control over the nature of field operations. This means fairly detailed record keeping. Several examples of forms used to keep track of field survey data are given in Appendix A; these include:

1. A form used in the survey of New Melones Reservoir in California, to record daily work team operations (Moratto 1976:3:135).
2. A form used to keep track of survey operations along sewer line segments in New York State (Berg & Emery 1976).
3. A set of forms used by the U.S. Forest Service, Region 9, to summarize data on the conduct of archeological reconnaissances (U.S. Forest Service 1976).

Developing systems for keeping track of survey data is an important part of pre-survey planning. The exact type of system employed will vary with the nature of the project and the area but the forms in Appendix A, all of which are in the public domain, may provide useful ideas.

Chapter VII: Predictive Survey for Comprehensive Planning

Much of the recent archeological literature concerning archeological survey has dealt with the conduct of predictive survey--i.e., those that result in the prediction of archeological site distributions within a large area based on a less than complete survey of the area. Most of this literature reports studies conducted for research purposes in the arid-semiarid west (cf. Gumerman 1971; Thomas 1969; Mueller 1974, 1975). Lovis (1976) has reported a predictive survey for research purposes in the northeastern woodlands. Agencies with broad land management responsibilities have learned the advantages of using predictive surveys in their general planning activities; as a result both the U.S. Forest Service (Smith 1977) and the Bureau of Land Management (Weide 1974) have begun to develop predictive survey programs. Both the U.S. Army Corps of Engineers (Schiffer & House 1975) and Interagency Archeological Services (King & Hickman 1973) have sponsored predictive surveys in order to determine the indirect or secondary effects of public works programs. State Historic Preservation Officers have begun to undertake predictive surveys in connection with their statewide comprehensive survey and planning programs (cf. Illinois 1977). Interagency Archeological Services has sponsored pilot studies that attempt to predict the distribution of prehistoric sites in two terrestrial areas (Dincauze & Meyer 1976; Benchley 1976) and both historic and prehistoric resources on the Gulf of Mexico outer continental shelf (Gagliano 1977), for multi-agency management purposes. Appendix B lists a number of exemplary predictive studies.

The purpose of this brief chapter is to discuss very generally how predictive sample surveys are done and how they can interlock with programs of comprehensive planning particularly those programs of statewide survey and planning undertaken by SHPOs.

What is Predictive Survey?

For purposes of planning, predictive surveys can be viewed as an attempt to build a data base for sensitive, responsible historic preservation planning without conducting a 100% non-exclusive survey. In a predictive survey one physically inspects only a fraction of the actual area of concern, and from this inspection--in the context of good background research--extrapolates to the entire area. Based on a predictive survey of high reliability (i.e., one that has been subjected to a number of carefully planned and executed tests) it should be possible to conduct controlled-exclusive surveys instead of non-exclusive surveys in advance of construction or land-use projects, thereby saving a considerable amount of time and expense.

Although predictive surveys can be useful in the preliminary analysis of relatively small areas (cf. Miller 1975), they are usually most cost-effective when applied to large regions such as States, river valleys or mountain ranges.

Research Design in Predictive Survey

A good research design is vital to the success of a predictive survey. The design should specify the general types of properties that will be sought and the criteria by which they will be evaluated. This specification should not only recognize current archeological (and other) research needs that ascribe value to various types of sites (cf. King 1971; Schiffer & House 1977); it should also seek to categorize sites into descriptive types so that an attempt can be made to preserve a representative sample for future research (cf. Glassow 1977). In addition, the design should set forth a strategy or strategies for sampling the study area. Such a strategy should provide a data base for predictions that are rigorously testable (cf. Mueller 1975; Smith 1977). Only when a set of predictions has been tested and shown to represent accurately the actual distribution of archeological sites, can it be used confidently in planning. Each new survey should be designed in such a way as to constitute a test of the predictions until a high level of confidence has been reached.

Development of a research design for statewide comprehensive survey, or for elements of such a survey, should involve scholars having research competence in the study area, in related areas, or in general anthropological or other research pertinent to the study area. The research design is an appropriate part of the State plan for historic preservation, and in fact might sometimes constitute the State plan with respect to archeology (see Michigan 1977, Georgia 1977).

Background Research in Predictive Surveys

Background historical, archeological, and environmental research overlaps considerably with research design formulation and may be necessary before the research design can be fruitfully prepared. Background research provides a basis for the first stage of the predictive study; based on background data one attempts to predict what kinds of sites will occur in the study area and where they will be found.

Studies of historic land-use patterns should enable one to at least predict general relationships between human activities and aspects of the natural environment (see Hickman 1977 and Bettinger 1977 for examples). For example, background research in the general vicinity of Griffin Valley might result in the development of a table of predictions similar to that shown in Figure VII-1. The same kind of predictive tables could be developed for prehistoric site-environment relations, as shown in Figure VII-2. Stratification of the sampling universe (discussed below) could then take these predicted relationships into account and fieldwork would test their accuracy.

It is important to emphasize that predictions from background research should be based on accurate settlement pattern data and well-grounded hypotheses about human-environmental relationships insofar as possible. An alternative approach is to take data on the distribution of known archeological sites relative to features of the environment and then project a similar distribution of sites relative to all similar environmental elements in the study area. Benchley (1976) and Dincauze & Meyer (1976) have done this for the Greater St. Louis and Eastern New England areas, respectively. There are great dangers in this approach, however. Because we typically have no idea how information on known archeological sites in any area was gathered (remember Beakey) it is seldom possible to state how representative the distribution of such sites may be of the actual distribution of

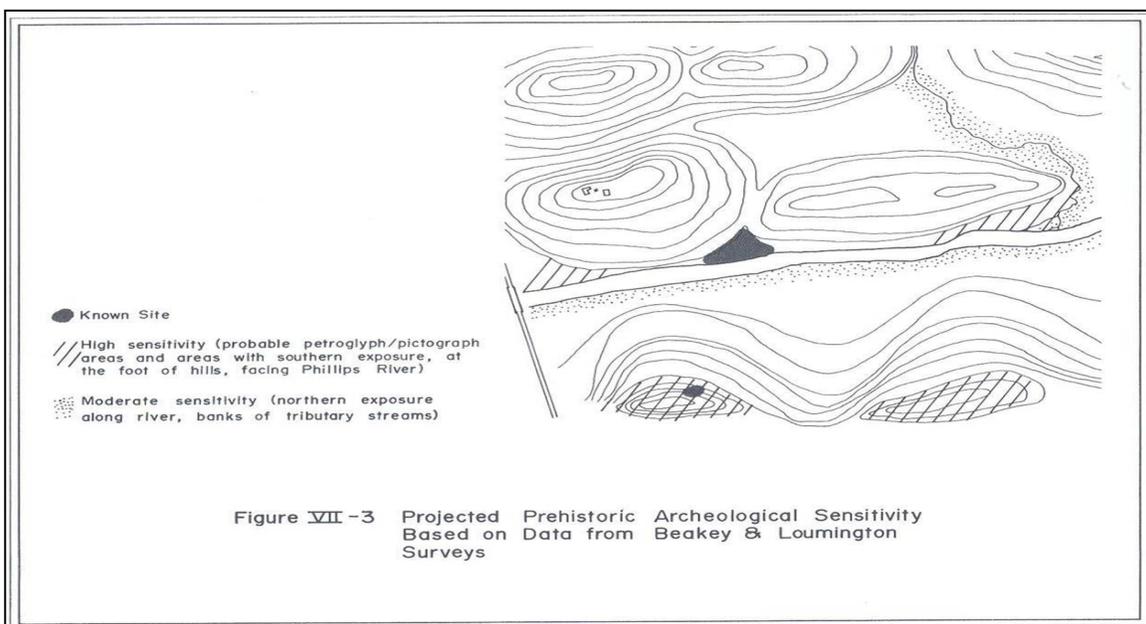
all sites. It is safe to assume that the answer to this question, in most cases, will be "not very." In many instances, known archeological sites are found to be consistently associated with modern roads and highways; this does not reflect the habits of historic and prehistoric people nearly so much as it does the habits of archeologists. Were we to predict the distribution of sites in Griffin Valley from Beakey/Loumington data our result would be a map like the one shown in Figure VII-3--not inaccurate in its plotting of "high probability areas" as far as it goes, but leaving many areas of actual high sensitivity designated as "low probability areas."

Figure VII-I			
Predicted Types and Distribution of Historic Sites:			
Griffin Valley Area			
Period	Social Group	Site Type	Distribution
Initial contact: Early-19 th century	Indians	Village sites	Same as terminal Stoneland prehistoric pattern
	Polish immigrants	Cabins with fields	Near fresh water sources but away from Indian sites on flat ground
Intensified immigration (mid-19 th century)	Indians	Refugee villages	Near fresh water but remote and relatively hard to reach: canyons high benches, etc.
	Whites	Cabins	Clustered together in loose communities for defense, near reliable water sources, flat ground away from high, rocky areas.
Euro-American consolidation (early-20 th century)	Land barons	Major farm complexes	Ford farm

Regardless of the sources used, predictions based on background research without field verification should never be used as the sole basis for planning. In other words, one should never assume that because unverified predictions from background data indicate that an area has low archeological sensitivity, a construction project planned for the area will not need to be surveyed. There are necessarily some pragmatic exceptions to the rule. On the outer continental shelf, field verification of predictions is extremely difficult, and more reliance on background data than would otherwise be acceptable may be necessary (cf. Gagliano 1977). Similarly in urban situations it may be necessary to rely more heavily than usual on background data in order to avoid very costly and difficult subsurface exploration in "low probability" areas (see Chapter V above). In all cases, however, as much field verification as possible should be completed before predictions are used as planning tools.

Figure VII-2
 Predicted Types and Distribution of Prehistoric Sites:
 Griffin Valley Area

Period	Social Group	Site Type	Distribution
Paleo-Indian	Clovis Hunter	Campsites	Passes, hogbacks, near extinct springs, overlooking game trails, extinct lakes and streams, grazing areas.
		Kill Sites	At the foot of cliffs, in box canyons, in extinct swamps, bogs, watercourses
Archaic	Hunter-gatherer	Semi-permanent	Near water sources and ecotones, especially chaparral/oak woodland ecotones
		Temporary seed Processing camps	In and immediately adjacent to sage communities, at bedrock exposures for grinding surfaces
Early Stoneland	Incipient Agriculturalist	Semi-permanent to permanent villages	Generally same as Archaic; some oscillation way from ecotones and towards good agricultural soils.
Late Stoneland	Proto-Irronole	Palisaded villages	Defensible areas within easy reach of fresh water and good agricultural land, but usually on high ground



Fieldwork in Predictive Surveys

On the ground the same methods are used for predictive survey as for any other kind of survey but only portions of the whole study area are actually inspected. It is vital that the portions selected be representative of the whole. Much of the literature on predictive survey deals with the problems of choosing a sample to inspect that truly represents the important aspects of diversity within the environment of a study area.

