Res. Mgmt. Plan & EA
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RESOURCES MANAGEMENT PLAN

AND

ENVIRONMENTAL ASSESSMENT

FOR

BANDELIER NATIONAL MONUMENT

1988

Recommended by _____ 10/14/88
Superintendent Date

Approved by _____ JAN 06 1989
Acting Regional Director Date

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INTRODUCTION

I. Purpose

The Presidential proclamation that created Bandelier stated that "...certain prehistoric aboriginal ruins ..are of such unusual ethnologic, scientific and educational interest...that the public interest would be promoted by preserving these relics of a vanished people, with as much land as may be necessary for the proper protection thereof." Although protection is in itself of prime importance, it is of little value if the public cannot benefit directly from it. Therefore, interpretation of the site has become the primary visitor program for the National Park Service.

Protection and interpretation of the ruins and preservation of the natural setting have been and will continue to be the purpose of the Service's management of Bandelier National Monument.

The Resources Management Plan is a strategic planning document and a key factor in good management and preservation of the resource.

This plan represents a first revision from the original plan of April, 1976, and includes a set of project statements which include proposed action for implementation as well as research actions. Other sections of the plan serve as a set of specific management guidelines. Project statements are determined on the basis of approved Management Objectives and NPS policies. Management constraints and completed research serve as guidelines for projects. The plan serves the Superintendent in two ways: 1) as a manual for management activities which will preserve the environment or achieve an environmental status quo to comply with Park Service standards, and 2) as a set of research projects and priorities that are designed to obtain additional information for management and interpretation.

II. RESOURCE-RELATED MANAGEMENT OBJECTIVES

- Inventory, preserve and maintain the cultural features and natural processes occurring within the Monument.

- Provide for cultural and natural resource research programs to enhance management decisionmaking.

- Monitor critical resources for change, and modify management practices which have adverse resource effects.

NATURAL RESOURCES

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OVERVIEW AND NEEDS

The basis and thrust of this plan for the next five years centers on the Director's 12-Point Plan and the Southwest Regional Director's action strategy to accomplish the Plan.

The following priority items represent the monument's emphasis in natural resource management and research, and provides funding levels to accomplish these tasks by fiscal year.

I. Biogeographical assessment of the greater Bandelier Ecosystem (Project N-20, N-1).

This need is directly linked to the Director's first objective: "emphasize the planning, management, and interpretation of resources in relation to the entire ecosystem or historic context."

schedule of planned accomplishments:
FY 87 - Begin Landscape Ecology Study
FY 88 - Complete study; begin interpretive brochure
FY 98 - Complete interpretive brochure

see programming sheets for funding requirements.

The product of this project can be viewed as providing a basis for interagency cooperation and mutual understanding on issues affecting resources both within and around the monument. Another benefit is the tremendous interpretive value contained within this study. The "holistic view" approach to environmental education (adults and children) can be fully utilized both by on-site interpreters and managers and the outreach program.

II. Natural Resource Inventory: A floral collection for the monument. (Ref. N-1, N-16, N-5).

Director Motts 12-Point Plan refers to creation of "usable inventories"; this study would complete what is now a partial herbarium collection of approximately 1/3 of all plants known to occur in the park. Many critical decisions are dependent on the product of this study: Management of wildland fire , rehabilitation of former burro range, hazardous/exotic plant control, interpretation and environmental education programs, etc.

Schedule:	Funding Req'd
FY 87-88 Complete Floral Study	$6,000

III. Conduct a Paleo-environment Study of the monument. (Ref. N-1, N-4, N-19, C-3).

A great deal is not know about the early natural environment of the monument area. Consequently, this severely limits the park's ability to understand processes which led to todays plant and animal communities, soils and other ecosystem components. What species occurred here which are now extripated? How did the early inhabitants alter their environment, and why? What natural forces were responsible for shaping this landscape?

The management information which is drived from this project should be usable to create reintroduction scenarios, interpretive programs, and publications which would enhance public understanding and appreciation of this unique area.

Schedule of work:		Est. Cost
FY 88	Begin study - field work & analysis	48K
FY 89	2nd year field work & analysis	48K
FY 90	3rd year field work & analysis	48K
FY 91	Complete field work, begin write-up	30K
FY 92	Write up & publication	20K

Up to 1/3 man-year per year plus housing will be provided by the park, which is not included in the above cost estimates. Also, the park will make a concerted effort to recruit students and volunteers to assist, which may relieve some cost burden.

NATURAL RESOURCE PROJECT STATEMENTS

NUMBER	TITLE	PAGE NUMBER
BAND N-1	Natural Resource Basic Inventory	4
BAND N-2	Feral Burro Management	10
BAND N-3	Grazing Impacts on Vegetation	11
BAND N-4	Management of Native Ungulate Populations	13
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BAND N-1
NATURAL RESOURCE BASIC INVENTORY

I. Statement of Issue

Natural Park Service Management Policies (Chpt. II, page 1) states, "The Service will develop, gather, compile, store, analyze, update, and employ natural, historic, social, economic, and demographic data for the planning and management of each park."

This project is intended to identify all studies required to complete the Monument Resource Basic Inventory.

II. Alternatives and Probable Impacts

A. No action - Management under this alternative would need to rely on available resource information for planning projects, answering requests, interpretive programs, and preparing factual responses to environmental documents and proposals of other agencies.

B. Conduct Baseline Inventory Studies Based on Priority Resource Problems Only - This alternative does not consider the interrelatedness of resource components and consequently, a study on one particular resource only could easily overlook the problem's effects on other ecosystem components.

C. Develop Research Strategies and Priorities Together With Baseline Inventory Needs as a Balanced Planning Effort and Total Program - This approach insures that both high priority problems along with inventory-type investigations are accomplished simultaneously, thus allowing RBI files to develop consistently.

There are no physical impacts to flora or faunal species resulting from studies, other than from collecting which is subject to approved collection permits.

III. Recommended Alternative

Number 3 - On an annual basis, resource management staff and researchers should conduct a seminar on completed and ongoing studies. Out of this session will evolve priorities and rationale for future investigations. Attached to this statement is a resource monitoring plan which documents on-going or planned monitoring activities.

Present status of natural resource inventory needs for the Monument are as follows:

A. Continued invertebrate inventory of terrestrial and aquatic species.

B. Habitat and seasonal patterns of black bear (ursus americanus), along with basic population estimates and potential management issues related to back-country visitor use.

C. Collect data on seasonal lightning patterns, using data from Los Alamos National Laboratory (LANL), National Oceanographic and Atmospheric Administration (NOAA) Weather Service, and the Automated Lightning Detection System.

D. Initiate a floral study of the monument. Presently, only one-third of the species occurring in the monument are included in a documented herbarium collection. This study will include plant specimens being added to the herbarium, docuemnting range in both habitat and phenology; identify any exoticc rare, unique species and disturbed habitats.

E. Continue faunal inventory of resident, transient and occasional species and evaluate reintroduction potentials where indicated. Begin a study to document biological factors surrounding the Mexican free tail bat (Tadarida brasiliensis).

F. Conduct a paleo-evironment study. This project will collect needed scientific data on the early flora and fauna of the monument, with the intention of providing management information on:

- extirpated species
- early flora structure
- dendro climatic information to document significant changes in the area's climatic regimes.
- characterize and document resource depletion from human and/or natural causes.
- hydrology, soils and geomorphological information.

A 10-238 has been prepared on this subject.

G. Identify and describe sources and nature of environmental pollutants, including but not limited to noise, esthetic impacts to resources, organic and inorganic contaminants, aereosols and gases.

H. Evaluate potentials (i.e., long term) impacts to resources resulting from changing regional economic and socio-political conditions. Emphasis on cumulative impacts resulting from regional and area developments, demographic trends, and visitor use patterns on the monument's ecological intergrity. Identify any incompatible visitor behavior, native American religious uses of resources, and illegal activities which may impact the resources under NPS protection.

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RESOURCE MONITORING PLAN

The following monitoring strategy has been designed to document trends in resource conditions and identify sources and nature of impacts. Additions and changes can be made as more information is known about a particular subject. These monitoring activities are intended to be repeatable over time.

FLORA

Type	Description	Season/ Date	Freq.	Remarks
T,P	LaMesa Burn Succession	Summer	1990-10 yr interval	Plante Research Assoc.
T	Germinant Reforestation	Summer	1990, 1995 2000	
T	Cerro Grande Plots	Summer	Every 5 yrs.	Estab. '85 - Tierney
P	Cerro Grande Photo	Summer	Every 5 yrs.	Estab. '84 - Allen
T,P	Riparian Vegetation	Summer	TBA	Estab. in '87
T,P	Mixed Conifer Veg.	Summer	TBA	Estab. in '87
T,P	Pinyon-Juniper Veg.	Summer	TBA	Estab. in '87
T	San Miguel Mesa Veg.	Summer	Yearly	Estab. by Gonzales, NMHU
T,P	Grazing Exclosures (3)	Sum.'88	Evry 4 yrs	UNM/Plantae Research Assoc.
P	Ponderosa Burn	Sp-Su	'88 Every 5 yrs	Estab. in '83 Bracker
P	Corral Hill DNF	July	'86 Every 5 yrs	Estab. in '83 Bracker
P	Apache Springs Burn	June	'85 Every 5 yrs	Estab. in '83 Bracker
P	Lower Falls Burn	June	'85 Every 5 yrs	Estab. in '83 Bracker
T,P	Designated Campsites Capulin/Alamo	Summer	TBA	'87 Begin New Technique
P	Aerial Photography - Parkwide	Summer	TBA	Coord. With USFS Flights

FAUNA

Type	Description	Season/ Date	Freq.	Remarks
O	Harvester Ant Colony Survey	Summer	'91-'96	Estab. by Pippin
O	Aerial Wildlife Survey	Jan.	Annual	By State G&F
O	Bald Eagle Survey	Jan-Feb	Annual	Count Only
O	Bat Survey (Long House)	Summer	Annual	Use SWR Video

P	Rio Grande Photo Stas. (4)	Summer	Annual	B/C Ranger
T	Bird Transects	Summer	'88-91	Estab. by Wauer
O	Wildlife observation	All year	Annual	Visitor & Staff
N	Rodent Collection	All year	(As Needed)	Visitor & Staff
O	Fisheries - Frijoles Creek	Summer	Start '88	Frijoles Creek
N	Invertebrates - Frijoles Creek	Summer	Start '88	Surber Sampler

WATER RESOURCES

Type	Description	Season/ Date	Freq.	Remarks
O	Frijoles Creek Gage	All Year		
O	Frijoles Creek Samples	Sp-Su	1 wk	7 stations
O	Capulin Creek Gage	Summer		
O	Capulin Creek Samples & Turkey Sprs.	Summer	2 mos	3 stations

AIR QUALITY

Type	Description	Season/ Date	Freq.	Remarks
I	Automated Teleradiometer	All Year	Daily	Start '87
I	Weather Readings, Fire Tower	Apr.- Oct.	Daily	Start '87
I	Weather Readings, Backgate	Su - Fall	Weekly	Winter - Sp Monthly
I	Weather Readings,	Apr-Oct.	Daily	RAWS Unit
I	Weather Readings,	Nov-Mar	Weekly	

VISITOR USE

Type	Description	Season/ Date	Freq.	Remarks
O	Document Illegal Fireings	Summer		B/C Ranger
O	Impact Assessment Designated Sites	Summer	1987 & Evry 3 yrs	B/C Ranger
N	B/C Permit System	All Year	Annual	
O	Visitor Preception Studies	Summer	1990 & Evry 5 yrs	Contract

IPM

Type	Description	Season/ Date	Freq.	Remarks
O/I	Affected Resource	Summer	'88 Start	Use traps, Observations, Instruments

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BAND N-2
FERAL BURRO MANAGEMENT

I. Statement of Issue

The feral burro (equus asinus) is not native to Bandelier National Monument. National Park Service policy on the management of exotic species speaks to the need for sound research-based resource management action to remove non-native animals. Research conducted on the feral burro since 1974 has documented impacts to over one-third of the Bandelier ecosystem.

II. Current Course of Action

The Management objective is total removal of the burro from the Monument. Detailed strategies are outlined in the "Amended Environmental Assessment, Feral Burro Management, Bandelier National Monument, New Mexico" dated 12/4/79.

As of 1/87, the total population of burros which reside primarily on the monument is estimated at 6-8 animals.

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BAND N-3
GRAZING IMPACTS ON VEGETATION

I. Statement of Problem or Issue

Feral and trespass grazing in the Monument for over 60 years has resulted in significant vegetative changes. The feral burro (equus asinus) population has been declining due to irregular reduction activities over the last three years. As management continues toward total removal of these animals, significant changes in plant frequency, density and cover will likely occur.

Trespass cattle have occasionally appeared on the Monument, primarily via the Rio Grande River crossing to the eastern shoreline areas. Impact data is nonexistent.

The historic burro range will eventually become more attractive to native species such as mule deer and elk and eventually, predator and other species occupying this vacant niche. An understanding of basic successional changes, once the heavy impact from feral burros has been eliminated, is important to the development of a management strategy for this area of pinon-juniper woodland.

Reference: "Re-valuaton Studies of Grazing Exclosure plots, Bandelier National Monument" (UNM, April 1, 1985.)

II. Current Management Action

Transect data is read from three animal exclosures established in July, 1975. Readings are performed via contract every four years. The next readings are scheduled for 1988.

III. Alternative Action and Probable Impacts

A. No Action - This alternative's main impact would be the absence of information on the ecological response of pinon-juniper woodland as feral animals are removed and trespass cattle are eliminated through enforcement.

Data relative to effective native animal management in this area would not exist and National Park Service natural resource policies would be ignored.

B. Continue periodic exclosure readings and supplement this data with a photographic record from established photo points. Continue enforcement of trespass cattle law.

Adverse impacts to the resource from this action are minimal. Benefits derived are a highly enhanced understanding of vegetative changes due to exotic animal removal.

C. Develop vegetative recovery plan - without prior understanding of natural revegetation processes, an action plan is premature and would possibly lead to unforseen problems.

IV. Recommended Management

Continue with provisions outlined in Option B. Exclosure readings and photo record are intended to yield, primarily, a trend index only.

Step-up law enforcement actions against trespass cattle owner to ensure minimal damage to shoreline vegetation.

Continue to read vegetative transects established on San Miguel Mesa in 1983 to assess natural ground cover recovery. Collect and analyse soil samples to determine consistency and which elements are needed for maximizing productivity of vegetation.

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BAND N-4
MANAGEMENT OF NATIVE UNGULATE POPULATIONS

I. Statement of Problem or Issue

A major wildfire consumed over 15,000 acres of interagency lands, 10,600 within the monument in 1977. The fire created a mosaic of severe, moderate, and unburned forest. A seeding program was conducted aerially and consisted of the following native grasses: Agropyron trachycaulum, (slender wheatgrass), Agropyron smithii (western wheatgrass), Festuca ovina (hard Fescue), Bouteloua gracilis (blue grammagrass), Sporobolus cryptandrus (sand drop seed), and Muhlenbergia wrightii (spike muhly). Present ground cover consists mainly of slender wheatgrass and hard fescue in severely burned areas (Ref: "Responses of Elk (cervus elaphus) and Mule Deer (odocoileus hemionus) to Wildfire: changes in utilization and migration patterns." Conley, 1979.)

Deer populations have shown no appreciable increase based on scientific observations, and hence should not pose any forseeable management problems. Monitoring is primarily by aerial census conducted by the State Game Department.

II. Alternative Actions and Probable Impacts

A. No action - This alternative would likely result in growing management ignorance of population density changes and distributions, and hence the scientific basis for any required management actions would not exist.

B. Seek to maintain close coordination and cooperation with Los Alamos National Laboratory staff and State Game and Fish. With this alternative, Bandelier management would have access to ongoing scientific investigations in areas such as nutritional pathways relative to vegetative changes over time and bio-telemetry and population trends pellet plot data. This information shall provide resource management with with adequate background for any future planning efforts

III. Recommended Course of Action

Alternative B is the strategy of choice. Communication with both the New Mexico State Department of Game and Fish and LANL will be crucial to the adequate acquisition of data, as well as receiving recommendations for management and research of ungulates.

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BAND N-5
FIRE AS A MANAGEMENT TOOL

I. Statement of Problem or Issue

The re-establishment of the role of fire as a natural process necessary for the perpetuation of Bandelier's largely fire-dependent ecosystem; the skillful application of prescribed burning to meet predetermined resource management objectives; and the prevention of man-caused wildfires on the monument.

II. Current Course of Action

An operational Fire Management Plan has been developed and approved for implementation, and is attached as an appendix to the Resource Management Plan.

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BAND N-6
ESTABLISHMENT OF A MONUMENT RESOURCE
MANAGEMENT INFORMATION SYSTEM

I. Statement of Issue or Problem:

Resource data and information has become too cumbersome to locate, sort out and utilize with any degree of efficiency. Research studies, reports, maps and data sheets are fast becoming useless as means to timely resource decision making.

II. Current Management

An IBM compatable desk-top computer has been acquired by the Resource Management Division.

III. Recommended Course of Action:

In detail, and in priority, the following applications would be requisite to a system that would result in efficient utilization of data in management of resources:

A. Resource Basic Inventory. Information consists of lists flora, fauna, physical features, restricted species, and cultural resources; area and regional information (socioeconomic, visitor use patterns and populations). (Reference: RMP N-1)

B. Wildlife observations.

C. Photo and archival records.

D. Resource monitoring data (water flow and quality, wildlife transect readings, weather).

E. Permits (collecting, special use, backcountry, etc.).

F. Fire management data.

G. Equipment and supply inventories.

Graphics:

A. Fire management (vegetative succession, fuels inventories, presuppression overlays, burn plans, lookout seen areas, etc.).

B. Wildlife (habitats, restricted species, observations, movements, etc.).

C. Aquatics (sources, courses, illustrations of quality changes, etc.).

D. Air quality (emitting source locations, integral vistas, etc.).

E. Backcountry use (visitor use patterns, camping zone and restricted areas, etc.).

F. Vegetation (exotic populations, restricted species, insect/disease occurrences, etc.).

G. Word processing.

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BAND N-7
HAZARDOUS PLANTS

I. Statement of Issue or Problems. "The Service in the operation and management of the parks, will provide for the safety of park visitors from hazards inherent in the park environment." A plan is necessary to minimize hazards resulting from tree failures and contact with toxic plants. There are over 70 species of plants in New Mexico known to have caused some form of human illness or death. At least 13 of these are found in the park; most, if not all, are considered indigenous species.

II. Alternative Actions and Probable Impacts:

A. No Action.

Hazardous trees would increase, and therefore increase the chances for injury and/or damage to life or property, especially in heavy use areas. Toxic plant contacts will likely continue without increase.

B. Implement a periodic inspection and correction schedule, combine with an interpretive message outlining the identification of toxic plants and known locations within the monument for visitors. Hazard tree removal presents no significant adverse impact to the resource.

III. Recommended Course of Action - Alternative number two.

A. Hazard Trees - Conduct hazard tree inspection on a yearly basis after snow melt in the spring. The Monument Resource Management Specialist and R&T foreman will conduct the inspection of:

- Backgate housing
- Ponderosa Camp Ground
- Entrance Road
- Mesa residential and Juniper Camp Ground
- Frey Trail
- White Rock and canyon housing areas, administration buildings, visitor center, parking area
- Picnic area, backpacker parking
- All Frijoles Canyon trails from Ceremonial Cave to Lower Frijoles Falls area
- Other high use or special use areas

- Backcountry trails, campsites, and facilities will be inspected as a routine patrol or maintenance activity

B. Inspection criteria

- Pre-determine inspection route to insure total coverage
- Select for examination each tree which might become a hazard to people or property
- Examine tree for defects or faults
- Estimate potential intensity of weather conditions on the tree
- Estimate probability of failure (based on above estimates)
- Estimate potential for human effects on tree
- Mark tree if indicated and record location and action required

C. Reporting and corrective action

The R&T foreman will complete the inspection report which will in turn serve as a work order. Resource Management personnel will assist in tree removal. When the work is completed, the work order will be signed off by the superintendent and filed.

D. Toxic Plants

1. Make use of interpretive media to educate the visitor and employee.

   - Plant identification
   - Plant habitat
   - Toxic effect (symptoms)
   - Contracted by ingestion, absorption or inhalation

2. In the park discourage promotion of literature on medicinal and edible plants.

3. Common Poisonous Plants

   - Monkshood (Aconitum columbianum)
   - Baneberry (Actaea arguta)
   - Amanita (Amanita muscaria)
   - Dogbane (Apocynum cannabinam)
   - Loco Weed (Astragalus sp.)
   - Water hemlock (Cicuta douglasii)
   - Poison hemlock (Conium maculatum)
   - Larkspur (Delphinium sp.)
   - Lupine (Lupinus sp.)

- Buttercup (Ranunculus sp.)
- Poison Ivy (Rhus toxicodendron)
- Skunk cabbage (Veratrum californicum)
- Death camas (Zygadenus spp)

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BAND N-8
HAZARDOUS ANIMALS

I. Statement of Problem or Issue:

"The Service will control wildlife populations or individual animals when necessary for visitor safety and health." A plan is necessary for control or removal of hazardous animals on the Monument. These include venemous snakes, hazards created by large mammals in and around developed facilities with heavy visitor use; and, mammals that are infected with rabies, plague or other diseases.

II. Alternative Actions and Probable Impacts:

A. No action - May result in increased populations during periods of favorable environmental conditions, thus increasing the chances of human contacts and resulting injury or illness.

B. Manage for minimum human-animal contact - By maintaining levels of cleanliness, inspections, and possible chemical treatment for plague (approved in an IPM Plan). There would be no forseeable adverse impacts.

C. Manage as described above including an interpretive message for both backcountry hikers and frontcountry visitors and enforcement of traffic regulations to avoid or accidents on roadway - Develop a Bear Management Plan outlining procedures for minimizing bear human incidents.

III. Recommended Course of Action:

Alternative number three. Cleanliness of frontcountry and back- country facilities will be checked during periodic safety inspections with followup corrective action. Continue present practice of collecting dead and dying small mammals (criteria defined) and forwarding to the New Mexico Office of Epidemiology for rabies/plague analysis.

The backcountry ranger will be responsible for the Base Camp facility. Woodpiles, debris, material storage areas, and food storage areas will be managed through periodic burning, excess property surveys, and stringent housekeeping practices. A separate action plan for management of bears in the Monument is being developed for approval as an appendix to the Resource Management Plan.

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BAND N-9
REHABILITATION OF COTTONWOOD PICNIC AREA AND JUNIPER CAMPGROUND

I. Statement of Problem:

NPS Management Policies (Chapter IV-16) state that "manipulation of terrain and vegetative cover may be carried out to encourage, simulate, or restore natural conditions on lands altered by human activity..."

The Frijoles Canyon picnic area is one of very heavy summer seasonal use and as a result, is exhibiting signs of proportionate deterioration. The area requires periodic rehabilitation.

The Monument's 93-site Juniper Campground is subject to adverse climatic influences, soils erosion and low resilience native vegetation, as well as heavy visitor impacts for an average of seven months per year.

II. Alternative Actions and Probable Impacts:

A. No Action - Both the Frijoles picnic area and Juniper Campground would continue to degrade physically and aesthetically, hence being in violation of management policy. This alternative is unacceptable.

B. Continue Present Action - Limited protection is occurring at Frijoles picnic area through disallowing all open and charcoal fires, which eliminates wood gathering and prevents coal and ash dumping and associated fire hazards.

The Juniper Campground is being managed through loop rotation of three years each, thereby allowing each loop to recover vegetatively without disturbance. Also, to prevent soils loss and disturbance to vegetation in certain vulnerable sites, tent sites were constructed to provide stability and ensure that tents were erected repeatedly within this "hardened" site.

C. Continue Present Action and Implement an Erosion Control Program - Keep campsite and picnic sites free of excessive water, allow runoff to reach vegetation near sites, reduce and obliterate excessive trailing in and around campground, periodically plant native grass seed in all sites to provide soil holding properties.

Begin a site monitoring program, using photographs to document trends and evaluate management sections.

Place rock cribbing in selected areas within the picnic area to minimize erosion into Frijoles Creek. Impacts resulting from management actions in this alternative are minimal to the resource in relation to that caused by human activity.

III. Recommended Course of Action: Alternative number three.

This alternative represents a positive management approach toward minimizing effects of regular human use over time.

Maintenance actions detailed here include:

A. Runoff and watercourse control in picnic area and campground will be accomplished by cleaning and improving on natural gullies and ditches, and rerouting of watercourses occurring through or near sites.

B. Obliteration of excessive trailing will occur by rock placement, signing where indicated, and seeding during off-season.

C. Rock cribbing along Frijoles Creek in the picnic area should be accomplished with native stone and followed by planting with Indian rice grass (Oryzopsis hymenoides) or a similar native soil binder.

Protection actions include continuing the no open or charcoal fire restrictions, loop rotation in campground every three years, along with Ranger contacts explaining the measures taken to visitors.

Monitoring actions will consist of photo stations established in the picnic area, backpacker parking area (for comparison and contrast), and a minimum of one station in each loop of the campground. Photos taken every other year.

Anticipated accomplishments over the next five years include the following:

FY 1987 - 1. Continue protection activities. 2. Select one stream side picnic site to test effectiveness of an erosion control blanket with seeding. 3. Establish photo stations before summer season.

FY 1988 - Begin maintenance action following the priorities listed:

Priority 1 - Utilize natural material (rocks and logs) in stream bed to increase ponding and thus show stream velocity and or turn flow away from eroding banks.

Priority 2 - Once bank erosion in picnic area is stopped, native grasses will be seeded to stabilize.

Priority 3 - Obliterate and rehabilitate unnecessary and excessive visitor use trails in campground and picnic area.

Continue protection activities.

FY 1989 thru FY 1990 - Continue maintenance (as necessary) and protection ativities; evaluate effects of management.

Rev. 1/87

BAND N-10
MANAGEMENT OF BACKCOUNTRY VISITOR USE

Statement of Issue:

NPS Management Policies state, areas with significant backcountry and/or designated wilderness shall have an approved management plan. A plan exists for the management of Bandelier's backcountry/wilderness, and is contained in the Appendix to the Resources Management Plan.

Current Management Action:
An approved Backcountry Management Plan (see appendix) addresses background, status, policy and legal mandates and strategies for implementation of this plan. The plan is scheduled for revision during CY 1987.

Rev. 1/87

BAND N-11
REGENERATION OF PONDEROSA PINE
IN THE LA MESA BURN AREA

I. Statement of Problem or Issue:

During the La Mesa forest fire of 1977, nearly fifty percent of the Ponderosa pine zone was severely burned, leaving no viable seed trees for natural revegetation. Subsequent to the fire, native grass seed was planted. As a result, few pine seedlings are found in areas of heavy grass cover and seed trees for pine reestablishment are nonexistent in areas of severe burn.

II. Current Management:

Approximately 4,000 ponderosa pines have been planted since 1982, including 1800 germinants and the remainder in 2 year nursery stock. The areas planted cover the S. 1/2, Sec. 31 and the N. 1/2, Sec. 5 along State Highway 4 in the monument. The remaining 2,000 seedlings in stock will be planted during the summer, 1987.

A total of 1030 germinants were planted in a surveyed experimental plot east of Ponderosa Campground (Ref: "Germinant Reforestation of Ponderosa Pine at Bandelier National Monument", December, 1983, by T.S. Foxx.) in 1982. To document survival rates and overall success of this method, periodic plot re-reading is required.

III. Course of Action

Discontinue planting program at end of 1987. Continue to read the germinant plots established in 1982 on 5 year intervals. Maintain records of results.

Rev. 1/87

BAND N-12
MANAGEMENT OF RIO GRANDE - COCHITI LAKE
SHORELINE IN BANDELIER NATIONAL MONUMENT

Statement of Problem:

The filling of Cochiti Dam in 1976 and subsequent high levels in 1979, 1980 1985, and 1986 (elev. 5417.14, 6/30/86) has changed the river riparian habitat to a fluctuating lake shoreline. Deposition has occurred from high water levels. Vegetational changes, both native and non-native, are resulting in differing wildlife use patterns, such as shorebird and waterfowl presence on or near numerous sand bars. These changes are thought to influence the welfare of a wintering bald eagle population utilizing the lower canyon areas. Management is concerned with what vegetational changes may be expected with this conversion to riparian lakeshore and the creation of sand bars through sediment deposition; and the resulting strategy options available to manage this area.

Current Course of Action:

Management presently has few options to protect the unique riparian habitat and associated wildlife, due to a Memorandum of Understanding between the NPS and the Corps of Engineers, Cochiti (on file in Monument).

The Potter Study, "Plant Ecology of the Shoreline Zone of Rio Grande - Cochiti Lake, Bandelier National Monument" (1981), recommends management actions which relate to a stable shoreline - that is, one with minor future fluctuation in water levels. However, water level fluctuations have widely varied for several reasons, and there are indications that this situation is not likely to change. Therefore, management is presently a monitoring function: documenting vegetative damage, including bald eagle roost tree destruction, aesthetic degradation, and waterfowl habitat loss in general.

Recommended Course of Action

As this issue will continue to command a high level of public visibility locally, management should develop a strategy for making the environmental impacts of water impoundment known through factual interpretive programs and well documented correspondence with agencies responsible.

Photographic depiction of changing conditions, together with continuing the studies of impacts on wintering populations of bald eagles from changes in prey base, should be pursued vigorously. At least 3 permanent photo points will be established in 1987, and re-photographed every year or as shoreline conditions dictate.

Beginning in early 1987, establish a series of small planting test sites to determine which strategies will be successful for improving shoreline habitat for wildlife and erosion control. Clean and stabilize the Frijoles Spring near mouth of Frijoles Creek.

Rev. 1/87

BAND N-13
MANAGEMENT OF WATER RESOURCES

I. Statement of Issue:

The National Park Service is mandated under the Clean Water Act, Management Policies (Ch. IV-15), and NEPA (1969) to maintain continous vigilance for ecosystem perpetuation. The Monument is especially vulnerable to:

A. Impacts from timber harvest on surface waters entering from the watershed upslope of NPS lands.

B. Potential impacts to surface waters from acid precipitation, originating from growing numbers of planned generating stations to the west.

C. Effects on surface waters resulting from increased backcountry visitation and sanitary waste disposal.

D. Developed zone impacts, i.e., parking facilties, trail construction and maintenance and camping/picnicing.

II. Current Course of Action

A. Qualifiable data is being collected on flow, temperature, pH, dissolved oxygen, conductivity and turbidity for Frijoles, Capulin Streams and five springs. A water resource management plan has been prepared. Included in this plan is an information base: Inventory, maps, classification, water rights, status, chemical and biological properties of monument water resources and flood plain management.

B. Maintenance of appropriated water rights under New Mexico law and protection of all water flowing in Bandelier National Monument under the Reservation Doctrine.

C. Riparian Zone - Functional Indicators Monitoring

a. Maintenance of biomass.
b. Terrestrial/aquatic interface.
c. Corridors for plant and animal movement.

D. Acquistion of a topographic map with 2 feet contours to delineate boundaries outlined in the Flood Plain Survey.

A water resource management plan is included as an appendix to the Bandelier National Monument Resource Management Plan.

Rev. 1/87

BAND N-14
CONTROL OF EXOTIC AILANTHUS

I. Statement of Problem:

"Manipulation of population numbers of exotic plant species, up to and including total eradicaton, will be undertaken whenever such species threaten protection or interpretation of resources being preserved in the park." The exotic Tree-of-Heaven (Ailanthus Altissima) is a fast growing, vigorous, prolific sprouting species. The long rhizome roots sprout freely and even a small section of live root (left after mechanically grubbing) can easity form a new plant stalk. These characteristics make it a potential invader and displacer of native vegetation. It is persistent and rapid growth additionally threatens the physical structures of cultural sites in Frijoles Canyon especially.

II. Review of Past Management:

July, 1974	Chief Scientist, Southwest Regional Office recommends digging out sprouts in Tyuonyi grove. Estimated size of grove - approximately one acre total.
August, 1974	Survey Ecologist, National Park Service Science Center, recommends injection of 2, 4-D Amine or cutting and painting stumps with Dalphone or Ammatex. Stems cut off at ground level with no chemical treatment.
Summer, 1975	Local Boy Scott troop hand-grubbed two areas of Tyuonyi grove. High school group of students pulled Ailanthus stems near Tyuonyi.
June, July, 1976	Tyuonyi grove stems clipped and treated with Ammate.
Sept., 1976	Patch nearest orchard clipped and treated with 43% Ammate solution.
Summer, 1978	Ranger personnel clipped and treated all known stems around Tyuonyi with ammonium sulfamate. Spread now considered checked. Small grove discovered in Lummis Canyon.
Summer, 1979	Grove near east wall of Tyuonyi clipped and treated with above chemical. No new sprouting reported from other areas of grove.

Summer, 1980 Clip and treat with ammate (Seasonal Personnel)

Summer, 1981 Mechanical removal (SCA)

Summer, 1983 Mechanical removal (YCC)

Summer, 1984 Mechanical removal (Seasonal Personnel)

Summer, 1985 Mechanical removal (Seasonal Personnel)

Summer, 1986 Mechanical removal (Pemanent Personnel) Frijoles only.

III. Alternatives:

No Action: Not acceptable; inconsistent with NPS Policy: "control programs will most likely be taken against species which have a high impact on protected park resources and where the program has a reasonable chance for successful control."

Chemical Treatment Only: Not acceptable, inconsistent with NPS Policy: "chemical herbicides will be used only where feasible alternatives are not available or acceptable."

Mechanical Treatment Only: Utilized VIPs, SCAs and volunteer organizations when possible.

Recommended Course of Action: Mechanical Treatment with selective application of an approved herbicide in the more remote groves - although more groves are being discovered periodically, present practices of mechanical grubbing has succeeded in reducing the size of groves and preventing spread from existing sites. However, application of an herbicide to individual plant stems may be necessary to realize the objective of eradication.

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BAND N-15
MANAGEMENT OF RESTRICTED FAUNAL SPECIES

I. Statement of Issue or Problem:

The following listing of restricted species based on the most accurate information to date. Status and bibliographical reference are included (Note - A restricted species is defined for purposes here as a species of unusual scientific value or of interest to visitors, including threatened, rare and endangered):

Species	Status/Reference
1. Jemez Mountain Salamander (Plethodon neomexicanus)	New Mexico State Endangered list; habitat research completed in Monument. Habitat in volcanic substratum; shade, moisture and decaying logs of spruce fir north slopes above 7,000 feet elevation; confirmed locations in Upper Frijoles Canyon Research Completed: Reagan, D.P., 1972, "Ecology and Distribution of the Jemez Mountains Salamander." "Comparison of the Reproduction and Ecology of the Jemez Mountain Salamander and the Sacramento Mountain Salamander." Stephen Williams (Bandelier Library). "Evaluation of Jemez Mountain Salamander Status at Bandelier National Monument" - Dr. Dan Guthrie, Claremont College, California (December, 1978)
2. Peregrine Falcon (Falco peregrinus anatum)	Federal endangered list; aeries near Monument lands suffer from low productivity and reproductive failure. Not confirmed to breed in Monument, but potential sites exist, and are protected through restricted management activities during the breeding season. (Ref. "Essential Breeding Habitat in Bandelier", by Terrell Johnson, 1983).

3.	Spotted Owl (*Strix occidentalis*)]	Peripheral species - known to breed in Bandelier area. observed in upper Alamo Canyon August 1982.
4.	Zone-tailed Hawk (*Buteo albonotatus*)	Only observed in Bandelier - breeding and nesting sites unconfirmed.
5.	Bald Eagle (*Haliaeetus leucocephalus*)	Federal endangered list; research completed on wintering populations populations (T. Johnson), 1978-1985. Habitat quality varies due to changing Cochiti Lake levels; see also Project BAND N-12.

II. Current Management Action:

The bald eagle is being studied during the winter months when populations are present in the southeastern canyons of the Monument. Study objectives center around population trends, stability of patterns of use, seasonal changes in diet, impacts of reservoir water level changes, and human disturbance.

To facilitate protection of habitat and minimize human disturbance to roosting sites, a restriction was imposed to limit overnite use to the following area during the period November 1 through March 30:

East and north of the eastern rim of Lummis Canyon from the Rio Grande north to the Mid-Alamo Trail

Northwest of the Mid-Alamo Trail to Capulin Canyon

Designated campsites and areas north in Capulin Canyon.

Northwest of the Turkey Springs Trail to the Monument western boundary.

Also, a portion of trail has been relocated in Capulin Canyon to route hikers away from roosting areas.

Although unconfirmed to date, potential nesting sites exist in the Monument for the Peregrine Falcon. A portion of the lower Capulin Trail has been rerouted away from potential sites to minimize human disturbance and maximize opportunities for Peregrine occupation. There are restrictions on aircraft use over the backcountry (low level) during nesting season.

The Jemez Mountain Salamander status study (Guthrie, 1978) delineated the general habitat area in the Monument. The study also suggests that this amphibian is active mostly during late summer, when the ground is moist from summer rainfall. At other times, it remains largely underground.

Management action to date has been a camping closure for Frijoles Canyon above Upper Crossing.

The remaining species listed are included for the purpose of bringing attention and protection from individuals and groups involved in research, collecting activities and so on.

III. Alternative Actions and Probable Impacts

- Continue Present Management - This alternative would satisfy only the basic habitat protection responsibilities for the bald eagle. A key to perpetuation of this species is habitat improvement through management, including continued burro reduction and periodic patrols of the roost areas.

  Jemez Mountain Salamander habitat would remain the same with a day use only policy for the present restricted camping zone in Upper Frijoles Canyon.

- Monitoring and Research (bald eagle) - To continue present research studies into habitat improvement strategies, population trends and behavior is a very important key to understanding and protecting the bald eagle. Above all, and as alluded to in Johnson's studies, management must approach with extreme sensivity to this species in all park activities.

- Manage for Potential Peregrine Falcon Habitat - Monitor primary sites for breeding occupancy and, if occupied, for productivity.

IV. Recommended Course of Action:

Recommended are derivations of all the alternatives:

A. An effort should be made, in concert with the Corps of Engineers, the U.S. Forest Service, U.S. Fish and Wildlife Service and concerned citizens, to change present guidelines of the Rio Grande Compact, which allow unseasonable water storage in Cochiti Reservoir, to minimize killing of lakeshore vegetation and of roost trees in Alamo Canyon. (See also RMP N-12).

B. Continue area closure to camping November 1 through March 30. Park interpretive programs and visitor contacts should refrain from specific mention of the

species, habitat locations, and types of use.

C. Continue monitoring of wintering bald eagle populations.

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BAND N-16
MANAGEMENT OF RESTRICTED FLORA

I. Statement of Issue:

To define the NPS responsibilities in protecting the Monument's unique plant species.

II. Status of Floral Species:

The following listing contains species occurring within the Monument which are considered to be restricted. This designation refers to those flora which require some protection due to factors of narrow ranges, niches sensitive to slight human or naturally caused changes, few numbers, or general habitat stability being modified.

(Note: A restricted species is defined here as a species possessing unusual scientific and/or visitor interest, which includes rare or endangered).

Species	General Habitat	Herbarium Specimen Monument Collection
1. Spikenard (Aralia (racemosa	Shaded slopes (7000-9000')	Yes-P
2. Butterfly-weed (Ascle-(pias)	Canyons (6500-7000')	Yes
3. Bearberry: (Arctosta) (arctostaphylos (phylos (Uva-Ursi)	Moist Woods (7000-10,000')	No
4. Wood Lily (Lilium (umbellatum)	Open woods (7000-8000')	No
5. Fairy Slipper (Calypso (bulbosa)	Woods (7000-10,000')	No
6. Fireweed (Epilobium) (angustifolium)	Damp Clearings (7000-11,000')	No

P = Photograph in resource management file.

7.	Spotted Corral-root Orchid (*Corallorhiza maculata*)	Woods (6500-9000')	Yes
8.	Helleborine (*Epipactis*) (*gigantea*)	Damp Woods (7000-8500')	No
9.	Striped Corral-root Orchid (*Corallorhiza striata*)	Woods (6500-9500')	Yes
10.	Bog Orchid (*Habenaria*) (*sparsiflora*)	Moist Areas (7500-9500')	No

Source: New Mexico Statute 45-11, 1963.

III. Present Management

(A) As plants become uncommon, unique or rare due to human impacts or environmental changes, they should be identified on this listing with status information and protection strategy if indicated.

(B) Attach this list to all collection and special use permits, cautioning permittees as to each plants' unique status in the Monument.

(C) That information on restricted species locations be excluded from interpretive and media programs.

(D) Continue liason with officials of the New Mexico State Heritage Program in providing and receiving specific information relative to any unique, rare or endangered plant species.

(E) Seek funding necessary to support a floral collection for the Monument. Presently only one-third of the total estimated species are vouchered. Continue photographing specimens in field for resource management and interpretive use.

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BAND N-17
PROTECTION OF AIR QUALITY RELATED VALUES

I. Statement of Issue or Problem:

Congress enacted the Clean Air Act (PL 88-206) in 1963 and through amendments in 1974, provided for prevention and control of air pollution to enhance the quality of air resources throughout the nation.

The 1977 Amendments address additional objectives including the preservation of air quality over specified Federal lands according to classes of protection. The Bandelier Wilderness was declared a mandatory Class I area and the federal land man- ager has been mandated with the responsibility to protect air quality related values, including visibility.

II. Current Course of Action:

The Bandelier air quality monitoring program, including teleradiometer measurement, suspended particulate sampling, and regular photographic documentation was involuntarily terminated during 1985. However, the Los Alamos National Laboratory (Environmental Surveillance Group) has established monitoring program for total suspended particulates, wet/dry acid depositon, plus four other airborne pollutantss: Ozone, oxides of sulfur and nitrogen, and carbon monoxide. This data will be available to Bandelier through normal channels with the Laboratory.

The New Mexico Environmental Improvement Division Air Quality Bureau has purchased an automated teleradiometer and has contracted with the University of California at Davis for a five particulate filter unit and analysis.

The teleradiometer and the stocked filter unit will be installed at Bandelier to take advantage of the long term data already established.

III. Alternative Actions and Probable Impacts:

A. No Action - Without adequate monitoring data factual decisionmaking cannot would not exist. This presents a negative impact on management's ability to deal with issues affecting the mandatory Class I Bandelier Wilderness.

B. Pursue a program to re-establish critical air quality monitoring through acquisition of an automated teleradiometer station.

IV. Recommended Course of Action: Alternative number two

A. Resource management actions are not indicated at present nor are anticipated. However, continued involvement with public interest groups and other agency air quality personnel is essential.

B. Monitoring will continue with an automated station at Bandelier. Baseline data is crucial for providing informed input into applications for new sources. Additionally, research and monitoring studies are required to affort early warning of air quality impacts from new sources being planned in the southwest:

1. Baseline pH analysis - Upper Frijoles and Headquarters area.
2. Baseline pH analysis - Upper Alamo, Upper and Lower Capulin Creeks.
3. Determine potentials for air quality impacts from ozone, oxides of sulfur and nitrogen.
4. Research the effects of smoke from fire management activities in and around Bandelier.
5. Research to focus on the dynamics of regional haze which is beyond the scope of a localized study but one which should include the analysis of Bandelier monitoring and weather data.
6. Determine air mass trasport corridors affecting Bandelier's air resource.
7. Survey perceptions of visual air quality at Bandelier
8. Continue development of interpretive programs stressing the importance of maintaining air quality values.
9. Study the effects of acid deposition on alkaline soils.

Rev. 1/87

BAND N-18
INTEGRATED PEST MANAGEMENT

I. Statement of Problems of Issues:

"Chemical pesticides of any type will be used only where feasible alternatives are not available or acceptable."

