Date: 1/26/06
RESOURCES MANAGEMENT
Chief, RM
CH Archeology
Curation
GIS
Vanishing Treasures
Vegetation
Wildlife
Secretary
Library-File (last)
Planner

ENVIRONMENTAL ASSESSMENT

REGARDING THE MANAGEMENT OF

THE TSANKAWI UNIT,

BANDELIER NATIONAL MONUMENT

AUGUST 14, 2000

UNITED STATES DEPARTMENT OF INTERIOR
NATIONAL PARK SERVICE
BANDELIER NATIONAL MONUMENT

TABLE OF CONTENTS

I. INTRODUCTION 1

A. PURPOSE AND SIGNIFICANCE 2
1. Bandelier National Monument *2*
2. Tsankawi Unit *2*
B. LEGAL AUTHORITY AND REQUIREMENTS 8
1. Resource Protection *8*
2. Religious and Traditional Use *9*
C. PARK MISSION AND VISION 10
D. RESOURCE MANAGEMENT PHILOSOPHY AND GOALS 10
E. TSANKAWI UNIT MANAGEMENT PHILOSOPHY AND GOALS 11
1. Cultural and Natural Resource Management *11*
2. Visitor Management *12*
3. Administration and Facilities Management *12*
4. External Threats *13*
F. PLANNING/MANAGEMENT OBJECTIVES AND CONSTRAINTS 13
1. Action Objectives *13*
2. Action Constraints *14*
G. PRIMARY DECISION TO BE MADE 14

II. MANAGEMENT ISSUES AND CONCERNS 15

A. HARMFUL VISITOR BEHAVIORS 16
B. DAMAGE TO NATURAL RESOURCES 19
1. Vegetation Impacts Caused by Historic Land Use *20*
2. Watershed Impacts Caused by Historic Land Use *20*
3. Watershed Impacts Caused by NPS Administration *20*
C. DAMAGE TO AND LOSS OF CULTURAL RESOURCES 21
1. Archeological Site Impacts Caused by Historic Land Use *21*
2. Cavate Impacts Caused by Accelerated Natural Processes *21*
3. Prehistoric Trail/Cavate Impacts Caused by NPS Administration and Visitors *21*
4. Archeological Site Impacts Caused by Visitors *22*
5. Cultural Landscape Condition *22*
6. Traditional Cultural Properties *23*
C. EXTERNAL THREATS 23
1. Environmental Aesthetics *24*
2. Use of Adjacent Lands *28*
D. NATIVE AMERICAN PERSPECTIVE 34
1. Significance of the Tsankawi Unit from the Puebloan Perspective *35*
2. Critical Management Issues from the Puebloan Perspective *35*
3. Alternatives Suggested to Address Critical Management Issues *36*

III. ACTION ALTERNATIVES 39

A. NO ACTION ALTERNATIVE 39
1. Manage Visitor Activities/Behaviors *39*
2. Inform and Educate Visitors *40*
3. Protect Public Health and Safety *40*
4. Enforce Laws and Regulations *41*
5. Maintain Tsankawi Mesa Loop Trail *41*
6. Maintain Signs *41*
7. Maintain Built Facilities *41*
8. Do Not Maintain the Parking Area *42*
9. Manage Resource Conditions *42*
10. Regularly Consult with Affiliated Tribes and Comply with NAGPRA *42*

B. IMPLEMENT TSANKAWI MANAGEMENT PLAN ALTERNATIVE 43
1. Proposed Definite Actions *43*
2. Proposed Discretionary Actions to Restore & Maintain Naturally Functioning Ecosystems *47*
3. Proposed Discretionary Actions to Decrease Adverse Resource Impacts through Visitor Management *54*
C. ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED ANALYSIS 68
1. Restrict Visitation to Ranger-Guided Tours Only *68*
2. Staff the Tsankawi Unit with Personnel from the Pueblo of San Ildefonso *68*
3. Remove the Ladders to Tsankawi Mesa and Close the Mesa to Public Access *68*
4. Restrict Hours of Operation to be Commensurate with Staffing Levels *68*
5. Close the Tsankawi Unit to All Visitor Use *68*
6. Transfer Ownership of the Tsankawi Unit to the Pueblo of San Ildefonso *68*
7. Construct Tsankawi Pueblo Viewing Platform Outside of the Archeological Site *69*

IV. AFFECTED ENVIRONMENT **70**

IV. ENVIRONMENTAL CONSEQUENCES OF IDENTIFIED ALTERNATIVES **71**

A. NO ACTION ALTERNATIVE 72
B. IMPLEMENT TSANKAWI MANAGEMENT PLAN ALTERNATIVE 74
1. Impacts of Proposed Definite Actions *74*
2. Impacts of Proposed Discretionary Ecosystem Restoration Actions *77*
3. Impacts of Proposed Discretionary Visitor Management Actions *79*
C. CUMULATIVE IMPACTS ANALYSIS 81
1. No Action Alternative *82*
2. Implement Tsankawi Management Plan *84*

VII. CONSULTATION AND COORDINATION **87**

A. DOCUMENT PREPARERS AND CONTRIBUTORS 87
B. INTERNAL CONSULTANTS 87
C. NATIVE AMERICAN CONSULTANTS 87
D. STATE HISTORIC PRESERVATION OFFICE 88
E. U.S. FISH AND WILDLIFE SERVICE 89
F. OTHER EXTERNAL CONSULTANTS 89
G. DISTRIBUTION LIST 89

REFERENCES CITED **91**

APPENDIX A – ENVIRONMENTAL SETTING **103**

A. GEOGRAPHY 103
B. CLIMATE 104
C. GEOLOGY 104
D. TOPOGRAPHY 105
E. HYDROLOGY 106
F. SOILS 109
G. VEGETATION 109
H. WILDLIFE 110

APPENDIX B – CULTURAL SETTING **113**

A. THE PLACE 113
B. PREVIOUS ARCHEOLOGICAL AND ETHNOGRAPHIC STUDIES 113
C. PREHISTORIC PERIOD (CIRCA 10000 B.C.-A.D. 1540) 115
1. Paleo-Indian Period (circa 10000-5500 B.C.) *115*
2. Archaic Period (circa 5500 B.C.-A.D. 600) *115*
3. Developmental Period (A.D. 600-1200) *116*
4. Coalition Period (A.D. 1200-1325) *116*
5. Classic Period (A.D. 1325-1600) *117*

D. Prehistoric Archeological Resources 118
1. Pueblos *119*
2. Cavates *119*
3. Talus Houses *120*
4. Surface Finishes, Petroglyphs, and Pictographs *120*
5. Trails, Stairs, and Hand-and-toe Holds *120*
6. Water Control Features *121*
7. Surface Artifacts *121*
8. Disturbed Areas *121*
E. History and Historic Land Use (A.D. 1600-1950) 121
1. Spanish Period (1600-1821) *121*
2. Mexican Period (1821-1848) *125*
3. United States Territorial Period (1848-1912) *125*
4. United States Statehood Period (1912-1950) *127*
F. Historic Archeological Resources 133
1. Petroglyphs and Inscriptions *133*
2. Duchess Castle *133*
3. Campsites *133*
4. Animal Husbandry *133*
5. Abandoned Roads *134*
6. Disturbed Areas *134*
G. Modern Period (A.D. 1950-present) 134
1. 1950-1969 ..... *134*
2. 1970-1989 ..... *135*
3. 1990-2000 ..... *139*
H. Cultural Aesthetics – Continuation of Traditional Uses 140

APPENDIX C – MANAGEMENT SETTING 143

A. Parking Area 143
B. Structures 143
C. Trails 144
D. Fences 144
E. Signs 144
F. Self-guiding Trail Pamphlet 145
G. Visitor Use 145
1. Visitors Needs *146*
2. Accidents and Injuries *146*

APPENDIX D – APPLICABLE LAWS, REGULATIONS, EXECUTIVE ORDERS, DIRECTIVES, POLICIES, AND GUIDELINES 149

A. Federal Laws 149
B. Federal Regulations 149
C. Federal Executive Orders 149
D. State of New Mexico Laws 150
E. National Park Service Director's Orders, Policies, Guidelines 150

APPENDIX E – OTHER SOURCES OF INFORMATION 151

A. Bandelier GPRA Strategic Plan 151
B. Bandelier Resource Management Plan 151
C. Tsankawi and Frijoles Canyon Development Concept Plans 151
D. Environmental Management Committee Recommendations 151
E. Data Gap Identification 151
F. Professional Staff Recommendations 152
G. Tsankawi Project Scope of Work 152
H. Tsankawi Mesa Trail Preservation Study 152
I. Tsankawi Unit Watershed Condition Survey 152

J. Tsankawi Unit Preliminary Soil Survey 152
K. Cultural Landscape Inventory 152
L. Cultural Resource Site/Feature Inventories 153
M. Cultural Resource Preservation Study 153

APPENDIX F – BANDELIER NATIONAL MONUMENT RESEARCH POLICY 155

APPENDIX G – TSANKAWI UNIT TRAILS INVENTORY 157

APPENDIX H – TSANKAWI UNIT 1999 SIGN INVENTORY 159

LIST OF FIGURES

FIGURE 1: BANDELIER NATIONAL MONUMENT AND VICINITY 3
FIGURE 2: TSANKAWI UNIT AND VICINITY 5
FIGURE 3. WATERSHED CONDITIONS 17
FIGURE 4: PROPOSED LAND OWNERSHIP BOUNDARY CHANGES 29
FIGURE 5. PROPOSED LOS ALAMOS - SANTA FE ROAD OPTIONS 31
FIGURE 6. EXPERIMENTAL VEGETATION RESTORATION TREATMENT AREAS 49
FIGURE 7. FUTURE VEGETATION RESTORATION TREATMENT AREAS 51
FIGURE 8. VEGETATION MAP AND PRESCRIBED FIRE BURN UNITS 55
FIGURE 9. TRAIL REROUTE AND ASPHALT TRAIL TO BE REMOVED 57
FIGURE 10. TRAIL REROUTES THROUGH TSANKAWI PUEBLO 63
FIGURE 11. MASONRY/EARTHEN VIEWING PLATFORM 65
FIGURE 12. SCAFFOLD VIEWING PLATFORM (DESTINATION STYLE) 66
FIGURE 13. SCAFFOLD VIEWING PLATFORM (LINEAR STYLE) 67
FIGURE 14. PRIMARY WATERSHEDS 107
FIGURE 15. LAND OWNERSHIP, 1906 123
FIGURE 16. BANDELIER NATIONAL MONUMENT, 1916 129
FIGURE 17. BANDELIER NATIONAL MONUMENT, 1932 130
FIGURE 18. BANDELIER NATIONAL MONUMENT, 1963 137

I. INTRODUCTION

The Tsankawi Unit is an approximately 320 ha (790 ac) detached section of Bandelier National Monument and is currently surrounded by Federal and tribal lands (Figures 1 and 2). See Appendix A for a detailed description of the environmental setting. The Monument was established in 1916 to protect cultural resources created by Ancestral Puebloans between circa A.D. 1150 and 1550. See Appendix B for a detailed description of the cultural history and current setting. The National Park Service (NPS) has administered the unit since 1932. See Appendix C for a detailed description of the current management setting.

Throughout 95 years of federal administration, the Tsankawi Unit area has lacked a long-term preservation philosophy or vision (NPS 1995a). The primary purpose of this plan is to provide direction for the long-term preservation of the cultural resources of the unit and for the natural matrix in which these resources are embedded. The people of the Pueblo of San Ildefonso consider the Tsankawi Unit as one of their former homes, the one of the most recently occupied before tribal members migrated to their current location along the Rio Grande. This living cultural link to the land and its resources is vitally important to both the NPS and the people of the Pueblo of San Ildefonso. An essential goal of this plan and supporting environmental assessment process is to develop an understanding with affiliated tribes (particularly those that continue to use these lands) on how to manage the Tsankawi Unit consistent with NPS mandates and goals.

The Tsankawi Unit is popular with organized tour groups and well known to local residents, primarily because of the prehistoric trails worn into the bedrock, a large, mostly unexcavated, pueblo, and approximately 300 cavates (rooms excavated into soft bedrock). Visitors also enjoy the unit's relatively undeveloped nature, their ability to experience a sense of relative tranquility in the modern world, and the unit's wide-ranging views.

To test a potential solution to chronic funding shortfalls and many other visitor use and resource management problems, Congress authorized a Recreational Fee Demonstration Program in the Omnibus Consolidated Rescissions Act of 1996 (P.L. 104-134, 315, as amended by P.L. 104-108 and P.L. 105-18). This allows some parks to experimentally retain 80% of the fees they collect specifically to address visitor facility and resource protection deficiencies. Partial implementation of the proposals outlined in this document has been approved as a "fee demonstration project." One of the purposes of this document is to provide a framework and direction for the allocation of project dollars in the short term – current spending authority for approved fee demonstration projects expires in 2002.

This document establishes baseline conditions and examines resource threats, desired future conditions, and management goals and principles to slow deterioration of the cultural resources in the Tsankawi Unit through ecosystem stabilization and site-specific cultural resource fabric treatments. It also prescribes management actions to address identified routine operational issues and how desired future conditions will be reached. This document explores management alternatives to resolve management issues that have the potential to alter the "human environment" and/or park values. This Plan is prescriptive, but also permits flexibility, since the Tsankawi Unit's preservation problems do not have simple solutions and may be affected by unforeseen factors. Refinements in planned actions will be made as more is learned through the experimentation and monitoring process.

The National Environmental Policy Act (P.L. 91-190, 83 Stat. 852, 42 U.S.C. §4321 *et seq.*, as amended) opened the Federal decision-making process to public scrutiny and input. The purpose of this document is to facilitate public dialog on how to manage the Tsankawi Unit of Bandelier National Monument for the next 10 or more years. This environmental assessment and management plan contains data pertinent to the pending decisions.

A. PURPOSE AND SIGNIFICANCE

1. Bandelier National Monument

Seven key factors contribute to the significance of Bandelier National Monument:

- A high concentration and wide variety of well-preserved archeological sites;
- The descendants of this prehistoric culture live in the area today and maintain their cultural and religious ties to the past through the area now encompassed by the park;
- Outstanding geologic features, which are part of the world-famous Jemez volcanic field;
- The diverse ecological resources in this relatively small area support intact ecosystems, many vegetation types, associated fauna, and the Bandelier Wilderness, all of which are managed to enable the functioning of natural processes;
- Visitors experience the inspirational qualities of past and present and the sense of solitude in an environment rich in archeological sites and wilderness values and in a relatively unaltered and scenic landscape;
- Outstanding natural and cultural research opportunities resulting from a relatively high integrity of resources and degree of resource protection;
- The Civilian Conservation Corps (CCC) historic district represents the largest concentration of CCC structures and furnishings in the National Park System and retains a high level of integrity.

2. Tsankawi Unit

The Tsankawi Unit is considered to be nationally significant and eligible for listing on the National Register of Historic Places (National Historic Preservation Act of 1969; Omnibus Bill of 1966). The significance and purpose of the Tsankawi Unit falls within the following topics:

Prehistoric Cultural Resources – The Tsankawi Unit contains and protects a high concentration of prehistoric cultural resources, which are generally well preserved in an unexcavated state. Bandelier National Monument was specifically created to preserve such sites and structural remains, which are of national, state, and local importance. The sites contained within the unit possess integrity of location, setting, design, feeling, and association that embody distinctive characteristics of Ancestral Puebloan occupation within the Coalition and Classic periods (circa A.D. 1150 to 1600). Characteristic workmanship and methods of construction of these pueblos and talus houses include tuff-block masonry walls, while cavates were excavated into tuff cliff faces. Associated petroglyphs and pictographs represent high ceremonial and artistic values. Such features evoke a sense of connection to previous inhabitants and the past. The unique nature of such resources is further indicated by the fact that Bandelier National Monument is the only major NPS unit that preserves materials documenting Ancestral Puebloan prehistory after A.D. 1300 (Powers and Van Zandt 1999:5).

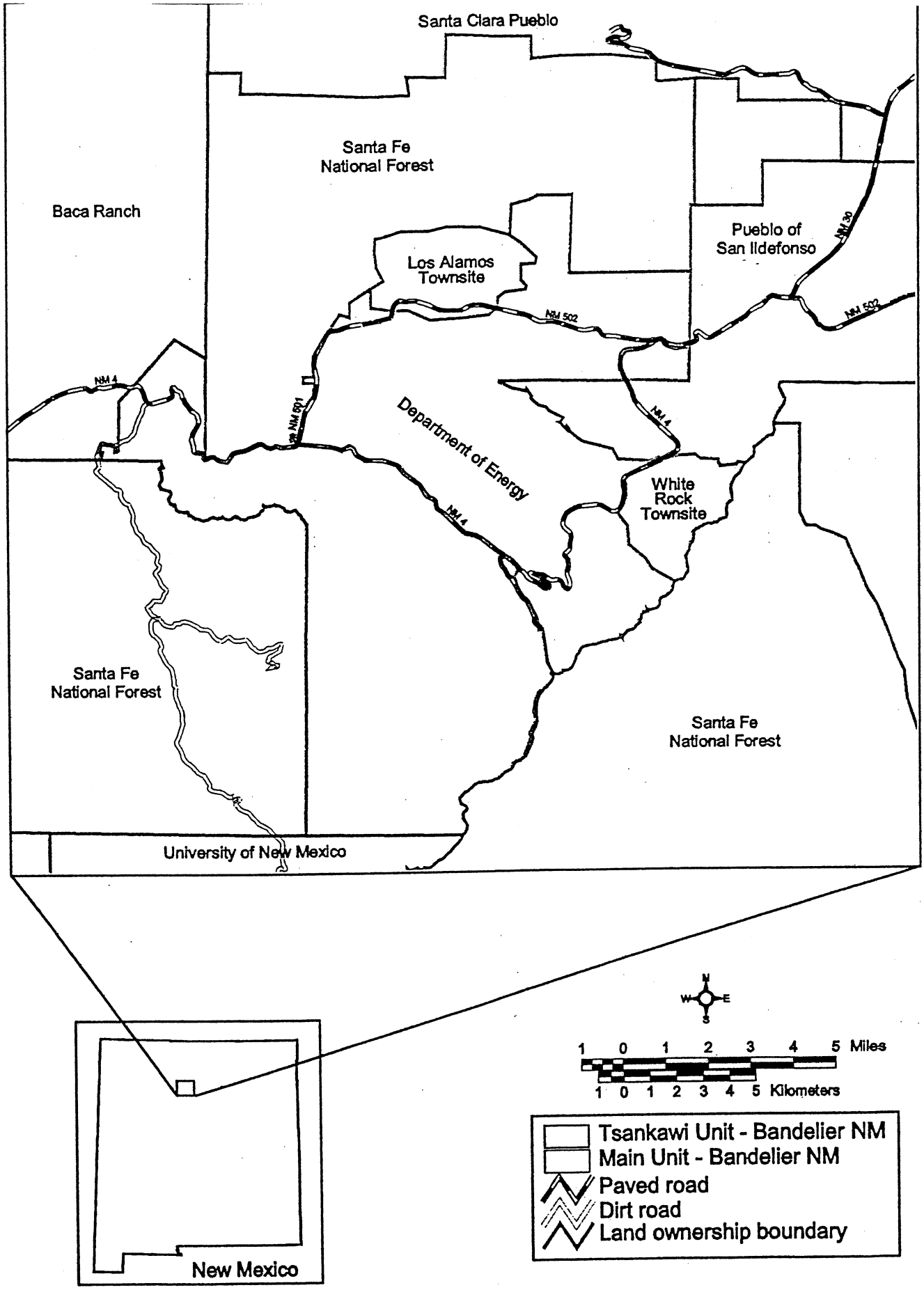


Figure 1: Bandelier National Monument and Vicinity

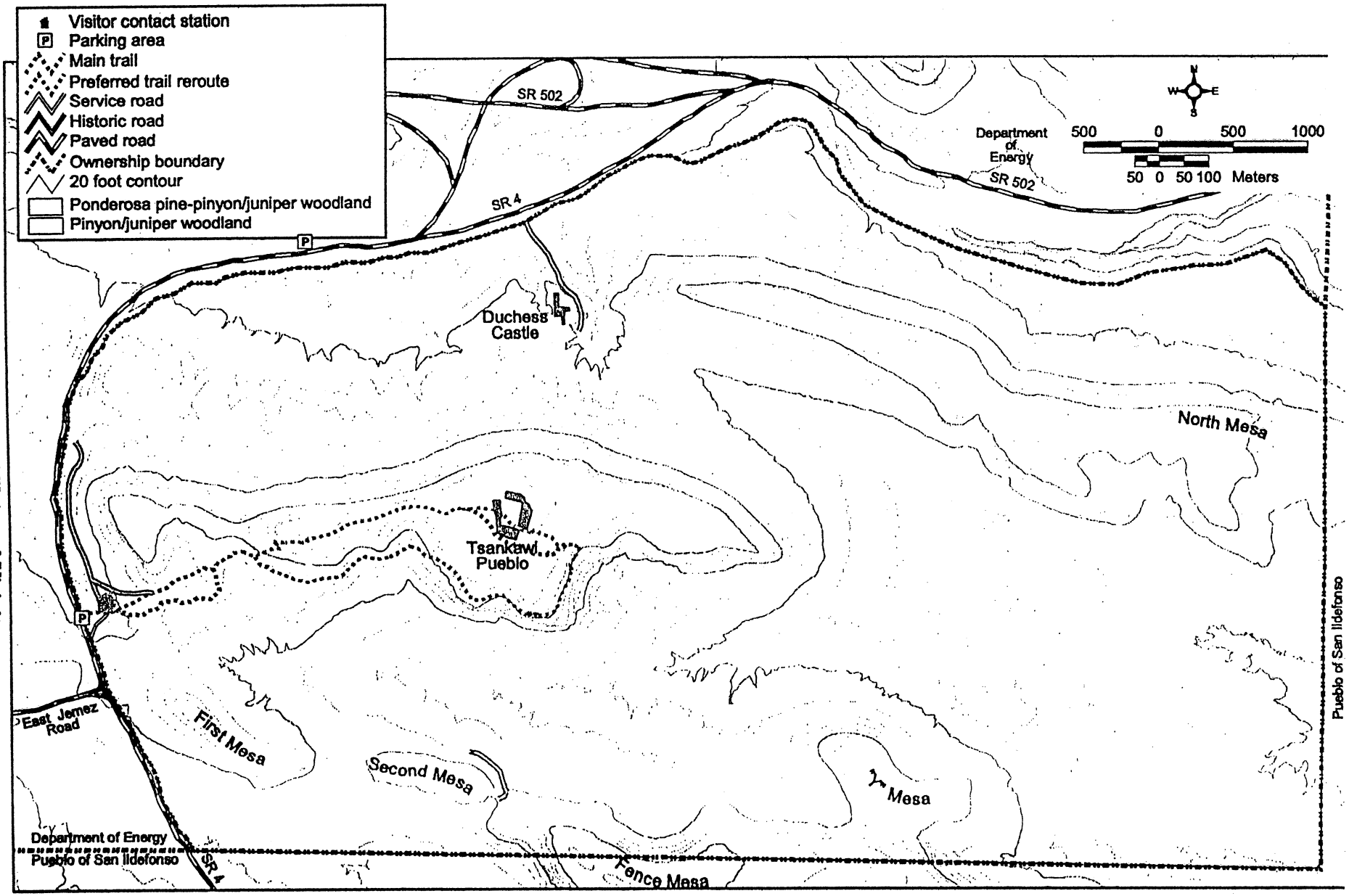


Figure 2: Tsankawi Unit and Vicinity

Historic Cultural Resources – Historic Puebloan pictographs (circa 1680s) and Hispanic inscriptions (date unknown, perhaps 1700s) are located within the unit. "Duchess Castle" is the historic Blumenthal and Dougan School, which operated during the summers from 1918 through 1929. Currently, the partial walls and foundations of a house and several outbuildings, kilns, and a cistern comprise the remains of the school near the unit's northern boundary. These structures were built in the Pueblo Revival Style around 1917 on the site of a Coalition Period pueblo, by craftsmen from the Pueblo of San Ildefonso (very likely descendants of the prehistoric inhabitants of Tsankawi) utilizing remnant prehistoric masonry blocks from the pueblo. Through the school and a School of American Archaeology program, Madame Vera von Blumenthal and her companion Rose Dougan (or Dugan) successfully sought to encourage a renaissance in local Puebloan ceramic production and design at the Pueblo of San Ildefonso. Such artists as Maria and Julian Martinez studied ancient pottery techniques there.

Natural and Scenic Resources – The Tsankawi Unit represents a highly scenic area near the eastern terminus of the Pajarito Plateau. The unit is placed within an austere landscape of deep steep-sided canyons, tabular mesas, and striking formations overlooking the Northern Rio Grande Valley and surrounded by high mountains. Settings within and views from the unit are highly scenic and inspirational, creating a sense of timelessness.

Traditional and Heritage Values – The Tsankawi Unit is of current critical importance to the cultural heritage, beliefs, customs, practices, and history of a living community of people – the *Tewa* Indians of New Mexico and Arizona – who are direct descendants of the prehistoric inhabitants and culture represented within the Tsankawi Unit and the surrounding area. *Tewa* people continue to live in the local area and region today, maintaining a continuity of use, cultural identity and heritage, religious and spiritual values, and traditional practices through this location. The Tsankawi Unit forms a key component in their living traditions and the belief that the spirits of their ancestors are guardians of Tsankawi and other sacred sites.

Diversity of Resources – While relatively small in area, the unit contains an extraordinary combination of prehistoric, historic, ethnographic, aesthetic, and biogeophysical resources as well as traditional, heritage, and religious values within a highly scenic landscape.

Public Education – A culturally and naturally rich context and knowledge of past and present conditions provide an opportunity to educate the public on: the fragility of resources within the region; the long-term consequences of historic land-use practices and intense modern visitor use; the deterioration of the natural and cultural landscape despite 68 years of NPS protection (e.g., absence of livestock grazing and fuelwooding); cooperative efforts to protect, stabilize, and restore the unit's resources and heritage values; and cross-cultural issues.

Research Potential – The unit's size and the type and condition of the cultural and natural resources make for interesting research opportunities. The unit contains natural resources and processes, which if studied, will likely yield useful information on low elevation pinon-juniper natural wildland fire frequency, paleoenvironmental conditions, soil erosion rates, and soil and vegetation recovery rates. The unit could serve well as a small laboratory for carrying-capacity research and for testing cultural and natural resource stabilization, restoration, and protection methods.

The Tsankawi Unit also contains resources likely to yield information on regional prehistory and history including: human land-use practices and effects, human-ignited wildland fire frequency,

cultural chronology, architecture and agricultural practices, domesticated animal management, human communications, economic and settlement patterns, political and social organization, demographics and trade, and human adaptation to environmental, cultural, and political change. [1]

B. Legal Authority and Requirements

Public laws and regulations; executive orders; Department of Interior directives, standards affect management of Bandelier National Monument, and implementing policies; and NPS director's orders, policies, and guidelines. Those deemed most relevant to objectives, constraints, and decisions to be made in this document are listed in Appendix D.

1. Resource Protection

The establishing legislation of the NPS (NPS Organic Act), charges the Service to: "promote and regulate the use of the Federal areas known as...monuments...to conserve the scenery and the natural and historic objects and the wild life therein...in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 U.S.C. § 1, 1988). This dual mandate, to protect and preserve[2] while providing for visitor enjoyment, is a challenge. Finding a balance between use and preservation is the purpose of this document. It is important to note, however, that case law (e.g., *Utah Shared Alliance, et al. v. Southern Utah Wilderness Alliance and Dabney* 1998 WL 703956 [D. Utah]; *Bicycle Trails Council of Marin v. Babbitt* 82 F.3d 1445, 1453 [9th Cir. 1996]; *National Rifle Association v. Potter*, 628 F. Supp. 903, 909, 912 [D.D.C. 1986]; *Michigan United Conservation Clubs v. Lujan* 949 F.2d 202, 206-207 [6th Cir. 1991]), public law (e.g., Redwood National Park Act [P.L. 90-545, 1988]; Archeological Resource Protection Act [P.L. 96-95, 1979]; National Parks Omnibus Management Act [P.L. 105-391, 1998]), and NPS directives and policies (e.g., NPS 1994a; NPS 1988) relative to achieving this balance strongly favors resource protection over providing for visitor "enjoyment." In other words, resource protection is the "overarching concern."

Natural resources in park areas will be managed with a concern for fundamental ecological processes as well as for individual species and features (NPS 1988). Interference with natural processes in park natural areas will be allowed only when directed by the United States Congress or to restore the function of native ecosystems that have been disrupted by human activity. NPS natural resource management policy (NPS 1991) dictates that lands and habitats be managed in a manner to "maintain, rehabilitate, and perpetuate their inherent integrity."

The enabling legislation of most units of the National Park System gives each unit its own particular purpose and objectives. Presidential Proclamation No. 1322 (Stat. 1764:1916), which created Bandelier National Monument in 1916, stated that:

---

[1] It should be noted that extant Pueblo peoples generally do not want their prehistoric, historic, or current beliefs, customs, or lifeways "researched," certainly not published. According to Pueblo custom, information on these topics is usually considered sacred and should not be disclosed to persons outside the Pueblo community (Myron Gonzales, Pueblo of San Ildefonso tribal representative, pers. comm. 1999).

[2] In this context and elsewhere in this document, to "preserve" natural and cultural resources means to insure to the extent practical that they continue to persist in distribution, amount, and condition free of industrial-age human influence. In other words, the resource in the presence of natural agents and rates of change since Ancestral Puebloans were resident on these lands is generally sustained.

> ...certain prehistoric aboriginal ruins...are of unusual ethnologic, scientific, and educational interest, and it appears that the public interests would be promoted by reserving these relics of a vanished people[1] with as much land as may be necessary for the protection thereof...

Further,

> The two reservations [Bandelier National Monument and Santa Fe National Forest] shall both be effective on the land withdrawn, but the National Monument hereby established shall be the dominant reservation, and any use of the land which interferes with its preservation or protection as a National Monument is hereby forbidden.

Cultural resources are protected under the Antiquities Act of 1906, the National Historic Preservation Act (Public Law 89-665, 80 Stat. 915-919, 16 U.S.C. §470 *et seq.*, as amended), and the Archeological Resource Protection Act (Public Law 96-95, 93 Stat. 174, 16 U.S.C. § 470a *et seq.*)

Park resources and the public's enjoyment of them are not limited to material relics but include such intangible elements as ambience, "atmosphere" and other conditions affecting the visitor experience, such as sound and visual intrusions from off-site. In other words, the total environment in which the resources and resource-related activities occur must be considered. Introduction of new impacts/intrusions on the national park area environment must be avoided or minimized. Protection of the quality of the visitor experience holds the same validity as a mission of Bandelier National Monument as the protection of the cultural and natural resources themselves (DOI 1990).

Bandelier National Monument and the Tsankawi Unit are considered eligible for listing on the National Register of Historic Places (Omnibus Bill of 1966). Activities with the potential to introduce visual, audible or atmospheric elements that are out of character with the property or alter its setting are considered "adverse effects according to 36 CFR 800.9(b)(3). The NPS is committed to seeking ways of avoiding or reducing adverse affects to cultural resources and landscapes (36 CFR 800.5[e]).

CA211 listed on NRHP

2. Religious and Traditional Use

The American Indian Religious Freedom Act (Public Law 95-341, 42 U.S.C. §1966), the Religious Freedom Restoration Act, and Executive Order 13007 "Indian Sacred Sites" mandate that Federal agencies support Native American religious activities on Federal lands. The Native American Grave Protection and Repatriation Act (Public Law 101-601, 104 Stat 3048, 25 U.S.C. §3001 *et seq.*) mandates that Bandelier National Monument consult with the All Indian Pueblos Council and/or individual tribes which have ancestral ties to the park with regard to repatriation of recovered or federally curated human remains, grave goods, and/or items of cultural patrimony.

Such laws, as well as NPS guidelines, directives, and policies (NPS 1988), enable associated and interested Native American groups to review and provide input on planned park management

[1] Now agreed to be the ancestors of present day Puebloan peoples.

activities which might affect religious and ceremonial activities, sacred materials or places, and/or other ethnographic resources located within the park.

C. PARK MISSION AND VISION

The mission of the National Park Service at Bandelier National Monument is to provide the means for the staff and the public to preserve, protect, understand, and enjoy the cultural and natural resources of the park through an integrated program where management activities support naturally functioning ecosystems consistent with cultural resource preservation needs.

Pursuant to the Government Performance and Results Act, the following mission statement, as developed by the entire park staff in 1993, guides park activities:

Our Mission...Your Mission
To preserve, protect, understand, and enjoy
the cultural and natural resources of
Bandelier National Monument.

The purpose of this mission statement is to focus management efforts on the same task. All park management decisions and actions should be measured against this mission statement.

The entire park staff developed the following vision statement in 1993:

> An exemplary, integrated program of cultural and natural resources management, focusing on both current and long-term needs, achieved in an innovative, sensitive, and balanced manner by an empowered professional work force dedicated to quality services, products and information.

The purpose of this vision statement is to frame how park staff wish to be perceived by their peers, other parks, cooperators, and the public.

D. RESOURCE MANAGEMENT PHILOSOPHY AND GOALS

The primary resource management goal for the park is:

> To preserve, protect, and manage cultural and natural resources in a manner that promotes self-sustaining environmental conditions and the information they represent, as they existed prior to industrial-age human influence. That is, following Ancestral Puebloan occupation of the area (after 1600), but prior to landscape-level livestock grazing and wildfire suppression (before 1870).

While precise information regarding the composition, structure, and appearance of the vegetation between 1600 and 1870 is rare, historical accounts from oral, written, and photographic records provide general impressions. Vegetation age-class and fire-history data can provide an even higher resolution of pre-1870 conditions (Bandelier National Monument 1999d:4).

Park managers will refer to the following general guiding principles and working strategies to accomplish Bandelier's mission, vision, and primary resource management goals. These

principles and working strategies are dynamic—may change as knowledge and experience are gained.

- We consider cultural and natural resource needs equally and holistically, fully integrating them at the professional and operational levels;
- We establish management action thresholds so that park management responses are consistent, ethical, and do not waste time;
- We ensure the protection of listed species and their habitat as required under the Endangered Species Act and NPS policy;
- We are committed to locating, documenting, and understanding all cultural and natural resources present in the park as well as the processes that affect them;
- We protect and process data in the same year it is collected;
- We support traditional cultural use of park resources by affiliated tribes as long as no Federal laws are violated and no use interferes with the primary resource management goals for the park;
- We view the entire watershed as the primary landscape or ecosystem management unit;
- We accept (and manage accordingly) that the Bandelier Wilderness is in need of assisted healing that will necessitate relatively short-term deviations from ideology as outlined in the 1964 Wilderness Act;
- We use prescribed and wildland-use fire as the primary agent of change, once ecosystems are restored to a natural, self-sustaining condition; and
- We take appropriate actions to prevent external threats from degrading the values, purpose, or significance of the park.

While the entire watershed is viewed as the primary ecosystem management unit, only one small complete watershed is fully contained within the Tsankawi Unit (Figure 14 in Appendix A). The remainder of the unit consists of partial watersheds that are shared with other management agencies that have different land and resource management mandates that sometimes conflict with those of the NPS.

E. TSANKAWI UNIT MANAGEMENT PHILOSOPHY AND GOALS

The Tsankawi Unit management philosophy statements below represent a synthesis of applicable legal requirements (see Chapter I B, Legal Authority and Requirements), tribal input (see Chapter II D, Native American Perspective), previous public input (NPS 1995a), and NPS management experience. An annotated summary of reports, documents, studies, meeting minutes and field notes, which were used to develop the Tsankawi Unit management philosophy and goals is available in Appendix E. The following proposed principles and goals specific to the Tsankawi Unit are presented here for public comment.

1. Cultural and Natural Resource Management

- Reasonable attempts will be made to treat and preserve the maximum amount of cultural resource fabric in place based on priority criteria established by park management with input from the Bandelier National Monument Tribal Consultation Committee.
- No attempt will be made to bring visitors to pristine[1] resource features.

[1] "Pristine" in this context is defined as: the resource retains the original qualities and appearance that developed as a result of Ancestral Puebloan occupation of the area (pre-A.D. 1600).

- Sensitive areas and species will be protected.

2. Visitor Management

- The Tsankawi experience should be "primitive[1]."
- The Tsankawi Unit will be interpreted, to the extent possible, from the Puebloan perspective.
- Visitors and staff should expect to take risks associated with a wild and primitive environment when they visit the unit. Basic safety and risk-related information will be provided as a cautionary note on the Tsankawi self-guided trail pamphlet, and possibly at a sign at the trailhead, but not through on-site signs. (Such current warning signs may be removed.)
- Visitors may be excluded from selected resources and areas.
- Enforcement of rules and regulations will be accomplished as much as possible through an educational presence.

3. Administration and Facilities Management

- The design of new or improved facilities will not cause an increase in visitation.
- Selected segments of prehistoric trails will be preserved if possible, for their experiential value to visitors and not for their fabric, which in some cases has already been lost.
- No new trails will be established outside of the proposed main trail reroutes.
- Only the most environmentally sensitive/friendly materials will be used to construct and/ or maintain facilities. Asphalt surfaces will be removed from the unit.
- Any new materials introduced for stabilization purposes and visitor management (with the exception of signs) will be compatible and blend with the adjoining prehistoric, historic, and natural fabric.
- Trail treads will be "out-sloped." Retaining walls are necessary and appropriate in some locations, but stone-lined paths should be removed to prevent channel erosion of trail treads.
- Interpretive messages will encourage visitors to "tread lightly" to minimize visitor-caused adverse affects on the resources.
- The Visitor Contact/Fee Station building may be relocated if funds become available. As part of this plan, the associated toilets may be relocated by 2002.
- The visitor parking area approved in the 1995 Tsankawi DCP may be constructed as planned if funds become available.
- Additional site-specific management actions not analyzed in detail in this document will receive compliance review and documentation under the National Historic Preservation Act (NHPA) and National Environmental Policy Act (NEPA). Management concepts approved through this planning/NEPA process may be implemented once site-specific concerns are adequately documented using the appropriate NEPA and or NHPA compliance document depending upon the nature of the proposed action. This plan/EA plus a "Finding of No Significant Impact" (FONSI), if applicable and approved by the Intermountain Regional Director, will serve as the philosophical and conceptual basis for additional analysis of potential actions and their impacts.

[1] "Primitive" in this context is defined as follows: the local landscape is uncultivated and relatively free of facilities, access to the area is naturally limited to foot traffic, and risk and solitude are highly valued as part of the human experience.

4. External Threats

To protect natural and cultural resources and the continued practice of traditional and religious use, and to promote a respectful, tranquil, and intimate visitor experience within the Tsankawi Unit:

- Bandelier National Monument will not encourage increased levels of visitation to the Tsankawi Unit through direct management actions (e.g., no advertising or promotion);
- Bandelier National Monument will continue to formally oppose new roads (e.g., Santa Fe-Los Alamos Road; see Chapter II C 2 b, below), changes in road/utility alignments/easements, residential and or commercial development, and any lessening of the current levels of natural and cultural resource protection on adjacent lands (e.g., transfer of DOE-administered lands to the County of Los Alamos; see Chapter II C 2 a, below), while simultaneously working with adjacent land owners to meet their cultural, resource management, and economic needs.

F. Planning/Management Objectives and Constraints

1. Action Objectives

The agency objectives that shall be met in this planning process and through implementation of the final plan are listed below. The decision-makers shall use these objective as the yardstick by which to measure the appropriateness of each action alternative.

a) Where reasonable, reduce cultural resource degradation to a natural[1] rate or slower.
b) Increase knowledge of the cultural and natural resources in the Tsankawi Unit and their link to adjacent lands, people, and systems.
c) Cause the native ecosystems to change toward pre-1870 conditions and affective processes.
d) Eliminate, as practical, non-native plants and animals.
e) Protect and facilitate continued religious and traditional use of the land and cultural features by affiliated tribal members.
f) Develop a mutually rewarding relationship with affiliated tribes and adjacent land managers to manage the unit consistent with NPS mandates, policies, and goals.
g) Facilitate a low level of visitor use, which does not cause culturally significant or sensitive resources to degrade.
h) Base management decisions and actions on defensible information.
i) Protect human health, safety, and Federal property to the extent reasonable in a natural environment managed for a primitive visitor experience.

[1] In this context and throughout this document "natural" and "naturally" are defined as: land retaining its prehistoric (pre-A.D. 1600) character and influence; and/or generally lacking the impacts of Industrial Age humans.

2. Action Constraints

Some actions are not permitted under current law or are unreasonable. A few of these are listed below because they are pertinent to this planning process:

a) It is unreasonable and inconsistent with NPS management objectives to identify and sign every potential or known hazard. Therefore, visitors and employees will continue to be exposed to all risks associated with a wild, natural environment designated for a primitive experience.
b) Threatened and endangered species and their habitat must be protected.
c) The NPS does not have sole authority to donate or transfer lands.
d) Bandelier National Monument must comply with Federal laws and regulations.
e) Bandelier National Monument actions are limited by current and projected funding appropriations and staffing levels.

G. Primary Decision to be Made

The primary required decision to be made is:

How will the NPS manage the Tsankawi Unit of Bandelier National Monument for the next ten years?

II. MANAGEMENT ISSUES AND CONCERNS

Although NPS areas represent islands of resource protection and relative stability, they are rooted within the history of past land use practices and are affected by present external forces. The Tsankawi Unit has been and continues to be impacted by anthropogenic changes on a landscape-wide scale. When left undisturbed over time, many impacted environments recover through natural processes. The Tsankawi Unit, however, does not fall within this category. The soils and piñon-juniper savanna of the Tsankawi Unit were notably fragile when previous land-use practices, particularly livestock grazing (1870s to 1932) and fire suppression (1910s to 1975), sent these resources into a declining spiral. It is the intent of this Plan to explore means for terminating this downward spiral and initiate unit-wide recovery.

The NPS management presence at the unit has been minimal over the past 68 years and primarily focused on managing visitors to Tsankawi Mesa. Little regard was given to the impacts caused by such visitation. For example, facilities were placed on steep, highly unstable slopes, visitors were tolerated in any and all cultural resources, including those with unprotected and highly fragile prehistoric surface finishes, and the route of the main visitor trail was established across prehistoric structural features and through fragile resource areas. Lack of staff and funds to protect the unit have been a chronic problem. Currently, the unit is patrolled by the NPS only about once a day due to limited staff and funding. Interpretative hikes are rarely given, again because of lack of sufficient staff and funds.

Through preliminary scoping and data collection, park management has identified the following primary issues affecting or with the potential to affect management of the Tsankawi Unit.

Natural Resources – Plants, animals, soils, and water quality have been and continue to be adversely affected by historic overgrazing, fuel wood collecting/logging, fire suppression, and visitor use. Since current conditions are the result of misuse of the land in historic times, corrective actions and their consequences are presented in this action plan.

Cultural Resources – Archeological sites protected under the National Historic Preservation Act and the Archeological Resource Protection Act have been and continue to be detrimentally affected by visitor use. Also, such sites have been and continue to be detrimentally affected by accelerated natural processes caused by former land uses. Cultural resource impact mitigation will require making some major changes to visitor use and the unstable landscape. Action alternatives and their consequences are described and analyzed in Chapters III and IV, respectively, of this document.

Proprietary Interest – The Pueblo of San Ildefonso has identified the Tsankawi Unit and its cultural resources as part of their ancestral heritage. This issue is addressed, in part, through regular consultation and a program designed to hire pueblo students to work on Tsankawi resource projects as long as there are project funds available. Since the NPS has already committed to these efforts, they are assumed to be a routine management activity in the no action and proposed action alternatives (Chapter II, Sections A&B).

Urban Growth/Other Development – Under Public Law 105-119, the U.S. Department of Energy (DOE) is mandated to transfer several land tracts it administers to the County of Los Alamos or the Pueblo of San Ildefonso. Any change in ownership of lands adjacent to the

Tsankawi Unit is likely to have an adverse impact on the NPS's ability to protect and manage those qualities identified as significant in the Tsankawi Unit. Alternatives for mitigating the probable impacts of development on adjacent lands are not included in this document. Currently, there is inadequate information on such development to propose meaningful management alternatives to respond to the threat. It should be noted, however, that lack of park base funds would severely constrain NPS response options.

These primary issues are given context in the following discussion. Detailed condition information and causative agents are outlined.

A. Harmful Visitor Behaviors

After acknowledging its inability to protect the previous, larger Otowi Unit (Von der Lippe and Widmer 1960), the NPS accepted the deletion of much of this area from the Monument in 1963. Subsequently, the NPS did not adequately protect resources in the retained, smaller, Tsankawi Unit, due to chronically inadequate levels of funding and staff. The Tsankawi Unit suffered from "benign neglect" as a result of its distance from park headquarters and insufficient funding levels. In time, managers came to rely on volunteer hosts to provide a minimal caretaker presence.

While the self-guiding trail pamphlet and trailside signs instructed visitors to stay on the main trail and not disturb artifacts, these admonitions could not be enforced. Reluctantly, NPS managers came to accept an unrestricted situation, which allowed visitors to roam and explore throughout the Tsankawi Unit during daylight hours generally free of constraints and entrance fees. As a result, social (volunteer) trails and resource damage proliferated.

Apparently, the first formal attempt to collect entrance fees at the Tsankawi Unit during the summer of 1989 resulted in some problems. In the fall of 1989, after the volunteer hosts left for the season, several incidents of vandalism occurred, including a break-in and vandalism at the Visitor Contact Station. As a result, the unit was closed to visitation for several months during the winter and early spring of 1990. During the closure, an enforcement response to trespassing individuals resulted in a ranger assault. Although damage to NPS facilities and lack of funding were cited as the justification, the closure created a backlash in the local community and little support for the park's decision. As a result, the unit was reopened that spring (Dale Coker, Ed Greene, and John Lissoway, personal communications, 2000).

In the early 1990s, input associated with the Tsankawi Development Concept Plan (NPS 1995a) indicated the public's desire to be unrestricted in its exploration of the unit. Limited NPS funding and staffing levels left few other options. Seeking to promote more of an aesthetic and emotional experience rather than an intellectual one, the NPS managed the unit as a "discovery site" (NPS 1992), which allowed visitors to walk and climb wherever they wished. In the intervening eight or so years, the entrances, floors, and walls of many cavates have been worn further by mechanical abrasion from visitor traffic. The network of secondary social trails developed throughout the unit also appears to have expanded and become more entrenched, although no data have been collected to verify this observation.

Vandalism to management facilities has occurred in the past, but is actually quite rare. The former Visitor Contact/Fee Station and restrooms were damaged in 1999, but no reports of damage have been received since then.

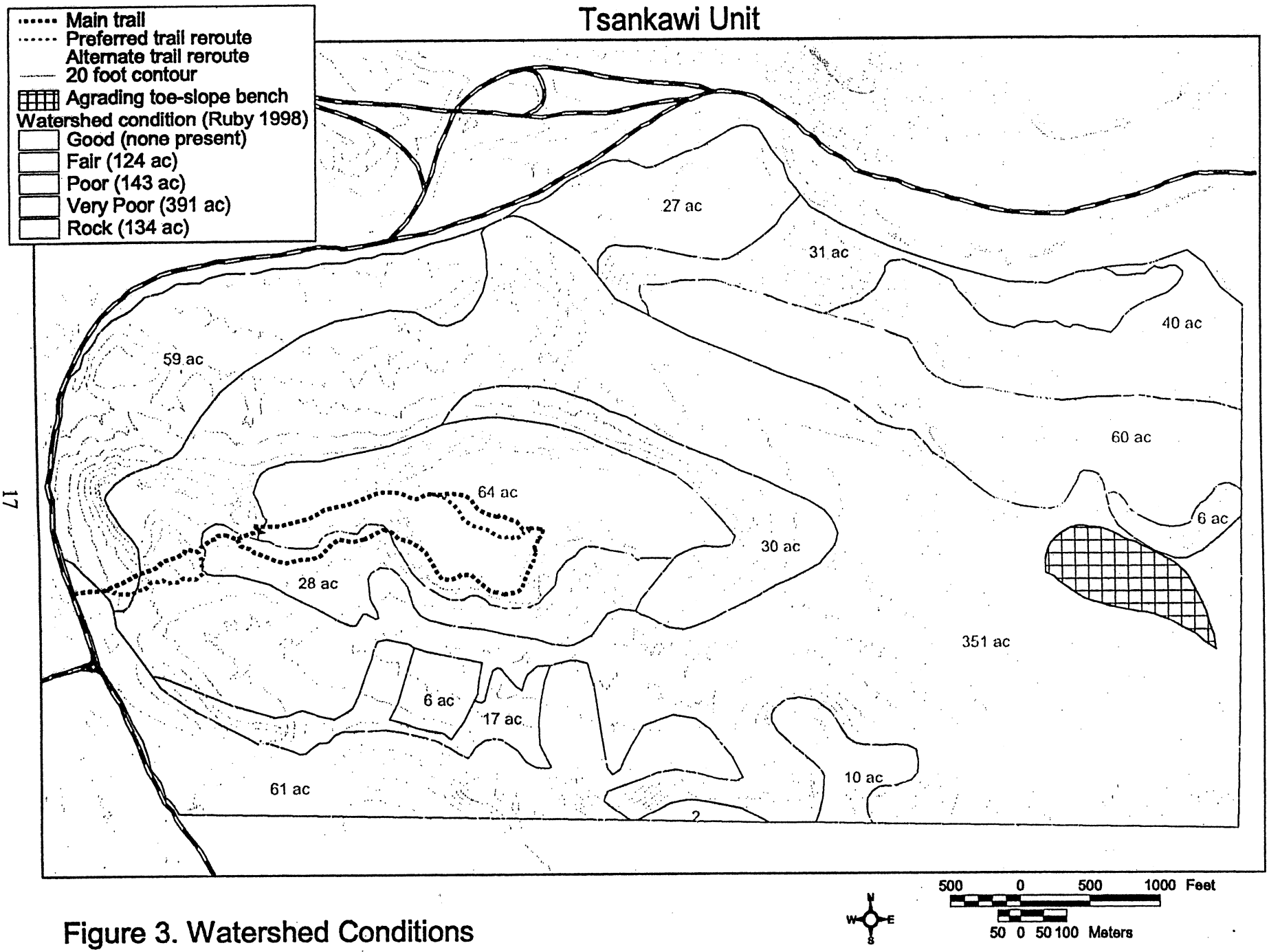


Figure 3. Watershed Conditions

B. Damage to Natural Resources

The height of the prehistoric occupation of the Tsankawi Unit, between the late A.D. 1100s and the late A.D. 1500s, represented a residential complex occupied by an estimated 400 to 600 Ancestral Puebloans. The earliest notable human-induced impacts in the area most likely began around A.D. 1200, when local wildlife and vegetation were utilized to support an increasing number of regional human hunter/gatherers. In particular, the vegetation was exploited or disrupted for foodstuffs, structural roofing materials, fuelwood, and agricultural fields. Fire frequency and tree density may have been significantly affected by prehistoric land use. After A.D. 1600, woody plants likely spread into fallow agricultural fields (Bandelier National Monument 1999d:4).