Choices of sampling scheme: The system used to select the portions of the study area to be inspected is called the sampling scheme, and several types of schemes have been or are being used. The simplest scheme is that referred to by Mueller (1974:39) as the "grab sample," in which one simply "grabs" whatever data are available and makes predictions from them. We have discussed this approach above; because it is not really sampling at all, it is not recommended except under particular circumstances. In one instance, this author felt justified in using a "grab sample" together with a considerable amount of background data to generate predictions. In and around the city of San Jose, California, as a result of a State environmental law and local implementing regulations, most private housing projects and other programs of public and private construction were (and are) subjected to prior archeological survey. Following guidelines set by the State archeological society (Society for California Archeology, 1971) most survey reports were filed with a local "archeological clearinghouse." In general, the surveys had been conducted in accordance with consistent fieldwork standards. As a result, after about two years during which the environmental law had been in force, the clearinghouse had data on a large number of small surveys scattered over the entire area of the city and its environs, including most natural environmental zones. These data were "grabbed" and used as a preliminary test of predictions generated from background research (King and Berg 1974). Such a test can only be regarded as preliminary, however, because of the uncertain representativeness of the sample and the possibility that field techniques used were not uniform among the various surveys.

"Simple random sampling" is a method of eliminating the biases from sample selection. The study area is first divided into equal-sized units (e.g., quarter-sections) which are assigned numbers. Units are then selected at random using a table of random numbers or some other objectifying device. Simple random sampling is useful in a homogeneous study area in which one lacks a basis for recognizing different sub-areas on environmental or other grounds. If the area contains different environmental zones that may have influenced settlement patterns, or if background research has suggested that particular sub-areas may contain particular types or densities of sites, simple random sampling essentially wastes this knowledge. Even if it is known that a given sub-area is likely to contain a particular type of site, one cannot go and look unless the table of random numbers so directs.

"Systematic sampling" has similar weaknesses. In a systematic sample units are chosen at regular intervals on a grid so that one obtains a sort of checkerboard effect. Although this approach distributes sample units well over the study area, it does not guarantee that all sub-areas that may be of interest are sampled.

"Stratified random sampling" has become the most common general sampling scheme used in archeology. In stratified sampling one first recognizes and delineates those sub-areas that are thought likely to contain different kinds or densities of sites or those attributes of the environment that are thought likely to have influenced settlement patterns. This, of course, is done on the basis of background research. Next, each sub-area, or "stratum," is

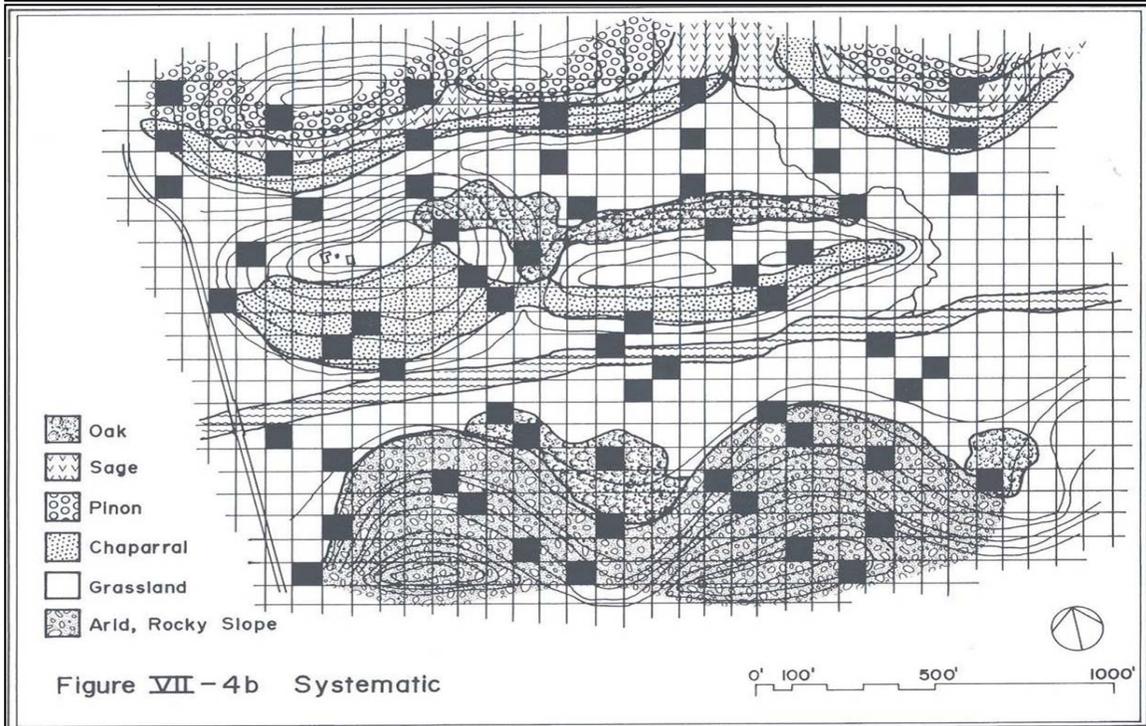
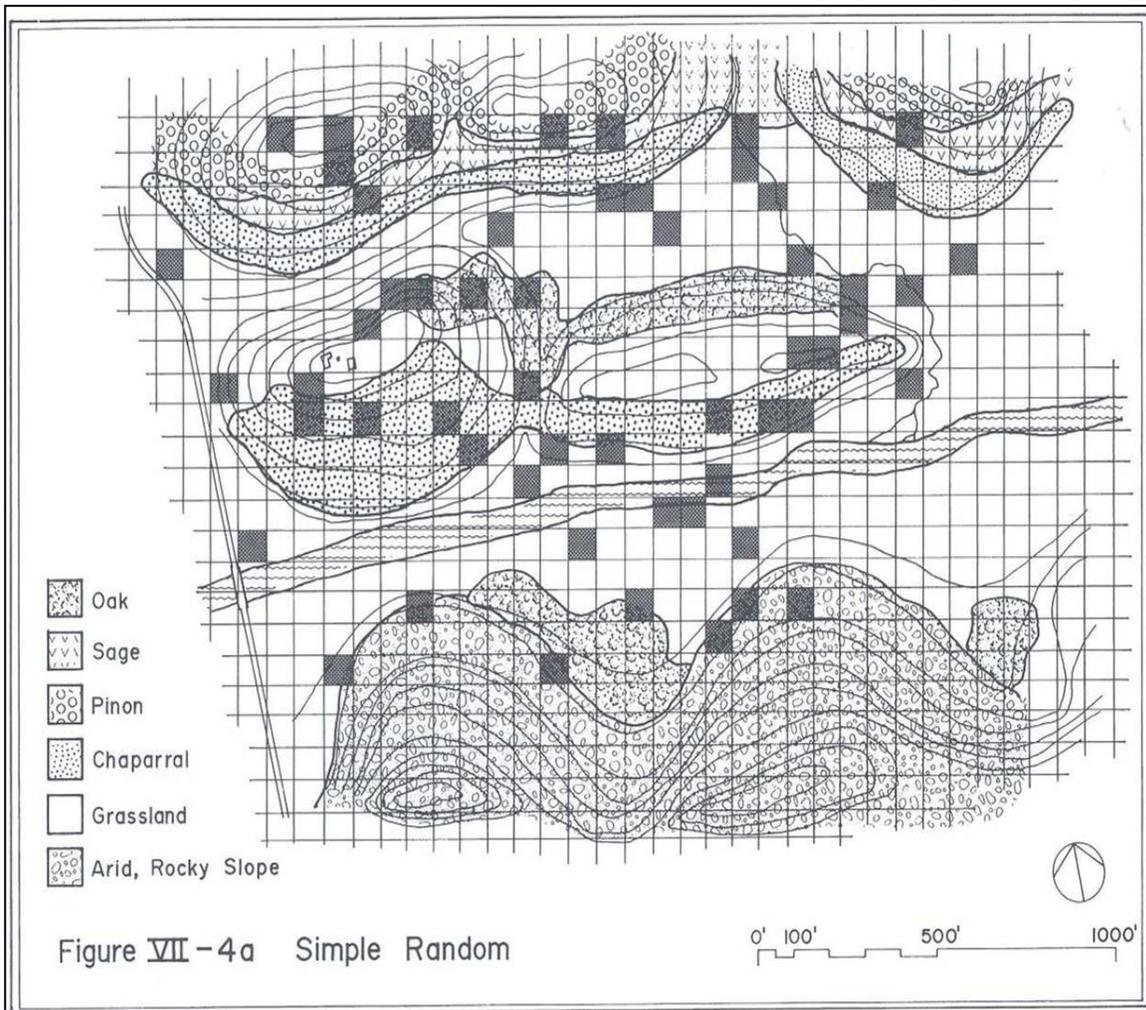
divided into units, a sample of units is selected at random from each stratum, and the size of the sample is weighted to assure equivalent representation from all strata.