Integrated Pest Management treatments are made when and where monitoring has indicated that the pest will cause unacceptable economic, medical, or aesthetic damage. Treatments are chosen and timed to be most effective and least disruptive to natural mortality factors.

II. Alternative Action and Probable Impacts:

A. No Action - Loss of host or host dependent species from the ecosystem, outbreaks spread outside the area, further jeopardize endangered, threatened or unique species or communities, loss of historic scene integrity hazards to public health and safety.

B. Chemical Controls Only - Inconsistent with National Park Service Management Policies, Chapter IV.

C. Natural Control Only - Natural controls work all the time. However, at certain time, in certain places, specific population may grow so large they become a problem. Examples are protected indoor environments where pests have intruded and their natural enemies have not, previously used chemical controls have killed off natural enemies, pest populations naturally rise to great numbers on a periodic basis and foreign pests migrate to a new area leaving behind natural enemies.

D. Integrated Pest Management - Identification of pest, monitoring and record keeping for a regular samplind, determining injury levels, determining action levels, treatments, and an evaluation system.

III. Recommended Course of Action: Alternative number four

Potential pest and their natural enemies, their habitat requirements will be observed on a regular basis and decisions made about what strategy or combination of strategies to use based on these observations. The actual treatment may involve selection, habitat manipulation, cultural or physical controls, enhancement of predators or parasites or to introduce more to the area. In conjuction with the above strategies, the use of an appropriate pesticide confined to a particular spot where no other

method is adquate to prevent intorlerable damage may be warranted. The object of treatment will be to suppress pest populations below their injury levels, not to attempt eradication. It is desirable to allow some pest to survive at some low level in order to maintain the presence of its natural enemies. (Specific exotics excluded).

Treatment Tactics:

A. Least disruptive to naturally occurring controls.

B. Most in harmony with both short and long term human and environmental health.

C. Most likely to be relatively permanent.

D. Easiest to carry out effectively.

E. Most conserving to nonrenewable fuels.

F. Most cost effective on the short and long term.

IPM Procedures - Developing a Program

A. Identification: Pest and their natural enemies.

B. Monitoring: Determine population and range.

C. Pre-injury Levels: Determine the amount of aesthetic or economic damage that can be tolerated.

D. Action Levels: The point at which treatment is necessary to prevent the pest from reaching intolerable levels.

E. Treatment: Selection of a strategy and or a mix of tactics least disruptive to natural controls and least hazardous to human health and the environment.

F. Evaluation: During treatment process to determine minimum controls necessary and follow-up on a routine basis to determine the effective duration of the controls in place.

IV. Attachments

A. Visitor Center IPM Plan.

B. Wood Preservatives Statement.

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Visitor Center IPM Plan

The center houses two offices, auditorium, information desk, lobby, basement/work area and storage, and a museum exhibit. It is roughly a rectangular structure constructed by the CCC in 1935. Original construction was of volcanic tuff blocks, supporting a viga and latilla roof in the traditional Southwest Pueblo style. A new wing was constructed in 1975 to house an expanded exhibit. This construction consisted of a concrete block wall and a ceiling of 1x4 rough sawed pine supported by vigas. The threat to museum exhibits will be the primary focus of this plan.

The museum collection, on exhibit and in storage, is one of the more valuable collections in the Southwest Region in terms of dollars and in the terms of historical significance of many of the objects. Its current value approaches $200,000.00. The number of unique and irreplacable objects, in addition, places it well within the category of those areas where the collection may be considered a major resource, contributing to the area's importance as a part of the National Park Service. The collections include a number of prehistoric pottery vessels that have been published in reports on southwestern archeology, modern ceramics by some of the leading Indian potters of today and a remarkable series of original paintings produced for use in the first exhibits installed in the visitor center, all early works of local Indian artist who have since gained considerable fame.

Prehistoric and historic collections are continually faced with the threat of biological attack. This major agent of deterioration is dependent upon three factors: 1)Presence of nutrient host(artifact of organic material), 2)Presence of favorable environmental conditions, 3)Presence of biological predator. Insects and rodents feed on the material composition of the artifact as well as utilize it as source of nesting material. Indirect damage often occurs through contact with the pest and their excrement. Rodents, in particular white footed deer mice and the pinion mouse, enter the structure in a number of ways. Roof vents, cracks around closed windows and doors, fresh air intakes, and the heavy traffic in and out of the structure create many opportunities for entry. The crawl space between the roof and ceiling provides a warm dry harbor and the loose construction of the viga/latilla ceiling provides good access to the exhibit area. Food and nesting material are readily available through the extensive use of organic material in the exhibits in the form of feathers, corn, dried meat, leather items and native plants used as exhibit props. Rodents have access to the total exhibit area, as evidenced by dropping, urine stains and exhibit items damaged by chewing.

MONITORING

Insect pest noted included carpet beetles, common clothes moth, corn moth, bark beetles, several wood boring beetles and carpenter ants. It is felt that most of these insect were introduced via unfumigated material used in exhibits. This includes blankets and robes, raw wool for the weaving demonstration, dried deer meat, native corn, dead wood for placement in diorama fireplaces and native plants used a exhibit props. All provide a ready harbor and food supply for the above mentioned pest. As a result, insect damage has been noted in both the historic and prehistoric Pueblo exhibits. A large amount of frass was noted below the vigas and latillas indicating bark/powder post beetles and carpenter ants at work. Many of the main support vigas, which extend through the exterior walls, are rotten and provide excellent harbor and entry ways for carpenter ants.

INJURY/ACTION LEVEL

Discovery of one mouse or insect as described in the monitoring section will bring about treatment. Rodents because of the damage they cause to artifacts and the diseases they are associated with; insects causing damage to irreplacable artifacts.

TREATMENTS

Rodents- White footed deer mouse and the pinion mouse.
Insects- Carpet Beetles, Cloths Moth, Bark Beetles and Carpenter Ants.

HABITAT MODIFICATION:

Structure- All holes, cracks and crevices found will be filled with steel wool covered with sheet metal, and or filled with caulk, plaster or similar materials. A major rehab program is scheduled for 1984-85 to replace or stabilize structural wood components in the visitor center. This action alone will be significant deterant to insect encroachment.
Exhibits- all organic materials used in exhibits whether props or artifact must be secured from acting as a food or nesting material.
Organic artifacts on display replaced with replicas or placed in secure display cases. Props- Reconsideration of their need for presentation, replace with non-organic material or provide physical barriers.

DIRECT SUPPRESSION

Rodents- Snap Traps. 1. baited with food or nesting material 2. one trap every two to three linear feet. 3. traps placed at right angles to runways. 4. traps moved to new location every two to three days. 5. minimize handling and wear gloves. 6. new traps seasoned by burying in soil or grass. Insects- none.

CHEMICAL CONTROLS

Rodents- none are considered necessary at this time. Insects- Structure wide, none. Individual artifacts will be removed as needed and placed in a fumigation chamber when insects are discovered. Chemical proposed: vapona strips- dimethyldichorovinylphosphate. See atachment: 1979 Bandelier Fumigation Project. This project demonstrated the effectiveness of chemical controls but at the same time provided the awareness of the conditions that lead to such a drastic measure. The project provided only short term benefits at a significant cost and posed health and environmental hazards.

EVALUATION

Exhibit inspection/cleaning schedule. Accurate record keeping of capture/sighting/discovery dates, numbers, species, location, weather, visitor use, structural changes and exhibit modifications.

Wood Preservatives: Effective and Meet IPM Objectives.

Chemicals are used primarily to prevent or reduce decay of wood by fungi and other decay organisms. The first step in assessing alternatives to these materials is recognition that decay organisms can only damage wood that is chronically moist. To the degree wood can be kept dry, or quickly dried out, decay can be prevented.

One of the techniques involves use of a simple water repellent product developed by the USDA Forest Products Laboratory in Madison, WI. While many commercial water repellents contain a preservative, the Forest Products Lab water repellent contains no preservatives, yet provides protection equal to "Penta" in certain settings.

Water repellents are composed of three baasic components: parafin wax, linseed oil, and a solvent. A simple water repellent contains NO fungicides or insecticides. It protects wood by enabling it to repel moisture, thus denying decay organisms a suitable environment they need to live.

A water repellent is used either alone as a natural wood finish, or as an undercoat before painting. When applied to bare wood, the water repellent penetrates into the wood fibers, creating a waxy barrier to water penetration. This protection from moisture in turn reduces excessive swelling and shrinking of wood that opens cracks and invites invasion by decay microbes and wood consuming insects.

The degree of protection provided by water repellents with and without chemical preservatives was studied in a 20-year testing program at the Forest Products Labortory. The researchers concluded that the degree of protection provided by the simple water repellent was equal to that provided by the repellent plus preservative (Feist 1984; Feist and Mraz 1978).

The most effective method of applying a water repellent is to dip the wood product into the solution for 1 to 3 minutes. When dipping is not feasible, the water repellent can also be brushed on in repeated applications until the wood is saturated. Particular care should be taken to saturate lap and butt joints, edges and ends of boards, and edges of panels where end grain occurs. If the water repellent is applied by brush, treated surfaces will be dry enough to paint after 2 or 3 days of warm weather, or after one week if a dip treatment is used. Other areas subject to moisture, such as the bottoms of doors and window frames, should be liberally coated even if the wood's surface is to be finish with latex or an oil base paint. One gallon of water repellent will cover about 250 square feet of smooth surface, or 100 to 150 square feet of rough surface. When used as a natural finish on wood, the water repellent will last 1 to 2 years before requiring additional treatments. When used under paint, no retreatment is needed unless the protective paint layer weathers away.

The Forest Products Lab suggest that for climates where weather patterns permit alternate wetting and drying of wood,(Bandelier) and where wood is not in contact with damp earth, use of a water repellent without a preservative can be effective.

At the present time the only preservative approved for use in the National Park Service is CCA, copper-chromium-arsenic-salts in pressure-treated wood products. Unfortunately, a small residue of arsenic from the preservative forms on the surface of treated wood. While the initial residue may be washed off by rainfall, new layers of arsenic-treated wood are continuously exposed as the wood weathers, and this may account for the creation of new surface residues.

Since arsenic is a well-known carcinogen, concern has been expressed about exposure to even low levels of arsenic. The California Department of Health Services are attempting to assess whether or not these residues pose a significant risk.

One method to reduce arsenic residues is the application of an oil-base, semi-transparent penetrating stain to the surface of the treated wood. This significantly reduces arsenic residues. When the oil base material is applied to wood, it soaks into the surface fibers and slows their breakdown by sunlight and weather, thus reducing the presence of unbonded arsenic, and presumably the opportunities for arsenic exposure.

In summary, penta and creosote are dead issues, pressure treated lumber with CCA exposed to weathering and human contact may have a cloudy future. The water-repellent mixture described offers effective treatment for our climate and is free of red tape. There are still some alternatives for preservatives (not approved) but any request would have to demostrate a special set of circumstances outlined in a detailed project statement warranting the special approval process.

1/87

BAND N-19
REINTRODUCTION OF RIO GRANDE
CUTTHROAT TROUT TO BANDELIER

I. Statement of Issue or Problem:

The reintroduction of native species into the parks is encouraged, provided that:

-adequate habitat exists in the park
-the species does not pose a serious threat to the safety of the park visitors or park resources.
-the species being reintroduced most nearly approximates the extripated species".

The native Rio Grande cutthroat trout, Salmo Clarki virginals (Girand, 1856), is likely to have once occupied the waters of Frijoles Creek. Frijoles is situated in the heart of the historic range of the state's native cutthroat. Although no tangible evidence exists to indicate they were once there, it is logical to postulate that they did at one time. This endemic population is thought to have been displaced by introduced Salmo trutta, Salmo gairdneri, and Salvelinus fontinalis. (Attachment) Several self-sustaining populations exist in the Jemez Mountains for restocking of Frijoles Creek.

II. Present Management:

No action; not consistent with NPS policy.

III. Proposed Action:

A. Undertake a comprehensive before/during/after study of the community structure of aquatic invertebrate populations, to minimize the impact of reintroduction upon the stream.

B. An Implementation Plan and an Environmental Assessment will be prepared.

C. Eliminate the previously stocked exotic fish.

D. Establish the threatened native Rio Grande trout in suitable upper portions of the watershed.

E. Eventually establish a fuller complement of native fishes.

Rev. 1/87

BAND N-20
BIOGEOGRAPHICAL ASSESSMENT OF THE SOUTHERN JEMEZ MOUNTAIN-PAJARITO PLATEAU ECOSYSTEMS

I. Problem Statement

The ecosystems comprising National Park Service ownership are but relatively isolated islands within the much larger Jemez Mountains and Pajarito Plateau landforms.

The legitimate discipline of regional ecology has now emerged to yield land managers a much broader understanding of relative biotic health and integrity of these unique and interconnected systems. However, there remains glaring lack of a landscape level assessment relating to lands both in and adjacent to Bandelier. Sporadic studies, combined with steadily increasing proposals and projects for various kinds and levels of use in these areas, indicate subtle, yet increasing influences on these landscapes from a wide variety of forces.

Future use trends projected by land management and conservation organizations, demands for increased energy use, and so forth, have placed and will continue to place tremendous pressures on managers to protect biological diversity and ecologically sensitive areas from cumulative degradation. It is of primary concern to the National Park Service, as addressed in the Director's recent 12-Point Plan, to "encourage the protection and enhancement of other publicly and privately owned cultural and natural resources", and to also "...emphasize the planning, management and interpretation of resources in relation to the entire ecosystem or historic context." Other major points of the 12-Point Plan speak of pursuing "...a creative, expanded land protection initiative:. Additionally, management is directed to pursue creativity and "...support experimental initiatives, and anticipate problems and opportunities so that innovative solutions can be explored."

The recent re-signing and re-dedication of the "Treaty of the Potomac" (1964), involving the U.S. Forest Service and the NPS continues an atmosphere of cooperation and coordination in land and resources protection, planning and management, and also provides impetus for a comprehensive assessment of emerging ecological trends. The obligation is clear, and it is one on which future generations will depend.

II. Present Course of Action

A. Nearly all contiguous ecosystems and habitats are open to energy, nutrient, and species exchanges; therefore, the initial study phase is to define the biogeographical boundaries from which an assessment can begin.

B. A second phase is to outline the criteria which will constitute and adequate assessment. Such criteria to be considered are biological, geographical and climatic factors which drive successional trends and change habitat structure and function in the various ecotypes. Of importance will be information from comparing disturbed and relatively undisturbed sites (those largely protected from various forms of exploitation).

C. Conduct a comprehensive review of pertinent literature already existing for the areas defined in (A). Include a review of historical documents relating to the various stages of development and settlement of the study area, emphasizing the alteration of the landscapes. Aerial photography, both early and recent, will be used extensively.

D. Establish permanent transects across elevational and ecological gradients, and collect data on site conditions, species composition/abundance, geological/soils properties, and fauna associations.

E. Compare the impacted areas (i.e., disturbed sites) with selected undisturbed areas. Integrating this data with existing ecological information, formulate an overall evaluation of the various effects on the indigenous genetic diversity and processes which contribute to the maintenance of this diversity.

F. From the assessment will come recommendations to protect identified ecologically sensitive areas, and strategies to protect crucial processes and ecological integrity.

Conflict resolution between agencies, public education programs, management directions, and sound public planning for the future will depend on this information.

RESOURCE OGRAMMING SHEET

Bandelier National Monument (PARK / AREA) | SW (REGION) | NM (ST) | X NATURAL | ___ CULTURAL | January 6, 1989 (DATE) | PAGE 1 OF 2

PRIORITY	RMP REF NO.	PKG NO.	T	PROJECT TITLE	A	1989 YEAR 1 NPS MY	1989 YEAR 1 COST /100	1990 YEAR 2 NPS MY	1990 YEAR 2 COST /100	1991 YEAR 3 NPS MY	1991 YEAR 3 COST /100	1992 YEAR 4 NPS MY	1992 YEAR 4 COST /100	1993 YEAR 5 NPS MY	1993 YEAR 5 COST /100	REMARKS
1.	N-20	-		Biogeographical Assessment of the Southern Jemez Mtn - Pajarito Plateau Ecosystems. (includes long term ecological monitoring)		-	5.0	0.3	4.0	0.4	6.0	-	-	0.3	6.0	
2.	N-3	-		Grazing Impacts/D-J Erosion project		-	12.0	-	12.0	-	8.0	-	8.0	-	8.0	
3.	N-1	-		Nat. Resource Inventory (including paleo environment studies)		-	10.0	-	8.0	-	5.0	-	5.0	-	5.0	Science funding only.
4.	N-5	-		Fire Management (prescribed fire only)		1.5	35.0	1.5	35.0	1.5	35.0	1.5	35.0	1.5	35.0	Firepro
5.	N-12	-		Mgt. Cochiti Shoreline		0.1	2.5	0.2	2.0	0.2	2.0	0.2	2.0	0.3	4.0	
6.	N-19	-		Reintroduction Native Cutthroat-Frijoles Creek		0.4	6.0	0.4	6.0	0.3	3.0	0.3	3.0	0.3	3.0	
7.	N-15	-		Mgt. Restricted Fauna		-	1.0	-	2.0	-	-	-	3.0	-	-	
8.	N-17	-		Protection of Air Quality		-	3.0	-	3.0	-	3.0	-	3.0	-	3.0	
9.	N-16	-		Mgt. Restricted Flora		0.1	2.5	0.1	2.5	0.1	2.0	0.1	2.0	0.1	2.0	
10.	N-13	-		Mgt. Water Resources		0.5	6.5	0.6	8.0	0.6	8.5	0.6	8.0	0.6	9.0	
11.	N-2	-		Feral Burro Management		0.2	2.5	0.2	3.0	-	-	0.2	3.0	0.2	3.0	
12.	N-8	-		Hazardous Animal Mgt.		0.3	3.5	0.3	3.5	0.3	3.0	0.3	3.0	0.3	3.0	

RESOURCES PROGRAMMING SHEET

Bandelier National Monument (PARK / AREA) | SW (REGION) | NM (ST) | X NATURAL | ___ CULTURAL | January 6, 1989 (DATE) |

PRIORITY	RMP REF NO.	PKG NO.	T	PROJECT TITLE	A	1989 YEAR 1 NPS MY	1989 YEAR 1 COST /100	1990 YEAR 2 NPS MY	1990 YEAR 2 COST /100	1991 YEAR 3 NPS MY	1991 YEAR 3 COST /100	1992 YEAR 4 NPS MY	1992 YEAR 4 COST /100	1993 YEAR 5 NPS MY	1993 YEAR 5 COST /100	REMARKS
13.	N-18	-		Pest Management		0.3	3.5	0.3	3.5	0.3	4.0	0.3	4.0	0.3	4.0	
14.	N-4	-		Mgt. of Faunal Pops		0.1	2.5	0.1	2.5	0.1	2.5	-	1.0	-	1.5	
15.	N-6	-		Establish Mgt. Information System		0.1	2.0	-	1.0	-	1.0	-	1.0	-	1.0	
16.	N-10	-		Mgt. Backcountry Visitor Use		-	10.0	-	12.0	-	13.0	-	13.5	-	14.0	
17.	N-9	-		Rehab. Cottonwood/ Juniper Campground Areas		1.0	2.0	-	1.0	-	1.0	-	1.0	0.1	1.0	
18.	N-7	-		Control Hazardous Plants		2.0	3.5	2.0	3.5	2.0	3.0	2.0	3.0	2.0	3.0	
19.	N-11	-		Regeneration Ponderosa Pine-La Mesa Burn		1.0	2.0	1.0	2.0	1.0	2.0	-	-	-	-	
20.	N-14	-		Control Exotic Ailanthus		1.0	1.5	-	-	1.0	1.5	-	-	-	-	

CULTURAL RESOURCES

OVERVIEW AND NEEDS

Bandelier was made a National Monument in 1916 by Presidential Proclamation (No. 1322; Stat. 1764:1916), which stated

> . . . . certain prehistoric aboriginal ruins . . . are of unusual ethnologic (sic.), scientific, and educational interest . . . that the public interest would be promoted by preserving these relics of a vanished people, with as much land as may be necessary for the proper protection thereof.

The Monument now covers approximately 33,000 acres of land in an area of marked topographic relief, ranging from mesa tops to canyons. The ruins referred to in the above quite were primarily built by Pueblo Indian peoples that lived in the Pajarito and Jemez Mountain areas between approximately 1000 and 1660 A.D.

Although a total site survey of the Monument has yet to be accomplished, it is currently estimated that there are well over 3000 structural remains within the Monument boundaries; these remains range from single-room field houses to pueblos containing hundreds of rooms.

The Monument's Native American users include persons from Cochiti, San Felipe, Zuni, Santo Domingo, San Ildefonso, Santa Clara, San Juan, and Jemez Pueblos. These people may be using the Monument either for ceremonial purposes or for the collection of objects used in ceremonies.

National Register listings for the Monument are incomplete; however, following the historical work done by Laura Soulliere Harrison in 1984, the Monument is now lacking only the architectural component, which is being prepared by the Denver Service Center, to complete the Historic Structures Report. The list of classified structures promises to be greatly enhanced by the archaeological site survey currently underway.

The Monument's museum catalog is currently being revised to bring it in line with standards set forth in NPS-28 and the Manual for Museums. The current update will result in its inclusion in the Automated National Catalog system by the end of FY 1990.

Although protection is, in itself, of prime importance, it is of little value if the public cannot benefit from it. Therefore, today, emphasis is also placed on providing for the public's understanding of the Monument's resources, as mandated in the National Park Service's Management Policies (1978:V-1):

> The National Park Service shall faithfully preserve the cultural resources entrusted to its care and provide for the understanding, appreciation, and enjoyment through appropriate programs of research and interpretation.

The Management Objectives of the National Park Service (Special Directive 75-1 1975:5, 6) also emphasize the need for dissemination of information to the public.

> The National Park Service . . . will stand for . . . accurate information and as well as for visitor and resource protection.
>
> In content, interpretive activities must be faithful to fact and free of cultural and ethnic biases. The Service with be prepared to demonstrate the validity of all facts, interpretations and conclusions.

The Archaeological Site Survey Project for Bandelier, Pkg #116, has already greatly aided the Monument by its accomplishment or planned accomplishment of parts of projects C-1, C-2 and CM-8, C-3, and C-4. This project, while not meeting all of the needs for management information, is going a long way to accomplish many park needs and aid in the establishment new preservation priorities.

The Cultural Resource Management Plan for Bandelier National Monument is designed to meet the Monument's legal obligations for preservation, protection, and interpretation of its cultural resources as dictated in the above statements, by the National Park Service Organic Act of 1916, and in the legal documents listed below.

a. The Antiquities Act of 1916
b. The Historic Sites Act of 1935
c. The National Historic Preservation Act of 1966
d. "Protection and Enhancement of the Cultural Environment," Presidential Order 11593, May 13, 1971
e. The Archaeological and Historic Preservation Act of 1974
f. The National Historic Preservation Act Amendments of December 12, 1980, P.L. 96-515, 94 Stat. 2997
g. the Policy Guidelines for Native American Cultural Resource Management, Special Directive 78-1
h. The American Indian Religious Freedom Act of 1978, P.L. 95-341
i. The Archaeological Resources Protection Act of 1979.

CULTURAL RESOURCE PROJECT STATEMENTS

NUMBER	TITLE	PAGE NO.
BAND C-1	Literature Search and File	4
BAND C-2	Locating and Cataloging Previously Excavated Artifacts	(See CM-8)
BAND C-3	Archaeological Site Survey	6
BAND C-4	Test Excavations and Prehistoric Environment Study	8
BAND C-5	Stabilization of Exposed Ruins	11
BAND C-6	Oral History Research	13
BAND C-7	Literature Search and Historic Narratives	15
BAND C-8	Assessment of Environmental Influences on Cultural Resources	17
BAND C-9	Protection of Cultural Resources Built by the CCC	21
BAND C-10	Maintenance of Historic Structures Built by the CCC	22
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BAND C-12	Historic Landscape Study	27
BAND C-13	Historic Orchard	28
BAND C-14	Ethnographic Overview/ Assessments	29

BAND C-1
LITERATURE SEARCH AND FILE

I. Problem Statement

Bandelier National Monument has received the attention of a substantial amount of scholarly research and writing, much of which is minor but still useful and pertinent to cultural resources research and management concerns. However, this information is scattered throughout a variety of publications and manuscripts--not all in the Monument's nor in its library--and is not readily available or retrievable when needed.

In order to facilitate future planning and research in the Monument, it would be advantageous to establish a reference file of literature citations that deal with scientific work pertinent to Bandelier's cultural resources. Not to be confused with the library card catalog, this file specifically catalogs references to scientific information for easy retrieval for research and management purposes. It would contain references not included in Bandelier's library resources.

This project will help the Monument meet its obligation to develop and maintain a comprehensive data bank related to its cultural resources (Management Policies 1978:V-6). It will also aid subsequent field research projects--including site survey, test excavation, and environmental studies.

II. Alternatives and Impacts

A. No action - The effect of taking this alternative is that a constantly increasing proportion of resource management personnel time will be required to meet the larger demands for reports and research information.

B. Developing multiple reference files - Although it is better than no action, the cataloging time for a multiple filing system would be extensive, with only a partial reduction in information retrieval time.

III. Recommended Course of Action

The initial work of locating and annotating pertinent references will involve considerable time and effort, including contacts with local and regional libraries and research institutions (e.g., The School of American Research, the University of New Mexico Library and Anthropology Museum and Department, and branches of the Museum of New Mexico). Once established, the system can be maintained as part of the library acquisitions and cataloging responsibilities activities.

The literature file will be computerized using the WASO-originated CRBIB Program on IBM-compatible ITT computers at Bandelier. Ultimately, computerization of all cultural resources data will provide the most effective system for retrieval of information for management and research needs.

This project would help meet the Bandelier Final Master Plan (1977) objective to aid in the administration of the Monument area.

BAND C-3
ARCHAEOLOGICAL SITE SURVEY

I. Problem Statement

In order to comply with Executive Order 11593 (Sec. 2a), which, in part, states that the cultural resources of every park shall be located, inventoried, and evaluated for significance and, in order to be consistant with requirements put forth by law, and the National Park Service Management Policies (1978:V-4), a site survey must be performed.

A comprehensive archaeological site survey of Bandelier National Monument has never been completed. Although a request for one was programmed into Bandelier's original Cultural Resources Management Plan (1976), and a 10-238 (Package No. 116) was approved. Funding for Pkg 116 has been approved and a large scale sampling survey is now underway.

To provide management and interpretive personnel with sufficient baseline information to adequately interpret the resource and plan its future use, the site survey should provide the following data:

1. A complete inventory of archaeological and historical sites as required by Executive Order 11593 (which includes an archaeological base map and a historical base map); and,

2. information that will potentially answer questions relating to the resource/base area and its use by native inhabitants and the prehistoric demography.

II. Alternative Solutions and Their Impacts

A. No action - The Monument would remain in violation of Executive Order 11593 and National Park Service Management Policies. Monitoring and protecting these resources cannot be done without knowledge of their extent and location.

B. Partial ground-check survey taking place over a period of several years using interested local citizens to aid in accomplishing the survey - The resulting survey would be extremely extended (on the order of ten years) and the resultant data would lack detail and uniformity.

C. Complete site survey using aerial photographs (as suggested in NPS 28 (1980:II,8) and professional archaeological survey teams - by this alternative action.

III. Recommended Course of Action

The recommended course of action is to use aerial photographs and professional archaeological survey teams to perform a complete site survey of the Monument.

By using professional archaeologists in conjunction with remote sensing techniques, the Monument can obtain a more complete and accurate evaluation of the existing resources in a short period of time.

Using a combination of archaeological techniques and theory would result in a coherent picture of prehistoric cultures and events for use in interpretation and long term management planning. This alternative would also enable a time/money-saving combination of personnel for use in both the inventory project and the test excavation paleo-environmental study project.

This alternative is proposed to take place over a period of five to seven years and would place the Monument in full compliance with Executive Order 11593 and pertinent National Park Service policies.

This survey would comply with the Bandelier Final Master Plan (1977) objective to "Conduct further archaeological surveys and excavations to furnish information and provide artifacts for display and interpretation."

BAND C-4
TEST EXCAVATIONS AND PREHISTORIC ENVIRONMENT STUDY

I. Statement of Problem

A.Test Excavations

A comprehensive site survey has been proposed to enable Bandelier National Monument to meet its legal obligations to locate, record, interpret, and properly manage its cultural resources (Management Policies 1978:V-6; Executive Order 11593). However, survey alone cannot yield all the data essential to the proper classification and recognition of function for all types of sites. Considering the paucity of actual archaeological fieldwork already done at the Monument, and the limitations in the majority of that work imposed by the early time period during which most was done, the need for more intensive field research is indicated.

Based on initial data from and in conjunction with the site survey, controlled surface sampling of some archaeological sites and test excavations of a few specific sites will be necessary to round out the picture of site classification for the Monument. It is important that the test excavation and controlled surface sampling be logical components of the archaeological survey, that is, that all the archaeological field projects be well integrated within an overall research design, preferably with all carried out by the same researchers to ensure continuity and productiveness. Both the surface sampling and the test excavation should be specifically designed to (1) illuminate the total spectrum of site types, sizes, time periods, functions, etc., found at Bandelier; (2) answer questions raised by specific research between proto-historic Keresan and Tanoan peoples or tracing social structure differences that may help elucidate migration patterns, and (3) meet management needs, supplying needed interpretive information or determining representativeness priority.

As collection and excavation represent irreversible and irretrievable commitments of cultural resources, their use should be kept to the minimum required to satisfy management and research objectives. Test excavation must impact as small a portion as practical for research purposes, and a portion of each tested site will remain unexcavated for possible future use. In order to ensure the maximum information benefit from the least amount of cultural resource destruction, all work should use the most advanced and productive archaeological techniques and methodologies available (including nondestructive techniques and remote sensing). Finally, meticulous records must be kept and incorporated into the data base, preferably computerized, for later retrieval and dissemination of accurate information about the Monuments's cultural resources.

B. Prehistoric Environment Study

The overall appearance of all cultural resources and their surroundings as they were in the historic (i.e., archaeological) period constitutes the historic scene . . . to the extent that modern

developments, exotic or altered vegetation, and topographic changes have intruded upon the environment of a historic place . . . the historic scene has been altered" (Management Policies, 1978:IV-20).

Conscious efforts shall be made to ensure that routine park operations, interpretation and visitor use, maintenance and storage, conduct of activities, and provision of services do not unnecessarily intrude on the historic scene by introducing visible, audible, or atmospheric elements that are out of character with the historic environment.

Little information is available that specifically treats Bandelier's prehistoric environment. Numerous studies of the contemporary environment at Bandelier are currently available or are ongoing (see the Natural Resources Section of the Resource Management Plan). Some good ethnographic reports (e.g., Ford 1968; Harrington 1916) are available on aboriginal land use in immediately surrounding areas. But significant prehistoric ecological data is limited to Diane Traylor's work (Traylor et al. 1977) on the Cochiti Dam Project. And, although the environmental studies undertaken on this project are excellent they do not constitute an all-inclusive picture of the prehistoric environment.

Management Policies (1978:V-6) mandate that identification and research precede any planning affecting the cultural resources (including their environment) of the Monument. Thus, research must be initiated to determine just what Bandelier's prehistoric environments--both natural and man-altered--were.

II. Alternatives and Impacts

A. No action - The impact of this would be that the Monument would remain in violation of Executive Order 11593 and National Park Service Management Policies (1978:V-6).

B. Limited test excavation independent of the site survey with environmental testing - This alternative could be performed more readily than a coordinated survey and excavation project. However, data accuracy and control would not be as good as if data were collected in a joint project.

C. Coordinated site survey and test excavation project - This method would reduce the amount of excavation necessary to obtain an accurate interpretation of the environment and its use by the prehistoric inhabitants of the area.

III. Recommended Alternative

Perform a coordinated site survey and test excavation of representative sites and control locations to establish a more complete and accurate picture of the prehistoric environment and man's relationship with it.

Use of this alternative would be the most cost-effective data-gathering method. This alternative would give accurate information with the least amount of disruption of undisturbed archaeological sites. Allowances for

this work have been included in the 10-238, Pkg #116 (Archaeological Site Survey).

This project, when completed, would help fulfill the directive in the Final Master Plan (1977) to "Conduct further archaeological surveys and excavations to furnish information . . . for display and interpretation."

BAND C-5
STABILIZATION OF EXPOSED RUINS

I. Problem Statement

A. Guidelines

National Park Service Management Policies (1978:V-13) state that "All cultural resources shall be preserved . . .," and Bandelier's enactment proclamation (Presidential Proclamation No. 1322; 39 Stat. 1764 1916) emphasizes the need for preservation of its archaeological resources. However, even in this very basic compliance obligation, the Monument is negligent in fulfilling its responsibilities. Although it has minimal ruins stabilization standards and procedures to follow (see Nordby 1978 and the WAC Soil Cement Study 1977), comprehensive preservation guidelines (10-238, Pkg. #174 and #175) have never been established for the Monument's archaeological sites.

Without such guidelines, it is impossible to initiate a comprehensive cyclic maintenance and stabilization program to preserve these irreplaceable cultural resources. Proper guidelines and skilled stabilization personnel would enable the Monument to institute ". . . measures and procedures to provide for the maintenance through preservation . . . at professional standards prescribed by the Secretary of the Interior" (Executive Order 11593, Sec. 2d, 1971). These standards are further detailed in NPS 28, Chap. 2 (October 1980).

B. Stabilization Personnel

According to the 1980 report of the Regional Management Evaluation Team, an additional three to five seasonal ruins maintenance positions are required to maintain the excavated ruins in a conditions that would ensure their structural integrity.

II. Alternatives and Their Impacts

A. No action - This alternative would result in violations of Presidential Proclamation 1322, Executive Order 11593, NPS 28 (1980:Chap. 2), and National Park Service Management Policies (1978:V-13). This alternative would also ensure a loss of structural integrity, resulting in the ultimate loss of these irreplaceable resources.

B. Experimenting with stabilization techniques and establishing more seasonal ruins maintenance positions - The experimental method of establishing ruins maintenance criteria would by its nature endanger much of the resource that the Monument is charged with preserving

C. Establishment of a comprehensive Ruins Management Plan and establishment of more ruins maintenance positions - This alternative would minimize the degradation of exposed ruins.

III. Recommended Course of Action

Undertake a research program designed to establish a comprehensive ruins maintenance program Including historic structure preservation guides, and establish more seasonal ruins maintenance positions (10-237).

A. Guidelines

The research data gained from some of the proposed projects, especially from Archaeological Project C-8, will have definite applicability to Bandelier's ruins stabilization and preservation plan. As these data are made available, pertinent information needs to be forwarded to the Maintenance Division and to Regional preservation specialists so that necessary adjustments and improvements to the present temporary maintenance plan can eventually be incorporated into a Historic Structure Preservation Guide.

In general, the ruins stabilization and preservation guide should mitigate those environmental effects that promote the deterioration of Bandelier's archaeological sites. The most effective ways of accomplishing this at this point in time are (1) backfilling all sites not needed for management, interpretive, and/or scientific projects, thereby reducing the costs of ruins stabilization and (2) using the best of the materials and procedures available from materials tests and standard ruins preservation guidelines to preserve exposed archaeological sites.

B. Stabilization Personnel

Hire three to five additional seasonal ruins stabilization personnel.

This action is proposed to fulfill the state objectives of the Bandelier Final Master Plan (1977) in that it would "ensure the protection and preservation of archaeological resources within the Monument through management and stabilization programs."

BAND C-6
ORAL HISTORY RESEARCH

I. Problem Statement

The recorded history of Bandelier National Monument and its environs is sparse before the mid-1930's, and thus there is little cultural data incorporated into its administrative documentation and interpretive activities.

A number of people have extensive knowledge of the early use and management of the Monument and its surrounding areas (These people have lived and/or worked in this area). Because these individuals are elderly, every effort should be made to contact them and record their histories.

If an oral history could be made, information on four areas would enhance the historical/interpretive picture of the Monument. The four areas of concern are the following:

1. Old Canada de Cochiti Grant Area
2. Land Use Customs of Keres-Speaking People
3. Land Use Customs of Tewa-Speaking People
4. Administrative History of Bandelier

II. Alternatives and Impacts

A. No action - No action on this would result in the loss of irreplaceable historic information about the Monument and its environs.

B. Interviewing and tape recording these informants using ethnographic or oral historic methods. Tape recordings are a temporary means of information storage and thus are only desirable in the short-term.

C. Interviewing and tape recording the informants and transcribing the interviews onto a hard copy for storage. Although this alternative is more costly, it assures permanent preservation of this valuable information.

III. Recommended Action

Interviewing and tape recording the informants and transcribing the information onto a hard copy for storage.

Although this method is more time consuming and expensive, it is preferable over the other alternatives because it lends itself to a permanent and accurate storage of information for future use.

The informants would be tape recorded in response to predetermined and discretionary questions. The resulting tape would be transcribed and systematized. Then the informants would be allowed to review the manuscript. Tape recordings could also be used in the development of a

variety of audio visual programs for the park visitors and orientation packages for new employees. This project helps to fulfill the objectives stated in the Bandelier Final Master Plan (1977) in that it would, "Enrich the visitor experience by emphasizing the life, culture, and history of the Pueblo Indian".

BAND C-7
HISTORIC RESOURCE STUDY

I. Problem Statement

Because of the emphasis archeology, virtually no documentation of early regional historic activity is currently available to Bandelier National Monument's interpreters or resource managers. With early Hispanic explorers and settlers having moved into the northern Rio Grande Valley in the 16th century, it seems very possible that some of that activity may have extended to the Bandelier area or have had a direct bearing on its late Puebloan occupation. The historic record itself would prove to be worthwhile for interpretation and could provide data useful to future resource management. In additon to the work required in the main body of the Monument, little if any National Register information has ever been assembled on the Canada de Cochiti which as been approved for park acquisition.

A Historic Resource Study would produce a thorough study of all available documentation, a Historic Resource Base Map and National Register nomination forms.

II. Alternatives and Impacts

A. No action - The information would continue to be inaccessible to the Monument's staff for planning and interpretive purposes. The Monument would also remain in violation of Executive Order 11593, which states in part that a historical base map will be established.

B. Perform a search of the available literature on the Bandelier area and develop a historic narrative using the resulting information - This narrative would enable Bandelier's interpretive staff to portray the historical context of the area more accurately and, at the same time, give the administrative staff a useful tool for managing the Monument's resources.

C. Prepare a Historic Resource Study - this complete study would professionally document historic events and locations within their hsitoric theme and meet all current legal requirements of nominating and documenting eligible properties for the National Register.

III. Recommended Action

In order to comply with NPS-28 standards a comprehensive Historic Research Study should be prepared.

A thorough search will be made of early Spanish and American documents (available through the New Mexico) State Archives and libraries and the university libraries) for data pertinent to Bandelier National Monument's early history (Management Policies 1978:V-6). These data will then be compiled into a referenced historic narrative for the convenience and use of both interpreters and resource managers.

This project helps to fulfill the objectives stated in the Bandelier Final Master Plan (1977) in that it would, "Enrich the Visitor experience by emphasizing the life, culture, and history of the Pueblo Indian."

This project also would provide all required historic documentaion for the Monument.

BAND C-8
ASSESSMENT OF ENVIRONMENTAL INFLUENCES ON CULTURAL RESOURCES

I. Statement of Problem

Bandelier National Monument's environment contains several internal and external influences that are negatively affecting (or have the potential for negatively affecting) the preservation of its archeological sites, objects, and environment. Laws and regulations governing the National Park Service,

> .....impose a special obligation on the Service to locate, identify, evaluate, preserve, manage, and interpret qualified cultural resources in every park in such a way that they may be handed on to future generations unimpaired (Management Policies 1978:V-2).

The Monument has a mandated responsibility to maintain its archeological sites, objects, and environment in as close to natural conditions as possible (Management Policies:V-3, V-11). However, many effects of various environmental influences on those cultural resources--environmental influences that may be either natural or man caused--have not yet been determined, but are now being monitored through photo points at showcase sites in the backcountry.

The following include the environmental factors currently considered to have possible adverse effects on the Monument's cultural resources--both archeological and historic:

A. Fire: Because of the devastation caused by the large La Mesa Fire (summer 1977), research into its impact on affected archeological sites was initiated by Bandelier National Monument. Preliminary work indicates that harmful effects of fire itself are generally limited to superficial materials, most notably spalling of exposed stone masonry. However, the process of fire suppression can cause more extensive damage, particularly if heavy equipment is used on sites (Traylor, 1978: 123-147). Currently, test plots for prescribed burning are being planned in parts of Bandelier's timbered lands. Several factors are being studied, such as combustability and the effects of heat intensity, with techniques such as fuel moisture stix and heat sensitive paints.

B. Carrying Capacity: Archeological sites are fragile resources and easily impacted. Among the most cogent considerations in assessing their ability to withstand impact is carrying capacity. Bandelier's sites--particularly the large, easily identified sites--are receiving ever-increasing pressure from visitor use, especially in areas of easy accessibility. Damaging effects from burro impact are occuring. In attempts to help mitigate these influences, camping restrictions are in effect around archeological sites, and the burro population has been temporarily reduced. However, the extent to which human and animal influences are actually affecting the sites has not been determined.

C. Vibrators: Vibrators from various sources, including tests carried or by the Los Alamos National Laboratory, sonic booms, landslides, and people or vehicles at or near the ruins, occur and affect the Monument and its sites regularly. Many of the vibrations are sufficient to rattel windows and/or cause minor rock slides and, therefore, have the potential for weakening or damaging Bandelier's cultural resources, especially the exposed excavating, archeological sites. During the summer or 1977, the Los Alamos National Laboratory recorded seismograph readings of numerous types of vibrations at selected sites in Frijoles Canyon. Those data area not correlated with any recorded impact or the archeological sites themselves.

D. Insect Infestations: Recently, several of the artifacts and historic objects on display and/or in storage, in Bandelier's museum and visitor center, have been found to be infestaed with several different forms of insects and/or their larvae. Currently, the collections are undergoing close scrutiny to discern any further infestations and to observe resultant damage.

Adverse effects from environmental influences at Bandelier National Monument are not solely limited to those outlined here. These are the ones currently identified as immediately presenting, or having the potential for causing, unfavorable impact on the Monument's cultural resources. As new tracts of land are added (such as the Canada de Cochiti Grant or the Valle Grande) or as these environmental influences are investigated, others may be discovered that will necessitate further study. All or some of the studies listed here can form the initial base for long term study. Remote sensing, in addition to individual, first hand assessments, can be used to monitor the influences.

II Alternatives and Impacts

A. Fire

(1) No action - This alternative results in incomplete decision making information in fire-control situations.

(2) Use a prescribed burn program to test the effects of fire on various cultural resource materials - This should be addressed in area Fire Management Plan with potential impacts outlined and evaluated.

B. Carrying Capacity

(1) No action - This alternative represents a threat to the resource because of insufficient management information.

(2) Monitoring site visitation and site condition to establish a carrying capacity for minimum site degradation - This proposed action appears to have no direct impact on the carrying capacity or the resource.

C. Vibration

(1) No action - This alternative limits data for responsible resource management.

(2) Monitoring the effects of explosions of given forces to establish the degree of resource degradation.

D. Insect Infestation

(1) No action - The degradational effects of insects on historic structures would soon become irreversible.

(2) Treat insect infestation as reported - By the time an infestation is noticed, damage has already occurred.

(3) Systematic program of insect prevention in pre-identified areas.