During Spanish (1600-1821) and Mexican (1821-1848) administrations of the region, the widespread exploitation of natural resources increased as wood collecting intensified and livestock grazing and logging were initiated and expanded through a system of land grants and open use of communal areas.

These earlier impacts, however, were dwarfed by the resource damage that occurred during the United States administration of the Territory (1848-1912) and State (post-1912) of New Mexico. During the 1870s, this involved intensive domestic livestock grazing, especially sheep, significantly increased woodcutting and logging, and suppression of natural fires (Allen 1989). Such practices continued until NPS administration of the Tsankawi Unit began in 1932. The complete fire exclusion policy initiated by Federal agencies in the 1910s continued into the 1980s.

The legacy of historic livestock-caused overgrazing and fire suppression has severely altered the inherent integrity and environmental homeostasis of the Tsankawi Unit (Allen 1989). Associated environmental damage is continuing in an on-going, unnatural, chain reaction (Davenport *et al.* 1998). In a downward spiral, less vegetative ground cover leads to increased soil erosion, bare soil, and watershed damage, which results in less vegetative ground cover, etc. Despite the termination of livestock grazing around 1933, the Tsankawi Unit vegetation has demonstrated little capacity to recover without human intervention (Chong 1992). Sixty-eight consecutive years of NPS protection has shown that, once vegetative disruption reaches a certain threshold within this fragile environment, spontaneous self-recovery is highly unlikely.

Recent soil erosion studies of the piñon-juniper vegetation community suggest an unsustainable rate of soil loss (Wilcox *et al.* 1996a, 1996b). Within the main unit of Bandelier National Monument this has been estimated at 1.0 cm (0.4 in) of soil lost per decade in tree interspaces (Bandelier National Monument 1999c). While this rate may be different within the Tsankawi Unit, it remains a leading cause of ecosystem disruption and habitat loss.

1. Vegetation Impacts Caused by Historic Land Use

Historic overgrazing decimated the grasses and forbs. As a result, areas that were previously grassland or piñon-juniper savanna were invaded by piñon and juniper trees. The absence of fine fuels prevented the spread of natural fires that would have encouraged ground cover vegetation and discouraged the establishment of young trees. An increased density of drought tolerant piñon and juniper trees (species that out-compete shallow-rooted grasses and shrubs), prevented the recovery of ground cover vegetation. As the trees absorbed and transpired soil moisture, the unprotected soils eroded away, infiltration of precipitation decreased, and the local water table lowered. Under such conditions, the previous forb and grass density could not reestablish. These factors have resulted in a decrease in biodiversity, a vegetation community shift to piñon-juniper woodlands largely devoid of ground and shrub vegetation on the mesas and slopes, and ponderosa-piñon-juniper woodlands in some drainage bottoms.

2. Watershed Impacts Caused by Historic Land Use

A recent hydrologic survey (Ruby 1998) determined that 50% of the Tsankawi Unit is in very poor watershed condition (Figure 3). Many watersheds in the unit have extensive areas of bare or sparsely vegetated soil. In some areas, an estimated 50 to 260 cm (20 to 100 in) of soil have eroded away, removing all of the life-giving "A horizon" and a portion of the "B horizon" subsoil in areas with weak to no "C horizon" formation (Ruby 1998:12, 14, 15). Exposed coarse B and C-horizon soils lack sufficient organic content to allow most plants to reestablish and prosper in a dry arid environment. Extensive loss of the organic topsoils in piñon-juniper woodlands may be irreversible, but research in Bandelier and elsewhere (Chong 1993, 1994; Jacobs and Gatewood 1999; Loftin 1999) has demonstrated that native shrubs, grasses, and forbs can recover and thrive if more favorable moisture and microclimatic conditions at the soil surface are created.

3. Watershed Impacts Caused by NPS Administration

Placement of facilities, trails, and impermeable asphalt surfaces in some areas of the unit has channeled runoff, triggered major gully formation and soil loss, and downcut drainages.

Seasonally, visitors to Tsankawi have access to two flush toilets or two chemical toilets adjacent to the Visitor Contact/Fee Station and host-site (Appendix C). The current toilet location is on the toe of an actively eroding slope and the topography was previously altered to level the toilet site. To create the flat area, the NPS built a large berm that diverts and concentrates runoff. The concentrated runoff is rapidly eroding the soils around the north wall of the Visitor Contact Station.

The flush toilets must be shut down during the winter to prevent freezing of the pipes and the associated septic tank has to be emptied regularly. Additionally, water must be imported for the chemical toilet holding tanks. This situation creates extra work for maintenance staff. It is also deemed inappropriate to have flush toilets in an arid environment where water-free sewage management alternatives are available.

C. Damage to and Loss of Cultural Resources

1. Archeological Site Impacts Caused by Historic Land Use

Alteration of the natural soil matrix and processes described above (Chapter II A 2. Watershed Impacts) has caused damage to and loss of cultural resource sites at a landscape scale. Soils hold archeological materials in place. Soil disturbance mixes stratigraphic deposits, destroys chronological context, and diminishes site integrity. Spatially and temporally diagnostic artifacts are washed down-slope, often across other sites. Ultimately such artifacts are carried into canyons and drainages, where they are transported even farther away and/or destroyed. Such events eliminate the information-yielding potential of the affected cultural resource sites.

2. Cavate Impacts Caused by Accelerated Natural Processes

The soft, porous, and jointed nature of Bandelier Tuff makes it particularly susceptible to natural degradation factors, including mechanical and chemical weathering. This includes moisture infiltration, freeze-thaw action, salt efflorescence, acid dissolution, and eventual breakdown of the rock itself. The volcanic tuff substrate, coalesced from pyroclastic ash particles, has a friable texture and a poor resistance to abrasion, which result in relatively rapid mechanical breakdown under the effects of natural processes.

An eventual breakdown of the tuff substrate is geologically inevitable and not generally preventable on a gross scale through human means. At most, degradation from natural processes may be slowed or simply acknowledged. Under these conditions, proper documentation becomes the highest priority, as the resource fabric may deteriorate rapidly.

In 1986, severe natural deterioration was noted in 74 of 246 surveyed cavates (30%), while lack of deterioration was noted in only 37 cavates (15%; Toll 1995:104). In 1998, 140 cavates within four major Tsankawi Unit cavate groups were inventoried, assessed for condition, and evaluated for management treatments by Provencher (1999). His report identifies preservation problems including the cracking, disintegration, and collapse of the tuff substrate; moisture and salt damage; and sedimentation from drainage flow. The presence of animals, particularly rodents and birds, has adversely impacted a few cavate interiors. The potential collapse of two cavates, due to fractures along joint planes, has been identified as a human health and safety issue (Provencher 1999). These cavates have been closed to visitation through the use of temporary area closure signs and natural trail barriers to discourage visitors from entering a group of cavates.

3. Prehistoric Trail/Cavate Impacts Caused by NPS Administration and Visitors

Public visitation of the Tsankawi Unit has caused cumulative adverse impacts on the area's cultural resources. Since the first published description of Tsankawi Pueblo (Beam 1909), visitation has increased dramatically, particularly since the late 1940s. Although some trails segments were formalized and shaped, a prehistoric population of 400 to 600 individuals wearing relatively soft footwear wore a prehistoric trail system into the soft tuff of Tsankawi Mesa over about 400 years. After recognizing the prehistoric trail network as a main feature of interest at the Tsankawi Unit, the NPS encouraged visitors to use many of these trails. In the 1950s, the NPS designated portions of the original prehistoric trail network on Tsankawi Mesa as a self-

guided, interpretive, visitor trail. In the past 50 years, visitors wearing hard-soled shoes, bulky clothing, and daypacks have abraded the trails and entrances and walls of many cavates. In one Chapter of trail, the tuff has been abraded to perhaps 1.8 m (6 ft) greater depth than it was in prehistoric times (Matero *et al.* 1998). The majority of the prehistoric trails in the unit have lost their original cultural fabric and appearance.

Both historic-era and modern-era graffiti is present within some of the unit's prehistoric-era cavates. In 1986, graffiti was recorded as present in 9.3% (23 of 246) of surveyed cavates (Toll 1995:102). Graffiti appears to have increased in the subsequent 14 years. The paucity of an NPS visitor education and resource protection presence is a contributing factor.

4. Archeological Site Impacts Caused by Visitors

Free-roaming visitors within archeological sites has resulted in a proliferation of social trails, artifact trampling and disturbance, and soil compaction. The entire unit, and the Tsankawi Pueblo area (Figure 2) in particular, is plagued by the removal of artifacts found on the ground surface. The most commonly encountered artifacts include ceramic vessel fragments or "sherds" and lithic debris from stone tool manufacture or "flakes." Visitors regularly collect samplings of notable sherds and flakes and either pocket them or arrange them on bare soil, flat stones, or masonry blocks. While such "displays" of disturbed artifacts demonstrate the wide variety of ceramic styles and materials used at the pueblo (probably the innocent motivation of most visitors), it removes these items from their original archeological context. Such practice also alerts others to the presence of small, portable objects, which are vulnerable to casual collection and theft as souvenirs.

In the summer of 1980, a study attempted to quantify surface artifact disturbance by visitors at the Tsankawi Unit (Bandelier National Monument 1980). Over a two-month period, 13% of an identified ceramic sherd sample located within a "control" area (61 m or 200 ft from the main trail) was displaced or buried, presumably by natural forces such as wind, runoff, and/or wildlife. Between 33 and 53% of similar sherd samples were removed from areas with low to moderate visitation, representing Duchess Castle and 4 m (13 ft) off the main trail, respectively. Similar samples at or near trail markers #9, 13, and 14, suffered losses of 93 to 100% over just seven weeks, presumably due to removal by visitors. It should be noted that in 1980 (as well as at the present time) the trail pamphlet text for Trail Marker #12 notes the importance of such artifacts and admonished visitors to not remove them. While some may be simply redistributed – that is, picked up and dropped elsewhere within the site or unit – there is no way to quantify the number of such artifacts that are actually stolen and forever lost from the archeological record.

Such redistribution and removal of artifacts destroys chronological context, diminishes site integrity, and undermines the scientific research potential of the affected cultural sites. Thus far, NPS efforts to curtail such activities have proven ineffective.

5. Cultural Landscape Condition

A draft, level II, cultural landscape inventory of the Tsankawi Unit was completed in October 1999 by staff specialists from the Intermountain Support Office in Santa Fe (NPS 1999a). This document will be finalized in 2000. The condition of the Tsankawi Unit Cultural Landscape is rated as "poor" which is defined in the Cultural Landscapes Inventory Professional Procedures Guide (NPS 1998:62) as:

> "**Poor:** indicates the inventory unit shows clear evidence of major disturbance and rapid deterioration by natural and/or human forces. Immediate corrective action is required to protect and preserve the remaining historical and natural values."

The "poor" condition rating was jointly determined by NPS cultural landscape staff and Bandelier resource staff.

This condition rating could be raised to "fair" or possibly "good" if landscape conditions and ecosystem health/sustainability are restored to pre-1870s conditions. A cultural landscape in "fair" condition is defined as:

> "**Fair:** indicates the inventory unit shows clear evidence of minor disturbances and deterioration by natural and/or human forces, and some degree of corrective action is needed within three to five years to prevent further harm to its historical and/or natural values."

Further development of adjacent landscapes as described in Chapter II, Section C.2, Use of Adjacent Lands, would permanently impact the quality of the Tsankawi Unit Cultural Landscape and a rating of "fair" may be the best that can be accomplished in this rapidly growing region of northern New Mexico.

6. Traditional Cultural Properties

The extent of damage to traditional cultural properties is unknown and may only be accurately discovered upon disclosure by affected peoples. Generally, Puebloan peoples protect this information through traditional secrecy and non-disclosure (see Levine and Merlan 1997:17). The NPS respects Native American religious privacy and will not seek or disclose (at the request of Puebloan representatives) traditional cultural property information. At the request of the Pueblo of San Ildefonso, no systematic traditional cultural property inventory has been undertaken in the Tsankawi Unit and such an inventory is not planned for the future.

C. External Threats

The current development and use levels of adjacent lands are a relatively minor threat to the Tsankawi Unit. Increased development and use, however, could be extremely harmful to NPS resources and values. Although there is relatively little that park managers can do about external threats, regional environmental aesthetics and use of adjacent lands are discussed here as context for the cumulative impacts analysis in Chapter IV, Section C and for the sake of issues discussion completeness.

It is impossible to predict with certainty, the ultimate outcome or impacts of current proposed regional or adjacent land use changes on the Tsankawi Unit since the process for making these land use decisions has not been completed. Therefore, this management plan has been created based on the premise that there will be no significant change in adjacent land use or development. If significant land use or development changes were to occur on adjacent lands, **this management plan would be inadequate to guide management of the Tsankawi Unit.**

1. Environmental Aesthetics

National park resources and their enjoyment by the public include ambience, atmosphere, and other factors that are essential to the park's purpose and that directly affect the visitor experience. Degradation of such factors generally result from air quality, noise, and visual intrusions generated off-site. Protection of the quality of the visitor experience is a critical park mission. The introduction of new impacts and intrusions on the environment of national park areas should be avoided or minimized (DOI 1990:3). NPS Management Policies (NPS 1988) state that: "parks contain various tangible natural and cultural features... [and] also have intangible qualities, such as natural quiet, solitude, scenery, a sense of history, sounds of nature, and clear night skies, that are important components of the overall park experience and have received congressional recognition." Further, the Bandelier Resource Management Plan (NPS 1999b) states that the abundance of prehistoric archeological features and the landforms that influenced their construction and habitation are, in themselves, aesthetic values essential to the park's purpose. Preservation of aesthetic resources is critical to the protection and maintenance of the park's natural and cultural resources and their integrated scenes. Such aesthetic values may be qualified and quantified through the evaluation of the cultural landscape (Chapter II, Section.B.5), air quality, natural soundscapes, night sky visibility, and scenic viewsheds.

According to visitor preference research (Cowley 1987), people visit the Tsankawi Unit because of its ambience, solitude, lack of modern distractions, and relatively undisturbed condition. Surveyed visitors listed tranquility as the primary reason for visiting archeological areas such as Tsankawi. Such visitors wish to immerse themselves in the environment of the Ancestral Puebloans to absorb the place, its feeling, and its atmosphere. Increased air quality, noise, light, and/or visual intrusions could substantially impair the resources and values for which the Tsankawi Unit of Bandelier National Monument was initially established.

a) Air Quality and Visibility

Section 160 of the Clean Air Act specifically addresses NPS areas, including the Tsankawi Unit: "to preserve, protect, and enhance air quality in national parks, national wilderness areas, [and] national monuments..." The Act establishes standards for Class I and II airsheds. The Tsankawi Unit is designated a Class II airshed, while the nearby Bandelier Wilderness (located 8.8 km or 5.5 mi to the southwest) is designated a Class I airshed (NPS 1999b). Research has indicated that the public considers clean, clear air as one of the most important features of NPS properties (NPS 1988).

Over time, air quality has degraded throughout the Four Corners region, with an increase in seasonal haze (Allen 1989:172). Based on more than a decade of air quality monitoring data, however, the air over Bandelier has remained relatively unchanged. Recent monitoring by the State Air Quality Bureau has demonstrated that New Mexico Region 3, which includes Bandelier National Monument, meets the air quality standards identified by the Environmental Protection Agency under the Clean Air Act, as amended in 1977 and 1990. Bandelier supports an on-going program of air quality monitoring, including visibility, particulate, and acid deposition indices.

The long-term air quality of the Tsankawi Unit, and of Bandelier National Monument in general, is threatened by residential wood burning, increasing vehicle use, fossil fuel power generation, and the growth of surrounding urban areas (i.e., Albuquerque, Santa Fe Basin, and Española Valley). Such air-borne pollutants are widespread and do not recognize land-management

boundaries. As an agency of the Federal government, the NPS supports the establishment and enforcement of clean air standards, the development of less-polluting technologies, and sensible urban planning by all Federal, state, local, and private entities.

Additional short-term events, such as prescribed burning by land management agencies and periodic ignition of high explosives by the Los Alamos National Laboratory, affect air quality temporarily. Air quality and visibility impacts may increase if the transfer of DOE lands adjacent to the unit to the County of Los Alamos and the Pueblo of San Ildefonso goes through.

b) Natural Soundscapes

An important part of the National Park Service mission is to preserve natural soundscapes associated with national park units. The natural ambient soundscape is the aggregate of all the natural sounds that occur in an area, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, and/or solid materials.

The Tsankawi Unit is valued as a generally quiet, serene, and spiritual location. The significance statement for Bandelier National Monument describes a "sense of solitude" as being an important feature of the park. Of the Tsankawi Unit, Bandelier National Monument's Interpretive Prospectus (NPS 1992) states: "In this quiet, unexcavated site it is easy to have a personal encounter with the cultural resources..." The Cultural Landscapes Inventory (NPS 1999a 1:8, 3:1) identifies the "silence" and "quiet of the area" as elements contributing to the unit's integrity as a cultural landscape. As described by the DOE (1999:12-7, 13-6): "Visitors are attracted to the Tsankawi unit because of its solitude, peace, and tranquility, and the opportunity to explore the archeological resources in such a setting."

Unfortunately, the highly valued qualities of solitude, quiet, and natural sounds are becoming increasingly rare within the unit. Such ideal conditions are easily trammeled by unwanted sound from internal and external sources. Internal noise sources may include increasing visitation levels and temporary unit management activities. External noise sources include automobile and truck traffic along the northern and western unit boundaries, aircraft overflights, and activities of the Los Alamos National Laboratory (LANL).

Although such internal conditions are relatively infrequent at the present, large numbers of concurrent visitors along the narrow main trail can disturb the unit's serenity and visitor experience. This may become an increasing problem, particularly if visitation continues to increase. Previous documents have asserted that the unit's parking lot restricts visitor use to 30 vehicles. Currently, a capacity of between 40 to 45 cars is estimated. In any case, the current infrastructure would allow additional autos to be parked in nearby areas, not controlled by the NPS, during an overflow situation. Even typically low current visitation patterns may present an intrusion to religious and/or traditional uses by Puebloan peoples. Although minimal and generally restricted to the Visitor Contact/Fee Station area, noisy NPS maintenance activities may disturb the unit's solitude for brief periods. The same is true for NPS resource restoration activities related to this Plan, which would take place throughout the unit over limited periods of time. Such activities may include the temporary use of motorized equipment (e.g. a Bobcat to remove asphalt and chainsaws to thin vegetation).

Local automobile and truck traffic intrudes audibly and visually on the visitor experience. State routes (SR) 4 and 502 form, or are directly adjacent to, the Tsankawi Unit's western and northern

boundaries, ringing 60% of the unit's perimeter. The semi-clover-leaf junction of SR4 and SR502 is on the unit's northern boundary, while the less-developed junction of SR4 and East Jemez Road is on the unit's western perimeter. At this latter junction, East Jemez Road trends east-to-west through Sandia Canyon away from the unit. Together, these three roads and two road junctions represent a major corridor for LANL commuter traffic and also form the designated truck route for large trucks traveling to and from Los Alamos and LANL. Currently, the more remote portions of the unit are still relatively quiet. The western and northern areas of the unit, however, are subject to vehicle traffic noise, particularly during commute hours.

Commuter traffic is most concentrated during weekday "rush hours," generally 6:30 to 9:00 a.m. and 3:00 to 6:00 p.m. Traffic also increases during "lunch hours" between 11:30 a.m. and 1:30 p.m. Large trucks use the designated truck route – a combination of SR502, SR4, and East Jemez Road, which circles the unit – at all hours. All commercial truck traffic is required to use this route on weekdays between 6:00 and 9:00 a.m. Data from 1996 indicate that peak hour traffic volume was 1,805 passenger cars per hour for SR502, 1,570 for SR4, and 1,000 for East Jemez Road (DOE 1999:12-4). On the two latter roads, if the maximum traffic capacity level has not been reached or exceeded as yet, this is likely to occur within the next few years.

Truck and automobile traffic contributes heavily to the background noise levels in the region. While ambient noise levels at the Bandelier National Monument entrance station range from 31 to 35 decibels, ambient noise levels near the highways within the White Rock Y Tract range from 60 to 70 decibels, with occasional spikes to 90 decibels. These exponential decibel values have been "A-weighted" to more closely describe the response of the human ear (DOE 1999:3-10–3-11, 12-4, 12-7). While the ambient highway noise level as heard within the Tsankawi Unit is greatly reduced due to distance from the highways, traffic noise is still generally audible and practically constant during peak traffic hours.

Air traffic flies over the unit vicinity on a regular basis. Low (below 300 m [1,000 ft] altitude) to mid-level (above 300 m [1,000 ft] altitude) aircraft overflights generally consist of small, propeller-driven, airplane traffic utilizing the Los Alamos Airport. This facility is located just 3.8 km (2.3 mi) northwest of the unit's boundary. Air traffic includes the private light planes of local commuters and recreational users, as well as larger commercial aircraft on regularly scheduled flights. Currently, the airport is one-way, with all flights arriving from and departing towards the east. This flight path follows Los Alamos Canyon, directly along the northern unit boundary. Airport traffic arriving from or departing to the south generally flies directly over the unit or circles roughly 60% of the unit's boundary. While the DOE has operated the Los Alamos Airport under "private" status for many years, the Los Alamos community is currently debating whether this should be changed to public status. The airport is included within a 33 ha (81 ac) Airport Site Tract, which will be transferred to the County of Los Alamos. Commercial jet traffic, flying at high altitude, is often audible in the Tsankawi Unit. While rare, military- and LANL-related aircraft and helicopters occasionally fly in the unit's vicinity.

LANL research activities include explosives testing at Technical Area 16, located 10 km (6.2 mi) southwest of the unit. The resulting explosive shock waves reverberate and echo along the unit's cliffs. Such explosions vary in strength, intensity, and timing. While none may occur for months, several may occur within a few hours. The reports of firearms may be heard at the Tsankawi Unit. More concentrated firearm reports may be heard on a regular basis from Technical Area 72, which is a formalized shooting range for LANL security forces, located along East Jemez Road approximately 1.1 km (0.7 mi) west of the unit. For the most part, occasional

recreational firearm discharges originate on lands controlled by the Santa Fe National Forest or the Pueblo of San Ildefonso.

Additional noise impacts may occur after the transfer of DOE lands adjacent to the unit to the County of Los Alamos and the Pueblo of San Ildefonso.

c) Night Sky

Bandelier National Monument supported the New Mexico Dark-Sky Protection Act of 1999, which mandates the preservation and restoration of regional night sky views. Clearly visible night skies and astronomical observations were an important part of the Ancestral Puebloan world. With increasing light pollution from urban and rural development, the night sky is becoming more difficult to see and celestial features are being obscured. The degradation of clear night skies is an increasing concern to NPS managers. The Tsankawi Unit is designated for day-use only, and this is unlikely to change. This reduces the direct impacts of light pollution on the visitor experience.

The only installed outdoor artificial light source in the Tsankawi Unit is a two-bulb, household, floodlight fixture controlled by a motion-sensor trigger mounted on the south wall of the Visitor Contact/Fee Station. This fixture assists the volunteer hosts enforce the unit's day-use-only restrictions.

Currently, night sky vistas in the Tsankawi Unit are lit by the glow of White Rock, Santa Fe, and Albuquerque to the south; Los Alamos and Los Alamos National Laboratory facilities to the northwest; and Española and scattered ranches and homes in the Northern Rio Grande Valley to the northeast. Artificial light sources will most likely increase over time. Additionally, automobile headlights on three highways and streetlights at two nearby highway junctions are highly visible from the unit. Additional development near the unit's borders would impinge on night sky quality.

Additional night sky impacts may occur after the transfer of DOE lands adjacent to the unit to the County of Los Alamos and the Pueblo of San Ildefonso.

d) Scenic Viewshed

The Tsankawi Unit is rather small area with a huge viewshed. Its primary visitor use trail circles the top of a rather imposing and isolated mesa, providing a vast panorama in all directions of the surrounding mountains and the northern Rio Grande Valley. The Tsankawi Unit Cultural Landscapes Inventory (NPS 1999a 3:1, 3:20) lists "The inspiring 360-degree view of the natural landscape of the Pajarito Plateau, the Jemez Mountains, and the Rio Grande Valley from the top of Tsankawi Mesa..." as an element contributing to the unit's integrity as a cultural landscape. Further, this view "...is one of the primary character-defining elements of the landscape" (NPS 1999a 3:20). As described by DOE (1999:12-7, 13-6): "The view from Tsankawi mesa is breathtaking..."

Scenic vistas from the Tsankawi Unit are directly affected by air quality (see Section a, above). Also, the lands immediately adjacent to the Tsankawi Unit are currently undeveloped, with the exception of some utility corridors, highway rights-of-way, and New Mexico Department of Highways structures. This situation may change in the near future. Currently, the Tsankawi Unit is bordered on all sides by land controlled by two other entities: the Pueblo of San Ildefonso (directly to the south and east) and the DOE, Los Alamos National Laboratory (rights-of-way of

SR4, SR502, and East Jemez Road, as well as numerous facilities and public access land to the north and west). More distant areas, still included in the Tsankawi Unit's viewshed, include public lands managed for multiple-use (Forest Service, Bureau of Land Management), the State of New Mexico, tribal lands, and private land holdings.

External influences are the primary threat to the unit's viewshed resources. Several current land developments are visible from the Tsankawi Unit, including major roads and highways, large structures, dirt roads, radio antennae, and water towers. These facilities and activities have degraded the natural scenic vistas from the unit. The rights-of-way, semi-clover-leaf road junctions, and road cuts associated with SR502, SR4, and East Jemez Road are notably visible from several locations in the unit. Additional viewshed impacts may result from the ownership transfer and future development of two land parcels to the north of the unit, which is discussed in the next section.

2. Use of Adjacent Lands

Los Alamos National Laboratory has caused contaminants to accumulate in the adjacent Los Alamos Canyon, but impacts on the Tsankawi Unit are probably undetectable. Recreational rock climbers regularly use the walls of Los Alamos Canyon, adjacent to the unit's northern boundary. This makes it difficult for park rangers to know if others are entering the unit from this area. State highways on two sides of the unit, as well as the nearby Los Alamos Airport, impair the ambience, air quality, and character of the cultural landscape. Access is virtually impossible to control, since half of the unit's perimeter is readily accessible from highway rights-of-way. Severe accelerated erosion is also a problem on adjacent Pueblo of San Ildefonso lands that are occasionally used for wood gathering and grazing, which further destabilizes the local soils. Regional resource harvesting and erosion problems are having an unknown effect on the Tsankawi Unit.

Further development of lands surrounding the Tsankawi Unit would likely increase uncontrolled access, exacerbate crowding and associated adverse impacts, and possibly introduce new impact sources to the unit where such conflicts or impacts presently do not occur. Anticipated adverse impacts include additional visual, noise, and light intrusions; reduction of air quality; and increased resource damage in the unit. These factors could substantially impair the resources for which the Tsankawi Unit was established. Should development and associated use of adjacent lands occur, the unique characteristics that draw visitors to Tsankawi could be destroyed (DOI 1990). The NPS would not be able to fulfill its legislated mandate to protect the resources and provide for visitor enjoyment at the Tsankawi Unit, although some of the impacts would be mitigated to some degree by increasing NPS presence in the unit. Unfortunately, the Bandelier National Monument budget precludes such a change now and for the foreseeable future. The NPS is on record opposing development or intense use of lands adjoining the Tsankawi Unit due to resource protection concerns (DOI 1990; DOE 1999:18-42—18-43). Current regional and adjacent land use issues are briefly described here.

a) Proposed Land Ownership Changes

The potential for development of adjacent lands has accelerated now that Public Law 105-119 mandates the DOE transfer adjacent lands to the Pueblo of San Ildefonso and the County of Los Alamos. In the case of Los Alamos County, there is an explicit expectation associated with the land transfer that the County attain economic self-sufficiency.

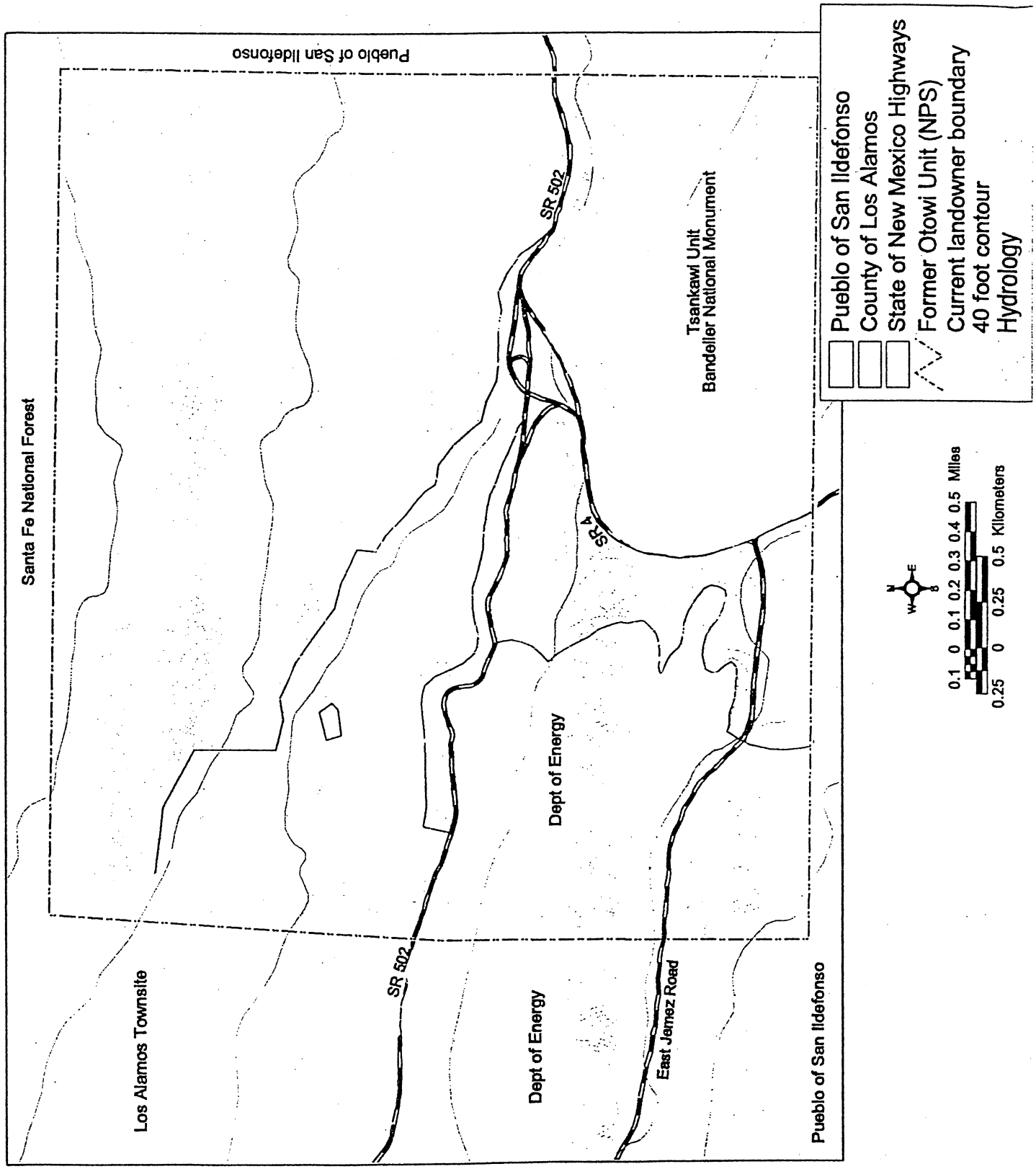


Figure 4: Proposed Land Ownership Boundary Changes

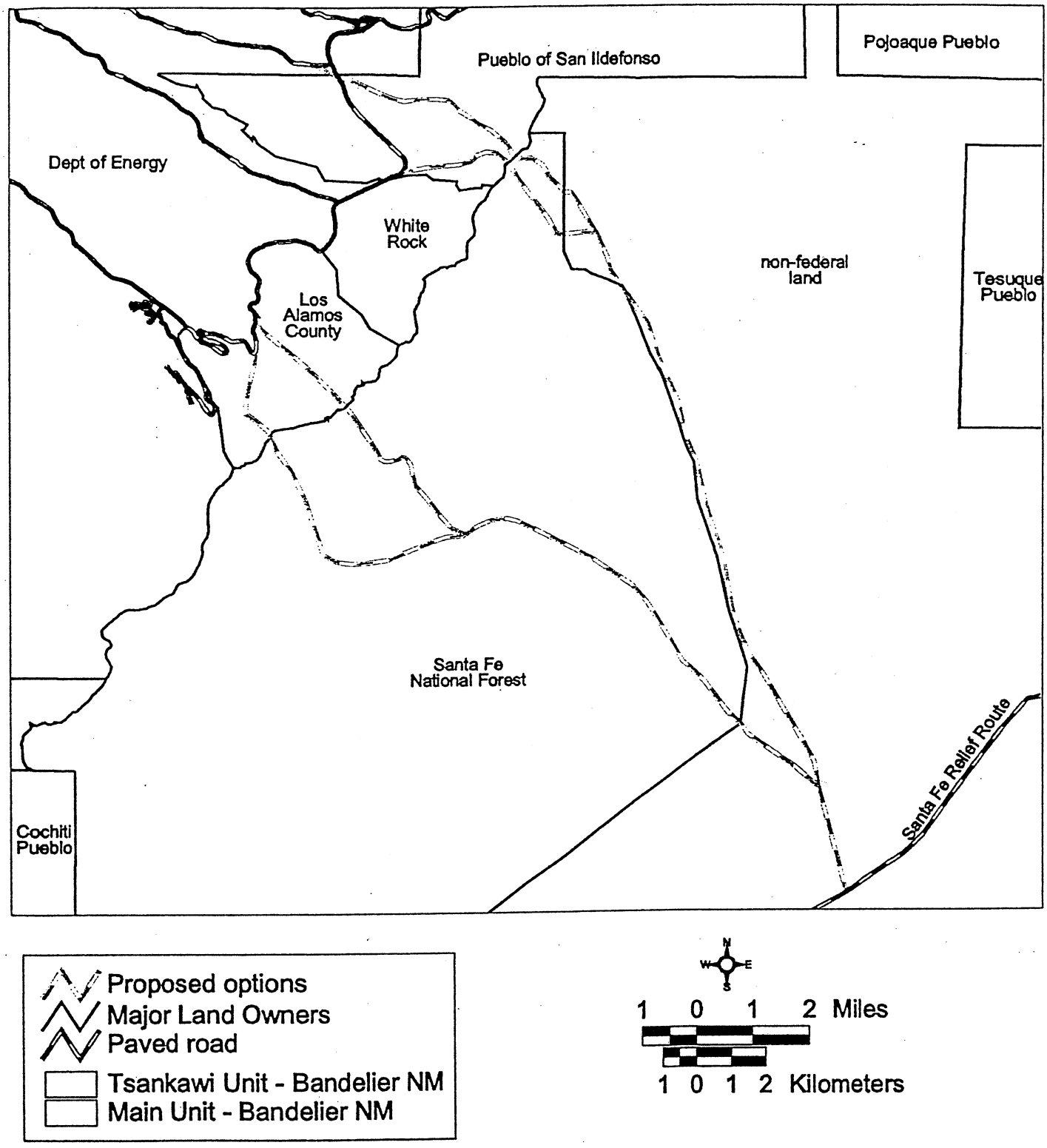


Figure 5. Proposed Santa Fe-Los Alamos Road Options

Of specific concern to Bandelier National Monument are two culturally rich tracts of land totaling 1,318 ha (3,255 ac). Both tracts represent portions of the former Bandelier National Monument Otowi Unit located to the north and west of the current Tsankawi Unit. **The view from the Tsankawi Unit "encompasses most of the area proposed for transfer"** (DOE 1999:12-7, 13-6). The White Rock Y (Y-) Tract includes approximately 218 ha (540 ac), encompassing land on the opposite side of SR4 and on either side of SR502, west and northwest of the Tsankawi Unit boundary. This tract also abuts the unit's northeast boundary in the vicinity of Los Alamos Canyon (DOE 1999:12-1–12-21). The much larger Technical Area 74 (TA74) Tract encompasses 1,100 ha (2,715 ac), extending to the north of the Y-Tract, and includes the confluence of Bayo and Pueblo canyons (DOE 1999:13-1–13-22).

The Environmental Impact Statement (EIS) prepared for the land transfers states that the visual resources in both tracts are ranked as having "high public value" (DOE 1999:12-7, 13-8) and:

> ...the development of currently undeveloped areas...would typically degrade the visual landscape. The reduction in visual quality would not be substantial on a regional scale, but local diminished viewsheds could impact resources important to maintaining a positive visitor impact on adjacent NPS lands [DOE 1999:2-12].

After a year of negotiations, the Pueblo of San Ildefonso and the County of Los Alamos agreed to a division of the lands to be transferred from the DOE north and west of the Tsankawi Unit. The Pueblo of San Ildefonso would receive the northeast portion and majority of the TA74-Tract, as well as a small inholding within county land, which represents land surrounding Little Otowi Pueblo (see Figure 4). Los Alamos County would receive the remainder of the TA74-Tract and the entire White Rock Y-Tract. The county has plans to subsequently transfer about 72 ha (180 ac) surrounding the current State-designated highways to the State of New Mexico. This will include the area between the Tsankawi Unit's northern boundary and SR502, which contains an informal recreational rock-climbing area. As a result of these land ownership changes, land controlled by the State of New Mexico will create a narrow buffer between the Tsankawi Unit and County- and Pueblo-controlled lands.

During the land conveyance and transfer planning process the county and pueblo identified the intended use of these lands as: 1) "cultural preservation" or "natural areas, transportation, and utilities" for the Y-Tract and 2) "cultural preservation" or "natural areas and utilities" for the TA74-Tract (DOE 1999:S-17, 12-15, 13-15; Los Alamos County 1999). The Conveyance and Transfer EIS states that under these contemplated uses, visual character will be retained and visual resources will not be impacted (DOE 1999:12-17, 13-17). Neither the county nor the pueblo, however, are legally bound by this sentiment. In fact, P.L. 105-119 states that these lands are to be transferred "fee simple," that is with no strings attached. At various times, the County of Los Alamos has expressed interest in developing the area to some degree. For example, the Los Alamos County Draft Comprehensive Plan (1999) proposes construction of a new road ("Bayo Canyon Road") from northern Los Alamos to the SRs 4/502 intersection adjacent to the Tsankawi Unit's northwestern boundary and the expansion or relocation of the sewer plant in Pueblo Canyon.

Further development and associated activities on land tracts in the vicinity of the Tsankawi Unit, may introduce new impact sources to the unit where such threats and impacts are absent or occur at low levels. Cumulative development impacts would include significant visual and noise intrusions; alterations to air quality, visibility, and the night sky; and modifications to visitor use

and access. The latter may increase the likelihood of off-hours trespass, vandalism, looting, and resource damage in the unit. These kinds of changes could substantially impair the resources for which Bandelier National Monument was initially established. Should such development or intense use occur, the unique characteristics that draw visitors to Tsankawi could be destroyed and the park would not be able to fulfill its legislated mandate to protect the resources and provide for visitor enjoyment at the Tsankawi Unit.

b) Santa Fe-Los Alamos Road Options

On several occasions, the latest being in 1990, the Federal Highway Administration asked the NPS and others to consider a proposed, four-lane, alternate highway, known as the Santa Fe-Los Alamos Road. Several tentative highway options cross the Rio Grande and pass through canyons located between State Route 502 to the north of the Tsankawi Unit and east and north of Bandelier's main unit. The Sandia Canyon alternative, which would have caused the Tsankawi Unit to be "virtually surrounded" by transportation corridors, was vigorously opposed by both the Pueblo of San Ildefonso and the Department of the Interior (DOI). The Office of the Secretary of the Interior opposed the construction of the new road corridor "...because of potentially significant impacts to Bandelier National Monument and its detached Tsankawi Unit...." (DOI 1990). The bases for opposition were numerous but included the following: visual, noise and air pollution, negative impacts on park operations, enhanced access to the area would increase park visitation ("which currently exceeds capacity"), and "adverse effects" (36 CFR 800.9[b][3]) on a National Register of Historic Places property, specifically "Introduction of visual, audible or atmospheric elements that are out of character with the property or alter its setting."

Although a Santa Fe-Los Alamos Road was not developed at the time (apparently due to public opposition and inadequacies in the original and supplemental draft EIS), some members of the planning team expressed an opinion that the need still existed for the road (Bandelier National Monument 1992). It is assumed that options for a Santa Fe-Los Alamos Road may be proposed again and the possibility of its development remains a threat to the Tsankawi Unit.

D. Native American Perspective

As specified in NPS management policies (NPS 1988), the interests of Native American communities and groups traditionally associated with national parks and monuments are identified as "important considerations in the selection of proposed actions." Any action of the park which may affect cultural resources may be undertaken only if traditionally associated groups have been consulted, their concerns have been taken into account, and significant ethnographic values, religious practices, and traditional uses have been recognized and protected.

Initial ethnographic research has identified approximately 200 sources of information regarding ancestral affiliation with Bandelier National Monument (Levine and Merlan 1998). In compliance with federal law and NPS policy, Bandelier National Monument has contacted all the pueblos of New Mexico and Arizona, the Navajo Nation, the Pueblo of Ysleta del Sur (of Texas), the Comanche Tribe, the Kiowa Tribe, the Southern Ute Tribe, and the Ute Mountain Ute Tribe to solicit interest in consultations regarding park management issues. These tribal groups have a fundamental and continuing interest in lands, resources, and sites traditionally occupied and used by their ancestors, members, and representatives. They are federally recognized Indian tribes and, as such, represent sovereign entities that may consult with agencies of the Federal government on a government-to-government basis (Tribal Self-Governance Act of 1994).

In 1998, the Navajo Nation informed park managers that cultural resource elements located within the Tsankawi Unit may be significant in Navajo oral history regarding late prehistoric and early historic events in the Bandelier area.

A tribal consultation committee was formed on April 16, 1999 to facilitate ongoing consultations on management of Bandelier National Monument. All tribal entities listed above were invited to participate. Five tribal groups have informally agreed to become members of the Bandelier Tribal Consultation Committee: the Pueblo of Cochiti, the Pueblo of San Felipe, the Pueblo of San Ildefonso, the Pueblo of Santa Clara, the Pueblo of Santo Domingo, and the Pueblo of Zuni (NPS 1999a, 1999b).

During meetings with Bandelier staff held on June 3, July 28, and November 29, 1999, members of the Bandelier Tribal Consultation Committee shared their perspectives on the significance of the Tsankawi Unit, management issues they see as critical, and management alternatives which they feel address the management issues. This information is provided below. Puebloan participants in the Bandelier training program who completed resource protection work at the Tsankawi Unit in 1998 and visiting tribal elders provided additional input in numerous discussions with the staff of both Bandelier and the NPS Intermountain Support Office.

1. Significance of the Tsankawi Unit from the Puebloan Perspective

- Puebloan peoples hold interrelationships with the whole cultural area,
  - -- There is a direct relationship between Pueblo of San Ildefonso people and Tsankawi,
  - -- Tsankawi is a part of a greater whole;
- Pueblo of San Ildefonso people have lived there, our ancestors continue to reside there;
- Tsankawi holds an important place in Puebloan traditions of being one with the natural world.

2. Critical Management Issues from the Puebloan Perspective

The following issues are not prioritized. They are listed in the order they were raised on July 28, 1999, by members of the Bandelier Tribal Consultation Committee.

1) Resources and site integrity have degraded;
2) Traditional uses are being impacted;
3) There is inappropriate management and/or use of sensitive areas;
4) Protocols for protecting sensitive information do not exist;
5) We have insufficient information to participate in the decision-making processes;
6) Fees generated from Ancestral Puebloan homes do not benefit their descendents;
7) There is not enough money to protect resources;
8) Adjacent state highways increase access and complicate resource protection;
9) Visitation is increasing under pressure from the tourism industry;
10) The story of Tsankawi is being improperly interpreted;
11) Prehistoric trails should be properly managed and protected;
12) The Tsankawi Pueblo area should be left undisturbed; walking over walls, through the plaza, through kivas, using social trails, collecting artifacts, etc. must be stopped;
13) No research of any kind should be conducted on Ancestral Puebloan lifeways or culture;

14) Human remains are occasionally exposed in high-visitation areas;
15) Human remains removed during the 1900-1905 excavations are not yet repatriated;
16) We object to the words "preserve" and "primitive" because they have bad or inappropriate connotations as commonly used.

3. Alternatives Suggested to Address Critical Management Issues

1) Transfer the Tsankawi Unit to the Pueblo of San Ildefonso (Issues 1 through 14) – this is the PUEBLOAN PREFERRED ALTERNATIVE;
2) Continue National Park Service restoration efforts using natural materials and allowing natural processes to function (Issue 1);
3) Increase/modify visitor education (Issues 1, 3, 10, and 12);
4) Control visitation (Issues 1, 3, 8, 9, 11, and 12)
   -- Close Tsankawi Unit to visitation,
   -- Close trails atop Tsankawi Mesa, remove ladders that provide access to the mesa top,
   -- Limit Tsankawi Unit visitation to two or three days per week and provide a resource protection presence on those days,
   -- Staff Tsankawi Unit with Pueblo of San Ildefonso members to provide a resource protection presence,
   -- Allow visitation through guided tours only,
   -- Close Tsankawi Pueblo area to visitation, re-route the main trail to the south of the pueblo, allow visitors to view the pueblo from a respectful distance only,
   -- Establish one trail and keep people on it, eliminate all the social trails,
   -- Do not establish secondary trails to Duchess Castle or North Mesa,
   -- Enforce existing NPS regulations,
   -- Reduce the promotion of visitation,
   -- Develop a better understanding of causative factors leading to increasing visitation;
5) Design information protection protocol and consider completing a Traditional Cultural Property survey (Issues 2, 3, and 4);
6) Provide Bandelier National Monument's Government Performance and Results Act (GPRA) information to the Bandelier National Monument Tribal Consultation Committee (Issue 5);
7) Continue to explore funding sources for resource protection, restoration, cultural continuance activities, and the hiring of Puebloan employees (Issues 6 and 7);
8) Update Tsankawi Unit interpretive information with Puebloan input (Issue 10),
   -- Information should be more inclusive, with Puebloan people considered as part of the audience;
9) When human remains are exposed in high visitation areas, the NPS should continue to use current informal protocol for response (Issue 14);
10) NPS assistance in bringing about the repatriation of the 1900-1905 excavation remains and materials is requested. Repatriated remains and materials should be reinterred during eventual NPS back-filling of the 1905 excavation area (Issue 15);
11) Establish common definitions or alternate language for the words "preserve," as used to define the level of acceptable change, and "primitive," as used to define limits on the use or development of areas (Issue 16).

All of the issues and suggested management alternatives brought out through Native American consultation are addressed in this document. The majority of recommended management actions are incorporated in the action alternatives or in the routine management actions of the unit. Some

recommendations, however, are not included in the plan or action analysis since the NPS lacks the authority and/or funds to carry them out or they would not accomplish identified objectives.

delete

III. ACTION ALTERNATIVES

The purpose of this Chapter is to describe the conditions and actions that are likely to take place when an alternative action is selected. The purpose and need for the proposed actions is described in Chapter II, Management Issues and Concerns.

There are two action alternatives presented in the draft plan and EA: A) the No Action alternative, and B) the Implement Tsankawi Management Plan alternative. The no action alternative represents the baseline situation that will continue unless the implementation alternative is selected in whole or part. The "Implement Tsankawi Management Plan" alternative is divided into **definite** and **discretionary** actions. If a proposed action element in this alternative could result in an adverse impact, "action options" are provided. Each "action option" stands alone in the decision-making process. Collectively, the proposed "definite and discretionary actions" address all of the identified management objectives.

A. No Action Alternative

The following management practices and resource conditions would continue unless found to be causing unacceptable risks to human health and safety or Federal property.

1. Manage Visitor Activities/Behaviors

The whole Tsankawi Unit would continue to be effectively "open" to uncontrolled visitor exploration during daylight hours, except for site-specific areas closed (by signs) because of a formally recognized safety concern. Desired visitor behaviors would be solicited through the self-guiding trail pamphlet and limited visitor education through guided walks and roving patrols. Park rangers would continue to enforce federal laws, such as citing visitors who bring pets into the unit, light fires, or vandalize park resources or property.

A combination of patrol rangers, fee-collection personnel, volunteer hosts, resource management staff, and interpretive staff make up the NPS management presence at the Tsankawi Unit. Regular resource protection patrols have increased slightly during the past two to three years, but are likely to decrease in 2003 due to an anticipated reduction in funding. Although it varies by season and the number of vehicles observed in the parking area, ranger patrols of the Tsankawi Unit would continue to consist of once daily walking patrols of the complete Tsankawi Mesa Loop (main) trail and two to three daily checks of the parking area and Visitor Contact/Fee Station. Patrols of less-used areas would be random and, on average, accomplished about once per week. Generally, each patrol would continue to cover the main loop trail and specific "trouble" areas. For the most part, patrols will be accomplished in the morning and after sunset, with the mid-day patrol usually covering the main trail.

At times, a fee-collection staff member will be present at the Visitor Contact/Fee Station and may also patrol all or a portion of the main trail. An automated fee-collection machine was installed at the Visitor Contact/Fee Station in 1999. This machine may decrease fee-collection staff presence.

During warm season months, volunteer hosts (if available) will occupy the host-site trailer pad, adjacent to the Visitor Contact/Fee Station. The hosts drive their personal vehicle(s) on an as-

needed basis from the host-site to SR4 along the unit's short dirt access road. Beyond providing a sedentary caretaker presence, hosts informally patrol the trails to provide information, assistance, and resource protection. During resource restoration work, resource management staff provide an informal protection presence. Interpretive staff presence at the unit varies from year to year. Generally, the resource management and interpretation staff presence occurs only during the summer months.

2. Inform and Educate Visitors

The bulletin boards mounted on the Visitor Contact/Fee Station's south wall contain changeable supplementary and/or time-related visitor information, which would be updated as needed.

NPS-sponsored educational opportunities would be limited to the 1986 version of the self-guiding trail pamphlet associated with numbers posted at points of interest along the main trail on Tsankawi Mesa. This pamphlet is available in a self-serve box at the trailhead. Interpretive walks may occasionally be provided to the public during the summer season, if seasonal staffing permits. In 2000, a new introductory wayside exhibit panel would be placed near the Tsankawi Unit public access gate. Panel installation would be cleared and monitored by an archeologist.

3. Protect Public Health and Safety

Basic safety- and risk-related information would continue to be provided as a simple cautionary note within the Tsankawi Mesa self-guiding trail pamphlet. Warnings regarding such things as "hazardous cliffs" and "rough and uneven trail" are currently provided at a few locations by trailside signs (Appendix G). Specialists have identified two cavates as unstable and in danger of collapse in the near term. These cavates are marked with unsecured "area closed" signs and would continue to be so marked.