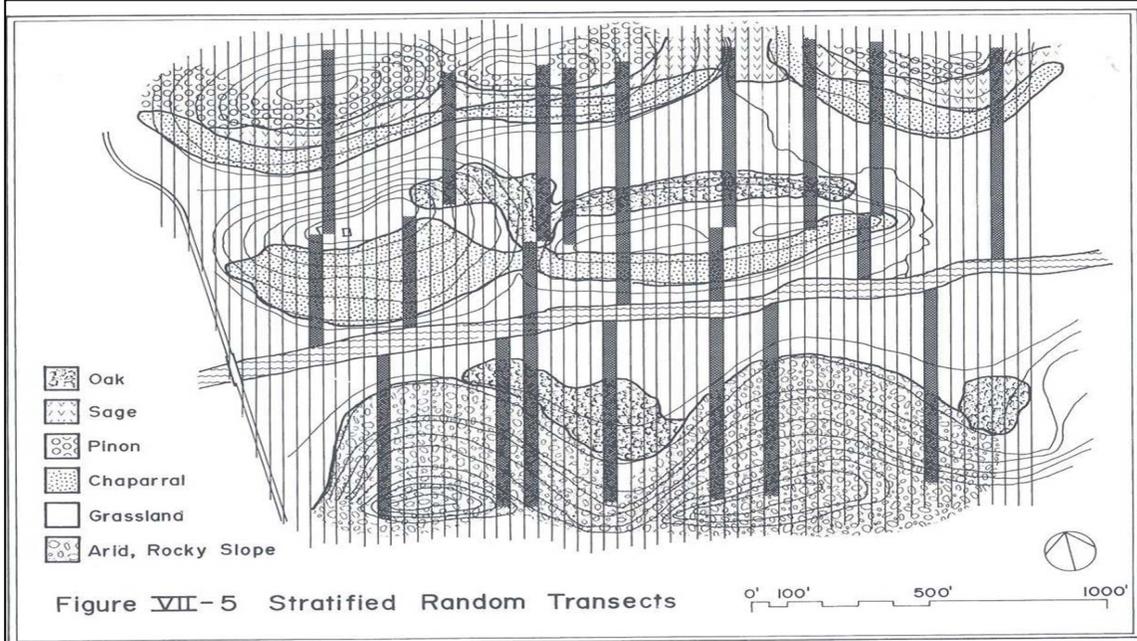
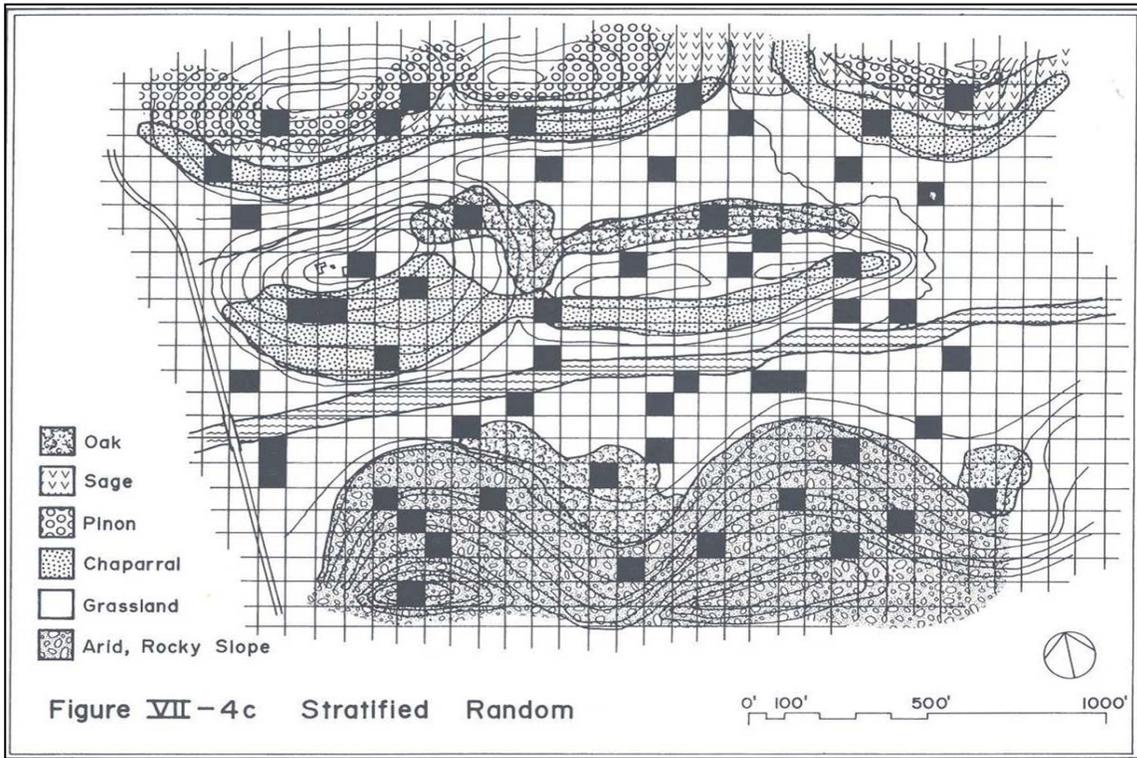
Figure VII-4 contrasts the kinds of samples that might be selected from Griffin Valley using simple random, systematic, and stratified random sampling schemes, assuming that environmental zones were used to define sampling strata in accordance with normal practice (cf. Thomas 1969, 1973; Mueller 1975).

A variant on stratified random sampling, which takes logistics into account, is referred to as "cluster sampling" (cf. Matson and Lipe 1975). Once the study area has been stratified, clusters of potential sample units are defined with each cluster designed to include representatives of all possible strata. Sample units are then selected within each stratum within each cluster rather than being scattered throughout the study area. This approach is obviously more cost-effective than straightforward stratified random sampling in most cases.

Choices of sampling unit: Sampling units are the parcels of land chosen for inspection. Both unit size and unit shape are important because the units must be comparable and because their size and shape affect the number of units that can be selected and the efficiency with which they can be inspected. Archeologists have traditionally used "quadrats" their sampling units. Quadrats are squares of some convenient size (often a quarter-section), selected from a grid superimposed on a map or air photo of the study area. The sample units shown in Figure VII-4 are quadrats. Many archeologists are now switching to "transecte," which appear to be more effective and less costly to inspect. A transect is a long, thin rectangle, perhaps a mile long and 100 meters wide. They are laid out in such a way as to cross-cut sampling strata, thus allowing the surveyor to observe greater variability than is possible with a quadrat; they are also easier and faster to cover on foot and can be inspected with fewer people. Figure VII-5 shows a stratified random transect survey selection at Griffin Valley.

Choices of sampling fraction: The sampling fraction is that portion of the total number of sampling units in the study area that is chosen for inspection. Sampling fractions used in predictive surveys have ranged from under one percent of the whole study area to over 50 percent (Mueller 1974:30). No reliable estimate can be made about the fraction needed to produce satisfactory predictions. Archeologists in the southwestern United States hold opinions that range from 15 percent (Donaldson 1975:15) to about 40 percent (Mueller 1974:66), and the one available study from the northeast estimates that around 20 percent is adequate (Lovis 1976). Obviously the exact size of the sample necessary depends on the nature of the data needed (cf. Read 1975), which in turn depends on the nature of the archeological sites in the area., the nature of the area itself, and (for our purposes) the management needs that prompt the study. As a rule of thumb, we suggest that for a large area like a State, a rough idea of site densities can probably be obtained from a sample of about one percent, *combined with thorough background research*. To obtain finer-scale predictions, define site-types, or make predictions about smaller areas, much larger samples are needed. It is important to remember that *the purpose of sampling is not the discovery of sites but the establishment of expectations about where sites will be and what they will be like. Sampling is not a substitute for complete survey but one step in the survey process*¹⁵.





The Results of Predictive Survey

Predictive survey results are usually presented as maps portraying differential site densities or, in some cases, site type-densities. Figure VII-6 is a predictive map of a large area in the State of Indeterminate, including Griffin Valley, in which predictive survey has advanced to a level at which both site densities and site types, including both historic and prehistoric sites, can be predicted. Predictions are made by noting the association of particular site-types with particular environmental features within the sample units actually inspected, then projecting a similar distribution of sites to all equivalent environmental features

within areas not yet inspected. An association gains reliability if it was first predicted on the basis of background research and later verified by field survey. An association also gains credence if it is explicable once discovered (e.g., the camps of unrecorded gold miners are found near placer deposits), and if it is consistently re-verified by further testing.

Because many associations of sites with environmental features are relatively uncomplicated, many predictive maps have simply been prepared by hand (cf. King and Hickman 1973). For plotting more complex relationships, and applying statistical tests to associations, analysis and preparation of maps with the aid of a computer is advisable. *Symap* (synagraphic mapping) is a program designed to prepare such predictive maps (Dougenik and Sheehan 1975).

Hierarchical Predictive Surveys

For comprehensive planning, predictive survey may best be considered an ongoing process in which increasingly fine-tuned predictions can be made as more and better information becomes available. If the archeologist continues to survey a new selection of sample units every year, he will eventually obtain a 100% sample. This is a rational goal for statewide comprehensive surveys and for Federal agency surveys conducted under section 2(a) of Executive Order 11593. The advantage of predictive survey is that some useful data for purposes of planning in the entire study area become available almost immediately,--for many parts of the country at least--and it is probable that all the information needed to carry out responsible preservation planning will be available before physical inspection has covered even 50 percent of the land.

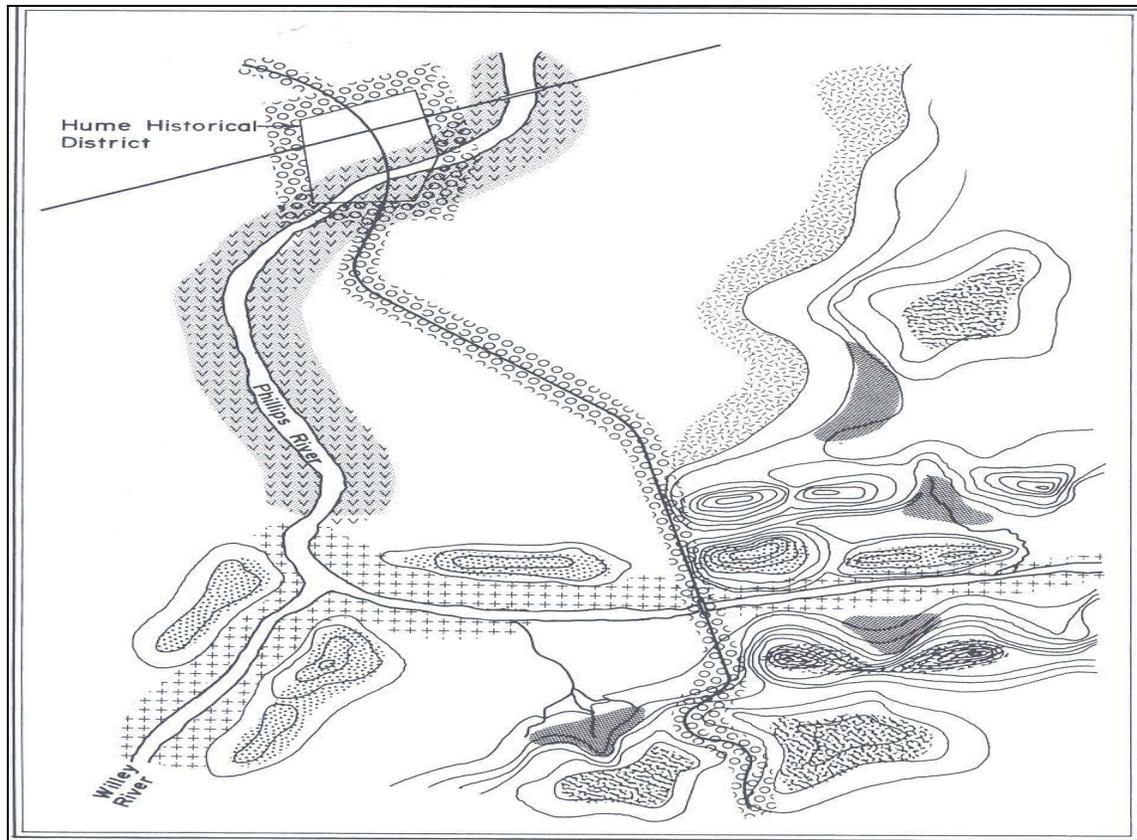
The ongoing predictive survey process is best conceived of as hierarchical, with refined predictions being built each year (or some other appropriate interval) through testing of older, less certain ones. The following basic phases can be projected:

Phase 1: Background research serves as the basis for developing preliminary predictive tables and maps. Field survey strata are established and a sampling scheme is developed.

Phase 2: Initial sample fieldwork is undertaken. Depending on such factors as the size of the study area and the level of funding the sample fraction might be less than 1 percent or it might be as much as 10 percent; it will provide a rough check on the predictions developed from background research and result in a fact-based but still general prediction.

Phase 3: The sampling scheme is refined based on the results of Phase 2. The sample fraction can be increased with further fieldwork and new background research may be undertaken to seek information on phenomena identified in the field. Results should include more refined predictive maps and data.