III. Recommended Course of Action

A. Fire - Studies using the prescribed burn program to test the effects of fire on various simulated cultural resources should be performed to aid in planning that can help mitigate the adverse influences of wildfire and prescribed management fires.

B. Carrying Capacity - Quantitative and qualitative tests need to be initiated to evaluate these effects--for instance, recording actual visitation; establishing control sites protected from impact in heavily visited sites; and utilizing test wall samples, periodic photographic comparisons, and other evaluative technique. Once non-destructive carrying capacity has been determined for the various threatened sites and areas in Bandelier, steps can be taken to plan their proper use and access.

C. Vibration - Systematic monitoring of this possible threat is important to the establishment of an informed policy concerning these tests.

D. Insect Infestation - A systematic program of insect prevention appears to be essential to the prevention of insect-related historic resource degradation in this area.

These research-related programs would serve to meet the objectives stated in the Bandelier Final Master Plan (1977) to, "Ensure protection and preservation of archeological resources within the Monument through management and stabilization programs."

BAND C-9
PROTECTION OF CULTURAL RESOURCES THROUGH
PATROL AND ENFORCEMENT

I. Problem Statement

A preliminary study indicates a high level of artifact removal from the Tsankawi area. This area is a detached segment of the Monument that is maintained for public use without supervision. The Tsankawi area is a complex conglomerate of building and living styles that is principally undisturbed by vandalism and will prove to be of great value to future researchers in deciphering the prehistory of the Rio Grande Valley and the Pajarito Plateau. Six major backcountry sites are in similar danger from collecting and/or vandalism. There is currently no regular patrol at either the Tsankawi area or the backcountry ruins.

II. Alternatives and Impacts

A.No action - If no action is taken, the Monument would be in violation of the principles of Presidential Proclamation 1322, which established Bandelier to preserve and protect the ancient Indian remains of the area.

B.Provide greater patrol coverage with existing staff - This would adversely affect present position responsibilities and duties.

C.Hire additional staff to perform backcountry and Tsankawi patrol functions, and make additional use of electronic surveillance equipment. No adverse impact.

III. Recommended Course of Action

In order to best perform the patrol function without impairment of ongoing activities, it is recommended that an additional two seasonal positions be filled to perform patrol and enforcement functions in those areas of the Monument that present a threat to the cultural resources through vandalism and illegal collection. In conjunction with these patrols, the installation of electronic sensors and periodic monitoring should be undertaken to help document base-line conditions.

BAND C-10
MAINTENANCE OF HISTORIC STRUCTURES BUILT BY THE CCC

I. Problem Statement

The building constructed by the Civilian Conservation Corps in the Headquarters area of Bandelier are in the process of being nominated to the National Register. This places special responsibilities for the preservation and maintenance of these upon the Monument's staff.

The need for comprehensive presentation guides has become increasingly clear; to avoid the return of maintenance practices which required large projects over the years of 1980-1987. Both careful maintenance and well prepared and coordinated preservation guides are necessary to maintain historic buildings in a manner which is consistant with Park Service policies adn objectives.

II. Alternatives and Impacts

A. No action. This alternative would be in violation of the NPS policies (NPS-28, 1980:VI-1-10) and would lead to further degradation of this historic resource.

B. Prepare comprehensive historic structure preservaton guides such that maintenance practices can be intergrated to allow for the highest levels of preventive maintenance and repair.

III. Recommended Action

Establish preservation guides and merge these guides with the maintenance management system to insure a continued preventative maintenance cycle. This should be part of a program of maintenance training and practical work to fully comply with National Park Service policies and guidelines.

BAND C-11
EROSIONAL AND VEGETATIVE
THREATS TO BACKCOUNTRY RUINS

I. Statement of Problem

During the summer of 1983, the staff and volunteers examined many backcountry archaeological sites at Bandelier to check their condition, itemize the forces acting to destroy them, and determine what steps might be taken to stabilize them against rapid destruction.

We consider the backcountry sites to be the most scientifically valuable cultural resources at Bandelier. The big ruins in Frijoles Canyon, all that most visitors see, have been wrecked by crude excavation, repeated and none-too-careful stabilization and reconstruction, and heavy visitor use; their only real value now is interpretive. Some of the backcountry ruins are heavily impacted by tourism and primitive archaeology, but most are relatively free of human disturbance. Ideally, they should constitute a valuable scientific resource. Unfortunately, the backcountry sites are subject to a number of other forces that can greatly decrease their scientific value. Some of these cannot be ameliorated by any practical means, but some of the worst forces of deterioration can be slowed or stopped by feasible management action.

In examining the degradation of archaeological sites, it is important to keep in mind the realities of archaeological research today. In the old days, archaeology was mostly artifact digging, and there is little going on in the backcountry that would seriously detract from such archaeology (or, as we would call it today, pothunting). Today, a great deal of archaeological investigation is carried out by surface surveys supplemented by a small sample of excavations; that means that disruption of the superficial materials--the walls and the ceramic and lithic scatters--is of major significance. When excavations are undertaken, a large number of very sensitive techniques are employed, many of which are very sensitive to site disruption as well. This sensitivity is of two forms: in some cases, the data itself is corrupted (e.g., modern seeds are carried into a site by rodents so that studies of prehistoric uses of plant materials are confounded), and in other cases, the cost of analysis becomes prohibitive even though the data can still, in principle, be extracted without serious confusion (e.g., modern wood and charcoal enter a site being dated by carbon-14 or tree-ring analysis).
This summer's work (1986) has been what we call a site management survey. It certainly does not take the place of a badly needed full archaeological survey. We collected some basic facts about each site (location, size, and basic ceramic and lithic types), the environment the site was located in (soil type and condition), condition of vegetation, and animals active in the area. In inspecting the sites, we tried to keep in mind two questions: what are the forces seriously impacting this site that we could something about, and what kind of resources would it require to stabilize the site?

The principle agents of destruction acting on the backcountry sites are the following.

1. Trees and cacti growing in or near ruins destroy them in several ways. As they grow, they push over walls or the surface and infiltrate underground structures. When they collapse, they may tear a big root ball out of the site, and they may collapse across surface structures, knocking them down. As the roots rot, they serve as channels for the contamination of underground portions of the site, and if they burn in a forest fire, they can do further damage.

2. Widespread intensive erosion is damaging many sites. Lithic and ceramic scatters are strewn far down slope, often across other sites, and ultimately into canyons where they are ground to nothing or carried away in floods. Walls are undermined and broken apart; in some cases, sites are ripped apart and destroyed by gullies slashing right through them. The severe erosion is caused by extensive, gross devegetation. Trail gullying, wallows, and droppings are present in sites in the southwestern portion of Bandelier, and it is literally true that we visited no site southwest of Alamo Canyon that was not severely impacted by burros and their works. In a study of soils and vegetation in that area, Earth Environmental Consultants, Inc. reported typical soil depths of 18 inches along the mesa tops and measured erosion rates of about 21 inches per century; this is more than 10 times the rate of erosion considered normal in such regions.

3. In sites that have been partially excavated or severely eroded, some walls have very different levels of fill on opposite sides. This places a great strain on the wall, eventually causing its collapse. Such stress is often exacerbated by trees and cacti growing against the filled side of the wall and trampling by animals, and probably people, who walk right to the edge of the filled side.

These are the "big three" causes of site deterioration that can be counted. There are others more difficult to deal with--burrowing mammals and Harvester ants, sherd gathering, redistribution by people, etc.--that are also contributors to site degradation.

II. Alternatives and Impacts

A. No action - This alternative would result in continued losses to irreplaceable cultural resources. This action would be in direct opposition to both the National Park Service "Organic Act" and to the enabling legislation for Bandelier.

B. Continued monitoring - This would only serve to establish careful recording of the deterioration that should have been avoided.

C. Remove trees and control erosion - This option, where practical, would do the most to reduce deterioration of the resource.

III. Recommended Course of Action

What specific management actions can be taken? Among those under discussion are the following.

1. Cut trees and cacti causing damage now or promising to cause damage in the future; paint the stumps with herbicide, if necessary, to prevent regrowth.

2. Undertake local control of erosion; throw logs across drainage channels in sites to slow runoff and encourage plant growth, seed native grasses and forbs on the sites to bind the soil, etc. Reseeding techniques must be evaluated on or near selected sites.

3. Undertake area-wide erosion control using methods similar to those employed after the La Mesa Fire (recognizing that the progressive destruction of the natural vegetation by overgrazing has been as catastrophic as the fire, though less spectacular), by fertilization to encourage vegetation recovery, or by other means.

4. Prevent further damage by vigorous eradication of burros (which is already management policy, being implemented through improvement of the boundary fence in conjunction with a reduction program).
5. Stabilize wall with uneven fill by marking the present surface and backfilling with soil free of cultural artifacts.

All of these measures have some impact on the natural environment, and this must be weighed against the damage to nonrenewable resources. Although it is easiest to do nothing (because then one need not evaluate the destruction and balance it against other values, but only suffer it), doing nothing is probably not a responsible course. Bandelier was originally established specifically to protect these archaeological sites, and it is incumbent upon the Park Service as curators of the sites to afford them the very best protection that it can.

BAND C-12
CULTURAL LANDSCAPE

I. Problem Statement

Bandelier has throughout its existence attempted to manage vegetation and terrain problems on a basic the least action required at any given time to minimize impacts at that time. This policy, while a good one, has lead to a large number of minor landscape alterations over time. These cumulative changes have resulted in a departure from what the cultural scene should be managed for. What is lacking are management policy guidelines, specific to this area, that will result in the long term protection of its cultural integrity.

II. Background

In the days from September of 1880, Adolf Bandelier first visited Frijoles, until the fall of 1941, when the last CCC camp closed, all of the early Anglo inhabitants of Frijoles Canyon left their mark on the distribution land diversity of the plant communities now found in Bandelier.

In 1913, Judge Abbott brought the first fruit trees to Frijoles Canyon, in the 1920's Mr. Frey built the first irrigation system. In the 1930's, the WPA hired Jim Fulton, a landscape architect, to draft the plant layout for the then new Frijoles Canyon Lodge. The areas of the orchard and old lodge would seem of prime historic importance as it relates to the historic scene and should be considered under NPS Management Policies Chapter V, pages 24 and 25.

III. Alternatives and Impacts

A. No action - This would, over a period of years, result in the eventual loss of the unique historic character of this area.

B. Prepare an inclusive Cultural Landscape Report. to preserve an established direction and level of maintenance, based on a definitive statement of goals for this area.

IV. Recommended Action

In keeping with both NPS Management Policies and NPS-25 guidelines, a cultural landscape report should be prepared to insure maintenance of these area in a manner which would be in keeping with the preservation of this area's cultural integrity.

BAND C-13
HISTORIC ORCHARD

I. Problem Statement

When Judge Abbott moved to Frijoles in 1913, he brought with him the first of the fruit trees which were later to become the Frijoles Canyon orchard. This orchard, and related agricultural projects, were the basis for his December 4, 1913 water right application, which was perfected on October 15, 1921. These rights were later purchased by Mrs. Frey on November 5, 1942, and turned the rights over to the National Park Service on February 2, 1959.

As several of the trees still standing in the orchard are those brought into the canyon in 1913, the prospect for their continued life is quite limited.

Having established the historic and legal significance of the orchard, it becomes incumbent upon the Park Service to maintain the orchard as our only current use of these water rights so that they will preserve the established water rights and as a valuable interpretive exhibit to illustrate the early Anglo use of the canyon.

II. Alternatives and Impacts

A. No action - This would over a period of years result in the death of the existing orchard, eliminating its use as an interpretive display and placing in question the legal status of water rights in Frijoles Canyon.

B. Maintain the orchard area with a number of young trees so as to assure a continuity.

C. Eliminate the orchard and rehabilitate the area to a reparian zone. This again would place the water rights in question.

III. Recommended Action

Maintain the orchard largely with descendants of the original trees assuring both leagal and historic continuity, while keeping within the NPS Management Policy Statement on Historic Scenes, Chapter V, pages 24 and 25.

BAND C-14
ETHNOGRAPHIC OVERVIEW/ASSESSMENT

I. Problem Statement

For centuries, Bandelier land and the surrounding area have been used by the Anasazi people and their descendents, the Puebloans. No current ethnographic research has been conducted to determine exactly how many pueblos have ancestral claims to Monument lands and resources. Research conducted at the turn of the century indicates that the pueblos of Cochiti, San Ildefonso, Santa Clara, and Jemez have direct links to the area; Zuni, Santo Domingo, San Felipe, and possibly Navajo use is indicated as well. However, this information is dated, and there is some question as to the sources used.

We are also aware of Spanish use of Monument lands, but the total extent of this occupation is not well known. Basic questions such as where and how much of the land was cultivated, how many animals were grazed, and how much alteration of the landscape was done through lumbering and firewood collecting cannot be answered.

The Anglo population also introduced new concepts of land use, such as mining, large-scale grazing, and homesteading. Again, very little is known about the total extent of this occupation.

Very little research and documentation has occurred since the early 1900's. We are not well informed on post-Anasazi use of the area or the influences that have shaped Bandelier. Our knowledge of Pueblo, Spanish, and Anglo use of this area is totally inadequate.

II. Alternatives and Impacts

A. No action - This alternative will result in the loss of informants who will take irreplaceable information with them. The lack of correct information could also lead Monument staff to make misinformed interpretations of people, places, and events and bad management decisions.

B. Contact people from each of the ethnic groups to interview those whose relatives lived, worked, or traveled through Monument lands, according to tradition. In addition, research can be conducted through archives, legends, Spanish chronicles, and archaeologists' and ethnologists' field notes to pull together information specific to the Monument. Although this course has no adverse impacts on the surface, it would strengthen legal claims of traditional uses of Monument lands, and there is no way of ascertaining the truth of any given informant's statements.

III. Recommended Course of Action

The recommended course of action is alternative B. This will provide the

staff with a holistic view of the ethnologic use of the Monument lands. This will greatly influence interpretation of the Monument, guidelines for Native American use of the land, and resource management planning in the Monument.

RESOURCES PROGRAMMING SHEET

Bandelier Nat'l. Monument — PARK / AREA | SW — REGION | NM — ST | ___ NATURAL | X CULTURAL | 2/9/87 — DATE | PAGE 1 OF 1

PRIORITY	RMP REF NO.	PKG NO.	T	PROJECT TITLE	A	87 YEAR 1 NPS MY	87 YEAR 1 COST /1000	88 YEAR 2 NPS MY	88 YEAR 2 COST /1000	89 YEAR 3 NPS MY	89 YEAR 3 COST /1000	90 YEAR 4 NPS MY	90 YEAR 4 COST /1000	91 YEAR 5 NPS MY	91 YEAR 5 COST /1000	REMARKS
1.	C-6	242		Oral History Research		0.3	4	-	-	0.0	12	-	-	-	-	
2.	C-5	A71 174 A13		Stabilization of Exposed Ruins		0.0	3.0	0.0	3.0	1.0	35	1.0	35	1.0	35	
3.	C-10	A61 224 175		Maintenance of Historic Structures		1.0	28	1.0	28	-	3	-	3	-	3	
4.	C-4	-		Test Excavation and Prehistoric Environment Study		-	-	-	50	-	50	-	50	-	25	
5.	C-9	-		Patrol and Enforcement		-	-	1.6	20	1.6	20	1.6	20	1.6	20	
6.	C-3	116		Archaeological Site Survey		2.8	70	3.6	80	4.1	89	4.1	98	1.0	54	
7.	C-13	-		Historic Orchard		-	-	0.0	2.0	-	1	-	1	-	-	
8.	C-12	-		Historic Landscape Study		0.0	14	-	-	-	-	-	-	-	-	
9.	C-11	257		Vegetative and Erosional Threats		-	-	1.0	12	1.0	14	-	-	-	-	
10.	C-7	241		Historic Resource Study		-	-	-	12	-	5	-	-	-	-	
11.	C-1	-		Literature Search & File		-	-	0.0	5	0.0	5	0.0	5	-	-	
12.	C-8	-		Assessment of Environmental Influences on Cultural Resources		-	-	-	-	-	-	-	-	-	-	
13.	C-14	-		Ethnographic Overview/ Assessment		-	-	-	-	-	-	0	12	-	-	

C O L L E C T I O N M A N A G E M E N T

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BAND CM-1
CONSERVATION NEEDS SURVEY AND CONSERVATION

I. Problem Statement

A conservation needs survey was conducted in 1982. Objects were prioritized according to the urgency of treatment needed. Priority 1, 2 and 3 contain 135 objects. Due to lack of funding, 1986 was the first year conservation was contracted. Many of the objects included in the top 3 priorities have been on loan to us, from the Museum of New Mexico, since 1975 and are on permanent exhibit. Although most of the objects were excavated from park land the State of New Mexico considers them their property and we must renew our loan annually. Because of the lapse in time from the Conservation Needs Survey until the actual treatment, each object must be reexamined to determine its status. When the condition of each item has been determined priorities must be established and contract conservation begun immediately.

II. Alternatives and Impacts

A. No action. Without a reexamination of the aritfacts, to select objects for treatment, we may exclude artifacts whose condition has deteriorated over the 6 years. As a result, artifacts may loose their value as research or exhibit material and the cost of conservation would greatly increase.

B. Continue conservation of artifacts as recommended by the 1982 Conservation Needs Survey. Send artifacts to Harpers Ferry to be treated. Usually the artifacts sent to Harpers Ferry are in very bad condition and shipping the artifacts that distance, to such a drastically different environment, greatly increases the risk of irrepairable damage. Harpers Ferry also usually has about a one year backlog of work allowing the condition of the artifact to further deteriorate.

C. Contract a professional conservator to reexamine the necessary artifacts before conservation treatments begin. Not only will the reexamination of the artifact determine the best possible treatment but it will also tell us the possible changes that must be made in the artifact's environment for the utmost preservation of each object and contract conservation as soon as possible.

III. Recommended Course of Action

The recommended course of action is alternative C. The main justification for a resurvey of the collection is to re-examine the already prioritized artifacts and to re-prioritize if their condition has worsened. This will result in the artifacts being treated in a timely manner which will ensure the artifacts value both aesthetically and as research material.

BAND CM-2
CONSTRUCT NEW STORAGE FACILITY

I. Problem Statement

The Bandelier artifact collection is presently stored in two historic cabins and two temporary structures. The interiors have been modified, to some degree, to protect the collections, however, in reality the structures do little to control the environment. The "storage facilities" are crowded with artifact cases in the same room with archival documents and photographs and boxes of uncleaned potsherds. The workspace is minimal, not allowing for necessary conservation and safety equipment to work with the collections, i.e., sinks, exhaust hood or an area for photographing artifacts. The park currently has an archeological research project in progress which will continue for at least three more years. Each of the last three years of the project have resulted in the addition of thousands of artifacts to the already crowded conditions. Currently, there is no expansion room for additional storage cases. A new storage facility is of critical need to properly house, preserve and care for the collections.

II. Alternatives and Impacts

A. No action. The storage conditions will become increasingly crowded and will do little to preserve the artifacts. At present the storage facilities are not fulfilling the responsibility the park has for preserving and caring for the artifacts and the ability to accommodate researchers.

B. Obtain the office/warehouse/carpenter shop complex of the present maintenance facility. Only if complete modification of the interior is permitted to create a stable environment. This complex will enable the separation of collections, the warehouse could house the main collection, providing a separate room for fine arts storage, office space, archival room for books and photographs, historic furniture storage and lab space for research and conservation.

C. Construct a new storage facility with input from Harpers Ferry conservation staff to insure all concerns are met in the new structure. In starting with a new facility, careful planning can determine the best placement of the vault section, researchers' work space and a separate curator's office; with special emphasis on a functional security and fire suppression system. We could then bring back collections currently being stored at the Regional Office and at the WACC and consider artifacts stored in other museums. The result would be increased preservation of the artifacts, less conservation costs and increased availability of an intact collection for researchers. Review Band CM-5.

D. Place artifact collection in a repository such as WACC. The

removal of artifacts from the park has been a chronic problem since the early 20th Century. The result is a great deal of the primary resource of the Park, all Federal property, is in various collections somewhere other than the Park. These collections are beyond the influence and control of the park and not accessible by researchers as a valuable document of the culture of the people for whom the park was established.

III. Recommended Course of Action

The recommended course of action is to build a new facility which will have taken into consideration Bandelier collections stored at the Regional Office and at the WACC and the possible reclaimed artifacts from other institutions whose standards do not meet NPS requirements. Expanded facilities and combined Bandelier collections would enable the park to encourage scholars to conduct research on the artifacts which would benefit the park's information and interpretive services. We would be a first in preserving an intact collection, in one location, from the Pajarito Plateau, a highly significant and archaeologically rich location.

BAND CM-3
VISITOR CENTER AND MUSEUM SECURITY SYSTEM REVISION

I. Problem Statement

A new high technology security system was installed in the visitor center by the Los Alamos National Laboratory (LANL). The new security system has proven very reliable; we have not had any artifacts stolen since its installation. However, the exhibit design has posed a special problem of alarming those objects in open display and a flexible system for our rotating exhibit space. Harpers Ferry has been contacted for possible solutions to this problem.

II. Alternatives and Impacts

A. No action. The park would be remiss on its obligation and NPS mandate "to perserve and protect" the resources. Without appropriate security measures we are unable to borrow objects from other institutions for exhibit and park material is vulnerable to theft.

B. Construct more physical barriers. This will change the "mood" of the exhibits and the creativity in exhibit designs, but will protect the artifacts from the "honest person' and from physical damage.

C. Continue working with LANL in finding secruity technology that will protect the exhibit items without causing any damage. Also, contact other parks who have solved similar problems.

III. Recommended Course of Action

The recommended course of action is alternative C. New security devises are reviewed by LANL staff periodically and they may find one that will accommodate our needs. Also, through the help of other parks, that have solved similar problems, we may be able to utilize similar techniques to achieve the maximum in security for the artifacts with the least amount of disruption to the exhibit and the visitor.

BAND CM-4
MUSEUM RECORDS MANAGEMENT

I. Problem Statement

The records of Bandelier's artifact collection, both in the park and at WACC, have been brought up to a workable standard. From this point, it will require a person reviewing catalog numbers, accession numbers, loan agreements (both from and to Bandelier) to match them with artifacts and identify any further problems. Once this step is completed, the collection will continue to require on-going maintenance to insure that all activity is properly documented, i.e., when artifacts are removed from exhibit, placed on loan, research requests, etc. An accession file has been instituted and must be periodically reviewed to insure proper documentation. The Bandelier Research Project is also contacting various institutions which contain artifacts from the park. This information and follow-up contacts must also be kept in an organized manner. The accomplishment of one of these tasks always leads to another, hence there is no end to the Management of Museum Records. As much, as possible, the records update work should be made current before the computerization of the catalog cards occurs.

II. Alternatives and Impacts

A. No action. This would result in total loss of documentation of the park's museum collection. We would not be able to answer for the artifacts entrusted to Bandelier. Also, we would be submitting incorrect information to the Automated National Catalog System, which would defeat its whole purpose.

B. Make corrections as staff time permits. The curator, the only staff member available to fulfill curatorial responsibilities, does not have the luxury of time to conduct the thorough research required to locate inconsistencies and maintain proper documentation of all activities relevant to museum records.

C. Hire a museum technician who would work year around in record-keeping, loan agreements, inventory of collection, computerization of card catalog, researching to document collections, assisting in the artifact search at other institutions, etc.

III. Recommended Course of Action

The recommended course of action is C. Hire a museum techinician whose primary duties would be record-keeping of the museum collection and park collection stored elsewhere. Having a museum technician would ensure the proper documentation of the park's collection, with all records being up to date. A 10-237 will be submitted to increase base funding.

In hiring a person whose main duty is to care for the artifact collection you will be assured this individual will want correct and current records to work with. Also, the curator will be aware of any changes that occur with the artifact collection and will be responsible for the on-going maintenance of the museum records.

BAND CM-5
ENVIRONMENTAL CONTROL IN STORAGE FACILITY

I. Problem Statement

Bandelier's research collection has suffered damage from clothes moth larvae, carpet beetles and mice. This was primarily a result of poor and inadequate storage conditions. The collections have been relocated in modified cabins. While this move has helped to reduce infestations, it has not completely eliminated the problems. The conditions remain crowded and because of the structures historic integrity many modifications cannot be made to stabilize the environment.

II. Alternatives and Impacts

A. No action. The over-crowded conditions and historic quality of the structure will increase the deterioration rate of the artifacts significantly. We are unable to modify the structure sufficiently to deter rodent and insect access. The organic collection is very small in number, hence, damage from rodent or insect activity causes the loss of valuable documentation which can never be replaced.

B. Establish and maintain a rigid housekeeping schedule whereby artifacts are checked and cleaned regularly. Also, fumigate objects susceptible to infestation at scheduled times.

C. Construct a new storage facility that will be designed and built to prevent specifically for curation of artifacts. This would include environmental controls, adequate storage space and workspace. Review BAND CM-2.

III. Recommended Course of Action

The recommended course of action is alternative C and B. In the event a new storage facility is constructed it will still be necessary to fumigate fragile objects on a regularly scheduled basis because cleaning could cause irreparable damage and also newly donated artifacts or artifacts being returned to storage.

BAND CM-6
MAINTENANCE OF HISTORIC FURNITURE BUILT BY THE CCC

I. Problem Statement

Bandelier's headquarters' buildings and many residences were constructed by the Civilian Conservation Corps (CCC) during the 1930's. These buildings include furniture and tin light fixtures also made by the CCC's. Originally, the furniture was constructed for use in the restaurant, weekend cabins and a visitor center. Some 50 years later, the historic furniture is still being used in the visitor center, in the cabins which now serve as park housing and in offices at headquarters.

During the furniture's use it has been subjected to weathering, bumping, scarring, lack of proper maintenance, the wood has dried and cracked and rawhide has become dried and cracked. Approximately, two-thirds of the furniture is being stored in an over crowded, rodent accessable facility, in various stages of disrepair.

A recent Park Servicewide survey indicates that Bandelier has approximately half of the total CCC furniture NPS collection.

II. Alternative and Impacts

A. No Action - The furniture will continue to deteriorate at a rapid rate, quickly loosing its functional value, thus removing historic integrity from the CCC structures. This alternative would be in violation of the NPS policies (NPS-28, 1090:VI-1-0).

B. Write a historic furniture preservation guide to insure the proper restoration procedures are followed in repairing thhe historic furniture. Contract all repair work to a skilled wood worker with sensitivity towards historic furniture.

C. Construct a new storage facility, solely for the historic furniture, with a furniture repair shop. The new facility should be planned with space to accommodate shelving so the furniture will not be stacked on each other. The repair shop should contain precision tools to be used only in the repair of the historic furniture.

D. Transfer furniture to WACC.

III. Recommended Course of Action

To insure the proper preservation and maintenance of the historic furniture, Alternative B and C would be the best solution. A new storage facility would insure a stable environment, with properly designed storage and a repair shop with the necessary tools. A preservation guide for the maintenance and the repair of the furniture will result in quality care and extended preservation of the historic furniture.

BAND CM-7
EXHIBIT AREA ENVIRONMENT CONTROL

I. Problem Statement

The Visitor Center is a historic building which is aesthetically appealing; however, the construction of the roof and ceiling is such that it provides warm living conditions for rodents and insects. As a result the artifacts on exhibit are in constant jeopardy of either being infested with insects or damaged by rodents. Another problem present in using a historic structure is the inability to modify it as needed.

The lobby of the visitor center is the room next to the entrance of the exhibit rooms, during the winter fire is built in the lobby fireplace which introduces smoke and soot into the air. Also, wood for the fire is brought in and stored increasing the possibility of introducing beetles and other insects in the building. The entrance and exit doors are continously being opened by visitors, which causes fluctuations in the temperature. During the summer the visitor center doors are proped open to allow easy access for visitors and to aid in cooling the building. Unfortunately, insects, rodents and dust and dirt also gain easy access. In this open-type situation, there is no possible way to stabilize the environment for the artifacts.

II. Alternatives and Impacts

A. No action. This action would eventually lead to the destruction of NPS artifacts, as well as artifacts from other institutions which are on long term loan. By allowing such damage to the cultural resources we will be losing an important facet of the park's tools for interpretation and lessen the unique experience of the visitor, as well as violating our mandates.

B. Attempt to make all exhibits and exhibit cases airtight to create a stable mini-environment in each. This measure would aid in the preservation of artifacts but would be excessively costly.

C. Isolate the environment in the museum from that of the visitor center lobby. Harpers Ferry must be contacted to design a method of separating the environments without intruding on the building's historic integrity and the mood setting environment of the exhibits.

III. Recommended Course of Action

Alternative C is the recommended course of action if an agreeable solution can be made. By separating the museum from the lobby the museum environment could be controlled. The end result would be the preservation of the artifacts, the decrease need for conservation work, as well as the efficient use of heating and cooling energy.

BAND CM-8
LOCATING AND CATALOGING PREVIOUSLY EXCAVATED ARTIFACTS

I. Problem Statement

The National Park Service is legally responsible for the accountability and preservation of all artifacts entrusted to its care. Executive Order 11593 and Management Policies (1978:V-4) require that, "The cultural resources of every park shall be located, inventoried, and evaluated for significance...".

> Every park shall maintain a complete accession record and museum catalog of historic and/or scientific objects for which it is responsible...(Ibid.V-5).
>
> ...shall document, record, and protect for optimum preservation all historic objects entrusted to its care (Ibid.V-11).

During the first half of this century, a number of institutions and individuals did research (including excavations and surveys) within the Monument. During this research, many artifacts were unearthed and were removed from the Monument for storage and analysis.

In the past, some reports of research activities and collections either have not been given to the Monument or were lost after arrival. Other reports, which are in the Monument's possession, are incomplete. The nature and condition of these reports, as well as the status of the collections, must be determined to further our current understanding of the Monument's cultural resources.

II. Alternatives and Impacts

A. No action - If no action is taken, the Monument would continue to be in violation of National Park Service Management Policies and Executive Order 11593. As time passes, it is going to be harder to locate Bandelier artifacts; some institutions that once housed them are no longer in existence. For instance, the Philadelphia Civic Center no longer houses the Otowi Collection, what the park did not receive is gone without record.

B. Continue working with the Bandelier Research Project in sending letters to museums which we believe have or had Bandelier artifacts. Because various names were assigned to sites it may be necessary to send follow-up letters, or phone calls or possible on-site examination of their records.

III. Recommended Course of Action

By law, Bandelier is responsible for those cultural objects found in the Monument and must attempt to locate, catalog, accession, and protect them. But, in situations where the Bandelier artifact is not properly curated, the collection should be recalled and stored at the park, if space allows or temporarily at the WACC. But, in addition to meeting its responsibilities in relation to interpretation (Management Policies 11978:V-6) by locating and accessioning those artifacts. Knowledge of the specifics of those cultural objects will enlarge and improve the Monument's cultural resources data base--providing accurate information for interpretation--and will help provide a sound basis for future research, all of which will benefit the management of Bandelier's cultural resources.

This project would help meet the objectives stated in the Bandelier Final Master Plan. (1977) to "Ensure protection and preservation of archaeological resources within the Monument through management...".

BAND CM-9
INVENTORY AND MANAGE USE OF HISTORIC CCC FURNITURE

I. Problem Statement

Bandelier has never had a complete inventory of historic furniture including tin light fixtures. An earlier attempt to inventory and monitor the furntiure utilized in quarters was abandoned, due to lack of "signed" responsibility by the occupants. Thus, the furniture is traded from cabin to cabin and sometimes removed and stored in inappropriate places without notification to proper personnel. Currently, the occupant faces no financial responsibility when furniture is damaged or misplaced.

The park's historic furniture collection is a significant number of the Park Service's total collection. We should be able to account for such an important part of Bandelier's history.

II. Alternatives and Impacts

A. No action. This will result in the continued abuse and negligence of the historic furniture and possible loss due to theft and damage.

B. Establish a numerical listing of each historic furniture item. Computer adaptations could include the use of a bar code, similar to bar codes found on grocery items. This bar code would need to be attached to each piece of furniture and would allow us to document as much about the piece as available. Through the use of the computer it would be easy to establish which items of furniture belong in each residence and easily monitor their condition.

C. All historic furniture should be removed from use and stored to prevent damage.

III. Recommended Course of Action

The recommended course of action is B. In establishing a numbering or bar code listing we will be able to better preserve the furniture. We will keep track of current furniture conditions, financial responsibility of quarters occupants and location of each piece of furniture.

RESOURCES PROGRAMMING SHEET

Bandelier Nat'l. Monument (PARK / AREA) | SW (REGION) | NM (ST) | ___ NATURAL | X CULTURAL | 2/9/87 (DATE) | PAGE 1 OF 1

PRIORITY	RMP REF NO.	PKG NO.	T	PROJECT TITLE	A	87 YEAR 1 NPS MY	87 YEAR 1 COST /1000	88 YEAR 2 NPS MY	88 YEAR 2 COST /1000	89 YEAR 3 NPS MY	89 YEAR 3 COST /1000	90 YEAR 4 NPS MY	90 YEAR 4 COST /1000	91 YEAR 5 NPS MY	91 YEAR 5 COST /1000	REMARKS
1.	CM-1	-		Conservation Needs Survey & Conservation		-	3.0	-	-	-	0.5	-	-	-	0.5	
2.	CM-2	-		Construct New Storage Facility		-	-	-	49.0	-	275.0	-	1.0	-	-	
3.	CM-3	-		Visitor Center & Museum Security System Revision		-	-	-	3.0	-	2.0	-	-	-	-	
4.	CM-4	-		Museum Records Management		-	-	1	17.0	1	17.5	1	18.0	1	18.5	
5.	CM-5	-		Environment Control in Storage Facility		-	2.5	-	2.0	-	0.5	-	0.5	-	0.5	
6.	CM-6	-		Maintenance of Historic Furniture Built by the CCC		-	-	-	0.5	-	0.5	0.2	20.0	0.2	10.0	
7.	CM-7	-		Exhibit Area Environment Control		-	4.5	-	0.5	-	0.3	-	0.2	-	0.2	
8.	CM-8	-		Locating & Cataloging Previously Excavated Artifacts		-	3.0	-	3.0	0.2	6.0	-	-	-	-	
9.	CM-9	-		Inventory & Manage Use of Historic CCC Furniture		-	-	0.3	3.0	0.2	0.5	0.2	0.5	0.2	0.5	

RESOURCES PROGRAMMING SHEET

Bandelier Nat'l. Monument (PARK / AREA) | SW (REGION) | NM (ST) | ___ NATURAL | X CULTURAL | 2/9/87 (DATE) | PAGE 1 OF 1

PRIORITY	RMP REF NO.	PKG NO.	T	PROJECT TITLE	A	87 YEAR 1 NPS MY	87 YEAR 1 COST /1000	88 YEAR 2 NPS MY	88 YEAR 2 COST /1000	89 YEAR 3 NPS MY	89 YEAR 3 COST /1000	90 YEAR 4 NPS MY	90 YEAR 4 COST /1000	91 YEAR 5 NPS MY	91 YEAR 5 COST /1000	REMARKS
1.	CM-1	-		Conservation Needs Survey & Conservation		-	3.0	-	-	-	0.5	-	-	-	0.5	
2.	CM-2	-		Construct New Storage Facility		-	-	-	49.0	-	275.0	-	1.0	-	-	
3.	CM-3	-		Visitor Center & Museum Security System Revision		-	-	-	3.0	-	2.0	-	-	-	-	
4.	CM-4	-		Museum Records Management		-	-	1	17.0	1	17.5	1	18.0	1	18.5	
5.	CM-5	-		Environment Control in Storage Facility		-	2.5	-	2.0	-	0.5	-	0.5	-	0.5	
6.	CM-6	-		Maintenance of Historic Furniture Built by the CCC		-	-	-	0.5	-	0.5	0.2	20.0	0.2	10.0	
7.	CM-7	-		Exhibit Area Environment Control		-	4.5	-	0.5	-	0.3	-	0.2	-	0.2	
8.	CM-8	-		Locating & Cataloging Previously Excavated Artifacts		-	3.0	-	3.0	0.2	6.0	-	-	-	-	
9.	CM-9	-		Inventory & Manage Use of Historic CCC Furniture		-	-	0.3	3.0	0.2	0.5	0.2	0.5	0.2	0.5	

E N V I R O N M E N T A L A S S E S S M E N T

ENVIRONMENTAL ASSESSMENT MATRIX

Discussion

The following matrix displays summarize and highlight evaluations outlined in the individual project statements for cultural natural resources. Alternative actions are evaluated in light of impact categories (vegetation and soils, wildlife, water quality cultural resources, air quality, visitor use patterns, aesthetic values, etc.) and resultant alternatives are discussed separately. The overall guidance document used in preparation of this matrix is "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" (November 29, 1978), Council of Environmental Policy, Executive Office of the President. Reference is made to Part 1501 - NEPA and Agency Planning.

Other documents cited for reference here are:

- -Antiquities Act, 1906
- -NPS Organic Act, 1916
- -Presidential Proclamation No. 1322 (2/11/16)
- -Executive Order 11593
- -Special Directive 75-1
- -Bandelier Master Plan and FES, 1977
- -Wilderness Act, 1964
- -NPS Management Policies (Cultural' and Natural Resources)
- -P.L. 94-567, Bandelier Wilderness, 10/76
- -Bandelier Resource Management Plan (4/76)
- -Statement for Management, Bandelier NM (3/76)

ENVIRONMENTAL ASSESSMENT MATRIX

Discussion

The following matrix displays summarize and highlight evaluations outlined in the individual project statements for cultural and natural resources. Alternative actions are evaluated in light of impact categories (vegetation and soils, wildlife, water quality, cultural resources, air quality, visitor use patterns, aesthetic values, etc.) and resultant alternatives are discussed separately. The overall guidance document used in preparation of this matrix is "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" (November 29, 1978), Council of Environmental Policy, Executive Office of the President. Reference is made to Part 1501 - NEPA and Agency Planning.

