

**AN OVERVIEW OF THE ARCHAEOLOGICAL RESOURCES
IN THE SAN JUAN-RIO GRANDE NATIONAL FOREST:
MANCOS-DOLORES, COLUMBINE AND PAGOSA DISTRICTS**

**A Report Prepared for
the San Juan-Rio Grande National Forest,
United States Department of Agriculture**

compiled by

Philip Duke

**Center of Southwest Studies,
Fort Lewis College,
Durango, CO 81301-3999**

With contributions by:

***Mona Charles
Bonnie Hildebrand
Jack Pfertsh
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Abstract

This document is one element of a three-year cultural resources program review of the Mancos-Dolores, Columbine and Pagosa Districts of the San Juan-Rio Grande National Forest by Fort Lewis College, under the terms of a participating agreement (# 110209019601). The document provides an overview of the current state of knowledge regarding the cultural resources located on this portion of the forest. The document is intended primarily to serve forest managers and archaeological consultants working on the forest by providing them with a current overview of those resources, a series of management recommendations, and a listing of research themes that require further investigation.

Acknowledgments

The contributors to this volume are indebted to the district archaeologists of the San Juan-Rio Grande National Forest, Laura Heacock, Sharon Hatch and Bruce Ellis, for their support of this work and their willingness to supply us with information and advice. Gary Matlock and Bob York, previously Forest Archaeologists for the SJNF, provided valuable historical perspectives on the development of the cultural resources program on the forest. Gary, who initiated this project when he was Forest Archaeologist, also served as an excellent sounding board for our ideas. Adam Duke prepared the computer graphics. Finally, we owe a special debt of gratitude to Laura Heacock, our primary forest liaison. Without her total support, encouragement and help, this document would have been much poorer.

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CHAPTER 1

Introduction

In 1994, Fort Lewis College entered into a three-year participating agreement with the then-San Juan National Forest (SJNF) to produce an overview of the cultural resources program of the San Juan National Forest for use in the forest plan revision. The work was conducted by students at Fort Lewis College (FLC) and appropriate specialists, under the general supervision of Philip Duke. This project was treated as an amendment to an existing participating agreement between SJNF and FLC (# 110209019601). This present document represents one component of the project, a synthesis of existing cultural resources on the San Juan National Forest, plus two appendices that relate to ten-year program goals and a proposed reorganization of certain aspects of the program. Although the San Juan National Forest has now been amalgamated with the Rio Grande National Forest, this overview pertains only to the former. Consequently, the mnemonic *SJNF* is used throughout the rest of this document to refer to the actual area under study: the Mancos-Dolores, Columbine and Pagosa Ranger Districts of the newly formed national forest (Figures 1.1; 1.2).

The goals of the project were initially defined as follows:

1. Identify and assemble all of the existing Heritage Resource data on the Forest and at the College including but not limited to the following:

- ◆ all sites recorded on Colorado or USFS site forms.
- ◆ all sites and locations recorded on overlays and topographic maps.
- ◆ all site information whether formally recorded or not that may exist within the files of the Forest or at the State Historic Preservation Office.
- ◆ all data currently maintained on the computerized data bases maintained by the forest and those data maintained by the SHPO and the Anasazi Heritage Center.
- ◆ the existence and location of other data information sources such as at universities, archives, individuals and others. These data will not be assembled and synthesized unless it is determined to be necessary for the production of the Overview. This information will be an appendix to the final report.

- ◆ all historic documents, photographs, maps, and other historic data available at the Forest offices or at Fort Lewis College. Other data sources and locations will be identified as they are known and can be identified.
- ◆ location and nature of all archaeological and historical collections from the forest that can be identified and as may currently exist in museum, forest, college and other inventory files. This information will be collected and presented as an appendix to the final report, but will only generally be included in the Overview as it may be relevant to future management, public use, and research programs.

All of this information will be organized by a set of appropriate themes, subject categories, research categories, or other methods that will allow users of the information to quickly and easily assess the information. This information may be presented in computerized, hard copies, graphic or other appropriate form. All of this information and data will be summarized and synthesized in an overview final report.

Consideration will be given to integrating this data into the District Data Base Production Heritage Resource data base design being developed for project 615. However, other forms may be used as agreed upon and as may be appropriate.

2. Identification and presentation of Management, Research, and Preservation Opportunities:

The College and the Forest will develop a set of management opportunities, goals, and directions for the forest heritage plan within a generally defined 10 year plan for consideration for inclusion in the Forest Plan revision. While these opportunities need not be comprehensive and specific, they should address a broad spectrum of themes, resource types, public uses, and other objectives.

Specific opportunities and recommendations include but should not be limited to the following:

- ◆ Sites needing active preservation or stabilization efforts.
- ◆ Sites and locations that are or may be eligible for the National Register and are significant for management. The opportunity will also be taken for the development of evaluation criteria and some level of priority setting.
- ◆ Sites and locations that have or may have opportunities for public development for interpretive, adaptive use, recreational use, research, or educational use.

- ◆ A set of long- and short-term research goals and objectives for the forest for the next decade. Consultation with other researchers and professionals should be made in this effort.
- ◆ Necessary curation and conservation for the protection of artifacts, historic documents, and in-place objects.
- ◆ Broad programs and procedures for the protection of heritage properties under legal requirements (section 106) and normal resource protection programs of the Forest Service.
- ◆ Public programs and involvement to assist in the public use and preservation of heritage sites on the forest.
- ◆ Interagency opportunities and programs that will assist the public and professional communities.

3. The project will examine existing professional procedures and technologies and will recommend additional technologies and procedures that will make the program more technologically current, efficient, productive, and relevant to the larger communities of Historic Preservation professional practices in the US and abroad.

4. Present all of the data, syntheses, and opportunities in a collected report or overview that will include as necessary appendices, photos and other visual depictions.

5. Permit internal and external review of their overview document and associated data presentations and revise as agreed upon by both parties.

As the project evolved over the three years in response to changing fiscal priorities, some of these goals were modified. For example, currently Project 615 is on hold, and consideration on the integration of the existing data base into this new system was consequently postponed.

Document Organization

This current document contributes to overall project goals, as it synthesizes the current state of knowledge on the cultural resources found on and administered by the SJNF, paying particular attention to the contexts of contemporary archaeology and federal politics by which the SJNF cultural resources program is ultimately controlled. This document will, it is hoped, serve as a point of reference for archaeological, historical and ethnographic studies in the forest and for the

management of the forest's cultural resources. However, this document does not attempt to accomplish specific primary research on any particular topic of SJNF archaeology; such a task is beyond the scope of this project. At the same time, we have placed emphasis on a conceptual approach to the archaeology of the forest, rather than to the production of lists of data whose utility is questionable without specific management or research problems in mind.

The document is organized by the following chapters: (1) Introduction; (2) The cultural resources program on the San Juan National Forest: a brief history; (3) Ten-year goals for the cultural resources program on the San Juan National Forest; (4) The natural environment of the San Juan National Forest; (5) A review of archaeological investigations on the San Juan National Forest; (6) The archaeological record of the San Juan National Forest; (7) The Paleoindian Period; (8) The Archaic Period; (9) Ancestral Pueblo; (10) The Late Prehistoric Period and the Historic Native Americans; (11) The Historic Period; (12) Concluding summary. Additionally, four appendices are provided: (I) The geoarchaeology of the San Juan National Forest; (II) A projectile point chronology for the San Juan National Forest; (III) A study of high-altitude ceramics on the San Juan National Forest; (IV) Scarred trees on the San Juan National Forest.

A management summary of the pertinent elements of this report has been prepared for forest managers and other interested parties. This summary includes a brief synopsis of the archaeological resources of the forest, a brief history of the cultural resources program on the SJNF, and a series of recommendations for the ten-year goals for the program.

CHAPTER 2

The Cultural Resources Program on the on the San Juan National Forest: a Brief History

(Primary Author - Jack Pfertsh)

This chapter gives a brief overview to the development of the cultural resources program on the SJNF and is primarily concerned with the various legal mandates to this program. However, attention is also paid to the theoretical and methodological paradigms under which most archaeological investigations on the forest have been conducted since the inception of the program.

Legal Mandates for the Cultural Resources Program

There exists a variety of statutes that have relevance to the protection and management of cultural resources on federal lands. However, for the sake of brevity, this section is concerned only with those pieces of legislation that specifically and primarily are concerned with the historic preservation on federal lands, particularly those administered as National Forests.

After the creation of Yellowstone National Park, in 1872, the world's first, an interest grew in conserving not only the scenic wonders of North America but Native American cultural remains as well. This mounting concern led to the passage of the *Antiquities Act* of 1906, which allowed the President "to declare by public proclamation (as national monuments) historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest." Although the act applied to all federal lands, only the National Park Service actively used the act to protect their cultural resources. The *Historic Sites Act* of 1935 extended the preservation mandate of the federal government by giving the Secretary of the Interior the power to create and maintain a historic preservation program "for the inspiration and benefit of the people of the United States."

Despite the efforts of the *Historic Sites Act* a large number of historic properties considered to be less than nationally significant continued to be neglected or destroyed. For this reason the landmark *National Historic Preservation Act* was enacted in 1966 and became the base line of federal laws governing the preservation of archaeological resources on a federal, regional, state, and local level. This

act was amended in 1992 and included the key provisions of *Executive Order 11593*, which required comprehensive surveys of all federal lands and gave state and local governments greater power in the treatment of cultural resources. The law established the Advisory Council on Historic Preservation, State Historic Preservation Offices (SHPOs), and the standards for professional work on federal land and the evaluation of archaeological sites for nomination to the National Register.

Section 106 was also born out of the *National Historic Preservation Act*. *Section 106* is the structural basis of the national policy that supports private and public entities in their efforts to locate, identify, evaluate, and protect historic and archaeological properties. *Section 106* requires that all Federal agencies consult with the individual state and the Advisory Council to determine the effect of any undertaking on cultural resources. Also, the *Section 106* review process requires that federal agencies recommend the most appropriate way of managing those resources. In turn, individual SHPOs are required to review and comment on the report.

Archaeological and historic sites that are deemed to be especially significant can be further protected by being placed on the *National Register of Historic Places*. The federal legal criteria used in this evaluation are found in 36CFR60 and are as follows:

The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- ◆ that are associated with events that have made a significant contribution to the broad patterns of our history; or
- ◆ that are associated with the lives of persons significant in our past; or
- ◆ that embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- ◆ that have yielded or may be likely to yield information

in prehistory or history.

Whilst such criteria have worked reasonably well for assigning significance to prehistoric sites, they have been somewhat less successful for historic-period sites, however. As Horn (1992) has pointed out, significance criteria tend to emphasize the importance of multi-component sites that might provide evidence of diachronic change. However, virtually all historic-period sites are by their very nature single-component. Therefore, they often fail to meet a very important criterion and are often declared ineligible for nomination to the National Register. It can also be argued that historic-period sites have been undervalued precisely because of their time period, the erroneous assumption often being made that such sites can contribute little, if any, *new* knowledge to text-aided histories.

The *Archaeological Resource Protection Act* of 1979 (ARPA) was another important piece of legislation to aid in the preservation of cultural properties. The legislation was enacted to serve two key purposes. The first is "to protect irreplaceable archaeological resources on public land and Indian lands from unauthorized excavation, removal, damage, alteration, or defacement." This goal has been met by requiring individuals to obtain permits to carry out any archaeological studies, surveys or excavations on federal lands. Further, any person making use of archaeological resources without a permit is subject to criminal and civil penalties. The second provision of the act directs that "the Secretary of the Interior shall take such action as may be necessary to foster and improve the communication, cooperation, and exchange of information among private individuals, Federal authorities responsible for the protection of archaeological resources on public lands and Indian lands, and professional archaeologists and archaeological organizations, in order to expand the archaeological resources of the United States" (Federal Register: Vol. 49 No. 4/ Jan. 6, 1984). In 1988 ARPA was amended and became final rule in 1995. The amendment was enacted to enhance the preservation and management of archaeological properties and to fortify the enforcement provisions of the act (Federal Register: Vol. 60 No. 17/ Jan. 1995).

To a lesser extent the *Reservoir Salvage Act* of 1960 has also been incorporated into the laws observed by the San Juan National Forest Cultural Resource Management Program. This law was established "to provide for the recovery and preservation of historical and archaeological data including

relics and specimens that might be lost or destroyed as a result of the construction of dams, reservoirs and attendant facilities and activities." (Forest Service Manual title 2300 chapter 2360)

Keyed more specifically to Federal agencies is the *National Environmental Policy Act* of 1969 (NEPA). This law states that "it is the policy of the Federal Government to preserve important historic, cultural, and natural aspects of our nation's heritage. Compliance with NEPA includes compliance during project planning and execution with other measures for the protection of environmental values." (Forest Service Manual title 2300 chapter 2360)

Two final legislative provisions governing the Federal Cultural Resource Program are specific to the treatment of North American Indian Tribes. The first is the *American Indian Religious Freedom Act* (AIRFA). This provision requires all federal agencies "to evaluate their policies and procedures in consultation with native traditional religious leaders in order to determine appropriate changes necessary to protect and preserve Native American religious cultural rights and practices."

The second is the *Native American Graves Protection and Repatriation Act* of 1990 (NAGPRA). NAGPRA encompasses two major functions. The first requires that all federally funded agencies and museums inventory human remains and associated funerary objects. Further, these agencies are requested to provide a written summary of unassociated funerary objects, sacred objects and objects of cultural patrimony in their collections. Once this task has been accomplished, these organizations must notify Indian tribal organizations thought to have cultural affiliation with the objects in question and offer them an opportunity to reclaim the remains or items. The second intent of the law is to foster protection of Native American graves and sensitive material still present on Federal and Indian lands. In the event that such items are located during ground-disturbing activities, the law requires that affiliated or potentially affiliated tribal groups be consulted as to the treatment or disposition of human remains or cultural objects in question.

The San Juan National Forest Cultural Resource Program is also governed by internal forest-specific directives. One such directive is outlined in the *Cultural Resources Assessment* written by Robert York for the *Forest Plan* in 1980, revised in 1984 and again in 1987, as a set of goals for the cultural

resources program:

- ◆ Locate, determine significance, and, where appropriate, preserve historical and archaeological sites.
- ◆ Manage exceptional historical and archaeological sites for increased public use and visitation, while still protecting the values of the site.
- ◆ Make historical and archaeological sites available for study by agencies involved in research.

Another internal directive that became effective in 1990 is the *Forest Service Manual* (FSM), title 2300 chapter 2360 - "Special Interest Areas" and chapter 2361 - "Cultural Resources". These chapters provide guidelines for cultural resources personnel working on the forest.

Finally, **the evaluation of the significance of sites is also guided by criteria established in a series of context reports published by the Colorado Historical Society in 1984. Guthrie et al. (1984:53-55) identified six general research problems that could guide future work in the Colorado mountains:**

- 1) ***Chronology.*** There is still a lack of absolute dates for mountain sites. Reliance on projectile point and other artifact typologies creates difficulties in interpreting the reasons for similarities between this region and others. There is a need to develop local chronologies.
- 2) ***Impact of surface collecting and vegetation cover on the data base.*** This is essentially a problem of sampling.
- 3) ***"Diversity of cultural types" vs. "Indigenous mountains-oriented culture".*** Does the archaeological record suggest that the mountains were used primarily by groups whose primary territories lay elsewhere, or did the mountains support indigenous groups?
- 4) ***Resource exploitation in the region.*** How exactly were the mountains used? Were they used only seasonally or were they used by groups permanently resident in them, (or both)?
- 5) ***Variables affecting site location.*** Why were sites located where they were, and why are some areas lacking in sites altogether?
- 6) ***Other research domains.*** These include exchange systems, social organization,

group interactions, movement of peoples, paleoenvironmental reconstruction, and technology.

History and Current Organizational Structure of the Cultural Resources Program

It must be pointed out at the beginning of this section that, unlike the National Park Service, historically the Forest Service was not established to protect and manage cultural resources; therefore, there is little historical tradition or even awareness in many instances today of the importance of these resources. This problem has been exacerbated by recent changes in congressional priorities for the National Forests. This section is organized around a discussion of the contribution of the various archaeologists who have led the program since its inception. However, it hardly needs noting that these individuals, while important, are themselves under the influence of wider disciplinary paradigms, as well as governmental policy.

Although inventory procedures had been carried out on the forest since 1974 by archaeological contractors and seasonal archaeological technicians, by 1978 a permanent cultural resources specialist position had been created. Bob York became Forest Archaeologist in that year, after serving four years as the Bureau of Land Management state archaeologist for Nevada.

York completed a Cultural Resources Assessment of the forest in 1980, and this text was later revised in October of 1984 as part of the San Juan National Forest Management Plan. The 1984 document was the first of its kind among regional forests, not only describing the current state of the program, but also outlining future management directions. The following is taken directly from the *Forest Plan - Selected CRM Direction* (section III, pp14 and 15) and outlines the proposed Cultural Resource Management Program for the San Juan National Forest:

1. *Protect, find an adaptive use for, or interpret all cultural resources on National Forest System (NFS) lands which are listed on the National Register of Historic Places, the National Register of Historic Landmarks, or have been determined to be eligible for the National Registers.*
2. *Nominate or recommend cultural resource sites to the National Register of Historic Places by 1990 in the following priority:*

- ◆ Sites representing multiple themes.
 - ◆ Sites representing themes which are not currently on the National Register within the state.
 - ◆ Sites representing themes which are currently represented by single sites.
3. *Protect and foster public use and enjoyment of cultural resources.*
- ◆ Complete cultural resource surveys prior to any ground disturbing project.
 - ◆ Avoid disturbance of known cultural resources until they are evaluated and determined not significant.
 - ◆ Collect and record information from sites where there is no other way to protect the properties.
 - ◆ Issue antiquities permits to academic institutions or other organizations for the study and research of sites.
 - ◆ Protect appropriate cultural resource properties for ceremonial/ religious or other socio-cultural purposes by Native Americans and other cultural/ethnic groups.

During York's tenure, a para-professional program was instituted on the SJNF. The goal of the program was twofold. The first was to enlist the aid of non-archaeologically trained SJNF specialists to do small CRM inventories and ease the large compliance load. The second goal of the Para program was to involve the public and other forest employees in CRM work, thus offering them, as it were, an inside look at the importance of the program, and in turn forming an alliance with the public at large. Although the program has largely been abandoned on other forests, it is still a component of the San Juan-Rio Grande National Forest CRM program.

The Forest Intern Program was also created to enlist students involved in BA, MA, and PhD programs to work as crew members for the forest on a volunteer basis. Not only was this program pivotal in alleviating the CRM compliance schedule, it was also extremely beneficial to the student. The intern program allowed the student the opportunity to gain valuable field experience.

York was also responsible for the historical markers program, in conjunction with the Colorado Federation of Womens' Club. The program involved marking key historical sites with

interpretive signs. Again, this program was initiated to accomplish a multitude of functions. First, the signs were a way to educate the public about historic sites, as well as spread public interest in these sites. Second, the signs were a way of building empathy towards cultural resources. Most importantly, the signs were utilized to give subtle messages on the illegality of looting historic and archaeological sites.

In 1983 energy exploration was at its peak in southwestern Colorado, with companies extracting gas, oil, and coal wherever the opportunity presented itself. A coal mining company found coal reserves on 80 acres of the Chimney Rock Archaeological Area and attempted to mine it. The acreage was surveyed by an archaeological contracting firm in compliance with Section 106; however, nothing was recorded that would halt the project. In order to ensure total protection of the area, York argued that the area should be protected not only for its archaeological sites, but also because of the presence at Chimney Rock of an endangered species, the peregrine falcon. The courts upheld the forest plan, citing that the overall landscape, and not just its specific structures, was important in defining an archaeological preserve. Chimney Rock Archaeological Area was subsequently designated as a Chacoan Site, and thereby protected by the Chaco Site Protection Act of 1980. In 1984, two individuals were convicted and fined for looting eleven prehistoric burials in the Chimney Rock area. The fine was signed over to the Cultural Resource Management program on the San Juan National Forest, again setting precedence for Cultural Resource Management on federal lands.

York left the SJNF in 1988 and was replaced as forest archaeologist by Gary Matlock until his retirement in 1994 (Matlock had worked as a seasonal archaeologist on the forest since 1986). Like his predecessor, Matlock felt that the Cultural Resources Program needed to include public involvement and therefore implemented several *Passports in Time* (P.I.T.) projects on the forest. Matlock was also responsible for creating a long-term research cooperative program with Fort Lewis College and partially funded research survey and excavation at the Turkey Springs Analysis Area and Freeman Park. Fort Lewis College also conducted an archaeological field school at Chimney Rock in 1988, and initiated an archaeological G.I.S. program for the forest.

Matlock was a chief proponent of the San Juan National Forest's historic-period resources. Because many of the historic buildings within the borders of the SJNF are no longer utilized for their

original intended purposes, some forest administrators felt that the buildings should be allowed to deteriorate. However, this was challenged by Matlock, who argued that these resources could still be used by the public as a means of protecting them. Therefore, Matlock began the process of refurbishing selected historic structures. For example, guard stations and fire towers are currently being rented to the public on a daily basis. Also historic cabins, once old homesteads, are being turned into living interpretive history areas. The creation of the Falls Creek Archaeological Area is part of the overall involvement of the public in conserving the forest's cultural resources, as is the expansion of tour facilities at Chimney Rock Archaeological District.

Laura Heacock began working on the San Juan National Forest in 1988 and became a permanent employee in 1990. Heacock was assigned to the west zone (Mancos-Dolores); one of the first archaeologists to be given zone/district responsibilities. Heacock has placed much of her efforts into the forest's compliance programs. For example, she has authored numerous memoranda of understanding (MOU) on behalf of the forest cultural resource management program. The MOU have been the avenue necessary to clarifying, strengthening and streamlining the compliance process.

Sharon Hatch began working on the San Juan National Forest in 1985 and took a permanent position in 1992. Hatch's philosophy is to provide a broader heritage program that goes beyond just compliance with Section 106 of the National Historic Preservation Act. To achieve this goal Hatch felt that section 110 of the National Historic Preservation Act needed to be applied to the program, as well. Section 110 allows forest archaeologists to inventory areas on the forest in a pro-active, rather than simply a reactive, manner. Hatch has also initiated a dialogue between Native American groups and the SJNF on the future management of the Falls Creek Rockshelters.

Bruce Ellis was hired as the Pagosa Springs District Archaeologist in 1995. Ellis has also focused his attention on compliance issues, particularly as they pertain to prescribed burning, and has developed an agreement with the State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation concerning the systematic burning of the national forest. All three zone archaeologists have continued to develop cooperative agreements with local institutions and to involve the public through P.I.T. projects.

Prior to 1994, the cultural resource program on the SJNF was administered by a Forest Archaeologist, headquartered in the Supervisor's Office. However, in 1994, the San Juan National

Forest underwent a drastic change to its infrastructure, as a result of the "reinvention of government" proposed by the first Clinton administration and the subsequent amalgamation of the San Juan National Forest with the Rio Grande National Forest. Many middle-management positions in the Supervisors Office (SO) were eliminated through early retirement buyouts. Individuals not eligible for these buyouts were reassigned to the zone districts.

Consequently, the administration of the CRM program was no longer located in the Supervisors Office; rather, primary administrative responsibilities were shifted to individual forest zones. Currently, the San Juan Forest is split into three zones/districts, and each of these has its own zone archaeologist to carry out projects on a local level: Bruce Ellis (Pagosa Springs), Sharon Hatch (Columbine), and Laura Heacock (Mancos-Dolores). The individual archaeologists also have specific forest-wide program responsibilities, such as compliance, grazing and Native American consultation.

Because of the middle management voids created by the line office buyouts, the forest supervisor urged forest personnel to create office-specific self-directed teams, who would share their specialist talents and strengths across district boundaries. A result of this directive was the creation of the Heritage Team. The function of this team is to collectively evaluate the direction of the heritage resource management program as it relates to the entire San Juan-Rio Grande National Forest. Most significantly, it includes in its membership non-forest personnel. These have full voting rights in team decisions.

Although this reorganization was initiated by budgetary priorities, nevertheless the "team concept" has worked remarkably well thus far, in that it provides a way of integrating the diverse talents of individual team members to most efficiently manage the heritage program, at a level beyond that which could be provided by any one individual. Moreover, locating district archaeologists in the district offices has increased awareness by forest personnel of the importance of protecting and managing heritage resources.

Monitoring Programs

The Cultural Resources Program on the forest has drawn up a monitoring program for sensitive sites in its jurisdiction, based on site types and potential impacts to them. In 1987, Robert York drew up a list of specific sites, both prehistoric and historic, that needed to be monitored,

together with the specific monitoring procedures for each of them (Authorities: FSM 2360, Forest Plan and 1984 State of Colorado/Regional Forester Agreement). This plan also provided for *general directions* for the monitoring of archaeological resources. Additionally, sites in the Anasazi Archaeological District are protected by their own monitoring plan (Exhibit B of BOR/FS McPhee Reservoir Transfer MOA of 5/18,86, Action Item #1, and the SJNF FY '93 Monitoring Plan):

Red Priority Sites should be checked with a documented visit at least once a month during periods of fair weather. These sites are highly visible and within or adjacent to high visitor use areas.

Green Priority Sites should have at least six documented visits per year. These sites are highly significant and visible properties, but they are not easily accessed. They are particularly vulnerable to professional looting.

Yellow Priority Sites should be monitored during low water periods on the reservoir. These sites are subject to wave damage as they contain intact architecture and/or features and are located between the high and low pool lines.

Blue Priority Sites should be monitored at least once a year as part of a comprehensive inspection of the overall McPhee/Dolores River area. Individual resources are not identified here, rather sensitive areas.

Unfortunately, despite every effort, because of financial and personnel constraints, forest archaeologists find it impossible to conduct this level of monitoring, either in the Anasazi Archaeological District or elsewhere in the forest.

Chapter 3

Ten-Year Goals for the Cultural Resources Program on the San Juan National Forest

The Forest Plan mandates that each functional unit establish ten-years goals and strategies. The goals recommended here are based on a questionnaire sent out to individuals, both professionals in the field of cultural resource management and preservation, and members of the public, and on interviews with the SJNF district archaeologists.

Continuing Development of a Cultural Resources Management Program

The current program concentrates on the prehistoric and historic *archaeological* resources of the forest. However, it is recommended that a fully developed cultural resources management program integrate other important aspects of cultural heritage. This should ideally include a definition of cultural resources that includes spiritual and cultural values of past and present users of the forest. This will require a definition of traditional cultural properties that includes both American Indian and Euroamerican values. It will also require the completion of a comprehensive ethnographic overview of the forest. We also recommend that individual community advisory groups be established by the heritage team to provide advice on an *ad hoc* basis regarding the correct management and treatment of *all* cultural resources.

Compliance

The SJNF needs to develop a full compliance program that complies with both Section 106 and 110 of the National Historic Preservation Act. This needs to include site evaluation and the preservation and monitoring of those sites that have national significance and/or particular sensitivity for Native Americans. Site surveys need to be pro-active rather than reactive, in the sense that site significance needs at least to be partially determined by the specific research and management goals established by the forest cultural resources personnel, rather than being project-driven, as it is now. In particular, there is a need to attempt to conduct “landscape-level” inventories that are based on meaningful archaeological landscapes, however they may be defined in the future, rather than by

management units that may have little or no relevance to past land-use patterns. Compliance projects should be used to integrate research and management goals established by the cultural heritage program, rather than serving as "stand-alone" projects with the potential risk of data and information replication such a strategy implies.

The program needs the ability to continue to evaluate sites after their initial location and recording. Currently, there are too many archaeological sites whose eligibility status is undetermined because they "need-data". In this regard the program needs to establish a comprehensive monitoring program of sites. A monitoring plan for cultural resources on the forest was established in 1987, and a specific monitoring plan for sites in the Anasazi Archaeological District was established in 1993. However, neither of these has been implemented because of lack of adequate personnel, and resource and time availability.

Public Involvement and Partnerships

Given the congressional budgetary pressures, the cultural resources program should develop more partnerships and grants with public entities and educational institutions in order to promote awareness of the importance of the program and to assist in the fulfillment of its responsibilities. However, there is a finite number of partners, especially local partners, and the Forest Service is not providing sufficient money to attract partners.

The shift in the last two years to a more traditional role for the Forest Service has clearly devalued the importance of the cultural heritage program. Congress rejected the Forest Service's concept of ecosystem management, but the Clinton administration apparently wants this to continue. Heritage tourism is seen by Forest Service regional management as a means of producing a public product, which is in fulfillment of Congressional intent. However, it appears that in practice, Congress wants to see the forest primarily, if not exclusively, as a source of timber and animal grazing lands.

In line with the need to develop monitoring programs for significant sites, the program should consider developing "adopt-a-site" projects and other volunteer-assisted site stewardship programs. However, it should be pointed that the use of para-professionals must be strictly monitored, not just because of the need to ensure that quality of their work is adequate in terms of accuracy of site

location, description and analysis, but also in order to ensure that they display the appropriate cultural sensitivity to sites, especially aboriginal ones. Archaeology was historically seen by many in society as non-essential, almost a luxury, and forest archaeologists must be careful to ensure that the use of para-professionals is not perceived as indicating that the resources themselves are not important.

Native American Involvement

Native Americans are a very important constituency in the management of archaeological sites on the forest. The mandated consultation with Native Americans is appropriate and desirable, and should offer the benefits of mutual understanding. It is, therefore, commendable that the cultural resources program on the San Juan-Rio Grande National Forest is attempting to improve the lines of communication to Native Americans by periodically issuing bulletins to tribes on all projects that might affect cultural properties of importance to them, personally visiting tribal governmental agencies, and working on a culturally appropriate and sensitive consultation protocol that ultimately will lead to agreements with Indian tribes regarding which site types and/or projects will require consultation. A detailed and intensive ethnographic overview of the forest is an essential element in ensuring that tribal concerns are met, and it is recommended that the preparation of such an overview be a high priority for the cultural resources program.

The forest, in consultation with Native American tribes, needs to define what constitutes a TCP (traditional cultural property). Their significance for National Register eligibility needs to be evaluated and an appropriate management plan for them adopted. This might result in popular archaeological sites like Falls Creek and Chimney Rock being closed off to public access, because they contain, or contained, aboriginal burials. However, such a management plan must be done in consultation with other affected constituencies. If site access is limited or prohibited, then there needs to be public education regarding these decisions, including but not limited to, signs that inform the public of why access is forbidden.

Interpretation of sites should be more responsible and sensitive to cultural needs. The message should not be restricted to a western-centric scientific interpretation of the site. **An archaeological site can be the beginning of a debate about the present, rather than the end of a**

story about the past. This is particularly important for high-visibility sites like Chimney Rock.

If sites are to be maintained for public visitation, then it is vital that these sites be stabilized and protected against visitor use, and appropriate educational signs erected.

Development of Euroamerican Historic Sites Program

Despite the wealth of historic sites on the SJNF, the historic period has probably received less attention than any other on the forest. This is less an indictment of archaeologists, both federal or non-federal, who have worked on the forest as it is reflective of the generally low-esteem this branch of the discipline has historically commanded (South 1977; Horn 1992). Moreover, the passage of NAGPRA will increasingly alter access to the aboriginal past, and so there is potential for Euroamerican sites to assume greater importance than they have in the past.

The program should expand its interest in and use of historic-period Euroamerican sites. This is especially important if some aboriginal sites have limited public access. Moreover, developing historic sites both as important cultural resources and as heritage program sites takes pressure off the forest to keep using Native American sites alone for public visitation. There is no reason why some Euroamerican sites might not be termed as TCPs. For instance, does a grazing allotment used by the same Euroamerican family for over 50 years properly constitute a TCP? And if not, why not?

The program needs to develop greater sensitivity to the presence of minority groups on the forest historically, especially Hispanics, who have been very often overlooked.

The program needs to place higher priority on the forest's own history and the preservation of its own historic resources, such as ranger cabins and look-out towers. Connected to this is the need for the forest to improve its own archiving system at the forest, and to keep *on site* the forest's own historical documents, photographs and archives.

Development of electronic data management systems

The program desperately needs greater support in the implementation of electronic tabular database and GIS systems. These are not luxuries, but essential tools of the correct management of the forest's cultural resource data base.

The Forest should work to make its systems compatible with other governmental agencies, especially the State, so that data can be transferred quickly, more efficiently and more cheaply.

The program should ensure that all new data are immediately logged into the system, so that there is minimal lag time between data recovery and data entry.

Greater Inter-Agency Cooperation

There is great potential for the program to develop greater cooperation with other federal agencies in the following areas:

- 1) heritage tourism programs; site stewardship programs;
- 2) increased planning effectiveness in terms of prioritizing research strategies, funding priorities, and site significance (a site rare on one land unit may not be quite so rare compared to sites on other adjacent land units);
- 3) Shared data bases with other agencies;
- 4) the cultural resources program should become a primary element in the forest's fire program to make sure that archaeologists are on the fire Incident team and that sites are not damaged by fire bulldozing;
- 5) development of shared law enforcement programs in the field of site protection and monitoring.

Budget

All of the above recommendations are predicated on an adequately funded cultural resources program. The cultural resources program on the San Juan National Forest is currently funded from two primary sources: NFHR (National Forest Heritage Resources); individual functional units. The first amount is allocated to each cultural resources program by the Regional Office, the second is provided by individual functional units who "buy" the time and expertise of zone archaeologists to ensure compliance of their own projects with the relevant federal laws and Forest Service statutes. It is important to note, moreover, that a portion of the time of each archaeologist is committed to work on entirely non-heritage related programs, such as environmental assessments or the completion of the overall forest plan.

Currently, the SJNF employs three zone archaeologists, all at the GS11 grade and all full-

time (261 days per year). Additionally, 2 part-time specialists are hired, primarily with funding from individual functional units, per year. These work for 180 days of the year.

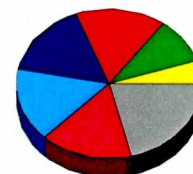
The budget allocation from NFHR is sufficient to cover 110-120 days of work for each zone archaeologist, and is also intended to provide additional money for special heritage projects, such as cooperative agreements and PIT programs. For FY97 (October 1, 1996 - September 30, 1997) and FY98, the following allocations from NFHR are found in Table 1. These figures reflect the budget allocations for both the San Juan and Rio Grande portions of the forest. It is clear that the NFHR portion of the total budget has declined precipitously, and that this problem has been exacerbated by an increase in overhead from 29% to 61%.

<i>Category</i>	<i>Budget Allocation FY97</i>		<i>Budget Allocation FY98</i>	
	\$	%	\$	%
Salaries (full- and part-time)	92,473	36	56,300	31
Projects and Supplies	77,528	30	1,000	1
Overhead	74,000	29	108,700	61
Vehicles	13,199	5	13,000	7
TOTAL	257,000		\$179,000	

Table 3.1
Budget Allocation: Fiscal Years 97 and 98

Beginning FY98, new allocation criteria are being used, which will reduce the San Juan National Forest's NFHR allocation by approximately thirty percent over the next three years (Figure 3.1). It is clear that implementation of these new criteria and the resultant reduction in NFHR allocation will require a radical reorganization of the cultural resources program on the San Juan National Forest. It is recommended, therefore, that the forest attempt to

Budget Allocation Criteria



- Long-term Heritage Commitments (5%)
- Heritage Partnerships (10%)
- Site Density (16%)
- Heritage Visitor Contacts (16%)
- Interpretive and Outreach Projects (16%)
- Heritage Volunteer Hours (16%)

make every effort to increase the funding base for the cultural resources program. More financial support must be given in order to ensure that the forest is in compliance with its basic federal mandates, that a functioning site monitoring system is implemented and that a state-of-the-art data-base system is implemented. More financial incentives are needed for cooperating agreements with partners, as this is a very cost-effective way of getting special projects completed. The move to having the zone archaeologists spend more of their time on non-heritage related projects must be resisted.

Heritage Team Organization

The change from a hierarchically based personnel system to a laterally organized team has already been described in chapter two of this report. It is our opinion that this new system of organization is working extremely well. However, consideration should be given to periodically evaluating its effectiveness in terms of liaising with both other management units on the forest, as well as with the regional heritage management.

CHAPTER 4

The Natural Environment of the San Juan National Forest (Primary Author - Jeri Smalley)

The San Juan National Forest is located on the western slope of the Continental Divide in southwestern Colorado, encompassing an area of over 120 miles from east to west and 60 miles from north to south, for a total of 2,086,484 acres (Figure 1.2). The eastern and northern forest boundary generally follows the crest of the Continental Divide and the Wilson Mountains. The southern and western boundary extends stair step fashion from Chromo, Colorado in the southeast to a point 40 miles northwest of Dolores, Colorado. The forest comprises all or part of nine counties. These are from east to west: Rio Grande, Conejos, Mineral, Hinsdale, Archuleta, San Juan, La Plata, Dolores, and Montezuma. The natural drainages of the area are used as the basis for the forest's administrative districts. The Pagosa District is the furthest east and contains the San Juan and Piedra Rivers. The Columbine District is the center district and includes the Animas, Los Pinos and Florida Rivers. All these rivers eventually drain into the San Juan River (Figure 1.2). To the west, the Mancos-Dolores District comprises the drainages of the Dolores, Mancos and La Plata Rivers. Both the San Juan and the Dolores Rivers ultimately flow into the Colorado River. The forest contains ninety four natural lakes and ten reservoirs. The four largest reservoirs are McPhee, Vallecito, Lemon and Williams Creek Lake. The San Juan National Forest encompasses three Wilderness areas, which are not subject to grazing or motorized vehicular traffic: the Weminuche Wilderness, the South San Juan Wilderness area, and part of the Lizard Head Wilderness.

Present Day Climate

The SJNF encompasses a great range in elevations, from approximately 6,000' asl (above sea level) to 14,000' asl. An average temperature drop of approximately 4⁰ F for every 1,000 feet of elevation gain results in a temperature difference of approximately 32⁰ between the high and low points of the forest (Keen 1996:113). Annual temperatures range from highs of 80⁰ F to lows of -30⁰ F. While other mountain areas of Colorado have recorded temperatures ranging from -40 to -60⁰ F, the lowest recorded temperature - at Silverton, Colorado - is just -39⁰ F. Daytime temperatures in

clear, sunny weather may rise 30 to 40⁰ F above nocturnal temperatures (Keen 1996:116-117). Freezing nights can occur during the summer in the higher zones and daytime temperatures are cool at the mid and high elevations (http://www.gorp.com/gorp/resource/US-National_Forest/CO-SAN-J.HTM)

Southwestern Colorado precipitation is determined by two predominant weather patterns. From approximately October through May, storms originating in the Pacific Ocean influence the SJNF's precipitation regime. An "upslope" or orographic effect during these storms is caused by air masses that are forced to rise and cool as they are pushed over the mountains by the prevailing winds (Mutel and Emerick 1984:8; Carrara et al. 1991:235). This results in the higher elevations sometimes receiving five to ten times as much precipitation as do the nearby towns of Cortez and Durango, at elevations of 6,000' asl and 6,500' respectively. Although winter snowfall in the lower areas of the forest may melt between storms, in the high country snow is much more likely to accumulate to peak depths in early spring (Keen 1996:113-115). This snow is absorbed slowly into the soil for use by plant roots at the beginning of the growing season (Schoenwetter and Eddy 1964:101). Although these winter storms are often accompanied by northerly winds bringing colder temperatures as the jet stream drops to the south, the bitterly cold air from Siberia and Alaska usually stays east of the Continental Divide. Therefore, extremely low temperatures are relatively rare in the San Juans.

During the spring, summer and fall precipitation originates predominantly in the warm, moist air masses that move northward from the Gulf of Mexico (Mutel and Emerick 1984:9). In May, as the storm track shifts, a warm high pressure system settles in and the winter's snowmelt begins. From mid- to late May the volume of snowmelt may be equivalent to a widespread rainfall of nearly one inch. June is the San Juan National Forest's sunniest and driest month, giving the area its best weather of the year for outdoor activities (Keen 1996:118; Mutel and Emerick 1984:9).

The summer monsoon cycle dominates from July through September. Air masses from the Gulf of California move in at this time, as do air masses from the Gulf of Mexico. In this season, the San Juan Mountains receive 30 to 35% of their annual precipitation (Carrara et al. 1991:235). Hikers in the high country need to be prepared for the rain and lightning that often accompany afternoon thunderstorms. In a dry year such 1996 in which lightning was often more prevalent than rain, the

resulting forest fires strained human resources and endangered lives and property as years of accumulated dead growth on the forest floors provided tinder for fires. The monsoon season tapers off in September and October as the air becomes cooler and drier (Keen 1996:119).

Wind velocities in the mountains usually increase with higher elevations, with some gusts reaching 100 miles per hour. While prevailing winds on mountaintops are often from the west, the winds in canyons and valleys may alter their direction as they are channeled along drainages (Mutel and Emerick 1984:11).

While this is a profile of a "typical" year in the San Juan National Forest, the drought that the area is currently experiencing is just one example of possible variations; there is no typical year in the San Juan National Forest. Keen (1996:121) has commented that "[t]he range of climates found in the southwestern corner of Colorado is greater than that in many entire states". An examination of temperature statistics show that Cortez just southwest of the San Juan National Forest at an elevation of 6,000' asl may receive 12 inches of rainfall per year while Red Mountain Pass, approximately 60 miles to the northeast at an elevation of 11,000', may receive 43 inches of snow (Keen 1996:123).

Environmental Zones and Physiographic Provinces

Environmental zones in the forest are determined by a combination of elevation, temperature, and precipitation. The forest's lowest elevation is approximately 6,000' asl, with the highest peaks in the region of 14,000' asl. The Needles Mountains in the Weminuche Wilderness include three peaks (Window Peak, Mount Eolus, and Sunlight Peak) over 14,000' asl. In the San Miguel Mountains there are also several peaks over 14,000' asl (Mount Wilson, El Diente Peak, Wilson Peak, and South Wilson).

The San Juan National Forest Plan (1992) defines major climatic and vegetative zones for the SJNF: lower montane forest, upper montane forest, subalpine forest and alpine tundra. Other publications, which are followed here, present a more complicated system. In *The Western San Juan Mountains: their Geology, Ecology and Human History* (Blair 1996) ten different major environmental zones are defined. In *From Grassland to Glacier: the Natural History of Colorado*, Mutel and Emerick (1984) describe eleven different zones (Table 4.1).

The lowest vegetation zone in elevation, *the shrub-steppe communities* of the Colorado

Plateau, is found primarily at the west end of the forest (Floyd-Hanna et al. 1996:144-45) and

comprises semi-arid grasslands found in low places in major valleys, especially those carved out of Mancos shale and other marine shales that feature heavy, poorly drained, saline soils. Mutel and Emerick (1984:56) refer to this environment as sagebrush shrublands. Other prominent plants in this zone are greasewood, shadscale, and other salt tolerant plants including sea blight and saltgrass. The annual species include grasses such as blue grama, a variety of other herbs, big sagebrush, and rabbitbrush (Floyd-Hanna et al. 1996:145).

The upper elevations of the shrub-steppe/sagebrush shrublands interfinger with the piñon-juniper vegetation and ultimately change into the *piñon-juniper woodland zone*. Here piñon pine usually shares canopy dominance with one of two species of juniper, the Utah juniper or the Rocky Mountain juniper. Towards the lower end of the zone the trees are widely spaced. As elevation increases tree density become greater. Near the upper limits of this zone the piñon and juniper may mingle with ponderosa pine, Douglas fir or Gambel oak (Mutel and Emerick 1984:69). This vegetation type occupies about 43 million acres of the Southwest at elevations between 5,000' to 7,750' (Floyd-Hanna et al. 1996:146). Piñon pine is more tolerant of colder temperatures and may grow to higher elevations than do junipers (Mutel and Emerick 1984:72). Piñon also is drought-tolerant. Their seeds have been an important food source for birds, animals, and humans since prehistoric times. Their delayed seed producing cycle, known as masting, occurs approximately every four to seven years and helps to ensure continuity of the species by keeping all the seeds from being eaten in one season (Floyd-Hanna et al. 1996:147).

