DRAFT

RESOURCE MANAGEMENT PLAN

MESA VERDE NATIONAL PARK

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I. INTRODUCTION

A. Purpose of this Plan

This is a plan for the proper long range management of the natural and cultural resources of Mesa Verde National Park. It consists of:

(1) a summary overview of those resources which relate to the values and purposes of the park,

(2) an analysis of both the natural and cultural resource management needs and problems, ranked according to importance,

(3) a set of proposed actions, including dollars and FTE's, specifically aimed at dealing with the most important and urgent of those needs and problems,

(4) a proposed multi-year program aimed at achieving measurable progress in the accomplishment of the proposed actions,

(5) and a plan for annual review and recording of accomplishments which will serve as a measure of the effectiveness of those actions.

It is an overview of the natural and cultural resources of the park, and the problems and proposed solutions for properly managing those resources. It is not intended to be the final word on the management of the park's resources, however but a working document which may be modified, refined, and adjusted as changing conditions require. Its loose-leaf modular format will allow revision and updating of individual portions without the necessity of completely rewriting the entire document.

The plan accords with previously approved planning documents, particularly Mesa Verde National Park's General Management Plan and Statement for Management, and the National Park Service Cultural Resources Management Guidelines (NPS-28).

B. Resource Management Policies.

Mesa Verde National Park contains a vast array of cultural and natural resources which must be protected. The park is more than a preserve for prehistoric sites and artifacts, and management of the park must take into account the historic and natural resources as well. Management objectives are thus to preserve and protect all of the resources: the prehistoric and historic sites and their related artifacts, the flora, and the fauna, and the geological/paleontological resources.

The following legislative acts, Executive order, and federal regulations concerned with the protection and preservation of cultural and natural resources constitute the basis for the Resources Management program at Mesa Verde National Park.

1. The Antiquities Act of 1906. (Public Law 59-209, 34 STAT. 225; 16 U.S.C. 431-433).

This act sets forth the basic principle that the Federal Government, acting for all the people, should work toward the protection, preservation, and public availability of the nation's historic and prehistoric archeological resources. With accompanying guidelines, the act provides for federal control of all archeological resources on federally-owned or controlled land and establishes a permit system for investigating them.

2. An Act to Create Mesa Verde National Park, 1906.

This act created the park for the "...preservation from injury or spoliation of the ruins and other works and relics of prehistoric and primitive man... and, as far as possible, for the restoration of said ruins." The act spells out the measures to be taken to assure the preservation of the prehistoric cultural resources.

3. An Act to Adjust the Boundary to Mesa Verde National Park, 1913. (Public Law 38; STAT. 82)

This act added a large parcel of land along the original southern park boundary in order to include major cliff dwellings in the park. It also gave authority to the park for the preservation of all ruins within five miles of the park boundary.

4. An Act to Establish the National Park Service, 1916. (Public Law 235; 39 STAT. 535).

This act created the National Park Service and charged it with administering all of the national parks, monuments, and reservations in such a way as to "...conserve the scenery, natural and historic objects and wildlife..." and to provide for their enjoyment in a manner that would leave them unimpaired for future generations.

5. An Act of the State of Colorado General Assembly Ceding to the United States Government Exclusive Jurisdiction over Mesa Verde National Park, 1927.

By this act, control of the park was formally transferred to the federal government.

6. An Act Accepting the Cession of Jurisdiction over

Mesa Verde National Park to the United States Government, 1928. (Public Law 45; STAT. 458).

This act officially transferred jurisdiction over the park to the federal government.

7. An Act to Adjust the Boundary and Add Certain Lands to Mesa Verde National Park, 1931. (Public Law 46; STAT 1422).

This act added a narrow strip of land to the northern boundary to provide an entrance corridor connecting the park with the major highway north of the park.

8. The Historic Sites Act of 1935. (Public Law 74-292, 49 STAT. 666; 16 U.S.C. 461-467).

This act declares it to be national policy to preserve for the public, historic (including prehistoric) site, buildings, and objects of national significance. The National Park Service is directed to "make necessary investigations and researches in the United States relating to particular sites... or objects to obtain true and accurate historical and archeological facts and information concerning the same."

9. Natural Wilderness Preservation Act, 1964.

This act states that wilderness areas will be administered in such a manner as to protect and preserve the wilderness character and to obtain and disseminate information regarding the wilderness.

10. The National Historic Preservation Act of 1966. (Public Law 89-665, 80 STAT. 915; 16 U.S.C. 470; amended by Public Law 91-423, Public Law 94-422, Public Law 94-458, and Public Law 96-515).

This act sets forth the basic concern of the nation for the preservation of its heritage. It provides for a National Register of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, and culture, and makes provision for matching funds to the states to help acquire and/or preserve these resources and to conduct cultural resource surveys for nomination of eligible properties to the National Register.

Section 106 of this act requires that the President's Advisory Council on Historic Preservation be afforded an opportunity to comment on any undertaking which affects properties listed in or eligible for listing in the National Register.

11. The National Environmental Police Act of 1969. (Public Law 91-190, 31 STAT. 852; 42 U.S.C. 4321-4327).

This act declares that it is the policy of the Federal Government to use all practical means, consistent with other essential considerations of national policy, to improve and coordinate federal plans, functions, programs, and resources to the end that the nation may preserve important historic, cultural, and natural aspects of its heritage. It requires that on all federally-sponsored or licensed projects which significantly affect the environment, the responsible official submit an environmental impact statement which assesses the impact of the proposed action and any unavoidable adverse environmental effects (which consistently has been interpreted to include those on archeological and historical resources), and sets forth the alternatives to the project, the long and short term results, and any irreversible and irretrievable commitment of resources.

12. Executive Order 11593. (36 C.F.R. 8921).

This Executive Order decrees that "The Federal Government shall provide leadership in preserving, restoring and maintaining the historic and cultural environment of the nation. Agencies...shall (1) administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, (2) initiate measures necessary to direct their policies, plans and programs in such a way that federally-owned sites, structures, and objects of historical, architectural or archeological significance are preserved, restored and maintained for the inspiration and benefit of the people, and (3) in consultation with the Advisory Council on Historic Preservation (16 U.S.C. 4701), institute procedures to assure that federal plans and programs contribute to the preservation and enhancement of non-federally-owned sites, structures and objects of historical, architectural or archeological significance."

The order further specifies that federal agencies are to inventory archeological and historical resources on lands under their control or affected by their programs and nominate to the National Register all resources which meet the criteria. Federal agencies are also to exercise due caution with respect to cultural resources, give them appropriate and adequate consideration during planning, and do whatever is possible with regard to protecting and, when necessary, recovering those resources.

13. Clear Air Act, 1970.

This act directs that national parks in excess of 6,000 acres, will be Class I areas and these parks will preserve, protect, and enhance the air quality. It further states that any decision to permit increase of air pollution must be preceded by careful consideration of the consequences. This consideration is to

include public participation. Related values which must be addressed are the affects of air quality on scenic, cultural, biological and recreation resources.

14. Endangered Species Act, 1973. (Public Law 93-205, 16 U.S.C. 1531-43 amended by Public Law 94-359).

This act provides a general directive to all federal agencies to take actions to protect threatened or endangered plant or animal species and to prevent harmful activities which may either directly or indirectly harm threatened or endangered plant or animal species and also to protect the natural resources, under the agencies jurisdiction, on which the species are dependent. The park adheres to this law.

15. The Archeological Conservation Act of 1974. (Public Law 93-921, 88 STAT. 174).

This act provides for the preservation of historical and archeological data which might otherwise be irreparably lost or destroyed as a result of any alteration of the terrain caused by any federal construction project or federally licensed activity or program. Under this act project funds are to be made available to cover the cost of survey, recovery, analysis, and publication.

16. Designation of Mesa Verde as a World Heritage Site, 1978.

By this act, the World Heritage Convention recognized the significance of Mesa Verde National Park as a cultural treasure of international significance, and added it to the list of World Cultural Sites.

17. The Archaeological Resources Protection Act of 1979. (Public Law 96-95, 93 STAT. 721; 16 U.S.C. 470 aa-ii).

This act provides sanctions against persons convicted of removal or defacement or traffic in archeological resources originating on public lands. In addition, there are provisions for rewards for information and for forfeiture of equipment used in connection with a violation. It also outlines the basic requirement s for permits for undertaking archeological excavations on public lands.

18. The American Indian Religious Freedom Act. (Public Law 95-431, 92 STAT. 469; 42 U.S.C. 1996).

The purpose of this act is to ensure that the policies, procedures, and actions of federal agencies do not infringe upon the constitutional right of free exercise of religion by Native Americans.

19. 36 CFR Part 800: "Protection of Historical and Cultural Properties". (Title 36, Code of Federal Regulations Part 800).

Herein are the step-by-step procedures which must be followed by all federal agencies to ensure that undertakings under their control are in compliance with the 1966 Historic Preservation Act, as amended, and Executive Order 11593. It includes the criteria for determining effect and adverse effect and the agency procedures and criteria for inclusion of cultural resources in the National Register of Historic Places.

A. Present Natural Resource Status

Indicated by the introduction to this Resource Management Plan the natural resources of Mesa Verde National Park are subordinated to the Park's cultural resources. Since the establishment of the park, the cultural resources have been the primary resources of concern. Given the situation of limited funding posed to management now and in the past this is and was a considerate action program to get the most resource protection with the limited funds available. The priorities at Mesa Verde are. have been, and always will be the protection and preservation of Cultural Resources. The major task for management is where do we take the Natural Resource Management program?

The overall condition of the natural resources at Mesa Verde should be considered good. This is a subjective observation that is based on non-scientific personal observations. As will be addressed later, the park has very little baseline research data on natural resources. The air quality program is a exception to the rule due to the large nationwide funding of the program and the commitment made to the program by local management after the air quality funds were withdrawn.

A basic program of wildlife observation records is maintained for natural resources. Additional records of observation also include plant species, water sources and geological/soil relationships.

We are at just the beginning of transferring written natural resource data to data base and spread sheet availability. There is a multitude of written historical natural resource data that also needs to be entered into a data retrieval system.

As mentioned before the emphasis at Mesa Verde National Park is the cultural resources but the natural resources of the area are also unique and special.

With the present budgetary constraints, the management of the natural resources are in a holding pattern. We do what we can to improve the research and data collection. The available staff will mitigate the impacts of adverse situations and conditions.

Also a continuing effort will be made to monitor the condition of natural resources. The Natural Resource staff will observe, record, and report the varied elements of the Natural Resources of Mesa Verde National Park.

B. Natural Resource Baseline Imformation

The status of Inventory and Monitoring of Natural Resources within Mesa Verde National Park is improving. Management has made the initial steps to centralize inventory and monitoring of air quality, flora and fauna. The fact remains that the natural services are secondary to the archeological mandate of the establishment of Mesa Verde. Many of the natural resource inventory and monitoring functions were collateral duties up until just a few years ago. With the commitment of fiscal and human resources and the emphasis of nationwide concerns on air and water quality, some specific monitoring programs have been initiated at Mesa Verde.

Within the criteria of Chemical Inventory and Monitoring Mesa Verde meets the minimum level I standard with the exception of a dry deposition recording site. In the past we did collect dry deposition information but the program was dropped by the central control of the NADP. The reason given at the time was that the data was not consistent with the wet site data. The park is under consideration for a new installation by NADP that will include the dry deposition site monitoring.

The park meets the geophysical inventory and monitoring level I minimum standards except for the requirement that all geological mapping be on a standardized scale. All current mapping meets this standard but maps done in the past have not been converted to a standardized scale.

The standards for Biological Inventory and Monitoring also comply with the level I. There is one exception in the lack of species summary sighting maps. Summary maps have been done on a species by species basis when volunteers have been available to do the data entry and correlation.

In the area of Anthropological Inventory and Monitoring there is a lot of data available. However, the data is not retrievable as indicated in the Inventory and Monitoring Guidelines. There are no maps available as required for compliance to the Level I standards.

The quality assurance and quality control for gathering data is a standard met by the present staff. The standard does not address the level of compliance for functions above and beyond the present data collected.

The entire Inventory and Monitoring standards need a more direct involvement from the Washington Office and Regional Office to the Superintendent. The standards are presented but without the input of local managers as to the cost and personnel need for implementation. How can quality control be addressed to data collection when long term employee commitment is limited. The

C. Present Cultural Resource Status

This section summarizes the status of the cultural resources of Mesa Verde National Park according to the major resource categories: sites, structures, and objects. For sites and structures, their significance, present condition, and the levels and types of impacts to which they are subjected are presented. For objects, their approximate number, present condition, and the levels and types of impacts to which they are subjected are presented as well, along with the status of their cataloging and registration. Rates of object acquisition and cataloging for the past three years are given to indicate the degree of progress that has been made in cataloging the backlog of objects during that period. This is followed by a discussion of ethnographic resources and their use by park-associated communities, the legislative basis for this use, and an analysis of the level of impact upon the affected resources. Finally, the status of cultural landscapes is addressed, along with their significance as cultural resources, and their present condition.

1. SITES

Sites are defined as distinguishable pieces of ground or areas upon which occurred some historic or prehistoric event, or which is significantly associated with historic or prehistoric events, persons, or cultures, or which was subjected to sustained human activity. In Mesa Verde National Park, this resource type includes prehistoric Archaic and Formative archeological sites, and historic archeological sites associated with early use of park lands and subsequent park developments. These sites, which now total 3,908, were recorded during the archeological survey of the park,begun in 1951 and completed in 1977. The sites are now in the process of being entered into the Cultural Sites Inventory, a computerized archeological data base, completion of which is anticipated in FY 89. The total of 3,908 sites consists of two from the Archaic Tradition, 3,806 from the Formative Anasazi Tradition, and 100 from the historic period. The prehistoric sites range from well-preserved cliff-dwellings of over 200 rooms to temporary camp sites and work areas. The historic sites consist mainly of the remains of camps, homesteads, and park-development related features. All sites are recorded on individual site record forms, sketch maps, and black-and-white photographs. These records are stored in the Mesa Verde Research Center where they are available for management needs and for use by qualified researchers. Site locations are plotted on a series of oversize U.S.G.S. 7.5 minute quadrangles covering the park.

All but a very few of the prehistoric archeological sites are considered eligible for inclusion in the National Register of Historic Places as contributing or having the potential for contributing to the prehistory of Mesa Verde. As such they are

considered to be of national significance. The historic archeological sites are also considered eligible since they have the potential for contributing to the history of southwestern Colorado: these are classified as being of significance at the state level.

The vast majority of the prehistoric archeological sites are found in exposed locations on the mesa tops, talus slopes, and canyon bottoms. These are mostly below ground and their exact condition cannot be determined without excavation. Much of the structural portions of those sites which once contained settled village populations have collapsed and the debris has been partially buried by accumulating sands and silts; their condition is thus classified as poor. Prehistoric campsites are by now devoid of any but the most durable materials, and they are also classified as in poor condition. Cliff dwellings, located in protected alcoves in the canyon walls vary from partially intact to mostly destroyed, and their condition is classified as poor.

Some deterioration is occurring at most prehistoric sites as a result of natural erosion, and some additional impact results from unauthorized visitation, but the condition of most is fairly stable. An active program of preservation maintenance (stabilization) helps to ensure their stability. The greatest impact is felt where ruins are open to the public. Some of these are visited by hundreds of thousands of people annually, and a constant program of repair and stabilization is necessary to ensure their continued existence.

The historic archeological sites are steadily deteriorating. Many are virtually gone. Natural erosion is the major factor in this deterioration, although a few have been lost to park developments. At present there is no program of preservation maintenance for these historic sites.

2. STRUCTURES

Structures are defined as works of humans consciously to serve some form of human activity, usually by nature or design immovable. In Mesa Verde National Park, this translates into an assortment of buildings, an amphitheater, a stone dam, and an assortment of hand-cut stone features including curbs, headwalls and drop inlets, trail lights, a small parking area, and retaining walls for trails and pathways. They are significant cultural resources by virtue of their association with unique architectural styles, or important events in the history of the development of the park. All are listed in the List of Classified Structures, and all are functioning elements of the park under a program of adaptive use.

All historic structures are maintained according to their traditional style, and alterations are kept to the minimum

necessary to adapt them to modern facilities such as lighting and heating. Incompatible alterations, such as replacement of original windows with modern aluminum styles, are gradually being corrected. Replacement and repair is done with duplicate or compatible materials. Major impacts are environmental, and consist mainly of the natural deterioration of wood and stone through exposure to climatic elements. Attempts to alter any of the buildings for the sake of easier maintenance are resisted, and any proposed alterations are subject to the Section 106 process specified in the National Historic Preservation Act of 1966.

3. OBJECTS

Objects (or artifacts) are defined as material things of functional, aesthetic, cultural, symbolic, or scientific value, usually by nature or design movable. Historic and prehistoric objects are ordinarily regarded as museum specimens, and most of the objects in Mesa Verde National Park which are considered to be cultural resources are so regarded. The exceptions are certain items which are still in active use, such as lighting fixtures or door fittings in historic buildings. These are inventoried and maintained as historic resources but are not part of the museum collection. Some items, such as pieces of historic furniture, are cataloged as museum specimen, but are in use.

The total number of items in the museum collections, including all seven natural and cultural resource categories, is 1,541,328. The overwhelming majority of these items, numbering 1,523,898, are archeological. This is the result of the numerous major excavation projects which have been conducted in the park from its beginning in 1906 until 1977 when the most recent excavation was completed. Next in quantity comes biological specimens which total 10,173. There are 2,900 archival items, 2,044 historic objects, 1,055 ethnographic objects, 1,013 paleontological specimens, and 245 geological specimens. The archeological, ethnological, and archival collections are mostly in good condition, with approximately three percent of archaeology, one percent of ethnology, and less than one percent of archival items in poor condition. The paleontological and geological collections are mostly in good condition with only a few items in the poor to fair categories. The historical collections are in the fair to good range, and biological specimens are only fair with about five percent in poor condition. Impacts to the museum objects are mainly the result of poor storage; many are in crowded cabinets where they are not properly separated, sometimes even being stacked together. Some objects are still in their original field containers---paper bags and boxes that are beginning to deteriorate. Lack of proper environmental controls has particularly affected the natural history collections, especially those which are biological; these are exposed to the

impacts of changes in temperature and relative humidity, dust, and insects and other pests. These are objects in nearly all categories which are in need of proper conservation, and increased storage space is badly needed for all.

Approximately 1,200 objects are on display in the archeological museum and the visitor center. These are subjected to environmental extremes of both temperature and humidity because of the lack of environmental controls in either building. Light is also a contributing factor to their deterioration, both external light and artificial light within the exhibit cases. Improper mounts, some dating from the 1920's and 1930's, have had an adverse impact on some of the exhibited specimens. Remounting of these objects is being done, but many remain to be done. Insect infestation has been a problem in the past with exhibited items and with those in storage. Efforts to correct this problem have been largely successful, but this, too, is an ongoing problem.

During the period of 1985-1987, the rate of cataloging compared to the rate of acquisition was greatly accelerated due to special funding which supplemented the basic operating account of the Division of Research and Cultural Resource Management where the museum collections are housed. Compared to a total acquisition during this period of 33,877 items, total cataloging for the same period amounted to 44,760 items. This means that not only were all new acquisitions cataloged, but an additional 10,883 items of the backlog were cataloged. This is the first time that such a significant proportion of the backlog of cataloged items has been dealt with in a comparable period of time.

It should be noted that Mesa Verde National Park is also responsible for a collection of some additional 28,000 objects from Hovenweep National Monument, and over one hundred objects from Yucca House National Monument. The museum collections from both Yucca House National Monument and Hovenweep National Monument are housed at Mesa Verde National Park and are curated by the Mesa Verde Research Center staff.

Since April 1988, Mesa Verde National Park has been participating in the Automated National Catalog System. Thus far only the Hovenweep National Monument catalog is being entered into this system, but eventually the entire inventory of museum collections from the park and both national monuments will be computerized into the system.

4. ETHNOGRAPHIC RESOURCES

Ethnographic resources, in this context, are defined as park resources which have traditional subsistence, sacred ceremonial or religious, residential, or other cultural meaning for members

of contemporary park-associated ethnic groups, including Native Americans.

Although it is assumed that at least some of the present Native American inhabitants of New Mexico and Arizona are probable descended from the prehistoric Mesa Verde Anasazi, there is no direct evidence beyond certain oral traditions of Hopi and some Rio Grande Pueblos to link the Mesa Verde National Park with living ethnographic groups. The prehistoric Anasazi had abandoned the park area and all surrounding regions nearly 800 years before the first recorded accounts of Native Americans in the area. By this time the entire Mesa Verde lay within the traditional lands of the Southern Utes, and the Utes expressed no sense of identity with the prehistoric inhabitants whose abandoned villages and towns they knew well. The time of arrival of Ute people in the area is not known, but linguistic and other indirect evidence suggests that it was at least several centuries after the departure of the Anasazi. There is no evidence of how or whether the Ute people utilized what are now park lands. They probably hunted on some of them, but at the time of the earliest written records, the Utes were said to avoid the prehistoric villages as dangerous places.

There is no official park policy regarding Ute utilization of park lands other than to grant access through the park to Ute hunters on their way to adjacent tribal lands.

From time to time, representatives of the Hopi tribe and of various Rio Grande Pueblo groups request permission to hold religious ceremonies at specified locations within the park. These requests are normally granted as being in accord with the terms of the Native American Religious Freedom Act, and have, in fact, been grated as long as these people have made such requests. Their claims to association with the park are based upon traditional beliefs of origins here and of ancestral ties with the people who once lived here. All such claims are acknowledged, but there is no official recognition of any one group as being ethnographically connected with the prehistoric Mesa Verde Anasazi.

The only active use of park resources by any ethnographic Native American group so far as is known is the occasional gathering of pine nuts from the abundant pinyon-juniper forests of the park by Native American workers and their families.

5. CULTURAL LANDSCAPES

Cultural landscapes other than the immediate surroundings of the major cliff dwellings and mesa top towns, have not been recognized as prehistoric cultural resources. There are, however, several landscapes related to historic occupation of park lands.

Most prominent are sites of two Civilian Conservation Corps camps and a Civilian Conservation Corps maintenance yard which are still present near the park headquarters. While all structures have been removed from one of the camp sites, two of the original buildings still stand at the other, and all of the original buildings are still intact in the maintenance area. The perimeter roads around the camps and a system of graded and stone-lines pathways are identifiable in all three areas. The camps and the maintenance yard are documented in detail in large scale topographic maps and photographs taken during the time of the utilization of the camps from 1934 to 1942.

A second cultural landscape type is associated with homesteads which were patented on what are now park lands before the establishment of the park and which continued to be occupied for several years after. Four homesteads are recorded, all in the eastern portion of the park. Evidence for these is found in concentrations of artifacts, remnants of cabins, windmills, wells, stock pens, and fences. Photographs in the park files detail the nature of some of the features of these homesteads. Some features are nearly gone, but many are still relatively intact although gradually deteriorating.

D. Cultural Resource Baseline Information

The status of the basic planning documents, inventories, catalogs, registers, and required overviews, assessments, and evaluations for Mesa Verde National Park is summarized in this section. (See also Attachment C, Cultural Resource Documentation Checklist.)

1. Planning Documents

a. Preauthorization and Authorization

Mesa Verde National Park was added to the National Park System on June 29, 1906 through enabling legislation: An Act Creating Mesa Verde National Park (34 Stat 616). Prior to passage of this act, the proposed park area was studied by Dr. Edgar L. Hewett, then of the Archaeological Society of America, and a report was prepared by him identifying and evaluating the cultural resources for which the park was being proposed. Dr. Hewett also made a series of recommendations for development of the park, some of which were incorporated into the enabling legislation, and others of which were implemented in the years following the creation of the park.

b. Statement for Management

The current Statement for Management, approved October 1986, provides an up-to-date inventory of the park's condition and an analysis of its problems. It also provides an evaluation of conditions and identifies major issues and information voids. Section II of the plan, entitled Purpose and Significance, outlines the significance of the park in terms of its cultural resources, and summarizes the legislated purpose and significance of the park in terms of those cultural resources. Section III provides a summary of legislative and administrative requirements for proper operation of the park. Section IV, Major Issues, addresses several areas of concern involving protection preservation of cultural resources. This latter section is not exhaustive, but issues not addressed are dealt with in the present document.

c. Outline of Planning Requirements

Two major planning needs related to cultural resource management are stated in the current Outline of Planning Requirements, dated June, 1988. These involve preparation of (1) a Research Center/Collections Operation Plan (Package 266) to resolve the issue of the need for an organized approach to research center storage and protection/preservation of museum collections and historic resources; and (2) the need for preparation of historic/prehistoric maintenance guides (ONPS) which will provide detailed plans for maintenance of the historic and prehistoric

structures/sites as required by NPS 28, Cultural Resource Management Guidelines.

This document, which serves as a guide for preparing Development/Study Package Proposals (Forms 10-238) according to a system of priorities, addresses needs for cultural resource management planning in the form of Development/Study Package Proposals. Newly perceived needs, as they arise, will be incorporated into this planning process.

d. General Management Plan

This plan, dated May 1979, is the outgrowth of a comprehensive evaluation of the legislative and administrative constraints, management objectives, resource capabilities and limitations, and an assessment of alternatives for Mesa Verde National Park, conducted in 1976. The plan contains several major concepts relating to cultural resource management and the rationale for their selection. While not all of these concepts have been fulfilled, the plan is still the basic guiding document for the future growth and development of the park and for the long term management of its cultural resources.

e. Development Concept Plan

Development Concept Plans are created for specific areas and projects within the park as they become necessary. At this time there are two Development Concept Plans which outline the plans and objectives for development of portions of Mesa Verde National Park. One addresses the development of new visitor facilities and a research center at the park entrance; the other addresses the creation of new visitor facilities on Wetherill Mesa.

f. Resource Management Plan

Earlier plans for management of the natural resources and the cultural resources were developed separately according to earlier guidelines. A current document, now in preparation, will address both cultural and natural resources in a single document according to a new set (1988) of guidelines.

g. Interpretive Prospectus

The Interpretive Prospectus, dated February 1981, details the park management objectives and planning decisions for park interpretation. Much of the park interpretive program involves major cultural resources, i.e. cliff dwellings and excavated mesa top ruins, and museum collection objects on exhibit in the archeological museum and visitor center. Considerations of preservation and protection are incorporated into the interpretive prospectus to ensure that effective interpretation

of the cultural resources is consistent with the protection and preservation requirement of the park enabling legislation.

2. Inventories, Basic Documents, Resource Studies/Plans

a. Cultural Resources Bibliography

The Cultural Resources Management Bibliography currently contains research reports, NPS planning documents, theses, dissertations, and other basic technical documents dealing with the park cultural resources (archeology, history, historic architecture, and collections). It is incorporated into the servicewide computerized date base (CRBIB), which will become operational in the park during FY 89. At present the bibliography is incomplete. There are 56 entries, but some contain errors, and there are numerous additional titles which need to be entered. Once the computerized data base does become operational in the park, entry of the remaining items will begin, errors will be corrected, and any inappropriate entries will be deleted.

b. Cultural Sites Inventory

The Cultural Sites Inventory describes and document the location of, significance of, threats to, and management requirements for the known park archeological resources, and identifies those that require funding for their proper management. The Rocky Mountain Region has completed a computerized archeological site data base for implementing the Cultural Sites Inventory, using software package dBASE III +, and incorporating the categories specified in the servicewide CSI database. This database is currently operational in Mesa Verde National Park, and approximately one-third of the records of inventoried archeological sites have been entered. Lack of staffing to continue the entry of these records has hampered completion of this project; this has been partially resolved by a contract administered through the Cultural Resources Division of the Rocky Mountain Regional Office. Completion of the Cultural Sites Inventory data base in anticipated during FY 89.

c. List of Classified Structures

The List of Classified Structures, the evaluated inventory of all historic and prehistoric structures that have archeological, historical and/or architectural/engineering significance, consists, in Mesa Verde National Park, mainly of historic buildings, but contains, in addition, various stone constructions of the Civilian Conservation Corps (e.g. headwalls, drop inlets, curbs, retaining wall, an amphitheater, a stone dam, a stone quarry, and several fire lookouts. Since all of the park's archeological sites are considered as sites rather than as structures, these are dealt with in the Cultural Sites Inventory.

The park inventory for the List of Classified Structures is at present about 98 percent complete, but its entry into the service wide dBASE III + software computerized data base is only about one-half complete. This data base, which can be accessed via an IBM-compatible computer recently installed in the park, will allow completion of the computerized List of Classified Structures during FY 89.

d. National Catalog of Museum Objects

Cataloging of the Mesa Verde National Park museum collections according to the requirements of the National Catalog of Museum Objects is about 80 percent complete. This amounts at present of 51,216 individual catalog records. However, none of these records have yet been entered into the Automated National Catalog System. This system was only recently made accessible to the park, and entries into it have been limited to materials from Hovenweep National Monument. During FY 89 the park will begin the process of entering the Mesa Verde catalog records into this computerized data base.

e. National Register of Historic Places

Mesa Verde National Park was automatically listed in the National Register of Historic Places by virtue of its prior status as a National Landmark. However, the necessary documentation of its National Register Status is not yet complete. The park is being documented as a multiple-resource property, involving both historic and prehistoric districts. The documentation of the prehistoric district is complete in draft form; that of the historic district is currently in preparation.

3. Basic Cultural Resource Documents

a. Archeological Overview and Assessment

An overview and assessment of the archeological resources of Mesa Verde National Park was prepared as part of the final report on the survey of Mesa Verde National Park by the University of Colorado. This was published as a chapter in that report (Smith, 1987) as an overview of the history of archeological excavation and survey in the park, and the original manuscript has since been adapted, expanded, and modified into a comprehensive.

b. Archeological Identification Studies

The archeological survey of Mesa Verde National Park, begun by Don Watson and James A. Lancaster in 1951, continued by Alden Hayes in 1958-59, and completed by Jack Smith during the seasons of 1971 through 1977, provides identification of locations and characteristics of all known archeological sites in the park.

The results of the archeological survey of the park have been published in three separate works, (Hayes, 1977, Rohn, 1977, Smith, 1987), and together constitute an essentially complete Archeological Identification Study. Sites are still discovered from time to time in the areas covered by the three components of the survey, but this is to be expected, given the rugged and sometimes heavily vegetated terrain in the park. Other sites will undoubtedly by discovered in the future, and these will be incorporated into the records of the archeological survey.

c. Archeological Evaluation Studies

The three published summaries of archeological surveys in the park also fulfill the requirements of archeological evaluation. Each of the above mentioned studies provides an evaluation of the archeological resources recovered during the course of the surveys. These have been utilized in the determination of the eligibility of the archeological sites as properties eligible for inclusion in the National Register of HIstoric Places and in the documentation of the characteristics which justify that determination of eligibility.

d. Ethnographic Overview and Assessment

This is a somewhat problematical subject for this park, since the archeological resources of the park cannot be directly linked to any existing ethnographic group. At the time of the creation of the park, the lands included within it were traditionally part of the domain of the Southern Utes. Yet, nothing in Southern Ute tradition or culture indicates any linkage of this ethnographic group with the prehistoric Mesa Verde Anasazi. A decision which followed the original creation of the park to add a considerable portion of what was then recognized Southern Ute reservation land to it, was not taken kindly by the Ute people, who regarded the land as theirs. The entire story os the relationship of the Southern Utes, (now known as Ute Mountain Utes) who claimed this land and of their utilization of that land, remains to be told.

A second consideration, based partly on marked resemblances between the architecture and material culture of the prehistoric Anasazi and living Native American Pueblo INdian groups, also remains to be explored in detail. Despite the common assumption that these living groups are at least in part descended from the prehistoric Mesa Verde People, aside from general similarities, there is no archeological evidence to establish this as a fact. Pueblo Indian groups, particularly the Hopi of northern Arizona and some of the Pueblos of the Rio Grande area of New Mexico, have expressed their beliefs that the Mesa Verde is an ancestral homeland, but again, there is no hard archeological evidence to validate any one of these claims. Still, the existence of these traditional beliefs has resulted in a strong feeling of identity with Mesa Verde National Park, and this feeling should be

acknowledged, even if in a general way, in detailed studies of the situation.

A third, although indirect, need for ethnographic overview and assessment involves the Navajo, traditional residents of northeastern Arizona and northwestern New Mexico. While these people have no known tradition of association with the prehistoric Mesa Verde Anasazi, their presence from at least the early days of the park as resident laborers has established an historic linkage with the park, and they are today the only Native American group known to utilize any of its natural resources. It is not at all certain that their presence on park lands does not predate the establishment of the national park, for some recognizable Navajo sites appear to be quite old and unrelated to park activities. There may be a linkage between the Navajos and the park going back into the early historic period. This should be explored.