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PROJ: STATEMENT TITLE: Natural Resource Basic Inven (BAND N-1)

NEED FOR THE PROPOSAL: To comply with NPS Management Policies to develop and employ resource data for management and planning purposes.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Devlp, research strategies w/baseline invt, req, as total program	Ignore baseline studies	Baseline invt, studies on priority problems only			
Flora	No physical impacts	Restricted species may be jeopardized due to lack of information	Priorities may leave information on many species unavailable			
Fauna	No physical impacts	Other resource mgmt, actions may affect species unknowingly	Some species may be affected through other programs			

PROJECT STATEMENT TITLE: Feral Burro Management (BAND N...)
(Ref: Environmental Assessment, Feral Burro Management, Bandelier NM. 11/76)

NEED FOR THE PROPOSAL: NPS policy requires management to remove exotic animals where feasible and where research determines that the non-native animal is contributing to significant resource degradation

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Recommended action; total removal of feral burros from monument		Retention of Managed herd			
Soils	Stablizing as disturbance is removed	Erosion due to devegetation of portions of range	Erosion of bare areas			
Water	Quality increase	Fouling of water sources (feral)	Decreased water quality			
Fauna	Habitat occupied by native ungulates & predators	Burros population increases; displaces native wildlife	Competition with native wildlife			
Flora	Slow process of vegetative recovery would result	Long term changes in ecosystem components	Browsing & tramping in heavy use areas			
Visitor Use	No herd viewing	Herd viewing	Herd viewing			
Cultural Resources	Enhanced protection of backcountry sites	Damage by trampling	Damage & accelerated soil erosion			

PROJECT ATTACHMENT TITLE: Grazing Impacts on Vegetation (L , N-3)

NEED FOR THE PROPOSAL: Once heavy impacts from feral burro grazing and vegetation disturbance from trespass grazing are removed, it is unknown how the ecosystem with show recovery, and what animals are likely to occupy the niche

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Research & monitoring of vegetative recovery		Develop vegetative recovery plan			
Vegetation	No impacts	Lack of data & trends in recovery	Mechanical alteration of vegetation, unknown effects			
Fauna	No impacts	Lack if data on wildlife replacement processes	No effects			

PROJE. STATEMENT TITLE: Management of Native Ungulate ulations (BAND N-4)

NEED FOR THE PROPOSAL: To understand the relationships involved between the re-vegetation program in the La Mesa Burn and native muledeer and elk population dynamics

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Maintain cooperative studies with LANL & monitor populations		Monitor population only			
Vegetation	Knowledge increased of relationships between animals & vegetative changes over time	No adequate planning data	No data would emerge			
Fauna		Ignorance of population density trends	Gross population index derived from pellet plots only			

PROJECT STATEMENT TITLE: Fire as a Management Tool (BAN -5)

NEED FOR THE PROPOSAL: To re-establish fire as a natural component in the largely fire-dependent ecosystem, and the prevention of man-caused wildfires

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Conduct fire research burns; prepare thoroughly documented Fire Mgmt Plan	Full Suppression	Literature survey to determine fire prescription effects			
Vegetation	Understanding of fire effects through research burns; successional patterns documented	Hazardous fuels accumulations, increased chance of holocaustic wildfires	True understanding of fire's role lacking			
Fauna	Enhance habitat, short term displacement of certain species	Habitat degradation with increased vegetative density; lack of diversity				
Water	No major impacts to quantity or quality	Large destructive wildfires result in flooding & siltation				
Visitors	Enhanced awareness of role of fire in ecosystem	Visitors remain unaware of fire's role; increased chances of life-threating wildfire	Opportunity absent for visitors to observe effects of management type fires			
Facilities	Increased protection around structures from fuel reduction burns	Increased chances of facility threats by wildfire	Increased threats			

NOTE: The above display will be addressed in detail through the Fire Management Plan currently in preparation

PROJE TATEMENT TITLE: Acquisition of a Monument Res , Management Information System (BAND N-6)

NEED FOR THE PROPOSAL: To alleviate manual processing (input, retrieval, display processes) of rapidly accumulating information, fast approaching too cumbersome to manage efficiently

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Acquire system to store, retrive & illustrate information	Continue present information management	Acquire automated input & retrieval system only			
Resource Management Decisionmaking	Timely, accurate up to date information availability	Slower; less informed & decreased public image	Timely & thorough information			
Resource Information Display	Rapid, easy to read & utilize; less costly in long run	Costly to perform manually; subject to increased inaccuracy	Manual means of display - costly & subject to error			
Information availability for reporting, document preparation	Rapid & timely; cost effective with time	Slow; cost ineffective	Rapid			

PROJECT STATEMENT TITLE: Control of Hazardous Plants (N-7)

NEED FOR THE PROPOSAL: To minimize the potential for injury and/or toxic contacts by public

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Implement inspection schedule, public information program & problem removal	No Action				
Vegetation	Removal of hazards, no additional impacts	No impacts				
Visitors & employees	Improved public safety & awareness - save life & limb	Increased chance of personal injury or death, damage to facilities and/or vehicles				

PROJECT STATEMENT TITLE: Control of Hazardous Animals (ID Nr 8)

NEED FOR THE PROPOSAL: Prevention of human - hazardous animal contact; minimize chances for disease outbreaks

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Public information, law enforcement, inspection schedule & corrective action	No action	Manage for human-animal contact only			
Visitors & employees	Minimize injury or disease greater awareness & prevention potential	Chances of harm or injury - lost employee time; increased chances of costly legal action	Minimize harmful effects			
Animals (wild & domestic)	Minimize injury and sickness to pets & wildlife. Threatment may result in animal removal, death, etc.	Increased chances of disease outbreaks; increased chance of harmful public/employee contact, chemical treatment specific to identified peat	Chemical or other treatment would result in animal removal or death			

PROJECT TITLE: Rehabilitation of Cottonwood Pi Area and Juniper Campground (BAND N-9)

NEED FOR THE PROPOSAL: Heavy camping and picnic use has resulted in visual impacts to vegetation and soils, and rehabilitation is needed to maintain site vigor

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Employ rockwork, erosion control, photo monitoring, reseeding	Allow use without rehabilitation	Continue camping loop rotation picnic area regulations only			
Vegetation	Vegetative cover will be increased in specific impacted areas	Vegetation will be trampled, decreasing percent coverage	Poor vegetative recovery in picnic area; campground vegetation would remain relatively stable			
Soils	Seeding will act to retain soil & minimize erosion; cribbing will reinforce creek banks in area	Increased compaction over time, resulting in poor re-vegetation & high rate of erosion	Compaction in picnic area			
Visitor Use	Temporary closures during rehab will result in some disruption to normal use	No impact other than aesthetic degradation	No impact except aesthetic degradation in picnic area			
Water	Cribbing along Frijoles Creek banks, will reduce siltation in creek resulting from slumping and trampling by visitors	Siltation in Frijoles Creek would increase from bank breakdown	Siltation slowly continuing in Frijoles near picnic area			

PROJECT STATEMENT TITLE: Management of Backcountry Vis' - Use (BAND N-10)

NEED FOR THE PROPOSAL: Manage for a balance of use and preservation of wilderness and backcountry values

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION Revise Backcountry Management Plan	NO ACTION Continue current management	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
Soils	Perceived stability of campsite soils	Gradual impacts to soils over time				
Water	Perceived continuing water quality	No effect				
Vegetation	Reduction of fuel-wood use through regulation change	Increase in fuel-wood use; less available wood near campsites				
Visitor Use	Perceived alteration of use patterns through regulation & enterpretative messages	No perceived change				

PROJECT TENTNT TITLE: Regeneration of Ponderosa Pine ie La Mesa Burn Area (BAND N-11)

NEED FOR THE PROPOSAL: Very little seeding reproduction is evident in the severe burn areas due in part to grass competition and lack of seed sources

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Study several methods of enhancing regeneration of Ponderosa Pine	Status Quo	Restock all former Ponderosa Pine sites only			
Vegetation	Increased tree cover, reduced grass cover	Slow succession to Ponderosa; many areas remaining pure grass - forb type	Improvement rapid for Ponderosa; high mortality			
Soils	Nutrient cycling into soils from eight burning; some mechanical disturbance	No perceived changes	No immediate changes			
Aesthetics	Improved over long term	Remains unpleasant in severe burn area	Improved near highway in long term			
Fauna	Increase in small mammal & predator populations; bird life increase over time	Good forage for grazers	Grazing forage decreased in long term			
Cost	Minimal with small plot treatments	None	Very costly for nusery stock or seed collection & propagation			

PROJECT STATEMENT TITLE: Management of Rio Grande - Coc[illegible] Lake Shoreline in Bandelier National Monument ([illegible]D N-12)

NEED FOR THE PROPOSAL: Severe water level changes recently have caused vegetational and faunal changes which may severely alter natural processes

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Initiate seeding program and evaluate results	Status Quo	Remove dead trees along shoreline only			
Vegetation	Improved through seeding; percent cover increased	Remains in poor condition	Increased reproduction perceived			
Fauna	Waterfoul habitat improved in seeded areas; raptor prey increased	Habitat remains marginal for waterfoul & raptor population	Decrease perch & nesting availability for birds			
Aesthetics	Vegetative cover would improve appearance of shoreline areas	Area would remain unsightly	Improved over long term			
Soils	Increased stability, however potentially temporary only	Soils & sediments remain unstable	Highly susceptible to erosion with high water levels			
Cost	Minimal if cooperative effort	None	Very high			

PROJECT TEMENT TITLE: Management of Water Resources (N-13)

NEED FOR THE PROPOSAL: Adjacent land use patterns, flooding and increased visitation is resulting in the need to actively manage for quantity and quality of surface waters

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Develop a water resource management plan	Status Quo	Manage by crisis			
Water	Increased protection measures through information - based management	Minimal protection lack of management information	Minimal and sporadic protection			
Visitor & Employee Safety	Safety maximized through prevention monitoring of water quality provided in plan	Chances of safety hazards increases	Hazards appear unnoticed without preventive measures			
Aquatic Life	Diversity & health improved through data based management programs	Trends unnoticed; loss of diversity and health from pollutants more probable	Treatment is only alternative			
Wilderness Character	Maximized through monitoring and management action	Vulnerable to degradation	Vulnerable to degradation			

PROJECT TREATMENT TITLE: Control of Exotic Ailanthus (BA' -14)

NEED FOR THE PROPOSAL: This non-native has potential for large scale displacement of native species, uncontrolled growth, and alteration of faunal populations

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Continue eradication program	No action	Research only			
Vegetation	Treatment causes no other vegetative damage	Native vegetation displaced through competition	Treatments have limited impact on vegetation			
Water	Water uptake reduced as plants are removed availability to other plants increases	Water uptake increases in plants availability to native plants decreases	Some water loss			
Soils	No perceived impacts	Potential chemical changes likely	Unknown			
Cultural Sites	Protection of Tyuonyi Ruins improved through plant removal	Damage from plant invasion of walls and floors, causing cracking & crumbling	Some damage may occur			
Fauna	No perceived changes or impacts	Populations of small mammals & birds may be altered	Effects unknown			

PROJECT TEMENT TITLE: Management of Restricted Faunal ecies (BAND N-15)

NEED FOR THE PROPOSAL: Unique, rare and endangered species require specialized management information and subsequent management

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Mgmt, via use regulation, habitat improvement & monitoring & research		Continue present management	Add protective measures & improve habitat	Monitoring & research only	Manage for potential Peregrine falcon habitat
Vegetation	Increased productivity in treated areas	Largely unchanged	Unchanged	Increased productivity through seeding	Unchanged	Increased productivity in seeded areas
Fauna	Increased waterfoul populations	Potentially decreasing waterfoul populations	Minimal Eagle habitat protection through regulation	Increased Eagle prey populations through burro reduction	Decreased protection for Bald Eagle areas	Potential increase in waterfoul
Visitor Use	Continued camping closures will have minimal effect on use patterns	No effect	No effect	Trail re-routing may temporarily disrupt normal use patterns	No effect	No effect
Soils	Improved stability through grass seeding	Gradual soil erosion from highly unstable sites	Gradual soil erosion in unstable areas	Improve stability	No effect	Improved soil stability at seeded sites

PROJECT STATEMENT TITLE: Management of Restricted Flora (ND N-16)

NEED FOR THE PROPOSAL: Compliance with NPS policies to employ protective measures for scientifically unique, rare and/or endangered plants

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION: Monitor identified plants & cooperate with state heritage program	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
Resource Information Availability	Plant data available to assist in developing protection strategies	Information used to develop protection strategies unavailable				

PROJEC ATEMENT TITLE: Protection of Air Quality Rela Values (BAND N-17)

NEED FOR THE PROPOSAL: To ensure adequate protecting of Class I Bandelier Wilderness air related resources

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Monitoring & acid precipitation data collection	No monitoring	Monitoring visibility & particulates only			
Baseline & trends data for management purpose	Data collected would comprise a good source of management information	No data, poor management & protection program	Data lacking in sulfates deposition and related PH trends; no time tapse photo records			

PROJECT TEMENT TITLE: Literature Search & File (BA C1)

NEED FOR THE PROPOSAL: Research and report writing are taking an ever-increasing proportion of park management time: to facilitate this process, a system of research information retrieval is necessary.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Compile annotated Bibo's.for research & mgmt. use, then program McBee cards		Multiple reference files	Computerized retrieval		
Cost to establish system	Cost of researching all available resource; cost of punching in data on cards		Cost of researching all available sources; cost of developing multiple source files	Cost of researching all available sources; plus cost to program & store data in computer		
Cost to use system	Very low time & maintenance cost		Time needed to use system is much greater than other files - increasing costs	Expensive maintenance, but low use time		
Flexibility of system	This system will sort for up to 100 catagories		This system is severely limited in the number of sort categories it can handle	This system can increase indefinitely the number of sort categories available		
Lack of information availability		Under the current system, each project must be individually researched				

PROJECT TENENT TITLE: Locating & cataloging previously excavated artifacts (BAND C-2)

NEED FOR THE PROPOSAL: To furnish a cohesive picture for the management & interpretation of the monument's cultural resources, we must obtain detailed information on the work that has already been completed within the monument's boundaries.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Locate, catalog, & accession previously excavated artifacts		Send out canvassing letters to determine the loc & cond. of artifacts			
Visitor Use	These resources would be increased	No public use of these artifacts is currently taking place				
Cost to monument	Would bear the cost of shipping, accessioning, & storing the artifacts					
Availability of information	Information, which is not currently in the monument's possession, would be available about the areas where these artifacts were taken from	No analysis of these artifacts has yet been published	In theory, this would supply a data base for management decisions			

PROJECT TITLE: Archaeological Site Survey (BAND [illegible])

NEED FOR THE PROPOSAL: An archaeological site survey is required by law and is needed for intelligent management of the resource

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Professional survey teams & remote sensing techniquies to perform complete survey		Use of local volunteer crews over a period of several years			
Visitor information	Interpretive data for the monument as a whole, would be greatly increased	Little or no information is currently available on the majority of sites	The information would tend to be somewhat inconsistent			
Management information base	Data for intelligent decision-making would be greatly increased	Same as above	Same as above			
Cost to monument	Greatest cost to monument		Lesser cost to monument			
Legal	Would meet legal obligations		Would meet legal obligations			

PROJECT STATEMENT TITLE: Test excavation and prehistoric environment study (BAND - C4)

NEED FOR THE PROPOSAL: Test excavation of specific locations is necessary to augment the information gathered by and answer questions posed by the proposed site survey. This project is intended to give a reliable and well-rounded view of the Puebloan environment and lifestyle.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Coordinated survey and test excavation		Independent test excavation & environmental testing			
Visitor information	Would meet information needs	Does not properly meet needs	Would meet information needs			
Management information	Would meet management needs	Would not meet management needs	Would meet management needs			
Natural resource damage	Would entail minimum resource damage		Would entail greater resource damage			
Cultural resource impacts	Would entail the minimum necessary distrubance		Would entail a wider spectrum of damage to resource			
Cost to park	Approximately $25,000		Approximately $25,000			

PROJECT STATEMENT TITLE: Stabilization of exposed ruins (MAND - C5)

NEED FOR THE PROPOSAL: To comply with the mission of preserving the cultural resources of the monument, an increased ruins maintenance push is required; to include additional ruins maintenance positions and preservation guidelines.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION Add. stabilization personnel; preparation of guidelines	NO ACTION	ALTERNATIVE Experimental stabilization techniques	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
Damage to ruins	These measures are designed to reduce damage to ruins	Currently deterioration is occuring at a greater rate than the rate of stabilization	This would endanger a portion of the resource			
Legal	Would meet the monument's legal obligations	Does not meet the legal obligations	Would meet the legal obligations			
Visitor Use	Enhanced maintenance should increase visitors and enjoyment	Will eventually reduce visitor use and enjoyment	Should increase visitor interest			

PROJECT STATEMENT TITLE: Oral history research (BAND - [illegible])

NEED FOR THE PROPOSAL: Until the mid-1900's, there was little or no recorded history of this part of New Mexico. Several individuals are yet living who have extensive knowledge of the early history of this area. Because of their advanced age, it is essential that their stories be recorded as soon as possible.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Tape interviews that are later transcribed		Taped interviews			
Visitor Information	The resource could be preserved & duplicated for widespread use and information	The resource will be permanently lost	The resource would be preserved for limited use			
Management information	The resource could be more easily used for management decisions	The resource will be permanently lost	The resource would be difficult to use for management & planning purposes			

PROJECT STATEMENT TITLE: Literature search and historic narrative (BAND - C7)

NEED FOR THE PROPOSAL:

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Research & formulate a historic narrative					
Visitor information	Information and access to it would be greatly increased					
Management information	Information and access to it would be greatly increased					

PROJECT STATEMENT TITLE: Assessment of environmental influences on cultural resources (BAND - C8)

NEED FOR THE PROPOSAL: Research effects of environmental factors on cultural resources for administrative and management decisionmaking

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Monitor resources & effects for data to be used in later decisionmaking					
Visitor use	Would increase information base	Well based information on environmental effect of cultural resource sites shall continue to be unavailable for use by both visitors & park managers				
Management information	Would increase management information base for decisionmaking concerning possible interference with natural processes					

FOR RESOURCES [illegible] EMENT PLANS

PROJECT STATEMENT TITLE: Band C-9 Protection of Cultural Resources through Patrol and Enforcement

NEED FOR THE PROPOSAL: Several park areas are currently subject to vandalism at a greater than expected rate due to their unsupervised status.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION Additional Patrol Positions	NO ACTION	ALTERNATIVE 1 Establishing patrol as a priority function	ALTERNATIVE 2	ALTERNATIVE 5	ALTERNATIVE 6
Visitor Services	Would increase visitor assistance without decreasing other essential services	N/A	Would eliminate some services currently provided to redirect manpower			
Resource Degradation	Would decrease resource degradation due to vandalism and visitor abuse	Resource degradation would continue at present rate or above as visitor use increases	Would decrease resource degradation			

ENVIRONMENTAL ASSESSMENT [illegible] FORM (Summary)
FOR RESOURCES MANAGEMENT PLANS

PROJECT STATEMENT TITLE: Maintenance of Historic Structures Built by the CCC (BAND C-10)

NEED FOR THE PROPOSAL: To insure proper maintenance of historic structures within the Monument and compliance with the criteria set down in N.R.S. 28, Chapter II and VI

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION Establish cyclic maintenance and adaptive use plans for historic struct.	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Aesthetics	Would help insure aesthetic continuity throughout the historic structures	Would give no assurance of future aesthetic continuity				
Continuity of Maintenance Actions	Would produce maintenance action in keeping with the historic nature of the structures					
Management Planning	Would facilitate management planning and the programming of funds and projects	Would tend to hinder management planning and programming				

PROJECT .TEMENT TITLE: Conservation Needs Survey and Co. .vation (BAND CM-1)

NEED FOR THE PROPOSAL: Bandelier artifacts have been ignored for several years; their storage condition & environment was detrimental to the artifacts. Few if any of the artifacts have received any conservation resulting in on-going deterioration. Much deterioration is not visible until it is too late to save the artifact. A survey by a conservator would provide information on the needs of the collection.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Contract conservator for survey of conservation needs. Funds for immediate & future needs.	Continue to display & loan artifacts in unstable conditions	Send artifact in need of conservation to Harpers Ferry			
Cultural Resource	The conservation & stabilization of artifacts will result in the preservation of a valuable park resource which can be utilized for many years	The professionalism of an institution which continues to allow the deterioration of artifacts is questionable	Conservation of artifacts does not normally occur unless item is very unstable. In this stage it would be detrimental to change its native environment by sending it to Harpers Ferry. Transporting the item could be very hazardous			
Aesthetic	By detecting deterioration in early stages the beauty of the artifact & its integrity can be preserved	The unchecked deterioration of artifacts will result in unsightly damaged artifacts				
Researcher's	Conservation can preserve the valuable information artifacts have to offer. When deterioration is stopped early the original shape, size & material can be saved. Thus providing valuable research material.	The less complete original material an artifact consists of, the less value to researchers.	While the artifact is stored at HFC till it can be conserved it is inaccessable to researchers.			

PROJECT STATEMENT TITLE: Conservation Needs Survey and ervation (continued)
(BAND CM-1)

NEED FOR THE PROPOSAL:

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Contract conservator for survey of conservation needs. Funds for immediate & future needs.	Continue to display & loan artifacts in unstable conditions	Send artifact in need of conservation to Harpers Ferry			
Information	Well preserved artifacts provide valuable interpretive tool for staff & visitors	Interpretation of artifacts suffering from visible deterioration makes it difficult to handle or display				

PROJECT STATEMENT TITLE: CONSTRUCT NEW STORAGE FACILITY (AND CM-2)

NEED FOR THE PROPOSAL: Bandelier's artifact collection is presently stored in a historic structure which has limiting factors of size, materials used in its consturction and the inability to modify the original building. The storage area is not sufficient to adequately house the collection, artifacts are crowded and infestations have recurred in the building. There is little workspace for the curator or researchers.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Construct new storage facility w/modern environment & security controls & an equipped work area	Continue to crowd artifacts, promote deterioration & prevent adequate care for the collection.	Modify interior of building for pest & environment control.	Store artifacts at repository		
Cultural Resources	New facility would stabilize environment for artifacts which would result in their preservation. With updated facilities, could attend to needs of artifacts as identified.	Crowding of artifacts & lack of work space will result in advancing deterioration of the collection	Keeping a stable environment & insects & rodents from entering the facility will aid in the preservation of the collection.	Would meet preservation needs of the resources		
Aesthetic Values	Modern, clean spacious facility would be more conductive to working with artifacts	Crowded facilities result in poor access to the artifacts & lack of visability. Rubbing of artifacts results in surface loss & scarring.	Preserved artifacts will result in better research & exhibit items.			
Visitor Use (Researchers)	Modernized facility will aid research of artifacts & will better accommodate researchers needs		Deteriorating artifacts are not stable for research handling or exhibiting.	Would centralize artifacts at a facility & expand collection inventory.		
Interpretation	New storage facility could serve as example to museum people from other institutions, on best care for museum pieces.		A fragment of an artifact does not give the same information to visitors as a whole artifact would.	Would reduce or hinder ready access.		

PROJECT TENANT TITLE: Visitor Center & Museum Securi. ystem Revision (BAND CM-3)

NEED FOR THE PROPOSAL: Present security system has proved insufficient. Since its installation in 1975, seven artifacts have been stolen. There have been several instances when visitors should have caused the alarm to sound and it has not. It is an unreliable system.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Security system expert evaluate museum needs, devise new flexible system	Continue to test alarm, daily & random walkthrough surveillance	Physically close off life-size dioramas, place electric eyes in each room			
Cultural Resources	New security system will provide optional protection of artifacts from damage or theft	Artifacts may possibly continue to be stolen from exhibits	The artifacts will be protected from damage or theft			
Aesthetic Value	New security system will not be overly visible, will not be attached to artifacts in way that will damage.		Mood of the dioramas will be changed			
Visitor Use	Visitors will be able to enjoy viewing artifacts in mood-setting environment	Exhibit niches will be empty when security system is not working	An uncomfortable, unrelaxed feeling will result from being viewed with electric eye			
Interpretation	The exhibits will be representative of environment of the artifact which will promote self-interpretation	When exhibits are empty due to security system malfunction, museum does not lend itself to interpretation	Physical barriers will prevent effective mood of life-size dioramas			

PROJECT STATEMENT TITLE: Museum Records Management (BAND 4)

NEED FOR THE PROPOSAL: Years of neglect have resulted in loss of information, misfiling, incorrect documentation & lack of an accession file. Extensive research through old correspondence & administrative files must be conducted to retrieve important information.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Grant money for personnell & research of artifacts. Establish record-keeping & ongoing maint. of it	Valuable info. will continue to be lost. Catalog cards will be incorrect	Make correction as found			
Cultural Resources	Research will provide valuable information necessary to document ownership of artifact storage location & archaeological documentation.	Museum records will be lacking in information artifacts will be unaccounted for & knowledge of BAND artifacts in other institutions will not be known	Random corrects will be made to the records which may or may not be complete			
Researcher Use	Correct & complete museum records will benefit researchers of artifacts. Valid & documented information will increase use of records by researchers & establish creditability in management .	Disservice is being done to researchers due to lack of record keeping. Basic information is not at hand so researchers must conduct research for information the park should provide				
Interpretation	With added information, interpretive uses of artifacts will be varied & will provide insight of the importance of artifacts	Artifacts will continue to provide minimum information to be used in interpretating	Any information added to records will promote further interpretation			

PROJECT STATEMENT TITLE: Storage Facility Environment C[illegible] 1 (BAND CM-6)

NEED FOR THE PROPOSAL: The present storage facility has no built in means of temperature and humidity control; there is no central heating or cooling system in the building. Also, the roof/ceiling construction allows for insect and rodent habitation and the build-up dust and dirt.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Construct new storage facility from plan specifically designed for Bandelier's needs	Continue to keep all artifacts in cases & dust & vacuum floors	Apply for 106 Clearance to recondition roof & add two-way circulation vents.			
Cultural Resources	Better storage & environment control will preserve the artifacts. This will maintain artifacts of display quality & require less expense for conservation	Artifacts will continue to undergo changes which will cause serious damage in the future	Through regulation the temperature & humidity artifacts will require less conservation work.			
Asethetic Values	Proper storage of collection will maintain face value of artifacts for display & research purposes		Artifacts will maintain original surface & consistenancy with regulated temperature & humidity			
Researchers Use	With expanded & modernized facilities researchers would have better accommodations	Researchers will continue to be cramped & lack equipment necessary to fully research artifacts				
Cost	Benefits derived from a well equiped facility will far out weigh the cost of construction	Conservation of artifacts will continue to be a costly & reoccurring expense	If approval was granted reroofing & other upgrating will be time consuming & costly			

PROJECT STATEMENT TITLE: Maintenance of Historic Furniture Built by the CCC (BAND CM-6)

NEED FOR THE PROPOSAL: To insure the preservation and proper maintenance of the historic furniture in compliance with the criteria set down in NPS-28, Chapter II and VI.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Maintain a type collection. Proper preservation will require a new storage facility.	Would be in violation of NPS policies	Replace original CCC furniture with reproductions			
Aesthetic Value	This preserved collection will enable the other furniture to keep their original look.	Loss of a valuable resource	Reproductions can serve the same purpose as the originals, however, at a great expense.			
Maintenance	The type collection will serve as models for the correct restoration of the furniture being used.	Would continue to be haphazard	Care of reproductions will be necessary and as costly as maintaining the originals.			
Management Planning	The plan will provide a means of regular, restricted care for the furniture	Would hinder any funding programming for its care				

PROJECT ATTACHMENT TITLE: Exhibit Area Environment Control (BAND CM-7)

NEED FOR THE PROPOSAL: The museum entrance opens into the Visitor Center lobby, which greatly affects the environment of the exhibit rooms. During summer the Visitor Center doors are kept open for cooling purposes, which allows dust, vehicle emission & insects to enter while in the winter fires are built in the fireplace in the lobby which results in smoke & soot in the building also, the entrance & exit doors are constantly being opened allowing cold air to enter causing temperature fluctuations

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Install doors to & from museum, improve temp. systems & recondition roof & ceiling.	Continue to dust & clean exhibits; check artifacts regularly for conservation needs	Attempt to make air tight exhibit cases, creating stable environment			
Cultural Resources	Artifacts will be better preserved which will result in less expense for conservation treatments.	It is possible to damage artifacts by constantly moving them for cleaning				
Aesthetic Values	Cleaner exhibits & a constant air temperature will enrich the exhibits		Beauty & preservation of the artifacts will be maintained but at a great cost			
Visitor Use		Exhibits may be in display during cleaning while visitors are in the museum				
Interpretation	The exhibits will be more appealing and may lend themselves to better interpretation.					

AGENCIES AND PERSONS CONSULTED IN ASSESSMENT PREPARATION

Frank Smith	New Mexico State Forestry, Santa Fe, NM
Mike Warren	Natural Resources, NPS, Santa Fe, NM
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Terry Johnson	Researcher, Los Alamos, NM
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Melody Webb	Historian, Cultural Resources, NPS, Santa Fe, NM
Laboratory of Anthropology	Santa Fe, NM
Charles Steen	Consulting Archaeologist, Los Alamos National Laboratory, Los Alamos, NM
Dee Green	Archaeologist, U.S. Forest Service Region III Office, Albuquerque, NM
Toby Raphael	Ethnological Conservator, NPS, Harpers Ferry Center, West Virginia
Dave Brugge	Regional Curator, NPS, Santa Fe, NM
Barbara Stanislowski	Curator, School of American Research, Santa Fe, NM

DCP Prop/ Assessment Frijoles Mesa

DEVELOPMENT CONCEPT PLAN - PROPOSAL/ASSESSMENT

FRIJOLES MESA DEVELOPMENT

BANDELIER NATIONAL MONUMENT

LOS ALAMOS/SANDOVAL COUNTIES, NEW MEXICO

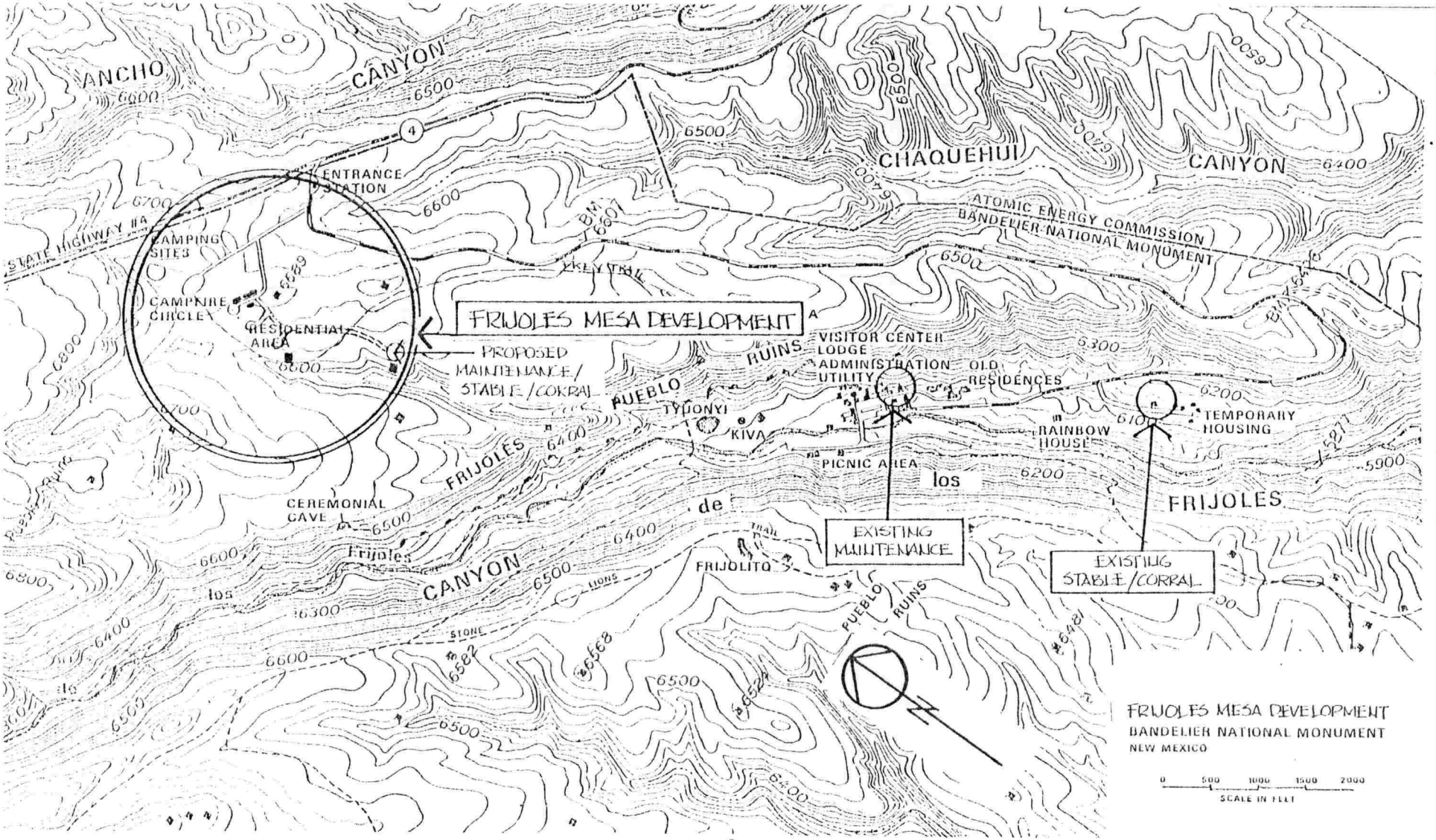
I. Statement of the Problem

The visitor and administrative facilities for Bandelier National Monument are concentrated in Frijoles Canyon. The entire complex was constructed during the 1930's by the Civilian Conservation Corps. Because the canyon is small, with much of its land occupied by the ruins and stream, the remaining limited space incorporates the bulk of the monument services.

The Frijoles Mesa area directly above and to the north of Frijoles Canyon was incorporated into Bandelier National Monument by Presidential Proclamation on January 9, 1961. The existing development on Frijoles Mesa was constructed under the Mission 66 Project, and consists of a campground and a residential area.

The approved Master Plan dated April 1977 proposed the expansion of the residential area on Frijoles Mesa and removal of the old "White Rock" seasonal houses in Frijoles Canyon. The Environmental Assessment/Review, Removal and Relocation of Residences, Bandelier National Monument, June 1977, outlined the plan for expansion of the Frijoles Mesa residential area and relocation of the White Rock residences to Frijoles Mesa. Construction of new maintenance facilities was not called for in the 1977 Master Plan, though a maintenance storage area already exists next to the sewage lagoons on Frijoles Mesa.

TCE PLAN FILES


ANCHO
CANYON
CHAQUEHUI
CANYON
ENTRANCE STATION
STATE HIGHWAY #4
CAMPING SITES
CAMPFIRE CIRCLE
RESIDENTIAL AREA
FRIJOLES MESA DEVELOPMENT
PROPOSED MAINTENANCE / STABLE / CORRAL
ATOMIC ENERGY COMMISSION
BANDELIER NATIONAL MONUMENT
RUINS
VISITOR CENTER
LODGE
ADMINISTRATION
UTILITY
OLD RESIDENCES
PUEBLO
TYUONYI
KIVA
RAINBOW HOUSE
TEMPORARY HOUSING
PICNIC AREA
CEREMONIAL CAVE
FRIJOLES
los
de
Frijoles
CANYON
FRIJOLITO
EXISTING MAINTENANCE
EXISTING STABLE / CORRAL
PUEBLO
RUINS
STONE
LIONS
FRIJOLES MESA DEVELOPMENT
BANDELIER NATIONAL MONUMENT
NEW MEXICO
0 500 1000 1500 2000
SCALE IN FEET

The existing maintenance and horse facilities for Bandelier National Monument are inadequate for handling the current area needs. Since these facilities are located in the prime visitor-use area (Frijoles Canyon), and the current policy for this area is to reduce development impacts and congestion (see Master Plan, April 1977), expansion of these facilities is precluded in their present locations. In addition, the corral, paint storage, and gasoline storage and dispensing facilities have been found to be in violation of health and safety standards, and will require immediate correction.

During the 1977 fire at Bandelier, helicopters which were fighting the fire used a makeshift landing area on Frijoles Mesa. A more permanent and safer helicopter landing area is needed for use in emergencies. The Frijoles Mesa area is the logical location for this facility both from the standpoint of topography and convenience and proximity to the proposed maintenance facilities.

An overall plan is needed which will relate the various design elements within the Frijoles Mesa development to one another, and will provide a guide for the orderly development of needed facilities.

II. Description of the Proposal

This proposal integrates the various elements of the development on Frijoles Mesa into one plan which includes a campground and residential area, both existing and otherwise covered in previous planning documents, and proposes a new maintenance area to include maintenance and horse facilities, and a helicopter landing pad.

The 1977 Master Plan stated that there would be no expansion of the campground and campfire circle.

A residential road with a cul-de-sac is currently under construction, and a contract has been let for the construction of two modular residential units to be located on the cul-de-sac. The Environmental Assessment/Review, Removal and Relocation of Residences, Bandelier National Monument, June

1977, stated that trailers would be used for housing on Frijoles Mesa until funds become available for the construction of permanent residences.

There are presently four permanent residences and three trailers in the Frijoles Mesa residential area. Another 24 residential sites will become available with the completion of an additional spur road.

A new maintenance area on Frijoles Mesa will include road access, parking, security fencing, and utility connections. Facilities to be included within the maintenance area are as follows:

--12-bay (6 heated) maintenance building with office and locker rooms (approximately 7,200 sq. ft.).

--A 180 sq. ft. fireproof paint storage area.

--A 144 sq. ft. gas and oil storage and dispensing facility, including two 1,000-gallon storage tanks.

--A storage structure (approximately 1,440 sq. ft.).

--A helicopter pad (approximately 25 ft. square) to be located outside the maintenance enclosure.

--Explosive storage, located away from other buildings to comply with OSHA and IRS requirements.

The paint storage facility and the gas and oil storage and dispensing facility are of high priority and will be built as soon as possible. Other facilities will be programmed for construction at some future date. Existing temporary storage structures (approximately 1,440 sq. ft.) in the Frijoles Mesa area will remain in use until replaced by permanent facilities.

There has been some discussion of establishing a YACC program at Bandelier. Should this become a reality in the near future, the space allocated for the maintenance structure would be developed as a facility for the YACC to house

classrooms, offices, shops, warehousing, etc. The structure would be designed in such a way as to be suitable for conversion to park use.

A horse facility on Frijoles Mesa will include road access, parking, fencing, utility connections, and the following:

--A roofed stable area of approximately 2,400 sq. ft., a portion of which (1,050 sq. ft.) would be enclosed and heated to accommodate two box stalls, a tack/workroom, an office, and a restroom. The remaining covered area would provide storage for hay and equipment and shelter for horses.

--Two corrals, one approximately 7,500 sq. ft., with feeding stalls, and the other one acre. The corrals will be connected to each other and the stable.

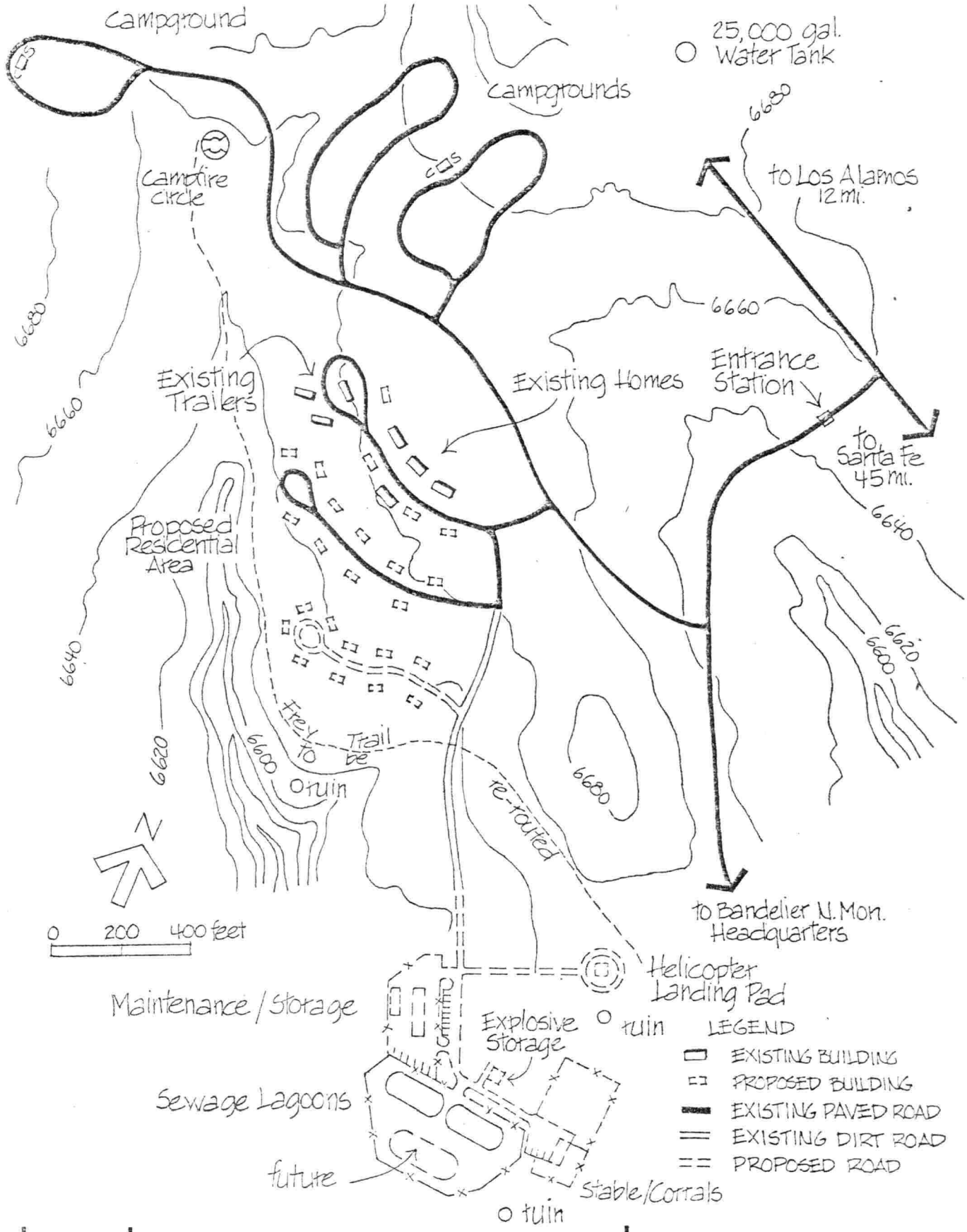
The horses are to be moved from the Frijoles Canyon area as soon as a suitable corral area and shelter can be provided for them. This may precede the completion of the entire facility and could either be accomplished by providing a temporary shelter or by constructing a portion of the stable structure.

A portion of the Frey trail on Frijoles Mesa will be re-routed to bypass the new maintenance area (approximately 1/2 mile of trail).

The Frijoles Mesa area is supplied with water from Los Alamos. A 25,000-gallon tank was constructed in 1978 in order to guarantee a constant supply. This supply is adequate to take care of all anticipated demands.

An 8" water main will be required to provide adequate fire protection for the maintenance area development. The existing main supplying the residential area is 6". This is not to be replaced until some future date; however, all new mains are to be 8" (approximately 1,600 lin. ft.).

A natural gas line (1,800 lin. ft.) will be constructed to supply heating for the stable and maintenance facilities.



development concept plan

Bandelier National Monument, New Mexico

In order to comply with codes, an 8" sewer line main (1,800 lin. ft.) replacing the existing 6" main from the residential area on Frijoles Mesa is required. A 10" sewer main (400 lin. ft.) will be required below the maintenance area. A third sewage lagoon cell will probably be needed when housing is fully developed, to handle peak summer-day volumes at Juniper Campground on the mesa.

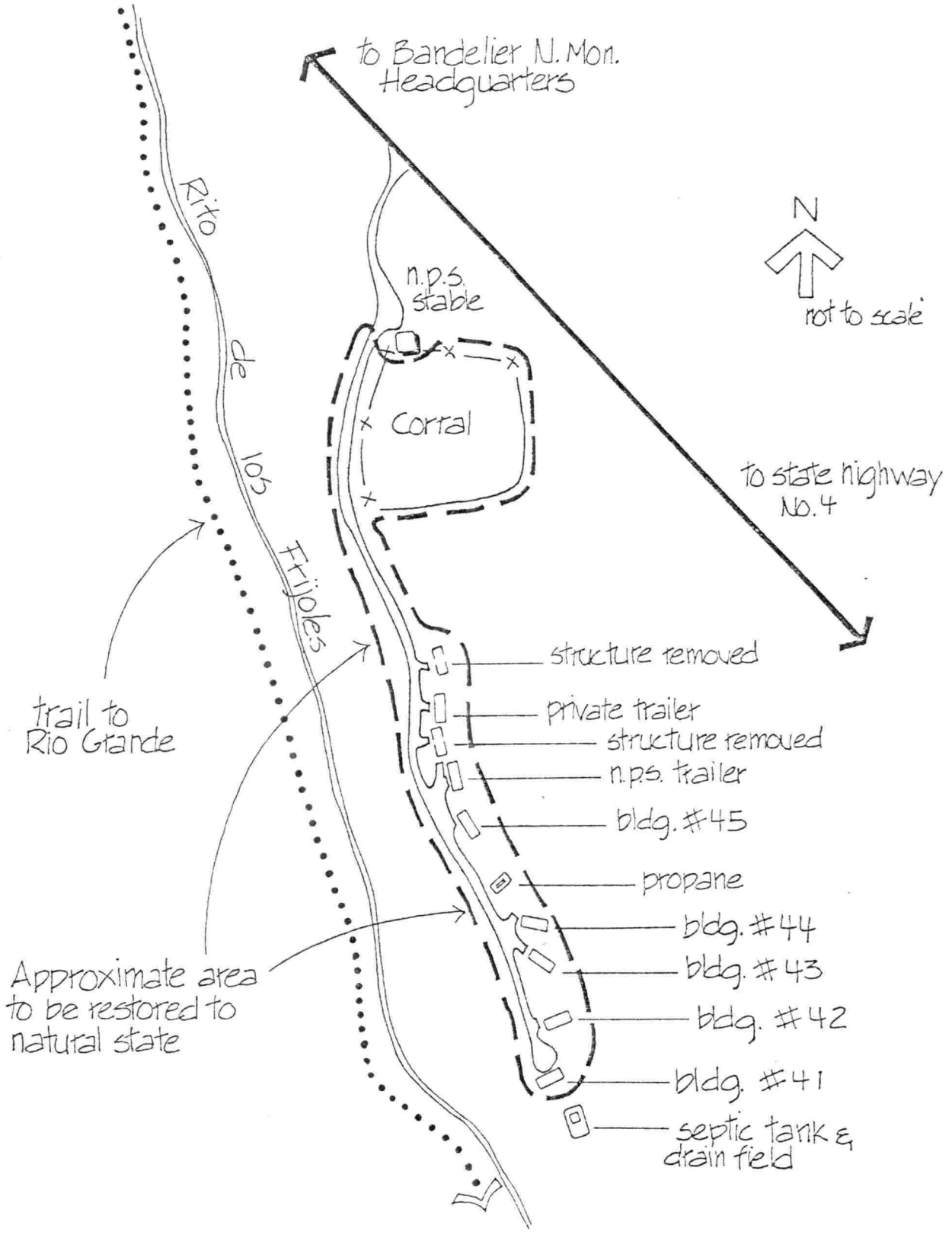
Installation of underground electric (2,000 lin. ft.) and telephone (2,000 lin. ft.) lines to serve maintenance area and horse facilities is required.

The existing corral in the drainage area, Frijoles Canyon, will be restored to a natural condition. The corral and run areas which are next to the existing barn will be removed and restored. The existing barn will be retained for use as park storage space. The access road to the barn and parking area will be retained, and a hitching rack provided. This area will continue to be used as a trail head for both the park trail crews and the public who bring horses into the park; however, no watering facilities will be provided. All existing plumbing will be disconnected.

The gasoline pump in the Frijoles Canyon maintenance area will be removed, and the gasoline storage tank will be filled with sand. All other buildings in the existing maintenance area (an approximate building area of 4,217 sq. ft.) will be retained for park uses.

