United States Department of the Interior

NATIONAL PARK SERVICE
Chiricahua National Monument
Dos Cabezas Route Box 6500
Willcox, Arizona 85643

IN REPLY REFER TO:

N16

November 20, 1990

Memorandum

To: Regional Director, Western Region

Through: General Superintendent, Southern Arizona Group 11/29

From: Superintendent, Chiricahua National Monument
Fort Bowie National Historic Site

Subject: **Revised Natural and Cultural Resources Management Plan for Chiricahua National Monument**

Enclosed is the revised Natural and Cultural Resources Management Plan for Chiricahua National Monument. It represents the current resources management program for the monument and the priority areas which are in need of attention.

It has incorporated comments from all divisions chiefs in the monument, the Southern Arizona Group Office, the CPSU/University of Arizona, the WRO Division of Research and Resources Management, the WRO Division of Cultural Resources, the WASO Division of Cultural Resources, the WASO Division of Air Quality, the WASO Branch of Mining and Minerals and the WASO Water Quality Division.

I would like to thank all who were involved in the review and revision of this plan, especially Dr. Dennis B. Fenn, for their time and effort.

We look forward to your approval or comments on this revised plan. If you have any questions please contact Resources Management Specialist Dick Anderson at (602) 824-3560.

David E. Moore

Enclosure

cc:
General Superintendent, SOAR, w/ encl.
Unit Leader, CPSU/UA, w/ encl.

United States Department of the Interior
NATIONAL PARK SERVICE
WESTERN REGION
600 HARRISON STREET, SUITE 600
SAN FRANCISCO, CALIFORNIA 94107

IN REPLY REFER TO:

D18(WR-RN)

June 4, 1991

Memorandum

To: Superintendent, Chiricahua NM

Through: General Superintendent, Southern Arizona Group

From: ACTING Regional Director, Western Region

Subject: Chiricahua NM Resources Management Plan

Enclosed is a signed copy of the Chiricahua National Monument Resources Management Plan. We recognize that this represents the culmination of a great deal of hard work by you and your staff; Denny Fenn (ex-CPSU Unit Leader at University of Arizona); Western Regional Office staff; and others who participated in the scoping session convened to identify the range of resource issues facing the park.

This memorandum constitutes approval of the plan, although its individual project statements have not yet undergone thorough peer review and therefore the specifics contained in them are not yet endorsed by us. The highest priority projects are being sent out for peer review, and the results of this review will be sent to you by December 15, 1991 for your consideration in the next update of the plan.

Congratulations to all that contributed to this plan. It will serve Chiricahua NM well in addressing the resource management challenges it faces.

Enclosure

cc: See list on next page

cc:
Associate Director, Natural Resources, WASO, w/enc.
Associate Director, Cultural Resources, WASO w/enc.
Chief, Air Quality Division, WASO, w/enc.
Chief, Water Resources Division, WASO, w/enc.
Chief, Geographic Information System Division, WASO w/o/enc.
Chief, Mining and Minerals Branch, WASO, w/o/enc.
CPSU Unit Leader, University of Arizona, w/enc.
Chief, Div. of Park Historic Preservation, Western Region, w/enc.
Chief, Div. of Natural Resources and Research, Western Region, w/3 copies of enc.
Chief, Div. of Planning, Grants, & Environmental Quality, Western Region w/enc.
Museum Collections Repository, WACC, w/enc.
NPS Archives, Harpers Ferry Center, w/enc.
Technical Information Center (DSC-PGT) w/enc.

Natural and Cultural Resources Management Plan

Chiricahua National Monument

Recommended By:

David R. Moore

Superintendent, Chiricahua National Monument — 11/20/90 Date

Concurred With:

Robert A. Cunningham

General Superintendent, Southern Arizona Group — 11-29-90 Date

Approved By:

Byron Albert

ACTING Regional Director, Western Region — 4/10/91 Date

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INTRODUCTION

Chiricahua National Monument is located in Cochise County, Arizona about 128 miles southeast of Tucson. The monument was established on April 18, 1924 by Presidential Proclamation (No. 1692, 43 Stat. 1946) under the authority of the Antiquities Act to protect the unique rock formations in a setting of steep, wooded drainages. It is within the fifth Congressional District.

In 1933, all national monuments were transferred from their previous agencies to the National Park Service (Executive Order No. 6166, Section 2, August 10, 1933). Chiricahua National Monument was transferred from the U.S. Forest Service to the NPS. In 1938, government lands adjacent to the monument were added as "...required for the proper care and management of the objects of historic and scientific interest..." by Presidential Proclamation (No. 2288, June 10, 1938, 52 Stat. 1551). In 1976, Congress designated 9,440 acres of Chiricahua National Monument as wilderness and 2 acres as potential wilderness (October 20, 1976, 90 Stat. 2692). In 1979, the boundaries were again enlarged by an Act of Congress--the Faraway Ranch addition of 440 acres (November 10, 1978, 92 Stat. 3473, Sec. 301). The final boundary change came in 1984 with an Act of Congress (August 28, 1984, 98 Stat. 1491, Sec. 105) which stipulated that the latest addition of approximately 850 acres "...shall be administered by the National Park Service as wilderness." This brought the monument to a total size of 11,985 acres, with a wilderness zone totalling 10,290 acres.

There is only one private parcel in the monument, a tract of 2.42 acres, in the northeast corner which is part of an adjacent 150 acre patented mining claim.

While preservation of geologic resources was the impetus to create the monument, the importance of both the natural setting and cultural history are recognized as integral to the management of the unit.

The natural environment in this rich and varied area includes woodlands, canyons with erosion sculpted rock formations, riparian corridors, chaparral hillsides and grassy meadows. It provides shelter and sustenance to a host of resident and migratory wildlife including some species very rare to the United States. It also provides an aesthetic setting for the visitor and for the interpretation of geological and biological processes.

The cultural resources of Chiricahua National Monument include historic and prehistoric Indian sites and artifacts, an 1800s military encampment, early settlers' homes and artifacts, CCC-

built structures, records of early visitor experiences and historic NPS administration.

This Natural and Cultural Resources Management Plan is a revision of the original plan. Subsequent updates were done in February 1980 and September 5, 1986. In developing this current plan, an interdisciplinary approach was used with a team of cultural and natural resources managers and scientists. The program, as a result, was enhanced.

The Resources Management Plan guides the resources management program at Chiricahua National Monument in accordance with the monument's management objectives. It identifies resource issues and proposes strategies to deal with these problems or threats. These strategies often include a mix of research, monitoring, and mitigation projects. The plan was prepared in conjunction with other monument documents in order to be consistent with the purposes for establishment and with operational plans.

Management Objectives

Management objectives are derived from such documents as the enabling legislation, executive orders, treaties, and general environmental and cultural legislation. Following is a summary of the current resource-related management objectives, as outlined in the Statement for Management of May 1987:

-- to identify, protect and perpetuate the geological formations, flora, fauna and wilderness values,

-- to preserve and manage lands designated as wilderness,

-- in cooperation with the Forest Service, to manage fire as a natural process affecting ecological resource conditions in the monument,

-- to work with outside agencies and landowners to eliminate adverse impacts to monument resources,

-- to restore natural qualities to impacted sites within the monument,

-- to preserve the scenic qualities of the monument; to protect and preserve air quality related values,

-- to develop a baseline of air quality information and provide an early warning detection for air quality impacts,

-- to identify, preserve and interpret the aspects of human activities and events, and

-- to seek and gather objects and information which have significance to the monument's cultural resources.

Purpose of the Resources Management Plan

This Resources Management Plan is to act as a vehicle for meeting the above stated management objectives. Additional purposes for this plan are as follows:

-- to summarize the resource values and purposes for which the monument was established, and to summarize other resource values for which the monument is legally responsible,

-- to analyze the significance of resource management needs and problems, and to rank their importance,

-- to propose specific actions, including dollars and FTEs, for dealing with the most important and urgent needs and problems,

-- to develop a multi-year program for achieving measurable progress on the proposed actions, and

-- to measure the effectiveness of actions by annual reviews and to record accomplishments.

PRESENT RESOURCE STATUS

Natural Resource Baseline Information

The status of Chiricahua National Monument's resource information base is inadequate for the job at hand because so little information exists. The major focus of the natural resources section of this plan is the development of adequate baseline data for the monument.

The level of baseline information in past and current studies is inadequate to understand the natural resources or to guide proper long-term management. Consequently, many of the natural resources project statements listed within this plan are designed to provide baseline data for the monument.

Currently, the natural resource database is comprised of the following information:

-- A flora of the monument completed by Timothy Reeves as a masters project at ASU in April 1976 (does not include 1,290 acres later added to the monument),

-- A vegetation map completed by Roseberry and Dole in 1939 with a plant list,

-- Permanent vegetation plots established by Dr. William Moir in 1974 for long-term monitoring (only re-read once, in 1988),

-- Geological studies conducted in 1988 and 1989 by Dr. John Pallister and Dr. Edward du Bray of the USGS centering on the Turkey Creek Caldera south of the monument but with mapping and sampling in the monument,

-- Black and white aerial photographs obtained from the EROS Data Center, USGS (photo dates of 1958, 1970, 1973 and 1976),

-- Black and white aerial photographs obtained from Cooper Aerial Surveys, Tucson in 1979,

-- A natural history study collection maintained in the monument consisting of a good herbarium and assorted zoological and geological specimens,

-- Wildlife observation cards, Form 10-257, maintained on file providing perhaps the only long-term view of wildlife occurrences in the monument,

-- A fire history study of Rhyolite Canyon completed by Dr. Thomas Swetnam in 1989,

-- A fire ecology study completed by Vigil in 1985,

-- A checklist of mammals completed by Dirk Lanning,

-- A checklist of birds completed by Richard Hibbard in 1983,

-- A checklist of snakes completed by Dr. Henry Lunsford, and

-- A checklist of amphibians, turtles and lizards completed by Michael Sipes in 1975.

Natural Resources

As stated above, there is a lack of basic data about the monument's natural resources. This makes a definitive assessment of the condition of these resources impossible. We are aware, however, of several issues which require attention. The most significant natural resource issues are listed below.

Modification of Plant Communities -- There are indications that native plant communities have been altered by human activities, particularly (a) suppression of lightning-ignited fires, (b) invasion of non-native plants, (c) air pollution and (d) historic grazing activities.

Impacts of Adjacent Land Use -- Concerns over adjacent land use center on (a) trespass cattle grazing, (b) mining, and (c) the threat of increased development adjacent to the monument.

(a) Trespass cattle grazing is a current problem. The monument is bordered by private ranches and Forest Service grazing allotments. The rugged terrain makes it difficult to maintain and monitor boundary fences. Some sections of the monument boundary have not been fenced.

(b) There is a concern over impacts from mining activities on private land at the headwaters of Bonita Creek in the northeast corner of the monument.

(c) There is a threat of increased development on adjacent lands which would result in direct and indirect impacts including: feral animals, fuelwood cutting, traffic, sub-divisions, water demands and visual intrusions to the natural setting. The national monument makes up only 11,985 acres of the Chiricahua Mountains. As adjacent lands are more intensively developed and more heavily used, the natural habitats in the monument will be insufficient to maintain the present biodiversity of the ecosystem.

Deterioration of Air Quality Related Values -- Chiricahua National Monument is near four large copper producing areas. The smelter at Douglas, Arizona, about 50 miles south, has recently stopped production. A second, at Morenci, Arizona, is about 70 miles north. A third, at Cananea, Sonora, Mexico, is about 95 miles southwest. A fourth, at Nacozari, Sonora, Mexico, is about 95 miles south. Copper smelters are large point-source polluters. Visibility impairment and biological effects are a concern.

Lack of Basic Biodiversity Data and Insufficient Understanding of Monument Ecosystems -- This lack of data constitutes a threat in itself. Without an understanding of the natural processes in the monument, threats can go unrecognized and resource management activities can be inadequate or misguided.