At present, there are no ethnographic overviews which adequately address the relationships of the park lands with any of the three above mentioned Native American groups. Studies in all three categories are needed.

e. Ethnographic Oral Histories/Life Histories

A program of oral history was initiated in the park during the 1980's, and a considerable body of records was made as a result of interviews conducted with early Anglo-American residents of the area, former park employees, and others connected with the early history of the park. Lack of funding has resulted in this project continuing on an as time permits basis, and the result is the irretrievable loss of information because of the deaths of some potential informants and the moving away of others. The present records, both taped and written, constitute an invaluable archive of the park both before and after its establishment. An active program to continue the gathering of similar records is badly needed.

f. Ethnographic Program

An ethnographic program, focusing on the consideration outlined in the section on Ethnographic Overview and Assessment, could help to satisfy some of the needs detailed in that section. Collections of oral traditions from people who feel an ancestral association with park cultural resources and from early historic residents of the area in the manner indicated in the section on Ethnographic Oral Histories and Life Histories, could contribute much to the body of knowledge of traditional associations, and help to formulate an effective program for ethnographic consultation with Native Americans and others regarding developments within the park. This far, no plans exist for such a program.

g. Historical Base Map

Base maps, showing all recorded archeological sites and historic sites, are completed in draft form. Final preparation of a base map of archeological sites is anticipated early in FY 89, and a comparable base map for historic sites will follow. Insufficient evidence of ethnographic use or sacredness of park sites exists to permit compilation of a base map of this character. Completion of some of the studies mentioned above in connection with ethnographic studies could provide sufficient data for creation of such a base map.

h. Historic Resource Study

An Historic Resource Study is presently underway in connection with the documentation of the nomination of an historic district as part of the Multiple Resource Nomination Being prepared for the National register of Historic Phases. Completion of this study will provide all three components of the Historic Resource Study: the title study, historic resources base map (presently in draft form), and National Register nomination and documentation forms.

i. Park Administrative History

An administrative history, entitled Mesa Verde National Park: An Administrative History, 1907-1970 by Ricardo Torres-Reyes, was published in December, 1970, by the Office of History and Historic Architecture, Eastern Service Center, National Park Service, Washington, D.C. This study served the propose of an administrative history up to that time. The study was not exhaustive and it is now eighteen years out of date. A revision and updating is needed. A recently published history of Mesa Verde National Park by Dr. Duane Smith provides an unofficial updated administrative history, but a more comprehensive document is still needed.

j. Scope of Collection Statement

The Scope of Collection Statement for Mesa Verde National Park was completed in draft form, in January, 1986, and is currently undergoing revision. The Mesa Verde plan has been selected, subject to those revisions, to serve as a model for the revised National Park Service Museum Handbook, Part 1. Completion of the revised statement is anticipated early in FY 89.

4. Special Resource Studies and Plans

a. Archeological and Ethnographic Collections Studies

The overwhelming bulk of the museum collections are archeological, and most studies involve items in this category. Several major analysis of prehistoric skeletal material have been completed. Stylistic studies of prehistoric pottery have also been frequent. These and often related studies have resulted in detailed reanalysis and description, providing expanded data on the collections studied. Reliance for these studies has been on external researchers; and an active program of such research is an ongoing aspect of the operations of the Division of Research and Cultural Resource Management. Some research projects involving the archeological collections have also been carried out by the park staff on an as time permits basis.

b. Archeological Data Recovery Studies

Data recovery as a means of mitigating the adverse effects of developmental projects has been a standard policy in the park. Excavation, analysis, and publication of the results has preceded major park developments in the Far View area in connection with construction of visitor facilities, and along the Wetherill Mesa road in connection with redesign and reconstruction of the road to the excavated Wetherill Mesa ruins and the paved track for operation of a mini-train to several of the ruins. Since these activities in the late 1960's and early 1970's, there have been no new developmental or interpretive activities which have endangered any of the park archeological resources. Recent designs for a proposed visitor facility at the entrance which would have adversely impacted the two known Archaic sites in the park were revised so as to avoid these rare and important sites. The preference is for avoidance wherever possible. Consequently, there has been no recent need for data recovery studies. Should such need arise, however, the procedures specified in Section 110 (c) of the National Historic Preservation Act would be followed.

c. Collection Management Plan

The collection management plan, designed to assist the park in improving its museum collection management program, was prepared for Mesa Verde National Park by Betsy H. Bradley (Collection Management) and Toby Raphael (Collection Conservation), of the Curatorial Resources, in January 1985 and revised in April 1986. The plan assesses the current status of the Scope of Collections Statement, museum records, storage, exhibits, and staffing and the status of the Conservation Needs Assessment Survey, collection use and conservation, and the programming and planning for funding. The current program for management of the collection and the carrying out of needed conservation is based upon this document as is guided by it.

d. Collection Storage Plan

A Collection Storage Plan is an integral part of the Collection Management Plan. It deals with the major problems faced by the park as a result of its presently inadequate facilities, and makes a series of recommendations for improvement of those facilities. At present, tentative plans for a new research center and storage facility for the museum collection are being formulated, based partly upon the recommendations included in this plan.

e. Collection Condition Survey

A collection condition survey, entitled "Report on Conservation Needs Survey, Mesa Verde National Park" was prepared by Conservator Bettina Raphael in October 1982. This is an assessment survey of the conservation needs of the park museum collections including those on display in the archeological Museum and the Far View Visitor Center, and in the storage facility in the Mesa Verde Research Center. The report analyzes climatic conditions, sources of deterioration and damage, and the current status of the various classes of objects, both archeological and ethnographic, in the museum collections. It also provides a set of recommendations for correction of deficiencies and conservation measures for certain items. This continues to serve as a guideline for establishing proper conditions and curation practices. Since 1982 a program of conservation and upgrading of display and storage conditions has been an ongoing result of this survey.

f. Cultural Landscape Report

At present there are no Cultural Landscape Reports for Mesa Verde National Park. Reports are needed, however, both for the sites of two former Civilian Conservation Corps camps and a Civilian Conservation Corps maintenance facility, and the sites of two early homesteads on park lands. Field data has been gathered for all of these projects, and documentation through file searches has been partially completed. Compilation of the data into completed landscape reports along with recommendations for action regarding cultural landscapes is a logical next step.

g. Ethnohistory

Ethnohistory of the park is a problematical situation because of the lack of any known direct connections between the prehistoric people who abandoned the area some 800 years ago and those people (Southern Ute Tribes) who inhabited the park lands during the historic period. The culture history of the park is closer to that of the Hopi of northern Arizona, the Pueblos of the Rio Grand area of New Mexico, and Zuni of western New Mexico, but there is no archeological evidence that any of these are direct descendants of the prehistoric Mesa Verde people. There are,

however, oral traditions among some of these people which do link them to the Mesa Verde. Ethnohistory, then, involves two separate considerations: the history of Ute possession and use of what are today park lands, and a study of the oral history traditions of Pueblo people who are not known to have inhabited what are now park lands, but which are interpreted by them as indicating such habitation. Both kinds of studies are needed.

h. Exhibit Plan

Changes in present exhibits and installation of new exhibits are preceded by an Exhibit Plan. Most park exhibits date from several decades in the past, and the overall plan is relatively static. Most recent changes have resulted from the necessity of returning borrowed specimens to their owners. Plans for a new interpretive facility at the park entrance will, however, necessitate a major revision of present exhibits as well as planning for new exhibits in the new facility. Any revisions of this nature will depend upon finalization of plans for construction of the new facility, but will be preceded by a comprehensive plan as well as individual exhibit plans. All such plans will take into consideration the preservation needs of all museum objects to be utilized.

i. Historic Furnishings Report

An Historic Furnishings Report is an exhibit plan for a furnished historic structure. There are no furnished historic structures in Mesa Verde National Park. An Historic Furnishings Report is therefore not required.

j. Historic Structure Preservation Guides

There are numerous specific historic and prehistoric structures (sites) in Mesa Verde National Park which are in a maintainable condition. Historic Preservation Guides are needed for all of these, but none have been completed to date. Lack of personnel to accomplish the task of preparation of such preservation guides has been the major barrier. Cyclic maintenance of the structures is done on a routine basis for the prehistoric structures, but only as a result of irregular funding for the historic structures. Routine activities are carried out, but without a set of established guidelines and approved procedures such as would be provided by written preservation guides. This is one of the major cultural resource management needs in the park.

k. Historic Structure Reports

At the present time there is no anticipated major intervention into any of the historic structures of the park which might affect the qualities and characteristics that make them eligible properties for inclusion in the National Register. Such reports

would be desirable adjuncts to the anticipated Historic Structure Preservation Guides, but their completion would require considerable increases in both funding and personnel.

l. Social Impact Study

A Social Impact Assessment is not necessary for Mesa Verde National Park since there is no recognizable impact of park development and park programs on the lifeways or resources of any traditionally related people.

m. Special History Study

Studies focusing upon significant events and personalities associated with Mesa Verde National Park have appeared from time to time as the products of authors interested in park history. Taken together, these studies, along with the Historic Resource Study currently underway, and an update of the park administrative history, will provide most of the historic information needed for both interpretive and resource management programs.

n. Traditional Use Study

There is little use of the park's cultural and natural resources by people who are by tradition associated with those resources. Some use of the prehistoric ruins for religious ritual by ethnographic groups from neighboring states, and a small amount of exploitation of the pine nut harvests by resident Navajo workmen and their families, have been noted. A formal study of both of these uses of the park resources would be a useful adjunct to some of the other ethnographic and ethnohistoric reports needed by the park.

E. Cultural Contexts and Themes

Ten discrete cultural contexts, relating to two major themes [1] are present in Mesa Verde National Park. These are:

1. THEME I. CULTURAL DEVELOPMENTS: INDIGENOUS AMERICAN POPULATION

a. Prehistoric Archaic Context

The Archaic Context represents the earliest evidence of human life thus far discovered in the park. Archaic people were nomadic wanderers whose subsistence was based upon hunting and the gathering of wild foods. This pattern, which persisted throughout North America from about 5,000 B.C. to about 300 B.C., required constant mobility and a minimum of material possessions. Archaeological evidence for this way of life is sparse, consisting mainly of campsites which vary in their artifactual content and spacial arrangements from simple scatters of toolstone to more complex aggregations of finished artifacts and features. Noteworthy is an absence of pottery. Projectile points are helpful but inexact chronological indicators. In addition to lost or discarded points, Archaic sites have many stone flakes, indicating on-site tool manufacture. Some flakes show secondary retouch or wear patterns indicating use as cutting and scraping tools. Discarded cores are usually present. Concentrations of burned stones and simple soil stains indicate the presence of hearths.

Thus far only two Archaic campsites have been identified within the park. Both are on the lower slopes along the north escarpment of the Mesa Verde in an area which forms a natural corridor between the valleys to the east and to the west. The probability of the presence of additional Archaic sites in this and other areas of the park is considerable. Tentative dating for these sites is in the 1000 B.C. - 500 B.C. range.

b. Prehistoric Formative Context

Mesa Verde National Park contains 3,855 recorded archeological sites of the Mesa Verde Branch of a Formative Culture known as Anasazi. Formative Anasazi sites include the remains of both large and small settlements as well as associated work and ceremonial areas, isolated structures, and soil conservation devices. They are found throughout the park on the mesa tops, canyon bottoms, and talus slopes. The term, Formative, implies

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[1] History and Prehistory in the National Park Service and the National Historic Landmarks Program, 1967.

the presence of agriculture (or other subsistence patterns of comparable productivity), and the establishment of sedentary village life. It appropriately describes the post-Archaic Mesa Verde Anasazi culture throughout the several phases (subcontexts) of its evolutionary development. Mesa Verde National Park is the type locality for this culture, due mainly to the exceptional preservation here of villages and many objects of everyday life. It was this remarkable preservation that first drew attention to the Mesa Verde and resulted in the creation of the national park.

The Formative Anasazi Culture of Mesa Verde may be subdivided into three subcontexts. These are:

(1.) Modified Basketmaker Subcontext. The earliest evidence of the Mesa Verde Anasazi, this is a phase of development characterized by small villages of pithouses (semi-subterranean structures with low walls and flat roofs) built on the mesa tops and in some of the larger cliff shelters. Villages seem to consist of only a few such houses, but their actual extent and their total number cannot yet be determined because of the difficulty of recognizing these characteristic structures from surface indications alone; most have been discovered by accident and few have been excavated. The Formative nature of the Modified Basketmakers is attested to by their settled village pattern of life. Other characteristics are skilled weaving of baskets, sandals, and similar items as well as the manufacture of crude Black-on-white pottery. Settled life was based upon horticulture; crops included corn, squash and beans. Wild plant food gathering and hunting of both large and small game also played important economic roles.

Known Modified Basketmaker sites are found on both Chapin Mesa and Wetherill Mesa, and their characteristic houses have been found in two locations in the cave shelters of Rock Canyon and Long Canyon. Doubtless there are many other as yet unrecognized sites elsewhere in the park.

Dates for sites within this context range from A.D. 450 to 725.

(2.) Developmental Pueblo Subcontext. By about A.D. 725, important developments in architecture, ceramics, and agriculture were significantly altering the earlier life style. The population appears to have expanded, both in total numbers and in areas occupied. Some large villages developed during this period. Most villages follow a similar site plan: rows of surface rooms located on the north or northwest part of the site, with pithouses or kivas to the southeast, and trash deposits to the southeast of both.

Pithouses were being replaced by surface rooms of posts and adobe (also called "jacal" or "wattle and daub") with stone slab foundations, joined in long curving rows with deep pit rooms

fronting them. Pithouses continued to be used as domiciles. These are deeper than those of the Modified Basketmakers. As residence gradually shifted to the surface rooms, the subterranean structures appear to have been used more for ceremonial purposes than as residences. The term "kiva", borrowed from the Hopi who use this word for their underground ceremonial rooms, is probably an appropriate designation for the later Developmental Pueblo subterranean structures.

Developmental Pueblo villages gradually increased the use of crude stone masonry surface buildings. These possibly functioned both for storage and as residences. Underground rooms, or kivas, were standardized in their interior features.

The late crude masonry pueblos have at least one row of contiguous rooms constructed of stones which were shaped by the removal of spalls. At least one kiva is usually present; these are typically of earthen walls with a limited amount of veneer.

Other characteristics which define this subcontext include a distinctive neck-banded pottery, the introduction of red-on-orange pottery, and changes in the basic black-on-white pottery style which include surface polishing.

Further improvements were made in pottery between A.D. 900 and 1100. "Corrugated" pottery, which was manufactured so as to achieve a rough surface, replaced the earlier neck-banded as cooking and storage ware, and black-on-white decorated pottery was now sometimes surfaced with a white "slip" and painted with iron base paints.

Lambdoidal skull deformation was begun during this time.

Developmental Pueblo sites are numerous and are found throughout the park. Most are multi-component sites, usually showing evidence of occupation during both the early and late phases of the period, and sometimes also showing a later occupation (or re-occupation) during the succeeding Great Pueblo period.

Sites of the Developmental Pueblo subcontext range in time from A.D. 725 to A.D. 1100.

(3.) Great Pueblo Subcontext. The Great Pueblo context represents the Mesa Verde Anasazi culture at its artistic and architectural climax.

This subcontext is identified by a major population shift and a trend toward consolidated, large communities, first on the mesa tops and later in the cliff alcoves. A few large villages were built in the eastern canyons, but the eastern park lands were being abandoned. Buildings of single and double-coursed stone

walls are common in this context. Individual building stones, well-shaped and uniformly rectangular, with pecked (or "dimpled") surfaces, the result of the use of stone hammers to shape the surfaces, are a hallmark. Villages consist of well-built, sometimes multi-storied, buildings with masonry-lined kivas still situated to the south of the main house block. Villages are larger and more consolidated, with kivas increasingly incorporated into the building plan. A round tower connected to one of the kivas by a tunnel is a common feature.

Virtually all Great Pueblo surface sites which have been excavated demonstrate a complex building sequence, with origins in the Developmental Pueblo stage.

A spurt of building activity in cliff alcoves began between A.D. 1230 and 1260. The resultant cliff dwellings range in size from one room to more than two hundred rooms. Walls are usually of single courses of stones, with the quality of the masonry varying from rough to good; extremes of masonry styles sometimes occur adjacent to one another. Small chinking stones are often set in the mud mortar to give added strength. Walls are often mud plastered, and interiors (and occasionally exteriors) are sometimes painted with designs. The cliff dwellings initial layouts were probably determined largely by the configuration of the shelters in which they were built. They show evidence of so many additions and modifications that it is often difficult to determine the appearance of the original structure. Kivas follow the now standard Mesa Verde design which includes shaft ventilator, firepit and draft deflector, sipapu, wall niches, bench, southern recess, and a cribbed log roof supported by six masonry pilasters.

Associated pottery during the earlier part of this period is predominantly Mancos Corrugated and McElmo Black-on-white. The later painted pottery is predominantly classic Mesa Verde Black-on-white, which features geometric designs in banded layouts, and occasional life forms. Pottery shapes include bowls, mugs, and jars -- including the "kiva jar" shape with lipped rim to accommodate a lid. Storage and cooking jars continue to be decorated with a corrugated surface treatment. Recovered textiles include baskets, basketry sandals, yucca cordage, cotton cloth, netting of human hair, and blankets of feathers and fur.

Stone tools throughout this context include predominantly slab metates and two-handed manos; small notched projectile points; 3/4-grooved axe heads; hammerstones; and chipped stone cutting tools. Bone artifacts include awls and weaving tools, eyed needles, scrapers, and tubular beads. Ornamental pendants were made of stone, and animal effigies were made of either clay or polished stone.

Geometric and representational art occurs on the walls of some kivas and rooms, and on cliff faces. Renderings were done in colored plaster or charcoal, or they were pecked into the sandstone.

The Mesa Verde cliff dwellings are the culmination of a long-term developmental sequence which resulted in the coalescence of family groups into large villages, situated in a very special environmental setting. Domestic and ceremonial architecture is formalized and adapted to the spatial requirements of the cliff shelters. The cliff dwellings are the most spectacular, and most well-known sites in the park. They embody the "cliff-dwelling" concept of Southwest architecture.

Also associated with this subcontext are other buildings, erected for purposes other than habitation or storage. These "ceremonial" sites were sometimes built in cliff shelters, but the majority are situated on the mesa tops. They vary in size and layout, and range from simple, isolated free-standing towers to tower-and-kiva complexes associated with several rectangular rooms. The enigmatic semi-circular Sun Temple, which encloses several circular kivas (or towers) and rows of rectangular rooms, is one of these.

Towers are also incorporated into the ground plans of both surface pueblos and cliff dwellings. Their purpose remains obscure, but the fact that they are frequently connected to kivas by subterranean tunnels supports the ceremonial interpretation.

The Great Pueblo subcontext encompasses a time period from A.D. 1100 to 1300.

c. Prehistoric Water Management Context

With a semi-arid climate, Mesa Verde suffers from a moisture deficiency in which precipitation is inadequate to maintain a constant groundwater supply. The mesas are dry for much of the year. Water must have been a critical concern to the prehistoric inhabitants. They practiced some forms of water management, but the extent and degree of elaboration of their water management systems are still subjects of professional debate and continuing inquiry.

While most of the natural seeps and springs in the canyon bottoms and talus slopes show no sign of "improvement", several are marked by overhead rock art. In many of the cliff shelters occupied by cliff dwellings,there are natural seeps at the rear of the overhangs, where sandstone and shale layers meet and water is forced to the surface. In some cliff dwellings there are

pecked holes in the seep area apparently to increase the water supply for domestic use.

The establishment of dwelling places near seep locations and the artistic marking of other springs indicate their importance to the prehistoric inhabitants of the Mesa Verde.

Besides the holes or basins pecked into bedrock in conjunction with natural seeps, other artificial catchment devices have been recorded in open settings throughout the park, often in bedrock outcrops near canyon rims. These basins collect rainwater, or runoff from rain melted snow. Bedrock water catchment basins are artificial depressions made in natural sandstone by a tedious process of pounding or pecking at the soft sandstone with a harder hammerstone. The surface of the depression has a dimpled appearance due to the crushing of sandstone particles.

Check dams and associated agricultural terraces are a frequently encountered site type. These consist of a series of low walls built across drainages, to slow runoff, conserving both water and topsoil. The areas behind (upstream of) the walls silted up, providing level garden plots. Isolated check dams sometimes occur, but more often they are found in a step-like series, comprised of as many as 50 individual check dams extending along a natural drainage. Check dams consist mainly of unshaped or roughly shaped stones.

Check dams and agricultural terraces represent efforts to control the environment by conserving soil and water. By creating farm plots in locations with naturally steep gradients, the builders expanded the amount of arable land and thus increased Mesa Verde's population carrying capacity.

Sites identified as prehistoric reservoirs have been found at six locations in the park. Three have been tested. One is in a canyon bottom location; the others are on mesa tops. These prehistoric "reservoirs" are characteristically large, oval depressions surrounded by thick earth embankments. The earth is held in place by exterior and interior stone retaining walls. In one case a ramp leads into the depression basin on its southwest corner, and a staircase affords access to the interior on the south side. Stratigraphic profiles reveal sand and clay layers that could have been deposited only by slow-moving water, as in shallow ponds. None of these structures hold water at the present time, although stockmen once created a pond in the depression of one by breaking down its north wall and digging a ditch to collect runoff. Whether or not they were designed to hold water remains uncertain, but their monumental proportions, which represent large efforts in their construction and maintenance, suggest major communal undertakings. In the absence of definitive evidence to the contrary, they are included as

components of this context. Dating is uncertain, but all are in close proximity to Developmental Pueblo villages.

d. Prehistoric Tool Manufacture Context

The Anasazi made a variety of cutting tools of chipped and flaked stone, but their lithic industry has only recently received attention. Studies conducted during the past 15 years have attempted to differentiate between Archaic and Formative Anasazi stoneworking techniques, but there is some overlap in technology between the two.

Isolated stone chipping areas have been recorded throughout Mesa Verde National Park.

Chipping areas are recognized by the presence of flaked or chipped stone artifacts, with a high proportion of items showing no evidence of utilization. The numbers of flakes and cores are often sufficient to address questions of cultural patterning in artifact manufacture. Chipping areas are as yet undatable, but presumably range throughout the extent of the prehistoric occupation.

These chipping areas are significant data resources. The study of prehistoric stoneworking could be advanced by their analysis and by a comparison of their contents with the lithic materials collected from site excavations.

e. Prehistoric Hunting Context

Bone assemblages from excavated sites have demonstrated that the Mesa Verde Anasazi diet included wild game animals, which were most likely hunted at some distance from home. Temporary campsites, found throughout the park, were probably established by hunters, or by other travelers who found it necessary to move about to seek resources not available within a short range of a permanent settlement.

Isolated firepits are characteristic remains of these temporary campsites. These firepits are often slab-lined, and they may or may not have associated artifacts, such as potsherds or lithic debris. When excavated, such hearths can yield dates from radiocarbon or archeomagnetic analysis. They also provide information on diet if they contain bones or macrobotanical material that can be identified. Analysis of pollen and bones also provides environmental information.

Isolated firepits are recognized by the presence of burned slabs of sandstone. Bits of charcoal may be visible in the soil around and between the sandstone slabs.

f. Prehistoric Rock Art Context

In the absence of a written language, Anasazi rock art provides our best evidence of symbolic communication. Rock art is of two forms: pictographs, which are painted on the rock, and petroglyphs, which are carved. Both varieties occur throughout Mesa Verde National Park. Often, multiple figures or motifs are combined in a single panel, but these lack framing lines or backdrop scenery that would make them form a readily interpreted picture. Single, isolated figures or motifs also occur.

Rock art panels display designs that are incised or pecked into the weathered rock surface, or they are painted on the surface. Individual motifs are separated by space, and while they may have told a story to the initiated, they do not form a recognizable representational picture. Motifs include stick figure anthropomorphs, zoomorphs, and geometric shapes. No time range can be established for the rock art other than in their occasional direct association with dated ruins.

2. THEME II. ARCHITECTURE

a. Historic Administrative District Context

A group of buildings based partly upon Native American designs and partly on Spanish Colonial designs, and known as the Modified Pueblo architectural style, was created by Superintendent Jesse Nusbaum and his wife, Aileen, at the time Nusbaum assumed the position of Superintendent of the park in 1921. The buildings were built during the period 1921 to 1934; most are concentrated in the park headquarters area, but three are situated in outlying areas. A total of nineteen buildings are included in this context.

These buildings are constructed of native sandstone blocks with protruding roof vigas and flat roofs. The stone is the local reddish sandstone which was also used in the prehistoric structure. The lower foundation courses are set in Portland cement for strength and resistance to moisture. The upper courses were originally pointed with native red earth, now with an amended mortar. The blocks are hand-cut in much the same style as those which were used in the prehistoric walls; in at least two cases prehistoric building stones removed from excavated ruins were used. These latter are easily recognized by their pecked, or "dimpled" appearance, resulting from the work of prehistoric stone masons in smoothing the surfaces with stone hammers.

Large peeled fir logs, averaging 20 to 30 cm in diameter, serve as vigas in these buildings. The logs are laid across the stone walls to support a nearly flat roof and they project about two feet beyond the walls.

The walls are slightly battered (sloped with a definite outward curve near the base and an inward curve toward the top). Stonework generally extends one to three feet above the vigas to form a parapet which hides the tar-surfaced roofs from sight.

These buildings were included in the Mesa Verde National Park Administrative District, which was determined to be eligible for the National Register of Historic Places in 1978. Six of the buildings are also designated Historic Landmarks.

b. Historic Navajo-Style Buildings Context

Traditionally, much of the maintenance and ruins stabilization work at Mesa Verde National Park has been performed by Navajo employees. Special stone residences were constructed for these employees in the 1930's on the model of the Navajo hogan. Six residences and a similarly built comfort station provide housing for Native American seasonal employees which are compatible with their tastes and ethnic experiences. They are located on a loop road which leads off the road presently serving the park headquarters on Chapin Mesa. All have some type of ramada or porch attached at the single entrance. The interiors have cement floors and the walls are plastered and painted.

The walls are of uncoursed sandstone, and they are battered. The original cement pointing was partially replaced with a mud-Rhoplex mixture in 1983. The upper walls end in a low parapet, and there is a low skylight atop the roof, which is slightly cribbed and made of juniper logs. There are small casement windows, with juniper pole lintels.

Navajo workmen have also constructed their own temporary shelters at various locations throughout the park, especially where workers have camped in conjunction with construction projects.

There are 36 of these recorded Navajo sites within Mesa Verde National Park. They include wooden hogans, sweat lodges, and shades. The majority are located near the main road into the park, and were temporary residences of Navajo laborers employed on the road repairs and modifications made during the 1920's.

c. Historic Civilian Conservation Corps Context

Three Civilian Conservation Corps (C.C.C.) camps were established in Mesa Verde National Park during the 1930's and continued in

operation until 1942. Two of the original camp buildings are still standing and a maintenance area built for the camps is also still extant. These document directly the history of the C.C.C. in the park and are considered to be important historic buildings.

The camps were laid out on a military plan, with a central flagpole and roll call area. Wooden buildings included barracks, mess hall, officer's quarters, administration building, dispensary latrine/bath house and recreation hall. The roads were clearly demarcated, and rock-lined paths were covered with gravel.

At the present time, two buildings of Camp NP 5-C still stand -- the Recreation Hall (Mesa Verde Building No. 148) and Barracks Five (Building 156). These are simple, but large, board buildings, with gabled roofs and 6-pane windows. Barracks Five is shaped like a large rectangle, but the Recreation Hall has a side wing. It also has a front porch, and a very impressive sunken fireplace with a flagstone hearth and adjacent bench seats. The Recreation Hall is still used for Park Service events, including large meetings, training sessions, and staff parties on special occasions. Barracks Five is used for miscellaneous storage.

The graveled walkways are also still in evidence, though threatened by weed growth. Some paths have been cleared and their bordering stones reset. The site of the latrine was excavated in conjunction with laying of water pipe through this area in 1981.

The maintenance area for the C.C.C. was designed around a loop road. Three large buildings were constructed on the outside of the loop; the E.C.W. offices and warehouse, a large storage shed, and a building combining storage sheds and shops. Inside the loop was the filling station and oil house.

These four buildings still stand, and the three larger ones are still in use for equipment and materials storage. The filling station is now used for the storage of flammable materials. The Office/Warehouse (Building 66), the Storage Sheds and Shops (Building 67), and the Storage Shed (Building 68) are framed with heavy wood timbers on concrete and stone pier foundations. They have board-and-batten sides. The office has swinging casement sash windows. The sheds have open bays, while the shops have sliding track doors. These buildings all have gabled roofs. The small filling station is covered with corrugated metal.

The buildings in the C.C.C./E.C.W. Utility Area have not been modified. Doors and window frames are original. No modern buildings have intruded this area, which is sheltered from view by the coniferous forest. Thus, the C.C.C./E.C.W. Utility area

has great integrity of location, design, setting, workmanship, materials, association and feeling.

The C.C.C. camps and maintenance area constitute an example of a facility designed and used for federal work projects during the Depression. Physical evidence for Depression-era programs is rare in western Colorado (Husband 1984), and the intact utility area, which has been used continuously, is a rare find, of national significance. While most of the camp buildings are gone, those which remain are still intact and retain their historic integrity.

Eighteen wooden frame cottages were built by the Civilian Conservation Corps in 1934-35, in order to provide necessary park staff and government housing, and to train enrolles in carpentry skills. Seventeen of the Eighteen cottages (Buildings 18 through 35) were built according to a single plan; the other (Building 17) was originally built as an engineer's office but was converted to a residence once the project was completed. All are of frame construction with board-and-batten above three courses of weatherboarding. All have shingled gabled roofs with gabled front and side porches. Foundations are of hand-cut native sandstone blocks set in Portland cement mortar. All except Building 17 have fireplaces also of native sandstone.

Originally, all of these buildings had wooden multiple-pane casement windows, but these were removed in the 1970's and replaced with aluminum windows. The original wooden doors were retained. Additions were made to four of the cottages (Buildings 20, 21, 22, and 25) in 1960 to provide a second bedroom. Although the original exteriors were of unfinished wood , all were later painted white. Otherwise, the buildings retain their original configuration.

One wooden frame cottage burned completely and no longer exists, but the other seventeen retain integrity of location, design, setting, workmanship, materials, association, and feeling. They are located within a loop road in the pinyon-juniper forest of Chapin Mesa. Although a utility area constructed in the 1930's is located nearby, no permanent modern buildings intrude on the setting.

Additions made in 1960 to four of the cottages extended the exterior design, by using horizontal weatherboards for the lower portions of the new walls and board-and-batten above. All roofs are shingled.

d. Historic Campsites Context

Several historic campsites have been located within the park which contain materials, architectural and artifactual, which provide insights into the living conditions experienced by early

explorers of the park and its ruins. Illustrating this context are three camps established by Gustaf Nordenskiold during his stay on the Mesa Verde in 1891, and two camps established by Jesse Nusbaum for winter excavations during the years 1926-1929. Nordenshiold's campsites are associated with a personage of major historic importance to Mesa Verde National Park; his work on the Mesa Verde and the publication of a major monographic resulting from that work, played an important role in calling attention to the importance of the Mesa Verde ruins and their value as a national treasure. Nusbaum's work established the outlines of the earliest known cultural manifestations of the prehistoric Anasazi, and provided major display material for the park archeology museum. His campsites contain evidence of the day to day camp activities and living arrangements during his productive years of excavation in the park.

e. Historic Park Utility Buildings Context

Park development in the 1920's and 1930's necessitated the construction of utility buildings, most of which are still in use. These building follow a uniform and distinctive board-and-batten style which is consonant with their utilitarian function. All of these buildings (10) are on the List of Classified Structures. They represent a portion of park history which deals with maintenance and support activities.

III. NATURAL RESOURCES MANAGEMENT PROGRAM

A. Overview of Current Program and Needs

During management of any of the park's natural resources, park managers must be mindful of how such manipulation will effect the cultural resources for which the park was established. Some of the natural resources have a definite relationship with the preservation or destruction of cultural resources. Park managers must determine what that relationship is and whether management of the specific resource will adversely or positively impact cultural resources. Relationships between natural resource entities must also be understood and management actions assessed as to the effects of their impacts, both short term and long term. Management of natural resources may have to be minimized or discontinued in favor of preservation of cultural resources, which, in an archeological park such as Mesa Verde National Park, cultural resources place definite constraints on natural resource management activities.

Perhaps the best example of this statement is seen in regard to wildland fire management. An aggressive fire protection program is considered important to the Anasazi culture as preserved in ruins, artifacts, pictographs, etc., both in the field and as displayed or stored in the park's public use buildings. In some situations in the past, suppression activities have destroyed the very values that they were supposed to protect. Another area where such constraints come into play is park manager's desire to use such management tools as prescribed fire. This practice must first be carefully researched and its effects on cultural resources evaluated and documented. Restoration of the natural fire regime to the park's backcountry has a number of desirable benefits for a natural resource management program, but a sudden reversal of fire management practices could be detrimental to cultural resources.

The approach to mitigating the effects of wild fire at Mesa Verde National Park is set forth in an approved fire management plan. The plan is designed to protect cultural and natural resources from damage by fire while manipulating fuels to prevent high-intensity, uncontrollable fires. An awareness of fire conditions is enhanced through the use of the AFFIRMS system. Response time is kept to a minimum through use of a helicopter carrying trained fire fighters to ignition sites. Manpower needed for larger fire situations is provided through mutual interagency fire suppression agreements. A slow, calculated move toward a natural fire regime in some of Mesa Verde's backcountry is embodied in the plan, in the form of a modified suppression policy. All fire management action initiated in the park must be based on research

findings and management techniques, tried and tested prior to full implementation.

Although fire management activities have been a concept of park managers since the establishment of the park, two external threats are now of great concern to Mesa Verde National Park as well as other national park areas: air quality and acid rain. Acid rain is considered to be the number one priority concern in both natural and cultural resource management. Monitoring programs started in 1981 indicate that acid rain is indeed falling on Mesa Verde National Park. Continued monitoring and analysis is necessary to determine the frequency and seriousness of this phenomena. The effects on vegetation, water resources, soil and cultural items is unknown. Research is needed to determine effects and to develop means of mitigating those effects. Research is now scheduled for study of effects on cultural resources; research on natural resources must follow.

Closely associated with acid rain is air quality. The park's primary resources are the remains of the Anasazi culture. That resource is made more meaningful by the preservation and interpretation of the setting in which that culture developed. Part of that setting are the magnificent views that the visitor experiences from such points as Far View, Park Point, Mancos Valley and Montezuma Valley overlooks and the Wetherill Road. These vistas are gradually deteriorating due to air pollutants.