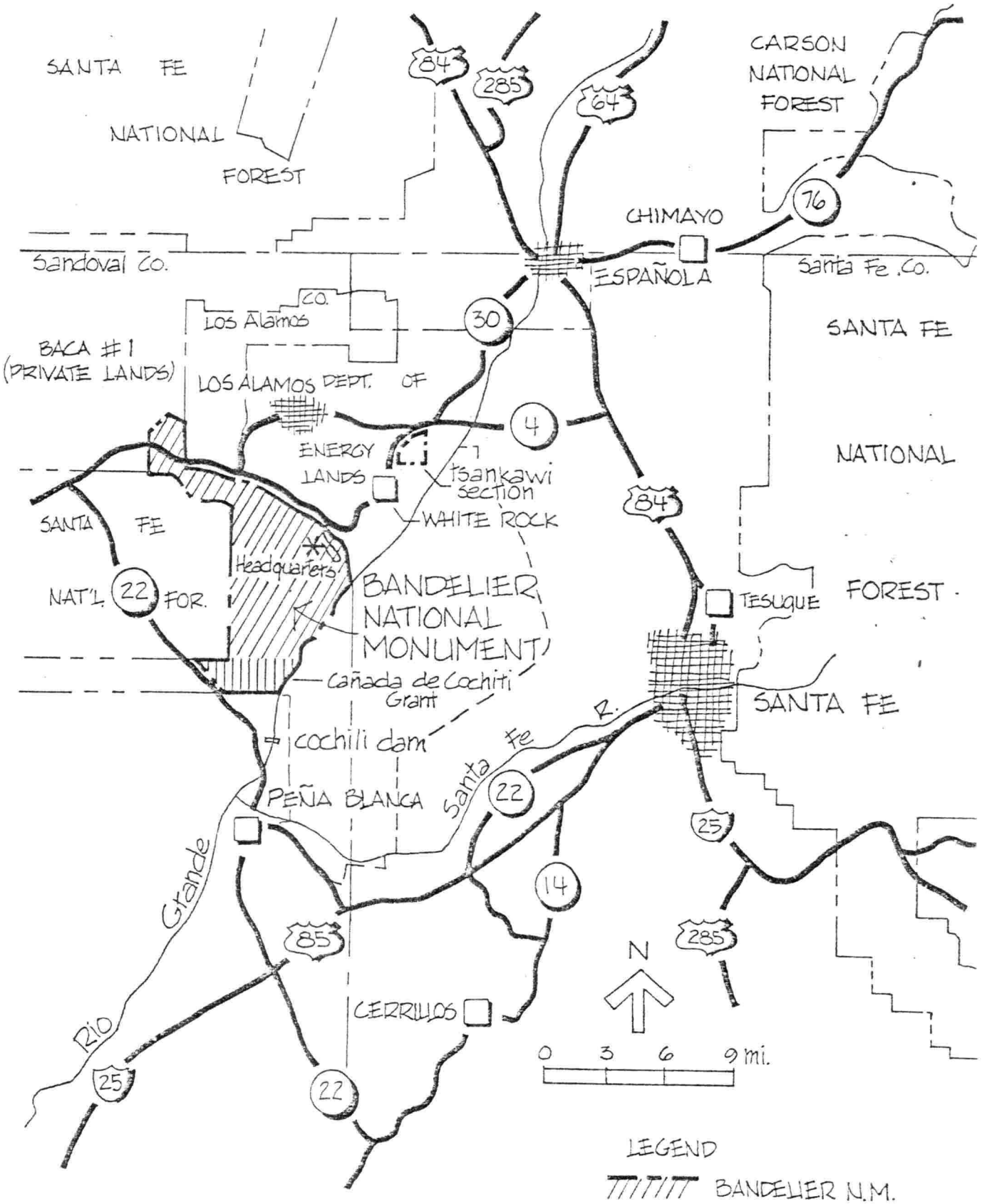
A new 18-foot wide, paved access road (1,600 lin. ft.) will be built to the maintenance/horse facilities, with a paved service/vehicle (15) storage area, parking (10 cars at maintenance and 4 cars at barn) turnaround, and fenced storage for 3 horse trailers. An 18-foot wide residential spur road (700 lin. ft.) with cul-de-sac will be built when the residential area is expanded. All old road (1,300 lin. ft.) and trail (3/4± mile) scars will be restored to natural conditions.

After all the Frijoles Canyon houses and trailers have been removed, the paved road (1/4± mile) will be scarified, and asphalt pieces removed from a point starting near the stable. (See sketch map.) House and trailer sites will be recontoured to blend with the natural landforms around them in such a way as to negate any evidence of



frijoles canyon housing and horse facility

Bandelier National Monument, New Mexico



region

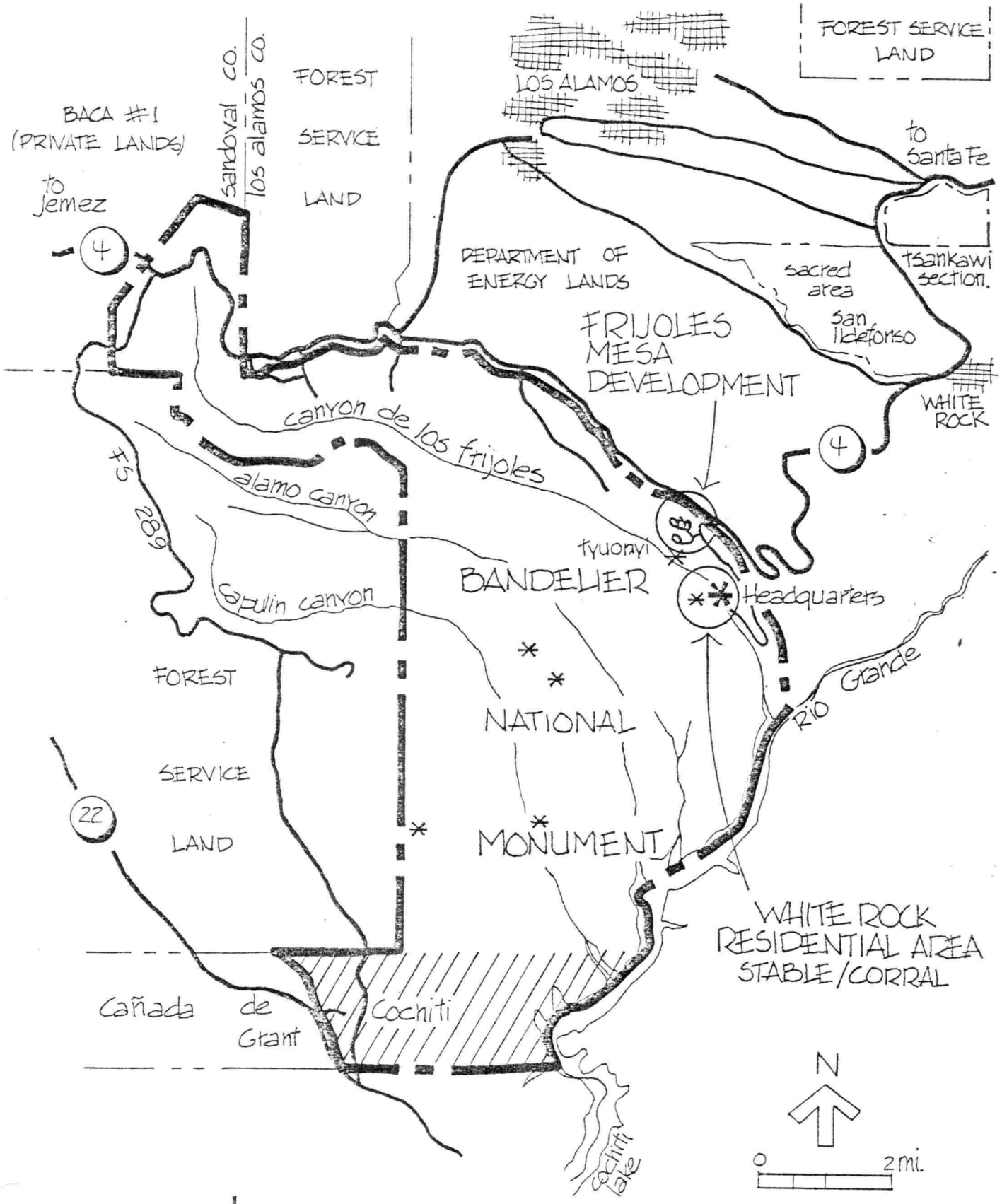
Bandelier National Monument, New Mexico

former human modification to the area. The road will be recontoured, and all traces of its former existence obliterated. When the terrain has been satisfactorily recontoured, a mixture of native grasses (Western Wheat grass, Blue grama, Side-oats grama, and Indian Rice grass) will be applied to the approximate 3-acre area. Natural regeneration should supplement the grasses in subsequent years. Underground utilities will be left in place and should pose no conflict with site restoration. Overhead utilities will be removed.

III. Description of the Environment

Bandelier National Monument, lying on the Pajarito Plateau in north-central New Mexico, contains an impressive number of prehistoric Indian ruins. (See Region Area map and General Area map.) Once occupied by people of the Pueblo culture during relatively late prehistoric times--from approximately A.D. 1250 to the late 1500's--the ruins represent the result of a migration, continuation and modification of an earlier culture developed in the north, and 300 years of a rich ceremonial and agricultural existence. The first migrants to Bandelier found, as modern visitors do today, a charming canyon oasis cutting through the high mesa with its tree-lined, spring-fed streams. Earlier peoples had been attracted to the green-fingered mesas, had settled and had constructed their dwellings, but only a few isolated traces of their occupation remains.

Adolph F. Bandelier, a pioneer of Southwest archeology and history, first brought the area and its ruins to the attention of the Nation. He came to Santa Fe in 1880, and his explorations in the next 20 years resulted in lengthy monographs, scientific reports, popular accounts, and a novel, "The Delight Makers," which remains popular to this day. The novel features the Tyuonyi Ruins in the Frijoles Canyon as a setting for the reconstruction of Pueblo life in the early 1500's. This popular story captured the fancy of a great number of people, and culminated in a Presidential Proclamation that set aside 22,352 acres of mesa land as a national monument, named in honor of Bandelier. (The monument is listed on the National Register of Historic Places.)



general area

Bandelier National Monument, New Mexico

//// AUTHORIZED FUTURE ADDITION

* MAJOR RUINS

Accessible via State Highway 4 and U.S. Highway 285, Bandelier National Monument lies 45 miles from Santa Fe (1970 pop. 41,167); 12 miles from Los Alamos (1970 pop. 11,310); 95 miles from Albuquerque (1970 pop. 243,751); and near the Pueblos of Santa Clara, San Ildefonso, and Cochiti.

Geology

The Pajarito Plateau is composed of volcanic lava flows and ash ejected from the Jemez Crater in a series of eruptions, the last being approximately a million years ago. After the flows of the last eruption had cooled and coalesced, the forces of erosion carved the plateau in a series of canyons that reach from the base of the Jemez Crater to the Rio Grande. Frijoles Canyon was formed in this manner.

Vegetation

The White Rock area, at 6,100 feet elevation, lies within the Upper Sonoran Life Zone and contains pinyon, juniper, and sagebrush-covered areas. Because water flows in the Rito de los Frijoles, cottonwood, willow, and other deciduous trees thrive around the area.

Frijoles Mesa, at 6,600 feet elevation, lies within the Transition Life Zone, and is vegetated with ponderosa pine, pinyon, and juniper.

Wildlife

There is a variety of wildlife habitat.

Some mammals, such as the porcupine and Abert squirrel, are restricted in range by plant types, while others, such as the mule deer and black bear, range over the entire monument. The most frequently found animals, other than those mentioned above, are wood rats, ground squirrels, rabbits, beavers, bobcats, foxes, coyotes, and mountain lions.

Bandelier plays host to a variety of birdlife. Migrating water birds use the Rio Grande as a major flyway on their way north and south, and flocks

of wild turkeys inhabit some of the upper mesas. The trees along the Rito de los Frijoles are frequented by many of the species found throughout the Southwest. Several species of reptiles, including rattlesnakes, live in the lower elevations.

Climate

Due to its elevation, the area enjoys a moderate Southwestern climate, with showers occurring from April through August, often accompanied by violent thunder and lightning in late summer. Occasional snowstorms occur during the winters, but the cold is seldom severe. The Rito de los Frijoles is a perennial stream.

Soils

The soils of the mesa (pinyon-juniper vegetative association) are forming in parent materials derived from pumice, and are very deep (60"+), medium textured, with very gravelly subsoils (sandy clay loams to clay loams), grading into a raw pumic substratum. The soils associated with tuff within the pinyon-juniper association range from shallow (less than 20" to bedrock) to very deep (60"+), and are medium textured (sandy clay loams to clay loams). These soils are on slopes within a 0 to 15 percent slope range. The steeper slopes have similar soils, but with a higher coarse-fragment content within the soil profile.

The soils within the pinyon-juniper vegetation association have a lower capability of producing vegetation and withstanding man's impacts than the more moist soils of the lower mixed conifer vegetation association. An increase in slope increases the sensitivity to use.

Air

Although no data on the air quality of the monument itself are available the State of New Mexico makes approximately five air quality determinations each month in the nearby towns of White Rock and Los Alamos. In checking the complete data, including monthly averages for total suspended particulate matter at the two check stations, two conclusions are

apparent. First, the quality of ambient air in the vicinity is very good. (Only three times in the four years that records are available have particulate materials exceeded EPA standards of 150 micrograms per cubic meter of air, and mean 24-hour levels are generally much lower.) Secondly, the mean particulate content in air increased sharply during the late summer months (July and August) of 1973.

IV. Environmental Impact of the Proposed Action

Land Use: While the relocation of the White Rock residences and horse facilities from Frijoles Canyon to Frijoles Mesa will create an initial physical impact, restoration of the vacated areas to a natural state will enhance the visitors' overall enjoyment. Potential contamination of the Rito de los Frijoles will cease to be a threat from the septic wastewater system at the residences and the horses in Frijoles Canyon. Mesa area sewage treatment will be safer and more energy-efficient by relying on gravity flow to sewage lagoons. Housing relocation to the Mesa and the rehabilitation of the vacated areas will not conflict with the approved land classification system. Maintenance and horse facilities will occupy an area already impacted by roads, trails, and storage structures. The additional sewage lagoon cell will be contained within the existing enclosure.

Vegetation: A gain in net vegetation will accrue to the Frijoles Canyon area as previously impacted areas become available for natural regeneration. On Frijoles Mesa, scattered clumps of pinyon pines and juniper (3-10 foot height range) will be removed for road construction and building sites. The few ponderosa pine in the area will not be impacted by development. Vegetation within corral areas is likely to be destroyed (1-1/3 $\pm$ acres) as the area becomes trampled by the horses. All efforts will be made to use existing Mesa vegetation (pinyon and juniper) for screening. No adverse visual scars are foreseen with selective clearing.

Wildlife: Habitat will be improved in Frijoles Canyon as human habitation and other uses terminate, and the area regenerates. On Frijoles Mesa, there will be little additional impact on wildlife, as existing residential and main-

tenance facility developments have already impacted the area. Housing density and site design will not be adverse to backyard deer browsing and other foraging by native wildlife.

Soils: Approximately 4-1/2 acres of the Frijoles Canyon area will be recontoured to a natural appearance and stabilized with natural grass plantings. All surface evidence of human occupation will be obliterated beyond the stable, including the road. Underground water, gas, and sewer lines will be left unexcavated.

The expanded development on Frijoles Mesa will require grading of approximately 10 acres for road access, and the siting of structures, parking, and yards. Gentle to moderate slopes of 4-8% should retard significant erosion during construction. Cuts and fills are not expected to exceed 2 feet in depth. Twelve hundred feet of the existing dirt service road to the new maintenance area will be obliterated and revegetated as a safer road is aligned to handle both maintenance and residential traffic.

Construction of the maintenance facilities will result in additional land areas being surfaced for road, parking, and service area use (approximately 3/4 acre), causing an increase in surface water runoff. This area is already impacted by an unpaved maintenance storage yard, temporary buildings, unpaved roads and trails, and sewage lagoons.

An additional sewage lagoon cell may be built within the existing enclosure on Frijoles Mesa.

Park Management: Employee morale will be raised due to improved living conditions. Maintenance efficiency of the residences will be facilitated by consolidation. Because trailers are visually obtrusive and are maintenance problems, the new site plan will allow for their replacement with more suitable dwellings when funds are available or, otherwise, easy removal when trailer use is no longer necessary.

Maintenance operations will be improved by providing adequate work and storage space. More time will be required to reach work areas and trail

heads in Frijoles Canyon, but this will be somewhat offset by the reduced distance to the upper areas.

Explosive storage facility built to comply with OSHA and IRS will ensure safe storage of explosives used by park maintenance staff.

Visitor Use and Visitor Experience: Visitors on the Rito de los Frijoles trail will no longer be subjected to the view of residences and the denuded corral in Frijoles Canyon, and the clean water quality of the Rito de los Frijoles will be ensured. The addition of housing at the Mesa residential area should not interfere with public use and visitor enjoyment, with proper site design and relocation of the present trail linking the campground with Frijoles Canyon. The development will not be obtrusive to visitors hiking the Long Trail on the opposite mesa to the south, because of the extensive distance and natural vegetative screening. Overall, congestion in the Frijoles Canyon will be reduced, and a more pleasant atmosphere created.

Aesthetics: The Mesa area is covered with dense groves of pinyon and juniper, which will help mitigate the visual impact of the new development upon the landscape and upon residents.

Nearby Communities: There are no impacts other than possible loss of potential house purchasers or renters.

Historic or Archeological Resources: An archeological survey was conducted on a part of the proposed residential site by a National Park Service archeologist.

In compliance with Section 106 and E.O. 11593, a consultation will be initiated with the New Mexico State Historic Preservation Officer and the Advisory Council on Historic Preservation. Part of this action is included in the approved Bandelier National Monument Master Plan which received the consultation and review afforded by 36 CFT, Part 800; therefore, approval of this specific action is anticipated. A separate survey and consultation for the proposed trail relocation will be conducted prior to such relocation.

Should buried archeological materials be encountered during construction, they will be evaluated by a National Park Service archeologist. If the

materials are determined to be significant, they will be avoided or a mitigation plan will be developed in consultation with the State Historic Preservation Office and the Advisory Council on Historic Preservation. Salvage excavations will be conducted only if there is no prudent or feasible alternative to the location of facilities.

Water: With removal of the residences and horse facilities from the canyon, a higher level of water quality will be ensured on the Rito de los Frijoles. Ample potable water supplies exist atop the Mesa.

Air: Elimination of the propane tank at White Rock will stop minor emission of hydrocarbons.

Safety: Removal of flammable storage and gasoline dispensing from the Frijoles Canyon area will ensure a safer environment for the public and staff in the congested area of Frijoles Canyon. Care will be exercised in construction of the new facilities to comply with all health and safety standards.

V. Mitigating Measures Included in the Proposed Action

During removal and rehabilitation of the White Rock residential area and the corrals, measures will be undertaken to prevent siltation of the Rito de los Frijoles until soils are stabilized and supplemented with natural grasses and plantings. Similar soil conservation measures will be undertaken on Frijoles Mesa, as well as transplanting salvageable vegetation during site development.

Efforts will be made by park management to eliminate trailers atop the Mesa as soon as funding permits the substitution of better housing.

All utilities will be underground.

VI. Adverse Impacts which Cannot be Avoided Should the Proposal Be Implemented

There should be no unmitigated impacts with the proposal other than minor alteration of natural landforms atop the Mesa and removal of selected vegetation pockets.

VII. The Relationship between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

There will be a long-term benefit to visitor enjoyment and appreciation of Bandelier's beauty with the removal of the residences and horse facilities, and roads from Frijoles Canyon. Long-term benefits will be realized with elimination of the source of potential sewage problems, elimination of costly propane gas, and provision and consolidation of housing atop Frijoles Mesa.

Short-term costs will be reflected in construction activity atop the Mesa. Potential long-term costs exist in the maintenance requirements and visual obtrusiveness inherent in trailer residences.

VIII. Irreversible and Irretrievable Commitments of Resources which Would Be Involved in the Proposed Action Should it Be Implemented

Resources such as materials, labor, funds, and energy will be irreversibly committed. Alternate land uses are precluded--an irretrievable consequence --for as long as the proposed housing area is in existence.

IX. Alternatives to the Proposed Action

No Action.

Not acceptable. Present horse corral is a potential pollution source for the Rito de los Frijoles, as well as a visual intrusion at the road entrance to Frijoles Canyon. Maintenance facilities in Frijoles Canyon are not adequate and flammable storage is considered unsafe. Present houses in Frijoles Canyon do not have adequate sewage treatment, and are a visual intrusion in a prime resource area.

X. Environmental Review/Finding of No Significant Impact

Alternative strategies would not resolve the present aesthetic impact to visitors, address the pressing housing needs of park employees, nor reduce pollution risks. A review of the environmental effects of the preferred action indicates that the proposal does not constitute a major Federal action that would significantly impact the environment. Long-term benefits will accrue through consolidating housing and maintenance atop the Mesa and restoring the White Rock area. There is no known controversy connected with the relocation proposal and, therefore, the preferred action is the selected action. An environmental impact statement is not required, and will not be prepared.

Recommended: John W. Hunter — 6-19-79
Superintendent, Bandelier National Monument — Date

Concurred: Lorraine Mintzmyer — 6-28-79
Acting Regional Director, Southwest Region — Date

APPENDIX

PLANNING TEAM AND CONSULTANTS

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Bert Mitchell, Public Health Service Consultant, SWRO

D-41

RESOURCES MANAGEMENT PLAN

AND

ENVIRONMENTAL ASSESSMENT

FOR

BANDELIER NATIONAL MONUMENT

1988

Recommended by _____ 10/14/88
Superintendent Date

Approved by _____ JAN 06 1989
Acting Regional Director Date

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INTRODUCTION

I. Purpose

The Presidential proclamation that created Bandelier stated that "...certain prehistoric aboriginal ruins ..are of such unusual ethnologic, scientific and educational interest...that the public interest would be promoted by preserving these relics of a vanished people, with as much land as may be necessary for the proper protection thereof." Although protection is in itself of prime importance, it is of little value if the public cannot benefit directly from it. Therefore, interpretation of the site has become the primary visitor program for the National Park Service.

Protection and interpretation of the ruins and preservation of the natural setting have been and will continue to be the purpose of the Service's management of Bandelier National Monument.

The Resources Management Plan is a strategic planning document and a key factor in good management and preservation of the resource.

This plan represents a first revision from the original plan of April, 1976, and includes a set of project statements which include proposed action for implementation as well as research actions. Other sections of the plan serve as a set of specific management guidelines. Project statements are determined on the basis of approved Management Objectives and NPS policies. Management constraints and completed research serve as guidelines for projects. The plan serves the Superintendent in two ways: 1) as a manual for management activities which will preserve the environment or achieve an environmental status quo to comply with Park Service standards, and 2) as a set of research projects and priorities that are designed to obtain additional information for management and interpretation.

II. RESOURCE-RELATED MANAGEMENT OBJECTIVES

- Inventory, preserve and maintain the cultural features and natural processes occurring within the Monument.

- Provide for cultural and natural resource research programs to enhance management decisionmaking.

- Monitor critical resources for change, and modify management practices which have adverse resource effects.

NATURAL RESOURCES

1/87

OVERVIEW AND NEEDS

The basis and thrust of this plan for the next five years centers on the Director's 12-Point Plan and the Southwest Regional Director's action strategy to accomplish the Plan.

The following priority items represent the monument's emphasis in natural resource management and research, and provides funding levels to accomplish these tasks by fiscal year.

I. Biogeographical assessment of the greater Bandelier Ecosystem (Project N-20, N-1).

This need is directly linked to the Director's first objective: "emphasize the planning, management, and interpretation of resources in relation to the entire ecosystem or historic context."

schedule of planned accomplishments:
FY 87 - Begin Landscape Ecology Study
FY 88 - Complete study; begin interpretive brochure
FY 98 - Complete interpretive brochure

see programming sheets for funding requirements.

The product of this project can be viewed as providing a basis for interagency cooperation and mutual understanding on issues affecting resources both within and around the monument. Another benefit is the tremendous interpretive value contained within this study. The "holistic view" approach to environmental education (adults and children) can be fully utilized both by on-site interpreters and managers and the outreach program.

II. Natural Resource Inventory: A floral collection for the monument. (Ref. N-1, N-16, N-5).

Director Motts 12-Point Plan refers to creation of "usable inventories"; this study would complete what is now a partial herbarium collection of approximately 1/3 of all plants known to occur in the park. Many critical decisions are dependent on the product of this study: Management of wildland fire , rehabilitation of former burro range, hazardous/exotic plant control, interpretation and environmental education programs, etc.

Schedule:		Funding Req'd
FY 87-88	Complete Floral Study	$6,000

III. Conduct a Paleo-environment Study of the monument. (Ref. N-1, N-4, N-19, C-3).

A great deal is not know about the early natural environment of the monument area. Consequently, this severely limits the park's ability to understand processes which led to todays plant and animal communities, soils and other ecosystem components. What species occurred here which are now extripated? How did the early inhabitants alter their environment, and why? What natural forces were responsible for shaping this landscape?

The management information which is drived from this project should be usable to create reintroduction scenarios, interpretive programs, and publications which would enhance public understanding and appreciation of this unique area.

Schedule of work:		Est. Cost
FY 88	Begin study - field work & analysis	48K
FY 89	2nd year field work & analysis	48K
FY 90	3rd year field work & analysis	48K
FY 91	Complete field work, begin write-up	30K
FY 92	Write up & publication	20K

Up to 1/3 man-year per year plus housing will be provided by the park, which is not included in the above cost estimates. Also, the park will make a concerted effort to recruit students and volunteers to assist, which may relieve some cost burden.

NATURAL RESOURCE PROJECT STATEMENTS

NUMBER	TITLE	PAGE NUMBER
BAND N-1	Natural Resource Basic Inventory	4
BAND N-2	Feral Burro Management	10
BAND N-3	Grazing Impacts on Vegetation	11
BAND N-4	Management of Native Ungulate Populations	13
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Rev. 1/87

BAND N-1
NATURAL RESOURCE BASIC INVENTORY

I. Statement of Issue

Natural Park Service Management Policies (Chpt. II, page 1) states, "The Service will develop, gather, compile, store, analyze, update, and employ natural, historic, social, economic, and demographic data for the planning and management of each park."

This project is intended to identify all studies required to complete the Monument Resource Basic Inventory.

II. Alternatives and Probable Impacts

A. No action - Management under this alternative would need to rely on available resource information for planning projects, answering requests, interpretive programs, and preparing factual responses to environmental documents and proposals of other agencies.

B. Conduct Baseline Inventory Studies Based on Priority Resource Problems Only - This alternative does not consider the interrelatedness of resource components and consequently, a study on one particular resource only could easily overlook the problem's effects on other ecosystem components.

C. Develop Research Strategies and Priorities Together With Baseline Inventory Needs as a Balanced Planning Effort and Total Program - This approach insures that both high priority problems along with inventory-type investigations are accomplished simultaneously, thus allowing RBI files to develop consistently.

There are no physical impacts to flora or faunal species resulting from studies, other than from collecting which is subject to approved collection permits.

III. Recommended Alternative

Number 3 - On an annual basis, resource management staff and researchers should conduct a seminar on completed and ongoing studies. Out of this session will evolve priorities and rationale for future investigations. Attached to this statement is a resource monitoring plan which documents on-going or planned monitoring activities.

Present status of natural resource inventory needs for the Monument are as follows:

A. Continued invertebrate inventory of terrestrial and aquatic species.

B. Habitat and seasonal patterns of black bear (ursus americanus), along with basic population estimates and potential management issues related to back-country visitor use.

C. Collect data on seasonal lightning patterns, using data from Los Alamos National Laboratory (LANL), National Oceanographic and Atmospheric Administration (NOAA) Weather Service, and the Automated Lightning Detection System.

D. Initiate a floral study of the monument. Presently, only one-third of the species occurring in the monument are included in a documented herbarium collection. This study will include plant specimens being added to the herbarium, docuemnting range in both habitat and phenology; identify any exoticc rare, unique species and disturbed habitats.

E. Continue faunal inventory of resident, transient and occasional species and evaluate reintroduction potentials where indicated. Begin a study to document biological factors surrounding the Mexican free tail bat (Tadarida brasiliensis).

F. Conduct a paleo-evironment study. This project will collect needed scientific data on the early flora and fauna of the monument, with the intention of providing management information on:

- extirpated species
- early flora structure
- dendro climatic information to document significant changes in the area's climatic regimes.
- characterize and document resource depletion from human and/or natural causes.
- hydrology, soils and geomorphological information.

A 10-238 has been prepared on this subject.

G. Identify and describe sources and nature of environmental pollutants, including but not limited to noise, esthetic impacts to resources, organic and inorganic contaminants, aereosols and gases.

H. Evaluate potentials (i.e., long term) impacts to resources resulting from changing regional economic and socio-political conditions. Emphasis on cumulative impacts resulting from regional and area developments, demographic trends, and visitor use patterns on the monument's ecological intergrity. Identify any incompatible visitor behavior, native American religious uses of resources, and illegal activities which may impact the resources under NPS protection.

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RESOURCE MONITORING PLAN

The following monitoring strategy has been designed to document trends in resource conditions and identify sources and nature of impacts. Additions and changes can be made as more information is known about a particular subject. These monitoring activities are intended to be repeatable over time.

FLORA

Type	Description	Season/ Date	Freq.	Remarks
T,P	LaMesa Burn Succession	Summer	1990-10 yr interval	Plante Research Assoc.
T	Germinant Reforestation	Summer	1990, 1995 2000	
T	Cerro Grande Plots	Summer	Every 5 yrs.	Estab. '85 - Tierney
P	Cerro Grande Photo	Summer	Every 5 yrs.	Estab. '84 - Allen
T,P	Riparian Vegetation	Summer	TBA	Estab. in '87
T,P	Mixed Conifer Veg.	Summer	TBA	Estab. in '87
T,P	Pinyon-Juniper Veg.	Summer	TBA	Estab. in '87
T	San Miguel Mesa Veg.	Summer	Yearly	Estab. by Gonzales, NMHU
T,P	Grazing Exclosures (3)	Sum.'88	Evry 4 yrs	UNM/Plantae Research Assoc.
P	Ponderosa Burn	Sp-Su	'88 Every 5 yrs	Estab. in '83 Bracker
P	Corral Hill DNF	July	'86 Every 5 yrs	Estab. in '83 Bracker
P	Apache Springs Burn	June	'85 Every 5 yrs	Estab. in '83 Bracker
P	Lower Falls Burn	June	'85 Every 5 yrs	Estab. in '83 Bracker
T,P	Designated Campsites Capulin/Alamo	Summer	TBA	'87 Begin New Technique
P	Aerial Photography - Parkwide	Summer	TBA	Coord. With USFS Flights

FAUNA

Type	Description	Season/ Date	Freq.	Remarks
O	Harvester Ant Colony Survey	Summer	'91-'96	Estab. by Pippin
O	Aerial Wildlife Survey	Jan.	Annual	By State G&F
O	Bald Eagle Survey	Jan-Feb	Annual	Count Only
O	Bat Survey (Long House)	Summer	Annual	Use SWR Video

P	Rio Grande Photo Stas. (4)	Summer	Annual	B/C Ranger
T	Bird Transects	Summer	'88-91	Estab. by Wauer
O	Wildlife observation	All year	Annual	Visitor & Staff
N	Rodent Collection	All year	(As Needed)	Visitor & Staff
O	Fisheries - Frijoles Creek	Summer	Start '88	Frijoles Creek
N	Invertebrates - Frijoles Creek	Summer	Start '88	Surber Sampler

WATER RESOURCES

Type	Description	Season/ Date	Freq.	Remarks
O	Frijoles Creek Gage	All Year		
O	Frijoles Creek Samples	Sp-Su	1 wk	7 stations
O	Capulin Creek Gage	Summer		
O	Capulin Creek Samples & Turkey Sprs.	Summer	2 mos	3 stations

AIR QUALITY

Type	Description	Season/ Date	Freq.	Remarks
I	Automated Teleradiometer	All Year	Daily	Start '87
I	Weather Readings, Fire Tower	Apr.- Oct.	Daily	Start '87
I	Weather Readings, Backgate	Su - Fall	Weekly	Winter - Sp Monthly
I	Weather Readings,	Apr-Oct.	Daily	RAWS Unit
I	Weather Readings,	Nov-Mar	Weekly	

VISITOR USE

Type	Description	Season/ Date	Freq.	Remarks
O	Document Illegal Fireings	Summer		B/C Ranger
O	Impact Assessment Designated Sites	Summer	1987 & Evry 3 yrs	B/C Ranger
N	B/C Permit System	All Year	Annual	
O	Visitor Preception Studies	Summer	1990 & Evry 5 yrs	Contract

IPM

Type	Description	Season/ Date	Freq.	Remarks
O/I	Affected Resource	Summer	'88 Start	Use traps, Observations, Instruments

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BAND N-2
FERAL BURRO MANAGEMENT

I. Statement of Issue

The feral burro (equus asinus) is not native to Bandelier National Monument. National Park Service policy on the management of exotic species speaks to the need for sound research-based resource management action to remove non-native animals. Research conducted on the feral burro since 1974 has documented impacts to over one-third of the Bandelier ecosystem.

II. Current Course of Action

The Management objective is total removal of the burro from the Monument. Detailed strategies are outlined in the "Amended Environmental Assessment, Feral Burro Management, Bandelier National Monument, New Mexico" dated 12/4/79.

As of 1/87, the total population of burros which reside primarily on the monument is estimated at 6-8 animals.

Rev. 1/87

BAND N-3
GRAZING IMPACTS ON VEGETATION

I. Statement of Problem or Issue

Feral and trespass grazing in the Monument for over 60 years has resulted in significant vegetative changes. The feral burro (equus asinus) population has been declining due to irregular reduction activities over the last three years. As management continues toward total removal of these animals, significant changes in plant frequency, density and cover will likely occur.

Trespass cattle have occasionally appeared on the Monument, primarily via the Rio Grande River crossing to the eastern shoreline areas. Impact data is nonexistent.

The historic burro range will eventually become more attractive to native species such as mule deer and elk and eventually, predator and other species occupying this vacant niche. An understanding of basic successional changes, once the heavy impact from feral burros has been eliminated, is important to the development of a management strategy for this area of pinon-juniper woodland.

Reference: "Re-valuaton Studies of Grazing Exclosure plots, Bandelier National Monument" (UNM, April 1, 1985.)

II. Current Management Action

Transect data is read from three animal exclosures established in July, 1975. Readings are performed via contract every four years. The next readings are scheduled for 1988.

III. Alternative Action and Probable Impacts

A. No Action - This alternative's main impact would be the absence of information on the ecological response of pinon-juniper woodland as feral animals are removed and trespass cattle are eliminated through enforcement.

Data relative to effective native animal management in this area would not exist and National Park Service natural resource policies would be ignored.

B. Continue periodic exclosure readings and supplement this data with a photographic record from established photo points. Continue enforcement of trespass cattle law.

Adverse impacts to the resource from this action are minimal. Benefits derived are a highly enhanced understanding of vegetative changes due to exotic animal removal.

C. Develop vegetative recovery plan - without prior understanding of natural revegetation processes, an action plan is premature and would possibly lead to unforseen problems.

IV. Recommended Management

Continue with provisions outlined in Option B. Exclosure readings and photo record are intended to yield, primarily, a trend index only.

Step-up law enforcement actions against trespass cattle owner to ensure minimal damage to shoreline vegetation.

Continue to read vegetative transects established on San Miguel Mesa in 1983 to assess natural ground cover recovery. Collect and analyse soil samples to determine consistency and which elements are needed for maximizing productivity of vegetation.

Rev. 1/87

BAND N-4
MANAGEMENT OF NATIVE UNGULATE POPULATIONS

I. Statement of Problem or Issue

A major wildfire consumed over 15,000 acres of interagency lands, 10,600 within the monument in 1977. The fire created a mosaic of severe, moderate, and unburned forest. A seeding program was conducted aerially and consisted of the following native grasses: Agropyron trachycaulum, (slender wheatgrass), Agropyron smithii (western wheatgrass), Festuca ovina (hard Fescue), Bouteloua gracilis (blue grammagrass), Sporobolus cryptandrus (sand drop seed), and Muhlenbergia wrightii (spike muhly). Present ground cover consists mainly of slender wheatgrass and hard fescue in severely burned areas (Ref: "Responses of Elk (cervus elaphus) and Mule Deer (odocoileus hemionus) to Wildfire: changes in utilization and migration patterns." Conley, 1979.)

Deer populations have shown no appreciable increase based on scientific observations, and hence should not pose any forseeable management problems. Monitoring is primarily by aerial census conducted by the State Game Department.

II. Alternative Actions and Probable Impacts

A. No action - This alternative would likely result in growing management ignorance of population density changes and distributions, and hence the scientific basis for any required management actions would not exist.

B. Seek to maintain close coordination and cooperation with Los Alamos National Laboratory staff and State Game and Fish. With this alternative, Bandelier management would have access to ongoing scientific investigations in areas such as nutritional pathways relative to vegetative changes over time and bio-telemetry and population trends pellet plot data. This information shall provide resource management with with adequate background for any future planning efforts

III. Recommended Course of Action

Alternative B is the strategy of choice. Communication with both the New Mexico State Department of Game and Fish and LANL will be crucial to the adequate acquisition of data, as well as receiving recommendations for management and research of ungulates.

Rev. 1/87

BAND N-5
FIRE AS A MANAGEMENT TOOL

I. Statement of Problem or Issue

The re-establishment of the role of fire as a natural process necessary for the perpetuation of Bandelier's largely fire-dependent ecosystem; the skillful application of prescribed burning to meet predetermined resource management objectives; and the prevention of man-caused wildfires on the monument.

II. Current Course of Action

An operational Fire Management Plan has been developed and approved for implementation, and is attached as an appendix to the Resource Management Plan.

Rev. 1/87

BAND N-6
ESTABLISHMENT OF A MONUMENT RESOURCE
MANAGEMENT INFORMATION SYSTEM

I. Statement of Issue or Problem:

Resource data and information has become too cumbersome to locate, sort out and utilize with any degree of efficiency. Research studies, reports, maps and data sheets are fast becoming useless as means to timely resource decision making.

II. Current Management

An IBM compatable desk-top computer has been acquired by the Resource Management Division.

III. Recommended Course of Action:

In detail, and in priority, the following applications would be requisite to a system that would result in efficient utilization of data in management of resources:

A. Resource Basic Inventory. Information consists of lists flora, fauna, physical features, restricted species, and cultural resources; area and regional information (socioeconomic, visitor use patterns and populations). (Reference: RMP N-1)

B. Wildlife observations.

C. Photo and archival records.

D. Resource monitoring data (water flow and quality, wildlife transect readings, weather).

E. Permits (collecting, special use, backcountry, etc.).

F. Fire management data.

G. Equipment and supply inventories.

Graphics:

A. Fire management (vegetative succession, fuels inventories, presuppression overlays, burn plans, lookout seen areas, etc.).

B. Wildlife (habitats, restricted species, observations, movements, etc.).

C. Aquatics (sources, courses, illustrations of quality changes, etc.).

D. Air quality (emitting source locations, integral vistas, etc.).

E. Backcountry use (visitor use patterns, camping zone and restricted areas, etc.).

F. Vegetation (exotic populations, restricted species, insect/disease occurrences, etc.).

G. Word processing.

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BAND N-7
HAZARDOUS PLANTS

I. Statement of Issue or Problems. "The Service in the operation and management of the parks, will provide for the safety of park visitors from hazards inherent in the park environment." A plan is necessary to minimize hazards resulting from tree failures and contact with toxic plants. There are over 70 species of plants in New Mexico known to have caused some form of human illness or death. At least 13 of these are found in the park; most, if not all, are considered indigenous species.

II. Alternative Actions and Probable Impacts:

A. No Action.

Hazardous trees would increase, and therefore increase the chances for injury and/or damage to life or property, especially in heavy use areas. Toxic plant contacts will likely continue without increase.

B. Implement a periodic inspection and correction schedule, combine with an interpretive message outlining the identification of toxic plants and known locations within the monument for visitors. Hazard tree removal presents no significant adverse impact to the resource.

III. Recommended Course of Action - Alternative number two.

A. Hazard Trees - Conduct hazard tree inspection on a yearly basis after snow melt in the spring. The Monument Resource Management Specialist and R&T foreman will conduct the inspection of:

- Backgate housing
- Ponderosa Camp Ground
- Entrance Road
- Mesa residential and Juniper Camp Ground
- Frey Trail
- White Rock and canyon housing areas, administration buildings, visitor center, parking area
- Picnic area, backpacker parking
- All Frijoles Canyon trails from Ceremonial Cave to Lower Frijoles Falls area
- Other high use or special use areas

- Backcountry trails, campsites, and facilities will be inspected as a routine patrol or maintenance activity

B. Inspection criteria

- Pre-determine inspection route to insure total coverage
- Select for examination each tree which might become a hazard to people or property
- Examine tree for defects or faults
- Estimate potential intensity of weather conditions on the tree
- Estimate probability of failure (based on above estimates)
- Estimate potential for human effects on tree
- Mark tree if indicated and record location and action required

C. Reporting and corrective action

The R&T foreman will complete the inspection report which will in turn serve as a work order. Resource Management personnel will assist in tree removal. When the work is completed, the work order will be signed off by the superintendent and filed.

D. Toxic Plants

1. Make use of interpretive media to educate the visitor and employee.

   - Plant identification
   - Plant habitat
   - Toxic effect (symptoms)
   - Contracted by ingestion, absorption or inhalation

2. In the park discourage promotion of literature on medicinal and edible plants.

3. Common Poisonous Plants

   - Monkshood (Aconitum columbianum)
   - Baneberry (Actaea arguta)
   - Amanita (Amanita muscaria)
   - Dogbane (Apocynum cannabinam)
   - Loco Weed (Astragalus sp.)
   - Water hemlock (Cicuta douglasii)
   - Poison hemlock (Conium maculatum)
   - Larkspur (Delphinium sp.)
   - Lupine (Lupinus sp.)

- Buttercup (Ranunculus sp.)
- Poison Ivy (Rhus toxicodendron)
- Skunk cabbage (Veratrum californicum)
- Death camas (Zygadenus spp)

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BAND N-8
HAZARDOUS ANIMALS

I. Statement of Problem or Issue:

"The Service will control wildlife populations or individual animals when necessary for visitor safety and health." A plan is necessary for control or removal of hazardous animals on the Monument. These include venemous snakes, hazards created by large mammals in and around developed facilities with heavy visitor use; and, mammals that are infected with rabies, plague or other diseases.

II. Alternative Actions and Probable Impacts:

A. No action - May result in increased populations during periods of favorable environmental conditions, thus increasing the chances of human contacts and resulting injury or illness.

B. Manage for minimum human-animal contact - By maintaining levels of cleanliness, inspections, and possible chemical treatment for plague (approved in an IPM Plan). There would be no forseeable adverse impacts.

C. Manage as described above including an interpretive message for both backcountry hikers and frontcountry visitors and enforcement of traffic regulations to avoid or accidents on roadway - Develop a Bear Management Plan outlining procedures for minimizing bear human incidents.

III. Recommended Course of Action:

Alternative number three. Cleanliness of frontcountry and back- country facilities will be checked during periodic safety inspections with followup corrective action. Continue present practice of collecting dead and dying small mammals (criteria defined) and forwarding to the New Mexico Office of Epidemiology for rabies/plague analysis.

The backcountry ranger will be responsible for the Base Camp facility. Woodpiles, debris, material storage areas, and food storage areas will be managed through periodic burning, excess property surveys, and stringent housekeeping practices. A separate action plan for management of bears in the Monument is being developed for approval as an appendix to the Resource Management Plan.

Rev. 1/87

BAND N-9
REHABILITATION OF COTTONWOOD PICNIC AREA AND JUNIPER CAMPGROUND

I. Statement of Problem:

NPS Management Policies (Chapter IV-16) state that "manipulation of terrain and vegetative cover may be carried out to encourage, simulate, or restore natural conditions on lands altered by human activity..."

The Frijoles Canyon picnic area is one of very heavy summer seasonal use and as a result, is exhibiting signs of proportionate deterioration. The area requires periodic rehabilitation.

The Monument's 93-site Juniper Campground is subject to adverse climatic influences, soils erosion and low resilience native vegetation, as well as heavy visitor impacts for an average of seven months per year.

II. Alternative Actions and Probable Impacts:

A. No Action - Both the Frijoles picnic area and Juniper Campground would continue to degrade physically and aesthetically, hence being in violation of management policy. This alternative is unacceptable.