The *mountain shrub community* (Floyd-Hanna et al. 1996:149) or mountain shrublands (Mutel and Emerick 1984:51) is comprised of a variety of low-growing woody plant species. Gambel's oak are prevalent between 5,500' and 10,000' but reach their maximum growth between 7,000' and 8,500'. The plant usually grows six to ten feet tall but can be taller. Mountain mahogany, a shorter shrub, occurs in sparse patches, especially in rocky soil. Other shrubs that prevail in this zone are skunkbrush, serviceberry, bitterbrush, wild rose and currants. Grasses include blue grama and mountain muhly (Mutel and Emerick 1984:62-63). Other predominant species are fenderbrush, antelope bitterbrush, squaw apple, snowberry, serviceberry, currants, barberry, rose, skunkbush or squawbush, banana yucca, narrowleaf yucca, and Davis's prickly pear. Many of the species found in this zone are also found in adjacent zones (Floyd-Hanna et al. 1996:149). Most mountain-shrub

stands are located on steep or moderate slopes of 10^0 or more. The composition of plant communities found on north-facing slopes will vary somewhat from those found on south-facing slopes due to the differences in soil water, snow loading in winter, and water availability in late spring and early summer.

Floyd-Hanna et al. (1996: 154) group the *ponderosa pine-oak-Douglas fir woodlands* into one zone that makes up the transition between the lower elevation semiarid foothills and the moist forests of the upper slopes. In contrast, Mutel and Emerick (1984:86) treat it as two separate zones, the ponderosa pine and the Douglas fir zones, although they acknowledge that neither is a pure stand of just one species. Further, they comment that most of today's stands are patchy and mixed with ponderosa pine or successional species including aspen (Mutel and Emerick 1984:94). This transitional zone contains a variety of plant communities common in both higher and lower elevations (Floyd-Hanna et al. 1996:154). Growing to 150 feet tall or more, the ponderosa pine is the largest conifer species in the Southern Rocky Mountains (Mutel and Emerick 1984:81). Ponderosa pine forests are found on sunny, dry mountain slopes from 5,600' to 9,000'. The understory of the ponderosa pine area varies depending on the amount of moisture and shade or sunlight (Mutel and Emerick 1984:84). The shrub-like Gambel oak commonly forms the major ground cover beneath the ponderosa pine, but it also grows to tree size in favorable sites.

Douglas fir prefer cool, moist, north-facing slopes at lower elevations but grow on a variety of sites. Douglas fir forests are generally more crowded than the ponderosa pine but less dense than the spruce-fir forests. The Douglas fir is a medium sized tree in the Rockies where its growth is limited by cold temperatures, short growing season, and arid conditions. They are generally found from 5,600' to 9,000' (Mutel and Emerick 1984:93). A variety of grasses and wild flowers will be found in this zone depending on local soil and micro-climatic conditions. Depending on the season, these may include wild candytuft, yellow mule's ears, balsamroot, beardtongue, and a variety of white and purple asters (Floyd-Hanna et al. 1996:154).

In middle elevations of the forest (7,500'-9,500'), the ponderosa pine zone grades into *mixed conifer forests*. The trees and vegetation here are suited to the relatively cool, moist conditions of short growing seasons and scarce soil nutrients. This forest includes ponderosa pine and Douglas fir as well as southwestern white pine, white fir, corkbark fir, blue spruce, and Engelmann spruce

(Jamieson et al. 1996:159-160).

At higher elevations (9,500' to 11,000'), many of these trees cannot grow, leaving Engelmann spruce and corkbark fir as the dominant trees in the spruce-fir (Jamieson et al. 1996:161) or Engelmann spruce-subalpine fir zone (Mutel and Emerick 1984: 151). Both of these species grow in a spire shape, thought to be an adaptation to the heavy snows of this subalpine environment. These forests can be seen along mountain passes, including Wolf Creek Pass and Coal Bank Pass.

This zone contains some of the oldest and largest trees found in the forest. Because of its altitude and climate this zone is not as heavily affected by humans as some of the others. Fires are also not as prevalent in this zone as in some of the lower elevation zones. Therefore, tall, thick trees may be found. However, when fire does occur such as the Lime Creek Burn of 1879, recovery is very slow because of the short growing season (Mutel and Emerick 1984:155).

The *aspen forest zone* (8,000' to 10,000') comprises the only major deciduous tree in the SJNF. Aspen require extensive moisture, which also contributes to the growth of a distinctive variety of herbs and shrubs. Old-growth aspen stands can support an even greater diversity of breeding birds than is found in coniferous forests. Dead aspen provide homes for violet-green swallows and mountain bluebirds who like to nest in them but are unable to excavate them (Jamieson et al. 1996:164-165). Aspens are also found within other vegetation zones.

Mutel and Emerick (1984:161-163) define a zone at 11,000' to 12,000' they call the *Forest-Tundra Transition*. It is composed of windswept trees and is located at the upper limits of the forests. Here, just below the alpine tundra, the trees are known as krummholz, from a German word meaning "crooked wood". At this elevation the warmest temperatures of the year average 50° F, wind speeds may exceed 100 miles per hour, and snow accumulation may be 12 feet or more. The dominant trees are Engelmann spruce and subalpine fir. Other vegetation may include herbs, willows, bog birch and mosses (Mutel and Emerick 1984: 161-163; Carrara et al. 1991: 234).

The *alpine vegetation zone* (Jamieson et al. 1996:166) or the alpine tundra (Mutel and Emerick 1984:169) is one of low temperatures, a short growing season and a treeless landscape. The growing season is so short that plants scarcely have time to photosynthesize and store enough carbohydrates to carry them through the long winter months when snow cover makes photosynthesis impossible. As this does not leave enough time for wood production, there are no trees in this zone.

The plants that do survive here are mostly low, herbaceous types and prostrate woody shrubs (Jamieson et al. 1996:167-169). This zone compares with the Arctic tundra in climate and vegetation. Here, snow cover affects the vegetation, first providing a water source as it melts, and second by influencing the length of the growing season.

Most alpine plants are slow growing but persistent perennials. Nearly all alpine plants have evolved a common adaptation that enables them to attain the greatest reproductive success. This includes initiating flower formation at the end of a growing season, which enables them to flower within two to three weeks after the snow melts. (Jamieson et al. 1996:170-171)

Jamieson et al. (1996:172-173) further subdivide the alpine vegetation zone by forms. The most widespread and luxuriant is the alpine meadow such as the one in the Molas Pass area. Here are found avens, cinquefoil, Indian paintbrushes and alpine bistort. On drier, more exposed upper mountain slopes, vegetation diminishes in stature. There are also alpine marshes around lakes and tarns. These areas are dominated by sedges. At the lower limits of the alpine vegetation, the shrubby willows mix with the herbaceous marsh species.

Within these major zones are found "anomalous" areas of vegetation that are dependent on localized environmental conditions. Open meadows or parks may occur among the spruce-fir and mixed conifer forests for a number of reasons. Some meadows are located on old lake beds in fine-textured soils. Some are on deposits of volcanic ash. Near timberline, meadows may occur where trees have not yet grown back after a burn. At high elevation a meadow may occur because of the cold air flows that shorten the growing season. These mountain meadows provide biological diversity and habitat for species such as Thurber's fescue, large bunchgrasses, and pocket gophers, as well as feeding grounds for elk, deer, and bear (Jamieson et al. 1996:166).

Wetland areas are found throughout the forest. Somers and Floyd-Hanna (1996:175) define wetlands as areas that remain moist through all or most of the growing season and consider a riparian ecosystem to be a special type of wetland. Mutel and Emerick (1984:41, 161) make a distinction between lowland riparian ecosystems and mountain riparian environments. They note, in general, that riparian systems are cooler than their surroundings because of cold air drainages. Although wetlands make up only a fraction of the total land area in Colorado, an estimated 70% of the fauna depend on them for permanent homes or other uses. Wetlands may be seasonal. They are a

threatened ecosystem in the West and are protected by federal legislation. Numerous examples of high-elevation wetlands can be found near Molas Pass (Somers and Floyd-Hanna 1996:175-177).

The major aquifers in the SJNF generally run south before flowing ultimately into the Colorado river system. From west to east, these comprise the Dolores, Mancos, La Plata, Animas, Florida, Los Pinos (Pine), Piedra and San Juan rivers. At this time the Animas River is one of the few remaining unregulated waterways in western Colorado. Early expeditions into this area noted the purity of the mountain waters; the Pratt Expedition of 1848 commented on the springs gushing from foothills between the La Plata and Mancos Rivers, while a 1859 Corps of Army Engineers Expedition reported the La Plata River to be well-stocked with trout (Ott 1994). A settler in the Spring Creek watershed area in the early 1890s noted that there were good springs with abundant water in every canyon (Reed 1981:2).

Meandering rivers such as the Animas and the Dolores River upstream of Dolores (the flow in the Dolores River downstream is now controlled and rather low as a result of the McPhee Dam) continuously reshape their environment. The life cycle of the cottonwood adapts well to this process. Cottonwoods produce large quantities of small seeds that once established grow quickly. The adjacent riparian woodland is heterogenous in age class and has a diverse floral and faunal composition. Narrowleaf cottonwood is the dominant tree (Somers and Floyd-Hanna 1996:178-180).

Fauna

The various vegetation zones in the San Juan National Forest support numerous kinds of animal and insect life. Each species in the San Juan National Forest is controlled by limiting factors, which may be physical, such as low temperatures or lack of water, or biological, such as the presence of a competitor or predator. Further, most species do not utilize all the potential habitats because they have never had the opportunity to spread into all the suitable areas (Spencer and Romme 1996:129). Some animals are found exclusively in one vegetation zone, but many more spend time in more than one zone. Wildlife species whose ranges extend through more than one vegetation zone include mule deer, elk, bighorn sheep, mountain lion, coyote, bear, beaver, and marten. Game fish species include cutthroat, rainbow, brook and brown trout, northern pike, and kokanee salmon

(Forest Plan II-1).

The predominant vertebrates in the shrub-steppe areas are rabbits, prairie dogs, birds, and lizard that can be seen during the day. Other mammals and snakes are less often seen because of their nocturnal habits (Floyd-Hanna et al. 1996:145).

Many animals depend on the resources of the piñon-juniper zones but fewer of them actually live there year-round. Mule deer and elk graze there during the winter. Predators such as mountain lion and bobcat may be found if there are rocky areas and cliffs for den sites. Coyotes and badgers may find small animals for prey. Desert cottontail inhabit shrubby areas, as do many small rodents including the piñon mouse. Birds include the piñon jay, mountain chickadee, sparrows, and raptors such as kestrels and red-tailed hawks. This zone is also a popular habitat for reptiles including the collared lizard, Great Basin gopher snake and western rattlesnake (Mutel and Emerick 1984:74-76).

Animals inhabiting the mountain shrub communities include the brush mouse, gray fox, rufous-sided towhee, glue-gray gnatcatcher, scrub jay, and sharp-shinned hawk. The insects that feed off many of the edible fruits in turn feed an assortment of mammals, birds, and reptiles (Floyd-Hanna et al. 1996:150-151).

Ponderosa pine forests are home to a variety of wildlife species. These include elk, mule deer, coyote, bobcat, and mountain lion. Often seen are small, noisy flocks of mountain chickadees, violet-green swallows and Abert's squirrels. Other birds in this area include Stellar's jays, ravens, and mountain chickadees. Large dead trees provide nests for flickers, nuthatches and woodpeckers. Common predators are goshawks and red-tailed hawks (Floyd-Hanna et al. 1996:157, Mutel and Emerick 1984:86-87).

The spruce fir zone, like the mixed conifer zone, is rich in plant and animal life. Birds in this zone include warblers, nuthatches, kinglets, woodpeckers, and crossbills. Black bears as well as smaller mammals live here. Birds that can be found in mature forests in this zone include the goshawk owl and the pine marten (Jamieson et al. 1996:161-2).

The spruce bark beetle is an ecologically significant insect that inhabits spruce-fir forests. This small insect bores into Engelmann spruce to lay its eggs. Eventually, they will kill the host tree. Ordinarily they will affect only isolated trees, but occasionally these beetles experience a population explosion and kill large amounts of trees. The resulting snags produce homes for other animals and

birds, such as woodpeckers and raptors. Fallen trees provide nutrients for small insects and fungi. Thus, although to the casual visitor these areas may seem "dead", in fact they are diverse and complex (Jamieson et al. 1996:162).

Animals in the tundra forest zone are generally the same as those found in the alpine tundra. At various times of the year this transitional zone will be utilized by white-tailed ptarmigan, mule deer, elk, and white-crowned sparrows (Mutel and Emerick 1984:166-167). Only a handful of birds breed in the alpine zone. These include horned larks, rosy finches, water pipits, white-crowned sparrows, golden eagles, and white-tailed ptarmigans. All except the ptarmigan leave the alpine elevations to winter. Mammals that live in the alpine zone utilize one of three strategies to survive the winter. Some, such as the elk, migrate to lower altitude. Others, like the yellow-bellied marmot, hibernate. The third group, such as the northern pocket gopher, remains active under the snow, using it as a protective cover (Jamieson et al. 1996:171).

Riparian areas attract large numbers of bird species including ducks, owls, hawks, woodpeckers, and songbirds that feed on dragonflies and other members of the large insect population. The lowland areas attract reptiles and amphibians including salamanders, frogs, toads, and snakes (Mutel and Emerick 1984:46-47). In general, the floral and faunal makeup of riparian areas will vary depending on elevation, with areas of higher elevations having fewer species than those at lower elevations. The herbaceous understory can include grasses, forbs, sedges, rushes, mosses, and lichens (Mutel and Emerick 1984:117). Beaver, the largest rodent in North America, are among the better known inhabitants of riparian ecosystems and their activities can often be noted in the forest.

Paleoenvironmental Reconstructions

Two models for ancient climatic patterns in North America are commonly used by archaeologists. The first, proposed by Antevs (1955), envisages climatic change as slow and gradual. Consequently, he defined only three major climatic episodes for the Holocene (or Neothermal, in his nomenclature): (1) Anathermal (10,150-7,000 BP); (2) Altithermal (7,000-4,500 BP.); (3) Medithermal (4,500 BP- present).

Antevs' general model has been augmented by one based on the European

Blytt-Sernander model, which identifies short periods of climatic stability, or dynamic metastable equilibrium, interrupted by rapid changes to new stable states (Wendland and Bryson 1974; Wendland 1978). The dates for the episodes are found in Table 4.2. There is, however, much regional variation in the dating and severity of these episodes because of their transgressive nature (Wilson 1988), and, therefore, local studies are necessary for any intensive study of human-environment relationships.

Recent	Present-100 BP
Neoboreal (Little Ice Age)	100-400 BP
Pacific	400-850 BP
Neo-Atlantic	850-1,260 BP
Scandic	1,260-1,680 BP
Sub-Atlantic	1,680-2,760 BP
Sub-Boreal	2,760-5,060 BP
Atlantic	5,060-8,490 BP
Boreal	8,490-9,300 BP
Pre-Boreal	9,300-10,030 BP
Late Glacial	10,030-13,000 BP

**Table 4.2
Paleoclimatic Episodes**

A climatic history of the SJNF can be proposed on the basis of neighboring studies that have used tree-ring data, pollen profiles and deuterium analysis. However, this history can only be tentative, pending more detailed work within the boundaries of the forest itself (readers are also referred to the following palynological studies of specific archaeological sites on the forest for further information: Buge and Schoenwetter [1977]; Cummings [1991]; Feiler and Anderson [1994]; Minnis and Ford [1977]; Petersen et al. [1985]; Scott and Steward [1981]; Cummings and Moutoux [1996], amongst others).

The San Juan Mountains experienced at least six glacial periods during the last two million years, although there may have been up to 15 or even more (Blair 1996:10-12). The high cirques were ice-free by at least 15,000 BP, and since there is evidence that the global glacial maximum occurred about 18,000 BP, then deglaciation in the San Juans must have occurred *approximately* between these two dates. Packrat middens from the Colorado Plateau indicate deglaciation was complete by 14,000 BP (Betancourt 1990:285), and there is evidence that the Durango-Silverton area was deglaciated by this date (Pitblado 1993:78). The Animas glacier was one of the longest in the Southern Rockies, stretching from Silverton to Durango, a distance of over 40 miles. Today, the Equilibrium Line Altitude (ELA), the imaginary line above which snow and ice accumulates faster than they waste, and which corresponds roughly to the permanent snowline, lies at an elevation of about 12,200'. About 18,000 BP, however, the ELA was up to 2,000' lower. Thus, above about 10,000' permanent snow and ice existed, shutting off this area entirely to human exploitation.

In general, the glaciers had the effect of moving vegetation communities down in elevation. Thus, about 15,000 BP, the climate of the Durango area, at an elevation of 6,500 asl, approximated that of Molas Pass, at an elevation of 10,910' asl (Pielou 1991; Spencer and Romme 1996:130). Musk oxen (*Ovibos moschatus*) grazed on the flats at the foot of the glacier

Palynological studies in the La Plata Mountains indicate that at 15,450 BP timberlines were much lower than today's (Petersen 1988). A decrease in sage pollen and an increase in pine pollen at 13,350 BP is interpreted as the movement upslope of tree line, presumably as a result of warming temperatures. Between 13,500 and 12,000 BP, there is evidence for increased precipitation and warmer temperatures. Between 12,000 to 8,500 BP there is little evidence for the particular climatic conditions (Pitblado 1993:79). Andrews et al. (1975) indicate warming conditions in the middle of the 9th millennium BP in the vicinity of Silverton, and also in the La Platas (Pitblado 1993:79). Cooler temperatures then ensued, and present-day timberline was established by 6,800 BP (Pitblado 1993:79). Most of the Arctic and northern Rocky Mountain fauna that lived in the area at the height of the glaciation became extinct as the climate changed, leaving only the pika and white-tailed ptarmigan to represent the glacial fauna (Spencer and Romme 1996:130).

Petersen (1988:7) analyzed 10,000 year old pollen from the Twin Lakes area 750' below the present day upper limit of spruce growth. The pollen provided a history of past summer temperatures through interpretation of fluctuations of the temperature sensitive upper tree line. Past studies have indicated that 10,000 to 9,000 B.P. was a time of maximum solar insolation in the summer, with lower winter temperatures than at present (Petersen 1988:104-105).

Carrara et al. (1991) conducted a study between 1978 and 1987 in the northern San Juan Mountains at the Lake Emma site (about six miles northeast of Silverton), at an altitude of approximately 12,000' that indicated an early- to mid-Holocene warm period with greater monsoonal circulation than that of the present day. Radiocarbon dating of coniferous wood fragments indicated that between 9,600 to 5,400 BP the treeline was at least 260' higher than at present (Carrara et al. 1991:234). Deuterium data from the Lake Emma site suggested that the summer monsoon in this area was more intense around 9000 BP, and thus wetter conditions prevailed. This corresponds with other evidence that estimates July solar radiation in the Northern Hemisphere to have been 8% greater than at present (Carrara 1991:244). Radiocarbon dating of a large spruce fragment suggests that at about 8,000 BP timberline may have been at least 450' higher than it is today. This evidence suggests that during the early to middle Holocene average July temperatures were at least 0.5 to 0.9 degrees Centigrade higher than they are today.

Radiocarbon dates and stratigraphy from bogs in the Lake Emma area suggest that treeline between 5,400 to 3,500 BP was near that of present day treeline, although after 3,500 BP it was generally lower than at present. The altitudes of both treeline and timberline will vary depending on aspect, frequently being higher on west and south facing slopes (Carrara et al. 1991:234).

The Colorado Plateau region encompassing the western San Juan National Forest is presently characterized by great variability in climate, temperature, and number of frost-free days. Paleoecological research indicates that the climate of the Southwest region has not essentially changed in the past 4,000 years. (Schoenwetter and Dittert 1968:43). A problem researchers have grappled with is that of determining the length of the winter season and the amount of summer rainfall (Schoenwetter and Dittert 1968:44). Schoenwetter and Dittert (1968:45) found that prior to AD 200 the best, though poorly supported inference, is that the winters may have been long. From AD 200-700 palynological data, though limited, indicates a drought in the third century. Still,

evidence between AD 300-700 indicates that it was never drier than today and that there were long periods that were consistently wetter (Schoenwetter and Dittert 1968:47). This correlates with palynological evidence from the Navajo Reservoir District. Schoenwetter and Eddy (1964:105) report that in the Los Pinos Phase from AD 1-400 a winter dominant rainfall pattern with effectively more arid conditions than at present was replaced by moister conditions. Then, in the Sambrito Phase from AD 400-700, those moist conditions were replaced by conditions similar to those of the present time, with a winter- dominant rainfall pattern.

In the 8th century, the long winter pattern seems to have shifted to a short winter pattern similar to that of today. High energy summer rains with greater run-off rates than earlier created a vertical and lateral dissection of arable lands on valley floors. The shorter, milder winters caused an increase in the length and severity of spring droughts but also extended the growing season. A short period of increased moisture appeared in the 11th century. However, both geological and palynological data show that variable conditions prevailed (Schoenwetter and Dittert 1968:49; Brunswig 1993:77).

The evidence from Navajo Reservoir indicates that present day-types of conditions were replaced in the Rosa Phase around AD 700 by wetter conditions with the winter-dominant rainfall pattern remaining in effect. This was followed around AD 800 by conditions more arid than the present (Schoenwetter and Eddy 1964:123). Gooding (1980:10) shows these patterns to be generally true in the Durango district as well but speculates that a local drought from AD 800 to 809 was more severe than in the surrounding districts and that it contributed to the general abandonment of that area.

Euler et al. (1979:1096) interpret the interval from AD 950 to 1150 as one of the best documented periods of increased effective moisture in the Colorado Plateau. It appears to have been a time of substantially higher annual precipitation than the present. Schoenwetter and Eddy (1964:105) also report a shift from winter to summer dominated rainfall in the Navajo Reservoir. This shift corresponded with a higher density and wider spatial distribution of human populations.

Studies suggest that environmental variations were similar across the Colorado Plateau region and that environmental changes coincided with cultural changes (Euler et al. 1979). There is evidence that populations moved to wetter and localities during droughts and towards drier and

warmer regions during periods of higher precipitation, as farming became possible in areas otherwise too dry to support this strategy (Euler et al. 1979:1098). During periods of drought, therefore, populations may have sought the mountains as settlement refugia.

From AD 1100 to 1300 summer-dominant rainfall patterns continued with general moisture patterns similar to those of the present day. Exceptions were an unusually wet period just before AD 1250 and a widespread drought between AD 1275 and 1300 (Schoenwetter and Dittert 1968:54). Unfortunately, the Navajo Reservoir records are truncated at this period and no inferences are possible (Schoenwetter and Eddy 1964:117).

Drought conditions persisted into the beginning decades of the 14th century accompanied by a return to the pattern of long winters and short growing seasons. In the Navajo Reservoir area between AD 1550-1700 a winter dominant moisture pattern was in effect with greater effective moisture than at present. By AD 1775, a summer dominant patterned reappeared and has continued into the present (Schoenwetter and Eddy 1964:117). Around 1850, the present pattern of short winters with summer dominant droughts generally began on the Colorado Plateau (Schoenwetter and Dittert 1968:57).

Historic settlement activities in the La Plata Mountains including mining, logging, and grazing, have had an affect on the vegetation and thus the pollen deposits at both the Twin Lakes and Beef Pasture study sites. There has been a rise in some species such as willows, while elsewhere erosion caused by grazing has increased the sedimentation rates and pollen concentration in lake sediments (Petersen 1988:55-56). Petersen's study documents the expansion in historic times of the upper limit of the spruce zone in the La Plata Mountains. Additionally, krummholz spruce has gone from a stunted form to a robust, upright growth form (Petersen 1988:57). Pollen and photographic evidences shows that in the twentieth century Engelmann Spruce has thickened at its lower elevation limit and expanded down the mountainside. This may be related to record-making winter snowpack in the San Juan and La Plata Mountains between 1905 and 1930 (Petersen 1988:82). Petersen (1988:94) also speculated that increases in piñon correlate with times of higher summer precipitation. Thus, he sees a link between the movements of the Ancestral Puebloans in this area with increased piñon growth as they moved in response to an area's ability to produce crops.

Records from nineteenth century expeditions to the area reveal climatic conditions slightly

different from those of today. Furthermore, tree-rings and estimates of treeline elevations indicate that summers during this early exploration period were cooler than at present. This is also supported by persistent snow beds in the La Plata Mountains as reported by Newberry in 1876. Early explorers often lumped the vast expanse west of the Mississippi under the heading of the "Great American Desert". When Newberry and Macomb explored the area just to the west of today's San Juan National Forest in 1859 their reports of the Sage Plain contain descriptors such as "dry, sterile, no water". Yet areas such as Yellowjacket just west of the San Juan National Forest show evidence of intensive Puebloan occupation. This area in Montezuma and Dolores counties was a rich, well-watered corn farmland in the twentieth century prior to World War II, and so perhaps 19th century descriptions are anomalous. However, the demand for watered farmland prompted the Dolores Water Project in the 1980s. In 1996 because of drought conditions the water level in McPhee Reservoir was so low that remains of the sites in that area again became visible in some places.

Despite the numerous studies that have been described in this section, it still remains that given the range of environmental zones covered by the SJNF and, therefore, the range of human adaptations required, many more local studies are needed before an adequate paleoenvironmental sequence for the SJNF can be constructed.

Human Use of and Impact on the San Juan National Forest

The San Juan National Forest vividly illustrates many naturally induced environmental changes, but changes wrought by humans are also often visible. Human occupation of this area dates back to at least 8000 BP but between the time that Ancestral Puebloans left the area in the thirteenth century until the arrival of Anglo settlers in the 1870s, human impact on the landscape seems to have been sporadic and temporary (Ott 1994). Spencer and Romme (1996:130) comment that life in the San Juans is not only still adjusting to the glacial retreat, but is also constantly adjusting to the arrival of humans, of European settlers and their livestock, and to modern technology. Human impacts on the forest - some of them prehistoric in age - include hunting and gathering, farming, logging, mining, ranching, recreational use, and fire initiation and suppression.

Hunting and Gathering systems

The long history of human occupation of the SJNF has been dominated by hunting-and-

gathering systems. In general, it is postulated that the low population densities associated with this subsistence strategy did not have large-scale impacts on the natural environment. However, it was not without some degree of impact. For instance, piñon-juniper ecosystems have long been utilized for the piñon nut harvest. Prehistorically, tribes may have traveled long distances seeking large harvests. Prehistoric and historic residents used piñon, juniper and ponderosa pine as fire wood and for construction. Piñon pitch was utilized for glue, waterproofing, cooking and medicinal purposes. Scarred ponderosa pines are evidence of Ute and Apache use of the inner bark for human consumption (see Appendix IV, this volume). On Starvation Creek members of the Moss party ate chokecherries and acorns to survive in the winter of 1874-1875 (Ott 1994). High alpine terraces were used for driving game, butchering, and camping over 7000 years ago (Mutel and Emerick 1984:179).

Today the San Juan National Forest is a popular area for hunting. Modern residents also show an interest in the flora, especially in the many herbs that grow there. Hunting and gathering continues, both for recreational as well as more serious subsistence purposes..

European Settlement

Riparian areas were the first areas settled and developed for townsites, farmlands, and residential use, and as a result, vast riparian areas have been cleared or severely modified; native species have been reduced, and exotics such as Russian olive have been introduced. The construction of dams, reservoirs, and irrigation diversion projects have also affected natural environments (Jamieson 1996:177-178; Mutel and Emerick 1984:41)

Despite the threat of flooding, housing is frequently built along rivers and streams. Cottonwoods are cut for firewood. Human cultivation of trees along with the construction of artificial waterways has led to the relocation of riparian plants and animals (Mutel and Emerick 1984:47). Ranchers have removed beavers and converted willow thickets to hay meadows, thus hastening bank erosion and silting. Grazing has changed the herb composition and increased the dominance of weedy species.

Farming and ranching

First use of the lower elevations of the SJNF for farming occurs during the late Basketmaker II and early Basketmaker III (Chapter 8, this volume). Evidence shows that at this time the people

were changing from a hunting-and-gathering pattern to food production, beginning with corn and later adding beans and squash. Even during periods of heaviest farming, wild plants and animals were exploited. For example, in the Chimney Rock area people exploited the piñon-juniper habitat on the mesa tops as well as ponderosa pine habitat at lower elevations between the mesa rim and the Piedra River, and also hunted deer, elk and mountain sheep (Eddy 1975).

The first cattle in this area were brought in the early 1870s (Ott 1994; Chapter 10, this volume). The cattle industry expanded rapidly in the mountains in the late 1800s, with the ponderosa pine forest being an important grazing area (Mutel and Emerick 1984:89). Mountain meadows and grasslands were utilized at the turn of the century by settlers for their excellent hay crops and pasturage. These settlers frequently created meadows by removing the ponderosa pine (Mutel and Emerick 1984:109). Domestic sheep have grazed tundra areas, cut trails across slopes, and trampled delicate growth areas (Mutel and Emerick 1984:179).

Cattle do not find sagebrush palatable and eat between it creating bare, disturbed soil, which then is invaded by more sagebrush. Sagebrush is intolerant of fire, whereas rabbitbrush and other shrub non-palatable to cattle sprout from their stumps and may increase in abundance after burning. (Mutel and Emerick 1984:159). Overgrazing removes herbaceous ground cover. Grasslands surrounding piñon-juniper woodlands may be invaded by junipers after overgrazing. Bulldozing or chaining in piñon-juniper forests, in order to increase range for cattle and wildlife, has resulted in reversion of woodlands to early grass-shrub successional stages. Generally, the cost effectiveness of these operations has been dubious, and the wildlife value of the trees has been ignored (Mutel and Emerick 1984:74).

Logging

Heavy use of ponderosa pine ecosystems in Colorado began with the Gold Rush of 1859 as people began to cut them for fuel, and houses and mine construction (Mutel and Emerick 1984:89, Ott 1984; Chapter 10, this volume). The high quality of the wood and its easy accessibility made it the first wood to be cut when this region was settled (Floyd-Hanna et al. 1996:154), and most of the ponderosa pine forests in southwestern Colorado were extensively logged at the beginning of the twentieth century. The practice of clear cutting continued until the 1970s. In the 1800s Douglas fir ecosystems probably contained the finest lumber in their areas. They too were heavily harvested for

building (Mutel and Emerick 1984:96). Although aspen has not been heavily forested in the past, markets are growing for paneling and fiber that may increase the demand for this wood (Mutel and Emerick 1984:133). Logging continues as a major activity on the Forest today, albeit one of great controversy as environmental and industry groups battle for dominance in managing the Forest's wood resources.

Mining

Juan Maria Antonio Rivera visited the La Platas in 1765 in search of gold and silver riches. There are, not surprisingly, very few signs of the earliest mining activities in the San Juan National Forest before the arrival of the Anglos (Chapter 10, this volume). Nineteenth century trappers, including Kit Carson, reported that the San Juan Mountains were "prolific in mines of gold, silver and other precious stones." However, the San Juans were not as accessible as other Colorado mining areas, so it was not until 1860 that Charles Baker led a small party into the San Juans (Ubbelohde et al. 1995:176; Smith 1996:235). Mining finally became profitable in the 1870s, with new mining techniques opening up the rich veins of gold, silver, lead, zinc and copper found throughout the area.

Mining has rightly received more attention than any other source of pollution in the SJNF. Minerals and mining in the San Juan National Forest and in areas upstream of the forest have had pronounced impacts on the water and riparian environment in the forest. Waste materials brought to the surface in the mining process were dumped near the mine entrance where atmosphere and weather flushed their toxins to streams below. Tailings produced when the ores were milled were often flushed into the nearest stream. Tailing piles continued to grow as more ore was milled. Two tributaries of the Animas River, Cement Creek and Mineral Creek, both contain high levels of sulfuric acid. Fortunately, the volume of water they discharge into the Animas is relatively low compared to the amount of water in the main stream and is greatly diluted by many of the tributaries between Silverton and Rockwood (Somers and Floyd-Hanna 1996:183-185).

Recreational use

Today, all parts of the Forest are used for various forms of recreation, including hiking, horseback riding, and hunting, for wood cutting, and for home sites (Mutel and Emerick 1984:90). Douglas fir areas are also used increasingly for recreation (Mutel and Emerick 1984:96). Although spruce-fir forests were long protected by their remoteness and rugged terrain, they have become

popular for hiking, skiing, and other forms of recreation (Mutel and Emerick 1984:158).

The ski industry, established in Colorado after World War II has had an impact on parts of the San Juan Mountains as it has on other parts of Colorado. Purgatory Resort is the only active ski area on the Forest, although in the 1980s resorts were proposed for the East Fork of the San Juan River and elsewhere east of Pagosa Springs. Krummholz ecosystems are frequently altered by cutting ski slopes through them. The twisted wood has also been collected for campfires and home decoration (Mutel and Emerick 1984:167). Off-road vehicles are capable of doing serious damage to all the forest's ecozones, as are hikers who increasingly are moving away from established trails in search of less populated areas (Mutel and Emerick 1984:179).

Fire Suppression

The San Juan National Forest has always been prone to fires, both natural and human-made. Major historic-era fires in the area, prior to the fire control program initiated with the creation of the national forest, have been documented as follows: 1840 - 2500 acres near Rico; 1860 - 20,000 acres at the head of the Pine and Vallecito Rivers; 1874 - 18,000 acres between Rockwood and Silverton; 1879 - 26,000 acres in the Lime Creek area; 1895 - 1000 acres in the Vallecito area; 1898 - a 5000 acre burn near Bayfield that had burned many years previously; 1900 - a three-week fire from the Piedra River and up Sand and Weminuche Creeks, a 10-day fire between Middle Fork and the East Piedra River, 500 acres in the Vallecito; from 1899-1905 - "several large fires burned in the Pagosa Country. . .many of them. . .nearly all summer" (Cornelius 1943:63-66). Beginning in the late nineteenth century, administrators of public lands started a conscious program of fire suppression as more people began to live in or near forests. As the nature of the forest has changed and thereby the nature of forest fires, the amount and kind of destruction potential changed and intensified.

While climate is a key factor in vegetation development, fire has also had a great impact on southwestern vegetation (Harrington and Sackett 1992:44; Floyd-Hanna et al. 1996:155-157). Nineteenth century explorers describe forests that are quite different from those seen in many areas today. The large old stumps that remain in ponderosa pine forests suggest that these earlier forests were more open and composed of larger trees than present day ponderosa forests. Abundant grass and forb cover probably dominated the under story. Fires were started by both lightning and in some instances Native Americans (Floyd-Hanna et al. 1996:156). Tree-ring studies indicate the long-term

recurrence of extremely short fire intervals (Floyd-Hanna et al. 1996:155-156). Fire-scar chronicles in ponderosa pine point to only a few fire-free intervals as long as 15 to 20 years prior to 1900. Most of these longer intervals have been associated with abnormally wet cycles (Harrington and Sackett 1992:44-45).

Changes in the old-growth ponderosa pine forests of the Southwest also were caused by extensive livestock grazing in the late 19th century, which radically reduced herbaceous vegetation. This decline led to reduced fire spread because of the decrease in fuels and thus to increased ponderosa pine regeneration because of reduced competition and fire mortality. Early in the 1900s, forestry practices, including fire suppression, led to unprecedented fuel accumulations and stagnation of seedling and sapling thickets.

The resulting ponderosa pine forests bear little similarity to prehistoric forests. The open structure is gone, and the natural accumulation of pine needles and woody fuels is exacerbated by the slow decomposition rates caused by the dry southwestern climate (Harrington and Sackett 1992:45). With more area taken up by ponderosa pine, under story vegetation has diminished, reducing forage for wildlife and livestock.

Recently, with hazardous fuel conditions, drought-like weather has made large wildfires a regular occurrence; high intensity crown fires are common (Harrington and Sackett 1992:46). Prescribed fire as a method of hazard reduction has increased from the 1950s to the early 1980s. However, there are a number of concerns that must be addressed. Seventy five to one hundred years of fire suppression have serious impacts when fire is reintroduced into old growth ponderosa pine. Litter and old duff accumulations can amount to 30 to 70 tons per acre. Lethal temperatures have been measured deeper than 8 inches in the mineral soil on some sites (Harrington and Sackett 1992:48; Floyd-Hanna et al. 1996:155-157; Mutel and Emerick 1984:90).

Some early workers postulated that the predominance of the mountain shrub community over extensive areas in the San Juan Mountains could have been caused by burning by Native Americans (Floyd-Hanna et al. 1996:151). Study at Mesa Verde has shown that mountain shrub stands are a stage in progression toward piñon-juniper woodlands. Recurring fire disturbances would maintain the shrub stage and discourage the development of trees (Floyd-Hanna et al. 1996:151-152). The herbaceous cover is scant under and between piñon-juniper in comparison to that under Gambel's

oak or ponderosa pine.

Concluding Summary

In terms of its potential for human habitation, the SJNF was free of glaciation by about 14,000 BP. As this chapter has shown, there is a wide range of vegetative and climatic zones on the forest, and these provided a mosaic resource potential that could have been exploited by hunters-and-gatherers moving both horizontally and vertically as the changing seasons opened up different areas for human use. Moreover, the lower reaches of the SJNF - below about 6,500' was also capable of supporting farming communities. The advent of Euroamerican settlement opened up forest resources to new patterns of exploitation, some of which, like mining and grazing, have had profound impacts on the natural environment of the area. The particular dynamics of the relationship between the environment and human use of the forest through prehistory and history will be explored more fully in later chapters of this document.

This chapter has also demonstrated that a paleoenvironmental sequence for the forest is possible, using studies done in neighboring regions in tandem with localized studies done on the forest itself. However, given the size of the SJNF and the range of environments it encompasses, it is also clear that full understanding of the forest's paleoenvironments and the changes they wrought on human occupation and utilization can only proceed from more numerous detailed local studies.

Chapter 5

A Review of Archaeological Investigations on the San Juan National Forest

Earliest Euroamerican interest in the archaeological sites of the SJNF was shown - perhaps not surprisingly - to Anasazi (Ancestral Pueblo) sites. In 1918, Ancestral Pueblo sites in the Lost Canyon area (now an archaeological district) north of Dolores, were brought to the attention of Jesse Walter Fewkes, then Chief of the Bureau of American Ethnology, by Gordon Parker, then Superintendent of the Montezuma National Forest, now part of the San Juan-Rio Grande National Forest. Fewkes visited 5MT4587, a multi-room cliff dwelling dating to the 12th century, and declared it an example of the "Mesa Verde type" of cliff house (National Register of Historic Places nomination form prepared by Sharon Hatch, July 18, 1988). At the other end of the forest, Chimney Rock pueblo, west of Pagosa Springs, was first visited by Jean Jeancon, curator at the State Historical and Natural History Society in Denver, as part of a survey of the Piedra River valley in 1921 (Lister 1993:10).

However, such investigations were exceptions to the rule; sustained archaeological research in the San Juan National Forest, as is the case elsewhere in the Rockies (Benedict 1992:1), is relatively new. Obvious reasons for this are simply the relative inaccessibility of the region and the harsher environmental conditions, even during the summer, compared to those of lower elevations. Another reason was the erroneous assumption that mountain sites were shallow and eroded and thus unsuitable for excavation. A final and more pernicious reason is that because archaeology in North America has been relegated to a sub-discipline of anthropology, archaeologists have in the past tended to organize their own research along ethnographic culture areas. The original formulations of these areas were based on the assumption that the mountains were essentially impenetrable and unusable by aborigines, except during the summer months or after they had acquired the horse. The mountains were conceived, therefore, as "refugia", used only when absolutely necessary. Consequently, in a splendid example of a self-fulfilling prophecy, archaeologists tended not to look in the mountains for prehistoric occupation, thereby confirming the ethnographers' predictions.

Fortunately, this position is changing, and, although work is still tentative and provisional, a

much clearer picture of prehistoric occupation of the mountains is now emerging. Most importantly, numerous archaeologists, not only in Colorado (Benedict 1992; Black 1991), but also in other parts of the Rockies, now seem comfortable in proposing indigenous cultural traditions. Nevertheless, much work still needs to be done. Despite the plethora of cultural resource surveys and excavations that have taken place in the SJNF during the last twenty years, this present volume stands as the first synthesis of the forest itself, and as recently as 1983 a seminar held at the School of American Research on high-altitude adaptations in the American Southwest had not one participant representing this corner of Colorado (Winter 1983).

The tenor of archaeological work on the forest has somewhat paralleled that of the discipline in general, in that it is an outcome of discipline-wide theoretical and methodological developments placed within the context of the legal mandates that have established cultural resources programs on federal lands. This chapter provides the reader with a review of these trends, so that a clearer understanding may be gained of how and why archaeological investigations on the forest have proceeded in the ways that they have.

The legal mandates to comply with federal laws regarding the correct management of cultural resources on the forest have already been described in chapter 2 of this document. Evaluation projects fall into one of three categories. A Class I is a non-field literature survey of an area for information of existing sites. A Class II survey is a sample survey of the overall project area. A Class III survey provides a 100% comprehensive survey of the project area. All surveys are intended to provide managers with an evaluation of the cultural resources in any particular area, as well as an assessment of the potential for sites to be eligible to the National Register and an assessment of the potential damage to sites as a result of contemporary activity. Such surveys are made primarily in response to: 1) logging activities; 2) oil and gas exploration and extraction; 3) earth-moving activities; 4) grazing activities. Particularly because of the heavy emphasis on the first type of activity, this has created a bias towards the distribution of surveys and thereby the distribution of known sites in the Ponderosa pine zone.

It must also be pointed out that, unlike the National Park Service, historically the Forest Service was not established to protect and manage cultural resources; therefore, there is little

historical tradition or even awareness in many instances today of the importance of these resources. This problem has been exacerbated by recent changes in congressional priorities for the National Forests.

Within these general parameters, forest archaeologists and cultural resource management archaeologists have also been guided by wider disciplinary paradigms. Currently, it is possible to define three paradigms, if only for didactic purposes: culture history, processualism and postprocessualism. To a greater or lesser extent, each of these have guided and continue to guide archaeological work on the forest.

Culture History

Culture history is the oldest and most established theoretical paradigm in archaeology, despite a concerted effort by some archaeologists in the 1960s to kill it off. This paradigm is based on a normative conception of culture, whereby the data - primarily artifacts but including structures - are organized into internally homogeneous taxa, both spatial and temporal. The resultant taxa, whether they be called phases, cultures or some other term, are assumed to represent the remains of some form of past social intercourse, very often organized along ethnic lines. The archaeological record is arranged chronologically and spatially in order to recreate the events of the past, so that the following questions are answered: (1) *what* (are the artifacts and sites and what were they used for); *when* (were they made); *where* (else are these artifacts and sites found); *who* (made them and left them behind). Explanations of cultural change were also proposed within this paradigm, but they have received widespread criticism in some quarters of the discipline for their apparent inadequacy. This point will be addressed in the next section of this chapter.

The culture-historical paradigm has been, and remains important, in federally mandated archaeological projects for the following reasons: (1) the antiquity and relative rarity of a site is one way of determining its significance for management purposes or for nomination to the National Register; (2) understanding the time depth of and variety in prehistoric and historic occupation of federal land units is an important step in the proper management of cultural resources; (3) there is an increasing need to attempt ethnic affiliation of cultural resources, and culture-history provides a way of attaining this goal (cf. Jones 1997:135-144).