Subsequent phases will further refine the survey results on the basis of increased sampling fractions and testing of the results of previous phases. When additions to the predictive maps become entirely repetitive i.e., when predictions are consistently verified by subsequent fieldwork, the predictive survey can be terminated. From this point on, barring the discovery of new types of sites or other newly important forms of data not previously attended to, only controlled-exclusive surveys would be necessary in the study area in advance of projects affecting unsurveyed lands.



-  High Potential: Terminal Stoneland occupation sites
-  High Potential: Late Archaic/Early-Late Stoneland occupation sites
-  High Potential: Early Archaic campsites
-  High Potential: Prehistoric rock art
-  Moderate Potential: Stoneland occupation sites
-  High Potential: Historic occupation and commercial sites
-  Moderate Potential: Historic occupation sites
-  Moderate Potential: Archaic campsites
-  Potential undetermined

Figure VII - 6 Predictive Map: Probable Distribution of Archeological Sites: Cooper-Cole Water Pollution Control District

Crisis-free and Crisis-oriented Surveys

When developing a predictive survey program for a large and complex area like a State, the responsible officials will need to choose between crisis-free and crisis-oriented strategies. A crisis-free strategy is one in which present or possible future land-management problems in particular portions of the study area are ignored, and all portions are given equal representation in survey design. Conversely, a crisis oriented survey is one in which attention is focused first on portions of the study area where preservation crisis conditions exist or are expected. Crisis-oriented strategies are perfectly reasonable, and are probably the most responsible strategies for *SHPO's* to adopt in most cases. In deciding between a crisis-free and a crisis-oriented strategy, however, a *SHPO* should consider the whole range of crisis-types that may confront preservation in the area. For example, the most obvious kind of crisis may be the destruction of prehistoric sites in one part of the State through reservoir construction. But this may be obvious only because such projects appear daily on the *SHPO's* desk through the A-95 Clearinghouse¹⁶; on the other side of the State important sites may be lost to land leveling in connection with agricultural expansion, unknown to the *SHPO* because A-95 procedures do not apply. Although it may be quite possible to handle the impacts of the reservoir construction through existing procedures for compliance with the National Environmental Policy Act, Executive Order 11593, and other authorities, the agricultural damage constitutes a more serious crisis because of its unregulated nature.

Applying Predictive Survey Data

The data produced by predictive surveys can be integrated into the activities of State and Federal agencies for pure preservation planning and to facilitate compliance with the National Environmental Policy Act, Executive Order 11593, and other preservation-related authorities.

Realizing preservation opportunities: Predictive maps can be used in planning for the preservation of open space and for the acquisition of parkland. Areas of predicted high archeological site density, or areas where particularly significant types of sites can be predicted to occur, can be identified as high priority areas for public acquisition, open space zoning, or other forms of protection. Such data can also be used by owners and developers of private land to guide development in such a way as to preserve archeological values.

Local regulation of land-use: Many States now have environmental statutes that require consideration of historic and archeological values in local general planning and in granting local permits for private land-use. Local and State plans (e.g., Coastal Zone Management Plans) assisted by the Federal Government must take these values into account even if State law does not require it. Predictive data can be of great aid to local planners and decision-makers by helping them decide when private applicants for permits should be required to undertake archeological surveys

A-95 and environmental review: *SHPOs* who participate in environmental review under the procedures set forth in the Office of Management and Budget's Circular A-95¹⁷, the procedures of the Advisory Council on Historic Preservation, or the procedures of other agencies, will find predictive data very useful in making responsible comments on project proposals. Appendix C is an excerpt from the review procedures that have been employed by the North Carolina *SHPO* that indicate how predictive data can be used in environmental review. During the early phases of a hierarchical predictive study, when

predictions are still tentative, it will be important to be relatively inclusive in calling for survey data before commenting on a project because the predictions cannot be relied upon. Surveys that are done as a result of the environmental review will contribute to testing the predictions, however, and help allow the SHPO to narrow the range of projects for which he will request surveys in the future.

Chapter VIII: Conclusion

In this brief paper we have tried to encapsulate some of the conventional wisdom about archeological surveys and how they contribute to both general and project planning. Our concluding remarks deal with two problems.

Maintaining Data on Surveys

As archeological surveys proliferate, the need grows not only to ensure that they are conducted according to high standards, but to maintain and keep careful account of the data they produce. These data include information on archeological sites and other historic properties as well as other types of positive information. They also include negative data. We need to know which areas have been thoroughly surveyed with negative results so that the work will not be duplicated and so that negative information, like positive information, can contribute to the development of predictions. We need to be able to distinguish between those areas that have been exactly surveyed with negative results and those that have been surveyed with marginal precision. Appendix D is a short paper recently published in 11593¹⁸ (King and Cole 1977), reproduced here for convenience. Until a system like the one proposed in Appendix D is developed, it will be the SHPOs' responsibility to maintain survey data as best they can.

Coordination with the Profession

We cannot overemphasize the importance of maintaining close coordination among the SHPOs, the Federal agencies that engage in either general or project planning, and the archeological community. Maintenance of a good professional staff and a good State Review Board is vital but is usually not enough. Greater breadth and flexibility are needed if the SHPO is to develop and implement a State historic preservation survey and plan that meets high professional standards. Appendix E is another paper first published in 11593 which discusses State archeological communities (King 1976). In organizing, developing, carrying out, and periodically reviewing the State historic preservation survey and plan, every effort should be made to involve the whole spectrum of legitimate archeological interests in the State as well as those outside the State that can make useful contributions.

APPENDIX A:
Examples: Forms used in recording archeological survey data

NEW MELONES ARCHAEOLOGICAL PROJECT (PHASE VI-B)

DAILY WORK REPORT

Date 17 June 1975 Type of Work site survey

Vehicle Used Avis truck Odometer 50402 / 50423
 " " _____ " _____ / _____

Total Mileage 21 Name of Supervisor(s) Richard Hanes

Team Composition: //////// Map Ref. Nos. (1) 46, (2) 44, (3) 45, (4) _____
 #1. Richard Hanes, Anne Carlson, _____
 #2. Bryan Aivazian, Hank Erickson, _____
 #3. David Stuart, Sue Baker, _____
 #4. _____, _____, _____

Describe Area Surveyed The western 1/3 of the SW 1/4 of Section 18;
the southern 1/2 of the SW 1/4 of Section 7--both T1N, R14E; and
the western shoreline of the southern extension of Melones Reservoir
in the SE 1/4 of Section 12, T1N, R13E.

Total No. of Acres Surveyed 120 = 20 Acres/Man-day

Comments re. Field Conditions Clear, cool day; steep terrain with large
areas of dense chaparral and dense tall grass.

Designation(s) of site(s) recorded NMP-319, 320, 321; NMP-64, 65;
NMP-114, 115

////////////////////////////////////

Designation(s) of Site(s) Sampled Not Applicable.

<u>Team</u>	<u>Site</u>	<u>Unit</u>	<u>Size</u>	<u>Levels</u>	<u>Depth @</u>	<u>Method</u>	<u>Volume m³</u>
<u>#1.</u>	_____	_____	_____	_____	_____	_____	_____
<u>#2.</u>	_____	_____	_____	_____	_____	_____	_____
<u>#3.</u>	_____	_____	_____	_____	_____	_____	_____
<u>#4.</u>	_____	_____	_____	_____	_____	_____	_____

Total Volume of Sampled Deposit N.A. cubic meters/ _____ Man-days

Notes and Comments on Fieldwork Progress was made difficult because
of the unusually dense stands of chamisa and manzanita and because of
the steepness of the terrain.

Signed Richard Hanes

Gary Berg, Archeologist
Crew Chief Shovel Test Record

Project _____

Area _____ Crew Chief _____ Date _____

	(meters)	50	40	30	20	10	C/L of ROW	10	20	30	40	50	(meters)
(meters) . 100 . 200 . 300 . 400 . 500 . 600	HEDGE ROW B6. B5. B4. B3. B2. B1. CULVERT HEDGE ROW POWER COMPANY ACCESS ROAD OLD RAILROAD BED (DIRT) HEDGE ROW AREA B END AREA A BARRIER PAVEMENT ENDS .A54 DITCH CARDINAL CT. STREAM VIEW LANE (PAVED) Compass Orientation AZ												Topographic Profile
Photographic Record							Notes: (Vegetation, Structural Cover, Other Conditions Influencing Observation) HEDGE ROW BORROW TRENCH RAILROAD BED (ACCESS ROAD) BORROW TRENCH						
DETAIL: RAILROAD BED													
Use reverse side if necessary... Indicate intersecting roads, features, house numbers, etc. (on map portion). Bag a soil sample every 1000 meters and indicate point of extraction (i.e. S.T.)													

USDA - FOREST SERVICE				ARR NO.	
ARCHAEOLOGICAL RECONNAISSANCE REPORT (SUMMARY)				05-11-102	
1. TITLE OF UNDERTAKING (If no undertaking is involved, attach sheet explaining rationale for AR)					
HORTON TIMBER SALE					
2. NAME OF AR REPORTER: Barnaby Badger			ADDRESS:		
TITLE: Soil Scientist			Box 4		
STATION: Four Leaf Ranger Station			Four Leaf, CA 95900		
CERTIFICATION NO: A 925	NO. OF ASSISTANTS: two	NO. OF MAN OR PERSON DAYS SPENT ON ARR: 28	ACREAGE INVOLVED: 3,020		
3. LOCATION OF UNDERTAKING: The Horton Timber Sale is located approx. 10 air miles NE of Portola, CA					
FOREST: Plumas National Forest			DISTRICT: Feather District		
UNIT (If app.): Clover Planning Unit			USGS QUAD: Portola, CA; 15'; 1952		
OTHER MAPS: Clover Planning Unit Vegetation Map					
AIR PHOTO:	PROJ NO: KL	FLT. LINE: 43	ROLL NO: 9	FRAME: 191 - 196	
DATE: 7/72	OTHER (type of film, etc.): none				
4. PRE-FIELD RESEARCH					
SOURCES OF DATA:					
a. <input checked="" type="checkbox"/> Forest Cultural Resource Files		e. <input checked="" type="checkbox"/> State Historic Preservation Officer			
b. <input checked="" type="checkbox"/> District Cultural Resource Files		f. <input checked="" type="checkbox"/> Informants			
c. <input checked="" type="checkbox"/> Other USFS Files		g. <input checked="" type="checkbox"/> Published or Unpublished Documents			
d. <input checked="" type="checkbox"/> Institutional Records		h. <input checked="" type="checkbox"/> Federal Register			
5. FIELD RESEARCH					
a. Type of Reconnaissance (single or mixed strategy):					
<input type="checkbox"/> Cursory		<input checked="" type="checkbox"/> Complete			
<input type="checkbox"/> Intuitive Controlled		<input checked="" type="checkbox"/> General			
<input checked="" type="checkbox"/> Intuitive Uncontrolled		<input type="checkbox"/> Controlled Sample			
b. Maps:					
<input checked="" type="checkbox"/> Vicinity of Undertaking		<input checked="" type="checkbox"/> Location of Undertaking			
<input checked="" type="checkbox"/> Coverage (Archaeological) and Sensitivity (Archaeological)		<input checked="" type="checkbox"/> Other: Environmental			
c. Cultural Resources recorded? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>					

9. RESULTS (Continued)

e. Recommendations - Will the undertaking have any effect on Cultural Resources? YES NO
 (See 36 CFR 800.8 and .9)

If yes, what do you recommend to avoid any adverse effect.