B. Continue Present Action - Limited protection is occurring at Frijoles picnic area through disallowing all open and charcoal fires, which eliminates wood gathering and prevents coal and ash dumping and associated fire hazards.

The Juniper Campground is being managed through loop rotation of three years each, thereby allowing each loop to recover vegetatively without disturbance. Also, to prevent soils loss and disturbance to vegetation in certain vulnerable sites, tent sites were constructed to provide stability and ensure that tents were erected repeatedly within this "hardened" site.

C. Continue Present Action and Implement an Erosion Control Program - Keep campsite and picnic sites free of excessive water, allow runoff to reach vegetation near sites, reduce and obliterate excessive trailing in and around campground, periodically plant native grass seed in all sites to provide soil holding properties.

Begin a site monitoring program, using photographs to document trends and evaluate management sections.

Place rock cribbing in selected areas within the picnic area to minimize erosion into Frijoles Creek. Impacts resulting from management actions in this alternative are minimal to the resource in relation to that caused by human activity.

III. Recommended Course of Action: Alternative number three.

This alternative represents a positive management approach toward minimizing effects of regular human use over time.

Maintenance actions detailed here include:

A. Runoff and watercourse control in picnic area and campground will be accomplished by cleaning and improving on natural gullies and ditches, and rerouting of watercourses occurring through or near sites.

B. Obliteration of excessive trailing will occur by rock placement, signing where indicated, and seeding during off-season.

C. Rock cribbing along Frijoles Creek in the picnic area should be accomplished with native stone and followed by planting with Indian rice grass (Oryzopsis hymenoides) or a similar native soil binder.

Protection actions include continuing the no open or charcoal fire restrictions, loop rotation in campground every three years, along with Ranger contacts explaining the measures taken to visitors.

Monitoring actions will consist of photo stations established in the picnic area, backpacker parking area (for comparison and contrast), and a minimum of one station in each loop of the campground. Photos taken every other year.

Anticipated accomplishments over the next five years include the following:

FY 1987 - 1. Continue protection activities. 2. Select one stream side picnic site to test effectiveness of an erosion control blanket with seeding. 3. Establish photo stations before summer season.

FY 1988 - Begin maintenance action following the priorities listed:

Priority 1 - Utilize natural material (rocks and logs) in stream bed to increase ponding and thus show stream velocity and or turn flow away from eroding banks.

Priority 2 - Once bank erosion in picnic area is stopped, native grasses will be seeded to stabilize.

Priority 3 - Obliterate and rehabilitate unnecessary and excessive visitor use trails in campground and picnic area.

Continue protection activities.

FY 1989 thru FY 1990 - Continue maintenance (as necessary) and protection ativities; evaluate effects of management.

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BAND N-10
MANAGEMENT OF BACKCOUNTRY VISITOR USE

Statement of Issue:

NPS Management Policies state, areas with significant backcountry and/or designated wilderness shall have an approved management plan. A plan exists for the management of Bandelier's backcountry/wilderness, and is contained in the Appendix to the Resources Management Plan.

Current Management Action:
An approved Backcountry Management Plan (see appendix) addresses background, status, policy and legal mandates and strategies for implementation of this plan. The plan is scheduled for revision during CY 1987.

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BAND N-11
REGENERATION OF PONDEROSA PINE IN THE LA MESA BURN AREA

I. Statement of Problem or Issue:

During the La Mesa forest fire of 1977, nearly fifty percent of the Ponderosa pine zone was severely burned, leaving no viable seed trees for natural revegetation. Subsequent to the fire, native grass seed was planted. As a result, few pine seedlings are found in areas of heavy grass cover and seed trees for pine reestablishment are nonexistent in areas of severe burn.

II. Current Management:

Approximately 4,000 ponderosa pines have been planted since 1982, including 1800 germinants and the remainder in 2 year nursery stock. The areas planted cover the S. 1/2, Sec. 31 and the N. 1/2, Sec. 5 along State Highway 4 in the monument. The remaining 2,000 seedlings in stock will be planted during the summer, 1987.

A total of 1030 germinants were planted in a surveyed experimental plot east of Ponderosa Campground (Ref: "Germinant Reforestation of Ponderosa Pine at Bandelier National Monument", December, 1983, by T.S. Foxx.) in 1982. To document survival rates and overall success of this method, periodic plot re-reading is required.

III. Course of Action

Discontinue planting program at end of 1987. Continue to read the germinant plots established in 1982 on 5 year intervals. Maintain records of results.

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BAND N-12
MANAGEMENT OF RIO GRANDE - COCHITI LAKE
SHORELINE IN BANDELIER NATIONAL MONUMENT

Statement of Problem:

The filling of Cochiti Dam in 1976 and subsequent high levels in 1979, 1980 1985, and 1986 (elev. 5417.14, 6/30/86) has changed the river riparian habitat to a fluctuating lake shoreline. Deposition has occurred from high water levels. Vegetational changes, both native and non-native, are resulting in differing wildlife use patterns, such as shorebird and waterfowl presence on or near numerous sand bars. These changes are thought to influence the welfare of a wintering bald eagle population utilizing the lower canyon areas. Management is concerned with what vegetational changes may be expected with this conversion to riparian lakeshore and the creation of sand bars through sediment deposition; and the resulting strategy options available to manage this area.

Current Course of Action:

Management presently has few options to protect the unique riparian habitat and associated wildlife, due to a Memorandum of Understanding between the NPS and the Corps of Engineers, Cochiti (on file in Monument).

The Potter Study, "Plant Ecology of the Shoreline Zone of Rio Grande - Cochiti Lake, Bandelier National Monument" (1981), recommends management actions which relate to a stable shoreline - that is, one with minor future fluctuation in water levels. However, water level fluctuations have widely varied for several reasons, and there are indications that this situation is not likely to change. Therefore, management is presently a monitoring function: documenting vegetative damage, including bald eagle roost tree destruction, aesthetic degradation, and waterfowl habitat loss in general.

Recommended Course of Action

As this issue will continue to command a high level of public visibility locally, management should develop a strategy for making the environmental impacts of water impoundment known through factual interpretive programs and well documented correspondence with agencies responsible.

Photographic depiction of changing conditions, together with continuing the studies of impacts on wintering populations of bald eagles from changes in prey base, should be pursued vigorously. At least 3 permanent photo points will be established in 1987, and re-photographed every year or as shoreline conditions dictate.

Beginning in early 1987, establish a series of small planting test sites to determine which strategies will be successful for improving shoreline habitat for wildlife and erosion control. Clean and stabilize the Frijoles Spring near mouth of Frijoles Creek.

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BAND N-13
MANAGEMENT OF WATER RESOURCES

I. Statement of Issue:

The National Park Service is mandated under the Clean Water Act, Management Policies (Ch. IV-15), and NEPA (1969) to maintain continous vigilance for ecosystem perpetuation. The Monument is especially vulnerable to:

A. Impacts from timber harvest on surface waters entering from the watershed upslope of NPS lands.

B. Potential impacts to surface waters from acid precipitation, originating from growing numbers of planned generating stations to the west.

C. Effects on surface waters resulting from increased backcountry visitation and sanitary waste disposal.

D. Developed zone impacts, i.e., parking facilties, trail construction and maintenance and camping/picnicing.

II. Current Course of Action

A. Qualifiable data is being collected on flow, temperature, pH, dissolved oxygen, conductivity and turbidity for Frijoles, Capulin Streams and five springs. A water resource management plan has been prepared. Included in this plan is an information base: Inventory, maps, classification, water rights, status, chemical and biological properties of monument water resources and flood plain management.

B. Maintenance of appropriated water rights under New Mexico law and protection of all water flowing in Bandelier National Monument under the Reservation Doctrine.

C. Riparian Zone - Functional Indicators Monitoring

a. Maintenance of biomass.
b. Terrestrial/aquatic interface.
c. Corridors for plant and animal movement.

D. Acquistion of a topographic map with 2 feet contours to delineate boundaries outlined in the Flood Plain Survey.

A water resource management plan is included as an appendix to the Bandelier National Monument Resource Management Plan.

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BAND N-14
CONTROL OF EXOTIC AILANTHUS

I. Statement of Problem:

"Manipulation of population numbers of exotic plant species, up to and including total eradicaton, will be undertaken whenever such species threaten protection or interpretation of resources being preserved in the park." The exotic Tree-of-Heaven (Ailanthus Altissima) is a fast growing, vigorous, prolific sprouting species. The long rhizome roots sprout freely and even a small section of live root (left after mechanically grubbing) can easity form a new plant stalk. These characteristics make it a potential invader and displacer of native vegetation. It is persistent and rapid growth additionally threatens the physical structures of cultural sites in Frijoles Canyon especially.

II. Review of Past Management:

July, 1974	Chief Scientist, Southwest Regional Office recommends digging out sprouts in Tyuonyi grove. Estimated size of grove - approximately one acre total.
August, 1974	Survey Ecologist, National Park Service Science Center, recommends injection of 2, 4-D Amine or cutting and painting stumps with Dalphone or Ammatex. Stems cut off at ground level with no chemical treatment.
Summer, 1975	Local Boy Scott troop hand-grubbed two areas of Tyuonyi grove. High school group of students pulled Ailanthus stems near Tyuonyi.
June, July, 1976	Tyuonyi grove stems clipped and treated with Ammate.
Sept., 1976	Patch nearest orchard clipped and treated with 43% Ammate solution.
Summer, 1978	Ranger personnel clipped and treated all known stems around Tyuonyi with ammonium sulfamate. Spread now considered checked. Small grove discovered in Lummis Canyon.
Summer, 1979	Grove near east wall of Tyuonyi clipped and treated with above chemical. No new sprouting reported from other areas of grove.

Summer, 1980 Clip and treat with ammate (Seasonal Personnel)

Summer, 1981 Mechanical removal (SCA)

Summer, 1983 Mechanical removal (YCC)

Summer, 1984 Mechanical removal (Seasonal Personnel)

Summer, 1985 Mechanical removal (Seasonal Personnel)

Summer, 1986 Mechanical removal (Pemanent Personnel) Frijoles only.

III. Alternatives:

No Action: Not acceptable; inconsistent with NPS Policy: "control programs will most likely be taken against species which have a high impact on protected park resources and where the program has a reasonable chance for successful control."

Chemical Treatment Only: Not acceptable, inconsistent with NPS Policy: "chemical herbicides will be used only where feasible alternatives are not available or acceptable."

Mechanical Treatment Only: Utilized VIPs, SCAs and volunteer organizations when possible.

Recommended Course of Action: Mechanical Treatment with selective application of an approved herbicide in the more remote groves - although more groves are being discovered periodically, present practices of mechanical grubbing has succeeded in reducing the size of groves and preventing spread from existing sites. However, application of an herbicide to individual plant stems may be necessary to realize the objective of eradication.

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BAND N-15
MANAGEMENT OF RESTRICTED FAUNAL SPECIES

I. Statement of Issue or Problem:

The following listing of restricted species based on the most accurate information to date. Status and bibliographical reference are included (Note - A restricted species is defined for purposes here as a species of unusual scientific value or of interest to visitors, including threatened, rare and endangered):

Species	Status/Reference
1. Jemez Mountain Salamander (*Plethodon neomexicanus*)	New Mexico State Endangered list; habitat research completed in Monument. Habitat in volcanic substratum; shade, moisture and decaying logs of spruce fir north slopes above 7,000 feet elevation; confirmed locations in Upper Frijoles Canyon Research Completed: Reagan, D.P., 1972, "Ecology and Distribution of the Jemez Mountains Salamander." "Comparison of the Reproduction and Ecology of the Jemez Mountain Salamander and the Sacramento Mountain Salamander." Stephen Williams (Bandelier Library). "Evaluation of Jemez Mountain Salamander Status at Bandelier National Monument" - Dr. Dan Guthrie, Claremont College, California (December, 1978)
2. Peregrine Falcon (*Falco peregrinus anatum*)	Federal endangered list; aeries near Monument lands suffer from low productivity and reproductive failure. Not confirmed to breed in Monument, but potential sites exist, and are protected through restricted management activities during the breeding season. (Ref. "Essential Breeding Habitat in Bandelier", by Terrell Johnson, 1983).

3.	Spotted Owl (*Strix occidentalis*)]	Peripheral species - known to breed in Bandelier area. observed in upper Alamo Canyon August 1982.
4.	Zone-tailed Hawk (*Buteo albonotatus*)	Only observed in Bandelier - breeding and nesting sites unconfirmed.
5.	Bald Eagle (*Haliaeetus leucocephalus*)	Federal endangered list; research completed on wintering populations populations (T. Johnson), 1978-1985. Habitat quality varies due to changing Cochiti Lake levels; see also Project BAND N-12.

II. Current Management Action:

The bald eagle is being studied during the winter months when populations are present in the southeastern canyons of the Monument. Study objectives center around population trends, stability of patterns of use, seasonal changes in diet, impacts of reservoir water level changes, and human disturbance.

To facilitate protection of habitat and minimize human disturbance to roosting sites, a restriction was imposed to limit overnite use to the following area during the period November 1 through March 30:

East and north of the eastern rim of Lummis Canyon from the Rio Grande north to the Mid-Alamo Trail

Northwest of the Mid-Alamo Trail to Capulin Canyon

Designated campsites and areas north in Capulin Canyon.

Northwest of the Turkey Springs Trail to the Monument western boundary.

Also, a portion of trail has been relocated in Capulin Canyon to route hikers away from roosting areas.

Although unconfirmed to date, potential nesting sites exist in the Monument for the Peregrine Falcon. A portion of the lower Capulin Trail has been rerouted away from potential sites to minimize human disturbance and maximize opportunities for Peregrine occupation. There are restrictions on aircraft use over the backcountry (low level) during nesting season.

The Jemez Mountain Salamander status study (Guthrie, 1978) delineated the general habitat area in the Monument. The study also suggests that this amphibian is active mostly during late summer, when the ground is moist from summer rainfall. At other times, it remains largely underground.

Management action to date has been a camping closure for Frijoles Canyon above Upper Crossing.

The remaining species listed are included for the purpose of bringing attention and protection from individuals and groups involved in research, collecting activities and so on.

III. Alternative Actions and Probable Impacts

- Continue Present Management - This alternative would satisfy only the basic habitat protection responsibilities for the bald eagle. A key to perpetuation of this species is habitat improvement through management, including continued burro reduction and periodic patrols of the roost areas.

  Jemez Mountain Salamander habitat would remain the same with a day use only policy for the present restricted camping zone in Upper Frijoles Canyon.

- Monitoring and Research (bald eagle) - To continue present research studies into habitat improvement strategies, population trends and behavior is a very important key to understanding and protecting the bald eagle. Above all, and as alluded to in Johnson's studies, management must approach with extreme sensivity to this species in all park activities.

- Manage for Potential Peregrine Falcon Habitat - Monitor primary sites for breeding occupancy and, if occupied, for productivity.

IV. Recommended Course of Action:

Recommended are derivations of all the alternatives:

A. An effort should be made, in concert with the Corps of Engineers, the U.S. Forest Service, U.S. Fish and Wildlife Service and concerned citizens, to change present guidelines of the Rio Grande Compact, which allow unseasonable water storage in Cochiti Reservoir, to minimize killing of lakeshore vegetation and of roost trees in Alamo Canyon. (See also RMP N-12).

B. Continue area closure to camping November 1 through March 30. Park interpretive programs and visitor contacts should refrain from specific mention of the

species, habitat locations, and types of use.

C. Continue monitoring of wintering bald eagle populations.

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BAND N-16
MANAGEMENT OF RESTRICTED FLORA

I. Statement of Issue:

To define the NPS responsibilities in protecting the Monument's unique plant species.

II. Status of Floral Species:

The following listing contains species occurring within the Monument which are considered to be restricted. This designation refers to those flora which require some protection due to factors of narrow ranges, niches sensitive to slight human or naturally caused changes, few numbers, or general habitat stability being modified.

(Note: A restricted species is defined here as a species possessing unusual scientific and/or visitor interest, which includes rare or endangered).

Species	General Habitat	Herbarium Specimen Monument Collection
1. Spikenard (Aralia (racemosa	Shaded slopes (7000-9000')	Yes-P
2. Butterfly-weed (Ascle-(pias)	Canyons (6500-7000')	Yes
3. Bearberry: (Arctosta) (arctostaphylos (phylos (Uva-Ursi)	Moist Woods (7000-10,000')	No
4. Wood Lily (Lilium (umbellatum)	Open woods (7000-8000')	No
5. Fairy Slipper (Calypso (bulbosa)	Woods (7000-10,000')	No
6. Fireweed (Epilobium) (angustifolium)	Damp Clearings (7000-11,000')	No

P = Photograph in resource management file.

7.	Spotted Corral-root Orchid (*Corallorhiza maculata*)	Woods (6500-9000')	Yes
8.	Helleborine (*Epipactis*) (*gigantea*)	Damp Woods (7000-8500')	No
9.	Striped Corral-root Orchid (*Corallorhiza striata*)	Woods (6500-9500')	Yes
10.	Bog Orchid (*Habenaria*) (*sparsiflora*)	Moist Areas (7500-9500')	No

Source: New Mexico Statute 45-11, 1963.

III. Present Management

(A) As plants become uncommon, unique or rare due to human impacts or environmental changes, they should be identified on this listing with status information and protection strategy if indicated.

(B) Attach this list to all collection and special use permits, cautioning permittees as to each plants' unique status in the Monument.

(C) That information on restricted species locations be excluded from interpretive and media programs.

(D) Continue liason with officials of the New Mexico State Heritage Program in providing and receiving specific information relative to any unique, rare or endangered plant species.

(E) Seek funding necessary to support a floral collection for the Monument. Presently only one-third of the total estimated species are vouchered. Continue photographing specimens in field for resource management and interpretive use.

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BAND N-17
PROTECTION OF AIR QUALITY RELATED VALUES

I. Statement of Issue or Problem:

Congress enacted the Clean Air Act (PL 88-206) in 1963 and through amendments in 1974, provided for prevention and control of air pollution to enhance the quality of air resources throughout the nation.

The 1977 Amendments address additional objectives including the preservation of air quality over specified Federal lands according to classes of protection. The Bandelier Wilderness was declared a mandatory Class I area and the federal land man- ager has been mandated with the responsibility to protect air quality related values, including visibility.

II. Current Course of Action:

The Bandelier air quality monitoring program, including teleradiometer measurement, suspended particulate sampling, and regular photographic documentation was involuntarily terminated during 1985. However, the Los Alamos National Laboratory (Environmental Surveillance Group) has established monitoring program for total suspended particulates, wet/dry acid depositon, plus four other airborne pollutantss: Ozone, oxides of sulfur and nitrogen, and carbon monoxide. This data will be available to Bandelier through normal channels with the Laboratory.

The New Mexico Environmental Improvement Division Air Quality Bureau has purchased an automated teleradiometer and has contracted with the University of California at Davis for a five particulate filter unit and analysis.

The teleradiometer and the stocked filter unit will be installed at Bandelier to take advantage of the long term data already established.

III. Alternative Actions and Probable Impacts:

A. No Action - Without adequate monitoring data factual decisionmaking cannot would not exist. This presents a negative impact on management's ability to deal with issues affecting the mandatory Class I Bandelier Wilderness.

B. Pursue a program to re-establish critical air quality monitoring through acquisition of an automated teleradiometer station.

IV. Recommended Course of Action: Alternative number two

A. Resource management actions are not indicated at present nor are anticipated. However, continued involvement with public interest groups and other agency air quality personnel is essential.

B. Monitoring will continue with an automated station at Bandelier. Baseline data is crucial for providing informed input into applications for new sources. Additionally, research and monitoring studies are required to affort early warning of air quality impacts from new sources being planned in the southwest:

1. Baseline pH analysis - Upper Frijoles and Headquarters area.
2. Baseline pH analysis - Upper Alamo, Upper and Lower Capulin Creeks.
3. Determine potentials for air quality impacts from ozone, oxides of sulfur and nitrogen.
4. Research the effects of smoke from fire management activities in and around Bandelier.
5. Research to focus on the dynamics of regional haze which is beyond the scope of a localized study but one which should include the analysis of Bandelier monitoring and weather data.
6. Determine air mass trasport corridors affecting Bandelier's air resource.
7. Survey perceptions of visual air quality at Bandelier
8. Continue development of interpretive programs stressing the importance of maintaining air quality values.
9. Study the effects of acid deposition on alkaline soils.

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BAND N-18
INTEGRATED PEST MANAGEMENT

I. Statement of Problems of Issues:

"Chemical pesticides of any type will be used only where feasible alternatives are not available or acceptable."

Integrated Pest Management treatments are made when and where monitoring has indicated that the pest will cause unacceptable economic, medical, or aesthetic damage. Treatments are chosen and timed to be most effective and least disruptive to natural mortality factors.

II. Alternative Action and Probable Impacts:

A. No Action - Loss of host or host dependent species from the ecosystem, outbreaks spread outside the area, further jeopardize endangered, threatened or unique species or communities, loss of historic scene integrity hazards to public health and safety.

B. Chemical Controls Only - Inconsistent with National Park Service Management Policies, Chapter IV.

C. Natural Control Only - Natural controls work all the time. However, at certain time, in certain places, specific population may grow so large they become a problem. Examples are protected indoor environments where pests have intruded and their natural enemies have not, previously used chemical controls have killed off natural enemies, pest populations naturally rise to great numbers on a periodic basis and foreign pests migrate to a new area leaving behind natural enemies.

D. Integrated Pest Management - Identification of pest, monitoring and record keeping for a regular samplind, determining injury levels, determining action levels, treatments, and an evaluation system.

III. Recommended Course of Action: Alternative number four

Potential pest and their natural enemies, their habitat requirements will be observed on a regular basis and decisions made about what strategy or combination of strategies to use based on these observations. The actual treatment may involve selection, habitat manipulation, cultural or physical controls, enhancement of predators or parasites or to introduce more to the area. In conjuction with the above strategies, the use of an appropriate pesticide confined to a particular spot where no other

method is adquate to prevent intorlerable damage may be warranted. The object of treatment will be to suppress pest populations below their injury levels, not to attempt eradication. It is desirable to allow some pest to survive at some low level in order to maintain the presence of its natural enemies. (Specific exotics excluded).

Treatment Tactics:

A. Least disruptive to naturally occurring controls.

B. Most in harmony with both short and long term human and environmental health.

C. Most likely to be relatively permanent.

D. Easiest to carry out effectively.

E. Most conserving to nonrenewable fuels.

F. Most cost effective on the short and long term.

IPM Procedures - Developing a Program

A. Identification: Pest and their natural enemies.

B. Monitoring: Determine population and range.

C. Pre-injury Levels: Determine the amount of aesthetic or economic damage that can be tolerated.

D. Action Levels: The point at which treatment is necessary to prevent the pest from reaching intolerable levels.

E. Treatment: Selection of a strategy and or a mix of tactics least disruptive to natural controls and least hazardous to human health and the environment.

F. Evaluation: During treatment process to determine minimum controls necessary and follow-up on a routine basis to determine the effective duration of the controls in place.

IV. Attachments

A. Visitor Center IPM Plan.

B. Wood Preservatives Statement.

p

Visitor Center IPM Plan

The center houses two offices, auditorium, information desk, lobby, basement/work area and storage, and a museum exhibit. It is roughly a rectangular structure constructed by the CCC in 1935. Original construction was of volcanic tuff blocks, supporting a viga and latilla roof in the traditional Southwest Pueblo style. A new wing was constructed in 1975 to house an expanded exhibit. This construction consisted of a concrete block wall and a ceiling of 1x4 rough sawed pine supported by vigas. The threat to museum exhibits will be the primary focus of this plan.

The museum collection, on exhibit and in storage, is one of the more valuable collections in the Southwest Region in terms of dollars and in the terms of historical significance of many of the objects. Its current value approaches $200,000.00. The number of unique and irreplacable objects, in addition, places it well within the category of those areas where the collection may be considered a major resource, contributing to the area's importance as a part of the National Park Service. The collections include a number of prehistoric pottery vessels that have been published in reports on southwestern archeology, modern ceramics by some of the leading Indian potters of today and a remarkable series of original paintings produced for use in the first exhibits installed in the visitor center, all early works of local Indian artist who have since gained considerable fame.

Prehistoric and historic collections are continually faced with the threat of biological attack. This major agent of deterioration is dependent upon three factors: 1)Presence of nutrient host(artifact of organic material), 2)Presence of favorable environmental conditions, 3)Presence of biological predator. Insects and rodents feed on the material composition of the artifact as well as utilize it as source of nesting material. Indirect damage often occurs through contact with the pest and their excrement. Rodents, in particular white footed deer mice and the pinion mouse, enter the structure in a number of ways. Roof vents, cracks around closed windows and doors, fresh air intakes, and the heavy traffic in and out of the structure create many opportunities for entry. The crawl space between the roof and ceiling provides a warm dry harbor and the loose construction of the viga/latilla ceiling provides good access to the exhibit area. Food and nesting material are readily available through the extensive use of organic material in the exhibits in the form of feathers, corn, dried meat, leather items and native plants used as exhibit props. Rodents have access to the total exhibit area, as evidenced by dropping, urine stains and exhibit items damaged by chewing.

MONITORING

Insect pest noted included carpet beetles, common clothes moth, corn moth, bark beetles, several wood boring beetles and carpenter ants. It is felt that most of these insect were introduced via unfumigated material used in exhibits. This includes blankets and robes, raw wool for the weaving demonstration, dried deer meat, native corn, dead wood for placement in diorama fireplaces and native plants used a exhibit props. All provide a ready harbor and food supply for the above mentioned pest. As a result, insect damage has been noted in both the historic and prehistoric Pueblo exhibits. A large amount of frass was noted below the vigas and latillas indicating bark/powder post beetles and carpenter ants at work. Many of the main support vigas, which extend through the exterior walls, are rotten and provide excellent harbor and entry ways for carpenter ants.

INJURY/ACTION LEVEL

Discovery of one mouse or insect as described in the monitoring section will bring about treatment. Rodents because of the damage they cause to artifacts and the diseases they are associated with; insects causing damage to irreplacable artifacts.

TREATMENTS

Rodents- White footed deer mouse and the pinion mouse.
Insects- Carpet Beetles, Cloths Moth, Bark Beetles and Carpenter Ants.

HABITAT MODIFICATION:

Structure- All holes, cracks and crevices found will be filled with steel wool covered with sheet metal, and or filled with caulk, plaster or similar materials. A major rehab program is scheduled for 1984-85 to replace or stabilize structural wood components in the visitor center. This action alone will be significant deterant to insect encroachment.
Exhibits- all organic materials used in exhibits whether props or artifact must be secured from acting as a food or nesting material.
Organic artifacts on display replaced with replicas or placed in secure display cases. Props- Reconsideration of their need for presentation, replace with non-organic material or provide physical barriers.

DIRECT SUPPRESSION

Rodents- Snap Traps. 1. baited with food or nesting material 2. one trap every two to three linear feet. 3. traps placed at right angles to runways. 4. traps moved to new location every two to three days. 5. minimize handling and wear gloves. 6. new traps seasoned by burying in soil or grass. Insects- none.

CHEMICAL CONTROLS

Rodents- none are considered necessary at this time. Insects- Structure wide, none. Individual artifacts will be removed as needed and placed in a fumigation chamber when insects are discovered. Chemical proposed: vapona strips- dimethyldichorovinylphosphate. See atachment: 1979 Bandelier Fumigation Project. This project demonstrated the effectiveness of chemical controls but at the same time provided the awareness of the conditions that lead to such a drastic measure. The project provided only short term benefits at a significant cost and posed health and environmental hazards.

EVALUATION

Exhibit inspection/cleaning schedule. Accurate record keeping of capture/sighting/discovery dates, numbers, species, location, weather, visitor use, structural changes and exhibit modifications.

Wood Preservatives; Effective and Meet IPM Objectives.

Chemicals are used primarily to prevent or reduce decay of wood by fungi and other decay organisms. The first step in assessing alternatives to these materials is recognition that decay organisms can only damage wood that is chronically moist. To the degree wood can be kept dry, or quickly dried out, decay can be prevented.
One of the techniques involves use of a simple water repellent product developed by the USDA Forest Products Laboratory in Madison, WI. While many commercial water repellents contain a preservative, the Forest Products Lab water repellent contains no preservatives, yet provides protection equal to "Penta" in certain settings.
Water repellents are composed of three baasic components: parafin wax, linseed oil, and a solvent. A simple water repellent contains NO fungicides or insecticides. It protects wood by enabling it to repel moisture, thus denying decay organisms a suitable environment they need to live.
A water repellent is used either alone as a natural wood finish, or as an undercoat before painting. When applied to bare wood, the water repellent penetrates into the wood fibers, creating a waxy barrier to water penetration. This protection from moisture in turn reduces excessive swelling and shrinking of wood that opens cracks and invites invasion by decay microbes and wood consuming insects.
The degree of protection provided by water repellents with and without chemical preservatives was studied in a 20-year testing program at the Forest Products Labortory. The researchers concluded that the degree of protection provided by the simple water repellent was equal to that provided by the repellent plus preservative (Feist 1984; Feist and Mraz 1978).

The most effective method of applying a water repellent is to dip the wood product into the solution for 1 to 3 minutes. When dipping is not feasible, the water repellent can also be brushed on in repeated applications until the wood is saturated. Particular care should be taken to saturate lap and butt joints, edges and ends of boards, and edges of panels where end grain occurs. If the water repellent is applied by brush, treated surfaces will be dry enough to paint after 2 or 3 days of warm weather, or after one week if a dip treatment is used. Other areas subject to moisture, such as the bottoms of doors and window frames, should be liberally coated even if the wood's surface is to be finish with latex or an oil base paint. One gallon of water repellent will cover about 250 square feet of smooth surface, or 100 to 150 square feet of rough surface. When used as a natural finish on wood, the water repellent will last 1 to 2 years before requiring additional treatments. When used under paint, no retreatment is needed unless the protective paint layer weathers away.

The Forest Products Lab suggest that for climates where weather patterns permit alternate wetting and drying of wood,(Bandelier) and where wood is not in contact with damp earth, use of a water repellent without a preservative can be effective.

At the present time the only preservative approved for use in the National Park Service is CCA, copper-chromium-arsenic-salts in pressure-treated wood products. Unfortunately, a small residue of arsenic from the preservative forms on the surface of treated wood. While the initial residue may be washed off by rainfall, new layers of arsenic-treated wood are continuously exposed as the wood weathers, and this may account for the creation of new surface residues.

Since arsenic is a well-known carcinogen, concern has been expressed about exposure to even low levels of arsenic. The California Department of Health Services are attempting to assess whether or not these residues pose a significant risk.

One method to reduce arsenic residues is the application of an oil-base, semi-transparent penetrating stain to the surface of the treated wood. This significantly reduces arsenic residues. When the oil base material is applied to wood, it soaks into the surface fibers and slows their breakdown by sunlight and weather, thus reducing the presence of unbonded arsenic, and presumably the opportunities for arsenic exposure.

In summary, penta and creosote are dead issues, pressure treated lumber with CCA exposed to weathering and human contact may have a cloudy future. The water-repellent mixture described offers effective treatment for our climate and is free of red tape. There are still some alternatives for preservatives (not approved) but any request would have to demostrate a special set of circumstances outlined in a detailed project statement warranting the special approval process.

1/87

BAND N-19
REINTRODUCTION OF RIO GRANDE
CUTTHROAT TROUT TO BANDELIER

I. Statement of Issue or Problem:

The reintroduction of native species into the parks is encouraged, provided that:

-adequate habitat exists in the park
-the species does not pose a serious threat to the safety of the park visitors or park resources.
-the species being reintroduced most nearly approximates the extripated species".

The native Rio Grande cutthroat trout, Salmo Clarki virginals (Girand, 1856), is likely to have once occupied the waters of Frijoles Creek. Frijoles is situated in the heart of the historic range of the state's native cutthroat. Although no tangible evidence exists to indicate they were once there, it is logical to postulate that they did at one time. This endemic population is thought to have been displaced by introduced Salmo trutta, Salmo gairdneri, and Salvelinus fontinalis. (Attachment) Several self-sustaining populations exist in the Jemez Mountains for restocking of Frijoles Creek.

II. Present Management:

No action; not consistent with NPS policy.

III. Proposed Action:

A. Undertake a comprehensive before/during/after study of the community structure of aquatic invertebrate populations, to minimize the impact of reintroduction upon the stream.

B. An Implementation Plan and an Environmental Assessment will be prepared.

C. Eliminate the previously stocked exotic fish.

D. Establish the threatened native Rio Grande trout in suitable upper portions of the watershed.

E. Eventually establish a fuller complement of native fishes.

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BAND N-20
BIOGEOGRAPHICAL ASSESSMENT OF THE SOUTHERN JEMEZ MOUNTAIN-PAJARITO PLATEAU ECOSYSTEMS

I. Problem Statement

The ecosystems comprising National Park Service ownership are but relatively isolated islands within the much larger Jemez Mountains and Pajarito Plateau landforms.

The legitimate discipline of regional ecology has now emerged to yield land managers a much broader understanding of relative biotic health and integrity of these unique and interconnected systems. However, there remains glaring lack of a landscape level assessment relating to lands both in and adjacent to Bandelier. Sporadic studies, combined with steadily increasing proposals and projects for various kinds and levels of use in these areas, indicate subtle, yet increasing influences on these landscapes from a wide variety of forces.

Future use trends projected by land management and conservation organizations, demands for increased energy use, and so forth, have placed and will continue to place tremendous pressures on managers to protect biological diversity and ecologically sensitive areas from cumulative degradation. It is of primary concern to the National Park Service, as addressed in the Director's recent 12-Point Plan, to "encourage the protection and enhancement of other publicly and privately owned cultural and natural resources", and to also "...emphasize the planning, management and interpretation of resources in relation to the entire ecosystem or historic context." Other major points of the 12-Point Plan speak of pursuing "...a creative, expanded land protection initiative:. Additionally, management is directed to pursue creativity and "...support experimental initiatives, and anticipate problems and opportunities so that innovative solutions can be explored."

The recent re-signing and re-dedication of the "Treaty of the Potomac" (1964), involving the U.S. Forest Service and the NPS continues an atmosphere of cooperation and coordination in land and resources protection, planning and management, and also provides impetus for a comprehensive assessment of emerging ecological trends. The obligation is clear, and it is one on which future generations will depend.

II. Present Course of Action

A. Nearly all contiguous ecosystems and habitats are open to energy, nutrient, and species exchanges; therefore, the initial study phase is to define the biogeographical boundaries from which an assessment can begin.

B. A second phase is to outline the criteria which will constitute and adequate assessment. Such criteria to be considered are biological, geographical and climatic factors which drive successional trends and change habitat structure and function in the various ecotypes. Of importance will be information from comparing disturbed and relatively undisturbed sites (those largely protected from various forms of exploitation).

C. Conduct a comprehensive review of pertinent literature already existing for the areas defined in (A). Include a review of historical documents relating to the various stages of development and settlement of the study area, emphasizing the alteration of the landscapes. Aerial photography, both early and recent, will be used extensively.

D. Establish permanent transects across elevational and ecological gradients, and collect data on site conditions, species composition/abundance, geological/soils properties, and fauna associations.

E. Compare the impacted areas (i.e., disturbed sites) with selected undisturbed areas. Integrating this data with existing ecological information, formulate an overall evaluation of the various effects on the indigenous genetic diversity and processes which contribute to the maintenance of this diversity.

F. From the assessment will come recommendations to protect identified ecologically sensitive areas, and strategies to protect crucial processes and ecological integrity.

Conflict resolution between agencies, public education programs, management directions, and sound public planning for the future will depend on this information.

RESOURCE PROGRAMMING SHEET

Bandelier National Monument (PARK / AREA) | SW (REGION) | NM (ST) | X NATURAL | ___ CULTURAL | January 6, 1989 (DATE) | PAGE 1 OF 2

PRIORITY	RMP REF NO.	PKG NO.	T	PROJECT TITLE	A	1989 YEAR 1 NPS MY	1989 YEAR 1 COST /100	1990 YEAR 2 NPS MY	1990 YEAR 2 COST /100	1991 YEAR 3 NPS MY	1991 YEAR 3 COST /100	1992 YEAR 4 NPS MY	1992 YEAR 4 COST /100	1993 YEAR 5 NPS MY	1993 YEAR 5 COST /100	REMARKS
1.	N-20	-		Biogeographical Assessment of the Southern Jemez Mtn - Pajarito Plateau Ecosystems. (includes long term ecological monitoring)		-	5.0	0.3	4.0	0.4	6.0	-	-	0.3	6.0	
2.	N-3	-		Grazing Impacts/D-J Erosion project		-	12.0	-	12.0	-	8.0	-	8.0	-	8.0	
3.	N-1	-		Nat. Resource Inventory (including paleo environment studies)		-	10.0	-	8.0	-	5.0	-	5.0	-	5.0	Science funding only.
4.	N-5	-		Fire Management (prescribed fire only)		1.5	35.0	1.5	35.0	1.5	35.0	1.5	35.0	1.5	35.0	Firepro
5.	N-12	-		Mgt. Cochiti Shoreline		0.1	2.5	0.2	2.0	0.2	2.0	0.2	2.0	0.3	4.0	
6.	N-19	-		Reintroduction Native Cutthroat-Frijoles Creek		0.4	6.0	0.4	6.0	0.3	3.0	0.3	3.0	0.3	3.0	
7.	N-15	-		Mgt. Restricted Fauna		-	1.0	-	2.0	-	-	-	3.0	-	-	
8.	N-17	-		Protection of Air Quality		-	3.0	-	3.0	-	3.0	-	3.0	-	3.0	
9.	N-16	-		Mgt. Restricted Flora		0.1	2.5	0.1	2.5	0.1	2.0	0.1	2.0	0.1	2.0	
10.	N-13	-		Mgt. Water Resources		0.5	6.5	0.6	8.0	0.6	8.5	0.6	8.0	0.6	9.0	
11.	N-2	-		Feral Burro Management		0.2	2.5	0.2	3.0	-	-	0.2	3.0	0.2	3.0	
12.	N-8	-		Hazardous Animal Mgt.		0.3	3.5	0.3	3.5	0.3	3.0	0.3	3.0	0.3	3.0	

RESOURCES PROGRAMMING SHEET

Bandelier National Monument (PARK / AREA) | SW (REGION) | NM (ST) | X NATURAL | ___ CULTURAL | January 6, 1989 (DATE) |

PRIORITY	RMP REF NO.	PKG NO.	T	PROJECT TITLE	A	1989 YEAR 1 NPS MY	1989 YEAR 1 COST /100	1990 YEAR 2 NPS MY	1990 YEAR 2 COST /100	1991 YEAR 3 NPS MY	1991 YEAR 3 COST /100	1992 YEAR 4 NPS MY	1992 YEAR 4 COST /100	1993 YEAR 5 NPS MY	1993 YEAR 5 COST /100	REMARKS
13.	N-18	-		Pest Management		0.3	3.5	0.3	3.5	0.3	4.0	0.3	4.0	0.3	4.0	
14.	N-4	-		Mgt. of Faunal Pops		0.1	2.5	0.1	2.5	0.1	2.5	-	1.0	-	1.5	
15.	N-6	-		Establish Mgt. Information System		0.1	2.0	-	1.0	-	1.0	-	1.0	-	1.0	
16.	N-10	-		Mgt. Backcountry Visitor Use		-	10.0	-	12.0	-	13.0	-	13.5	-	14.0	
17.	N-9	-		Rehab. Cottonwood/ Juniper Campground Areas		1.0	2.0	-	1.0	-	1.0	-	1.0	0.1	1.0	
18.	N-7	-		Control Hazardous Plants		2.0	3.5	2.0	3.5	2.0	3.0	2.0	3.0	2.0	3.0	
19.	N-11	-		Regeneration Ponderosa Pine-La Mesa Burn		1.0	2.0	1.0	2.0	1.0	2.0	-	-	-	-	
20.	N-14	-		Control Exotic Ailanthus		1.0	1.5	-	-	1.0	1.5	-	-	-	-	

CULTURAL RESOURCES

OVERVIEW AND NEEDS

Bandelier was made a National Monument in 1916 by Presidential Proclamation (No. 1322; Stat. 1764:1916), which stated

> . . . . certain prehistoric aboriginal ruins . . . are of unusual ethnologic (sic.), scientific, and educational interest . . . that the public interest would be promoted by preserving these relics of a vanished people, with as much land as may be necessary for the proper protection thereof.

The Monument now covers approximately 33,000 acres of land in an area of marked topographic relief, ranging from mesa tops to canyons. The ruins referred to in the above quite were primarily built by Pueblo Indian peoples that lived in the Pajarito and Jemez Mountain areas between approximately 1000 and 1660 A.D.

Although a total site survey of the Monument has yet to be accomplished, it is currently estimated that there are well over 3000 structural remains within the Monument boundaries; these remains range from single-room field houses to pueblos containing hundreds of rooms.

The Monument's Native American users include persons from Cochiti, San Felipe, Zuni, Santo Domingo, San Ildefonso, Santa Clara, San Juan, and Jemez Pueblos. These people may be using the Monument either for ceremonial purposes or for the collection of objects used in ceremonies.

National Register listings for the Monument are incomplete; however, following the historical work done by Laura Soulliere Harrison in 1984, the Monument is now lacking only the architectural component, which is being prepared by the Denver Service Center, to complete the Historic Structures Report. The list of classified structures promises to be greatly enhanced by the archaeological site survey currently underway.

The Monument's museum catalog is currently being revised to bring it in line with standards set forth in NPS-28 and the Manual for Museums. The current update will result in its inclusion in the Automated National Catalog system by the end of FY 1990.

Although protection is, in itself, of prime importance, it is of little value if the public cannot benefit from it. Therefore, today, emphasis is also placed on providing for the public's understanding of the Monument's resources, as mandated in the National Park Service's Management Policies (1978:V-1):

> The National Park Service shall faithfully preserve the cultural resources entrusted to its care and provide for the understanding, appreciation, and enjoyment through appropriate programs of research and interpretation.

The Management Objectives of the National Park Service (Special Directive 75-1 1975:5, 6) also emphasize the need for dissemination of information to the public.

> The National Park Service . . . will stand for . . . accurate information and as well as for visitor and resource protection.
>
> In content, interpretive activities must be faithful to fact and free of cultural and ethnic biases. The Service with be prepared to demonstrate the validity of all facts, interpretations and conclusions.

The Archaeological Site Survey Project for Bandelier, Pkg #116, has already greatly aided the Monument by its accomplishment or planned accomplishment of parts of projects C-1, C-2 and CM-8, C-3, and C-4. This project, while not meeting all of the needs for management information, is going a long way to accomplish many park needs and aid in the establishment new preservation priorities.

The Cultural Resource Management Plan for Bandelier National Monument is designed to meet the Monument's legal obligations for preservation, protection, and interpretation of its cultural resources as dictated in the above statements, by the National Park Service Organic Act of 1916, and in the legal documents listed below.

a. The Antiquities Act of 1916
b. The Historic Sites Act of 1935
c. The National Historic Preservation Act of 1966
d. "Protection and Enhancement of the Cultural Environment," Presidential Order 11593, May 13, 1971
e. The Archaeological and Historic Preservation Act of 1974
f. The National Historic Preservation Act Amendments of December 12, 1980, P.L. 96-515, 94 Stat. 2997
g. the Policy Guidelines for Native American Cultural Resource Management, Special Directive 78-1
h. The American Indian Religious Freedom Act of 1978, P.L. 95-341
i. The Archaeological Resources Protection Act of 1979.