American archaeology, because of its particular historical development as a sub-discipline of anthropology and as an archaeology of living indigenous populations, has placed great store in correlating specific archaeological assemblages and taxa with contemporary groups. The need for such affiliation is currently enjoying a resurgence in popularity as NAGPRA and the need to identify the ethnic affiliation of human remains and their associated funerary and other objects has become a legal mandate. In order for tribes to reclaim human remains and objects, they have to demonstrate a clear connection to the materials; in other words, they have to demonstrate a clear ethnic affiliation. Archaeologists have been of some help in this, but as Jones (1997), in a recent review of ethnicity and archaeology has shown, our abilities are fairly limited. Moreover, Native American tribes are forced to buy into the very simplistic models of social organization beloved of archaeologists but not very reflective of the complexity of the real world; and the tribes will do this, if only to get the remains off the museum shelves to wherever they properly belong. Unfortunately, any attempt on the part of archaeologists to resist the ethnic identification of archaeological remains on the grounds that it is a lot harder to do than anyone thought will almost certainly be interpreted by Native Americans as just one more ploy on the part of archaeologists to retain control over their ancestral remains.

Much traditional culture-historical interpretation was predicated on explaining the past as a series of ethnic migrations. Consequently a number of models were developed to link archaeological taxa to specific tribal units, although none of them adequately overcome their inherent methodological shortcomings. The earliest approach, called the *Direct Historical Approach* (Steward 1942), has worked best for sedentary societies with relatively fixed territories, so that a particular archaeological taxon could be reasonably assigned to a particular tribe. Thus, the Anasazi Tradition is accepted as the archaeological manifestation of contemporary Puebloan groups. However even here, it has been virtually impossible to assign specific assemblages or regional variants of that tradition to individual Pueblo groups.

The difficulties of assigning ethnic affiliation become even greater in the case of hunting-and-gathering groups, whose very mobility meant that different groups could share different territories. In response to this ambivalence in the archaeological record, Forbis (1963) proposed the *Direct Inferential Approach*, whereby affiliation was made on the basis of an inferred and reasonable

overlap between a particular ethnic group's primary territory and the distribution of particular archaeological assemblages. Thus, it can reasonably be inferred that Late Period non-Formative assemblages on the San Juan National Forest are the remains of prehistoric Ute encampments, although, as we shall argue in chapter nine of this volume, there is nothing in the assemblages *per se* that is uniquely diagnostic of Ute culture.

Processual Archaeology and Middle-Range Problems

Although culture-history does provide explanations for cultural change, the rise of processual archaeology in the 1960s encouraged a search for what may be considered more fundamental processes underlying culture change. In particular, processual archaeology promulgated what can be called *ecological functionalism*, whereby human societies were seen as functioning entities, constantly striving for balance both internally in terms of their individual components, such as subsistence and social organization, and externally in terms of the relationship between population size and environmental carrying capacity. Its intellectual pedigree stretches back to the neo-evolutionism and cultural ecology of Steward (1955), the culturology of White (1949, 1959) and the systems analysis of cybernetics (Clarke 1968). That most federal archaeologists received their anthropological training in the 1960s and 1970s, the heyday of scientific processualism, has further entrenched significant elements of this paradigm as *normal science* in federal archaeology, as it is in the discipline as practiced in North America as a whole.

Processual archaeology's commitment to recreating the discipline as a *hard* science capable of truly explaining human behavior nomothetically has been less successful, although certainly there exists a general and deep-seated acceptance that some type of verification of statements is necessary. Despite the rejection of nomothetic laws, processual archaeology has made significant contributions - in the form of middle range theory - to our interpretation of the *creation* of the archaeological record. The need for this in an area like the SJNF is acute, but unfortunately little attention has yet been paid to it. Three examples illustrate the potential for middle-range studies on the forest: geoarchaeology; off-site archaeology; and fire impacts on archaeological sites.

Geoarchaeology

Geoarchaeology is a sub-discipline that combines the methodologies of archaeology and

geology to arrive a greater understanding of how archaeological sites were formed, particularly in terms of the effects soil-formation and other geomorphological processes have on the integrity of the archaeological record. Archaeological excavations in the eastern half of the SJNF by Fort Lewis College since 1990 has demonstrated that geoarchaeology must become a major part of the interpretive endeavor. For example, mountain forested sites are particularly prone to root movements and bioturbation, as well as to the more obvious erosional and depositional problems typical of such environments (Charles, Appendix I, this volume).

As an example of this, consider that the assumption behind of choice of sites for testing in the 1990 and 1991 FLC field seasons was that the variety and density of surface deposits would be a roughly accurate gauge of sub-surface components (Duke and Charles 1992, 1994). Sites 5AA1518 and 5AA1407 were high-density surface clusters, both in terms of the quantity of artifacts, as well as the variety and temporal depth of diagnostic projectile points and ceramics. However, test excavations at both these sites recovered no extensive buried deposits. If this lack of correlation between surface and sub-surface artifact densities is normal - and there is no cause to think that the geomorphological conditions at either site are rare enough to discount this assumption - then we can make two fundamentally important inferences.

The first concerns the management of cultural resources. Federal management of archaeological sites requires significance criteria to be applied to sites, and significance assessment determines the treatment of these sites in the face of land development, from simple recording prior to destruction to outright preservation of the site. We would suggest that the assessment of significance of hunting-and-gathering sites on surface evidence alone is insufficient, *if* the purpose of assessment is to determine the effect of development on sub-surface deposits. At the very least, assessment of a site's archaeological significance should be done in conjunction with a detailed geomorphological evaluation of the site's potential for containing buried cultural material.

The second inference concerns the methods by which the archaeological record can be interpreted in order to shed light on past human behavior. As noted earlier, our attraction to the two sites and their excavation was based on their supposed significance, which was itself

based on the variety of temporally diagnostic artifacts on their surfaces. As we (Duke and Charles 1992) have found, however, these sites are surface palimpsests as a result of: 1) vertical sediment deflation that mixes temporally discrete components (perhaps evidenced at site 5AA1518); 2) horizontal surface migration that mixes stratigraphically contemporary surface components (perhaps evidenced at 5AA 1407); 3) a lack of sediment deposition that causes later cultural activities to be conducted in direct contextual association with the archaeological remains of earlier activities (perhaps at both 5AA 1518 and 1407). Therefore, it is difficult to separate either temporal components or contemporary activity areas). For example, does a site with a wide range of lithics, indicative of different lithic reduction strategies and by extrapolation different activities, represent a single base-camp occupation (different activities being carried out contemporaneously) or a spatial locus in which entirely discrete activities, of different types, were carried out independently, perhaps by different ethnic groups, over a long period of time, perhaps even millennia, or a combination of both processes?

Off-Site Archaeology

Off-site archaeology moves the focus of attention of archaeologists from the large multi-component sites to the overall distribution of artifacts over a landscape or region (Foley 1981; Rossignol and Wandsnider 1992). Its premise is that very often the *absence* of sites in an area can be as important for an understanding of human behavior as their *presence*. However, this approach also begs the question of what is an archaeological site. Many sites in the study area, as we have noted above, conflate both time and space in the sense that the analytical units, whether they be *sites* or artifact clusters within sites, are mixes of activities done at different times and originally in different locales. The task of the archaeologist is to try to devise techniques whereby some attempt at least is made to separate out these two dimensions. In attempting this, it is not enough, as Dunnell (1992) has recently suggested, simply to do away with the notion of site, since, as Binford (1992) has pointed out, we are still left with the *empirical* phenomenon of an observable spatial clustering of artifacts (i.e. a site), a clustering that must still be explained; the problem is not solved by ignoring it. However, we would argue that it is valid to place less emphasis on *sites* as the central focus of our attention (which in the process relegates low-density artifact clusters and isolated finds to incidental phenomena

that can be *explained*, if absolutely necessary, after the "big picture" has been painted).

This tendency to concentrate on the larger sites is natural enough in any initial investigation of an area, since the sites provide temporally diagnostic artifacts and at least the potential for buried stratigraphies. However, given the empirical difficulties of isolating the temporal and spatial activities that typically make up the average site, perhaps archaeologists have been trying to answer the most difficult question first (i.e. the behavioral and transformational processes of site formation). To use a rather crude analogy, perhaps we are trying to identify the precise ingredients of Kentucky Fried Chicken, without even bothering to find out what spices were available to Colonel Sanders in the first place. In order to solve the questions of site formation and ultimately the human behavior practiced at them, we first need to isolate the smallest activities, both temporally and spatially, that together constituted the overall behavioral strategies of prehistoric peoples in the area.

The separation of spatially discrete, but contemporary, events is confounded by both natural and cultural processes. The former, which are the same as those listed above as creating temporal conflation, potentially unites once spatially discrete activities through such processes as artifact migration, such that what we typically get in hunting-and-gathering sites is an overlapping congruence of contemporary (both precisely and archaeologically) events. Actualistic studies such as ethnoarchaeology can provide us with some sense of spatial ordering of activities in, for example, a camp site.

Beyond the difficulties of isolating spatially discrete events in a single site, there is the problem of how whole landscapes were spatially organized. For instance, the abandonment of a particular locus by a group of hunters-and-gatherers and their subsequent movement to another space can be the result of myriad factors such as local resource depletion and pollution of the immediate living space, as well as of non-ecological factors (cf. Woodburn 1972).

More difficult to explain is why specific locales were consistently reoccupied over time, thereby creating the multi-component sites that archaeologists have traditionally searched for. Is reoccupation fortuitous, in that by the process of serendipity there is occasionally produced a site that has multiple occupations? Did ancient groups go back to the same sites either because the particular resources at the site were overwhelmingly superior to nearby sites (a

difficult concept to accept given the presence of culturally sterile locales in juxtaposition with multi-component and ecologically identical sites that typically make up the average *spotty* archaeological landscape). Was a site reoccupied so that use could be made of existing debitage collections? Or was there, perhaps, an ideological imperative that encouraged groups to go back to sites that had been used by their ancestors, even if other places, identical from the viewpoint of resource availability, were nearby?

Finally, the spatial problems we have just identified are compounded if the same landscape is used by different and discrete societies. This is documented ethnographically; the classic example is Barth's (1961) analysis of the overlapping exploitation of the same area by different Persian nomad groups who scheduled their seasonal subsistence activities in such a way that they avoided each other. We also suspect that this problem is reflected in the archaeological record of the SJNF, in which Ancestral Pueblo populations and forest dwellers used the same portions of the forest. This is a problem to which we shall return in chapter eight of this volume.

Fire impacts on archaeological sites

Thirdly, more attention must be paid to understanding the effects of forest fires on archaeological sites in the forest. Sites on the forest range in age and type. Paleoindian through Archaic sites tend to be ephemeral lithic scatters. From Basketmaker III on, however, at least in the lower forest elevations, archaeological sites contain more evidence of dwellings, storage facilities and more permanent occupation. The physical evidence increases during the Ancestral Pueblo period, the main building materials being jacal, stone, and wood. The Spanish have left tools and evidence in mining areas. A large body of historic Anglo sites include homesites, mining sites, logging sites. Anglo settlers built in stone, but mainly in wood. Many of the structures that still remain are rotting and more disappear each year. As Cartledge (1996:3) notes, most often it is the historic structures that are lost in wildfires, while damage to remains such as pueblo ruins, artifact scatters, and other prehistoric and historic cultural resources is less apparent and more difficult to assess.

Cartledge goes on to note that the U.S. Forest Service conducts prescribed burns on between 70,000 to 100,000 acres in the Southwest each year. It had been assumed that these fires are

relatively "cool" with little effect on cultural resources, other than on wood and organic materials. In fact these prescribed fires and their effects have been inadequately investigated and poorly understood. Specifically, he mentions that it is still unknown at what temperatures stone artifacts start to spall or crack, or how fire affects obsidian artifacts as compared to how it affects chert or basalt (Cartledge 1996:3).

Studies in other regions of the Southwest with conditions similar to those in the San Juans provide insight into the effects of fire on archaeological resources and provide suggests as to how to minimize negative impacts. In one study at Mesa Verde National Park, for example, Romme et al. (1993:28) focus on high intensity fires because they are the most potentially damaging and difficult to control. Their list of sites with high vulnerability includes the following:

- 1) *Native American historic structures*, such as sweat lodges, corrals, and similar structures. These are wooden structures that can be destroyed by fire and leave little trace.
- 2) *Alcoves and cliff dwellings* containing combustible materials such as packrat middens, wooden beams, and corn cobs. Many alcove sites are relatively protected from fire because they are surrounded by expanses of bare rock with no fuel. However, intense fire burning around the alcove can cause firebrands or spontaneous combustion through pre-heating.
- 3) Studies of *rock art panels* in the upper Salt Creek in the Needles District of Canyonlands indicate that exfoliation of the rock face occurs during high intensity fire. At the Falls Creek Rock Shelters there is a panel of rock art that contains some wonderful, vividly colored images. Hopefully, because of prescribed burns conducted in this area, these panels will not be submitted to fire damage.
- 4) Scarred trees that were stripped of portions of their bark by Historic Period Utes for consumption and other purposes (Appendix IV, this volume) can be killed by high intensity fires and their tree ring record lost (Romme et al. 1993:28). In addition to scarred trees, the Forest has many instances of historic aspen art that is vulnerable to high intensity fires.

Romme et al. list a second set of sites with moderate vulnerability:

- 1) *Euro-American historic structures*. In Mesa Verde, most of these are associated with park management. In the San Juan National Forest, however, there are many historic structures. Many of these are affiliated with the mining history of the area and include cabins, mine shafts, mills, and tramways. There are so many of them that

they cannot be maintained because of expense and they are in varying stages of decay. The devastation from a high intensity fire could be acute.

- 2) Lithic scatters with shallow hearths. As the effects of fire are strongest at the surface, these artifacts are very vulnerable to fire damage. They will show color alteration due to heating. In hotter fires or on certain types of stone changes may occur that impair morphological analyses [the high winds caused by fires can also displace artifact assemblages, and the resultant ash can completely cover artifact scatters {Sharon Hatch: personal communication}].

Shallow hearths contain materials that can be analyzed for their pollen, faunal, and macrobotanical contents. There are three factors to consider here. First, the morphology of hearth construction does not appear to be affected by fire. Second, fires such as the Long Mesa and La Mesa fires have little impact on the study of the contents of shallowly buried hearths. Third, these fires would affect the reliability of certain dating techniques applied to hearths such as thermoluminescence and archeomagnetic dating (Romme et al. 1993:28).

There are several indirect effects that fire may have either immediately or months after a fire.

- 1) Rodent and insect populations may increase as succulent vegetation increases after a fire. They can potentially disturb artifacts and alter their positions.
- 2) Bare soil exposed by fires is vulnerable to erosion and redeposition especially before revegetation takes place. Again, artifacts may be moved in this process.
- 3) Microbial activity may increase after fire. This possibility needs more study.
- 4) Use of fire retardant slurry during fire suppression may affect artifacts. A study of slurry affects in Joshua Tree National Park indicate that the phosphorus, a limiting nutrient in most ecosystems, in the retardant may influence post-fire plant growth (Romme et al. 1993:29).

Romme et al. (1993:29-30) further suggest measures that could reduce fire damage. They include:

- 1) Document sites and artifacts that cannot be protected from high intensity fire.
- 2) Reduce fuels selectively in localized high value areas.
- 3) Evaluate all known sites and interpretive facilities and assign each a priority rating in case of a high intensity fire.
- 4) Build fire resistant features into new and existing buildings and interpretive structures wherever possible.

An interesting aspect of the fire history at Mesa Verde is that Park officials stated that more damage was done to archaeological sites by the fire suppression crews than by fire itself. They specifically cited Moccasin Mesa fires where dozers were used to indiscriminately cut fire lines.

However, there is a positive aspect for archaeology in the overall forest fire scenario. At Mesa Verde prior to August 1996 there were 293 known sites. The Chapin 5 Fire resulted in the exposure of 70 to 75 previously unknown and undocumented sites. Archaeologists anticipate that this number may double as their assessment work progresses (public presentation by the National Park Service in Cortez, Colorado in October 1996). Fire effectively cleared vegetation that had previously hidden these sites. Moreover, prescribed burning managed by Forest personnel to reduce the amount of combustible material in an area tend to have less effect on archaeological site integrity than do the natural high-intensity fires that would otherwise result (Sharon Hatch: personal communication).

Postprocessual and Postmodernist Approaches

Postprocessual archaeology was borne out of the dissatisfaction in some parts of the discipline with the traditional goals of processual archaeology (Hodder 1985, 1986, 1991). As first defined in the 1980s, this paradigm was steeped in French post-structuralist thought and was an attempt both to acknowledge the essentially humanist program of archaeology as well as to reject the natural science basis to processual archaeology. It holds the following principles (Duke 1991:19):

- 1) a rejection of ecological-functionalism;
- 2) a rejection of the view of human culture only as a means of passively reacting to outside stimuli, especially the environment;
- 3) a rejection of a positivist dichotomy between fact and theory;
- 4) a view of material culture as symbol-sets actively directing, and being directed by, human behavior and action;
- 5) a partial reliance on idealist, structuralist-based models as a basis for understanding cultural variation;
- 6) the use of neo-Marxist analysis, especially regarding the concepts of ideology

and power;

- 7) a reliance on historical explanation for the appearance of specific cultural phenomena;
- 8) the use of an overarching *contextual* approach whereby the *meanings* of artifacts and thus their role in guiding human behavior can be understood only by placing them within their contexts and association of use.

It hardly needs adding that postprocessual archaeology's insistence on the politicization of archaeological interpretation - especially its leftward bent - and its greater acceptance of interpretive relativism has made it difficult for this paradigm to make much direct headway in the rather conservative atmosphere of American federal and academic archaeology, where the notion of scientific objectivity still holds sway. Where progress for this paradigm has been made, it has been in the fields of explicitly feminist and indigenous archaeologies, areas to which public opinion was already sympathetic (but see Meighan [1992] for an acerbic criticism of Native American involvement in the construction of the archaeological past). Postprocessual archaeology now stands not so much alone from other approaches to the past but simply as one set of approaches by which a greater understanding can be achieved; ideological purity has given way to the practicalities of mundane interpretation, as this paradigm has both captured and been captured by the rest of the discipline (Duke, 1991, 1995; Preucel 1991; Trigger 1991). There are three examples of this paradigm's application that are of particular relevance to the archaeology of the SJNF.

First, the attention to Native Americans and the political implication of this for federal archaeology is a topic to which postprocessual archaeology has made many contributions, as knowledge claims are challenged and new ways of knowing proposed. On the one hand, with the implementation of NAGPRA, access to certain human and cultural materials has been limited. Archaeologists, working with Native American consultants, are asked to render ethnic designations quickly and definitively, and are in some cases prohibited from using the technology and taking the time necessary to yield an informed answer. For example, reliable dating techniques involve destruction of small amounts of the material; skeletal and dentition analysis is invasive, exacting and requires time. The invasiveness of these techniques is considered offensive to many contemporary Indians. However, these materials and methods provide information on the age of organic material,

the age of individuals, ethnic association, population movements, health, diet, muscular patterns and hence work habits: a wealth of information about prehistoric lifeways, cultural patterns, and ethnic origins.

However, on the other hand, the interpretation of the Native American past is mostly done by Anglos with their own world-views and interests uppermost. Constructing a past that is sensitive to Native American and Anglo concerns is a challenge that must be met successfully if archaeology is to continue as a viable scientific enterprise and is to achieve greater accuracy in its understanding of the past. The mandated consultation with Native Americans is appropriate and desirable, and should offer the benefits of mutual understanding. It is, therefore, commendable that the cultural resources program on the San Juan-Rio Grande National Forest is attempting to improve the lines of communication to Native Americans by periodically issuing bulletins to tribes on all projects that might affect cultural properties of importance to them, by designating a tribal relations coordinator, by holding more face-to-face meetings with tribal representatives, and by attempting to hire staff who can speak traditional languages..

Anthropologists stand to learn more about present ethnic cultural practices, and Native Americans may find that archaeologically-obtained information enriches and informs their own cultural background. Both Native American spiritual and burial customs, and western traditions of scholarship, are of considerable and valid importance to their individual practitioners. Every effort must be made by both sides to break down the barriers of mistrust and use archaeology in a mutually beneficial and culturally sensitive way.

Two projects currently underway exemplify the potential for this new level of cooperation between Native Americans and archaeologists. First, Fort Lewis College works with the Education Department of the Southern Ute tribe to teach archaeology to Southern Ute children through field camps and excavations. Secondly, Native American consultants are currently helping interpret the numerous rock-art panels located at Falls Creek.

The second example concerns the imposition of our own cultural values on the interpretation of the past, even in such apparently mundane matters as the organization and conceptualization of time. **Temporal processes are culturally determined, and this can be understood by dividing them into two separate categories. The first deals with temporal conceptions of the prehistoric**

peoples themselves. By attempting to identify these conceptions, we cannot, of course, recreate a particular and idiosyncratic conception of metaphysical time. We can, however, examine the material record of these peoples, such that conservatism versus change can be identified in different elements of their overall material culture assemblages (Hodder 1987; Duke 1991). Also, rates of site re-occupation can be determined (Wandsnider 1992), as a prelude to understanding the reasons for these temporal cycles. The temporal resolution attainable in these types of analysis is, of necessity, coarse-grained; however, the fact that only certain artifacts are temporally diagnostic does carry some meaning that goes beyond simple culture-historical utility. Indeed, identifying the long-term histories of artifacts, and their meanings, is one potentially unique contribution that archaeology can make to social science (Hodder 1987). We can also, in this regard, look at the long-term processes of adaptation in the same light, so that we are not so constrained by the culture-historical divisions of earlier analyses. It is understanding this type of adaptive process that has been the particular and important contributions of processual (e.g. Binford 1989) and palaeoeconomic (Higgs 1975) studies to archaeology.

The second category of cultural time concerns the impositions that archaeologists place on the archaeological record. The very need to order the past into a lineal sequence is a direct consequence of our own temporally commodified society (Shanks and Tilley 1987). Emphasizing the importance of temporal ordering means that we place significance on those sites that provide us with temporally diagnostic artifacts, and thereby we skew our own research emphases towards those types of sites. We do not, we hasten to add, argue that identifying technological change is an unimportant goal; merely, that it should not be the only criterion by which we evaluate the importance of either sites or specific research designs, and that criteria for significance should include others (perhaps only locally relevant), as well as those derived from culture-historical needs. Our emphasis on this type of temporal dissection is also a result of archaeology's implicit emulation of ethnography, whereby we try to create analyses as temporally fine-grained as those found in ethnographies, an objective that is doomed to failure by the very nature of the archaeological record, of course.

If the empirical difficulties of dealing with each one of these temporal categories

separately are great, our task becomes even harder, when these categories are conflated *either* by the nature of the archaeological record itself, *or*, more likely, by our own analytical inability to separate the first category (the *object* of our research) from the second (the *tools* of our research). When the temporal divisions of both real past and imposed present coincide, is it just fortuitous, or have we identified a past empirical reality?

The third example is drawn from a postprocessual study conducted on sites from the Turkey Springs Analysis Area (Duke 1995), which attempted to reconcile elements of all three paradigms into a holistic interpretation of the area's past. This study amongst other things, argued that artifact distance did not directly correlate to social distance between different groups. As a result of different internal social power structures, there was an increase in the intensity of the social and economic relationships between Ancestral Pueblo farmers and hunter and gatherers to the north that was reflected not in an increase in the amount of shared material culture, but, at least as reflected in ceramic styles, in a decrease.

Concluding Summary

Most archaeological work in the San Juan portion of the San Juan-Rio Grande National Forest has been a result of federally-mandated compliance work. This work has relied heavily on the culture-historical paradigm in order to determine the age of cultural properties and to help in assessing their archaeological significance. Although this paradigm has languished in popularity over the past thirty years, it still remains the primary framework for the organization of the forest's archaeological past. It promises to enjoy a resurgence in popularity as the implementation of NAGPRA requires the assigning of ethnic affiliation to certain cultural materials. Moreover, budgetary and staffing deficiencies have hampered the implementation on the Forest of archaeological studies that go beyond basic culture-historical objectives.

Interpretive work beyond the parameters of this paradigm has essentially been processual in nature, especially in terms of emphasizing the role of the environment in determining the causes of prehistoric cultural dynamics and in terms of providing middle-range solutions to the problems of understanding the creation of the archaeological record.

Although still small in influence, postprocessual studies show great potential for helping inculcate greater sensitivity on the part of archaeologists to Native American cultural issues, as well as for providing alternative types of knowledge on the archaeology of the study area.

Chapter 6

The Archaeological Record of the San Juan National Forest

The San Juan Forest has great archaeological diversity, with a variety of prehistoric cultural and historic tribal entities represented, as well as ample evidence of historic period European occupation. The time span of human occupation runs from about 10,000 BP to the present day (Table 6.1).

Paleoindian	11,500 - 5,500 B.C.
Archaic	5,500 - AD 1
Basketmaker II	400 BC - AD 450
Basketmaker III	AD 450 - 700
Pueblo I	AD 700 - 900
Pueblo II	AD 900 - 1100
Pueblo III	AD 1100 - 1300
Ute	unknown - Present
Navajo	unknown - Present
Euroamerican	AD 1765 - Present

Table 6.1
Culture Chronology of the San Juan National Forest

As of March 1997, a total of 4,751 archaeological sites had been located and placed under the management of the SJNF heritage program. This number excludes reports of archaeological materials made by members of the public that have not yet been verified by forest personnel. These reports are, however, filed in the individual districts and await field verification at a later date. The total of archaeological sites is much greater than the approximate total of 700 sites, when the first inventory was made by Robert York in 1980.

The archaeological data used in this and the following chapters are inventoried in a number

of sources. Most of the quantitative data used in this report were retrieved from the Forest Service's Data General system (D.G.). This system provides not so much a database that can be manipulated and different search protocols established, as rather a computerized set of site forms, the primary purpose of which was to assist in the management of those resources. The archaeological data gathered in field inventory are entered onto the system according to their Forest Service project number and site number, rather than by their Smithsonian Designation number, and so all queries must be done by the former. Moreover, the system is old; in fact, there are plans for it to be replaced at some point in the future by a system that will be common to all forests in the nation, and which, by tying it into the forest's GIS system, will allow complicated searches and correlations to be conducted. Right now, however, the D.G. system has little capability for customized searches (for instance, queries by site elevation cannot be made). Theoretically, all cultural resources located on the forest are entered into this system in a standardized and timely manner. In practice, however, because of time and personnel constraints, there is variation in the quality of data entry.

Artifact collections from SJNF sites are curated at the Anasazi Heritage Center in Dolores, CO. Specific collections from the Falls Creek and Chimney Rock areas are stored at the University of Colorado Museum, Mesa Verde National Park, the Smithsonian Institution, the Arizona State Museum, Fort Lewis College and the Animas Museum. Each district office of the SJNF has a set of archival material relating to the forest's own history, and historic photographs are located at the Supervisor's Office in Durango. Additionally, historic photographs relevant to the SJNF are located at the Animas Museum in Durango and the Center of Southwest Studies at Fort Lewis College.

When the cultural resources program was initiated in 1978, three site types were established:

isolated find: "usually a small (hand-size) object found in solitary circumstances...which is *essentially* restricted in its location to the present ground surface";

small archaeological resource: "conforms to the I.F. definition in all respects *except* that it is the location of more than one object. As a general rule, an "SAR" is the location of plus or minus twenty small objects found as a concentration...or often in the form of a light and sporadic scatter of small objects found over a relatively wide area";

archaeological site: "any archaeological or historical phenomena [sic] that does *not* meet the I.F. and/or S.A.R. definitions".

In practice, SJNF archaeologists have been flexible in what constitutes an isolated find, basing it not so much on quantity of cultural material, but rather on the level of inference on human behavior that can reasonably be made. Over the years the category of small archaeological resource has fallen out of use. Consequently, in this report small archaeological resources have been conflated into the category of *archaeological site*. Their distribution is represented in Table 6.2.

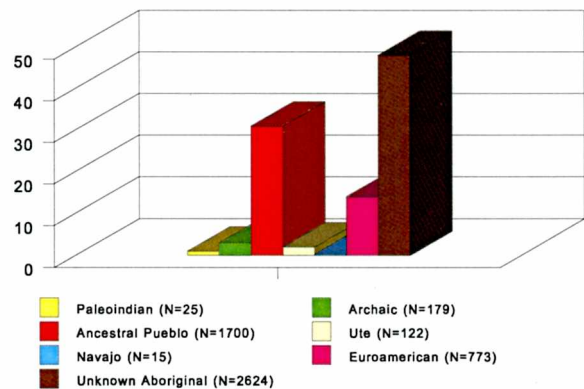
	Mancos-Dolores	Columbine	Pagosa	Total
<i>Prehistoric site</i>	1516	564	328	2408
<i>Historic site</i>	255	122	64	441
<i>Prehistoric/ historic site</i>	26	37	32	95
<i>Prehistoric isolated find</i>	727	354	427	1508
<i>Historic isolated find</i>	183	50	66	299
Total	2707	1127	917	4751

Table 6.2

Site Frequencies by District: San Juan National Forest

The 4,751 sites contain a total of 5,438 individual cultural components, which are broken down into the following cultural categories as shown in Figure 6.1. The highest percentage is represented by unknown aboriginal components; lithic scatters that lack any diagnostic artifacts. Ancestral Pueblo components are the next highest, a reflection of their

Individual Cultural Component Frequencies



relatively easily recognizable diagnostic artifacts. For the same reason, Euroamerican components (which here includes Hispanic components) are high. Surprisingly, identifiable Native American components are low in frequency. As will be discussed in Chapter 9 of this volume, ethnically affiliated sites, with the exception of scarred trees, are difficult to identify on the SJNF.

Of the 4,751 sites, 1132 have been declared eligible to or placed on the National Register (Table 6.3).

	National Register Listed	National Register Eligible (with or without SHPO concurrence)
<i>Mancos/Dolores</i>	907	102
<i>Columbine</i>	5	26
<i>Pagosa</i>	65	27
Total	977	155

Table 6.3
National Register Status Properties: San Juan National Forest

There are also four National Register Districts on the San Juan National Forest: Anasazi Archaeological District (Mancos-Dolores District); Lost Canyon (Mancos-Dolores District); Spring Creek Archaeological District; and Chimney Rock (Pagosa District). Additionally the conversion of the Falls Creek Archaeological Area into a National Register District is currently being proposed and a submission prepared. All four districts were designated because of the quantity and quality of their Ancestral Pueblo sites.

The Anasazi Archaeological District covers 64 square kilometers on either side of the Dolores River downstream of the town of Dolores. The majority of sites were recovered during the Dolores Archaeological Project, which was initiated to mitigate the loss of cultural resources resulting from the construction of the McPhee Reservoir. There is evidence for human occupation in the area since the Paleoindian Period, with substantial evidence beginning about 3,000 BC. The area's importance stems from its high number of very well-preserved Ancestral Pueblo ruins (from

Pueblo I on). The district comprises a total of 977 sites, of which 79 historic period sites are considered to be non-contributing.

The Lost Canyon Archaeological District, located in the Dolores/Mancos Ranger District ten miles north of Mancos, covers 820 acres and is defined by a concentration of masonry sites that date primarily to the late Pueblo II and early Pueblo III periods. It was declared eligible in that it embodied "the distinctive characteristics of a type, period or method of construction..." and has "has yielded, or may be likely to yield, information important in prehistory or history", as defined in the regulations governing the National Register, Chapter 1, Title 36 (CFR) Part 60. A total of 24 contributing Ancestral Pueblo sites and six non-contributing sites (five historic period sites and one prehistoric projectile point isolated find) comprise the district.

The Chimney Rock Archaeological District is centered on the Pueblo II site complex seventeen miles west of Pagosa Springs and covers approximately 3,160 acres. The district encompasses a total of over 90 sites, ranging from the large Pueblo II greathouse complex on the high mesa to smaller non-contributing temporary campsites.

The Spring Creek Archaeological District, located south of Bayfield in La Plata county, was placed on the register in 1984. It comprises 15 prehistoric sites, ten unrecorded sites and six isolated finds. These sites range in age and cultural affiliation from the Archaic, through Ancestral Pueblo (mainly Basketmaker III and Pueblo I), to Athabascan and the Ute. The majority of sites are small farming communities consisting of pithouses, jacal roomblocks and some possible kivas.

The Falls Creek Archaeological Area is not yet a National Register district. However, plans are underway to submit the nomination in the near future (Sharon Hatch: personal communication). As an archaeological area, Falls Creek receives special management emphasis by Forest Service planners and managers.

Site Types

There has been no consistent application of any single site classification system to the SJNF, perhaps understandably in light of the very great range of cultures and periods represented. As noted above, for management purposes sites have been broken down into isolated finds and archaeological sites. However, within these gross categories are found finer-grained site types. Of these the most

common are lithic scatters, most of which do not contain any diagnostic artifacts. The larger lithic scatters tend to comprise individual spatial loci, which may represent separate activities (see discussion in previous chapter). Ancestral Pueblo remains are found in the lower elevations of the forest, with European structural remains found at all elevations, mining sites in particular. Rock art, both petroglyphic and pictographic is found throughout the forest, especially in the western half, although overall this site type is rare. These panels are assigned to both the Ancestral Pueblo and Ute cultures. Recently, hunting blinds and drive lanes have been found in the Lizard Head Pass area (Douglas Bowman: personal communication). These are of an unknown date, but probably are aboriginal in terms of cultural affiliation. Individual site types are described for each period in the appropriate chapters.

The range of historic type sites, similarly, has never been formalized. Historic sites encompass a range of types, from isolated artifact finds to large and complex structural remains. The range of site types varies with age, cultural or ethnic affiliation and specific function; specific site types are described in chapter eleven under the appropriate heading.

Lithic Sources

The San Juan National Forest provides a range of siliceous materials that were used by prehistoric inhabitants as a source of stone tools. The following is a description of the more important sources and quarries located so far.

The Mosca Quarry site is located in Hinsdale County at an elevation of 10,030'-10,650' asl. The quarry is huge, covering an area of over 323,000m². The chert "outcrops from a northeast to southwest-trending exposure of Lower Mississippian Leadville Limestone" (Charles 1995:6.8). The site is a prehistoric equivalent of industrial wasteland in that the top of the ridge is covered with waste cores and other debris. The cherts and chalcedonies range in color from red and pink, to white, brown, yellow and gray. Projectile points at the site date as far back as the Archaic period (Armijo Phase [1800-800 BC]).

Sources for Morrison Formation and Burro Canyon Formation quartzites and cherts are found throughout the forest (Laura Heacock: personal communication 1996); however, they have been studied most intensively by members of the Dolores Archaeological Project at the west end of the

forest. Morrison Formation materials, which contains "red, green, and orange sandstone, siltstone, mudstone, and conglomerate", are "of considerable archaeological interest because they are a high quality, locally available stone" (Leonhardy and Clay 1985:131). Likewise, the Burro Canyon Formation, which overlays the Morrison, contains "light gray to buff conglomeritic sandstone, green-gray shale and siltstone, and green-gray to gray limestone and chert...the cherts and opalithic orthoquartzites are especially good quality stone for flaked stone implements" (Leonhardy and Clay 1985:133).

Two sites exemplify quarries in the west end of the forest. Site 5DL1648 is located in Dolores County at an elevation of 7800' asl. and covers an area of 30,000 m². The site comprises hundreds of grey quartzite flakes scattered in three concentrations. Numerous unworked chunks of quartzite were found eroding out the modern roadbed that cuts the site. Site 5DL979 covers an area of 25,000 m². It comprises flakes and cores of quartzite and chert whose source lies in outcrops on the surrounding slopes. A Desert Side-Notched point dates use of this site to at least the Late Prehistoric Period.

Obsidian was widely used during the prehistoric period. Sources of obsidian are available in the SJNF, specifically in the vicinity of Wolf Creek Pass (Jack Ellingson: personal communication). However, this material is of poor quality (Chris Stevenson: personal communication) and was not apparently used by prehistoric inhabitants of the area. Kather's (1990) master's thesis sourced 54 obsidian samples from various sites in the SJNF to seven New Mexico locations: Polvadera Peak (the most common), San Antonio, Jemez, Cochiti, Red Hill, Mule Creek and Las Cruces. One further piece of Mule Creek obsidian was also later found at Chimney Rock (Havel 1993). Interestingly, although closer to the SJNF than the New Mexico sources, the two Colorado sources, Cochetopa Dome and Beaver Creek were not recognized in Kather's sample, possibly because of their flaking quality and the difficulty of access to both of these sources (Kather 1990:85). The earliest evidence of the use of obsidian comes from 5AA 1518, where a buried piece of obsidian was hydration dated to 5603BP +/- 533.

Elsewhere, local materials were used on a more expedient basis. This strategy is exemplified by site 5AA1584 in the Turkey Springs Analysis Area. The site comprises an extensive scatter of hand-sized boulders of sandstone, quartzite, granite, welded tuffs and basalt. These sit on an eroded

bedrock surface but are intrusive in that they were probably brought in from higher elevations by glacial action (Glen Raby: personal communication 1993). A large number of these pieces were culturally worked or fractured. This site seems to represent not so much a quarry where the bedrock was actually mined, but rather a quarry where individual pieces underwent primary processing.

Site Predictive Modeling

Predictive models have been developed, although they have never *dictated* management decisions on cultural resources to the exclusion of other criteria. Areas of moderate to high sensitivity for cultural resources are defined as follows:

1. Slopes of less than 30%;
2. Open parks, especially those with water sources;
3. Ridge lines and benches near water sources;
4. Stream confluences.

More recently, models have been implemented for use with the forest's new grazing allocation criteria, and these are based on Forest Archaeologist Robert York's original predictive model of site location.

Mixed conifer communities/aspen communities/ponderosa pine communities

- A. Areas expected to have a high density of cultural resources:
 1. Areas of known high site density.
 2. Ecotonal boundary areas.
 3. South-, east-, and west-facing slopes less than 15%.
 4. Areas located within 1/4 mile of permanent natural water sources.
 5. Intermittent drainages that have potential for rockshelters and lithic raw material sources.
 6. Natural openings such as meadows, open floodplains/terraces, and seasonal wetlands occurring in depressions.
 7. Geomorphic features such as high points with open views, saddles, terraces, benches, ridges, and drainage confluences.
 8. Along linear features that are known or suspected prehistoric and/or historic

trails, roads or other travel routes.

B. Areas expected to have a low density of cultural resources:

1. South-, east-, and west-facing slopes greater than 15%.
2. North-facing slopes.
3. Forested areas at or approaching crown closure.

Pinon-juniper communities

Entire communities expected to have a high density of cultural resources.

Sagebrush shrub communities

Entire communities expected to have a high density of cultural resources.

Mixed shrub communities

A. Areas expected to have a high density of cultural resources:

1. Areas of known high site density.
2. Ecotonal boundary areas.
3. South-, east-, and west-facing slopes less than 15%.
4. Areas located within 1/4 mile of permanent natural water sources.
5. Intermittent drainages that have potential for rockshelters and lithic raw material sources.
6. Natural openings such as meadows, open floodplains/terraces, and seasonal wetlands occurring in depressions.
7. Geomorphic features such as high points with open views, saddles, terraces, benches, ridges, and drainage confluences.
8. Along linear features that are known or suspected prehistoric and/or historic trails, roads or other travel routes.

B. Areas expected to have a low density of cultural resources:

1. South-, east-, and west-facing slopes greater than 15%.
2. North-facing slopes.
3. Forested areas at or approaching crown closure.

Alpine meadows and mountain grassland communities

- A. Areas expected to have a high density of cultural resources
 - 1. Areas of known high site density.
 - 2. Ecotonal boundary areas.
 - 3. All slopes less than 15%.
 - 4. Areas located within 1/4 mile of permanent natural water sources.
 - 5. Geomorphic features such as high points with open views, saddles, terraces, benches, ridges, and drainage confluences.
 - 6. Along linear features that are known or suspected prehistoric and/or historic trails, roads or other travel routes.
- B. Areas expected to have a low density of cultural resources:
 - 1. All slopes greater than 15%.

CHAPTER 7

The Paleoindian Period

Dated from approximately 10,000 B.C. to 5500 B.C., this period comprises three traditions. The Llano (Clovis) Tradition is characterized by Clovis points, mammoth kill sites, and radiocarbon dates from 11,500 to 11,000 years ago. The Folsom Tradition is identified primarily by Folsom points and the hunting of now-extinct bison, and dates from 11,000 to 9,000 B.P. The Plano Tradition uses a variety of well-made, Lanceolate points, hunted animals still extant, and exhibited a wider range of regional differences than its predecessors (Hayden 1982). Earliest human occupation of the San Juan National Forest can only be considered within the context of the area's glacial history, and the reader is referred to chapter three of this volume for details.

Archaeological Evidence

In what we can now kindly take as a challenge to archaeologists, Eddy et al. (1984:20) declared that:

[there are presently only hints of the existence for each of the Pale-Indian complexes (Llano, Folsom, and Plano) in southwestern Colorado and adjoining areas... it must be noted that many of the examples listed below [of projectile point finds] could well be instances of later use of "curated" or collected points by groups such as the Anasazi.

Recent studies have, however, demonstrated that while Paleoindian materials in the study area are low in frequency, they nevertheless represent the remains of actual use or occupation of the area, rather than simply the result of later curation activities.

Pitblado (1993) analyzed 166 projectile points from 110 sites, in both public and private collections, from the following counties: Archuleta; Delta, Dolores, Gunnison, Hinsdale, La Plata, Mesa, Mineral, Montezuma, Montrose, Ouray, Pitkin and San Miguel. She concluded that the Paleoindian presence in southwest Colorado has been significantly underestimated

(Pitblado 1993). Pitblado defined eight complexes for Paleoindian points from southwestern Colorado:

Clovis (11,500-11,000 BP) N=5 3%

Defined by Wormington (1957:263) as fluted points with parallel or slightly convex sides with the fluting usually extending no more than halfway from the base to the tip.

Folsom (11,000-10,200BP) N=2 1%

The flutes usually extend over most of the length of the point (Wormington 1957:263) and are characterized, like Clovis, by excellent workmanship

Plainview (10,200-9,900 BP) N=6 4%

These are unfluted points, lanceolate in shape, and with flaking often parallel but more often is irregular. Basal edges are always ground. (Wormington 1957:265). Basal grinding not always present on the SW Colorado specimens. Includes Milnesand, Goshen, Midland, Mill Iron and Belen types.

Western Stemmed (10,700-8,200BP) N=14 8%

As defined by Bryan (1980, 1988), this complex includes the Old Cordilleran Culture, Western Lithic Co-Tradition, San Dieguito Complex, Intermontane Western Tradition, Desert Culture, Western Pluvial Lakes Tradition. It is essentially a Great Basin phenomenon.

Agate Basin (10,800-10,000BP) N=5 3%

Wormington (1957:269) defines these points as long and slender. In some instances the bases are as pointed as the tips, flaking is horizontal parallel, and the base is rarely ground.

Hell Gap (10,500-9,400 BP) N=3 2%

Agogino (1961:558) describes it as a lanceolate form reminiscent of Agate Basin. Hell Gap has pronounced basal grinding.

Foothills-Mountain (10,000-7,500 BP) N=47 28%

These are roughly made and leaf-shaped, with a ground base and parallel oblique flaking. Includes Pryor Stemmed, Lovell Constricted, Alder Complex, Pine Spring and Frison's (1991:74) parallel oblique flaked points complex (Angostura, Frederick, Jimmy Allen, Lusk). Pitblado (1993:36) rejects all of these except Lusk.

Cody (10,000-8,000 BP) N=9 6%

Includes Scottsbluff, Eden, Portales, Alberta points and Cody knives.

Pitblado (1993) suggests that Paleoindian presence in the mountains was based on a generalized subsistence strategy, as opposed to the specialized big-game emphasis of Plains Paleoindian groups. This conclusion is based on: 1) ethnographic evidence for historic-period utilization of the area; 2) a lack of correlation between megafauna and human remains in Great Basin sites; 3) faunal assemblages at Paleoindian Great Basin sites are dominated by mid-sized animal remains; 4) groundstone is found in large quantities at sites; 5) there is a lack of communal killsites. Materials are mostly quartzite (61%) and chert (22%); every other material is represented by frequencies of less than 5% each). Compared to the choice of fine materials at many other Paleoindian sites, this is suggestive of less concern with hunting, indicative of a generalized subsistence strategy. This strategy is represented elsewhere in the Rockies by Frison's (1991:67) Foothills-Mountains Tradition. Black (1991) argues that his Mountain Tradition (see Chapter 7, this volume) may have begun in the Paleoindian period, too.