Although approximately one or two visitor injuries per year occurred at Tsankawi between 1990 and 1997, none have occurred in the past two years. Prior injury incidents were, in general, the result of visitors not watching their step on the main trail, rather than off-trail or social trail use. Park rangers would continue to provide emergency medical and rescue services if a visitor is injured.

The unit parking area is not designed for safe access since it lacks acceleration/deceleration lanes. The Tsankawi Unit parking area is under New Mexico State Highway Department control and jurisdiction. The NPS would continue to be unable to rectify the current parking area public health and safety problems since it does not own the parking area. A new parking area located on NPS lands could eventually be constructed as described in the Tsankawi DCP (NPS 1995a) if line item construction funds become available. This is highly unlikely in the near term since the proposed action is low on the national line-item construction priority list.

4. Enforce Laws and Regulations

Park rangers would continue to be responsible for the enforcement of federal, state, and some county laws and regulations. Additionally, they would continue to provide emergency medical services, search and rescue, fire prevention and suppression, and visitor information and education services. The NPS law enforcement focus would continue to be preventing violations of laws (such as removing or vandalizing cultural features) and incidents of injury due to unsafe acts. For example, signs are posted instructing hikers to "remove nothing."

Vehicle break-ins are a problem at the current SR4 parking area, which is under the jurisdiction of the State of New Mexico. Break-ins would continue to be investigated and reported to the Santa Fe Sheriff's Office. Signs warning of potential vehicle break-ins and informing visitors regarding basic NPS regulations would continue to be posted along the main trail and in and near the parking area (Appendix H).

5. Maintain Tsankawi Mesa Loop Trail

Beyond waterbreak and trail retaining wall maintenance and occasional brushing along the Tsankawi Mesa trail, routine trail maintenance would not be performed at the Tsankawi Unit. The two rustic wooden ladders along the main trail will be replaced on roughly a four-year cycle. Ladder replacement involves timber cutting, peeling, treatment, boring, fabrication, erection, and disposal of the old ladder. In accordance with "Bandelier Snow Removal Priorities", the main trail would not be maintained or cleared of snow and ice after storms, but the trail would remain open to visitor use. Visitors would continue to use the directional signs (if visible), ladders, steps and trail tread at their own risk.

The current trail maintained by the NPS would remain in its present position and condition. The existing asphalt surface at the lower end of the main trail would be repaired and minimally maintained; the main trail would continue to traverse a Tsankawi Pueblo wall and go through the Pueblo plaza.

6. Maintain Signs

The existing cement posts and routed wooden signs were fabricated in-house by Bandelier staff. Due to erosion of funds for skilled permanent staff, future sign construction would be contracted out.

7. Maintain Built Facilities

The Tsankawi Unit Visitor Contact/Fee Station was completely refurbished in 1999. Routine maintenance activities require that a government vehicle traverse the short dirt access road from SR4 to the Visitor Contact/Fee Station once a week. This access road is stable and should not require special maintenance or improvements for many years.

Four toilet enclosures are located near the Visitor Contact/Fee Station. From April to November, the two chemical toilet outhouses would continue to be locked and the two flush-toilet outhouses will be cleaned once a week. From November to April, the two flush-toilet outhouses will be kept locked and the two chemical toilets will be drained once a week. Water from Bandelier

headquarters will be added to the chemical toilet holding tank each time it is drained. Trash cans would be emptied once weekly.

Bandelier staff would continue to maintain the unit's water and septic systems. The water system includes the back-flow preventer, water meter, and the water lines to the Tsankawi Unit from their junction with the County of Los Alamos water line located just east of the SR4 and East Jemez Road junction. Generally, the Tsankawi water lines would be deactivated in November and reactivated in April. The county may impose a fee each time they temporarily deactivate or reactivate these lines. The septic system includes drain lines from the unit's three flush toilets and the host-site trailer pad, a septic tank, and a leach field. The septic tank would be monitored for proper operation and emptied on an as-needed basis.

8. Do Not Maintain the Parking Area

The informal gravel parking area for the Tsankawi Unit is not located on NPS property. Bandelier is not and would not be responsible for parking area maintenance or snow removal.

9. Manage Resource Conditions

Routine resource management actions in the Tsankawi Unit fall into the visitor education, resource protection, and facilities management categories previously described. Bandelier staff would continue to casually monitor impacts to and degradation of resources. If special project funds can be found, severe natural and cultural resource problems may be addressed on a case-by-case basis. All new activities, including research, with the potential to impact cultural or natural resources would continue to be routinely evaluated through standard NHPA and NEPA compliance procedures.

10. Regularly Consult with Affiliated Tribes and Comply with NAGPRA

A tribal consultation committee was formed on April 16, 1999 to facilitate ongoing consultations on management of Bandelier National Monument. Five tribal groups have informally agreed to become members of the Bandelier Tribal Consultation Committee: the Pueblo of Cochiti, the Pueblo of San Felipe, the Pueblo of San Ildefonso, the Pueblo of Santa Clara, the Pueblo of Santo Domingo, and the Pueblo of Zuni (NPS 1999a, 1999b). Bandelier and hopefully the five interested tribes would sign the MOA formally establishing this committee. The committee would continue to meet at least two times per year.

All human remains, associated and unassociated funerary objects, and objects of cultural patrimony with a Tsankawi provenience and under NPS control have been repatriated in compliance with the Native American Grave Protection and Repatriation Act (NAGPRA). Under NAGPRA, the NPS is not responsible for repatriation of NAGPRA-related items removed from the Tsankawi Unit prior to the establishment of NPS administrating authority (pre-1932). However, the NPS will assist in the repatriation process for these items to the extent that it can. It is Bandelier staff's understanding that NAGPRA-related items excavated prior to NPS administration are part of the collections held by the Smithsonian Institution's National Museum of Natural History (see Appendix B for more details).

In-situ NAGPRA items will surface naturally through erosion. Sometimes, in spite of our attempts to do otherwise, NAGPRA items are inadvertently discovered during the

implementation of a planned management action, such as installation of a trail or structure. Bandelier National Monument has informal protocols in place to deal with instances of inadvertent discovery that satisfy local affiliated tribes. NAGPRA prescribes a highly formalized consultation process that applies when our informal process is insufficient.

B. Implement Tsankawi Management Plan Alternative

Unless otherwise specified in the "Implement Tsankawi Management Plan" Alternative described in this section, routine management actions outlined in the No Action Alternative would continue unchanged as standard operating procedure.

1. Proposed Definite Actions

Under the Implement Tsankawi Management Plan Alternative, the following actions would be intensified or initiated, as appropriate (funds and personnel permitting), effective June 1, 2000.

a) Increase Education and Resource Protection Presence Temporarily
An on-site working resource management presence should discourage inappropriate visitor behavior, especially during the summer seasons from 2000-2002. Park interpretive rangers would rove the area more frequently during this time period to promote resource preservation, visitor understanding, and the national fee demonstration program.

b) Increase Education and Resource Protection Presence over the Long-Term
Please note that to increase the education and resource protection presence using existing park base funds and or to construct a new parking area/visitor contact station (see III.B.1c below) is impractical because park base funds are already inadequate to meet the basic operating needs of the main unit. Therefore, the NPS would actively seek a permanent base-funding increase through established procedures to support a more comprehensive visitor education and resource protection presence, especially during high visitor use periods after 2002.

c) Passively Discourage Visitor Access
Natural deterrents/barriers would be installed to passively discourage visitor access to cavate groups and other sensitive resources/resource areas. The deterrents/barriers would consist of natural materials (boulders, stone, wood, dirt, plants, etc.), color-matched and constructed to blend into the local landscape. Particularly unsafe and sensitive cavates and cavate groups would be "closed to visitation" through the park compendium and small signs.

d) Discourage Potentially Harmful Development of Adjacent Lands
The transfer of adjacent lands from the Department of Energy to the County of Los Alamos and the Pueblo of San Ildefonso for economic reasons (see Chapter II, Section C..2a) would likely have disastrous consequences for Tsankawi. In the event that external parties/persons cause harm to Tsankawi Unit resources, the NPS may exercise its authority to sue for damages and costs associated with restoration of the damaged resource (16 U.S.C., Chapter 1, Subchapter III, Section 19jj-3 & 4). The NPS will seek to avoid such situations through effective communications with its neighbors. For example, potential threats to Tsankawi Unit resources would be identified and discussed at East Jemez Resource Council meetings (occur at least four times per year). And, federally funded/agency actions subject to the NEPA process and having the potential to affect Tsankawi Unit resources would be reviewed by Bandelier staff.

e) Construct New Parking Area and Visitor Contact/Fee Station

The Tsankawi Development Concept Plan/EA (NPS 1995a) and resulting Finding of No Significant Impact for a new parking area and Visitor Contact/Fee Station within the unit would be implemented. Unfortunately, it is unlikely that Congress will authorize line-item construction funds for this purpose in the next 10 years due to an enormous federal projects construction backlog.

f) Conduct Research

Research is a designated purpose of units in the national park system, although each permitted research activity must be sensitive to protecting all resource values (see Appendix F). Requests from reputable researchers would be continue to be routinely considered and approved on a case-by-case basis as they are in the No Action Alternative. Requests for research permits may be denied for legal reasons or evidence of unacceptable harm to park resources or visitor use. A detailed impact analysis of each proposed research project would be routinely required and accomplished through internal National Historic Preservation Act (NHPA) and National Environmental Protection Act (NEPA) compliance procedures.

While research is an appropriate use of Bandelier resources and processes, its application can be controversial and harmful. For this reason, a description of possible park-supported research topics for the Tsankawi Unit and their potential impacts is provided below. Implementation, of course, is dependent upon funding and approval of specific research proposals and compliance documents.

i) Cultural Landscape/Trail Studies

Prehistoric landscape use patterns may be researched through the study of prehistoric (A.D. 1150-1550) Ancestral Puebloan trails within and adjacent to the Tsankawi Unit. This research would augment a regional analysis of prehistoric trails of the Pajarito Plateau undertaken by Dr. James Snead (1994, 1999a, 1999b).

ii) Cavate Preservation Studies

- Tsankawi Unit cavate conditions assessments (Provencher 1999) and graffiti treatment studies (Rivera 1999), begun in 1998, would be completed as funds permit.
- A study to describe and rank the unit's cavates utilizing current (traditional, ethnographic, archeological, and interpretive) values may be conducted. The resulting information would assist park managers in identifying unique features, fragility of resources, and identifying management risks and priorities.
- Rock art resources may be studied to expand upon our knowledge and ability to protect these cultural resources.

iii) Archeological Studies

- Excavations to expand the base of knowledge about Ancestral Puebloan peoples or lifeways would not be supported except unless fully justified (found to be essential) and after extensive consultation with affiliated tribes (Appendix F).
- Surface studies of artifacts may be conducted to answer some research questions. Information on the location of site attributes is prohibited in published form or in any forum accessible to non-authorized personnel. No research permits would be issued to persons who cannot safeguard sensitive cultural resource information.

iv) Land-use Studies

- Historic (1899-1932) landscape use patterns may be investigated through historic land survey records (Government Land Office, Bureau of Land Management, Forest Service), especially regarding herbaceous cover, erosion, and land-use practices in the unit area.

v) Vegetation Studies

- Additional plant materials (local native seeds and transplants) and other, more intensive, vegetation restoration treatment research (e.g., seed bed and/or transplant area preparation, mulching with seed-free hay) may be necessary if the initial, minimal approach (proposed in Alternative 2a below) fails to stabilize soils and promote the establishment of effective grass/herbaceous cover. While the use of soil amendments (organic material, fertilizers, and chemicals) would be generally avoided, such methods may be tested in carefully controlled and limited study areas.
- A floral study may be conducted utilizing the apparently well-preserved, stratified, historic, sheep dung deposits within several Tsankawi Unit prehistoric cavates. The identification of grazed plant parts may contribute to the understanding of post-Puebloan occupation vegetation and historic vegetation (particularly grass species) shifts for an unknown period between the 1700s and the 1930s. A repeat-photography study, utilizing existing (1909-1970) photographs of the unit, may be conducted to elucidate vegetation/landscape change.
- A time-series of aerial photos may be interpreted in order to determine vegetation change over time (1929-present) and quantify differences in overstory density, grass/herbaceous cover, and exposed soils. In particular, researchers would examine pre-fire vegetation and post-fire succession in the area burned in 1950.
- The current vegetation map (Figure 8), which is based on 1981 air photos, would be field-checked and modified, if necessary.
- A current baseline vascular plant inventory would be conducted and a checklist for the unit compiled.
- Landscape pattern and vegetation change research would be utilized to establish a "desired conditions" vegetation map to guide revegetation and landscape restoration efforts.
- The presence and distribution of woody non-native species within the unit would be assessed to guide control and/or eradication efforts.

vi) Fire Studies

- A unit fire history may be developed by locating and sampling fire-scarred trees within and adjacent to the unit. Other methods of establishing fire history data may be used as fire history research technology matures for piñon-juniper woodlands.
- Vegetation monitoring types and prescribed fire units would be established, if ecologically warranted, to promote and monitor the reintroduction of fire to the unit.

vii) Wildlife Studies

- If large ungulates begin to linger or reside within the Tsankawi Unit, they may be captured and radio collared.
- Small mammal and bird studies should be encouraged, however, killing of animals to obtain desired data would be discouraged.
- All animals involved in or affected by research activities would be treated in a humane manner.

viii) Biodiversity Studies

A complete biodiversity inventory of the unit is desirable as are studies of species distribution and abundance.

g) Preserve Representative Examples of Cultural Resource Sites and Features

Cultural resource specialists would systematically evaluate the integrity, condition, preservability, and significance of archeological features. Treatment methods would meet the following criteria: (a) be generally reversible; (b) utilize natural, color-matched, materials; (c) utilize non-invasive techniques and appearances; and (d) allow natural processes to function generally unimpeded.

i) Infill Damaged Trail Segments

Those portions of damaged prehistoric trails used by visitors to access Tsankawi Mesa and Tsankawi Pueblo would be infilled and maintained to enable safer visitor access and reduce visitor abrasion of the base rock. Other sections of prehistoric trails not on the main trail would be likewise treated if it appears that public use is causing excessive fabric loss. Such repairs would be out-sloped wherever possible to minimize potential moisture damage. The lowest "holds" of selected hand-and-toe hold trail segments may be semi-permanently plugged with chock-stones to prevent visitor use.

ii) "Rock-up" Selected Cavate Entrances

Some cavates would be sealed with dry-lain or mortared rock walls to preserve resource features and or to promote public safety. The choice of materials would be determined through consultation with an architectural conservator familiar with the characteristics of the Bandelier Tuff. The conservator would also oversee the construction of the rock walls.

iii) Repair Selected Cavate Interior Surface Finishes

Selected finishes that are graffiti-impacted, significant, and determined to be at great risk of imminent loss would be infilled with native sediments augmented with minimal, non-destructive adhesives. Conservation measures taken would not be designed to stop deterioration but should prolong the natural life cycle of the extant features. A trained architectural conservator would oversee the repairs to cavate finishes.

iv) Reduce and or Eliminate (Within Reason) Pathways for Moisture to Enter Cavates

Natural forces causing rapid deterioration of some cavate interiors, in particular moisture damage through the modification of drainage flow, would be mitigated through careful and discreet placement of silicon bead channels and other water diversion methods determined to be efficacious by an architectural conservator.

v) Discourage and/or Eliminate the Use of Social Trails

The former main trail segment and the network of social trails covering Tsankawi Mesa would be reclaimed through the application of revegetation techniques (e.g., mulching, brushing, installation of deterrents/natural barriers) and signs, as appropriate, on a case-by-case basis. New materials needed to revegetate old trail treads would be flown in by helicopter if people and or pack animals cannot safely carry the materials to work locations. Social trail elimination in the low lands (not applicable to Tsankawi Mesa) would be accomplished with livestock support, if necessary. Ground-disturbing trail rehabilitation techniques would be avoided. If ground disturbance becomes necessary, an archeologist would monitor the work.

vi) Place the Tsankawi Cultural Landscape on the National Register
The Tsankawi Unit landscape would be nominated for listing on the National Register.

2. Proposed Discretionary Actions to Restore & Maintain Naturally Functioning Ecosystems

The following proposed actions are discretionary. However, each individually or in combination with other actions address critical resource management issues. Four management activities to restore and maintain naturally function ecosystems would be initiated or expanded upon. These activities are described below.

a) Restore Degraded Watersheds
To improve degraded environmental conditions, a target of 14.5 ha (36 ac), amounting to 4.5% of the unit, is proposed for initial, experimental treatment in 2000 and 2001 (Figure 6). Up to 146 ha (360 ac; Figure 7) or 46% of the unit may be treated over the next decade depending upon the success of the initial experimental treatments and program funding.

i) Proposed Criteria for Selection of Areas to Treat
Technical soil/watershed condition assessments were completed through two independent surveys conducted in 1999. These two data collection efforts provided remarkably similar maps and qualitative results. The selection of treatment areas in this Action Alternative/Plan is based on the following simplified criteria:

- Soils mapped and labeled as 400, 401, and 406 on Figure 6 and 7 have been rated as having "moderate" to "very severe" "hazard of water erosion" and "moderate" to "severe" "hazard of soil blowing" (Hibner *et al.* 2000).
- The soil series has been rated as being "poor" or "very poor" relative to "their potential for providing habitat" for both plants and animals (Hibner *et al.* 2000). A rating of poor "indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive." A rating of very poor "indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible." The soils mapped and labeled as 400, 401, and 406 on Figure 6 and 7 are all rated "very poor" for grasses and legumes and "fair" to "poor" for herbaceous plants, although the rock outcrops components of all three soil types are rated "very poor" as would be expected. Soils in series 404 (on "valley floors") were rated as "poor" for grass and herb plant establishment potential.
- The hydrological watershed condition as rated by Ruby (1999) is "poor" or "very poor" (Figure 3). A rating of poor indicates that the infiltration rate is low, overland run-off potential is moderate, and current soil damage is "severe, but treatable." A rating of very poor indicates that the infiltration rate is very low, overland run-off potential is high, and current soil damage may be "irreversible (A-horizon lost)."
- The areas are within reasonable distance of an access road or trail so that materials can be brought in with minimal effort and crew hiking time would be less than 30 minutes one-way.
- The density of cultural resources is relatively high in the area as compared to the Tsankawi Unit at-large.

If results are favorable in Treatment Areas #1 and #2 (Figure 6), we propose expanding the treatment into additional areas (Figure 7). Funding is limited, so expansion of treatment

areas would be dependent upon additional project dollars. This document is intended to cover the proposed expansion should additional funds be obtained.

ii) Proposed Treatment and Data Collection Methods

In a test of restoration methods, Treatment Area #1 (Figure 6) would receive the same techniques utilized in Bandelier's higher elevation main unit (Bandelier National Monument 1998a; Snyderman and Jacobs 1995). These techniques have not been applied to low elevation piñon-juniper woodlands, so the level and type of management intervention needed to help watersheds recover is uncertain in the Tsankawi Unit. Treatment methods would be evaluated and modified as data is collected and processed.

Tree density would be reduced by as much as 75% and the slash generated would be used for soil retainers and broadcast mulch. Visitors would be asked to stay out of the experimental treatment area. The thin/mulch treatment method encourages growth of understory species utilizing the existing, native, seed source already present in the soil. Seeding with native genotypes may be tested in the study area even though it proved very costly and to be of marginal benefit in other piñon-juniper restoration studies in the main unit. If tree density is inadequate to produce the desired mulch, limbs and branches, and possibly weed free hay and/or erosion control fabrics may be imported to supplement the materials available on site.

To evaluate the effectiveness of treatment, restoration trials would be actively monitored via standard methodologies previously used at Bandelier or through experimental techniques. Generally, vegetative cover would be measured along transects and erosion would be characterized using "bridges," erosion pins, and/or sediment collection traps. Associated infrastructure would consist of semi-permanent sample points (i.e., re-bar and/or aluminum stakes), which would delineate individual vegetation transects and possibly erosion bridge locations. Sediment collection traps would consist of straw bale dams, small lumber and silt-fencing structures, or another data collection system. Also, subsurface probes to measure soil moisture may be installed. Data would be collected and processed using standard protocols applied to other piñon-juniper restoration studies in Bandelier. The additional data should strengthen our overall knowledge of the efficacy of restoration techniques that have proven to be successful in higher elevation piñon-juniper sites with more standing, woody biomass present.

Portions of Treatment Area #2 (Figure 6) are significantly steeper than in Area #1 and the soils present in Area #2 are generally scarce or absent in Area #1. Area #1 is located at the headwaters of a relatively gently sloping valley while Area #2 is located on a steep south-facing slope and on a portion of the top of Tsankawi Mesa. The soil conditions in Area #2 are very poor and the predicted probability of success is low to non-existent. Unfortunately, there are significant resources in Area #2 that we are obligated to attempt to stabilize.

We propose to broadly experiment with treatment methods in Area #2, including: staged mechanized removal of the asphalt trail and culvert using a Bobcat; mechanized recontouring of the landscape to correct drainage problems caused by the existing trail, culvert, and water breaks; installing erosion control devices (progressive soil retainers and check dams), which should stabilize headward erosion and could eventually eliminate treated gullies if maintained for several decades; thinning trees and utilizing the tree slash as mulch; installing sterile geotextile

Figure 6. Experimental Vegetation Restoration Treatment Areas

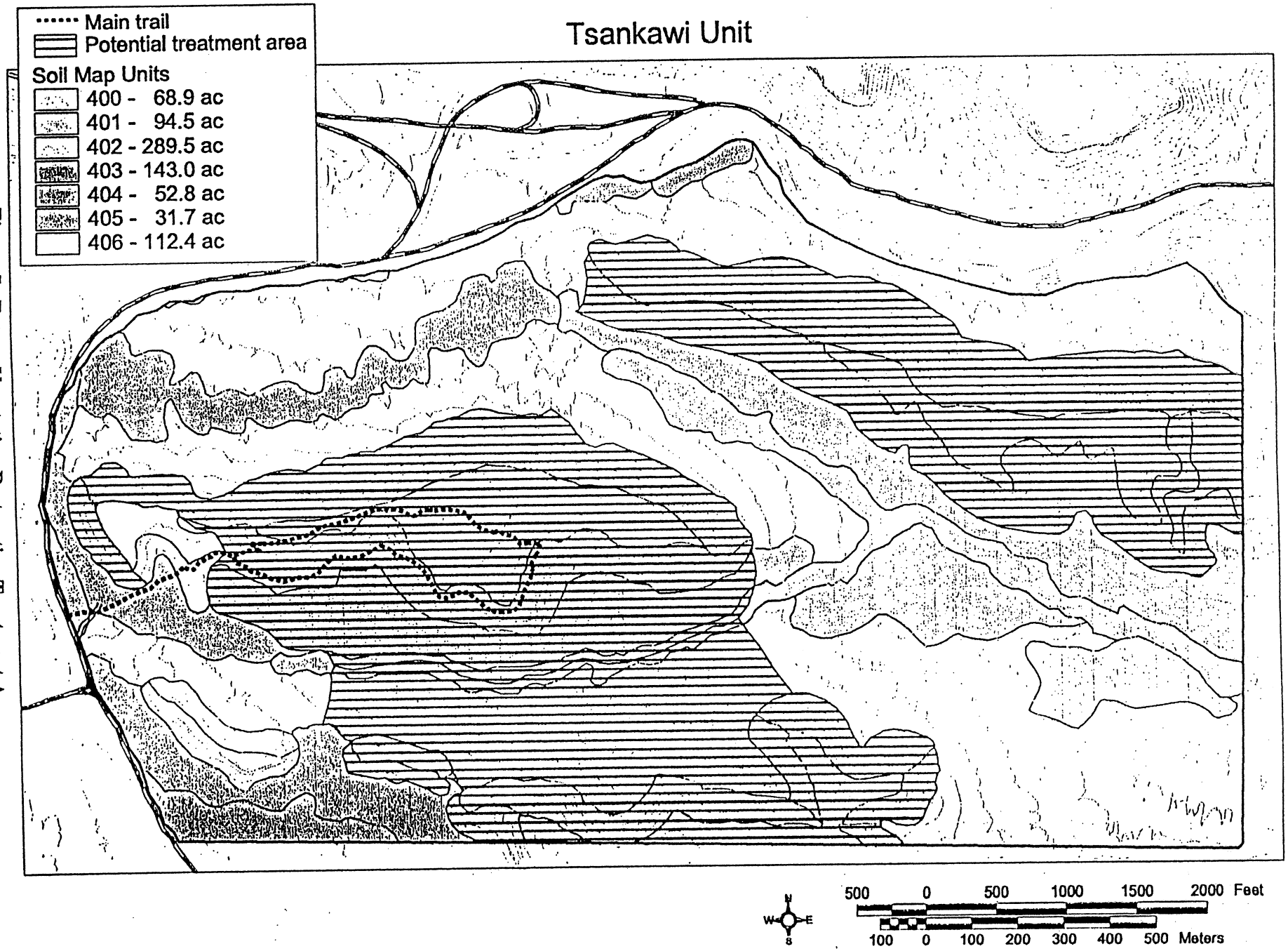


Figure 7. Future Vegetation Restoration Treatment Areas

erosion control fabrics; and controlled seeding and transplanting of native species. Again, treatment methods would be systematically evaluated and modified as data is collected and processed. Selected broadscale application of such treatments may be conducted over the next decade if experimental results indicate efficacy and cultural resource and environmental benefits. Cultural resources located in the study areas would be carefully isolated and monitored by an archeologist during the treatment project to prevent unintended/unanticipated adverse effects.

b) Reintroduce Fire Into Fire-dependent Ecosystems

Park fire staff would use prescribed fire to mimic the frequency of pre-1870 naturally occurring fires (NPS 1997). Fire would be reintroduced in areas containing ground cover vegetation capable of carrying fire and expanded as such vegetation becomes reestablished. Ponderosa pine woodlands have the best fuels to carry fire and would be treated first (Figure 8). Those areas treated with slash/mulch would also be treated with prescribed fire in the future, but fire treatment would be delayed to maximize the potential for grass and herbaceous vegetation recovery. Fire effects would be monitored according to standardized protocols to document fire effects trends and to make fire management course corrections.

c) Remove Asphalt Trail and Construct a New Trail

The following actions are proposed to eliminate approximately 300 m (1,000 ft) of asphalt trail (see Figure 9): a) eliminate the existing asphalt trail and culvert; b) reestablish natural drainage patterns disrupted because of the trail; c) fill the (possibly historic) short "slot trail" leading to the large caprock platform (sometimes referred to as the "dance floor") with boulders and brush to prevent its further use; d) construct a new trail to the large caprock platform; e) construct and install a "rustic" wood ladder to allow visitors to access the large caprock platform; and f) remove, move and install signs or other directional guides (e.g., cairn, line of rocks) to insure visitors can find the rerouted trail. Also proposed is removal of asphalt or similar petroleum product from an old road bed or maintenance staging area.

The asphalt trail and culvert would be mechanically removed using a Bobcat and dump truck. An old roadbed or staging area intercepts the existing trail at its lower end (point A, Figure 9). If additional asphalt is encountered, it would also be removed (12 wheelbarrow loads were removed in 1998). The culvert in the upper third of the asphalt trail segment would be carefully removed in stages to prevent worsening of upper watershed headcuts. We propose stabilizing (through revegetation and checkdams) the upper watershed first (to the extent practical) before removing the culvert to restore the natural drainage. This means that the culvert may remain in place for many years before it can be safely removed.

A new trail would be constructed as shown in Figure 9. The trail would not be paved with asphalt but may be hardened (e.g., paved with flagstone in localized areas). The trail would be made of compact, sterile, crushed rock and soil selected to match the color of the surrounding landscape. Frequent drainage breaks would be constructed with natural materials (generally stone) imported from outside the Tsankawi Unit unless a suitable source of stone can be found on-site. It should be noted, however, that no stone may be "harvested" for management use in the Tsankawi Unit if there is any possibility that it is culturally significant or is a stabilizing element in its parent environment.

The new trail surface may be maintained, if deemed necessary, with a non-toxic (e.g., non-petroleum based) soil amendment that lengthens the life of the soil tread. The treated trail tread would not differ substantially in color or appearance from the surrounding landscape.

The removal of the old asphalt trail and construction of a new trail would necessitate the relocation of some existing signs and construction of new directional signs. The precise location of these signs would be determined through management review of the new interpretive brochure which will be developed in consultation with the Pueblo of San Ildefonso (see III.C.4) and an archeologist's survey of the proposed location for each sign. Some signs would have to be "permanently installed" in soil or bedrock. There are two points along the preferred trail route where visitors might lose the trail – where it crosses a wash and a large area of bedrock. It may be necessary to put a directional sign on the upslope side of the trail where it crosses the wash (point B, Figure 9). Hikers going downhill are far less likely to lose the trail because of the flat open topography and presence of major structures at the lower end of the trail. A new signpost would be installed on or into the large caprock platform (point C, Figure 9) to insure that visitors can find the trail across this expanse of bedrock. This action could slightly damage a cultural resource site feature in the affected location, but should prevent extensive abrasion of the larger feature along its entire length by confused hikers.

d) Replace Two Flush and Two Chemical Toilets with One His/Her Vault Toilet
This action item has two subelements: a) remove the four existing toilets and reclaim the area; and b) installation of a new his/her vault toilet at a new location (point D, Figure 9). This location was selected because it is already highly disturbed and blocking the route of the old asphalt trail should reduce the use of the old tread, facilitating its recovery. The new his/her vault toilet would have a single vault but would have two toilets in separate spaces. The impacted area would be approximately 3 m (10 ft) wide, 5 m (16½ ft) long, and 3 m (10 ft) deep. The area is currently very compact dirt covered with gravel and asphalt. The park's "honey wagon" can easily back up to this proposed location to service the toilets without causing any additional damage to the environment.

3. Proposed Discretionary Actions to Decrease Adverse Resource Impacts through Visitor Management

The following five proposed actions are discretionary. However, each individually or in combination with other actions address critical resource management issues. The proposed actions that follow are designed to intensify or alter routine visitor management activities for enhanced resource protection and to provide new visitor experiences/opportunities.

a) Increase Visitor Education and Update Interpretive Information
The "Tsankawi story" would be told, to the extent practical and appropriate, from the Puebloan cultural perspective. The Tsankawi Unit self-guiding trail pamphlet would be rewritten in close consultation with San Ildefonso tribal representatives. Associated stopping points would be altered to eliminate sensitive information and to present revised and or new information. A Tsankawi Pueblo viewing platform with an artist's rendering to interpret pueblo features and facts may be created (see action item 5 below).

b) Designate a Primary Trail Route on Tsankawi Mesa and Restrict Visitors to It
As Tsankawi Mesa and Tsankawi Pueblo (in particular) are culturally sensitive, all trails, except a hardened, designated trail route would be permanently closed. In other words, visitors would be required to remain on the designated trail route and Tsankawi Mesa would be formally (and actually) closed to unfettered public exploration. Visitors found off-trail would be initially warned to stay on the designated trail. Repeat violators would be cited for entering a "closed area."

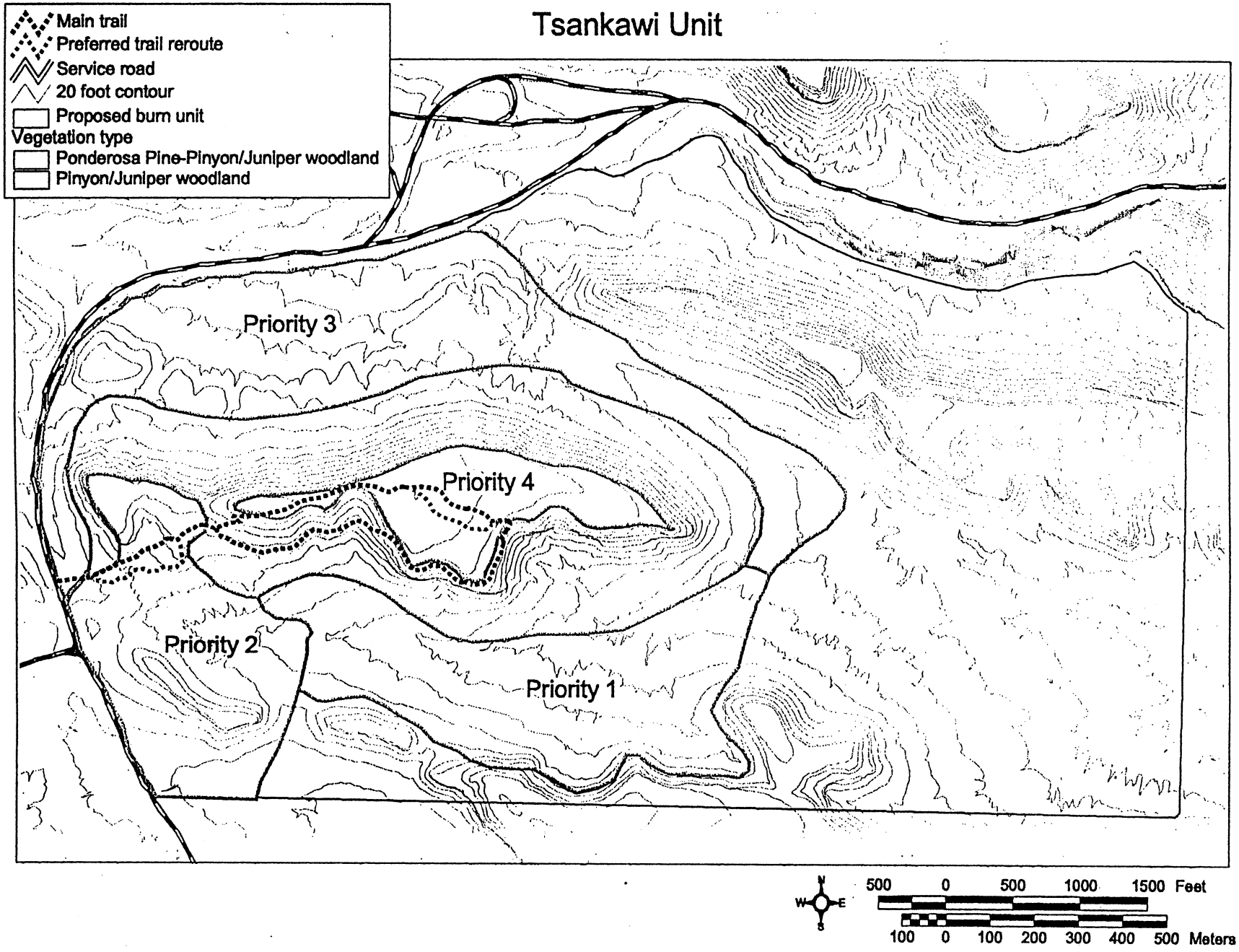


Figure 8. Vegetation Map and Prescribed Fire Burn Units

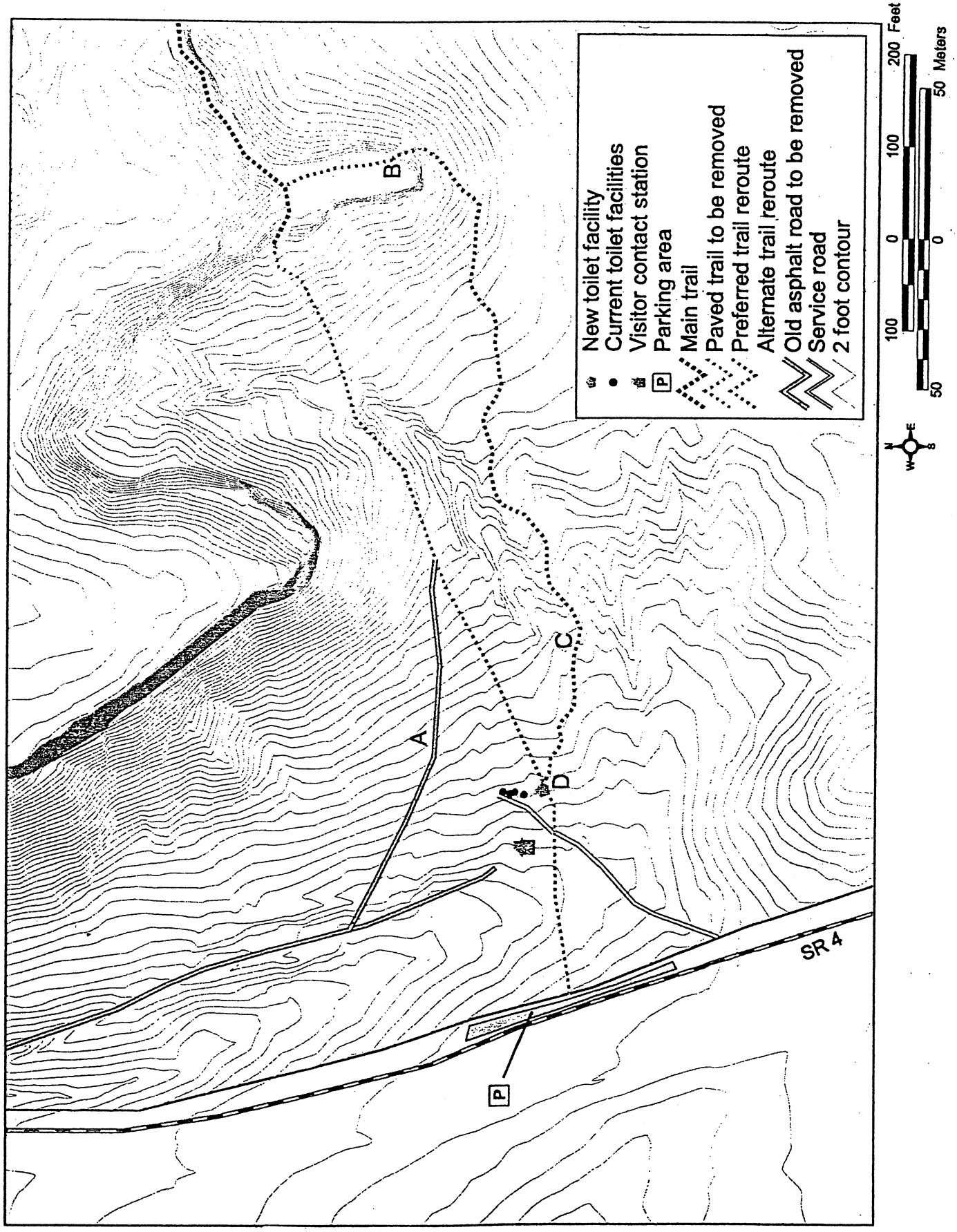


Figure 9. Trail Reroute and Asphalt Trail to be Removed

The old official trail and the network of social trails covering the mesa would be reclaimed through the application of revegetation techniques (e.g., mulching, brushing, installation of deterrents/natural barriers) and signs. New materials needed to construct the primary trail route and or to revegetate old trail treads would be flown in by helicopter and or carried in on people's backs.

c) Reroute, or do not Reroute, the Trail at Tsankawi Pueblo

The existing Tsankawi Pueblo trail could be rerouted to permit respectful, though distant viewing of the Pueblo. Visitors would be discouraged from entering sensitive areas through educational media and roving interpreters (at least while the NPS continues to receive fee demonstration dollars to pay for the increase in seasonal staff).

Four access options, including no trail reroute, are offered (see Figure 10). The consequences of each are analyzed in Chapter IV of this document. Members of the public and tribes are asked to identify their preferred action option when they provide written comments. The NPS's **preferred solution is the south route option** because it significantly reduces impacts to the archeological site while providing a good visitor experience opportunity.

i) No Trail Reroute Option

The existing 320 m long designated trail would stay where it is currently located, but the self-guiding trail pamphlet numbered posts (10-12) could be moved if deemed appropriate to visitor education objectives described in 3a above. The trail takes hikers over room blocks (walls) and through the main plaza, but would not take visitors through any known kivas.

ii) Middle Route Option

The middle route option is entirely within the Tsankawi Pueblo site boundary (Figure 10) and undoubtedly passes over subsurface archeological features. The new trail would entail construction of about 250 meters of new tread. The trail would be contracted so that visitors would walk only on imported fill (sterile imported gravel) to clearly define a 0.5 meter wide (18 in) tread and to mitigate potential impacts to subsurface materials. The tread material would be held in place by being put into a 5-10 cm (2-3 in) deep trough carefully dug into the ground by archeologists. A mitigation plan for this work and specific protocols for dealing with materials encountered would be developed separately in consultation with the State Historic Preservation Office (SHPO). No cultural artifacts would be collected for curation and storage.

iii) North Route Option

The north route option would entail the construction of about 435 meters of new tread as shown on Figure 10. The trail would not be constructed on imported fill except for the 39 meter long spur trail to the "destination" viewing platform (described in 3d below). The same trail construction technique and mitigation requirements described in the middle route option would apply to the north route viewing platform spur trail.

vi) South Route Option

The south route option would entail the construction of about 385 meters of new tread as shown on Figure 10. The trail would not be constructed on imported fill except for the 43 meter long spur trail to the "linear" viewing platform (described in 3d below). The same trail construction technique and mitigation requirements described in the middle route option would apply to the south route viewing platform spur trail.

d) Construct, or do not Construct, a Viewing Platform

A viewing platform, which could be built on a high point to the west of Tsankawi Pueblo (Figure 10) would include interpretive information through an artistic rendering of the Pueblo and/or descriptive text. The base of the viewing platform would have to be a minimum of 1.5 m (5 ft) above the ground to provide an adequate vantage point. Funds permitting, portions of Tsankawi Pueblo that were excavated in the early 1900s by Edgar Hewett (1906, 1938; Mathien 1986, 1989) would be backfilled with soil or brush to eliminate false perspectives of the naturally deteriorated pueblo landscape.

Three Tsankawi Pueblo viewing options are described below. The consequences of each are briefly examined in Chapter IV of this document. Members of the public and tribes are asked to identify their preferred action option when they provide written comments. The NPS's **preferred solution is the earthen platform option** because it has a smaller footprint, is easily reversible, and is appropriate to the south route option (see 3.c.vi above).

i) No Platform Option

No platform would be constructed, but one of the three trail reroute options discussed above and shown on Figure 10 would be installed.

ii) Masonry/Earthen Platform Alternative

The choice of trail route would dictate the platform design and access requirements. The middle route (Figure 10) would support a linear, walk through platform (Figure 11). In other words, the viewing platform would be elevated trail. The north and south routes would necessitate construction of a destination style platform (Figure 12).

Regardless of the style (linear or destination) platform selected, it would be built of earth and stone under this alternative. The earth and stone structure would be compatible with the texture, color, and materials in the adjacent environment.

The footprint of the linear style structure would be minimized by making it part of the trail. Hikers would simply climb up several steps, traverse the platform, and walk down several steps to return to the original trail level. Platform dimensions would be approximately 1.8 m (6 ft) wide, 8.5 m (28 ft) long, and 1.5 m (5 ft) high, including the stairs at both ends. Approximately 32 m^2 (350 ft^2) of existing vegetation would be disturbed during construction. If any native plants are present in the disturbance zone, they would be salvaged and transplanted. The footprint of the destination style platform would be about 9 m^2 (80 ft^2) smaller than the footprint of the linear style platform. (The masonry/earthen destination style platform is not shown, but would be the same size as the platform shown in Figure 12; the general appearance would be stylistically similar to that shown in Figure 11).

Materials would be flown to the work site by a Type II helicopter. Most loads will be delivered by long-line sling load, but occasional landings may be necessary. There will be no landings permitted on archeological sites. The amount of materials needed and absence of a suitable access route precludes the use of pack animals of any kind. Even if access to Tsankawi Mesa from a staging area were possible, stock would have to use narrow, prehistoric, slot trails to access the top of Tsankawi Mesa. Sustained use of pack animals on prehistoric trails or across the fragile landscape would present unacceptable safety and resource risks.

Based on an estimate of the volume of materials needed it would cost approximately $40,000 to $50,000 to construct the masonry/earthen platform.

iii) Scaffold Platform Alternative

The choice of trail route would dictate the platform design and access requirements. The middle route (Figure 10) would support a linear, walk through platform (Figure 11). In other words the viewing platform would be elevated trail. The north and south routes would necessitate construction of a destination style platform (Figure 12).

Under the scaffold viewing platform (Figure 12) alternative, a professionally engineered structure would be constructed of metal, wood, or recycled plastic. The platform would be engineered and constructed to be free standing in order to avoid the magnitude of ground disturbance required if concrete pilings were used. The scaffold would be painted, if necessary, to blend with the surrounding environment.

Viewing platform alternatives 3.d.ii and 3.d.iii would require the installation of guard rails/fence to prevent falls off the platform. Materials would be brought in by helicopter for the same reasons stated in the masonry/earthen platform alternative.

Based on an estimate of the volume of materials needed it would cost approximately $25,000 to construct the scaffold platform.

e) Monitor Effectiveness of Cultural Resource Impact Reduction

If cultural resource inventories indicate that established levels of maximum allowable change are exceeded, affected areas and/or features would be closed to visitation and an assessment of preservation options would be initiated.

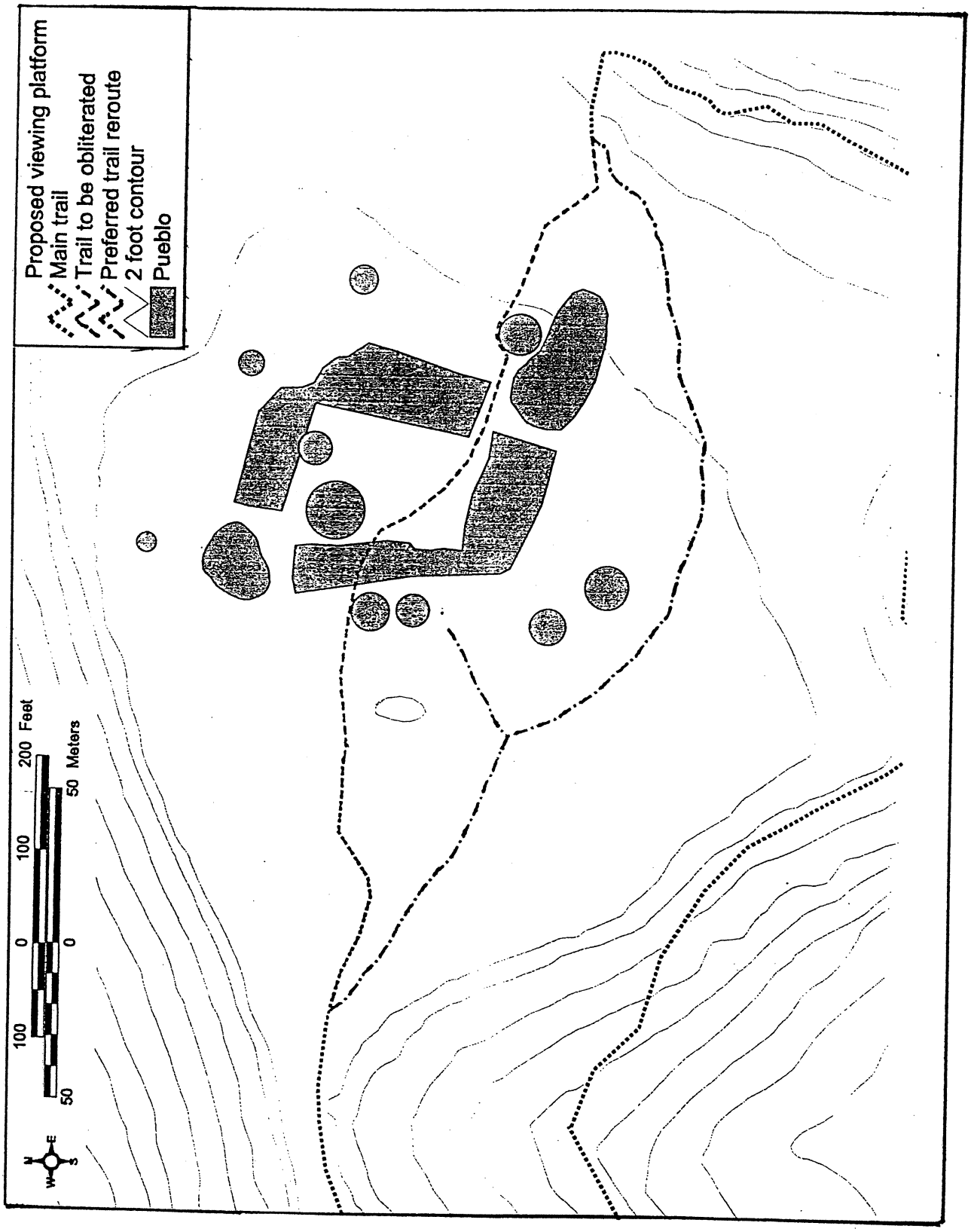
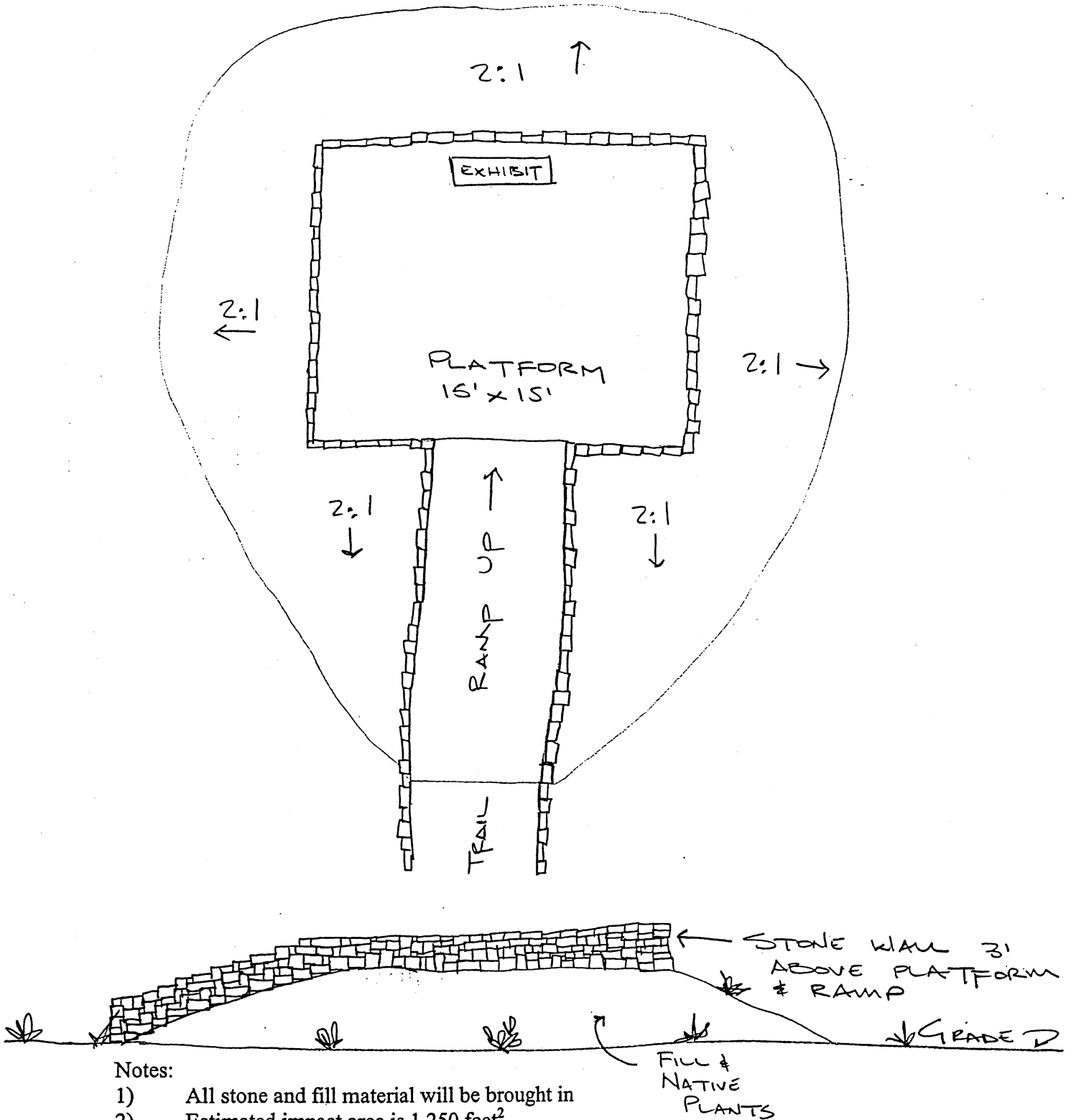


Figure 10. Trail Reroutes Through Tsankawi Pueblo

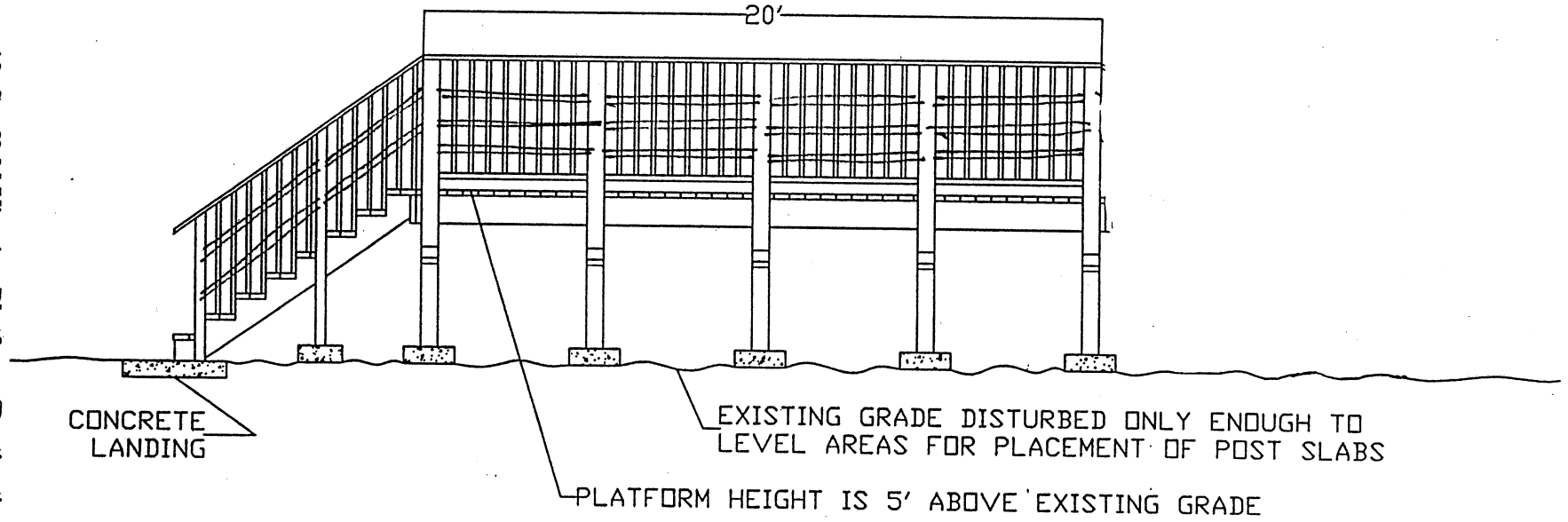


Notes:

1) All stone and fill material will be brought in
2) Estimated impact area is 1,250 feet^2
3) Interpretive exhibit to be installed on side closest to the pueblo

Figure 11. Masonry/Earthen Viewing Platform

OBSERVATION PLATFORM



NOTES:
-PLATFORM WIDTH = 6'-0"
-DECK MATERIALS TO BE WOOD-POLYMER COMPOSITION LUMBER. STEEL AND WOOD COMPONENTS WILL BE USED WHERE NEEDED FOR STRUCTURAL REINFORCEMENT.
-AN INTERPRETIVE PANEL WILL BE ATTACHED TO THE PLATFORM ON THE SIDE CLOSEST TO THE PUEBLO.
-CONCEPTUAL PLAN ONLY. PLATFORM DESIGN WILL NEED TO BE FINALIZED FOR STRUCTURAL CAPABILITIES AND FOR COMPLIANCE WITH APPLICABLE BUILDING CODES WHILE REMAINING AESTHETIC.