CULTURAL RESOURCE PROJECT STATEMENTS

NUMBER	TITLE	PAGE NO.
BAND C-1	Literature Search and File	4
BAND C-2	Locating and Cataloging Previously Excavated Artifacts	(See CM-8)
BAND C-3	Archaeological Site Survey	6
BAND C-4	Test Excavations and Prehistoric Environment Study	8
BAND C-5	Stabilization of Exposed Ruins	11
BAND C-6	Oral History Research	13
BAND C-7	Literature Search and Historic Narratives	15
BAND C-8	Assessment of Environmental Influences on Cultural Resources	17
BAND C-9	Protection of Cultural Resources Built by the CCC	21
BAND C-10	Maintenance of Historic Structures Built by the CCC	22
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BAND C-12	Historic Landscape Study	27
BAND C-13	Historic Orchard	28
BAND C-14	Ethnographic Overview/ Assessments	29

BAND C-1
LITERATURE SEARCH AND FILE

I. Problem Statement

Bandelier National Monument has received the attention of a substantial amount of scholarly research and writing, much of which is minor but still useful and pertinent to cultural resources research and management concerns. However, this information is scattered throughout a variety of publications and manuscripts--not all in the Monument's nor in its library--and is not readily available or retrievable when needed.

In order to facilitate future planning and research in the Monument, it would be advantageous to establish a reference file of literature citations that deal with scientific work pertinent to Bandelier's cultural resources. Not to be confused with the library card catalog, this file specifically catalogs references to scientific information for easy retrieval for research and management purposes. It would contain references not included in Bandelier's library resources.

This project will help the Monument meet its obligation to develop and maintain a comprehensive data bank related to its cultural resources (Management Policies 1978:V-6). It will also aid subsequent field research projects--including site survey, test excavation, and environmental studies.

II. Alternatives and Impacts

A. No action - The effect of taking this alternative is that a constantly increasing proportion of resource management personnel time will be required to meet the larger demands for reports and research information.

B. Developing multiple reference files - Although it is better than no action, the cataloging time for a multiple filing system would be extensive, with only a partial reduction in information retrieval time.

III. Recommended Course of Action

The initial work of locating and annotating pertinent references will involve considerable time and effort, including contacts with local and regional libraries and research institutions (e.g., The School of American Research, the University of New Mexico Library and Anthropology Museum and Department, and branches of the Museum of New Mexico). Once established, the system can be maintained as part of the library acquisitions and cataloging responsibilities activities.

The literature file will be computerized using the WASO-originated CRBIB Program on IBM-compatible ITT computers at Bandelier. Ultimately, computerization of all cultural resources data will provide the most effective system for retrieval of information for management and research needs.

This project would help meet the Bandelier Final Master Plan (1977) objective to aid in the administration of the Monument area.

BAND C-3
ARCHAEOLOGICAL SITE SURVEY

I. Problem Statement

In order to comply with Executive Order 11593 (Sec. 2a), which, in part, states that the cultural resources of every park shall be located, inventoried, and evaluated for significance and, in order to be consistant with requirements put forth by law, and the National Park Service Management Policies (1978:V-4), a site survey must be performed.

A comprehensive archaeological site survey of Bandelier National Monument has never been completed. Although a request for one was programmed into Bandelier's original Cultural Resources Management Plan (1976), and a 10-238 (Package No. 116) was approved. Funding for Pkg 116 has been approved and a large scale sampling survey is now underway.

To provide management and interpretive personnel with sufficient baseline information to adequately interpret the resource and plan its future use, the site survey should provide the following data:

1. A complete inventory of archaeological and historical sites as required by Executive Order 11593 (which includes an archaeological base map and a historical base map); and,

2. information that will potentially answer questions relating to the resource/base area and its use by native inhabitants and the prehistoric demography.

II. Alternative Solutions and Their Impacts

A. No action - The Monument would remain in violation of Executive Order 11593 and National Park Service Management Policies. Monitoring and protecting these resources cannot be done without knowledge of their extent and location.

B. Partial ground-check survey taking place over a period of several years using interested local citizens to aid in accomplishing the survey - The resulting survey would be extremely extended (on the order of ten years) and the resultant data would lack detail and uniformity.

C. Complete site survey using aerial photographs (as suggested in NPS 28 (1980:II,8) and professional archaeological survey teams - by this alternative action.

III. Recommended Course of Action

The recommended course of action is to use aerial photographs and professional archaeological survey teams to perform a complete site survey of the Monument.

By using professional archaeologists in conjunction with remote sensing techniques, the Monument can obtain a more complete and accurate evaluation of the existing resources in a short period of time.

Using a combination of archaeological techniques and theory would result in a coherent picture of prehistoric cultures and events for use in interpretation and long term management planning. This alternative would also enable a time/money-saving combination of personnel for use in both the inventory project and the test excavation paleo-environmental study project.

This alternative is proposed to take place over a period of five to seven years and would place the Monument in full compliance with Executive Order 11593 and pertinent National Park Service policies.

This survey would comply with the Bandelier Final Master Plan (1977) objective to "Conduct further archaeological surveys and excavations to furnish information and provide artifacts for display and interpretation."

BAND C-4
TEST EXCAVATIONS AND PREHISTORIC ENVIRONMENT STUDY

I. Statement of Problem

A.Test Excavations

A comprehensive site survey has been proposed to enable Bandelier National Monument to meet its legal obligations to locate, record, interpret, and properly manage its cultural resources (Management Policies 1978:V-6; Executive Order 11593). However, survey alone cannot yield all the data essential to the proper classification and recognition of function for all types of sites. Considering the paucity of actual archaeological fieldwork already done at the Monument, and the limitations in the majority of that work imposed by the early time period during which most was done, the need for more intensive field research is indicated.

Based on initial data from and in conjunction with the site survey, controlled surface sampling of some archaeological sites and test excavations of a few specific sites will be necessary to round out the picture of site classification for the Monument. It is important that the test excavation and controlled surface sampling be logical components of the archaeological survey, that is, that all the archaeological field projects be well integrated within an overall research design, preferably with all carried out by the same researchers to ensure continuity and productiveness. Both the surface sampling and the test excavation should be specifically designed to (1) illuminate the total spectrum of site types, sizes, time periods, functions, etc., found at Bandelier; (2) answer questions raised by specific research between proto-historic Keresan and Tanoan peoples or tracing social structure differences that may help elucidate migration patterns, and (3) meet management needs, supplying needed interpretive information or determining representativeness priority.

As collection and excavation represent irreversible and irretrievable commitments of cultural resources, their use should be kept to the minimum required to satisfy management and research objectives. Test excavation must impact as small a portion as practical for research purposes, and a portion of each tested site will remain unexcavated for possible future use. In order to ensure the maximum information benefit from the least amount of cultural resource destruction, all work should use the most advanced and productive archaeological techniques and methodologies available (including nondestructive techniques and remote sensing). Finally, meticulous records must be kept and incorporated into the data base, preferably computerized, for later retrieval and dissemination of accurate information about the Monuments's cultural resources.

B. Prehistoric Environment Study

The overall appearance of all cultural resources and their surroundings as they were in the historic (i.e., archaeological) period constitutes the historic scene . . . to the extent that modern

developments, exotic or altered vegetation, and topographic changes have intruded upon the environment of a historic place . . . the historic scene has been altered" (Management Policies, 1978:IV-20).

Conscious efforts shall be made to ensure that routine park operations, interpretation and visitor use, maintenance and storage, conduct of activities, and provision of services do not unnecessarily intrude on the historic scene by introducing visible, audible, or atmospheric elements that are out of character with the historic environment.

Little information is available that specifically treats Bandelier's prehistoric environment. Numerous studies of the contemporary environment at Bandelier are currently available or are ongoing (see the Natural Resources Section of the Resource Management Plan). Some good ethnographic reports (e.g., Ford 1968; Harrington 1916) are available on aboriginal land use in immediately surrounding areas. But significant prehistoric ecological data is limited to Diane Traylor's work (Traylor et al. 1977) on the Cochiti Dam Project. And, although the environmental studies undertaken on this project are excellent they do not constitute an all-inclusive picture of the prehistoric environment.

Management Policies (1978:V-6) mandate that identification and research precede any planning affecting the cultural resources (including their environment) of the Monument. Thus, research must be initiated to determine just what Bandelier's prehistoric environments--both natural and man-altered--were.

II. Alternatives and Impacts

A. No action - The impact of this would be that the Monument would remain in violation of Executive Order 11593 and National Park Service Management Policies (1978:V-6).

B. Limited test excavation independent of the site survey with environmental testing - This alternative could be performed more readily than a coordinated survey and excavation project. However, data accuracy and control would not be as good as if data were collected in a joint project.

C. Coordinated site survey and test excavation project - This method would reduce the amount of excavation necessary to obtain an accurate interpretation of the environment and its use by the prehistoric inhabitants of the area.

III. Recommended Alternative

Perform a coordinated site survey and test excavation of representative sites and control locations to establish a more complete and accurate picture of the prehistoric environment and man's relationship with it.

Use of this alternative would be the most cost-effective data-gathering method. This alternative would give accurate information with the least amount of disruption of undisturbed archaeological sites. Allowances for

this work have been included in the 10-238, Pkg #116 (Archaeological Site Survey).

This project, when completed, would help fulfill the directive in the Final Master Plan (1977) to "Conduct further archaeological surveys and excavations to furnish information . . . for display and interpretation."

BAND C-5
STABILIZATION OF EXPOSED RUINS

I. Problem Statement

A. Guidelines

National Park Service Management Policies (1978:V-13) state that "All cultural resources shall be preserved . . .," and Bandelier's enactment proclamation (Presidential Proclamation No. 1322; 39 Stat. 1764 1916) emphasizes the need for preservation of its archaeological resources. However, even in this very basic compliance obligation, the Monument is negligent in fulfilling its responsibilities. Although it has minimal ruins stabilization standards and procedures to follow (see Nordby 1978 and the WAC Soil Cement Study 1977), comprehensive preservation guidelines (10-238, Pkg. #174 and #175) have never been established for the Monument's archaeological sites.

Without such guidelines, it is impossible to initiate a comprehensive cyclic maintenance and stabilization program to preserve these irreplaceable cultural resources. Proper guidelines and skilled stabilization personnel would enable the Monument to institute ". . . measures and procedures to provide for the maintenance through preservation . . . at professional standards prescribed by the Secretary of the Interior" (Executive Order 11593, Sec. 2d, 1971). These standards are further detailed in NPS 28, Chap. 2 (October 1980).

B. Stabilization Personnel

According to the 1980 report of the Regional Management Evaluation Team, an additional three to five seasonal ruins maintenance positions are required to maintain the excavated ruins in a conditions that would ensure their structural integrity.

II. Alternatives and Their Impacts

A. No action - This alternative would result in violations of Presidential Proclamation 1322, Executive Order 11593, NPS 28 (1980:Chap. 2), and National Park Service Management Policies (1978:V-13). This alternative would also ensure a loss of structural integrity, resulting in the ultimate loss of these irreplaceable resources.

B. Experimenting with stabilization techniques and establishing more seasonal ruins maintenance positions - The experimental method of establishing ruins maintenance criteria would by its nature endanger much of the resource that the Monument is charged with preserving

C. Establishment of a comprehensive Ruins Management Plan and establishment of more ruins maintenance positions - This alternative would minimize the degradation of exposed ruins.

III. Recommended Course of Action

Undertake a research program designed to establish a comprehensive ruins maintenance program Including historic structure preservation guides, and establish more seasonal ruins maintenance positions (10-237).

A. Guidelines

The research data gained from some of the proposed projects, especially from Archaeological Project C-8, will have definite applicability to Bandelier's ruins stabilization and preservation plan. As these data are made available, pertinent information needs to be forwarded to the Maintenance Division and to Regional preservation specialists so that necessary adjustments and improvements to the present temporary maintenance plan can eventually be incorporated into a Historic Structure Preservation Guide.

In general, the ruins stabilization and preservation guide should mitigate those environmental effects that promote the deterioration of Bandelier's archaeological sites. The most effective ways of accomplishing this at this point in time are (1) backfilling all sites not needed for management, interpretive, and/or scientific projects, thereby reducing the costs of ruins stabilization and (2) using the best of the materials and procedures available from materials tests and standard ruins preservation guidelines to preserve exposed archaeological sites.

B. Stabilization Personnel

Hire three to five additional seasonal ruins stabilization personnel.

This action is proposed to fulfill the state objectives of the Bandelier Final Master Plan (1977) in that it would "ensure the protection and preservation of archaeological resources within the Monument through management and stabilization programs."

BAND C-6
ORAL HISTORY RESEARCH

I. Problem Statement

The recorded history of Bandelier National Monument and its environs is sparse before the mid-1930's, and thus there is little cultural data incorporated into its administrative documentation and interpretive activities.

A number of people have extensive knowledge of the early use and management of the Monument and its surrounding areas (These people have lived and/or worked in this area). Because these individuals are elderly, every effort should be made to contact them and record their histories.

If an oral history could be made, information on four areas would enhance the historical/interpretive picture of the Monument. The four areas of concern are the following:

1. Old Canada de Cochiti Grant Area
2. Land Use Customs of Keres-Speaking People
3. Land Use Customs of Tewa-Speaking People
4. Administrative History of Bandelier

II. Alternatives and Impacts

A. No action - No action on this would result in the loss of irreplaceable historic information about the Monument and its environs.

B. Interviewing and tape recording these informants using ethnographic or oral historic methods. Tape recordings are a temporary means of information storage and thus are only desirable in the short-term.

C. Interviewing and tape recording the informants and transcribing the interviews onto a hard copy for storage. Although this alternative is more costly, it assures permanent preservation of this valuable information.

III. Recommended Action

Interviewing and tape recording the informants and transcribing the information onto a hard copy for storage.

Although this method is more time consuming and expensive, it is preferable over the other alternatives because it lends itself to a permanent and accurate storage of information for future use.

The informants would be tape recorded in response to predetermined and discretionary questions. The resulting tape would be transcribed and systematized. Then the informants would be allowed to review the manuscript. Tape recordings could also be used in the development of a

variety of audio visual programs for the park visitors and orientation packages for new employees. This project helps to fulfill the objectives stated in the Bandelier Final Master Plan (1977) in that it would, "Enrich the visitor experience by emphasizing the life, culture, and history of the Pueblo Indian".

BAND C-7
HISTORIC RESOURCE STUDY

I. Problem Statement

Because of the emphasis archeology, virtually no documentation of early regional historic activity is currently available to Bandelier National Monument's interpreters or resource managers. With early Hispanic explorers and settlers having moved into the northern Rio Grande Valley in the 16th century, it seems very possible that some of that activity may have extended to the Bandelier area or have had a direct bearing on its late Puebloan occupation. The historic record itself would prove to be worthwhile for interpretation and could provide data useful to future resource management. In additon to the work required in the main body of the Monument, little if any National Register information has ever been assembled on the Canada de Cochiti which as been approved for park acquisition.

A Historic Resource Study would produce a thorough study of all available documentation, a Historic Resource Base Map and National Register nomination forms.

II. Alternatives and Impacts

A. No action - The information would continue to be inaccessible to the Monument's staff for planning and interpretive purposes. The Monument would also remain in violation of Executive Order 11593, which states in part that a historical base map will be established.

B. Perform a search of the available literature on the Bandelier area and develop a historic narrative using the resulting information - This narrative would enable Bandelier's interpretive staff to portray the historical context of the area more accurately and, at the same time, give the administrative staff a useful tool for managing the Monument's resources.

C. Prepare a Historic Resource Study - this complete study would professionally document historic events and locations within their hsitoric theme and meet all current legal requirements of nominating and documenting eligible properties for the National Register.

III. Recommended Action

In order to comply with NPS-28 standards a comprehensive Historic Research Study should be prepared.

A thorough search will be made of early Spanish and American documents (available through the New Mexico) State Archives and libraries and the university libraries) for data pertinent to Bandelier National Monument's early history (Management Policies 1978:V-6). These data will then be compiled into a referenced historic narrative for the convenience and use of both interpreters and resource managers.

This project helps to fulfill the objectives stated in the Bandelier Final Master Plan (1977) in that it would, "Enrich the Visitor experience by emphasizing the life, culture, and history of the Pueblo Indian."

This project also would provide all required historic documentaion for the Monument.

BAND C-8
ASSESSMENT OF ENVIRONMENTAL INFLUENCES ON CULTURAL RESOURCES

I. Statement of Problem

Bandelier National Monument's environment contains several internal and external influences that are negatively affecting (or have the potential for negatively affecting) the preservation of its archeological sites, objects, and environment. Laws and regulations governing the National Park Service,

> .....impose a special obligation on the Service to locate, identify, evaluate, preserve, manage, and interpret qualified cultural resources in every park in such a way that they may be handed on to future generations unimpaired (Management Policies 1978:V-2).

The Monument has a mandated responsibility to maintain its archeological sites, objects, and environment in as close to natural conditions as possible (Management Policies:V-3, V-11). However, many effects of various environmental influences on those cultural resources--environmental influences that may be either natural or man caused--have not yet been determined, but are now being monitored through photo points at showcase sites in the backcountry.

The following include the environmental factors currently considered to have possible adverse effects on the Monument's cultural resources--both archeological and historic:

A. Fire: Because of the devastation caused by the large La Mesa Fire (summer 1977), research into its impact on affected archeological sites was initiated by Bandelier National Monument. Preliminary work indicates that harmful effects of fire itself are generally limited to superficial materials, most notably spalling of exposed stone masonry. However, the process of fire suppression can cause more extensive damage, particularly if heavy equipment is used on sites (Traylor, 1978: 123-147). Currently, test plots for prescribed burning are being planned in parts of Bandelier's timbered lands. Several factors are being studied, such as combustability and the effects of heat intensity, with techniques such as fuel moisture stix and heat sensitive paints.

B. Carrying Capacity: Archeological sites are fragile resources and easily impacted. Among the most cogent considerations in assessing their ability to withstand impact is carrying capacity. Bandelier's sites--particularly the large, easily identified sites--are receiving ever-increasing pressure from visitor use, especially in areas of easy accessibility. Damaging effects from burro impact are occuring. In attempts to help mitigate these influences, camping restrictions are in effect around archeological sites, and the burro population has been temporarily reduced. However, the extent to which human and animal influences are actually affecting the sites has not been determined.

C. Vibrators: Vibrators from various sources, including tests carried or by the Los Alamos National Laboratory, sonic booms, landslides, and people or vehicles at or near the ruins, occur and affect the Monument and its sites regularly. Many of the vibrations are sufficient to rattel windows and/or cause minor rock slides and, therefore, have the potential for weakening or damaging Bandelier's cultural resources, especially the exposed excavating, archeological sites. During the summer or 1977, the Los Alamos National Laboratory recorded seismograph readings of numerous types of vibrations at selected sites in Frijoles Canyon. Those data area not correlated with any recorded impact or the archeological sites themselves.

D. Insect Infestations: Recently, several of the artifacts and historic objects on display and/or in storage, in Bandelier's museum and visitor center, have been found to be infestaed with several different forms of insects and/or their larvae. Currently, the collections are undergoing close scrutiny to discern any further infestations and to observe resultant damage.

Adverse effects from environmental influences at Bandelier National Monument are not solely limited to those outlined here. These are the ones currently identified as immediately presenting, or having the potential for causing, unfavorable impact on the Monument's cultural resources. As new tracts of land are added (such as the Canada de Cochiti Grant or the Valle Grande) or as these environmental influences are investigated, others may be discovered that will necessitate further study. All or some of the studies listed here can form the initial base for long term study. Remote sensing, in addition to individual, first hand assessments, can be used to monitor the influences.

II Alternatives and Impacts

A. Fire

(1) No action - This alternative results in incomplete decision making information in fire-control situations.

(2) Use a prescribed burn program to test the effects of fire on various cultural resource materials - This should be addressed in area Fire Management Plan with potential impacts outlined and evaluated.

B. Carrying Capacity

(1) No action - This alternative represents a threat to the resource because of insufficient management information.

(2) Monitoring site visitation and site condition to establish a carrying capacity for minimum site degradation - This proposed action appears to have no direct impact on the carrying capacity or the resource.

C. Vibration

(1) No action - This alternative limits data for responsible resource management.

(2) Monitoring the effects of explosions of given forces to establish the degree of resource degradation.

D. Insect Infestation

(1) No action - The degradational effects of insects on historic structures would soon become irreversible.

(2) Treat insect infestation as reported - By the time an infestation is noticed, damage has already occurred.

(3) Systematic program of insect prevention in pre-identified areas.

III. Recommended Course of Action

A. Fire - Studies using the prescribed burn program to test the effects of fire on various simulated cultural resources should be performed to aid in planning that can help mitigate the adverse influences of wildfire and prescribed management fires.

B. Carrying Capacity - Quantitative and qualitative tests need to be initiated to evaluate these effects--for instance, recording actual visitation; establishing control sites protected from impact in heavily visited sites; and utilizing test wall samples, periodic photographic comparisons, and other evaluative technique. Once non-destructive carrying capacity has been determined for the various threatened sites and areas in Bandelier, steps can be taken to plan their proper use and access.

C. Vibration - Systematic monitoring of this possible threat is important to the establishment of an informed policy concerning these tests.

D. Insect Infestation - A systematic program of insect prevention appears to be essential to the prevention of insect-related historic resource degradation in this area.

These research-related programs would serve to meet the objectives stated in the Bandelier Final Master Plan (1977) to, "Ensure protection and preservation of archeological resources within the Monument through management and stabilization programs."

BAND C-9
PROTECTION OF CULTURAL RESOURCES THROUGH
PATROL AND ENFORCEMENT

I. Problem Statement

A preliminary study indicates a high level of artifact removal from the Tsankawi area. This area is a detached segment of the Monument that is maintained for public use without supervision. The Tsankawi area is a complex conglomerate of building and living styles that is principally undisturbed by vandalism and will prove to be of great value to future researchers in deciphering the prehistory of the Rio Grande Valley and the Pajarito Plateau. Six major backcountry sites are in similar danger from collecting and/or vandalism. There is currently no regular patrol at either the Tsankawi area or the backcountry ruins.

II. Alternatives and Impacts

A.No action - If no action is taken, the Monument would be in violation of the principles of Presidential Proclamation 1322, which established Bandelier to preserve and protect the ancient Indian remains of the area.

B.Provide greater patrol coverage with existing staff - This would adversely affect present position responsibilities and duties.

C.Hire additional staff to perform backcountry and Tsankawi patrol functions, and make additional use of electronic surveillance equipment. No adverse impact.

III. Recommended Course of Action

In order to best perform the patrol function without impairment of ongoing activities, it is recommended that an additional two seasonal positions be filled to perform patrol and enforcement functions in those areas of the Monument that present a threat to the cultural resources through vandalism and illegal collection. In conjunction with these patrols, the installation of electronic sensors and periodic monitoring should be undertaken to help document base-line conditions.

BAND C-10
MAINTENANCE OF HISTORIC STRUCTURES BUILT BY THE CCC

I. Problem Statement

The building constructed by the Civilian Conservation Corps in the Headquarters area of Bandelier are in the process of being nominated to the National Register. This places special responsibilities for the preservation and maintenance of these upon the Monument's staff.

The need for comprehensive presentation guides has become increasingly clear; to avoid the return of maintenance practices which required large projects over the years of 1980-1987. Both careful maintenance and well prepared and coordinated preservation guides are necessary to maintain historic buildings in a manner which is consistant with Park Service policies adn objectives.

II. Alternatives and Impacts

A. No action. This alternative would be in violation of the NPS policies (NPS-28, 1980:VI-1-10) and would lead to further degradation of this historic resource.

B. Prepare comprehensive historic structure preservaton guides such that maintenance practices can be intergrated to allow for the highest levels of preventive maintenance and repair.

III. Recommended Action

Establish preservation guides and merge these guides with the maintenance management system to insure a continued preventative maintenance cycle. This should be part of a program of maintenance training and practical work to fully comply with National Park Service policies and guidelines.

BAND C-11
EROSIONAL AND VEGETATIVE
THREATS TO BACKCOUNTRY RUINS

I. Statement of Problem

During the summer of 1983, the staff and volunteers examined many backcountry archaeological sites at Bandelier to check their condition, itemize the forces acting to destroy them, and determine what steps might be taken to stabilize them against rapid destruction.

We consider the backcountry sites to be the most scientifically valuable cultural resources at Bandelier. The big ruins in Frijoles Canyon, all that most visitors see, have been wrecked by crude excavation, repeated and none-too-careful stabilization and reconstruction, and heavy visitor use; their only real value now is interpretive. Some of the backcountry ruins are heavily impacted by tourism and primitive archaeology, but most are relatively free of human disturbance. Ideally, they should constitute a valuable scientific resource. Unfortunately, the backcountry sites are subject to a number of other forces that can greatly decrease their scientific value. Some of these cannot be ameliorated by any practical means, but some of the worst forces of deterioration can be slowed or stopped by feasible management action.

In examining the degradation of archaeological sites, it is important to keep in mind the realities of archaeological research today. In the old days, archaeology was mostly artifact digging, and there is little going on in the backcountry that would seriously detract from such archaeology (or, as we would call it today, pothunting). Today, a great deal of archaeological investigation is carried out by surface surveys supplemented by a small sample of excavations; that means that disruption of the superficial materials--the walls and the ceramic and lithic scatters--is of major significance. When excavations are undertaken, a large number of very sensitive techniques are employed, many of which are very sensitive to site disruption as well. This sensitivity is of two forms: in some cases, the data itself is corrupted (e.g., modern seeds are carried into a site by rodents so that studies of prehistoric uses of plant materials are confounded), and in other cases, the cost of analysis becomes prohibitive even though the data can still, in principle, be extracted without serious confusion (e.g., modern wood and charcoal enter a site being dated by carbon-14 or tree-ring analysis).
This summer's work (1986) has been what we call a site management survey. It certainly does not take the place of a badly needed full archaeological survey. We collected some basic facts about each site (location, size, and basic ceramic and lithic types), the environment the site was located in (soil type and condition), condition of vegetation, and animals active in the area. In inspecting the sites, we tried to keep in mind two questions: what are the forces seriously impacting this site that we could something about, and what kind of resources would it require to stabilize the site?

The principle agents of destruction acting on the backcountry sites are the following.

1. Trees and cacti growing in or near ruins destroy them in several ways. As they grow, they push over walls or the surface and infiltrate underground structures. When they collapse, they may tear a big root ball out of the site, and they may collapse across surface structures, knocking them down. As the roots rot, they serve as channels for the contamination of underground portions of the site, and if they burn in a forest fire, they can do further damage.

2. Widespread intensive erosion is damaging many sites. Lithic and ceramic scatters are strewn far down slope, often across other sites, and ultimately into canyons where they are ground to nothing or carried away in floods. Walls are undermined and broken apart; in some cases, sites are ripped apart and destroyed by gullies slashing right through them. The severe erosion is caused by extensive, gross devegetation. Trail gullying, wallows, and droppings are present in sites in the southwestern portion of Bandelier, and it is literally true that we visited no site southwest of Alamo Canyon that was not severely impacted by burros and their works. In a study of soils and vegetation in that area, Earth Environmental Consultants, Inc. reported typical soil depths of 18 inches along the mesa tops and measured erosion rates of about 21 inches per century; this is more than 10 times the rate of erosion considered normal in such regions.

3. In sites that have been partially excavated or severely eroded, some walls have very different levels of fill on opposite sides. This places a great strain on the wall, eventually causing its collapse. Such stress is often exacerbated by trees and cacti growing against the filled side of the wall and trampling by animals, and probably people, who walk right to the edge of the filled side.

These are the "big three" causes of site deterioration that can be counted. There are others more difficult to deal with--burrowing mammals and Harvester ants, sherd gathering, redistribution by people, etc.--that are also contributors to site degradation.

II. Alternatives and Impacts

A. No action - This alternative would result in continued losses to irreplaceable cultural resources. This action would be in direct opposition to both the National Park Service "Organic Act" and to the enabling legislation for Bandelier.

B. Continued monitoring - This would only serve to establish careful recording of the deterioration that should have been avoided.

C. Remove trees and control erosion - This option, where practical, would do the most to reduce deterioration of the resource.

III. Recommended Course of Action

What specific management actions can be taken? Among those under discussion are the following.

1. Cut trees and cacti causing damage now or promising to cause damage in the future; paint the stumps with herbicide, if necessary, to prevent regrowth.

2. Undertake local control of erosion; throw logs across drainage channels in sites to slow runoff and encourage plant growth, seed native grasses and forbs on the sites to bind the soil, etc. Reseeding techniques must be evaluated on or near selected sites.

3. Undertake area-wide erosion control using methods similar to those employed after the La Mesa Fire (recognizing that the progressive destruction of the natural vegetation by overgrazing has been as catastrophic as the fire, though less spectacular), by fertilization to encourage vegetation recovery, or by other means.

4. Prevent further damage by vigorous eradication of burros (which is already management policy, being implemented through improvement of the boundary fence in conjunction with a reduction program).
5. Stabilize wall with uneven fill by marking the present surface and backfilling with soil free of cultural artifacts.

All of these measures have some impact on the natural environment, and this must be weighed against the damage to nonrenewable resources. Although it is easiest to do nothing (because then one need not evaluate the destruction and balance it against other values, but only suffer it), doing nothing is probably not a responsible course. Bandelier was originally established specifically to protect these archaeological sites, and it is incumbent upon the Park Service as curators of the sites to afford them the very best protection that it can.

BAND C-12
CULTURAL LANDSCAPE

I. Problem Statement

Bandelier has throughout its existence attempted to manage vegetation and terrain problems on a basic the least action required at any given time to minimize impacts at that time. This policy, while a good one, has lead to a large number of minor landscape alterations over time. These cumulative changes have resulted in a departure from what the cultural scene should be managed for. What is lacking are management policy guidelines, specific to this area, that will result in the long term protection of its cultural integrity.

II. Background

In the days from September of 1880, Adolf Bandelier first visited Frijoles, until the fall of 1941, when the last CCC camp closed, all of the early Anglo inhabitants of Frijoles Canyon left their mark on the distribution land diversity of the plant communities now found in Bandelier.

In 1913, Judge Abbott brought the first fruit trees to Frijoles Canyon, in the 1920's Mr. Frey built the first irrigation system. In the 1930's, the WPA hired Jim Fulton, a landscape architect, to draft the plant layout for the then new Frijoles Canyon Lodge. The areas of the orchard and old lodge would seem of prime historic importance as it relates to the historic scene and should be considered under NPS Management Policies Chapter V, pages 24 and 25.

III. Alternatives and Impacts

A. No action - This would, over a period of years, result in the eventual loss of the unique historic character of this area.

B. Prepare an inclusive Cultural Landscape Report. to preserve an established direction and level of maintenance, based on a definitive statement of goals for this area.

IV. Recommended Action

In keeping with both NPS Management Policies and NPS-25 guidelines, a cultural landscape report should be prepared to insure maintenance of these area in a manner which would be in keeping with the preservation of this area's cultural integrity.

BAND C-13
HISTORIC ORCHARD

I. Problem Statement

When Judge Abbott moved to Frijoles in 1913, he brought with him the first of the fruit trees which were later to become the Frijoles Canyon orchard. This orchard, and related agricultural projects, were the basis for his December 4, 1913 water right application, which was perfected on October 15, 1921. These rights were later purchased by Mrs. Frey on November 5, 1942, and turned the rights over to the National Park Service on February 2, 1959.

As several of the trees still standing in the orchard are those brought into the canyon in 1913, the prospect for their continued life is quite limited.

Having established the historic and legal significance of the orchard, it becomes incumbent upon the Park Service to maintain the orchard as our only current use of these water rights so that they will preserve the established water rights and as a valuable interpretive exhibit to illustrate the early Anglo use of the canyon.

II. Alternatives and Impacts

A. No action - This would over a period of years result in the death of the existing orchard, eliminating its use as an interpretive display and placing in question the legal status of water rights in Frijoles Canyon.

B. Maintain the orchard area with a number of young trees so as to assure a continuity.

C. Eliminate the orchard and rehabilitate the area to a reparian zone. This again would place the water rights in question.

III. Recommended Action

Maintain the orchard largely with descendants of the original trees assuring both leagal and historic continuity, while keeping within the NPS Management Policy Statement on Historic Scenes, Chapter V, pages 24 and 25.

BAND C-14
ETHNOGRAPHIC OVERVIEW/ASSESSMENT

I. Problem Statement

For centuries, Bandelier land and the surrounding area have been used by the Anasazi people and their descendents, the Puebloans. No current ethnographic research has been conducted to determine exactly how many pueblos have ancestral claims to Monument lands and resources. Research conducted at the turn of the century indicates that the pueblos of Cochiti, San Ildefonso, Santa Clara, and Jemez have direct links to the area; Zuni, Santo Domingo, San Felipe, and possibly Navajo use is indicated as well. However, this information is dated, and there is some question as to the sources used.

We are also aware of Spanish use of Monument lands, but the total extent of this occupation is not well known. Basic questions such as where and how much of the land was cultivated, how many animals were grazed, and how much alteration of the landscape was done through lumbering and firewood collecting cannot be answered.

The Anglo population also introduced new concepts of land use, such as mining, large-scale grazing, and homesteading. Again, very little is known about the total extent of this occupation.

Very little research and documentation has occurred since the early 1900's. We are not well informed on post-Anasazi use of the area or the influences that have shaped Bandelier. Our knowledge of Pueblo, Spanish, and Anglo use of this area is totally inadequate.

II. Alternatives and Impacts

A. No action - This alternative will result in the loss of informants who will take irreplaceable information with them. The lack of correct information could also lead Monument staff to make misinformed interpretations of people, places, and events and bad management decisions.

B. Contact people from each of the ethnic groups to interview those whose relatives lived, worked, or traveled through Monument lands, according to tradition. In addition, research can be conducted through archives, legends, Spanish chronicles, and archaeologists' and ethnologists' field notes to pull together information specific to the Monument. Although this course has no adverse impacts on the surface, it would strengthen legal claims of traditional uses of Monument lands, and there is no way of ascertaining the truth of any given informant's statements.

III. Recommended Course of Action

The recommended course of action is alternative B. This will provide the

staff with a holistic view of the ethnologic use of the Monument lands. This will greatly influence interpretation of the Monument, guidelines for Native American use of the land, and resource management planning in the Monument.

RESOURCES PROGRAMMING SHEET

Bandelier Nat'l. Monument (PARK / AREA) | SW (REGION) | NM (ST) | ___ NATURAL | X CULTURAL | 2/9/87 (DATE) | PAGE 1 OF 1

PRIORITY	RMP REF NO.	PKG NO.	T	PROJECT TITLE	A	87 YEAR 1 NPS MY	87 YEAR 1 COST /1000	88 YEAR 2 NPS MY	88 YEAR 2 COST /1000	89 YEAR 3 NPS MY	89 YEAR 3 COST /1000	90 YEAR 4 NPS MY	90 YEAR 4 COST /1000	91 YEAR 5 NPS MY	91 YEAR 5 COST /1000	REMARKS
1.	C-6	242		Oral History Research		0.3	4	-	-	0.0	12	-	-	-	-	
2.	C-5	A71 174 A13		Stabilization of Exposed Ruins		0.0	3.0	0.0	3.0	1.0	35	1.0	35	1.0	35	
3.	C-10	A61 224 175		Maintenance of Historic Structures		1.0	28	1.0	28	-	3	-	3	-	3	
4.	C-4	-		Test Excavation and Prehistoric Environment Study		-	-	-	50	-	50	-	50	-	25	
5.	C-9	-		Patrol and Enforcement		-	-	1.6	20	1.6	20	1.6	20	1.6	20	
6.	C-3	116		Archaelogical Site Survey		2.8	70	3.6	80	4.1	89	4.1	98	1.0	54	
7.	C-13	-		Historic Orchard		-	-	0.0	2.0	-	1	-	1	-	-	
8.	C-12	-		Historic Landscape Study		0.0	14	-	-	-	-	-	-	-	-	
9.	C-11	257		Vegetative and Erosional Threats		-	-	1.0	12	1.0	14	-	-	-	-	
10.	C-7	241		Historic Resource Study		-	-	-	12	-	5	-	-	-	-	
11.	C-1	-		Literature Search & File		-	-	0.0	5	0.0	5	0.0	5	-	-	
12.	C-8	-		Assessment of Environmental Influences on Cultural Resources		-	-	-	-	-	-	-	-	-	-	
13.	C-14	-		Ethnographic Overview/ Assessment		-	-	-	-	-	-	0	12	-	-	

COLLECTION MANAGEMENT

	COLLECTION MANAGEMENT PROJECT STATEMENTS	PAGE NUMBER
BAND CM-1	Conservation Needs Survey and Conservation	33
BAND CM-2	Construct New Storage Facility	35
BAND CM-3	Visitor Center and Museum Security System Revision	37
BAND CM-4	Museum Area Environment Control	38
BAND CM-5	Environmental Control in Storage Facility	40
BAND CM-6	Maintenance of Historic Furniture Built by the CCC	41
BAND CM-7	Exhibit Area Environment Control	43
BAND CM-8	Locating & Cataloging Previously Excavated Artifacts	45
BAND CM-9	Inventory & Manage Use of Historic CCC Furniture	47

BAND CM-1
CONSERVATION NEEDS SURVEY AND CONSERVATION

I. Problem Statement

A conservation needs survey was conducted in 1982. Objects were prioritized according to the urgency of treatment needed. Priority 1, 2 and 3 contain 135 objects. Due to lack of funding, 1986 was the first year conservation was contracted. Many of the objects included in the top 3 priorities have been on loan to us, from the Museum of New Mexico, since 1975 and are on permanent exhibit. Although most of the objects were excavated from park land the State of New Mexico considers them their property and we must renew our loan annually. Because of the lapse in time from the Conservation Needs Survey until the actual treatment, each object must be reexamined to determine its status. When the condition of each item has been determined priorities must be established and contract conservation begun immediately.

II. Alternatives and Impacts

A. No action. Without a reexamination of the aritfacts, to select objects for treatment, we may exclude artifacts whose condition has deteriorated over the 6 years. As a result, artifacts may loose their value as research or exhibit material and the cost of conservation would greatly increase.

B. Continue conservation of artifacts as recommended by the 1982 Conservation Needs Survey. Send artifacts to Harpers Ferry to be treated. Usually the artifacts sent to Harpers Ferry are in very bad condition and shipping the artifacts that distance, to such a drastically different environment, greatly increases the risk of irrepairable damage. Harpers Ferry also usually has about a one year backlog of work allowing the condition of the artifact to further deteriorate.

C. Contract a professional conservator to reexamine the necessary artifacts before conservation treatments begin. Not only will the reexamination of the artifact determine the best possible treatment but it will also tell us the possible changes that must be made in the artifact's environment for the utmost preservation of each object and contract conservation as soon as possible.

III. Recommended Course of Action

The recommended course of action is alternative C. The main justification for a resurvey of the collection is to re-examine the already prioritized artifacts and to re-prioritize if their condition has worsened. This will result in the artifacts being treated in a timely manner which will ensure the artifacts value both aesthetically and as research material.

BAND CM-2
CONSTRUCT NEW STORAGE FACILITY

I. Problem Statement

The Bandelier artifact collection is presently stored in two historic cabins and two temporary structures. The interiors have been modified, to some degree, to protect the collections, however, in reality the structures do little to control the environment. The "storage facilities" are crowded with artifact cases in the same room with archival documents and photographs and boxes of uncleaned potsherds. The workspace is minimal, not allowing for necessary conservation and safety equipment to work with the collections, i.e., sinks, exhaust hood or an area for photographing artifacts. The park currently has an archeological research project in progress which will continue for at least three more years. Each of the last three years of the project have resulted in the addition of thousands of artifacts to the already crowded conditions. Currently, there is no expansion room for additional storage cases. A new storage facility is of critical need to properly house, preserve and care for the collections.

II. Alternatives and Impacts

A. No action. The storage conditions will become increasingly crowded and will do little to preserve the artifacts. At present the storage facilities are not fulfilling the responsibility the park has for preserving and caring for the artifacts and the ability to accommodate researchers.

B. Obtain the office/warehouse/carpenter shop complex of the present maintenance facility. Only if complete modification of the interior is permitted to create a stable environment. This complex will enable the separation of collections, the warehouse could house the main collection, providing a separate room for fine arts storage, office space, archival room for books and photographs, historic furniture storage and lab space for research and conservation.

C. Construct a new storage facility with input from Harpers Ferry conservation staff to insure all concerns are met in the new structure. In starting with a new facility, careful planning can determine the best placement of the vault section, researchers' work space and a separate curator's office; with special emphasis on a functional security and fire suppression system. We could then bring back collections currently being stored at the Regional Office and at the WACC and consider artifacts stored in other museums. The result would be increased preservation of the artifacts, less conservation costs and increased availability of an intact collection for researchers. Review Band CM-5.

D. Place artifact collection in a repository such as WACC. The

removal of artifacts from the park has been a chronic problem since the early 20th Century. The result is a great deal of the primary resource of the Park, all Federal property, is in various collections somewhere other than the Park. These collections are beyond the influence and control of the park and not accessible by researchers as a valuable document of the culture of the people for whom the park was established.

III. Recommended Course of Action

The recommended course of action is to build a new facility which will have taken into consideration Bandelier collections stored at the Regional Office and at the WACC and the possible reclaimed artifacts from other institutions whose standards do not meet NPS requirements. Expanded facilities and combined Bandelier collections would enable the park to encourage scholars to conduct research on the artifacts which would benefit the park's information and interpretive services. We would be a first in preserving an intact collection, in one location, from the Pajarito Plateau, a highly significant and archaeologically rich location.

BAND CM-3
VISITOR CENTER AND MUSEUM SECURITY SYSTEM REVISION

I. Problem Statement

A new high technology security system was installed in the visitor center by the Los Alamos National Laboratory (LANL). The new security system has proven very reliable; we have not had any artifacts stolen since its installation. However, the exhibit design has posed a special problem of alarming those objects in open display and a flexible system for our rotating exhibit space. Harpers Ferry has been contacted for possible solutions to this problem.

II. Alternatives and Impacts

A. No action. The park would be remiss on its obligation and NPS mandate "to perserve and protect" the resources. Without appropriate security measures we are unable to borrow objects from other institutions for exhibit and park material is vulnerable to theft.

B. Construct more physical barriers. This will change the "mood" of the exhibits and the creativity in exhibit designs, but will protect the artifacts from the "honest person' and from physical damage.

C. Continue working with LANL in finding secruity technology that will protect the exhibit items without causing any damage. Also, contact other parks who have solved similar problems.

III. Recommended Course of Action

The recommended course of action is alternative C. New security devises are reviewed by LANL staff periodically and they may find one that will accommodate our needs. Also, through the help of other parks, that have solved similar problems, we may be able to utilize similar techniques to achieve the maximum in security for the artifacts with the least amount of disruption to the exhibit and the visitor.

BAND CM-4
MUSEUM RECORDS MANAGEMENT

I. Problem Statement

The records of Bandelier's artifact collection, both in the park and at WACC, have been brought up to a workable standard. From this point, it will require a person reviewing catalog numbers, accession numbers, loan agreements (both from and to Bandelier) to match them with artifacts and identify any further problems. Once this step is completed, the collection will continue to require on-going maintenance to insure that all activity is properly documented, i.e., when artifacts are removed from exhibit, placed on loan, research requests, etc. An accession file has been instituted and must be periodically reviewed to insure proper documentation. The Bandelier Research Project is also contacting various institutions which contain artifacts from the park. This information and follow-up contacts must also be kept in an organized manner. The accomplishment of one of these tasks always leads to another, hence there is no end to the Management of Museum Records. As much, as possible, the records update work should be made current before the computerization of the catalog cards occurs.