Pitblado (1993:46) also argues that the frequency of particular point types suggests that the dominant occupation was by resident Foothills-Mountain adapted groups rather than by Plains or Great Basin groups. However, it is not at all certain that such geographical variation was the result of separate ethnic groups. The lower numbers of Great Basin and Plains points is caused by either: 1) curation (not likely given the high incidence of isolated finds these sites constitute); 2) (possibly) seasonal travel to higher country; 3) actual immigration of small groups into the area.

Pitblado (1993:95-96) concluded her study with a list of areas for further study: 1) more attention should be paid to non-diagnostic lithic scatters in order to attain better chronological controls of these scatters; 2) there should be greater awareness that many Paleoindian sites might be located under considerable alluvium; 3) there should be greater attention to horizontal stratigraphy; 4) connections between the Paleoindian and Archaic periods should be explored.

The first systematic study of Paleoindian use of the San Juan National Forest was conducted by Robert York (1991). York deliberately made his comparisons tentative, to avoid the danger of inferring too much cultural contact between areas based on morphological

similarities between specimens in a single artifact class, in this case projectile points. All of the points are Plano in type: Hell Gap, Alberta, Agate Basin, Milnesand, Alberta, Pryor Stemmed, Me serve. York conservatively refined the sample to a total of twelve, of which eight were from the area between the Dolores and the West Fork of the Dolores River, one from between the La Plata and the Animas north of Durango, and three from the upper San Juan area northeast of Pagosa Springs. All were isolated finds. York (1991:16) does not believe these points to have been the result of curation, arguing that five and probably ten of the twelve points were made of materials native to the San Juan mountains (Burro Canyon, Brushy Basin material and other unnamed, probably local, sources). York (1991:19) suggested that the Dolores Plateau should be an excellent area for pursuing Paleoindian (and Archaic) research, because it contains stratified rockshelters and has natural features like Glade Lake marsh that potentially contain valuable palynological and microbotanical data.

Combining York's and Pitblado's analyses with more recent studies, a total of twenty five individual Paleoindian points at twenty three separate locations have so far been found on the San Juan National Forest (Table 7.1).

Table 7.1
Paleoindian Sites on the San Juan National Forest

DISTRICT	SITE	AFFILIATION
Mancos-Dolores	5DL201	Agate Basin/Angostura (York 1991) Foothills-Mountain (Pitblado 1993)
Mancos-Dolores	5DL691	Unknown (Pitblado 1993)
Mancos-Dolores	5DL775	Agate Basin/Angostura (York 1991) Unknown (Pitblado 1993)
Mancos-Dolores	5DL1043	Unknown (Pitblado 1993)
Mancos-Dolores	5DL1045	Unknown (Pitblado 1993)

DISTRICT	SITE	AFFILIATION
Mancos-Dolores	5DL1059	Hell Gap/Lind Coulee (York 1991) Western Stemmed (Pitblado 1993)
Mancos-Dolores	5DL1061	Unknown (Pitblado 1993)
Mancos-Dolores	5DL1231	Foothills-Mountain (Pitblado 1993)
Mancos-Dolores	5DL1625	Agate Basin (Pitblado 1993)
Mancos-Dolores	5MT4631	Foothills-Mountain (Pitblado 1993)
Mancos-Dolores	5MT4678	Unknown (Pitblado 1993)
Mancos-Dolores	5MT4678	Unknown (Pitblado 1993)
Mancos-Dolores	5MT4682	Unknown (Pitblado 1993)
Mancos-Dolores	5MT4682	Unknown (Pitblado 1993)
Mancos-Dolores	5MT5653	Milnesand (York 1991) Unknown (Pitblado 1993)
Mancos-Dolores	5MT5656	Agate Basin/Angostura (York 1991) Unknown (Pitblado 1993)
Mancos-Dolores	5MT10601	Agate Basin/Angostura (York 1991)
Mancos-Dolores	N/A	Agate Basin/Angostura (York 1991) - <i>Point 1 in York (1991). No Smithsonian number assigned.</i>
Mancos-Dolores	N/A	Pryor Stemmed(York 1991) - <i>Point 2 in York (1991). No Smithsonian number assigned.</i>
Columbine	5LP1599	Hell Gap/Lind Coulee (York 1991) Hell Gap (Pitblado 1993)
		Plainview (Pitblado 1993) - <i>found by J.</i>

DISTRICT	SITE	AFFILIATION
Columbine	N/A	<i>Judge. No Smithsonian number assigned.</i>
Pagosa	5AA774	Hell Gap/Lind Coulee (York 1991) Western Stemmed (Pitblado 1993)
Pagosa	5AA1407	Hell Gap (Matlock 1988)
Pagosa	5ML143	Alberta (York 1991) Unknown (Pitblado 1993)
Pagosa	5ML144	Pryor Stemmed/Meserve/Dalton (York 1991) Unknown (Pitblado 1993)

Unfortunately, all of these points are isolated finds. In order to get a more detailed picture of Paleoindian life in the SJNF, reference must be made to the Black Mountain site (5HN55), located across the continental divide from the San Juan National Forest. This important site provides the best information on Paleoindians in the San Juans. The Black Mountain site is located at an altitude of 10,160' asl at the headwaters of the Rio Grande river about twenty five miles west of Creede, Colorado. The site was found in 1977 and has been excavated since 1993 by a team from the Smithsonian Institution under the direction of Margaret Jodry and Dennis Stanford. It has so far yielded portions of five Folsom preforms, numerous tools and over 1,000 flakes. Radiocarbon dates from associated charcoal are: 1) 7888-8110 BP; and 2) 10631 BP. (Jodry et al. 1996). This site is the highest altitude Folsom site yet found and clearly shows that Paleoindian peoples were utilizing the high country.

Research Opportunities and Directions

Developing a greater understanding of the nature of Paleoindian occupation and use of the SJNF is predicated on the location of Paleoindian sites, other than isolated finds, followed by their subsequent excavation. Initial work should, therefore, concentrate on the development of predictive models of site location, based on an understanding of specific local glacial and postglacial geomorphological histories.

Secondly, work should be directed to understanding the nature of Paleoindian subsistence and settlement patterns, especially the relative importance of hunting to gathering. Again, this awaits the location and excavation of Paleoindian sites.

Thirdly, models of seasonality of resource use should be developed. Seasonal climatic variation, and thereby resource availability, during the Paleoindian Period was undoubtedly more marked than it is today. Seasonal movements may have been both vertical and horizontal. Attention should be paid to understanding the full range of resources exploitable on the SJNF, including both food resources and other important commodities such as lithic sources.

CHAPTER 8

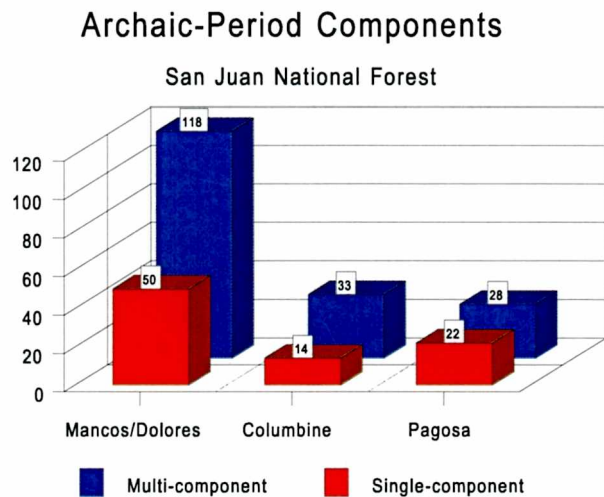
The Archaic Period

The Paleoindian Period is followed by the Archaic, a term used as either a period or a stage (Willey and Philips 1958:104). As a period the Archaic dates to between 5,500 B.C. to AD 1. **However, in regions like the American Southwest, Archaic-stage lifestyles continued in some areas, while in others the transition to a Formative lifestyle was made. Thus, in the mountains of southwest Colorado Archaic-stage lifestyles existed contemporaneously with Ancestral Pueblo lifestyles practiced immediately to the south. This continuity of lifestyle between different time periods and different ethnic groups has resulted in confusion in archaeological interpretation. Kight (1988:156) has urged that historic and pre-contact Ute designations be clearly distinguished, and Black (1991:1) implies that Archaic needs to be distinguished from Numic:**

Archaic continuity in the Southern Rocky Mountains is expressed in archaeological remains as recent as 1000 - 700 B.P., after which explaining the presence of Numic sites may require a new influx of hunter-gatherer populations.

Whether defined as a stage or a period, the Archaic way of life is *in general* characterized by a change to a broader subsistence strategy with a greater reliance on a large array of animals and increased reliance on plant resources in comparison to the preceding Paleoindian Period (Reed 1984:17), although Judge (1973) suggested that the switch to a generalized economy took place during, rather than at the beginning of, the period. **The lifestyle lasted up to historic times, when it was practiced by the Utes. The relationship of Archaic cultures to preceding Paleoindian cultures is problematic. On the one hand, Irwin-Williams (1973:4-5) argued that differences between the two were so great as to indicate no connection, the Archaic presumably resulting from some sort of population movement. On the other, Stuart and Gauthier (1981) have suggested an *in situ* development.**

Archaeological Evidence



Currently, 179 *dated* Archaic components (either single-component Archaic sites or multi-component) are listed on the Forest Service's computer inventory (Figure 8.1; it should be noted that the number for single components in each district is a subset of the overall number of components, not in addition to it). These sites are found throughout all altitudinal zones in the forest.

They range in size from isolated projectile point finds to large lithic scatters covering several thousand square meters that spanned several thousand years of seasonal occupation. Archaic-Period sites are surface-dateable only by the presence of diagnostic projectile points, but it is likely that many of the undated lithic scatters also fit into this time period. Surface features are rare, and when found they comprise enigmatic hearths and firepits. The sites represent a range of behaviors, from specialized tasks such as lithic reduction, to multi-functional habitation units.

Sites dating to the Archaic Period have been found at very diverse elevations in southwest Colorado. In Ridges Basin, located south of Durango on the southern border of the SJNF, at an elevation of approximately 6400' asl, 54 lithic sites, dating about 4000 B.C. to AD I, were found during the Animas-La Plata survey (Ware 1981). At the other extreme are two sites above 11,000 feet in the Piedra Pass vicinity that together yielded 2404 artifacts, and charcoal scatters supplying four corrected radiocarbon dates between 3720 B.C. +/- 170 and 1820 B.C. +/- 220 (Reed 1984:8). The presence of obsidian materials and the general nature of the assemblage placed these sites in the so-called Rio Grande Complex (Honea 1969). The Archaic Mountain Tradition recently described by Black (1991) has not been convincingly demonstrated to be present within the Forest (Charles, Appendix II, this volume). Projectile point typology for this period has not been fully refined for the San Juan National Forest materials. Charles' study (Appendix II, this volume) indicates that point types throughout the Archaic bear resemblance to both Great Basin and Oshara Tradition types of northern New

Mexico.

The Rio Grande Complex was formally defined in 1969 by Kenneth Honea, on the basis of his own work in the Galisteo Basin of north-central New Mexico and Renaud's earlier survey of the upper Rio Grande Valley in the 1940s which had recovered a number of Early Archaic-style projectile points. Honea argued that the points of this so-called proto-Archaic culture had their origin in Agate Basin. Similarities in point styles throughout the West:

could conceivably be due to diffusion of a culturally determined projectile point tradition, which, on somewhat different, successive, time levels and in different regions, underwent distinct evolutionary changes giving rise to a series of local types.

(Honea 1969:65)

More recently, Great Basin point types have been synthesized by Holmer (1980), based on a sequence at the stratified Sudden Shelter in Utah. The sequence includes the Elko series (corner-notched, side-notched and eared); Pinto series (shoulderless, sloping-shouldered, square-shouldered, barbed and single-shouldered); Humboldt; Silver Lake; Hawken Side-Notched; Sudden Side-Notched; San Rafael Side-Notched; and Rocker Side-Notched. Many of these point types have extremely long use histories; the Pinto series, for example, being used for perhaps as long as 7,000 years at Danger Cave (Holmer 1980:80).

The Oshara Tradition was defined by Irwin-Williams (1973) for material from the Arroyo Cuervo area of northern New Mexico as one of the four Archaic precursors to later Formative cultures of the American Southwest. The tradition comprises five temporal phases, Jay, Bajada, San Jose, Armijo and En Medio, each of them distinguished primarily by particular projectile points.

The *Jay Phase* is dated to 5,500-4,800 BC. Assemblages contain stemmed points, large bifacial knives, and side scrapers. It is believed by Irwin-Williams to represent discontinuity with the preceding Paleoindian period. The *Bajada Phase* dates from 4,800 to 3,200 BC. and possibly represent an increase in population. The *San Jose Phase* (3,200-1,800 BC) has the first evidence for temporary dwellings, in the form of post holes. The *Armijo Phase* dates from 1,800 to 800 BC is a continuation of the San Jose Phase with the addition of corn horticulture. The *En Medio Phase* (800 BC to AD 400) is the regional manifestation of Basketmaker II, and

the *Trujillo Phase* (AD 400 to 600) is the equivalent of Basketmaker III.

Archaic-period sites in the San Juan National Forest consist mainly of lithic scatters, which should not be automatically dismissed as non-diagnostic or uninformative. One approach distinguishes between Archaic and ceramic-period scatters based on the higher percentage of biface reduction debitage in the former (Sullivan and Rozen 1985:755-779). Another infers the tool type being manufactured from the scatter pattern (Kelly 1987:717-734, cited in Pitblado 1993:75). Sullivan and Rozen's technique was experimentally applied to a sample of 29 undated lithic scatters located on nine sites in the Turkey Springs area on the Pagosa District (Ozolins 1994), and a series of dendrograms produced. Unfortunately, little discrimination was noticed between the scatters, except in the types of materials used.

Research Opportunities and Directions

The sheer quantity of lithic scatters comprising the archaeological record of the SJNF and the expectation that a large number of these date to the Archaic period make research on this period of history one of the more compelling foci of interest. The following research opportunities constitute but a small portion of possible topics.

First, as has been noted in chapter five and this present chapter, lithic scatters on the forest are what might be called palimpsests of human activities, with the archaeological remains of these activities overlapping each other in a spatially confusing manner. It is, therefore, imperative for researchers to develop methodologies that will allow them to isolate as much as possible these signatures. These will involve minimally a better understanding of geoarchaeological processes on the forest, but also the use of statistically sophisticated methods for separating spatially overlapping assemblages.

Second, as has been noted previously, artifact variation lithic scatters, both with and without diagnostic artifacts, should be studied in order to determine, where possible the causes of such variation, whether it be temporal, functional or even ethnic in origin.

Thirdly, there is still little knowledge regarding the specifics of Archaic-period subsistence and settlement strategies or the impact on these of paleoenvironmental change. Localized paleoenvironmental studies should be linked to detailed regional analyses to create a more detailed

and coherent picture of such activities as the scheduling of seasonal movements and the relative importance of hunting versus gathering. In particular the number of Archaic-Period sites, plus the observed range of activities at these sites should allow for more specific inferences on settlement and subsistence. For example, Vierra (1990:63), using Binford's (1980) model, has suggested that in northwestern New Mexico, hunter gatherers practiced a forager strategy during the spring, summer and fall in that they moved their residence units around, whereas during the winter they were *collectors*, storing foods at long-term camps. Kather (1990), using the distribution of specific types of obsidian flakes in the SJNF has proposed a down-the-line exchange system for this material. Such work demonstrates that the archaeological record of this period is susceptible to the application of theoretically sophisticated models.

Linked to the third research goal is the need to link exploitation patterns in the forest itself to more outlying regions, in particular the area of northern New Mexico and the use of obsidian from the Jemez Mountains. Is the presence of this material at sites in the mountains the result of low-level exchange systems, wide-reaching seasonal rounds, or a combination of both. Explicating this problem requires a better understanding of the social organization of prehistoric dwellers of the forest, so that a clearer understanding of the different types of social linkages (i.e. between different *ethnic* units) needed as part of the hypothesized exchange systems can be achieved.

Fifth, localized projectile point chronologies need to be developed, and, more importantly, the processes underlying the spatial distribution of these artifacts clarified (this problem is not restricted to the SJNF.) The patterns of social intercourse that underlie projectile-point style horizons need to be explored in much more detail, as we noted in general in the preceding paragraph. Although most archaeologist would discount ethnicity as a factor in the spatial distribution of projectile point types, nevertheless this distribution is the result some form of prehistoric social intercourse, as yet unknown. The work of Charles (Appendix II, this volume) provides a base for future studies in this vein.

Finally, the amount of archaeologically recovered material, practically or potentially assignable to the Archaic period, is sufficient to allow the formulation of preliminary hypotheses regarding social organization and structure. In particular, models are available for a delineation of internal power structures in such areas as gender discourse (e.g. Gero 1991). Although many

archaeologists are still unfamiliar with these types of social models, they are rapidly becoming part of received archaeological practice and show much potential for expanding our awareness of the Archaic Period beyond the more traditional studies of subsistence and settlement.

CHAPTER 9

Ancestral Pueblo

(Primary Author - Bonnie Hildebrand)

The Formative stage is identified in societies in all parts of the world with the beginning of village life. (Cordell 1984:214). While areas rich in natural resources, like the Pacific coast, could support sedentary societies without the need for agriculture, in the American Southwest sedentism was possible only when agriculture was sufficiently established to compensate for the loss of a mobile and wide-spectrum subsistence base. The other characteristic of Formative-level societies is a social organization capable of managing and holding together the agricultural village systems. Throughout the Southwest, Formative-level societies display different characteristics in different areas. In common, however, are permanent dwellings, bow and arrow technology, ceramics, woven materials, corn-grinding apparatus, and evidence of agriculture, beginning with maize, and adding through time beans, squash and, in appropriate regions, cotton.

In southwestern Colorado, this stage is represented by the Anasazi or Ancestral Pueblo culture. The term *Ancestral Pueblo* is preferred in this document as a more accurate, descriptive name for the archaeological tradition known as Anasazi. It has the merit of acknowledging the direct cultural relationship between prehistoric farmers of the Four Corners and contemporary Pueblo peoples. It also eliminates part of the commonly-perceived "mystery" of the prehistoric abandonment of the Four Corners and directs attention to using archaeology to answer questions about past *Pueblo* life. However, we also acknowledge that at least one other Native American tribe, the Navajo, has laid claim to Anasazi material as part of NAGPRA-mandated repatriation procedures. The Anasazi Tradition grew out of the First Pecos Conference of 1927 (Plog 1974:29) and was refined over the next decade. The individual sequential units were never intended primarily as periods, but rather as stages isolating "different levels of development (Plog 1974:29), although space and time were organizational components of the overall system. Despite its original intent, the system has assumed primarily a chronological dimension, with variation in dates resulting from spatial variation in the processes of cultural change.

	Pecos	Navajo Reservoir	Dolores
AD 1-50	Basketmaker II	Los Pinos Phase	Great Cut Phase
50-100			
100-150			
150-200			
200-250			
250-300			
300-350			
350-400			
400-450	Basketmaker III	Sambrito Phase	Sage Hen Phase
450-500			
500-550			
550-600			
600-650			
650-700			
700-750	Pueblo I	Rosa Phase	McPhee Phase
750-800			
800-850			
850-900	Pueblo II	Piedra Phase	McPhee Phase
900-950		Arboles Phase	
950-1000			Sundial Phase
1000-1050			

Table 9.1
Ancestral Pueblo Classification Systems

Although the utility of the basic Pecos Classification remains, archaeologists have long recognized local variation and have accordingly created localized sequences. Two such sequences are of relevance to archaeological materials on the San Juan National Forest (Table 8.1). The first is an outcome of Frank Eddy's (1966) work in the Navajo Reservoir district, south of the forest on the Colorado/New Mexico state line. The second is the result of intensive archaeological work by the Dolores Archaeological Project as part of the construction of the McPhee Reservoir (Breternitz 1984). The sites found during this project now constitute the Anasazi Archaeological District.

Basketmaker I is a hypothetical stage purported to represent the transition from the Archaic to Formative-level society. This stage is not used, having been subsumed into the Late Archaic. Basketmaker II is dated approximately to 400 BC - AD 450 (Cordell 1979:134; Plog 1979:113; Lister 1997:135), and there are numerous sites belonging to this phase in the Durango and Navajo Reservoir areas. Sites dated to this period include Talus Village on the west side of the Animas, the North and South Falls Creek rockshelters, the Tamarron site, and others in Ridges Basin (Eddy et al. 1984:71). Among the indicators are charred corn and milling stones, and evidence of use of deer, elk and mountain sheep. Coiled, undecorated pottery fired in an oxidizing atmosphere characterizes the ceramics (Los Pinos Brown). Basketmaker II dwellings are pithouses with central fire pits, slab-lined cysts, beehive-shaped storage units and irregular placement. (Cordell 1979:134). Sites are located on bluffs and benches, away from the river bottom but close to areas of ecological diversity (Eddy 1966:477), and in rockshelters.

The SJNF contains the Basketmaker II type site of Falls Creek, named for a small valley located a few miles northwest of Durango. The site consists of two sandstone rock shelters at the base of a thick sheer cliff of Entrada sandstone, called the North Shelter and the South Shelter, respectively. Based on the tree-ring dates obtained from the sites, the heaviest occupation of the sites occurred about AD 50, with a total occupation range from about 300 B.C. to AD 300. Recent AMS dates of the associated rock art assayed at approximately 2300 B.P. (Sharon Hatch: personal communication). Recent radiocarbon dates for corn recovered from the site fell into the 3rd century B.C., making this the earliest evidence for this cultigen in the region (Lister 1997:135).

The mummified remains of a young woman and a young boy, as well as the final total of forty two human burials excavated from the shelter were eventually transferred to Mesa Verde

National Park and the University of Colorado museum. Rare artifacts including jewelry, sandals, baskets, and other items were also recovered. A few of the house floors still exist, but these were recently covered by the Forest Service to prevent them from being damaged by vandals, foot traffic, and natural processes.

Today the rockshelters are on the National Register of Historic Places. The Forest Service also initiated a complete survey of 1500 acres of the surrounding area and have recorded 51 additional sites that date to the Basketmaker II, Basketmaker III, Pueblo I, Protohistoric and Historic Periods. This area has now been designated by the United States Forest Service as the Falls Creek Archaeological Area, which was created in 1993 to preserve its archaeological sites, to provide for public access to them, and to protect the area's wildlife.

The nearby site of Talus Village (although not on Forest Service land) was also excavated by Morris and provided additional information on Basketmaker II life, in that Morris was able to find evidence for the Basketmaker II structures having been covered by a cribbed timber roof. Confirmation of this form of wall construction was found years later by archaeologist Alan Reed at the Tamarron Site to the north (Reed and Kainer 1978).

The accessibility of many Basketmaker II sites to areas of different resources, both hunted and gathered suggests an economy of long-term stability, which became gradually more sedentary with the increasing use of agriculture. The change in material culture documents this shift. From 3200 - 1800 B.C., shallow grinding stones are evidence of foraging strategy. From around 1800 B.C. to 800 B.C., the beginning of corn cultivation is suggested by the appearance of the first patterned work areas and seasonal aggregations of bands, perhaps in response to autumn surplus. Between 800 B.C. to AD 400, the deep basin metates efficient for increased corn grinding are taken as evidence of the transition into the Formative stage (Eddy et al. 1984:28).

Basketmaker III is typically dated AD 450-700 with some regional variation (Cordell 1979:134; Plog 1979:114). Alluvial terraces or first benches of rivers, close to arable land are preferred locations (Glassow 1972). Sites of this period comprise pithouses and storage features, arrow points, and both trough and slab metates. Ceramics include Chapin gray, a distinctly Anasazi style, fired in a reducing atmosphere (Cordell 1979:134) and toward the end

of the period, Chapin black-on-gray with painted patterns (Plog 1979:114). Lead glaze is used in the Durango area (Eddy et al. 1984:73). In the upper San Juan, Sambrito is the local polished brownware (Eddy et al.1984:32).

Pueblo I (AD700-900) was an era of gradual transition from pithouse villages to above-ground structures (Cordell:1979:135; Plog 1979:114). Beginning with jacal dwellings and kivas of stone and mortar, there is a transition to shaped stone and finally dressed masonry and room blocks by AD 1100 (Plog 1979:126). The ceramic assemblage includes plainware, some neckbanded and corrugated, and some red-on-orange and black-on-red. Projectile points are thin and side-notched. Stockaded settlements are found in the Navajo Reservoir area up to about AD 900, but none are found thereafter (Eddy et al. 1984: 83).

Pueblo II (A. D. 900-1100) is characterized by further ceramic development, with painted decoration and distinctive regional styles (some polychrome) emerging (Plog 1979:114; Cordell 1979:136). Flat slab metates and two-handed manos also appear (Plog 1979:115). Pueblo II sites are found in the lower reaches of the forest. Numerous Pueblo II components are found in the Anasazi Archaeological District, for example (Breternitz et al. 1986). An important Pueblo II site on the forest is the Chimney Rock Pueblo complex, located about 17 miles west of Pagosa Springs (Eddy 1977). The complex comprises two major clusters of sites, both of which date to Pueblo II. The first is a small house village of indigenous style. The second, designated 5AA 83, comprises a "great house" of 55 rooms and two kivas and is affiliated with the so-called Chacoan system. This system is manifested archaeologically in a series of Pueblo II sites, called outliers, located mainly in northern New Mexico, but also in Arizona and Colorado, many of which are linked by roads. The outliers share common architectural and ceramic styles with a series of large town sites in Chaco Canyon in northern New Mexico that are considered to be the hub of the system. The Chacoan system may have existed for both economic and religious purposes (Cordell 1984:246-274).

The reasons for Chimney Rock's location in the forest are still unclear. The site may have served as a base for exploiting forest resources for redistribution throughout the Chacoan system, as a religious colony sent out from Chaco Canyon, as an astronomical observatory, or some combination of all these (Lister 1993; Malville and Matlock 1993; Hatch 1994). Hatch's (1994:118) innovative study of wood sourcing at the Chimney Rock area concluded that although chemical

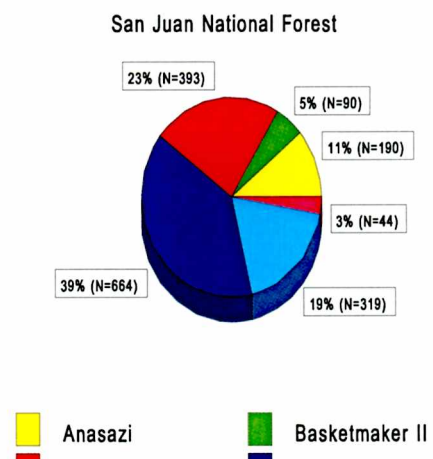
analysis showed that prehistoric wood samples from Aztec Ruins, Salmon Ruins, and the Chimney Rock Archaeological Area could have been harvested at the Chimney Rock area, it is more likely that they were harvested generally in the Northern San Juan Basin rather than specifically from Chimney Rock.

Pueblo III (AD 1100-1300) is marked by the development of Mesa Verde's mesa-top villages and towers and large cliff-alcove pueblos of multi-storied masonry. Ceramics showed great technological and stylistic sophistication and variation: Chaco Corrugated, Gallup Black-on-White, various Mesa Verde wares, McElmo Black-on-White, and Chaco copies of Mesa Verde styles were common (Cordell 1979:137-138). Significant numbers of Pueblo III sites are found in both the Anasazi and Lost Canyon Archaeological Districts.

Archaeological Evidence

There are a total of 1700 Ancestral Pueblo components on the forest, dating from Basketmaker II to Pueblo III times (Figure 9.1). Of these, 190 are unassignable beyond the gross Ancestral Pueblo classification. A total of 664 (39%) components belong to the Pueblo I period. This figure is slightly inflated, however, because of the intensive PI occupation unearthed by the Dolores Archaeological Project. Once the Pueblo I components in the Dolores Archaeological district are removed (N=447), the PI frequency falls more into line with those elsewhere.

Ancestral Pueblo Components

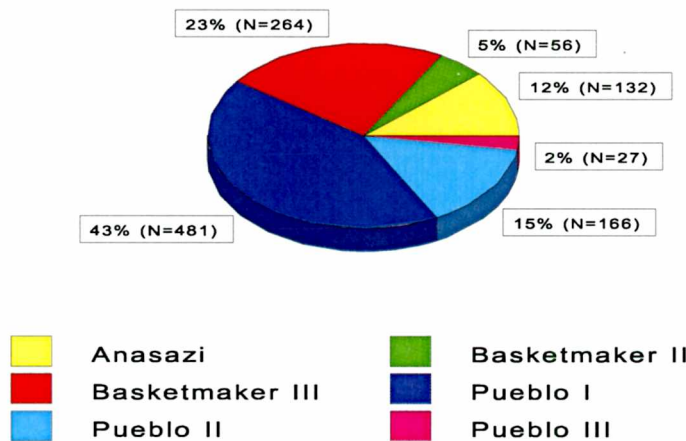


The types of Ancestral Pueblo sites found on the SJNF vary greatly as a consequence of their particular ages and because of the particular environments in which they are found. Along the southern and western borders of the forest, areas which have the lowest elevations of the forest, Ancestral Pueblo sites are fully Formative, sedentary and reliant on corn agriculture. Heavy site densities have been found in the Anasazi Archaeological District, for example.

The most important concentrations of ancestral Pueblo sites have been organized either as National Register Districts (Anasazi; Lost Canyon; Chimney Rock; Spring Creek) or as Archaeological Areas (Falls Creek). The Anasazi Archaeological District covers 64 square kilometers on either side of the Dolores River downstream of the town of Dolores. The area's importance stems from its high number of very well-preserved Ancestral Pueblo ruins, particularly those dating to the Pueblo I Period, although many sites before and after this period are found in the district (Breternitz et al. 1986). The majority of sites were recovered during the Dolores

Ancestral Pueblo Components

Mancos/Dolores Ranger District



Archaeological Project, which was initiated to mitigate the loss of valuable cultural resources resulting from the construction of the McPhee Reservoir. There is evidence for human occupation in the area since the Paleoindian Period, with substantial evidence beginning about 3,000 BC. The work on this district is important because it has provided one of the most comprehensive and well-documented studies of ancestral

Pueblo life ever conducted .

The Lost Canyon Archaeological District, located in the Dolores/Mancos Ranger District ten miles north of Mancos, covers 820 acres and is defined by a concentration of masonry sites that date primarily to late Pueblo II/early Pueblo III periods. A total of 24 contributing Ancestral Pueblo sites and six non-contributing sites (five historic period sites and one prehistoric projectile point isolated find) comprise the district.

The Chimney Rock Archaeological District is centered on the Pueblo II site complex west of Pagosa Springs and covers approximately 3,160 acres. The district encompasses a total of over 90 sites, ranging from the large Pueblo II greathouse complex on the high mesa to smaller non-contributing temporary campsites.

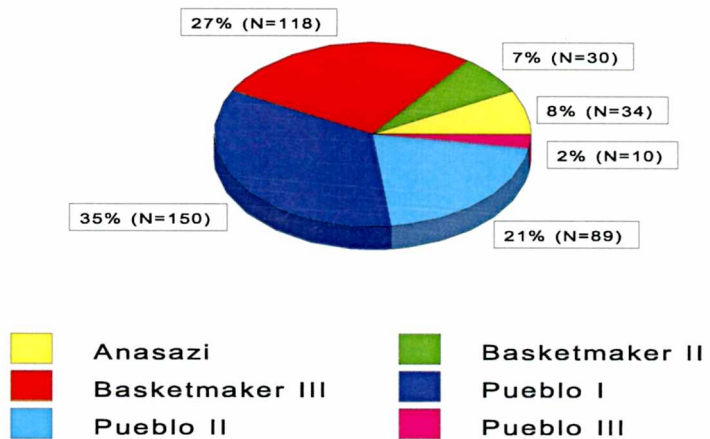
The Spring Creek Archaeological District, located south of Bayfield in La Plata county, was

placed on the register in 1984. It comprises 15 prehistoric sites, ten unrecorded sites and six isolated finds.

These sites range in age and cultural affiliation from the Archaic, through Ancestral Pueblo (mainly Basketmaker III and Pueblo I), to Athabascan and the Ute. The majority of sites are small farming communities consisting of pithouses, jacal roomblocks and some possible kivas.

Ancestral Pueblo Components

Columbine Ranger District

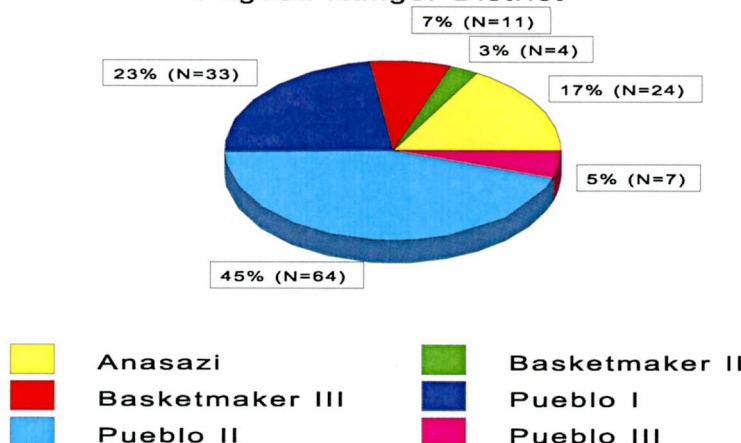


The Falls Creek Archaeological Area comprises 1500 acres containing the Falls Creek Rockshelter site itself, as well as 51 additional sites that date to the Basketmaker II, Basketmaker III,

Pueblo I, Protohistoric and Historic Periods. These sites have been described earlier in this chapter.

Ancestral Pueblo Components

Pagosa Ranger District



There is also a significant Ancestral Pueblo presence in the higher elevation areas of the SJNF, where components are represented by non-structural ceramic-bearing assemblages,

which are probably the remains of specialized activities, such as hunting or gathering. For example, Ancestral Pueblo grayware has been found at an elevation of about 12,000' asl along Indian Ridge Trail just to the west of Kennebec Pass in association with an otherwise non-diagnostic lithic scatter. A study of high altitude ceramics – those above 7200' (2195m) – prepared by Mona Charles (Appendix III, this volume) examined materials from 48 sites of a

total of 61 on which ceramics have been reported, with results important for future survey and management. The emphasis of this study was the distribution of ceramics. It was found that due to weathering, sherds at this elevation are apt to be very small and easily overlooked, but that they are present over most of the forest, ranging from 7500' to nearly 12,000'. Represented are all ceramic types of the surrounding area with the significant exception of Chaco Black-on-white. Not only are there no Chaco Black-on-white sherds in the forest north of Chimney Rock, where forest resource use is postulated for the pueblo and to supply the Chacoan system, but they are also lacking in two midden areas south of the pueblo itself.

The study shows that ceramic types in the Forest at high elevation follow the general frequencies of those at low elevation. Early gray and brown wares are more common in the upper reaches of the Animas, Los Pinos and Piedra drainages while Pueblo II and Pueblo III ceramics are concentrated in the west end of the Forest. However, Pueblo III types – McElmo and Mesa Verde Black-on-white – are much rarer, despite heavy lowland population during this period, corresponding to the paucity of forest resources in archaeological remains in the Cortez area for this time. Despite this paucity of late Ancestral Pueblo ceramics, the SJNF -at least its lower elevations - continued to be used by Pueblo peoples. This is evidenced by the presence of two pieces of Jeddito-Black-on-Yellow sherds at 5LP1410 at an elevation of 6710' asl in the Spring Creek area south of Bayfield (Lewis and Ellis 1984). This ware dates between AD 1325-1600, and its source lies within the boundaries of the Hopi Reservation (Colton 1956; Schaefer 1969).

It is clear that a much more detailed study of the nature of Ancestral Pueblo use and occupation of the SJNF needs to be undertaken. However, for now a number of conclusions can be made. First, there are at least two patterns of Ancestral Pueblo presence within the boundaries of the Forest. The first of these is found at lower elevations and constitutes a permanent year-round pattern of settlement and exploitation. This pattern probably goes back as early as Basketmaker II and is exemplified by the Falls Creek materials. Particularly at the west end of the forest, the heavy presence of Basketmaker III and Pueblo I sites indicates that the lower elevations of the forest were the scene of permanent village life, dependent to varying degrees on maize agriculture. The Pueblo II occupation of Chimney Rock is, however, more problematic, in the

sense that the role of this site complex is still not clear.

Secondly, as suggested by the analysis of high-altitude ceramics by Charles (Appendix III, this volume), Ancestral Pueblo peoples were either seasonally exploiting the San Juan National Forest or in contact with people who were (Duke 1995). It has been argued that the nature of this contact changed through time, with direct use of forest resources during Pueblo I period giving way to trade and exchange during the Pueblo II period, as ancestral Pueblo farmers became more sedentary (Duke 1995). Attention should also be paid to the use of the San Juans as a refugium for Ancestral Pueblos during times of environmental stress (Euler et al. 1979:1098; Berry 1982:passim). For example, a movement of Ancestral Pueblo groups up the Piedra River has been tentatively identified during Pueblo I and II times (Eddy 1966; Brunswig 1993) as a result of environmental degradation and the search for a more suitable climate for farming (better annual precipitation patterns, in particular).

A final problem, one certainly not exclusive to the San Juan National Forest, concerns the very nature of what archaeologists mean by the term *Anasazi*. Is it the archaeological manifestation of a single ethnic group, multiple ethnically related groups, similar to what we see in contemporary Pueblo societies, or does it represent some as yet undeciphered social organization? Clarifying this has fundamental significance for understanding Ancestral Pueblo presence on the forest, especially in terms of clarifying the so-called boundary problem: i.e. the heuristic line drawn between full-fledged Anasazi assemblages and sites (i.e. architecture and ceramics) that lay to the south of the line and those assemblages and sites that contain only a small sample of Anasazi ceramics or other diagnostics. Unfortunately, the difficulties of recognizing an Ancestral Pueblo presence - and the nature of that presence - in forest sites that lack architecture or ceramics will confound our attempts at understanding the causes of the spatial pattern.

Research Opportunities and Directions

This section briefly synthesizes the research opportunities and directions for Ancestral Pueblo sites in the forest have already been alluded to. First, clarification must be sought regarding the nature of the spatial variation in Ancestral Pueblo components throughout the forest. In particular, attention should be drawn to the so-called boundary problem, between fully Formative-level sites in

the lower elevations of the forest and those non-structural sites that presumably represent seasonal use of forest resources.

Second, because of the emphasis on diagnostic ceramic and structural remains, it is still unclear as to what types of lithic scatters might be associated with the Ancestral Pueblo tradition. It is suggested that analyses similar to those proposed for Archaic-period scatters (Chapter 7, this volume) could usefully be applied to this problem, too.

Thirdly, what is the precise nature of Ancestral Pueblo use of mountain resources, assuming that at some point in the past, the archaeological remains are those of a separate social group (cf. Duke [1995] for a more detailed discussion of this problem)? Were these groups exploiting the area seasonally for plants, animals and/or mineral, and if so how can their remains be distinguished from those of contemporary hunting-and-gathering groups who were residing permanently in the forest?

Finally, what is the nature of the social and economic relationship between Ancestral Pueblo groups and contemporaneous hunting-and-gathering groups? Did those groups whose archaeological remains are classified as Ancestral Pueblo always retain a separate ethnic identity from other contemporary groups? If ethnogenesis did occur from an indigenous Archaic population, at what point in time and through what processes did this happen (Duke 1995)?

CHAPTER 10

The Late Prehistoric Period and the Historic Native Americans (Primary Author - Bonnie Hildebrand)

This chapter summarizes the major elements of traditional Ute and Navajo culture and their recognition in the archaeological record. Focus is placed primarily on the Ute because the ethnographic record indicates that they were the most frequent users of the forest during the historic period, although other tribes may also have used the forest on occasion. For this reason, the Navajo are only briefly discussed. Although Puebloan groups almost certainly used the forest, historic-period archaeological evidence for this use is absent. This chapter is not intended as an exhaustive ethnographic review of these cultures. The literature abounds with detailed analyses, although **the Utes have historically received less ethnographic attention than the surrounding Pueblo and Navajo, because unlike the other two groups, the Utes did not fit conveniently into one of the pre-established culture areas, showing traits both Great Basin and Plains in origin:**

roughly two-thirds of the Anasazi territory is traditional Ute/Southern Paiute territory. . .the pervasive Southwestern cultural-historical sequences. . .place the Navajo after the Anasazi and fail to even mention Numic-speaking groups

(Madsen 1994:30).

Ute Occupation

The following section briefly describes traditional Ute culture as recorded in the ethnographic literature before discussing the difficulties of recognizing this tribe in the archaeological record. It is important to note that the knowledge claims made here are based on western scientific paradigm.

An Abbreviated Ethnography

The Utes were the primary aboriginal inhabitants of the SJNF before Euroamerican settlement. Prior to this, the Utes occupied around 130,000 square miles of territory extending from west-central Utah to the plains of Colorado, and including a strip along the northern edge of New Mexico to the San Juan River in the area south of Mesa Verde (Callaway et al.

1986:336; Madsen 1994:28-29). In Colorado, their original range - 56 million acres - had been reduced to 18 million acres by 1868 (about 9 million each for the Southern Ute and Ute Mountain Ute). By 1934, the original Southern Ute Reservation had been reduced by 99% to 40,600 acres, and in the same period the Ute Mountain Reservation had been further reduced by 94% to 513,000 acres (Callaway et al. 1986:355). Since 1934, the tribe has purchased allotment and heirship-status lands, so that in 1996, the Southern Ute reservation stands at approximately 432,000 acres, and the Ute Mountain Ute stands at 530,000 acres.

As will be discussed in more detail below, the Utes were probably immigrants from the west. Their culture is basically Great Basin in origin with an overlay of more recent Plains culture traits, although at least one living Ute historian believes that the Capote and Muache have a tradition of arrival from the east (Naranjo 1994). Eastern Ute bands had contacted the Spanish by the first part of the 17th century (Callaway 1986 et al.:354) and thereby acquired horses and some elements of the Plains Indian lifestyle. Seventeenth and eighteenth century raids into New Mexico, stealing horses from the Spanish and other goods from the Pueblos, also contributed to the eclecticism that characterizes much Ute culture.

Residence groups numbered from 50 to 100 people, with larger accumulations possible in the summer (Callaway et al. 1986:352-354). These residence groups were exogamous and matrilineal, and were composed of several families related to each other matrilineally. Bands were composed of several residence units, led by a headman who consulted with a council composed of the other residence unit leaders. Individuals easily changed band membership. Callaway et al. (1986:339) identify eleven Ute bands. Six of these ranged primarily in Colorado: Muache, Capote, Weeminuche [or Weenuche], Uncompahgre, Parasunuch, Yampa), and five bands ranged in present-day Utah: Uintah, Timpanagots, Pahvant, Sanpits, Moanuts). The Muache, Capote and Weeminuche bands ranged in and around the San Juan National Forest. The present-day Southern Ute tribe, whose tribal center is Ignacio, is primarily descended from the first two bands, while the Wenuche, centered at Towoac, make up the Ute Mountain Utes.

Prior to the reservation period, the Utes were generalized hunters and gatherers (Callaway et al. 1986:340-345). They hunted deer, elk, antelope, bison (on the Eastern Slope

and in plains), rabbit, birds, ground squirrels, waterfowl, crickets and cicadas. They also caught fish, although this resource was more important to the western bands. The Utes gathered sunflower seeds, grass seeds, cactus blossoms, and fruit, roots, tubers, berries and thistles, as well as wild tobacco. The Weeminuche may have grown some corn. Women were the primary gatherers, although men might help with the piñon nut harvest, combining this with the fall hunting of deer.