- 1) The placement of buffer zones around sites within and in the vicinity of timber harvest units.
- 2) If possible, realignment of roads in order to avoid sites.
- 3) Further reconnaissance should be carried-out in areas that have not been covered by this reconnaissance if future project modification will result in subjecting those areas to direct impact.
- 4) Post signs of the "National Antiquities Act" at two locations: a) the junction of the intersection of the two proposed roads, b) the junction of (see Continuation Sheet)

10. PERSONNEL CONDUCTING RECONNAISSANCE

NAME	TITLE	DUTY STATION
Smokey Bear	Fire Control Officer	Four Leaf Ranger Station
Woodsie Owl	Sanitation Engineer	Four Leaf Ranger Station
Barnaby Badger	Soil Scientist	Four Leaf Ranger Station

11. CERTIFICATION: I certify that I conducted the Archaeological Reconnaissance reported here, that my observations and methods are fully reported, and that this ARR is complete and accurate to the best of my knowledge:

 Barnaby Badger
 NAME OF AR REPORTER

 5/28/76
 DATE

12. PROFESSIONAL REVIEW: I have reviewed this ARR and find it acceptable according to professional standards with the following exceptions:

NONE REFER TO SECS. _____ on attached Evaluation of Completeness Form (R5-2700-38).

 NAME DATE

 TITLE

 INSTITUTION OR DUTY STATION

USDA - FOREST SERVICE		ARR NO. 05-11-102
SUPPLEMENTAL DATA TO ARCHAEOLOGICAL RECONNAISSANCE REPORT FOR:		
TITLE OF UNDERTAKING: Horton Timber Sale		
FOREST: Plumas National Forest	DISTRICT: Four Leaf Ranger District	
ITEM:		
<input checked="" type="checkbox"/> GENERAL CONTINUATION SHEET		
<input checked="" type="checkbox"/> UNDERTAKING VICINITY MAP		
<input checked="" type="checkbox"/> UNDERTAKING LOCATION MAP(s)		
<input checked="" type="checkbox"/> ARCHAEOLOGICAL COVERAGE MAP(s)		
<input checked="" type="checkbox"/> OTHER MAPS OR AIR PHOTOS : Environmental Map		
<input type="checkbox"/> PRE-FIELD RESEARCH CORRESPONDENCE		
<input type="checkbox"/> INSTITUTIONAL RECORDS		
<input type="checkbox"/> SHPO CORRESPONDENCE		
<input checked="" type="checkbox"/> ARCHAEOLOGICAL SITE SURVEY RECORD(S)		
<input type="checkbox"/> OTHER SUPPLEMENTAL DATA		
<input type="checkbox"/> _____		
<input type="checkbox"/> EVALUATION OF COMPLETENESS (R5-2700-38)		
<input type="checkbox"/> EVALUATION OF SIGNIFICANCE (R5-2700-41)		
<input type="checkbox"/> DETERMINATION OF EFFECT (R5-2700-39)		
<input type="checkbox"/> DETERMINATION OF ADVERSE EFFECT (R5-2700-40)		

CONTINUATION SHEET

5. General Environmental Description

Flora: The vegetation type of the sale area is primarily an Intermediate Pine-Scrub Forest and a Timberland-Scrub Complex (g5). On the western edge of the sale area the vegetation type is a Scrub Rangeland-Xeric Grassland.

Intermediate Pine-Scrub Forest: is characterised by a low tree density, open canopy, and is dominated by Jeffrey Pine, Ponderosa Pine and Juniper. The understory matrix is dominated by low sagebrush with sparse annual grasses.

Timberland-Scrub Complex: is characterized by an open canopy where Ponderosa Pine and Jeffrey Pine dominate. The understory matrix is dominated by low sagebrush with mules ear and squaw carpet.

Scrub Rangeland-Xeric Grassland: is predominantly composed of low sagebrush and sparse annual grasses.

Fauna: The dominant fauna of the sale area are deer and coyote. Several deer and coyote were observed during the reconnaissance. The deer were observed predominantly in Horton Canyon, while the coyote were observed in Red Clover Canyon.

8. Field Research

c. Coverage

Complete Reconnaissance: conducted in areas of expected high archeological sensitivity, in areas where the proposed undertaking may have a direct impact and the expected archeological sensitivity is moderate, and along proposed road rights-of-way. Spacing was between 10-20 yards and often less. When necessary, ground cover was cleared for ground inspection at least every 5 yards.

General Reconnaissance: conducted in areas where the proposed undertaking will have a direct impact and the expected archeological sensitivity is low except on proposed road rights-of-way (see complete reconnaissance). A spacing of 10-25 yards was employed, depending on terrain.

9. Results

e. Recommendations

Squaw Valley road and the proposed road.

(5) Monitor timber and road crews to see that sites are not disturbed or vandalized by their activities.

(6) Attempt to observe and prevent vandalism through normal patrols.

USDA - FOREST SERVICE				ARR NO.	
ARCHAEOLOGICAL RECONNAISSANCE REPORT (DETAIL)				05-11-2967	
1. TITLE OF UNDERTAKING: (If no undertaking is involved, attach sheet explaining rationale for AR)					
HORTON TIMBER SALE					
2. NAME OF AR REPORTER:			ADDRESS:		
Barnaby Badger			Box 4 Four Leaf, CA 95900		
TITLE:					
Soil Scientist					
STATION:					
Four Leaf Ranger Station					
CERTIFICATION NO.:	NO. OF ASSISTANTS:	NO. OF MAN OR PERSON DAYS SPENT ON ARR:	ACREAGE INVOLVED:		
A 925	two	28	3,020		
3. LOCATION OF UNDERTAKING:					
The Horton Timber Sale is located approximately 10 air miles NE of Portola, CA					
FOREST:			DISTRICT:		
Plumas National Forest			Feather District		
UNIT (if app.):			USGS QUAD:		
Clover Planning Unit			Portola, CA; 15'; 1952		
OTHER MAPS:					
Clover Planning Unit Vegetation Map					
AIR PHOTO	PROJ. NO.	FLT. LINE:	ROLL NO.	FRAME:	
	KL	43	9	191 - 196	
DATE:		OTHER (type of film, etc.):			
7/72		none			
4. GENERAL DESCRIPTION OF UNDERTAKING (describe areas which will be effected and how this effect will occur):					
The Horton Timber Sale is a proposed commercial timber sale. The undertaking will involve timber harvest and improvement to the transportation system. Planned transportation improvements consist of construction, reconstruction and improvements to existing access roads. Landings and skid trails will be established within cutting units of the timber sale (g 4).					
5. GENERAL ENVIRONMENTAL DESCRIPTION (consider geology and hydrology, flora and fauna recent alterations).					
(Environmental map attached)					
Topography: The topography is characterized by a rise in elevation from east to west, resulting in largely a western aspect. The tributary drainages, of which there are several, flow seasonally into Red Clover Creek.					
Geology and Hyrdology: Approximately twenty percent of the sale is composed of barren pyroclastic, basaltic and andesite rock outcroppings and scattered rock bluffs (g 4). Pyroclastic material tends to collect and hold water, resulting in many year-round springs within the project boundary.					
(see attached continuation sheet for a description of flora, fauna and recent alterations.)					
R5-270J-37a (Iss. 4/76)					

6. PRE-FIELD RESEARCH

SOURCES OF DATA:

- a. FOREST CULTURAL RESOURCE FILES
- b. DISTRICT CULTURAL RESOURCE FILES
- c. OTHER USFS FILES (Specify): _____
- d. OTHER RECORDS (Specify): Clover Land-Use Plan and Horton Timber Sale Environmental Analysis Statement.
- e. STATE HISTORIC PRESERVATION OFFICER (attach correspondence)
- f. INFORMANTS:
- (1) Name Joe Frisbee (Rancher)
 Address 18743 Maple Street, Dixie, CA
 Time spent in area 70 years
- (2) Name Charley Woodchuck III (Forest Archaeologist)
 Address Box Q, Kuinzie, CA 95900
 Time spent in area 3 years
- g. PUBLISHED OR UNPUBLISHED DOCUMENTS:
- (1) Author Anonymous
 Title Red Clover Valley
 Publisher/Location Plumas Co. Historical Soc. Publ. No. 20, Kuinzie, CA
 Date 1965 Relevant Pages 18-20
- (2) Author Kroeber
 Title Handbook of the Indians of California
 Publisher/Location California Book Co., Berkeley, CA
 Date 1925 Relevant Pages 391-441
- (3) Author Riddell, Francis A.
 Title Archeological Reconnaissance of Frenchman Dam & Reservoir
 Publisher/Location Dept. of Water Resources, Sacramento, CA
 Date 1960 Relevant Pages 1-12
- (4) Author U.S. Forest Service: Plumas National Forest
 Title Horton Timber Sale Environmental Analysis Statement
 Publisher/Location U.S. Forest Service: Plumas National Forest, Quincy, CA
 Date 8/75 Relevant Pages 17
- (5) Author U.S. Forest Service: Plumas National Forest
 Title Clover Land-Use Plan
 Publisher/Location U.S. Forest Service, Plumas National Forest, Quincy, CA
 Date in progress Relevant Pages 27-33; 42-45
- h. FEDERAL REGISTER CHECKED (cite vol., no., page and date): RESULT NEGATIVE RESULT POSITIVE
 NATIONAL REGISTER PROPERTIES: Vol. 41, No. 43, pg. 5841

7. OBSERVATIONAL EXPECTATIONS *(cite appropriate references listed under 6f and 6g)*

a. Expected Prehistoric Land-use:

Based on Kroeber (g. 2) and Riddell (g. 3), the prehistoric groups that inhabited the sale area are projected as having located near permanent water sources and the ecotone between open valley grasslands and pine forest. More seed processing implements were expected to be found within the grassland communities (f. 2).

b. Ethnographic Group:

Northeastern Maidu (g. 2)

c. Prehistoric Complexes:

Martis Complex (f. 2)

d. Expected Historic Land-Use:

Historic land-use of the area has been limited primarily to ranching and logging activities (f. 1 and g. 1). It was expected that land disturbance from past logging operations (post WWII) would be evident, especially in Horton Canyon.

e. Expected Areas of Archaeological Sensitivity *(if not adequately explained above):*

Expected archeological sensitivity was determined intuitively by considering various environmental factors (i.e., vegetation, water and topography).

High - along Horton Creek within the valley-hill ecotone.

Medium - area of gentle to moderate slope within the valley-hill ecotone. Vegetation types and in the vicinity of springs within a hill vegetation type.