Cultural Resource Baseline Information

Cultural baseline information includes the following:

Archeological Sites -- Chiricahua National Monument, with 11,985 acres, has not been completely surveyed for archeological sites. The Faraway Ranch area has been surveyed (Baumler 1984). See the Summary Chart for Sites, Appendix 1.

Structures -- There are 26 structures on the List of Classified Structures. There are 12 structures on the National Register of Historic Places. See the Summary Chart for Structures, Appendix 1.

Objects -- Archeological material recovered from the area, and historic furnishings from the Faraway Ranch and its outbuildings make up the cultural collection. These items are either on exhibit in the monument, in the monument's collections storage room, or stored and curated at the Museum Collections Repository, Western Archeological and Conservation Center, Tucson, Arizona. All items are, or will be, entered into the NPS Automated National Catalog System, ANCS, for records access at the monument level. See the Summary Chart for Objects in Appendix 1 for cataloging status.

Cultural Landscapes -- The Faraway Ranch Historic District contains several structures on the National Register of Historic Places, however, the ranch has never been evaluated for significance or quality of cultural landscape. Within the Faraway Ranch Historic District are the Faraway Ranch, the Stafford Cabin, and Camp Bonita. The CCC Camp at Silver Spur Meadow is not in the Faraway Ranch Historic District. See the Summary Chart for Cultural Landscapes in Appendix 1.

Ethnographic Resources -- The Chiricahua Apache community was significant in the history of the monument. Today, however, Native Americans make no specially authorized (legislative or policy-based) use of cultural or natural resources.

Cultural Resources

The monument's cultural resources are threatened by some of the same issues that are threatening its natural resources (air pollution, non-native plants and the alteration of the monument's natural fire regime) as well as certain other issues as described below.

Acid Rain Damage to Cultural Resources -- Chiricahua National Monument is near four large copper producing areas -- Douglas (currently inoperative), Morenci, Cananea and Nacozari. Erosive damage to cultural resources is a concern.

Invasion of Non-Native Plants -- Non-native species accompanying human occupation have invaded the monument with varying degrees of impact to pre-existing fauna and flora. Some non-native species are historic cultivars (cultivated plants) and are important elements of the cultural resources of the monument. Their preservation in the historic zone is threatened by weedy non-natives. Also the cultural landscape in the historic zone is impacted by non-native plant species.

Change in the Cultural Landscape -- The suppression of lightning-ignited fires is likely causing changes in the vegetation community away from the historic landscape. Prescribed burning may be indicated as a rehabilitation treatment.

Visitor Impacts -- The limits of acceptable change may be exceeded by visitor impacts. Enhanced notoriety and popularity of the monument has resulted in increased visitation. The physical visitor impacts may cause a strain on the natural and cultural resources, the facilities and the quality of the visit.

Erosion of Cultural Resources -- Loss of archeological and historic artifacts is a concern as these resources are irreplaceable. The location and significance of many sites are not known since a monument-wide archeological survey has never been conducted. It is unknown what artifacts have been exposed and threatened by loss to weathering and theft.

Wildlife Impacts -- Burrowing rodents have damaged historic structures. Insects are a threat to historic furnishings and other collections. The monument's integrated pest management (IPM) program needs to address each of these threats to cultural resources.

Cultural Context/Theme

The major cultural themes for the monument have been identified in the Annual Statement for Interpretation (1990) as the following:

The Native American Story -- The Chiricahua Apaches and their predecessors occupied this area before the colonial period.

The Military Story -- Nineteenth century military history is woven into the settlement period of Bonita Canyon.

Pioneer Ranching in Bonita Canyon -- Neil Erickson, an early rancher, made a historic link to the national monument establishment.

The Role of the CCC -- The Civilian Conservation Corps, CCC, of the 1930s had a camp in Chiricahua National Monument at Silver Spur Meadow. Remnants of the camp can still be found. The CCC constructed roads, trails, residences, the headquarters and visitor center building, maintenance facilities, campground facilities, and other physical improvements.

RESOURCES MANAGEMENT PROGRAM

Overview of Current Program and Needs

Current staffing levels are sufficient to allow for the continuation of minimal levels of resource management. This includes such ongoing activities as limited prescribed burns; air quality monitoring; integrated pest management; input to fire suppression, hazard tree, and other programs to assure that impacts on natural ecosystems are minimized; curation of study collections; preservation of artifacts on display in historic buildings; and historic buildings maintenance and preservation. Funding for these comes from FIREPRO, the Air Quality Division, cyclic maintenance, repair and rehabilitation funds, the housing account, and base funding.

The base funding includes salary and benefits of one resource management specialist to handle both Chiricahua National Monument and Fort Bowie National Historic Site, but includes little support money. Additional resource management is conducted by the Faraway Ranch ranger whose position is largely curatorial, and the chief ranger who implements the fire and air quality programs. See Table 1 (Personnel) and Table 2 (Funding).

The Western Archeological and Conservation Center, WACC, provides assistance in curation of museum objects and with archeological clearances. The Cooperative National Park Resources Studies Unit at the University of Arizona, CPSU/UA, provides assistance with natural resources research issues. The Southern Arizona Group Office, SOAR, provides natural and cultural resources management and planning assistance. Most of this assistance, however, is predicated on project specific funding rather than on base funded activities.

Natural Resource Program Needs -- Current staffing and support levels only allow minimal progress toward addressing the monument's priority natural resource issues. The following long-range strategies will be pursued to address these issues as funding becomes available.

-- Modification of Plant Communities -- Some fire history research has been conducted to establish the historic role of fire in the monument. A limited prescribed fire program is underway to begin reducing unnaturally high fuel levels resulting from past fire suppression. Much remains to be done, however, before we understand how fire suppression, grazing and air pollution have modified the monument's native plant communities. Only with this knowledge can we successfully manage a program to restore natural fire regimes to the monument.

The long-range strategy for addressing this issue calls for (a) analyzing vegetation changes and trends over the past 80 years (N-06), (b) additional fire history research to determine natural fire frequencies and intensities (N-11), (c) fire ecology research to determine how changes in fire regimes have modified plant community structure and how prescribed natural fires and prescribed burns should be used to mitigate these impacts (N-10), (d) research on impacts of air pollution on native plant communities (N-17), (e) completion of a revised Fire Management Plan, and (f) full implementation of a prescribed burn and prescribed natural fire program to restore native plant communities and to begin simulating natural fire regimes (N-07).

-- Impacts of Adjacent Land Use -- Some fencing has been done to reduce trespass grazing impacts in the monument, but certain sections of fence are aging and some areas of the monument remain unfenced. This has contributed to problems of trespass grazing, illegal wood gathering and poaching. The long-range strategy for addressing this issue is to (a) survey the 1984 boundary addition which added 850 acres to Bonita Creek drainage, (b) construct boundary fences along the surveyed lines, connecting with existing boundary fences, (c) identify suspect portions of existing boundary fence, resurvey these portions of boundary line and reconstruct fence along proper lines, (d) identify aging sections of boundary fence in need of reconstruction and rebuild these portions, (e) install new boundary markers along the entire monument boundary as necessary, and (f) remove the old boundary fences in areas where boundary changes have occurred (N-05).

The concern over possible impacts from mining activities on the private land at the headwaters of Bonita Creek in the northeast corner of the monument are being addressed by (a) carefully monitoring activities to forestall possible problems, and (b) working closely with the NPS Mining and Minerals Branch to determine other appropriate actions to protect monument resources (N-04B).

The threat of increased development on adjacent lands is being addressed through (a) carefully monitoring air quality, (b) carefully monitoring Coronado National Forest, Bureau of Land Management and Cochise County planning processes and (c) working closely with these agencies and potential developers to minimize possible impacts on the monument's resources (N-01 and I-02).

-- Deterioration of Air Quality Related Values -- Chiricahua National Monument is a class I area under the Clean Air Act and is mandated to protect its air quality related values. A substantial air quality monitoring program is underway to

monitor acid precipitation, visibility and airborne particulates in the monument (N-01). The long-range strategy is to expand this effort by (a) conducting research on the effects of pollutants on the monument's biological resources and initiating a long-term biological effects monitoring program (N-17), (b) monitoring ozone and night sky visibility (N-01), and (c) working with county, state, federal and Mexican agencies to control pollutant levels and protect air quality related values.

-- Lack of Basic Data and Insufficient Understanding of Park Ecosystems and Biodiversity -- As discussed under the Natural Resource Baseline Information section of this plan, there is inadequate data available to understand the natural resources or to guide their proper long-term management. The long-range strategy to address this issue is to (a) inventory important monument resources, (b) develop monitoring protocols for selected species, geologic features and other resource components, (c) train staff in the proper implementation of these protocols, (d) initiate long-term monitoring efforts, (e) develop a geographic information system to store and analyze the inventory information gathered, and (f) once a series of monitoring efforts have been initiated, integrate the individual protocols into a unified long-term monitoring program.

This long-range strategy has been translated into a series of project statements in the following priority order:

1. N-09 Conduct an Inventory and Assessment of Plants
2. N-13 Conduct an Inventory and Assessment of Birds
3. N-14 Conduct an Inventory and Assessment of Non-Native Species
4. N-15 Conduct an Inventory and Assessment of Invertebrates
5. N-18 Conduct an Inventory and Assessment of Mammals
6. N-20 Conduct an Inventory and Assessment of Amphibians and Reptiles
7. N-21 Conduct an Inventory and Assessment of Soils
8. N-22 Conduct an Inventory and Assessment of Geology

<u>Cultural Resource Program Needs</u> -- Current staffing and support levels are similarly insufficient to make significant progress toward addressing the monument's highest priority cultural resource issues. The following long-range strategies will be pursued to address these issues as funding becomes available.

-- Deterioration of Historic Structures -- The Stafford Cabin was not included in the restoration project for the Faraway Ranch. It pre-dates the Faraway Ranch and is on the National Register of Historic Places. It is deteriorating from lack of upkeep, carpenter ants, termites, wood rot, rodent burrows and weathering. In 1990, a historic report

and an architectural report were begun for the cabin under regional funding. These will make up a Historic Structures Report, HSR. The reports will guide the stabilization and restoration effort by identifying the interpretive time frame, theme and architectural restoration needed (C-02). In the meantime, basic stabilization is needed. The long-range strategy is to (a) monitor for major structural damage such as loss of the chimney or main support beams, (b) trap-out rodents whenever they are observed, (c) use integrated pest management, IPM, to halt structural loss to termites and carpenter ants, and (d) once the reports becomes available, stabilize and restore the cabin.

-- Need for Cultural Resources Planning Documents -- Several planning documents are incomplete. Their completion is given high priority in this plan. The long-range strategy for completion of these plans is to (a) request regional funding through the Cultural Resources Preservation Program and the Cultural Cyclic Maintenance Program for the Denver Service Center to complete the Historic Structures Preservation Guide, HSPG, (C-04) and the Architectural Section of the HSR for Faraway Ranch (C-05), (b) cooperate with the regional office to complete the Collections Management Plan (C-03), (c) cooperate with WACC to complete a cultural resources base map in-house (C-06) and (d) complete an administrative history of the monument in-house (C-09).

-- Loss of Historic Cultivars (cultivated plants) -- The Faraway Ranch was abandoned in 1977. In the mid-1980s the National Park Service conducted a major project to restore the buildings but not the grounds. Most of the cultivars have died out from the garden, the outbuildings and the orchards. However, a few fruit trees have survived in remnant orchards and are in need of preservation before their historic strains are lost. The long-range strategy is to (a) identify the surviving historic cultivars in the Faraway Ranch Historic District, (b) identify appropriate locations for maintaining representatives of the plants, (c) take cuttings from surviving plants and grow them both in an in-monument nursery (I-04) and the newly selected site in the ranch area, (d) maintain the living representatives of the ranching era (C-07) and (e) interpret the historic cultivars (I-05) as well as the historic buildings of the Faraway Ranch.