In southern Colorado, seasonal movements were primarily altitudinal, with bands moving into present-day northern New Mexico for the winter (Callaway et al. 1986:336). Specific routes, however, are not known. A description of a historic Ute encampment is provided by J.S. Newberry, a geologist on the Macomb Expedition. On July 30th, 1859, Newberry visited the camp of Sobertah, located about 12 miles west of present day Pagosa Springs. Even so early in the year, the Utes were apparently preparing for winter: "[they were] collecting and drying [service] berries", and there were "Squaws dressing and painting [?] skins" (Schroeder 1965:70). Cornelius and Marshall (1961:161) provide a further description of a Ute encampment in the vicinity of the continental divide:

During the season of the Long Sun (the month of June), my clan would always climb up the cumbre (crest or summit) of the high mountains...One year many Indians went up together, and we made one big camp in the edge of the timber just beyond the top of the Sagholue (Divider of the Waters).

The military expedition of Captain Stewart in 1852 also contacted local Utes. Prevented from bathing in the hot springs at Pagosa by the presence of large party of Utes, Stewart then traveled in a northwesterly direction towards the continental divide, through a distinctive notch, identified tentatively as the modern local landmark, the Window (Powell 1988). It is possible that Stewart's route took him through O'Neal Park.

Traditional technologies of the Utes included leatherwork, basketry, woodwork and cordage (Callaway 1986 et al.:346-348). **Stone-tool technology included arrow points, scrapers, drills, round or oval manos, and both thin-slab and deep-trough metates. The Eastern Ute groups did not make pottery at all, although some Weeminuche made coiled pottery. Pettit (1990:35) describes Ute pottery as "made from a mixture of lime, clay, sand, and manure ground into a**

powder." Pottery does not appear to have been an important technology during the ethnographic period, but perhaps it was more important during the prehistoric period; certainly, it was one of the first items to be abandoned in favor of European goods.

Living structures included tripod or conical houses called wickiups (Callaway 1986 et al.:348-350). Ute wickiups were about fifteen feet in diameter and about eight feet high, and covered with willows, juniper bark and grass. These traditional lodges were later replaced by Plains tipis, as the tribe fell under the influence of Plains culture during the 19th century. Wickiup-type sweathouses were also constructed; only Eastern bands used the conical type. A sweathouse was heated by rocks carried from the outside (Everett Burch: personal communication, 1992).

The Ute language is one of two assigned to the Southern Numic branch of the Uto-Aztecan language family, the other being Kawaiisu (Miller 1986:99). The original Numic speakers were Archaic-period populations who lived in and around the Great Basin before migrating in a number of directions (the so-called Numic Expansion) and undergoing further linguistic and social divergence (Aikens 1994:40). Lamb (1958) argued that the Numic originated in the southwest corner of the Great Basin, and the split into the three Numic branches of Western, Central and Southern occurred sometime around 2,000 years ago. The expansion northward and eastward is thought to have taken place about 1,000 years ago, and it is this movement that brought the Utes into Colorado.

Thus, establishing a rough date for Numic expansion beyond the Great Basin through such techniques as linguistic study, oral tradition, and climatic correlation is important for understanding the history of the Ute occupation in Colorado. A long period of residency in Colorado would, for instance challenge the Navajo claim to be the temporal and spatial successors of the Ancestral Pueblo in the Four Corners (Madsen 1994:10). It is quite possible that the "Shoshoneans [Utes] and not the Athabaskans [Navajos]" may have been the enemy cited in Pueblo traditions of the Ancestral Pueblo relocation (Madsen 1994:30). Unfortunately, establishing such a date for westward expansion is an exercise fraught with difficulties:

The timing of Numic movements range from as much as 10,000 years ago to as little

as a few hundred years ago. Mechanisms range from *in situ* development of a 'Shoshonean' way of life, to assimilation through kin ties, to economic competition, to naked aggression

(Sutton and Rhode 1994:6).

Recent models (Bettinger/Baumhoff, Aikens/Witherspoon, Sutton [see Madsen 1994]) concern themselves more with the methods and reasons for expansion, falling back upon the work of Lamb (1958) for timing (Madsen 1994:10-11). As noted above, Lamb originally postulated a recent spread from the Death Valley area beginning around AD 1000. On the other hand, Goss (1977) has argued that the distribution of Numic languages was the result of an *in situ* long-term development of Uto-Aztecan languages that were found *throughout* the intermountain West (Sutton and Rhode 1994:8-9). Lamb himself has recently reconsidered his original position and now argues for a very gradual spread, possibly over the last 2-3,000 years (Thomas 1994:57). Unfortunately, as Thomas so correctly points out, Lamb's rethinking on the date of the spread has not been allowed by archaeologists to mar their certainty on at least one aspect of the past; that the Numic expansion began about AD 1,000. Other studies on the dates for this expansion are even earlier, perhaps "as early as 8,000 years ago." (Jones 1994:72).

Janetski has argued for a later westward movement, proposing that the Fremont were followed first by an occupation of unspecified but possibly Athabaskan hunter-gatherers who occupied the area from 1400 to the late 1600s, and were only then succeeded by the Ute (Janetski 1994:178). Reed, based on studies of purportedly diagnostic brownware, concluded that Ute presence in western Colorado possible anytime after AD 1100 (Reed 1994:196). Simms (1994) concurred, finding Archaic continuity through the Formative in some areas, discontinuity in others where the horticultural tradition intervened, increasing population mobility after AD 1000, and re-acculturation to differing lifestyles. The effect of all this, he warns, is to create confusion and mixing of influences in the material record (Simms 1994:82), a point on which we shall elaborate in the following section.

Possible archaeological signatures for the Ute

The difficulties in unequivocally attributing archaeological sites and assemblages to the Utes derive from precisely the general methodological problems discussed in Chapter 4 of this report. More specifically, archaeologists interested in prehistoric Ute sites are confounded by

a transient and mobile adaptation which left scanty remains; by the resemblance of those remains to earlier Archaic-period sites; by the small number of diagnostic artifacts usually found on them; by the fact that in historic-period sites, Euroamerican artifacts are often automatically - and erroneously - assumed to have been deposited by Euroamericans; and by the fact that archaeologists often lack the time, inclination or expertise to study such items. Ute pottery in southwest Colorado needs to be distinguished from Ancestral Pueblo and Navajo types that may be found on the same sites, as well as from ceramics of Hopi and other Pueblos traded into Ute contexts (Hill and Kane 1988:63). Moreover, there is no reason to assume normatively that every Ute site will contain diagnostic artifacts even if such existed; variation in assemblage characteristics will result from site function and curation amongst other things.

Reed (1988:88-91) has proposed a four-period sequence for prehistoric and historic Ute in western Colorado and eastern Utah: the *Chipeta Phase* (AD 1250-14)); the *Canalla Phase* (AD1400-1650), the *Antero Phase* (AD 1650-1880), and the *Reservation Phase* (AD 1880-present). These phases are based on changes in material culture (most noticeably the appearance of ceramics, an equestrian lifeway and then European goods) and their confinement to reservation lands. This sequence provides a useful starting point for a clearer delineation of Ute culture history, but must remain largely hypothetical given the available data base (cf. Buckles 1971, 1988).

The *traditional* (from an archaeological viewpoint) Numic/Ute artifact assemblage comprises Desert Side-Notched and Cottonwood Triangular projectile points, the so-called Shoshonean knife, brush wickiups, and brown ceramic wares. In addition, rock-art, scarred Ponderosa pine trees and flaked glass artifacts have been seen as diagnostic Ute traits. These are discussed individually below.

Uncompahgre Brownware ceramics are considered the best single diagnostic for Numic presence, if not strictly Ute presence in Colorado (Reed 1994:195). They range from dark brown to tan to light reddish, are coil and scrape-produced with poorly controlled firing. Plain-, stick-, and finger-tip- impressed, these wares include wide-mouthed jars with pointed bases, slight rim flare and slight necking (Reed 1994:192-3; Reed 1988:81). Ute pottery can be

distinguished from Navajo, Apache and others (Hill and Kane 1988:62-98; Reed 1994:195).

Projectile point types are less reliable as Ute indicators. Desert Side-Notched and Cottonwood Triangular points are widely distributed and associated with Apache, Fremont, and Dinétah/Navajo sites as well as Numic (Buckles 1988:219; Reed 1994:195), and there has been considerable criticism in the literature regarding the general utility of projectile points serving as ethnic indicators (Duke 1991:106-129). In any event, in the San Juan National Forest the Desert Side-Notched and tri-notched points are very rare (Charles, Appendix II, this volume).

Although the *Shoshonean* knife is generally listed among the diagnostic items of the generalized Numic culture, it does not indicate the presence of the cultural/linguistic Shoshonean tradition (in fact, the knife is nowhere present in sufficient frequency to justify any cultural affiliation [Reed 1994:192]).

Specific wickiup styles (especially the four-poled variety) are sometimes considered diagnostic of Ute culture. However, wickiup styles seem to have cross-cut ethnic boundaries, and their use as an ethnically diagnostic feature is open to debate (Scott 1988:45-47). Dean (1969) describes the remains of a Ute-period brush shelter (structure #5) at Talus Village, built probably between AD 1600 and 1774. The structure differs from nearby Basketmaker II structural remains in that it is oval in shape, lacks subfloor cysts, apparently had a different roofing system and lacks the artifact assemblage of the earlier structures. However, its identification as Ute is based as much on the lack of definite evidence for its being Puebloan, Navajo or Apache, as on positive evidence for its being Ute. Although not found on the SJNF, but a few miles south of Durango, the Bird's Nest Site (5LP353) is an excellently preserved historic-period wickiup (Heikes 1979). This structure comprises four standing poles, possibly another eighteen fallen poles, two fallen pole sockets or abutments, a hearth, small cyst, grinding slab, and assorted lithic and ceramic fragments. Interestingly, Heikes (1979) assigned the ceramics to Dinétah Utility ware, a Navajo-associated type, and on the basis of this dated the site to AD 1775-1875.

The subject of Ute rock-art has been broached most intensively by Cole (1988, 1990) who has identified a number of styles attributable to different periods of Ute art, which are an

amalgam of both indigenous tradition and borrowing from other cultures, such as the Puebloan groups and later Euroamericans.

Information on Ute mortuary practices is available for the early historic period, but is based on relatively few examples. Radiocarbon dating, in the absence of any other indications, is the only way to distinguish these from Archaic remains. For example, in two burials in western Colorado, a crevice burial was radiocarbon-dated to about 3000 B.C. and a rock-covered pit burial was radiocarbon-dated to about 1520 B.C. Had there been no dating, the contexts alone could have indicated equally Ute or Archaic designation (Nickens 1988:30). More certain affiliation is the proto-historic (ca. A.D. 1860) Ute burial at the Star Bead Shelter (5MT5380), which overlooks the Dolores River canyon. The site comprises a crevice burial in association with European- and Euroamerican-manufactured goods, such as glass seed beads, brass percussion caps and a German silver concho (Hovezak 1988). This burial was recovered by the Dolores Archaeological Program. The Los Atavios burial (5MT5399), also recovered by the DAP, comprises human remains plus associated grave goods, including grave goods, was dated to the same time period as the Star Bead Shelter burial, and is also probably Ute in affiliation (Chenault 1988).

The scarring of trees by historic-period Utes is a significant cultural resource in the San Juan National Forest, and is the subject of Appendix IV of this report. Although there is ample ethnographic evidence that the Utes practiced this scarring (Martorano 1988), there is no *unequivocal* evidence from the trees alone that scarred trees on the forest were produced solely by the Utes and not some other tribe.

There is evidence that historic-period aboriginal inhabitants of the San Juan National Forest applied lithic-flaking techniques to fragments of Euroamerican glass, although the technique was by no means confined solely to the Utes. In some instances, this technique is obvious, such as when the glass fragment has been turned into a formal tool. However, caution should be applied in designating some fragments simply as retouched flakes or flakes with edge wear, because cattle hooves can accidentally crush the edges of broken glass giving them the appearance of tools (Jonathon Horn: personal communication).

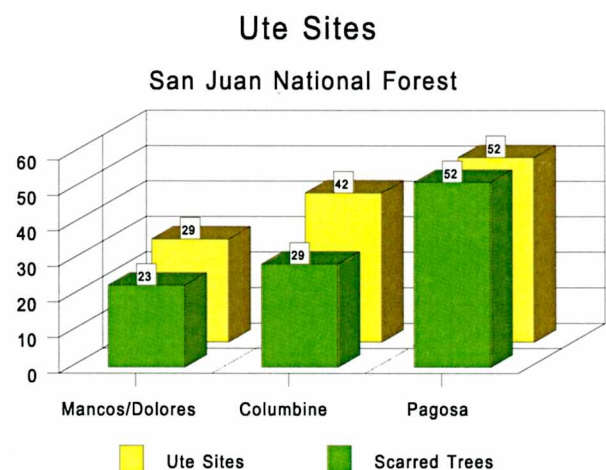
Despite the numbers of diagnostic artifact types that were used by Utes or at least found

in late period sites in what was historically Ute territory, the fact remains there is no single artifact type that was *unequivocally* used by the Utes (Buckles 1988). Asserting the presence of Utes as responsible for some of the archaeological remains on the forest must rely then not on archaeology alone but on the assumption that, because the Ute were the primary inhabitants of the forest during the historic period and for some part of the prehistoric period, too, it is *likely* that post-formative sites were produced by this tribe.

Ute Archaeological remains on the San Juan National Forest

In reviewing post-Formative sites on the forest, it quickly became clear that different archaeologists have used the terms *Shoshone*, *Numic* and *Ute* interchangeably in many CRM reports. We recommend that the first two terms be dropped as inappropriate for this area. Current consensus on the expansion of Numic speakers out of the Great Basin concludes that the term *Shoshone* is best reserved for those peoples who either remained in the upper Great Basin or migrated to the north and northeast (for example, Aikens 1994:41). There is, therefore, no reason not to acknowledge that it was the Ute version of Numic peoples who occupied the forest during the last thousand years.

Given these caveats, there are currently 123 sites identifiable as Ute on the San Juan National Forest, relying on a combination of any of the above criteria (Figure 10.1; it should be noted that the number for scarred trees in each district is a subset of the overall number, not in addition to it). Numerous undated lithic scatters may also be assignable to this tribe, but unfortunately they lack any temporally diagnostic artifacts at all. Most of these sites are scarred trees; indeed, in the case of the Pagosa district, all of the known Ute sites (N=52) belong to this type site. Although not strictly an archaeological site, the Beaver Creek massacre site, sixteen miles north of Dolores, should also be noted. This site is the location of Colorado's last Indian "battle." Here, on June 19, 1885, six Utes - three men, two women and one child - were killed



by a small group of local cowboys. The site is considered sacred by contemporary Ute Indians.

Navajo Use of the Forest

The Navajo have been the subject of an inordinate amount of study by scholars, at both the specialized and more publicly-oriented levels scholarly (e.g. numerous scholarly papers in Ortiz [1983] and the popularly-targeted Locke [1989]). There is actually very little archaeological evidence for substantial use of the SJNF by Navajo peoples, and so the following section is accordingly truncated. Nevertheless, despite the paucity of archaeological evidence, it must be noted that Hesperus Mountain in the La Plata Range forms the northern boundary of the Navajo world (Locke 1989:68), and thus these mountains are an important part of their culture.

An abbreviated Ethnography

This section is drawn primarily from Spencer et al. (1977:292-311) and various papers in Ortiz (1983). The Navajo Nation is the largest Indian tribe in North America, numbering approximately 140,000 individuals (from a low of 15,000 in 1868) and controlling a reservation about 16 million acres in size. They speak a variation of Southern Athapaskan and are related linguistically and culturally to the Apache. They were originally hunters and gatherers, but contact with the Spanish allowed them to become sheepherders, a practice upon which they still rely today. The Navajo culture is considered to be a classic example of cultural syncretism, in that today it incorporates elements borrowed from the Spanish, Anglos and neighboring Puebloan groups.

It is likely, given their probable northern origins (see following section), that they arrived in the Southwest with a generalized hunting-and gathering assemblage that included the sinew-backed bow and perhaps pottery. The original house structure was a forked-stick hogan, although this was later replaced by the more substantially constructed cribbed dome hogan which is still used on the reservation today.

Possible Archaeological Signatures for the Navajo

The time of arrival of the Athabaskan-speaking Navajo (Cordell 1984:305) is a subject on which indigenous origin tradition and archaeological interpretation of material evidence are not always in accord. Sometimes, Navajo tribal elders have represented their people as having been in the area *forever*. Until recently, archaeological evidence indicated that the Navajos arrived only

slightly before the Spanish, moving in from the east about the time of the Pueblo Revolt of 1680, and living at first in the Gobernador area of New Mexico and the Jemez Mountains in mutual communities with Pueblo exiles – the so-called *Pueblito* occupation (Cordell 1984:305).

However, recent archaeological work suggests that the arrival could have been much earlier; perhaps as early as the late AD 1300s (Reed and Horn 1990:283). One of several sites to substantiate this is Kin 'Atsa', 1.6 miles south of the Colorado border, 4 km. east of the La Plata River, with late Archaic, Basketmaker II and proto-historic Navajo components (Reed and Horn 1990:285). Six overlapping radiocarbon dates (indicating short-term occupation) average AD 1437-1466 and correlate with a tree-ring date of 1444. In all, 23 radiocarbon dates from 12 sites suggest a pre-1540 Navajo presence. The common denominator is Dineta Gray pottery, a type securely connected with the Navajo (Reed 1994:195), as well as cooking slabs and projectile points typical of other Navajo sites, and a forked stick hogan structure. The Kin 'Atsa' site yielded 359 sherds. It is possible that further investigation will show Navajo occupation overlapping with Ancestral Pueblo (Reed and Horn 1990:297).

The earliest material evidence of Navajo presence does not include pottery but does include side-notched projectile points indicative of an arrow technology, game drives, conical habitation remains including forked-pole framing, and twined and flat-coiled basketry (Brugge 1983:489). Accounts from the 1600s suggest a semi-sedentary, hunting and gathering, maize-growing people who traded with Puebloan people and probably utilized the resources of the San Juan mountains to some extent. The Navajo Reservoir area has yielded Navajo ceramics with very strong Puebloan influences, including Jemez Black-on-white and the local Frances Polychrome (Brugge 1983:492). From the Pueblito period in the Los Pinos and Animas canyons north of the San Juan have come 18th century Black-and-red-on-yellow, and dark gray, surface-striated ceramics (Brugge 1983:493). The large, side-notched projectile point similar to the Sudden Side-Notched style of the Great Basin is considered an early Navajo item when found in northwest New Mexico and southwest Colorado.

In the late prehistoric/early historic stages, several Navajo phases have been distinguished. The Piedra Lumbre phase, 1649-1710, mostly represented in the New Mexico Chama and Abiquiu areas, features dry-laid masonry in single rooms to grouped structures,

Rio Grande pueblo ceramics, lithic tool manufacture with limited metal artifacts, and sheep husbandry, all of them evidence of Spanish influence. The Gobernador phase, found in the Bisti area and in southern Colorado, particularly the Piedra River valley near Chimney Rock and the Navajo Reservoir, dates from 1700 to 1775. This "Pueblito" manifestation, a joint occupation of Pueblo and Navajo peoples escaping the Spanish, is marked by acculturation in economy, subsistence and religion. It is characterized by forked-stick structures, stone-and-cribbed-log hogans, sweat lodges, fortified and defensible sites, slab grinding bins, distinctive petroglyphs and pictographs, Dineta utility ceramics (Eddy et al. 1984:96-98).

In the Dolores District, several sweatlodges have been found that are Navajo (Heacock: personal communication). These structures were built and used by Navajo laborers working for the New Mexico Lumber Company in the 1920s. At one sweatlodge, located at Miller Camp, worked glass was also found.

Research Opportunities and Directions

All future archaeological work on the SJNF that involves possible remains of contemporary Indian tribes must be conducted in full consultation with these tribes in order to ensure the appropriate cultural sensitivity in the construction of archaeological knowledge and the reclamation of Native American control over their cultural materials. Moreover, efforts should be made to inform tribal authorities of the contributions to tribal history that archaeology can potentially make.

First, every effort must be made to identify all sacred sites and traditional cultural properties for all tribes whose ancestors used the forest. Second, efforts should be directed to refining archaeological methods for identifying the remains of these tribes, whether it be through the isolation of individual diagnostic artifacts or through the definition of particular lithic assemblages that can reasonably be identified with such tribes. Third, efforts should be made to consult with tribal elders to develop better use of ethnographic analogy and tribal histories that can complement strictly archaeological knowledge. Finally, archaeological

attention should be directed to identifying the first appearance in the archaeological record of particular tribal assemblages and the changes through time that their material culture has undergone. This should include working towards a better understanding of the processes of transition as a result of Euroamerican contact.

CHAPTER 11

The Historic Period

(Primary Author - Bonnie Hildebrand)

Somewhat amending Clark (1968:24), we define the Historic Period as beginning at that point in time when individuals of European ancestry actually arrived in southwest Colorado. This period follows the protohistoric period, when the area was still solely occupied by aboriginal groups who, nevertheless, had contact, at first distant and indirect, with European culture. Relative dating of these sites is most often done by comparing the frequencies of aboriginal and European goods; the more of the latter, the later the site is assumed to be. However, other factors, such as access to trading centers and the particular materials in question, also affect their frequency in the archaeological record.

This chapter documents the archaeological evidence for Europeans on the SJNF. Obviously, information on this period relies heavily upon historical documents. Nevertheless, there is very great potential for archaeology to contribute original knowledge and insights on this period of human occupation. It is accurate to note, however, that despite the potential wealth of historic sites on the SJNF, this period has probably received less attention than any other on the forest. This is less an indictment of archaeologists, both federal or non-federal, who have worked on the forest as it is reflective of the generally low-esteem this branch of the discipline has historically commanded (South 1977; Horn 1992).

Current Problems and Opportunities in Historical Archaeology

The problems that face the strengthening of the historical archaeology program on the SJNF are endemic not just to Colorado but to the rest of the nation as well. First, and perhaps most importantly, is that historical archaeology is not considered a vitally important element of the anthropology degree at *any* state university or college, the retirement of William Buckles from the University of Southern Colorado a few years ago creating a void in the teaching of this branch of the discipline. Historical archaeologists like Jonathon Horn at *Alpine Archaeological Consultants* and Steven Baker at *Centuries Research* remain extremely productive, but their direct impact on the education of the next generation of archaeologists is obviously limited.

Second, until recently historical archaeology was considered (and perhaps still is) as somewhat of an academic orphan abandoned by both its parents, archaeology and history; the difficulties of having to become expert in two different disciplines has dissuaded many younger scholars from its study. This problem has been exacerbated in the Southwest by the domination in the discipline's historical development of the study of the region's prehistoric formative-level societies.

Third, archaeologists are trained to look at the *long-term*. However, a full understanding of a historic-period site requires an attention to the *short-term* minutiae of past that often simply is overlooked (or perhaps not even known) by the archaeologist.

Fourth, historical archaeology requires a whole new set of field skills, ones that go way beyond those required for *prehistoric* archaeology. Historical resources relate to issues ranging from the specific and local, to the broad and distant. Therefore, ability to recognize sites in the field, determine their significance, and secure the full potential of historic evidence, requires awareness of 1) the range of site-types and material objects possible in a given area; 2) the various and overlapping cultural and land-use themes that have been operative at a given site over time; and 3) the scope of research questions for which evidence may be obtained (Buckles and Buckles 1984:1-8).

As Buckles and Buckles (1984:*passim*) make clear, there is a wealth of information in archives - whether they be from local county offices, or from more esoteric sources - and in other sources, but their retrieval is something that most archaeologists are simply not trained to do. Consequently, most don't make the attempt.

Fifth, the study of historic resources is complicated not only by the complexity of the cultural record of the past two hundred years, but also by the very nature of historic cultural resources. With the passage of time, new themes, site-types, and artifacts are continually becoming old enough to be classified as *historic*. Investigators need to keep up with the resources moving into historic classification, because sites, events, and themes just over fifty years old may seem relatively modern.

Moreover, just as is true of prehistoric archaeology, historic resources are finite in amount, irreplaceable, often highly perishable, and subject to permanent loss through the effects of time, taphonomy, and human and animal activity. Even within the relative protection of the SJNF, perishable historic materials such as cabins, wickiups, aspen art, and smaller artifacts are being

continually lost to erosion, decay, vandalism, grazing animals, logging, and clearing. Sites and evidence of past human activity are subsumed by current resource use, harvesting, roads, water projects, recreational use and development. Their modernity alone is no protection against the ravages of time.

Finally, there is some validity to Horn's (1992:159-162) complaint that the criteria for assessment of significance, with its emphasis on multi-component sites as well as the very difficulty of isolating just what is significant in an area, given the cultural complexity of the historic period, have militated against historic-period sites. Other subtle factors can also limit or influence archaeological reporting and resource management. For instance, the *Historical Archaeology Component Form* and the *Historic Architectural Building/Structure Form* used by the State of Colorado emphasize the description of structures and artifacts (Colorado Historical Society 1992:41-44). There is also the sense that such sites can with more safety be ignored, because it is assumed, *erroneously in most cases*, that historical documents are available; thus, it is often perceived that there is less need to preserve a particular historic site, if information alone is all that is needed from it.

However, despite academic archaeology's difficulties in producing an adequate supply of well-qualified historical archaeologists, there are clear signs that the public is increasingly interested in this period of the past. For one thing, the passage of NAGPRA will increasingly alter access to the aboriginal past, and so there is potential for Euroamerican sites to assume greater importance than they have in the past. Moreover, the wider commitment to heritage tourism by federal managing agencies has revived the notion of the importance of historic-period sites. The popularity of the San Juan Skyway and its emphasis on the European past is an indication of the potential for growth, and historical archaeology must keep pace with this trend. Like natural resources, European-American historical sites and contexts have multiple uses and values. They are vital educational resources that keep us in touch with our personal and community past, sources of recreation and entertainment, and material for historical research and analysis on the causes and courses of social change. They have diverse, highly practical social uses. Their management should be directed to preserving their full potential.

Notwithstanding this, archaeology, both academic and federal, has a responsibility not simply

to cater to popular interest, which often focuses only on a history that is readily accessible, often within the context of heritage tourism; the enthusiasm for rehabilitated fire towers is a positive example. More subtle resource topics that may not command popular attention also fulfil interpretation and research objectives, and they still require identification and preservation. For example: 1) the identification of the **earliest structures of their kind in an area**; 2) **buried information on early mining that goes unobserved or uninterpreted due to subsequent, overlying systems of mining on the same location**; 3) **water management and delivery systems necessary to mining operations**; 4) **sites associated with the sheep industry, which is not well documented (Husband 1984:3).**

Historical Themes and Contexts

Historical resources are studied by identifying dates, themes, periods, and relationships, and by identifying causes and processes of change (Buckles and Buckles 1984; Husband 1984). The SJNF, a geographic territory of diverse ecological zones and natural resources, comprises numerous thematic contexts from all historical periods and encompasses much social and economic change. Site designation involves not only the presence of artifacts, architecture, and other built environments, but also identification of the themes of which these are evidence, and of continuity and change.

Three criteria determine the amount of land to be included within historic site boundaries: **“continuity of physical use of a property, visual qualities, and research values” (Colorado Historical Society 1992:14).** The following guidelines are offered: 1) **When site significance is related to a land-use theme, the site may include all the land pertinent to that use, not just the central spot. The pertinent land is excluded if it “no longer contributes to the integrity or significance” of the site.** If change in land-use or alteration in resource-use strategy is part of the site significance, the entire use area is included; 2) Visual elements are included (where possible) if related to the original positioning of site elements, or if there is aesthetic significance; 3) Elements and land related to potential site research questions are included (Colorado Historical Society 1992:15).

To correctly identify the appropriate theme, period, or date of sites and artifacts, familiarity

with diagnostic items and horizon markers is essential:

One of the problems with conducting historic archaeological research is the tremendous span of information available. Specialists exist in Colorado and elsewhere who should be relied upon for identification of historic resources. . . . There are gunsmiths, blacksmiths, railroad buffs, metallurgists, chemists, palynologists, coin collectors, antique collectors, and many more who can aid in identification.

(Buckles and Buckles 1984:4).

In an attempt to standardize the recording and reporting of historic sites in the state, Buckles and Buckles (1984) and Husband (1984) produced *RP3* context reports for the state and the Colorado Plateau respectively. Their work was long overdue, but unfortunately, if only because of the resulting complexity of their classificatory systems, they have been overlooked by most archaeologists; indeed, the very complexity of historic archaeological resources continues to confound attempts to produce standard classification systems for them. These two works define *thematic systems*, which correspond broadly with economic activities in an area (Buckles and Buckles 1984), and *historic contexts*, which organize historic resources by contexts (i.e. activities) within specific time-periods (Husband 1984).

Thematic systems relate resources and behaviors to specific contexts, and usually correspond to the basic economic activities of the area (Buckles and Buckles 1984:77). Seldom do they operate in isolation; overlap and interdependence is usual, as in the interplay of railroad and mining development. Context may include one event or a series of events, patterns of development, or associations that shape the past human matrix of an area. Therefore, central to any historical analysis is the identification of "thematic systems, specific activity sets, relationships of thematic systems, other thematic systems and other units of the statewide framework, such as social-structural and ideologically-related behaviors, ecology and other variables" (Buckles and Buckles 1984:3).

Buckles and Buckles (1984) use the following themes to organize their discussion:

Agriculture	Health /Medicine
Alternative Life Styles	Industries, Small Scale
Business/Commerce	Maladaptations
Communication	Manufacturing
Communities	Military
Construction	Mining
Education	Native American
Environmental/Conservation/	Public Utilities

Aesthetic Resources
Exploration, Expeditions,
Research
Finance, Insurance, Real
Estate
Forestry/Lumber
Government

Recreational/Cultural
Religion
Resource Processing
Services
Sites of Unknown
Affiliation Transportation Networks

The thematic systems are further divided into multiple sub-headings. Maladaptations, for example, consists of alcoholic consumption; bootlegging; cannibalism; cattle-sheep wars; claim jumpers; gambling; gun battles; hideouts; high graders; hijacking; illicit drug use; Ku Klux Klan; labor wars; landmarks; massacres; moonshining; murders; organized crime; outlaws; poachers; prostitution; robbers' roosts; robbery; rustling; slavery; smuggling; vigilantes (Buckles and Buckles 1984:84).

Husband (1984) provided the following historic contexts specifically for the Colorado Plateau:

Spanish Exploration, Fur Trade, American Exploration (1760-1876)
Ute-Euro-American Contact (1640-1889)
Early Gold Rush (1859-1870)
Precious Metal Mining (1870-1890)
Modern Mining (1890-1945)
Coal Mining (1872-1945)
Non-Metallic Mining (1881-1945)
Early Transportation (1870-1903)
Railroads (1871-1934)
Ranching (1870-1934)
Farming (1867-1945)
Water and Irrigation (1874-1922)
Logging and Lumber Industry (1870-1933)
Recreation, Tourism, Development of Highway (1859-1933)
Communal Settlements and colonies (1881-1915)
Federal Activity (1891-1946)
Socio-Cultural Developments (1886-1925)

Buckles and Buckles (1984:75-104) have attempted a taxonomic system that encompasses all historic resources encountered in Colorado:

1. *Temporal, chronological estimates or socio-political periods* (example: Statehood

to Silver Crash - 1877-1893).

2. *Ecological, Topographic, and Climate Zones* (examples: grassland; mountain valley).
3. *Thematic Systems* (example: agriculture); *System Types* (example: cattle ranch); and *Descriptors* (excluding artifacts) are:
 - a. physical remains, features and site activities (examples: cultivating, flume, toll booth, long tom, placering, shearing pens).
 - b. habitation types (examples: bunk house, sheepwagon, wickiups, seasonal residence).
 - c. attributes related to social structural inference (example: winter range); and architectural attributes (example: frame, log).
4. *Formal Network Relationships* - a category with its own taxonomy:
 - a. isolated find - resource found on a property and intrinsic to it (example: fence or gate).
 - b. autonomous site - single occupation unrelated to any larger unit.
 - c. satellite site - a unit of occupation that is part of the larger integrated system (a macro-site), (example: a specialized ranch managed as part of a larger corporate system).
 - d. macro-site - one containing in its boundaries sites or elements of a completely different macro-system (example: a ranch containing resources of a previous time period).
 - e. macro-system - hierarchical units of relationships larger than the macro-site (example: military sites, industrial or transportation networks).
5. *Population estimates*.
6. *Ethnicity* (see discussion below).
7. *Behavioral Descriptors* (examples: acculturated, entrepreneur, squatter, nuclear family, self-sufficient).
8. *Settlement Patterns* (examples: autonomous settlement such as ranch, farm, or camp; commercial district; nucleated rural; resource-specific settlement).
9. *Activity Set Descriptors*: with Sets (example: animal-drawn transportation); and Attributes (examples: industrially dependent, recycling).
10. *Association with Important Persons or Events*: "Often such relationships are not pursued by archaeologists due to lack of historical knowledge of the area or lack of knowledge of how to identify ownerships and associations of the past with sites" (Buckles and Buckles 1984:104).

The term *site* continues to be used interchangeably with cultural resource type, structure, and building. Sites “are not just the loci of occupation but are also fields, fences, roads, ditches, land uses, and modifications” (Buckles and Buckles 1984:12), and, therefore, can be a townsite, town, or neighborhood; built camp or campsite used for a variety of themes; rail, wagon, or road bed and the stations along them; cemetery, farmstead, ranch; and many more. If this seems confusing, perhaps it is not so important to construct as rigid a site-type classification system for the Historic Period as it is for the Prehistoric Period, except insofar as it is demanded by the exigencies of data base needs.

Sites can be described in relation to both temporal periods and activity themes. For example, for the period of Spanish and American exploration and fur trade, sites include trails and routes, campsites, caches, storage pits, trading posts, cabins, survey markers. For more recent periods, so many themes operate concurrently, overlapping on the same location and continuing through periods, that a site-type list becomes voluminous. Sites and features (or structures) such as cabin, farm, or fence may relate to any of a number of use-themes depending on location and association. For example, a ranch may be a horse, hay, cattle, sheep, or general operation, and its place in the social fabric of its era will differ accordingly. Surveyors must be alert for multiple thematic components, and elements representing all historical periods. Descriptive terms should be related to the theme with which they are associated:

A gulch placer mining site, for example, can be identified by such descriptors as a Long Tom, ditch, and cabin. These three descriptors identify the mining site as part of a system where miners lived at the site and used a type of placering usually identified as a team effort in contrast to individual panning activity or a larger operation

(Buckles and Buckles 1984:78).

Other considerations include: 1) Site and structure type labels may not reflect the actual function or usage. Habitation structures should be distinguished from similar structures used for other purposes, as well as for the category of occupation, i.e., rooming house, bunk house, mansion. 2) The state of preservation is informative. An entire structure may be preserved, or only its foundation, or only evidence of its foundation-type, i.e. wooden post, stone pier (masonry); masonry wall, concrete wall, concrete slab.

The terms *structure* and *building*, often used interchangeably, can be separated to create a useful distinction, using *building* for constructed shelters of all kinds, and *structure* for constructions that do not shelter and for the human-shaping of natural elements. Examples are irrigation systems, corrals, windmills, haystacks, fence enclosures, and dams. Artifacts, sometimes called objects and equipment, range from a single trade bead to a diagnostic bottle to a hydraulic ram or railroad car, or piece of switching equipment.

The term *district* can be problematic, but is useful as a definition of an area of a specific activity, "as a synthesizing term that fulfills some of the idealized uses of the term", as long as unique sites within districts are not neglected (Buckles and Buckles 1984:96-97). Examples: placer area; mining area for a specific metal; "red light"; specific ethnic or economic occupation areas in a town; railroad loops and yards (Husband 1984).

A final note is necessary regarding the terms used for ethnic groups. Buckles and Buckles (1984:98) offer a list of ethnic identification terms based on the cultural resources, origins, or traditions. Although such terms may offend some, or not fit contemporary social usage, they serve to distinguish between traits of differing cultural traditions. They also suggest that the term *American* be used for the "material culture and behaviors of citizens of the United States who do not maintain cultural traditions of their ancestors' ethnic groups" (Buckles and Buckles 1984:98). This convention is meant to eliminate the verbiage of such terms as Anglo-American or Euro-American (Buckles and Buckles 1984:98). However, the latter term is in common usage in historical archaeology, and so it has been retained in this document.

Ethnic terms likely to be used in southwest Colorado include: *Spanish*, for cultural resources of the Spanish traditions; *Hispanic*, for resources of "unknown specific identity but. . . associated with Spanish-speaking populations"; *Mexican and New Mexican*, for resources derived from those places of origin; *Chicano*, for resources of "more recent origin which exemplify political movements identifiable with persons who call themselves Chicanos" (Buckles and Buckles 1984:98). The last term was uncommon until the 1960s, when it was adopted by movements seeking to combat discrimination (Bustamante 1982). Therefore, "Chicano" may be inappropriate in current historical archaeology, but may soon be accurate and relevant. In this document, for the purposes of standardization, we have retained the common USFS usage of *Hispanic* for all cultural traits that are

Spanish or Mexican in origin. Classifying these cultures as a distinct entity separate from the rest of Euroamerican culture is a mark of the fundamentally important and unique role that Hispanic culture played in the settlement of this area.

Archaeological Evidence

The computer files for the SJNF list a total of 773 historic-period sites (Table 11.1). These range in size from isolated finds of metal and pottery to impressive structural remains encompassing several acres.

	Euroamerican	Hispanic	Total
<i>Mancos-Dolores</i>	371	42	413
<i>Columbine</i>	183	23	206
Pagosa	107	47	154
Total	661	112	773

Table 11.1
Historic Period Sites (Non-Aboriginal) on the San Juan National Forest

This section modifies the proposals of Buckles and Buckles (1984) and of Husband (1984) by offering a history of the area now encompassed by the SJNF that is organized around the major themes that are seen as providing the texture for historic-period occupation of the area. Historic-period sites on the forest are used as examples of the individual themes. It is certainly beyond the scope of this overview to do anything but provide a short history of Euroamerican utilization and occupation of the SJNF. Readers needing more detailed information are directed towards the following regional histories: Kendrick (1982); Motter (1984); Nossaman (1989, 1993); Smith (1980). This section is organized along the major themes that have created the texture of Euroamerican and Hispanic history in this part of Colorado: (1) earliest contact; (2) fur trapping; (3) mining; (4) settlement; (5) timber industry; (6) farming and ranching; (7) the establishment of the

San Juan National Forest; (8) recreation and tourism.

An Abbreviated History

Earliest Contact

Until the Mexican-American war of 1846-1848, all of the San Juans were under the jurisdiction of Mexico (Motter 1984:100). Early Spanish settlers in New Mexico long relied on trade with the Utes for deerskins and other necessities. Their trading expeditions into southwest Colorado is indicated by the fact that such trips were made illegal by the Spanish around 1700 (Ellis 1996a:216). Mining in Colorado was also illegal without a Spanish permit, which required one-fifth of recovered ore to be given to the Crown. This requirement is probably one reason there are no written records of Spanish trade or mining in Colorado. Numerous legends of buried treasure survive from this period; Treasure Mountain north of the East Fork of the San Juan preserves one such legend (Motter 1984:100).

In the 1760s a metal-prospecting party was sent to the San Juans by the governor of New Mexico in the 1760s, and this was followed by the de Rivera expedition of 1765, which established the path of the Spanish Trail. The quasi-missionary Dominguez and Escalante expedition in 1776 sought a trade route to California that would not be impeded by either the Hopi and Apache tribes (Nossaman 1989:17). Their route took them along the southern fringes of the San Juans. They crossed the San Juan River in the vicinity of present-day Pagosa Junction and then moved west crossing the Piedra, Pine, Florida and Animas Rivers in the process (Delaney and McDaniel 1976). They camped a little south of the present town of Durango, and made their way to the west. They camped, amongst other places, around the present-day town of Dolores, before moving into the area of Dove Creek and Cahone (Delaney and McDaniel 1976).

Several purported instances of Spanish presence in the high country have been found (Ellis 1996a:216; Smith 1996:234). For example, Cornelius (1943:7c) reported: (1) the existence of Spanish tree blazes and markings between the Pyramid and the Needles mountains, which were dated by dendrochronology to 1740-50; (2) Spanish mines, caches, and tree markings in the Vallecito area; and (3) in the Florida River valley two sluice boxes made of local stone, but with interior riffles of imported Mexican stone (Cornelius 1943:7c). Claims have been made that cut timber from mines in Elk Creek and at the head of the Piedra date to the first half of the 18th century (Nossaman 1989:17). A tunnel over 100 feet long, with copper tools, at an elevation of about 12,250 in

Poughkeepsie Gulch was found in 1878 by a British mining explorer; other mineral workings were reported in the Dolores drainage and west of Del Norte; the Hayden survey found prospect holes on Handies Peak; a Spanish coin dated 1792 or 1793 was found in a cellar excavation at Howardsville on the Animas (Nossaman 1989:17). The travails of a group of French miners gold miners near Summitville, about 1790, is recorded. Leaving abruptly, they were attacked by New Mexicans who hoped to acquire the French gold cache; there is no confirmed record of its recovery (Cornelius 1943:8-9). Blazes made in about 1800 in the watershed of Ute Creek and in Vallecito canyon were attributed to the Old Spanish Trail from Santa Fe to Los Angeles (Cornelius 1943:7b). Trading trips from New Mexico to California followed this route through 1820; the Antonio Armijo expedition passed through in 1829 (Ellis 1996a:220).

Archaeological remains for this early period are rare. Site indicators include lost or discarded artifacts, caches, campsites (Husband 1984:1.6). Potential site types for this period include the remains of cabins and fire rings.

The Fur Trade

Fur trappers were in the San Juans by the first decade of the 19th century (Nossaman 1989:19), with many trappers using Taos as their point of departure (Motter 1984:31-32). By the end of 1824 it is estimated that at least six major parties had passed through southwestern Colorado on their way to the Green River area (O'Rourke 1980:28). An expedition of American trappers went up the Rio Grande to Wagon Wheel Gap in 1821, and another worked most of the San Juan tributaries in 1824. In 1833, a St. Louis fur-trapping group worked the upper Dolores, camping at Trout Lake. The leader, William Walton, returned in 1879 and easily found his old blazes and campsites (Nossaman 1989:19-20). The Lizard Head Pass vicinity is known to have been used by the Spanish and by later fur trappers (Nossaman 1989:23).

Potential site types for this period are like the earlier period sparse but potentially include the remains of cabins and fire rings. Artifacts include camping and trapping gear.

Mining

Rumors of gold in the San Juans probably began before the middle of the 1800s. Members of an expedition carrying mail and goods to California chanced to pan some gold while lunching at (probably) the Piedra River. Their reports resulted in a trickle of 49ers returning to try their luck in

Colorado (Nossaman 1989:33). The gold fever then rampant in the eastern mountains made even uninformed speculation credible. In the three years following a 1858 address by future Colorado Governor William Gilpin on the riches of the San Juans where he had never been, a veritable "prospecting onslaught. . .placed hundreds of men in the San Juan Mountains" (Nossaman 1989:35).

The Macomb Expedition of 1859 apparently added relatively little to actual knowledge of the San Juans (Nossaman 1989:34), except to declare it a place where gold could be found (Motter 1984:33)

Further assays were made throughout the forest. Charles Baker's expedition with 21 prospectors crossed Poncha Pass, Cochetopa Pass, and went down the Gunnison. One group split off and crossed Cinnamon Pass into Eureka Gulch on the Animas. In the same summer, George Howard with some others may have followed the Gunnison, ascended the Uncompaghre, and worked their way through Ouray, Red Mountain, and into the Animas headwaters park (Nossaman 1989:38). The prospectors camped in Baker's Park, present-day Silverton, and started to dig (O'Rourke 1980:40).