Major western developments are effecting the quality of the Mesa Verde airshed through the long-range transport of pollutants. Some pollutants also may originate from fossil-fuel power plants, two of which lie within 25 miles of the park to the south. Nine additional power plants are proposed within a radius of 175 miles of the park.

Although the park has been involved in air quality monitoring since 1979, visibility of distant mesa tops and geologic formations has already been impaired. Efforts to collect data must continue. Ongoing projects consist of particulate samplers, photographic records and acid rain monitoring. Visitor opinion surveys have also been made to determine the visitors' perception of the problem. Expansion of the monitoring program to document air quality to the north of the park and initiation of research programs to determine effects of air pollution on natural resources is planned.

A resource management action which is now underway in the park is the elimination of trespass stock. The problem of livestock trespass in the park is a historical one. Horses and cattle have free access from the Ute Mountain Ute Indian Reservation in some areas of the park. A cooperative effort between the Ute Mountain Ute Indian Agency and the park was fruitful in construction of 9 miles of fence in 1981 and 1982. A student Conservation

that this herd may have established itself in the park. Research and monitoring is needed to determine the status of this species.

Predators that inhabit the park as residents or as transients include coyote, fox, mountain lion, bobcat, badger, weasel and black bear. Of these, the coyote and fox are probably the most abundant. The black bear is an infrequent transient. Little is known of what part these animals play in the natural systems of the park. All of them are a delight to the visitors who are lucky enough to observe them. A visitor perception survey found that visitors listed their interests as wildlife, vistas, and then ruins, in that order after seeing the park. No research or census has been done for any wildlife species within the park in recent years. Such research would be of benefit to ungulate management as well as increase the information available for interpretation of the natural environment.

The pinyon-juniper forests of Mesa Verde provide an esthetic setting for the remains of the Anasazi culture. They also provide habitat for a variety of animals. Black stain root rot is a disease which effects the pinyon trees in this forest and has been a concern to park managers for many years. The disease weakens the tree which then becomes prey to bark beetles resulting in the death of the tree. The dead trees contribute to wildland fire fuel loading. In developed areas, they decrease the esthetics, and eventually create hazards to visitors. Landscaping may be necessary if the effects are severe.

Other areas of concern are four species of endangered flora, reestablishment of the peregrine falcon and effects of intermittent efforts at cloud seeding to increase precipitation in years of drought.

External threats to the park are related to air quality, visibility impairment and effects of acid rain. Mineral development in lands surrounding the park is not seen as a threat at this time, although coal and natural gas operations have been increasing on adjacent lands. The development of resources, gravel and natural gas, near the park is increasing and the sale of lots for houses has increased to the northeast of the park. The potential exists for rapid local development if and when a proposed electronics plant is constructed north of Mancos.

III. B. Project Statements

1. MEVE-N-0001 Monitor Predators and their Habitat.

2. Systemwide Issue: N02, N17, N04, N07, N19, N20, C13.

3. Problem Statement: Mesa Verde National Park represents the Sierran Madran Life Zones. The associated pinyon-juniper and mountain shrub vegetative communities provide habitat that is favorable to several predators.The predator populations have been reduced or eliminated from much of their original range. The park terrain (i.e. the rimrock mesa and canyons) also plays a role in providing dens for some species.

The park represents one of the largest undisturbed areas of rimrock Sierran Madran Complex remaining. Plans for future development in the park are limited and operations are planned to bring about the least impact possible. However, other public lands and much of the private land, including those lands adjacent to the park, are being developed in various ways, destroying the habitats and causing a reduction in the range of some animal species.

Large predators which seasonally migrate in and out of the park such as the mountain lion, bear, coyote, bobcat, gray fox, red fox, kit fox, and possibly the badger are hunted by ranchers and by the Colorado Division of Wildlife for predator control in areas of livestock operations. Most of these species are trapped by private fur trappers or hunted for trophies, the intensity of the impact on each species depending on the current market value.

In 1988 the bobcat population in Southwest Colorado was considered quite low following several years of an active European market for bobcat fur clothing. In 1988 50 bobcats were tagged as a result of fur trapping. In 1988 200-300 coyotes were trapped from Montezuma County as predator control and as a source of fur. Since 1985 the Colorado Division of Wildlife has issued 14 permits annually to kill mountain lions for trophies. In 1988 nine additional mountain lions were killed in Mancos Valley east of the park as predator control and two others were killed in upper McElmo Canyon as predator control. Bear are taken for meat, as trophies, and for predator control. Ten were tagged in 1988.

One or perhaps two pairs of mountain lions breed in the park and during many winters they follow the deer south onto Ute Mountain Reservation lands, or east to agricultural lands or north to sheep winter pasture. In all three areas there is a high potential of mountain lion hunting or trapping and

when done for trophies the largest lions are actively sought. The same is true with bears. Even though Mesa Verde may have a breeding sow, the movement off of the park and subsequent selection for the largest animal does not ultimately lead to a viable population.

All of the above predators move in and out of the park following their prey or responding to climatic conditions such as deep snow (or in search of water or specialized food in the case of bears). The status of badgers is not known. They are rarely sighted in the park.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: As human development increases in the lands adjacent to the park and in areas of winter migration, some predators will experience population decreases. Impacts ranging from direct killing to habitat destruction and affects of toxins will take their toll. The park is required to protect "the wildlife therein" based on the Organic Act and subsequent legislation.

B. Monitor Populations of Predators: Record locations, activities and numbers of predator populations in the park. Continue to recognize impacts from adjacent areas. Alert park management of in park impacts and coordinate active protection.

C. Study Seasonal Movement of Large Predators: Radio collar monitoring would provide information on the predators range, their seasonal use of the park, and their breeding habitat. From this the park could more accurately assess the impacts of outside park predators, trophy hunting, and fur trapping. Use GIS mapping to demonstrate and record predator-prey movements.

The park boundaries will be closely patrolled from November through March to detect evidence of illegal trapping/hunting in the park. Susceptible locations are in the lower canyons along the south boundary, in the Mancos , and under the North Escarpment. Most of the western boundary is relatively inaccessible.

Disturbance to the animals natural activities from radio collar tagging and tracking will be kept as minimal as possible. Approved methods of live-trapping for collaring will be used. The results will assist in evaluation of out of park impacts on the large predator, also in predator and park visitor proximity problems.

5. Description of the Recommended Project or Activity:
A combination of alternatives "B" and "C" are preferred. A special radio telemetry study will provide information for management decisions and the continued monitoring by sightings, tracks, scats, and dens will provide data of relative population size and seasonal movements.

Aside from radio installation on the animal, the study will have no negative impacts and the information gained will assist in the protection of the animals. A GS-7 who is acquainted with the terrain and vegetational habitats of the park is needed for .2 FTE's at $5000. during the initial collaring and telemetry receiving field work. This person will need assistance of a specialist in radio telemetry work at a cost of $15000 for the first two years. A trained GS-4 for .4 FTE at $6000. will also be necessary to assist in transmitter locations.

6. Compliances: Nondestructive methods only will be employed. No specimens will be taken and the habitat will not be disturbed. An environmental assessment will be made to cover any possible disturbances to the species. Rare, threatened, and endangered species as well as species of special concern will not be impacted. No archeological clearance is necessary since no surface or below ground disturbances will occur.

1. MEVE-N-0002 Management of Special Plant Populations.

2. Systemwide issues: N03, N17, N01, N07, N20, N23, C13.

3. Problem Statement: The National Park Service is required by the Endangered Species Act of 1973, P.L. 93-205, 87 Stat. 884 to identify all threatened and endangered species within park boundaries. Three plant species endemic to the Mesa Verde plateau occur in the park; these are: false forget-me-not, Hackelia gracilenta (currently being considered for classification), Schmollaes milkvetch, Astragalus schmolloe (classified as rare and endangered), and Cliff Palace milkvetch, Astragalus deterior (classified as rare and endangered). H. gracilenta occurs in small populations in the park and is known outside the park on the Mesa Verde Plateau. Astraguls schmollae is found only on Chapin Mesa from 7600 to 6400 feet. A. deterior has been found only within the park, confined to a specific sandstone outcrop. The research indicated that these populations are presently secure; however, the range of all these species is very limited and some populations occur within or adjacent to developed areas. Trail and overlook construction has usurped and may have endangered the restricted bedrock habitat of A. deterior, a species which thrives on or near cliff dwelling entrances. Trail, road and building construction and the associated visitor impact may have adversely affected all three of these species.

Relic populations of the Pleistocene Era and possibly some from warmer periods are of special concern. Examples of these are ponderosa pine, wavy leaf oak, scrub live oak, aspen, a hybrid cottonwood,big tooth maple, stonecrop, virgins bower, helleborine, coral root, maiden hair fern, lyofern, brittle fern, woodia fern, and possibly several other forbes.

Also of special concern are cryptogamic soil, foliose lichens, and rock dwelling crustose lichens which are highly susceptible to human caused disturbance and possible to acid rain.

More study is needed on these components. Bryophytes at isolated water sites and fungi in ponderosa and aspen sites may also represent relic populations and further study is needed in these fields.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Program: The special plant populations would not be monitored. This may result in inadvertent, negative impact on populations from management actions and visitor use.

B. Environmental Impacts Statements: Areas where construction is planned should be surveyed for endemic

plants or plants of special concerns. If there are potential disturbances to these plants, alternative plans will be recommended. No annual data of backcountry populations well be obtained.

C. Monitor Endangered Plant Populations and Provide Protection Where Necessary: Monitor presently established plots and transects annually by park staff. Periodically (every five years) an intensive plant survey should be conducted by a recognized professional. The resulting report should include figures of the population status, health of the population, and a map of the range. The special populations size should be recorded. Ponderosa pines should be individually tagged, measured, and stature and pathological conditions recorded. Some trees should be aged through tree rings. This will require limited Service funding. Trends of species would be established, providing data on which to make adequate management decisions for timely protection of the species. Special niche relationships will be studied.

5. Description of the Recommended Project or Activity:
A combination of alternatives "B" and "C" is preferred, as it simultaneously provides a method of adequately protecting the species and complies with protection mandates.

Monitoring the three endemic species and environmental impact assessment should continue. All construction and maintenance activities and vegetative research should be sensitive to the endangered plant species. Collecting permits exclude endangered species.

Volunteer groups should be involved in intensive population surveys of endemic and special plants.

Since 1983 relic plant stands have been recorded by Natural Resource Park Staff. The plants are recorded by UTM locations, geological association, water site association, and extent of population. More expansive ponderosa pine study includes tagging each tree and recording various data per tree. A cottonweed inventory was started in 1986 and is continuing.

Lichens and cryptogamic soils are virtually unstudied. Three days of field work in 1980 by Thomas Nash doubled the known species. Currently there is a proposal through Air Quality Division to incorporate Mesa Verde National Park in a study of the affects of air quality degradation on cryptogamic soil.

It is very likely that the park has relic stands of mosses and liverworts (around water sites) and fungi (associated with ponderosa, aspen, and Douglas fir stands). The non-vascular plants are largely unknown for the park. Dr. Page Lindsey, of Fort Lewis College is currently doing a study of the fungi.

A thorough study of soil relationship is needed for Astragalus deterior because this plant seems to be restricted to a specific soil type. The same may be true for Hackelia gracilenta.

Since 1981 a VIP geologist, Dr. Mary Griffitts, has been studying the members of the Mesa Verde Sandstone Complex and the Mancos Shale Formation. In 1988 Dr. Griffitts identified an unusual breccia and the natural resource management staff has located outcrops of this breccia which indicate fault lines parallel to the North Escarpment. These outcrops are associated with relic plants and in fact the plants such as ponderosa has been helpful in locating the breccia. The search and further analysis of this breccia will be helpful in plant and water studies.

In 1988 soil samples from four common soil types and five sites of special interest were sent to the State Soil Test Lab at Ft. Collins for a comprehensive trace element, pH, and texture analysis. More samples are needed until the various types of special plant/soil sites are analyzed.

There is currently a proposal from Rocky Mountain Regional Office to conduct a survey of several parks for relic plants. This is to be done in conjunction with the Nature Concervancy.

The pending GIS program will be very useful in documentation of this data and in use of the data by park management.

To continue present monitoring of endemic species and to complete the initial field work of locating special plants a GS-7 for .2 FTE's with a $5000. expenditure is needed. A GS-4 for .2 FTE's with a $3000. expenditure for salary and project support is needed to map and record the species.

6. Compliances: An Environmental Assessment would refer to protection of the plants to be studied. No collecting of plant specimens is necessary for this project. The study will benefit the enforcement of the Rare, Threatened and Endangered Species Act. No flood plains will be affected. An archeological clearance is needed for the soil sampling to determine soil/species relationships.

1. MEVE-N-0003 Removal of Non-Native Animals:

2. Systemwide Issue: N04, N05, N17, N02, N08, N19, C06.

3. Problem Statement: Historically there has been unrestricted access to the park by trespass Ute Mountain Ute Indian horses and cattle which has been a continuing management concern. Contrary to the park preservation mandates, stock trespass has resulted in damage to cultural resources, in destruction of native vegetation, intrusion of non-native plants, initiating erosion, and disturbing water sites.

   Horse herds, ranging from 30 to 60 head, live year round in the park and cattle, about 65 head, seasonally graze the park. For the last seven years, marginally successful cooperative efforts to remove this stock have been conducted by the park, Bureau of Indian Affairs (BIA) and Ute Mountain tribal personnel.

   From 1978-1982 ten and a half miles of the park's boundary was surveyed and fenced using regional contingency reserve funds, Ute Mountain tribe labor and SCA labor.

   In 1987 park fee enhancement funds were used to initiate a fencing contract to complete the south and southwest boundaries of the park. With the end of the fencing contract in 1988 this completed the initial fencing along the boundary between the Ute Mountain Tribal lands and the park, except for several mesa points that are inaccessible to stock and do not require fencing. Two major boundary lines remain unfenced: the northern boundary and the eastern boundary.

   The eastern boundary in Mancos Canyon and the northern line between the park and the inholder in Mancos Canyon remain unfenced. Three hundred sixty two acres of the inholding have extended tenancy allowing 80 Animal Unit Months during April and May until 1998 but the 2,657 acres down canyon from this have never been fenced to exclude grazing, therefore this important riparian habitat is heavily grazed by cattle from the inholding.

   The northern park boundary, which has little threat of intrusive livestock because of the 1500 feet escarpment, was surveyed in 1988. Funding for fencing to complete the project is pending.

4. Alternative Actions Solutions and Their Probable Impacts:

   A. No Program: This alternative is the one the park had necessarily followed until 1976 due to lack of funding. It has resulted in adverse cultural and environmental

impacts. Continuing with this alternative would further these negative impacts.

B. Remove Trespass Stock: Since 1976, the park has followed this alternative, conducting cooperative roundup operations with the Ute Tribe and the BIA. Overall, these efforts have provided incomplete and temporary solutions.

C. Complete and Maintain Park Boundary Fence and Maintain Annual Removal program: Funding for fence construction by contract is needed to complete the northern and eastern boundary lines. A park ranger should inspect the fencing during and after construction. An ongoing fence patrol and maintenance program is necessary since fences have been found cut, wires and posts broken by horses and cows, fences washed out at the river crossing, and fences destroyed by the slumping of shale hill sides. A continuing livestock removal program is necessary due to the above factors.

Impacts from the fencing project are reduced by minimal right-of-way clearance (10 feet) and only sight-of-way trees are used for brace posts. Archeological and environmental assessments are made to determine where alternate post placement is necessary.

The 42 inch high fence should not deter deer, elk, and bighorn movement. The use of smooth stranded wire on top and bottom strands will mitigate problems for young animals.

5. Description of the Recommended Project or Activity: Alternative "C" is preferred. The major resource management action for 1989 will be the removal of trespass stock from the park to Ute lands. The 29 miles of completed fence will have to be patrolled. The patrol will require repair of fence and removal of livestock as needed to maintain the exclusion of trespass animals. Removal of the animals should be accomplished by horseback drives into constructed enclosures and by winter helicopter drives when the animals are nearest the Ute lands. A GS-7 park ranger and 2 GS-5 park rangers (.3 FTE's) are needed for this at a cost of $6000. per year. Two park horses should be purchased for annual fence maintenance and livestock removal. Initial cost of the horses will be approximately $1200. and annual feed cost, veterinary services, and shoeing will be approximately $400. Contract helicopter time scheduled during mid-winter for livestock removal will be four hours flight time for the first year ($1600) and 1 hour in subsequent years ($400).

North Boundary - Approximately 12.0 miles fencing was surveyed in 1988. Fencing, by contract, is needed. This will cost approximately $90,000 to complete.
East Boundary - Approximately .5 miles of fencing repair on slopes above private lands. A line .5 miles long at the south end of private lands within the park in Mancos Canyon needs to be surveyed and the fence constructed. Fence will have to extend onto BLM lands east of the river. A fence 3.5 miles long is needed along the eastern bank of the Mancos River. Some land trading with the BLM will make fence building possible. Presently Mesa Verde has a piece of land east of the river which may be used in the trade to formulate straight fenceable lines along the river.
Total - Approximately 16.0 miles fencing is needed to complete fencing the park. The cost, because of the rugged and inaccessible terrain will be approximately $120,000. A GS-9 will be needed to inspect the work, requiring .3 FTE. The personnel and support costs will be $8000.

6. Compliance: The Resource Management Plan must be approved for any action on fence construction, method of livestock removal, and land trade with BLM for Mancos Canyon boundary. An archeological clearance should be made accompanying the survey. Environmental assessment must be made during this time also, noting locations of rare and endangered species also species of concern, and also special populations in the park. Possible affects on the floodplain should be examined, however, this has not been an issue at Mesa Verde National Park.

1. MEVE-N-0004 Documentation and Control of Non-native Plants.

2. Systemwide Issue: N05, N23c, N04, N22, N17, N06.

3. Problem Statement: Man has accidentally or deliberately introduced species of plants which are not native to the park. Other non-native plants have invaded the park by natural dispersion.

   Some species were introduced during the period of time when grazing was allowed in the park. Others undoubtedly were a result of horse concession operations, an activity which was terminated in 1977. Seeding of burned over areas within the park and adjacent to the park introduced others. In addition, construction activities, particularly road construction, intentionally introduced non-native grasses which were used to stabilize road shoulders and fills. Intermediate and crested wheat grasses and smooth brome were the primary species involved in post burn and post-construction introductions. Some species have made a natural transition by wind dispersal or water dispersal (along the Mancos River and up the lower canyon drainages).

   Many of the non-native plant species which have become established in Mesa Verde National Park are pioneer plants which are adapted to disturbed soils. In 1987 a helicopter and ground survey of the extent of mush thistle and Canadian thistle in the park was conducted. A preliminary map and listing of locations was prepared and updated in 1988. This data is available for entry into a GIS database. Other non-native species which should be put on GIS are; whirl milkweed, tamarisk, bindweed, Russian knapweed, and smooth brome. Yellow sweet clove is common but it is not considered a problem because it does not persist as a disturbed area begins plant succession. All of the other non-native species are either uncommon or rare in the park and have posed no serious threat. Smooth brome is a non-native that is particularly hardy in semi-arid climates and because it is rhizominous it competes with native plant communities.

   Man caused disturbances of the soil in the park are from road maintenance of shoulders, road drainage systems which increase silting and water supply, visitor trampling, trespass horse and cattle grazing, dumping of introduced water (generally sewage enriched) and to a minor degree construction of buildings.

   Natural disturbances are heavy summer rains which result in down cutting and deposition, slumping of slopes due to high annual precipitation increased ground water, and die off of large acreages of pinyon stands due to black stain root rot.

By 1963 there were 416 vascular plants listed for the park and of these 52 were non-native. Additional collecting has been done from 1979 -1988, which added 223 species of plants previously not known to exist in the park. Of these, 27 species were non-native to the park, making a total of 79 non-native plant species in Mesa Verde. Less than 10 of these are abundant or present a significant impact on native species. Water sites might be affected by species such as tamarisk which has been increasing since 1980 due to increasing precipitation and subsequent increased spring flow. This type of intrusion may affect the spring flow during dry years as well as the water chemistry.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Program: No preventative measures will be taken to control potential outbreaks of non-native intruders.

B. Initiate a Program to Eradicate Non-Native Species: This alternative would be costly. The impacts on other flora and on fauna could be detrimental. It is doubtful that all non-native species could be eradicated. The alternative does not assess the impacts of non-native species on the natural plant communities.

C. Initiate a Research Program of Exotic Species and Selected Control of Obtrusive Species: A continuous record of first sighting, location, type of disturbance and extent of populations for each non-native species is needed. Record annual treatment, if any, and results. Obtrusive species in development zones and around selected water sites should be controlled. IPM methods will be employed. Utilize GIS to record locations and extent of species; update annually.

5. Description of the Recommended Project or Activity:
Alternative "C" is the recommended alternative. The management actions should be proceeded by scientific research and study. Control (if desired) should be by mechanical methods, elimination of habitat, and chemical application only in the case of special problems after thorough evaluation. Mechanical disturbances, such as dirt moving, should be reduced to a minimum during maintenance practices. Control measures and construction work should be followed by revegetation with native species. Records should include methods of control, affects of control, and affects of prevailing climatic conditions. Requirements are .1 FTE of a GS-7 at $3000. who is trained in IPM methods and is knowledgeable about native plant species per habitat and revegetation methods and .5 FTE's of GS-4 seasonal personnel

plus project support cost for $8000 for control implementation, revegetation, and data recording.

6. Compliances: The Management Plan addresses preservation of the natural landscape, and control of non-native plant species are considered an alteration to the natural landscape. Rare and endemic plants and species of relic or other special native populations must be avoided during control of non-native species. No archeological clearance is necessary. No flood plain will be affected by the recommended methods of control.

National Park Service Management Policies state that non-native species will not be introduced into a park unless (1) a similar native species is extinct (2) native species will not meet the needs of the management program (3) scientific evidence indicates the introduced species will not become a pest (4) the introduced species will not spread or disrupt the native communities. Mesa Verde National Park has not had nor will likely need to introduce non-native plant species because of any of the above reasons.

1. MEVE-N-0005 Management of Wildland Fire

2. Systemwide Issue: N07, N20.

3. Problem Statement: Wildland fire at Mesa Verde National Park has been recognized as a threat to park visitors and all park resources for many years. The park bears the scars of several large wildland fires including: Wild Horse Mesa Fire, 1934 (4,197 acres); Morefield Fire, 1959 (2,043 acres); Moccasin Mesa Fire, 1972 (2,680); and Rock Springs Fire, 1972 (700 acres). Biological evidence exists proving the fact that other large wildland fires occurred prior to the establishment of the park. These historical fires were severe, damaging both natural and cultural resources.

Recent fire ecology studies have confirmed park fire managers' convictions that the Mesa Verde pinyon-juniper forest is over mature, diseased, insect infested, dense in composition and heavily loaded with fuels. Under the right conditions of wind speed, relative humidity, temperature and low fuel moisture, an ignition source such as lightning could produce large damaging fires.

Resource managers at Mesa Verde National Park must monitor fire conditions and be prepared for immediate suppression action to protect park resources and human lives. They must also take steps to reduce the threat of fire through such fire management actions as fuel reduction. To guide managers in these tasks, a Fire Management Plan was developed by park staff and approved by the Rocky Mountain Regional Director October 27, 1981.

Although this plan dwells heavily upon suppression activities, it points out a definite need for additional fire effects research, involving both natural and cultural resources. The Fire Management Plan sets forth the following fire management objectives:

> Manage fire cost effectively in such a manner that will protect the cultural resources of the park in light of non-renewable resources versus costs of suppression.
>
> Reduce wildland fire hazards by cost effective means in areas of the park with significant cultural resources and developments.
>
> Prevent the occurrence of high intensity fires throughout the park.
>
> Preserve the aesthetic values of the vegetative areas of the park frequented by park visitors.

Reestablish over time the natural role of fire to predesignated areas of the park where possible.

Initiate long term research subsequent to large, naturally occurring fires to determine effects upon cultural and natural resources as impacted by fire.

Under the present implementation of Fire pro funding, management has provided for the early detection and quick response to wildland fires. This is essential to a successful fire suppression program. Until recently, fire managers depended heavily on fire tower observers and reports of staff, residents and visitors for initial fire reporting. Roads and trails into the dense pinyon-juniper forest were relatively few and traversed rough backcountry. Detection and response were understandably less than desirable. Resource managers soon recognized the usefulness of helicopters in fire detection and suppression. In 1979 Mesa Verde National Park joined with the BIA in an interagency helitack program for mutual benefit and protection. Fire managers for the Bureau of Land Management, Montrose District recognized the advantage of such an interagency program. In 1980 the interagency agreement was expanded to encompass all three agencies. In 1983, FIREPRO funding was made available for funding of the NPS helitack portion of the interagency program. In 1985 both the BLM and BIA withdrew from the interagency agreement. The park then entered into a no guarantee contract which has been used since the 1986 fire season. In 1987 the BIA "bought" back into the program and now covers the cost of 4 seasonals, a vehicle, and 50 hours of presuppression helicopter rotor time.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Program: This alternative would result in the eventual reestablishment of the natural fire regime. Small natural fires would create a partial vegetative mosaic with a variety of fuel loadings. Generally, fuel loadings will continue to build up until conditions are such that large, high-intensity fires will occur. These fires will create large vegetative mosaics. The frequency of large fires will likely decrease over time, as fuels are reduced and a dynamic vegetative equilibrium is established.

Under this alternative, there would be no suppression costs incurred. However, unacceptable damage to cultural resources, developments, neighboring lands and possible loss of life will almost certainly result from the large, high-intensity fires. Potential damage to endangered flora is unknown.

B. Total Fire Suppression: This action will result in continued, unchecked fuel buildup, which in turn increases

the risk of large catastrophic fires. Experience has unquestionably shown that there comes a point of negative return. A point where even heavy manning levels are unable to successfully suppress 100 percent of all fires. Eventually a combination of conditions - heavy fuel loadings, relative humidities, wind speeds, temperature and multiple ignitions - will result in an overburdening of suppression capabilities, with resultant large conflagrations.

C. Modified Fire Suppression, with Mechanical Thinning of Fuels in Selected Areas: Areas with high risk to human life, cultural resources and developments would receive total fire protection. Heavy fuel loadings in these areas will be mechanically thinned reducing them to predetermined acceptable levels. Other predesignated areas of lower risk will receive less protection. Fires in these areas may be totally suppressed, or allowed to burn under strictly prescribed and monitored conditions.

This alternative attempts to optimize management options. Human life and irreplaceable cultural resources would receive mandated protection. Concurrently, the natural role of fire would be reestablished in predesignated zones of the park.

5. Description of the Recommended Project or Activity: Alternative "C" is the preferred course of action. The approved park Fire Management Plan implemented in 1982, expressly addresses this alternative in detail.

A research proposal has been prepared for submittal for a research study on the effects of fire on cultural resources and a 10-238 development study package proposal has been prepared and submitted for additional research on fire management activities, due to the highly significant archaeological resources for which this park was established.

The present resource management personnel will continue the monitoring of the vegetation, soils and wildlife on past burn sites. Research is necessary to determine the long term effects of fire and to gain data on the success of prescribed fire under various prescriptions and intensities.

6. Compliance: The resource management plan and the fire management plan are currently covered by an approved environmental assessment. Research into fire effects on cultural resources would require a 106 clearance prior to implementation of the actual prescribed research fire. Air quality clearances would also be needed for the prescribe fire.

1. MEVE-N-0006 Monitoring of Surface and Ground Water:

2. Systemwide Issue: N12, N17, N14, N20, N23b, N23, C06.

3. Problem Statement: Water sources have been historically and prehistorically important at Mesa Verde National Park. The original source of water for early visitors to Mesa Verde was Spruce Canyon Spring which was used for over 40 years. Early homesteaders and ranchers constructed fifteen wells in canyon heads across the park lands. The history of artificial water developments up until the early 1950's has been adequately documented in Robert H. Rose's "Water History of Mesa Verde, 1952". By 1988 37 million gallons of water was being introduced into the park annually. About 70 percent of this amount is treated and discharged into the park's drainage.

The naturally occurring water sites were only minimally documented until 1983 when the natural resource management staff began maintaining a permanent and continuous file. Free water is the limiting factor for some animal species and some plants have close ties to water sites.

In 1988 the water resource files had recorded 190 springs and seeps, some having permanent flow up to 2 gal/min. These were the primary source of water utilized by the Anasazi in prehistoric times. Cliff dwellings are generally found at the base of the Cliff House sandstone where springs are commonly found. The most common type of water site is in the Menefee Sandstone layer, where the sandstone aquifer is underlain by a bentonite water barrier, and there may be an association in some instances with a recently discovered fault breccia. Where these sites occur in the canyon drainage the flow (1/2 gal to 2 gal/min) surfaces for a distance of up to one half mile. Other Menefee water sites are on the Canyon wall slopes. A third type of water site is in the Mancos Shale, on the North and East Escarpments and in Morefield and Prater Canyon heads. Following years of heavy precipitation some of these sites have a flow of 5 gal/min to 1/4 cfs in the spring. A fourth type of water site is the potholes. These are on the Upper Cliffhouse Sandstone and consist of a series of holes in drainage. Some are 3 feet deep, not exceeding 6 feet in diameter, and a total system may have a capacity up to 900 gallons.

The Mancos River runs 1500 cfs during floodstage and may go down to 12 cfs during the summer of a drought year. Possible contaminants may be from gold mining, gravel mining, fertilized hay fields, cattle feed yards, and town sewage.

Other water sites which are man caused are associated with the park water/sewer system, and park construction (such as historic barrow pits and road cuts) or they are historic reservoirs and wells.

Categorized by type (based on geological formation) the Mesa Verde water sites are: Cliffhouse Sandstone seeps, 50 sites; Menefee Sandstone Bentonite springs, 86 sites; Point Lookout seeps, 7 sites; Mancos Shale springs, 35 sites; Potholes, 23 sites; man caused, 32 sites; Permanent river, 1 site.

Large mammals, birds, amphibians, some insects, fresh water snails, and fresh water crustaceans, are known to use the water sites. Certainly there are unknown life forms associated with the water sites such as single celled animals, fresh water sponges, hydras, flat worms, rotifers, round worms, water bears, bryozoa, segmented worms and water mites - all found in fresh water. These groups have never been researched in Mesa Verde National Park.

Thirty to forty vascular plant species are closely associated to water sites. The non-vascular aquatic plants such as single celled plants, algae, mosses, and liverworts have not been studied.

Some relationships of the pH/chemical contents to the occurrence of specific invertebrates and plants has been observed but more study is needed. Since 1983 twelve water sites have received chemical analysis annually. All of the sites tested to date have elemental content exceeding EPA standards for human consumption. Selenium is high in Mancos Shale and some of the Menefee shale sites and this may affect skeletal growth of mule deer during years when this element is concentrated. One site in School Section Canyon has a high salt content and this is heavily used by large mammals. The pH ranges from very alkaline in the Menefee sites (pH 8.0 - 8.7) to slightly acidic (pH 6.8) at some Cliffhouse Sandstone seeps and in the potholes.

4. Alternatives Actions/Solutions and Their Probable Impacts:

A. No Action: Baseline data of water quality/quantity would be unrecorded. Alterations in subsurface flow amount, water chemistry, and biological associations may not be detected.

B. Measure Quality and Quantity of Water Sites: Measurements of quantity of some sites taken at irregular intervals will continue. Twelve sites per year will receive qualitative measurements.

C. Expand water Resource Monitoring Program:

(1). Conduct intensive survey of geological features that affect water resources (i.e. location,chemistry, flow rate).
(2). Determine flow rate of water through Cliffhouse Sandstone.
(3). Obtain evapo-transpiration rates of pinyon-juniper, and mountain shrub communities.
(4). Record percolation rate of major Mesa Verde soil types.
(5). Determine water shed volume of major drainage and mesa tops.
(6). Conduct studies of invertebrate fauna, and non-vascular flora; also inventory fish in the Mancos River; determine species and biological relationships of each water site.
(7). The Natural Resource Management staff will write a water site report with accompanying map.

5. Description of the Recommended Project or Activity:
The preferred course of action is a combination of alternatives B and C. A comprehensive study of water quantity and quality of biological associates, of geological relationships, and climatic influences will assist in park management actions concerning cultural resources, construction and natural resources.

Yearly monitoring will include continued documentation of water site quantity. Twelve sites will continue to be sampled for chemical analysis. Impacts of trespass livestock and construction will be reported and recommendations made for their correction. Relationships of native plants and animals to the water sites will be recorded. New water sites will continue to be recorded in a water site file.

Special studies as listed in alternative "C" will require $6000. per year for 4 years. Park staff should continue to record annual biological components.

A complete report of water sites of Mesa Verde will be written within ten years after comprehensive quantity data, and data from the special studies is obtained. A GS-7 for .3 FTE's at $6000. will be required for this project and for annual monitoring.

6. Compliances: No archeological clearances are needed for the current monitoring of the water sites or for proposed water site research as no disturbances will occur below ground level. The same is true for environmental assessment, other than there may be endangered plant and animal species

involved. The research and the monitoring would have no negative impact of rare species, rather the studies may identify previously unknown species or subspecies in these Mesa Verde niches which may be genetically isolated.

1. MEVE-N-0007 Monitoring Air Quality:

2. Servicewide Issue: N11, N14, N17, C06.

3. Problem Statement: The air quality concerns at the Park are part of a complex situation involving the continually changing composition of air flowing over the Mesa Verde. Air quality variations can effect visibility, human health, natural resources and cultural resources. The park is one of 48 units in the NPS system which was designated mandatory Class 1 status. There is a need to address the effects of air quality deterioration on the natural resources. No matter how great the task, the National Park Service is committed to a policy which will protect and enhance air quality resources in the National Park System. Cultural resources, natural systems and visitor enjoyment of the parks are at stake.