-- Damage to Unknown Archeological and Historical Sites -- The monument is rich with history of the Chiricahua Apaches and earlier cultures. The historic zone is also rich in Black and Anglo cultural history, including nineteenth century military and settlers and twentieth century government administration. A survey of archeological and historical

sites has not been done. The long-range strategy for protecting and identifying sites is to (a) summarize existing knowledge of known sites (C-06), (b) prioritize areas to be surveyed, (c) perform cursory surveys with monument staff, (d) perform detailed surveys of promising areas with service archeologists (C-10) and (e) integrate new information in a geographic information system (N-16).

Other Issues That Cannot Be Addressed With Current Staffing and Funding Levels -- There are several other basic resource management programs that are not receiving any substantial attention at this time. This is not because they are unimportant, rather, it is because they are not quite as urgent as the activities currently being addressed. These issues include the following.

-- Need for a Comprehensive Vegetation Management Program -- The long-range strategy is to (a) prepare a Vegetation Management Plan (N-08), (b) update the herbarium (I-02), (c) develop a native plant nursery (I-04), (d) rehabilitate and revegetate impacted sites (N-12) and (e) remove non-native plants (N-08).

-- Need for a Comprehensive Water Resources Management Program -- This need is addressed in the project statement N-19, Prepare a Water Resources Management Plan.

-- Need for Visitor Use Data -- This need is addressed in the project statement I-06, Conduct a Visitor Survey.

-- Need for Organized Knowledge and Information on Cultural Resources -- This need is addressed in the project statement C-08, Develop a Bibliographic Database and Assessment of Cultural Resources.

-- Need to Mitigate Air Quality Impacts on Cultural Resources -- This need is addressed in the project statement: Evaluate Air Quality Impacts on Cultural Resources C-11.

Staffing and Funding Needs -- Tables 1 and 2 show the current levels of staffing and funding for natural and cultural resource management. As described above, this level of funding only enables the monument to attend to basic ongoing resource management functions. A base increase of $35,000 is needed to hire seasonal staff to begin addressing the resource management issues of the monument in a more comprehensive way (I-02).

Even with this $35,000 base increase, it will still take 14 years to complete the monument's 10 highest priority projects (out of 36 natural, cultural or integrated unfunded projects identified to date).

To reduce this time lag, a substantial increase in regional or service-wide funding is recommended to pay for non-recurring medium to large scale research and resource management projects.

TABLE 1

CURRENT YEAR NPS NATURAL AND CULTURAL RESOURCES PERSONNEL

FY: 90
PARK: CHIR
REGION: Western

TYPE OF NPS EMPLOYEE	FTEs of RESOURCES WORK		
	Natural	Cultural	Total
RESEARCH SCIENTISTS (i.e., Research Grade Evaluation and Research Grant Administration Programs)	0	0	0
RESOURCES SPECIALISTS (i.e. 170, 190, 193, 401, 404, 430, 808, 1015, 1016, 1215, etc.)	1.0	0.2	1.2
025 PARK RANGERS - Resource Management	1.6	0	1.6
025 PARK RANGERS - Resource Protection	0.4	0	0.4
025 PARK RANGERS - Resource Interpretation	0	0.6	0.6
MAINTENANCE PERSONNEL	0	0.8	0.8
TOTALS OF ALL RESOURCES PERSONNEL	3.0	1.6	4.6
TOTAL MONUMENT FTE (ALL PERSONNEL) 18.9	PERCENTAGE OF MONUMENT FTEs DEVOTED TO RESOURCES	15.9%	8.5%	24.3%

TABLE 2

CURRENT YEAR NATURAL AND CULTURAL RESOURCES FUNDING

FY: 90
PARK: CHIR
REGION: Western

($ in thousands - funding by activity type)

FUNDING SOURCE CODE	TOTAL	RESEARCH/ DOCUMEN-TATION	MITIGA-TION/ TREATMENT	MONITOR-ING	PROTECTION	INTERPRE-TATION	PROGRAM ADMIN/ TRAINING
CF1	$17.5	$ 0	$17.5	$ 0	$ 0	$ 0	$ 0
CF7	$25.0	$ 0	$25.0	$ 0	$ 0	$ 0	$ 0
NF1	$24.1	$ 1.0	$23.1	$ 0	$ 0	$ 0	$ 0
NF3	$14.3	$ 8.3	$ 6.0	$ 0	$ 0	$ 0	$ 0
NF4	$ 1.7	$ 1.7	$ 0	$ 0	$ 0	$ 0	$ 0
NF7	$ 7.0	$ 0	$ 0	$ 7.0	$ 0	$ 0	$ 0
ALL SOURCES	$89.66	$11.0	$71.6	$ 7.0	$ 0	$ 0	$ 0

FUNDING SOURCE CODES

Natural Resources

Park Base--Natural Resources	NF1
Park Base--Other	NF2
Regional Base--Natural Resources	NF3
Regional Base--Other	NF4
Fee Revenues	NF5
Natural Resources Preservation Program (NRPP)	NF6
Servicewide Air Quality	NF7
Servicewide Water Resources	NF8
Fire Program	NF9
Acid Precipitation	NF10
Other Servicewide NPS Funds	NF11

Cultural Resources

Park Base--Cultural Resources	CF1
Park Base--Other	CF2
Regional Base--Cultural Resources	CF3
Regional Base--Other	CF4
Cultural Resources Preservation Program (CRPP)	CF5
Repair/Rehabilitation (R/R)	CF6
Cultural Cyclic	CF7
Regular Cyclic	CF8
Fee Revenues	CF9
Construction	CF10
Other Servicewide NPS Funds	CF11
Non-NPS Funds	CF12

PROGRAMMING SHEETS

The following pages show the natural, cultural and integrated resource projects in the monument which are currently funded and ongoing--Programming Sheet 1. Also following are priority listings of unfunded needs for natural and cultural projects--Programming Sheet 2. These are produced as part of the resources planning process.

Cultural Resource Type Codes

COMB	Combination
CULL	Cultural Landscape
ETNO	Ethnographic
OBJC	Object
STRC	Structure
NA	Not Applicable

Servicewide Issue Codes

Natural Resources

N01	Degradation of Park Resources Due to Native Animal Species Overpopulation
N02	Impacts on Threatened, Endangered and Other Sensitive Animals
N03	Impacts on Threatened, Endangered and Other Sensitive Plants
N04	Degradation of Park Resources Due to Non-Native Animals
N05	Degradation of Park Resources Due to Non-Native Plants
N06	Disruption of Native Plant Communities and Accelerated Erosion Due to Past Land Practices
N07	Disruption of Natural Fire Regimes
N08	Loss of Cultural Landscapes
N09	Disruption of Natural Coastal Dynamics
N10	Disruption of Park Resources Due to Mineral Extraction and Geothermal Activities
N11	Degradation of Park Water Quality Due to External Activities
N12	Alteration of Natural Flow Regimes/Groundwater Levels
N13	Lack of Secure Water Rights
N14	Visibility Impairment and Biological Damage Caused by Air Pollution (includes wet and dry deposition)
N15	Noise, Visual, and Biological Impacts Related to Aircraft Overflights

N16 Visual and Biological Impacts of Urbanization and Other Near-Park Development on Park Resources
N17 Loss of Biological Diversity
N18 Visitor Use Impacts on Backcountry Park Resources
N19 Loss of Park Resources Due to Consumptive Practices (hunting, fishing, commercial fishing, grazing)
N20 Lack of Basic Data: Insufficient Understanding of Park Ecosystems and Threats to Them
N21 Loss of Fragile and Irreplaceable Cave Resources
N22 Overuse/Impacts of Recreation and/or Landscape Zones
N23 Other Issues

Cultural Resources

Documentation Issues:
C01 Insufficient Planning Documents
C02 Insufficient Inventory Data
C03 Insufficient Required Studies and Reports
C04 Insufficient Specialized Studies for Unique or Complex Management Issues

Treatment Issues:
C05 Insufficient Maintenance Programs
C06 Erosion of Sites and Structures
C07 Insufficient Storage and Environmental Controls for Museum Collections
C08 Uncontrolled Vegetation Growth

Monitoring Issues:
C09 Insufficient Monitoring Programs

Protection Issues:
C10 Looting and Vandalism

Other Cultural Resource Issues:
C11 Insufficient Professional Staff
C12 Need for CRM-Related Training
C13 Other

Funding Source Codes

Natural Resources

NF1 Park Base--Natural Resources
NF2 Park Base--Other
NF3 Regional Base--Natural Resources
NF4 Regional Base--Other
NF5 Fee Revenues
NF6 Natural Resources Preservation Program, NRPP

NF7	Servicewide Air Quality
NF8	Servicewide Water Resources
NF9	Fire Program
NF10	Acid Precipitation
NF11	Other Servicewide NPS Funds

Cultural Resources

CF1	Park Base--Cultural Resources
CF2	Park Base--Other
CF3	Regional Base--Cultural Resources
CF4	Regional Base--Other
CF5	Cultural Resources Preservation Program, CRPP
CF6	Repair/Rehabilitation, R/R
CF7	Cultural Cyclic
CF8	Regular Cyclic
CF9	Fee Revenues
CF10	Construction
CF11	Other Servicewide NPS Funds
CF12	Non-NPS Funds

Activity Type Codes

RES	Research/Documentation
MIT	Mitigation/Treatment
MON	Monitoring
PRO	Protection (Enforcement)
ADM	Program Administration/Training

PROGRAMMING SHEET 1
CURRENT YEAR FUNDED NATURAL RESOURCES ACTIVITIES
($ in thousands)

FY: 90
Park: CHIR
Region: Western

PROJ STMT NUM.	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE-WIDE ISSUE(S)	FUNDING SOURCE	ACT TYPE	CURRENT YEAR $$	CURRENT YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
N-01	Monitor Air Quality	TBA	NA	N14	NF7	MON	$ 7.0	0.3	$ 7.0	0.3	$ 7.0	0.3	$ 7.0	0.3	$ 28.0	1.2
N-02	Complete the Annotated Checklist of Birds	TBA	NA	N20	NF3	RES	$ 8.3	0	$ 0	0	$ 0	0	$ 0	0	$ 8.3	0
N-03	Develop a Bibliographic Database and Assessment of Natural Resources	TBA	NA	N20	NF4	RES	$ 1.7	0	$ 1.4	0	$ 0	0	$ 0	0	$ 3.1	0
N-04	Evaluate NPS Options with King of Lead Mine	TBA	NA	N10	NF1	RES	$ 1.0	0	$ 1.0	0	$ 1.0	0	$ 1.0	0	$ 4.0	0
N-05	Protect Natural Resources from Boundary Effects and Survey Monument Perimeter	TBA	NA	N19	NF3	MIT	$ 6.0	0.1	$ 0	0	$ 0	0	$ 0	0	$ 6.0	0.1
TOTAL FOR ALL FUNDED NATURAL RESOURCES ACTIVITIES							$ 24.0	0.4	$ 9.4	0.3	$ 8.0	0.3	$ 8.0	0.3	$ 49.4	1.3

PROGRAMMING SHEET 1
CURRENT YEAR FUNDED CULTURAL RESOURCES ACTIVITIES
($ in thousands)

FY: 90
Park: CHIR
Region: Western

PROJ STMT NUM.	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE-WIDE ISSUE(S)	FUNDING SOURCE	ACT TYPE	CURRENT YEAR $$	CURRENT YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
C-01	Paint CCC Structures	TBA	STRC	C13	CF7	MIT	$ 25.0	0.5	$ 0	0	$ 0	0	$ 0	0	$ 25.0	0.5
TOTAL FOR ALL FUNDED CULTURAL RESOURCES ACTIVITIES							$ 25.0	0.5	$ 0	0	$ 0	0	$ 0	0	$ 25.0	0.5

PROGRAMMING SHEET 1
CURRENT YEAR FUNDED INTEGRATED ACTIVITIES
($ in thousands)