Low - area of moderate to steep slope within a hill vegetation type.

f. Special Problems Encountered in Pre-field Research:

No specific archeological information exists for the area of the undertaking.

8. FIELD RESEARCH							
<p>a. Type of Reconnaissance (<i>Single or mixed strategy</i>):</p> <table border="0"> <tr> <td><input type="checkbox"/> Cursory</td> <td><input checked="" type="checkbox"/> Complete</td> </tr> <tr> <td><input type="checkbox"/> Intuitive Controlled</td> <td><input checked="" type="checkbox"/> General</td> </tr> <tr> <td><input checked="" type="checkbox"/> Intuitive Uncontrolled</td> <td><input type="checkbox"/> Controlled Sample</td> </tr> </table>		<input type="checkbox"/> Cursory	<input checked="" type="checkbox"/> Complete	<input type="checkbox"/> Intuitive Controlled	<input checked="" type="checkbox"/> General	<input checked="" type="checkbox"/> Intuitive Uncontrolled	<input type="checkbox"/> Controlled Sample
<input type="checkbox"/> Cursory	<input checked="" type="checkbox"/> Complete						
<input type="checkbox"/> Intuitive Controlled	<input checked="" type="checkbox"/> General						
<input checked="" type="checkbox"/> Intuitive Uncontrolled	<input type="checkbox"/> Controlled Sample						
<p>b. Rationale for Selection of Various Reconnaissance Types:</p> <p>Different types of reconnaissance were employed depending upon the expected archeological sensitivity and the proposed direct and indirect impact the undertaking will have on the ground. Areas in proposed road rights-of-way and timber harvest units are considered areas of direct impact. Areas of indirect impact are those areas subject to increased worker and visitor use as a result of implementation of the undertaking and an improved transportation system.</p>							
<p>c. Coverage (<i>describe the way the area was examined and attach coverage map showing extent and intensity of coverage</i>): (see Coverage Map)</p> <p>Intuitive Uncontrolled: all areas of expected high archeological sensitivity were inspected by a complete coverage. Areas of expected moderate archeological sensitivity where direct impacts are proposed were inspected completely. Areas of expected low archeological sensitivity were inspected only where direct impacts are proposed.</p> <p>(see attached continuation sheet)</p>							
<p>d. Portions of Affected Property Not Inspected (<i>key to coverage map</i>):</p> <p>(1) Location: Areas of an expected low sensitivity where no direct impact will occur and in some areas of moderate sensitivity where no direct impact will occur.</p> <p>(See Coverage Map)</p>							
<p>(2) Reason Not Inspected: The investigator did not feel it was likely that cultural resources would be found in areas not inspected and no ground disturbing activities are planned for those areas.</p>							
<p>e. Portions of Affected Property Receiving Less Than A Complete Reconnaissance. (<i>Key to coverage map</i>):</p> <p>(1) Location: A few small areas within the area covered by a general reconnaissance were not completely inspected.</p>							
<p>(2) Reasons Not Completely Inspected: Limitation imposed by the environment. Some steep rocky areas impeded travel on the southern and eastern edge of Section 13 requiring relative wider spacing and a few small isolated areas were not inspected, especially within the Timberland-Scrub Complex (see environmental map), because of heavy ground cover (i.e., thick duff, deadfall, and brush). It is the investigator's opinion that all areas covered by the general reconnaissance that were less than completely inspected are highly unlikely to have cultural resources.</p>							

119		
RESULTS		
a. Cultural Resources Recorded. <i>Historic and/or Prehistoric Properties or Sites. Attach archaeological or other appropriate site records and key to coverage map.</i>		
NAME	F.S. NUMBER	TYPE <i>(historic or prehistoric)</i>
	05-11-51-62	prehistoric
	05-11-51-63	historic
	05-11-51-64	prehistoric
	05-11-51-65	prehistoric
	05-11-51-66	prehistoric
	05-11-51-67	prehistoric
	05-11-51-67	historic & prehistoric
	05-11-51-67	prehistoric
b. Cultural Resources Noted but not Formally Recorded <i>(key to coverage map):</i>		
ELD NO.	GENERAL DESCRIPTION	WHY NOT RECORDED
1	Hunters camp	contemporary
2	Logging Railroad grade (south side Horton Crk)	Post WWII; grade itself
		only remaining evidence
c. Special Problems Encountered in Field Research <i>(brush, duff, slope, time, etc.):</i>		
<p>was unable to observe much of the ground within areas in the timberland-scrub complex and intermediate pine-scrub forest vegetation type due to duff, and to a lesser extent deadfall and squaw carpet on the surface. These areas were inspected by locating and observing clear areas within them or the clearing of the duff for visual inspection of the ground.</p> <p>coverage of steep slopes required relative wider spacing (a zig-zag method was employed) relative to that of more level areas.</p>		
d. Comments:		

6. CERTIFICATION: I certify that I conducted the Archaeological Reconnaissance reported here, that my observations and methods are fully reported, and that this ARR is complete and accurate to the best of my knowledge:

Barnaby Badger 5/28/76
NAME OF AR REPORTER *DATE*

7. PROFESSIONAL REVIEW: I have reviewed this ARR and find it acceptable according to professional standards with the following exceptions:

NONE REFER TO SECS. _____ on attached
Evaluation of Completeness Form, (R5-2700-38).

NAME *DATE*

TITLE

INSTITUTION OR DUTY STATION

APPENDIX B

Examples: Archeological predictive studies

Cache river archeological project

Under contract with the U.S. Army Corps of Engineers, Schiffer and House conducted a sample survey of the Cache River Basin in Arkansas and provided advice on the distribution of prehistoric sites for purpose of both direct and indirect impact mitigation planning. References: Schiffer and House 1975, 1977.

Reese river ecological project

Thomas conducted a stratified random sampling program in the Reese River Valley of Nevada to test hypotheses about the settlement organization of its inhabitants. References: Thomas 1969, 1973, 1975.

Chaco canyon sampling experiment

Several different types of sampling schemes were applied to the already recorded sites of Chaco Canyon National Monument, New Mexico to test their relative efficiency. Reference: Judge, Elbert and Hitchcock in Mueller 1975.

Cedar mesa project

In a study of regional human adaptation on Cedar Mesa, Utah, a sample of stream drainages was selected and quadrats within each were surveyed; the results were evaluated against simulated data. Reference: Matson and Lipe in Mueller 1975.

White Mountain planning unit

For purposes of Forest Service planning in the Apache-Sitgraves National Forest, Arizona, a stratified transect sample was used to generate predictions about the relative density of prehistoric sites throughout the unit. Reference: Donaldson 1975.

Randsburg/Spangler Hills/South Searle lake study

In connection with a proposed geothermal leasing program in the California Desert, a stratified random sample quadrat survey was conducted and archeological sensitivity maps were developed. References: Bureau of Land Management 1976; for general research design, Weide 1974.

San Felipe archeological project

To assess the indirect impacts of a regional water system in central California, a dispersed sample of stream drainages, stratified by size, was inspected and a systematic background study was conducted to predict impacts on prehistoric and historic sites. References: King and Hickman 1973, 1977.

Gulf of Mexico outer continental shelf study

For purposes of planning for the sale and management of offshore oil leases, zones of differential archeological sensitivity were projected on the outer continental shelf in the Gulf of Mexico. The predictions were based on study of on-shore prehistoric settlement patterns, changes in sea level over the last 60,000 years, submarine topography and geology, reported shipwrecks, and patterns of shipping from the time of initial exploration through 1945. Reference: Gagliano, et al 1977.

Eastern New England study

Based on available data on prehistoric site distributions, areas of predicted archeological sensitivity were projected for eastern New England. Potential land-use patterns were overlaid to identify probable future conflicts. This study suffers from the fact that no fieldwork was done to check the accuracy of the predictions derived from background data. Reference: Dincauze and Meyer 1977.

Greater St. Louis study

Based on available data on prehistoric site distributions, zones of predicted archeological sensitivity were generated for the greater St. Louis area. General land-use plans were overlaid to identify areas of probable future conflict. This study has the same deficiencies as the eastern New England study. Reference: Benchley 1976.

Inland water survey

Along the Inland Waterway on Michigan's lower peninsula, stratified random quadrats were surveyed in order to predict the distribution of prehistoric sites. Reference: Lovis 1976.

APPENDIX C:**Example of an archeological review procedure using predictive data****After environmental assessments of historical and archeological resources: Policies and procedures of the State Historic Preservation Officer and the Department of Cultural Resources**

Division of Archives and History, Department of Cultural Resources, State of North Carolina, October, 1975

Review Procedures: North Carolina Department of Cultural Resources

To provide for the most expeditious, efficient and professionally responsible review possible, the State Historic Preservation Officer and the Department of Cultural Resources have established a set of environmental assessment review procedures. These have been systematized over the past few years in accordance with Federal and State legislation. Because all proposals reviewed by the SHPO and the Department of Cultural Resources must be submitted to two similar but technically different reviews (one for impact on historic structures and another for archeological resources), the review procedures will be outlined in two sections.

Archeological Review

When project documentation is received by the Archeology Section, the first step in the review is to examine the material to ascertain if there is sufficient information for review. In many cases, the information provided is incomplete and more data must be requested before the review can proceed. The most common omissions are locational data, construction schedules, and amount and location of new ground disturbance. If the supplied documentation does not exactly locate the project and indicate in detail how much and where the surface of the earth will be disturbed, it is impossible to assess the project's impact on archeological resources. If no schedule for site work is supplied, it is very difficult to arrange any needed archeological investigations. Whenever additional information must be requested, the review process is held up. Because of this, project planners are urged to contact the SHPO or the State Archeologist at the earliest stages of planning to insure that the review will not be shelved to await more complete information.

At this first level of review, approximately 80 percent of all projects resources will be affected by the project. The paving of previously graded streets, the laying of water lines in previously graded rights-of-way, and projects in highly urbanized areas are examples of such automatically cleared projects. As a general rule, any project that occupies a previously disturbed area, or an area that was unfit for human occupation in the past, will fall into the automatically cleared category. There are, of course, exceptions to this rule but, most will result from an inability on the part of the reviewer to determine if the above criteria apply.

The second level of review is to check the project location against existing archeological site files. As very little of the State has been subjected to intensive archeological reconnaissance, the files are often not very helpful in the review process. If the project is in a previously surveyed area, however, it will be cleared if it can be established that it will not have an adverse impact on known sites. If the project will have an adverse impact, comments suggest steps for the mitigation of the impact. For projects that can be assessed at levels one or two, the review is usually completed within two days. Whenever possible,

problems arising during the first two levels of review are resolved by telephone. Completion of the review process as rapidly as possible is a basic policy.

The third level of archeological review deals with those projects located in unsurveyed areas of the State that are judged as having a potentially adverse impact on archeological resources. At this level professional training and judgment are crucial elements. As mentioned above, only a small portion of the State's archeological resources are known. It is important to note that lack of knowledge concerning a project's impact is not sufficient for a declaration of "negative impact." In essence, where there has been no reconnaissance, the commenting duties of the staff archeologists can be fulfilled by pointing out that assessment of the project's impact is impossible due to lack of data. The assumption must be made that the impact will be adverse until such time as the applicant can demonstrate otherwise. Thus, the burden of proof falls to the applicant.