Laboratory analysis of samples taken to date have ranged from a ph of 3.81 to 6.36. The normal ph for rain is considered to be approximately 5.6. The annual average has ranged from 5.1 to 5.5. This preliminary data indicates that acid rain may be of long term concern to natural and cultural resources at Mesa Verde National Park.

Some of the active programs which need to be addressed in the Park Air Quality Management problem are:

--Establishing standards for air quality based on the measurable sensitivity of cultural and natural resources.

--Develop quantitative natural and cultural indicators that will establish measurable thresholds for management action.

--Conducting an on-going air quality monitoring program to gain baseline information.

--Conducting research on the effects of air pollution on cultural and natural resources.

--Developing a legal action plan for taking corrective measures based upon legal park protection responsibilities and air quality legislation.

--Develop in-park staff expertise on air quality matters.

--Establish a documented review program to assure all actions taken by park officials and concessioner comply with air quality regulations.

--Developing close communications with state and federal agencies responsible for air quality management.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Program: This would mean terminating air quality and acid rain monitoring programs now in existence. It would also mean ignoring the mandates of the Clean Air Act and the mandates of Congress in the 1916 Organic Act. Further, park managers would not have the data needed to make legal and resource management action decisions. Vegetation, soils and wildlife would, in time, suffer adverse effects.

B. Continue Air Quality and Acid Rain Monitoring Program: Continue the current plan of action with park employees performing various monitoring functions. Work will continue but will not progress to higher levels of proficiency. This program will provide data on acid rain trends which allow for necessary legal and resource management actions, but the study in itself does not provide information on the effects of acid precipitation on natural resources. Without this information, the mandates to protect the "scenery and natural objects" cannot be met.

C. Establish Long Term Studies and Research: Long term studies should be established to determine the impacts of changes in air quality on the natural resources of Mesa Verde National Park. This will require research by specialists over an extended time span (10 to 15 years).

Research should be implemented to determine the sources of air pollution which occur in the Park. Again, this will require researchers from colleges and universities or within the National Park Service. The research studies will need to utilize established research techniques and state of the art monitoring equipment.

Add studies of affects of air quality degradation on vegetation, soil, and susceptible faunal species. Incorporate more interpretation of data. Formulate graphs of data to use in management decisions and for visitor interpretation. Expand the interpretive information on air quality by use of a video, still photos, and printed literature.

5. Description of the Recommended Project or Activity:
Alternative "C" will provide a continuation of present

monitoring with improvement in coordination of operations, addition of monitoring methods, additional research, and interpretation of the data.

Visibility monitoring to the north will be established to cover the other half of the air shed. The automated camera at the Visitor Center will continue operation and a second camera should be installed at Park Point to provide a photographic record of visibility to the north. The proposed wet/dry collection station should be incorporated into the program. This station will include a complete weather station to help determine sources of pollutants. Solar radiation measurement will be taken to add to useful available data. Water sites will be studied to determine affects on insect larvae, amphibians, fresh water crustaceans, algae, aquatic vascular plants, etc. Cryptogam soils research will be started as proposed supported by the Air Quality Division. Permanent staked plots will be monitored on a regular and continuous basis. In conjunction with this study, a study of the affects of wet/dry deposition on water sites, aquatic invertebrae, and crustaceans, has been proposed also supported by the Air Quality Division. In June 1988 Mesa Verde National Park was investigated as a possible site for a Wet/Dry Deposition Collection Site. The decision on this issue has not yet been made. Vascular and nonvascular plants will be monitored for pathological signs which may be related to air pollution.

The comprehensive monitoring program should continue and updated equipment should be incorporated. In 1974 monitoring of air quality began when a high volume particulate monitor was installed by with the Colorado Health Department. A manually operated multi-wave length teleradiometer was in continual operation from 1978-1987, when this was replaced by an automatic camera system. From 1979-1981 a nephelometer under contract with Air Quality Division was maintained. In 1979 an acid rain monitoring program was initiated as part of NADP/NTN. In 1980, Dr. Thomas H. Nash of the University of Arizona at Tempe compiled a species list of lichens to determine their possible use as air pollution indicators. In 1982 a fine particulate sampler was installed by the University of California at Davis. This unit was replaced in 1987 by a new Improve Air Sampler with four filter units. During the summer seasons of 1981 and 1983 a study to measure the visitors' perception of different levels of visibility degradation was completed under the direction of WASO Air and Water Quality Division. The affects of sulfur compounds in the air on pinyon health was studied by Los Alamos researchers in 1985. In January 1987 the park put a pyronograph into continuous operation. Copies of the data

has been sent to the Colorado Climate Center at Ft. Collins, Colorado for measurement of total solar radiation.

In July 1988 soil samples from eighteen sites representing the park's major soil types were taken to measure calcium carbonate equivalency and buffering capacity.

In 1988 a transmissometer was put into operation. The information is sent by satellite to Air Quality Resources at Ft. Collins and also the data is recorded on a paper tape.

Funding for the existing programs were absorbed by the park when funds were reduced from the WASO Air and Water Quality Division. There is a need to obtain base funding for these activities for more continuity and efficiency in the park's air quality monitoring program.

The air quality program is currently being maintained by a GS-7 park ranger under the supervision of a GS-9 Natural Resource Management Specialist and with assistance from volunteers, using .4 FTE's at a cost of 18,000 per fiscal year.

We need the additional equipment, using present staff, to measure visibility to the north. Most important, we need research on the affects of air quality on floral components and fresh water fauna.

6. COMPLIANCES

All compliances have been met to date. The installation of the additional monitoring equipment will be approved as needed. Archeological clearance and environmental assessments are needed prior to installation on a site. Endangered species and flood plain alteration is considered in all cases.

1. MEVE-N-0008 Collection of Baseline Data.

2. Systemwide Issue: N2O.

3. Problem Statement: Mesa Verde National Park has a long documented history. The fact remains that the documentation is mostly archeological or anthropological. The natural science observations, unless unique to the Anasazi, are footnotes or asides in the written literature. The park does have some historical natural science observations that are usually species specific depending on the management emphasis of the time. Porcupine observations are duly noted where the species was considered a pest. The control of predators was also recorded when this was a concern.

There is an overall lack of data on many species of flora and fauna and their environment. There is a need to investigate small mammals and invertebrates. Their population density, species richness and changes may reflect long term changes in the ecosystem. In addition there is a pressing need to determine the status of the park's ungulates.

We are just not aware of what is happening in the environment to the species that make up our plant and animal populations. And we are not aware of the relationships of climatic conditions, topography, and geology to the biological components of the ecosystem.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: A no action alternative would remove even the limited quantity of information now collected. This is not a proper alternative under the legislative mandate of the park or the National Park Service.

B. Minimal Data Collection and Recording: Recording of observations as part of an informal program provides floral and fauna data. Specific data on species is entered on wildlife sightings, in plant file records, as plant plot and transect summaries, in a water site file, as geological data and climatic records. The cumulative information is available for analysis and data application as funds become available.

C. Research Lead Data Collection: The park will establish a comprehensive natural science research program that includes all of alternative B plus a natural science research program. A full time and/or retired researcher will be assigned to the park. Employee personnel for GIS and data entry will be provided.

5. Description of the Recommended Project or Activity:
The recommended activity is a combination of alternatives B and C. The project should be implemented now at the alternative B level then expanded to the alternative C level.

The present resource management staff will continue to collect wildlife and plant observations data. The standards for the park's data collection will be coordinated with other areas. Data records will be entered into the computerized data system via V.I.P.'s and seasonal personnel.

Species and areas of concern will be identified on specific research projects completed as funds are made available. A park service scientist will be assigned to coordinate and review research projects.

6. Compliance: Compliance with all federal collecting permits will be required. If an endangered species is involved, clearance with the Fish and Wildlife Service is required. Approval of the Park Superintendent based on the recommendation of the Park's research Committee is required.

Research and Monitoring involving the disturbance of the soil surface will require a 106 clearance. All plant, animal, and mineral specimens which are collected for future reference will be catalogued and entered into the park's collection.

1. MEVE-N-0009 Analysis of Geological Resources.

2. Systemwide Issue: N23, N17, N20, N12, C02, C03, C13.

3. Problem Statement: Understanding the geology of the park is basic to understand the natural resources of the park. The quantity and quality of water sites within the park, have definite but not totally understood relationships to the structural geology. The same geology affects the locations of relic plants, endemic plants, and plants of special interest. There appear to be a certain geological chemical relationship that allows plants to occupy special environmental niches. Many species of birds are known to use cliff ledges, alcoves, and cavities for nesting. Pack rats, ring tails, bobcats and mountain lions use the rocks for breeding dens. The bighorn sheep prefer a territory of high cliffs above and below talus slopes, possibly for protection from predators. Specific geologic formations and their variations within the park are responsible for faunal distribution, density, and activity. The occurrence of dikes and faults provide breaks in the cliffs which route the movement of deer and other mammals. These natural pathways must also have been important to the Anasazi. The locations and types of clays must also have been important to the Anasazi for construction mortar and pottery clays.

The Mesa Verde formations are rich in fossil remains ranging from trace fossils, fish scales, and molluscs to bones and plant remains. General academic and research data from the Cretaceous Period is not available. Study of geological evidence from 90 million years ago, will be useful in relationship to other areas and periods. Continuous search for fossils is necessary for dating the geological events and for making correlations.

A discovery of breccia out crops in 1988 may be useful in understanding the formation of the plateau as well as in water site/plant occurrences. More field and laboratory analysis is needed on this unusual material.

A study on rate of water movement through the three major Mesa Verde sandstone types would be useful for natural resources studies, in ruins stabilization, and in road maintenance and construction.

Alexander Wanek of USGS prepared a document in 1959 entitled Geology and Fuel Resources of the Mesa Verde Area, Montezuma and LaPlata Counties, Colorado, bulletin 1072-M. From 1980 - 1988 Dr. Mary Griffitts has studied the fossil and structural geology of the park as a volunteer (V.I.P.) and consultant. In 1987 the park purchased a petroscopic microscope for thin section analysis. In 1988, Mark Leckie, University of Massachusetts, and Jim Kirkland, University of Nebraska, conducted an intensive fossiliferous and petrographic analysis of the nearly 2000 foot

thick Mancos Shale formation which makes up the park North Escarpment.

Soil studies include soil typing and mapping on Wetherill Mesa by Orville Parsons, ASCS, in 1962-63; soil/vegetation study by ASCS in 1964-65; a soil map by Allen Price of ASCS in 1986; soil buffering capacity tests in 1988 related to air quality wet/dry deposition; and soil/plant relationship analysis in 1988 of special plant populations.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Program: The basic tool of geological understanding available for making management decisions relating to protection of water resources, special plants, protection of fossil zones, and construction practices.

B. Limited Program: Geological reference will continue to be utilized to a limited degree. The park staff will report fossils and unusual features.

C. Survey of Special Geological Problems: A geologist will be contracted to complete a survey of igneous outcrops and fault breccia outcrops. Measurements of formation strata will be taken in several cross sections. Petroscopic work on park rock types will continue. The local clays and gravels will be mapped and analyzed as a study of the possible sources of Anasazi tools, pottery, and mortar clay. GIS mapping should be employed to record fossil data and formation occurrences and for correlation of water sites and special plant populations to geological data. A comprehensive geological report, assembling available data, will be produced.

The remaining 80 percent of the park should be mapped to soil type for vegetation analysis, revegetation, and construction. The buffering tests should be repeated in 1993 to determine affects of wet/dry depositions from air; thirty to forty sites of special plant populations require soil analysis to determine correlations.

5. Description of the Recommended Project or Activity:

Alternative "C" is preferred. Contract field and laboratory work will help resolve some special geological questions. A basic map of Mesa Verde geology and accompanying report will be made available for park management decision. Fossils and features which are located from year to year will be added to the map and written up as appendices to the report.

A soils map will also be useful in park planning and maintenance. The buffering tests will give the park a better understanding of wet/dry deposition and its potential

cumulative threats to vegetation, rock features, and Anasazi dwellings.

A GS-7 employee, who is acquainted with the park's backcountry and who is knowledgeable in geology, at .1 FTE for $6000. will be needed to advise and assist the contractor. Remote area transportation by helicopter will cost 1,100 per year. A seasonal GS-3, at .2 FTE and $3000.is needed for data entry and to assist in cataloging of collected sample specimens.

6. Compliance: Necessary permits and approval at the park level will be required prior to field research. Surface disturbance in archeological areas will require 106 clearance.

1. MEVE-N-0010 Entry of Natural Resource Data into G.I.S.

2. Systemwide Issue: N20, N01, N02, N03, N04, N05, N06, N07, N08, N10, N11, N12, N14, N15, N16, N17, N18, N19, N23.

3. Problem Statement:

The park does not have the ability to provide the coordinated data to address resource questions. A Geographic Information System (GIS) is needed to provide access to this vast amount of data from the past 100 years. The park needs to do the following to achieve this availability of data.

The GIS themes should encompass entire the Mesa Verde plateau and the areas North-west of Cortez, Colorado. Hovenweep National Monument and Yucca House National Monument should be a part of the overall GIS map digitization. The maps political and topographic themes should be continuous to cover the entire greater Mesa Verde area. The other theme need not be continuous but should have the ability to record and update inputs outside the areas of major consideration. An example would be the location of oil and mining leases within the area but not adjacent to any Park of Monument boundary.

The priority 1 themes will be necessary to get the system operational. The priority 2 themes will be done as time and funds are made available.

The priority 1 themes are:

Political and Physical Plant
Topographic
Vegetation and Vegetative Communities

The priority 2 themes are:

Soils and Geology
Wildlife
Fire History
Demography

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: With the vast amount of information required to guide management a G.I.S. is required. Without the G.I.S. as a management tool we do not have the resources to meet our legislative mandates.

B. Implement Separate G.I.S. Programs for Both Natural and Cultural Resources: This is limited in scope and fiscal responsibility.

C. Develop a Coordinated Comprehensive G.I.S. Containing all Resource Data: This is the only reasonable means to provide the data base for guiding the management decisions and complying with legislative mandates. If we have access to the data it will result in an understanding of the relationships of various themes within both natural and cultural resource.

5. Description of the Recommended Projects or Activity: The preferred alternative is "C". A coordinated and comprehensive G.I.S. will make more data available for management and research. The project is the only way to achieve any reasonable level of meaningful information retrieval.

The general GIS area should cover an area 80 kilometers east to west and 60 kilometers north to south. Listed in UTM the geographic corners should be:

north-west	665,000/4150,000	north-east	745,000/4150,000
south-west	665,000/4090,000	south-east	745,000/4090,000

The specific GIS area for Yucca House N.M. should be a 5 kilometer square area with the corners being:

north-west	703,000/4128,000	north-east	708,000/4128,000
south-west	703,000/4123,000	south-east	708,000/4123,000

The specific GIS area for Mesa Verde National Park should be 30 kilometers square with the UTM corners:

north-west	710,000/4140,000	north-east	740,000/4140,000
south-west	710,000/4110,000	south-east	740,000/4110,000

The project will require a full time data entry person for the next three years, a GS-4 at 1 FTE for $16,000. The specific equipment to utilize the personnel for data entry would be a large digitizing tablet, optical scanner, and color platter.

Additional themes may require a contract or interagency transfer of funds to obtain data that is already digitized. This would result in a one time purchase of digitized topographic data, land out imagery and other area specific themes.

6. Compliances: The input of theme data will have to be coordinated by the park's research committee.

The research committee will have to set standards for the G.I.S. data that are compatible with the park's, region's, and WASO data management standards.

1. MEVE-N-0011 Research and Monitor Forest Insect and Disease.

2. Systemwide Issue: N03, N04, N05, N06, N07, N14.

3. Problem Statement: The pinyon-juniper forest on the Mesa Verde Plateau appears unique in its class and density. Much of the forest is in a climax or near climax state. Densities are extremely high in portions of the forest, relative to other pinyon-juniper communities in the Southwest. Many of these high density areas exhibit a significant degree of decadence. This condition appears to be caused, at least in part, by historic management practices of land use (grazing, etc.) and wildland fire suppression.

Partial results of this condition have been periodic infestations of bark beetles, wood boring beetles and eruptions of black stain disease (Vericiladiella wagnerii) of the pinyon pine (the 1920's, 1930's and 1970's). These infestations and eruptions have increased mortalities and somewhat reduced densities in the stands. However, while these influences (natural and man caused) are understood in general terms, insufficient information presently exists to fully comprehend the dynamics pertinent to this unique forest community.

The lack of natural resources monitoring in the park including forest insects and disease was recognized as a significant resource management problem in a report submitted to RMRO February 1981.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Program: No action will continue to allow present conditions to progress without management's involvement. With no efforts made to understand the interrelationships of insects and disease within this forest ecosystems, management will continue to lack adequate information on which to base effective decisions. Insect and disease mortalities will continue to contribute to lessened aesthetic values and increased fire risk. Short term Service costs may be minimal under this alternative, but long term costs will increase over time, due to increased fire risk/cost of eventual fire suppression, costs of diseased tree removal and replanting for aesthetic purposes in developed areas, etc. as will risk to cultural and natural resources.

B. Maintain Monitoring Programs at Present Levels: A Black Stain root rot study was initiated in 1977, with work accomplished each summer since by a volunteer in parks biologist, Dr. Russel Wagner. Emphasis has been

upon vectors of dispersal and extent of spread on lower Chapin Mesa.

Occasional U.S. Forest Service Forest Insect and Disease Management (FIDM) monitoring of insect outbreaks have been conducted on a cooperative basis. Aerial photographs of Chapin Mesa have also been provided by FIDM on occasion to supplement other data obtained.

Costs to the Service of this monitoring have been minimal, but data collected is not fully adequate to address management programs parkwide.

C. Increase Levels of Monitoring and Institute Research of Insect and Disease Occurrences: Expand monitoring t cover the entire park. Provide funds for periodic (every five years) high altitude imagery, infrared aerial photo flights in conjunction with the USFS contracted flights. While costs to the Service will be incurred, a parkwide data base will be established and trends may be monitored, providing input for adequate and timely management action. Continue current research and institute additional researches indicated. This knowledge would also assist in the integration of fire and fuels management programs addressed elsewhere in this plan.

5. Description of the Recommended Project of Activity: Alternative "C" is the recommended action. The Forest Insect and Disease Management Division of the Forest Service will be requested to provide an updated aerial survey of the Chapin Mesa area to determine the current status of Black Stain root rot disease (Vericiladiella wagnerii). FIDM personnel will continue their study initiated in 1982 to develop a technique to isolate Black Stain root rot disease by means of physical and chemical barriers and will monitor the research plots established in 1947 and in 1978. Research to determine a vector responsible for the spread of the disease is continuing through the use of volunteer scientist Dr. Russel Wagner. Monitoring of previously established study plots will be continued annually by Dr. Wagner. Remove infected trees in developed areas as necessary.

To prevent the continuation and spread of disease and insect infestations, damaged and diseased trees will be physically removed in developed areas. In other situations, fire may provide a means of removing infested and diseased trees. All winter-damage trees and other slash type materials will be burned to prevent buildup of insect infestations.

Annual parkwide forest conditions monitoring will be conducted by backcountry technicians in addition to other resource protection/monitoring/management activities elsewhere outlined in this plan. They will assist in and carry out standardized (1) condition survey programs and (2) field research activities on pinyon Black Stain root rot incidence and beetle infestations. Data received will be collated and interpreted with the assistance of recognized FIDM authorities. Monitoring, both aerial and study plot, programs will be continued as necessary in cooperation with FIDM personnel.

Research studies are to be continued to identify the vector and determine control means of the Black Stain root rot disease. Conduct research to identify what active disease and insect pests are at work within Mesa Verde National Park.

The monitoring and supervision of mitigation will require a GS-7 for .4 FTE at a cost of $8000. If continued mitigation is required then .8 FTE of seasonal help will be needed at a cost of $10,000.

Research for determining mitigation action can continue to be done by the FIDM and volunteer researchers. Additional specific research proposals indicated by the FIDM data can be considered individually at a later date.

6. Compliances: Any disturbance of the soil horizons will require archeological 106 clearance.

Nondestructive endangered species monitoring will require park approval. Collecting of specimens will require park collections permits. All research proposals should be reviewed by the park's research committee and forwarded to the Superintendent with recommendations.

1. MEVE-N-0012 Maintenance of Natural Resource Reference Collection.

2. Systemwide Issue: N23, N20, N17, C07.

3. Problem Statement: A park reference collection of natural resources is necessary for two purposes; it validates the identification of each species or specimen and it facilitates identification of species or specimens. Monitoring and formulating management decisions on over 2000 identified species requires the use of a reference collection when park personnel is transient, from varied disciplines, and long term use is considered.

Mesa Verde Natural Park has had an active herbarium since 1928, however, hundreds of pressed specimens have not been entered into the systems. Many of these are species which are not represented in the herbarium and some are of recently located or recently introduced species.

The entomological collection consists of specimens, which were mostly collected in the 1950 and 1960's. Additional insects were collected in the 1980's. In most cases the insects are identified only to family. A seed collection was started in 1979 and a bone, hair, and feather reference collection was started in 1980. A scat and casting collection was started in 1983. Tree cones and cross sections of trees of special interest and from relic Ponderosa are on hand to be entered into the collection.

The rock, mineral and fossil collection has been added to and updated through the 19080's.

Addition to the natural resource collection, with the exception of geological specimens, has been discontinued because of lack of collection housing and curatorial staff. The present policy is to maintain the reference collection. Many species are not represented.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Program: Non-maintenance of the reference collection is the current park policy. Newly located species are not being represented and salvage specimens are being discarded.

B. Limited Collection: Only specimens of special interest will be added to the existing natural resource collection. This type of collection will represent a minor number of park species or materials and will not serve for reference or material record.

C. Representation of all Species and Materials: The collection should be considered renewable and available for reference, under the direction of the park curator. The exceptions to this include holotype specimens and specimens of rare and endangered species.

The collection should be housed in the controlled environment at the research lab, as long as that facility is open and within reasonable distance of the Natural Resource Management Office. Copies of the catalogue data are needed for reference at the Natural Resource Management Office.

Cataloging, under the direction of the curator, should be done by seasonal museum trained staff. Data regarding the collection will be entered by the collector in specially formatted field notebooks. Visiting researchers will be responsible for preliminary cataloging and preservation.

5. Description of the Recommended Project or Activity: The recommended course of action is Alternative "C". Only specified park personnel will be involved in collecting. Visiting researchers and park staff will be required to meet collection and cataloging standards. The use of the collection for reference will be under surveillance of the park curator. Referral of the specimens and copies of the catalogue data will be available to the Natural Resource Management Staff.

A GS-9 park ranger involved in natural resources for .1 FTE and $4000. is needed for collection, salvage and field data entry. A GS-3 museum technician for .5 FTE and $7000. including support costs is necessary for preservation and cataloging. A GS-_____ curator for .1 FTE and $1000. is needed for collection supervision. Costs will reduce after old collections are entered into the system.

6. Compliance: The collecting of specimens must meet the park's collection management plan. If below ground disturbance is necessary archeological clearance is necessary. Environmental assessment and addressing the potential of special or endangered species is necessary.

1. MEVE-N-0013 Monitoring and Protection of Peregrines:

2. Systemwide Issue: N02, N17, N04, N07, N19, N20, C13

3. Problem Statement: Peregrine falcons were historically in Mesa Verde until 1976 at which time the entire peregrine population in Colorado had been reduced to six known pairs. In 1983 a pair nested on Lone Cone at the head of Morefield Canyon and after manipulation three young fledged. Since that time two to three young have fledged each year. In 1987 the birds shifted the aerie to the Knife Edge area. This was thought to be because of human disturbance from park visitors in Morefield Campground. In 1988 because the aerie was quite accessible to humans and predator intrusion (15 feet from the cliff top) two VIP's were stationed nearby to watch the area for five weeks until fledgling was completed. Eleven visitors were asked to come down from the slopes below the aerie.

   Egg shell thinning has been observed in this pair and in 1987 the egg shell condition declined to -20% overall thinning, which is on the border line of resulting in accidental breakage during incubation.

   Other threats are a golden eagle nest .75 of a mile to the west of the aerie and a great horned owl nest 2 miles to the east.

   Live capture of young peregrines for sell to falconers is a potential threat.

4. Alternative Actions/Solutions and Their Probable Impacts:

   A. No Program: As an endangered species we can not accept the alternative of no program.

   B. Monitor Populations of Peregrines: Record locations, activities and numbers of peregrine populations in the park. Continue to recognize impacts from adjacent areas. Alert park management of in park impacts.

   C. Intensive Monitoring and Continued Surveying: The existing Lone Cone peregrine aerie will continue to be monitored and protected and the fledglings banded with the assistance of the Peregrine Fund staff. Prey species, toxic residues, and egg shell thickness should be determined. New aeries will be searched for, especially along the Northern and Eastern Escarpments and in the lower deep canyons, such as Navajo and Rock Canyon. If necessary, additional protection personnel will be utilized.

5. Description of the Recommended Project or Activity: Alternative C is the preferred course of action. Because of the historical status of peregrines on the Mesa Verde plateau and because of their dramatic decrease in worldwide population, every effort should be made to assist in their recovery. Continued monitoring and protection of the Mesa Verde aerie is necessary. Additional research on in park and out of park impacts is vital to the continued recovery of the species. In addition to Peregrine Fund personnel, a GS-7 for .1 FTE at $3000. is required to monitor the species parkwide.

   Two to three Peregrine Fund people are needed to visit the Lone Cone aerie for 4 hours per visit during courtship or nesting, for banding, and during fledgling. As outlined in Parks peregrine action plan policy the aerie will be visited only three time during nesting. First to count the eggs. Second to count the number hatched. And last the third time to band the young and collect shell fragments. The aerie will be entered only during the banding visit. Of necessary protection from human and intrusion will be provided. The aerie area is closed as part of the "no entry" backcountry park policy.

6. Compliances: Nondestructive methods only will be employed. No live specimens will be taken and the habitat will not be disturbed. As required by the parks action plan a member of the park's staff will accompany the Peregrine Fund people when the aerie is visited. Rare, threatened, and endangered species as well as species of special concern will not be impacted. No archeological clearance is necessary since no surface or below ground disturbances will occur.

1. MEVE-N-0014 Revegetation Using Native Species

2. Systemwide Issue: N23b, N04, N05, N06

3. Problem Statement: The Park supports several major habitat types, each with a distinct plant community. The plant zones in the park range from Upper Sonaran to Lower Montane. The park serves as a natural reservoir of some species which have been severely affected on other lands by grazing, farming, and development. Because of Mesa Verde's limited development, limited backcountry use, and attempted exclusion of domestic grazers, a natural state exists over most of the area. Exotics, with the exception of musk thistle, smooth brome, yellow sweet clover, Russian knapweed, and tamarisk, have minor occurrence or are confined largely to developmental areas.

In order to minimize the intrusion of exotics and to curtail erosion, revegetation using native species following development or maintenance practices is needed. Forbes and grasses which are effective competitors, and provide ground cover and wildlife habitat are preferred. Shrubs and trees are also desirable to restore the natural scene.

The purchase of seeds and live root-stock from commercial source has been difficult since several of the primary species are not available. To alleviate this, seeds have been collected in the park annually since 1985. This practice has proved satisfactory but it depends on hand labor during specific and erratic times as the seeds mature. Hand picked seeds have been supplemented with some commercially purchased seeds of appropriate species.

In 1988 seeds of shrubs and trees were collected. These should be germinated in controlled conditions and kept potted for 1-2 years before being transplanted. In some instances, it would also be advisable to plant tree/shrub seeds directly at the site, especially if the disturbed area is larger than one acre. Experiments in propagation by new growth clippings was attempted in the misting system of a local nursery in 1988. Propagation using woody clippings should be attempted. Because shrub seedling growth in nature is so slow, nursery starts (from seed, new growth clippings or woody clippings) is preferred.

Working with clippings depends on specific timing as the new growth appears and the same is true for the seeds as they become ready following stratification. A small park greenhouse and nursery set up is necessary to provide a continuous supply of live root-stock for revegetation of areas ranging in size from 1000 square feet around developed areas to 100 acres following road construction. There is a continuous park need for revegetation using native species.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Program: Native and non-native adventives will invade disturbed areas. Areas around heavily visited Anasazi sites and the park campground will undergo native vegetation decline until erosion occurs.

B. Revegetation by Construction Contractor: Revegetation will be accomplished by the contractor involved in construction. The park will recommend species for each site.

The problem of non-availability of some primary species will continue. There is also always the possibility of species substitution or subspecies contamination occurring when seeds or root-stocks are purchased from commercial sources.

C. Revegetation Using In-Park Sources: Most seeds, live root-stock, and balled trees for all revegetation projects should be obtained directly from the park. Only approved seeds, such as some grasses, may be purchased from a reliable commercial source and this will be done only for large revegetation projects. Seeds should be hand picked from areas of their natural occurrence by hand labor. Seasonal help will be used when available and contract labor will be employed if necessary. The seeds will be dept in a cool, dry storage and a selection of 30 to 40 species to cover 3-4 major habitat types will be available.

Shrubs and trees will be grown in a park greenhouse/nursery from new growth and/or woody clippings and from seeds. Seedlings will be potted and stored in a fenced yard. Supply on hand will fluctuate with projected needs.

Balled trees will be obtained within the park, by trained park staff, as special needs arise. This practice will be used for immediate restoration around developed areas. Balling of seedling and sapling trees will be salvaged prior to any new construction. The trees will be planted directly to a site or stored at the nursery until the appropriate season.

The year around maintenance work at the greenhouse will be done by the Natural Resource Park Staff. Approximately five hours per week will be required. A GS-7 at .1 FTE for $4000. annually will be necessary for all revegetation processes, including greenhouse/nursery maintenance. The employee must be acquainted in native species site associations and horticultural methods.

The greenhouse/storage building/nursery yard will cost

$25,000. A greenhouse with temperature controls and a timed misting system is necessary.

5. Description of the Recommended Project or Activity: Alternative "C" is the only long range viable practice to provide revegetation using only native species. The species used per site will be on the recommendation of the Natural Resource Park Staff. Schedule of planting use of in-park top soil, mulch, fertilizer, and artificial watering will be specified per site. Contract labor will be utilized on large areas and seasonal park labor will be utilized on areas smaller than one acre.

6. Compliances: Archeological clearance and an Environmental Assessment proceeds all park construction. The Environmental Assessment includes affects on floodplain and a purview for rare, endangered, and threatened species. Areas of visitor impact will need Archeological Clearance if mechanized equipment is used to loosen soil or to reform the terrain (such as at the park campground tent sites and unauthorized trails).

1. MEVE-N-0015 Monitoring of Amphibians and Their Habitat.

2. Systemwide Issue: N02, N17, N04, N07, N19, N20, C13.

3. Problem Statement: Rocky Mountain toad and leopard frog are restricted to a few isolated habitats in the park and both species have experienced a decrease in population in lands adjacent to the park. In fact, the leopard frog can no longer be found in Montezuma County valleys since widespread mosquito control spraying was done in the 1970's. Rocky Mountain toads are also quite rare there since that time.

   In the park, leopard frogs may have been heard croaking during breeding season at two of the four sewer lagoons but no eggs, tadpoles, or adult frogs could be located. No leopard frogs have been seen along the Mancos River during several searches in the 1980's, even though they were reported there in 1962-63. Prior to 1970's leopard frogs were abundant over Montezuma County wherever there was permanent water.

   Single toads or small breeding populations of Rocky Mountain toads have been reported in Morefield (1985) and Prater (1962) Canyon marshes, the head of Fewkes Canyon (1983), Cliff Canyon (1986), lower Soda Canyon (1985), and Middle Navajo Canyon (1988) - all associated with water sites which have a pH of 6.7 to 7.6. None have been found in the more alkaline Menefee Shale water sites where the pH may be 8 to 8.5.

   Use of pesticides in or out of the park is a serious threat to amphibian tadpoles and possibly to the adults. Alteration in pH from introduced water from cumulative wet/dry deposition could create an environment having an unacceptable pH level. Another threat is the probable introduction of bacterial diseases from imported amphibians.

4. Alternative Actions/Solutions and Their Probable Impacts:

   A. No Program: Lack of research on the amphibian populations may contribute to the extinction of a species.

   B. Limited Monitoring: Continue the monitoring of species by observations of opportunity.

   C. Determine Amphibian Populations & Reasons for Decline: Sites for Rocky Mountain toad populations will be surveyed in mid-summer (during egg-tadpole stage) and in late summer (during juvenile stage) to determine population numbers. Populated water sites should be analyzed for pH and basic elemental content. Any water

sites of suspected toxic impacts or chemical alterations should be analyzed. Historic locations of leopard frogs should be examined. Leopard frogs (adults and tadpoles) from the nearest known population should be tested for pesticide contaminants. A history of leopard frog populations in the Montezuma and LaPlata counties should be determined.

An agreement between the park and the Montezuma mosquito control program is recommended so that no spraying is allowed that will affect the park, such as along the Mancos River.

5. Description of the Recommended Project or Activities: Alterative "C" is recommended. Combined research and monitoring are both necessary to protect the Rocky Mountain toads from air quality and park impacts. Research and continue search for the leopard frog is necessary to determine the next best action and this species of concern.

Neither monitoring or research will have adverse affects on the amphibians or on their habitats. Some park practices, such as control of exotic species, and discharge of introduced water, may have to be adjusted so the habitats are not damaged. The Montezuma County officials should be contacted regarding prohibition of spraying for mosquito control along the Mancos River within park boundaries.