Figure 12. Scaffold Viewing Platform (Destination Style)

C. Alternatives Considered, but Eliminated from Detailed Analysis

1. Restrict Visitation to Ranger-Guided Tours Only

Although it would meet several identified objectives, this alternative was dropped because projected funding and staffing levels are insufficient cover the direct (tour guides) and indirect (enforcement patrol rangers) costs.

2. Staff the Tsankawi Unit with Personnel from the Pueblo of San Ildefonso

The Pueblo of San Ildefonso would provide a resource protection and visitor education presence. Such a proposal would be feasible, if a cooperative agreement could be reached and sufficient funds were available. This alternative was dropped from analysis, however, because projected NPS funding is insufficient to support this alternative.

3. Remove the Ladders to Tsankawi Mesa and Close the Mesa to Public Access

The Tsankawi Mesa trail would be "closed" by removing existing access ladders. This alternative would technically deny the majority of public access to the major interpretive and educational segment of the unit. While reducing visitation impacts in some areas, it would increase them in others. The removal of trail access ladders would likely result in visitor use of fragile prehistoric stairways and hand-and-foot holds to access the top of Tsankawi Mesa. This alternative was dropped from analysis because an internal closure would require law enforcement patrols beyond current and projected NPS funding and staffing levels.

4. Restrict Hours of Operation to be Commensurate with Staffing Levels

Tsankawi would be open only during those times when the NPS has adequate funding and resource protection staff to be present on site. This alternative was dropped from analysis because a closure during "non-operating hours" would require a law enforcement presence beyond current and projected NPS funding and staffing levels.

5. Close the Tsankawi Unit to All Visitor Use

Bandelier National Monument's enabling legislation defines public education and interpretation as primary goals. This alternative was dropped from analysis because the proposed action does not fall within the defined mission and goals of the NPS. Such a closure would require a law enforcement presence beyond current and projected NPS funding and staffing levels.

6. Transfer Ownership of the Tsankawi Unit to the Pueblo of San Ildefonso

This alternative does not fall within the purview or mission of the NPS or Bandelier National Monument. Such a land ownership transfer would require an Act of Congress. Significant changes in land management and use might result from such an ownership transfer. Such an action would not ensure the realization of the management goals and objectives defined in Chapter I of this Plan.

7. Construct Tsankawi Pueblo Viewing Platform Outside of the Archeological Site

A tall (approximately 7 meter (20 ft) viewing platform was proposed for installation in the treed area adjacent to the Tsankawi Pueblo archeological site. The structure would have to be anchored into bedrock and specially engineered to withstand strong winds and other harsh weather conditions. This alternative was rejected because Bandelier lacks the capability of maintaining such a structure and its adverse impacts on the environment were deemed too severe. The NPS would also be forced to assume too large of a public health and safety risk.

IV. AFFECTED ENVIRONMENT

Bandelier National Monument is located on the Pajarito Plateau on the eastern flank of the Jemez Mountains. The Tsankawi Unit is a 320 ha (790 ac) detached portion of Bandelier National Monument, located 8.5 km (5.3 miles) northeast of the park's main unit (Figure 1) and 29.3 km (18.2 miles) northwest of Santa Fe, New Mexico. The current climate is semi-arid continental, with distinct seasons and widely fluctuating annual and daily temperature ranges.

The Pajarito Plateau was formed by solidified ash ejected during two sequences of massive, explosive volcanism. Over time, the plateau has been eroded by water into striking parallel canyons and angular forms. The Tsankawi Unit contains two fairly complete and isolated mesas – Tsankawi Mesa and North Mesa. Portions of a third mesa, known as South Mesa, fall just within the unit's southern boundary. The unit is located between two large west-to-east-trending drainages, Los Alamos Canyon to the north and Sandia Canyon to the south, and contains seven primary watersheds (Figure 13 in Appendix A). At present water table levels, all the stream courses within the unit are intermittent.

The piñon-juniper woodland vegetation community covers approximately 80% of the unit, while the ponderosa-piñon-juniper woodland community covers the remaining 20%. Over the past 120 years, the unit's vegetation has been degraded. Had resource-damaging practices, particularly livestock overgrazing and suppression of the natural fire cycle, not taken place, it its believed that the Tsankawi Unit would contain fewer trees with more grassland and piñon-juniper-grassland savanna. As yet, the Tsankawi Unit has not been adequately surveyed for non-native flora, although several species are known to be present.

When compared to the main unit of Bandelier, wildlife diversity and activity in the Tsankawi Unit is less dynamic, as well as less visible to day-use-only visitors. Although a faunal inventory and species list has yet to be completed for the unit, approximately 30 mammals, seven reptiles, 30 birds, and numerous insects are assumed to be at least occasionally present.

More detailed environmental description information is available in Appendix A.

IV. ENVIRONMENTAL CONSEQUENCES OF IDENTIFIED ALTERNATIVES

Environmental issues that are affected by or apply to the identified alternatives, and thus, decision to be made, are discussed in this Chapter. Ten issue categories were identified as being appropriate for analysis. These are listed in the following table. None of the alternatives would have an affect on federally listed threatened and endangered species, wetlands and floodplains, or wilderness so these environmental issues were not analyzed.

ISSUES	AFFECTED/APPLIES	
	Yes	No
Aesthetic Qualities & Values	X	
Air Quality & Related Values	X	
American Indian Religious/Traditional Use	X	
Cultural Resources	X	
Environmental Justice	X	
Human Health and Safety	X	
Management Presence/Costs	X	
Soils and Water Quality	X	
Threatened/Endangered Species		X
Vegetation	X	
Visitor Use	X	
Wetlands or Floodplains		X
Wilderness		X
Cumulative Impacts*	X	

*The Council on Environmental Quality (CEQ) established regulations for the implementation of the National Environmental Policy Act. CEQ regulations (40 CFR 1508.7) define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." The regulations further explain that "cumulative effects can result from individually minor but collectively significant actions taking place over a period of time." Cumulative effects or impacts are summarized at the end of this Chapter after the environmental consequences are analyzed for each alternative.

A. No Action Alternative

Impact Categories	Impacts Beneficial or Adverse?	Impact Context	Impact Duration	Impact Intensity*
Aesthetic Qualities/Values	Adverse	Local	Long-term	Minor
Air Quality Related Values	No affect			
American Indian Religious/Traditional Use	Adverse	Regional	Long-term	Unknown
Cultural Resources	Adverse	Local	Long-term	Major
Environmental Justice	Beneficial	Regional	Long-term	Minor
Human Health and Safety	Adverse	Local	Long-term	Minor
Management Presence/Costs	Beneficial	National	Long-term	Negligible
Soils and Water Quality	Adverse	Local	Long-term	Major
Vegetation	Adverse	Local	Long-term	Moderate
Visitor Use	Both	Regional	Long-term	Minor
Cumulative Impacts	Both	Regional	Long-term	Moderate

*The threshold of change for the intensity of an impact is defined as follows: **Negligible** – the impact is at the lowest levels of detection; **Minor** – the impact is slight, but detectable; **Moderate** – the impact is readily apparent; and **Major** – the impact is a severe, adverse impact or an exceptional benefit.

a) Issue: Aesthetic Qualities & Values

Aesthetic qualities and values may be defined in terms of natural soundscapes, night sky visibility, scenic vistas, and to some extent cultural landscapes. Preservation of natural soundscapes are an important part of the NPS mission. The natural ambient soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for transmitting natural sounds.

While preservation of clear night skies, is an important component of the NPS mission, night sky visibility is not one of the values examined in this analysis because the public is currently not permitted in the unit at night.

Scenic vistas and cultural landscapes are critical to the NPS mission. The NPS was initially established to preserve superb scenery. Since the NPS mission and vision has significantly broadened, cultural landscape identification and preservation is one of the many values now given specific protection. The cultural landscape of the Tsankawi Unit is described and its significance discussed in the Draft Tsankawi Unit Cultural Landscape Inventory Report (NPS 1999a).

i) Natural Soundscape

No changes in natural soundscape would occur as a result of the no action alternative. Vehicle traffic noise would continue to be a major intrusion in some areas of the unit. An increase in traffic or public visitation would further diminish the natural soundscape.

ii) Visual Resources

Little change to the internal viewshed/landscape would occur as a result of the no action alternative. A network of social trails and visibly worn bedrock surfaces associated with visitor-caused abrasion would continue to dominate the local view in some areas. An increase in adjacent land development and vehicle traffic would have significant adverse impact on the scenery and the cultural landscape.

b) Issue: Air Quality

No change to air quality would occur as a result of the no action alternative. Regional wildland and prescribed fires and pollution haze would continue to reduce air quality and adversely impact scenic vistas.

c) Issue: American Indian Religious/Traditional Use

Visitor impacts on American Indian religious and traditional (TCP) use of the Tsankawi Unit would continue and possibly increase as visitor numbers increase. Continued uncontrolled visitor exploration of Tsankawi Mesa would likely reduce or eliminate some religious and or traditional uses of the mesa, since the NPS is generally not informed of specific American Indian religious or traditional use protection needs.

d) Issue: Cultural Resources

Current and increased visitation expected under the no action alternative would maintain and/or increase the current rate of and depth, width, and extent of social trailing, prehistoric trail and cavate fabric abrasion, graffiti and vandalism, and artifact collecting. Also, visitors would have no opportunity to learn about Tsankawi from the Puebloan perspective. Resource features and components would continue to degrade at an accelerated rate due to unstable environmental conditions triggered by historic land-use practices.

e) Issue: Environmental Justice

The no action alternative would not have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Draft Environmental Justice Guidance (July 1996).

f) Issue: Human Health and Safety

Some cavate features with the potential for structural failure would continue to be identified with area-closure signs. Since some people choose to ignore and even destroy safety signs, cavate structure failure would remain a risk.

Visitors would continue to start their hike on a wide, gently-undulating asphalt trail surface, which creates a mistaken expectation of a wide, maintained, low-risk hike.

g) Issue: Management Presence/Costs

No change in the current resource protection strategy or management presence would occur. No resource impacts mitigation would occur. Occasionally, visitors may be given an opportunity for

a guided walk. Park rangers would patrol the unit about once a day keeping administrative costs at a minimum.

h) Issue: Soils and Water Quality
Accelerated soil erosion would continue to spread at roughly its present unnaturally accelerated rate. The soft tuff substrate would continue to degrade through visitor-caused abrasion coupled with natural processes. As changes in vegetation community structure, accelerated soil erosion, and watershed damage continue or increase, water quality and availability would diminish. Although there are no current perennial streams within the unit, intermittent flows related to precipitation events would continue to carry a high sediment load. The unit's groundwater table would likely continue to lower.

i) Issue: Vegetation
Changes in vegetation community structure (decreasing ground cover understory, increasing piñon/juniper woodland overstory) in all parts of the unit would continue or increase as soil and watershed conditions continue to degrade at an unnaturally accelerated rate.

j) Issue: Visitor Use
No change in visitor use would occur as a result of the no action alternative. Visitors would continue to perceive that they have virtually unrestricted access (a sense of freedom) to all areas of the Tsankawi Unit, except those areas closed for safety reasons. An increasing population would cause visitation to increase.

B. Implement Tsankawi Management Plan Alternative

1. Impacts of Proposed Definite Actions

Impact Categories	Impacts Beneficial or Adverse?	Impact Context	Impact Duration	Impact Intensity*
Aesthetic Qualities/Values	Adverse	Local	Long-term	Minor
Air Quality Related Values	No affect			
American Indian Religious/Traditional Use	Beneficial	Regional	Long-term	Unknown
Cultural Resources	Beneficial	Local	Long-term	Minor
Environmental Justice	Beneficial	Regional	Long-term	Minor
Human Health and Safety	Beneficial	Local	Long-term	Minor
Management Presence/Costs	Adverse	National	Long-term	Negligible
Soils and Water Quality	Beneficial	Local	Long-term	Negligible
Vegetation	Beneficial	Local	Long-term	Minor
Visitor Use	Beneficial	Regional	Long-term	Minor
Cumulative Impacts	Beneficial	Regional	Long-term	Minor

*The threshold of change for the intensity of an impact is defined as follows: **Negligible** – the impact is at the lowest levels of detection; **Minor** – the impact is slight, but detectable; **Moderate** – the impact is readily apparent; and **Major** – the impact is a severe, adverse impact or an exceptional benefit.

a) Issue: Aesthetic Qualities & Values

For a definition of "aesthetic qualities and values" see IV.A.1 above.

i) Natural Soundscape

Noise impacts would temporarily increase if a Type II helicopter is used to transport supplies and materials for the rocking-up of selected cavates and or repair and maintenance of trail treads. A localized increase in noise would occur when and where resource management staff are working in the unit.

ii) Visual Resources

Cultural resource management activities would temporarily impact on-site visual resources at specified work locations. This impact would include caches of materials, slash barriers, rock walls, and crews at work.

b) Issue: Air Quality

No change to air quality would occur as a result of the definite actions proposed under the Implement Tsankawi Management Plan Alternative. Regional wildland and prescribed fires and pollution haze would continue to periodically reduce air quality and scenic vistas.

c) Issue: American Indian Religious/Traditional Use

Preservation of damaged cultural resources would lengthen their life cycle and potential utility. The appearance of some cultural features would be improved as well. While cultural resource restoration activities could result in some detrimental effects to tribal continuation-of-use, this possibility would be avoided or resolved through on-going consultation with the Bandelier Tribal Consultation Committee.

d) Issue: Cultural Resources

Visitor damage to some prehistoric trail segments, Tsankawi Pueblo, and selected cavates would be nearly eliminated. Some vandalism impacts (e.g., graffiti) would be repaired. Accelerated moisture damage to selected cavates would be eliminated or reduced.

e) Issue: Environmental Justice

The **definite actions** proposed in the implement Tsankawi Management Plan alternative would not have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Draft Environmental Justice Guidance (July 1996).

f) Issue: Human Health and Safety

Cavate features with a potential for structural failure may be structurally reinforced or simply closed to visitor access by warning signs and barriers, where appropriate. As some visitors choose to destroy barriers and ignore warning signs, no reasonable management action would entirely eliminate the threat posed by unstable cavates.

Some cavate features with the potential for structural failure would continue to be identified with area-closure signs. Since some people choose to ignore and even destroy safety signs, cavate collapse on visitors would remain a risk.

Risk of visitor injury on the main (NPS-designated) loop trail would be reduced since the walking surface in some sections would be on stone steps and fill instead of on slickrock or in narrow chutes.

g) Issue: Management Presence/Costs
Through cultural resource restoration activities, the NPS management presence would be temporarily increased and inappropriate visitor behavior would be discouraged where crews are working from 2000-2002.

Approximately $60,000 would be spent to do condition assessments and treat damaged cultural resources. Maintenance costs are impossible to accurately predict at this time, but would be higher than the no action alternative.

h) Issue: Soils and Water Quality
While natural moisture flow in and around some cavates would be modified, no significant impacts to soils or water quality would occur.

i) Issue: Vegetation
Some trees on cultural sites would be cut down and used to create slash barriers in social trails, particularly on Tsankawi Mesa. Where slash is used, the underlying ground vegetation (probably dominated by exotic species) would become vigorous and respond by recolonizing the former social trail treads.

j) Issue: Visitor Use
Approximately 300 m (1,000 ft) of the main trail, which has been identified as environmentally detrimental, would be rerouted. **Access to the loop trail would be permitted only by ladder, which may preclude the use of the loop trail by visitors who would otherwise use the trail.** (It is important to note that the Tsankawi Unit and Tsankawi Mesa trail, in particular, cannot be made "accessible" without destroying cultural fabric, features and landscape). Removal of the current asphalt trail section would discourage the use of strollers and inappropriate footwear within the unit and eliminate a problem with visitors perceiving that the entire trail is relatively smooth, broad and easy to hike.

Natural resource restoration activities may result in temporary area closures and/or trail detours. Visible cultural restoration efforts (e.g., repair of graffiti) and visitor contacts with the cultural restoration crew would result in improved visitor education and would change some visitors' experience of the Tsankawi Unit.

2. Impacts of Proposed Discretionary Ecosystem Restoration Actions

Impact Categories	Impacts Beneficial or Adverse?	Impact Context	Impact Duration	Impact Intensity*
Aesthetic Qualities/Values	Both	Local	Short-term & Long-term	Moderate
Air Quality Related Values	Adverse	Regional	Short-term	Minor
American Indian Religious/Traditional Use	Beneficial	Regional	Long-term	Unknown
Cultural Resources	Beneficial	Local	Long-term	Moderate
Environmental Justice	Beneficial	Regional	Long-term	Minor
Human Health and Safety	Beneficial	Local	Long-term	Minor
Management Presence/Costs	Adverse	National	Long-term	Minor
Soils and Water Quality	Beneficial	Local	Long-term	Moderate
Vegetation	Beneficial	Local	Long-term	Moderate
Visitor Use	Beneficial	Regional	Long-term	Minor
Cumulative Impacts	Beneficial	Regional	Long-term	Minor

*The threshold of change for the intensity of an impact is defined as follows: **Negligible** – the impact is at the lowest levels of detection; **Minor** – the impact is slight, but detectable; **Moderate** – the impact is readily apparent; and **Major** – the impact is a severe, adverse impact or an exceptional benefit.

a) Issue: Aesthetic Qualities & Values

For a definition of "aesthetic qualities and values" see IV.A.1 above.

i) Natural Soundscape

Noise would temporarily increase during tree thinning operations since chain saws are required to implement the proposed action. Approximately 36 acres would be treated with chainsaws. It generally takes one person one day to treat 1.5 acres. If four persons work at a time, approximately 6 acres can be treated with chainsaws per day. This means that chainsaw noise would be an adverse impact for about 6 total days for the experimental phase of the proposed action. The chainsaws would be operating on weekdays when visitation is lower.

ii) Visual Resources

Visitation management activities would temporarily impact on-site visual resources at specified work locations.

The elimination of social trails, reduction of bare ground, and modification of the vegetation/landscape would eventually improve the local scene. However, ecosystem restoration activities proposed for Treatment Areas #1 and #2 (Figure 6) and beyond (Figure 7) would adversely affect the local landscape for an uncertain number of years. Thinned

stands of trees, scattered slash/mulch, small artificial structures (soil retainers and check dams), and areas of burned vegetation would be highly evident in the first year of treatment and possibly for another five years depending upon the amount of precipitation received after treatments have been applied.

b) Issue: Air Quality
Same as the no action alternative, except during on-site prescribed fires when local air quality would be reduced by smoke for 1-3 days. Restoration of vegetative ground cover would locally decrease dust.

c) Issue: American Indian Religious/Traditional Use
Same as the no action alternative with the possibility of occasional disruption of TCP use as a result of activities associated with ecosystem restoration work areas (e.g., trail reroutes and rehabilitation, check dam construction, etc.). The likelihood of adverse effects upon religious and or traditional use occurring, however, is small since park managers routinely inform affiliated tribes of planned activities and adjust plans to meet ceremonial and traditional use needs. Restoration of vegetative cover would result in an increase in the variety and abundance of vegetal resources, likely including traditional-use plants.

d) Issue: Cultural Resources
The degradation of resource features through accelerated natural processes (e.g., soil erosion, watershed degradation) would be decreased to the natural range of variability in treated areas.

e) Issue: Environmental Justice
The proposed ecosystem restoration discretionary action alternative would not have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Draft Environmental Justice Guidance (July 1996). It is possible that soils stabilization activities would slightly reduce contaminant spread from upstream DOE lands to downstream Pueblo lands.

f) Issue: Human Health and Safety
Same as the no action alternative, except that installation of an additional wooden ladder to the bedrock platform (Figure 2) and removal of the paved trail at the beginning of the route would increase Tsankawi Mesa Loop Trail hiking difficulty. These changes would remove the mistaken expectation given to visitors at the beginning of their hike, that the entire trail is relatively smooth, wide and easily traveled.

g) Issue: Management Presence/Costs
Through trail work and natural resource stabilization activities, the NPS management presence would be increased during the field season in the years 2000-2002. A management presence (even a non-law enforcement presence) has proven to be a deterrent to inappropriate visitor behaviors. An estimated $50,000 would be spent to restore naturally functioning ecosystems. Long-term maintenance costs are impossible to accurately predict at this time, but would be similar to the no action alternative.

h) Issue: Soils and Water Quality
Accelerated soil erosion should be slowed and/or returned to natural levels in treated areas. Some precipitation runoff would be slowed by the installation of small soil retainers and small check dams within drainages. As vegetation community structure, accelerated soil erosion, and

watershed conditions are returned to nominal levels, water availability and quality may be enhanced.

i) Issue: Vegetation
Previous and on-going changes in vegetation community structure (decreasing ground cover understory, increasing piñon/juniper woodland overstory) would be slowed and possibly reversed in experimental restoration treatment areas which cover at least 14.5 ha (36 ac; Figure 6). Accomplishment of this vegetation restoration goal, however, may eventually require cutting down up to 75% of the trees over 146 ha (360 ac; Figure 7) or 46% of the unit.

j) Issue: Visitor Use
Natural resource restoration activities and prescribed burns would create the need for temporary area closures and/or trail detours.

3. Impacts of Proposed Discretionary Visitor Management Actions

Impact Categories	Impacts Beneficial or Adverse?	Impact Context	Impact Duration	Impact Intensity*
Aesthetic Qualities/Values	Both	Local	Long-term	Major
Air Quality Related Values	No affect			
American Indian Religious/Traditional Use	Beneficial	Regional	Long-term	Unknown
Cultural Resources	Beneficial	Local	Long-term	Major
Environmental Justice	Beneficial	Regional	Long-term	Minor
Human Health and Safety	Beneficial	Local	Long-term	Minor
Management Presence/Costs	Adverse	National	Long-term	Minor
Soils and Water Quality	Beneficial	Local	Long-term	Minor
Vegetation	Beneficial	Local	Long-term	Moderate
Visitor Use	Both	Regional	Long-term	Major
Cumulative Impacts	Beneficial	Regional	Long-term	Moderate

*The threshold of change for the intensity of an impact is defined as follows: **Negligible** – the impact is at the lowest levels of detection; **Minor** – the impact is slight, but detectable; **Moderate** – the impact is readily apparent; and **Major** – the impact is a severe, adverse impact or an exceptional benefit.

a) Issue: Aesthetic Qualities & Values
For a definition of "aesthetic qualities and values" see IV.A.1 above.

i) Natural Soundscape

Visitation would be more controlled so it is possible that local noise would be less in some areas of the unit frequented by visitors. Since the visitor is being asked to stay on the main trail on Tsankawi Mesa, visitors would likely hear each other more in this area, especially at stopping and view points.

Noise impacts would temporarily increase when a Type II helicopter is used to transport supplies and materials for the viewing platform. A localized increase in noise would occur when and where resource management crews are working.

ii) Visual Resources

Visitation management activities would temporarily impact on-site visual resources at specified work locations. This impact would include caches of materials, slash barriers, rock walls, and crews at work.

Any viewing platform in this open cultural landscape would be an anomaly and thus a major visual intrusion. Under the no platform option, visitors would be unable to view Tsankawi Pueblo, except for portions of the western and southern rubble mounds, unless they left the designated trail. The scaffold platform would be less aesthetically compatible with the local landscape, but would be much easier to remove if, in time, it proved undesirable. It would be possible to build the scaffold platform first as a test. If it works relatively well, a less visually intrusive masonry/earthen platform could be constructed at a future time.

b) Issue: Air Quality

Same as the no action alternative, except during helicopter operations, when rotors cause an increase in local area dust.

c) Issue: American Indian Religious/Traditional Use

Adverse visitor impacts to American Indian religious and traditional use of the Tsankawi Unit would likely decrease dramatically on Tsankawi Mesa where visitor access would be limited.

d) Issue: Cultural Resources

Degradation of resource features through visitor-related abrasion would be significantly reduced.

e) Issue: Environmental Justice

The proposed discretionary visitor management actions would not have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Draft Environmental Justice Guidance (July 1996).

f) Issue: Human Health and Safety

Cavate features with a potential for structural failure may be structurally reinforced or simply closed to visitor access by warning signs and barriers, where appropriate.

g) Issue: Management Presence/Costs

Inappropriate visitor behaviors would be significantly reduced for the short term – through 2002. Closing Tsankawi Mesa to unrestricted exploration would increase management costs because it is necessary to educate the public about the need for the closure and to enforce the closure. This cost could be substantial in the early years, as former visitors would expect complete freedom on the mesa. New visitors would not have the same expectations.

From $45,000 to $70,000 would be spent to reroute the Tsankawi Pueblo trail, construct a viewing platform ($0-$50,000, depending on the alternative selected), and create a new, educational, self-guiding trail pamphlet with information interpreted from the Puebloan perspective. Maintenance costs are impossible to accurately predict at this time, but would be similar to the no action alternative.

h) Issue: Soils and Water Quality
Degradation of the soft tuff substrate caused by visitor-related abrasion would be mitigated by proposed visitor impact reduction efforts and rehabilitation of social trails.

i) Issue: Vegetation
Ground cover vegetation in many areas would be restored when visitors are restricted to a single resource-sensitive route on Tsankawi Mesa. This alternative calls for monitoring for the effectiveness of visitor management actions so that vegetation impacts would be detected early. If a viewing platform is constructed, the vegetation in a limited area (approximately 32 m^2 or 350 ft^2, plus a supplies and equipment staging area and off-site helispot) would be disturbed. Installation of a scaffold platform would result in disturbance of vegetation in the same area, but weedy vegetation would reestablish under the platform. A helispot adjacent to Tsankawi Pueblo would cause short-term trampling of vegetation. Material deliveries would be through a long-line sling eliminating the impacts associated with landing a helicopter.

j) Issue: Visitor Use
Visitors would no longer be allowed to freely roam on Tsankawi Mesa. Visitors violating closure regulations (e.g., hiking off trail) could be cited.

C. Cumulative Impacts Analysis

The Tsankawi Unit of Bandelier National Monument is a relatively small area directly affected by several larger neighbors. These include: Los Alamos National Laboratory (overseen by the U.S. Department of Energy and the University of California); the Pueblo of San Ildefonso, the Pueblo of Santa Clara, and the Pueblo de Cochiti; and the counties of Sandoval, Santa Fe, and Los Alamos. Bandelier National Monument is very popular locally and regionally, with current visitation levels at approximately 350,000 people per year.

As stated at the beginning of this chapter, a cumulative impacts analysis is required under CEQ regulations for federal actions. The cumulative effects analysis which follows is based on reasonably foreseeable future actions on the human environment in the region and local area, and their potential to affect aesthetic qualities and values, biogeophysical resources and processes, cultural resource preservation, socioeconomics and environmental justice, and visitor use and public safety. For the purposes of the cumulative effects analysis the NPS makes the following assumptions:

- Los Alamos National Laboratory will continue to operate and dominate the economy of northern New Mexico.
- Bandelier will not get a base increase and the Congressionally approved fee demonstration program will terminate in 2002.

- The region's population and desire for educational/recreational opportunities will increase over the next 10 years. Although there will be fluctuations, the general trend is upward.
- The Conveyance and Transfer of the White Rock Y and TA74 tracts will take place as proposed by the County of Los Alamos and the Pueblo of San Ildefonso (Figure 4) and that these areas may be developed for residential and commercial use to some degree.
- The Bandelier Tribal Consultation Committee MOA will be signed by the following Pueblos: San Ildefonso, Santa Clara, Cochiti, San Felipe, Santo Domingo, and Zuni.

1. No Action Alternative

a) Aesthetic Qualities and Values

Aesthetic qualities and values are defined in Chapter II – Management Issues and Concerns, section C.1. Important cumulative impacts occur when the net effect of regional projects or activities would adversely affect aesthetic qualities and values from a regional and unit perspective.

External influences are the primary threat to the unit's aesthetic qualities and values. According to the DOE (1999), "lighting associated with a transportation corridor" is likely to change. In addition, the DOE predicts that if adjacent lands are developed, this action would cause a "reduction in visual quality" that would impact the viewshed from Tsankawi. "[D]iminished viewsheds could impact resources important to maintaining a positive visitor experience on adjacent [Tsankawi Unit] lands." The NPS agrees with this impacts assessment.

b) Biogeophysical Resources and Processes

Relevant biogeophysical resources and processes are described in Appendix A – Environmental Setting and in Chapter II - Management Issues and Concerns, section A.

At the local (unit) level, it is highly unlikely that deteriorating natural resource conditions would be mitigated under the no action alternative. Therefore, accelerated soil erosion and watershed degradation would continue to cause damage and loss of natural resources, particularly soils. Visitors would continue to abrade cultural fabric and features as they enter and leave cavates. The cumulative effect of these impacts would be unnatural trends in natural resource conditions.

It is impossible to predict with certainty, the cumulative impacts of development of adjacent lands, however, according to the DOE, the "proposed land use scenarios would...cause irreversible commitments of ecological habitat, and potentially cultural resources in land tracts where new development would occur."

c) Cultural Resource Preservation

Cultural resource concerns are described in Appendix B – Cultural Setting and in Chapter II - Management Issues and Concerns, section B. Cumulative impacts to cultural resources are assessed by examining the anticipated impacts on prehistoric, historic, and traditional cultural properties (TCPs). "Important cumulative impacts occur when the net effect of regional projects or activities would result in the destruction, alteration, isolation, neglect, loss of protection, or the introduction of visible, audible, or atmospheric elements out of character with the resource" (DOE 1999). There will be a net adverse effect and loss of cultural resources regionally, assuming adjacent lands are transferred as planned out of federal control and or developed.

The relative value of Tsankawi Unit cultural resources can be reasonably expected to rise with the loss of cultural resources on adjacent lands. Keeping this in mind, there would be a net adverse impact to cultural resources under the no action alternative. Free-roaming visitors would continue to vandalize cavate features and move and steal artifacts, particularly in the Tsankawi Pueblo area. Visitors would continue to make regular, direct and therefore detrimental contact with walls and room blocks, middens, and other cultural features. Cumulative impacts to TCPs are impossible to predict but adverse impacts would likely increase. Since visitation is expected to increase especially if residential units are developed on adjacent lands, it is reasonable to assume that the rate of damage and loss will increase. The rate of soil erosion and associated cultural resources damage and loss would remain the same (unnaturally accelerated).

d) Socioeconomics and Environmental Justice

Cumulative socioeconomic impacts are assessed by comparing baseline conditions with anticipated regional changes in population, employment, and expenditures expected as a result of reasonably foreseeable projects and activities. Important cumulative socioeconomic impacts occur when the net effect of regional projects or activities would substantially alter the location and distribution of regional populations.

No cumulative impacts on minority or low-income populations or the distribution of regional populations would be expected as a result of the no action alternative. No adverse human health impacts would be associated with the no action alternative, nor would there be disproportionate impacts to minority or low-income populations. The cumulative impacts of the no action alternative on socioeconomics would be non-detectable since the net effect of regional projects would be several magnitudes greater.

e) Visitor Use and Public Safety

The Tsankawi Unit is popular with organized tour groups and well known to local residents. Between 1997 and 1999, an annual average of 342,000 people visited Bandelier National Monument. Peak visitation occurs from May through August. A 1995 study (Bandelier National Monument 1995) estimated that perhaps 5% of visitors to Frijoles Canyon also visit the Tsankawi Unit. Tsankawi is considered to be one of the premiere spots to visit by regional and local (Los Alamos County) residents.

With a growing population anticipated, there would be a net increase in visitors using the Tsankawi Unit. The visitor experience/opportunities would remain relatively static, which might perpetuate the preponderance of unit use by "locals."

Cumulative human health and safety impacts are assessed by weighing rates of injury. The accident/visitor injury rate in the Tsankawi Unit is already very low (1-2 per year) and has decreased in recent years. The no action alternative would have negligible cumulative impact on public safety.

2. Implement Tsankawi Management Plan

Explanations relative to the meaning, definition or purpose of each cumulative impact category discussed below are given under the no action alternatives discussion above.

a) Aesthetic Qualities and Values

The cumulative impacts on aesthetic qualities and values would be both negative and positive at the local viewshed level if all elements of the Tsankawi Management Plan alternative are implemented. Social trails and modern graffiti would be eliminated improving the local views. If a viewing platform is constructed, there will be a net adverse effect on the local landscape in portions of Tsankawi Pueblo, but the structure would not be visible from adjacent highways or other regionally important viewpoints.

If the NPS is successful in working with adjacent land owners to avoid development that adversely impacts natural soundscapes, the night sky, and viewsheds, the Tsankawi cultural landscape may remain relatively unchanged, otherwise the cumulative impacts are identical to the no action alternative.

b) Biogeophysical Resources And Processes

There would be a net positive increase in ground cover vegetation in the unit if all discretionary ecosystem restoration and visitor management actions are implemented. If any are not implemented there would be an incremental loss of biogeophysical resources, particularly productive soils, in the region. Although there are no perennial streams within the unit, intermittent flows related to precipitation events would eventually carry less sediment to downstream areas owned by the Pueblo of San Ildefonso. Most likely, the unit's groundwater table would rise which may cause springs to change in downstream areas.

c) Cultural Resource Preservation

The degradation of resource features through accelerated natural processes (e.g., soil erosion, watershed degradation) would be locally decreased to the natural range of variability in treated areas. If all of the discretionary action options are implemented, the cumulative impact on cultural resources would be positive and significant in scope, especially when one considers the adverse effects on cultural resources that would occur from the planned conveyance and transfer of the White Rock Y and TA-74 tracts to Los Alamos County.

d) Socioeconomics

Low-income minorities from local Native American communities would be hired to do much of the proposed work. The cumulative effects of the implement Tsankawi Management Plan alternative would be a small increase in skilled Native Americans. The types of skills being developed would make these individuals particularly competitive for NPS and regional cultural resource preservation, resource interpretation, and specialized construction jobs.

e) Visitor Use and Public Health and Safety

There might be a net decrease in visitor numbers. The visitor experience would be significantly altered on Tsankawi Mesa, particularly in Tsankawi Pueblo. Visitors expecting former freedoms may be angered or frustrated by the requirement to stay on the main trail on Tsankawi Mesa. The NPS would mitigate this situation to a large extent by educating visitors on why such a restriction is necessary and by perhaps installing a viewing platform with interpretive information not previously provided.

The proposed action alternative (all options) would have a net positive cumulative impact on public safety in the unit. Inadequately prepared visitors would be much more likely to go elsewhere when they encounter a dirt hiking trail and ladder in the first 1000 ft of their hike.

As some visitors choose to destroy barriers and ignore warning signs, no reasonable management action would entirely eliminate the threat posed by unstable cavates.

VII. CONSULTATION AND COORDINATION

A. Document Preparers and Contributors

This document was prepared by Charisse Sydoriak (Chief of Research and Resources Management), and W. Joseph Mundy (Editorial Assistant). Figure maps were compiled and generated by Kay Beeley (Cartographic Technician) and Charles Sellars (Facilities Manager).

Contributors and reviewers from the park staff include: Roy Weaver (Park Superintendent), Rory Gauthier (Park Archeologist), Mike Elliott (former Staff Archeologist), Gary Roybal (Native American Affairs Liaison), Brian Jacobs (Vegetation Specialist), Carl Newman (Chief of Resource Protection), Dale Coker (Protection Ranger), Charles Sellars (Facility Manager), Carlos Gonzales (Roads and Trails Foreman), Chris Judson (Interpretive Specialist), and Steve Fettig (Wildlife Biologist).

B. Internal Consultants

Jake Barrow, Architectural Conservator, Cultural Resources Center, Intermountain Support Office has been and continues to be an advisor on the cultural resource preservation aspects of the proposed actions during all phases of experimentation and plan development. Jake assisted in the development of the original Scope of Work (NPS 1988) for the Tsankawi Project and has reviewed and commented on this document.

Ernest Ortega, Superintendent of the Santa Fe Support Office, and Virginia Salazar, Intermountain Region Curator, met with park staff on November 23, 1998 to review the pilot work completed during the summer of 1998. The purpose of the meeting was to discuss progress results and how to proceed. The consensus from the participants was that the pilot studies and hiring of Puebloan youth was an unqualified success and that we should continue as outlined in the Scope of Work developed in 1998 (NPS 1998).

NPS Cultural landscape specialists Jill Cowley and Lance Foster along with park and Santa Fe support office staff met in the spring of 1998 to plan for the 1998 pilot studies and to discuss planning goals and data gaps. Jill Cowley produced a list of "suggested data gathering topics for the Tsankawi plan" and assigned Lance Foster to create a Level II Cultural Landscape Inventory of the Tsankawi Unit (NPS 1999a), submitted to the Bandelier Superintendent in September 1999. Jill Cowley reviewed the Cultural Landscape Inventory portion of this draft Plan.

Former Bandelier staff members John Lissoway (retired) and Ed Greene (Carlsbad Caverns National Park) were consulted regarding the Tsankawi Unit's management history.

Dr. Craig D. Allen (USGS-Biological Resources Division, Jemez Mountains Field Station) provided advice and reviewed portions of the text.

C. Native American Consultants

Representatives from affiliated tribes were invited to meet with park staff on the following dates to discuss the issues and management alternatives for a Tsankawi Management Plan: September

16, 1998 (general topics consultation meeting), April 16, 1999 (first formal Bandelier Consultation Committee Meeting), June 3, 1999 (organized site visit to discuss Tsankawi issues), July 28, 1999 (all day meeting held with the Bandelier Tribal Consultation Committee in Santa Fe to ascertain the "Puebloan Perspective" on the Tsankawi Unit, see Chapter II E), November 29, 1999 (visit to Tsankawi Mesa with members of the Pueblo of San Ildefonso), and January 28, 2000 (first annual work-planning meeting with the Bandelier Tribal Consultation Committee). On February 7, 2000, Myron Gonzales (Pueblo of San Ildefonso) hiked the proposed trail reroutes tentatively laid out by park staff. Pueblo of San Ildefonso and New Mexico State Historic Preservation Office (SHPO) representatives have agreed to review on-site the details of the proposed actions before the end of the public comment period.

The Bandelier Tribal Consultation Committee was officially recognized as a valid consultation body at the September 16, 1998 meeting. Twenty-seven tribes, including all Pueblos in New Mexico and Arizona, and the Navajo tribe were invited to attend the September 16th meeting. Sixteen representatives from eleven tribes attending the meeting agreed to be represented by a committee except on NAGPRA related matters. The Pueblos of San Ildefonso, Santa Clara, Cochiti, San Felipe, and Zuni informally agreed to be on the Bandelier Consultation Committee. A first draft role and function statement and memorandum of agreement (MOA) was approved on April 16, 1999 (Bandelier National Monument 1999a). The final MOA should be signed in 2000.

Issues addressed in this document have been discussed face-to-face to varying degrees with representatives of the pueblos of San Ildefonso, Cochiti, San Felipe, and Zuni. The single most important consultation meeting occurred on July 28, 1999, with representatives of the pueblos of Cochiti, San Ildefonso, and Zuni attending. Pueblo of Cochiti and Zuni representatives stated that they would defer to the Pueblo of San Ildefonso on issues relating to the Tsankawi Unit, acknowledging this Pueblo's direct ties to Tsankawi and adjacent lands.

D. State Historic Preservation Office

Alysia Abbott of the State Historic Preservation Office (SHPO) visited the Tsankawi Unit with park staff on March 19, 1998, March 23, 1999, and March 9, 2000. At the March 19, 1998 meeting, she indicated that the preferred management strategy for Tsankawi Pueblo was to move the main trail off of the pueblo walls and away from the pueblo proper. She also indicated support for experimental activities to infill damaged prehistoric trails, reroute trail segments, and remove the asphalt trail segment, vegetation restoration management, remove trail markers and signs from archeological site features, repair graffiti, and rock in selected cavates. These management activities were approved on an experimental basis through a letter of concurrence signed by the designated SHPO officer on June 10, 1998.

On March 9, 2000, Ms. Abbott met with park staff to go over the proposed actions in this document. This Plan and EA generally calls for intensification and expansion of the same activities approved by the SHPO (on June 10, 1998) as having "no adverse affect." However, there is one exception. If the main loop trail is rerouted through or around Tsankawi Pueblo there could be an "adverse affect" to the archeology and or cultural landscape. This affect will be addressed in a mitigation plan if one of the reroute alternatives is selected for implementation.

E. U.S. Fish and Wildlife Service

The NPS anticipates no effect on federally listed species or critical habitat by the actions proposed in this Plan and EA. No federally listed species or critical habitat occur in the Tsankawi Unit. No breeding or foraging habitat is known in the unit for either the Mexican Spotted Owl or Southwestern Willow Flycatcher. Wintering Bald Eagles are not known to use the area for roosting.

F. Other External Consultants

Dr. Frank Matero, Dean of the Historic Preservation Department at the University of Pennsylvania was contracted as a consultant during the experimental phase of the Tsankawi Project (Matero *et al.* 1998).

Earl Ruby, USFS-retired, was contracted to do a hydrologic condition assessment of the Tsankawi Unit in 1998 (Ruby 1998). The USDA Natural Resource Conservation Service completed a survey of the soils of the Tsankawi Unit (Hibner *et al.* 2000). Associated findings and recommendations have been incorporated, where appropriate, in the alternatives described in this document.

G. Distribution List

The draft Tsankawi Management Plan and Environmental Assessment will be sent to 32 governing entities (including 26 tribes or tribal organizations), 16 state and federal offices or officers, 21 agencies or organizations, and four private citizens who have asked to be put on the park NEPA distribution list. Additional copies are available by contacting the superintendent, Bandelier National Monument at (505) 672-3861 ext 502.

In the interest of conservation of paper, the document distribution list is only available upon special request. Persons desiring a copy of this list should contact the resource management section administrative assistant at (505) 672-3861 ext 547.

REFERENCES CITED

Allen, Craig Daniel

1989 Changes in the Landscape of the Jemez Mountains, New Mexico. Unpublished Ph.D. Dissertation, University of California at Berkeley.

1993 The Setting. In: The Pajarito Plateau: A Bibliography, by Frances Joan Mathien, Charlie R. Steen, and Craig D. Allen, pp. 5-8. Southwest Cultural Resources Center Professional Paper No. 49. USDI National Park Service, Division of Anthropology, Santa Fe.

Allen, Craig, and Brian Jacobs

n.d. Recommendations for Management of the Tsankawi Unit Landscape, Bandelier National Monument. USDI National Park Service.

Attwell, Walter G.

1933 Report on Trails, Study in Bandelier National Monument. Ms. on file, Bandelier National Monument.

Bailey, R. A., R.L. Smith, and C.S. Ross

1969 Stratigraphic Nomenclature of Volcanic Rocks in the Jemez Mountains, New Mexico. U.S. Geological Survey Bulletin 1272-P. U.S. Printing Office, Washington D.C.

Bailey, R.G.

1980 Description of the Ecoregions of the United States. USDA Miscellaneous Publication No. 1931. Washington D.C.

Bandelier, Adolph F.

1890 Final Report of Investigations Among the Indians of the Southwestern United States, Carried on Mainly in the Years from 1880 to 1885. Papers of the Archaeological Institute of America, Part I, American Series, IV. Cambridge.

1892 Final Report of Investigations Among the Indians of the Southwestern United States, Carried on Mainly in the Years from 1880 to 1885. Papers of the Archaeological Institute of America, Part II, American Series, IV. Cambridge.

1880-92 Field Notebooks. Ms. on file, Archives of the Museum of New Mexico, Santa Fe.

Bandelier National Monument

1980 Visitor Impacts on Ceramic Artifacts at the Tsankawi Unit. Ms. on file, Archeology Office, Bandelier National Monument.

1992 Park File "New Road 1989;" File Code L7619 – Memorandum to Files, dated April 29, 1992.

1995 Visitor Study. USDI National Park Service. Ms. on file, Bandelier National Monument.

1996-98 Bandelier National Monument Environmental Management Committee, Notes and Correspondence. Material on file, Bandelier National Monument.

1998a 1996-97 Ecological Restoration Report: Progress of the Watershed Restoration

Demonstration Project & Results from Small Scale Studies. Resource Management Division, Bandelier National Monument.

1998b The Tsankawi Project Scope of Work, 1998-2002, Bandelier National Monument. USDI National Park Service.

1999a Bandelier National Monument Tribal Consultation Committee, Role and Function Statement. Draft 7/1/99. Ms. on file, Bandelier National Monument.

1999b Memorandum of Understanding, Regarding Consultation Between Bandelier National Monument and the Tribes Having a Traditional Cultural Affiliation with the Lands within the Monument. Discussion Draft 7/1/99. Ms. on file, Bandelier National Monument.

1999c Unpublished Soil Erosion Data. On file, Bandelier National Monument.

1999d Vegetation Management Plan, Draft. On file, Bandelier National Monument.

Barnes, Ethne

1991 Developmental Defects of the Axial Skeleton in Paleopathology, with Focus on a Southwest Prehistoric Anasazi Population: Puye, New Mexico. Unpublished Ph.D. Dissertation, Department of Anthropology, Arizona State University, Tempe.

Beam, George

1909 The Prehistoric Ruins of Tsankawi. National Geographic Magazine 20:807-822.

Chambers, Marjorie Bell

1974 Technically Sweet Los Alamos: The Development of a Federally Sponsored Scientific Community. Unpublished Ph.D. dissertation, Department of History, University of New Mexico, Albuquerque.

Chong, Geneva .W.

1992 Seventeen Years of Grazer Exclusion on Three Sites in Pinyon-Juniper Woodland at Bandelier National Monument, New Mexico. Report on file, Bandelier National Monument.

1993 Revegetation of Piñon-Juniper Woodlands with Native Grasses, pp. 34-41. In: E. F. Aldon and D. W. Shaw (tech. coords.), Managing Piñon-Juniper Ecosystems for Sustainability and Social Needs. USDA Forest Service General Technical Report RM-236, Fort Collins, Colorado.

1994 Recommendations to Improve Revegetation Success in a Piñon-Juniper Woodland in New Mexico: A Hierarchical Approach. Unpublished MS thesis, University of New Mexico, Albuquerque.

Cowley, Jillian P.

1987 The Role of Visitor Preference Information in the Planning, Design and Management of Archeological Resource Areas in National Parks. Unpublished M.A. Thesis in Landscape Architecture and Environmental Planning. Utah State University, Logan.

Davenport, D. W., D. D. Breshears, B. P. Wilcox, and C. D. Allen

1998 Viewpoint: Sustainability of Piñon-Juniper Ecosystems – A Unifying Perspective of Soil Erosion Thresholds. Journal of Range Management 51(2):229-238.