FY: 90
Park: CHIR
Region: Western

PROJ STMT NUM.	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE-WIDE ISSUE(S)	FUNDING SOURCE	ACT TYPE	CURRENT YEAR $$	CURRENT YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
I-01	Administer Natural and Cultural Resources Management Program	TBA	COMB	N24 C24	NF1 CF1	MIT	$ 40.6	1.3	$ 40.6	1.3	$ 40.6	1.3	$ 40.6	1.3	$162.4	5.2
TOTAL FOR ALL FUNDED INTEGRATED RESOURCES ACTIVITIES							$ 40.6	1.3	$ 40.6	1.3	$ 40.6	1.3	$ 40.6	1.3	$162.4	5.2

PROGRAMMING SHEET 2
UNFUNDED NATURAL RESOURCES ACTIVITIES
($ in thousands)

FY: 90
Park: CHIR
Region: Western

PK PRI NUM.	PROJ STATM NUM.	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE-WIDE ISSUE(S)	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTALS $$	TOTALS FTE
1	N-06	Analyze Vegetation Changes and Trends	TBA	NA	N20	NF6 NF3	RES	$ 22.0	0.7	$ 22.5	0.7	$ 23.0	0.7	$ 23.5	0.7	$ 91.0	2.8
2	I-02	Increase Resources Management Program	TBA	COMB	N24	NF1	MIT	$ 35.0	1.5	$ 35.0	1.5	$ 35.0	1.5	$ 35.0	1.5	$140.0	6.0
3	N-07	Develop Fire Management Program	TBA	NA	N07	NF9 NF6	MIT	$ 35.3	0.8	$ 35.3	0.8	$ 35.3	0.8	$ 35.3	0.8	$141.2	3.2
4	N-08	Develop Vegetation Management Program	TBA	NA	N17	NF6 NF3	MIT	$ 14.5	0.5	$ 0	0	$ 0	0	$ 0	0	$ 14.5	0.5
5	N-09	Conduct Inventory and Assessment of Plants	TBA	NA	N20	NF6 NF3	RES	$ 17.5	0.5	$ 17.5	0.5	$ 19.5	0.5	$ 0	0	$ 54.5	1.5
6	N-10	Conduct Fire Ecology Study of Selected Species	TBA	NA	N07	NF6 NF9	RES	$ 19.0	0.6	$ 19.7	0.6	$ 19.9	0.6	$ 22.6	0.6	$ 81.2	2.4
7	N-11	Conduct Monument-wide Fire History Study	TBA	NA	N07	NF6 NF9	RES	$ 17.5	0	$ 20.0	0	$ 0	0	$ 0	0	$ 37.5	0
8	N-12	Rehabilitate Impacted Sites	TBA	NA	N22	NF1	MIT	$ 25.8	0.7	$ 8.5	0.2	$ 8.5	0.2	$ 8.5	0.2	$ 50.5	1.3
9	N-04B	Evaluate NPS Options with the King of Lead Mine	TBA	NA	N10	NF1 NF11	RES	$ 3.0	0	$ 0	0	$ 0	0	$ 0	0	$ 3.0	0
10	N-13	Conduct Inventory and Assessment of Birds	TBA	NA	N20	NF3 NF6	RES	$ 15.0	0.4	$ 15.5	0.4	$ 18.0	0.4	$ 0	0	$ 48.5	1.2

PROGRAMMING SHEET 2
UNFUNDED NATURAL RESOURCES ACTIVITIES
($ in thousands)

FY: 90
Park: CHIR
Region: Western

PK PRI NUM.	PROJ STATM NUM.	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE-WIDE ISSUE(S)	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTALS $$	TOTALS FTE
11	N-14	Conduct Inventory and Assessment of Non-native Species	TBA	NA	N05	NF3 NF6	RES	$ 12.0	0.3	$ 12.0	0.3	$ 13.5	0.3	$ 0	0	$ 37.5	0.9
12	N-05B	Protect Natural Resources from Boundary Effects and Survey Monument Perimeter	TBA	NA	N19	NF6 NF4	MIT	$117.0	0.4	$ 0	0	$ 0	0	$ 0	0	$117.0	0.4
13	N-15	Conduct Inventory and Assessment of Invertebrates	TBA	NA	N20	NF6 NF11	RES	$ 19.5	0.6	$ 20.2	0.6	$ 21.4	0.6	$ 21.6	0.6	$ 82.7	2.4
14	N-16	Develop a GIS	TBA	NA	N20	NF11 NF5	RES	$ 26.0	0.6	$ 32.5	0.6	$ 40.0	0.6	$ 0	0	$ 98.5	1.8
15	I-03A	Integrate Program of Long-term Resource Monitoring	TBA	COMB	N24	NF1	MON	$ 35.0	0	$ 0	0	$ 0	0	$ 0	0	$ 35.0	0
16	I-03B	Integrate Program of Long-term Resource Monitoring	TBA	COMB	N24	NF1	MON	$ 0	0	$ 8.5	0.3	$ 8.5	0.3	$ 8.5	0.3	$ 25.5	0.9
17	N-17	Examine the Biological Effects of Air Pollution	TBA	NA	N14	NF7 NF6	RES	$ 17.0	0.5	$ 0	0	$ 0	0	$ 0	0	$ 17.0	0.5
18	N-18	Conduct Inventory and Assessment of Mammals	TBA	NA	N20	NF6 NF3	RES	$ 16.5	0.5	$ 17.0	0.5	$ 18.5	0.5	$ 0	0	$ 52.0	1.5
19	N-19	Develop a Water Resources Management Program	TBA	NA	N12	NF8 NF3	RES	$ 19.5	0.5	$ 17.5	0.5	$ 0	0	$ 0	0	$ 37.0	1.0

PROGRAMMING SHEET 2
UNFUNDED NATURAL RESOURCES ACTIVITIES
($ in thousands)

FY: 90
Park: CHIR
Region: Western

PK PRI NUM.	PROJ STATM NUM.	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE-WIDE ISSUE(S)	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTALS $$	TOTALS FTE
20	N-01B	Monitor Air Quality	TBA	NA	N14	NF1	MON	$ 30.0	1.0	$ 30.0	1.0	$ 30.0	1.0	$ 30.0	1.0	$120.0	4.0
21	N-20	Conduct Inventory and Assessment of Amphibians and Reptiles	TBA	NA	N20	NF6 NF12	RES	$ 17.0	0.5	$ 17.5	0.5	$ 20.0	0.5	$ 0	0	$ 54.5	1.5
22	I-04	Develop In-monument Plant Nursery	TBA	CULL	N22	NF1	MIT	$ 22.0	0.6	$ 7.0	0.2	$ 7.0	0.2	$ 7.0	0.2	$ 43.0	1.2
23	N-21	Conduct Survey and Assessment of Soils	TBA	NA	N20	NF6 NF3	RES	$ 33.5	0.8	$ 26.5	0.8	$ 0	0	$ 0	0	$ 60.0	1.6
24	I-05	Conduct Ethno-botanical Study	TBA	ETHN	N19	NF3 NF6	RES	$ 14.5	0.5	$ 16.0	0.5	$ 0	0	$ 0	0	$ 30.5	1.0
25	N-22	Conduct Survey and Assessment of Geology	TBA	NA	N20	NF6 NF3	RES	$ 24.0	0.8	$ 27.0	0.8	$ 0	0	$ 0	0	$ 51.0	1.6
26	I-06	Conduct Visitor Survey	TBA	COMB	N22	NF3 NF6	RES	$ 23.5	0.8	$ 0	0	$ 0	0	$ 0	0	$ 23.5	0.8
TOTAL FOR ALL UNFUNDED NATURAL RESOURCES ACTIVITIES								$630.8	14.1	$405.7	11.3	$318.1	8.7	$192.0	5.9	$1,546.6	40.0

PROGRAMMING SHEET 2
UNFUNDED CULTURAL RESOURCES ACTIVITIES
($ in thousands)

FY: 90
Park: CHIR
Region: Western

PK PRI NUM.	PROJ STATM NUM.	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE-WIDE ISSUE(S)	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTALS $$	TOTALS FTE
1	C-02	Stabilize and Repair the Historic Stafford Cabin	TBA	STRC	C06	CF5 CF3	MIT	$ 60.0	1.5	$ 0	0	$ 0	0	$ 0	0	$ 60.0	1.5
2	C-03	Finalize Collections Management Plan	TBA	OBJC	C09	CF3 CF5	ADM	$ 5.0	0.2	$ 0	0	$ 0	0	$ 0	0	$ 5.0	0.2
3	I-02	Increase Resources Management Program	TBA	COMB	C24	CF1	MIT	$ 34.1	1.5	$ 34.1	1.5	$ 34.1	1.5	$ 34.1	1.5	$136.4	6.0
4	C-04	Develop a Historic Structures Preservation Guide	TBA	STRC	C05	CF5 CF7	ADM	$ 80.0	0	$ 0	0	$ 0	0	$ 0	0	$ 80.0	0
5	C-05	Complete Architectural Section of the Historic Structures Report	TBA	STRC	C03	CF5 CF7	ADM	$ 20.0	0	$ 0	0	$ 0	0	$ 0	0	$ 20.0	0
6	C-06	Develop a Cultural Resources Base Map	TBA	COMB	C02	CF5 CF11	RES	$ 6.0	0.2	$ 2.0	0.1	$ 2.0	0.1	$ 2.0	0.1	$ 12.0	0.5
7	C-07	Develop a Historic Landscape Program	TBA	CULL	C08	CF5 CF7	MIT	$ 20.0	0.6	$ 12.0	0.4	$ 12.0	0.4	$ 12.0	0.4	$ 56.0	1.8
8	C-08	Develop a Bibliographic Database and Assessment of Cultural Resources	TBA	COMB	C02	CF5 CF3	RES	$ 15.6	0.4	$ 0	0	$ 0	0	$ 0	0	$ 15.6	0.4
9	C-09	Produce an Administrative History	TBA	COMB	C03	CF3 CF4	RES	$ 20.0	0.6	$ 5.0	0.1	$ 0	0	$ 0	0	$ 25.0	0.7
10	C-10A	Conduct Archeolog. and Historic Sites Survey and Assess.	TBA	COMB	C02	CF5 CF3	RES	$ 23.5	0.8	$ 24.0	0.8	$ 25.5	0.8	$ 0	0	$ 73.0	2.4

PROGRAMMING SHEET 2
UNFUNDED CULTURAL RESOURCES ACTIVITIES
($ in thousands)

FY: 90
Park: CHIR
Region: Western

PK PRI NUM.	PROJ STATM NUM.	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE-WIDE ISSUE(S)	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTALS $$	TOTALS FTE
11	C-10B	Conduct Archeolog. and Historic Sites Survey and Assess.	TBA	COMB	C02	CF5 CF3	RES	$ 24.0	0.8	$ 24.5	0.8	$ 26.0	0.8	$ 0	0	$ 74.5	2.4
12	I-03A	Integrate Program of Long-term Resource Monitoring	TBA	COMB	C19	CF1	MON	$ 35.0	0	$ 0	0	$ 0	0	$ 0	0	$ 35.0	0
13	I-03B	Integrate Program of Long-term Resource Monitoring	TBA	COMB	C19	CF1	MON	$ 0	0	$ 8.5	0.3	$ 8.5	0.3	$ 8.5	0.3	$ 25.5	0.9
14	I-04	Develop In-monument Plant Nursery	TBA	CULL	C13	CF1	MIT	$ 22.0	0.6	$ 7.0	0.2	$ 7.0	0.2	$ 7.0	0.2	$ 43.0	1.2
15	I-05	Conduct Ethno-botanical Study	TBA	ETHN	C10	CF3	RES	$ 14.5	0.5	$ 16.0	0.5	$ 0	0	$ 0	0	$ 30.5	1.0
16	I-06	Conduct Visitor Survey	TBA	COMB	C10	CF3	RES	$ 23.5	0.8	$ 0	0	$ 0	0	$ 0	0	$ 23.5	0.8
17	C-11	Evaluate Air Quality Impacts on Cultural Resources	TBA	COMB	C06	CF1	RES	$ 20.0	0.5	$ 0	0	$ 0	0	$ 0	0	$ 20.0	0.5
TOTAL FOR ALL UNFUNDED CULTURAL RESOURCES ACTIVITIES								$420.2	9.0	$133.1	4.7	$115.1	4.1	$ 63.6	2.5	$735.0	20.3

PROJECT STATEMENTS

NATURAL -- FUNDED

The following project statements are a description of the natural resources management and information program currently funded at Chiricahua National Monument.