6. Compliances: Nondestructive methods only will be employed. No specimens will be taken and the habitat will not be disturbed. An environmental assessment will be made to cover any possible disturbances to the species. Rare, threatened,and endangered species as well as species of special concern will not be impacted. No archeological clearance is necessary since no surface or below ground disturbances will occur.

1. MEVE-N-0016 Survey Bats, Shrews, and Small Rodents:

2. Systemwide Issue: N02, N17, N04, N07, N19, N20, C13.

3. Problem Statement: A limited survey of all mammalian species of the park was done in 1962-63, but recent reports of bats, shrews, and small rodents are only from road kills and occasional reports around developmental areas. No quantitive data has ever been obtained on these species. Bat populations over the United States have changed dramatically in the past twenty years and we still know virtually nothing of the habitats used by bats in the park, of their current population status, and bat species present. In the case of shrews and small rodents we need more information of the habitat used by each species for making management decisions. In 1962 the Apache pocket mouse was first found in the park. This occurrence made a significant expansion in the mouse's range. The Mexican vole, which occurs in dry pinion-juniper-sagebrush sites is thought to be a Pleistocene relic in isolated montane zones over the Southwest. The Merriam's shrew has been reported only five times in Colorado and three of these reports are from Mesa Verde National Park. More research on this insectivore is needed.

   An intensive survey to update species in the park and to obtain quantitative and habitat data is needed. Repeat studies every five to ten years, possibly in the middle of climatic wet and dry trends, would be useful to relate to predaceous bird and other small mammal population trends.

4. Alternative Actions/Solutions and Their Probable Impacts:

   A. No Program: No survey will be conducted. Information on these small mammals and their relationship in the park ecology will not be known.

   B. Monitor Populations of Bats, Shrews and Small Rodents: Record locations, activities and occasional sightings in the park. Alert park management of in park impacts, based on minimal knowledge.

   C. Intensive Surveying: Conduct inventories of bats by habitat type using mist nets and search for roost sites. Determine species and numbers per habitat t Establish standard live trap lines per habitat type shrews and small rodents. Each location should be surveyed in the spring and fall annually. Determ species and numbers per habitat type. Use GIS m to record animal density and range.

Identification will be made from live specimens which will be released; representative photographs will be made per species during initial survey.

5. Description of the Recommended Project or Activity: Alternative "C" is the only method which will result in comprehensive data regarding species, numbers, and habitat. Locations of bat roost sites will be better protected from discharged introduced water and from park maintenance and development. Knowledge of bat feeding sites may influence park practices of herbicide or insecticide use.

Mist netting, trapping and identification may be accomplished by a GS-7 with wildlife inventory skills and one volunteer assistant, initial costs being $6000. and .2 FTE and follow up work at $4000. and .1 FTE.

Impacts of trapping will be insignificant to the populations even though some trapped rodents and shrews may perish during live trapping. Mist netting results in less than one percent fatality rate.

6. Compliances: Nondestructive methods only will be employed. No specimens will be taken except as salvage and the habitat will not be disturbed. An environmental assessment will be made to cover any possible disturbances to the species. Rare, threatened, and endangered species as well as species of special concern will not be impacted. No archeological clearance is necessary since no surface or below ground disturbances will occur.

1. MEVE-N-0017 Monitor of Owls and Their Habitats:

2. Servicewide Issue: N02, N17, N04, N07, N19, N20, C13.

3. Problem Statement: The population and range of the spotted owl has been greatly reduced over its former range in western United States. This reduction is due largely to cutting of old growth forests where the birds nested. At Mesa Verde spotted owls have adapted to nesting in the cliff cavities and ledges, sometimes in association with the Anasazi cliff dwellings. In 1987 the first record of a breeding spotted owl was made in Colorado. This record was made in Cliff Palace. From 1978 through 1988 owl calling has produced responses from spotted owls at five locations on eight occasions. In 1988 spotted owls responded from Kodak House and from Step House - both Anasazi cliff dwellings.

   More information of hunting and nesting territories of this bird is needed so that park practices, such as ruins stabilization, ruins visitation, and other activities, do not conflict with the spotted owl. Mesa Verde has a significant remnant of a species population and beside protecting the bird, the data obtained will be useful for researchers in other areas. The adaptation from large trees to cliffs is an example of new information.

4. Alternative Actions/Solutions and Their Probable Impacts:

   A. No Program: No data of the population status will be obtained for basis of park management.

   B. Monitor Populations of Owls: Record locations, activities, and numbers all owl populations in the park using wildlife sighting cards. Recognize impacts from adjacent areas. Alert park management of in park impacts. The problem with this alternative is that some of the more inaccessible areas of the park remain unmonitored and the identity of species is uncertain.

   C. Intensive Monitoring: Owl calling will be done once in the early spring and once in the fall per possible nesting area. Sex and age will be determined,if possible, by observation without capture. Nest sites, if determined, will be examined in late summer after fledgling and castings will be collected to determine prey species. An effort will be made to positively identify owls seen in the canyonhead hunting territory. This may be done by use of an infrared observation light and accompanying calling. Various owl responses to audio calls will be recorded using a parabolic

microphone and high quality recorder. The calls recorded will serve as a reference tape.

Park personnel involved in ruins stabilization must be alerted to possible spotted owl nests in the upper stories of the cliff dwellings. Any observations of nesting or feeding activities within the cliff dwellings should be reported to the Natural Resource Management staff. An annual file will be maintained on each site of response or observation.

No physical contacts will be made except after fledgling when the nest sites are examined. Because the owls may sometimes be approached very closely, only trained observers will be involved.

5. Description of the Recommended Project or Activities:

Alternatives "B" and "C" combined is recommended. Presently the data of the spotted owl occurrence in the park is limited to a few sites and more expansive methods are necessary to know how to best protect this species of concern.

Initially one GS-7 for .2 FTE at $5000. will be necessary to survey the park and to monitor known spotted owl sites. Audio recording equipment will need to be purchased. Follow-up monitoring will require .1 FTE at $2500 each year.

The monitoring will have no adverse affects on the population nor on the habitats. The ruins stabilization may have to temporally halt their work in portions of a cliff dwellings to avoid an active nesting site. Visitor access may have to be restricted from the vicinity of active nesting.

6. Compliances: Nondestructive methods only will be employed.

No specimens will be taken and the habitat will not be disturbed. An environmental assessment will be made to cover any possible disturbances to the species. Rare, threatened, and endangered species as well as species of special concern will not be impacted. No archeological clearance is necessary since no surface or below ground disturbances will occur.

1. MEVE-N-0018 Re-establish Turkeys

2. Systemwide Issue: N02, N17, N04, N07, N19, N20, C13.

3. Problem Statement: Wild turkeys are a part of the native faunal community of Mesa Verde National Park. Specimens of Meleagris gallopavo merriami, Merriams wild turkey, have been found in prehistoric sites ranging from Basketmaker II Period (500 AD) through Pueblo III Period (1250 AD). The status of the wild turkey population in the Mesa Verde area from the Anasazi Period to the late 1800's and early 1900's is uncertain. In 1946 wild turkeys were reintroduced in the park and until the 1960's they reproduced and increased their range. By 1968 the last known turkey was reported in the park. The decline of wild turkey populations was felt over the entire San Juan Basin area. Colorado Division of Wildlife felt that the decline was related to diseases carried by domestic poultry and to several winters of severe weather.

   No turkeys are known to inhabit the park at this time. In August 1982 three separate sightings were made of two hens in Morefield Campground area. No sightings have been made since. In 1982 wild turkeys were introduced in the La Plata Mountains on the San Juan National Forest (12 airline miles from the park) and on Sleeping Ute Mountain on Ute Mountain Indian Reservation (also 12 airline miles from the park). These populations are presently expanding in number.

4. Alternative Actions/Solutions and Their Probable Impacts:

   A. No Program: A species which is adapted and a historic native to the environment of the park would be absent from the faunal community.

   B. Reintroduction of Turkeys into the Park:Proper management and precautions should prevent contact and spread of domestic poultry diseases. Park lands at least 10 miles from domestic livestock will be selected. Prior to the reintroduction the habitat will be evaluated. During the year monitoring of the flocks, food resources and water resources will aid in turkey management.

      Initial reintroduction of the flocks at a specified distance from developed areas will decrease human/turkey conflicts. After establishment in remote areas becomes successful, the population will be expanded to areas of human visitation.

Stock adapted to local conditions should be obtained from neighboring public lands through cooperation with the Colorado Division of Wildlife. The flocks will be monitored by radio transmitter and by direct observation; files on the turkeys movements, fatalities, and breeding success will be established. GIS mapping will be employed.

Turkey populations will not be introduced adjacent to developed areas but they may become visible for visitor observation in Prater Canyon or School Section Canyon or possibly lower Chapin Mesa.

5. Description of the Recommended Projects or Activity: Alternative "B" is the only acceptable choice. The reintroduction of turkeys will reestablish the only known native bird species currently absent from the park. Turkeys will also be an important addition to the interpretive program concerning Anasazi lifestyle.

An university study involving 2 to 3 persons trained in wildlife habitats will be required to analyze food and water resources and select the release locations. The analysis will require 1 week during the winter and 1 week in the mid-summer. These people should also be aware of predator association. A GS-7 will require .1 FTE at $5000. to assist in capture, release and radio tracking/monitoring during the first year only. Following years will require .1 FTE at $2000. for monitoring and protection.

6. Compliances: Nondestructive methods only will be employed. No specimens will be taken and no habitat will be disturbed. An environmental assessment will be made to cover any possible disturbances to the species. Rare, threatened, and endangered species as well as species of special concern will not be impacted. No archeological clearance is necessary since no surface or below ground disturbances will occur.

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0001 Title: Predator seasonal movements
Activity No.:001

Funding (Y/N)? : N Estimated Total Costs:46.0 Start Date:01/01/89
End Date:12/31/91

Servicewide Issue Category Code(s): NO2 , , , ,
Cultural Resource Type Code(s) : N17 , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 2.0 FTE's: 1.4

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 100% I: %: % I: %: % I: %:

Work Planned this FY: Plan for study to radio collar two park bears, mountain lions, and six coyotes.

Out Year 1 FY: 90 Planned Costs: 20.0 FTE's: 1.4

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): RES %: 70 % I: ADM %: 10 % I: PRO %: 10 %

Out Year 2 FY: 91 Planned Costs: 20.0 FTE's: .4

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): RES %: 70 % I: ADM %: 10 % I: PRO %: 10 %

Out Year 3 FY: 92 Planned Costs: 3.0 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: PRO %: 10 % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: 2.0 % Project Completed 5 %
% Personnel: 90 %
% Project Support: 10 %

Funds Obligated with University: University:

Accomplishments This Year: Over 1,000 wildlife sightings of large predators were recorded, including locations, age, and sex when possible, and activity. Relationships to prey species obtained to small degree.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RMR** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-0002** Title: **Monitoring Special Plant Populations**
Activity No.:**001**

Funding (Y/N)? : Y Estimated Total Costs:16.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N03 , N17 , N01 , N07 , N23
Cultural Resource Type Code(s) : C13 , , , ,

Contact Name: ROBERT C. HEYDER Phone: (303) 529-4465

Current Fiscal Year FY: **89** Planned Costs: **4.0** FTE's: **.1**

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 4.0
Fund Source Code 2: NF Funding:

Activity Type Code(s): MON %: 80% |: PRO %: 10% |: ADM %: 10% |: %: %

Work Planned this FY: Continue the monitoring of the endemic plant plots and search for new populations. Continue monitoring and documentation of other special populations.

Out Year 1 FY: **90** Planned Costs: **4.0** FTE's: **.1**

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 4.0
Fund Source Code 2: NF Funding:

Activity Type Code(s): MON %: 80 % |: PRO %: 10 % |: ADM %: 10 %

Out Year 2 FY: **91** Planned Costs: **4.0** FTE's: **.1**

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 4.0
Fund Source Code 2: NF Funding:

Activity Type Code(s): MON %: 80 % |: PRO %: 10 % |: ADM %: 10 %

Out Year 3 FY: **92** Planned Costs: **4.0** FTE's: **.1**

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 4.0
Fund Source Code 2: NF Funding:

Activity Type Code(s): MON %: 80 % |: PRO %: 10 % |: ADM %: 10 %

Past Fiscal Year FY: **88** Funds Obligated: **4.0** % Project Completed **98%**
% Personnel: 80 %
% Project Support: 20 %

Funds Obligated with University: University:

Accomplishments This Year: THE NINE PERMANENT PLOTS FOR ENDEMIC PLANTS WERE MONITORED. TWO PONDEROSA SITES WERE SURVEYED. NINE SOIL TYPES WERE SENT FOR ANALYSIS FOR PLANT/SOIL RELATIONSHIPS. ONE NEW CLONE OF SCRUB LIVE OAK WAS LOCATED AND SEVERAL FORBES LOCATIONS WERE ADDED TO THE CARD FILE. FAULT LINE W/BRECCIA OUT CROPS WERE LOCATED AT NINE SITES.
Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RMR Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0002 Title: RELIC AND SENSITIVE PLANT RESEARCH
Activity No.:002

Funding (Y/N)? : N Estimated Total Costs:16.0 Start Date:10/01/89
End Date:09/30/92

Servicewide Issue Category Code(s): N03 , N17 , N01 , N07 , N23
Cultural Resource Type Code(s) : C13 , , , ,

Contact Name: ROBERT C. HEYDER Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 8.0 FTE's: 0.2

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: NF03 Funding: 6.0

Activity Type Code(s): RES %: 80% |: ADM %: 20% |: %: % |: %: %

Work Planned this FY: PREPARATION OF RECORDS AND PRELIMINARY MAPS FOR PROPOSED RELIC AND SENSITIVE PLANT STUDY.

Out Year 1 FY: 90 Planned Costs: 4.0 FTE's: 0.1

PWE: PWE: Fund Source Code 1: NF03 Funding: 4.0
Fund Source Code 2: NF Funding:

Activity Type Code(s): RES %: 80 % |: ADM %: 20 % |: %: %

Out Year 2 FY: 91 Planned Costs: 4.0 FTE's: 0.1

PWE: PWE: Fund Source Code 1: NF03 Funding: 4.0
Fund Source Code 2: NF Funding:

Activity Type Code(s): RES %: 80 % |: ADM %: 20 % |: %: %

Out Year 3 FY: 92 Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): %: % |: %: % |: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year:

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RMR Region Priority: Park: MEVE Park Priority:

RM Project No.:MEVE-N-0003 Title: IMPACTS AND REMOVAL OF NON-NATIVE ANIMALS
Activity No.:001

Funding (Y/N)? : N Estimated Total Costs:136. Start Date:01/01/89
End Date: / /

Servicewide Issue Category Code(s): N04 , N17 , N02 , N08 , N19
Cultural Resource Type Code(s) : C06 , , , ,

Contact Name: ROBERT C. HEYDER, SUPT. Phone: (303) 529-4465

Current Fiscal Year FY: 88 Planned Costs: 98. FTE's: .8

PWE: 180 PWE: 160 Fund Source Code 1: NF1 Funding: 4.
Fund Source Code 2: NF1 Funding: 4.

Activity Type Code(s): MIT %: 90% |: MON %: 05% |: PRO %: 05% |: %: %

Work Planned this FY: MAINTAIN AND PROTECT CONSTRUCTED FENCE. REMOVAL OF TRESPASS LIVESTOCK BY GROUND ROUNDUP AND BY WINTER HELICOPTER DRIVES.

Out Year 1 FY: 89 Planned Costs: 28. FTE's: .6

PWE: 180 PWE: 160 Fund Source Code 1: NF1 Funding: 4.
Fund Source Code 2: NF1 Funding: 4.

Activity Type Code(s): MIT %: 80 % |: MON %: 10 % |: PRO %: 10 %

Out Year 2 FY: 90 Planned Costs: 8. FTE's: .6

PWE: 180 PWE: 160 Fund Source Code 1: NF1 Funding: 4.
Fund Source Code 2: NF1 Funding: 4.

Activity Type Code(s): MIT %: 25 % |: MON %: 25 % |: PRO %: 50 %

Out Year 3 FY: 91 Planned Costs: 8. FTE's: .6

PWE: 180 PWE: 160 Fund Source Code 1: NF1 Funding: 4.
Fund Source Code 2: NF1 Funding: 4.

Activity Type Code(s): MIT %: 25 % |: MON %: 25 % |: PRO %: 50 %

Past Fiscal Year FY: Funds Obligated: 100. % Project Completed 70 %
% Personnel: 70 %
% Project Support: 30 %

F Obligated with University: University:

Accomplishments This Year: COMPLETION OF FENCE CONSTRUCTION OF SOUTH AND SOUTHWEST BOUNDARY, BETWEEN THE PARK AND UTE MOUNTAIN RESERVATION (20% of total).COMPLETION OF SURVEY OF NORTHERN BOUNDARY LINE, FROM ENTRANCE AREA TO NORTHWEST PARK CORNER.

Publications/Reports: NONE.

Annual Project Status and Accomplishments Report

Region: **RMR** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-0004** Title: **MONITORING INTRODUCED PLANT SPECIES**
Activity No.:**001**

Funding (Y/N)? : Y Estimated Total Costs:3. Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): NO5 , NO8 , NO6 , ,
Cultural Resource Type Code(s) : C06 , , , ,

Contact Name: ROBERT C. HEYDER Phone: (303) 529-4465

Current Fiscal Year FY: **89** Planned Costs: **3.** FTE's: **.1**

PWE: 180 PWE: Fund Source Code 1: NF1 Funding: 3.
Fund Source Code 2: NF Funding:

Activity Type Code(s): MON %: 80% |: MIT %: 20% |: %: % |: %: %

Work Planned this FY:

Out Year 1 FY: **90** Planned Costs: **3.** FTE's: **.1**

PWE: 180 PWE: Fund Source Code 1: NF1 Funding: 3.
Fund Source Code 2: NF Funding:

Activity Type Code(s): MON %: 80 % |: MIT %: 20 % |: %: %

Out Year 2 FY: **91** Planned Costs: **3.** FTE's: **.1**

PWE: 180 PWE: Fund Source Code 1: NF1 Funding: 3.
Fund Source Code 2: NF Funding:

Activity Type Code(s): MON %: 80 % |: MIT %: 20 % |: %: %

Out Year 3 FY: **92** Planned Costs: **3.** FTE's: **.1**

PWE: 180 PWE: Fund Source Code 1: NF1 Funding: 3.
Fund Source Code 2: NF Funding:

Activity Type Code(s): MON %: 80 % |: MIT %: 20 % |: %: %

Past Fiscal Year FY: **88** Funds Obligated: **3.** % Project Completed
% Personnel: 90 %
% Project Support: 10 %

Funds Obligated with University: University:

Accomplishments This Year: GENERAL MONITORING OF THE DISTRIBUTION OF NON-NATIVE PLANT SPECIES.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RMR** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-0004** Title: **MITIGATION AND MONITORING PLANT SPECIES**
Activity No.:**002**

Funding (Y/N)? : **N** Estimated Total Costs:**8.** Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): NO5 , NO8 , NO6 , ,
Cultural Resource Type Code(s) : CO6 , , , ,

Contact Name: ROBERT C. HERDER, SUPT. Phone: (303) 529-4465

Current Fiscal Year FY: **89** Planned Costs: **8.** FTE's: **.5**

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): MIT %: 60% |: MON %: 40% |: %: % |: %: %

Work Planned this FY: PHYSICAL CONTROL AND MONITORING OF SPECIES DISTRIBUTION WITHIHN THE PARK.

Out Year 1 FY: **90** Planned Costs: **8.** FTE's: **.5**

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): MIT %: 60 % |: MON %: 40 % |: %: %

Out Year 2 FY: **91** Planned Costs: **8.** FTE's: **.5**

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): MIT %: 60 % |: MON %: 40 % |: %: %

Out Year 3 FY: **92** Planned Costs: **8.** FTE's: **.5**

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): MIT %: 60 % |: MON %: 40 % |: %: %

Past Fiscal Year FY: **88** Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: NONE. NOT FUNDED.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0005 Title: Wildland Fire Suppression
Activity No.:001

Funding (Y/N)? : Y Estimated Total Costs:75.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): NO7 , NO2 , NO3 , NO6 ,
Cultural Resource Type Code(s) : C04 , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 75.0 FTE's: 3.5

PWE: 180 PWE: 342 Fund Source Code 1: NF01 Funding: 15.0
Fund Source Code 2: NF09 Funding: 59.0

Activity Type Code(s): MIT %: 10 % I: PRO %: 80 % I: ADM %: 10 % I: %:

Work Planned this FY: Continue the present wildland fire suppression and detection capabilities. Retain use of helicopter for initial atack and support of local and national fire suppression agreements.

Out Year 1 FY: 90 Planned Costs: 75.0 FTE's: 3.5

PWE: 180 PWE: 342 Fund Source Code 1: NF01 Funding: 15.0
Fund Source Code 2: NF09 Funding: 60.0

Activity Type Code(s): MIT %: 10 % I: PRO %: 80 % I: ADM %: 10 %

Out Year 2 FY: 91 Planned Costs: 75.0 FTE's: 3.5

PWE: 180 PWE: 342 Fund Source Code 1: NF01 Funding: 15.0
Fund Source Code 2: NF09 Funding: 60.0

Activity Type Code(s): MIT %: 10 % I: PRO %: 80 % I: ADM %: 10 %

Out Year 3 FY: 92 Planned Costs: 75.0 FTE's: 3.5

PWE: 180 PWE: 342 Fund Source Code 1: NF01 Funding: 15.0
Fund Source Code 2: NF09 Funding: 60.0

Activity Type Code(s): MIT %: 10 % I: PRO %: 80 % I: ADM %: 10 %

Past Fiscal Year FY: 88 Funds Obligated: 59.0 % Project Completed 99 %
% Personnel: 55 %
% Project Support: 45 %

Funds Obligated with University: University:

Accomplishments This Year: The park's wildland fire suppression forces responded to 97 fire calls; 6 false alarms; 12 wildland fires within Mesa Verde National Park; 35 wildland fires within cooperative initial attack zone; and 44 fire dispatches out of the area for support of other agency fires.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-0005** Title: **Fire History and Fuels Research**
Activity No.:**002**

Funding (Y/N)? : **N** Estimated Total Costs:**30.0** Start Date:**05/01/89**
End Date: / /

Servicewide Issue Category Code(s): **N07 , N02 , N03 , N06 ,**
Cultural Resource Type Code(s) : **C02 , , , ,**

Contact Name: **Robert C. Heyder** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **12.0** FTE's:

PWE: PWE: **342** Fund Source Code 1: **NF09** Funding: **12.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 95 % I: ADM %: 05 % I: %: % I: %:**

Work Planned this FY: **Provide the initial fuels inventory and survey. Establish criteria for a fire history study. Place vegetation community types on a map and digitize into GIS**

Out Year 1 FY: **90** Planned Costs: **12.0** FTE's:

PWE: PWE: **342** Fund Source Code 1: **NF09** Funding: **12.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 95 % I: ADM %: 05 % I: %: %**

Out Year 2 FY: **91** Planned Costs: **6** FTE's:

PWE: PWE: **342** Fund Source Code 1: **NF09** Funding: **12.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 95 % I: ADM %: 05 % I: %: %**

Out Year 3 FY: **92** Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year:

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0005 Title: Hazardous Fuels Reduction
Activity No.:003

Funding (Y/N)? : N Estimated Total Costs:30.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N07 , , , ,
Cultural Resource Type Code(s) : C08 , C13 , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 30.0 FTE's: 1.8

PWE: 002 PWE: 342 Fund Source Code 1: NF09 Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): MIT %: 90 % I: MON %: 05% I: ADM %: 05% I: %:

Work Planned this FY: Continue with hazardous fuels removal from the maintenance area complex, housing area, and the historical headquarters district.

Out Year 1 FY: 90 Planned Costs: 30.0 FTE's: 1.8

PWE: 002 PWE: 342 Fund Source Code 1: NF09 Funding: 30.0
Fund Source Code 2: Funding:

Activity Type Code(s): MIT %: 90 % I: MON %: 05 % I: ADM %: 05 %

Out Year 2 FY: 91 Planned Costs: 30.0 FTE's: 1.8

PWE: 002 PWE: 342 Fund Source Code 1: NF09 Funding: 30.0
Fund Source Code 2: Funding:

Activity Type Code(s): MIT %: 90 % I: MON %: 05 % I: ADM %: 05 %

Out Year 3 FY: 92 Planned Costs: 30.0 FTE's: 1.8

PWE: PWE: Fund Source Code 1: NF09 Funding: 30.0
Fund Source Code 2: Funding:

Activity Type Code(s): MIT %: 80 % I: MON %: 15 % I: ADM %: 05 %

Past Fiscal Year FY: 88 Funds Obligated: 14.0 % Project Completed 5 %
% Personnel: 90 %
% Project Support: 10 %

Funds Obligated with University: University:

Accomplishments This Year: Completed the hazardous fuels reduction around one developed aea. 20 acres were treated and over 450 trees removed with 36 cords of wood hauled for disposal.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RMR** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-0006** Title: **AFFECTS OF GEOLOGY ON WATER SITES**
Activity No.:**001**

Funding (Y/N)? : **N** Estimated Total Costs:**6.0** Start Date:**01/01/89**
End Date:**12/31/91**

Servicewide Issue Category Code(s): **N12** , **N20** , **N23** , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: **ROBERT C. HEYDER, SUPT.** Phone: (303) 529-4465

Current Fiscal Year FY: **89** Planned Costs: **2.0** FTE's:

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): RES %: 90% |: ADM %: 10% |: %: % |: %: %

Work Planned this FY: CONTINUE LOCATIONS OF FAULT BRECCIA; RECORD PLANT AND WATER SITE ASSOCIATES. DETERMINE THROUGH SPECTRA MICROSCOPIC WORK THE GEOLOGICAL HISTORY OF THE BRECCIA. DO SIMILAR STUDYOF IGNEOUS OUTCROPS.

Out Year 1 FY: **90** Planned Costs: **2.0** FTE's:

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): RES %: 90 % |: ADM %: 10 % |: %: %

Out Year 2 FY: **91** Planned Costs: **2.0** FTE's:

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): RES %: 90 % |: ADM %: 10 % |: %: %

Out Year 3 FY: **92** Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): %: % |: %: % |: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year:

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RMR** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-0006** Title: **INVENTORY FLORA/FAUNA OF ALL WATER SITES**
Activity No.:**002**

Funding (Y/N)? : N Estimated Total Costs:16. Start Date:01/01/90
End Date:12/31/93

Servicewide Issue Category Code(s): N23 , N20 , N02 , N12 ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: ROBERT C. HEYDER, SUPT. Phone: (303) 529-4465

Current Fiscal Year FY: **89** Planned Costs: **1.** FTE's: **.1**

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): ADM %: 90% |: RES %: 10% |: %: % |: %: %

Work Planned this FY: PLAN RESEARCH FOR INVENTORY OF BIOLOGICAL COMPONENT. ARRANGE FOR CONTRACT WORK.

Out Year 1 FY: **91** Planned Costs: **4.** FTE's:

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): RES %: 90% |: ADM %: 10 % |: %: %

Out Year 2 FY: **92** Planned Costs: **4.** FTE's:

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): RES %: 80 % |: MON %: 20 % |: %: %

Out Year 3 FY: **93** Planned Costs: **4.** FTE's:

PWE: PWE: Fund Source Code 1: NF Funding:
Fund Source Code 2: NF Funding:

Activity Type Code(s): RES %: 80 % |: MON %: 20 % |: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year:

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-007 Title: Air Quality - Acid Rain Station Operation
Activity No.:001

Funding (Y/N)? : Y Estimated Total Costs:7.5 pa Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N11 , N14 , N17 , C06 ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 7.5 FTE's: 0.1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 7.5
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: % I: %:

Work Planned this FY: Continue the weekly collection of acid rain samples and field analysis of precipitation.

Out Year 1 FY: 90 Planned Costs: 7.5 FTE's: 0.1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 7.5
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: %

Out Year 2 FY: 91 Planned Costs: 7.5 FTE's: 0.1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 7.5
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: %

Out Year 3 FY: 92 Planned Costs: 7.5 FTE's: 0.1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 7.5
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: 7.5 % Project Completed 98 %
% Personnel: 45 %
% Project Support: 55 %

Funds Obligated with University: University:

Accomplishments This Year: Weekly acid rain sample was collected and field analysis done. Sample forwarded to CAL for lab analysis. Recorded acid rain information made available to park staff and published in Natural Resource Newsletter.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-007 Title: Air Quality - Visual Range Automatic Camera
Activity No.:002

Funding (Y/N)? : Y Estimated Total Costs:2.5 pa Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N14 , N16 , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 2.5 FTE's: <.1

PWE: 180 PWE: Fund Source Code 1: NF07 Funding: 2.5
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: % I: %:

Work Planned this FY: Continue the operation of the automatic camera.

Out Year 1 FY: 90 Planned Costs: 2.5 FTE's: <.1

PWE: 180 PWE: Fund Source Code 1: NF07 Funding: 2.5
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: %

Out Year 2 FY: 91 Planned Costs: 2.5 FTE's: <.1

PWE: 180 PWE: Fund Source Code 1: NF07 Funding: 2.5
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: %

Out Year 3 FY: 92 Planned Costs: 2.5 FTE's: <.1

PWE: 180 PWE: Fund Source Code 1: NF07 Funding: 2.5
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: 2.5 % Project Completed 99 %
% Personnel: 85 %
% Project Support: 15 %

Funds Obligated with University: University:

Accomplishments This Year: Operation and service of the automatic camera was provide by Park staff. A video tape was produced for viewing by the Park visitor.

Publications/Reports: Video tape on Air Quality

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-007** Title: **Air Quality - Fine Particulate Sampler**
Activity No.:**003**

Funding (Y/N)? : **Y** Estimated Total Costs:**1.5 pa** Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): **N14 , N11 , N17 , ,**
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder, Supt.** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **1.5** FTE's: **<.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **1.5**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 90 % I: ADM %: 10 % I: %: % I: %:**

Work Planned this FY: **Maintain and service the Improve Fine Particulate Sampler**

Out Year 1 FY: **90** Planned Costs: **1.5** FTE's: **<.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **1.5**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 90 % I: ADM %: 10 % I: %: %**

Out Year 2 FY: **91** Planned Costs: **1.5** FTE's: **<.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **1.5**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 90 % I: ADM %: 10 % I: %: %**

Out Year 3 FY: **92** Planned Costs: **1.5** FTE's: **<.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **1.5**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 90 % I: ADM %: 10 % I: %: %**

Past Fiscal Year FY: **88** Funds Obligated: **1.5** % Project Completed **99 %**
% Personnel: **85 %**
% Project Support: **15 %**

Funds Obligated with University: University:

Accomplishments This Year: **Maintained and serviced the Improve Fine Particulate Sampler.**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-007** Title: **Air Quality Wet and Dry deposition**
Activity No.:**004**

Funding (Y/N)? : **N** Estimated Total Costs:**2.5 pa** Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): **N14 , N11 , N17 , C06 ,**
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder, Supt.** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **1.0** FTE's: **<.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **1.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **ADM %: 100% I: %: % I: %: % I: %:**

Work Planned this FY: **Plan installation of wet/dry deposition monitoring equipment.**

Out Year 1 FY: **90** Planned Costs: **2.5** FTE's: **<.1**

PWE: **180** PWE: Fund Source Code 1: **NF07** Funding: **2.5**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 90 % I: ADM %: 10 % I: %: %**

Out Year 2 FY: **91** Planned Costs: **2.5** FTE's: **<.1**

PWE: **180** PWE: Fund Source Code 1: **NF07** Funding: **2.5**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 90 % I: ADM %: 10 % I: %: %**

Out Year 3 FY: **92** Planned Costs: **2.5** FTE's: **<.1**

PWE: **180** PWE: Fund Source Code 1: **NF07** Funding: **2.5**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 90 % I: ADM %: 10 % I: %: %**

Past Fiscal Year FY: **88** Funds Obligated: **1.0** % Project Completed **1%**
% Personnel: **95 %**
% Project Support: **5 %**

Funds Obligated with University: University:

Accomplishments This Year: **Administratively located an acceptable site for the wet/dry monitor system.**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-007** Title: **Air Quality - Aquatic Fauna Study**
Activity No.:**005**

Funding (Y/N)? : **N** Estimated Total Costs:**16.0** Start Date:**01/01/90**
End Date:**12/30/92**

Servicewide Issue Category Code(s): **N14 , N11 , N17 , ,**
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder, Supt.** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **1.0** FTE's: **<.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **1.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **ADM %: 95 % I: MON %: 05 % I: %: % I: %:**

Work Planned this FY: **Establish standards and guidelines for the proposed aquatic faunal study. Forward research proposal to CPSU.**

Out Year 1 FY: **90** Planned Costs: **5.0** FTE's:

PWE: **180** PWE: Fund Source Code 1: **NF03** Funding: **5.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 95 % I: ADM %: 5 % I: %: %**

Out Year 2 FY: **91** Planned Costs: **5.0** FTE's:

PWE: **180** PWE: Fund Source Code 1: **NF03** Funding: **5.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 95 % I: ADM %: 5 % I: %: %**

Out Year 3 FY: **92** Planned Costs: **5.0** FTE's:

PWE: **180** PWE: Fund Source Code 1: **NF03** Funding: **5.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 95 % I: ADM %: 5 % I: %: %**

Past Fiscal Year FY: **88** Funds Obligated: **1.0** % Project Completed **2 %**
% Personnel: **90 %**
% Project Support: **10 %**

Funds Obligated with University: University:

Accomplishments This Year: **Met with the Air Quality division and researcher personnel concerning aquatic study. Recorded two new locations of fresh water crustaseans.**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-007** Title: **Air Quality - Cryptgramic Soils & Lichens**
Activity No.:**006**

Funding (Y/N)? : **N** Estimated Total Costs:**27.0** Start Date:**01/01/89**
End Date:**12/31/92**

Servicewide Issue Category Code(s): **N14 , N11 , N17 , C06 ,**
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **8.0** FTE's: **0.1**

PWE: **180** PWE: Fund Source Code 1: **NF07** Funding: **5.0**
Fund Source Code 2: **NF01** Funding: **3.0**

Activity Type Code(s): **RES %: 60 % I: MON %: 20 % I: ADM %: 20 % I:** %:

Work Planned this FY: **Plan for crytogramic soils and lichen research. Have samples tested in fumigation chambers to determine the affects of various pollutants. Establish permanent photo points and measurement points.**

Out Year 1 FY: **90** Planned Costs: **8.0** FTE's: **0.1**

PWE: **180** PWE: Fund Source Code 1: **NF07** Funding: **5.0**
Fund Source Code 2: **NF01** Funding: **3.0**

Activity Type Code(s): **RES %: 60 % I: MON %: 20 % I: ADM %: 20 %**

Out Year 2 FY: **91** Planned Costs: **8.0** FTE's: **0.1**

PWE: **180** PWE: Fund Source Code 1: **NF07** Funding: **5.0**
Fund Source Code 2: **NF01** Funding: **3.0**

Activity Type Code(s): **RES %: 60 % I: MON %: 20 % I: ADM %: 20 %**

Out Year 3 FY: **92** Planned Costs: **3.0** FTE's: **0.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **3.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 20 % I: MON %: 60 % I: ADM %: 20 %**

Past Fiscal Year FY: **88** Funds Obligated: % Project Completed **1%**
% Personnel: **%**
% Project Support: **%**

Funds Obligated with University: University:

Accomplishments This Year: **Met with the Air Quality Division and researcher to review proposals**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0008 Title: SMALL MAMMAL RESEARCH
Activity No.:001

Funding (Y/N)? : N Estimated Total Costs:17.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , N17 , N02 , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: ROBERT C. HEYDER Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 3.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF06 Funding: 2.0
Fund Source Code 2: NF01 Funding: 1.0

Activity Type Code(s): ADM %: 95 % I: MON %: 5 % I: %: % I: %:

Work Planned this FY: PLAN SMALL MAMMAL SURVEY PROGRAM. PLAN FOR PURCHASE OF 100 TRAPS OF MOUSE AND PACK RAT CAPACITY DURING FY-90.