Baker's report in the *Rocky Mountain News* of October 1860 caused a rush of prospecting the following spring (Smith 1996:235-6), with about 300 miners rushing in to find their fortune (O'Rourke 1980:40). The one-summer phenomenon produced Baker's toll road and creation of the first Animas City, which lasted from 1860-61 (Smith 1980:6) and was located "at the head of the open portion of the Animas Valley, about 30 miles south of Baker's Park. . .on the east side of the Animas River, just south of a modern-day structure commemorated as Baker's Bridge" (Nossaman 1989:40). Unfortunately, the gold failed to materialize in any quantity, and the gold rush fizzled. However, on the east side of the forest, prospectors were more fortunate. Summitville, about 30 miles northeast of Pagosa Springs and just across the continental divide, was founded in 1870 and during that decade became the leading gold producer in the San Juans. Throughout the 1890s, repeated claims of gold and silver strikes on the east side of the forest kept alive Pagosa's hopes of striking it rich (Motter 1984:89).

Slowly, the federal government turned its attention to the region's mineral wealth. In 1874, two survey teams, led by AD Wilson and H. Gannett, explored the San Juans and the Gunnison as part of the Hayden Expedition's exploration to find out more about the region's topography, geology and mineral potential. Wilson explored the region west of Silverton before moving into the Animas River valley, including the future site of Durango (O'Rourke 1980:62). Likewise, Lieutenant Ruffner

of the Army Corps of Engineers explored the San Juans in the early 1870s (Motter 1984:102).

The modern era of industrial ore mining began in 1890. Large quantities of gold, zinc, lead, and copper were mined as a result of new low-grade ore extraction methods and the completion of railroads that allowed shipment of the ore to processing plants. In Dolores County, for example, zinc production rose from 15 tons in 1897 to 200 tons the following year (O'Rourke 1980:102). Silver dominated the 1890s, with copper, lead, and coal following, and zinc extraction was initiated at Eureka's Sunnyside Mill just before World War I (Smith 1996:242).

The success of mining was dependent on many factors, such as market prices and the mistreatment of workers by the mine owners. For instance, in 1903-4 growing tension between the gradually unionizing miners, under the Western Federation of Miners, and the industrial, corporate, non-locally-owned mine management erupted into violence. National Guard troops supported the management, resulting in death and union dissolution (Smith 1996:244-45). The support communities, farms, ranches, and transportation routes that were initiated to serve the mining industry survived in varying degrees, even if the industry itself had been badly shaken.

Coal mining was especially important between 1872-1945. The La Plata coalfield runs through La Plata, Montezuma, Dolores and San Miguel counties and was developed to power the ore smelters. Coal mining depended on the development of first toll roads and then railroads. "Coke ovens were built at Durango and Rico, and toll roads were used to bring coking coal from the mines near the latter town to the nearby coke ovens. The completion of the Rio Grande Southern Railroad to Ridgeway, Telluride, and Rico opened up new markets near area coal deposits. . .and coal towns such as Porter, Hesperus, and Perins prospered" (Husband 1984:6.1; O'Rourke 1980:105). The coal mining industry also stimulated the coke industry. The three major coke producing areas in southwestern Colorado were Crested Butte, Durango and Dolores (O'Rourke 1980:107). Some of the first toll roads in Dolores County were constructed to transport coal to the ovens at Rico.

The earliest period of mining (to about 1870) was concerned mainly with sluicer (pan) mining, which involved little equipment and structures. Potential site types include temporary camps, adits, glory holes, claim sites, trails and roads, townsites and trash dumps, privy pits and foundations, and early farmsteads. Artifacts and equipment include: the arrastra (drag-stone mill for pulverizing ore containing free gold), hydraulic equipment, the long tom (a trough for washing gold-

bearing earth), rocker or sluice boxes (Husband 1984:3.2). Unfortunately, much evidence of this period has been obliterated by later mining on the same sites.

Later precious metals lode mining (1870-1935) has left much more substantial remains. Potential site types include mining towns, camps, sites of labor problems related to mining, mines, ore dumps, tailings ponds, mining-claim sites, and cemeteries. Buildings and structures include houses, privies, public and commercial buildings, opera houses, livery stables, banks, bordellos, hotels, boarding houses, prospector cabins, farmsteads and outbuildings, stamp mills, smelters, ore-crushing mills, flotation plants, shaft houses, loading chutes, tool and repair shops, flumes, tunnels, aerial tramways and terminals, power houses, concentrating mills, exterior support cribbing, ore storage bins, ore chutes, tram towers, headframes, headworks, gallows frames, whims, hoists, ore car trestles and turntables, electric generating plants, and tipples. Artifacts include ore buckets, cars and binds, isolated mining machinery and equipment. Districts include mining and placer districts, working class neighborhoods in mining towns, business blocks, red light districts, snowslide areas, areas showing environmental effects of mining activity. (Husband 1984:4.2-3).

Site types and buildings associated with coal mining include townsites, company towns, ethnic communities, mines, road beds and rail grades. Artifact types include mining-related structures, coke ovens, town cemeteries, road beds and rail grades, period construction materials, and coal mining machinery, including cutters, hoists, loaders and conveyors, timber trucks, man trips, drill rigs, ore cars (Husband 1984:6.2)

The earliest water control in the area is associated with placer mining, at first involving sluices, hydraulicking and dredging. The second phase of mining required water control and supply for the new technological processes, such as stamp mills, smelters, mining and tailing ponds; and finally, water was controlled and delivered for hydroelectric power production (Husband 1984:12.1).

As farmers entered the area, they adapted this technology; small area farms should show evidence of water control. Sites are associated with mines, farms and mills. Structures or features include: settling ponds, reservoirs, earthen dams, cisterns, water siphons, and flumes (Husband 1984:12.2).

The Settlers

The Abiquiu land grant in 1754 had made the San Juans a popular access route for Hispanic settlers entering Colorado. They increasingly settled in Del Norte and La Loma after the Treaty of

Guadalupe Hidalgo in 1860, or continued north to mine for gold. They traveled to the Silverton fields via Stony Pass and Baker's Park, and created roads from Abiquiu through Pagosa Springs to the San Juan mountain camps and from the Chama through Canyon Largo to the mines and valley farms of the tributaries north of the San Juan (Ellis 1996a:221).

The first to homestead in Piedra Park was John Toner in 1896; a group entering Blanco Basin and the West Fork in that year found a few squatters and 4-5 homesteads, with seasonal residences for hay and cattle production (Cornelius 1943:27-28). When the Homestead Law was passed in 1862, Colorado was only a territory, and no surveys were made of the area until the Hayden Survey in 1873-76. For a long while, it was impossible to file claims, and land was occupied under Squatters' Rights. Agriculture became established in the bottomlands of the Animas, Florida, Pine, Piedra, San Juan and Blanco by 1876 (Cornelius 1943:48).

An important early Euroamerican settlement was Pagosa Springs, which was founded in 1878, when the Fort Lewis military post was established there (Motter 1984:21). The post lasted for four years until it was moved west to the La Plata River, in order to be closer the highest concentrations of Indians and settlers (Motter 1984:75). Pagosa Springs, having lost out to Durango as the major railhead and to Ignacio as the site of the Indian agency, languished for several decades. Only in 1890 did a railroad, constructed to haul out timber from the surrounding forests, connect it to the main networks to the south (Motter 1984:87).

The East Fork of the San Juan River was early on an important settlement and communication corridor until the flood of 1911 closed down the road. Finally, the opening of Wolf Creek Pass in 1916 meant that the East Fork route could be bypassed entirely. Gold mining camps of Bowenton and Elwood were established just after the founding of Summitville in 1870 (Motter 1984:99), a site which became extremely important after the 1873 discovery of free gold (Motter 1984:101). It is likely that the remains of Bowenton are recorded as 5ML152, a site located during a cultural resources survey of the East Fork of the San Juan River in 1985 (Duke et al. 1985:86). This site comprises the remains of four dilapidated wooden structures. Associated with this site is 5ML141, the Old Military Road, which is the oldest road between the San Luis valley and the rest of southwest Colorado. This road was surveyed by the Army in 1879 to connect Fort Garland to Fort Lewis (in Pagosa) but quickly began to serve the growing numbers of settlers and miners in the area.

Traces of this road are still visible along the East Fork, although much of the road has been overlain by the later Forest Service access road (Duke et al. 1985:87-88).

The first permanent Anglo-American settlers moved into the Montezuma Valley in the 1870s, using the land along the Dolores River as winter grazing land for their cattle (O'Rourke 1980:84). By 1884, Mancos was connected to Durango by a line of the Rio Grande Southern Railroad, thereby completing the Dolores-Durango line (O'Rourke 1980:95).

Hispanic settlers were well represented on railroad-building crews that reached Durango in 1881 and in the valley and mine communities throughout the region, working in construction, the McPhee lumber operation, cattle and sheep ranching, agriculture, as agents of the U. S. government on Ute reservations, and in the mines and smelters (Ellis 1996a:221). However, despite their early arrival and continued presence, they were continually victims of discrimination (Ellis 1996a:222).

Increasing pressure to open the San Juans to mining and settlement led to the Brunot Agreement of 1874, in which the Utes, misled into believing they were only conferring the mines, sold the entire area to the government. Greed for what was left of Ute land resulted in their removal to Utah and the retention by only three bands of a narrow strip along the Colorado-New Mexico border (Ellis 1996b:229). The rush, however, had not waited upon formalities of treaty conventions: permanent mining began in 1870 in Baker's Park near Silverton, and by 1874, small settlements had built up at all entry points to the mountains. In that same year, Silverton was founded, ultimately winning dominance of the region over its neighboring rival of Howardsville (Horn et al. 1986:3). John Moss, head of a group of California placer gold miners, came to San Juan country in 1871, and mined metal and coal in La Plata Canyon for a few years, founding Parrott City, which flourished briefly and was county seat of La Plata county from 1875-1883 (Cornelius 1943:11-12; Smith 1996:236).

The first transportation systems of the area were created by Otto Mears during the gold rush of the 1870s, beginning with dog-pulled toboggans, then establishing wagon routes and finally toll roads that moved mail, freight, and passengers (Brown 1965:15-59; O'Rourke 1980:161; York 1982:10). The modern Durango-Silverton road used the 1880s Rockwood to Coal Bank route and then the old Ute trail from the top of Coal Bank to Silverton; the Whitman toll road, which became a railroad bed in 1881, went up the Animas Canyon to Rockwood and Electra Lake, dropping to the

canyon bottom, crossing Cascade Creek, and then with many crossings, on to Silverton (Cornelius 1943:17). A toll road from Molas Lake to Silverton was constructed about 1881, following the old trail, with a toll gate and house visible [in 1943] near the Champion Mine buildings; Mears put in the Rainbow Route from Silverton to Ouray in 1882 (Cornelius 1943:18). These roads were put out of business, however, with the completion of the Durango-Silverton rail line on July 8, 1882 (Horn et al. 1986:4). The Durango-Pagosa Springs toll road was built 1876-1889, with a toll gate near the Florida River two miles above the state highway crossing (Cornelius 1943:23).

Site 5LP1259 is the remains of an old cabin associated with the Animas City-Silverton wagon road, located just north of Rockwood (Horn et al. 1986). The cabin was constructed as early as 1878 according to a tree ring date taken from one of its logs. The cabin's original function is still unclear, but it was probably used as a toll booth for the road at a later date, during the construction of the nearby rail line. The lack of ceramics and lighting equipment suggests that use of the cabin was perhaps only seasonal.

Lake City, Del Norte, and the Animas Valley became areas of concentrated settlement based on agriculture and cattle ranching to supply the miners. In 1880, a second Animas City of 286 people grew up south of Baker's former site of that name; Baker's Park soon encompassed three towns: Silverton, with 1000 people, Howardsville, and Eureka. Ouray was thriving; in higher elevations there were Animas Forks and Mineral Point; Lake City outliers included Sherman and Capital City; Telluride began as Columbia (Smith 1996:237-38).

Railroads were the final sign of the area's entry into the industrial world, and these were built primarily to carry ores and timber to processing centers. Their impact on settlements were both far-reaching. For instance, the Denver and Rio Grande builders had intended Animas City as the center of their rail operation, but when the town failed to grant the demanded concessions, the railroad bought land and built nearby a company town which they could control: Durango, initiated in September 1880, became quickly populated at the expense of Animas City's demise, and became the site of the San Juan and New York smelters (Smith 1996:239).

The rails arrived in Durango in July 1881 and in Silverton a year later, continuing over Marshall Pass to Ouray in 1887 and to Lake City in 1889. The Moffat line built into Creede was bought by the D&RG in 1892. Three separate, local companies built narrow-gauge lines from

Silverton, to Red Mountain in 1888-9, to Animas Forks in 1904, to Gladstone in 1899. Otto Mears built a line connecting Durango, Rico, Telluride and Ridgeway in 1890-91 (Smith 1996:240).

Towns dating from the 1870s include Ouray, Silverton, Rico, Telluride, Lake City. Smaller mining camps from the 1870s and 1880s include Animas Forks, Parrott City, Sneffles, Gladstone, Tellurium, Ironton, Guston (Husband 1984:4.1). Community structures, artifacts, transportation systems and other attributes of permanent settlement of the era accompanied the mining attributes in increasing degrees of elaboration throughout this period.

Sites that represent the themes of historic transportation systems include trails, wagon stops, way stations; toll roadways and toll stations for the Dallas and San Miguel, the San Miguel and Rico, the Durango, Parrott City and Fort Lewis, and Ouray to Silverton toll roads; freight and stage roads such as the **Lake City to Ouray route**, the Montrose to Telluride road, the Circle Route Stage route from Ouray to Red Mountain, and stage routes from northern New Mexico to Pagosa Springs, Durango, Animas City, and Silverton. All these routes are known and mapped.

Buildings, structures, and artifacts include livery stables, stage barns, toll road keeper cabins, depots, toll gates, bridges, and any materials identifiable with such sites (Husband 1984:8.2). The development of railroads (1880-1890) is likewise an important element in the Euroamerican and Hispanic settlement of the area. Site types include roadbeds, rights-of-way, yards, sites of significant accidents or disasters, sites with special rail-engineering. Buildings, structures, and artifacts include depots, terminals, roundhouses, water towers, bridges, trestles, snowsheds, coal loading facilities, tunnels, rails, sidings, signals, towers, signs, equipment (Husband 1984:9.3-4).

The Timber Industry

Logging was initially stimulated by the needs of the mining industry and the construction of camps and towns; logging companies and railroad companies developed simultaneously. For example, the owners of the New Mexico Lumber Company in 1895 created the Rio Grande and Pagosa Springs Railroad to exploit the timber resources of Colorado. In 1899, the Rio Grand Pagosa, the Northern Railroad and the Pagosa Lumber Company were incorporated as a successful commercial venture with mills at Pagosa Junction and Dyke. The railroad had reached Pagosa by 1900 (Mottet 1984:87), and a spur to the north of Pagosa Springs was added in 1905. The industry lasted until 1916, at which point the timber resources had been depleted beyond commercial viability

(Husband 1984:13.1), because contemporary practices consisted of clear-cutting of the most accessible land, which was then put into agriculture. Only with the creation of the national forest in 1905 was some attempt at resource conservation made.

One of the three New Mexico Lumber owners, Biggs, created the Rio Grand Southern railroad into the La Platas and San Miguels, acquiring rights in 1891 to huge stands of timber north of Dolores. The other two, McPhee and McGinty, took over the company in 1913, bought the timber rights around Dolores, and built railroad spurs and the McPhee logging town four miles north of Dolores in 1924. The lumber business failed with the depression in 1933 (Husband 1984:13.1). However, at its height, timber was a powerful industry in southwestern Colorado. For example, McPhee at the height of its productivity in 1926 and 1927, was producing 125,000 board feet of lumber per day, accounted for more than half of the total state production of timber and employed more than 500 people (O'Rourke 1980:129).

The archaeological remains of logging camps have been noted by numerous cultural resources surveys on the SJNF (Charles and Curtis 1997:15). Of special interest, although on private land are sites 5AA1910 and 5AA1914, because they have been excavated. The former site comprises the remains of a logging camp dating to the first decade of the twentieth century. Site 5AA1914 is the remains of three razed log structures, thought to have been the residences of the foremen of the logging camp (Charles and Curtis 1997:i).

In general, sites and equipment for this theme include camps, wagon roads, railroad spurs, cars, skids, sleds, lumbering machinery (Husband 1984:13.2). A type of water use necessary in the pre-electric periods, apparently not much investigated or discussed, is that of saw- and grinding mills.

Farming, Ranching and Grazing

Early agriculture was directly related to the need to supply miners at prices competitive with those of more distant farms. The first farms were an important source of fresh produce and staples such as potatoes, later grown in the larger valley agricultural systems for export beyond the mountains. The Elk River Valley farms of the 1860s developed in direct response to the Hahn's Peak gold rush. A dairy farm was started in Silverton in 1874 to provide milk to the camps (Husband 1984:11.1). Mining failures during the Silver Panic of 1893 adversely affected this

agriculture (Husband 1984:11.2).

Large scale grazing in the SJNF area began with the Cox Family, who arrived from Texas in 1878 to run cattle in an area stretching from Cedar Hill to the San Juans and from Conejos to Bluff. In 1880 the Carlyle Outfit started grazing cattle in an area from Trinidad to the Abajos. The first sheep were introduced in 1882 at Pagosa Springs; the Perry Outfit began running 400 head of cattle there in 1896; West and McGrew brought 1600 head of cattle to Piedra Park in 1899. McClure and Murray began to ranch on the Florida in the early 1870s. The H.D. Outfit established a ranch and grazed on Bear and Spring Creeks from 1879 to 1891 (Cornelius 1943:74-74). The Canyon Creek Land and Livestock Company, a partnership of 12 men, was formed in 1905 with plans to use the land to homestead, raise pedigreed cattle, propagate fish, and host tourists. They established a sawmill, went into the lumber business, built a flume in 1910, and disbanded the company in 1911 (Cornelius 1943:75-75).

In the west part of the forest, beginning in the 1870s, large herds of cattle open ranged in the Montezuma Valley. In 1879, for example, George Thompson of Trinidad, Colorado grazed about 5,000 head of cattle between the Mancos and Dolores rivers (O'Rourke 1980:122). The large cattle companies ran over 10,000 head; the smaller from 1000-5000 (Cornelius 1943:72).

The increasing encroachment on Ute lands by both ranchers and settlers erupted into violence on June 19, 1865, when **six Utes - three men, two women and one child - were killed by a small group of local cowboys for alleged rustling. The site, located along Beaver Creek at the west end of the forest, is considered sacred by contemporary Ute Indians. Fearful of retaliation, the settlers built a crude log structure at the head of Narraguinnep Canyon. The fort consisted of horizontal logs, three feet in diameter with firing holes cut into them. The roof was made of pine logs and dirt (Colorado State Site Inventory Form). The fort was occupied for about two weeks. The Utes took revenge by killing the entire Mays family, who lived east of Cortez in the vicinity of present-day Totten Reservoir.**

Cattle and sheep owners came into frequent conflict as numbers increased. In 1908, cattle and horses grazing on the Forest numbered 6,284 on 118 permits; sheep and goats numbered 32,136 on 22 permits. In 1915 there were 10,580 cattle and horses on 178 permits, and 66,695 sheep and goats on 56 permits. By 1931 the figures were 18,949 cattle and horses on 230 permits (no figures

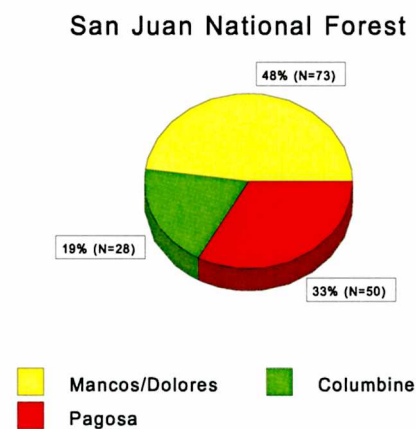
were given for sheep and goats) (Cornelius 1943:77-78).

Conflict between the sheep and cattle industries were only really settled with the creation of the San Juan National Forest in 1905 and the switch to allotted grazing lands and the establishment of stock driveways (Motter 1984:89). In the Pagosa area, an unwritten agreement between the industries allowed sheep to graze in the summer pastures over 10,000' in elevation; cattle were grazed between 8,000 and 10,000'. Sheep were allowed to cross cattle country but they had to kept moving; no grazing was allowed (Motter 1984:89). One historic-period cattle- or sheep-counting pen is located on the top of Turkey Springs mesa, close to the Forest Service's guard station. The creation of the national forest along with numerous others in southwest Colorado radically altered the grazing industry in many other ways, too. One particularly controversial change was the grazing tax program, which went into effect on January 1, 1906 (O'Rourke 1980:127). Cattlemen were charged grazing fees of twenty-five to thirty-five cents per head in order to graze on forest land, and sheepherders were charged five to eight cents. The days of free-range grazing were coming to a close.

An important cultural resource pertaining to this period of use of the San Juan National Forest is the aspen art, which consists of motifs of varying designs carved into the bark of aspen trees (Duke et al. 1985:90). These carvings were done by many different people for many different reasons over many years. A total of 151 individual aspen carving sites have been located on the SJNF (Figure 11.1). However, many of these sites contain numerous individual carvings, the largest number being found at 5DL1454, where 150 individual carved trees were recorded.

Of particular interest are those carvings made by Hispanic sheepherders during the early part of the twentieth century. These sites represent a unique cultural and historic expression in the San Juan Mountains and adjacent parts of Colorado and northern New Mexico (DeKorne 1970). Hispanic aspen art is stylistically different from the more common names and dates carved by later

Individual Carved Tree Frequencies



Anglo-American ranchers, hunters and other recreationists. The Hispanic aspen art is consistent in form and execution and shows a much greater degree of legibility in a fine and often elaborate script, as a result of the specific carving techniques used. Most of the art consists of names, places of origin and dates. References to contemporary events were sometimes made, as well. Representations of houses, horses, butterflies, cows, women, religious crosses and other motifs are common, many of them being humorously represented. This art form is important not only because it is specific to a single ethnic group, but also because it can yield valuable information on grazing patterns (i.e. locality and seasonality), and the ethnic composition of work forces.

Sites, buildings and structures associated with farming, ranching and grazing include houses, barns and sheds of varying purposes, root cellars, irrigation elements, fences, fields and aspen art.

The San Juan National Forest and the Federal Government

The 1891 Forest Reserves, created to guard timber and watersheds, introduced the permit system and ended open range, thus controlling the use of the forests. This and fencing, which began with the arrival of homesteaders, altered the way cattle were raised on public land. The creation of nearby rail centers obviated long drives to distant railheads and spurred the breaking of new drive trails to shipment centers such as Durango. National Forest policies were designed to limit timber depletion not only from grazing but also from mining activities and railroad construction, both of which consumed huge amounts of timber. Many southwestern Coloradans considered the lands, however, to be limitless and free resources and bristled against what they saw as unwarranted government intervention.

The San Juan National Forest was created in 1905. Mesa Verde National Park was established in 1906. The Taylor Grazing Act was passed in 1934 to combat the depleting effects of uncontrolled grazing. In 1946, the Bureau of Land Management was given charge of grazing management. All of these events brought federal employees and buildings, and evidence of their activities. Town and county water systems created over time received federal assistance, including the Lemon and Vallecito Reservoirs. Ft. Lewis moved from Pagosa to near Hesperus, was established in 1880, and over time changed from a military post to an Indian school to an agricultural college.

Sites, buildings, and structures pertaining to the SJNF include homesteads, sheep camps, ranch houses, hay and animal barns, sheds of various kinds, line camps, tree carvings, sites of conflict, corrals, windmills, haystack enclosures, fences, tunnels, canals, and water control elements (Husband 1984:10.1). Also included are CCC camps, National Forest camps, PWA, CCC and Forest Service buildings, military posts. Artifacts include markers for CCC and Forest Service trails, and items related to the camps and federal projects (Husband 1984:16.1-2).

Recreation, Tourism and Highways

Early tourism was tied to the presence of railroads. In the 1890s, promotions by the Denver and Rio Grande sought to bring tourists to the mountains from Denver via a circle route passing through the present SJNF between Durango and Ouray. Attractions were the scenery, sport outfitting, and hot springs. Tourism entered a new stage with the creation of Mesa Verde National Park in 1906 and the State Highway Commission in 1910, which led to the building of roads and automobile access. The road across Wolf Creek Pass was opened in 1916, one of its principal goals being to connect the populations of the eastern part of the state to Mesa Verde National Park, opened a decade earlier (Motter 1984:119). Prior to this, eastern access to the Pagosa area had been across Elwood Pass and the East Fork of the San Juan River, a difficult and sometimes impassable route. During the 1950s, a rudimentary ski area was developed in the Coal Bank Pass area (Gary Matlock: personal communication). To what extent are the remains of these early attempts to develop the forest as a recreation area still extant?

Sites and structures pertaining to this theme include roads and roadbeds, road building machinery, hot springs, hunting camps, lodges, resorts, tourist ranches (Husband 1984:14.3).

Research Opportunities and Directions

First, historical archaeology provides the opportunities for social archaeological topics to be discussed. There is much potential for examining the presence of different ethnic groups on the forest and their differing utilization of forest resources. In conjunction with this, historical archaeology provides an opportunity to examine the different socio-economic classes using and living on the forest. Archaeology, in particular, can provide a texture to their lives that is often missing in the available contemporary historical documentation. There is potential for examining in

more detail the small-scale timber and mining family operations that were not controlled by the large concerns.

Second, prehistoric and historic transportation systems and stock trails should be studied so that the web of such trails can be mapped. This will allow for a much clearer understanding of how the forest was used and the timing of Euroamerican encroachment into the forest.

Thirdly, the archaeology of mining should be examined, not only in terms of the large operations, but the smaller operations, too, and the innumerable failed mine attempts (as well as those lodes that were fraudulently sold to unsuspecting and gullible prospectors). Industrial archaeology provides much potential in terms of developing heritage sites and public access and information sites.

Fourth, how successful were the earliest homesteaders. What constrained their expansion into the forest, for example? What are the constraints of living at such a high-altitude, or were other factors such as inaccessibility to supply towns also important?

Fifth, there is much work that can be done in developing a clearer understanding of the archaeology of the timber industry. How much lumber processing, for example, actually was conducted in the forest as opposed to the logs being shipped out for processing elsewhere?

Six, historical archaeology can turn its attention to the early recreation industry and the remains of such things as the Coal Bank Ski Area.

Finally, the San Juan-Rio Grande National Forest should investigate the history of its own past, by locating and, if necessary, conserving ranger stations, lookout towers and other such buildings.

CHAPTER 12

Concluding Summary

This overview has attempted to summarize the current state of archaeological knowledge on the San Juan portion of the San Juan-Rio Grande National Forest. It has also attempted to describe how the cultural resources program has evolved in practice and philosophy since its inception in 1978, and to define some of the problems and challenges facing the program not just as archaeological paradigms have shifted but - more importantly - as the program itself struggles to cope with new congressional directives and budgetary priorities.

Since the program's inception, a total of 4,751 archaeological sites that cover the whole range of human occupation in the area, from the Paleoindian through to the Historic Euroamerican Periods, have been recorded within the forest's boundaries. The sites range in size from individual isolated finds to large site complexes covering thousands of acres; from hunting-and gathering campsites to large Formative-level Ancestral Pueblo villages, to historic Euroamerican towns and mines. Although the data-base and the resulting increase in our knowledge of the forest's human history has expanded incalculably in the last twenty years, it is also obvious, given the forest's size and the diversity of its cultural resources, that the program has only begun to scratch the surface of the potential wealth of knowledge on the forest's human history.

The program's goals are mandated by numerous federal directives and are primarily concerned with the inventory, management and preservation of these cultural resources. Cultural resources program managers have since 1978 placed much of their effort in responding to the overall dictates of the federal laws, as well as to the internal needs of other forest managers involved in such undertakings as road construction and timber sales. However, it is fair to say that because the United States Forest Service was not intended as a conservation agency, the cultural resources program still needs constantly to justify itself within the overall organizational structure of the forest bureaucracy.

Beyond the day-to-day management of these resources, program managers have developed long-term collaborative teaching-research partnerships with various educational institutions, especially Fort Lewis College, in order to expand actual knowledge of the prehistory and history of the forest. At the same time, programs like the paraprofessional program and more recently the

Passports in Time (PIT) projects have attempted to solidify public support for the importance of preserving these cultural resources. Most recently, forest archaeologists have responded positively to the need to include Native Americans in all aspects of the management, preservation and interpretation of these resources.

The historic preservation laws, of which this country should with justification be proud, are under attack from various congressional and industry quarters. While they may not be repealed outright, nevertheless it is incumbent not only on federal cultural resource managers, but also on academics and interested members of the public, to ensure that these laws are exercised judiciously and that the resultant knowledge is shared with as many segments of the public as possible. The days when legal compliance and adding to an archaeological database that was known only to a relatively small number of few federal archaeologists are probably gone forever. Such a crisis must be turned into opportunity if the important task of preserving the nation's cultural heritage is to remain a part of the federal government's mandate from the people it serves.

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Appendix I

**The Geoarchaeology
of the San Juan National Forest**

by

Mona Charles

Mountains are the surface manifestations of forces beneath the earth's surface that result in crustal deformations that project well above the surrounding land (Summerfield 1991). The forces of erosion and weathering act simultaneously with those of uplift and mountain building to form a variety of landforms, each subject to a complex set of forces acting in isolation or together to shape the landscape. The two most important physical properties for weathering are temperature and precipitation, both of which vary with altitude; thus, the geomorphic processes that produce the landforms in the mountains vary significantly. Moreover, at higher elevations other processes are also significant in creating landforms: mechanical weathering, especially from seasonally active frost action; moderate to intense episodic mass movements such as debris flows and landslides; seasonal fluvial processes; and localized glacial action. These processes produce a complex set of azonal or altitude-dependent landforms.

Archaeological sites in the mountains are subject to precisely the same set of complex geomorphic processes that produce the various landforms typical of mountain environments. Sites in mountain settings, like all archaeological sites, are subject to numerous transformation processes that affect the archaeological record (Waters and Kuehn 1996). Archaeologists must both recognize these transformation processes and quantify their effects before they can construct meaningful statements about the prehistory of a given region, a specified time period, or even a single site. It is important that archaeologists identify and understand the geophysical limitations of sites from mountainous environments before we can make informed decisions about the research potential and ultimately about the future of these cultural resources. The purpose of this appendix is to explore the role traditional criteria play in evaluating archaeological significance in the mountains of Colorado. Data used in this study were gathered over a six-year testing program in the San Juan Mountains of southwestern Colorado to isolate the most important natural transformation processes that affect mountain sites. In conclusion, several research avenues, technical and methodological, for conducting future work within mountainous contexts are provided.

Archaeologists are required to consider two options for managing cultural resources: the resource is significant for nomination to the NRHP and is protected, mitigated or avoided, or the resource is found not eligible and thus receives no further archaeological work. To qualify for the first option, the resource must have local, state, or national significance. There is only one criterion, under 36 CFR 60 of the National Historic Preservation Act of 1966 and 36 CFR 800 of Executive

Order 11593 , which seems to apply directly to archaeological resources: this is Criterion D, "[sites] that have yielded or are likely to yield information important in prehistory or history". It has long been a source of concern to the archaeological community how this criterion might be qualified and standardized (Fowler 1982; Grady 1977; McGimsey and Davis 1977; Moratto and Kelly 1977, 1978; Scovill et al. 1972; Thompson 1979). There are often no specific criteria or "cookbook" methods to evaluate significance. Indeed, the idea of significance is dynamic and relative (Moratto and Kelly 1978), changing with advances in archaeological research and theoretical orientations. Although the ambiguity surrounding Criterion D is often frustrating to the decision-making process, it is necessary to ensure flexibility in the management of our cultural resources.

Traditional standards for determining archaeological significance are often "intuitive" and rely on the perceived scientific research potential of the site. Typically, the research potential depends on the archaeologist's unevaluated opinion of the subsurface integrity of a site, as well as the potential of the site to yield buried structures and features, habitation surfaces, artifacts in chronostratigraphic context, and chronometrically datable features, all of which must have good context. Guthrie et al. (1984:58), in the *Colorado Mountains Prehistoric Context*, describes significant prehistoric sites thus: "important sites from the Mountains Study Region are those sites which can help develop local chronologies... sites with hearths, charcoal lenses or other potentially datable materials (e.g., obsidian) are especially important". The authors continue that "sites should be relatively undisturbed and in good physical condition to allow the extraction of reliable information which can be applied to the research questions" (Guthrie et al. 1984:58). However, good physical condition and undisturbed contexts are value judgments and are made irrespective of the limitations imposed by the landscape on archaeological sites. Relying on traditional criteria to evaluate mountain sites is a priori assuming that sites in the mountains possess the geomorphology that allows eligibility determinations based on the perceived "subsurface potential" and "good context." The ability of any site to produce important data is limited by a set of transformation processes (cultural and natural) that act on the site during and after occupation. The context of the site within the larger framework of the landscape and of the geological processes imposed on a site may lead to misinterpretations of a site's research potential.

Most archaeological work conducted in the Colorado Mountains is limited to government-mandated inventory reports. These inventories are usually defined by project parameters, and are not

statistically generated sample inventories implemented to quantitatively test settlement or subsistence models. The resultant inventory data are dominated by open flaked-lithic scatters often without temporally sensitive surface artifacts. Due to the nature of the mountainous environment and patchy visibility, sites are commonly found on slopes where sediment mixing is visually evident and soils are shallow, and, therefore, most sites are considered not eligible for nomination to the NRHP. In the San Juan Mountains in particular the challenge to evaluating significance is exacerbated by its position adjacent to the San Juan Basin with a rich material culture and salient architecture. Simply because of proximity, many archaeologists working in the San Juan Mountains are trained in Southwest archaeology, and often work in the mountains only until they can find a job doing "real archaeology" (i.e. Anasazi).

This brings an unintentional bias to how we evaluate the ubiquitous "open flaked-lithic scatter." A case in point is a recent Class II inventory of 7376 acres in the Turkey Springs Resource Area (Calabrese et al. 1991). This inventory resulted in the recording of 117 cultural properties, which includes 81 isolated finds. Three of the 117 cultural properties were considered eligible for nomination to the NRHP, and an additional 14 were considered potentially eligible and, therefore, unevaluated. The three cultural resources evaluated as being significant have at least one common thread; each possesses Formative Period ceramics. The point can be made that evaluating archaeological resources in the San Juan Mountains may be biased toward the more "affluent" archaeology of the adjacent Southwest where ceramics are associated with long-term habitation, architecture, and extensive buried cultural deposits.

The next portion of this paper describes the project area and discusses seven archaeological sites from the project area in order to provide the results of subsurface evaluative testing of archaeological sites from mountain contexts.

Project Area

The project area for this research comprises a portion of the southeastern San Juan Mountain Range of southwestern Colorado. The San Juan Mountain Range is an isolated extension of the Rocky Mountains. Climate is cold-mid latitude and varies considerably with elevation and aspect. Generally in the project area, the average winter temperature is 23.9° F (-4.5° C). The average summer temperature is 61.6° (16.4° C). Total annual precipitation falls between 12 in (30.4 cm) and 18 in (45.7 cm) with 45 percent of this falling between April and September. Snowfall averages about 125 in (317 cm) year in the project area (Bauer 1981).

Table 1 is included as a visual aid to the following discussion on the local geology and geomorphology. The San Juan Mountains are characterized by rugged terrain, a result of orogenic processes, Oligocene volcanics, and Pleistocene glaciation (Raby 1992). In the San Juans, the deeply peneplaned and rather stable shelf of Precambrian rocks were first covered by Devonian and Mississippian deposits. This stable shelf, however, was not without minor vertical oscillations that resulted in periods of non-deposition and erosion (Raby 1992). Considerable deposition and subsidence continued throughout the Triassic, until uplift, followed by erosion, removed Triassic to Precambrian rocks. The Cretaceous was a time of major subsidence with extensive beach facies followed by shallow-shelf deposits over the entire Rocky Mountain geosyncline. This was followed by uplift and volcanism which was considerable during the Oligocene and supplied great amounts of debris to parts of the San Juan Mountains (Kelley 1957).

Most of the higher elevations reflect a heavily glaciated topography. The retreat of the last glaciers between 15,000 and 13,000 years ago (Carrara et al. 1984; Elias 1982, 1988; Maher 1961) lead to massive slumps and widespread colluvial deposition in the higher elevations, accompanied at lower elevations by a considerable reworking of the colluvium into alluvial deposits in the major stream systems. The geomorphology of the project area is, therefore, mostly a product of recent glaciation modified by subsequent erosion (Raby 1992). The project area, for the most part, was not subject to direct glaciation, although it was affected by glaciofluvial processes from seasonal and terminal melting of the glaciers. These supplied considerable meltwater into the local drainages which lead to the exposure and undercutting of the Cretaceous sedimentary lithostratigraphic units. With the full retreat of the glaciers active stream erosion declined. The lack of glacial meltwater,

compounded with a regional drying trend, further reduced the available water for erosion. There was, therefore, essentially a stable landscape until the introduction of modern land-use practices during the last two decades of the 19th century (Raby 1992).

The Continental Divide is just west of the project area along Wolf Creek Divide. Drainages from the project area include the Los Pinos, the Piedra, and their tributaries, all of which flow south to their confluence with the San Juan River, which eventually flows into the Colorado River in southern Utah. The principle drainage pattern of the San Juan mountains is trellis in which a dominant drainage direction is accompanied by a secondary direction perpendicular to the main drainage. This drainage pattern is structurally controlled. The tilted and folded, alternately resistant and weak sedimentary rocks, form a drainage pattern with roughly parallel strike streams that are joined at high angles by short dip streams. In the lower elevations where soft, horizontal shales dominate, the trellis drainage pattern is replaced by a spreading, tree-like dendritic pattern. Drainage in the project area consists of three flow types: ephemeral; intermittent; and perennial. In the lower elevations the landscape is commonly dissected by active gullies or arroyos. These ephemeral drainages may be, in part, the result of historic land-use patterns such as over-grazing, logging, and other ground-disturbing practices. Cattle affect the hydrology in two main ways: they increase rapidity of run-off and the rate of erosion by destroying the vegetation; and they compact the soil through trampling, enabling channels for erosion (Bryan 1925; Duce 1918).

Soils in the San Juan mountains are formed under cold, wet conditions with warm summers and very cold winters. The soils, however, are complex and vary with moisture, temperature, relief, and elevation. Soils vary greatly within short distances and with changes in altitude causing vertical zonation. Soil development in the mountains is mostly a result of bedrock lithology, climate, and slope. In the project area there are two major soil groups: Alfisols and Mollisols (Foth and Schafer 1980:). The subgroup Boralfs are the well-drained Alfisols formed under a cool climate. They typically have an "O" surface horizon that is underlain by an "A2" horizon over an argillic horizon. This soil type supports a forest vegetation with conifers being the dominant vegetation. At higher elevations most Boralfs have a frigid soil temperature and are Cryoboralfs. In the lower elevations and foothills Boralfs may be replaced by Borolls, the cool to cold, well-drained Mollisols of a continental climate (Foth and Schafer 1980:131). In the western mountains, this soil type supports trees as well as grasses.

Archaeological Sites

Data in this discussion were collected from testing at seven archaeological sites (Charles 1993; Charles and Curtis 1997; Duke and Charles 1992, 1994; Duke et al. 1995). The sites are located in two counties; Archuleta and Hinsdale. The sites range in elevation from 7140 ft (2176 m) asl to 9450 ft (2880 m) asl. Five of the seven sites are within the San Juan-Rio Grande National Forest, and the remaining two sites are on private land. The site types are dominated by open flaked- and ground- stone scatters with light historic components, four of which possess Formative-period ceramics as well. Most of these sites are situated on slopes with underlying shale bedrock; one site is underlain by sandstone, and two are on deposits from glacial outwash. The discussion that follows briefly describes each of the seven archaeological sites tested.

5AA952 (Freeman Park)

Site 5AA952 (Freeman Park Site) is a large, multi-component prehistoric site located on lands managed by the San Juan-Rio Grande National Forest. A Class III (intensive) cultural inventory was conducted of this large (90,000 m²) site, and six main concentrations of archaeological activity were identified (Webster 1984). Most of the cultural material was found on the south-facing slopes overlooking the drainages. There was a high number of groundstone found on the site as well. Most of the groundstone were also found on the south-facing ridges and were eroding down the cut-banks and into the arroyos (Webster 1984). The flaked-lithic artifact inventory included approximately 500 flakes, most of which were quartzite. There was also a large amount of chert (100+) in addition to 30 pieces of obsidian and 15 chalcedony flakes. Among the flaked-lithic artifacts were five scrapers, seven bifaces, and five projectile points. Webster also identified 24 pieces of groundstone; 18 sandstone metates (complete or fragmented) and 6 quartzite manos. The 15 sherds were composed of 13 grayware ceramics, 1 broken painted ceramic (Piedra or Cortez B/W) and 1 neck-banded ceramic [Moccasin or Mancos Grey (Webster 1984)]. Using projectile point typologies and the ceramic types two components to the site were identified by Webster (1984). The first was a Middle to Late Archaic component dating from around 2000 B.C. to AD 1. The second is Anasazi and dates to PI or early PII (AD 800-950). From the surface inventory record several activities were inferred to have taken place at the site, such as intensive food processing taking place, most of which must have been vegetal processing, primary flaked-lithic reduction, game processing,

and resource procurement (Webster 1984).

Freeman Park is a slightly south-to southwest-facing closed basin (Figure 1) located at a mean elevation of 7640 ft (2328 m) asl. The basin is formed by a high, flat alluvial terrace to the south and coalescing alluvial fans to the north. The two areas are separated by a west flowing tributary of Freeman Creek. The western edge of the basin is defined by a steep, rocky shale slope that directs the flow of Freeman Creek to the southwest. The high terrace to the south is formed on alluvial deposits from the lateral migration of a west flowing drainage and by fanglomerates from sandstone slopes to the south.

Figure 1
General Overview, 5AA952 (Freeman Park)
Test Excavations in Background

At locations near the sandstone bedrock, the soil consists of a sandy clay loam. On the remainder of the site, the soil is a clay loam overlying fractured shale bedrock. The loam grades to clay with depth in the profile. A thin Soil "A" horizon is partly responsible for the surface erosion at the site. According to Birkeland (1984), structure is the most important influence on the movement of water through soil and on soil erosion. A well defined Soil "A" horizon allows soils to take up large quantities of water thus reducing surface erosion. The infiltration rate of the Soil "B" horizon is less than that of the "A" horizon and can result in increased erosion due to increased rates of runoff at the surface.

The site is dissected by two major arroyos along the northern half of the site. At present these are very active. This gully action may well have intensified with historic cattle activities and with the construction of the access road. Gully erosion develops where rainfall cannot adequately percolate into the ground. The water is collected in rivulets which flow across the surface. These rivulets enlarge and take on shapes peculiar to the bedrock on which they are formed. In the Mancos Shale, these gullies are typically very long and have smooth, steep sides. Erosion through rainsplash is also significant here. Evidence for overland flow at the site is sediment accumulation on the downslope side of bushes and forbs.

5AA1407 (Snow Ranch Road)

5AA1407 is a large (24,000 m²) multi-component archaeological site located on lands managed by the San Juan-Rio Grande National Forest. 5AA1407, also known as the Snow Ranch Road site, is located at an altitude of 7140 ft (2176 m) asl. It is a multiple component base camp with surface evidence of late Paleo Indian through to historic Ute and European components. It contains evidence of both Archaic hunters and gatherers and the more sedentary Anasazi (Duke and Charles 1992). The surface artifact scatter includes 19 projectile points or point fragments, 2 drills, 5 "one-hand" manos, numerous metate fragments, scrapers, and other bifacially worked tools and tool fragments. The points include the base of a Hell Gap point, Archaic types (Sudden Side-notched), Pueblo II (Rose-Spring corner-notched) and small Late Prehistoric (Ute?) points. The historic European component includes a series of artifact types including a diagnostic cartridge casing dated to 1875-1892 and used primarily by the U.S. Cavalry (Matlock 1988). Other historic artifacts include bottle glass and whitewares. The distribution of each artifact across the site shows definite clustering within each class. The flaked- and ground-stone occur in relatively equal frequencies

within one particular area of the site. This frequency overlap suggest that activities utilizing both ground- and flaked-stone artifacts occurred within the same locations. The historic artifacts do not overlap significantly with the prehistoric artifacts, indicating an area of discrete activity.