CHIR-N-01A	Monitor Air Quality
CHIR-N-02	Complete the Annotated Checklist of Birds
CHIR-N-03	Develop a Bibliographic Database and Assessment of Natural Resources
CHIR-N-04A	Evaluate NPS Options with the King of Lead Mine
CHIR-N-05A	Protect Natural Resources from Boundary Effects and Survey Monument Perimeter

PROJECT STATEMENT

1. Project Number: CHIR-N-01A & N-01B

2. Project Title: Monitor Air Quality

3. Service-wide Issues:

N14 - Visibility Impairment and Biological Damage Caused By Air Pollution (includes wet and dry deposition)

4. Problem Statement:

Air is a natural resource which, when polluted, may affect other natural and cultural resources. A related problem is loss of night sky visibility, caused by light from nearby or distant sources, which impairs visitors' views of stars, planets, constellations and other astronomical phenomena. Air pollution has increased in the Chiricahua area, but the extent of the increase and its effects on the monument's resources are unknown. The monument's management objectives regarding air quality related values include preservation of scenic qualities. This is accomplished through (a) research, (b) data collection, (c) the recording of air quality factors which affect natural and cultural resources, (d) the development of baseline information and (e) the development an early warning system of resource impairment. These will enable management to make decisions regarding visibility protection and potential pollution sources. The monument currently monitors acid rain, visibility, and airborne particulates.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Discontinue present monitoring and rely on other federal and state agencies to provide monitoring data. These data would not necessarily be representative of the air quality in the monument, and therefore would not provide the superintendent with necessary information to meet the monument's air quality related values management objectives.

B. Maintain Existing Monitoring. Continue to monitor acid rain, visibility and airborne particulates. The acid deposition monitoring program (the National Dry Deposition Program, NDDN, conducted by EPA's contractor Hunter/ESE Inc. of Gainesville, Florida) yields data on the acidity of wet and dry precipitation in the monument. The visibility monitoring program (called IMPROVE, includes an automatic camera, a fine particulate

sampler, and a transmissometer) yields information on visibility reduction in the monument, as well as the constituent elements possibly responsible for the visibility reduction. These monitoring programs partially satisfy the monument's air quality related values management objectives. However, the existing monitoring programs do not provide information about the concentrations of the major pollutants which may be impacting monument resources--sulfur dioxide and ozone--or where the air pollution originates.

C. Develop Comprehensive Monitoring Program. Enhance the existing visibility and acid rain monitoring program. Enhance the monitoring of criteria pollutants so that the monument can exercise its class I air quality protection program. Begin monitoring of night sky visibility. Enhance monitoring of physical air quality factors (including simple meteorological factors) which are most likely to influence biological diversity. This comprehensive air quality monitoring program, implemented in conjunction with project statement number CHIR-N-17 (Examine the Biological Effects of Air Pollution), will satisfy the monument's existing air quality related management objectives.

6. Description of the Recommended Project or Activity:

Alternative C is the recommended course of action. A comprehensive air quality monitoring program will be established in the monument. It will include visibility monitoring, ambient air quality monitoring, acid deposition monitoring and meteorological monitoring (wind speed and direction, solar radiation, temperature and relative humidity). As many of the instruments as possible will be co-located in an unobtrusive area near monument headquarters for efficient operation and maintenance by monument staff, Air Quality Division and contractor personnel. However, a complete meteorological station will be added near the Sugarloaf Mountain Fire Lookout. This is necessary to obtain data from the highest, coldest areas of the monument for comparison with data from the existing meteorological station at the lowest, warmest portion of the monument. Timely periodic summaries will be made available to the monument superintendent for use in regulatory actions, interpretive programs or public information opportunities.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least four other projects listed in this plan. These are as follows:

CHIR-N-06 Analyze Vegetation Changes and Trends
CHIR-N-16 Develop a Geographic Information System
CHIR-N-17 Examine the Biological Effects of Air Pollution
CHIR-C-11 Evaluate Air Quality Impacts on Cultural Resources

9. Funding Requirements:

This is a continuous project which will require participation by numerous technicians and professionals.

CHIR-N-01A -- FUNDED

Currently funded by Air Quality Division, WASO:

	Year 1	Year 2	Year 3	Year 4
IMPROVE Monitoring	$2,500	$2,500	$2,500	$2,500
NDDN Monitoring	4,500	4,500	4,500	4,500
Total	$7,000	$7,000	$7,000	$7,000

CHIR-N-01B -- UNFUNDED

A park base increase is needed to implement a fully functional and comprehensive air quality monitoring program for Chiricahua National Monument.

	Year 1	Year 2	Year 3	Year 4
Sugarloaf Met. Station	$ 5,000	$ 5,000	$ 5,000	$ 5,000
Enhanced A.Q. Monitoring	15,000	15,000	15,000	15,000
Night Sky Visibility Mon.	10,000	10,000	10,000	10,000
Total	$30,000	$30,000	$30,000	$30,000

10. Annual Project Status and Accomplishments:

The NDDN site became operational in April 1989. The IMPROVE transmissometer became operational in February 1989. The IMPROVE auto-camera and filter sampler have been operational since 1988.

PROJECT STATEMENT

1. Project Number: CHIR-N-02

2. Project Title: Complete the Annotated Checklist of Birds

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them

4. Problem Statement:

The Sierra Madre as well as the Rocky Mountain floras are well and richly represented in the mountains of southeastern Arizona (Axelrod 1958). The Madrean Evergreen, the Interior Southwestern Riparian Deciduous, and the Relict Conifer forest and woodland formations are found at lower elevations, while the Madrean Montane Conifer Forest occupies mountain summits (Brown, Lowe & Pase 1979). Furthermore, because these mountains are the northern distributional limit of a number of Mexican taxa, and lie close to the juncture of the Chihuahuan and Sonoran deserts, the regional flora is quite rich. Lowe (1963) notes that the fauna of the Atascosa, Santa Rita, Huachuca and Chiricahua mountains, support richer than expected array of uncommon plants and animals. These mountains in general, and the Chiricahuas in particular, have a fine-grained mosaic of plant communities that range from the xeric to mesic and from sub-boreal conifers to Madrean deciduous broadleaf species. The habitat interconnection between the Sierra Madre of Mexico and the Chiricahua Mountains remains relatively intact, little impacted by development in Mexico, serving as a conduit for Mexican species. All of these factors have created a very rich biota. This richness has long been known to the birding community who come here in great numbers. The Chiricahua Mountains are one of the premier birding areas of the world. Roger Tory Peterson lists Southeastern Arizona as one of the 10 best birding areas in North America. The demand for a good checklist is significant.

There has been a recent emphasis in the popular literature toward avian ecology. Perhaps as a result of endangered species concern, many birders are no longer content to collect sightings in the same way philatelists collect stamps; they want to know more about how the bird lives and fits into the fabric of the ecosystem.

From time to time, excellent bird checklists (USFS n.d.) and birding guides (Davis & Russell 1984, Lane 1965) have been

published for the Chiricahua Mountains or southeastern Arizona. None of these checklists satisfactorily tie the animals to their habitat, certainly not to the degree shown in the format created by Brown et.al. (1979). A checklist presenting the latest avifauna observations related to abundance, seasonality and vegetative habitat with an extensive bibliography is needed, will be useful, and should be popular with the professional and amateur alike.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. This alternative entails maintenance of the status quo. Monument staff will rely on the existing scant database to make management decisions affecting native birds. No research on native avifauna will be conducted. The public demand for a high quality checklist will go unmet.

B. Compile an Annotated Checklist of Birds. This study will provide information on native birds which will serve as an additional management tool for examining the ecological health of the ecosystems. It will also provide information on relative abundance and natural history characteristics of species. An inventory will be conducted using non-destructive sampling techniques such as mist netting and observation. This study will produce an annotated checklist of the avifauna of the Chiricahua Mountains.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. This study will accomplish the following tasks:

- -- Evaluate historical bird records for the Chiricahua Mountains. Verify the historical list with recent observations.
- -- Integrate recent records (especially for rare and accidental categories) into a long-term database.
- -- Relate species occurrence to vegetation communities at the Series level (Brown, Lowe & Pase 1979).
- -- Compile an extensive (aiming at exhaustive) bibliography of birds in the Chiricahua Mountains.
- -- Make the above information available to the scientific community and the public through a series of publications-- (a) a traditional folded checklist for field use which would be a joint effort between USFS & NPS, (b) an annotated checklist presenting brief species accounts, fidelity to vegetation, abundance, seasonality, sighting localities, taxonomic synonymy and citation to germane literature, (c) an annotated bibliography and (d) an extensive natural history of the Chiricahua avifauna.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least six other projects listed in this plan. These are as follows:

CHIR-N-03	Develop a Bibliographic Database and Assessment of Natural Resources
CHIR-N-06	Analyze Vegetation Changes and Trends
CHIR-N-08	Develop a Vegetation Management Program
CHIR-N-13	Conduct an Inventory and Assessment of Birds
CHIR-N-14	Conduct an Inventory and Assessment of Non-native Species
CHIR-N-16	Develop a Geographic Information System

9. Funding Requirements:

Funded with Western Regional Natural Resource funds.

	FY89	FY90	FY91
Personnel Services	$1,500	$4,800	$ 0
Travel and Per Diem	2,400	2,500	0
Supplies and Materials	0	500	0
Publication Costs	0	500	0
Total	$3,900	$8,300	$ 0

10. Annual Project Status and Accomplishments:

This project was initiated in FY89 and should be completed with the production of an annotated checklist of breeding birds in the Chiricahua Mountains.

PROJECT STATEMENT

1. Project Number: CHIR-N-03

2. Project Title: Develop a Bibliographic Database and Assessment of Natural Resources

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them

4. Problem Statement:

Historically, selective but intermittent studies have been conducted since the monument was established in 1924. Sociological, physical and natural changes are occurring throughout the monument at accelerated rates. Numerous resource threats, generated by a host of external and internal threats, are currently being investigated. The amount of information that has to be processed prior to a management decision or action is constantly increasing. Existing collections contain over 5,500 informational resources and are expanding.

Currently, the monument does not have the ability to efficiently utilize the wealth of historic, technical and ecological information that has already been generated. Without the development of an adequate information system and information base, management cannot efficiently manage the resource or respond to developing resource problems systematically without duplication of effort.

Public interest and environmental groups, and state and federal agencies frequently request bibliographic citations and information upon which management actions were based. Researchers and other professionals routinely depend upon and utilize the monument's information base as the first prerequisite step in addressing management concerns.

The development of a computerized bibliographic system will place the monument in a better position to review and assess past actions and evaluate current programs.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. With this alternative, the monument will not have adequate access to current or past informational resources. This will increase the time and reduce the cost effectiveness of management's ability to evaluate and compare past and present resource actions and issues. All information will be processed and cross referenced by manual techniques which will increase demands upon limited personnel.

B. Develop Computerized Bibliographic Information System. This will increase management's ability to respond effectively to cultural and natural resource issues. An adequate information base can prevent duplication of effort and prevent costly mistakes. Adequate and effective access to informational resources are a mandatory prerequisite for efficient and cost effective management. Time frames in examining resource issues can be significantly reduced with the creation of an information tracking system. Information management is a critical first step in developing cost effective solutions.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. The bibliographic system will enable management to retrieve, store and sort information by date, author, title, subject or key words. The monument currently has the computer hardware necessary to operate software. Software and data entry would require the expenditure of some funds. This system would increase the effectiveness and efficiency of all management programs.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to all resources management activities and programs at Chiricahua National Monument.