Dean, J.S., and W. J. Robinson
1977 Dendroclimatic Variability in the American Southwest: A.D. 680 to 1970. Ms. on file, Laboratory of Tree-Ring Research, Tucson.

Degenhardt, William G.
1975 Herpetofaunal Survey of Bandelier National Monument, Final Report to the National Park Service. Department of Biology, University of New Mexico, Albuquerque.

Department of Energy (DOE)
1999 Final Environmental Impact Statement for the Conveyance and Transfer of Certain Land Tracts Administered by the U.S. Department of Energy and Located at Los Alamos National Laboratory, Los Alamos and Santa Fe Counties, New Mexico, Summary. U.S. Department of Energy, Los Alamos Area Office, Los Alamos.

Department of Interior
1990 Review of Supplemental Draft Environmental Impact Statement/Section 4(f) Evaluation for Santa Fe-Los Alamos Corridor Study, Santa Fe and Los Alamos Counties, New Mexico (ER-90/874). Comment letter addressed to Reuben S. Thomas, Division Administrator, Federal Highway Administration, from Jonathan P. Deason, Director, Office of Environmental Affairs. USDI Secretary of Interior, Office of Environmental Affairs, Washington D.C.

DOE – see Department of Energy

DOI – see Department of Interior

Dudley, Peter, Emily Donald, and Shannon Smith
1999 Tsankawi Cultural Resources Inventory 1999. NMCRIS No. 62955. USDI National Park Service, Bandelier National Monument.

Edelman, Sandra A.
1979 San Ildefonso Pueblo. In: Handbook of North American Indians, Vol. 9, Southwest, pp. 308-316. Smithsonian Institution, Washington D.C.

Elliott, Michael L.
1998a Summary of Cultural Resources Compliance Activities for the 1998 Tsankawi Project. USDI National Park Service, Bandelier National Monument.
1998b Tsankawi Asphalt Trail Reroute Archeological Survey. Cultural Resources Report BAND-98-1, USDI National Park Service, Bandelier National Monument.
1998c Tsankawi Preservation Project Cultural Resources Inventory and Site Relocation. USDI National Park Service, Bandelier National Monument.

Gleason, Herbert W.
1919a The Bandelier National Monument: Part II of Report by Herbert Gleason for the Summer of 1919. Ms. on file, Bandelier National Monument.
1919b The Proposed Park of the Cliff Cities: Part III of Report by Herbert Gleason for the Summer of 1919. Ms. on file, Bandelier National Monument.

Goff, F.E., J.N. Gardner, and G. Valentine
1990 Geologic Map 69: Geology of the St. Peter's Dome Area, Jemez Mountains, New Mexico. New Mexico Bureau of Mines and Mineral Resources, Santa Fe.

Harrington, John Peabody
1916 The Ethnogeography of the Tewa Indians. Annual Report of the Bureau of American Ethnology No. 29, 1907-1908. Smithsonian Institution, Washington D.C.

Hendron, Jerome A.
1945 Potsui'I II, a Pueblo III Site on the Pajarito Plateau. Ms. on file, Bandelier National Monument.

Hewett, Edgar L.
1904 Archaeology of the Pajarito Park, New Mexico. American Anthropologist 6:629-659.
1906 The Antiquities of the Jemez Plateau, New Mexico. Bureau of American Ethnology Bulletin No. 32. Smithsonian Institution, Washington D.C.
1938 Pajarito Plateau and Its Ancient People. 2nd ed., revised 1953. Handbook of Archaeological History. University of New Mexico Press and School of American Research, Albuquerque.

Hibner, Charles, Lee Gray, and Jennifer Puttere
2000 Soil Survey Report for Tsankawi Part of Bandelier National Monument. USDA Natural Resource Conservation Service, Santa Fe Soil Survey Office.

Hill, J.N., and W.N. Treirweiler
1986 Prehistoric Responses to Food Stress on the Pajarito Plateau, New Mexico: Technical Report and Results of the Pajarito Plateau Archaeological Research Project, 1977-1985. Submitted to the National Science Foundations, Washington D.C.

Hoard, Dorothy
1989 A Guide to Bandelier National Monument. Third Edition. Los Alamos Historical Society, Los Alamos.

Izett, G.A. and J.D. Obradovich
1994, $^{40}Ar/^{39}Ar$ Age Constraints for the Jarmillo Normal Subchron and the Matuyama-Brunhes Geo-magnetic Boundary: Journal of Geophysical Research, v. 999, p.2925-2934.

Jacobs, Brian F., and Richard G. Gatewood
1999 Restoration Studies in Degraded Piñon-Juniper Woodlands of North-Central New Mexico, pp. 294-298. In: Monsen, S.B., R. Stevens, R.J. Tausch, R. Miller, and S. Goodrich (eds.), Proceedings: Ecology and Management of Pinyon-Juniper Communities within the Interior West. USDA Forest Service Proceedings RMRS-P-9. Ogden, Utah.

Judson, Chris, and Rory Gauthier
1986 Tsankawi Trail, Bandelier National Monument. Self-guided trail pamphlet. Design by Ormsby and Thickstun. Southwest Parks and Monuments Association in cooperation with the National Park Service. Revised and reprinted 1999.

Kidder, A.V.
1915 Pottery of the Paharito Plateau and Some Adjacent Regions of New Mexico. Memoirs of the American Anthropological Association 2:6.

Lange, Charles H., and Caroll L. Riley (eds.)
1966 The Southwestern Journals of Adolph Bandelier 1880-1882. University of New Mexico Press, Albuquerque.

Lange, Charles H., Caroll L. Riley, and Elizabeth M. Lange (eds.)
1970 The Southwestern Journals of Adolph Bandelier 1883-1884. University of New Mexico Press, Albuquerque.
1975 The Southwestern Journals of Adolph Bandelier 1885-1888. University of New Mexico Press, Albuquerque.
1984 The Southwestern Journals of Adolph Bandelier 1889-1892. University of New Mexico Press, Albuquerque.

Levine, Frances, and Thomas Merlan
1997 Bandelier National Monument Ethnographic Literature Search and Consultation. Report prepared for Bandelier National Monument.
1998 Frijoles Canyon: A Multidisciplinary Approach to the Determination of Cultural and Historic Affiliation. Paper presented at the National Park Service Cultural Affiliation Conference, Fort Lewis College, Durango, Colorado, January 23, 1998.

Lister, Robert H.
1939 Stabilization of Otowi, Bandelier National Monument. Ms. on file, Bandelier National Monument.
1940a Otowi Artifacts. Southwestern National Monuments Supplement:272-277.
1940b Stabilization of Cave Ruins, Bandelier National Monument. Ms. on file, Bandelier National Monument.

Loftin, S.R.
1999 Initial Response of Soil and Understory Vegetation to a Simulated Fuelwood Cut of a Pinyon-Juniper Woodland in the Santa Fe National Forest, pp. 311-314. In: Monsen, S.B., R. Stevens, R.J. Tausch, R. Miller and S. Goodrich (eds.), Proceedings: Ecology and Management of Pinyon-Juniper Communities within the Interior West. USDA Forest Service Proceedings RMRS-P-9. Ogden, Utah.

Los Alamos County
1999 Draft, Los Alamos Comprehensive Plan Update, Policy and Implementation. A Los Alamos County Publication, August 31, 1999.

Lyon, Fern, and Jacob Evans
1984 Los Alamos: The First Forty Years. Los Alamos Historical Society, Los Alamos.

Matero, Frank, Shaun Provencher, Michael Kelleher, and Scott Kreilick
1998 Trail Preservation Study, Tsankawi Mesa, Bandelier National Monument, Los Alamos County, New Mexico. Prepared by the Architectural Conservation Laboratory, Graduate Program in Historic Preservation, Graduate School of Fine Arts, University of Pennsylvania. Prepared for USDI National Park Service, Bandelier National Monument.

Mathien, Frances Joan
1986 The National Park Service Bandelier Survey Project: Archeological Background Information. Ms. on file, National Park Service, Southwest Regional Office, Division of Anthropology.
1989 Edgar Lee Hewett's 1905 Excavations on the Pajarito Plateau. Paper presented at the 1989 Pecos Conference, Bandelier National Monument, New Mexico.

Mera, Harry P.
1932 Style Trends of Pueblo Pottery in the Rio Grande and Little Colorado Culture Areas in the Sixteenth to Nineteenth Centuries. Laboratory of Anthropology Technical Series Bulletin 6. Laboratory of Anthropology, Santa Fe.

Morley, Sylvanus G.
1910 The South House, Puyé, New Mexico. Papers of the School of AmericanArchaeology 7.
1938 The Rito de los Frijoles in the Spanish Archives, Appendix 2. In: Pajarito Plateau and Its Ancient People, by Edgar L. Hewett. University of New Mexico Press, Albuquerque.

Mozzillo, Elizabeth Oster
1999 Draft Management Summary of the Bandelier Archeological Survey, 1987-1991. Ms. on file, Bandelier National Monument. January 4, 1999 version.

National Park Service
1932 Bandelier National Monument, Map Showing Those Portions of Lands Comprising the Monument. USDI National Park Service. Map on file, Bandelier National Monument.
1962 Map, Otowi Section, Bandelier National Monument. USDI National Park Service, Regional Office, Resource Planning, Drawing No. NM-BAN-7110. Map on file, Bandelier National Monument.
1977 Final Master Plan: Bandelier National Monument. USDI National Park Service, Bandelier National Monument.
1988 NPS-88: Management Policies. USDI National Park Service, Washington D.C.
1991 NPS-77: National Resources Management Guideline. USDI National Park Service, Washington D.C.
1992 Interpretive Prospectus, Bandelier National Monument, New Mexico. USDI National Park Service, Bandelier National Monument.
1994a NPS Directive 985***
1994b NPS-28, Release No. 3: Cultural Resources Management Guideline. USDI National Park Service, Washington D.C.
1994c Resource Management Plan Guideline: Strategic and Tactical Planning for a Resource Management Program. USDI, National Park Service, Washington D.C.
1995a Draft Development Concept Plan, Frijoles Canyon and Tsankawi, Bandelier National Monument. USDI National Park Service, Denver Service Center.
1995b Environmental Assessment and Finding of No Significant Impact, Development Concept Plan, Frijoles Canyon and Tsankawi, Bandelier National Monument. USDI National Park Service, Bandelier National Monument.
1997 Fire Management Plan, Bandelier National Monument. USDI National Park Service, Bandelier National Monument.

1998 Cultural Landscape Inventory Professional Procedures Guide. Washington D.C. Compiled by Robert R. Page.

1999a Draft Cultural Landscapes Inventory, Tsankawi, Bandelier National Monument. USDI National Park Service, Intermountain Support Office, Santa Fe.

1999b Draft Resource Management Plan, Bandelier National Monument. USDI National Park Service, Bandelier National Monument.

2000 Case Incident Record No. 000010. Report on file, Bandelier National Monument, Ranger Activities Office.

NPS – see National Park Service

Nusbaum, Jesse L., M. R. Tillotson, and Roger W. Toll

1930 Report on the Bandelier National Monument and Proposed Cliff Cities National Park. Ms. on file, Bandelier National Monument.

Olsen, Nancy H.

1997 Bandelier National Monument Petroglyphs and Pictographs: A Documentation Study Report to the National Park Service. Ms. on file, Bandelier National Monument.

Orcutt, Janet D.

1981 Changing Settlement Locations of the Pajarito Plateau, New Mexico. Ph.D. dissertation, University of California at Los Angeles. University Microfilms International, Ann Arbor.

Petersen, K.L.

1988 Climate and the Dolores River Anasazi: A Paleoenvironmental Reconstruction from a 10,000-year Pollen Record, La Plata Mountains, Southwestern Colorado. University of Utah Anthropological Paper 13, Salt Lake City.

Plat Map

1915 Plat showing Restorative Survey of the Ramon Vigil Grant, dated 4/24/15, Vol. 0151:38, surveyed 1912-1913. Government Land Office, U.S. Surveyor General's Office. Copy on file, Bandelier National Monument, Box 3, Drawer 4.

Powers, Robert P., and Janet D. Orcutt (eds.)

1999 The Bandelier Archeological Survey, 2 vols. Intermountain Cultural Resources Management Professional Paper No 57. USDI National Park Service, Intermountain Cultural Resources Management, Anthropology Program, Santa Fe.

Powers, Robert P., and Tineke Van Zandt

1999 An Introduction to Bandelier. In: The Bandelier Archeological Survey, Robert P. Powers and Janet D. Orcutt (eds.), Vol. 1, Chapter 1. Intermountain Cultural Resources Management Professional Paper No 57. USDI National Park Service, Intermountain Cultural Resources Management, Anthropology Program, Santa Fe.

Preucel, Robert W.

1990 Seasonal Circulation and Dual Residence in the Pueblo Southwest: A Prehistoric Example from the Pajarito Plateau, New Mexico. Garland Publishing, Inc., New York.

Prince Papers
1892 Map of the Grant Known as Rito de los Frijoles. United States Court of Private Land Claims Exhibit No. 7, Claimant: George N. Fletcher *et al.* Papers of Governor Bradford L. Prince. Microfilm PLC 41, Roll 37. New Mexico State Library Archives, Albuquerque.

Provencher, Shaun
1998 Tsankawi Project Completion Report. USDI National Park Service, Intermountain Support Office, Santa Fe.
1999 Tsankawi Unit Cavate Conditions Assessment and Treatment Recommendations. USDI National Park Service, Intermountain Support Office, Santa Fe.

Reneau, Steven L., Jamie N. Gardner, and Steven L. Forman.
1996 New Evidence for the Age of the Youngest Eruptions in the Valles caldera, New Mexico: Geology, v. 24, p. 7-10.

Rivera, Angelyn Bass
1999 Conservation Treatment Report, Cavate Preservation Project, Bandelier National Monument. Submitted to NPS, Intermountain Support Office, Architectural Conservation Projects Program, Santa Fe.

Robinson, William J., R.L. Smith, and R.A. Bailey
1972 Tree-Ring Dates from New Mexico I, O, U: Central Rio Grande Area. Laboratory of Tree-Ring Research, University of Arizona, Tucson.

Rohn, Arthur H., William M. Ferguson, and Lisa Ferguson
1989 Rock Art of Bandelier National Monument. University of New Mexico Press, Albuquerque.

Rose, M.R., J.S. Dean, and W.J. Robinson
1981 The Past Climate of Arroyo Hondo as Reconstructed from Tree Rings. School of American Research Press, Santa Fe.

Ross, C.S., R.L. Smith, and R.A. Bailey
1961 Outline of the Geology of the Jemez Mountains, New Mexico. In: Stuart A. Northrop (ed.), New Mexico Geological Society Guidebook, 12th Field Conference, pp. 139-143. New Mexico Geological Society, Socorro.

Rothman, Hal
1988 Bandelier National Monument: An Administrative History. Southwest Cultural Resources Center Professional Papers No. 14. USDI National Park Service, Southwest Region, Santa Fe.

Ruby, Earl C.
1998 Watershed Condition Survey, Tsankawi Unit, Bandelier National Monument. Report on file in the Resource Management Library, Bandelier National Monument.

Sanchez, Joseph P., and Bruce A. Erickson
1999 Sources for the History of Bandelier National Monument. USDI National Park Service, Intermountain Spanish Colonial Research Center, Albuquerque. Ms. on file, Bandelier National Monument.

Santa Fe
1914 Archaeological Map of the Proposed National Park of the Cliff Cities from the Surveys of W.B. Douglass. Chamber of Commerce, Santa Fe, N.M.

Santa Fe National Forest
1921 Santa Fe National Forest, New Mexico, New Mexico Meridian. U.S. Forest Service. Map on file, Bandelier National Monument, Box 2, Drawer 2.

Scurlock, D.
1981 Euro-American History of the Study Area, p. 270-336. In: C. Baker and J.C. Winter (eds.), High Altitude Adaptations Along Redondo Creek – the Baca Geothermal Anthropology Project. Office of Contract Archaeology, University of New Mexico, Albuquerque.

Smiley, T.L., Stanley Stubbs, and B. Bannister
1953 A Foundation for the Dating of Some Late Archaeological Sites in the Rio Grande Area, New Mexico: Based on the Studies in Tree-Ring Methods and Pottery Analysis. University of Arizona Bulletin, Vol. 24, No. 3, Laboratory of Tree-Ring Research No. 6, Tucson.

Smith, R.L. and R.A. Bailey
1996 The Bandelier Tuff: a Study of Ash-flow Eruption Cycles from Zoned Magma Chambers: Bulletin Volcanologique, v. 29, p. 83-103.
1968 Resurgent Cauldrons: Geological Society of America, Memoir 116, p. 613-662.

Smith, R.L., R.A. Bailey, and C.S. Ross
1997 Geologic Map of the Jemez Mountains, New Mexico: U.S. Geological Survey, Miscellaneous Investigations Map I-571, scale 1:125,000.

Snead, James E.
1994 Trails, Interaction, and Integration in the Eastern Pueblo World, A.D. 1200-1550. Paper presented at the 1994 Chacmool Conference, University of Calgary, Calgary, Alberta.
1995 Beyond Pueblo Walls: Community and Completion in the Northern Rio Grande, A.D. 1300-1400. Unpublished Ph.D. dissertation, University of California at Los Angeles.
1999a Pajarito Trails Project: Preliminary Proposal for Archaeological Fieldwork in Bandelier National Monument, July 1999. Ms. on file, Bandelier National Monument.
1999b Pajarito Trails Project 1999: Summary of Results. Ms. on file, Bandelier National Monument.

Snyderman, David, and Brian F. Jacobs
1995 Piñon-Juniper Restoration Studies at Bandelier. Report on file, Bandelier National Monument.

Stallings, W. G., Jr.
1933 A Tree-ring Chronology for the Northern Rio Grande Drainage in Northern New Mexico. Proceedings of the National Academy of Sciences 19(9):803-806.
1937 Southwestern Dated Ruins. Tree-Ring Bulletin 4-2.

Stuart, David E. and Rory P. Gauthier
1981 Prehistoric New Mexico: Background for Survey. New Mexico Historic Preservation Bureau, Santa Fe.

Swetnam, T.W.
1990 Fire History and Climate in the Southwestern United States, pp.6-17, In: Krammes, J.S. (tech. coord.), Effects of Fire Management on Southwestern Natural Resources. General Technical Report RM-191. USDA Forest Service, Rocky Mountain Forest and Range Experimental Station.

Swetnam, T.W., and J.L. Betancourt
1998 Mesoscale Disturbance and Ecological Response to Decadal Climatic Variability in the American Southwest. Journal of Climate 11:3128-3147.

Toll, H. Wolcott
1995 An Analysis of Variability and Condition of Cavate Structures in Bandelier National Monument. Intermountain Cultural Resources Center Professional Paper No. 53. US DOI, National Park Service, Anthropology Program. Santa Fe.

Touchan, R., and T.S. Swetnam
1992 Fire History of the Jemez Mountains: Fire Scar Chronologies from Five Locations. Report on file, Bandelier National Monument.

Traylor, Diane
1982 Bandelier Archeological Survey and Summary. In: Bandelier: Excavations in the Flood Pool of Cochiti Lake, New Mexico, by Lyndi Hubbell and Diane Traylor, pp. 1-12 and 441-161. USDI National Park Service, Southwest Cultural Resources Center, Santa Fe.

Traylor, Diane, Lyndi Hubbell, Nancy Wood, and Barbara Fiedler
1990 The 1977 La Mesa Fire Study: An Investigation of Fire and Fire Suppression Impact on Cultural Resources in Bandelier National Monument. Southwest Cultural Resources Center Professional Paper No. 28. USDI, National Park Service, Branch of Cultural Resources Management, Division of Anthropology.

Turney, John Francis
1962 Bandelier Survey. Ms. on file, Bandelier National Monument.

U.S. Geologic Survey (USGS)
1953 Bandelier National Monument and Vicinity, N. Mex. Topographic map, scale 1:24,000. USDI USGS, Denver.
1984 White Rock Quadrangle, New Mexico. 7.5 Minute Series, topographic map, scale 1:24,000. USDI USGS, Denver.

USGS – See U.S. Geologic Survey

Von der Lippe, George, and Edward J. Widmer
1960 A Field Report on the Uncontrolled Use of the Otowi Section of Bandelier National Monument. Bandelier National Monument Files, National Park Service Southwest Region Library, Santa Fe.

Wendorf, Fred, and Erik K. Reed
1955 An Alternate Reconstruction of Northern Rio Grande Prehistory. El Palacio 62(5-6):131-173.

Whitman, William
1947 The Pueblo Indians of San Ildefonso. Columbia University Press, New York.

Wilcox, B.P., B.D. Newman, C.D. Allen, K.D. Reid, D. Brandes, J. Pitlick, and D.W. Davenport
1996a Runoff and erosion on the Pajarito Plateau: Observations from the field. Pages 433-439 In: New Mexico Geological Society Guidebook, 47th Field Conference, Jemez Mountains Region, 1996.

Wilcox, B.P., J. Pitlick, C.D. Allen, and D.W. Davenport
1996b Runoff and Erosion from a Rapidly Eroding Pinyon-Juniper Hillslope, pp. 61-77. In: M.G. Anderson and S.M. Brooks (eds.), Advances in Hillslope Processes, Vol. 1. John Wiley & Sons, Ltd., New York.

Williams, Jerry L.
1986 New Mexico in Maps. 2nd ed. University of New Mexico Press, Albuquerque.

Wilson, L.L.W.
1916 Excavations at Otowi, New Mexico. El Palacio 3(2):29-36.
1917 Excavations at Otowi, New Mexico. Arts and Archaeology, Vol. VI:259-260.
1918 Three Years at Otowi. El Palacio 5:290-295.

Wolff, J.A., and Gardner, Jamie N.
1995 Is the Valles caldera Entering a New Cycle of Activity?: Geology, v. 23, p. 411-414.

Zelick, Michael
1989 Keeping the Sacred and Planting Calendar: Archeoastronomy in the Pueblo Southwest. In: World Archeoastronomy, Selected Papers, Second "Oxford" International Conference Held at Merida, Yucatan, edited by A.F. Aveni, pp. 143-166. Cambridge University Press, Cambridge.

APPENDIX A – ENVIRONMENTAL SETTING

A. Geography

The Tsankawi Unit is a 320 ha (790 ac) detached portion of Bandelier National Monument (Figures 1 and 2). The unit falls completely within Santa Fe County and, in direct (not highway) distances, it is located 8.5 km (5.3 mi) northeast of the main body of the park, 3.8 km (2.4 mi) north of White Rock, 5.6 km (3.5 mi) southeast of Los Alamos, and 29.3 km (18.2 mi) northwest of Santa Fe, New Mexico. Based on census information, the total population of the two nearest communities – Los Alamos and White Rock – was 18,344 residents in 1990. Further information is available in Allen (1989, 1993).

The location, topography, and primary loop trail of the Tsankawi Unit is depicted in the northwest quarter of the 7.5-minute White Rock, New Mexico, Quadrangle (USGS 1984). A recent document search (see NPS 1962) and an informal land survey of extant 1963 boundary markers and fence lines utilizing GPS technology reveal that the Tsankawi Unit's northeastern boundary is incorrectly represented on this and most other maps. The unit's northeast border does not actually include Los Alamos Canyon up to the southern edge of the State Route 502 right-of-way. In reality, the unit border corresponds to the southern rim of Los Alamos Canyon (Figure 2). Additionally, the current State Route (SR) 502 is incorrectly labeled on many maps. In previous years, SR4 and SR502 were designated as SR4.

While Bandelier National Monument views an entire watershed as the primary ecosystem management unit, only one small complete watershed is fully contained within the Tsankawi Unit (Figure 14). The remainder of the unit consists of incomplete watershed fragments shared with other large land management agencies. The boundary of the Tsankawi Unit is not based on watershed areas, general topography, philosophies regarding cultural resource management or natural resource management, or prehistoric sphere of influence. Rather, it is the result of shared historic property boundaries, historic road alignments, a portion of a canyon rim, and a modern (1963) land transfer.

On the south and east, the Tsankawi Unit shares linear property boundaries with *Po-who-ge Oweenge*, the Pueblo of San Ildefonso. The unit is bounded on the northwest and west by the curvilinear right-of-way of State Route 4. Currently, the highway rights-of-way, the lands between the northeastern Tsankawi boundary (see above) and the southern edge of the State Route 502 right-of-way, as well as on the opposite sides of the State Route 4 and 502 rights-of-way, are controlled by the U.S. Department of Energy (DOE). The transfer of two tracts of land – the White Rock Y Tract and the Technical Area-74 Tract (approximately 1,318 hectares or 3,255 acres in total) – from the DOE to the County of Los Alamos and the Pueblo of San Ildefonso is pending (DOE 1999). The expected land ownership changes are shown in Figure 4.

B. Climate

In general, recurring episodes of wetter and drier conditions characterize the climate of the Southwest during the past 2000 years (Rose *et al.* 1981; Petersen 1988). A regional dendrochronological (tree-ring) study suggests that drought conditions dominated 27 of the 129 decades between A.D. 680 and 1970 (Dean and Robinson 1977). Recently recorded regional droughts occurred during the periods of 1932-1938, 1942-1947, and 1950-1956. Significant wetter periods occurred during the periods of 1905-1921, 1939-1941, 1957-1959, 1967-1969, and 1978-1998 (Allen 1989:65-67; Swetnam and Betancourt 1998). At least in recent times, such wetter periods appear to be the result of more frequent wet winters and springs ("El Niño" years), rather than an increase in precipitation during the summer monsoons. Long-term droughts have had disastrous effects on the Ancestral Puebloan's ability to produce crops (Powers and Van Zandt 1999:12).

Currently, the vicinity of the Tsankawi Unit has a semi-arid continental mountain climate, with distinct seasons and widely fluctuating annual and daily temperature ranges. On average, spring and fall are transitional, short, and mild. Winds may be particularly strong in the spring. June and early July are the hottest and driest months, with high temperatures occasionally exceeding 38° C (100° F). Summers are hot and wet, with temperatures ranging between 13 and 35° C (55-95° F). Late July and August are punctuated by thunderstorms, which bring about 60% of the annual precipitation in the form of monsoonal rainfall via moist air from the Gulf of Mexico. While showers can be a daily occurrence, and occasionally involve torrential downpours of rain and hail, thundershower cells may be very localized. Abundant rain may fall in one area, while another remains dry, and flash floods may sweep through canyons. Winters are mild to cold, with temperatures generally ranging between -18 and 16° C (0-60° F). Winter storms from the northwest and west produce generally light snowfall, with an average total of around 51 cm (20 in) of snow per year. While there are occasional blizzards and deep snow, most snowfall melts off within a week or two. Total annual precipitation is about 35 to 40 cm (14-16 in), however, periods of drought are common. On average, the area experiences sunshine 80% of the time during summer days and 60% of the time during winter days.

With semiarid, continental, high-elevation desert conditions, the evaporation rate and daily temperature range are both very high. Average daytime relative humidity is about 35% and about 65% at night. Relative humidity values of less than 20% and daily temperature fluctuations within a range of 22° C (40° F) occur frequently. On average, the area experiences over four frost-free months (130 days) per year between mid-May and early October.

C. Geology

Bandelier National Monument is located on the Pajarito Plateau on the eastern flank of the Jemez Mountains, which are included in the southernmost Rocky Mountains. At its lowest elevations along the southeastern boundary, the park includes the banks of the Rio Grande, which flows south along the Rio Grande Rift – a line of complex fractures and faults in the North American tectonic plate. Generally volcanic in origin, the Jemez Mountains are part of the Jemez Volcanic Field. At the park's highest elevations along its northwestern boundary, Bandelier includes the rim of the Valles Caldera, the remnants of a large collapsed volcano, which measures approximately 24 km (15 mi), in diameter (Bailey *et al.* 1969; Ross *et al.* 1961).

The origin of the Pajarito Plateau's landscape is found relatively late in geologic time during the late Tertiary and Quaternary. Around 9 million years ago, the San Miguel Mountains, to the west of the park, formed as volcanic domes. About 1 to 3 million years ago the Cerros del Rio volcanoes, located to the south of the unit, produced widespread lava flows and pumice deposits. The lava solidified into very hard, dark, fine-grained Cerros del Rio basalts, while the loose pumice formed patches of pumiceous soil and gravel.

In subsequent eruption sequences of a volcano located to the west of the unit, the earlier and smaller Toledo Caldera and the later and larger Valles Caldera, known collectively as the Valles Caldera, ejected approximately 150 cubic miles of ash and cinders. This is over 600 times the material produced by the 1980 eruption of Mt. St. Helens. Some of this pyroclastic material was blown eastward by prevailing winds but most of the material moved down the flanks of the volcanic highland as pyroclastic flow. The pyroclastic flows compacted and "welded" into soft, rhyolitic, Bandelier Tuff. An eastern fan of this tuff forms the wide Pajarito Plateau.

The compacted-ash tuff deposits, which range over 1,040 square km (400 square miles), are estimated to be at least 270 m (886 ft) and up to 305 m (1,000 ft) in vertical thickness. Although referred to collectively as Bandelier Tuff, two distinct strata are recognized (Goff *et al.* 1990). The Lower Bandelier Tuff, or Otowi Member, is more friable and white to pink in color (generally white in the Tsankawi Unit); is up to 150 m (492 ft) in thickness; and originated with the eruptions of the Toledo Caldera circa 1.61 million years ago (Smith and Bailey, 1966; 1968; Smith *et al.*, 1970). The Upper Bandelier Tuff, or Tshirege Member, forms conspicuous pink cliffs throughout the Pajarito Plateau. The color of the Tshirege Member can vary, however, from orange to white, tan, or pink (generally pink to orange-brown in the Tsankawi Unit). The Tshirege Member is up to 120 m (394 ft) thick, and originated with the eruptions of the Valles Caldera circa 1.22 million years ago (Izett and Obradovich, 1994). Additional ejecta from the El Cajete eruptions of about 50 to 60 thousand years ago formed additional, widely scattered, pumice fields (Reneau *et al.*, 1996; Wolff and Gardner, 1995). Eroded and transported materials have been deposited within floodplains, arroyos, and canyons in the form of Quaternary Period sediments.

D. Topography

The Pajarito Plateau slopes downward from the Valles Caldera towards the southeast to terminate above the Rio Grande. Over time, the plateau has been eroded into striking angular forms. The area's major topographic landforms are generally oriented northwest to southeast and consist of elongated mesas separated by deep, steep-sided, and parallel canyons. Flat or gently sloping mesa tops are sharply defined by steep, rocky escarpments and intervening floodplains. Differential erosion of the harder tuff caprock, softer tuff substrate, and very hard basalt strata resulted in highly varied and broken topography. Many canyons are cut down through the easily eroded tuff to the erosionally resistant basalt. Here further downcutting of the channel was blocked and steep dry-falls were formed.

The Tsankawi Unit contains two fairly complete and isolated mesas – North Mesa and the centrally located and isolated Tsankawi Mesa. The top of North Mesa continues eastward beyond a saddle on to Pueblo of San Ildefonso land. Additionally, the northernmost portions of a third mesa – South Mesa – fall just within the unit's southern boundary. From west to east, Ruby (1998) has designated these four portions of South Mesa as First, Second, Fence, and "Y" mesas.

Steep cliffs as well as gently sloping intermittent drainages, floodplains, and arroyos, separate the tops of North, Tsankawi, and South mesas. Elevations within the unit range from 1,890 m (6,200 ft) on the southern rim of Los Alamos Canyon to 2,036 m (6,680 ft) atop Tsankawi Mesa.

E. Hydrology

The Tsankawi Unit is located between two large west-to-east-trending drainages, Los Alamos Canyon to the north and Sandia Canyon to the south. The unit may be divided into seven primary watersheds (Figure 14) as delineated and named by Ruby (1998).

Only the North Fork Tsankawi watershed is fully contained within the unit. All other watersheds are only partially contained and continue outside the unit's boundaries. Three southeastern watersheds – designated Upper Tsankawi, Lower Tsankawi, and North Fork Tsankawi – comprise 195 ha (481 ac) within the unit and drain southeast in a dendritic pattern into Tsankawi Creek, a tributary of Sandia Creek. Three northwestern watersheds – designated West Creek, Duchess Flat, and Canyon Lands – comprise 109 ha (270 ac) within the unit and drain to the north in both a dendritic and a steep, parallel, linear pattern into Los Alamos Creek. The seventh watershed – designated Sandia – is located in the southwest corner of the unit, includes 16 ha (40 ac) within the unit, and drains to the south in a dendritic pattern into Sandia Creek.

After capturing all the unit's runoff, both Los Alamos and Sandia canyons trend eastward to terminate at the Rio Grande, which flows northeast to southwest through nearby White Rock Canyon. At its most proximal point the Rio Grande is 3.7 km (2.3 mi) southeast of the Tsankawi Unit boundary.

At present water table levels, surface flow in the unit's stream courses is highly intermittent in nature. Surface water generally coincides with runoff during and shortly after localized precipitation events. Localized summer thunderstorms can result in downpours and flash flood conditions.

Prehistoric residents may have utilized a perennial stream course in Los Alamos Canyon, outside the unit, for their water requirements. This drainage is currently intermittent. Today, the perennial water sources nearest the unit are limited surface flow in Los Alamos Canyon and associated wetland areas in the adjacent While Rock Y Tract (DOE 1999, App. D:24-29). These are generally the result of the upstream discharge of treated sewage effluent released near the confluence of Bayo and Pueblo canyons by the County of Los Alamos.

Currently, the County of Los Alamos (formerly DOE) maintains a well and pumping system to recover water from Los Alamos Canyon 0.4 km (0.25 mi) northeast of the Tsankawi Unit boundary. Recently, DOE has drilled two additional wells in this vicinity to test for Los Alamos National Laboratory "legacy waste" contamination of the regional aquifer.

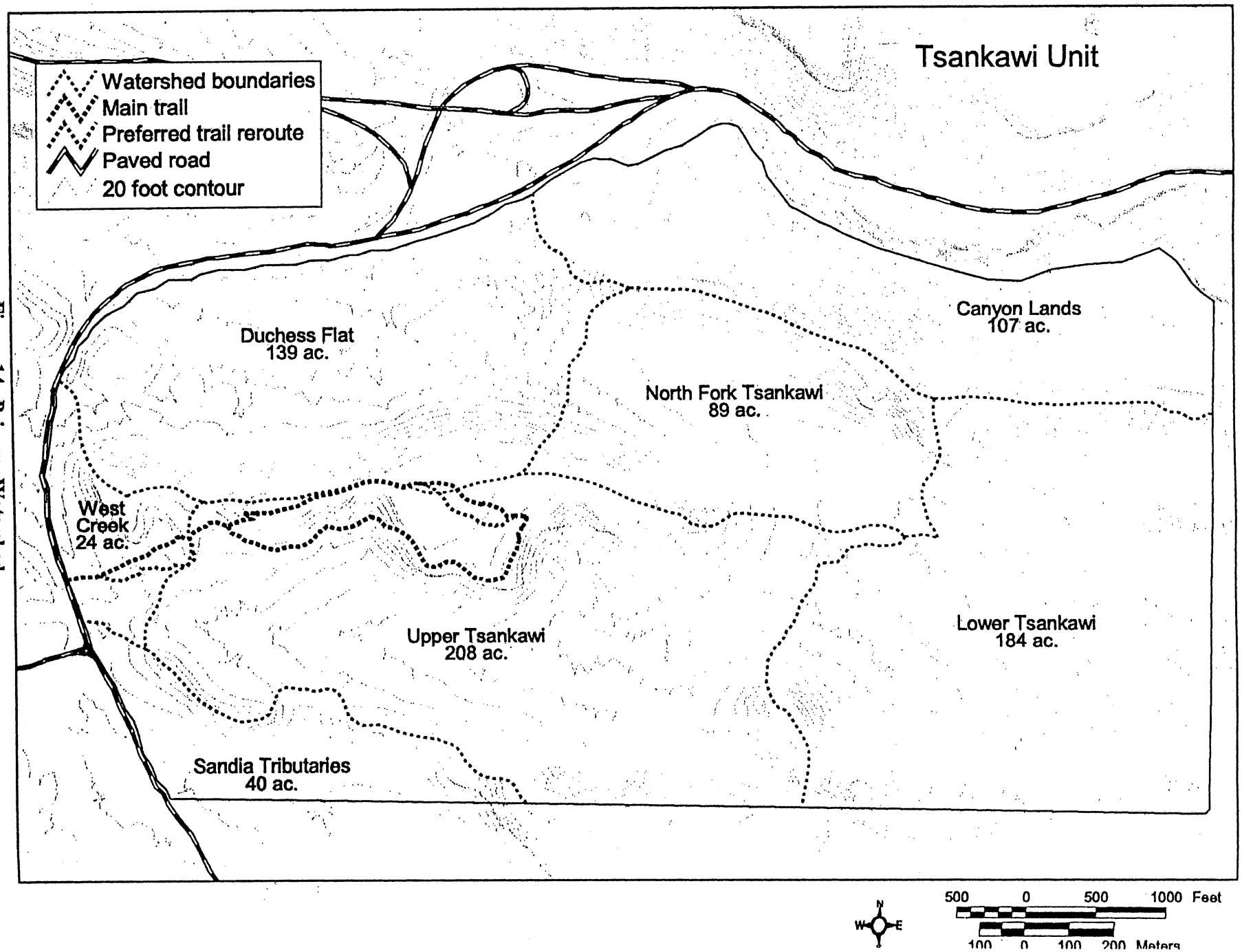


Figure 14. Primary Watersheds

F. Soils

The majority of soils in the Bandelier area are derived from the residual breakdown of soft volcanic tuff and pumice which has been secondarily transported and consolidated. Generally, soils are thin on mesa tops; shallow to deep in indented areas, talus zones, drainages, and canyons; and relatively deep in pumice fields. Although highly variable, they are mostly coarse-textured, well-drained, and nutrient-poor. Areas with deep soil development generally contain soils that are loose, granular, and highly suitable for prehistoric farming techniques. Such use and/or overuse may have resulted in depletion of soil nutrients and organic content, and decreased water-holding capacity.

Many pumice fields, which contain a combination of deep well-developed soil below the surface and white to gray pumice on the surface as a result of frost heaving, were particularly suitable for small-scale farming. Essentially the layer of pumice forms a surface mulch, which protects the soil from compaction during heavy downpours and the intense insolation, moisture evaporation, and wind erosion during the warm dry days; retains soil warmth and moisture during the cool dry nights; and is readily permeable to available rainfall. In a relatively short time, the frangible pumice breaks down to form an additional, beneficial soil component.

A survey of the soils of the Tsankawi Unit was completed by Hibner *et al.* (2000). It identified seven soil units (Figure 6 and 7) containing 12 soil types, which are generally sandy loam with variable clay, gravel, and cobble constituents. Approximately 35% of the unit's area is classified as having a very severe to moderate hazard of erosion by water and a severe to moderate hazard of erosion by wind. Soils on the mesa tops are very thin, while those in the floodplains are deep but currently highly eroded and degraded. Quantities of soil and sediments, which have been removed from upland areas by accelerated erosion, may be recognized and tracked as their transportation down gullies and arroyos continues over time, particularly in the Lower Tsankawi Creek watershed (Ruby 1998).

G. Vegetation

Vegetation in Bandelier National Monument falls into the southern Rocky Mountain Forest Province (Bailey 1980). Plant communities vary considerably with elevation, topography, aspect, and water availability. Although the Tsankawi Unit exhibits some variability, its drier conditions and lower elevations currently support the "low elevation" piñon-juniper woodland and the ponderosa-piñon-juniper woodland vegetation communities (Figure 2).

Currently, the piñon-juniper woodland community covers approximately 80% (260 ha, 640 ac) of the unit. Dominant species include piñon pine (*Pinus edulis*), one-seed juniper (*Juniperus monosperma*), four-wing saltbush (*Atriplex canescens*), sagebrush (*Artemisia* sp.), and broadleaf yucca (*Yucca baccata*). Smaller ground cover species include rabbitbrush (*Chrysothamnus naseosus*), Apache plume (*Fallugia paradoxa*), blue trumpets (*Ipomopsis longiflora*), buckwheat (*Eriogonum* sp.), four-o-clock (*Mirabilis multiflora*), Indian tea (*Thelesperma* sp.), mountain mahogany (*Cerocarpus montanus*), scorpionweed (*Phacelia* sp.), sumac (*Rhus trilobata*), prickly pear (*Opuntia* sp.), tansy mustard (*Descurainia* sp.), bluestem (*Andropogon scoparius*), and grama grass (*Bouteloua* spp). The ponderosa-piñon-juniper woodland community covers the remaining 20% (approximately 60 ha or 150 ac) of the unit. Generally located in narrow bands within areas of higher water availability, particularly floodplains and north-facing slopes, this

community supports denser stands of most of the above species plus scattered ponderosa pines (*Pinus ponderosa*). The unit contains habitat for the gramma grass cactus (*Pediocactus papyracanthus*), a plant species of concern because it is locally rare.

Approximately 122 of the 720 plant species identified in Bandelier National Monument are non-native. Such introduced species have displaced native plants and affected natural plant diversity. The Tsankawi Unit has not been adequately surveyed for non-native flora, in particular for Russian olive (*Elaeagnus angustifolia*; known to be present), tamarisk (*Tamarix pentandra*), Russian thistle (*Salosa kali*), and common mullein (*Verbascum thapsus*). Additional non-native species, which are known to be present and tend to flourish in previously disturbed soil, include kochia (*Kochia scoparia*), cheat grass (*Bromus tectorum*), and salsify (*Tragopogon dubius*). Invasion by these latter plants is most notable in areas with disturbed soils, including Tsankawi Pueblo and some floodplain areas (potential utilized during prehistoric and/or historic times).

Additional floral inventory surveys of native and non-native vegetation to establish current baseline conditions will be completed in 2000.

H. Wildlife

Bandelier National Monument provides natural habitat for wildlife, including mammals, reptiles, amphibians, fish, birds, and insects. Distribution of these animals is highly variable and dependent on season, elevation, vegetation, and water availability.

Human activities had extirpated 13 historically present animal species from the Bandelier area by 1945. Five of those are again present due to recolonization, reintroduction, or expansion of park boundaries (Allen 1989:152-153). Such species no longer present include grizzly bear (*Ursus horribilis*), gray wolf (*Canis lupus*), bighorn sheep (*Ovis canadensis*), Gunnison's prairie dog (*Cynomys gunnisoni*), pronghorn (*Antilocapra americana*), and possibly black-footed ferret (*Mustela nigripes*).

Elk (*Cervus elaphus nelsoni*), while notably rare in archeological faunal collections, were extirpated by 1909 and reintroduced with stock from the north/central Rocky Mountains in 1948 (Allen 1989:134-137). Based on all available information, the local elk population appears to be at its highest level in at least 800 years. This is likely the result of the elimination or reduction of top carnivores (i.e., gray wolf, grizzly bear, mountain lion). Elk numbers have grown dramatically in the past 20 years, with thousands of elk now wintering in the Bandelier area. The park is currently studying changes in the composition and structure of plant communities caused by elk. "Shattered rosettes of Yucca and shaping of favored browse shrubs clearly document elk browsing pressures in the piñon-juniper woodlands" (Bandelier National Monument 1999d:7). In some areas of the park, high numbers of elk appear to be causing damage to archeological resources. An interagency effort to reintroduce Rocky Mountain bighorn sheep (*Ovis canadensis*) into White Rock Canyon, about 3.7 km (2.3 mi) from the Tsankawi Unit, is tentatively planned for the summer of 2002.

Habitat for Federal- and state-listed threatened and endangered species, including Bald Eagle (*Haliaeetus leucocephalus*), Common Blackhawk (*Buteogallus anthracinus anthracinus*), Mexican Spotted Owl (*Strix occidentalis lucida*), Southwest Willow Flycatcher (*Empidonax traillii extimus*), Bairds Sparrow (*Ammodramus bairdii*), spotted bat (*Euderma maculatum*), and

the recently de-listed American Peregrine Falcon (*Falco peregrinus anatum*) exists within the park.

When compared to the remainder of Bandelier, wildlife diversity and activity in the Tsankawi Unit is less dynamic, as well as less visible to day-use-only visitors. While Bandelier's main unit contains numerous perennial water sources and large tracts of intact habitat, the Tsankawi Unit does not. No faunal inventory has been completed and no species list has been compiled specifically for the Tsankawi Unit. During a recent period of autumn fieldwork at the Tsankawi Unit, only a few coyote, elk, and rodent tracks were encountered (Ruby 1998:47). Due to the current lack of perennial water sources, no fish and few if any amphibian species are present. The following animals are assumed to be at least occasionally present within the Tsankawi Unit:

Mammals – elk (*Cervus elaphus nelsoni*), mule deer (*Odocoileus hemionus*), mountain lion (*Felis concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), desert cottontail (*Sylvilagus audoboni*), rock squirrel (*Citellus variegatus*), long-tailed weasel (*Mustela frenata*), woodrat (*Neotoma* sp.), Botta's pocket gopher (*Thomomys bottae*), least chipmunk (*Eutamias minimus*), multiple mouse species (*Peromyscus* sp.; *Perognathus* sp.; *Reithrodontomys* sp.), several shrews (*Sorex* sp.), and perhaps a dozen bat species.

Reptiles – Chihuahua whiptail (*Cnemidorphorus exsanguis*), plateau whiptail (*Cnemidophorus velox*), eastern fence lizard (*Sceloporus undulatus*), short horned lizard (*Phrynosoma douglasi*), tree lizard (*Urosaurus ornatus*), gopher snake (*Pituophis melanoleucus*), and western diamondback rattlesnake (*Crotalus atrox*) (Degenhardt 1975).

Birds – Turkey Vulture (*Cathartes aura*), Red-tailed Hawk (*Buteo jamaicensis*), Mourning Dove (*Zenaida macroura*), Common Nighthawk (*Chordeiles minor*), Broad-tailed Hummingbird (*Selasphorus platycercus*), Black-chinned Hummingbird (*Archilochus alexandri*), Hairy Woodpecker (*Picoides villosus*), Northern Flicker (*Colaptes auratus*), Gray Flycatcher (*Empidonax wrightii*), Western Scrub Jay (*Aphelocoma californica*), Common Raven (*Corvus corax*), Black-billed Magpie (*Pica pica*), Pinyon Jay (*Gymnorhinus cyanocephalus*), Plain Titmouse (*Parus inornatus*), Bushtit (*Psaltriparus minimus*), Canyon Wren (*Catherpes mexicanus*), Rock Wren (*Salpinctes obsoletus*), Western Bluebird (*Sialia mexicana*), American Robin (*Turdus migratorius*), Black-throated Gray Warbler (*Dendroica nigrescens*), Western Tanager (*Piranga ludoviciana*), Canyon Towhee (*Pipilo fuscus*), Black-headed Grosbeak (*Pheucticus melanocephalus*), Violet-green Swallow (*Tachycineta thalassina*), Dark-eyed Junco (*Junco hyemalis*), Chipping Sparrow (*Spizella passerina*), Brown-headed Cowbird (*Molothrus ater*), Lesser Goldfinch (*Carduelis psaltria*), and Cassin's Finch (*Carpodacus cassinii*). The Tsankawi Unit is located along the Central Flyway, a route for seasonally migrating birds that corresponds to the Rio Grande in north and central New Mexico. The most notable migratory species are Sandhill Crane (*Grus canadensis*) and Canada Goose (*Branta canadensis*). Also, a small, experimental, population of endangered Whooping Cranes (*Grus americana*) migrates along with the Sandhill Cranes. Generally, southward migration occurs in October through mid-November, while these bird fly northward in February and March. For the most part, these species may fly over, but would very rarely if ever touch down within the Tsankawi Unit.

More than 1,000 arthropod species have been documented within Bandelier National Monument, including 10 that were unknown to science a few years ago. Approximately 90 species of ants

have been identified to date. Several as yet unnamed moths are likely present as well. The presence or absence of these species in the Tsankawi Unit is undetermined at this time.

APPENDIX B – CULTURAL SETTING

A. The Place

As a detached portion of Bandelier National Monument, the Tsankawi Unit represents the prehistoric community of *Tsankawi*. The name *Tsankawi* represents a shortened version of the *Tewa* words *Sækewi' onwikeji* or *Sækewikwaje' onwikegi*, which may be translated as "old pueblo of the gap [pass, narrow] of the sharp round cactus" (Harrington 1916:75, 82, 93, 273-274), as follows:

sæ: applied to several varieties of jointed round cactus, among others to *Opuntia* sp.;
ke: sharpness, sharp, referring to the sharpness of the cactus thorns;
wíi: gap, pass, narrow;
kwaje: height, mesa, on top of;
onwi: pueblo, village;
keji: old.

Since the 1880s, various phonetic versions and spellings of this *Tewa* name have been used including: Sa-qu'ue, Sa-que-uy, Sa-ke-yu, Sankawi, Sankewi, Saekewi, Saekewi'i, Tsankawi'i, and Tsankawi (Matero *et al.* 1998:9). A representative from the Pueblo of San Ildefonso has recently indicated that this name relates to the narrow mesa top saddle that connects the western and eastern portions of Tsankawi Mesa west of Tsankawi Pueblo (Myron Gonzales, personal communication, 1999). Today this saddle is populated by a few prickly-pear (*Opuntia* sp.) cactus.

The prehistoric communities of what is now the Tsankawi Unit were a part of the Tshirege Group (Hewett 1904; Snead 1994), and were socially and politically aligned with three other large, nearby, linguistically related pueblos – *Potsuwi* (Otowi), *Tsirege* (Tshirege), and *Navawi*. All four of these communities are located in a curving alignment, 6.3 km (3.9 mi) in length, along the eastern edge of the Pajarito Plateau. The four pueblos are evenly spaced at an interval of approximately 2.9 km (1.8 mi). Additional outstanding cultural resources are located just beyond the borders of the Tsankawi Unit in all directions (e.g., DOE 1999:12-8, 13-9).

B. Previous Archeological and Ethnographic Studies

As an associate of the Archaeological Institute of America, Adolph F. Bandelier made five field trips to the Pajarito Plateau between 1880 and 1886. Over the years he visited and informally documented sites along the Rito de los Frijoles and on the Cañada de Cochiti (Bandelier 1880-92, 1890, 1892; Lange and Riley 1966; Lange *et al.* 1970, 1975, 1984). In July, 1885, Bandelier recorded in his journal that: "...close to the river, the ruins of 'Tzi-re-ge' [*Tsirege*, Tshirege], 'Sa-qu'ue' [*Tsankawi*], and 'Po-tzu-ye' [*Potsuwi*, Potsu'ui, Otowi] on the low mesas were visible." While visiting the Pueblo of San Ildefonso two months later, Bandelier noted that "Sa-que-uy [*Tsankawi*] is near by" (Bandelier 1880-92). He further records:

> There are also several pueblo ruins on the mesas, about which I have only learned from the Indians that they were Tehua [*Tewa*] villages, and that their construction, occupation, and abandonment antedate perhaps by many centuries the times of

> Spanish colonization. The Tehua [*Tewa*] names for these ruins are, respectively, Tzi-re-ge [*Tsirege*, Tshirege], Sa-ke-yu [*Tsankawi*], and Po-tzu-ye [*Potsuwi*, Potsu'ui, Otowi] [Bandelier 1892].