In practice, and in line with the belief that the review procedure is a service that is performed for the people of the State, projects are reviewed on the basis of a series of probability models for site location. That is, it is possible to predict that if certain ecological and topographic features are present, there is a high probability that the location was inhabited by man. For example, high ground near a source of fresh water provided an ecological setting with an extremely high probability of containing archeological sites. If the project will impact such a location, a reconnaissance survey is required. If it can be determined that the ecological setting is unfavorable for human habitation, the project is cleared. It is at this level that historical documents are examined to assess the possibility of the project impacting on historic period archeological sites.

A certain amount of confusion has resulted from archeological review comments due to the applicant's unfamiliarity with the nature of archeological materials and processes. Almost any archeological work involved with clearing an applicant's responsibility to assess impact on cultural resources could involve three separate, but related, operations. First, the area must be examined to see if it contains archeological sites. This usually involves an archeologist walking over the area, collecting and mapping evidence of previous occupations. This kind of surface collecting and mapping can often tell the archeologist approximately when a site was occupied, how long it was occupied, and indicate the relative archeological value of the site. If no sites are found, or if those located are not significant, the project can be cleared. At times, however, a surface collection does not return enough evidence to assess the site's significance. When this is the case, the site must be tested to see if the surface indications are a true reflection of the site's potential.

Archeological testing is a limited excavation designed to answer specific questions about the value of a site. In the environmental assessment process, testing will tell the archeologist if the site is of sufficient value for nomination to the National Register. When this is the case, the project's impact on the site must be mitigated. However, it must be pointed out that the final determination of eligibility to the National Register lies with the Heritage Conservation and Recreation Service and not with the SHPO or with archeologists in the Department of Cultural Resources.

Archeological sites are, in the truest sense of the phrase, finite and nonrenewable resources. Thus, the most favorable action to mitigate impact is preservation. If projects can be designed so that they do not disturb sites that is preferable to salvage excavations, which can only collect a limited amount of the information contained in a site. It is possible to preserve an archeological site by covering it and building on top. Blacktop or a

concrete pad can effectively preserve a site if it can be put in place without ground disturbance.

The final step in mitigating impact comes once it has been determined that a lack of construction alternatives means that a significant site must be destroyed. In cases of this nature, salvage archeology is the only recourse. A salvage excavation attempts to recover as much information as possible from a site before it is destroyed. This may mean total excavation or it may mean extensive excavations of only the more important parts of the site.

APPENDIX D:**Automated management of data and research results on archeological surveys**

A PROPOSAL FOR DISCUSSION

by Thomas F. King

Archeologist, Interagency Archeological Services

Wilford P. Cole, Chief, ADP Section

The use of automated data processing (ADP) for storage and retrieval of site inventory data has been widely discussed, and occasionally implemented in historic preservation. While this is obviously useful, we believe that for data on archeological resources, at least, it may be more important for planning purposes to keep track of a more general class of information—data on the level and quality of archeological surveys in particular areas, and on the locations of information sources.

It will be many years before the National Register is complete (if it can ever be said to be complete). Only then will it be usable as the sole documentary base for historic preservation planning in advance of land-modifying projects. In the interim, supplemental bodies of data are needed to facilitate application of the processes for compliance with Executive Order 11593, the National Historic Preservation Act, and the National Environmental Policy Act. The most frequently discussed form of supplemental data is the "inventory," which is usually defined as a body of information on properties known to the State Historic Preservation Office (or some other inventory-keeping body), but not yet evaluated for National Register eligibility. The inventory contains all sorts of data on historic properties, ranging from dots on a map to detailed reports, collected by private, local, state, and federal entities. If a property listed in the inventory is endangered, then this triggers an evaluation response leading to a determination of eligibility and compliance with the procedures of the Advisory Council on Historic Preservation. Inventories, however, suffer from the same problems as the National Register—they are incomplete. Many areas of the country have never been "inventoried," and even where inventory data are available these data are not necessarily reliable. An inventory listing by itself provides no basis for considering the reliability or availability of the data. Even more important, the lack of an identified property in a given area does not necessarily mean that there is nothing there. The inventory provides no way of differentiating between areas that have been closely surveyed and found wanting and areas that have simply never been inspected.

Regarding archeological resources, at least, we believe the most useful interim planning tool that could be developed would be a body of consistent, comprehensible, updatable information on the quality of survey work that has been done in each part of the country, and on the disposition and availability of survey data and other useful information. Such a data base would supplement the National Register and the state inventories. This would permit an agency planning a project in a given location not only to find out what known archeological properties exist in the vicinity, but also to find out: the level and intensity of archeological surveys that have been conducted in the vicinity; what areas in the vicinity have actually been subjected to survey; bibliographic citations to and locations of all reports of archeological fieldwork conducted in the vicinity; and locations of all collections of primary archeological data, artifacts, etc., from surveys and excavations in the vicinity. Using such a system would enable State Historic Preservation Officers and federal agencies to clearly determine the need for archeological surveys prior to particular projects, and to mobilize the necessary data to guide, supplement, or take the place of field surveys. Such a system would also permit SHPOs to more effectively plan their

comprehensive statewide surveys. The following points might be useful in organizing such a system.

Design. The Nation should be subdivided into geographical units of some convenient size, but not so small as to make the task of data input unnecessarily difficult, or so large as to render them too general for use in planning. Quadrangles matching 7.5-minute USGS maps might be appropriate, or squares 10,000 meters on a side designated by UTM references. In consultation with the SHPOs, OAHP should develop a method of classifying archeological surveys regarding intensity, comprehensiveness, and reliability, and develop systems for coding the nature of survey coverage in each designated unit. The system should be capable of storing and providing information such as:

"Entire unit has been subjected to Surface survey."

"Shovel testing has been done in about 1/16 of the unit."

"Three cursory surveys have been done but none has covered the entire unit."

It should also be possible to assign each unit a numerical rank based on the extent and quality of the survey work.

Input. Having established the system, OAHP and the SHPOs should arrange for compiling the data for input, as a part of the statewide planning process in each state. This would involve locating and recording the nature of surveys in each unit, in accordance with the classification system, and providing information for each unit as follows:

Bibliographic references on all publications of archeological work within the unit.

Full references and locations on all unpublished reports of archeological work within the unit. If feasible, a copy of each report should be provided to OAHP for placement in the microfiche series maintained by the National Technical Information Service (NTIS). The NTIS designator would then be entered into the system. If access to a document must be limited in some way, this fact would also be noted.

Names and standardized descriptions of all archeological collections from the area, with notes about their locations and availability for study.

The SHPOs in adjacent states should be encouraged to pool their efforts; federal agencies should be encouraged to assist SHPOs as part of their responsibilities under Executive Order 11593, sections 2(a) and 1(3). It would no doubt take several years before a fairly comprehensive data base could be compiled; it would be appropriate to give first priority to units in areas of high development pressure or other potential adverse impacts.

Output. The system should be capable of printing out brief summaries of the level and nature of survey(s), and the location and availability of documentation and collections for any given unit, and printing maps or map overlay sheets of states or other large regions showing the level and nature of survey in terms of numerical ratings for all units within the region.

We believe that developing such a system should be given high priority by OAHP and the states in connection with comprehensive state plan development. Initially, it seems most feasible to centralize the system in OAHP, using existing computer facilities and programming to maintain data input by the states, then providing output to the states and federal agencies on request. Eventually regional data collection centers might be developed.

We solicit comments, criticisms, and counter-proposals. Address comments to Thomas F. King. Archeologist, Interagency Archeological Services, Office of Archeology and Historic Preservation, National Park Service U.S. Department of the Interior, Washington, D.C. 20240.

APPENDIX E:

State archeological co-ops: Their evolution, dangers, and value

A Commentary

by Tom King

Archeologist, Interagency Archeological Services

This article does not reflect an official Office of Archeology and Historic Preservation position. It results from a conversation between Acting Director Jerry Rogers and the author about archeological "cooperatives" -those bands of archeologists in various states that have as their purpose the regulation of archeological research. I will be speaking mostly to State Historic Preservation Officers, who I think seldom either use these groups well or guard against their dangers.

It may be that some archeological co-ops are formed to restrain trade, but I have never encountered such a pirate band. The groups I know have formed in response to pressures much like those that motivate preservation groups. Archeological sites are destroyed, and it dawns on archeologists that the only way to slow the destruction is through unified action. Group members may also be interested in similar kinds of research so they can gain by sharing data and by standardizing methods of data collection.

Once the group is formed it may evolve in two directions. It can be scholarly, dedicated to sharing research results, or it can be action oriented, setting research standards, influencing legislation, working with government, and going to court. Action groups share data, too, but this is not their primary purpose. It is with action cooperatives that I'll be concerned here.

Territoriality

It does not take long for a cooperative to learn that sites are often bulldozed, not because construction agencies are run by blackguards but because of bad professional advice. Although several responses to this realization are possible, it is almost inevitable for the cooperative to begin setting standards, for recognition as a researcher and for research performance. This can be both positive and dangerous. Territoriality runs deep in archeology's collective psyche, demanding defense of one's research turf. There are good reasons for territoriality-if you've done research in an area you probably deal with it better than others, and may need to collect specific data for your research. You've probably invested time developing relations with landowners, governments, planning departments, and historical societies that you'd rather not have upset by some klutz from the next state who breezes in to pluck a juicy contract, failing in the process to collect the data you need. When the territorial imperative leads a cooperative to decide that all contracts in Filmore County must go to Tom Twiddletrowel, however, the cooperative is treading on shaky legal ground and risking intellectual atrophy as well.

Traditional vs. New

A second danger results from the fact that during the last 15 years a major intellectual upheaval has occurred in archeology. To oversimplify: archeology was traditionally involved with the study of culture history represented by change in the forms of artifact assemblages. Big, long-occupied prehistoric sites provided relevant data. Small sites, sites with little complexity, and most historic sites were not recognized as valuable. "New" archeologists tend to study settlement patterns, social systems, and economic systems at single points in history or prehistory and to study how these vary according to conditions. Their best data often come from little sites, and from the spatial relationships among sites.

It is easy for a new archeologist to look on a traditionalist as a fuddy duddy who doesn't understand science. It is easy for the traditionalist to view the new archeologist as a brash upstart. When the new archeologist gets a survey contract-often obscenely large by the standards employed during the 1950's-and crawls around meticulously recording dinky sites, the traditionalist is likely to see this as a rip-off of the taxpayers' money. If a cooperative is dominated by traditionalists, it may adopt standards that exclude new archeologists: if it is dominated by new archeologists it may adopt standards that send traditionalists off in a huff. I have never seen this problem solved by anything better than a truce in which all cooperative members pledge fealty to common principles but regard one another with healthy skepticism.