Out Year 1 FY: 90 Planned Costs: 8.0 FTE's: .3

PWE: 180 PWE: Fund Source Code 1: NF06 Funding: 2.0
Fund Source Code 2: NF01 Funding: 1.0

Activity Type Code(s): MON %: 85 % I: ADM %: 15 % I: %: %

Out Year 2 FY: 91 Planned Costs: 8.0 FTE's: .3

PWE: 180 PWE: Fund Source Code 1: NF06 Funding: 2.0
Fund Source Code 2: NF01 Funding: 1.0

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: 2.0 % Project Completed 20 %
% Personnel: 90 %
% Project Support: 10 %

Funds Obligated with University: University:

Accomplishments This Year: LIMITED SPECIES IDENTIFICATION. CONTINUED HABITAT ANALYSIS - PLANT PRODUCTION PLOTS AND SPECIES LIST.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0008 Title: INSET SURVEY
Activity No.:002

Funding (Y/N)? : N Estimated Total Costs:4.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , N17 , N02 , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: ROBERT C. HEYDER Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 10.0 FTE's: .3

PWE: PWE: Fund Source Code 1: NF03 Funding: 5.0
Fund Source Code 2: NF05 Funding: 5.0

Activity Type Code(s): ADM %: 30 % I: RES %: 70 % I: %: % I: %:

Work Planned this FY: COLLECT AND IDENTIFY SPECIMENS - ENTER INTO PARK COLLECTION. RECORD ECOLOGICAL RELATIONSHIPS AS NOTED IN FIELD.

Out Year 1 FY: 90 Planned Costs: 10.0 FTE's: .2

PWE: PWE: Fund Source Code 1: NF03 Funding: 5.0
Fund Source Code 2: NF05 Funding: 5.0

Activity Type Code(s): ADM %: 30 % I: RES %: 70 % I: %: %

Out Year 2 FY: 91 Planned Costs: 10.0 FTE's: .2

PWE: PWE: Fund Source Code 1: NF03 Funding: 5.0
Fund Source Code 2: NF05 Funding: 5.0

Activity Type Code(s): ADM %: 20 % I: RES %: 80 % I: %: %

Out Year 3 FY: 92 Planned Costs: 10.0 FTE's: .2

PWE: PWE: Fund Source Code 1: NF03 Funding: 5.0
Fund Source Code 2: NF05 Funding: 5.0

Activity Type Code(s): ADM %: 20 % I: RES %: 80 % I: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed 0 %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: NONE.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0008 Title: Survey of non-vascular plants
Activity No.:003

Funding (Y/N)? : N Estimated Total Costs:4.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , N17 , N02 , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: % I: %:

Work Planned this FY: Assist Dr. Lindsey in current study of park fungi. Discuss with Dr. Jamison regarding study of bryophytes and alga.

Out Year 1 FY: 90 Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 2 FY: 91 Planned Costs: 2.0 FTE's:

PWE: PWE: Fund Source Code 1: NF03 Funding: 1.0
Fund Source Code 2: NF05 Funding: 1.0

Activity Type Code(s): RES %: 80 % I: ADM %: 20 % I: %: %

Out Year 3 FY: 92 Planned Costs: 2.0 FTE's:

PWE: PWE: Fund Source Code 1: NF03 Funding: 1.0
Fund Source Code 2: NF05 Funding: 1.0

Activity Type Code(s): RES %: 80 % I: ADM %: 20 % I: %: %

Past Fiscal Year FY: Funds Obligated: 0 % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: Specimens of fungi examined by Dr. Page Lindsey, Fort Lewis College, VIP in third year of mycology study. Specimens of bryophytes examined by Dr. Jamison of Fort Lewis College.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0008 Title: Deer and Elk Study
Activity No.:004

Funding (Y/N)? : N Estimated Total Costs:2.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , N02 , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: Planned Costs: 2.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 100% I: %: % I: %: % I: %:

Work Planned this FY: Continue limited monitoring; continue vegetation analysis; continue recording effects of predators and road kills.

Out Year 1 FY: Planned Costs: 2.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 100% I: %: % I: %: %

Out Year 2 FY: Planned Costs: 2.0 FTE's: .1

PWE: PWE: Fund Source Code 1: NF05 Funding: 1.0
Fund Source Code 2: NF03 Funding: 1.0

Activity Type Code(s): ADM %: 20 % I: MON %: 10 % I: RES %: 70 %

Out Year 3 FY: Planned Costs: 2.0 FTE's: .1

PWE: PWE: Fund Source Code 1: NF05 Funding: 1.0
Fund Source Code 2: NF03 Funding: 1.0

Activity Type Code(s): ADM %: 20 % I: MON %: 10 % I: RES %: 70 %

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: Limited population and destribution records maintained. Relationships to predators and water sites noted.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0008 Title: Determine Populations of Amphibians
Activity No.:018

Funding (Y/N)? : N Estimated Total Costs:17.0 Start Date:01/01/89
End Date: / /

Servicewide Issue Category Code(s): N02 , N17 , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 4.0 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: % I: %:

Work Planned this FY: Survey all sites where amphibians have been recorded. Tests for toxicity on water where frogs were previously recorded but are presently absent. Plan for test on adult and larval stages for bacterial or fungal disease.

Out Year 1 FY: 90 Planned Costs: 5.0 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 2 FY: 91 Planned Costs: 5.0 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 3 FY: 92 Planned Costs: 3.0 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: 2.0 % Project Completed 15 %
% Personnel: 90 %
% Project Support: 10 %

Funds Obligated with University: University:

Accomplishments This Year: Wildlife sightings of Rocky Mountain toad are located in one new site (Middle Navajo Canyon) water site 20. Search for leopard frogs in Mancos River and sewer lagoons was made - none found.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0008 Title: Invertebrae survey (other than insects)
Activity No.:007

Funding (Y/N)? : N Estimated Total Costs:2.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , N17 , N02 , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: FTE's:

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 1.0
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 100% I: %: % I: %: % I: %:

Work Planned this FY: Plan for survey and collection program.

Out Year 1 FY: 91 Planned Costs: 10.0 FTE's: .2

PWE: PWE: Fund Source Code 1: NF03 Funding:
Fund Source Code 2: NF05 Funding:

Activity Type Code(s): ADM %: 20 % I: RES %: 80 % I: %: %

Out Year 2 FY: 92 Planned Costs: 10.0 FTE's: .2

PWE: PWE: Fund Source Code 1: NF03 Funding:
Fund Source Code 2: NF05 Funding:

Activity Type Code(s): ADM %: 20 % I: RES %: 80 % I: %: %

Out Year 3 FY: Planned Costs: 2.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 100% I: %: % I: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed 0 %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: None.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0008 Title: Pack Rat Midden; dating & floral analysis
Activity No.:009

Funding (Y/N)? : N Estimated Total Costs:6.0 Start Date:01/01/89
End Date:12/31/91

Servicewide Issue Category Code(s): N20 , , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 3.0 FTE's: .2

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 15 % I: RES %: 85 % I: %: % I: %:

Work Planned this FY: Select and collect pack rat midden sample.

Out Year 1 FY: 90 Planned Costs: 1.5 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 15 % I: RES %: 85 % I: %: %

Out Year 2 FY: 91 Planned Costs: 1.5 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: None.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0008 Title: Study Bighorn Sheep Biology
Activity No.:010

Funding (Y/N)? : N Estimated Total Costs:10.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , N02 , N07 , N17 , N12
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: Planned Costs: 5.0 FTE's: .1

PWE: PWE: Fund Source Code 1: NF06 Funding: 3.0
Fund Source Code 2: NF12 Funding: 2.0

Activity Type Code(s): RES %: 80 % I: MON %: 10 % I: ADM %: 10 % I: %:

Work Planned this FY: Arrange for college intern project of habitat analysis, seasonal locations of existing sheep, examination for disease, recommendation for reintroduction and if so subspecies?

Out Year 1 FY: Planned Costs: 5.0 FTE's: .1

PWE: PWE: Fund Source Code 1: NF06 Funding: 3.0
Fund Source Code 2: NF12 Funding: 2.0

Activity Type Code(s): RES %: 80 % I: MON %: 10 % I: ADM %: 10 %

Out Year 2 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: The park herd of bighorn sheep numbered from 40-75 head from 1950 to 1960. In 1985 there were 14 head and only 4 head in 1988. They have always moved off of the park during the winter.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0008 Title: **Computer Data Input**
Activity No.:017

Funding (Y/N)? : N Estimated Total Costs:40.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , N02 , N03 , N17 , N12
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **10.0** FTE's: **.2**

PWE: PWE: Fund Source Code 1: NF04 Funding: 10.0
Fund Source Code 2: Funding:

Activity Type Code(s): **MIT %: 80 % I: ADM %: 20 % I: %: % I: %:**

Work Planned this FY: **Complete vegetation plot computer program. Write water site computer program. Begin entry of 30,000 wildlife sightings.**

Out Year 1 FY: **90** Planned Costs: **10** FTE's: **.2**

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **MIT %: 80 % I: ADM %: 20 % I: %: %**

Out Year 2 FY: **91** Planned Costs: **10.0** FTE's: **.2**

PWE: PWE: Fund Source Code 1: NF04 Funding: 10.0
Fund Source Code 2: Funding:

Activity Type Code(s): **MIT %: 80 % I: ADM %: 20 % I: %: %**

Out Year 3 FY: **92** Planned Costs: **10.0** FTE's: **.2**

PWE: PWE: Fund Source Code 1: **NF04** Funding: **10.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **MIT %: 80 % I: ADM %: 20 % I: %: %**

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year:

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-009** Title: **Geological Data Collection**
Activity No.:**001**

Funding (Y/N)? : **Y** Estimated Total Costs:**2.0 pa** Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): , , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder, Supt.** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **2.0** FTE's: **0.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **2.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 80 % I: ADM %: 20 % I:** %: % I: %:

Work Planned this FY: **Continue the field monitoring of the geology of Mesa Verde. Compile information for GIS availability and field check some of the geological data generated by the GIS.**

Out Year 1 FY: **90** Planned Costs: **2.0** FTE's: **0.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **2.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 80 % I: ADM %: 20 % I:** %: %

Out Year 2 FY: **91** Planned Costs: **2.0** FTE's: **0.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **2.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 80 % I: ADM %: 20 % I:** %: %

Out Year 3 FY: **92** Planned Costs: **2.0** FTE's: **0.1**

PWE: **180** PWE: Fund Source Code 1: **NF01** Funding: **2.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 80 % I: ADM %: 20 % I:** %: %

Past Fiscal Year FY: **88** Funds Obligated: **2.0** % Project Completed **20 %**
% Personnel: **85 %**
% Project Support: **15 %**

Funds Obligated with University: University:

Accomplishments This Year: **New geological features and structures were noted and reported. Visitor roadguide was completed to draft by the Mesa Verde Museum Assosiation and reviewed by the Natural Resource staff.**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-009** Title: **Special Geological Concerns**
Activity No.:**002**

Funding (Y/N)? : **N** Estimated Total Costs:**20.0** Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): **N23 , N20 , C02 , C03 , C13**
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder, Supt.** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **7.0** FTE's: **0.1**

PWE: PWE: Fund Source Code 1: NF05 Funding: 7.0
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 50 % I: MON %: 25 % I: ADM %: 25 % I: %:**

Work Planned this FY: **Contract a geological survey of the Park. Continue field work on soil analysis for baseline data.**

Out Year 1 FY: **90** Planned Costs: **7.0** FTE's: **0.1**

PWE: PWE: Fund Source Code 1: **NF05** Funding: **7.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 50 % I: MON %: 25 % I: ADM %: 25 %**

Out Year 2 FY: **91** Planned Costs: **6.0** FTE's: **<.1**

PWE: PWE: Fund Source Code 1: **NF05** Funding: **6.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 40 % I: MON %: 40 % I: ADM %: 20 %**

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Past Fiscal Year FY: **88** Funds Obligated: **1.5** % Project Completed **5 %**
% Personnel: **50 %**
% Project Support: **50 %**

Funds Obligated with University: University:

Accomplishments This Year: **Basic soils samples were taken as a stop gap in aquiring baseline data on soils. Geological field data recorded along with other natural resource information.**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0010 Title: Natural Resource Data Entry
Activity No.:001

Funding (Y/N)? : N Estimated Total Costs:64.0 Start Date:01/01/89
End Date:12/30/92

Servicewide Issue Category Code(s): N20 , C02 , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder, Supt. Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 16.0 FTE's: 1.0

PWE: 180 PWE: Fund Source Code 1: NF05 Funding: 16.0
Fund Source Code 2: Funding:

Activity Type Code(s): MIT %: 80 % I: ADM %: 20 % I: %: % I: %:

Work Planned this FY: Begin Natural Resource Data entry by contract or employee. Do baseline digitation of maps and related databases. Priority 1 digitization of themes; political, physical plant, vegetation, and topography.

Out Year 1 FY: 90 Planned Costs: 16.0 FTE's: 1.0

PWE: 180 PWE: Fund Source Code 1: NF05 Funding: 16.0
Fund Source Code 2: Funding:

Activity Type Code(s): MIT %: 80 % I: ADM %: 20 % I: %: %

Out Year 2 FY: 91 Planned Costs: 16.0 FTE's: 1.0

PWE: 180 PWE: Fund Source Code 1: NF05 Funding: 16.0
Fund Source Code 2: Funding:

Activity Type Code(s): MIT %: 80 % I: ADM %: 20 % I: %: %

Out Year 3 FY: 92 Planned Costs: 16.0 FTE's: 1.0

PWE: 180 PWE: Fund Source Code 1: NF05 Funding: 16.0
Fund Source Code 2: Funding:

Activity Type Code(s): MIT %: 80 % I: ADM %: 20 % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: 4.0 % Project Completed 1 %
% Personnel: .5 %
% Project Support: 3.5%

Funds Obligated with University: University:

Accomplishments This Year: We have been able to purchase a Dell System 200 with color capabilities that will be compatible with the GIS installation at the Research Lab. The computer program for wildlife sightings has been written but no personnel are available for data entry.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0010 Title: Purchase GIS Hardware
Activity No.:002

Funding (Y/N)? : N Estimated Total Costs:14.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , C02 , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 14.0 FTE's:

PWE: 180 PWE: Fund Source Code 1: NF05 Funding: 14.0
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 100% I: %: % I: %: % I: %:

Work Planned this FY: Purchase multi-color plotter, optical scanner and digitizing tablet for use with the Park's GIS - plotter 6.0; digitizing tablet 6.0; optical scanner 2.0.

Out Year 1 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 2 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: Purchased basic GIS computer hardware installed at Research and Cultural Resource Office.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N0010 Title: **Digitize Topographic Theme**
Activity No.:003

Funding (Y/N)? : **N** Estimated Total Costs:**20.0** Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , C02 , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **20.0** FTE's:

PWE: PWE: Fund Source Code 1: NF04 Funding: 20.0
Fund Source Code 2: Funding:

Activity Type Code(s): **ADM %: 100% I: %: % I: %: % I: %:**

Work Planned this FY: **Contract or have another agency digitize the topographic theme for Mesa Verde National Park.**

Out Year 1 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Out Year 2 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Past Fiscal Year FY: **88** Funds Obligated: **1.0** % Project Completed **1** %
% Personnel: **50 %**
% Project Support: **50 %**

Funds Obligated with University: University:

Accomplishments This Year: **Developed standards and action plan for GIS themes.**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-0010** Title: **Digitize Political & Physical Plant**
Activity No.:**004**

Funding (Y/N)? : **N** Estimated Total Costs: Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): **N20** , **C02** , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **10.0** FTE's:

PWE: PWE: Fund Source Code 1: **NF04** Funding: **10.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **ADM %: 100% I: %: % I: %: % I: %:**

Work Planned this FY: **Contract or other agency digitize the political and physical plant theme of Mesa Verde National Park.**

Out Year 1 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Out Year 2 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: **Developed standards and action plan for GIS themes.**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0010 Title: **Digitize Vegetative Map**
Activity No.:005

Funding (Y/N)? : N Estimated Total Costs:7.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , C02 , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder** Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 7.0 FTE's: .3

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 4.0
Fund Source Code 2: NF09 Funding: 3.0

Activity Type Code(s): ADM %: 50 % I: MON %: 50 % I: %: % I: %:

Work Planned this FY: **Digitize the FIREPRO Vegetative Map to the vegetative theme of the GIS. Ground truth and check the data entered.**

Out Year 1 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 2 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: **Updated plant survey and records. Established theme standards for use of the GIS.**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0010 Title: GIS Wildlife Program
Activity No.:006

Funding (Y/N)? : N Estimated Total Costs:5.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , C02 , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 90 Planned Costs: 5.0 FTE's:

PWE: PWE: Fund Source Code 1: NF04 Funding: 5.0
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 100% I: %: % I: %: % I: %:

Work Planned this FY: Develop a program to translate wildlife observation data for DBASE to GIS for data retrieval. Outside contractor or in-house computer person. Regional/Servicewide benefits.

Out Year 1 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 2 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: 89 Funds Obligated: 1.0 % Project Completed 1 %
% Personnel: 95 %
% Project Support: 5 %

Funds Obligated with University: University:

Accomplishments This Year: Established standards for wildlife database entry and started database entry of observation records.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N0010 Title: Geology and Soils Data for GIS
Activity No.:007

Funding (Y/N)? : N Estimated Total Costs:12.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N20 , C02 , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 90 Planned Costs: 12.0 FTE's:

PWE: PWE: Fund Source Code 1: NF05 Funding: 12.0
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 100% I: %: % I: %: % I: %:

Work Planned this FY: Aquire geology and soil data in digitized format for GIS.

Out Year 1 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 2 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: Established GIS theme standards.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N0010** Title: **Demographic Data for GIS**
Activity No.:**008**

Funding (Y/N)? : **N** Estimated Total Costs:**14.0** Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): **N20 , C02** , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder** Phone: **(303) 529-4465**

Current Fiscal Year FY: **90** Planned Costs: **10.0** FTE's:

PWE: PWE: Fund Source Code 1: NF03 Funding: 10.0
Fund Source Code 2: Funding:

Activity Type Code(s): **ADM %: 45 % I: MON %: 55 % I:** %: % I: %:

Work Planned this FY: **Enter demographic study information into Database for use by GIS. Translator program may be required. Establish data collection standards to continue data input.**

Out Year 1 FY: **91** Planned Costs: **2.0** FTE's: **.1**

PWE: PWE: Fund Source Code 1: **NF01** Funding: **2.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 80 % I: ADM %: 20 % I:** %: %

Out Year 2 FY: **92** Planned Costs: **2.0** FTE's: **.1**

PWE: PWE: Fund Source Code 1: **NF01** Funding: **2.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 80 % I: ADM %: 20 % I:** %: %

Out Year 3 FY: **93** Planned Costs: **2.0** FTE's: **.1**

PWE: PWE: Fund Source Code 1: **NF01** Funding: **2.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 80 % I: ADM %: 20 % I:** %: %

Past Fiscal Year FY: **89** Funds Obligated: **2.0** % Project Completed **1** %
% Personnel: **80 %**
% Project Support: **20 %**

Funds Obligated with University: University:

Accomplishments This Year: **Established standards for GIS themes and action plans.**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-011** Title: **Forest Pathology Survey - FIDM-USDA**
Activity No.:**001**

Funding (Y/N)? : **N** Estimated Total Costs:**10.0** Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): **N07 , N20 , , ,**
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder, Supt.** Phone: **(303) 529-4465**

Current Fiscal Year FY: **90** Planned Costs: **10.0** FTE's:

PWE: PWE: Fund Source Code 1: **NF11** Funding: **10.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **MON %: 95 % I: ADM %: 5 % I: %: % I: %:**

Work Planned this FY: **Do a complete forest pathology survey of Mesa Verde National Park. Include aerial photography, on site observations and lab analysis.**

Out Year 1 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Out Year 2 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): **%: % I: %: % I: %: %**

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year:

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: **RM** Region Priority: Park: **MEVE** Park Priority:

RMP Project No.:**N-011** Title: **Black Stain Root Rot Research**
Activity No.:**002**

Funding (Y/N)? : **Y** Estimated Total Costs:**1.0** Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): **N03 , N05 , N06 , N14 ,**
Cultural Resource Type Code(s) : , , , ,

Contact Name: **Robert C. Heyder, Supt.** Phone: **(303) 529-4465**

Current Fiscal Year FY: **89** Planned Costs: **1.0** FTE's:

PWE: PWE: Fund Source Code 1: NF12 Funding: 1.0
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 80 % I: MON %: 20 % I: %: % I: %:**

Work Planned this FY: **Have Dr. R. Wagner continue his research on Black Stain Root Rot as a VIP.**

Out Year 1 FY: **90** Planned Costs: **1.0** FTE's:

PWE: PWE: Fund Source Code 1: NF12 Funding: 1.0
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 80 % I: MON %: 20 % I: %: %**

Out Year 2 FY: **91** Planned Costs: **1.0** FTE's:

PWE: PWE: Fund Source Code 1: **NF12** Funding: **1.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 80 % I: MON %: 20 % I: %: %**

Out Year 3 FY: **92** Planned Costs: **1.0** FTE's:

PWE: PWE: Fund Source Code 1: **NF12** Funding: **1.0**
Fund Source Code 2: Funding:

Activity Type Code(s): **RES %: 80 % I: MON %: 20 % I: %: %**

Past Fiscal Year FY: **88** Funds Obligated: **1.0** % Project Completed **80 %**
% Personnel: **10%**
% Project Support: **90%**

Funds Obligated with University: University:

Accomplishments This Year: **Dr. R. Wagner continued the research project as a VIP and was in the Park for 2 weeks.**

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0012 Title: NATURAL RESOURCE REFERENCE COLLECTION
Activity No.:001

Funding (Y/N)? : N Estimated Total Costs:44. Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N23 , N20 , N17 , C02 , C07
Cultural Resource Type Code(s) : , , , ,

Contact Name: ROBERT C. HEYDER, SUPT. Phone: (303) 529-4465

Current Fiscal Year FY: Planned Costs: 20. FTE's: 1.0

PWE: PWE: Fund Source Code 1: NF05 Funding:
Fund Source Code 2: CF02 Funding:

Activity Type Code(s): MIT %: 70% I: ADM %: 30 % I: PRO %: 15% I: %:

Work Planned this FY: PURCHASE NEEDED STORAGE FACILITIES. MUSEUM TECHNICIAN WILL CATALOGUE AND PREPARE SPECIMENS FROM MOST RECENT COLLECTIONS ON HAND, THEN WORK WILL BEGIN ON OLD COLLECTIONS. COPIES OF CATALOGUE CARDS WILL BE FILED AT RESEARCH CENTER AND NATURAL RESOURCE OFF.

Out Year 1 FY: Planned Costs: 20. FTE's: 1.0

PWE: PWE: Fund Source Code 1: NF05 Funding:
Fund Source Code 2: CF02 Funding:

Activity Type Code(s): MIT %: 70% I: ADM %: 15% I: PRO %: 15%

Out Year 2 FY: Planned Costs: 2. FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding:
Fund Source Code 2: CF02 Funding:

Activity Type Code(s): MIT %: 80% I: ADM %: 10% I: PRO %: 10%

Out Year 3 FY: Planned Costs: 2. FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding:
Fund Source Code 2: CF02 Funding:

Activity Type Code(s): MIT %: 80% I: ADM %: 10% I: PRO %: 10%

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year:

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0013 Title: Monitoring Peregrine Success Rate
Activity No.:001

Funding (Y/N)? : Y Estimated Total Costs:8.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N02 , N17 , , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 2.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 60 % |: PRO %: 30 % |: ADM %: 10 % |: %:

Work Planned this FY: Continue to monitor Lone Cone eyrie from arrival through departure. Provide protection of eyrie area. Examine the possible eyrie sites along north rim, in Navajo Canyon and Rock Canyon.

Out Year 1 FY: 90 Planned Costs: 2.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 60 % |: PRO %: 30 % |: ADM %: 10 %

Out Year 2 FY: 91 Planned Costs: 2.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 60 % |: PRO %: 30 % |: ADM %: 10 %

Out Year 3 FY: 92 Planned Costs: 2.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 60 % |: PRO %: 30 % |: ADM %: 10 %

Past Fiscal Year FY: 88 Funds Obligated: 2.0 % Project Completed 100%
% Personnel: 85 %
% Project Support: 15 %

Funds Obligated with University: University:

Accomplishments This Year: Lone Cone eyrie was monitored from late March through September (from arrival time through nesting and fledging until departure); VIP help was enlisted to help protect vulnerable eyrie from intruders. Success rate was three female fledglings which were banded by Peregrine Fund Staff.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0014 Title: Native Species Revegetation
Activity No.:001

Funding (Y/N)? : Y Estimated Total Costs:16.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N23 , N04 , N05 , N06 ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 4.0 FTE's: .2

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 30 % I: MIT %: 70 % I: %: % I: %:

Work Planned this FY: Continue seed collection. Provide seeds for mesa top sites revegetation. Stratify shrub seeds for germination in commercial greenhouse. Experiment with woody clipping for propogation. Plan for park greenhouse/deer and rodent proof yard/storage building.

Out Year 1 FY: 90 Planned Costs: 4.0 FTE's: .2

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 30 % I: MIT %: 70 % I: %: %

Out Year 2 FY: 91 Planned Costs: 4.0 FTE's: .2

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 20 % I: MIT %: 80 % I: %: %

Out Year 3 FY: 92 Planned Costs: 4.0 FTE's: .2

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 20 % I: MIT %: 80 % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: 3.0 % Project Completed 50 %
% Personnel: 75 %
% Project Support: 25 %

Funds Obligated with University: University:

Accomplishments This Year: Experimented propogation of new growth clippings and forbe fhizomes of two native shrub species; collected seeds of five native shrub species, one grass, and twelve forbes. Seeds planted in disturbed areas around Ruin 16 on Chapin Mesa, barriers installed. Wrote 5-year Revegetation Plan for park to be sent to DSC.
Publications/Reports: Five-year Revegetation Plan for Mesa Verde N.P.

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0015 Title: Study Amphibian Population Dynamics
Activity No.:001

Funding (Y/N)? : N Estimated Total Costs:8.0 Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N02 , N20 , N12 , ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: Robert C. Heyder, Supt. Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 2.0 FTE's: 0.1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: % I: %:

Work Planned this FY: Continue the monitoring of water sites for larval and adult amphibians.

Out Year 1 FY: 90 Planned Costs: 2.0 FTE's: 0.1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: %

Out Year 2 FY: 91 Planned Costs: 2.0 FTE's: 0.1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: %

Out Year 3 FY: 92 Planned Costs: 2.0 FTE's: 0.1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding: 2.0
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 90 % I: ADM %: 10 % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: 2.0 % Project Completed 20 %
% Personnel: 90 %
% Project Support: 10 %

Funds Obligated with University: University:

Accomplishments This Year: Found Rocky Mountian toads in two new locations in the Park. Leapard frogs not found in survey of the areas around water sites.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0015 Title: DETERMINE REASON FOR AMPHIBIAN DECLINE
Activity No.:002

Funding (Y/N)? : N Estimated Total Costs:16. Start Date: / /
End Date: / /

Servicewide Issue Category Code(s): N02 , N12 , N14 , N20 ,
Cultural Resource Type Code(s) : , , , ,

Contact Name: ROBERT C. HEYDER, SUPT. Phone: (303) 529-4465

Current Fiscal Year FY: Planned Costs: 6. FTE's: .1

PWE: PWE: Fund Source Code 1: NF06 Funding:
Fund Source Code 2: NF08 Funding:

Activity Type Code(s): RES %: 70% I: ADM %: 20% I: MON %: 10% I: %:

Work Planned this FY:

Out Year 1 FY: Planned Costs: 6. FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF06 Funding:
Fund Source Code 2: NF08 Funding:

Activity Type Code(s): MON %: 90% I: ADM %: 10% I: %: %

Out Year 2 FY: Planned Costs: 2. FTE's:

PWE: 180 PWE: Fund Source Code 1: NF06 Funding: 1
Fund Source Code 2: NF08 Funding: 1

Activity Type Code(s): MON %: 90 % I: ADM %: 10% I: %: %

Out Year 3 FY: Planned Costs: 2. FTE's:

PWE: 180 PWE: Fund Source Code 1: NF06 Funding: 1
Fund Source Code 2: NF01 Funding: 1

Activity Type Code(s): MON %: 90% I: ADM %: 10% I: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year:

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0016 Title: Survey bats, shrews and small rodents
Activity No.:001

Funding (Y/N)? : N Estimated Total Costs:20.0 Start Date:01/01/89
End Date:12/31/91

Servicewide Issue Category Code(s): N02 , N17 , , ,
Cultural Resource Type Code(s) : C06 , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 6.0 FTE's: .2

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): RES %: 80 % I: ADM %: 20 % I: %: % I: %:

Work Planned this FY: Establish live trap lines for shrews and small rodents in six major habitat types. Identify species and numbers.

Out Year 1 FY: 90 Planned Costs: 6.0 FTE's: .2

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): RES %: 80 % I: ADM %: 20 % I: %: %

Out Year 2 FY: 91 Planned Costs: 4.0 FTE's: .2

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): RES %: 80 % I: ADM %: 20 % I: %: %

Out Year 3 FY: Planned Costs: FTE's:

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: 88 Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: Minimal wildlife sightings based on road kill and non-specific sightings.

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0017 Title: Determination of spotted owl populations
Activity No.:001

Funding (Y/N)? : Y Estimated Total Costs:8.0 Start Date:01/01/89
End Date: / /

Servicewide Issue Category Code(s): N02 , N17 , , ,
Cultural Resource Type Code(s) : C06 , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 2.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): MON %: 80 % I: PRO %: 20 % I: %: % I: %:

Work Planned this FY: Continue recording spotted owl sightings, maintain file on each nest site. Use owl calling in early spring and fall in all deep canyons, along the north escarpment and in the Mancos Canyon.

Out Year 1 FY: 90 Planned Costs: 2.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 2 FY: 91 Planned Costs: 2.0 FTE's: .1

PWE: 180 PWE: Fund Source Code 1: NF01 Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 3 FY: 92 Planned Costs: 2.0 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: Owl calling methods located two spotted owls during breeding season on Wetherill Mesa and one spotted owl at Cliff Palace during fledging period. (1987 - two fledged spotted owls in Mesa Verde were the first breeding record of this species in Colorado.)

Publications/Reports:

Annual Project Status and Accomplishments Report

Region: RM Region Priority: Park: MEVE Park Priority:

RMP Project No.:N-0018 Title: Introduction of wild turkeys
Activity No.:001

Funding (Y/N)? : N Estimated Total Costs:6.0 Start Date:01/01/89
End Date: / /

Servicewide Issue Category Code(s): N02 , N17 , , ,
Cultural Resource Type Code(s) : C013 , , , ,

Contact Name: Robert C. Heyder Phone: (303) 529-4465

Current Fiscal Year FY: 89 Planned Costs: 3.0 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): ADM %: 10 % I: MON %: 30 % I: MIT %: 50 % I: PRO %:

Work Planned this FY: Coordinate with Colorado Division of Wildlife for trapping of 50-75 local wild turkeys to be released in five park locations. Radio tag 2-4 individuals of each flock. Record movement, fatalities, nesting success, etc.