II. Alternatives and Impacts

A. No action. This would result in total loss of documentation of the park's museum collection. We would not be able to answer for the artifacts entrusted to Bandelier. Also, we would be submitting incorrect information to the Automated National Catalog System, which would defeat its whole purpose.

B. Make corrections as staff time permits. The curator, the only staff member available to fulfill curatorial responsibilities, does not have the luxury of time to conduct the thorough research required to locate inconsistencies and maintain proper documentation of all activities relevant to museum records.

C. Hire a museum technician who would work year around in record-keeping, loan agreements, inventory of collection, computerization of card catalog, researching to document collections, assisting in the artifact search at other institutions, etc.

III. Recommended Course of Action

The recommended course of action is C. Hire a museum techinician whose primary duties would be record-keeping of the museum collection and park collection stored elsewhere. Having a museum technician would ensure the proper documentation of the park's collection, with all records being up to date. A 10-237 will be submitted to increase base funding.

In hiring a person whose main duty is to care for the artifact collection you will be assured this individual will want correct and current records to work with. Also, the curator will be aware of any changes that occur with the artifact collection and will be responsible for the on-going maintenance of the museum records.

BAND CM-5
ENVIRONMENTAL CONTROL IN STORAGE FACILITY

I. Problem Statement

Bandelier's research collection has suffered damage from clothes moth larvae, carpet beetles and mice. This was primarily a result of poor and inadequate storage conditions. The collections have been relocated in modified cabins. While this move has helped to reduce infestations, it has not completely eliminated the problems. The conditions remain crowded and because of the structures historic integrity many modifications cannot be made to stabilize the environment.

II. Alternatives and Impacts

A. No action. The over-crowded conditions and historic quality of the structure will increase the deterioration rate of the artifacts significantly. We are unable to modify the structure sufficiently to deter rodent and insect access. The organic collection is very small in number, hence, damage from rodent or insect activity causes the loss of valuable documentation which can never be replaced.

B. Establish and maintain a rigid housekeeping schedule whereby artifacts are checked and cleaned regularly. Also, fumigate objects susceptible to infestation at scheduled times.

C. Construct a new storage facility that will be designed and built to prevent specifically for curation of artifacts. This would include environmental controls, adequate storage space and workspace. Review BAND CM-2.

III. Recommended Course of Action

The recommended course of action is alternative C and B. In the event a new storage facility is constructed it will still be necessary to fumigate fragile objects on a regularly scheduled basis because cleaning could cause irreparable damage and also newly donated artifacts or artifacts being returned to storage.

BAND CM-6
MAINTENANCE OF HISTORIC FURNITURE BUILT BY THE CCC

I. Problem Statement

Bandelier's headquarters' buildings and many residences were constructed by the Civilian Conservation Corps (CCC) during the 1930's. These buildings include furniture and tin light fixtures also made by the CCC's. Originally, the furniture was constructed for use in the restaurant, weekend cabins and a visitor center. Some 50 years later, the historic furniture is still being used in the visitor center, in the cabins which now serve as park housing and in offices at headquarters.

During the furniture's use it has been subjected to weathering, bumping, scarring, lack of proper maintenance, the wood has dried and cracked and rawhide has become dried and cracked. Approximately, two-thirds of the furniture is being stored in an over crowded, rodent accessable facility, in various stages of disrepair.

A recent Park Servicewide survey indicates that Bandelier has approximately half of the total CCC furniture NPS collection.

II. Alternative and Impacts

A. No Action - The furniture will continue to deteriorate at a rapid rate, quickly loosing its functional value, thus removing historic integrity from the CCC structures. This alternative would be in violation of the NPS policies (NPS-28, 1090:VI-1-0).

B. Write a historic furniture preservation guide to insure the proper restoration procedures are followed in repairing thhe historic furniture. Contract all repair work to a skilled wood worker with sensitivity towards historic furniture.

C. Construct a new storage facility, solely for the historic furniture, with a furniture repair shop. The new facility should be planned with space to accommodate shelving so the furniture will not be stacked on each other. The repair shop should contain precision tools to be used only in the repair of the historic furniture.

D. Transfer furniture to WACC.

III. Recommended Course of Action

To insure the proper preservation and maintenance of the historic furniture, Alternative B and C would be the best solution. A new storage facility would insure a stable environment, with properly designed storage and a repair shop with the necessary tools. A preservation guide for the maintenance and the repair of the furniture will result in quality care and extended preservation of the historic furniture.

BAND CM-7
EXHIBIT AREA ENVIRONMENT CONTROL

I. Problem Statement

The Visitor Center is a historic building which is aesthetically appealing; however, the construction of the roof and ceiling is such that it provides warm living conditions for rodents and insects. As a result the artifacts on exhibit are in constant jeopardy of either being infested with insects or damaged by rodents. Another problem present in using a historic structure is the inability to modify it as needed.

The lobby of the visitor center is the room next to the entrance of the exhibit rooms, during the winter fire is built in the lobby fireplace which introduces smoke and soot into the air. Also, wood for the fire is brought in and stored increasing the possibility of introducing beetles and other insects in the building. The entrance and exit doors are continously being opened by visitors, which causes fluctuations in the temperature. During the summer the visitor center doors are proped open to allow easy access for visitors and to aid in cooling the building. Unfortunately, insects, rodents and dust and dirt also gain easy access. In this open-type situation, there is no possible way to stabilize the environment for the artifacts.

II. Alternatives and Impacts

A. No action. This action would eventually lead to the destruction of NPS artifacts, as well as artifacts from other institutions which are on long term loan. By allowing such damage to the cultural resources we will be losing an important facet of the park's tools for interpretation and lessen the unique experience of the visitor, as well as violating our mandates.

B. Attempt to make all exhibits and exhibit cases air-tight to create a stable mini-environment in each. This measure would aid in the preservation of artifacts but would be excessively costly.

C. Isolate the environment in the museum from that of the visitor center lobby. Harpers Ferry must be contacted to design a method of separating the environments without intruding on the building's historic integrity and the mood setting environment of the exhibits.

III. Recommended Course of Action

Alternative C is the recommended course of action if an agreeable solution can be made. By separating the museum from the lobby the museum environment could be controlled. The end result would be the preservation of the artifacts, the decrease need for conservation work, as well as the efficient use of heating and cooling energy.

BAND CM-8
LOCATING AND CATALOGING PREVIOUSLY EXCAVATED ARTIFACTS

I. Problem Statement

The National Park Service is legally responsible for the accountability and preservation of all artifacts entrusted to its care. Executive Order 11593 and Management Policies (1978:V-4) require that, "The cultural resources of every park shall be located, inventoried, and evaluated for significance...".

> Every park shall maintain a complete accession record and museum catalog of historic and/or scientific objects for which it is responsible...(Ibid.V-5).
>
> ...shall document, record, and protect for optimum preservation all historic objects entrusted to its care (Ibid.V-11).

During the first half of this century, a number of institutions and individuals did research (including excavations and surveys) within the Monument. During this research, many artifacts were unearthed and were removed from the Monument for storage and analysis.

In the past, some reports of research activities and collections either have not been given to the Monument or were lost after arrival. Other reports, which are in the Monument's possession, are incomplete. The nature and condition of these reports, as well as the status of the collections, must be determined to further our current understanding of the Monument's cultural resources.

II. Alternatives and Impacts

A. No action - If no action is taken, the Monument would continue to be in violation of National Park Service Management Policies and Executive Order 11593. As time passes, it is going to be harder to locate Bandelier artifacts; some institutions that once housed them are no longer in existence. For instance, the Philadelphia Civic Center no longer houses the Otowi Collection, what the park did not receive is gone without record.

B. Continue working with the Bandelier Research Project in sending letters to museums which we believe have or had Bandelier artifacts. Because various names were assigned to sites it may be necessary to send follow-up letters, or phone calls or possible on-site examination of their records.

III. Recommended Course of Action

By law, Bandelier is responsible for those cultural objects found in the Monument and must attempt to locate, catalog, accession, and protect them. But, in situations where the Bandelier artifact is not properly curated, the collection should be recalled and stored at the park, if space allows or temporarily at the WACC. But, in addition to meeting its responsibilities in relation to interpretation (Management Policies 11978:V-6) by locating and accessioning those artifacts. Knowledge of the specifics of those cultural objects will enlarge and improve the Monument's cultural resources data base--providing accurate information for interpretation--and will help provide a sound basis for future research, all of which will benefit the management of Bandelier's cultural resources.

This project would help meet the objectives stated in the Bandelier Final Master Plan. (1977) to "Ensure protection and preservation of archaeological resources within the Monument through management...".

BAND CM-9
INVENTORY AND MANAGE USE OF HISTORIC CCC FURNITURE

I. Problem Statement

Bandelier has never had a complete inventory of historic furniture including tin light fixtures. An earlier attempt to inventory and monitor the furntiure utilized in quarters was abandoned, due to lack of "signed" responsibility by the occupants. Thus, the furniture is traded from cabin to cabin and sometimes removed and stored in inappropriate places without notification to proper personnel. Currently, the occupant faces no financial responsibility when furniture is damaged or misplaced.

The park's historic furniture collection is a significant number of the Park Service's total collection. We should be able to account for such an important part of Bandelier's history.

II. Alternatives and Impacts

A. No action. This will result in the continued abuse and negligence of the historic furniture and possible loss due to theft and damage.

B. Establish a numerical listing of each historic furniture item. Computer adaptations could include the use of a bar code, similar to bar codes found on grocery items. This bar code would need to be attached to each piece of furniture and would allow us to document as much about the piece as available. Through the use of the computer it would be easy to establish which items of furniture belong in each residence and easily monitor their condition.

C. All historic furniture should be removed from use and stored to prevent damage.

III. Recommended Course of Action

The recommended course of action is B. In establishing a numbering or bar code listing we will be able to better preserve the furniture. We will keep track of current furniture conditions, financial responsibility of quarters occupants and location of each piece of furniture.

RESOURCES PROGRAMMING SHEET

Bandelier Nat'l. Monument / PARK / AREA — SW / REGION — NM / ST — ___ NATURAL — X CULTURAL — 2/9/87 / DATE — PAGE 1 OF 1

PRIORITY	RMP REF NO.	PKG NO.	T	PROJECT TITLE	A	87 YEAR 1 NPS MY	87 YEAR 1 COST /1000	88 YEAR 2 NPS MY	88 YEAR 2 COST /1000	89 YEAR 3 NPS MY	89 YEAR 3 COST /1000	90 YEAR 4 NPS MY	90 YEAR 4 COST /1000	91 YEAR 5 NPS MY	91 YEAR 5 COST /1000	REMARKS
1.	CM-1	-		Conservation Needs Survey & Conservation		-	3.0	-	-	-	0.5	-	-	-	0.5	
2.	CM-2	-		Construct New Storage Facility		-	-	-	49.0	-	275.0	-	1.0	-	-	
3.	CM-3	-		Visitor Center & Museum Security System Revision		-	-	-	3.0	-	2.0	-	-	-	-	
4.	CM-4	-		Museum Records Management		-	-	1	17.0	1	17.5	1	18.0	1	18.5	
5.	CM-5	-		Environment Control in Storage Facility		-	2.5	-	2.0	-	0.5	-	0.5	-	0.5	
6.	CM-6	-		Maintenance of Historic Furniture Built by the CCC		-	-	-	0.5	-	0.5	0.2	20.0	0.2	10.0	
7.	CM-7	-		Exhibit Area Environment Control		-	4.5	-	0.5	-	0.3	-	0.2	-	0.2	
8.	CM-8	-		Locating & Cataloging Previously Excavated Artifacts		-	3.0	-	3.0	0.2	6.0	-	-	-	-	
9.	CM-9	-		Inventory & Manage Use of Historic CCC Furniture		-	-	0.3	3.0	0.2	0.5	0.2	0.5	0.2	0.5	

RESOURCES PROGRAMMING SHEET

Bandelier Nat'l. Monument / PARK / AREA — SW / REGION — NM / ST — ___ NATURAL — X CULTURAL — 2/9/87 / DATE — PAGE 1 OF 1

PRIORITY	RMP REF NO.	PKG NO.	T	PROJECT TITLE	A	87 YEAR 1 NPS MY	87 YEAR 1 COST /1000	88 YEAR 2 NPS MY	88 YEAR 2 COST /1000	89 YEAR 3 NPS MY	89 YEAR 3 COST /1000	90 YEAR 4 NPS MY	90 YEAR 4 COST /1000	91 YEAR 5 NPS MY	91 YEAR 5 COST /1000	REMARKS
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3.	CM-3	-		Visitor Center & Museum Security System Revision		-	-	-	3.0	-	2.0	-	-	-	-	
4.	CM-4	-		Museum Records Management		-	-	1	17.0	1	17.5	1	18.0	1	18.5	
5.	CM-5	-		Environment Control in Storage Facility		-	2.5	-	2.0	-	0.5	-	0.5	-	0.5	
6.	CM-6	-		Maintenance of Historic Furniture Built by the CCC		-	-	-	0.5	-	0.5	0.2	20.0	0.2	10.0	
7.	CM-7	-		Exhibit Area Environment Control		-	4.5	-	0.5	-	0.3	-	0.2	-	0.2	
8.	CM-8	-		Locating & Cataloging Previously Excavated Artifacts		-	3.0	-	3.0	0.2	6.0	-	-	-	-	
9.	CM-9	-		Inventory & Manage Use of Historic CCC Furniture		-	-	0.3	3.0	0.2	0.5	0.2	0.5	0.2	0.5	

E N V I R O N M E N T A L A S S E S S M E N T

ENVIRONMENTAL ASSESSMENT MATRIX

Discussion

The following matrix displays summarize and highlight evaluations outlined in the individual project statements for cultural natural resources. Alternative actions are evaluated in light of impact categories (vegetation and soils, wildlife, water quality cultural resources, air quality, visitor use patterns, aesthetic values, etc.) and resultant alternatives are discussed separately. The overall guidance document used in preparation of this matrix is "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" (November 29, 1978), Council of Environmental Policy, Executive Office of the President. Reference is made to Part 1501 - NEPA and Agency Planning.

Other documents cited for reference here are:

- -Antiquities Act, 1906
- -NPS Organic Act, 1916
- -Presidential Proclamation No. 1322 (2/11/16)
- -Executive Order 11593
- -Special Directive 75-1
- -Bandelier Master Plan and FES, 1977
- -Wilderness Act, 1964
- -NPS Management Policies (Cultural' and Natural Resources)
- -P.L. 94-567, Bandelier Wilderness, 10/76
- -Bandelier Resource Management Plan (4/76)
- -Statement for Management, Bandelier NM (3/76)

ENVIRONMENTAL ASSESSMENT MATRIX

Discussion

The following matrix displays summarize and highlight evaluations outlined in the individual project statements for cultural and natural resources. Alternative actions are evaluated in light of impact categories (vegetation and soils, wildlife, water quality, cultural resources, air quality, visitor use patterns, aesthetic values, etc.) and resultant alternatives are discussed separately. The overall guidance document used in preparation of this matrix is "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" (November 29, 1978), Council of Environmental Policy, Executive Office of the President. Reference is made to Part 1501 - NEPA and Agency Planning.

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PROJ STATEMENT TITLE: Natural Resource Basic Inven (BAND N-1)

NEED FOR THE PROPOSAL: To comply with NPS Management Policies to develop and employ resource data for management and planning purposes.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Devlp. research strategies w/baseline invt, req, as total program	Ignore baseline studies	Baseline invt, studies on priority problems only			
Flora	No physical impacts	Restricted species may be jeopardized due to lack of information	Priorities may leave information on many species unavailable			
Fauna	No physical impacts	Other resource mgmt. actions may affect species unknowingly	Some species may be affected through other programs			

PROJECT STATEMENT TITLE: Feral Burro Management (BAND N..)
(Ref: Environmental Assessment, Feral Burro Management, Bandelier NM. 11/76)

NEED FOR THE PROPOSAL: NPS policy requires management to remove exotic animals where feasible and where research determines that the non-native animal is contributing to significant resource degradation

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Recommended action; total removal of feral burros from monument		Retention of Managed herd			
Soils	Stablizing as disturbance is removed	Erosion due to devegetation of portions of range	Erosion of bare areas			
Water	Quality increase	Fouling of water sources (feral)	Decreased water quality			
Fauna	Habitat occupied by native ungulates & predators	Burros population increases; displaces native wildlife	Competition with native wildlife			
Flora	Slow process of vegetative recovery would result	Long term changes in ecosystem components	Browsing & tramping in heavy use areas			
Visitor Use	No herd viewing	Herd viewing	Herd viewing			
Cultural Resources	Enhanced protection of backcountry sites	Damage by trampling	Damage & accelerated soil erosion			

PROJECT ATEMENT TITLE: Grazing Impacts on Vegetation (L , N-3)

NEED FOR THE PROPOSAL: Once heavy impacts from feral burro grazing and vegetation disturbance from trespass grazing are removed, it is unknown how the ecosystem with show recovery, and what animals are likely to occupy the niche

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Research & monitoring of vegetative recovery		Develop vegetative recovery plan			
Vegetation	No impacts	Lack of data & trends in recovery	Mechanical alteration of vegetation, unknown effects			
Fauna	No impacts	Lack if data on wildlife replacement processes	No effects			

PROJE. STATEMENT TITLE: Management of Native Ungulate ulations (BAND N-4)

NEED FOR THE PROPOSAL: To understand the relationships involved between the re-vegetation program in the La Mesa Burn and native muledeer and elk population dynamics

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Maintain cooperative studies with LANL & monitor populations		Monitor population only			
Vegetation	Knowledge increased of relationships between animals & vegetative changes over time	No adequate planning data	No data would emerge			
Fauna		Ignorance of population density trends	Gross population index derived from pellet plots only			

PROJECT STATEMENT TITLE: Fire as a Management Tool (BAN -5)

NEED FOR THE PROPOSAL: To re-establish fire as a natural component in the largely fire-dependent ecosystem, and the prevention of man-caused wildfires

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Conduct fire research burns; prepare thoroughly documented Fire Mgmt Plan	Full Suppression	Literature survey to determine fire prescription effects			
Vegetation	Understanding of fire effects through research burns; successional patterns documented	Hazardous fuels accumulations, increased chance of holocaustic wildfires	True understanding of fire's role lacking			
Fauna	Enhance habitat, short term displacement of certain species	Habitat degradation with increased vegetative density; lack of diversity				
Water	No major impacts to quantity or quality	Large destructive wildfires result in flooding & siltation				
Visitors	Enhanced awareness of role of fire in ecosystem	Visitors remain unaware of fire's role; increased chances of life-threating wildfire	Opportunity absent for visitors to observe effects of management type fires			
Facilities	Increased protection around structures from fuel reduction burns	Increased chances of facility threats by wildfire	Increaaed threats			

NOTE: The above display will be addressed in detail through the Fire Management Plan currently in preparation

PROJECT STATEMENT TITLE: Acquisition of a Monument Res[illegible] Management Information System (BAND N-6)

NEED FOR THE PROPOSAL: To alleviate manual processing (input, retrieval, display processes) of rapidly accumulating information, fast approaching too cumbersome to manage efficiently

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Acquire system to store, retrive & illustrate information	Continue present information management	Acquire automated input & retrieval system only			
Resource Management Decisionmaking	Timely, accurate up to date information availability	Slower; less informed & decreased public image	Timely & thorough information			
Resource Information Display	Rapid, easy to read & utilize; less costly in long run	Costly to perform manually; subject to increased inaccuracy	Manual means of display - costly & subject to error			
Information availability for reporting, document preparation	Rapid & timely; cost effective with time	Slow; cost ineffective	Rapid			

PROJECT STATEMENT TITLE: Control of Hazardous Plants (n-7)

NEED FOR THE PROPOSAL: To minimize the potential for injury and/or toxic contacts by public

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Implement inspection schedule, public information program & problem removal	No Action				
Vegetation	Removal of hazards, no additional impacts	No impacts				
Visitors & employees	Improved public safety & awareness - save life & limb	Increased chance of personal injury or death, damage to facilities and/or vehicles				

PROJECT STATEMENT TITLE: Control of Hazardous Animals (D N-8)

NEED FOR THE PROPOSAL: Prevention of human - hazardous animal contact; minimize chances for disease outbreaks

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Public information, law enforcement, inspection schedule & corrective action	No action	Manage for human-animal contact only			
Visitors & employees	Minimize injury or disease greater awareness & prevention potential	Chances of harm or injury - lost employee time; increased chances of costly legal action	Minimize harmful effects			
Animals (wild & domestic)	Minimize injury and sickness to pets & wildlife. Treatment may result in animal removal, death, etc.	Increased chances of disease outbreaks; increased chance of harmful public/employee contact, chemical treatment specific to identified pest	Chemical or other treatment would result in animal removal or death			

PROJECT/EVENT TITLE: Rehabilitation of Cottonwood Pi[illegible]ea and Juniper Campground (BAND N-9)

NEED FOR THE PROPOSAL: Heavy camping and picnic use has resulted in visual impacts to vegetation and soils, and rehabilitation is needed to maintain site vigor

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Employ rockwork, erosion control, photo monitoring, reseeding	Allow use without rehabilitation	Continue camping loop rotation picnic area regulations only			
Vegetation	Vegetative cover will be increased in specific impacted areas	Vegetation will be trampled, decreasing percent coverage	Poor vegetative recovery in picnic area; campground vegetation would remain relatively stable			
Soils	Seeding will act to retain soil & minimize erosion; cribbing will reinforce creek banks in area	Increased compaction over time, resulting in poor re-vegetation & high rate of erosion	Compaction in picnic area			
Visitor Use	Temporary closures during rehab will result in some disruption to normal use	No impact other than aesthetic degradation	No impact except aesthetic degradation in picnic area			
Water	Cribbing along Frijoles Creek banks, will reduce siltation in creek resulting from slumping and trampling by visitors	Siltation in Frijoles Creek would increase from bank breakdown	Siltation slowly continuing in Frijoles near picnic area			

PROJECT TENTATIVE TITLE: Management of Backcountry Vis' 'se (BAND N-10)

NEED FOR THE PROPOSAL: Manage for a balance of use and preservation of wilderness and backcountry values

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Revise Backcountry Management Plan	Continue current management				
Soils	Perceived stability of campsite soils	Gradual impacts to soils over time				
Water	Perceived continuing water quality	No effect				
Vegetation	Reduction of fuel-wood use through regulation change	Increase in fuel-wood use; less available wood near campsites				
Visitor Use	Perceived alteration of use patterns through regulation & enterpretative messages	No perceived change				

PROJECT EMENT TITLE: Regeneration of Ponderosa Pine La Mesa Burn Area (BAND N-11)

NEED FOR THE PROPOSAL: Very little seeding reproduction is evident in the severe burn areas due in part to grass competition and lack of seed sources

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Study several methods of enhancing regeneration of Ponderosa Pine	Status Quo	Restock all former Ponderosa Pine sites only			
Vegetation	Increased tree cover reduced grass cover	Slow succession to Ponderosa; many areas remaining pure grass - forb type	Improvement rapid for Ponderosa; high mortality			
Soils	Nutrient cycling into soils from eight burning; some mechanical disturbance	No perceived changes	No immediate changes			
Aesthetics	Improved over long term	Remains unpleasant in severe burn area	Improved near highway in long term			
Fauna	Increase in small mammal & predator populations; bird life increase over time	Good forage for grazers	Grazing forage decreased in long term			
Cost	Minimal with small plot treatments	None	Very costly for nusery stock or seed collection & propagation			

PROJECT/EMENT TITLE: Management of Rio Grande - Coc[illegible]ke Shoreline in Bandelier National Monument ([illegible] 12)

NEED FOR THE PROPOSAL: Severe water level changes recently have caused vegetational and faunal changes which may severely alter natural processes

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Initiate seeding program and evaluate results	Status Quo	Remove dead trees along shoreline only			
Vegetation	Improved through seeding; percent cover increased	Remains in poor condition	Increased reproduction perceived			
Fauna	Waterfoul habitat improved in seeded areas; raptor prey increased	Habitat remains marginal for waterfoul & raptor population	Decrease perch & nesting availability for birds			
Aesthetics	Vegetative cover would improve appearance of shoreline areas	Area would remain unsightly	Improved over long term			
Soils	Increased stability, however potentially temporary only	Soils & sediments remain unstable	Highly susceptible to erosion with high water levels			
Cost	Minimal if cooperative effort	None	Very high			

PROJECT ASSESSMENT TITLE: Management of Water Resources (N-13)

NEED FOR THE PROPOSAL: Adjacent land use patterns, flooding and increased visitation is resulting in the need to actively manage for quantity and quality of surface waters

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Develop a water resource management plan	Status Quo	Manage by crisis			
Water	Increased protection measures through information - based management	Minimal protection lack of management information	Minimal and sporadic protection			
Visitor & Employee Safety	Safety maximized through prevention monitoring of water quality provided in plan	Chances of safety hazards increases	Hazards appear unnoticed without preventive measures			
Aquatic Life	Diversity & health improved through data based management programs	Trends unnoticed; loss of diversity and health from pollutants more probable	Treatment is only alternative			
Wilderness Character	Maximized through monitoring and management action	Vulnerable to degradation	Vulnerable to degradation			

PROJECT [illegible]EMENT TITLE: Control of Exotic Ailanthus (BA[illegible]4)

NEED FOR THE PROPOSAL: This non-native has potential for large scale displacement of native species, uncontrolled growth, and alteration of faunal populations

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION Continue eradication program	NO ACTION No action	ALTERNATIVE Research only	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
Vegetation	Treatment causes no other vegetative damage	Native vegetation displaced through competition	Treatments have limited impact on vegetation			
Water	Water uptake reduced as plants are removed availability to other plants increases	Water uptake increases in plants availability to native plants decreases	Some water loss			
Soils	No perceived impacts	Potential chemical changes likely	Unknown			
Cultural Sites	Protection of Tyuonyi Ruins improved through plant removal	Damage from plant invasion of walls and floors, causing cracking & crumbling	Some damage may occur			
Fauna	No perceived changes or impacts	Populations of small mammals & birds may be altered	Effects unknown			

PROJECT EMENT TITLE: Management of Restricted Faunal ies (BAND N-15)

NEED FOR THE PROPOSAL: Unique, rare and endangered species require specialized management information and subsequent management

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Mgmt, via use regulation, habitat improvement & monitoring & research		Continue present management	Add protective measures & improve habitat	Monitoring & research only	Manage for potential Peregrine falcon habitat
Vegetation	Increased productivity in treated areas	Largely un - changed	Unchanged	Increased productivity through seeding	Unchanged	Increased productivity in seeded areas
Fauna	Increased waterfoul populations	Potentially decreasing waterfoul populations	Minimal Eagle habitat protection through regulation	Increased Eagle prey populations through burro reduction	Decreased protection for Bald Eagle areas	Potential increase in waterfoul
Visitor Use	Continued camping closures will have minimal effect on use patterns	No effect	No effect	Trail re-routing may temporarily disrupt normal use patterns	No effect	No effect
Soils	Improved stability through grass seeding	Gradual soil erosion from highly unstable sites	Gradual soil erosion in unstable areas	Improve stability	No effect	Improved soil stability at seeded sites

PROJECT STATEMENT TITLE: Management of Restricted Flora (Item N-16)

NEED FOR THE PROPOSAL: Compliance with NPS policies to employ protective measures for scientifically unique, rare and/or endangered plants

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION Monitor identified plants & cooperate with state heritage program	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
Resource Information Availability	Plant data available to assist in developing protection strategies	Information used to develop protection strategies unavailable				

PROJECT STATEMENT TITLE: Protection of Air Quality Rela values (BAND N-17)

NEED FOR THE PROPOSAL: To ensure adequate protecting of Class I Bandelier Wilderness air related resources

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Monitoring & acid precipitation data collection	No monitoring	Monitoring visibility & particulates only			
Baseline & trends data for management purpose	Data collected would comprise a good source of management information	No data, poor management & protection program	Data lacking in sulfates deposition and related PH trends; no time tapse photo records			

PROJECT ELEMENT TITLE: Literature Search & File (BA .1)

NEED FOR THE PROPOSAL: Research and report writing are taking an ever-increasing proportion of park management time: to facilitate this process, a system of research information retrieval is necessary.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Compile annotated Bibo's.for research & mgmt. use, then program McBee cards		Multiple reference files	Computerized retrieval		
Cost to establish system	Cost of researching all available resource; cost of punching in data on cards		Cost of researching all available sources; cost of developing multiple source files	Cost of researching all available sources; plus cost to program & store data in computer		
Cost to use system	Very low time & maintenance cost		Time needed to use system is much greater than other files - increasing costs	Expensive maintenance, but low use time		
Flexibility of system	This system will sort for up to 100 catagories		This system is severely limited in the number of sort categories it can handle	This system can increase indefinitely the number of sort categories available		
Lack of information availability		Under the current system, each project must be individually researched				

PROJECT [illegible]MENT TITLE: Locating & cataloging previously excavated artifacts (BAND C-2)

NEED FOR THE PROPOSAL: To furnish a cohesive picture for the management & interpretation of the monument's cultural resources, we must obtain detailed information on the work that has already been completed within the monument's boundaries.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Locate, catalog, & accession previously excavated artifacts	:	Send out canvassing letters to determine the loc & cond. of artifacts			
Visitor Use	These resources would be increased	No public use of these artifacts is currently taking place				
Cost to monument	Would bear the cost of shipping, accessioning, & storing the artifacts					
Availability of information	Information, which is not currently in the monument's possession, would be available about the areas where these artifacts were taken from	No analysis of these artifacts has yet been published	In theory, this would supply a data base for management decisions			

PROJECT [illegible]MENT TITLE: Archaeological Site Survey (BAND [illegible])

NEED FOR THE PROPOSAL: An archaeological site survey is required by law and is needed for intelligent management of the resource

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Professional survey teams & remote sensing techniquies to perform complete survey		Use of local volunteer crews over a period of several years			
Visitor information	Interpretive data for the monument as a whole, would be greatly increased	Little or no information is currently available on the majority of sites	The information would tend to be somewhat inconsistent			
Management information base	Data for intelligent decision-making would be greatly increased	Same as above	Same as above			
Cost to monument	Greatest cost to monument		Lesser cost to monument			
Legal	Would meet legal obligations		Would meet legal obligations			

PROJECT STATEMENT TITLE: Test excavation and prehistoric environment study (BAND - C4)

NEED FOR THE PROPOSAL: Test excavation of specific locations is necessary to augment the information gathered by and answer questions posed by the proposed site survey. This project is intended to give a reliable and well-rounded view of the Puebloan environment and lifestyle.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Coordinated survey and test excavation		Independent test excavation & environmental testing			
Visitor information	Would meet information needs	Does not properly meet needs	Would meet information needs			
Management information	Would meet management needs	Would not meet management needs	Would meet management needs			
Natural resource damage	Would entail minimum resource damage		Would entail greater resource damage			
Cultural resource impacts	Would entail the minimum necessary distrubance		Would entail a wider spectrum of damage to resource			
Cost to park	Approximately $25,000		Approximately $25,000			

PROJECT [illegible]MENT TITLE: Stabilization of exposed ruins [illegible] - C5)

NEED FOR THE PROPOSAL: To comply with the mission of preserving the cultural resources of the monument, an increased ruins maintenance push is required; to include additional ruins maintenance positions and preservation guidelines.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Add. stabilization personnel; preparation of guidelines		Experimental stabilization techniques			
Damage to ruins	These measures are designed to reduce damage to ruins	Currently deterioration is occuring at a greater rate than the rate of stabilization	This would endanger a portion of the resource			
Legal	Would meet the monument's legal obligations	Does not meet the legal obligations	Would meet the legal obligations			
Visitor Use	Enhanced maintenance should increase visitors and enjoyment	Will eventually reduce visitor use and enjoyment	Should increase visitor interest			

PROJECT TITLE: Oral history research (BAND -

NEED FOR THE PROPOSAL: Until the mid-1900's, there was little or no recorded history of this part of New Mexico. Several individuals are yet living who have extensive knowledge of the early history of this area. Because of their advanced age, it is essential that their stories be recorded as soon as possible.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Tape interviews that are later transcribed		Taped interviews			
Visitor Information	The resource could be preserved & duplicated for widespread use and information	The resource will be permanently lost	The resource would be preserved for limited use			
Management information	The resource could be more easily used for management decisions	The resource will be permanently lost	The resource would be difficult to use for management & planning purposes			

PROJECT [illegible]AENT TITLE: Literature search and historic [illegible]ve (BAND - C7)

NEED FOR THE PROPOSAL:

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Research & formulate a historic narrative					
Visitor information	Information and access to it would be greatly increased					
Management information	Information and access to it would be greatly increased					

PROJECT MENT TITLE: Assessment of environmental influen on cultural resources (BAND - C8)

NEED FOR THE PROPOSAL: Research effects of environmental factors on cultural resources for administrative and management decisionmaking

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Monitor resources & effects for data to be used in later decisionmaking					
Visitor use	Would increase information base	Well based information on environmental effect of cultural resource sites shall continue to be unavailable for use by both visitors & park managers				
Management information	Would increase management information base for decisionmaking concerning possible interference with natural processes					

FOR RESOURCES [illegible]MENT PLANS

PROJECT STATEMENT TITLE: Band C-9 Protection of Cultural Resources through Patrol and Enforcement

NEED FOR THE PROPOSAL: Several park areas are currently subject to vandalism at a greater than expected rate due to their unsupervised status.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 5	ALTERNATIVE 6
	Additional Patrol Positions		Establishing patrol as a priority function			
Visitor Services	Would increase visitor assistance without decreasing other essential services	N/A	Would eliminate some services currently provided to redirect manpower			
Resource Degradation	Would decrease resource degradation due to vandalism and visitor abuse	Resource degradation would continue at present rate or above as visitor use increases	Would decrease resource degradation			

PROJECT STATEMENT TITLE: Maintenance of Historic Structures Built by the CCC (BAND C-10)

NEED FOR THE PROPOSAL: To insure proper maintenance of historic structures within the Monument and compliance with the criteria set down in N.R.S. 28, Chapter II and VI

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 5	ALTERNATIVE 6
	Establish cyclic maintenance and adaptive use plans for historic struct.					
Aesthetics	Would help insure aesthetic continuity throughout the historic structures	Would give no assurance of future aesthetic continuity				
Continuity of Maintenance Actions	Would produce maintenance action in keeping with the historic nature of the structures					
Management Planning	Would facilitate management planning and the programming of funds and projects	Would tend to hinder management planning and programming				

PROJECT [illegible] DMENT TITLE: Conservation Needs Survey and Co[illegible]tion (BAND CM-1)

NEED FOR THE PROPOSAL: Bandelier artifacts have been ignored for several years; their storage condition & environment was detrimental to the artifacts. Few if any of the artifacts have received any conservation resulting in on-going deterioration. Much deterioration is not visible until it is too late to save the artifact. A survey by a conservator would provide information on the needs of the collection.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Contract conservator for survey of conservation needs. Funds for immediate & future needs.	Continue to display & loan artifacts in unstable conditions	Send artifact in need of conservation to Harpers Ferry			
Cultural Resource	The conservation & stabilization of artifacts will result in the preservation of a valuable park resource which can be utilized for many years	The professionalism of an institution which continues to allow the deterioration of artifacts is questionable	Conservation of artifacts does not normally occur unless item is very unstable. In this stage it would be detrimental to change its native environment by sending it to Harpers Ferry. Transporting the item could be very hazardous			
Aesthetic	By detecting deterioration in early stages the beauty of the artifact & its integrity can be preserved	The unchecked deterioration of artifacts will result in unsightly damaged artifacts				
Researcher's	Conservation can preserve the valuable information artifacts have to offer. When deterioration is stopped early the original shape, size & material can be saved. Thus providing valuable research material.	The less complete original material an artifact consists of, the less value to researchers.	While the artifact is stored at HFC till it can be conserved it is inaccessable to researchers.			

PROJECT TITLE: Conservation Needs Survey and ... vation (continued)
(BAND CM-1)

NEED FOR THE PROPOSAL:

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Contract conservator for survey of conservation needs. Funds for immediate & future needs.	Continue to display & loan artifacts in unstable conditions	Send artifact in need of conservation to Harpers Ferry			
Information	Well preserved artifacts provide valuable interpretive tool for staff & visitors	Interpretation of artifacts suffering from visible deterioration makes it difficult to handle or display				

PROJECT STATEMENT TITLE: CONSTRUCT NEW STORAGE FACILITY (AND CM-2)

NEED FOR THE PROPOSAL: Bandelier's artifact collection is presently stored in a historic structure which has limiting factors of size, materials used in its consturction and the inability to modify the original building. The storage area is not sufficient to adequately house the collection, artifacts are crowded and infestations have recurred in the building. There is little workspace for the curator or researchers.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Construct new storage facility w/modern environment & security controls & an equipped work area	Continue to crowd artifacts promote deterioration & prevent adequate care for the collection.	Modify interior of building for pest & environment control.	Store artifacts at repository		
Cultural Resources	New facility would stabilize environment for artifacts which would result in their preservation With updated facilities, could attend to needs of artifacts as identified.	Crowding of artifacts & lack of work space will result in advancing deterioration of the collection	Keeping a stable environment & insects & rodents from entering the facility will aid in the preservation of the collection.	Would meet preservation needs of the resources		
Aesthetic Values	Modern, clean spacious facility would be more conductive to working with artifacts	Crowded facilities result in poor access to the artifacts & lack of visability. Rubbing of artifacts results in surface loss & scarring.	Preserved artifacts will result in better research & exhibit items.			
Visitor Use (Researchers)	Modernized facility will aid research of artifacts & will better accommodate researchers needs		Deteriorating artifacts are not stable for research handling or exhibiting.	Would centralize artifacts at a facility & expand collection inventory.		
Interpretation	New storage facility could serve as example to museum people from other institutions, on best care for museum pieces.		A fragment of an artifact does not give the same information to visitors as a whole artifact would.	Would reduce or hinder ready access.		

PROJECT [illegible]EMENT TITLE: Visitor Center & Museum Securi[illegible]tem Revision (BAND CM-3)

NEED FOR THE PROPOSAL: Present security system has proved insufficient. Since its installation in 1975, seven artifacts have been stolen. There have been several instances when visitors should have caused the alarm to sound and it has not. It is an unreliable system.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Security system expert evaluate museum needs, devise new flexible system	Continue to test alarm, daily & random walkthrough surveillance	Physically close off life-size dioramas, place electric eyes in each room			
Cultural Resources	New security system will provide optional protection of artifacts from damage or theft	Artifacts may possibly continue to be stolen from exhibits	The artifacts will be protected from damage or theft			
Aesthetic Value	New security system will not be overly visible, will not be attached to artifacts in way that will damage.		Mood of the dioramas will be changed			
Visitor Use	Visitors will be able to enjoy viewing artifacts in mood-setting environment	Exhibit niches will be empty when security system is not working	An uncomfortable, unrelaxed feeling will result from being viewed with electric eye			
Interpretation	The exhibits will be representative of environment of the artifact which will promote self-interpretation	When exhibits are empty due to security system malfunction, museum does not lend itself to interpretation	Physical barriers will prevent effective mood of life-size dioramas			

PROJECT TEMENT TITLE: Museum Records Management (BAND

NEED FOR THE PROPOSAL: Years of neglect have resulted in loss of information, misfiling, incorrect documentation & lack of an accession file. Extensive research through old correspondence & administrative files must be conducted to retrieve important information.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Grant money for personnell & research of artifacts. Establish record-keeping & ongoing maint. of it	Valuable info. will bontinue to be lost. Catalog cards will be incorrect	Make correction as found			
Cultural Resources	Research will provide valuable information necessary to document ownership of artifact storage location & archaeological documentation.	Museum records will be lacking in information artifacts will be unaccounted for & knowledge of BAND artifacts in other institutions will not be known	Random corrects will be made to the records which may or may not be complete			
Researcher Use	Correct & complete museum records will benefit researchers of artifacts. Valid & documented information will increase use of records by researchers & establish creditability in management .	Disservice is being done to researchers due to lack of record keeping. Basic information is not at hand so researchers must conduct research for information the park should provide				
Interpretation	With added information, interpretive uses of artifacts will be varied & will provide insight of the importance of artifacts	Artifacts will continue to provide minimum information to be used in interpretating	Any information added to records will promote further interpretation			

PROJECT STATEMENT TITLE: Storage Facility Environment C[illegible] (BAND CM-6)

NEED FOR THE PROPOSAL: The present storage facility has no built in means of temperature and humidity control; there is no central heating or cooling system in the building. Also, the roof/ceiling construction allows for insect and rodent habitation and the build-up dust and dirt.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Construct new storage facility from plan specifically designed for Bandelier's needs	Continue to keep all artifacts in cases & dust & vacuum floors	Apply for 106 Clearance to recondition roof & add two-way circulation vents.			
Cultural Resources	Better storage & environment control will preserve the artifacts. This will maintain artifacts of display quality & require less expense for conservation	Artifacts will continue to undergo changes which will cause serious damage in the future	Through regulation the temperature & humidity artifacts will require less conservation work.			
Asethetic Values	Proper storage of collection will maintain face value of artifacts for display & research purposes		Artifacts will maintain original surface & consistenancy with regulated temperature & humidity			
Researchers Use	With expanded & modernized facilities researchers would have better accommodations	Researchers will continue to be cramped & lack equipment necessary to fully research artifacts				
Cost	Benefits derived from a well equiped facility will far out weigh the cost of construction	Conservation of artifacts will continue to be a costly & reoccurring expense	If approval was granted reroofing & other updating will be time consuming & costly			

PROJECT STATEMENT TITLE: Maintenance of Historic Furniture Built by the CCC (BAND CM-6)

NEED FOR THE PROPOSAL: To insure the preservation and proper maintenance of the historic furniture in compliance with the criteria set down in NPS-28, Chapter II and VI.

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Maintain a type collection. Proper preservation will require a new storage facility.	Would be in violation of NPS policies	Replace original CCC furniture with reproductions			
Aesthetic Value	This preserved collection will enable the other furniture to keep their original look.	Loss of a valuable resource	Reproductions can serve the same purpose as the originals, however, at a great expense.			
Maintenance	The type collection will serve as models for the correct restoration of the furniture being used.	Would continue to be haphazard	Care of reproductions will be necessary and as costly as maintaining the originals.			
Management Planning	The plan will provide a means of regular, restricted care for the furniture	Would hinder any funding programming for its care				

PROJECT 'IENT TITLE: Exhibit Area Environment Contro\ND CM-7)

NEED FOR THE PROPOSAL: The museum entrance opens into the Visitor Center lobby, which greatly affects the environment of the exhibit rooms. During summer the Visitor Center doors are kept open for cooling purposes, which allows dust, vehicle emission & insects to enter while in the winter fires are built in the fireplace in the lobby which results in smoke & soot in the building also, the entrance & exit doors are constantly being opened allowing cold air to enter causing temperature fluctuations

ALTERNATIVE ACTIONS / IMPACT CATEGORIES	PROPOSED ACTION	NO ACTION	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE	ALTERNATIVE
	Install doors to & from museum, improve temp. systems & recondition roof & ceiling.	Continue to dust & clean exhibits; check artifacts - regularly for conservation needs	Attempt to make air tight exhibit cases, creating stable environment			
Cultural Resources	Artifacts will be better preserved which will result in less expense for conservation treatments.	It is possible to damage artifacts by constantly moving them for cleaning				
Aesthetic Values	Cleaner exhibits & a constant air temperature will enrich the exhibits		Beauty & preservation of the artifacts will be maintained but at a great cost			
Visitor Use		Exhibits may be in display during cleaning while visitors are in the museum				
Interpretation	The exhibits will be more appealing and may lend themselves to better interpretation.					

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