If the cooperative does not fall into the territoriality trap and if it reaches detente among its epistemologies, it has to cope with money, which is needed for newsletters, secretarial help, legal fees, and the like. It is also faced with problems created by the infusion of federal money into archeology: agencies want advice, consultants want data, environmentalists want to know what to protest about. The cooperative soon finds itself running a clearinghouse-which requires more money. Meanwhile, how is it to enforce those standards it seeks to maintain? Obviously, by reviewing work done in the state and commenting on it-to the responsible archeologist, to the Society of Professional Archeologists, to sponsor agencies, to the SHPO, the Advisory Council, or OAHP. This takes more time and money. Grants are not easy to get, so some cooperatives go into contracting themselves, supporting their coordinative activities through overhead.

This naturally creates new pressures. The cooperative is in a tenuous position if it agitates for compliance with the preservation authorities, if it insists that high standards be maintained in compliance work, and if it offers to do the needed work for money. If the state archeologist, SHPO's archeologist or a contracting agency's archeologist are members of the cooperative, they may be placed in an entirely untenable position.

At this point--or before-many cooperatives decide they would rather not be activist, and their members disappear into their pits and strata. Some SHPOs no doubt say good riddance, but I believe this is short sighted. Until every SHPO has a large professional staff, every agency has professional oversight capability, and OAHP and the Advisory Council are really able to effectively review agency actions, we will need the clearinghouse and watchdog roles that cooperatives can fulfill. Moreover, if SHPOs are to develop surveys and plans that protect and realize archeological research values, they need scholarly guidance and advice, cooperatives are ideal for this task. How, then, can SHPOs help a cooperative avoid pitfalls and realize its potential?

First, the SHPO can be an active participant in or advisor to the cooperative, and by so doing try to insure that the policies established by the cooperative are consistent with preservation principles. Second, the SHPO can involve the cooperative in state plan formulation and in conduct of the statewide survey, not simply as a data source but as a reimbursed participant. Standard setting, data sharing, and review-the basic functions of a cooperative-are appropriate parts of survey and planning, and there is no reason not to support the cooperative in doing them when funds are available. The SHPO can also encourage involvement of the cooperative in broad planning and review by federal agencies, again on a funded basis. This involvement should obviate the need for the cooperative to go into project-level contracting, thus eliminating conflicts of interest.

But what if the cooperative really *is* out to restrain trade, or is dominated by one narrow approach to archeology? No cooperative should be given carte blanche: the SHPO should insist on:

1. No exclusive territories-archeologists working in the same area should cooperate:
2. No discrimination based on theoretical differences:
3. No price fixing-standards must be set for work quality, not price:
4. Procedures that are consistent with those of OAHP and the Advisory Council:
5. Periodic review of the cooperative's activities by OAHP, and perhaps by the Society of Professional Archeologists.

With these controls over their natural tendency to become closed and self-defensive, I believe that archeological cooperatives can be important contributors to any State's historic preservation efforts.

The author is a founder and ex-President of the Society for California Archeology, former Administrator of the New York Archeological Council, and a member of the Board of Directors, Society of Professional Archeologists.

AUTHOR'S AFTERWORD: MARCH 2003

Thomas F. King
March 17, 2003

It was a gratifying surprise to learn that the California Department of Forestry and Fire Protection (CDF) sees continuing merit in my quarter-century-old volume, *The Archaeological Survey: Methods and Uses* (TASMU). CDF's Dan Foster kindly gave me the opportunity to go through the re-typed manuscript to check for errors – which I've done, also adding a few endnotes to explain antique oddities like "HCRS" and to add a caveat or two based on experience since TASMU saw the light of day.

But I've not made any real attempt to update the text, as it could and doubtless should be updated, particularly in such areas as the application of remote sensing. In these days of GPS, GIS, multi-spectral scanning, and radar mapping, with at least one author suggesting that the very need for surface survey will disappear within a few years (Dore 2002), my 1977 treatment of this subject is painfully dated, but others are far more qualified than I to elucidate these technologies and their applications.

However, I would like to add a few general comments about TSMU, based on experience gained in the last twenty-six years, to highlight deficiencies and ways in which the volume might be misleading.

First, let me acknowledge that the thing is loaded with masculine pronouns, only occasionally leavened with references to "she" or "her." I try to be more balanced these days – which may be taken as sensitive or politically correct, depending on the reader's inclinations. On reading TSMU for the first time in maybe 20 years, it seems a bit piggy to me.

Regarding the practice of survey itself, one major problem with TSMU is that it doesn't nearly enough emphasize the importance of *talking with people*. The need to understand people's perceptions of their cultural environment is especially evident when one gets beyond archeology to deal with traditional cultural properties (Parker & King 1990; King 2003) and other places whose value lies more or less exclusively in people's heads, but it exists in strictly archeological contexts too. The descendants of the folk who created the archeological sites – and those who, while not demonstrable descendants, nevertheless feel responsible for the places – need to be consulted so their concerns can be respected. The artifact collectors who've seen and often picked or dug stuff up from a site are likely to have a far more intimate knowledge of it than any archeologist can get in a quick inspection. Farmers, ranchers, loggers, forest managers – all may have relevant data about sites and their environments, and important ideas about how both should be managed. I can't emphasize it enough – archeological surveys should include finding and talking with real live people who know or care about the area being surveyed.

Which brings me to a second point. In 1977 we needed to convince managers that they needed to do archeological surveys; in 2003 we sometimes need to persuade them that they do *not*, or more often, that a mere archeological survey is not enough to satisfy the cultural resource management (CRM) laws and regulations (See King 1998a, 1998b). Ideally, I think, for the purposes of CRM we shouldn't be doing or requiring the conduct of

archeological surveys per se. We ought to be looking for all kinds of cultural resources, or at least all kinds of historic properties, using the interdisciplinary expertise and methods appropriate to so doing. I think our continued division of the CRM world into disciplinary hegemonies, each with its specialized methods, is irresponsible, counterproductive, and silly. We should develop a manual on the methods and uses of comprehensive cultural resource identification to replace TASMU.

Somewhat related to the above is a more nitty-gritty problem with TASMU – it never deals with APEs. The Area of Potential Effects is the area within which a project like timber cutting or road building may have effects on historic properties, or more broadly on cultural resources. Too often people equate the APE with the project footprint – where the road will be built or the trees cut. For archeology it often needs to be more than that – embracing the area where the road will allow trees to be cut, or people to build homes or fast food joints, or sport utility vehicles to access pristine landscapes. For cultural resources beyond the archeological the APE may need to be broader still – including areas where visual, auditory, social, and other non-physical effects may occur. TASMU doesn't discuss APE definition, and it probably should have.

Finally, TASMU was very much a product of its time and place. The time was one in which we were trying to make people take the National Register of Historic Places seriously. The place was what had been and would soon again be that part of the National Park Service concerned with external historic preservation programs. As a result, TASMU really pushes the idea of documenting sites according to National Park Service, National Register standards. We overdid it, and people bought it with altogether too much enthusiasm. There are lots and lots of contexts in which documenting sites (or anything else) to the standards of a National Register nomination is unnecessary, counterproductive, and plain dumb. I was drifting toward this realization when I wrote TASMU, which contains some inklings of it, but as an antidote to TASMU's general emphasis on documenting the bejeebers out of sites, let me shamelessly recommend that the reader take a look at some of my more recent publications that treat this issue among others (King 1998a; 2000, 2002, 2003).

That said, I appreciate CDF's interest in keeping TASMU available for use in the field, and hope that this re-issue will be helpful to practitioners and managers alike. And thanks to Dan Foster and his colleagues for their careful editing.

Thomas F. King
Silver Spring, Maryland

Endnotes

¹ The Heritage Conservation and Recreation Service (HCRS, naturally called “Hookers”) was the Carter administration’s abortive effort to combine the “external” (non-park) functions of the National Park Service (NPS) with those of the Bureau of Outdoor Recreation. Under the next president, Ronald Reagan, these programs were folded back into NPS.

² The Office of Archeology and Historic Preservation (OAHP) was the NPS office that at the time oversaw the Park Service’s external historic preservation functions.

³ These guidelines were to be appended to 36 CFR 66, regulations implementing the Archaeological and Historic Preservation Act of 1974. The regulations, though completed in draft, were never issued.

⁴ The regulations cited above.

⁵ Now the NPS Archeology and Ethnography Program.

⁶ Organizing this typology was an important rationale for writing and publishing this booklet – in part as a reaction to the developing tendency at the time to categorize all archeological survey (and data recovery) into three simpleminded phases – Phase I being find stuff; Phase II being test it to determine eligibility; Phase III being dig it all up. Unfortunately, in the author’s view, it never caught on.

⁷ Experience has shown (the author, at least) that the notion of a rigid separation between finding sites and evaluating them was simpleminded and counterproductive. It is often most efficient to find and evaluate sites in a single operation, or to assume the eligibility of sites that appear likely to be important enough (for whatever reason) to consider in planning.

⁸ Now the Natural Resource Conservation Service (NRCS).

⁹ Of course, there has been great progress made in remote sensing since 1977; a host of more contemporary sources of guidance are available on satellite imaging and other techniques.

¹⁰ Sic: NRCS

¹¹ This statement, naturally enough, reflects a narrow archeological perspective. A very badly disturbed site that has lost all research integrity may still be important to, say, a descendant community. While no archeological survey may be needed in a disturbed area, consultation with possible concerned parties may be entirely appropriate.

¹² If this guidance was ever issued, the author doesn’t remember it.

¹³ Abuse of this guidance, which was based on Section 304 of the National Historic Preservation Act, led to amendments to Section 304 in 1992. Except on Federal land under Section 9 of the Archeological Resources Protection Act, an agency can no longer unilaterally keep information confidential under Federal law. Under Section 304 as amended, the decision must be made jointly with the Secretary of the Interior, represented by the Keeper of the National Register, and the Secretary can then decide who gets access to the data.

¹⁴ This direction, experience has shown, should not be taken literally and rigidly. There are many instances in which it is efficient and appropriate simply to assume eligibility without going through all the folderol of formal documentation. While the National Register likes lots of documentation, such documentation should not (in the author’s opinion) be prepared unless there is some actual planning reason for doing so – it shouldn’t be done just because “that’s the way it’s done.”

¹⁵ Here again, the rather inflexible-seeming direction to do “complete survey” has proved to be misguided. “Complete” survey – meaning to cover all the ground in enough detail to arguably find everything – is often appropriate and efficient, but often is not necessary. In the words of the Secretary of the Interior’s Standards for Identification (issued in 1983), identification should be done to the extent needed to make a management

decision. Predictive survey may be a substitute for “complete” survey in the context of large-scale project planning as well as in more general contexts.

¹⁶ Office of Management and Budget Circular A-95 had all states set up “A-95 Clearinghouses” to coordinate review of Federal actions by State agencies under all legal authorities. This system was abandoned as inflexible by the Reagan administration.

¹⁷ See endnote 16.

¹⁸ “11593” was a newsletter then issued by OAHP. It has since been more or less replaced by the NPS publication “CRM”

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