Out Year 1 FY: 90 Planned Costs: 1.0 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 2 FY: 91 Planned Costs: 1.0 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Out Year 3 FY: 92 Planned Costs: 1.0 FTE's: .1

PWE: PWE: Fund Source Code 1: Funding:
Fund Source Code 2: Funding:

Activity Type Code(s): %: % I: %: % I: %: %

Past Fiscal Year FY: Funds Obligated: % Project Completed %
% Personnel: %
% Project Support: %

Funds Obligated with University: University:

Accomplishments This Year: Proposed turkey re-establishment; contacted CDW regarding availability of stocking birds; contacted CSU regarding habitat evaluation.

Publications/Reports:

IV. CULTURAL RESOURCES MANAGEMENT PROGRAM

A. Overview of Current Program and Needs

Current cultural resource activities are focused on the most pressing and immediate needs. These are preservation of the prehistoric archeological ruins, preservation of the museum collections, and preservation of the historic buildings, in that order. The first two concerns are mandated in the enabling legislation creating the park, and the third (as well as the first two) is mandated in the provisions of the National Historic Preservation Act of 1966. Given the present permanent staff, only the most pressing activities can be performed in any of these categories, and base funding for cultural resource management has been barely sufficient to cover salaries of the staff. An effective program of preservation, protection, and upgrading of storage facilities has been possible since 1982 only because of supplementary funding for ruins stabilization, cataloging of the museum collections, and for repointing and repair of the historic buildings. This has permitted the hiring of additional seasonal staff and the purchase of needed equipment and supplies, and the completion of several needed projects. Prior to 1982, activities were possible only on a very limited basis: little more than annual maintenance of the ruins open to the public was possible in the area of stabilization, virtually nothing was done toward dealing with the immense problems of storage and cataloging of the collections, and very little was done to maintain the historic buildings. The active program of the years since 1982, sharply contrasting with the one previous, represents a program approximating what is needed by the park for the effective management of its resources.

Planning has had to be on a year to year basis, dependent always on the uncertainties of funding, so that a long range program has not been possible. Nevertheless, the contrast between the present management program and that which preceded it, is a dramatic one. The present fiscal year has seen a dramatic reduction in supplemental funding, and with a base operating budget still barely sufficient (in the absence of supplemental funding) to cover salary costs of personnel. Thus, the program has had to be cut back, a reduced program of stabilization is planned, a reduced program of cataloging of the backlog is anticipated, and there is no program at all for preservation maintenance of the historic buildings.

Despite annual assurances that it is pointless to request additional staff, the major problem remains the inadequacy of the present staff to deal with the immense needs of the three major categories of management mentioned above. The permanent (subject-to-furlough) ruins stabilization staff has, in fact, shrunk 50 percent in the past three years, the reduction being compensated for by seasonal help. What is needed is at least a

50 percent increase in this permanent staff. Ruins stabilization is a specialized skill practiced by very few people, and the only effective way to ensure quality is to retain a permanent well-trained staff. There are virtually no contractors of quality in this specialized field. Skilled museum technicians are more likely to be found, but few can afford to work seasonally, and there are no museum technicians on the permanent staff. Clearly, then, the major need for establishment of a permanent effective program is an increase in staffing; without this progress will remain on a year to year basis, wholly dependent upon unpredictable supplements to an inadequate base operating budget.

Needs outlined in this plan indicate other major lacks in the program. There are inadequate protective devices to ensure the proper care of the museums and their invaluable collections. Security is poor, fire is an ever present danger, and the long range consequences of such things as acid rain are unknown.

Clearly, the issues faced by the park in the management of its cultural resources encompass all five of the Servicewide Cultural Resource Issues addressed in this document. There are insufficiencies in inventory of both collections and archeological site elements, of reports such as those on years of past stabilizations which remain undocumented, and specialized studies of potential harmful agencies such as wild fires and acid rain. There are insufficiencies in the maintenance of all three major categories of cultural resources, continuing erosion of sites and structures, and insufficient storage and environmental controls for the collections. Monitoring of potentially harmful agencies, such as those mentioned above, is limited to non-existent. Threats of theft, looting, and vandalism remain because of insufficient security. The insufficiencies of professional staff have been discussed in detail.

The importance of the needs for increased staffing and funding for (1) ruins stabilization, (2) collections management, and (3) historic preservation, overshadow all other aspects of the present program of cultural resource management. Without these, in the absence of the year to year supplemental funding which has kept the present program alive, that program would quickly revert to the relatively stagnant level of the period preceding 1982. These are the major needs, the top priorities, Without them the park cannot meet its intrinsic obligations to preserve and protect its resources unimpaired for the benefit of even this generation, let alone those of the future.

B. Project Statements

1. MEVE-C-001 Conduct Annual Maintenance of 32 Ruins.

2. Systemwide Issue: C05.

3. Problem Statement:

Annual maintenance is carried out at 32 ruins which are either accessible to visitors or which are viewed by visitors at specified viewpoints. A program scheduling inspections and necessary work is maintained as a part of the regular operations of the park, and is funded from the base account. Maintenance of these ruins is required in order to ensure both the visitor experience and the protection and preservation of these ruins.

6. Compliance:

Actions involving the prehistoric ruins of the park are subject to the requirements of Section 106 of the National Historic Preservation Act of 1966. Routine maintenance of these 32 ruins is covered by a Memorandum of Agreement with the State Historic Preservation Officer. Any exceptional activities outside the terms of this agreement are preceded by an Assessment of Effect submitted to the State Historic Preservation Officer and, where necessary, to the Advisory Council on Historic Preservation.

1. MEVE-C-002 Catalog Museum Collection.

2. Systemwide Issue: CO2

3. Problem Statement:

There are approximately 150,000 accessioned but uncatalogued objects in the Mesa Verde National Park museum collections. Many of these are still in the original field containers, mainly paper bags and boxes. Provenience information is written on these bags and boxes, but there is no permanent association of this information with the individual objects. The bags and boxes are deteriorating, and the objects are in serious danger of being disassociated from their essential provenience information. These objects constitute an invaluable research source, but they will be rendered valueless should this happen.

There are also approximately 40,000 objects which have been cataloged, but for many of which the catalog records (10-234) are inaccurate or inadequate. These need to be reviewed and all necessary revisions made.

Proper cataloging of objects in the park museum collection is necessary for purposes of accountability, and to make them available for research and interpretation.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Under this alternative, the museum objects as yet uncatalogued will remain in their present state with a continuation of deterioration of field containers and an eventual loss of relevant information. Gradually they will lose all usefulness for either research or interpretive purposes. The inadequately catalogued objects will continue to be of limited value for either research or interpretation.

B. Use of Present Staff to do Cataloging. Existing personnel will continue to catalog and/or recatalog objects and transfer objects to proper storage as time permits. Completion of the work will require many years, during which time much of the information associated with the objects will be lost, research and interpretation will be limited, and some of the objects themselves will be lost.

C. Use of Additional Staff to Complete Cataloging. Experienced museum aids/or museum technicians will be employed on a seasonal basis to help complete the cataloging of all objects to acceptable standards. Essential information will be permanently recorded, and the objects will be properly stored and, where

required, properly conserved. Research and interpretive potential of all objects will be retained, and accountability for all museum objects will be facilitated.

5. Description of the Recommended Project or Activity:

Additional staff would be used to catalog all uncatalogued and improperly cataloged objects according to National Catalog standards, with all relevant information; recorded. National Visual Inventory Records (10-30) would be completed where necessary, including photography of objects where appropriate. All objects would be placed in permanent storage under conditions that will minimize deterioration and enhance accessibility for basic research, interpretation, and accountability.

Use of additional temporary staff to complete the backlog of cataloging, recataloging, and proper storage of all museum objects would be necessary to assure maximum preservation of the objects and of the associated provenience information. This procedure has been followed for the past three years, based upon year to year supplementary funding, but several years of additional work at this level will be required to bring the level of cataloging up to the required standard. Only in this way will the park be able to fulfill its compliance requirements according to the park enabling legislation, the standards set forth in the National Historic Preservation Act of 1966, and the specified procedures contained in NPS-28, Cultural Resource Management Guidelines.

6. Compliance:

This is an ongoing management procedure established when the park museum collection was established. No specific compliance is required other that stated in the enabling legislation and in NPS-28, Cultural Resource Management Guidelines.

1. MEVE-C-003 Computerize Catalog Backlog.

2. Systemwide Issue: CO2

3. Problem Statement:

There are currently about 49,000 catalog entries in the Mesa Verde National Park museum record system, and thousands more are being generated as cataloging of objects continues. Information is recorded on standard NPS catalog cards, but the information is virtually irretrievable through the present manual system. The park has installed a computer program for the Automated National Catalog System, but sufficient staff is not available to input the many thousands of catalog entries into this system.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Under this alternative the present staff will enter as many catalog entries into the ANCS as time permits, but requirements of other duties will result in only a few entries per year, and completion of the automated catalog will require many years.

B. Use of Additional Staff to Complete Automation: Temporary hiring of additional staff who are knowledgeable in the use of computers for data entry would be employed on a year round basis until the backlog of entries is entered into the ANCS. Part time or seasonal help could then be utilized to maintain pace with the cataloging being done.

5. Description of the Recommended Project or Activity:

Use of Additional help is the only way that the massive amount of data to be entered into the ANCS can be accomplished within any foreseeable future. Seasonal computer-knowledgeable help will permit completion of the ANCS within a few years and will enable the park to comply with the requirements of the Automated National Catalog System.

6. Compliance:

No additional compliance is necessary. Use of the ANCS is required for all catalogs in the National Park System.

1. MEVE-C-004 Conduct Annual Inventory of Collections.

2. Systemwide Issue: CO2

3. Problem Statement:

An annual inventory is required for all museum collections in the National Park Service. This is an ongoing cultural resource management activity conducted as part of the regular staff activities in Mesa Verde National Park.

4. Alternative Actions/Solutions and Their Probable Impacts:

There are no alternatives other than to conduct an annual inventory. It is a requirement and is built into the annual performance standards of the curatorial staff.

6. Compliance:

No special compliance is required; this is an established ongoing activity.

1. MEVE-C-005 Upgrade Museum Storage.

2. Systemwide Issue: C07

3. Problem Statement:

Storage of objects in the museum collection is largely adequate. Many objects are stored on open shelves and in poorly designed cabinets. Storage space is limited, and the available facilities are strained nearly to the limit. Any sizeable additions to the collection would be impossible to accommodate in the space available. Ambient conditions of the storage areas are also inadequate to provide proper preservation and protection for sensitive items. Increased space is needed and proper containers are needed for proper storage, and increased help is needed to remove many objects from presently unacceptable containers and to prepare proper storage facilities to ensure their preservation.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Under this alternative many objects now in poor storage facilities will continue to deteriorate and some will be completely lost.

B. Increase Storage Space in Proper Storage Containers: Under this alternative, additional containers and cabinets will be obtained to replace those now in use, and proper protective measures, such as individual mounts for fragile objects, will be carried out. Problems of adequate space will be temporarily solved through reorganization and rearrangement and through the use of more efficient storage cabinets and shelving types.

5. Description of the Recommended Project or Activity:

The only acceptable alternative is to increase the storage space and to upgrade the storage facilities through installation of proper cabinets and shelving and through preparation of proper protective mounts for sensitive objects. Proper cabinetry will aid in diminishing the adverse effects of a poorly controlled environment.

6. Compliance:

Proper protection and preservation of the materials in the park museum collection is mandated in the park enabling legislation and in NPS-28, Cultural Resource Management Guidelines. No further compliance is necessary.

1. MEVE-C-006 Complete Backlog of Stabilization Reports.

2. Systemwide Issue: C03.

3. Problem Statement:

Information is lacking on numerous ruin stabilization projects carried out at Mesa Verde National Park, Hovenweep National Monument, and Yucca House National Monument during the period between 1934 and 1980. Lack of specific details on what kind of work was done, materials used, areas of ruins repaired, etc. makes it impossible to adequately plan for future stabilization work. In some cases it is not possible to distinguish between original fabric and later repairs. This information may still be retrievable from a careful study of photographs taken of the work and from interviews with former workers and foremen of the ruins stabilization crew at Mesa Verde National Park, but at present it is not available.

4. Alternative Actions/Solutions and Their Probable Impacts:

   A. No Action: This alternative will result in a continuation of the present situation. Stabilization projects will be carried out without a clear understanding of what materials are original and what are modern repairs. Past unacceptable stabilization actions will continue to be undetected in many instances, and the stabilization program will be unable to establish a baseline for future work.

   B. Compile Stabilization Reports from Available Information: Under this alternative, reports will be compiled on a ruin by ruin basis, utilizing past field notes, photographs, and interviews with people who have done work on the subject ruins in the past. The information will provide a chronology of what work had been done, will document areas of recent work and contrast this with original prehistoric fabric, and will permit work to be done to rectify past mistakes and to protect original fabric.

5. Description of the Recommended Project or Activity:

A careful study of all existing documents pertaining to past ruin stabilization projects should be made so as to compile all possible information. Interviews should be conducted with surviving members of former stabilization crews to compile what information they may be able to provide. Reports of each project should then be assembled using photographs, maps, and detailed drawings as well as a narrative description of the work, personnel, time of the project, materials used, and stabilization techniques use.

1. MEVE-C-007 Stabilize Back Country Ruins.

2. Systemwide Issue: C06.

3. Problem Statement:

Many of the prehistoric ruins in the park have never received stabilization treatment. Others have been repaired only once or twice over periods of many years. The result has been a continuing deterioration of the ruins, mainly through natural causes, with a consequent irretrievable loss of original fabric. The park is obligated to preserve the prehistoric ruins unimpaired for future generations as stated in the enabling legislation, and failure to do this for all deterioration ruins is not an acceptable carrying out of that obligation. A program of emergency stabilization of many of the major ruins has been funded since 1982, but funding from year to year is now greatly reduced and uncertain, making it impossible to plan adequately for long range preservation.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Failure to maintain the prehistoric ruins through a regular schedule of cyclic maintenance will result in continued deterioration and loss of prehistoric resources. Eventually, many of the ruins will be totally lost.

B. Scheduled Cyclic Maintenance of All Ruins: A permanent program of backcountry stabilization would be established whereby all ruins subject to deterioration through natural or other agencies would be inspected and repaired on a regular basis. Such a program would permit long range planning for repair of all ruins, those subject to considerable erosion being inspected and repaired on a frequent basis, those essentially stable and subject only to low rates of deterioration being inspected on a less frequent basis. A long range schedule would ensure that all inspections and repairs to ruins would be planned for so that in any given year a known series of ruins would be attended to.

5. Description of the Recommended Project or Activity:

Regular scheduling of ruins stabilization and repair through an established permanent program is the only means by which the continued preservation and protection of the ruins can be accomplished. This would require either an increase in base funding or a regularly scheduled supplementary funding program. Additional personnel skilled in the techniques of prehistoric ruins stabilization would be needed to carry out the program.

6. Compliance:

All actions affecting prehistoric ruins must be approved by the State Historic Preservation Officer. This is done through the Assessment of Effect process, in compliance with Section 106 of the National Historic Preservation Act of 1966.

1. MEVE-C-008 Preserve Historic Buildings.

2. Systemwide Issue: C06.

3. Problem Statement:

Many of the historic buildings in the park have been improperly maintained in the past, resulting in loss of historic fabric and damage to the structures. Portland cement has been used as a mortar, resulting in damage to the relatively soft sandstone blocks of which many of the buildings are constructed. Original wooden frame windows have been replaced with inappropriate aluminum windows contrary to the dictates of historic preservation legislation. Wooden vigas and other decorative and structural elements have been allowed to deteriorate. Roof flashing has been done with inappropriate materials with resultant leaks and structural deterioration. Aesthetic compromises have resulted in the loss of some of the original appearance of the buildings. Many of these buildings have been determined to be eligible for inclusion on the National Register of Historic Places, and some have been declared to be National Landmarks.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Continued deterioration of these buildings will be an inevitable result of failure to correct past and present deficiencies in their preservation. The result will be eventual loss of much historic fabric and the entire loss of several of the buildings.

B. Establish a Program of Proper Preservation Maintenance: A permanent program of scheduled inspections and maintenance would be established whereby inappropriate materials would be removed and replaced with approved materials, deteriorated elements would be replaced in kind with duplicates, aluminum windows would be removed and replaced with wooden duplicates of the originals, and a set of established preservation practices would be instituted for ling range care of the buildings.

5. Description of the Recommended Project or Activity:

A program of preservation maintenance should be established to ensure long range preservation of this major cultural resource. Sufficient funding to allow removal and replacement of inappropriate materials would be necessary as well as additional help to carry out the program.

6. Compliance:

All work carried out on historic building which will affect their historic integrity must be done in accordance with the requirement of Section 106 of the National Historic Preservation Act of 1966. All work must be approved by the State Historic Preservation Officer, and where necessary, by the Advisory Council on Historic Preservation.

1. MEVE-C-009 Install Collections Environmental Controls.

2. Systemwide Issue: C07.

3. Problem Statement:

The museum collections are housed in three separate buildings, none of which have proper environmental controls. Many of the most important (and fragile) items are displayed in the Archeological Museum, a stone building with seven rooms of public exhibits. All rooms have windows and doors regularly left open to permit visitor access and to reduce heat build-up within the building. Material culture of historic Native Americans is displayed in the Far View Visitor Center which is open only in the summer months and is closed and unheated through the winter. The greater part of the museum collections is housed in the Research Center, and ARMCO metal building originally designed as a temporary field laboratory for an archeological project. Its storage area is less subject to environmental fluctuations, but nevertheless experiences considerable range of both temperature and relative humidity.

The collections in all three facilities experience fluctuations of wide range in both temperature and humidity. Such fluctuations are a prime cause of deterioration, especially of materials such as bone, leather, plant fiber, feathers, and other perishable materials. Many valuable items have already suffered irreversible damage, and others will similarly deteriorate in the future.

Loss of fragile items in the museum collections is contrary to the mandates of the park enabling legislation to preserve and protect unimpaired for future generations the ruins and the objects of primitive man contained in the park. Such loss is also contrary to the standards set forth in NPS-28, Cultural Resource Management Guidelines.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Result of no action will be a continuation of the present situation. Irreplaceable artifacts of prehistoric and historic Native Americans will continue to deteriorate and will eventually be lost. The values of these for both interpretation and for research will also be permanently lost.

B. Install Environmental Controls for Museum Collection: Proper environmental controls would be installed in all three locations which would ensure that temperature and relative humidity fluctuations which are deteriorating fragile items would be avoided.

5. Description of the Recommended Project or Activity:

The only way to preserve these irreplaceable materials is to control the environmental fluctuations which are gradually destroying them. Controls in the Research Center should be focused in the storage area. Controls in the Archeological Museum and the Visitor Center will have to be designed so as to protect the objects on display despite the necessity for keeping the buildings open to heavy visitor traffic.

6. Compliance:

The Archeological Museum is a declared Historic Landmark. Any actions affecting its historic integrity are subject to the requirement of Section 106 of the National Historic Preservation Act of 1966, and must be approved by the State Historic Preservation Officer.

1. MEVE-C-010 Inventory Prehistoric Wall Plaster.

2. Systemwide Issue: CO2

3. Problem Statement:

A large amount of wall plaster still survives in various Mesa Verde National Park cliff dwellings. Much of the plaster is a plain wash over masonry walls, but some is elaborately painted and incised with both geometrical and zoomorphic designs. This is an extremely fragile resource, and much of that which was originally placed on the room and kiva walls has deteriorated or been completely lost. What remains is a cultural resource of great research and interpretive value. It will eventually be lost unless a means is found to preserve it. Most wall plaster is by nature immovable, and must be preserved in place. Only a limited amount of information has thus far been compiled regarding the locations, quantity, and condition of this resource. The initial step in devising a program of preservation is to complete an inventory of all known occurrences of prehistoric plaster along with an evaluation of its condition and those elements which endanger it.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Failure to conduct an inventory from which a program of preservation and /or detailed recording and recovery can be devised, will result in the eventual loss of all of this irreplaceable cultural resource. The park has a mandate in its enabling legislation to preserve and protect the prehistoric ruins, and failure to do so in this case would be a violation of that mandate.

B. Conduct Inventory of All Plaster Resources: Each instance of extant prehistoric plaster would be documented by color and black and white photography supplemented by scale drawings were necessary. Environmental conditions affecting the stability of the plaster would be recorded, along with a detailed description of the plaster, its condition, and its immediate needs for treatment.

5. Description of the Recommended Project or Activity:

The only reasonable course of action, if the prehistoric plaster is to be preserved, is to act upon the second alternative and conduct an inventory to provide a baseline for further preservation action. This should be done by qualified archeologists with some preservation experience. It probably should be done by contract in order to obtain the maximum expertise in treating this unique form of cultural resource.

1. MEVE-C-011 Restore Waters Cabin.

2. Systemwide Issue: C06

3. Problem Statement:

Waters Cabin is the sole remaining homesteader's cabin in Mesa Verde National Park, all other having been long since demolished. The cabin is in imminent danger of total loss, and any hope of saving it as a unique part of park history depends upon prompt actions. Its location, in a remote eastern canyon far from the developed areas, has contributed to its preservation, but it has been steadily deteriorating because of exposure to the severe winters experienced in the park. When first recorded in 1973, all four walls sere standing, and many of the furnishings were still intact in its interior. The gabled roof had collapsed, but the various roof components were still largely preserved where they had fallen into the interior. A revisit in 1980 showed but minor additional deterioration, but a visit in 1988 showed one wall to have largely collapsed and part of another in an unstable condition. At that time emergency measures were taken to shore up the remaining walls in order to prevent further collapse. These temporary measures will not ultimately prevent the entire collapse of what remains.

Construction date of the cabin is unknown, but preceded the creation of the park in 1906. It was built by a homesteader who patented the land in the 1880's, and was used as a home by its owner who had a lease to graze sheep in the area after the park was established. It is the only remaining constructed building in the park which dates to this early time. Homesteading, farming, and stock raising were all a part of the early history of the lands in the easter portion of the park; this is one of only a dew surviving remnants of that historic period. Its present condition ensures that it will not survive more than one or two more winters. If it is to be saved, action must be taken very soon.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Failure to act promptly will result in the total loss of this single surviving example of early homesteading in the park lands. Once the walls have fallen, deterioration through exposure to the weather will soon render it unrecoverable.

B. Restore Waters Cabin to its Original Condition: The walls which are now temporarily shored up would be placed back into position and braced. Careful mapping of the fallen roof material would provide a plan for restoration of the roof using duplicate materials. The single door could be replicated and rehung using the

same technique, and windows could be replicated and rehung in their original locations. An excellent photograph of the cabin taken in 1910 provides numerous details about its exterior appearance and configuration, and this, also, would serve as a guide to its restoration. Interior furnishings, mostly hand made and crude, could also be replicated if desired.

5. Description of the Recommended Project or Activity:

The cabin should be restored as the only practical means of saving it. Repositioning of the walls and replacement through replication of the roof would provide a structurally sound building. Its location in a designated wilderness area would make it an idea shelter for visitors who might be utilizing the wilderness area. (The wilderness area is at present closed to visitors, but presumably will one day be accessible to them.) It could also be utilized as a shelter by park personnel patrolling the back country. Its location, near one of the few trails through the wilderness area, could also be utilized to make it an effective interpretive device in the eastern park area, both for early park history and for the history of settlement of the region in which the park is located.

6. Compliance:

Waters Cabin is an historic resource and potentially eligible for the National Register of Historic Places as significant at the state level. As such, and as part of the park which is itself a National Register property, work at the site would have to be preceded by an Assessment of Effect, in accord with the requirements of Section 106 of the National Historic Protection Act of 1966. The project would have to have the approval, also, of the State Historic Preservation Officer.

1. MEVE-C-012 Implement Oral History Program.

2. Systemwide Issue: C03.

3. Problem Statement:

Numerous residents of local communities retain knowledge of the history of Mesa Verde National Park and its neighboring areas. These include early residents, park employees, concessioner employees, and members of the Civilian Conservation Corps camps which were located in the park. The knowledge these people have includes work experience, administrative events, historic figures, environmental conditions, and special park projects. There is at present insufficient staff and time to properly conduct interviews with these people, and there is a steady loss of information as individuals move away or die. The unrecorded history of the park is in danger of being irretrievably lost because of the lack of means to properly collect it.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: No action will result in the total loss of all oral history presently available in the memories of people who are all getting old.

B. Conduct an Organized Program of Oral History: Interviews would be conducted to collect the information which is still available from local informants. This would be done through contract with an educational institute or other source which can provide people with the professional skills and experience necessary for the successful conduct of such a program. The park could provide tape recorders and photographic (including TV) equipment to facilitate the project along with a compiled list of local informants.

5. Description of the Recommended Projects of Activity:

Contract with an experienced and qualified source to conduct oral history interviews of people who have information on the history of the park and its surrounding areas so as to retrieve this information before it is permanently lost.

6. Compliance:

No compliance is necessary other than to ensure that all legal requirements for dealing with local informants are met and that the proper agreements are made to ensure the rights of the park to the information collected.

1. MEVE-C-013 Install Collections Security System.

2. Systemwide Issue: C13

3. Problem Statement:

The museum collections in the Research Center, Archeological Museum, and Far View Visitor Center are insufficiently protected from potential vandalism or theft. The present system is inadequate and is subject to frequent malfunction. The collections, which are extremely valuable when considered in terms of the potential dollar value on the open market to private collectors and museums throughout the world, are thus imperiled as to their security within the park. Persons who are familiar with the present system could easily circumvent it or disarm it, leaving these irreplaceable resources vulnerable to theft or damage.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: This would result in a continuation of the present situation. Thefts have occurred in the park in other contexts, so that the possibility of intrusion and removal of museum objects will remain high. A high probability exists that eventually an attempt will be made to remove some of these valuable objects.

B. Install an Effective Security System: State of the art systems would be devised and installed for all three localities presently containing museum objects. These systems would detect the presence of unauthorized persons in areas containing the museum objects and would alert security personnel to the situation, allowing prompt response to the area in question.

5. Description of the Recommended Project of Activity:

The installation of an effective security system is the only way to ensure the safety of this valuable collection of museum objects. Otherwise an unsatisfactory arrangement will continue which will place these objects at risk of theft or damage.

6. Compliance:

The Archeological Museum is a National Register property and a designated National Landmark. Any actions affecting its historic integrity such as installation of devices in the walls, would require an Assessment of Effect under the terms of Section 106 of the National Historic Preservation Act of 1966 and the concurrence of the State Historic Preservation Officer.

1. MEVE-C-014 Study Effects of Acid Rain on Cultural Resources

2. Systemwide Issue: C04

3. Problem Statement:

Acid rain has caused harmful effects on cultural resources in many areas of the world. No information is available on the amount of acid rain effects on the park's cultural resources. Lack of this knowledge prevents an evaluation of possible present and future hazards from this source and possible action to prevent damage to the resources. Failure to understand the impact of acid rain could result in eventual destruction of the primary cultural resources of the park.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Failure to monitor the potential effects of acid rain will result in a lack of baseline data and of any information regarding the possible harmful effects of this phenomenon at present and over a long period in the future. Lack of this data will prevent any action being taken to mitigate the harmful effects.

B. Initiate Long-term Study of Acid Rain Effects: Utilizing the limited studies of the past, a long range study, done under contract with a university or other agency qualified to conduct such studies, would be initiated at several key locations within the park to monitor deterioration of stone masonry, mud mortar, and other mineral elements of both prehistoric and historic structures known to be vulnerable to the chemistry of acid rain.

5. Description of the Recommended Project or Activity:

A study of the possible harmful effects of acid rain should begin as soon as possible in order to determine whether there are such harmful effects in progress at present and to provide a baseline for determining any such harmful effects in the future as a result of continuation of present conditions or as a result of increased acid rain in the future.

6. Compliance:

Protection and preservation of the prehistoric and historic structures of the park is mandated in the enabling legislation and in the Historic Resource Protection Act of 1966. Actions directly affecting either category of structure would require an Assessment of Effect in accord with the terms of Section 106 of the above Act and the concurrence of the State Historic Preservation Officer.

1. MEVE-C-015 Study Fire Effects on Archeological Sites.

2. Systemwide Issue: C04

3. Problem Statement:

Despite two major forest fires within Mesa Verde National Park since 1934, there is still little understanding of the effects of fire on the archeological resources. Casual observations at sites burned over in the 1972 fire on Moccasin Mesa showed that some harmful effects, such as fire-cracking of building stones and re-firing of pottery sherds to altered color and hardness, does occur. Proposals for controlled burning of areas with heavy fuel concentrations have been hampered by the lack of knowledge of the relative effects of different degrees of heat intensity which would result from different conditions of controlled burning. With continual fuel build-up, the potential for major fires increases, with consequent increased interest in controlled burns as a means of prevention. The need for data on the consequences to the archeological resources in either situation increases with the need for decisions on solutions to the fire potential problem.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Absence of a study of the effects of fire on archeological sites will prevent any development of controlled burning programs as a means of reducing the present hazardous fuel load. Continuance of the fuel build-up will increase the likelihood of a major high intensity fire which may cause major damage to archeological sites.

B. Conduct Study of Effects of Fire on Cultural Materials: An experimental study, including the results of similar studies elsewhere and utilizing non-provenienced archeological materials from this park could provide data on the relative impacts upon archeological materials of fires of varying intensity so as to determine where a possible threshold of toleration of heat might occur. This would then be used to evaluate a program of controlled burning in areas containing archeological ruins so as to eliminate the danger of future uncontrolled high intensity.

5. Description of the Recommended Project of Activity:

An organized study of fire effects on cultural resources should be instituted to determine the possible consequences of either a major fire or controlled burning at given temperatures and under given conditions. There is insufficient park staff for such a project, but a project of the required nature could be contracted

out to professional archeologist. The actions might involve tests on appropriate archeological materials, but should also include data gathering from other areas where fires have occurred in archeological zones. A study of the park for evidence of ancient fires and their possible effects should also be made.

6. Compliance:

Protection and preservation of the prehistoric and historic structures of the park is mandated in the enabling legislation and in the Historic Resource Protection Act of 1966. Actions directly affecting either category of structure would require an Assessment of Effect in accord with the terms of Section 106 of the above Act and the concurrence of the State Historic Preservation Officer.

1. MEVE-C-016 Install Fire Protection in Museums.

2. Systemwide Issue: C10

3. Problem Statement:

The Mesa Verde museum collections are housed and displayed in the Far View Visitor Center and in the Archeology Museum. The Visitor Center is a stone and concrete building with an insulated tar-covered roof. Most of the interior walls are of wood frame construction. The exhibit area contains the greater part of the park's valuable ethnographic collection; some items are on loan to the park; all are irreplaceable. The Archeology Museum is a two-story stone masonry building with a roof based on wooden vigas and vigitas. In it are many of the outstanding items recovered in archeological excavations in the park. These are also extremely valuable and irreplaceable. These buildings are currently protected by a fire detection system which employs smoke detectors and rate-of-rise detectors which are tied into the park's internal communication system. Given the nature of the resources contained within these buildings, many of which are non-renewable and irreplaceable, the present system does not provide adequate fire protection. Any fire which might start in the buildings would probably continue to spread until reached by park personnel; there are no automatic fire suppression systems.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Failure to install adequate fire suppression systems will leave both of these buildings vulnerable to severe damage as a result of fire, with almost certain loss and/or damage to irreplaceable museum objects contained in their displays.

B. Install Adequate Fire Protection in Both Museums: A custom engineered system should be installed in each building utilizing extinguishing agent containers and heat/smoke detectors placed in strategic positions. A combination of "total flooding" and local application methods should be employed, such as Halon 1301 (Bromotrifluoromethane), or other rapid and highly effective fire extinguishers which leave no residue and will not damage the materials which need to be protected.

5. Description of the Recommended Project or Activity:

Fire protection systems should be molded in both museums as soon as possible to alleviate the threat of loss of a major and irreplaceable collection.

6. Compliance:

The Archeological Museum is a National Register property and a designated National Landmark. Any actions affecting its historic integrity such as installation of devices in the walls, would require an Assessment of Effect under the terms of Section 106 of the National Historic Preservation Act of 1966 and the concurrence of the State Historic Preservation Officer.

1. MEVE-C-017 Preserve Historic Documents

2. Systemwide Issue: C05

3. Problem Statement:

A wide variety and large quantity of records exist in various localities within the park which document park development and history and which provide detailed information about important park resources. Examples are Civilian Conservation Corps records, early superintendent's reports, chief naturalist's reports, data generated through research projects, photographic records, and construction drawings for various historic structures. These have never been inventoried, their extent and nature has never been determined, and their state of preservation in many cases is unknown. These constitute a valuable cultural resource which should be properly preserved and made available for park planning and preservation programs, but in their current state, neither preservation nor effective use are guaranteed.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Lack of inventory and measures to preserve these old and fragile documents will result in a continuation of the hazardous conditions in which some remain stored, and they will be unavailable through lack of knowledge of their contents to qualified researchers and park administrative personnel. Eventually many of them will deteriorate beyond hope of preservation.

B. Inventory Documents and Establish Proper Storage: All documents in this category would be inventoried and records made of their contents. Those in severely deteriorated condition would be conserved by a professionally qualified conservator, and those in less severe condition would be stored in archivally correct storage facilities to ensure their preservation. Work copies would be made of those which would be harmed through continued handling by researchers.

5. Description of the Recommended Project or Activity:

The park's historic documents should be fully inventoried, indexed, and cross referenced by various categories, and appropriate preservation measures taken. The records should be consolidated into one location, properly stored, and access to them controlled in order to ensure their long-term preservation. Copies should be made of those documents needed for general use with the originals kept in proper storage.