9. Funding Requirements:

	FY90	FY91
Data Entry Costs	$1,000	$ 0
Bibliographic Assessment and Summary	700	0
Biblio. Software (PROCITE, or Equivalent)	0	900*
Bibliographic Search Costs	0	0
Publication Costs	0	500
Total	$1,700	$1,400

* This software can serve both the cultural and natural resources information management needs simultaneously.

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-04A & N-04B

2. Project Title: Evaluate NPS Options with the King of Lead Mine

3. Service-wide Issue(s):

N10 - Disruption of Park Resources Due to Mineral Extraction and Geothermal Activities

4. Problem Statement:

The King of Lead mine is a patented claim, therefore a private ownership land, adjacent to the monument at the northeast corner. It is over 100 acres in size. Of this, 2.42 acres is within the monument boundary and is therefore a private inholding. It is surrounded by NPS and Forest Service land. The only vehicle access is via a dirt road through the monument. It is a gold, silver and lead mine. The owner is Ralph Pursley, a rancher who lives about four miles from the monument.

The Land Protection Plan of December 1985 for Chiricahua National Monument contains detailed discussion of the issues surrounding this mine.

There is no Plan of Operations filed with the monument at this time for the access road operations on NPS land. The land in private ownership needs no Plan of Operations. If major mineral discoveries were to occur and large scale mining activities were to begin, the impacts on the monument related to the mining operation and related to the access road could be significant.

The mine is in a steep canyon at the headwaters of Bonita Creek, which is one of two main watersheds in the monument. The main water well for the monument is in the campground and adjacent to Bonita Creek about four miles downstream from the mine. In about 1986, Mr. Pursley, who normally conducts minimal mining activity, arranged for mining to be done by another party, possible lessees. This new team began the installation of a cyanide leach pit, but were discouraged from completing the pit because of the danger it posed to the monument. The cyanide barrels were removed from the area and never used on site. There is a concern that increased mining activity could once again threaten the upper watershed of Bonita Creek.

The Arizona Water Pollution Control System has a program which requires persons whose activities may result in contamination of groundwater to obtain a permit from the state's Department of Health Services. However, only in the event of a serious spill affecting water quality would the state undertake close regulation of the mine operation. Hence, if reliance is placed on this regulatory program for protection of the monument's natural resources, there would be the potential for serious damage. It is important to recognize also that this program relates only to water quality protection. It does not provide any protection for the important scenic values in the area.

The access road to the mine is blocked by a locked gate. Mr. Pursley has a padlock on it which is interlocked with an NPS padlock so that both Mr. Pursley and the NPS have access. The road is steep, rough and badly eroded. It is about 0.75 miles long. It has been maintained by annual blading with the NPS road grader. Questions arise as to who should maintain the access road, and especially to what standard it should be maintained. There is currently no Plan of Operations for the access road.

Mr. Pursley has allowed hunters to use his land. Their access is through the monument along the mine road. This raises the threat of poaching in the area as well.

Mr. Pursley is using his patented mining claim for cattle grazing in 1990. This raises the threat of trespass cattle as well.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Land use impacts, especially from mining operations, will not be evaluated. Mitigating actions to protect monument resources will not be taken.

B. Continue Present Site Visits. Currently, monument staff visit the site several times a year to look at what developments have occurred. Photographs are taken and discussions are sometimes held with the owner. This is not an effective nor permanent solution to this problem however.

C. Evaluate NPS Options. With the assistance of the NPS Mining & Minerals Branch in Denver, NPS options will be evaluated regarding the access road, the 2.42 acre inholding, potential water contamination and adjacent private lands.

6. Description of the Recommended Project or Activity:

Alternative C is the preferred course of action.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of Interior. NHPA compliance under Section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least three other projects listed in this plan. These are as follows:

CHIR-N-05 Protect Natural Resources from Boundary Effects and Survey Monument Perimeter
CHIR-N-12 Rehabilitate Impacted Sites
CHIR-N-19 Develop a Water Resources Management Program

9. Funding Requirements:

CHIR-N-04A -- FUNDED

The monument staff is currently conducting low level monitoring of developments in the mine area through periodic visits to the site. Photographs are taken and discussions are held with the owner.

	Year 1	Year 2	Year 3	Year 4
Personal Services	$ 900	$ 900	$ 900	$ 900
Travel and Per Diem	100	100	100	100
Supplies and Equipment	0	0	0	0
Total	$1,000	$1,000	$1,000	$1,000

CHIR-N-04B -- UNFUNDED

$3,000 is needed in year one to hire a consultant to evaluate the NPS options regarding the access road, the 2.42 acre inholding, potential water contamination and adjacent private lands.

	Year 1	Year 2
Personal Services	$2,200	$ 0
Travel and Per Diem	800	0
Total	$3,000	$ 0

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-05A & N-05B

2. Project Title: Protect Natural Resources from Boundary Effects and Survey Monument Perimeter

3. Service-wide Issue:

N19 - Loss of Park Resources Due to Consumptive Practices (Hunting, Fishing, Commercial Fishing, Grazing, etc.)

4. Problem Statement:

Expansion of Chiricahua National Monument in 1984 added 850 acres and over 5 miles of new boundary along the northern section of the monument. This area has never been surveyed to accurately locate the new boundary line. This survey needs to be completed. The southern boundary of the 1979 addition of 440 acres has been partially fenced to eliminate the most severe trespass grazing. Some of the current boundary fencing may not have been located on a properly surveyed line and needs to be re-checked. The existing fence is aging and needs to be carefully evaluated for condition. Some sections need to be rebuilt and new boundary marker signs need to be installed along the entire length of the fence line.

These actions are needed to properly protect monument resources from grazing, hunting and wood gathering. Such practices are allowed on neighboring public and private lands. Unless the boundary is properly fenced and marked users may not be aware of when they have crossed into monument lands.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. This option will abrogate the National Park Service's responsibility to protect natural and cultural resources at Chiricahua National Monument. Trespass grazing, wood gathering, illegal hunting, etc. will continue unchecked. The monument will continue to have poor boundary fencing and poor boundary markings.

B. Survey Boundary and Construct or Reconstruct Fencing. This option will ensure that all inadvertent and most willful acts of illegal trespass use will stop. Resources will be protected from the negative impacts of such use.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. This project will involve several related steps.

-- Survey the 1984 boundary addition which added 850 acres to Bonita Creek drainage, and survey the 1979 boundary addition which added the 440 acre Faraway Ranch.

-- Construct boundary fences along the surveyed lines, connecting with existing boundary fences. Fencing specifications are adapted from BLM standards to meet multiple-use needs for livestock and wildlife:

Kinds of Livestock	Cattle
Predominant Wildlife Species	Deer, Peccary, Antelope
Number of Wires	4
Maximum Fence Height	38 inches
Wire Spacing From Ground Up	15, 5.5, 5.5, 12
Wire Type	Top & Bottom Smooth, Others Barbed
No. of Stays Between Line Posts with 15' Spacing	2

-- Identify suspect portions of existing boundary fence, resurvey these portions of boundary line and reconstruct fence along proper lines.

-- Identify aging sections of boundary fence in need of reconstruction and rebuild these portions.

-- Install new boundary markers along the entire monument boundary as necessary.

-- Remove the old boundary fences in areas where boundary changes have occurred.

7. Compliance:

This project is categorically excluded under NEPA compliance guidelines, 516 DM 6, Appendix 7.4 C(20), "Construction of fencing exclosures or boundary fencing posing no effect on wildlife migrations." NHPA compliance under Section 106 will be required for this project due to the potential for disturbance of cultural sites during construction. There is one known archeological site on the boundary line north of the monument entrance.

8. Relationships:

This project is related to at least two other projects listed in this plan. These are as follows:

CHIR-N-04 Evaluate NPS Options with the King of Lead Mine
CHIR-N-16 Develop a Geographic Information System

9. Funding Requirements:

CHIR-N-05A -- FUNDED

This phase of the project was funded in FY90 out of Western Region Rotating Resource Base funds and was used to construct 1.3 miles of four-strand wire wildlife fence along the southwest boundary (the 1979 Faraway Ranch addition to the monument).

	FY90	FY91
Personal Services	$3,000	$ 0
Travel and Per Diem	0	0
Supplies and Equipment	3,000	0
Total	$6,000	$ 0

CHIR-N-05B -- UNFUNDED

This funding is needed to survey the actual boundary from the 1984 addition to the monument and to construct approximately 5.5 miles of fence along that boundary. Funds are needed to evaluate approximately 12 miles of boundary, some of which is currently fenced, and to repair sections of fence needing such action.

	Year 1	Year 2
Contract - Survey Boundary Line	$ 10,000	$ 0
Contract - Construct Northern Fence Line	50,000	0
Contract - Construct Faraway Addition Fence	6,000	0
Contract or In-house - Repair Old Fence Line	40,000	0
Personal Services	10,000	0
Transportation	1,000	0
Total	$117,000	$ 0

10. Annual Project Status and Accomplishments:

Supported by $6,000 of Rotating Resource Base funding; 1.3 miles of wildlife fence was constructed in FY90 on south sections of the 1979 Faraway Ranch addition.

PROJECT STATEMENTS

NATURAL -- UNFUNDED

The following project statements are a description of the natural resources protection and information program currently identified and in need of funding at Chiricahua National Monument.

CHIR-N-01B	Monitor Air Quality
CHIR-N-04B	Evaluate NPS Options with the King of Lead Mine
CHIR-N-05B	Protect Natural Resources from Boundary Effects and Survey Monument Perimeter
CHIR-N-06	Analyze Vegetation Changes and Trends
CHIR-N-07	Develop the Fire Management Program
CHIR-N-08	Develop the Vegetation Management Program
CHIR-N-09	Conduct an Inventory and Assessment of Plants
CHIR-N-10	Conduct Fire Ecology Study of Selected Species
CHIR-N-11	Conduct a Monument-wide Fire History Study
CHIR-N-12	Rehabilitate Impacted Sites
CHIR-N-13	Conduct an Inventory and Assessment of Birds
CHIR-N-14	Conduct an Inventory and Assessment of Non-native Species
CHIR-N-15	Conduct an Inventory and Assessment of Invertebrates
CHIR-N-16	Develop a Geographic Information System
CHIR-N-17	Design Air Quality Biological Effects Program
CHIR-N-18	Conduct an Inventory and Assessment of Mammals
CHIR-N-19	Develop a Water Resources Management Program
CHIR-N-20	Conduct an Inventory and Assessment of Amphibians and Reptiles
CHIR-N-21	Conduct a Survey and Assessment of Soils
CHIR-N-22	Conduct a Survey and Assessment of Geology

PROJECT STATEMENT

1. Project Number: CHIR-N-06

2. Project Title: Analyze Vegetation Changes and Trends

3. Service-wide Issue(s):

   N20 - Loss of Basic Data: Insufficient Understanding of Park Ecosystems and Threats to Them

4. Problem Statement:

A species rich, mixed oak-conifer woodland covers 90 percent of Chiricahua National Monument. Some of this vegetation arose from the usual Rocky Mountain and central continental stock familiar to American foresters and botanists. However, much of the flora, the Evergreen Madrean Forest and Woodland, originated in the Sierra Madre of Mexico and is poorly understood. It is only fleetingly represented in the United States, in the mountain islands of southeast Arizona and southwest New Mexico. This Madrean vegetation mix is confined to soils of igneous origin on mountain slopes and moist canyons that are surrounded by Chihuahuan Desert. Because of its limited distribution, this vegetation type contains the only U.S. representatives of numerous plants and animals (Brown 1982). The ecology of the plants and animals of the Evergreen Madrean Forest and Woodland are poorly known as a result of their limited distribution and their low economic value. The community ecology, the seral structure and the expected responses in this community are of primary concern.

Wildland fires have been successfully suppressed in the Chiricahuas for some 60 years. It is suspected that this lack of natural fire may have altered the vegetation communities significantly.