In association with academic institutions in Colorado and New Mexico and the Smithsonian Institution, Edgar L. Hewett supervised archeological reconnaissance and excavations on the Pajarito Plateau between 1896 and 1911. These projects took place in the area between Santa Clara Canyon and the Rito de los Frijoles, particularly in Frijoles Canyon. Such early excavations were rudimentary and generally destructive and reports of results were very limited in scope. It appears that the collections recovered during these excavations were informally passed on to other researchers and institutions (cf. Kidder 1915; Morley 1910; Wilson 1916, 1917, 1918) and are now widely scattered and lost. Hewett documented the threat of "pot-hunting" activities by "irresponsible parties" seeking relics on the plateau as early as 1900 (Rothman 1988:3).

In 1899, Hewett completed a sketch map of Tsankawi Pueblo, based on surface evidence. In 1900 and 1905, he excavated several limited areas at Tsankawi Pueblo (Hewett 1904:655-656; 1906:55; 1938:133-134; Mathien 1989:193). Hewett wrote:

> The site was chosen entirely for its defensive character... The builders of Tsankawi kept to the orthodox rectangular plan... There were ten kivas at Tsankawi – a large number for the population, which probably never exceeded 300 to 400 people, although this would be considerably increased if we should count the population of the cliff-village in the south face of the mesa. Tsankawi was a composite pueblo, consisting of four virtually independent houses [Hewett 1906:20].

> About two miles southeast of Otowi is the ruin of *Sankewi'I* [Tsankawi]...the most picturesquely situated of any settlement of primitive [sic] people that I have seen, with the exception of Tsiping... [Hewett 1938:47].

> ...40 skeletons were obtained from the two small mounds, 32 from the main cemetery [Hewett 1938:134].

Although some of Hewett's statements are difficult to interpret, it appears that up to 72 individual burials may have been removed from Tsankawi Pueblo. Of these, it is reported that 25 are currently held in the collections of the Smithsonian Institution's National Museum of Natural History (Barnes 1991:284; Joan Mathien, personal communication, 2000; Mathien 1986, 1989).

Tsankawi Pueblo received increasing public attention after George Beam published articles in National Geographic describing *Tsankawi*, *Puyé*, Otowi (*Potsuwi*), and *Navawi* pueblos. Beam's (1909) article contains some of the earliest photographs of what is now the Tsankawi Unit. Beam depicts the approach to Tsankawi Pueblo, describing a "well defined path...worn in places fully one foot deep in the solid rock by the constant tread of sandaled feet. To have accomplished this, the wearing process must have been carried on for a long period of time by a population of many hundreds..."

An early archeological survey, which included the Tsankawi area, was conducted in the 1930s by Mera (1932). Further projects were conducted within the Tsankawi and Otowi units during the 1930s and 1940s (Hendron 1945; Lister 1939, 1940a, 1940b; Stallings 1933, 1937; see also

Robinson *et al.* 1972; Smiley *et al.* 1953). Lister's work included very limited excavation and stabilization of 181 cavates on the south side of Tsankawi Mesa. In the 1950s, Turney (1962) conducted the first systematic survey of portions of Bandelier National Monument, describing 55 sites within the Otowi Unit (which included the current Tsankawi Unit), however, much of the recorded information was apparently lost (Mathien 1986). Two burials were removed from the Tsankawi Unit in 1960 and 1967, respectively (Joan Mathien, personal communication, 2000; Toll 1995:11). These were curated in the Bandelier National Monument collections and were repatriated and reinterred in 1995. The petroglyphs and pictographs of Bandelier National Monument, including the Tsankawi Unit, were studied by Rohn *et al.* (1989) and Olson (1997).

Although it did not include any Bandelier acreage, a large-scale, random-sample, archeological survey of selected areas of the Pajarito Plateau was conducted by Hill in the 1980s (Barnes 1991; Hill and Trierweiler 1986; Orcutt 1981; Preucel 1990). Additionally, Snead (1995) studied the Caja del Rio Plateau, located directly across the Rio Grande from Bandelier National Monument.

In 1986 and 1987, the NPS Southwest Regional Office conducted a surface archeological survey of the Tsankawi Unit (Powers and Orcutt 1999; Toll 1995). Approximately 73% of the Tsankawi Unit was examined utilizing generally judgmental and probabilistic sampling protocols. Elliott (1998c) and Dudley *et al.* (1999) completed the archeological survey coverage of the Tsankawi Unit, resurveying some areas, recording additional sites, and relocating and reassessing all previously recorded sites. Additional, small-scale compliance work was also completed (Elliott 1998a, 1998b). Currently, the Tsankawi Unit is known to contain 145 recorded archeological sites. Also in 1998, 140 cavates located within four cavate groups at the Tsankawi Unit were inventoried, assessed for condition, and evaluated for management treatments by Provencher (1999). Fieldwork for a regional study of the prehistoric trails of the Pajarito Plateau was initiated in 1999 (Snead 1999a, 1999b).

C. Prehistoric Period (circa 10000 B.C.-A.D. 1540)

It is generally accepted that Native Americans have occupied what is now New Mexico for at least the past 12,000 years. Most archeologists believe that, through time, the prehistoric cultures in what is now the Bandelier region passed through the following archeologically defined periods, with generalized cultural descriptions (after Mozzillo 1999; Powers and Van Zandt 1999; Stuart and Gauthier 1981; Wendorf and Reed 1955).

1. Paleo-Indian Period (circa 10000-5500 B.C.)

It is believed that these pre-ceramic groups were highly mobile and generally utilized low-elevation plains and grassland environments. There was an emphasis on hunting large herbivores with large fluted projectile points and atlatls. While few have been found to date, archeological sites and artifacts representing the Paleo-Indian Period are located to the south and east of the Northern Rio Grande Valley. The only direct evidence of this culture located thus far in Bandelier National Monument is two isolated projectile points (Powers and Van Zandt 1999).

2. Archaic Period (circa 5500 B.C.-A.D. 600)

This occupation represents pre-ceramic, highly mobile hunter/gatherer groups with an increased reliance on diverse locally available resources. Associated material goods include specific

projectile point styles and plant-processing tools, particularly basin metates. The late Archaic (A.D. 300-600) was a continuation of the previous culture by more sedentary groups in scattered communities. It brought the innovations of basketry, incipient weaving, and incipient corn cultivation.

It is notable that Archaic lifeways persisted in what is now the Bandelier area much later than other areas of North American and the Southwest. In the Bandelier area, Archaic sites generally occur along the Rio Grande, mostly consisting of campsites, rockshelters, and work areas, and appear to span the circa 2000 B.C. to A.D. 600 period (Powers and Van Zandt 1999:22-23; Traylor 1982). To date, three Archaic Period sites have been well documented within the park. At the Tsankawi Unit, surface material located at one site appears to represent an Archaic Period occupation.

3. Developmental Period (A.D. 600-1200)

Early Developmental Period (A.D. 600-900) occupation included ceramics decorated with mineral pigments, woven goods, pithouses, house blocks, designated storage rooms, and slab metates. The population was concentrated at lower elevations near permanent water sources and conducted small-scale dry farming, mainly of corn. The early development of Ancestral Puebloan culture occurred in what are now known as the Four Corners and Mogollon Rim areas. To date, no evidence of Early Developmental Period habitation has been located in Bandelier National Monument. During this period, Chaco Basin and San Juan River communities flourished.

During the late Developmental Period (A.D. 900-1200), the population moved to drier and higher elevation locations and cultivated a wider variety of plants. The bow and arrow technology was introduced and the turkey was domesticated. Evidence representing Late Developmental occupation is very sparse at Bandelier (Traylor 1982:443-444; Traylor *et al.* 1990:20).

4. Coalition Period (A.D. 1200-1325)

While generally continuing previous practices, the early Coalition Period (A.D. 1200-1275) population increased. People lived in small, low-density sites, with small pueblos containing six to 30 rooms consisting of jacal structures on stone foundations. Generally, it is believed that Ancestral Puebloans initially settled on the Pajarito Plateau after A.D. 1150. Migration stories in *Tewa* oral history speak of ancestors migrating from the north, generally from what is now the Four Corners area (Gary Roybal, personal communication 1999; Whitman 1947:3). The earliest settlements consist of small pueblos and cliff-side dwellings containing six to 30 rooms. Most of these were without kivas and were only occupied for perhaps 10 to 15 years, until surrounding natural resources and agricultural soils were exhausted.

During the late Coalition Period (A.D. 1275-1325), sites increased in number and were generally centered around larger plaza pueblos. Ceramics were decorated with organic pigments and the people used multiple farming practices (in smaller watered canyons, on mesa tops utilizing water control features, and along the Rio Grande).

The Coalition Period represents the earliest sustained settlement of the Pajarito Plateau. A great increase in site frequency on the Pajarito Plateau circa A.D. 1175 to 1325 indicates a ten-fold increase in human population (Stuart and Gauthier 1981). The occupants of the Pajarito Plateau

may have emigrated from several different areas over time, as suggested by variable architectural features.

5. Classic Period (A.D. 1325-1600)

Classic Period sites were fewer in number but larger in size, with large multi-plaza and multi-story pueblos. Also, there were fewer but larger kivas. Social and organizational complexity increased and a widespread exchange system was established. The people farmed both flood plains and dry areas along perennial drainages utilizing rudimentary irrigation systems, hillside terracing, and temporarily occupied fieldhouses.

From circa A.D. 1325 to 1550, while occupying the Bandelier area, Ancestral Puebloans experienced a cultural rebirth. In a substantial shift from the previous settlement pattern, small agriculturalist groups coalesced to form large, communal, year-round villages. An estimated 5,000 people lived on the Pajarito Plateau during this time, the size and number of archeological sites had peaked, and the largest pueblos located in the Bandelier area were constructed and occupied. Many settlements consisted of large, multi-storied pueblos with hundreds of rooms, built to surround central plazas. Almost all such pueblos contained circular kivas.

The major cultural sites and features now within Bandelier National Monument were apparently constructed and occupied between circa A.D. 1150 and 1550, during the Coalition and Classic periods. Frijoles Canyon formed a general boundary between linguistic groups, with *Tewa*-speaking pueblos to the north and *Keres*-speaking pueblos to the south.

While surface material located at one site in the Tsankawi Unit appears to represent an Archaic Period occupation, it is believed that the area was more generally settled by Ancestral Puebloans living in small pueblos and cavate groups in the late 1100s. At its height (circa A.D. 1400 to 1550), Tsankawi Pueblo represented a Classic Period residential complex consisting of several major groups of dwellings occupied by *Tewa*-speakers. Tsankawi and three other nearby large pueblos – *Potsuwi* (Otowi), *Tsirege* (Tshirege), and *Navawi* – were linguistically, socially, and politically aligned. A high population density during this time, estimated to be 400 to 600 individuals in the Tsankawi area alone, resulted in a high density of cultural resource sites within what is now the Tsankawi Unit.

Natural indentations in the soft vertical cliffs of volcanic tuff were excavated to carve out rooms referred to as cavates. Such cliffs and walls formed an ideal medium for the carving and pecking of petroglyphs and painting of pictographs. Tuff cobbles were shaped into blocks to construct masonry-walled structures mortared with mud. These were generally in the form of talus houses built out from a natural wall with roof beams (*vigas*) set into socket holes excavated in the natural walls, or were free standing pueblos. Most interior walls and floors were plastered and most cavate ceilings were plastered or fire-blackened. Local materials were utilized for roofing, particularly ponderosa pine (*Pinus ponderosa*) for long straight beams, piñon pine (*Pinus edulis*) and juniper (*Juniperus monosperma*) for shorter beams, and willow (*Salix* sp.) and other plants for thatching. This roofing was finally covered with mud.

Patches of loose, granular, and rich volcanic soil were highly suitable for prehistoric agriculture. Harvested crops, including corn, beans, squash, and amaranth, were grown in agricultural fields generally between elevations of 1,860 and 2,200 m (6,100 and 7,200 ft). Such fields were located on mesa tops, in canyon bottoms, on slopes utilizing terraced benches, and in pumice

field areas. Outlying fields were tended during the growing season via the temporary use of isolated fieldhouses, generally of one or two rooms. Crop yields from dry-farming techniques were highly dependent on natural precipitation in an area where periods of drought are common. Therefore, soil conservation techniques (grid gardens, terraces, pumice patches) were developed and water channeling and storage features (rock alignments, check dams, basins) were constructed where feasible.

While the inhabitants were primarily farmers, they also gathered wild edible plants, including wild seeds, greens, fruits, and nuts. In particular, piñon nuts have a very high caloric content. Hunting of wild game included deer, rabbits, and other small animals. Turkeys were domesticated and raised in pens for meat and feathers. Insulating blankets were woven from turkey feathers and primarily yucca fibers were utilized for cordage and textiles. A broad variety of wild plants provided raw materials for medicines and special purposes.

Plant foods were processed with grinding implements (manos and metates) manufactured from locally available basalt, rhyolite, andesite, tuff, and quartzite. Obsidian, basalt, chert, and schist provided raw materials for tools and weapons, such as arrowpoints, knives, scrapers, and hafted axeheads. Locally collected clays were used to manufacture ceramic pottery. Textiles were woven on vertical looms, often anchored into the floors of kivas. A widespread exchange network extended into Texas, the Great Plains, and probably southern Mexico. The recorded comments of early Spanish expeditions indicate that Puebloans were wide-ranging travelers.

Between A.D. 1450 and 1550, the human occupation of the Bandelier area had decreased substantially and by 1550 most inhabitants had migrated to form or join the pueblos established closer to the Rio Grande. This emigration was virtually completed by 1600, perhaps driven by local resource exhaustion and the cooler climatic conditions of the "little ice age."

The earliest Spanish expedition to enter what would become New Mexico was led by Francisco Vásquez de Coronado in 1539-1540. Observations recorded in the logs and diaries of this expedition represent the earliest written records from the region. The explorers encountered groups of agricultural Indians whom they called "*Pueblos*," because of their organization in large sedentary villages. Several, generally unsuccessful, expeditions followed and Spain eventually colonized the northern Rio Grande Valley after 1598. Navajo people immigrated southward into what is now the Four Corners area around this same time.

Although still utilized for hunting, gathering, grazing, traditional, and religious purposes, the Bandelier area is thought to have been little occupied by living Ancestral Puebloans after 1600. An exception to this is the period of the Pueblo Revolt of 1680-1693 (see below under Historic Period).

D. Prehistoric Archeological Resources

Prehistoric archeological sites currently recorded within the Tsankawi Unit include the following categories: large pueblos, cavate pueblos, cavate structure sites, small structures, unknown structures or rubble piles, storage structures, surface artifact scatters, bedrock mortars, petroglyph and pictograph panels, water control features, rock alignments, and trail segments (Elliott 1998c).

Natural impacts to these cultural resources include those related to gravity, weathering, moisture damage, soil erosion, invasive flora, and faunal activity. Human induced impacts include historic period use, historic livestock grazing (1870s to 1932), illegal artifact collection, "pot-hunting" activities (circa 1900 to 1980), early small-scale archeological excavations (1900, 1905, 1939), early NPS restoration efforts (1939 and 1940), historic and modern graffiti, mechanical abrasion, social trails, littering, and general visitor use.

Additional archeological sites associated with Tsankawi Pueblo, which were inside the historic NPS Otowi Unit (1932-1963) but fall outside the current Tsankawi Unit boundaries, are on land controlled by the DOE, Los Alamos National Laboratory. Under a cooperative agreement, public access DOE lands are currently protected and patrolled by NPS staff.

1. Pueblos

Surrounding a central plaza, the collapsed masonry walls of *Sækewi' onwikeji* or Tsankawi Pueblo stand atop topographically isolated Tsankawi Mesa. While Tsankawi Pueblo was subjected to several limited and small-scale excavations (1900, 1905, 1939), for the most part, it remains unexcavated. Therefore, further descriptions are speculative. Roughly rectangular in shape, Tsankawi Pueblo is thought to have contained two or four large room blocks and from 200 to 400 masonry-walled rooms. Rooms were likely arranged eight deep and two stories high, perhaps three stories high in places. These room blocks currently appear as rectangular piles of rock rubble. Subterranean kivas with collapsed roofs in the pueblo area are currently indicated by surface depressions.

The construction of Tsankawi Pueblo is thought to have begun in the late 1300s, with building continuing into the early 1400s. General habitation by living people is thought to have ended in the mid- to late 1500s. Three additional sites represent smaller, free-standing pueblos including *Sækewinuge onwikeji* in the Duchess Castle area.

2. Cavates

Toll (1995:1) initially defined cavates as "cavities in the canyon wall that are primarily the result of excavation of the rock." This definition was further modified by Provencher (1999:3) to include cavities with (1) clear signs of excavation, (2) smooth and continuous wall and ceiling surfaces, (3) grinding pits in the floor, (4) evidence of interior surface finishing or chinking, and/or (5) access via a trail, stone ladder, or hand-and-toe-holds.

Although used throughout the range of Ancestral Puebloan occupation, cavates are thought to be the primary residences of Tsankawi's earliest (early 1100s) and latest (late 1500s) Ancestral Puebloan occupants. It is clear that cavates represent low-maintenance and long-lasting shelters, as many cavates have survived the years while pueblo and talus house walls have collapsed. Generally oriented to the south, southeast, or southwest, four major cavate clusters have been identified within the unit: the West Tsankawi Mesa Group, the Tsankawi Mesa South Rincon Group, the Tsankawi Mesa Southeast Rincon Group, and the North Mesa Group. These contain approximately 250 to 300 cavates (Elliott 1998c:16; Toll 1995:102).

Toll (1995:13) classified cavates within Bandelier National Monument into three general utilitarian types. Storage cavates are small and do not have smoke-blackened ceilings; habitation cavates are larger with smoke-blackened ceilings and other occupational features; and kiva

cavates are the largest, with smoke-blackened ceilings as well as petroglyphs, pictographs, and/or loom anchor features. Cavates within the Tsankawi Unit contain examples of all these features, but are slightly more complex (Toll 1995:59). The most common are single rooms with one entrance and a smoke hole through an outside wall. Rooms are generally rectangular in plan and trapezoidal in vertical shape. Generally, wall corners are nearly perpendicular, while wall-to-ceiling joints are rounded. Many contain features such as fire pits and wall niches. Some have secondary rooms excavated to the rear or with the walls between adjoining cavates removed. Toll also defines four cavate attributes that are unique to the Tsankawi Unit: vertical ceiling holes, groups of floor pits, deeply incised room walls, and cliff niches.

3. Talus Houses

Generally fronting cavates, talus houses formed additional habitation blocks. These consisted of clusters of masonry-walled houses set against mesa cliffs. Such dwellings were built one to two stories high and took advantage of cliff walls on one or two sides for structural support. Now collapsed, evidence of talus houses include structural outlines, masonry debris, and roof-support-beam (*viga*) socket holes excavated into cliff walls. Such evidence is clustered in the four major cavate groups listed above.

4. Surface Finishes, Petroglyphs, and Pictographs

The interiors of many Tsankawi cavates have smoke-blackened ceilings and/or are decorated with painted plaster, which is generally reddish-brown in lower areas and white or black in upper areas. Some ceilings contain obvious excavation marks, some floors are coated with thick plaster, and some walls are plastered very smooth. A few cavates contain complex plaster finishes of two or more colors, while others indicate replastering five or more times.

Petroglyphs and pictographs are contributing elements to 26 recorded archeological sites and six isolated occurrences. These features consist of designs pecked, incised, or painted on smooth natural rock surfaces or the smoke-blackened ceilings or plastered walls of cavate interiors. Most are associated with talus house and cavate cluster areas or the access trails along southern cliff walls. Exterior motifs include stylized anthropomorphic figures, zoomorphic elements, geometric designs, and a few botanical representations. Some highly decorated cavate interiors include geometric designs, anthropomorphic figures, and zoomorphic elements. Zelick (1989) proposes that some petroglyphs located within the Tsankawi Unit have astronomical functions and represent solar calendars. Olsen (1997:187) posits that many petroglyphs and pictographs in what is now Bandelier National Monument were created during a proposed large-scale drought (circa A.D. 1295 to 1375) which may have coincided with expanding human population (circa A.D. 1175 to 1325).

5. Trails, Stairs, and Hand-and-toe Holds

While a wide network of prehistoric trails webs across the Pajarito Plateau to connect the sites and localities associated with Ancestral Puebloan occupation, "The trails of Tsankawi are considered the most remarkable of those on the plateau..." (Snead 1994:5). Within the unit, a local network of prehistoric trails, stairs, and hand-and-toe holds carved and/or worn into the soft tuff substrate connect the mesa top areas, the cliff face cavate and talus house areas, and the floodplains below. A major portion of the prehistoric access trail network is currently utilized as the modern, NPS-established, primary visitor trail. Other prehistoric trail segments receive light

to very heavy secondary visitor use. Several isolated portions of the prehistoric trail network survive with little wear beyond that of their original prehistoric use.

In steeper areas, stairs, and hand-and-toe holds were utilized. Incised into soft tuff slopes and walls, these are true to their descriptive names, and are more common in upper cavate and cliff areas. Hand-and-toe holds consist of shallow holes or indentations excavated into the rock to facilitate direct ascent/descent of practically vertical faces.

6. Water Control Features

Rudimentary water channeling features and rock dams are present at various locations within the Tsankawi Unit. The former may be generally described as constructed channels that guided runoff from small intermittent drainages and sloping bedrock. Small rock dams effectively blocked the outflow from shallow basins to create storage pools from which water was removed and redistributed in vessels. Also, smaller channel features were carved in the soft tuff to divert runoff away from cavate entrances.

7. Surface Artifacts

Artifacts are small, portable items of human manufacture or modification. These include pottery vessels and fragments; lithic tools and debitage (debris from stone tool manufacture) generally of chert, basalt, or obsidian; fragments of stone plant-processing implements (manos and metates); etc. Such artifacts may be visible on the surface of the ground either in isolation or in clusters or "scatters."

8. Disturbed Areas

Several previously disturbed areas may be identified through the absence of native vegetation and/or the presence of non-native vegetation. These may represent patches utilized for prehistoric and/or historic agricultural or other uses.

E. History and Historic Land Use (A.D. 1600-1950)

1. Spanish Period (1600-1821)

Following several Spanish explorations of the area, the Viceroy of New Spain appointed Juan de Oñate governor of New Mexico in 1598 and charged him with establishing a colonial settlement on the *Rio Bravo (Grande) del Norte*. That same year, with some 200 settlers and over 7,000 head of livestock, Oñate established a headquarters at the Pueblo of San Juan eventually named San Gabriel. San Gabriel was abandoned when Santa Fe was established as the capitol circa 1610 (see Harrington 1916:227-228).

Although still utilized for hunting, gathering, grazing, traditional, and religious purposes, the Bandelier area is thought to have been little occupied by living people from 1600 until the 1740s. The Spanish occupation of New Mexico was plagued by isolation, conflicts between civil and religious authorities, and Puebloan resistance to the extreme demands inflicted upon them.

The Puebloans suffered from epidemics of introduced European diseases. Although retaining much of their land and cultural base, they were politically subjugated by the military administration and forcibly converted to Catholicism through a system of missions. Local Puebloans banded together under *Popé*, an Indian from the Pueblo of San Juan, in the Pueblo Revolt of 1680. As a consequence, Spanish soldiers, missionaries, and settlers were driven south out of the region for approximately 13 years. During the Revolt, Puebloans reoccupied eastern Frijoles Canyon and the eastern Pueblo of Cochiti areas (Harrington 1916). Pueblo of San Ildefonso oral history holds that Tsankawi Pueblo was also reoccupied during this time (Myron Gonzales, personal communication, 1999). Puebloan pictographs located in the Bandelier area and attributed to this period depict Christian symbols, horses, soldiers, and missionaries. Between 1693 and 1695, Spanish control over New Mexico was militarily reasserted by Diego de Vargas. An additional, limited, and unsuccessful Pueblo uprising took place at the Pueblo of San Ildefonso in 1696 (Harrington 1916:306).

Under threat from Navajo and Comanche or Apache raiders (see Harrington 1916:413, 485, 573) and French colonies to the east, the Spanish formed cooperative alliances with the Puebloans and formalizing some of their land holdings. During the 1600s and 1700s, land grants were issued by the Spanish Crown, through the colonial governors, to the pueblos and to predominant citizens in order to encourage further colonization by Spanish settlers. Land grants played an important role in the boundaries eventually established for Bandelier National Monument.

The original Spanish land grants of nearby pueblos were fairly small; these holdings have expanded over time. The land grant summary below (and Figure 15) was gleaned from Sanchez and Erickson 1999 (see also Chambers 1974; Harrington 1916; Morley 1938; Presidential Proclamation No. 3183 map, 1916; Santa Fe National Forest 1921; Williams 1986:105).

In 1728, Antonio Lucero was granted the Cañada de Cochiti Grant north of the Pueblo of Cochiti Grant. The Cañada de Cochiti Grant eventually established the southern boundary of Bandelier's current main unit. Some of the grant was used for farming and it was generally disbursed through inheritance and sale between 1755 and 1785. During this time, only one Hispanic community was established in what is now the local Bandelier area – the village of Cañada, with 184 inhabitants in 1782, located on the Cañada de Cochiti Grant. Much of this grant is currently owned by the University of New Mexico and Jemez Pueblo.

In 1739, Captain Andres Montoya petitioned for land extending from the northern side of the Rito de los Frijoles southward to the Cañada de Cochití Grant. Referred to as the Rito de los Frijoles Grant, this included much of what is now Bandelier's main unit. While not immediately occupied, some of Montoya's heirs settled in what may be the Capulin Canyon vicinity in the 1760s. After a land title dispute between 1750 and 1780, the Grant was eventually occupied by the Lujan family between 1780 and 1811. As a result of the apparent use of prehistoric cavates in Frijoles Canyon as hideouts by outlaws, all the grant's occupants were expelled by Santa Fe authorities in 1811. The Lujan family re-inhabited and cultivated Frijoles Canyon from 1814 to the 1860s, and perhaps the mid-1880s. Eventually, evidence presented during U.S. court proceedings in the 1890s indicated that this grant title was actually voided in 1767. Much of the land claimed under the Rito de los Frijoles grant was withdrawn by the U.S. government in 1900, and became Bandelier National Monument in 1916 (see below). During the 1700s, the Pueblo of Cochiti claimed grazing rights northward to the Rito de los Frijoles, within both the Rito de los Frijoles and Cañada de Cochiti grants.

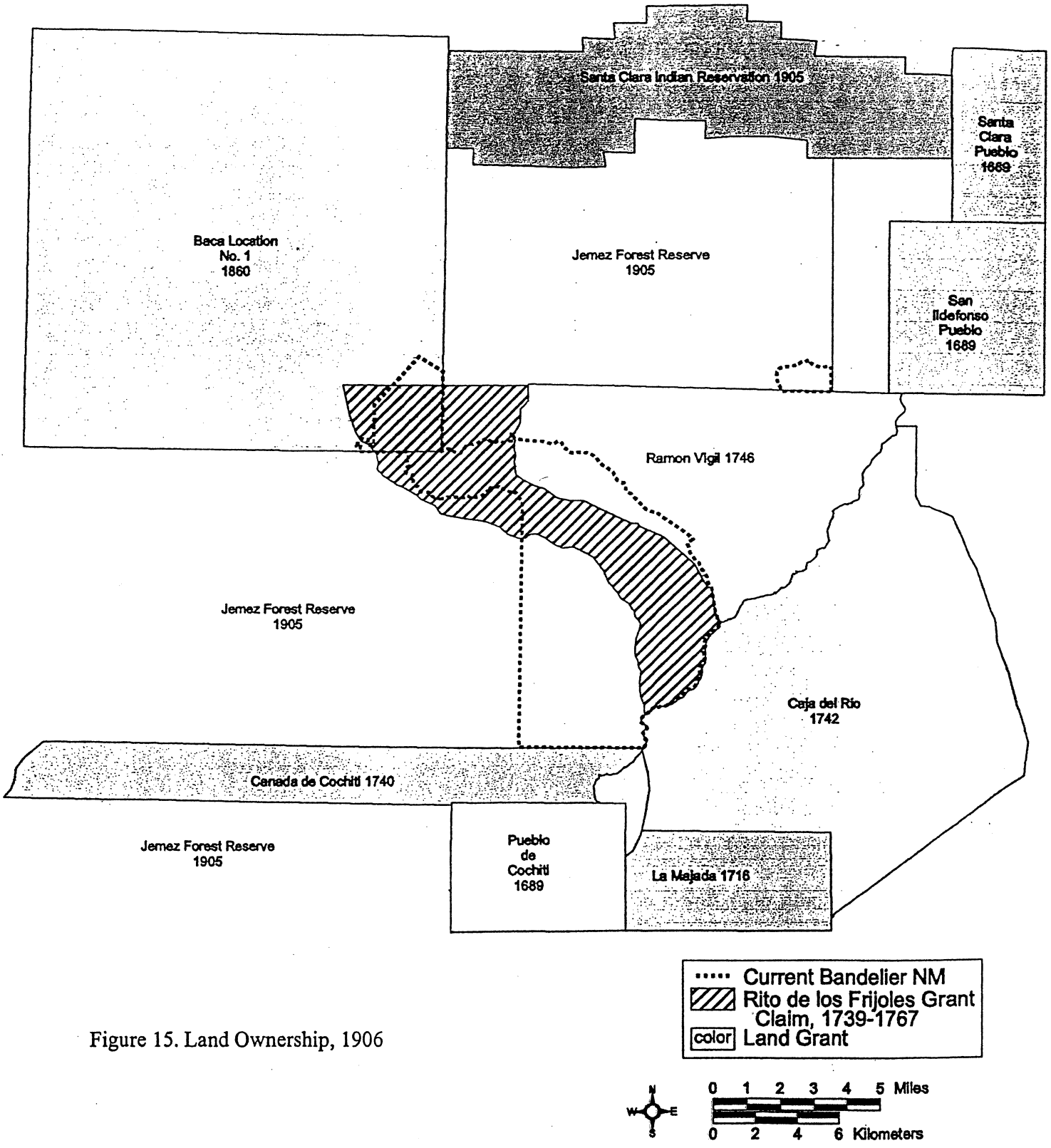


Figure 15. Land Ownership, 1906

In 1742, the Caja del Rio Grant was established across the Rio Grande, to the southeast of the main unit's present location. Also in 1742, Pedro Sanchez was granted lands immediately north of the land claimed by the Rito de los Frijoles Grant and this area was occupied by him and his heirs for more than a century. The Sanchez (Ramon Vigil) Grant boundary along the northern rim of Frijoles Canyon established the current Sandoval/Los Alamos county line and the northeast boundary of Bandelier's main unit from 1916 to 1961. The exact boundary between the northern Sanchez Grant and the southern grazing commons of the Pueblo of San Ildefonso was disputed from 1763 into the 1880s. Apparently, this dispute centered on the Pajarito Canyon, Llano Pajarito, and Los Alamos Canyon areas, former grassland areas which are now the location of the community of White Rock and the Tsankawi Unit. The Sanchez (Ramon Vigil) Grant is currently held by the Department of Energy, the Los Alamos town site, the County of Los Alamos, and Bandelier National Monument.

2. Mexican Period (1821-1848)

When Mexico won independence from Spain in 1821, little in New Mexico changed in terms of land-use practices and cultural influences. Over time, Spanish protectionist trade policies were dropped and free trade was encouraged. A weakening of Mexican support for her northern colonies brought an influx of American trade goods and settlers westward on the Santa Fe Trail. Eventually, American immigration and U.S. expansionist philosophy led to independence movements in Texas and California and the Mexican-American War (1846-1848). Soon after the United States declared war on Mexico, U.S. troops occupied Santa Fe. The war ended with the signing of the Treaty of Guadelupe Hildalgo, the annexation of Texas, and the purchase of California and New Mexico by the United States.

3. United States Territorial Period (1848-1912)

Immigration of U.S. citizens into the U.S. Territory of New Mexico increased greatly during the California Gold Rush of 1849. Although the Treaty of Guadelupe Hildalgo mandated the U.S. to legally recognize land rights established under the Spanish and Mexican administrations, often this was not the case. Many local long-standing land and water claims were dismissed by U.S. authorities on the basis of lack of acceptable documentation or vague boundary descriptions.

Despite efforts by the Pueblo of San Ildefonso to regain portions of the Sanchez Grant over many years, the ranch was sold to Ramon Vigil in 1851. In fact, at that time the grant title extended even farther north into Pueblo of San Ildefonso land than had been previously claimed. Apparently used as a commons by many people, Vigil and others recalled utilizing the grant between the 1820s and the 1880s to graze sheep and cattle, raise crops, and cut lumber. Vigil built and occupied a house to the north of his grant, located just east of the confluence of Los Alamos and Pueblo canyons and just northwest of the current Tsankawi Unit (Sanchez and Erickson 1999).

In 1860, the heirs of Don Luis Maria Cabeza de Baca were awarded the Baca Location No. 1 Grant, which encompassed the Valles Grande, in lieu of other holdings around Las Vegas. Navajo and Comanche or Apache raids continued into the early 1860s and held local development in check until several U.S. military campaigns were launched (Scurlock 1981; see also Harrington 1916:413, 573). In the 1880s, the Ramon Vigil Grant title was accepted as valid by U.S. courts. In 1894 and 1895, U.S. courts ruled that the title for the Rito de los Frijoles Grant

was invalid (boundaries shown in Figures 15-17 are based on Prince Papers 1892; see also Chambers 1974; Morley 1938:154; Sanchez and Erickson 1999).

Between 1880 and 1886, a Swiss-American scholar, Adolf F. Bandelier, researched the ethnographic history of the Puebloans of the Santa Fe area. A man from the Pueblo of Cochiti first guided Bandelier into Frijoles Canyon in October 1880, stating it was where his ancestors had lived. Bandelier completed the first organized survey and documentation of prehistoric sites in the area, at times accompanied by Charles Lummis (Bandelier 1880-92, 1890, 1892; Lange and Riley 1966; Lange *et al.* 1970, 1975, 1984).

Historic land use of the Pajarito Plateau by Puebloan and Hispanic occupants between the 1600s and 1880s included sheep and cattle grazing, wildlife hunting, timber and fuelwood cutting, the cultivation of summer crops (particularly beans and corn), mining, and collecting native plant resources. Puebloan and Hispanic herders may have set fires to enhance grazing forage (Allen 1989:85). Gathered natural resources included *piñones* (piñon pine nuts), juniper berries, and *zacate* (tall grass).

> The sierra [Jemez Mountains] is full of people from the pueblo [Cochiti] gathering zacate (grass) and piñones. The zacate is cut with iron sickles and gathered in bunches to be sold farther south where it does not grow. Three bundles are worth a string of green chile two meters long.... Juniper berries are gathered now. They take one year to ripen, and they are used for tea in case of colds [Bandelier 1880-92].

Harrington (1916:221) may have recorded the occurrence of this same grass species at lower elevations near the Pueblo of San Juan:

> [12:19] San Juan *Tasentunwæjo'oku* 'hills of the tall *tasen f* grass species' (*tasen f* 'an unidentified species of grass which is very good for grazing purposes and grows waist-high under very favorable conditions, called by the Mexicans zacate azul...'

These descriptions may refer to little bluestem (*Schizachyrium scoparium*), which can reach a height of about 90 cm (3 ft).

Retaining its name, the Ramon Vigil Land Grant was sold to American stockmen in 1884 and the number of sheep and cattle grazing in the Jemez Mountains increased to perhaps ten times the carrying capacity of the modern vegetation (Allen 1989:145-146). The resulting reduction of herbaceous fuels led to a decrease in fire frequency from the natural fire regime. Commercial logging became established in the 1890s and livestock grazing intensified dramatically (Allen 1989:17, 94-95, 156-157). Between 1880 and 1886, the "Chili Line," a narrow-gauge spur of the Denver and Rio Grande Railroad was extended south to Santa Fe, which was already a station on the Atchison Topeka & Santa Fe Railroad. Lumberman Harry S. Buckman established the Buckman Road, a dirt wagon road traversing the west side of Cañada Ancha (White Rock Canyon) and crossing the Rio Grande via a wooden bridge. The road connected several Pajarito Plateau sawmills to Santa Fe and the Chili Line stop of Buckman (Harrington 1916:282, 285, 286, 326; Rothman 1988:131; Santa Fe 1914; USGS 1953). The Buckman Road and its spurs facilitated the transport of lumber and livestock from the uplands to the railroad. As a result, both American settlers and developers immigrating from the east and the amount of timber exported from the Pajarito Plateau increased dramatically. The rights and concerns of regional

Puebloans were generally disregarded by American developers (see Harrington 1916:191, 296, 420, 428).

Early tourists followed the Buckman Road, which was eventually extended to the north rim of Frijoles Canyon in 1912, and was the precursor to today's State Route 4. The unimproved, lowest elevation, segment of the Buckman Road is located 2.4 km (1.5 mi) south of the current Tsankawi Unit.

In the late 1890s, the Department of Interior, General (also U.S. or Government) Land Office (GLO), began to study many of the major archeological sites in the Southwest in terms of preserving and protecting them. As a result, a policy of "temporary withdrawal" was developed under which the GLO withdrew land from private claim until the best use and purpose of the land could be determined (Rothman 1988:2). Beginning in 1899, multiple efforts were made to protect archeological sites of the Pajarito Plateau with national park status. Archeologist Edgar L. Hewett spearheaded these early efforts while supervising archeological excavations in the region. The proposed park was expansive, with potential names including "Pajarito Plateau National Park" and "National Park of the Cliff Cities," however, there was little precedent for an archeological national park. Hewett described illicit looting damage to Pajarito Plateau archeological sites as early as 1900 (Rothman 1988:3). After further study, the GLO ordered the temporary withdrawal of 62,194 ha (153,620 ac) of Territory of New Mexico land in the Pajarito Plateau area for consideration as a national park on July 31, 1900 (Rothman 1988:10). This included land that would eventually become Bandelier National Monument.

Presidential Proclamation No. 3183, signed by Theodore Roosevelt on October 12, 1905, set aside the Jemez Forest Reserve, an even larger tract of land that included the temporary withdrawal of 1900. This was designated for use as a public reservation under GLO administration. Surrounding lands held within the Pueblo of San Ildefonso, Pueblo de Cochiti, Baca Location Number 1, Ramon Vigil, and Cañada de Cochiti land grants remained intact. The boundaries of the Pueblo of Santa Clara's holdings were expanded westward up Santa Clara Canyon to the Baca Location.

In 1900 and 1905, Edgar L. Hewett conducted limited excavations at Tsankawi Pueblo within the GLO withdrawal and perhaps the Jemez Forest Reserve. In 1905, the administration of the Reserve was transferred to the Department of Agriculture. Faced with strong opposition to the national park concept from growing ranks of private homesteaders, livestock ranchers, development interests, and local Puebloans, Hewett helped draft the Antiquities Act, which became law in 1906. The Act empowered the President of the United States to create national monuments in order to protect cultural resources and areas of national interest. In 1907, the Jemez Forest Reserve was renamed the Santa Fe National Forest and placed under the jurisdiction of the U.S. Forest Service. Also in 1907, Judge Abbott was allowed to homestead in Frijoles Canyon and became an unofficial caretaker of the canyon assisting Edgar Hewett with his archeological work.

4. United States Statehood Period (1912-1950)

Four years after New Mexico attained statehood, Presidential Proclamation No. 1322, signed by Woodrow Wilson on February 11, 1916, created Bandelier National Monument from land withdrawn from the Santa Fe National Forest. Scaled down from national park proposals, the new monument included 9,049 ha (22,352 acres) in three discrete locations – the main tract, the

Tsankawi tract, and the Otowi tract (Figure 16; see Gleason 1919a, 1919b; Rothman 1988:161; Santa Fe National Forest 1921). Monument status was designated to protect the archeological resources located in those three areas. The original Tsankawi tract encompassed about a quarter section (approximately 65 ha or 160 ac), while the original Otowi tract included about one section (approximately 260 ha or 640 ac; Santa Fe National Forest 1921).

While the National Park Service (NPS) was established later in 1916, the new monument continued under the custodial jurisdiction of the U.S. Forest Service. Although Presidential Proclamation No. 1322 states: "...any use of the land which interferes with its preservation or protection as a National Monument is hereby forbidden. Warning is hereby given to all unauthorized persons not to appropriate, injure, remove, or destroy any feature of this National Monument...," previous land-use practices (particularly heavy grazing) and "pot-hunting" activities continued essentially unchanged. Local land management agencies initiated total fire suppression policies during the 1910s. This reinforced the disruption of the natural fire regime, which had begun about 30 years earlier with extensive livestock grazing (Allen 1989:96).

Maps from this period (Plat Map 1915; Presidential Proclamation No. 1322, 1916, map; Santa Fe National Forest 1921) record several items of interest. There is a possibility that an early road or a construction staging area intruded into the southwest corner of the current Tsankawi Unit (see Figures 2 and 9 and Alternative B in Chapter 3). To the west of the unit, features include the McDougall ranch (on the Mesita del Buey, apparently now Los Alamos National Laboratory Technical Area 51), the J.S. Loomis ranch at the northwest corner of the Ramon Vigil Grant, and a sawmill (apparently at the confluence of Pajarito and Threemile canyons and currently Los Alamos National Laboratory Technical Area 18). The Plat Map (1915) of the Ramon Vigil Grant generally shows the Buckman Road (upper portion of State Route 4) and sections of the future Ranch School Road (portion of State Route 502) and their spur roads in their current alignments in the Tsankawi Unit's vicinity.

In 1917 a Californian named Madame Vera von Blumenthal received permission from the Forest Service to construct a summer home within the current Tsankawi Unit. The chosen location was atop and adjacent to an archeological site representing *Sækewinuge onwikeji*, a free-standing, Classic Period pueblo. A house with several outbuildings was constructed by craftsmen from the Pueblo of San Ildefonso utilizing shaped masonry blocks scavenged from the remains of the prehistoric pueblo. Von Blumenthal and her companion, Rose Dougan (or Dugan), occupied the house during summers. They also funded a program through the School of American Archaeology, which sought to stimulate a resurgence of Puebloan ceramic production and design at San Ildefonso Pueblo. The "Blumenthal and Dugan School" operated with much success between 1918 and 1929. Such artists as Maria and Julian Martinez studied ancient pottery techniques there. In 1929, both women abandoned the house and returned to the West Coast (Hoard 1989:49-50; Mozzillo 1999). Remains of the historic house, which became known as the "Duchess Castle," are located inside the northern border of the current Tsankawi Unit.

As use of the railroad stop at Buckman waned in the 1920s, the use of the Buckman Road decreased. The Los Alamos Ranch School, which was located in what is now the center of the community of Los Alamos, received an easement from the Forest Service to construct a road which more directly connected existing road segments and included a bridge across the Rio Grande at Otowi Crossing. Named the Ranch School Road, this was the antecedent to today's State Route 502. With two good roads available to automobile traffic, promotional efforts by the

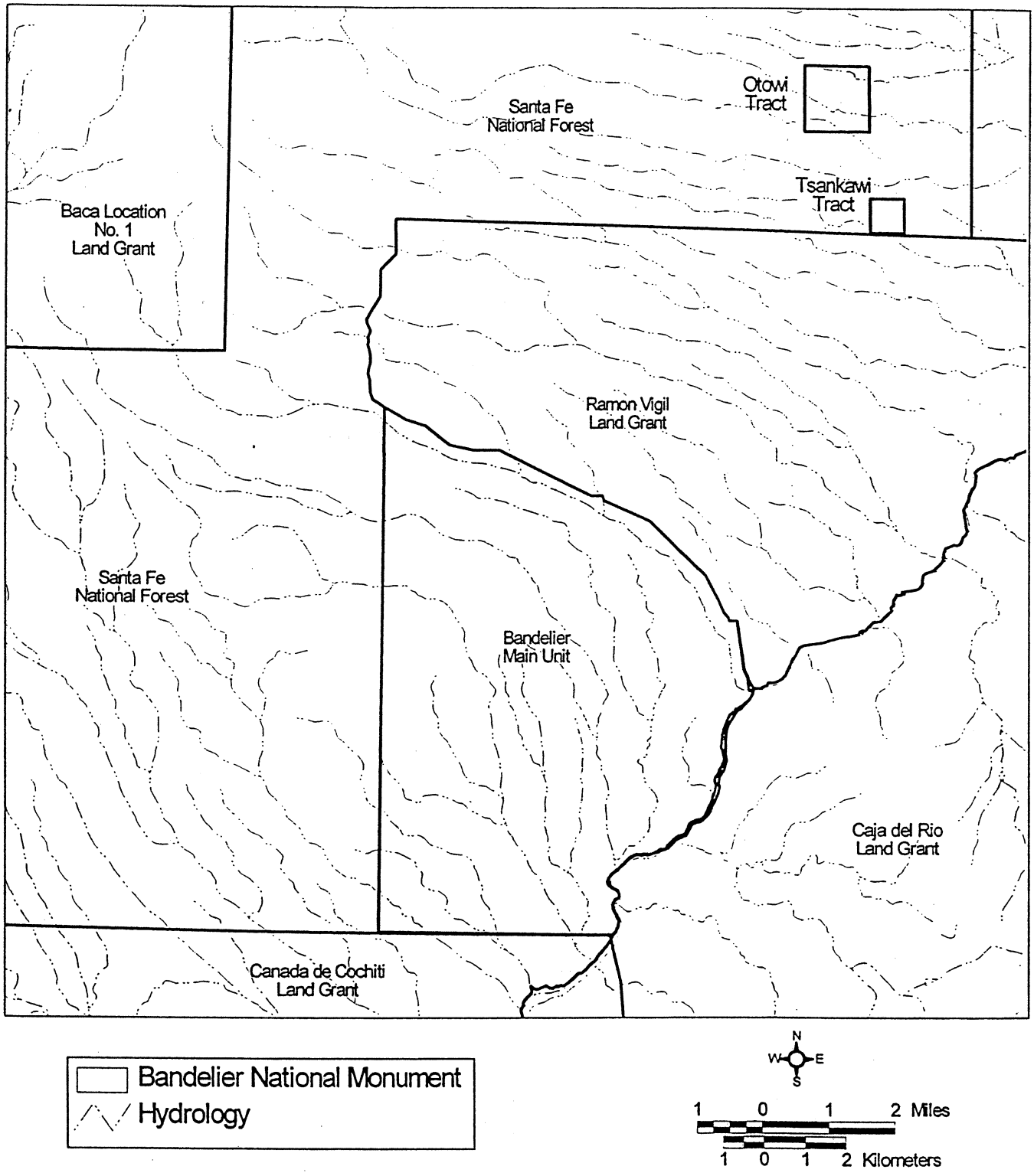


Figure 16. Bandelier National Monument, 1916

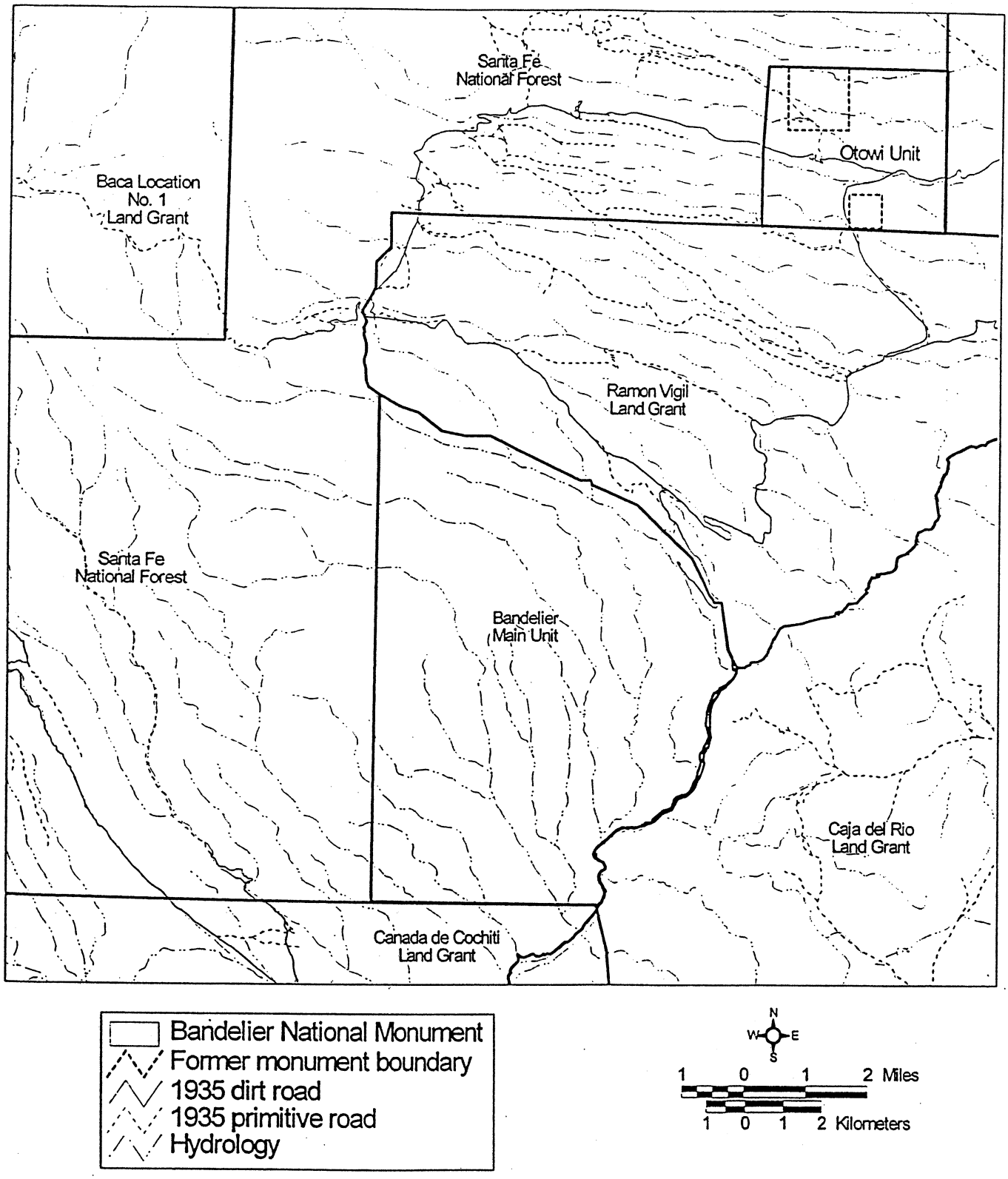


Figure 17. Bandelier National Monument, 1932

Atchison, Topeka, and Santa Fe Railroad, and an expansion of tourism after World War I, the Pajarito Plateau ceased to be a remote location.