1. MEVE-C-018 Prepare Collections Emergency Plan.

2. Systemwide Issue: C04

3. Problem Statement:

Mesa Verde National Park lacks a plan which will direct actions to be taken in the event of an emergency which would endanger its museum collections. Emergencies and disasters usually occur with little or no warning, and they could cause the total destruction of the museum collection which constitutes a valuable and irreplaceable cultural resource. A plan is needed which would address all types of disasters, accidents, and criminal activity which might impact the museum collection along with appropriate actions which would be implemented should any such event occur.

4. Alternative Actions/Solutions and Their Probable Impacts:

   A. No Action: Lack of an in place emergency plan will leave the museum collections vulnerable to any sudden emergency since there will be no procedure to be followed to rapidly act to protect them.

   B. Prepare an Emergency Plan: An Emergency Preparedness Plan would be prepared for the actions to be taken in the event of any foreseeable disaster or emergency situation. The plan would also include suggested preventive measures to reduce the potential for disasters.

5. Description of the Recommended Project or Activity:

Preparation of an Emergency Preparedness Plan is the only way to ensure maximum protection of the museum collections in the event of an emergency or disaster.

6. Compliance:

Preservation and protection of the museum collections is mandated in the enabling legislation for the park, and proper measures to ensure that preservation and protection are outlined in NPS-28, Cultural Resource Management Guidelines.

1. MEVE-C-019 Duplicate Nitrate Negatives.

2. Systemwide Issue: C07.

3. Problem Statement:

The park has in its photographic files approximately 2,000 known nitrate negatives and possibly another 1,000 as yet unidentified. Nitrate negatives are unstable and are a potential source of spontaneous combustion. They thus constitute a safety hazard as well and a probable impermanent record. Most of the park's nitrate negatives document important activities and periods of park history and are thus invaluable historic documents. Their instability poses a serious problem in preservation of historic documents as well as insuring the safety of the entire photographic collection.

4. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action: Failure to duplicate the many unduplicated nitrate negatives in the park photo collection will continue the fire hazard presented by these unstable objects. The negatives will eventually self-destruct, causing the loss of these primary cultural resource documents.

B. Duplicate Nitrate Negatives: All unduplicated nitrate negatives would be duplicated by a professional agency according to established standards for archival processing. Duplicates would then be entered into the photo collection files and the unstable nitrate originals would be stored separately under conditions which would pose no hazard to other materials.

5. Description of the Recommended Project or Activity:

All nitrate base negatives should be identified and removed from the present storage area and stored separately from the safety film. The negatives should be duplicated according to American National Standards Institute (ANSI) standards for archival processing of photographic materials. The duplicate negatives should then be integrated into the park's photographic files. The original nitrate negatives should be retained, but should be stored under conditions that are suitable for their safe long-term preservation.

6. Compliance:

No specific compliance issues are involved. As important cultural resource documents, these should be treated according to established National Park Service guidelines for dealing with nitrate negatives.

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ___ Park: MEVE Park Priority: ___

RMP Project No.: C-001 Title: Conduct Annual Maintenance of 32 Ruins
Activity No.: ___

Funded (Y/N)?: Y Estimated Total Costs: 207.0 Start Date: 10/ 1/88
End Date: 9/ 3/92

Servicewide Issue Category Code(s): C02 ~~N23~~ Cultural Resource Type Code(s): ___ ___ ___ ___

Contact Name: Kathleen Fiero Phone: (303) 529-4510

Current Fiscal Year FY: 89 Planned Costs This FY: 47.0 FTE's: 2.6

PWE: 301 PWE: ___ Fund Source Code 1: CF 1 Funding: 47.0
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): MIT %: 100 ___ %: ___ ___ %: ___

Work Planned This FY: Conduct annual maintenance and required stabilization at 32 ruins either accessible or visible to the public.

Out Year 1 FY: 90 Planned Costs: 50.0 FTE's: 2.6

PWE: 301 PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): MIT %: 100 ___ %: ___ ___ %: ___

Out Year 2 FY: 91 Planned Costs: 53.0 FTE's: 2.6

PWE: 301 PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Out Year 3 FY: 92 Planned Costs: 56.0 FTE's: 2.6

PWE: 301 PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): MIT %: 100 ___ %: ___ ___ %: ___

Past Fiscal Year FY: 88 Funds Obligated: 45.0 % Project Completed: 100
% Personnel: 70
% Project Support: 30

Funds Obligated with University: ___ University: ___

Accomplishments This Year: Required annual repair and stabilization was carried out at all 32 ruins.

Publications/Reports: ___

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ____

RMP Project No.: C-002 Title: Catalog Museum Collection
Activity No.: ____

Funded (Y/N)?: Y Estimated Total Costs: 231.0 Start Date: 10 / 1 / 88
End Date: 9 / 30 / 92

Servicewide Issue Category Code(s): C02 N23 Cultural Resource Type Code(s): ____ ____ ____ ____

Contact Name: Elizabeth Bauer Phone: (303) 529-4510

Current Fiscal Year FY: 89 Planned Costs This FY: 54.0 FTE's: 2.0

PWE: 301 PWE: ____ Fund Source Code 1: CF 1 Funding: 32.0
Fund Source Code 2: CF 5 Funding: 15.0

Activity Type Code(s): RES %: 100 ____ %: ____ ____ %: ____

Work Planned This FY: Catalog 3,500 objects, complete 75.0 work sheets. Enter data from worksheets into Automated National Catalog System.

Out Year 1 FY: 90 Planned Costs: 57.0 FTE's: 2.5

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ____ ____ %: ____

Out Year 2 FY: 91 Planned Costs: 60.0 FTE's: 2.5

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ____ ____ %: ____

Out Year 3 FY: 92 Planned Costs: 63.0 FTE's: 2.5

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ____ ____ %: ____

Past Fiscal Year FY: 88 Funds Obligated: 52.0 % Project Completed: 100
% Personnel: 75
% Project Support: 35

Funds Obligated with University: ____ University: ____

Accomplishments This Year: Cataloged 3,383 objects, completed 757 worksheets. Data from worksheets entered into Automated National Catalog System.

Publications/Reports: ____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ____

RMP Project No.: C-003 Title: Computerize Catalog Backlog
Activity No.: ____

Funded (Y/N)?: N Estimated Total Costs: 99.0 Start Date: 10 / 1 / 89
End Date: 9 / 30 / 92

Servicewide Issue Category Code(s): C02 N23 Cultural Resource Type Code(s): RES 100 ____ ____

Contact Name: Elizabeth Bauer Phone: (303)529-4510

Current Fiscal Year FY: __ Planned Costs This FY: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ____ ____ %: ____ ____ %: ____

Work Planned This FY: ____

Out Year 1 FY: 90 Planned Costs: 30.0 FTE's: 1.0

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ____ ____ %: ____

Out Year 2 FY: 91 Planned Costs: 33.0 FTE's: 1.0

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ____ ____ %: ____

Out Year 3 FY: 92 Planned Costs: 36.0 FTE's: 1.0

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ____ ____ %: ____

Past Fiscal Year FY: __ Funds Obligated: ____ % Project Completed: ____
% Personnel: ____
% Project Support: ____

Funds Obligated with University: ____ University: ____

Accomplishments This Year: ____

Publications/Reports: ____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ___ Park: MEVE Park Priority: ___

RMP Project No.: C-004 Title: Conduct Annual Collections Inventory
Activity No.: ___

Funded (Y/N)?: Y Estimated Total Costs: 13.1 Start Date: 10/1/85
End Date: 9/30/92

Servicewide Issue Category Code(s): C02 N23 Cultural Resource Type Code(s): ___ ___ ___ ___

Contact Name: Elizabeth Bauer Phone: (303) 529-4510

Current Fiscal Year FY: 88 Planned Costs This FY: 2.6 FTE's: 0.15

PWE: 301 PWE: ___ Fund Source Code 1: CF 1 Funding: 2.6
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): REA %: 100 ___ %: ___ ___ %: ___

Work Planned This FY: Conduct Annual Collections Inventory according to established guidelines.

Out Year 1 FY: 90 Planned Costs: 3.0 FTE's: 0.15

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Out Year 2 FY: 91 Planned Costs: 3.5 FTE's: 0.15

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Out Year 3 FY: 92 Planned Costs: 4.0 FTE's: 0.15

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Past Fiscal Year FY: 88 Funds Obligated: 2.5 % Project Completed: 100
% Personnel: 100
% Project Support: ___

Funds Obligated with University: ___ University: ___

Accomplishments This Year: Annual Collections Inventory complete according to established guidelines.

Publications/Reports: ___

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ____

RMP Project No.: C-005 Title: Upgrade Museum Storage
Activity No.: ____

Funded (Y/N)?: Y Estimated Total Costs: 30.0 Start Date: 10/1/88
End Date: 9/30/92

Servicewide Issue Category Code(s): C07 N23 Cultural Resource Type Code(s): ____ ____ ____ ____

Contact Name: Elizabeth Bauer Phone: (303) 529-4510

Current Fiscal Year FY: 88 Planned Costs This FY: 5.0 FTE's: .1

PWE: 301 PWE: ____ Fund Source Code 1: CF 1 Funding: 5.0
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): MIT %: 100 ____ %: ____ ____ %: ____

Work Planned This FY: Upgrade storage for approximately 30,000 objects.

Out Year 1 FY: 89 Planned Costs: 7.0 FTE's: .1

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): MIT %: 100 ____ %: ____ ____ %: ____

Out Year 2 FY: 90 Planned Costs: 9.0 FTE's: .1

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): MIT %: 100 ____ %: ____ ____ %: ____

Out Year 3 FY: 91 Planned Costs: 11.0 FTE's: .1

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): MIT %: 100 ____ %: ____ ____ %: ____

Past Fiscal Year FY: ____ Funds Obligated: 4.4 % Project Completed: 2
% Personnel: 38
% Project Support: 62

Funds Obligated with University: ____ University: ____

Accomplishments This Year: Storage of 3,383 objects was upgraded. Items were removed from inappropriate and deteriorating containers and stored in archival containers in standard storage cabinets.

Publications/Reports: ____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ____

RMP Project No.: C-006 Title: Complete Past Stabilization Reports
Activity No.: ____

Funded (Y/N)?: N Estimated Total Costs: 47.0 Start Date: 10 / 1 /90
End Date: 9 /30/92

Servicewide Issue Category Code(s): C03 Cultural Resource Type Code(s): SITE
____ ____ ____ ____

Contact Name: Jack E. Smith Phone: (303) 529-4510

Current Fiscal Year FY: __ Planned Costs This FY: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Work Planned This FY: ____

Out Year 1 FY: 90 Planned Costs: 15.0 FTE's: 0.7

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ___ ____ %: ___

Out Year 2 FY: 91 Planned Costs: 15.5 FTE's: 0.7

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ___ ____ %: ___

Out Year 3 FY: 92 Planned Costs: 16.5 FTE's: 0.7

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ___ ____ %: ___

Past Fiscal Year FY: __ Funds Obligated: 14.1 % Project Completed: 10
% Personnel: 60
% Project Support: 40

Funds Obligated with University: ____ University: ____

Accomplishments This Year: Documentation completed for two large cliff dwellings covering all available information on past stabilization.

Publications/Reports: Report in preparation.

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ___

RMP Project No.: C-007 Title: Stabilize Backcountry Ruins
Activity No.: _____

Funded (Y/N)?: Y Estimated Total Costs: 165.0 Start Date: 10 / 1 / 90
End Date: 9 / 30 / 92

Servicewide Issue Category Code(s): C05 N05 N08 Cultural Resource Type Code(s): SITE ___ ___ ___

Contact Name: Kathleen Fiero Phone: (303) 529-4510

Current Fiscal Year FY: 89 Planned Costs This FY: 40.0 FTE's: 1.8

PWE: 301 PWE: ____ Fund Source Code 1: CF 5 Funding: 40.0
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): MIT %: 66 RES %: 34 _____ %: ___

Work Planned This FY: Conduct necessary stabilization and mapping in 5 ruins in Navajo Canyon and in Spruce Tree House.

Out Year 1 FY: 90 Planned Costs: 50.0 FTE's: 2.0

PWE: 301 PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): MIT %: 70 RES %: 30 _____ %: ___

Out Year 2 FY: 91 Planned Costs: 55.0 FTE's: 2.0

PWE: 301 PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): _____ %: ___ _____ %: ___ _____ %: ___

Out Year 3 FY: 92 Planned Costs: 60.0 FTE's: 2.0

PWE: 301 PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): _____ %: ___ _____ %: ___ _____ %: ___

Past Fiscal Year FY: 88 Funds Obligated: 70.0 % Project Completed: 10
% Personnel: 70
% Project Support: 30

Funds Obligated with University: _____ University: _____

Accomplishments This Year: Seven prehistoric cliff dwellings were stabilized to prevent further deterioration.

Publications/Reports: Report in preparation.

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ____

RMP Project No.: C-008 Title: Preserve Historic Buildings
Activity No.: ____

Funded (Y/N)?: N Estimated Total Costs: 23.5 Start Date: 10/1/90
End Date: 9/30/92

Servicewide Issue Category Code(s): C05 N05 Cultural Resource Type Code(s): STRC ____ ____ ____

Contact Name: Jack E. Smith Phone: (303) 529-4510

Current Fiscal Year FY: __ Planned Costs This FY: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ____ ____ %: ____ ____ %: ____

Work Planned This FY: ____

Out Year 1 FY: 90 Planned Costs: 70.0 FTE's: 2.1

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): MIT 100 %: ____ ____ %: ____ ____ %: ____

Out Year 2 FY: 91 Planned Costs: 75.1 FTE's: 2.1

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): MIT100 %: ____ ____ %: ____ ____ %: ____

Out Year 3 FY: 92 Planned Costs: 80.0 FTE's: 2.1

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): MIT 100 %: ____ ____ %: ____ ____ %: ____

Past Fiscal Year FY: __ Funds Obligated: ____ % Project Completed: ____
% Personnel: ____
% Project Support: ____

Funds Obligated with University: ____ University: ____

Accomplishments This Year: ____

Publications/Reports: ____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ____

RMP Project No.: C-009 Title: Provide Controlled Environment for Museum Collections
Activity No.: ____

Funded (Y/N)?: N Estimated Total Costs: 90.0 Start Date: 10 / 1 / 90
End Date: 9 / 30 / 91

Servicewide Issue Category Code(s): C07 N23 Cultural Resource Type Code(s): ____ ____ ____ ____

Contact Name: Elizabeth Bauer Phone: (303) 529-4510

Current Fiscal Year FY: __ Planned Costs This FY: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Work Planned This FY: ____

Out Year 1 FY: 90 Planned Costs: 90.0 FTE's: Contract

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): PRO 100 %: ___ ____ %: ___ ____ %: ___

Out Year 2 FY: __ Planned Costs: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Out Year 3 FY: __ Planned Costs: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Past Fiscal Year FY: __ Funds Obligated: ____ % Project Completed: ___
% Personnel: ___
% Project Support: ___

Funds Obligated with University: ____ University: ____

Accomplishments This Year: ____

Publications/Reports: ____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ___ Park: MEVE Park Priority: ___

RMP Project No.: C-010 Title: Inventory Prehistoric Plaster
Activity No.: ___

Funded (Y/N)?: N Estimated Total Costs: 20.0 Start Date: 10/ 1/90
End Date: 9/30/91

Servicewide Issue Category Code(s): C02 Cultural Resource Type Code(s): SITE
___ ___ ___ ___

Contact Name: Elizabeth Bauer Phone: (303) 529-4510

Current Fiscal Year FY: __ Planned Costs This FY: ___ FTE's: ___

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Work Planned This FY: ___

Out Year 1 FY: 90 Planned Costs: 20.0 FTE's: Contract

PWE: 301 PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): RES %: 100 ___ %: ___ ___ %: ___

Out Year 2 FY: __ Planned Costs: ___ FTE's: ___

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Out Year 3 FY: __ Planned Costs: ___ FTE's: ___

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Past Fiscal Year FY: 88 Funds Obligated: 14.9 % Project Completed: 30
% Personnel: Contract
% Project Support: ___

Funds Obligated with University: ___ University: ___

Accomplishments This Year: Fifteen cliff dwellings were inventoried for plaster resources.

Publications/Reports: ___

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ___

RMP Project No.: C-011 Title: Restore Waters Cabin
Activity No.: _____

Funded (Y/N)?: N Estimated Total Costs: 60.0 Start Date: 10/ 1/90
End Date: 9/30/91

Servicewide Issue Category Code(s): C06 Cultural Resource Type Code(s): STRC
____ ____ ____

Contact Name: Jack E. Smith Phone: (303) 529-4510

Current Fiscal Year FY: __ Planned Costs This FY: _____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): _____ %: ___ _____ %: ___ _____ %: ___

Work Planned This FY: _____

Out Year 1 FY: 91 Planned Costs: 60.0 FTE's: Contract

PWE: ~~301~~ PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): MIT %: 100 _____ %: ___ _____ %: ___

Out Year 2 FY: __ Planned Costs: _____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): _____ %: ___ _____ %: ___ _____ %: ___

Out Year 3 FY: __ Planned Costs: _____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): _____ %: ___ _____ %: ___ _____ %: ___

Past Fiscal Year FY: __ Funds Obligated: _____ % Project Completed: ___
% Personnel: ___
% Project Support: ___

Funds Obligated with University: _____ University: _____

Accomplishments This Year: _____

Publications/Reports: _____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ___ Park: MEVE Park Priority: ___

RMP Project No.: C-012 Title: Impement Oral History Program
Activity No.: ___

Funded (Y/N)?: N Estimated Total Costs: 15.0 Start Date: 10/ 1/89
End Date: 9/30/90

Servicewide Issue Category Code(s): C03 N20 Cultural Resource Type Code(s): ETHN ___ ___ ___

Contact Name: Jack E. Smith Phone: (303)529-4510

Current Fiscal Year FY: __ Planned Costs This FY: ___ FTE's: ___

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Work Planned This FY: ___

Out Year 1 FY: 90 Planned Costs: 15.0 FTE's: 0.5

PWE: 301 PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): RES %: ___ ___ %: ___ ___ %: ___

Out Year 2 FY: __ Planned Costs: ___ FTE's: ___

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Out Year 3 FY: __ Planned Costs: ___ FTE's: ___

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Past Fiscal Year FY: __ Funds Obligated: ___ % Project Completed: ___
% Personnel: ___
% Project Support: ___

Funds Obligated with University: ___ University: ___

Accomplishments This Year: ___

Publications/Reports: ___

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ____

RMP Project No.: C-013 Title: Install Collections Security System
Activity No.: ____

Funded (Y/N)?: N Estimated Total Costs: 40.0 Start Date: 10/ 1/89
End Date: 9/30/90

Servicewide Issue Category Code(s): C13 N23 Cultural Resource Type Code(s): OBJC ____ ____ ____

Contact Name: Howard Dimont Phone: (303) 529-4461

Current Fiscal Year FY: __ Planned Costs This FY: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Work Planned This FY: ____

Out Year 1 FY: 90 Planned Costs: 40.0 FTE's: Contract

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): MIT %: 100 ____ %: ___ ____ %: ___

Out Year 2 FY: __ Planned Costs: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Out Year 3 FY: __ Planned Costs: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Past Fiscal Year FY: __ Funds Obligated: ____ % Project Completed: ___
% Personnel: ___
% Project Support: ___

Funds Obligated with University: ____ University: ____

Accomplishments This Year: ____

Publications/Reports: ____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ____

RMP Project No.: C-014 Title: Study Effects of Acid Rain
Activity No.: ____

Funded (Y/N)?: N Estimated Total Costs: 90.0 Start Date: 10/ 1/89
End Date: 9/30/92

Servicewide Issue Category Code(s): C03 Cultural Resource Type Code(s): SITE
____ ETRC OBJC ____

Contact Name: Jack E. Smith Phone: (303) 529-4510

Current Fiscal Year FY: __ Planned Costs This FY: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Work Planned This FY: ____

Out Year 1 FY: 90 Planned Costs: 25.0 FTE's: Contract

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: ___ ____ %: ___ ____ %: ___

Out Year 2 FY: 91 Planned Costs: 30.0 FTE's: Contract

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ___ ____ %: ___

Out Year 3 FY: 92 Planned Costs: 35.0 FTE's: Contract

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ___ ____ %: ___

Past Fiscal Year FY: __ Funds Obligated: ____ % Project Completed: ___
% Personnel: ___
% Project Support: ___

Funds Obligated with University: ____ University: ____

Accomplishments This Year: ____

Publications/Reports: ____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ____

RMP Project No.: C-015 Title: Study Fire Effects on Archeological Sites
Activity No.: ____

Funded (Y/N)?: N Estimated Total Costs: 30.0 Start Date: 10/ 1/89
End Date: 9/30/90

Servicewide Issue Category Code(s): C03 ____ Cultural Resource Type Code(s): SITE ____ ____ ____

Contact Name: Jack E. Smith Phone: (303) 529-4510

Current Fiscal Year FY: __ Planned Costs This FY: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Work Planned This FY: ____

Out Year 1 FY: 90 Planned Costs: 30.0 FTE's: Contract

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): RES %: 100 ____ %: ___ ____ %: ___

Out Year 2 FY: __ Planned Costs: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Out Year 3 FY: __ Planned Costs: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Past Fiscal Year FY: __ Funds Obligated: ____ % Project Completed: ___
% Personnel: ___
% Project Support: ___

Funds Obligated with University: ____ University: ____

Accomplishments This Year: ____

Publications/Reports: ____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ____

RMP Project No.: C-016 Title: Install Fire Protection in Museums
Activity No.: ____

Funded (Y/N)?: N Estimated Total Costs: 80.0 Start Date: 10/ 1/89
End Date: 9/30/91

Servicewide Issue Category Code(s): C06 ____ Cultural Resource Type Code(s): OBJC STRC ____ ____

Contact Name: Jack E. Smith Phone: (303) 529-4510

Current Fiscal Year FY: __ Planned Costs This FY: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Work Planned This FY: ____

Out Year 1 FY: 90 Planned Costs: 40.0 FTE's: Contract

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): MIT %: 100 ____ %: ___ ____ %: ___

Out Year 2 FY: 91 Planned Costs: 40.0 FTE's: Contract

PWE: 301 PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): MIT %: 100 ____ %: ___ ____ %: ___

Out Year 3 FY: __ Planned Costs: ____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: ____ Funding: ____
Fund Source Code 2: ____ Funding: ____

Activity Type Code(s): ____ %: ___ ____ %: ___ ____ %: ___

Past Fiscal Year FY: __ Funds Obligated: ____ % Project Completed: ___
% Personnel: ___
% Project Support: ___

Funds Obligated with University: ____ University: ____

Accomplishments This Year: ____

Publications/Reports: ____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ____ Park: MEVE Park Priority: ___

RMP Project No.: C-017 Title: Preserve Historic Documents
Activity No.: _____

Funded (Y/N)?: N Estimated Total Costs: 30.0 Start Date: 10/ 1/89
End Date: 9/30/90

Servicewide Issue Category Code(s): C07 Cultural Resource Type Code(s): OBJC
____ ____ ____ ____

Contact Name: Jack E. Smith Phone: (303) 529-4510

Current Fiscal Year FY: __ Planned Costs This FY: _____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): _____ %: ___ _____ %: ___ _____ %: ___

Work Planned This FY: _____

Out Year 1 FY: 90 Planned Costs: 30.0 FTE's: 1.0

PWE: 301 PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): RES %: 100 _____ %: ___ _____ %: ___

Out Year 2 FY: __ Planned Costs: _____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): _____ %: ___ _____ %: ___ _____ %: ___

Out Year 3 FY: __ Planned Costs: _____ FTE's: ____

PWE: ____ PWE: ____ Fund Source Code 1: _____ Funding: _____
Fund Source Code 2: _____ Funding: _____

Activity Type Code(s): _____ %: ___ _____ %: ___ _____ %: ___

Past Fiscal Year FY: __ Funds Obligated: _____ % Project Completed: ___
% Personnel: ___
% Project Support: ___

Funds Obligated with University: _____ University: _____

Accomplishments This Year: _____

Publications/Reports: _____

Annual Project Status and Accomplishments Report

Region: RM Reg. Priority: ___ Park: MEVE Park Priority: ___

RMP Project No.: C-018 Title: Prepare Collections Emergency Plan
Activity No.: ___

Funded (Y/N)?: N Estimated Total Costs: 28.0 Start Date: __/__/__
End Date: __/__/__

Servicewide Issue Category Code(s): C04 Cultural Resource Type Code(s): OBJC
___ ___ ___ ___

Contact Name: Jack E. Smith Phone: (303) 529-4510

Current Fiscal Year FY: __ Planned Costs This FY: ___ FTE's: ___

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Work Planned This FY: ___

Out Year 1 FY: 90 Planned Costs: 28.0 FTE's: 1.0

PWE: 301 PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): MIT %: ___ ___ %: ___ ___ %: ___

Out Year 2 FY: __ Planned Costs: ___ FTE's: ___

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Out Year 3 FY: __ Planned Costs: ___ FTE's: ___

PWE: ___ PWE: ___ Fund Source Code 1: ___ Funding: ___
Fund Source Code 2: ___ Funding: ___

Activity Type Code(s): ___ %: ___ ___ %: ___ ___ %: ___

Past Fiscal Year FY: __ Funds Obligated: ___ % Project Completed: ___
% Personnel: ___
% Project Support: ___

Funds Obligated with University: ___ University: ___

Accomplishments This Year: ___

Publications/Reports: ___

Park: MEVE
Region: RM
Total Park FTE: 77.9

TABLE 1--PERSONNEL

Type of Employee	Number of NPS Employees by % Time Spent				FTEs of Resources Work	
	1%-74%		75%-100%			
	Natural	Cultural	Natural	Cultural	Natural	Cultural
Research Scientists (i.e., Research Grade Evaluation and Research Grant Administration personnel)	0	0	0	0	0	0
Resources Specialists (e.g., 170, 190, 193, 401, 404, 430, 808, 1015, 1016, 1215,	0	0	0	6	0	5.1
025 - Resources Management	4	0	2	1	2.5	8.2
025 - Resources Protection	10	10	5	0	2.2	0
025 - Resources Interpretation	35	0	0	35	1.0	13.6
Maintenance	6	5	0	0	1.0	2.3
Others Support	0	0	0	7	0	4.0
TOTAL	60	15	7	49	6.7	33.2

Park: MEVE

Region: RM

TABLE 2 - NATURAL & CULTURAL RESOURCES FUNDING

($ in thousands)

		Nat./Cul. Resources Funding by Expense Type		Nat./Cul. Resources Funding by Activity Type				
Funding Source	Total for Resource Activities	Personnel	Project Support	Research/ Documentation	Mitigation/ Treatment	Monitoring	Protection	Program Adm./ Training
NF01	68.0	57.0	7.0	4.0	5.0	25.0	25.0	9.0
NF07	2.5	0	2.5	-	-	2.5	-	-
NF09	59.0	32.6	26.4	-	-	-	55.0	4.0

Park: MEVE

Region: M

TABLE 2 - NATURAL & CULTURAL RESOURCES FUNDING

($ in thousands)

		Nat./Cul. Resources Funding by Expense Type		Nat./Cul. Resources Funding by Activity Type				
Funding Source	Total for Resource Activities	Personnel	Project Support	Research/ Documentation	Mitigation/ Treatment	Monitoring	Protection	Program Adm./ Training
CF1	186.3	159.1	27.1	51.3	89.5	2.0	25.0	43.5
CF5	128.9	88.9	39.7	23.9	103.5	1.5	-	1.0
CF9	32.2	Contract	-	13.1	18.1	0.0	-	11.0

FY: 88
Park: MEVE
Region: RM

PROGRAMMING SHEET 1
FUNDED ACTIVITIES
($ in Thousands)

Issue Code	Cult. Res. Code	RMP Proj #	Project Title	Fund Source Code	Activ Type Code	Funding/FTE's Current FY $	/FTE	Out Year 1 $	/FTE	Out Year 2 $	/FTE	Out Year 3 $	/FTE
C02	SITE	C-001	Conduct Annual Maintenance of 32 Ruins	CF 1	MIT	47.0	2.6						
C02	OBJC	C-002	Catalog Museum Collection	CF 5	MIT	54.0	2.0						
C02	OBJC	C-004	Conduct Annual Collections Inventory	CF 1	RES	2.6	0.1						
C05	SITE	C-007	Stabilize Backcountry Ruins	CF 5	MIT	40.0	1.8						

FY: 88
Park: MEVE
Region: RM

PROGRAMMING SHEET 2
UNFUNDED ACTIVITIES
($ in Thousands)

Issue Code	Cult. Res. Code	RMP Proj #	Park Pri	Project Title	Fund Source Code	Activ. Type Code	Funding/FTE's Start FY $ /FTE	Out Year 1 $ /FTE	Out Year 2 $ /FTE	Out Year 3 $ /FTE
C02	OBJC	C 003	1	Computerize Catalog Backlog		RES				
C02	OBJC	C 005	2	Upgrade Storage and Exhibits		MIT				
C03	SITE	C 006	3	Complete Stabilization Reports		MON				
C04	STRC	C 008	4	Preserve Historic Buildings		MIT				
C05	OBJC	C 009	5	Install Environmental Controls		MIT				
C07	SITE	C 010	6	Inventory Prehistoric Plaster		RES				
C06	STRC	C 011	7	Restore Waters Cabin		MIT				
C03	ETHN	C 012	8	Implement Oral History Program		RES				
C13	OBJC	C 013	9	Install Security System		MIT				
C03	COMB	C 014	10	Study Effects of Acid Rain		RES				
C03	SITE	C 015	11	Study Fire Effects		RES				
C06	OBJC	C 016	12	Install Fire Protection		MIT				
C07	OBJC	C 017	13	Preserve Historic Documents		MIT				
C04	OBJC	C 018	14	Prepare Emergency Plan		RES				

PARK CULTURAL RESOURCES STATUS SUMMARY CHARTS

SUMMARY CHART FOR SITES

MEVE

Significance		Condition					Impacts				Documentation		
	Total	Good	Fair	Poor	Des	Unk	Severe	Mod	Low	Unk	Good	Fair	Poor
Nat.	3908			3908			66	3842			2000	728	90
St. & Reg													
Local													
Not Eval.													
TOTALS	3908			3908			66	3842			2000	728	90

SUMMARY CHART FOR STRUCTURES

Significance		Condition				Impacts				Documentation		
	Total	Good	Fair	Poor	Unk.	Severe	Mod.	Low	Unk.	Good	Fair	Poor
National	46	39	7					46		46		
State	30	19	11					30		12	18	
Local	1			1				1		1		
Undetermined												
TOTALS	77	58	18	1				77		59	18	

SUMMARY CHART FOR OBJECTS

Documentation	ARCH	ETHN	HIST	ARCHV	BIOL	PALEO	GEOL	TOTAL
Registration Data Only	∅	∅	∅	∅	∅	∅	∅	∅
Registration & Catalog Data	1,301,296	1,000	1,000	900	5,000	750	235	1,310,181
Total Items Cataloged	1,301,296	1,000	1,000	900	5,000	756	235	1,310,181
Backlog to be Cataloged	222,602	55	1,044	2,000	5,173	263	10	231,147
Total Collection Summary	1,523,898	1,055	2,044	2,900	10,173	1,013	245	1,541,328

Condition	ARCH	ETHN	HIST	ARCHV	BIOL	PALEO	GEOL
Excellent (%)	1%	5%	2%	∅	1%	∅	∅
Good (%)	60%	80%	49%	97%	20%	99½%	100%
Fair (%)	36%	14%	49%	3%	74%	½%	∅
Poor (%)	3%	1%	∅	∅	5%	∅	∅
Unknown (%)	∅	∅	∅	∅	∅	∅	∅

CULTURAL RESOURCE DOCUMENTATION CHECKLIST

Place an X in the appropriate column.

TITLE	CURRENT AND APPROVED	INCOMPLETE; NEEDS REVISION OR UPDATING	NEEDED
PLANNING DOCUMENTS			
Preauthorization and Authorization	X		
Statement for Management (SFM)	X		
Outline of Planning Requirements (OPR)	X		
General Management Plan (GMP)	X		
Development Concept Plan (DCP)	X		
Resources Management Plan (RMP)		X	
Interpretive Prospectus (IP)	X		
SERVICEWIDE INVENTORIES, LISTS, CATALOGS, AND REGISTERS			
Cultural Resources Bibliography (CRBIB)		X	
Cultural Sites Inventory (CSI)		X	
List of Classified Structures (LCS)		X	
National Catalog of Museum Objects		X	
National Register of Historic Places		X	
BASIC CULTURAL RESOURCE DOCUMENTS			
Archeological Overview and Assessment	X		
Archeological Identification Studies	X		
Archeological Evaluation Studies	X		
Ethnographic Overview and Assessment			X
Ethnographic Oral Histories & Life Histories		X	
Ethnographic Program			X

CULTURAL RESOURCE DOCUMENTATION CHECKLIST

TITLE	CURRENT AND APPROVED	INCOMPLETE; NEEDS REVISION OR UPDATING	NEEDED
BASIC CULTURAL RESOURCE DOCUMENTS (cont.)			
Historical Base Map		X	
Historic Resource Study (HRS)	X		
Park Administrative History		X	
Scope of Collection Statement	X		
SPECIAL RESOURCE STUDIES AND PLANS			
Archeological & Ethno. Collections Studies		X	
Archeological Data Recovery Studies		X	
Collection Management Plan	X		
Collection Storage Plan	X		
Collection Condition Survey	X		
Cultural Landscape Report (CLR)			X
Ethnohistory			X
Exhibit Plan			X
Historic Furnishings Report	N/A		
Historic Structure Preservation Guide (HSPG)			X
Historic Structure Report			X
Social Impact Study			X
Special History Study			X
Traditional Use Study			X

Note: See NPS-28, Chapter 2, for a description of each inventory or study.

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