The site lies at the contact between the upper and lower members of the Mancos Shale. The formation contains fine-grained, dark gray to black calcareous shale and argillaceous limestone and sandy limestone and argillaceous sandstone at the contact interface. A sandstone outcrop at the ponderosa pine tree line at the northeast edge of the site is believed to be a local outcrop of the Dakota Sandstone. Large and small fragments of the angular sandstone are scattered across the site. Some of the larger fragments appear to have been utilized for grinding surfaces in food preparation. The fragments are believed to be more the result of geologic drift as opposed to having been transported to the site by the prehistoric occupants. The slope is considered to be moderate across the site at about 6 percent. Slope aspect of the site is to the south at 182°.

Two drainages converge at the lower limits of the site. The drainage that forms the southern and eastern boundary of the site and flows in an east to west direction is deeply entrenched with channel meanders and a depth of over two meters. The drainage along the western edge of the site is a perennial stream with a narrow alluvial terrace and riparian vegetation. Upslope of the site 125 m (410 ft) water emerges as a spring from beneath a sandstone outcrop. Rain and snow melt accumulation soak through the overlying, permeable sandstone bedrock which acts as a reservoir. At the contact between the two lithostratigraphic units, water collected within the sandstone emerges as a spring. This spring supplies a year-round water source and is probably responsible for the preferred prehistoric site location.

The stream is laterally migrating. A small alluvial terrace built of fine-grained sands and silts from overbank deposits is formed along the west edge of the stream between the steep shale outcrops and the present stream channel. The shale bedrock along the eastern margins of the stream form the lateral extent of the stream in this direction. The eastern edge of the stream cut bank is dominated by shale bedrock and clay colluvium. The colluvium is the result of sediment transported and collected in ancient arroyo cuts between the bedrock exposures. An abandoned arroyo channel was observed in the cut bank along the eastern edge of the stream. This channel is marked by a clay loam which rests upon a layer of poorly sorted clay, siltstone and pebble to cobble-size angular sandstone fragments supported within a lighter-colored clay loam matrix.

The slope is dissected by a series of small to fairly large arroyos (Figure 2). These arroyos are most dominant along the northern half of the site. At present, these arroyos are very active. The dendritic drainage pattern visible today was probably present during prehistory but gully erosion probably intensified with historic cattle activities. Defoliation through ungulate grazing has undoubtedly influenced the present erosion pattern. Abandoned arroyo cuts are visible along the present cut bank but the extensive erosional channels visible today were not observed in the cut banks. In the Mancos Shale bedrock these gullies are typically very long and have smooth, rounded surfaces. However, several of the gullies at the site have steep-sided profiles. Another source of erosion observed at the site is the result of overland flow (previously mentioned). The combined factors of the slope, lithology, and sparse vegetation have contributed significantly to the overall erosion observed at the site.

Figure 2
Site 5AA1407 (Snow Ranch road)
Intensive Gully Action. View is to the South

The soil over most of the site is a silt loam which grades to a clay with depth in the profile. It is a deep, well-drained soil on alluvial plains, piedmonts and coalescing alluvial fans (Bauer 1981). The surface layer is a thin, brown and grayish brown loam. Subsoil is grayish brown, clay loam and brown clay. The substratum is a light olive brown, calcareous clay. The soil profile (regolith) is defined as having a very thin (2-3 cm) "A" horizon and a very thick colluvium layer. Shale bedrock was exposed at varying depths in several test units. In other units, colluvium continued to a maximum depth of 50 cm below the ground surface without exposing the shale bedrock. Along the alluvial terrace; however, the soil is a sandy loam grading to a silt loam. Soil cores taken within the alluvial terrace showed that the alluvial sediments continued for 50 cm below the present ground surface. Charcoal flecks were found in all core samples, probably reflecting accumulations from past forest fires. Bioturbation from gophers is extensive along the terrace.

5AA1518

5AA1518 is a large (60,000 m²) multi-component site at elevation of 7943 ft (2421m) asl. Artifacts were observed along the ridge and slopes and into O'Neal Park and into the small U-shaped basin south of the ridge. Artifacts were grouped into four main areas of concentration or loci. Each locus is independent of the others, assumed to represent a spatially and culturally autonomous archaeological manifestation. There appears to be a preference for this geographic location over a relatively long period of prehistoric occupation. The suggestion of a base camp or rendezvous camp is provided as one possible explanation for the temporally discreet loci. Temporal and cultural distinctions were based upon diagnostic artifacts observed during the surface reconnaissance. These artifacts include a Middle Archaic obsidian projectile point base, Late Archaic Period points, Formative Period Pueblo I and Pueblo II ceramics, Pueblo II corrugated ceramics, Rose Spring corner-notched points (PI - PII), and scarred-ponderosa pine trees (Ute).

The site is located along a northeast-to southwest-trending ridge (Figure 3). Slope of this unnamed ridge is to the south and west where it forms steep slope faces. To the southeast the ridge slopes gradually to form the western boundary of the small U-shaped basin. An unnamed, ephemeral drainage bisects the basin eventually merging with Dunagan Canyon 100 m southwest of the ridge. North of the site is O'Neal Park, a large open parkland. This topographic feature is characterized by low, rolling hills, small, entrenched arroyos and ridges, and mesas. The site is located at the far southern limits of the Park at the transition between the Ponderosa Pine, Douglas

Fir Community and the open grasslands.

The site is on an erosional surface of Late Pleistocene or Recent age, flanked by Dunagan Canyon drainage to the west and an unnamed side drainage feeding into Dunagan Canyon from the east. The side drainage is included in the south portion of the study area. The surface is an exposure of Dakota Sandstone. Recent alluvium is found in the drainages. The Dakota locally is made up of thickly bedded sandstone strata with thin, locally continuous silt and shale layers. The local exposure is probably close to the base of the Dakota Sandstone.

Figure 3
Site 5AA1518.
Locus C in the foreground and Locus A in the background along the ridge.
View is to the North

Present weathering and erosion is generally due to precipitation runoff, aerial ablation, freeze-thaw stress, solution of carbonate cement in the sandstone, and soil creep due to gravity and saturation of the soil (Raby 1992). The site has probably been stable in appearance and contour for several thousand years, with only rare geomorphic modification due to extreme flood or precipitation events. The floor and side slopes of the small unnamed side drainage show no evidence of active erosion or transport of material except for soil creep and slumping. The west-trending drainage in the study area probably ceased active or continual erosion between 10,000 and 5,000 years ago and became choked with material weathering from the steep slopes of its channel (Raby 1992). Dunagan Canyon's stream retains an intermittent flow and actively transports material during seasonal flows.

Two major soil types are identified at the site: a silt loam along the ridges and a silty clay loam that grades to a clay along the drainages and in the lower basin. The silt loam is formed in residuum derived from sandstone bedrock and perhaps some interbedded shales and is more consistent with soils in adjacent areas referred to as loams. The high silt content (40-60%) is due to the accumulation of loess (wind blown sediments) and to the weathering of residual shale bedrock. The surface layer is a dark brown silt loam. The silt loam continues with minor pedologic changes to sandstone along the ridges and to a yellow brown clay loam that separates the silt loam from the sandstone bedrock. Permeability is high to moderate and the available water capacity is high to moderate. Runoff is low and the hazard of water erosion is low. The slopes to the south and east into the small basin are a clay loam. This is a deep, somewhat poorly drained soil which occurs on fans and toe slopes. It is formed in a fine-textured alluvium and colluvium derived from mixed rock sources (Bauer 1981). The surface soil layer is a gray or dark gray clay loam. A gray, silty clay continues to a depth of 150 cm (60 in) or more. A yellow brown, clay loam occurs below the gray clay loam. Permeability of this soil is slow and the capacity to hold water is high. Runoff is slow and erosion by water is slight. The soils are wet for a part of the time in the spring and subject to severe compaction by trampling.

5AA1655 (Beaver Meadows)

5AA1655 is a fairly large (8750 m²) and dense flaked-lithic artifact scatter located along the edge of a low rise above a tributary of Beaver Creek on lands managed by the San Juan-Rio Grande National Forest. At an elevation of 9480 ft (2889 m) asl, this site represents the highest in elevation of the sites from this study group. Site 5AA1655 was recorded during the survey for the Beaver

Meadows Timber Sale and reported by Quere (1991). The site includes a dense scatter of flaked-lithic artifacts of chert, quartzite, jasper, chalcedony, and obsidian. One biface, one utilized flake and one gray quartzite projectile point were also recorded. The point was typed as a McKean Lanceolate or Bajada point and described as being Archaic (Quere 1991:19). Concentrations of lithic materials, also referred to as loci, are believed to represent specialized activity areas which may be temporally or functionally unique from each other.

Beaver Meadows is an open, high mountain meadow which surrounds a spring. Although a large meadow is adjacent to the spring, smaller open areas radiate from the spring. It is in one of these small open areas that 5AA1655 is located. The site is situated along a gentle slope of 0-2° to the west and south on a rise above an unnamed tributary of Beaver Creek (Figure 4). A narrow bench separates the site from the drainage. This small stream originates 300 m southwest at Beaver Spring. The confluence of the stream and Beaver Creek is 1.8 km to the southwest. Aspect is 110° east to the open meadow surrounding Beaver Meadow Spring and 250° west. Local bedrock is Lower Cretaceous, Dakota Sandstone which disconformably overlies the Burro Canyon Formation, a lenticular, pebble-chert conglomerate interlayered with green and gray claystone (Steven et al. 1974).

Figure 4
General Overview, Site 5AA1655 (Beaver Meadows)
View is to the West

This soil is a sandy loam and silt loam formed in residuum derived from the sandstone bedrock. A typical regolith has a thin, "A" horizon with heavy organic materials. This grades into a

yellow brown "B" horizon with a higher silt content. A weathered "C" horizon of deteriorating sandstone is found at the bottom of most excavation units.

5AA1910

5AA1910 is a large (10,400 m²) multiple component site located on private lands within the San Juan Mountains. This site along with five others including 5AA1914, are within the normal pool level of a proposed 55-acre reservoir (Charles and Blatter 1996; Charles and Curtis 1997). The site consists of a low-to moderate-density scatter of historic and prehistoric artifacts with a few areas of higher artifact concentrations and some rock clusters that are interpreted as possible features. The prehistoric assemblage includes myriad of debitage, 1 uniface, 1 drill, 1 biface, 4 projectile points, 1 mano, and 8 grayware ceramics. Prehistoric surface components date from the Middle Archaic to Historic Ute occupation. However, the base of a buried Plainview or Milnesand point was recovered from the subsurface. The historic component includes a variety of historic artifacts of which most are fragments of liquor bottles, patent medicine bottles, horseshoes, wagon parts and a few personal items. Several pieces of worked bottle glass were present on the surface as well (Carrillo 1997). This location was the focus of a logging camp and railroad spur line in operation from ca. 1908- 1913 (Sullenberger 1990). It was locally named the Hidden Valley Logging Camp and was operated by the Pagosa Lumber Company.

The site is located within an open valley (Hidden Valley) formed by unnamed tributaries of McCabe Creek (Figure 5). The elevation of the site is 7540 ft (2473 m) asl. This site is located along the northeast slope of the valley along a slope between 5° and 7°. Aspect is to the north and northeast. The exposed bedrock is the Mancos Shale although the ridge directly to the south is capped by Mesa Verde Sandstone. Pleistocene gravel occurs in thin layers on the higher terraces of the valley, and limited numbers of terrace gravel are present at the site. Gravel lithologies include, but may not be limited to, sandstone, chalcedony, quartzite, orthoquartzite, diorite, conglomerate, and various igneous rocks that originated in their source area to the north.

The site is situated within the upper reaches of a major tributary of McCabe Creek. McCabe Creek flows south to its confluence with the San Juan River in Pagosa Springs. Drainage within the project area consists of three flow types: ephemeral; intermittent; and perennial. Significant headcuts are present in several places within the valley and the site is dissected by active gullies. The terrain of Hidden Valley is one of a broad, open valley formed by the downcutting of perennial drainages

that have their source waters in the higher elevations. These episodes of downcutting and lateral stream migrations have left signatures in the form of terraces and floodplains; an active floodplain (T0), and three higher terraces (T1, T2, and T3). The T1 terrace is developed in Holocene valley alluvium while the upper Late Pleistocene terraces unconformably overly shale bedrock. Shale bedrock is undulating at the site with exposures along the surface which dip drastically to depths of over a meter in the subsurface.

The soil is a silt loam that grades to a clay with depth the profile. This soil is deep, somewhat poorly drained, and developed on valley alluvium or in colluvium formed on fans and toe slopes (Bauer 1981). Soil permeability is slow, runoff is moderate, and the capacity for water retention is high. This soil, when wet, is subject to severe compaction and livestock trampling. A typical soil

Figure 5
General Overview, Site 5AA1910,
Test Excavations in Middle Ground

regolith consists of a thin "Ap" pedogenic unit overlying a massive "B" soil unit. A thin "A2" horizon is present along portions of the site where it overlies a thick "B" clay loam with prismatic soil structure and near the bottom platy shale inclusions.

5AA1914

Site 5AA1914 is a single-component historic site (1000 m²) consisting of three razed log structures, a possible dugout structure, and a low-density surface scatter of historic artifacts. The site is located on private property and was identified and recorded during a cultural resource inventory of a proposed 55-acre reservoir (Charles and Blatter 1996; Charles and Curtis 1997). The site is on a steep southwest-facing hill slope across the drainage and east of site 5AA1910 (Figure 6). It is at an elevation of 7500 ft (2460 m) asl. Site 5AA1914 was the residence for logging foreman and their families during the operation of the Hidden Valley Logging Company.

Figure 6

General Overview, Site 5AA1914

**Two cabins visible along slope; a third cabin is on the alluvial terrace
and covered by vegetation. View is to the east.**

5AA1914 is located along a steep southwest slope of shale bedrock at a point where the

valley begins to narrow considerably. Two structures are excavated into the shale bedrock, while a third is situated along the alluvial terrace. A discussion of the general geomorphology and hydrology of Hidden Valley is provided in the previous discussion of site 5AA1910. Erosion is significant along the shale bedrock, but the alluvial terrace is currently stable with lateral migration of the creek. Sediment depth along the terrace (T0) at the site is unknown but exposures over three meters are visible from the cutbank.

Soil at the site consists of a silt loam grading to a silty clay loam with depth in the profile. This soil is formed in fine-textured alluvium derived from mixed parent materials. The profile consists of a thick "A" to "Ap" horizon over an even thicker "B" horizon. Small pebble lenses interspersed throughout represent high energy episodic deposition.

5HN1 (Williams Creek)

5HN1 is a very large multiple-component site located within the William Creek Campground on lands managed by the San Juan-Rio Grande National Forest. The site is extensive, and the extent of the site is currently unknown due to the campground being superimposed on the site. This flaked-lithic, groundstone, and ceramic scatter is located along a high glacial terrace and in the valley alluvium along Williams Creek at an elevation of 8100 ft (2469 m) asl. Several distinct loci of prehistoric artifacts are defined at the site along with a concentration of 21 scarred-ponderosa pine trees. The flaked-lithic artifacts include unifacial and bifacial tools and a plethora of flaked-lithic debitage. It is estimated that the surface flaked-lithic artifact scatter is between 3000 and 5000 individual artifacts. Groundstone is limited to one-hand manos. Temporally sensitive artifacts include projectile points which date from the Middle Archaic to the Late Prehistoric Periods and grayware ceramics that are probably of Pueblo I or Pueblo II manufacture. The scarred-ponderosa pines indicate later use of the area by historic Native Americans, most probably Ute.

The morphology of the site is complex and includes such topographic relief as Pleistocene glacial outwash features, open meadows, alluvial terraces, and the current floodplain. The majority of artifacts are on a long northwest to southeast terrace above Williams Creek which is to the east. Across the creek are steep slopes of shale bedrock. The landscape is relatively stable at this location, and outside of impacts to the site from recent campground construction and use, the site appears in good physical condition. However, in some areas particularly in the silt loams of the terrace alluvium, bioturbation from earthworms and pocket gophers can be extensive. Soils are complex

and range from a sand loam with silt to a silty clay loam. These soils reflect primarily the parent materials, slope, and organisms which act on the pedogenic process.

Testing Methods and Techniques

The seven sites were mapped, surface artifacts were analyzed, and occasionally all surface artifacts were collected. In other cases, only formal tools, temporally sensitive artifacts, or specific loci within a site were collected. Testing was conducted in units that ranged in size from 1 m² to 4 m². The total area tested for the seven sites is 200 m². Shovel testing was conducted within all sites. These were placed perpendicular and parallel to the slope, and spaced from 4 to 5 m apart with an average diameter of .5 m for a total of 220 shovel tests. Occasionally, test trenches were excavated, and on one site, a trackhoe trench provided a large cross-section profile for stratigraphic interpretation. Units were excavated in 5 to 10 cm arbitrary levels and preferably within pedostratigraphic, lithostratigraphic, or ethnostratigraphic units. Sediments from all subsurface tests were dry-screened through one-fourth inch mesh and a twenty-five percent sample was collected for dry screening through one-eighth inch mesh. Vertical control was from the ground surface, and vertical units were excavated with the contour of the ground surface or with the contour of the subsurface stratigraphic units. Soil samples, pollen samples, radiocarbon, and obsidian samples were submitted for laboratory analysis.

Results from these exploratory tests demonstrate that archaeological sites in the mountains are often complex and difficult to interpret. Moreover, the information potential of sites in the mountains varies within the confines of a single site and also among their positions on the landscape because they are subject to a variety of transformation processes that, while not unique to the mountains, present special challenges to the field archaeologists and cultural resource managers. The following discussion identifies the more important transformation processes that occur on mountainous sites from the study area.

Faunalturbation

Three main categories of faunalturbation were identified in the project area. These include disturbance by fossorial animals, disturbance by semi-fossorial animals, and surface disturbance by large herd animals.

Fossorial animals are those that spend virtually their entire life underground. In our sample area these animals include earthworms, cicadas, termites, and ants. Earthworms affect the soil for hundreds and perhaps thousands of years, churning and homogenizing the sediments (Darwin 1881; Shaler 1891). Earthworms move upward and downward through the soil profile with the seasons, which in the mountains can be extreme. They can obscure soil horizon boundaries and perhaps even destroy subtle ethnostratigraphic interfaces. The effects from soil homogenization may be significant in obliterating changes in stratigraphy, but they play less of a role in the movement of artifacts than the larger, semi-fossorial animals (Watson 1961, 1962, 1964; Wood and Johnson 1978).

Semi-fossorial animals, (gophers, marmots, prairie dogs, packrats) spend part of their life underground, mostly to feed and hibernate. They too destroy stratigraphy, but not usually over the entire site, and their presence and the nature of their disturbance is often detectable as krotovina (Figure 7). Their greatest impact is in the movement of artifacts both laterally and vertically (Bocek 1986; Erlandson 1984; Johnson 1989; Johnson and Watson-Stegner 1987, 1990; Wood and Johnson 1978). On every site from this study, presence of these animals is ubiquitous. Masking or destroying stratigraphic interfaces, however, is less of a problem than with the fossorial animals.

The effect of large animals on archaeological sediments is typically seen in enhanced erosion, a result of overgrazing and attributed to the introduction of sheep and cattle. Their effect is an indirect one, although changes in soil chemistry as a result of the introduction of organic matter are attributed to these animals as well. The effects from the wild herd animals such as deer and elk are less often recognized on sites. Herd animals congregate at predictable locations often along their migratory route. The effect of these animals as they migrate through an area, particularly in spring when the soil is wet, is to displace sediments through trampling (Figure 8). Saturated soils, which happen after summer storms or during spring melt-off, are particularly susceptible to trampling. Hooves sink deep in the soil, displacing artifacts and nonartifactual material laterally and vertically. Trampling was recognized on at least one site by platy soil development in the "Ap" horizon. Trampling along slopes in saturated soils can enhance a form of mass wasting called soil creep, by which the site

matrix, replete with archaeological deposits, is heaved downslope.

Figure 7
Test Unit 6, 5AA952
Krotovina exposed in east wall profile

Floralturbation

Floralturbation is a common problem in forested regions such as the mountains. A commonly recognized type of floralturbation from the mountains is that of tree fall or tree throw where the tree is uprooted and blown over by strong winds (Schaetzl 1986; Schaetzl et al. 1989, 1990). Tree throw is usually most severe where the soil is saturated or very moist (Retzer 1963). Wind during storms affects the subsurface by pulling and moving the roots, which in turn loosens the soil both at the surface and in the subsurface. The effects from tree throw and from root displacement include discontinuous horizons that may resemble cultural anomalies such as large pit features (Mueller et al. 1997). Roots of larger vegetation can displace artifacts and features. Like the krotovina, root tongues can often be identified through careful observation. Tree throws may be recognized in the field by discontinuous soil horizonation, stone lines, surface microrelief, heterogeneous soil textures, and variable permeability. Roots from smaller plants such as grasses

may cause soil homogenization as well.

A more interesting and less quantified form of floralturbation is the influence of forest fires or wildfires on archaeological sites. Fires are far more common in forests than grasslands, and in the prehistoric period fires must have been a common occurrence. There are at least three resulting physical effects on the landscape that are of concern to archaeologists. First, the most serious surface erosion in forested areas occurs after fires (Retzer 1963). Prior to revegetation the denuded ground is susceptible to alluvial and colluvial erosion. Rain and snow storms remove great quantities of surface sediments, thereby altering - sometimes drastically - the morphology of the landscape. Debris flows often follow forest fires resulting in rapid sediment build-up over a short period of time. Secondly, when a forest burns, large quantities of charcoal are introduced into the matrix (Retzer

Figure 8
Trampling by large Herd Animals
Can cause displaced sediments and artifacts.
Continued trampling can result in a form of erosion known as mass wasting

1963). Although no controlled studies on the effect of forest fires on radiocarbon dates exists, inclusion of recent charcoal into a radiocarbon sample could result in a significantly younger date

(Romme et al. 1993). Dated charcoal from mountain sites should always be interpreted with caution as to the source of the charcoal. Third, subsurface burns are almost indistinguishable from the thermal features produced by humans (Figure 9 and Figure 10). Signatures of forest fires, besides the presence of charcoal, are oxidation and baked earth. Hot fires ignite stumps and roots of *dead* (living trees are never fully consumed due to the high water content) snags and trees that burn below the surface (glowing combustion). Before these are extinguished, the soil is filled with open caverns of porous brick-like clasts. Prolonged drought (several weeks or a season), dry conditions, and hot fires unite to produce a situation where sweeping grass fires consume the dead trees and stumps and drive the heat into the soil (Romme 1997). In our study area, we found these natural thermal features to be most common on sites with a clay loam.

Argilliturbation

Because most of the sites tested are underlain by shales, their soils are rich in montmorillonite clay; therefore, argilliturbation - disturbance from the shrinking and swelling of sediments with a high clay content - is a common problem (Johnson and Hester 1972; Yaalon and Kalmar 1978). In soils or sediments high in clay, artifacts can migrate upwards in the soil profile, while smaller artifacts might fall through the open cracks, causing natural size-grade sorting of archaeological deposits that could be misinterpreted as a culturally meaningful layering. An even greater problem with clay-rich soils in the San Juan Mountains is what is termed self-swallowing soils. Vertisols and soils with high clay content can become self-swallowing and engulf their own, formerly differentiated "A" and "E" horizons (Johnson and Watson-Stegner 1990). This process masks the original soil horizonation, and make distinction of ethnostratigraphic and pedostratigraphic units difficult.

Figure 9
5AA1407, Feature 2

A thermal feature that most likely represents an ancient stump or snag burn

Cryoturbation

Cryoturbation is common at sites from most elevations in the San Juan Mountains. Cryoturbation is the result of freezing and thawing. Besides breaking and exfoliating artifacts, the process of freezing and thawing moves and sorts artifacts through the soil profile. Larger artifacts have a tendency to move upwards in the profile and form stone pavements (French 1976; Garner 1974; Johnson et al. 1977; Johnson and Hansen 1974; Washburn 1973, 1980; Wood and Johnson 1974). At higher elevations with seasonally frozen ground cryoturbation produces microrelief features

such as stone pavements and lenticular structures (Mermut and St. Arnaud 1981). In our project area, the more visible affect of cryoturbation was in the breaking of ceramics. The high porosity of ceramics leads them to collect moisture that then freezes eventually breaking the artifacts into smaller and smaller pieces, until they are so small as to become almost unnoticeable.

Graviturbation

Graviturbation (the movement of sediments and artifacts by gravity), is a particular problem because many sites from the mountains are situated on slopes. Besides movement under the force of gravity, downslope movement of artifacts and sediments from overland flow is of great concern. Displacement from overland flow is greatest on steeper slopes and those with sparse vegetation. At sites with an argillic soil and sparse vegetation the energy from rainsplash dislodges individual particles and exacerbates erosion from overland flow (Morgan 1977). Rainsplash erosion commonly occurs where vegetation does not entirely cover the ground surface and is intensified by slope gradient. Experimental studies have shown that at a slope gradient of 5°, 60 percent of the particles dislodged by raindrop impacts move downslope (Summerfield 1991:175). The effects of erosion by rainsplash increase when combined with slope wash. This is a result of the surface being disrupted by the raindrops which enables the particles to become dislodged and available for transport. The impact of the raindrops creates turbulence, which in turn enhances the ability to entrain and transport materials. During severe rainstorms artifacts can be transported downslope through overland flow.

Methodological and Technical Geoarchaeological Research Avenues

The processes mentioned above are but few of the most prevalent processes that affect sites in the mountains and make it difficult to evaluate their research potential. From the results of testing by Fort Lewis College in the San Juan Mountains, several avenues of methodological and technical geoarchaeological research are isolated which I believe will aid in the process of site evaluation for archaeological sites in the mountains. A few examples will be discussed.

Geoarchaeological Research

In shallow sediments, ethnostratigraphic and pedostratigraphic units are thin, and subject to transformation processes that can make visual distinction difficult. Our testing results showed that 5 cm excavation levels and one-eighth inch screening of a sample of the units provided valuable information not obtained from the thicker levels and larger screen size. On the other hand, opening larger areal units such as 2 m x 2 m and 4 m x 4 m grids proved no more productive than shovel testing and 1 m x 1 m test units for exploratory investigations.

Sites on slopes should be thoroughly investigated for subsurface and surface integrity before being dismissed on the premise that the deposits are mixed and the context compromised. Our research has shown that slope morphology is complex, and that integrity of deposits of a site varies along its position on the slope. Testing should include shovel tests spaced so that a representative subsurface sample of the entire slope morphology is investigated.

From the photograph in Figure 11, it is apparent that the surface here is eroding through slope wash. Artifacts are continuously being exposed on the surface here, and it might be concluded that the subsurface archaeological deposits are mixed. The subsurface pedostratigraphic units, however, are flat and indicate that the landscape was stable during soil formation. Moreover, the cultural sediments were deposited on this more stable landscape and were not affected by the same magnitude of slope wash that is present today.

The nature of geomorphology in the mountains is such that surface and subsurface incongruities may exist, and these incongruities can be significant to the interpretation of the site. The success of testing and excavation in the mountains is decided on a site-by-site basis. Some general strategies that proved successful are extensive shovel testing, trackhoe trenching, and fine vertical

control. Auger testing has not been as successful in this project as we had hoped. However, it is possible that better results may be achieved with a larger bucket. Larger buckets would need to be motorized to penetrate the silty clay loam on many sites in the mountains. Trackhoe trenching has proved in one case (5AA952) to be of value to the interpretation of the site geoarchaeology.

Figure 11
5AA952, Test Units F1 and F3
Note the sloping topography, but pedostratigraphic units are flat lying
and indicate a once-horizontal ground surface

At the Freeman Park site (5AA952) shale bedrock is visible at several locations at the surface. Along one portion of the site that is situated on a large alluvial fan, a 1 m² test unit demonstrated that deeper sediment pockets occur in what was otherwise believed to be a very shallow site matrix. This test unit showed that sediments and artifacts continued for 50 cm below the present ground surface. A trackhoe trench was placed near the test unit in hopes of retrieving data on the depositional history of the site. This trench showed that the bedrock here dips rapidly to the south. This dip is an alluvially filled Pleistocene stream channel. At this position, the trackhoe bisected a prehistoric pit feature, most probably a dwelling, which is currently the furthest north and east in the San Juan Mountains (Figure 12). If we had relied only on the appearance of bedrock at the surface, we may have interpreted the site to be very shallow and would have missed the pit feature and perhaps misinterpreted the research potential of the site.

Incongruities between the surface and the subsurface can bias our interpretations of historic sites as well. Recent testing at three deteriorated cabins from a logging-period site (5AA1914) occupied between 1908 and 1913 illustrates this point. Two of three structures were surface features

slightly excavated into the shale bedrock with very shallow deposits over a natural shale floor. A third cabin was initially viewed as almost completely razed, and like the previous two cabins, held little potential for subsurface deposits. Only through subsurface testing was it discovered that unlike the others, this structure was of dug-out construction with three feet of fine alluvial sediments sealing the floor and its contents. Preservation of the floor, walls, and artifacts is excellent. A catastrophic flood in the fall of 1910 most likely began the initial cycle of flooding and sediment accumulations that completely filled the semi-subterranean structure.

Figure 12
Overview of pit feature, 5AA952
Pit feature was excavated into the fill of an ancient channel.
Shale bedrock is exposed at the surface less than 5 meters north of the feature

Paleoenvironmental Research

Sites from the study area have not retrieved any macrobotanical remains and only small numbers of bone. In this sense, data on subsistence patterns and economic activities are limited. However, sites from the San Juan Mountains have excellent pollen preservation. For example, *Zea* pollen was recovered from a slightly ground sandstone artifact from a buried context at the Freeman Park site (5AA952) at an elevation of 7640 ft (2328 m) asl. At this site, pollen samples obtained from an 80 cm profile indicated environmental shifts had occurred over 5000 years of prehistory. There may be a potential for paleoenvironmental or possibly climatic shifts through a combination of pollen profiles and forest-fire history. It is plausible that we could establish such a history, and compare the dates of major fires with pollen profiles from the same time period to identify changes in the local biota. The presence of burned stumps on two sites suggests that trees were once more common at these location than they are today.

Early Holocene Research

Heavily forested and elevated landforms in the mountains produce islands of stable landscapes. These stable landforms possess an excellent potential for Paleo Indian deposits in primary context. Shovel testing at one site (5AA1910) recovered the base of a probable Plainview or Milnesand point manufactured from obsidian (Charles and Curtis 1997). From the number of Paleo Indian points retrieved from mountains in southwest Colorado (Pitblado 1993; York 1991), it is clear that the mountains were inhabited by Paleo Indian groups. Perhaps with tighter stratigraphic control, more attention to artifact assemblages verses the individual diagnostic artifact, and a greater emphasis on geoarchaeological studies, more mountainous Paleo Indian sites will be identified which will provide a more complete understanding of the human occupation and utilization of mountain environments.

Conclusion

In conclusion, the ability of an archaeological site to yield significant information to the understanding and explanation of prehistory and therefore be awarded some degree of status, should incorporate several levels of concern including the range of research objectives, the nature of the archaeological resource, and as importantly, the types and extent of transformation processes

affecting the resource. The larger context of the site, its position on the landscape, and the transformation processes working at the site both past and present can be overlooked under "traditional" or "intuitive" standards. Our standards have become biases. Variables such as shallow sediments, subtle pedostratigraphic and ethnostratigraphic horizons, and a complex set of transformation processes impose serious limitations on the extent of information potential sites in the mountains are capable of producing. When the transformation processes and the geological limitations of the landforms on which the sites are located are not integrated into the criteria for evaluating sites, we risk losing data bases and potentially eligible resources. This is nowhere more problematic than on archaeological sites in the mountains.

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Appendix II

**A Projectile Point Chronology
for the San Juan National Forest**

by

Mona Charles

This appendix identifies, through an analysis of projectile points found in the Pagosa district of the San Juan-Rio Grande National Forest, various regional influences on the course of prehistoric cultural dynamics in the San Juan Mountains. A total of seventy-three projectile points from twenty-eight cultural resources in the study area were compared to established typologies from adjacent regions. Results of this study suggest that although projectile point types from the study area generally reflect a variety of styles defined for the Northern Colorado Plateau, Great Basin, and the Greater Southwest, a distinctive series of point types from the study area can, with confidence, be assigned to the Oshara Tradition. This series of Oshara Tradition projectile points suggest that the prehistoric inhabitants of the study area possessed a projectile point technology that was rooted in the Greater Southwest. Moreover, the various Oshara Traditional point types recovered from the study area suggest that the San Juan Mountains was inhabited, perhaps continuously, for at least the last 5000 years. Influences from the Northern Colorado Plateau and Great Basin are present in the assemblage, but these influences are secondary to the overall influence of the Greater Southwest and may reflect population convergences in the mountains of southern Colorado during the Middle Archaic.

The study area is located in the southeastern San Juan Mountains and within the Northeastern San Juan Basin. Sites in this study are within two counties: Archuleta and Hinsdale. Typically the project area consists of gently sloping east- to south-facing mountain flanks. Elevations for the sites in the study area range from 7400 ft (2255 m) to 11,000 ft (3353 m) asl.

Methods

Funding for this research was provided thorough a cooperative research agreement between Fort Lewis College and the San Juan-Rio Grande National Forest. Archaeological research in this area of the San Juan Mountains is mostly limited to cultural resource reports from projects undertaken on federal lands administered by the Bureau of Land Management and, more importantly, the Forest Service. Therefore, the results of this research must be considered preliminary, serving primarily as a spring board for future similar work in the mountains of southwestern Colorado.

A total of seventy-three projectile points and point fragments from twenty-eight cultural resources comprise this study (Table 1). The projectile points are overwhelmingly from surface finds. Diagnostic attributes such as the blade, neck, shoulders and base were recorded for each point.

Other attributes noted include flaking technique, serration, and lithic material type. Points from the study area were compared with reported projectile points from the Animas, La Plata, and Mancos drainages (Brown 1991; Fuller 1988; Hayes and Lancaster 1975) and the Navajo Reservoir District (Dittert et al. 1961), and with established projectile point typologies from regions adjacent to southwest Colorado (Black 1991; Buckles 1971; Holmer 1980; Holmer and Weder 1980; Honea 1969; Irwin-Williams 1973; Irwin-Williams and Irwin 1966; Jennings et al. 1980; Moore 1994; Renaud 1942).

Lithic Material Types

Four broad material type categories were defined in this assemblage (Table 2). These four categories in their respective order of frequency are: chert and chalcedony, obsidian, quartzite and orthoquartzite, and other igneous (basalt and welded tuff). Most of the cherts, chalcedonies, quartzites, and orthoquartzites are local to the San Juan Mountains and are available in bedrock outcrops (orthoquartzite and Mosca chert and chalcedony) or as pebbles and cobbles in alluvial gravel (quartzite, chalcedony, and chert). Many of the cherts and chalcedonies originate from the Mosca Quarry (Charles 1995) at the headwaters of Coldwater and Mosca Creeks, tributaries of the Piedra River. This quarry outcrops from an exposure of Mississippian Leadville Limestone (Appendix I, this volume). These microcrystalline silicates are characterized by a range of banded and variegated cherts and chalcedonies with variations of purple and red dominating the spectrum. Interestingly, lithic materials from the quarry site and from sites that fringe the quarry include a high proportion of obsidian in addition to the variety of local silicates (Charles 1995).

No.	Site No.	Specimen No.	Material Type	Serrated (Y/N)	Point Type
1	5AA1407	187	Obsidian	N	Pueblo I - Rose Spring Corner-Notched
2	5AA1407	188	Chert	N	Chiricahua-Cochise or Sudden Side-Notched
3	5AA1407	23	Obsidian	N	Chiricahua-Cochise or Sudden Side-Notched
4	5AA1407	24	Obsidian	N	Pueblo I - Rose Spring Corner-Notched
5	5AA1407	30	Quartzite	NA	Unidentified
6	5AA1407	48	Chert	NA	Late San Jose
7	5AA1407	51	Quartzite	Y	Chiricahua-Cochise or Northern Side-Notched
8	5AA1407	52	Chert	NA	Chiricahua-Cochise or Sudden Side-Notched
9	5AA1407	53	Chert	N	Chiricahua-Cochise or unidentified side-Notched
10	5AA1407	54	Chert	NA	Late San Jose?
11	5AA1407	55	Chert	N	Pueblo I - Rose Spring Corner-Notched
12	5AA1518	1010	Chert	N	Unidentified

No.	Site No.	Specimen No.	Material Type	Serrated (Y/N)	Point Type
13	5AA1518	1012	Chert	Y	Late San Jose
14	5AA1518	26	Obsidian	Y	Elko/En Medio
15	5AA1518	2	Obsidian	N	Elko
16	5AA1518	8	Chert	Y	Late San Jose
17	5AA1518	10	Quartzite	N	Late San Jose
18	5AA1518	13	Chert	N	Pueblo I - Rose Spring Corner-Notched
19	5AA1518	14	Chert	N	Pueblo I - Rose Spring Corner-Notched
20	5AA1518	78	Obsidian	N	Chiricahua-Cochise or Northern Side-Notched
21	5AA1518	185	Chert	N	Pueblo I - Rose Spring Corner-Notched
22	5AA1518	187	Chert	N	San Jose
23	5AA1518	67	Chert	Y	Unidentified
24	5AA930	1	Chert	Y	San Jose
25	5AA930	10	Chert	NA	Elko Series

No.	Site No.	Specimen No.	Material Type	Serrated (Y/N)	Point Type
26	5AA930	5	Basalt	N	Bajada
27	5AA930	2	Basalt	NA	San Jose?
28	5AA930	4	Quartzite	NA	Unidentified
29	5AA930	9	Chert	NA	Unidentified
30	5AA930	67	Chert	NA	Unidentified
31	5AA930	13	Obsidian	NA	Unidentified
32	5AA952	285	Quartzite	Y	Armijo
33	5AA952	6088	Chert	N	San Jose?
34	5AA952	108	Quartzite	N	Late San Jose
35	5AA952	315	Chert	N	En Medio (Basketmaker II)
36	5AA952		Quartzite	Y	En Medio (Basketmaker II)
37	5AA952	6087	Obsidian	NA	Unidentified

No.	Site No.	Specimen No.	Material Type	Serrated (Y/N)	Point Type
38	5AA952	5013	Obsidian	NA	Unidentified
39	5AA952	5453	Chert	N	Unidentified
40	5AA616	11	Chert	Y	Armijo
41	5AA1197	NA	Basalt	Y	Late San Jose
42	5AA1209	NA	Chert	N	Sudden Side-Notched
43	5AA1213	NA	Basalt	NA	San Jose
44	5AA1215	3	Orthoquartzite	N	En Medio or Elko Corner-Notched
45	5AA1219	3	Chert	N	Armijo
46	5AA	NA	Obsidian	NA	Bajada or San Jose
47	5AA1562	NA	Obsidian	NA	Unidentified
48	5AA1563	NA	Chert	N	San Jose
49	5AA1583	30	Obsidian	N	Bajada
50	5AA1583	31	Chert	Y	Unidentified

No.	Site No.	Specimen No.	Material Type	Serrated (Y/N)	Point Type
51	5AA1585	NA	Quartzite	N	Late San Jose
52	5AA1588	IF	Obsidian	NA	Unidentified
53	5AA1589	NA	Chert	NA	Unidentified
54	5AA1589	NA	Chert	NA	Unidentified
55	5AA1589	NA	Chert	NA	Unidentified
56	5AA1592	NA	Quartzite	NA	Unidentified
57	5AA1726	NA	Orthoquartzite	NA	Elko Corner-Notched/En Medio
58	5AA1726	NA	Orthoquartzite	NA	Elko Corner-Notched/En Medio
59	5AA1726	NA	Chert	Y	Late San Jose
60	5HN392	NA	Chert	N	Desert Side-Notched
61	5HN392	NA	Quartzite	Y	Armijo
62	5HN438	NA	Chert	Y	Late San Jose?

No.	Site No.	Specimen No.	Material Type	Serrated (Y/N)	Point Type
63	(DG-1)	NA	Orthoquartzite	N	Unidentified stemmed serrated
64	(DG-1)	NA	Basalt	Y	Late San Jose?
65	(DG-1)	NA	Basalt	Y	Late San Jose?
6	(DG-1)	NA	Chert	NA	Late San Jose?
67	(DG-1)	NA	Chert	Y	Late San Jose?
68	(DG-3)	NA	Basalt	N	Late San Jose?
69	(DG-4)	NA	Chert	NA	Desert Side-Notched
70	(DG-5)	2	Chalcedony	N	Unidentified
71	(DG-15)	NA	Obsidian	N	Chiricahua - Cochise or Sudden Side-Notched
72	(12-13)	NA	Welded Tuff	N	Dalton-like
73	5AA	NA	Obsidian	N	Undifferentiated Paleo Indian

Table 1 Projectile point data from twenty-eight cultural resources in the Pagosa District of the San Juan National Forest.

Chert/ Chalcedony	Obsidian	Quartzite/ Orthoquartzite	Other Igneous	Total
36	15	14	8	73
49.3%	20.5%	19.2 %	11%	100%

Table 2
Lithic material types for the seventy-three projectile points in the study assemblage

Paleo- indian	Bajada	San Jose/ Bajada	San Jose	Late San Jose	Elko/E n Medio	Armijo	Chiricahua- Cochise or Northern Plateau Side-Notched	Pueblo I	Desert Side- Notched	Unidentified
2	2	1	7	15	8	4	9	6	2	17
2.7%	2.7%	1.4%	9.6%	20.5%	11%	5.5%	12.3%	8.2%	2.7%	23.3%

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Table 3
Projectile points by type for the study assemblage

Second in frequency to the cherts and chalcedonies is obsidian. Fifteen (20.5%) of the points in the sample are manufactured from obsidian. A dozen of these have been sourced to Polvadera Peak in the Jemez Mountains of New Mexico.

Quartzite and orthoquartzite occur in almost exactly the same frequency as obsidian. Orthoquartzite is more common than quartzite. Orthoquartzite is most commonly grey to buff in color and possesses a grainy texture with visible inclusion. This material is believed to be a silica-cemented sedimentary rock such as Dakota Sandstone. At one site, this material is present in a tabular form. Other quartzites are present in the terrace and stream gravel.

The other igneous category includes basalt and welded tuff (11%). Basalt is probably obtained further to the south and east and was brought into the area. Welded tuff is available as outcrops to the east and north of the study area. Both material types are more common in the southeastern portion of the study area south and east of Pagosa Springs.

Projectile Point Types

The points were placed within eight types and an unknown type and grouped according to major temporal periods: Paleoindian, Archaic, Formative, and Protohistoric or Historic Periods. These periods and corresponding point types are briefly discussed below.

Paleoindian

Two points in this assemblage are tentatively identified as belonging to the Paleo Indian Period (Stanford 1997). These include a Dalton-like corner-notched point manufactured from welded tuff and an undifferentiated broken obsidian point with characteristic parallel oblique flaking (Stanford 1997). Both artifacts are surface finds and were collected from sites in the extreme southwestern portion of the SJNF south of Pagosa Springs. These points were recently added to the data base and no illustrations are presently available.