Several more attempts to create a larger national park, which would include the existing Bandelier National Monument (Santa Fe 1914), proved unsuccessful. Early Department of Interior inspection reports (Gleason 1919a, 1919b) stated that, contrary to the monument's enabling legislation language, the "Forest Service, apparently, takes no pains to protect these ruins from irresponsible relic-hunters." Gleason further recommended that the monument be brought under the protection of the NPS. Eleven years later, a report issued by Nusbaum *et al.* (1930) states that, although in their opinion the area does not contain sufficient scenic value for national park designation, administration of Bandelier National Monument should be transferred from the Forest Service to the NPS. They opined that the existing Tsankawi and Otowi units should be expanded and combined into a larger single unit. They also noted that the prehistoric trails of the Tsankawi Unit are "a main feature of interest" and recommended that Tsankawi Pueblo be further excavated to provide interpretive information for visitors. With a dramatic rise in tourism anticipated from the improvement of State Route 4 (formerly upper Buckman Road) up to Bandelier National Monument's boundaries in 1931, the Forest Service dropped its opposition to the administrative transfer.

With Presidential Proclamation No. 1991, signed by Herbert Hoover on February 25, 1932, the NPS assumed the administration of Bandelier National Monument and the discrete Tsankawi and Otowi tracts were expanded and combined into a single larger unit with additional land removed from the Santa Fe National Forest (Figure 17). This larger unit was referred to as the Otowi Unit (NPS 1932; USGS 1953) and included a section of the Ranch School Road (current State Route 502). Also in 1932, the Soil Conservation Service, funded by the Federal Emergency Relief Administration, acquired the Ramon Vigil Land Grant from cattleman Frank Bond. Further attempts to create a national park on the Pajarito Plateau in the 1930s failed.

Some time between the original construction of the Buckman Road (1880s) and initial NPS administration of the Tsankawi Unit (1932), a limited area of the North Fork Tsankawi Creek Watershed (Figure 14) was logged, most likely for fuelwood. In an early NPS trails study, Attwell (1933) describes "a thousand wood roads" and states:

> The entire area [of the Monument] has been checkerboarded [sic] with wagon roads where Mexicans [sic] have been hauling wood. It is now possible to drive a car within possibly a quarter mile of any point.... As no trail work is desired within the detached area [the enlarged Otowi Unit], no trails are shown [on map attached to report].

Clearly, this 1933 report omits the web of prehistoric trails within the former Otowi Unit and the current Tsankawi Unit, which apparently were not considered for use by visitors at the time. It is likely that the park's boundaries were fenced in 1934 or soon thereafter to exclude further range livestock grazing, vehicle incursions, and wood collecting. Attwell also notes the existence of utility lines and poles within Bandelier National Monument. Some of these still stand along the western boundary of the current Tsankawi Unit and have been archeologically recorded (Dudley *et al.* 1999; Elliott 1998).

In the 1930s, despite limited travel during the Great Depression, New Mexico relied on tourism for much of its economic base. Between 1934 and 1941, the NPS supervised construction and

modification projects undertaken within Bandelier National Monument by the Great Depression era Civil Works Administration and Civilian Conservation Corps. The majority of this work took place in Frijoles Canyon and included additional archeological excavations; prehistoric structure stabilization and reconstruction; trail work; road building; and the construction of a campground, visitor center, maintenance area, administration area, and lodge including interior furnishings. During this time, Lister (1939, 1940a, 1940b) completed very limited excavations in the Tsankawi Unit and the stabilization of 181 cavates on the south side of Tsankawi Mesa.

After the U.S. entry into World War II, the U.S. War Department became interested in constructing facilities for atomic bomb research on the Pajarito Plateau. In 1943 under the Manhattan Project, the secret laboratory and town site of Los Alamos was established on 19,981 hectares (49,337 acres) of the plateau, including the majority of the Ramon Vigil (Sanchez) Land Grant. This land was acquired through the transfer of public land, including areas administered by the Soil Conservation Service, the Santa Fe National Forest, and the Bureau of Land Management, as well as from multiple private owners, including the Los Alamos Ranch School and local homesteaders. U.S. Army Corps of Engineers' control over the public land terminated several long-term grazing allotments. Early on, the poor condition of area roads was considered an asset in discouraging more curious members of the public. Signed, fenced, patrolled by armed guards, and managed similar to a military base, the research and town sites were considered top-secret and were omitted from maps of the area produced between 1943 and 1957. The Los Alamos town site and the Los Alamos Scientific Laboratories (eventually the Los Alamos National Laboratory) fell under the administration of the Army Corps of Engineers (1943-1946), the Atomic Energy Commission (AEC, 1946-1974), the Energy Research and Development Administration (1974-1979), and finally the U.S. Department of Energy (DOE, post-1979).

In 1943 and 1944, under their wartime preeminence, the Army Corp of Engineers and its associated contractors initiated construction projects within Bandelier National Monument's Otowi Unit without providing any notification to the NPS administration. These included road improvements to the Ranch School Road (currently State Route 502), clearing a power line right-of-way, and installing several buildings on Bandelier National Monument property without permission. In ensuing discussions, the Army expressed its desire to acquire the Ranch School Road, Bayo Canyon, and Pueblo Canyon from the NPS. Although the NPS did not wish to hamper the war effort, the agency put up stiff resistance to this proposal on the basis of cultural resource concerns and the Army backed down. The already constructed facilities were allowed to remain under special use permits granted to the War Department through the Secretary of Interior (Rothman 1988:78-81). Bandelier National Monument land ownership records from 1945 states: "the whole area was heavily grazed," and that the main unit of the park contained numerous facilities to promote and support grazing (Allen 1989:147).

After the end of World War II, tourism boomed and visitation to Bandelier increased dramatically. Los Alamos Scientific Laboratory holdings increased by 7,988 hectares (19,725 acres) with additional land transferred from other Federal agencies. In 1949, the New Mexico legislature withdrew land from Sandoval and Santa Fe counties to create the County of Los Alamos, placed entirely under control of the Federal government. Also, a lower elevation area formerly used as an Army and construction camp was developed into the town site of White Rock. Within the current Tsankawi Unit, a wildfire burned an area of trees on Fence Mesa in 1950. After the fire, the burned area was salvage logged for firewood.

A more detailed review of the history of the Bandelier National Monument region is provided in Chambers (1974), Lyon and Evans (1984), and Rothman (1988).

F. Historic Archeological Resources

Historic features located on recorded archeological sites include: at least one Puebloan petroglyph, at least one Hispanic inscription, structural remnants, campsites, hearths, trash deposits, evidence of animal husbandry activities, roads, road cuts, a rock pile, and an alignment of utility-poles. One prehistoric/historic transitional site consists of a Native American petroglyph with historic elements. In general, these sites have been impacted by accelerated soil erosion and visitor use.

1. Petroglyphs and Inscriptions

One Puebloan petroglyph, which has been interpreted as a Conquistador (a human on horseback with helmet and lance) represents the historic period, perhaps the 1680s. One inscription inside a cavate is most likely of historic Hispanic origin. Although illegible, the script style appears similar to Spanish styles of the 18th and 19th centuries. Until recently, this inscription was recorded as modern graffiti by the initial archeological survey crew. Therefore, other potentially misidentified historic inscriptions may exist within the unit (Rory Gauthier, personal communication, 2000).

2. Duchess Castle

Duchess Castle represents the historic Blumenthal and Dugan School, which operated during the summers from 1918 through 1929. Currently, the partial walls and foundations of a house and several outbuildings, kilns, and a cistern represent the remains of the school near the unit's northern boundary. These structures were built in the Pueblo Revival Style around 1917 on the site of *Sækewinuge onwikeji*, a Coalition Period pueblo, by craftsmen from the Pueblo of San Ildefonso (very likely descendants of the prehistoric inhabitants of Tsankawi) utilizing remnant prehistoric masonry blocks from the pueblo. Through the school and a program of the School of American Archaeology, Madame Vera von Blumenthal and her companion Rose Dougan (or Dugan) successfully sought to encourage a renaissance in local Puebloan ceramic production and design at the Pueblo of San Ildefonso. Such artists as Maria and Julian Martinez studied ancient pottery techniques there.

3. Campsites

These sites appear to represent historic period camps used by shepherds, loggers, firewood collectors, and/or horse packers. Tin can types and lichen growth on hearth rocks appear consistent with the period before the Tsankawi Unit was fenced (circa 1934). Additional historic evidence includes high axe-cut juniper and piñon stumps, logging slash, limbed trees, and firewood caches.

4. Animal Husbandry

Shepherding activities are indicated by deposits of sheep dung within several prehistoric cavates and possibly by a large-walled pen or corral (Provencher 1999:5). The former indicates the

historic penning up and sheltering of sheep within the cavates. A potential sheep fence exists on Fence Mesa. Ruby (1998:19) also identifies potential sheep "driveway" and "bedground" areas, enclosed on two sides by cliffs, in the Upper Tsankawi Creek watershed.

5. Abandoned Roads

Numerous abandoned dirt roads exist within the Tsankawi Unit and many are listed as contributing elements to recorded archeological sites. Three unrecorded dirt roads have been noted in the Duchess Castle area (Ruby 1998:34). One of these is eroding into an incised gully. Described by Attwell (1933), these are undoubtedly spurs from historic roads. The remnants of one road, or perhaps a construction staging area, is located in the southwest corner of the current Tsankawi Unit (Figures 2 and 9; Alternative B).

6. Disturbed Areas

Several previously disturbed areas may be identified through the absence of native vegetation and/or the presence of non-native vegetation. These may represent patches utilized for prehistoric and/or historic agricultural or other uses.

G. Modern Period (A.D. 1950-present)

1. 1950-1969

Rapid growth of Los Alamos related to the expansion of the Los Alamos Scientific Laboratories (Los Alamos National Laboratory) during the Cold War era (1949-1989) resulted in increasing day-use and crowding of Bandelier National Monument facilities. As visitation rose around 1950, out-of-town visitors competed for space with local residents, who generally regarded the units of Bandelier National Monument as their city parks. In addition, many area residents viewed illegal "pot-hunting" activities in protected cultural sites as an acceptable recreational pastime. This was particularly true in the detached and little-patrolled Otowi Unit, despite the posting of laws and regulations by the NPS. Faced with staffing levels that were inadequate to provide guided tours, Bandelier first developed a self-guided trail and pamphlet for Tsankawi Mesa in the 1950s.

Despite continued resistance from the NPS, Los Alamos Scientific Laboratory activity and development continued within the Otowi Unit between 1944 and 1963. This included the construction of the East Jemez Road (a designated truck route) through the unit's southwest corner; the grading of dirt access roads through the unit's western half, generally in and around Los Alamos, Pueblo, and Bayo canyons; the ceding of Technical Area 10 (Bayo Canyon) and Technical Area 19 (East Gate) inside the unit's western boundary; and the drilling of at least 18 test wells in Pueblo Canyon (NPS 1962). These wells were designed to test for down-canyon groundwater contamination, as treated sewage was being discharged near the confluence of Bayo and Pueblo canyons and hazardous Laboratory effluents were being discharged into upper Pueblo Canyon (see DOE 1999:3-38).

The NPS discussed potential land transfers with the War Department and Atomic Energy Commission (AEC) during the 1940s, 1950s, and early 1960s. Presidential Proclamation No. 3388, signed by Dwight D. Eisenhower on January 9, 1961, transferred Frijoles Mesa, part of the

Ramon Vigil (Sanchez) Land Grant, from the AEC to the NPS. This included 1,166 hectares (2,882 acres) of land adjacent to Bandelier's main unit located south and west of State Route 4 and the Frijoles Canyon entrance road, including Burnt Mesa and portions of Frijoles and Escobas mesas (DOE 1999:S-1; Rothman 1988:50).

A further land exchange plan was formalized through an NPS report prepared by Von der Lippe and Widmer (1960). This report indicated that extensive recreational use of the northwest portion of the Otowi Unit by local residents, including extensive looting of cultural resource sites, had compromised the integrity of the area. Bandelier National Monument Superintendent Paul Judge wrote that, to curtail illegal use in the Otowi Unit, the NPS would require "proper fencing and sufficient manpower." In 1960, Judge's preference was to transfer much of the Otowi Unit to the AEC with a stipulation that would require the AEC to adequately protect the included archeological sites. The land transfer proceeded over the objections of the NPS regional archeologist (Rothman 1988:48-55, 106).

Presidential Proclamation No. 3539, signed by John F. Kennedy on May 27, 1963, formalized a land exchange between the NPS and AEC (NPS 1962). It stated that most of the Otowi Unit transferred from Bandelier National Monument had been adequately studied and was considered unnecessary for Bandelier's interpretive requirements. All NPS Otowi Unit lands north and west of State Route 4, and north of the southern rim of Los Alamos Canyon to the south of State Route 502 (incorrectly shown on most maps, see Appendix A, A. Geography), was transferred to the AEC. This included 1,590 hectares (3,925 acres) and a section of State Route 502. In exchange, the AEC transferred to the NPS the Upper Frijoles Canyon tract. The park lost portions of Barrancas, Bayo, Pueblo, Los Alamos, Sandia, and Mortandad canyons, but gained the upper Frijoles watershed up to the boundary of the Baca Location No. 1 Land Grant (Figure 18).

As a result, the Otowi Unit as established in 1932 was reduced by about 82%. The 18% retained by the NPS, surrounding Tsankawi Pueblo and free of accessible roads (except for one, short, dirt, maintenance access), once again became known as the Tsankawi Unit. From 1916 to 1932, the original Tsankawi Unit of Bandelier National Monument encompassed about a quarter section (approximately 65 hectares or 160 acres; Santa Fe National Forest 1921). In its 1963 configuration, the 320 ha (790 acre) Tsankawi Unit is almost five times larger than it was originally. The area of the Tsankawi Unit has remained unchanged since 1963, within a perimeter established by modern highways and long-established land ownership boundaries.

Soon after the 1963 land transfer, a New Mexico Highway Department facility was constructed just west of the junction of State Route (SR) 502 and SR4, just beyond the Tsankawi Unit's northern boundary.

2. 1970-1989

Rothman (1988:110) records that "pot-hunting" activities continued to be a problem at Tsankawi Mesa into the 1970s. In the 1970s, the first Visitor Contact/Fee Station and asphalt trail were installed at the Tsankawi Unit. While development centered on the main unit of Bandelier, proposals for further excavations and development of the Tsankawi Unit were discussed over many years. Such plans were first formally developed in the Bandelier National Monument Master Plan (NPS 1977).

In recognition of limited attempts by the NPS throughout the 1970s, the 1977 Master Plan formalized efforts by the NPS to reacquire four specific cultural resource sites within the former Otowi Unit transferred to the AEC in 1963. These four sites were *Potsuwi* (Otowi) Pueblo, Little Otowi Pueblo, Cave Kiva, and the game trap near Mortandad Canyon. NPS reacquisition of these areas hinged on the AEC designating them as "surplus" (Rothman 1988:59, 93-94). Such a designation, however, never materialized. Bandelier's main unit was expanded into the Baca Location No. 1 Land Grant area in 1977 (Rothman 1988:60) and 1999 (Figure 1).

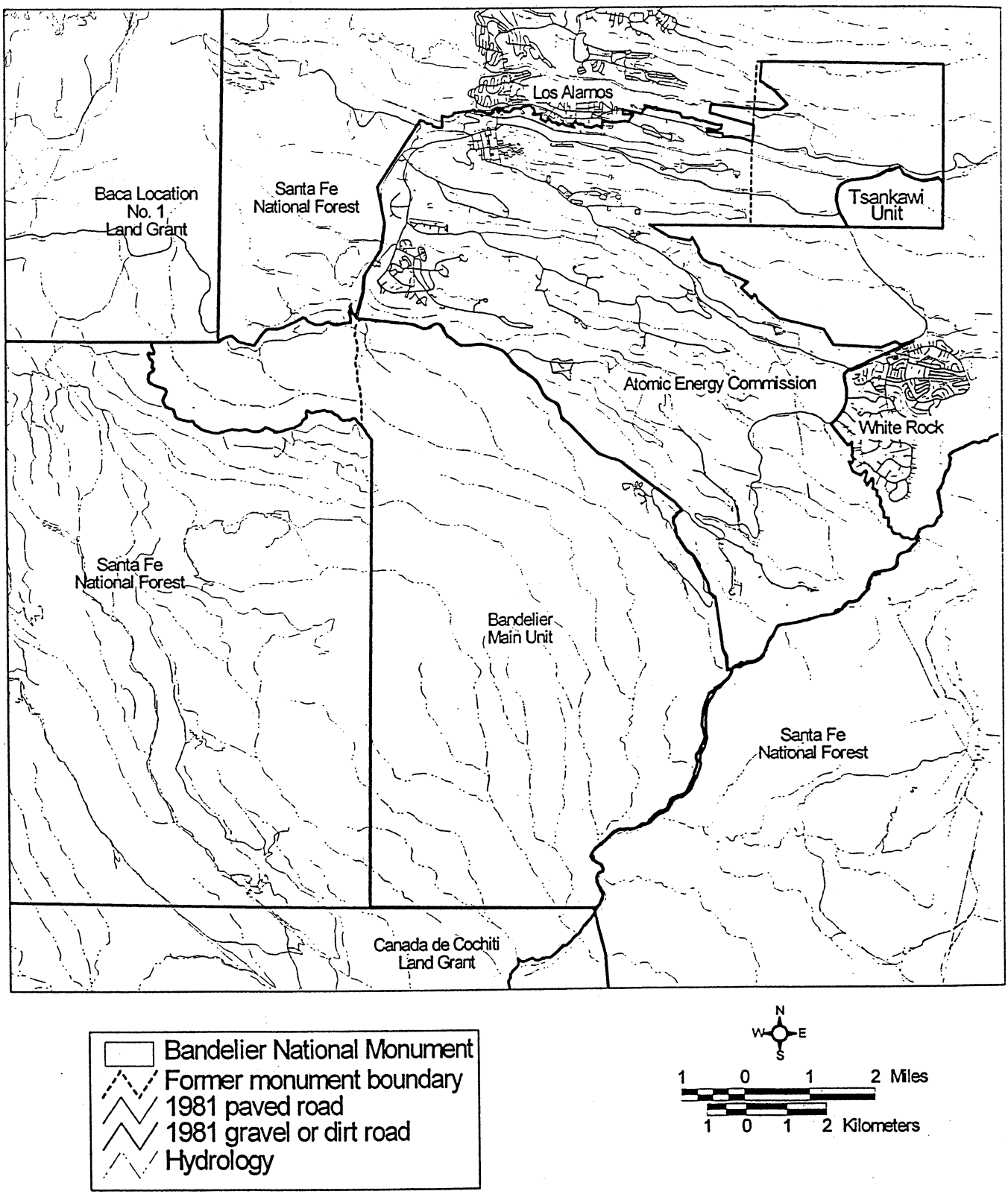


Figure 18. Bandelier National Monument, 1963

Some cultural resource areas accessible under the DOE's public access policy, have been patrolled by NPS resource protection personnel since 1989 under a cooperative agreement with DOE. Initially, the Otowi tract was not included, but was added to the agreement in 1995 after looting was reported in the Pueblo Canyon area. Also an informal recreational rock-climbing area became established within Los Alamos Canyon, just outside the northeastern boundary of the Tsankawi Unit.

Although additional archeological projects, including excavation and stabilization endeavors, were undertaken within the park's main unit in the 1960s, 1970s, and 1980s, little besides surface survey and minimal stabilization was completed by park staff within the Tsankawi Unit. During the 1970s, 1980s, and 1990s, the NPS recognized the crucial role naturally occurring fire plays in many vegetation communities (see NPS 1988) and ended its long-standing policy of fire suppression. The fire-adaptation and fire-dependence of most of Bandelier's vegetation communities was established through scientific research (Allen 1989; Swetnam 1990; Touchan and Swetnam 1992). The Tsankawi Unit, however, is located in a "full suppression zone," where naturally occurring fires are actively suppressed. Management-lit fires are allowed under prescribed conditions (NPS 1997).

On several occasions in the 1980s and 1990s, the construction of a four lane alternate highway (known as the Santa Fe-Los Alamos Road) was proposed. Several proposed routes followed canyons just south of the Tsankawi Unit (Figure 5).

Over the years, with its higher visibility and visitation levels, most of Bandelier's scarce budget resources were utilized at the park's main unit. The Tsankawi Unit suffered from "benign neglect" as a result of its distance from park headquarters and insufficient funding. Although NPS managers recognized the continuing cultural and natural resource degradation within the Tsankawi Unit, there was little they could do about it. Despite internal NPS lobbying efforts and the documentation of artifact disturbance by visitors at Tsankawi Pueblo (Bandelier National Monument 1980), no budget increases resulted. In time, managers came to rely on seasonal volunteer hosts to provide a minimal caretaker presence.

While the self-guided trail pamphlet and trailside signs instructed visitors to stay on the main trail and not disturb artifacts, these admonitions could not be enforced. Reluctantly, NPS managers came to accept an unrestricted situation, which allowed visitors roam and explore throughout Tsankawi Unit during daylight hours generally free of constraints and entrance fees. As a result, social trails and resource damage proliferated and multiple incidents of vandalism occurred.

Apparently, the first implementation of entrance fees at the Tsankawi Unit during the summer of 1989 resulted in some problems. In the fall of 1989 after the volunteer hosts left for the season, the Visitor Contact Station was burglarized and vandalized. As a result, the unit was closed to visitation for several months during the winter and early spring of 1990. During the closure, an enforcement response to trespassing individuals resulted in a ranger assault. Although damage to NPS facilities and lack of funding were cited as the justification, the closure created a backlash in the local community and little support for the park's decision. As a result, the unit was reopened in early spring (Dale Coker, Ed Greene, and John Lissoway, personal communications, 2000).

3. 1990-2000

In the early 1990s, input associated with the Tsankawi Development Concept Plan (NPS 1995a, see below) indicated the public's desire to be unrestricted in its exploration of the unit. Limited NPS funding and staffing levels left few other options. Eventually, the Tsankawi Unit's lack of development, relative obscurity, and low visitation levels were recognized as valued assets. Bandelier National Monument's most recent Interpretive Prospectus (NPS 1992) states:

> In contrast to the paved trails, full-service, multi-media facilities of Frijoles Canyon, Tsankawi will not be developed for mass visitation. Instead, it will remain a less developed discovery site where people can have the thrill of walking in the paths used by prehistoric people. In this quiet, unexcavated site it is easy to have a personal encounter with the cultural resources, maybe even sense the presence of the former inhabitants. It is an aesthetic and emotional experience rather than an intellectual one, or has been one in the past.

Publicity from local, regional, and national sources, including published articles and guidebooks, led to a trend of increasing visitation. This increasing use was recognized by the mid-1990s and NPS management options were explored in the Development Concept Plan (NPS 1995a), which included input from the public. The preparation of this plan coincided with a State of New Mexico proposal to widen State Route 4 to four lanes along the western border of the Tsankawi Unit. The state's original proposal would have eradicated the Tsankawi Unit's rudimentary parking and visitor access areas. Various options to cope with the proposed highway expansion and increasing visitor use were explored. Two alternatives considered but rejected early on include: maximizing visitation with larger facilities, and removing existing facilities entirely and closing the unit to visitor use except for ranger-guided tours.

The 1995 Draft Development Concept Plan considers two main alternatives for the Tsankawi Unit:

Alternative A -- Remove all existing structures. Restore, revegetate, and naturalize the current visitor entrance area located west of the current Visitor Contact/Fee Station. Construct facilities in the southwestern corner of the unit including an entrance road with highway margin turning lanes, a 30-automobile off-highway gravel parking area, a hardened trail segment connecting the new facilities to the current primary trail, a replacement Visitor Contact/Fee Station, a comfort station, and a ranger residence. The on-site residence is proposed to provide around-the-clock NPS presence at the unit via two full-time resident rangers – one designated to remain at the Visitor Contact/Fee Station, the other designated to rove throughout the day-use-only unit to prevent resource damage. Restricting the capacity of the new parking area to 30 vehicles is designed to allow only a "moderate" level of visitor use via parking availability.

Alternative B – Remove the current Visitor Contact/Fee Station. Restore, revegetate, and naturalize the current visitor entrance area located west of the existing Visitor Contact/Fee Station. Construct facilities in the southwest corner of the unit including an entrance road with highway margin turning lanes, a 30-car off-highway gravel parking area, and a hardened trail segment connecting the new parking area to the current Visitor Contact/Fee Station. Visitor contacts would continue via the existing brochure box system with no significant change in NPS presence or patrols. Again, restricting the capacity of the new parking area to 30 vehicles is designed to allow only a "moderate" level of visitor use via parking availability.

Essentially, Alternative B was selected through an Environmental Assessment and "Finding of No Significant Impact," with new construction limited to a parking area and visitor kiosk only and not including a ranger residence (NPS 1995b). When the State of New Mexico reduced the scope of its proposed State Route 4 improvements and Congressional line item construction funding to implement the DCP was not provided to Bandelier National Monument, no further action was taken.

In 1997, Congress passed an Appropriations Act (Public Law 105-119), which directed the DOE to identify and transfer Los Alamos National Laboratory land parcels to either the County of Los Alamos or the Pueblo of San Ildefonso in order to assist these entities in reaching economic self-sufficiency (DOE 1999). The DOE is currently negotiating such land transfers as authorized by the Act, with actual ownership transfer scheduled between 2000 and 2007.

Two of the tracts under consideration for DOE "disposal" – the White Rock Y Tract and the Technical Area 74 Tract – include approximately 65% of the former Otowi Unit of Bandelier National Monument. While not officially classified as "surplus," these tracts were found to be unnecessary in meeting the mission of the DOE Los Alamos National Laboratory. The conveyance of the identified tracts from DOE to other Federal agencies, including their return to Bandelier National Monument, was considered, but eliminated from detailed analysis, as it would not comply with the requirements of the Act and "...these properties...are not known to be vital to [NPS] mission use needs" (DOE 1999:2-5–2-6).

Some publicly accessible DOE cultural resource areas have been patrolled by NPS resource protection personnel since 1989 and 1995, under a cooperative agreement with DOE. Regarding the land transfer areas, however, retention and protection of cultural resources by the DOE was considered, but eliminated because: "...enforcement of protection of the retained portion would be very burdensome to the agency and perhaps effectively impossible.... Fencing of these sites could result in...potential illegal pot-hunting actions by the public..." (DOE 1999:2-5–2-6).

In a letter to DOE, signed on January 7, 2000, the County of Los Alamos and the Pueblo of San Ildefonso stipulated the distribution of lands to be transferred from DOE (Figure 4). If approved, the pueblo would receive the northeast portion and majority of the Technical Area 74 Tract, as well as a small inholding within county land (Little Otowi Pueblo). Los Alamos County will receive the remainder of the Technical Area 74 Tract and the entire White Rock Y Tract. The county has agreed to subsequently transfer areas surrounding the current State-designated highways to the State of New Mexico. This will include the area between the Tsankawi Unit's northern boundary and State Route 502, which contains an informal recreational rock-climbing area. As a result, land controlled by State of New Mexico will create a narrow buffer between the Tsankawi Unit and county and pueblo-controlled lands. The county and DOE water and electric line easements along State Route 4 will be unaffected.
A more detailed review of the recent management history of the Bandelier area is available in Rothman (1988).

H. Cultural Aesthetics – Continuation of Traditional Uses

While cultural resources consist of a number of quantifiable physical features and artifacts upon the landscape, they also hold a second, social nature in their historical significance and tradition

of continuation of use. Such qualities lie in a larger integrated scene, where humans are integral to the natural landscape, living as a part of it. As people dwell and toil within a landscape, they develop a sense of belonging to the place. Cultural resources represent institutions that held, and continue to hold, communities together and link them to the environment and the past. As such, these resources are considered essential and critical to the tradition and continuance of a culture, subculture, or community.

Many descendants of the prehistoric inhabitants of Tsankawi continue to live in Puebloan communities today. These people maintain their cultural identity and heritage, as well as a connection to their ancestors and a wider cultural whole, through this location. They do not consider these sites abandoned, but rather alive with the presence of their ancestors. Descendants feel the need to garner respect for and take care of these ancestral sites through a continuation of use. In this manner, there exists a strong connection between past and present, which includes present day traditional, religious, and ceremonial practices. With the application of a system of cultural aesthetics, such social, cultural, traditional, historical, and religious values and uses may be protected and enhanced.

APPENDIX C – MANAGEMENT SETTING

At the Tsankawi Unit, only one, approved, NPS-designated, visitor entry point exists. This is a parking area and trailhead on the eastern margin of State Route 4, approximately 2.0 km (1.25 mi) southwest of the junction of State routes 4 and 502 and 150 m (500 ft) north of the junction of State Route 4 and East Jemez Road (Truck Route). Unit facilities consist of a gravel parking area, a trail guide box, a small Visitor Contact/Fee Station with an automated fee collection station, restrooms, a trailer pad, a primary trail, numerous undesignated secondary trails, NPS signs, and boundary fence. Another secondary, unapproved access to the Duchess Castle and North Mesa areas crosses through the northwestern fence line, which is posted with NPS "no trespassing" signs. While Bandelier presently discourages the use of this route, it is described in older brochures and on recent non-NPS sanctioned maps.

A. Parking Area

Parking for the Tsankawi Unit consists of a long, narrow, gravel parking lot, similar to a wide, gravel, road shoulder pullout, within the eastern State Route 4 right-of-way. This parking lot is not actually on NPS property, but is owned by the State of New Mexico. While improvements to the parking area have been proposed and discussed, no action has been taken. Water and electric line easements also exist within the parking area. A small gully exacerbated by the presence of the parking lot and a small natural drainage is incising into the northeastern margin of the current parking area.

While parking is completely unstructured, the lot has a current capacity of about 40 to 45 vehicles. Previous studies have stated that limited parking availability creates *de facto* limits on visitation levels. Although seemingly unnecessary within current visitation patterns, additional vehicles could park in other nearby areas in an overflow situation. The highway right-of-way parking area is bounded by a post-and-3 strand wire fence, 90 cm (3 ft) in height, with a small, swinging, trailhead entrance gate. Various administrative signs are present in and around the parking area (Appendix H).

B. Structures

The single, permanent, modern Tsankawi Unit structure consists of a small Visitor Contact/Fee Station. This structure was refurbished in 1999 to mitigate rodent and associated Hanta virus concerns. The station is located at the junction of the visitor trail and a dirt access road, the latter originating at the southern end of the unit parking area. The station is a one-room facility with an interior flush toilet, a covered patio containing several picnic tables, two garbage cans, a drinking fountain, an automated fee collection machine, a radio antenna, and a flagpole. The only permanently installed outdoor artificial light source in the Tsankawi Unit is a two-bulb, household, floodlight fixture controlled by a motion-sensor trigger mounted on the south wall of the station utilized for security during closed hours. Glass cases, mounted to the station's south wall and facing the main trail, contain temporary visitor information regarding NPS policies, regional prehistory, and Bandelier National Monument facilities and programs.

Two flush toilet enclosures and two chemical toilet enclosures are located directly east of the Visitor Contact/Fee Station. These have the appearance of portable toilets and are screened on

the west by a 10 m (34 ft) long, 2 m (7 ft) tall wooden fence. The flush toilets are for warm season use, while the chemical toilets are for cold season use. Behind the station to the northeast, the dirt access road terminates in a small trailer pad, which is equipped with water, sewer, and electric hookups. When outfitted with a trailer, this site serves as a residence for seasonal NPS volunteer "host" staff or temporary park staff quarters. A short dirt trail connects the trailer pad and visitor toilets to the contact station patio through a gap in the north patio wall.

Subsurface sewer lines connect the host trailer pad drain, the visitor flush toilets, and the Visitor Contact/Fee Station toilet to an on-site subsurface septic tank and leach field located to the north of the Station. Subsurface water and electric lines are also present.

C. Trails

There is only one NPS-designated visitor use trail within the unit. It is approximately 2.4 km (1.5 mi) in length, consisting of a short two-way segment and a longer one-way loop segment. The initial 300 m (1,000 ft) of the path is modern asphalt and chip seal, which has been in place since the 1970s. From the terminus of the asphalt, the remaining bedrock trail generally follows the prehistoric trail system around the eastern, central, and southern portions of Tsankawi Mesa. These original trails, constructed and worn into the tuff substrate during prehistoric occupation between circa A.D. 1150 and 1550, are recognized as one of the most unique features of the unit. The unit's undesignated secondary trails are prehistoric or social (volunteer) in nature. The latter are generally the result of unrestricted exploration by visitors. Current primary and social trails of the Tsankawi Unit are fully described in Appendix G.

D. Fences

The unit's boundary is identified with a post and 3-strand wire fence 90 cm (3 ft) in height. Near the visitor entrance gate the fencing is smooth wire, while away from the gate the wire is barbed. Small "boundary line," "property," and "no trespassing" signs generally alternate along the boundary fence.

E. Signs

A total of 22 NPS signs are currently in place within the Tsankawi Unit. A full inventory of signs present in the unit is available in Appendix H. There is a notable absence of signs calling the attention of State Route 4 travelers to the unit's location. The sole sign identifying the unit is oriented parallel to State Route 4 rather than perpendicular to it.

Signs within the unit are generally brown-painted wood incised with white lettering. Located on the main visitor trail, sign #20 (Appendix H) is highly weathered although still legible. Five signs are temporary, including one removable "fee area" sign and four removable white signs with black lettering which designate closed areas.

Interpretive information in glass cases, trail marker posts, and boundary signs are not included in the total count provided above. Not established signs per se, the glass cases on the south wall of the Visitor Contact/Fee Station contain visitor information regarding NPS policies, regional prehistory, and Bandelier facilities and programs. This information is changed from time to time. Twenty numbered trail marker posts are related to the main visitor trail and its self-guided tour

pamphlet. These are 20 by 20 cm (8 by 8 in) concrete posts, no more than 50 cm (20 in) tall. Lastly, two different boundary signs generally alternate along the unit's fence line. Along a few high-trespass fence line areas, Bandelier has experimented with utilizing boundary signs similar to those used to mark adjacent, highly restricted, Los Alamos National Laboratory perimeters. These signs appear to be fairly effective.

F. Self-guiding Trail Pamphlet

The pamphlet for the unit's self-guided tour trail (Judson and Gauthier 1986) is available from a trail-side dispenser near the trailhead entrance of the Tsankawi Unit. Pamphlets may be purchased at the trailhead or the Frijoles Canyon Visitor Center for 50 cents.

G. Visitor Use

Between 1997 and 1999, an annual average of 342,000 people visited Bandelier National Monument. Peak visitation occurs from May through August. A 1995 study (Bandelier National Monument 1995) estimated that perhaps 5% of visitors to Frijoles Canyon also visit the Tsankawi Unit. The study, however, failed to consider that some visitors, particularly local residents, may tour Tsankawi wholly independent of Frijoles Canyon. Beyond this study and Cowley (1987), no visitor use statistics or surveys are available, although very recent fee collection statistics from the Tsankawi Unit indicate higher visitation levels than expected.

Few, if any, restrictions on hiking visitors have ever been established in the Federal administrative history of the Tsankawi Unit. Although NPS interpretive information urged visitors to stay on the main trail and not disturb artifacts, insufficient NPS budgets left park managers without the means to enforce restrictions. Over time, this evolved into a generally unrestricted situation, which allowed visitors to explore the unit free of constraints and fees during daylight hours. In the early 1990s, this situation was supported by members of the public during scoping meetings (NPS 1995). It appears, however, that such unrestricted access has encouraged and perpetuated the formation of social trails and resulted in visitor-induced damage to fragile cultural resources.

In recent years, visitor use policy has been modified in the heavily used Tsankawi Mesa area in deference to the expressed concerns of Puebloan representatives, particularly involving access to kivas. Two cavates have also been closed due to safety concerns.

The NPS management presence has risen slightly in the past two to three years, although current NPS presence at the Tsankawi Unit may be described as minimal. Generally the NPS has relied on an honor system to collect entrance and pamphlet fees. This has been modified somewhat by the 1999 installation of a fee collection machine at the Visitor Contact/Fee Station.

Current interpretive visitor information (Judson and Gauthier 1986) suggests that visitors stay on defined trails. Ninety to 95% of visitors confine their visit to the Tsankawi Mesa area. Generally, the Tsankawi Unit was not popular with commercial tour groups until 1997, when the commercial fee structure of Bandelier's main unit was changed. With stricter enforcement of commercial fees at the Tsankawi Unit commencing in 2000, several tour companies have indicated they will cut back their commercial use (Carl Newman, personal communication, 2000).

1. Visitors Needs

Visitors to the Tsankawi Unit can be generalized into three groups: new and easily confused, intrepid, and law-abiding and experienced. By observing and characterizing visitors, park managers can respond more effectively to a range of needs.

New and Easily Confused – In several segments, the primary visitor trail is difficult for new or confused visitors to follow. Problem segments, where the trail is indistinct, include the trail marker 9 vicinity and after trail marker 19 at the western edge of Tsankawi Mesa South Rincon Cavate Group. Also, there are numerous well-worn secondary trails, especially between trail markers 7 and 15. Further definition and delineation of the main trail and elimination of secondary trails in selected areas may be necessary to meet the needs of the new and easily confused visitor.

Intrepid – This group of visitors includes risk-takers. During the 1990s, nothing prevented the intrepid visitor from hiking off-trail, exploring cavates and kiva depressions at will, even climbing up prehistoric stairways or hand-and-toe holds into cavates. In 1998, some of these options were limited with experimental barriers (slash emplacements, mortared walls). While such barriers may prevent/discourage exploration of selected areas and features by some, intrepid visitors will likely continue to free-range, reestablishing or creating new social trails. Intensified education efforts and a more consistent law enforcement presence may be necessary to keep such intrepid visitors leaving the main trail and from damaging fragile features on Tsankawi Mesa. The unfettered exploration needs of the intrepid visitor can be met throughout the remainder of the unit.

Law-abiding and Experienced – This category would include returnees and local residents, who have been hiking in the Tsankawi Unit for years. They may or may not have left the main trail on previous visits. Many of these visitors know the social trail network and cultural features by memory and have favorite spots on the old trail or off-trail. Such seasoned visitors may circumvent natural barriers (slash) to visit that particular feature/view, but will be satisfied with new restrictions if they understand the need. The majority of Tsankawi's visitors fall into this group.

2. Accidents and Injuries

Although approximately one or two visitor injuries per year occurred at Tsankawi between 1990 and 1997, none have occurred in the past two years. Past incidents were generally the result of visitors not watching their step on the main trail, rather than off-trail or social trail use. Bandelier National Monument Chief Ranger Carl Newman (personal communication, 1999) partially credits the recent main trail stabilization and restoration efforts for this decrease in injuries. He also speculates that factors such as an increase in the mean age and caution level of visitors and a general decrease in the number of younger risk-tolerant visitors may be involved.

The Tsankawi Unit's parking area provides short sight distances for pulling out onto a high-speed highway and the Bandelier staff has reported a few near-misses involving the parking area and highway access. Until very recently, however, no motor vehicle accidents involving the Tsankawi Unit parking area or the adjacent highways had been reported to the NPS. In February 2000, a pick-up truck travelling east on East Jemez Road (truck route) passed straight through the

"T" intersection with State Route 4 rather than turning. The truck continued cross-country through the Tsankawi Unit fence line and intruded approximately 107 m (350 ft) on to park property with a possibly unconscious (blacked-out) driver. Eventually, the vehicle's forward progress was halted by a juniper tree. The truck was driven back out along its entry path. Fortunately, no injuries occurred and resource damage was limited (NPS 2000).

APPENDIX D – APPLICABLE LAWS, REGULATIONS, EXECUTIVE ORDERS, DIRECTIVES, POLICIES, AND GUIDELINES

A. Federal Laws

Administration of the National Park Service Act of 1976
American Indian Religious Freedom Act of 1978 (AIRFA)
Antiquities Act of 1906
Archaeological Conservation Act of 1974 (also known as Historical and Archaeological Data Preservation Act of 1974)
Archaeological Resources Protection Act of 1979 (ARPA)
Clean Air Act, as amended
Endangered Species Act of 1973, as amended (ESA)
Federal Land Policy and Management Act of 1976 (FLPMA)
General Authorities Act of 1970
Government Performance and Results Act
Historic Sites, Buildings, and Antiquities Act
National Environmental Policy Act of 1969, as amended (NEPA)
National Historic Preservation Act of 1966, as amended (NHPA)
National Park Omnibus Management Act of 1998
National Park Service General Authorities Act of 1970
National Park Service Organic Act of 1916 (NPS Organic Act)
Native American Grave Protection and Repatriation Act of 1990 (NAGPRA)
Omnibus Bill of 1966
Omnibus Consolidated Rescissions Act of 1996 (fee demonstration program)
Redwood National Park Act of 1988
Religious Freedom Restoration Act of 1993
Resource Conservation and Recovery Act of 1976, as amended (RCRA)
Tribal Self-Governance Act of 1994
Wilderness Act of 1964

B. Federal Regulations

16 U.S.C: Title 16 – Conservation, Chapter 1 – National Parks, Military Parks, Monuments; and Seashores; Subchapter III-B – Park System Resource Protection; Section 19jj.
Code of Federal Regulations Titles 36 and 40
Supplement to Code of Federal Regulations Title 36, 1-4, Bandelier Compendium

C. Federal Executive Orders

Executive Order 11593: Protection and Enhancement of the Cultural Environment
Executive Order 11987: Exotic Organisms
Executive Order 12898: General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
Executive Order 13007: Indian Sacred Sites

D. State of New Mexico Laws

New Mexico Air Quality Control Act
New Mexico Cultural Properties Act and amendments
New Mexico Dark-Sky Protection Act
New Mexico Groundwater Protection Act
Laws 1977, Chapter 75, concerning archaeological sites

E. National Park Service Director's Orders, Policies, Guidelines

NPS-2, Planning Process Guideline
NPS-12, NEPA Compliance Guideline
NPS-28, Cultural Resources Management Guideline
NPS-75, Natural Resources Inventory and Monitoring Guideline
NPS-77, Natural Resource Management Guideline
NPS-88, Management Policies
Environmentally Responsible Building Products, 1992

Appendix E – Other Sources of Information

This planning document draws upon numerous previous reports, documents, studies, meeting minutes and field notes, which are summarized below.

A. Bandelier GPRA Strategic Plan

The Government Performance and Results Act (GPRA) ensures that the actions and expenditures of Federal agencies are guided by performance management standards. That is, establishing long- and short-term goals in pursuit of primary agency missions, then evaluating performance through results and outcomes. This process focuses on reaching goals in the most efficient and effective ways, as well as holding managers and employees accountable on the basis of their measurable performance. This mandate is accomplished through a strategic plan developed by each park. Bandelier National Monument's Strategic GPRA plan is updated annually.

B. Bandelier Resource Management Plan

Bandelier's most recent draft Resource Management Plan (NPS 1999b) is a programmatic guiding document. It identifies cultural and natural concerns and issues, evaluates resource conditions, and serves as a basis for future monitoring, planning, and research in the park-at-large. The 1999 Resource Management Plan describes the most recent Bandelier Master Plan (NPS 1977) as no longer adequate and calls for a new General Management Plan to be produced.

C. Tsankawi and Frijoles Canyon Development Concept Plans

The Development Concept Plans: Frijoles Canyon and Tsankawi (NPS 1995a) and associated Environmental Assessment (1995b) identify resource degradation problems generally related to the increase of visitor use beyond the carrying capacity of those two areas. The plans laid out in these documents have been approved through the NEPA process and remain valid. In the five years since these documents were approved, however, a more complete understanding of the extensive resource degradation at the Tsankawi Unit has been realized. Therefore the scope, findings, and proposals of the plan are considered no longer adequate.

D. Environmental Management Committee Recommendations

Between 1996 and 1998, the Bandelier National Monument Environmental Management Committee made recommendations on Tsankawi Unit visitor safety concerns, continued resource degradation, and law enforcement issues, as well as potential trail modification options (Bandelier National Monument 1996-98). These recommendations were incorporated into the Tsankawi Project Scope of Work (see Section G, below).

E. Data Gap Identification

In 1998, staff members of Bandelier National Monument and the NPS Intermountain Support Office in Santa Fe met to identify gaps in existing data and formulate a plan to generate the information. The results were incorporated into the Tsankawi Project Scope of Work (see Section G, below).

F. Professional Staff Recommendations

An informal, written report regarding the environment management of the Tsankawi Unit was prepared by Craig Allen (USGS-BRD Research Ecologist) and Brian Jacobs (Bandelier Vegetation Specialist) (n.d.). This report includes general environmental management recommendations and identifies gaps in existing resource data.

G. Tsankawi Project Scope of Work

The Tsankawi Project Scope of Work (Bandelier National Monument 1998b) established a partnership between Bandelier National Monument, the NPS Intermountain Support Office (IMSO) in Santa Fe, and the New Mexico State Office of Historic Preservation (SHPO). It also formalized consultation efforts with Native American tribal entities asserting ancestral affiliations with Bandelier National Monument. The Scope of Work represents a general (informal) agreement among these partners and identifies guiding principles and project goals for the proposed work. It also mandates the gathering of resource data necessary for informed management decision-making. The Scope of Work represents an internal planning document that did not include the SHPO or tribal representatives as signatories.

H. Tsankawi Mesa Trail Preservation Study

A trail preservation study of Tsankawi Mesa was completed by Matero *et al.* (1998). This study identifies many historic factors and cultural resource degradation issues and formed a basis for this plan, particularly with regard to prehistoric trail and cavate preservation.

I. Tsankawi Unit Watershed Condition Survey

A field survey of the hydrology and watershed conditions of the Tsankawi Unit was completed under contract by Ruby (1998). The survey determined that 50% of the Tsankawi Unit watershed areas are in very poor condition, 18% are in poor condition, 16% are in fair condition, while the remaining 16% represents bare rock and mesa tops. The report also identifies specific areas for priority watershed recovery treatment and recommends treatment options.

J. Tsankawi Unit Preliminary Soil Survey

A survey of the soils of the Tsankawi Unit was completed by Hibner *et al.* (2000). It identified seven soil units containing 12 soil types. Approximately 35% of the unit's area is classified as having a very severe to moderate hazard of erosion by water and a severe to moderate hazard of erosion by wind. The capability of about 40% of the unit's area to support the growth of grass species is considered to be very poor to poor and poor to fair to support the growth of herbaceous species.

K. Cultural Landscape Inventory

A Level II cultural landscape inventory of the Tsankawi Unit was completed in October 1999 and will be modified in 2000 by staff specialists located in the Santa Fe Support Office (NPS 1999a).

The condition of the Tsankawi Unit Cultural Landscape is rated as "poor." This indicates that the unit "shows clear evidence of major disturbance and rapid deterioration by natural and/or human forces." Further, "immediate corrective action is required to protect and preserve the remaining historical and natural areas" (NPS 1994b & c).

L. Cultural Resource Site/Feature Inventories

Three cultural resource inventory projects have been undertaken in the past 12 years. Between 1986 and 1991, the NPS Southwest Regional Office conducted a surface survey and inventory of selected areas of the Bandelier National Monument (Powers and Orcutt 1999). Coverage included approximately 73% of the Tsankawi Unit. In 1998, Bandelier staff conducted a survey of the remaining 27% of the unit and relocated all of the previously recorded sites (Elliott 1998c). Approximately 23 acres previously surveyed by Regional Office crews in 1987 was resurveyed in 1999 (Dudley *et al.* 1999). In 1998, 140 cavates within four major Tsankawi Unit cavate groups were inventoried, assessed for condition, and evaluated for management treatments by Provencher (1999). Tsankawi cavate condition assessment work will continue, but may take several years to complete, as additional special projects funds are required.

M. Cultural Resource Preservation Study

A pilot program of treatments for interior cavate finishes was completed in 1999 (Rivera 1999). This study tested conservation techniques for graffiti-affected and detaching plasters. Tested methods have proven successful, although continued monitoring will be necessary to evaluate long-term efficacy.

APPENDIX F – BANDELIER NATIONAL MONUMENT RESEARCH POLICY

Bandelier National Monument was established by Presidential Proclamation (No. 1332 – February 11, 1916 – 39 Stat. 1764) as a reserve to protect the "...unusual ethnographic, scientific, and educational..." resources so that "...the public interest..." would be served.

Slightly later, the National Park Service was established by Act of Congress (16 USC 1 et seq, August 25, 1916, ch. 408, 39 Stat. 535) "...to promote and regulate the use of Federal areas known as national parks, monuments, and reservations ... by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Bandelier National Monument was transferred from the US Forest Service to the National Park Service by Presidential Proclamation (No. 1991 – February 25, 1932 – 47 Stat. 2503) and in so doing directed that Bandelier National Monument be managed, protected and preserved under the same laws, regulations, and policies as established by 16 USC establishing the National Park Service and all subsequent laws, regulations, and policies governing the National Park Service.

Since then, many laws have been passed regarding the management, operation, preservation, and use of units of the National Park System including, but not limited to: The General Authorities Act (1970); Redwoods National Park Act (which amended the 1916 National Park Service Organic Act, 16 USC); Historic Sites, Buildings and Antiquities Act; National Historic Preservation Act; Archeological Resources Protection Act; Native American Graves Protection and Repatriation Act; American Indian Religious Freedom Act; National Environmental Policy Act; Clean Air Act; Clean Water Act; Endangered Species Act; the Wilderness Act; and the National Parks Omnibus Management Act (1998). All of these Acts direct that the National Park Service, through the managers of the various units of the National Park System, preserve and protect the natural and/or cultural resources of those units. Some Acts also outline general or specific procedures that must be followed.

In order to protect and manage the use of the natural and cultural resources of a given NPS unit, the well meaning manager must know what resources exist in the unit, their importance or significance, their relationship to other resources (both inside and outside the park unit), their relationship to interested publics, and their condition. In order to get this information (information required to make knowledgeable and objective management and operational decisions) studies and research must be conducted. Studies and research are considered an important part of resources management programs and help us direct our attention to the most important/significant resources that are at the highest degree of risk. This is particularly important since the NPS lacks the financial resources to protect all resources of every unit of the National Park System.

While research and studies have been understood to be the foundation of good management of the resources of the National Park System, Public Law 105—391, the "National Parks Omnibus Management Act of 1998", specifically directs the NPS to conduct such research and studies and

use the results to wisely and effectively manage the cultural and natural resources of the National Park System.

Public Law 105—391 states in part, **Sec. 201, Purposes**, "...to more effectively achieve the mission of the National Park Service...to enhance management and protection of national park resources by providing clear authority and direction for the conduct of scientific study...and the use of the information gathered for management purposes...", **Sec. 202, Research Mandate**, "The Secretary [of the Interior] is authorized and directed to assure that management of units of the National Park System is enhanced by the availability and utilization of a broad program of the highest quality science and information." **Sec. 206, Integration of Study Results into Management Decisions**, "The Secretary [of the Interior] shall take such measures as necessary to assure the full and proper utilization of the results of scientific study for park management decisions." **Sec. 207, Confidentiality of Information**, "Information concerning the nature and specific location of a National Park System resource which is endangered, threatened, rare, or commercially valuable, of mineral or paleontological objects within the National Park System, or of objects of cultural patrimony within units of the National Park System, may be withheld from the public in response to a request under section 552 of title 5, United States Code [Freedom of Information Act]..."