The grazing of cattle and horses in and around the monument occurred from the early Spanish ranching days of the 1600s and 1700s and was locally concentrated in the monument from the 1880s to the 1960s. Timber and fuelwood harvest occurred in the monument from the 1870s to the 1960s. It is likely that this grazing and timber cutting has left an impact on the vegetation communities. The degree of impact and the manner in which the natural vegetation has been altered by human activity is also a question.

Acid deposition from nearby and regional sulfur dioxide emitting industries, especially copper smelters, plus a general ozone buildup and possible global climate change are added considerations in solving the puzzle of vegetation change, past and future.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Without a good understanding of natural vegetation changes, and without a good understanding of past human-caused vegetation changes, suitable management actions are difficult to plan. This is especially true of actions intended to mitigate past human-caused changes, such as prescribing fire management activities to mitigate past fire suppression.

B. Investigate the Causes and Mechanisms of Vegetation Changes and Trends. Investigate the type and magnitude of vegetation change by comparison of the present vegetation status with that found by Moir (1974b) and Roseberry & Dole (1939). Establish a program to observe and evaluate vegetation changes, especially vegetation responses to different fire regimens, climatic changes and air quality deterioration. Set these observations into an interactive GIS model of fire effects prediction.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. Conduct a research program that will examine changes and trends of Madrean vegetation communities.

Through ecological research and statistical analysis, compare the present vegetation of the monument to that documented by Roseberry & Dole (1939) and by Moir (1974).

Through ecological research, analyze and compare the present-day vegetation of the monument with that of the nearby vegetative provinces. Of particular interest is the mix of Petran (Rocky Mountain origin) species and Madrean species, and the dynamics of that mix. Conduct a vegetation comparison between the monument and areas of the central Sierra Madre of Mexico, at the same elevation. Compare floras, biodiversity and forest structure to yield information useful to management in verifying assumptions about how vegetation is responding and changing.

Collect basic ecological information on dominant species and plant communities to allow for the development of an interactive vegetation model, based in a GIS system.

Present indications are that the Chiricahua vegetation is heavily influenced by natural fire. In order to maintain a naturally

functioning ecosystem we should allow natural fires to continue, or replace them with prescribed burns. In order to do this, we need to be able to model such parameters as lightning strikes, wind speed and direction, fuel type, fuel load, ignition probabilities, native vegetation type, rates of fire spread and fire effects on vegetation structure. This modeling must furthermore be broad based geographically, to include fire influence which would arise from well outside the monument. This project statement supports the compilation of the basic ecological information needed for the development of such an predictive model.

Through historical research, investigate the kind and scope of vegetation changes that resulted from historic cattle grazing, both in early Spanish times and in nineteenth century settlement times.

Through biological and chemical research, investigate the kind and scope of vegetation changes that have resulted from air pollution. Of particular interest are the effects of copper smelters, which operated over many decades in Douglas and Morenci, Arizona, and more recently in Nacozari and Cananea, Mexico. Regional or global air pollution such as carbon dioxide increase will also be considered.

Deliverable products will include an updated vegetation map, a description of present seral stages of the vegetation, an analysis of changes since the 1939 and the 1974 vegetation work was completed, an analysis of past perturbations of grazing, fire suppression and air pollution, and the basic ecological information necessary to implement vegetation change modeling in the monument.

7. Compliance:

NEPA compliance will not be required for this project, as per reference 516 DM 2, Appendix 1.

8. Relationships:

This project is related to nine other projects listed in this plan. These are as follows:

CHIR-N-01 Monitor Air Quality
CHIR-N-07 Develop the Fire Management Program
CHIR-N-08 Develop the Vegetation Management Program
CHIR-N-09 Conduct an Inventory and Assessment of Plants
CHIR-N-10 Conduct Fire Ecology Study of Selected Species
CHIR-N-11 Conduct a Monument-wide Fire History Study
CHIR-N-16 Develop a Geographic Information System

CHIR-N-17 Examine the Biological Effects of Air Pollution
CHIR-N-21 Conduct a Survey and Assessment of Soils

9. Funding Requirements:

	Year 1	Year 2	Year 3	Year 4	Year 5
Personal Services	$17,000	$17,500	$18,000	$18,500	$19,000
Travel & Per Diem	2,700	2,700	2,700	2,700	2,700
Photographs	300	300	300	300	300
Supplies	2,000	2,000	2,000	2,000	2,000
Publication Costs	0	0	0	0	2,000
Total	$22,000	$22,500	$23,000	$23,500	$26,000

10. Annual Project Status and Accomplishments:

The six long-term vegetation trend forest plots set up by Will Moir in 1974 were re-read by CPSU/UA in 1988.

Ken Stolte of the NPS Air Quality Division conducted a multi-part project in conjunction with Saguaro National Monument on air quality impacts on vegetation.

Jan van Wagtendonk and Rod Norum (1990) made a site visit in April 1990 and wrote a trip report to the superintendent regarding fire management.

PROJECT STATEMENT

1. Project Number: CHIR-N-07

2. Project Title: Develop the Fire Management Program

3. Service-wide Issue(s):

N07 - Disruption of Natural Fire Regimes

4. Problem Statement:

The fire management program is not and has not been fully operational.

Most of the fire management program at Chiricahua National Monument is funded by FIREPRO. It is not a base funded program and is therefore insecure. This project statement calls for the formalization of a base funded, complex fire management program for the monument.

Potential funding sources under the present FIREPRO system are not base funded and are as follows:

- -- FIREPRO Prescribed Fire Operations (PWE 340) -- This is emergency funding for monitoring and holding prescribed natural fires. It does not cover planning, training, etc. This source was used to fund the monument's fire effects monitor position in FY90.
- -- FIREPRO Hazard Fuel Reduction (PWE 341) -- This is funding to implement hazard fuel reduction programs, i.e., prescribed burning, mechanical thinning, etc. Projects are funded on a yearly basis and go through a ranking and rating process with only the highest scoring projects being funded.
- -- FIREPRO Emergency Pre-suppression (PWE 343) -- This is emergency funding to provide additional pre-suppression and prevention actions during periods of very high or extreme fire danger.
- -- FIREPRO Wildfire Suppression (PWE 344) -- This is emergency funding to pay for the suppression of wildfires.
- -- FIREPRO Pre-suppression Operations (PWE 346) -- This is our normal FIREPRO funding for fire suppression training, preparedness, prevention, detection and pre-suppression. This funding source is not secure as attempts were made in FY90 to discontinue using this source for the monument.

The fire management program operates under a Fire Management Plan, the latest of which was approved July 12, 1982. An updated plan is needed and is being written.

Jan van Wagtendonk and Rod Norum (1990) state that the role of fire in the monument ecosystems is complex and certainly not fully understood. They state that before burn objectives can be written for prescribed burns used to simulate natural fires, additional research will have to be undertaken. They mention the high importance of conducting investigations into fire effects upon vegetation. They recommend the expansion of fire history studies (project statement N-11), lightening strike studies to determine the ignition source and direction of burning, and the essential research into the effects of fire on the pine-oak woodland type (project statements N-06 and N-10).

Hazard fuels pose a threat to the headquarters and campground area. This hazard can be reduced with prescribed burning (van Wagtendonk & Norum 1990). These fuels need to be mapped, their hazard analyzed and mitigation measures initiated--through prescribed burns, hand thinning or a combination of techniques.

Permanent and seasonal staff need to be trained in aspects of fire management--suppression, monitoring, prescriptions, supervision, specialized equipment use, etc.

The use of prescribed burning to maintain historic landscapes around the Faraway Ranch needs to be evaluated and, if appropriate, a burning program needs to be initiated.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Continue with essentially no funding programed for fire protection, fire monitoring, prescribed burning or prescribed natural fire. Use any available FIREPRO project funding for the monument's fire management program. Continue with the 1982 Fire Management Plan as a guide for the fire program. This plan does not address maintenance of historic landscapes. Also the 1982 Fire Management Plan's zone system does not include cooperative boundary planning with the Forest Service or with private land owners.

Maintain existing suppression equipment and basic program. This includes the annual updating of the monument's fire atlas, the weekly recording of live fuel moisture readings, the recording of daily fire weather, limited prescribed burning and the administrative responsibilities of the chief ranger and resources management specialist regarding fire. If FIREPRO funds are approved, two seasonals will be hired to perform fire suppression duties. If this funding is not approved, then even the basic fire protection will be unfunded.

B. Develop and Conduct a Base Funded, Complex, Fire Management Program. This will include planning, administration, training, monitoring, detection, suppression, prescribed burns and

prescribed natural fires. These activities will be based on adequate research. These activities are broken down in the paragraphs to follow.

Update the Fire Management Plan. When approved this plan will guide all monument fire activities. The monument's fire management program should reflect present policy and recent developments in the field of ecological fire science. It should also address the use of prescribed burning as an option for vegetation manipulation in maintaining historic areas and in maintaining safety clearings. It will guide interagency and cooperative agreements for cross-boundary fire management.

Complete staff training and certification. At present the monument staff does not have sufficient training to conduct a full prescribed burning program.

Conduct necessary fire related research. A fire history study was done by Thomas Swetnam (1989) of the University of Arizona Tree-ring Laboratory. Funding, however, was limited, and only Rhyolite Canyon was surveyed. While valuable fire chronology information was obtained and inferences on fire management were made, it is clear that Swetnam's results should not be extrapolated to the entire monument. Swetnam further presented several questions and recommendations on potential studies. The fire history study should be expanded to include the geographic and botanical diversity of the entire monument (N-11). This recommendation is echoed by van Wagtendonk and Norum (1990). Conduct fire effects studies on key plant species (N-10) and consider the benefits of research prescribed burns.

Develop ecological objectives for prescribed burns and prescribed natural fire program. These should aim to restore and maintain the natural biodiversity in the monument. Objectives should be written in terms of natural fire characteristics, e.g., instead of specifying the number, size and distribution of desired species, the objective will be to have fires encompass a range of frequencies, intensities, seasons and sizes. These fire objectives should be based on adequate research which still needs to be conducted (van Wagtendonk & Norum 1990).

Use prescribed burning and prescribed natural fire to help restore and maintain the natural biodiversity in the monument. Fire objectives should be evaluated by using data from field index plots and fuel load transects. These vegetation and fuel monitoring plots must be read pre-burn, post-burn and at set year intervals (NPS 1990b). New or updated fire prescriptions must be written.

Evaluate the appropriateness of using prescribed fire to help control non-native vegetation. Where appropriate, initiate such a prescribed burn program.

6. Description of the Recommended Project or Activity:

Alternatives B is the recommended course of action. It is in sections by paragraph, and they are in priority order. The Fire Management Plan will detail each of these parts of the program. Alternative B will update the Fire Management Plan for the monument. Cooperative agreements with adjacent land owners regarding fire management will be promulgated. Several possible cases for using fire as a vegetation management tool will be evaluated--in maintaining the natural biodiversity of the monument, in maintaining a hazard fuel safety clearing around structures and the campground, in maintaining historic landscape around Faraway Ranch and in controlling non-native plant species. Research needs will be assessed, including research prescribed burns, fire histories, and fire ecology studies of ecosystems and of selected species.

7. Compliance:

NEPA compliance will not be required for this project, as per reference 516 DM 2, Appendix 1. NEPA, archeological and historic clearances will be completed before implementation.

8. Relationships:

This project is related to at least six other projects listed in this plan. These are as follows:

CHIR-N-06 Analyze Vegetation Changes and Trends
CHIR-N-08 Develop Vegetation Management Program
CHIR-N-10 Conduct Fire Ecology Study of Selected Tree Species
CHIR-N-11 Conduct a Monument-wide Fire History Study
CHIR-N-16 Develop a Geographic Information System
CHIR-C-07 Develop a Historic Landscape Program

9. Funding Requirements:

Funding is here broken down into prioritized projects. A base increase of $33,500 is needed to annually execute this improved fire management program. A detailed, itemized list of how these funds will be used follows.