Archaic

Bajada The two Bajada points are perhaps the most typologically distinctive of all points from the assemblage (Figure 1:a,b). Both are manufactured of nonlocal, igneous material - one from obsidian and one from basalt. The use of dark, volcanic material is characteristic of both Jay and Bajada points from the Oshara Tradition in New Mexico (Irwin-Williams 1973; Moore 1994) and

Figure 1 Captions

Row 1 Bajada

Row 2 San Jose

Row 3 Late San Jose

a 5AA930 b 5AA583

c 5AA392 d 5AA930 e 5AA952

f 5AA1518 g 5AA1407 h 5AA1518

still more characteristic of artifacts from the Rio Grande Complex in the San Luis Valley in south central Colorado (Renaud 1935; Honea 1969). According to Irwin-Williams (1973), Bajada points from the Arroyo Cuervo region of New Mexico date from 4700 B.C. to 3250 B.C.. An Early Archaic Period affiliation is generally assigned to these points. Both points in the study sample are surface finds, and no supplementary chronometric dates are available for these points from our study area.

San Jose San Jose Points (Figure 1:c,d, e), as defined from the Oshara Tradition (Irwin-Williams 1973), are also present in the study assemblage. These points are similar to Pinto shouldered varieties from the Great Basin (Holmer 1978, Jennings et al. 1980). In this study, serrated points were categorized as San Jose; otherwise, they were placed in the unidentified category. Irwin-Williams (1973) dates this point type from 3250 B.C. to 2500 B.C. and associates them with the early Middle Archaic. A single San Jose type projectile point (Figure 1:e) was recovered from a buried context at site 5AA952. The type for this point was unclear because the short stem length is not generally characteristic of San Jose points. The point was associated with a cultural layer that contained other flaked-lithic artifacts, mostly debitage, unburned bone, and groundstone. The point was situated on a use surface and within 30 cm of a lightly oxidized feature. Radiocarbon dates were extracted from charcoal within the feature and from the bone in the cultural layer. The bone produced a calibrated radiocarbon date of 2570 B.C. to 2205 B.C. (Beta 88036) while the charcoal gave a similar calibrated date of 2925 B.C. to 2875 B.C. In addition to these dates, a piece of obsidian from the same stratigraphic layer provided a hydration date of 2815 B.P. (SD=261). We believe the date that best reflects the age of the projectile point is the one obtained from the charcoal because it was in direct association with the use surface where the point was located. Therefore, this point type is associated with a Middle Archaic occupation.

Late San Jose The Late San Jose point type (Figure 1: f, g, h) was originally defined by Irwin-Williams but never fully documented until Moore (1982, 1994). Similar points are also typed as En Medio Side-Notched (Brown 1991: 529, Figure 7.8 [e, g, h]) and En Medio/Armijo (Brown 1991:529, Figure 7.8 [a, d, I, j]), as Gypsum (Duke and Charles 1992; Holmer 1978; Reed 1981), as Humboldt B or A2 (Holmer 1978; Jennings et al. 1980), and Late San Jose or BM II (Honeycutt and Fetterman 1994: 31-9, Figure 31-12 [79097.367.2.1, 79097.329.1.8, 79097.340.1.1]). This point type is present in the northeastern San Juan Basin and the study area, and is believed to

date between 3000 B.C. and 2000 B. C. (Moore 1982). A radiocarbon sample obtained in stratigraphic context with a point type referred to as Gypsum from the Piedra Pass site along the Continental Divide in the San Juan Mountains (Reed 1981:49; Figure 19d) produced a date of 3200 B.C. to 1800 B.C. which compares exactly to the date range for the Middle Archaic from the northern San Juan Basin defined by Kearns (1991:20). In the Great Basin a similar point is typed as a Humboldt B or A2 and is distinguished from Humboldt A or A1 on the smaller overall length (A2 or B is ≤ 3 cm). In sites from the Great Basin this point type is dated from 5900 B.P. to 3750 B.P. (Jennings et al. 1978:82), with the majority dating between 3800 B.P. and 4100 B.P. (Holmer 1980). Brown's (1991) work in the La Plata mine excavations of northern New Mexico types similar points as En Medio/Armijo and provides a generic Archaic affiliation. In another report from northwestern New Mexico, Honeycutt and Fetterman (1994:6-37, 6-48, 31-9) categorize similar points as probable Basketmaker II with no further temporal refinement.

Generally points that resemble the Late San Jose type are common to the eastern San Juan Mountains. These mountain points are often short (≤ 3 cm) with concave bases, abrupt shoulders and serrated edges. One site (DG-1), southeast of Pagosa Springs, produced six of this type on the surface: three basalt, two chert, and one orthoquartzite. With the exception of Piedra Pass, no chronometric dates are available for this point type from the mountains. It is proposed that at least the smaller variety is Middle to Late Archaic but probably not Basketmaker.

Armijo Armijo points are fairly distinctive point types (Figure 2:a,b). In the study area, all Armijo points possess serrated edges. In the Arroyo Cuervo region, the date range of the Armijo point is fairly narrow (1700 B.C. to about 1000 B.C.). These points fall within the dates for the Late Archaic Period in the northern San Juan Basin, which Kearns (1991) dates from 1800 B.C. to 800 B.C. All examples from our study assemblage are surface finds. No chronometric dates are available at this time.

Elko and En Medio Elko series (Elko Side-Notched, Elko Corner-Notched, Elko-Eared) defined for the Northern Colorado Plateau (Holmer 1978; Jennings et al. 1980) are discussed with En Medio or Basketmaker II because they appear similar (Figure 1:c,d,e) and because other archaeologists working the northern San Juan have lumped the two categories (Brown 1991; Moore

Figure 2 Captions

Row 1 Armijo

Rows 2 and 3 En Medio/Elko

a 5AA616 b 5AA436

c 5AA1407 d 5AA1407

e 5AA952 f 5AA952 g 5AA1518

1994). Dates for the Elko series from the northern Colorado Plateau (Holmer 1978; Jennings et al. 1980) range from 6000 B.C. to A.D. 1300. The En Medio or Basketmaker II points from the San Juan Basin have a much tighter control and date from 800 B.C. to A.D. 400 (Kearns 1991; Moore 1994). Points from northwestern New Mexico that are similar to those from the study area are documented both as BMII points (Honeycutt and Fetterman 1994:18-23, 31-9) and as Archaic (Brown 1991). The En Medio points from this assemblage are often serrated (Figure 2:d,e)), and for this reason, I have included them as En Medio rather than Elko.

A large corner-notched point was recovered from a buried context at site 5AA952 that closely resembles a variation of Elko (Holmer 1978; Jennings et al. 1980) and En Medio (Moore 1994). A charcoal sample (Beta 88034) from the stratigraphic unit containing the point produced a calibrated AMS date of 2865 B.C. to 2810 B.C. and 2695 B.C. to 2450 B.C. An obsidian sample from the same level provided a hydration date of 3867 B.P. (SD 307). Both dates fall within the Middle Archaic and are well outside the range of Basketmaker II. Two other points identified as Elko/En Medio are unusual in that they are not serrated and possess deep corner notches and well-developed tangs. Moore identifies a similar point type as En Medio (1994) and Honeycutt and Fetterman describe a similar point as Basketmaker (1994:18-23, 31-9). A point that best resembles the one from our assemblage was recovered from the La Plata Mine excavations (Brown 1991:529, Figure 7.8 [f]) and was typed as an En Medio Corner-Notched. Neither of the three points (two from the study assemblage and the one from the La Plata mine project) possesses bases, which are necessary to accurately type these points. Another point placed in the Elko/En Medio category is a smaller point, manufactured from obsidian and finely serrated (Figure 2:d). This point type most closely resembles Point Type MM20 from Magic Mountain (Irwin-Williams and Irwin 1966:83, Figure 26), although the points from Magic Mountain are not serrated. The MM20 points were recovered from Zone B which approximately dates between 500 B.C. and A.D. 700. This is toward the later end of the Apex Complex (Irwin-Williams and Irwin 1966) and within the Basketmaker II in the northern San Juan Drainage (Kearns 1992:26).

Formative

Pueblo I - Rose Spring Corner-Notched Pueblo I points in this assemblage (Figure 3) are similar to those described from dated Pueblo I contexts in the San Juan, Animas, La Plata, and

Figure 3 Captions

a 5AA1518 b 5AA1518

c 5AA1518 d 5AA1518 e 5AA1407

Mancos drainages, and to Rose Spring points from the northern Colorado Plateau (Holmer and Weder 1980). One obsidian point (Figure 3:e) from the study assemblage was submitted for hydration dating and sourcing. This point dated to A.D. 1049 and was sourced to Polvadera Peak, New Mexico. The point type spans the period from A.D. 750 to A.D. 950. In the sample assemblage these points are frequent and occur most often in association with Formative Period ceramics.

Side-Notched Varieties Various side-notched points from the assemblage (Figure 4:a,b,c,d,e,f) were compared to both Chiricahua-Cochise point types and to Northern Colorado Plateau Side-Notched types. These point types in the mountainous region of southwest Colorado are usually subsumed under the side-notched varieties from the Northern Colorado Plateau (Charles 1992; Honeycutt and Fetterman 1994; Fuller 1988; Hogan 1991; Winters et al. 1986). Depending on the typology used, these points show a date range from the Early Archaic to the Late Prehistoric. In the Great Basin these points are common in Early to Middle Archaic contexts (Holmer 1978; Jennings et al. 1980), while in the San Juan Basin they have been recovered from Late Archaic and Basketmaker II contexts (Fuller 1988; Kearns 1992). Two side-notched points from the study area were submitted for obsidian hydration dating. One point (Figure 4:c) was collected from the surface at 5AA1518. The obsidian hydration date for this point is 5200 B. C. to 2400 B.C. A second broken point base was collected from a buried cultural layer at 5AA952. The hydration date for this point is 1800 B.C. These dates suggest a wide temporal range for the side-notched point category.

Protohistoric or Historic

Desert Side-Notched Two Desert Side-Notched points were found in the assemblage (Figure 4:g,h). This point type is usually affiliated with a Numic origin; however, it has also frequently been identified with Navajo sites (Reed and Horn 1988, 1990; Brown 1991; Brown and Hancock 1992; Honeycutt and Fetterman 1994). One of the points was collected as a surface find from the Mosca Quarry site (Charles 1995:6.9). It is manufactured from gray chert, probably obtained from the local outcrop.

Unidentified (mostly San Jose/Pinto varieties) This category is a catch-all for points that basically did not seem to fit within established typologies. The majority of these could be placed within a general San Jose/Pinto Series (Figure 5:a,b,c,d). The Pinto series from the Great Basin is so inclusive both stylistically and temporally that they have little diagnostic value. One large, well-

Figure 4 Captions

Row 1 Great Basin and Northern Colorado Plateau

Row 2 Chiricahua/Cochise

a 5AA1407 b 5AA1407

c 5AA1518 d 5AA1407

e 5AA1407 f 5AA1562

g 5AA1407 h 5AA392

Figure 5 Captions

Row 1 Pinto/San Jose

Row 2 Uncompahgre/Shavano

a 5AA930 b 5AA1563

c 5AA930 d 5AA1518

e 5AA1583

made, serrated dart point (Figure 5:a) is similar to a point type defined as Shavano in the Uncompahgre Plateau and dated to the Middle Archaic, 3,500 - 1,000 B.C. (Buckles 1971).

Discussion

The reader is cautioned that generalizations made from this study are restricted to the northeastern San Juan Basin and are based on twenty-eight cultural resources. Prehistoric use of forest resources is of considerable antiquity. Although only two Paleoindian points are present in this sample other Paleoindian points are found both in the mountains and adjacent to the mountains (Chapter 7, this volume). Bases to two Folsom points were collected from nearby Navajo Reservoir (Dittert et al. 1961), and there is reference to a possible Hell Gap base from 5AA1407 (Matlock 1989). In her recent thesis, Pitblado (1993) identified two locations of Paleo Indian points within the present study area, but the detailed information on the two point types was not available in her thesis. York (1991) reported four isolated projectile points from the San Juan Mountains within the general vicinity of the study area. He identified these as Alberta or Hell Gap, Lind Coulee or Alberta, one Alberta-like, and a Pryor Stemmed, Meserve, or Dalton point. Due to the fragmentary nature of most of the examples described by York (1991) and presumably some of the same examples are the ones referenced to by Pitblado (1993), possibly these point fragments are misidentified, especially as they would be isolated examples beyond the generally accepted spatial ranges for the types they identified. In the adjacent San Juan Basin to the south and San Luis Valley to the east, point types identified as Clovis, Folsom, Plano, and Cody Complex points are reported. A single Hell Gap point is noted from the San Luis Valley. Most recently, the base of a Plainview/Milnesand point manufactured from obsidian was recovered from a subsurface context on private lands bordering Forest Service land north of Pagosa Springs (Charles and Curtis 1997).

Although there are only glimpses of Paleo Indian occupation within the study area, it is not implied that early man was absent from the area, nor is it suggested that the mountains were not hospitable during the Early Holocene; quite to the contrary, paleoecological studies from the La Plata Mountains to the west (Petersen and Mehringer 1976; Petersen 1981) and from the northern San Juan Mountains (Carrara et al. 1991) indicate that these regions witnessed a warm period with greater than present-day monsoonal circulation during the early to mid-Holocene. It is concluded, therefore, that aside from isolated Paleoindian projectile points (Charles and Curtis 1991; Dittert et al. 1961; York

1993) recovered from sites in the general area, occupation and utilization of the study area during the Paleoindian period has not been demonstrated. I would add, however, that continued research will conclusively demonstrate the presence of this period in the mountains of southwest Colorado. Furthermore, the point types most likely to be represented will be the more generalized types such as Clovis, Folsom-Midland and Plainview. The San Juan and its tributaries provide a natural corridor for travel and exchange from the more southerly regions. Hell Gap points, however, may be present in the northeastern San Juan Basin, especially if one shares the opinion of Honea (1969) regarding an in situ transition from Hell Gap to Jay to Bajada.

The Archaic through the Pueblo I Periods are well represented in the study assemblage. Early Archaic points are the least common followed by Middle Archaic points. Other than the Armijo point, we are as yet unable to accurately identify points belonging to the Late Archaic Period. Points that are typed as Elko/En Medio are likely to be associated with Middle Archaic dates or with Basketmaker components in the northern San Juan Basin and at higher elevations. It is possible that some of the side-notched varieties as well as the generic San Jose/Pinto points are Late Archaic, but without corresponding dates this remains inconclusive. In the study assemblage, a notable increase in frequency occurs in Middle Archaic point types.

Stemmed points transcend the assemblage from the Early Archaic Bajada type through the Pueblo I Period. Influences from the Northern Colorado Plateau are present in the assemblage in the form of Elko, Pinto, and perhaps in the side-notched varieties. These point types are considered secondary to the overall stemmed and serrated varieties distinguishing the Oshara Tradition, but their numbers and areal distribution are not to be underemphasized. Hogan et al. (1991) argue that these side-notched points are a Northern Colorado Plateau influence. These authors suggest that the distribution of side-notched varieties in the San Juan Basin contrasts to the distribution of San Jose points, indicating an Archaic Tradition distinct from the Oshara during the Middle-to-Late Archaic Periods. Our sample assemblage does not support their view. On the contrary, within our sample San Jose points are well represented. Additionally, a relatively large number of side-notched points from our sample are manufactured from obsidian that is sourced to the Jemez Mountains, and may indicate a southern influence. Gilpin et al. (1984) discuss the occurrence of Chiricahua-Cochise points in the San Juan Basin and note that rather than being a southern manifestation, as the type name implies, side-notched points appear to be most common in the Rocky Mountains, the Colorado

Plateau, and the Rio Grande Valley. It is possible, given their presence along the northeastern periphery of the San Juan Basin, that these points or their makers were coming into the San Juan Basin from adjacent uplands to the northeast or east.

The projectile point assemblage from the study area does not appear to have its origins in the Mountain Tradition as defined by Black (1991). The more obvious differences between sites associated with a Mountain Tradition and those from the study area include a lack of any identified rock art, the lack of a strong split-cobble core technology, a preference in our study area for non-local material types at least for projectile points, and a projectile point series entrenched in the Oshara Tradition of the southwest Archaic rather than the Western Pluvial Lakes Tradition (Black 1991).

Projectile points typically associated with Numic or Athapaskan origins such as the Desert Side-Notched and Desert Tri-Notched varieties are rare in this assemblage, and it is suspected that this pattern is representative of this portion of the forest as a whole and not simply the result of sampling error. The ubiquitous scarred or peeled Ponderosa trees recorded in this portion of the forest attest to a significant use of the forest by the Ute Indians by at least the late 1800s (Appendix IV, this volume). The migration of the Numic speaking population into this area is generally posited as having come west from the Great Basin, but traditional lore indicates that the Kopote and Muache came to the region from the east - the Plains (Naranjo 1994). Thus, it is plausible that they brought with them a material culture assemblage more representative of a Plains lithic technology, and these artifacts, not being of a "typical" Numic style for the region, may well have been overlooked as culture specific indicators.

Avenues of Research

As is the case with any preliminary study, this report has presented more questions than answers. The research avenues at this point in the San Juan Mountains are vast, and only a few are singled out for consideration. One particular research area which I feel should be seriously pursued is that of careful documentation and analysis of surface assemblages. In the mountains, it is more common than not to have multiple episodes of prehistoric occupation superimposed in a single location. This compounds immensely the problem of identifying artifacts, other than projectile points, that may be temporal indicators. We have identified temporally discrete loci from sites in our

study area (see Chapter 8, this volume). Moreover, analysis of the surface assemblages have showed some statistical differences among assemblages. This line of research focuses on the assemblage rather than individual projectile points and should be pursued further if we are to accurately identify the antiquity of the ubiquitous mountain lithic scatter.

Efforts should be continued on the subsurface testing of archaeological sites in the mountains (see Appendix I, this volume). The morphology of mountain sites is not only complicated but also poorly understood. Until archaeologists are comfortable with the subsurface potential of sites in the mountains, efforts should be directed at gathering knowledge about site morphology before making management decisions. Mountain sites possess buried artifacts including projectile points with associated materials for radiometric and obsidian hydration dating. It is suggested that shovel testing and limited subsurface testing be considered on many sites before eligibility determinations are made.

Another line of research is a more detailed technological analysis of projectile points from mountain sites. The research documented in this appendix discerns very general patterns or trends in the projectile point typologies but does not provide data on the technology involved in producing the points. Technological analysis of projectile points from mountain sites should be incorporated into future research on mountain sites.

Summary

Seventy three projectile points (complete and broken) from a portion of the eastern San Juan Mountains were examined for morphological characteristics and placed in existing projectile-point typologies from adjacent regions. All but three of these points are surface finds. This assemblage demonstrates cultural continuity with the Oshara Tradition of north central New Mexico and with the Rio Grande Complex from the San Luis Valley to the east. With exceptions (Elko, side-notched varieties, Pinto), the projectile point assemblage can be comfortably placed within the Oshara point types as defined by Irwin-Williams (1973), and later by Moore (1992, 1994). A preponderance of dark, igneous materials, a proclivity toward serrated blades and stemmed bases, and a strong resemblance to Oshara Tradition point types are offered as evidence for northern and perhaps westward migration of ideas if not populations into the mountainous reaches of the northern San Juan Basin. The San Juan Mountains may have provided a welcome retreat for groups whose

economic lifestyle would have been compromised by inclement or unpredictable weather patterns in the adjacent lowlands. The number of projectile points from the study area supports an increase in projectile point types during the Middle Archaic. The projectile points recovered from subsurface contexts where organic materials provided radiometric dates produced dates that fall within the Middle Archaic. Gradually the local population adopted agriculture, to varying degrees, but for economic, social and cultural reasons remained highly dependent on forest resources.

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Appendix III

**A Study of High-Altitude Ceramics
on the San Juan National Forest**

by

Mona Charles

In a continuing effort to document and explain the nature and presence of the Anasazi in the mountains of southwest Colorado, a joint effort between Fort Lewis College and the San Juan-Rio Grande National Forest was undertaken to analyze ceramics collected from high altitude sites within the San Juan National Forest (SJNF). The analysis was completed by Mona Charles of Fort Lewis College and Laura Heacock of the San Juan-Rio Grande National Forest. The purpose of the study was to classify into existing typologies, ceramics collected from archaeological sites at high elevations within the National Forest; Chimney Rock Archaeological Area was omitted from this study. This information could then be used in future research efforts concerning the distribution of ceramics on archaeological sites in the National Forest. This paper describes the findings of this study and concludes with some generalizations about the presence of ceramics at high elevations in southwest Colorado.

A single criterion, elevation, was used to differentiate high altitude sites, an elevation of 7200 ft (2195 m) asl being selected as the base elevation for the study. Above this elevation, it was assumed that sites should be non-agricultural. Sites above 7200 ft would more likely be used for activities which included generalized hunting and gathering, lithic procurement flaked-lithic tool manufacture, and special-function sites.

The study began with a literature search of all known sites within the SJNF from which ceramics were either collected or noted. At the time of this study State of Colorado Cultural Resource Forms for sites within the SJNF were not computerized and some forms were not available at all; therefore, a data search began with interviews of Forest Service personnel. These interviews were followed by a systematic perusal of the United States Geological Survey (U.S.G.S.) 7.5' quadrangle maps and the large SJNF overlays. A set of mylar overlays for the entire Forest was made available for the study. Each mylar overlay isolated all sites with a single artifact type; i.e., ceramics, groundstone, flaked-lithic artifacts, etc. The overlays were updated at the conclusion of every year's field season. From these overlays, it was possible to determine the U.S.G.S. quadrangle where the site or sites were located. A second set of mylar overlays was available for each of the U.S.G.S. quadrangles. The cultural resources were located on one mylar sheet, while information on the proposed activity, the inventory boundaries, and report information were contained on additional mylar sheets. The mylar sheet with the cultural resources was coded for specific archaeological variables. For examples, archaeological sites with ceramics had the suffix "c". A second mylar

overlay was consulted to acquire a Forest Service site number and the report number where the site information was recorded. These reports were pulled, and the site forms xeroxed.

A second phase of the study involved the analysis of the ceramics. Artifacts collected from the SJNF are catalogued and curated at the Anasazi Heritage Center (BLM) in Dolores, Colorado. Letters from the Forest Service to the staff at the Anasazi Heritage Center (AHC) informed them of the study and of the intent of the Forest Service to request that these ceramics be lent to the Forest Service (Heacock 1989, 1991). A reply from the AHC informed the Forest Service that in the request for ceramics would have to be accompanied by the appropriate Smithsonian Number. This became a problem since on several of the site forms, a Smithsonian Number was not available. Therefore, additional work was necessary to find the Smithsonian Number assigned to these sites. Smithsonian Numbers had been assigned to all sites within the SJNF, but documentation did not exist that enabled us to compare the Forest Service numbers with the Smithsonian Numbers. A later letter from AHC identified several sites for which they were unable to locate the collections and requested additional information such as the original Forest Service site number (Thomas 1991). At the end of the request and acquisition period, there still remained several sites for which we were unable to acquire the collections. Ultimately, collections were analyzed from a total of 57 sites from the SJNF.

Analysis was conducted by Laura Heacock and Charles with the aid of a binocular microscope. The ceramics were analyzed for multiple variables, and the AHC granted permission to snip the ceramics to recorded internal characteristic such as carbon streaking, past color, paste texture, temper, etc. The ceramics were categorized by existing typologies appropriate to the area (Blinman and Wilson 1989; Breternitz et al. 1974; Dittert and Eddy 1961, 1963; Eddy 1966, 1967; Reed and Hancock 1990). All the data were recorded on SJNF Ceramic Analysis Forms.

The final phase of the study involved obtaining blue-line copies of the U.S.G.S. quadrangle maps and plotting the 57 sites and obtaining basic topographic data. The sites are located on 20 topographic maps that range from the eastern end of the SJNF to the western end of the Forest (Figure 1). Two tables (Table 1, Table 2) were constructed to present the data. Table 1 quantitatively summarizes the results of the study by ceramic type while Table 2 provides basic data for each site in the study.

The total ceramic assemblage for this study numbered 325 (Table 1). Sites with ceramics

from the study ranged in elevation from 7500 ft (2286 m) to 11,820 ft (3603 m) asl. Mean elevation of the sites with ceramics is 8327 ft (2538 m) asl, with a mode of 7640 ft (2329 m), and a median of 8000 ft asl (Table 2). These data indicate within the SJNF ceramics occur on sites that are well above the elevation where corn, bean, and squash agriculture were practiced. Information on site size was obtained from the site forms whenever possible. From the available information, it appears that ceramics are often found on large sites with diagnostic indications for multi-occupational use. Average site size for this sample is 26,756 m².

Because of the vast territory for which the sample was acquired and the small sample size, interpretations based on the sample are general. As expected, the ceramic trend from the higher elevations tends to mirror that of the lower elevations. The earliest ceramics represented are the early gray and brown wares typed as Navajo Reservoir wares. These types (Sambrito Brown, Rosa Brown, Piedra Brown, Rosa Gray, Piedra Gray) are more common in the upper reaches of the Piedra, Los Pinos, and Animas Drainages to the east, while Pueblo II, and Pueblo III ceramics are more common in the western portion of the study area. No redwares were analyzed in this sample, although one site 5DL775 was tested and is reported to contain brownware ceramics, plain grayware ceramics, and Abajo Redwares. This testing report was not available at the time of the initial research, and these ceramics were not included in this research. Six ceramics are typed as Pueblo IV (4 Jemez and 2 Gobernador), and were collected from two sites (5DL1453 and 5MT10342) in the western portion of the forest. Interestingly, both these sites are at elevations above 10,000 ft and represent two of the higher elevations in the study. I would suggest that these ceramics represent either acquisition of these items by a local mountain population, or forays into the forest of visitors from the south. Ceramics identified as late period, such as Uncompahgre Brownwares, are not specific to any location, but occur evenly across the mountains. In this sample, there are no ceramics typed as Dinetah Gray (Navajo).

The most common ceramic type noted was Plain Gray (129), followed by PII Corrugated (53), PII/PIII Corrugated (29), and Piedra Black-on-White (25). It should be noted that several of these graywares and corrugated ceramics represent fragments of single vessel and are therefore not proportionate with the painted wares. A single diagnostic Mancos B/W ceramic is represented in the

Ceramic Type	Number	%
Plain Grayware	129	40
PII Corrugated (Payan)	53	16
PII/PIII Corrugated	29	9
Piedra B/W	25	8
Indeterminate White	19	6
Chapin Gray	17	5
Uncompahgre Brownware	16	5
Cortez B/W	6	2
BMIII/PI	4	1
Jemez	4	1
PI/PII B/W	4	1
PI Neckbanded	4	1
Early Brownware	3	1
PIII B/W	3	1
McElmo B/W	2	0.5
Gobernador	2	0.5
Chapin B/W	2	0.5
Basket-impressed	1	0.5
Mancos B/W	1	0.5

Indeterminate	1	0.5
Total	325	100

Table 1 Quantitative data for ceramics collected from high elevation sites in the SJNF.

sample. Ceramics typed as PIII painted wares (McElmo, Mesa Verde, and PIII whiteware indeterminate) comprise a small number (5) of the total diagnostic ceramics. This apparent discrepancy is surprising particularly in light of the high site density in the lowlands at this time. It is probably not a result of sampling bias because PIII painted wares are easily recognized as unique artifacts on mountain sites and are fairly highly visible despite their often small size. One explanation for the small number of these ceramics on mountain sites is simply that the mountains were not for whatever reason(s) exploited during this period. There are some archaeological data that supports this explanation from that Late Pueblo II and Pueblo III period sites in the four corners area. At least some sites from this time period exhibit small numbers of large mammal fauna such as deer and elk (Errickson 1993; Judge 1997), but there is almost no archaeological evidence of the use of other forest resources such as wood from Ponderosa Pine or Douglas Fir (Errickson 1993).

Another interesting occurrence in this sample is the lack of Chaco Black-on-White ceramics. Although Chimney Rock Archaeological Area was omitted from the study, sites from the mountains north of Chimney Rock are included in the assemblage. If, as some authors argue (e.g. Hatch 1994), the location of Chimney Rock was intended to facilitate long-distance distribution of forest resources to Chaco Canyon, the lack of ceramics of definite Chaco origin deserves explanation. The lack of these ceramics from mountain sites is not intended to refute the idea of long-distance trade with Chaco Canyon, only that perhaps the Chaco element at Chimney Rock may not have been pervasive.

A sample of midden deposits recently excavated at Chimney Rock supports this assumption. The ceramic inventory from the excavation conducted at Site 5AA87 within the Chimney Rock Archaeological Area and south of Chimney Rock Pueblo is represented by utilitarian wares of Corrugated Gray, Plain Gray, Payan Corrugated, and an occasional Brownware (Charles 1991). One Black-on-White ceramic was identified from the ceramic assemblage, and this ceramic is not Chaco Black-on-White. While trade items are present in the artifact assemblage from excavations at Chimney Rock (Eddy 1977), these items are rare, and while perhaps not incidental to the overall function of the site, trade in the form of material goods was not the primary role of Chimney Rock. A study of the projectile point assemblage from the surrounding mountainous areas (Appendix II, this volume) supports the idea that the eastern San Juan Mountains were entrenched in a techno-complex that originated to the south and east. The migration of trade items and more importantly ideas were in place in this area from the Paleo Indian Period through to the Pueblo Period; its vestige

at Chimney Rock.

This study remains in its infancy, and does not attempt to explain the nature and presence of ceramics in the higher mountains of southwest Colorado. However, it documents that Formative and post-Formative Period ceramics are present in small numbers throughout the mountains. It does not provide answers to questions about how such artifacts happened to be at these locations, nor does it explain who actually discarded them, e.g., Anasazi hunting and gathering expeditions or resident hunters and gatherers who had obtained them in trade for mountain resources?

Results of the study demonstrate that ceramics are present on many sites at high elevations, but they account for only a small portion of the total surface artifact inventory of mountain sites. The small representation is partly the result of archaeologists' biases toward artifacts that should occur on mountain sites as well as limitations imposed by the small size of ceramics from high elevations. This small size is due in part to the mountainous environment. Ceramics, being a fairly porous medium of clay and temper, are able to absorb fairly large quantities of moisture which expands and contracts with diurnal and seasonal temperature fluctuations. These fluctuations induce physical weathering which results in cracking, exfoliating, and breakage, thus reducing their size with each freeze-thaw cycle. Despite these inherent limitations of the assemblage, the difficulty in transport precluded ceramic vessels from ever accounting for a significant portion of the total site assemblage. It should be noted, however, that ceramics are probably more common on archaeological sites in the mountains than once believed. Closer examination of the surface artifacts, and the knowledge that ceramics do occur on in this environment will lead in the future to more ceramics noted on mountain sites.

The research conducted in this study is a part of a larger research orientation aimed at understanding the utilization by prehistoric and historic Native Americans of the mountains of Southwest Colorado. Future research avenues into the study of high altitude ceramic sites may include computer-based research capabilities such as geographical information systems and geostatistics to identify independent and dependent environmental variables while expanding our knowledge of distribution patterns.

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Appendix IV

**Scarred Trees
on the San Juan National Forest**

by

Philip Duke and Mona Charles

Introduction

The varied reliance on trees by aboriginal peoples was recognized at least as early as the beginning of the 20th century (Boas 1910, cited in Mobley and Eldridge 1992). Living trees were used for a number of reasons, ranging from obvious uses such as a source of construction timber and medicines, to less obvious ones such as providing a dietary supplement or bow staves (Hellsen 1974; Martorano 1981, 1988; Swetnam 1984; Wilke 1988; Mobley and Eldridge 1992). Today, as a result of intensive cultural-resource-management studies throughout the forested West, culturally modified trees, or CMT's, are attracting renewed attention from both archaeologists and foresters. In the Rocky Mountains, one sub-type of CMT, termed the culturally-scarred or -peeled tree, has been identified as a common and easily recognizable cultural resource (Figure 1).

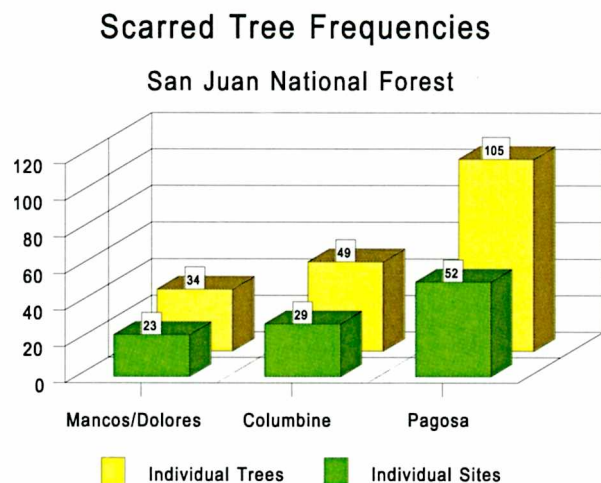
Figure 1

Scarred Tree: 5AA1518

A total of 104 sites that contain scarred trees, nearly all of which are ponderosa pine, have been identified on the San Juan National Forest as a result of cultural-resource-management projects (Figure 2). Scarred trees are found singly and in clusters of up to 21. A total of 188 individual trees have so far been recorded so far. It is probable, however, given that this resource has only been recognized in the past 15 years or so, that their total number runs into the thousands, and presumably many more scarred trees have already been lost to natural or man-made causes.

The scars on the trees were created by the removal of phloem and cambium cells (inner bark) for human utilization for a variety of purposes (Swetnam 1984:178). Swetnam (1984: 179) distinguished trees scarred for the inner bark from trees scarred naturally or those blazed for trails by the following: "[the scar has an] oval or rectangular shape, or sometimes pointed at top. Axe marks occasionally visible at bottom or top. Occur in groups, often near campsites with water." Different types of trees were scarred, although pine seems to have been most commonly utilized (White 1954; Swetnam 1984; Martorano 1988).

The use of the inner bark of the tree by aboriginal North American groups was noted as early as 1805 by Lewis and Clark (Swetnam 1984), but was first intensively studied from an anthropological viewpoint by Thain White (1954). White's study of inner-bark consumption by the Kutenai of western Montana led to a number of conclusions. First, the inner bark was consumed as a delicacy, because it had a very sweet taste. Second, the bark was removed from the trees during spring, especially May, when the tree sap was still running. Thirdly, removal and processing of the bark were *female* tasks, and were done on trees close to their campsites, in order to avoid having to carry the heavy bark far. Finally, the Kutenai used at least two different implements. The first was a piece of flexible wood that was used as a lever to remove the bark from the tree itself. The second was a small scraper that was used to separate the inner bark from the inedible outer portion. White's informant made a scraper from a piece of a tin can, but White was informed that in the prehistoric period the Kutenai had used pieces of mountain-sheep horn which were formed into a semi-oval



shape.

Martorano (1981, 1988), in a comprehensive study of inner bark consumption by the Utes of Colorado, concluded that in their case at least the bark's primary function had been as a food supplement in periods of dietary stress.. Other ethnographic references document this function amongst other groups, also (Swetnam 1984:187-188). Medicinal and other uses for the bark have also been reported by contemporary Ute Indians to forest personnel (Sharon Hatch: personal communication). Martorano (1988:13) dated the majority of the 40 scarred trees she analyzed in Colorado to between 1815 and 1875, a period, not coincidentally, when the Utes were being pushed from their traditional territory into year-round occupation of the mountains under the onslaught of Euroamerican invasion.

Apart from the intrinsic anthropological interest in such an important cultural resource, it is imperative to recognize that this resource will totally be gone within the next 100 or so years as the trees die out, or as they are commercially logged. For example, Ponderosa pine, the most commonly scarred tree on the SJNF, although often reaching ages of between 300 to 600 years (Burns and Honkala 1990: 417), more commonly succumb to disease and other agents before these dates. Moreover, commercial logging usually takes place well before trees reach such an age.

Anthropological investigation so far has been restricted to analyses of the morphologies of the trees, their scars and associated *surface* artifacts (e.g., Wilke 1988), and to dendrochronological dating, where possible, of the scar itself (e.g., Martorano 1981). To our knowledge, no excavations have been conducted at the base of scarred trees, in order to ascertain the possible presence of associated tools. Apart from the natural loss of such trees, remedying this deficiency is imperative, because there is little ethnographic information available on the types of tools that would have been used (Martorano 1988:18). In 1990, 1992, and 1993, Fort Lewis College excavated the bases of three trees in order to investigate further the archaeological record of these resources and their potential for understanding a specific element of Ute historic-period subsistence. Two trees are part of a nine-tree cluster at site 5AA 1518, and one is located at a tree located close to the Turkey Springs Guard Station.

Archaeological Investigations

Site 5AA 1518 lies at an elevation of approximately 8,000' above sea level, in an environment dominated by ponderosa pine, Douglas fir, Colorado blue spruce, quaking aspen and

piñon-juniper scrub (Duke and Charles 1992). The site is located on an east-west trending Pleistocene terrace and adjacent lower-lying areas. Like others in the area, the site does not have deeply stratified cultural deposits. Artifacts located on or just under the surface date between 5,200 B.C. and the historic period, based on obsidian hydration and point and ceramic typologies. The site has been interpreted as the remains of a summer-occupied hunting-and-gathering camp (Duke and Charles 1992).

Found on the site are 9 scarred ponderosa pines, two of which (#3 and #5) were chosen for limited excavation because of their location on flat parts of the site, which would inhibit natural artifact migration. Tree-ring dates of between 1888-1910 for tree #3 and a date earlier than 1875 for tree #5 were obtained for the creation of the scars (Table 1).

Scarred Tree	Date
2	1930-1936
3	1888-1910
5	earlier than 1875
7	1836-1905
8	earlier than 1897

Table 1
Tree-Ring Dates from Scarred Trees: 5AA1518

Unfortunately, as has been documented elsewhere (Swetnam 1984: 181-182), it is very difficult to remove cores from scarred trees, because the cutting tip of the increment borer often destroys the tree's outer rings. Consequently, cores taken from the scar itself are normally earlier than the actual date of scarring. The scar itself is also very hard and often difficult to penetrate. Dates for the trees are, therefore, only tentative, since some rings were almost certainly missed.

Twelve lithic artifacts were recovered from tree #3. With the exception of one debitage flake

and one core fragment, all the artifacts were recovered from the base of the scar itself. All of the stone artifacts were debitage or shatter debris. Eleven pieces of bone were recovered, ten of which were from the two quadrants in front of the scar itself. With one exception, all of the eleven pieces were from deer or comparably sized mammals, and capable of relatively heavy use. Six of these latter were long-bone fragments, and at least three separate animals were represented (one marmot and two deer). Other than the cut bone recovered at the base of tree #5, only 6 other pieces of bone were recovered from the rest of the site's excavation. Two of the pieces were polished. One of these (Figure 3) is:

a rib fragment from a large mammal. The lateral surface of the bone has been used as a tool, resulting in extreme polish. No striations were visible on the polished areas which indicates that the tool was used on a soft, malleable surface. Although the specimen is a tool and was used repeatedly, it was not a formally shaped tool, but rather one of expediency.

(Struthers 1992:147).

A second bone tool is a rib fragment from a large mammal. It has distinct polishing at one end, and may have been used in a manner similar to that of the first piece. While the back of the tree was more disturbed by root activity than the front, the heavy bias of the distribution of both stone artifacts and faunal pieces in front of the scar suggests that sampling error was not its cause.

Scarred Tree #5 was excavated in a manner similar to that of Tree #3. The exception was that Layer 3 was thinner in #5, and it was not necessary to further divide the stratum. The maximum depth of the excavations was 18 cm below the ground surface. Four lithic artifacts were located, three of which were at the base of the scar itself. In addition, a piece of historic worked glass, 1.7 cm in length, which exhibited use-crushing along one edge was found. One bone tool, made from a deer left calcaneum, was found on the side of the tree opposite to the scar (Figure 3). There is a cut mark on the proximal end 0.5 cm long. On the axial side there is evidence of polishing approximately 1 cm long x 0.5 cm wide.

Excavations demonstrated that prehistoric artifacts and historic artifacts occurred to the contact with Stratum 3, the sterile yellow-brown clay loam. Unlike the previous scarred tree excavations, no bone was recovered from 93-1 Scarred Tree. Our initial assessment about there not being a pre-existing archaeological site at this location came into doubt. Therefore, a 1m x 1m test unit, Test Unit 1, was placed west of the Scarred Tree to determine if buried artifacts occurred beyond the limits of the scarred tree. Artifacts were recovered from all excavated levels.

Discussion

Given the type and location of polishing found on the two bone tools found with tree #3, as well as the high density of bones at the base of the scar, we tentatively conclude that the bone was used either to remove the bark itself, or, more likely, to help strip the cambium from the detached bark. The worked bone at tree #5 is less easy to interpret; nevertheless, its general association with the tree suggests that it may have served a similar purpose. Bone would be easily available as part of Native peoples' regular subsistence activities, or could be taken from naturally occurring kills. The worked glass is consistent with its use in the removal of bark and/or cambium.

More problematical is the relatively high density of chipped stone artifacts at the base of tree #3 and, to a lesser extent, at the base of tree #5. It is possible that this association is coincidental, in that the scarred tree just happened to grow over an existing lithic scatter. However, this explanation is weakened by the fact that the vast majority of the artifacts is on the side of the tree that contains the scar. Moreover, Martorano (1988:10) has identified ragged stone cuts on some trees. Although no such evidence was noted on the trees reported herein, there is no reason to expect such cuts on *all* trees associated with a stone tool kit. Wilke (1988:16-17), similarly, has found basalt chisels and hammerstones in association with trees scarred by the removal of bow staves in western Nevada.

Many archaeologists have assumed that the historic period witnessed the very rapid abandonment of indigenously produced artifacts in favor of those of European manufacture. A corollary of this assumption is that any association between stone tools and historic goods must, therefore, be spurious, and a review of most site reports dealing with this period of contact would probably bear out this assumption. However, the excavation of these trees allow us to look at this association from a different angle. It can be hypothesized that these artifacts were, in fact, in direct contextual association with the scarring of the tree itself. If this is the case, interesting avenues for

further investigation are opened up.

It is possible that the stone tools were made by the same group who scarred the tree, or that the precise location for the scarring activity was chosen because there was an existing prehistoric site, with a supply of chipped stone artifacts that could readily be used for cambium removal and preparation. If this is the case, it can be hypothesized that the use of *older* stone artifacts, and/or the manufacture of stone tools using traditional technologies, by Native Americans who presumably had great access to European goods at the end of the 19th century may be explained by either functional reasons (access to such artifacts on the existing archaeological site required very little expenditure of energy) or by symbolic reasons, in that there was a structural historicity to the use of these artifacts that continued into the historic period.

In pursuing these hypotheses, we recommend that the excavation of scarred trees become a more common feature in both mitigation- and research-oriented studies, and that future work be directed to examining the degree of correlation between scarred trees and prehistoric sites, especially those that have quantities of chipped stone tools. Examining the prevalence of traditional stone technologies during the historic period opens up interesting speculation regarding the very nature of the abandonment and retention of different traditional technologies, speculations that are of wider interest than simply understanding the nature of scar manufacture and use.

It is important to stress that the excavation of these trees was greeted with much interest and enthusiasm by the Southern Ute high-school students who excavated tree #5 in 1992. They felt, perhaps for the first time, that archaeology could make a contribution to their understanding of their own tribe's history and culture. If this excavation has in some small way broken down some of the barriers of mistrust that Native Americans have, *with some justification*, erected against archaeology, then a significant step in the right direction has been taken. We note with satisfaction that at least one Ute tribal member involved with the excavation is now teaching the scarring of trees to younger tribal members, and this is partially attributable to the work that we have just described.

Clearly, the excavation of three scarred trees, two of which are on the same archaeological site, does not allow many firm conclusions. However, we are encouraged by the results so far and suggest that further excavations of such trees will increase the power of anthropological inferences on this resource and add to our understanding of settlement and subsistence patterns of aboriginal peoples during the reservation period. We hope the results will encourage other researchers to

consider similar investigations throughout the montane west. The urgency of researching the potential of such a resource for archaeological information is only heightened by the continuing loss of these trees through natural death and commercial logging. We can predict with chilling certainty that *all* of these cultural resources will be gone in a very short time.

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