Bandelier National Monument does not intend to conduct or allow the conduct of research or studies for their own sake. The purposes of our research and resource studies are to: 1) Inventory our resources so that we know what we are responsible for managing; 2) Evaluate and monitor resource conditions so that we know what is happening to them; 3) conduct research so that we know why resources are being affected in the way they are and what the potential outcome might be; 4) conduct research or studies to understand the importance and significance of the resource and understand who the resource is important to and why (to the extent that we do not pry into culturally sensitive information); 5) combine all the above information in order to establish funding priorities for our various resource protection mandates; and 6) develop meaningful, accurate, and sensitive visitor education programs. To the extent possible, and where we have discretion, we will be sensitive to the concerns of those groups who are culturally affiliated with the cultural and natural resources of Bandelier National Monument.

APPENDIX G – TSANKAWI UNIT TRAILS INVENTORY

Available upon request. Located in the Resource Management Library, Bandelier National Monument Headquarters; File Code H22 (Tsankawi Management Plan).

FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT AND MANAGEMENT PLAN
FOR THE TSANKAWI UNIT,
BANDELIER NATIONAL MONUMENT

SUMMARY OF THE PROBLEM AND THE NEED FOR ACTION

The Tsankawi Unit is a detached unit of approximately 320 ha. (790 A.) at Bandelier National Monument and is currently surrounded by federal, county and tribal lands. The monument was established in 1916 to protect cultural resources created by Ancestral Pueblo people between A.D. 1150 and1550. The National Park Service has administered the unit since 1932.

Throughout 95 years of federal administration, the Tsankawi Unit has lacked a long-term preservation philosophy or vision. The primary purpose of the "Environmental Assessment and Management Plan Regarding the Tsankawi Unit, Bandelier National Monument," is to provide for the long-term preservation of the cultural resources and for the natural matrix in which these resources are embedded. An essential goal of the Plan and the supporting environmental assessment process is to develop an understanding with the affiliated tribes on how to manage the Tsankawi unit consistent with NPS mandates and goals.

Through preliminary scooping and data collection, park management identified the following primary issues affecting or with the potential to affect management of the Tsankawi Unit.

Natural Resources – Plants, animals, soils, and water quality have been and continue to be adversely affected by overgrazing, fuel wood collecting/logging, fire suppression, and visitor use.

Cultural Resources – Archeological sites have been and continue to be adversely affected by visitor use and natural.

Proprietary Interest – The Pueblos of San Ildefonso has identified the Tsankawi Unit and its cultural resources as part of their ancestral heritage. This issue is addressed through regular consultation and a program to hire pueblo students to work on Tsankawi resource projects.

Urban Growth/Other Development – Under Public Law 105-119, the U. S. department of energy (DOE) is mandated to transfer several land tracts it administers to the County of Los Alamos and/or the Pueblo of San Ildefonso. Any changes in ownership of lands adjacent to the Tsankawi Unit may impact the NPS's ability to protect and manage those qualities that make Tsankawi significant and potentially eligible for listing on the National Register of Historic Places. Currently, there is inadequate information about the land transfer to propose meaningful management alternatives to the potential impacts.

SELECTED ALTERNATIVE

Under the Tsankawi Management Plan Alternative, the following actions will be initiated (funds and personnel permitting) after this FONSI is signed by the Intermountain Regional Director.

A) Passively Discourage Visitor Access to Closed Unofficial Areas

Natural deterrents/barriers will be installed to passively discourage visitor access to cavates and other sensitive resource. The barriers will consist of natural materials, such as boulders, stone, wood/slash, and native plants. The barriers will blend into the landscape as inconspicuously as possible. New material needed to vegetate old social trail treads (unofficial trails) will be flown in by helicopter if people or pack animals cannot safely transport the materials. Ground disturbing trail rehabilitation techniques will be avoided. If ground disturbing becomes necessary, a staff archeologist will monitor the activity. The park's goal is to discourage the visitor from walking randomly across the landscape causing greater impact to the sensitive cultural and natural resources. Concurrent with the preservation of the resources is another NPS goal that is to provide educational interpretation and enjoyment for present and future generations. By allowing the public access to the resource in a relatively unfettered wandering landscape, the visitor is able to discover a new vista or rock formation as often as possible while remaining on the official trail.

B) Construct New Parking Area and Visitor Contact/Fee Station

The Tsankawi Development Concept Plan/EA (NPS 1995) and the resulting Finding of No Significant Impact for a new parking area and visitor contact/fee station within the unit will be implemented.

C) Preserve Representative Examples of Cultural Resource Sites and Features

Cultural Resource Specialists will systematically evaluate the integrity, condition, ability to preserve, and significance of archeological features. Treatment methods will meet the Secretary of the Interior's Standards for the Treatment of Historic Properties.

1) Infill Damaged Trail Segments

Those portions of damaged prehistoric trails used by visitors to access Tsankawi Mesa will be filled in and maintained to enable safer visitor access and reduce visitor abrasion of the base rock. Such repairs will be out-sloped wherever possible to minimize moisture damage. The lowest "hand and toe holds" may be semi-permanently plugged with chock-stones to prevent visitor use.

2) "Rock-up" Selected Cavate Entrances

Some cavates will be sealed with dry-lain or mortared rock walls to preserve resource features and/or promote public safety. An architectural conservator familiar with the characteristics of the Bandelier Tuff will determine the choice of material and oversee the construction of the walls.

3) Repair Selected Cavate Interior Surface Finishes

Selected finishes that are graffiti-impacted, significant, and determined to be at great risk of imminent loss will be filled in with native sediments augmented with minimal non-destructive adhesives. Conservation measures taken will not be designed to stop

deterioration but rather, prolong the natural life cycle of the extant features. A trained architectural conservator will oversee the repairs to the cavate finishes.

4) Reduce and/or Eliminate Pathways for Moisture to Enter Cavates

Natural forces causing rapid deterioration of some cavate interiors, in particular moisture damage through the modification of drainage will be mitigated through careful and discreet placement of silicon bead channels and other water methods determined to be efficacious by an architectural conservator.

D) Restore Degraded Watersheds

To improve degraded environmental conditions, a target of 14.5 ha. (36 A.), or 4.5% of the unit is proposed for an experimental treatment in 2000 and 2001. Up to 146 ha. (360 A.), or 46% of the unit may be treated over the next decade depending on the success of the initial experimental treatments and project funding. A staff archeologist will carefully monitor the cultural resources in the area during the treatment to prevent unintended or unanticipated adverse effects. Funding is limited, so expansion of the treatment area will be dependent upon additional project dollars.

The treatment will reduce the tree density by as much as 75%. The slash will be used for soil retainers and broadcast mulch. The thinning/mulch treatment encourages growth of under-story vegetation. If tree density is inadequate to produce the desired mulch erosion control biodegradable fabric may be imported to supplement the materials available on site.

Vegetation cover will be measured along transects and erosion will be characterized using bridges, erosion pins, and/or sediment collection traps. Data will be collected and processed using standard protocols applied to other piñon-juniper restoration techniques that have proven successful in higher elevation sites with more biomass present.

E) Remove Asphalt Trail and Construct New Trail with Appropriate Signs

The asphalt trail and culvert will be mechanically removed using a bobcat and dump truck. The culvert in the upper third of the trail will be removed in stages to prevent adversely affecting the upper watershed head-cuts. NPS will stabilize the upper watershed first before removing the culvert. The culvert may remain in place for many years before it can be safely removed.

A new trail will be constructed using flagstone or geoweb in critical drainage areas. If geoweb is used the honeycombs will be filled with crushed native stone and it will match the surrounding soil color. When appropriate, drainage breaks may be placed in critical areas and be constructed from natural materials that are similar in color and texture to the surrounding landscape.

The trail at the contact station that proceeds up to the "dance platform" were mistakenly identified as proposals. These improvements were completed as part of the ongoing management at Tsankawi under Section 106 consultation with SHPO. These actions should have been included in the "No Action" alternative.

The new trail will necessitate the relocation of four existing sign markers and the construction of new directional signs.

F) Remove Flush and Chemical Toilets

Two existing flush and chemical toilets will be removed. The landscape will be contoured with hand rakes and reclaimed using native vegetation. A single vault with two toilet spaces will be constructed on the old trail. NPS may remodel the existing visitor contact/fee station to accommodate two flush toilets. If this alternative is accepted, the NPS will not install the vault toilet on the old trail.

G) Increase Visitor Education by Updating Interpretive Information

A new interpretive brochure will be developed in consultation with the Pueblo of San Ildefonso and other affiliated pueblos. The Tsankawi story will be a self-guiding trail pamphlet. An artist's rendering of the Tsankawi Pueblo may be created for the viewing platform on the mesa.

H) Designate a Primary Trail on Tsankawi Mesa

The primary trail will be constructed of native material and bedrock. At critical areas rocks/slash will be positioned to discourage visitors from wandering off the trail. Since Tsankawi Mesa and Tsankawi Pueblo are culturally sensitive areas, all social trails will be permanently closed. The social trails will be blocked/filled with local slash from the piñon/juniper thinning process. Visitors found off the trail will be officially warned to stay on the designated trail. Repeat violators will be cited for entering a "closed area".

I) Close Existing Tsankawi Pueblo Trail and Reroute South of the Pueblo

The existing Tsankawi Pueblo Trail will be closed and rerouted to permit respectful, though distant viewing of the pueblo from a new viewing platform. The old trail will be blocked /filled with slash from the piñon/juniper thinning process. Visitors will be discouraged from entering sensitive areas through educational media and roving interpreters. The new trail will be south of the pueblo and measures 385 meters of new tread. The trail will be made of native soil and bedrock. There will be a 43 meter long spur trail leaving the new trail and extending to the new viewing platform. The spur trail will be made from rigid geoweb filled with native soils. The geoweb acts as support for the soils thus removing the tread impact on the archeological record. Periodically (every several years) the webbing will need to be filled with native soil that matches the local landscape. The webbing material is very stable and long lasting.

J) Construct Earthen/Stone Viewing Platform near Tsankawi Pueblo

A viewing platform will be constructed on a high point southwest of Tsankawi Pueblo. The platform will include interpretive information and an artist's rendering of the pueblo. The base of the platform will be 5 feet above the ground.

The platform will be a destination platform professionally designed from earth fill and native stone placed over a modified septic tank. The platform will be freestanding in order to reduce the impact to the archeological record. The earth slope around the platform will be planted with native vegetation. The area impacted by the platform will be mitigated according to NPS Standards and NHPA compliance.

K) Conduct Research

Requests from reputable researchers will continue to be routinely considered and approved on a case-by-case basis. A detailed impact analysis of each proposed research project will be required and accomplished through internal National Historic Preservation Act (NHPA) and National Environmental Protection Act (NEPA) compliance procedures. Implementation of research is dependent upon funding and approval of specific research proposal and compliance documentation.

L) Introduce Fire into Fire-dependent Ecosystems

Qualified park staff will use prescribed fire and possibly mechanical thinning to mimic the frequency of pre-1870 naturally occurring fires. Fire will be reintroduced in areas containing ground cover vegetation capable of carrying fire. The prescribed fires will expand as vegetation becomes reestablished. Fire effects will be monitored according to standardized protocols to document fire effect trends and to make fire management course corrections.

M) Discourage Inappropriate Development of Adjacent Lands

The transfer of adjacent lands from the department of Energy (DOE) to the County of Los Alamos and the Pueblo of San Ildefonso would potentially impact the Tsankawi Unit. The NPS will review all federally funded/agency actions that are subject to the NEPA process and have potential to affect the Tsankawi Unit and work with adjacent landowners to ensure that inappropriate development does not occur on adjacent lands.

ALTERNATIVES CONSIDERED

Alternatives considered but eliminated were: a) restrict visitation to ranger-guided tours only; b) staff the Tsankawi Unit with personnel from the Pueblo of San Ildefonso: c) remove the ladders to Tsankawi Mesa and close the mesa to public access; d) restrict hours of operation to be commensurate with staffing levels; e) close the Tsankawi Unit to all visitor use; f) transfer ownership of the Tsankawi Unit to the Pueblo of San Ildefonso; and g) no action.

Environmentally Preferred Alternative

The environmentally preferred alternative is the proposed alternative. This action alternative was determined by applying the criteria suggested in the National Environmental Protection Act of 1969, which is guided by the Council on Environmental Quality (CEQ) regulations and the National Historic Preservation Act (NHPA) of 1966. CEQ regulations provide direction and support in the assessment process when determining which alternative causes the least damage to the biological and physical environment. CEQ regulations along with

NHPA provide further guidance when determining which alternative "best protects, preserves, and enhances historic, cultural, and natural resources". (40 CFR 1500-1508) Federal Register Vol. 46, No. 55, 18026-18038, March 23, 1981.

The environmentally preferred alternative was selected for the implementation after considering the public comments, careful review of potential resource and visitor impacts, developing appropriate restoration, stabilization, and mitigation applications to protect all the resources, and still provide a unique experience for the visitor at Tsankawi. The Tsankawi Unit Management Plan is a proactive plan that is based on sound scientific data and experimental methodologies that are successful in other ecosystems in the area.

WHY THE PROPOSED ACTION WILL NOT HAVE A SIGNIFICANT EFFECT ON THE HUMAN ENVIRONMENT

As defined in 40 CFR § 1508.27, significance is determined by examining the following criteria.

Impacts that may be both beneficial and adverse
The NPS will conduct a complete project review based on the NHPA and NEPA mitigation requirements and guidelines for every component of the Preferred Alternative. The project will be developed through extensive consultation with the six affiliated pueblos and then sent to the State Historic Preservation Office for concurrence.

Degree of effect on public health and safety
Discouraging public access to unofficial areas of the Tsankawi Mesa and Pueblo will increase public safety. The visitors will encounter fewer snakes and walk on stable tread instead of the unstable wall rubble.

Infilling damaged trail segments provides more tread stability and surer footing.

Some cavates are unsafe due to ceiling fall and unstable rock walls. The Plan will rock-up unstable walls and restrict access to cavates with unstable ceilings.

The viewing platform will be designed by a licensed architect and meet all OSHA requirements with appropriate handrails and stair tread dimensions.

Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas
The Tsankawi Unit is a detached area of the Bandelier National Monument, located approximately 12 miles northwest of the monument. The Pueblo of San Ildefonso is adjacent to the Tsankawi Unit on the east. The Tsankawi Pueblo and cavates are closely associated with two other pueblos – Otawi and Tserige. Otawi is located approximately 4 miles northwest of Tsankawi Pueblo and is on Los Alamos County land. Tserige is located approximately 6 miles southwest of Tsankawi Pueblo and is located on Los Alamos National Laboratory land. The three pueblos often referred to collectively in Pueblo of San Ildefonso storytelling and in their belief system. The Rio Grande River lies approximately 5 miles east

of the Tsankawi Unit. There are no other parklands, farmlands, wetlands, wild and scenic rivers, or ecologically critical areas adjacent to the Tsankawi Unit.

Degree to which effects on the quality of the human environment are likely to be highly controversial
Adverse controversial effects to the quality of the human environment for this project were not mentioned in any of the public comments. Based on early consultation with the Pueblo of San Ildefonso, the NPS environmental assessment received verbal support from Governor Martinez at the Pueblo of San Ildefonso. The NPS did not receive any written comments from the other five affiliated pueblos.

The State Historic Preservation Office (SHPO) reviewed the Tsankawi Management Plan and submitted comments on Jun 21, 2000. The comments expressed concerns with the observation platform and the proposed trail work on the Tsankawi Mesa. A meeting was held with SHPO and the Governor of San Ildefonso Pueblo on September 27, 2000 to clarify the issues and seek resolution. NPS agreed to withdraw the proposed observation platform at this time and use alternate management methods that place greater emphasis on visitor management and increase NPS presence in the area. NPS will continue to consult under Section 106 with SHPO and San Ildefonso on constructing a south trail to replace the existing trail through the Pueblo. Until such time Section 106 consultation is completed, NPS will emphasize visitor management at Tsankawi to restrict visitor use on the existing trail, especially in areas where sensitive cultural resources occur.

Degree to which the possible effects on the quality of the human environment is highly uncertain or involved unique or unknown risks
Experts in their respective fields developed the proposed activities identified in the EA. Their proposed activities are based on previous research and methodologies applied elsewhere in the NPS. Therefore, there are no highly uncertain, unique, or unknown risks identified in the EA.

Degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration
The NPS does not anticipate any future actions based on precedent established from this action.

Whether the action is related to other actions with individually significant but cumulatively significant impacts
One of the major goals for the EA was to establish a comprehensive long-range plan for the Tsankawi Unit. The NPS hopes when the Plan in completely implemented the NPS will have very little to monitor or change, thus requiring an "off hands" type of management. Therefore, the NPS does not anticipate cumulatively significant impacts from implementing the Tsankawi Management Plan.

Degree to which the action may adversely affect districts, sites, highways, structures, or objects listed on the National Register of historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources
There will be no loss or destruction of significant scientific, cultural, or historical resources. Ground disturbing activity has been planned and located to cause the least amount of

impact, and where it does occur the NPS will conduct archeological testing and mitigation in accordance with the NHPA of 1966. Any preservation/treatment measures applied to the Tsankawi Unit were applied to other areas near the Unit with success – NPS does not anticipate different results. One component of the Plan is to nominate the Tsankawi Unit to the National Register of Historic Places both as an historic landscape and as an archeological district.

Degree to which the action may adversely affect an endangered or threatened species or its critical habitat

A NPS wildlife biologist and a Vegetation Specialist conducted cursory surveys of the Tsankawi unit and did not find any habitat that would support local endangered or threatened plant or animal species. Since the NPS could not locate any habitat, it is believed by the specialists that the Tsankawi Unit will not have endangered or threatened species. Therefore, the proposed action will not adversely affect any endangered or threatened species in the region.

Whether the action threatens the violation of federal, state or local environmental protection laws

This action violates no federal, state or local environmental protection laws.

PUBLIC INVOLVEMENT

The environmental assessment was made available for public review and comment during a 30-day period, ending May 4, 2000. A total of 7 responses were received on or before May 4th. Two responses were received after the period was closed. The total of nine responses included: 1 letter from the U. S. Department of Energy; 1 from the National Park Service Southwest Support Office in Santa Fe, NM.; 1 from the Los Alamos National Laboratory Ecology Group (University of California), 1 from the Hopi Nation; 1 from the New Mexico State Historic Preservation Office (SHPO); 1 from a non-profit environmental group; 1 from a Bandelier National Monument Special Use Permit holder; and 2 from private citizens. SHPO supported the "No Action" alternative for the Tsankawi Mesa trail and platform only, and one 1 respondent stated "we neither support or oppose the preferred alternative". The remaining respondents supported implementing the Tsankawi Management Plan, which includes the "Proposed Definite Actions" and the Proposed Discretionary Actions 2 and 3.

CONCLUSIONS

The proposal does not constitute an action that normally requires preparation of an environmental impact statement (EIS). The proposal will not have a significant effect on the human environment. Negative environmental impacts that occur are minor and temporary in effect. There are no unmitigated adverse impacts on public health, public safety, threatened or endangered species, sites, or districts listed on or eligible for listing on the National register of Historic Places, or other unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, cumulative effects, or elements of precedence were identified. Implementation of the action will not violate any federal, state or local environmental protection laws.

Based on the foregoing, it has been determined that an EIS is not required for this project and thus will not be prepared.

Recommended: Joseph Lovick 11/2/00
acting Superintendent Bandelier National Monument Date

Approved: John A Kinsig 11/2/00
Intermountain Regional Director Date
Act.

ERRATA SHEETS
ENVIRONMENTAL ASSESSMENT AND MANAGEMENT PLAN
FOR THE TSANKAWI UNIT
BANDELIER NATIONAL MONUMENT

Substantive comments to the Environmental Assessment and Management Plan for the Tsankawi Unit centered on eight topics: platform; trails; interpretive booklet and signs; unsupervised or excess visitation; transfer of lands, development and impacts; piñon/juniper restoration and soil erosion; exotic plants; and threatened and endangered species. The topics are addressed below and resulted in no substantive changes to the text of the environmental assessment.

Platform

1) "I prefer the construction of a scaffold type platform..."
2) "put the scaffold platform near the northeast corner where a kiva would be visible and some of the walls..."
3) "in support of any alternative which both restrict(s) access to the site and avoid(s) any new construction at the site, including trails and platforms..."
4) "suggest the inclusion of professional landscape architects and engineers to consider platform alternatives."

Response: The platform the NPS has chosen after much debate and consideration is the earthen platform. The earthen platform was chosen because it will blend into the landscape by using native stones and soils that match the surrounding landscape. The platform's location will be the southwest corner outside of the existing pueblo walls. This location was chosen because it allows the best panoramic view of the plaza and the pueblo walls without providing a view into any of the kivas. From consultation with the affiliated pueblos the NPS choose not to interpret directly the kivas that are scattered throughout the pueblo. The platform location and access trail do not expose any sensitive locations on or in the Tsankawi Pueblo.

The NPS choose to construct the access trail and the platform, because Bandelier National Monument in its enabling legislation is mandated to interpret the cultural landscape that is preserved in the cavates and pueblos dating from A.D. 1150 – 1550. Bandelier National Monument is also mandated to allow access to the public lands for the enjoyment of present and future generations in a manner that provides preservation and interpretation of the cultural landscape. The action chosen by NPS preserves Tsankawi Pueblo and allows for the enjoyment and interpretation of the Tsankawi Pueblo landscape.

An engineer designed and drew the plans for the two platforms. A landscape architect will be consulted to finish the plans for the platform and access trail. In October 2000, Bandelier National Monument, specifically the Tsankawi Unit will be the site for an interagency, multi-disciplinary symposium that looks at prehistoric landscape preservation and interpretation. At the symposium there will be historic preservationists, landscape architects, archeologists, and other professionals interested in rethinking how resource managers view prehistoric landscapes.

Trails

1) "The ladder up the south wall to the dance table will be an appropriate and non-invasive alternative to the present slot entrance."
2) "I will be greatly saddened to see Tsankawi's traditional trails modified, but understand that it must be done in order to preserve it."
3) "We are supportive of removing the paved trail."
4) "The north trail appeals to me more."
5) "in support of any alternative which will both restrict access to the site and avoid any new construction at the site, including trails and platforms."
6) "keep all the trails marked on the map."
7) The EA does not make clear what methods would be used to keep visitors on the official trail... how can the agency actually close the area beyond the official trail?"

Response: NPS will stabilize only portions of the traditional trails that pose a safety hazard to the visitor. NPS will remove the asphalt from the lower trail and contour the landscape using hand tools back to the pre-trail conditions. NPS chose the south route for the new Tsankawi Pueblo Trail. The decision was based on the south trail providing: 1) better viewing of the landscape to the south, east, and north; 2) less traffic noise from state highways 4 and 501; 3) greater distance to sacred and sensitive areas of the pueblo; 4) shorted overall distance with more tread placed on existing bedrock; 5) absence of intact middens and artifact concentrations; 6) better visibility into the plaza; and 7) less impact to the overall landscape.

If NPS were to restrict access to the Tsankawi Mesa and not interpret the Tsankawi Pueblo, the NPS would ignore one of its mandates that are to interpret significant sites and provide "enjoyment for present and future generations". Some would say, by creating a new trail the NPS is impacting the site once again. The NPS will mitigate the impact in accordance with NPS Standards and the National Historic Preservation Act of 1966. NPS is preserving the unique characteristics of Tsankawi by moving the trail outside of the pueblo walls and away from sacred and sensitive areas identified by the Pueblo of San Ildefonso, who are federally and inter-tribally recognized as the descendents of the Tsankawi Pueblo.

All the official trails will be drawn on the new brochure and delineated with markers on the ground. The social trails will be filled with slash, especially where the social trails intersect the official trail, thus discouraging visitors from wandering off the trail. The NPS will have the option to cite violators for "entering a closed area", that is anywhere off the official trail. This new violation will be prominently posted at the trailhead and in the brochure.

Interpretive Brochure and Signs

1) "I heartily support having San Ildefonso write the pamphlet, saying what they think is important."
2) "I believe an interpretive booklet is a good idea... "
3) "have a sign at the parking lot entrance either suggesting or requiring that nothing harder than running shoes be worn... whatever they have that resembled the moccasins of the early people."

4) "it is critical that interpretive signs similar to those in Frijoles Canyon be used to explain the effort by NPS to restore pre-1870's conditions."
5) "interpretive signs make clear in a positive way, why the mesa is closed to exploration... sign at Forest Service Poshuouinge ruin is an excellent example of a good interpretive sign."
6) "I urge the NPS to lean toward more signs in order to interpret the area and its cultural features fully and in order to help the public understand the benefit of vegetation treatments and area closures."
7) "I suggest, offering both a scientific and a Pueblo view of matters where disagreement may rise."

Response: NPS will have a new self-guiding brochure written and reviewed for content by the six affiliated pueblos. The NPS will not suggest or require visitors to wear soft sole shoes. Due to the current wear patterns in certain areas it is better to have hard soles for safety issues. At the trailhead or at appropriate locations along the trail the NPS will present general issues such as vegetation restoration, mesa closures, landscape preservation, and cultural interpretation. The exact location and wording will be part of the new brochure that will be sent out to NPS specialists and the affiliated pueblos for confirmation and approval. When the scientific and Pueblo views differ, the NPS will make a collective choice on the outcome. Certain issues are sensitive to the Pueblo worldview and that will be respected during the decision process on how to present that issue to the public.

NPS will place a minimum number of sign markers along the trail. Tsankawi is unique because of the wildness and the visible presence of the Ancestral Pueblo heritage. If too many signs are present that wildness and presence are impacted thus extinguishing the unique Tsankawi experience.

Unsupervised or Excess Visitation

1) "We encourage NPS to take such actions as needed to alleviate this situation... "
2) "... keep the visitor experience at the 'primitive' level, allowing visitors to take risks on their own."
3) "I hope closing Tsankawi Unit would be a last resort, given that the public owns Tsankawi and public use is a significant portion of the NPS mission."
4) "We suggest that the wording... be revised to reflect the underlying issue of unsupervised use, rather than the aspect of additional development."
5) "We suggest that traffic impacts and hazards to Laboratory employees from NPS traffic be covered in the final EA."
6) "We are concerned that continued high visitation levels at Tsankawi Unit, may continue to cause an increase in unsupervised recreational use, concomitant cultural and natural resource damage on Lab lands. We do not find this topic addressed in the EA."

Response: At the present staffing levels the NPS does not anticipate a decrease in the number of unsupervised visitors. However, after the ladder is installed on the south side of the dance floor, the NPS does anticipate a decline in the number of visitors accessing the dance floor and the rest of the interpretive trail up to the mesa. Some visitors will not climb a ladder regardless of where it may lead them.

NPS believes with the new ladder and the positive explanations for restricting access to the pueblo and sensitive areas that closing the mesa completely to visitors will not be necessary. If visitors do not respect the conditions for hiking in the Tsankawi Unit, the NPS will consider closing the Unit, but only as the last option for preserving the Tsankawi landscape.

There are no data that suggests NPS visitation is related to bicycle traffic or cultural or natural resource damage on Lab lands, therefore NPS will not address the impacts between these issues in the final EA. To make the suggestion that an increase in NPS visitation is related to impacts and hazards to Lab employees would be similar to making the assertion that an increase in Lab employees will impact the safety and increase hazards to NPS employees and visitors. The NPS does not support this line of illogic reasoning. When NPS is critical of the DOE land transfer it is not the actual transfer that is criticized but the unknown impacts that could develop from the transfer, such as, increased traffic noise, increased lights in the night sky, and increased population density in a sensitive and significant cultural landscape.

Additional development on adjacent lands to the Tsankawi Unit will impact the management of the unit. Therefore, NPS will continue to discourage any development they believe would cause harmful or detrimental impacts to the surrounding landscape. See the following section for more public comments about the transfer and development of adjacent lands.

Transfer of Lands, Development, Impacts

1) "I oppose the transfer of nearby DOE lands to the county and/or San Ildefonso... "
2) "I urge the NPS to continue to take a firm official stance against development or intense use of lands adjoining the unit that would further degrade Tsankawi's resources and/or the visitor experience of them."
3) "constraints on NPS resources to mitigate development threats under PL 105-119."
4) "Air quality and visibility impacts... DOE recommends the text be changed to reflect the impact analysis provided by the CT EIS or, an explanation be provided as to why the NPS opines that the impacts are likely to increase for this resource."
5) "Additional noise impacts... " and "Additional night sky impacts... DOE recommends the text be changed to reflect the impact analysis provided by the CT EIS or, an explanation be provided as to why the NPS opines that impacts are likely to increase for these resources."
6) "Further development and associated activities... DOE requests that the text be changed to conform with the CT EIS statement of impacts or an explanation be provided as to why the NPS does not agree with the analysis provided."
7) "The transfer of adjacent lands... DOR recommends the NPS reconsider this impact statement, as it is not one supported by the DOE... DOE recommends additional text be provided to explain further its rationale."
8) "We concur with the ... Puebloan Perspective, including the Puebloan Preferred Alternative, Transfer the Tsankawi Unit to the Pueblo of San Ildefonso."

Response: The NPS will continue to oppose the transfer of DOE lands based on the existing transfer agreement with the Pueblo of San Ildefonso and Los Alamos County. In the agreement there is no restriction identified that will support the Tsankawi Management Plans mission to preserve and protect the resources for present and future generations as

well as provide for the interpretation and enjoyment by present and future gerenations. Because of the absence of easements, restrictions or greater clarification for the DOE land transfer, the NPS disagrees with the DOE's CT EIS in relation to the assessment on air quality, visibility, noise, and night sky that states the impacts will not increase after the land transfer.

The fact remains that the CT EIS is based on the best available information provided by the Los Alamos County and Pueblo of San Ildefonso for the proposed use of the acquired lands, and yet the EIS has not identified any restrictions for the transfer. This is not agreeable to the NPS, because the NPS cannot address directly any impacts or potential impacts because the NPS cannot foreshadow the new landowners actions. If the DOE identified transfer restrictions, then and only then could NPS address the impacts or potential impacts to the Tsankawi Unit's landscape.

PJ Restoration & Soil Erosion

1) "it should be possible to set goals for what levels of soil erosion are acceptable for ecosystem stability and cultural resources protection, and then determine whether the proposed treatments lower soil erosion levels sufficiently to meet management goals." (WEBB)

2) "NPS proposals (natural resources and erosion) at this stage are broadly stated and lack sufficient specificity in goals, objectives, and strategies ..." (WEBB)

3) "I am highly supportive of the vegetation treatment ideas proposed for the P-J woodlands."

Response: Research is underway at the main park unit to characterize erosion rates and sediment production in mechanically treated woodland (i.e. restored) areas relative to control (i.e. untreated). These data will allow us to determine current rates of erosion and sediment production in untreated woodlands and what levels of mitigation (i.e. in rates of soil erosion and sediment production) we can expect is response to mechanical treatment. Management objectives (i.e. for ecosystem stability and cultural resource protection) seek to mitigate what is viewed as 'accelerated' soil erosion processes (on a geological time scale) for the benefit of natural and cultural resources.

NPS objectives for the woodland restoration program are to stabilize soil and embedded cultural resources in order to mitigate effects of accelerated soil erosion on natural and cultural resources. NPS has taken a functional approach to restoration (i.e. as opposed to specific structural targets) and success can be measured by increases in herbaceous cover (i.e. effective cover), associated decreases in soil erosion rates and sediment production, and ability for ground fire to propagate through woodland systems (i.e. an indicator of continuity in fine fuels).

Exotic Plants

1) "NPS should make some effort to control kochia, at least in places so that critical elements of the ruin are visible..."

2) "our concern is the use of straw bales and weed free hay and the further introduction of noxious weeds (page 48)"

Response: NPS is implementing a vegetation reduction program in Frijoles Canyon in 2000. NPS will extend that program to the Tsankawi Pueblo after the interpretive trail and viewing platform are finished.

NPS has in storage, weed-free seed that has been used and found to be 'true'. These seeds will be used to stabilize erosion channels along with a biodegradable geocloth that will anchor the seeds until they take root. No straw bales or hay will be used during the stabilization efforts.

T & E Species

1) "... no discussion of T & E species is present in the EA. This omission should be corrected."

2) "Impacts to T & E species... surveys have yet to be completed, thus it is premature to state that no impact will occur"

Response: The NPS Wildlife Biologist and the Vegetation Specialist have surveyed the Tsankawi landscape and found no habitat that supports any of the threatened and endangered species currently known in the greater Pajarito Plateau, Jemez Mountain, or Rio Grande River Valley regions. Therefore, NPS is certain that no impacts will occur because their habitat is not present in the Tsankawi Unit.

Environmental Assessment to Manage the Tsankawi Unit of Bandelier
Record of Comments as of May 18, 2000

1. Rebecca H. Shankland
6 Mariposa Court
White Rock, NM 87544
672-9106
shankland@cybermesa.com

2. M. Diana Webb
Group Leader, Ecology Group, ESH-20
TA-21 Bldg. 210, MS M887
Los Alamos National Laboratory
667-0730 (fax) 667-0731
dwebb@lanl.gov

3. Tom Ribe
51 Feather Rd.
Santa Fe, NM 87501
Tribe@swadventures.com

4. Michael G. Smith, Chair Conservation Committee
Sierra Club – Pajarito Group
PO Box 945
Los Alamos, NM 87544
jbird@Rt66.com

5. David A. Gurule' P.E., Area Manager
Department of Energy
Albuquerque Operations Office
Los Alamos Are Office
Los Alamos, NM 87544
(505) 667-8690 Ms. Elizabeth Withers

6. Sarah Gustafson
52 Osito
Los Alamos, NM 87544
662-1496
Sarahgus@compuserve.com

7. Office of Cultural Affairs
Historic Preservation Division
Attn: Alysia L. Abbott
La Villa Rivera Building
228 East Palace Avenue
Santa Fe, NM 87501
827-6314

8. Jake Barrow
SWRO

9. Leigh J. Kuwanwisiwma,
Director, Cultural Preservation Office
The Hopi tribe
PO Box 123
Kykotsmovi, AZ 86039
(520) 734-3000

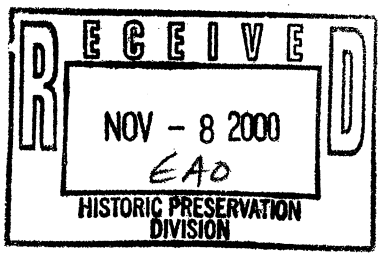
United States Department of the Interior

NATIONAL PARK SERVICE
Bandelier National Monument
HCR 1, Box 1, Suite 15
Los Alamos, New Mexico 87544-9701

IN REPLY REFER TO:

November 6, 2000

060859



Elmo Baca
Office of Cultural Affairs
Historic Preservation Division
La Villa Rivera Building
228 East Palace Ave.
Santa Fe, NM 87501

Dear Elmo,

Thank you for meeting with us on September 27, 2000, at San Ildefonso Pueblo to discuss your concerns about the Tsankawi Management Plan.

Enclosed is the Finding of No Significant Impact (FONSI) for the Tsankawi Management Plan. The FONSI concluded that the implementation of the Tsankawi Management Plan will not have a significant impact on the environment, and, therefore, does not require the preparation of an environmental impact statement.

Full implementation of the Tsankawi Manaement Plan will be contingent on resolving Section 106 concerns relating to construction of the new south trail, the platform and the access trail to the platform. This is based upon letters from your office of May 4, 2000, and August 21, 2000, and discussions with you at our September 27 meeting at San Ildefonso Pueblo. Until we achieve resolution, plans to construct a new south trail, the platform and new access trail to the platform are suspended.

As agreed to at our meeting, we will look at alternatives that do not include a platform. We will share our ideas with you by January 1, 2001, and schedule a follow-up meeting to discuss your views. We look forward to working with you on a resolution.

With the exception of the new south trail, the platform and trail to the platform, other elements of the Tsankawi Management Plan such as research and monitoring, vegetative treatment and restoration, interpretation, education, and visitor management activities will proceed.

Sincerely,

Joseph Sovick
Joseph Sovick
Acting Superintendent

Enclosure

This to acknowledge receipt of the FONSI. As per our previous communication with your office, referenced in your letter, we find that the management plan will create adverse impacts to the site of Tsankawi. We applaud Bandelier's willingness to consider alternatives and look forward to continued consultation with your office regarding this undertaking. 11/29/2000

Jan Biella
Jan Biella for NM SHPO

National Park Service
Briefing Paper

Prepared for: Assistant Secretary
Submitted: March 2, 2001 State: New Mexico

Title: Relations with Pueblo of San Ildefonso regarding Tsankawi Unit, Bandelier National Monument

Issue:

- The Pueblo of San Ildefonso, a federally recognized Indian tribe, is, through various channels, actively seeking a larger management role and eventual ownership of the Tsankawi Unit of Bandelier NM.

Background:

- Bandelier NM, including the detached Tsankawi Unit, was designated in 1916 to protect cultural resources created by the Ancestral Puebloans between circa AD 1150 and 1550. The National Park Service has managed the monument since 1932.

- The Tsankawi Unit is approximately 790 acres in size. While relatively small in area, the unit contains an extraordinary combination of prehistoric, historic, ethnographic, and biological resources as well as traditional, heritage, and religious values within a highly scenic landscape.

- The Tsankawi unit is part of the ancestral land of the Pueblo of San Ildefonso.

- The Pueblo of San Ildefonso now has before the U.S. Court of Federal Claims an Indian Claims Commission case, Pueblo of San Ildefonso v. United States of America, Docket 354.

- The Pueblo of San Ildefonso is seeking the acquisition of land, in particular the Tsankawi unit, in the settlement under the Indian Claims Commission Act. The Act only authorizes financial settlement, not settlement through land acquisition. The Pueblo has been informed by solicitors from the Department of Justice and the Department of the Interior that transfer of the Tsankawi unit cannot be part of the settlement of the case now being considered by the Court of Claims.

Status:

- An Environmental Assessment regarding the management of the Tsankawi unit was completed in 2000. The entire Tsankawi unit has been surveyed for archeological resources. Other studies and surveys completed on the site include a Trail Preservation Study, Watershed Condition Survey, Soil Survey, and Cultural Landscape Inventory. These studies have directed a number of recent stabilization, preservation, and maintenance activities on the archeological features, trails, and visitor facilities of the unit.

- The one and one-half mile long trail is popular with visitors primarily because of the prehistoric trails worn into the bedrock; a large, mostly unexcavated pueblo and approximately 300 cavates (rooms excavated into soft bedrock). Visitors enjoy the unit's relatively undeveloped nature, their ability to experience a sense of relative tranquility, and the area's inspirational qualities. Ranger patrols of the unit are conducted daily.

- The Bandelier Tribal Consultation Committee comprised of six tribal groups closely affiliated with the park was formed in 1999. The Pueblo of San Ildefonso is an active member of the committee.

- The Tsankawi Project, a major trail stabilization and archeological features preservation program initiated in 1998, has been a collaborative effort between the National Park Service, San Ildefonso Pueblo and the University of Pennsylvania, in coordination with the State Historic Preservation Office. The project crew includes students from local pueblos, including San Ildefonso.

- In December 2000, Bandelier NM staff met formally with the Pueblo of San Ildefonso Tribal Council to begin the formulation of a Memorandum of Understanding to enhance the involvement of the Pueblo of San Ildefonso in management of the Tsankawi unit.

- The Cerro Grande Fire Supplemental Legislation (P.L. 106-246, Sec. 2101) authorized the collection of plants and minerals within Bandelier NM by members of the Pueblo of San Ildefonso and the Pueblo of Santa Clara for traditional and cultural uses. We are currently working on an agreement to implement this legislation.

National Park Service Perspective:

- Congress and several Presidential Orders recognize that the superlative resources of the Tsankawi unit of Bandelier NM should be managed by the NPS for the public in perpetuity. This does not preclude cooperative activities with the Pueblo of San Ildefonso for enhanced protection and interpretation of Tsankawi.

- The park understands that it has special obligations to the descendants of the Indian peoples who continue to live in the region and who maintain cultural ties to the area now encompassed by the park. The park continues to be willing to work with the Pueblo of San Ildefonso and other traditionally associated groups in order to manage the park in a manner sensitive and respectful to their living cultures.

- The DOI Solicitor's Office and the Department of Justice have advised the NPS that the transfer of the Tsankawi unit will not be part of the litigation or settlement of the Indian Claims Commission case.

Contact:

- Dennis Vasquez, Superintendent, Bandelier National Monument, telephone 505-672-3861, extension 501.

Draft Agreement for Enhanced Involvement by Pueblo of San Ildefonso in Management of Tsankaw'i Unit, Bandelier National Monument (2/16/01)

Agreement No. ...

Memorandum of Understanding
Between the
National Park Service
and the
Pueblo of San Ildefonso

Article I - Background and Objectives

This agreement is entered into by and between the National Park Service (hereinafter "NPS"), United States Department of the Interior, acting through the Superintendent of Bandelier National Monument (hereinafter "Park"), and the Pueblo of San Ildefonso (hereinafter "Pueblo"), a federally recognized Indian tribe, acting through its Governor, as authorized by its Pueblo Council. The purpose of this agreement is to memorialize the agreement between the parties as to the Pueblo's enhanced role in advising and cooperating with the NPS with respect to the NPS's management of the Tsankaw'i Unit of the Park.

Whereas, the NPS administers the Park as unit of the national park system in accordance with 16 U.S.C. §§ 1-4 (2000) and other laws applicable generally to units of the national park system; and

Whereas, the Park includes a detached unit, comprising approximately 836 **[David—Insert approximate number of acres of Tsankaw'i Unit here.]** acres, more or less, known as the Tsankaw'i Unit; and

Whereas the Tsankaw'i Unit contains prehistoric Puebloan sites and traditional cultural properties to which the Pueblo has longstanding and deep cultural ties; and

Whereas, the Pueblo views the lands within the Tsankaw'i Unit as part of its ancestral lands; and

Whereas, the Pueblo's exclusive aboriginal title area, as determined by the Indian Claims Commission, includes the lands constituting the Tsankaw'i Unit; and

Draft Agreement for Enhanced Involvement by Pueblo of San Ildefonso in Management of Tsankaw'i Unit, Bandelier National Monument (2/16/01)

Whereas, the NPS wishes to recognize the Pueblo's longstanding and deep cultural ties to the Tsankaw'i Unit by according the Pueblo an enhanced role in advising and cooperating with the NPS in the management of the Tsankaw'i Unit;

Now, therefore, the parties agree as follows:

Article II - Statement of Work

A. The NPS agrees to:

1. To the greatest extent practicable and as authorized by federal law, consult with the Pueblo prior to taking any management actions that may affect cultural resources, including traditional cultural properties, located within the Tsankaw'i Unit.

2. To the greatest extent permitted by federal law, recruit, train, and employ Pueblo members to work at the Park, and particularly at the Tsankaw'i Unit. Job recruitment may be for seasonal or permanent positions and may include positions in resource management, interpretation, law enforcement/fee collection, administration, and/or maintenance. At least once a year, at a mutually agreeable time and place, the Park will conduct a job fair at the Pueblo to inform interested Pueblo members about possible positions at the Park and possible careers in the NPS.

B. The Pueblo agrees to:

1. To the greatest extent practicable and in accordance with the Pueblo's laws and traditions, consult with the NPS to enhance the identification, interpretation, preservation, and protection of cultural resources, including traditional cultural properties, located within the Tsankaw'i Unit.

C. The parties further agree as follows:

1. The Superintendent of the Park or his/her designee and the Governor of the Pueblo or his designee shall meet with each other at least twice a year at mutually agreeable times and places to discuss the NPS's management of the Tsankaw'i Unit.

2. The parties also shall communicate and meet regularly to conduct the consultation described in provisions II.A.1 and II.B.1 above. That consultation may occur through telephone conversations or written correspondence, but the parties intend that it will usually occur through face-to-face meetings at mutually agreeable times and places. All consultation between the parties shall be coordinated through the Superintendent of the Park and the Governor of the Pueblo.

3. To the greatest extent permitted by federal law and in accordance with the Pueblo's laws and traditions, the parties shall share information pertaining to (a) the NPS's management of the Tsankaw'i Unit and (b) the Pueblo's cultural ties to the lands constituting the Tsankaw'i Unit and the cultural resources, including traditional cultural properties, located within the Tsankaw'i Unit.

4. To the greatest extent permitted by federal law, the NPS shall protect the confidentiality of information provided by the Pueblo to the Park. The parties shall explore innovative ways of protecting confidential information within the confines of federal law.

5. Nothing in this agreement shall be construed as obligating the NPS to expend in any one fiscal year any sum in excess of the monies appropriated by Congress and allocated by the NPS for the performance of this agreement.

Article III - Term of Agreement

This agreement shall be effective for a period of two years from the date of final signature, unless it is terminated earlier by one of the parties pursuant to article VIII below. At the conclusion of that two-year term, this agreement may be extended or renewed by written agreement of the parties.

Article IV - Key Officials

All communications and notices regarding this agreement shall be directed to the following key official(s) for each party:

For the NPS:

Superintendent
Bandelier National Monument
HCR 1, Box 1
Suite 15
Los Alamos, NM 87544
Telephone: (505) 672-3861, extension 501
Telefax: (505) 672-9607

For the Pueblo of San Ildefonso:
Governor
Pueblo of San Ildefonso
[Insert address and telephone and telefax numbers here.]

Article V - Property Utilization

Unless otherwise agreed to in writing by the parties, any property furnished by one party to the other shall remain the property of the furnishing party.

Article VI - Prior Approval

Not applicable.

Article VII - Reports and/or Deliverables

Not applicable.

Article VIII - Modification and Termination of Agreement

This agreement may be modified only by a written instrument executed by the parties.

Either party may terminate this agreement by providing the other party with sixty (60) days advance written notice. In the event that one party provides the other party with notice of its intention to terminate, the parties shall meet promptly to discuss the reasons for the notice and to try to resolve their differences amicably. The parties commit to using every reasonable means available, including the use of a neutral mediator if necessary, to try to avoid terminating this agreement.

Article IX - Standard Clauses

A. Civil Rights

During the performance of this agreement, the participants agree to abide by the terms of USDI-Civil Rights Assurance Certification, non-discrimination, and will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, religion, sex, or national origin. However, this provision shall not be construed to prohibit the Pueblo from utilizing, pursuant to lawful tribal ordinance, tribal- or Indian-preference in employment.

B. Officials Not to Benefit

No member of or delegate to Congress or resident Commissioner shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom.

Article X - Warranty of Authority

Draft Agreement for Enhanced Involvement by Pueblo of San Ildefonso in Management of Tsankaw'i Unit, Bandelier National Monument (2/16/01)

The Pueblo's Governor hereby warrants that the duly constituted Pueblo Council has authorized him to execute this agreement on behalf of the Pueblo.

Article XI - Authorizing Signatures

In witness hereof, the following authorized representatives of the parties have signed their names on the dates indicated, thereby executing this agreement.

For the National Park Service:

_____
Name (signature)

Superintendent, Bandelier National Monument
Title

_____
Date

For the Pueblo of San Ildefonso:

_____
Name (signature)

Governor
Title

_____
Date

National Park Service
Briefing Paper

Prepared for: Assistant Secretary
Submitted: March 2, 2001 State: New Mexico

Title: Relations with Pueblo of San Ildefonso regarding Tsankawi Unit, Bandelier National Monument

Issue:

- The Pueblo of San Ildefonso, a federally recognized Indian tribe, is, through various channels, actively seeking a larger management role and eventual ownership of the Tsankawi Unit of Bandelier NM.

Background:

- Bandelier NM, including the detached Tsankawi Unit, was designated in 1916 to protect cultural resources created by the Ancestral Puebloans between circa AD 1150 and 1550. The National Park Service has managed the monument since 1932.

- The Tsankawi Unit is approximately 790 acres in size. While relatively small in area, the unit contains an extraordinary combination of prehistoric, historic, ethnographic, and biological resources as well as traditional, heritage, and religious values within a highly scenic landscape.

- The Tsankawi unit is part of the ancestral land of the Pueblo of San Ildefonso.

- The Pueblo of San Ildefonso now has before the U.S. Court of Federal Claims an Indian Claims Commission case, Pueblo of San Ildefonso v. United States of America, Docket 354.

- The Pueblo of San Ildefonso is seeking the acquisition of land, in particular the Tsankawi unit, in the settlement under the Indian Claims Commission Act. The Act only authorizes financial settlement, not settlement through land acquisition. The Pueblo has been informed by solicitors from the Department of Justice and the Department of the Interior that transfer of the Tsankawi unit cannot be part of the settlement of the case now being considered by the Court of Claims.

Status:

- An Environmental Assessment regarding the management of the Tsankawi unit was completed in 2000. The entire Tsankawi unit has been surveyed for archeological resources. Other studies and surveys completed on the site include a Trail Preservation Study, Watershed Condition Survey, Soil Survey, and Cultural Landscape Inventory. These studies have directed a number of recent stabilization, preservation, and maintenance activities on the archeological features, trails, and visitor facilities of the unit.

- The one and one-half mile long trail is popular with visitors primarily because of the prehistoric trails worn into the bedrock; a large, mostly unexcavated pueblo and approximately 300 cavates (rooms excavated into soft bedrock). Visitors enjoy the unit's relatively undeveloped nature, their ability to experience a sense of relative tranquility, and the area's inspirational qualities. Ranger patrols of the unit are conducted daily.

- The Bandelier Tribal Consultation Committee comprised of six tribal groups closely affiliated with the park was formed in 1999. The Pueblo of San Ildefonso is an active member of the committee.

- The Tsankawi Project, a major trail stabilization and archeological features preservation program initiated in 1998, has been a collaborative effort between the National Park Service, San Ildefonso Pueblo and the University of Pennsylvania, in coordination with the State Historic Preservation Office. The project crew includes students from local pueblos, including San Ildefonso.

- In December 2000, Bandelier NM staff met formally with the Pueblo of San Ildefonso Tribal Council to begin the formulation of a Memorandum of Understanding to enhance the involvement of the Pueblo of San Ildefonso in management of the Tsankawi unit.

- The Cerro Grande Fire Supplemental Legislation (P.L. 106-246, Sec. 2101) authorized the collection of plants and minerals within Bandelier NM by members of the Pueblo of San Ildefonso and the Pueblo of Santa Clara for traditional and cultural uses. We are currently working on an agreement to implement this legislation.

APPENDIX H – TSANKAWI UNIT 1999 SIGN INVENTORY

Available upon request. Located in the Resource Management Library, Bandelier National Monument Headquarters; File Code H22 (Tsankawi Management Plan).

National Park Service Perspective:

- Congress and several Presidential Orders recognize that the superlative resources of the Tsankawi unit of Bandelier NM should be managed by the NPS for the public in perpetuity. This does not preclude cooperative activities with the Pueblo of San Ildefonso for enhanced protection and interpretation of Tsankawi.

- The park understands that it has special obligations to the descendants of the Indian peoples who continue to live in the region and who maintain cultural ties to the area now encompassed by the park. The park continues to be willing to work with the Pueblo of San Ildefonso and other traditionally associated groups in order to manage the park in a manner sensitive and respectful to their living cultures.

- The DOI Solicitor's Office and the Department of Justice have advised the NPS that the transfer of the Tsankawi unit will not be part of the litigation or settlement of the Indian Claims Commission case.

Contact:

- Dennis Vasquez, Superintendent, Bandelier National Monument, telephone 505-672-3861, extension 501.