$22,000 annually is needed to maintain the status quo fire protection program, maintain the equipment and provide seasonal employees with minimal training. This is split evenly between personal services and equipment, and it assumes no FIREPRO funding.

$1,500 annually is needed for reviews and updates of the Fire Management Plan.

$3,300 annually is needed for training. This is in order to meet Western Region standards, NPS-18 standards and the decision capability requirements established by FIREPRO Analysis for a complex fire program.

Funding for a fire history study is included in project statement N-11, not in this project statement.

Funding for research to gather basic data needed to prepare ecological objectives of burns is requested in project statements N-06 and N-10, not in this project statement.

$4,000 annually is needed for pre-burn and post-burn monitoring each year for the complex fire management program.

$4,500 annually is needed for conducting three prescribed burns or prescribed natural fires.

These needs summarize into a base increase need of $35,300 as shown below.

	Year 1	Year 2	Year 3	Year 4
Personal Services	$20,800	$20,800	$20,800	$20,800
Training	1,650	1,650	1,650	1,650
Travel and Per Diem	1,650	1,650	1,650	1,650
Supplies & Materials	11,200	11,200	11,200	11,200
Total	$35,300	$35,300	$35,300	$35,300

10. Annual Project Status and Accomplishments:

A Fire Management Plan was completed and approved July 12, 1982 and is currently being revised.

Jan van Wagtendonk and Rod Norum (1990) made a site visit in April 1990 and wrote a trip report to the superintendent regarding fire management.

PROJECT STATEMENT

1. Project Number: CHIR-N-08

2. Project Title: Develop the Vegetation Management Program

3. Service-wide Issue(s):

N17 - Loss of Biological Diversity

4. Problem Statement:

Chiricahua National Monument does not have an approved Vegetation Management Plan. The issues surrounding vegetation management at Chiricahua have become sufficient in number and in complexity to require such a plan.

For several years re-vegetation projects have been carried out to rehabilitate impacted areas. This has been done in areas of prescribed fires, in compacted areas of the campground which were subsequently closed off, and along trail and road section which had been re-routed or closed. Re-vegetation has been done with seed or potted plants purchased from native plant nurseries to insure the use of native species. However, even native species may genetically differ significantly throughout their range. Also, a non-native species, Lehmann Lovegrass (Eragrostis lehmanniana), was used until 1986.

Chiricahua is located in the Basin and Range Province. The island nature of the mountain ranges in the area has been called "sky islands in desert seas," that is, the mountain ranges are isolated from one another by broad desert plains and their biota show frequent insularity and subspeciation. The Chiricahua Mountains are therefore distinct and have a distinct ecosystem. In order to protect the natural biodiversity of the Chiricahuas, it is important that plant material used by the monument be from the Chiricahua ecosystem. This makes the purchase of plant material from commercial sources difficult to justify and makes the establishment of a monument native plant nursery an important resources management goal for the protection of genetic diversity.

The prescribed burning and prescribed natural fire programs are in large part intended to manipulate the vegetation of the monument. They are intended to restore fire as an ecological agent, to restore early seral communities and to reduce hazardous fuels. The Vegetation Management Plan and the Fire Management Plan must therefore be integrated and complementary. This is

especially important in research concerning plant community mix and in defining the ecological objectives of the prescribed fire program.

A computerized listing of plant species has been started. The list now needs a significant amount of detailed checking and manipulation so that the information can be used in resources management. For example, a separate listing of non-native plant species is not available and the significance of the non-native plant problem has not been assessed. Also the rare, endemic and problem species are not identified. This is merely at the species level. At the plant community level even less information is available. A vegetation base map was done in 1934, but the scale and detail need to be improved and field checked. The monument herbarium is full and overflowing. More specimen cabinets are needed. Many herbarium specimens are not accessioned or cataloged.

The monument's historic area around the Faraway Ranch needs vegetation management attention. The meadow areas are being encroached by juniper woodland. The historic orchard is in decay. There is no plan for historic plantings around the ranch buildings or in the ranch garden. Weedy species need to be understood and interpreted to the public regarding their significance to the early settlers and the native Americans. Non-native species have invaded the woodland, meadows, old pastures, historic orchards, and around the ranch buildings. Nothing is known about the threat these non-native species pose to the native vegetation.

A tree hazard program needs to be revitalized. The most obvious tree hazards have been removed from the campground. In 1988 a program was started, using FIREPRO funds, to thin hazard brush and trees which were a fire hazard to buildings. Other than that, tree hazards have not been surveyed or rated.

Vista clearing along the main monument road has been discussed but no plan nor monument guideline has been produced. Clearing around the air quality monitoring sites, especially the transmissometer sites is another type of vista clearing, as is clearing around the fire lookout on Sugarloaf Mountain. Vista clearing needs to be addressed in the Vegetation Management Plan. Another category might be called nuisance trees. Trees affecting structures or foundations, road edge encroachment, or species which will become very large trees in areas inappropriate for such sized trees. These may also be dealt with as part of the IPM program.

5. <u>Alternative Actions/Solutions and Their Probable Impacts</u>:

A. No Action. No Vegetation Management Plan will be written. No re-vegetation projects in impacted sites will be undertaken.

No in-monument native plant nursery will be considered. The Faraway Ranch historic orchard will continue to decay. Tree hazards will not be identified or prioritized, and no actions will be taken to mitigate any tree hazards.

B. Continue past re-vegetation and rehabilitation actions, with the possibility of introducing external and inappropriate genome characteristics into the isolated Chiricahua ecosystem.

C. Develop a comprehensive vegetation management program. Write a Vegetation Management Plan for Chiricahua. This will guide the vegetation management program and direct its various aspects in a coordinated and approved way.

Conduct an inventory of plant species in the monument herbarium. Carefully curate each plant specimen according to NPS standards. Accession and catalog each plant specimen in the herbarium. Create an interactive database of information from the monument herbarium, and from it create an updated monument plant list.

6. Description of the Recommended Project or Activity:

Alternative C is the preferred course of action. A comprehensive vegetation management program will be put into effect. It will be guided by a Vegetation Management Plan for the monument. The plan will address each of the several subjects of vegetation management as described above in separate paragraphs.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project. Any implementation of the Vegetation Management Plan will be preceded by environmental clearances as appropriate for each project. Historical or archeological clearances will also be completed as appropriate.

8. Relationships:

This project is related to at least nine other projects listed in this plan. These are as follows:

CHIR-N-06 Analyze Vegetation Changes and Trends
CHIR-N-07 Develop the Fire Management Program
CHIR-N-09 Conduct an Inventory and Assessment of Plants
CHIR-N-14 Conduct an Inventory and Assessment of Non-native Species
CHIR-N-16 Develop a Geographic Information System

CHIR-N-21 Conduct a Survey and Assessment of Soils
CHIR-N-22 Conduct a Survey and Assessment of Geology
CHIR-C-07 Develop a Historic Landscape Program
CHIR-I-05 Conduct an Ethnobotanical Study

9. Funding Requirements:

$14,500 is needed in year one for the development of a Vegetation Management Plan.

	Year 1	Year 2
Personal Services	$12,000	0
Travel and Per Diem	1,500	0
Supplies and Equipment	500	0
Publication Costs	500	0
Total	$14,500	$ 0

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-09

2. Project Title: Conduct an Inventory and Assessment of Plants

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them

4. Problem Statement:

This project will consist of a botanical survey of Chiricahua National Monument to provide new information for management and interpretation. Vegetation is the keystone of natural ecosystems, serving as a basis for animal life and as a synthesizer of environmental factors, including geology, soils, slope, exposure, and climate. Thus, vegetational analyses can be used as a tool for examining potential environmental problems within the monument. The baseline established by this study will allow future managers to assess such factors as changes in non-native plant species and communities, changes in surface and groundwater regimes, and stability or lack of stability in plant communities.

Project statement I-02 requests funding for the implementation of long-term monitoring and any other management actions recommended as a result of this research. This specific project is limited to a baseline vegetation survey and assessment, and to the development of monitoring protocols.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. This will leave management vulnerable to being unable to detect changes in the vegetation and flora, thus also related changes, e.g. in flow levels of surface or groundwater. Addition information for interpretation of botanical parameters will not be forthcoming.

B. Conduct Plant Inventory and Assessment. This will increase management's ability to assess changes in the natural resources of the monument. Close monitoring of the vegetation can serve as an early warning system for undesirable changes and increase management's ability to respond effectively to these changes in a timely manner. Additional botanical information will be provided for interpretive programs. Long-term monitoring protocols will be developed for vegetation in Chiricahua National Monument. The

monument staff will be trained in the implementation of these protocols.

Create an updated vegetation map of the monument, define vegetation communities within the monument, inventory and evaluate the populations of rare species, inventory and evaluate the populations of non-native species, examine the health of lichen flora in order to set a baseline for impacts from air pollution, and investigate the age structure of dominant tree species to determine trends in changes in forest type.

Identify the status of each plant on the updated plant list. For example, list species as endangered, threatened, state listed, range limit extensions, endemic, non-native, special plants, monotypic families or genera, or other designation. Evaluate plant species status, and identify those species that require the most urgent management action. Then use these data, through the Vegetation Management Plan, and initiate actions such as surveying for rare plants and reducing harmful non-native species infestations.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. This project will inventory and assess the vegetation in the monument. Vegetation is composed of plant communities, e.g. Madrean woodland or mixed riparian woodland, and is the keystone of natural ecosystems, serving as a basis for animal life and as a synthesizer of environmental factors, including geology, soils, slope, exposure, and climate. Vegetation, in turn, is made up of the collective plant species of the monument, or flora. Data will be collected concerning the distribution, composition, structure, evolution, and aerial extent of vegetation. The monument currently has a herbarium which contains specimens of some 750 species and subspecies. A basic botanical survey, description, and synthesis of existing and new information will be completed, adding new information from the project to the information now contained in the herbarium and monument files. Researchers will provide information which will upgrade interpretation of the monument's flora and vegetation.

One of the products of this research effort will be a set of long-term monitoring protocols that the monument staff can use to gauge the health of this ecosystem component over time. The goal is to develop a complete long-term monitoring program for the monument that covers all aspects of monument.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least five other projects listed in this plan. These are as follows:

CHIR-N-05 Protect Natural Resources from Boundary Effects and Survey Monument Perimeter
CHIR-N-06 Analyze Vegetation Changes and Trends
CHIR-N-08 Develop a Vegetation Management Program
CHIR-N-14 Conduct an Inventory and Assessment of Non-native Species
CHIR-N-16 Develop a Geographic Information System

9. Funding Requirements:

$6,500 is needed in years one and two to evaluate the special status of plants in the monument.

$11,000 is needed in year one and $17,500 is needed in year two for botanical research, inventory, and assessment.

$19,500 is needed in year three to produce the vegetation map and to design the long-term monitoring protocols.

	Year 1	Year 2	Year 3	Year 4
Personal Services	$13,000	$13,500	$13,500	$ 0
Travel and Per Diem	3,500	3,000	2,500	0
Equipment and Supplies	1,000	1,000	1,500	0
Publication Costs	0	0	2,000	0
Total	$17,500	$17,500	$19,500	$ 0

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-10

2. Project Title: Conduct Fire Ecology Study of Selected Species

3. Service-wide Issue(s):

N07 - Disruption of Natural Fire Regimes

4. Problem Statement:

Prescribed fire has become an important, if controversial, resources management tool.

Fire managers use fire prescriptions that have been developed mainly in Rocky Mountain and Sierra Nevada forests. Some of these statistically-based assumptions of fire behavior may not hold true for the Madrean Forest of Chiricahua (Axelrod 1966).

The Madrean Forest and Woodland (Brown 1982) covers 90 percent of the monument. This vegetation originated in the Sierra Madre of Mexico and is only fleetingly represented in the United States--in southeastern Arizona and southwestern New Mexico (Whittaker & Niering 1964, 1965, 1968, Niering & Lowe 1984). This vegetation type contains the only U.S. representatives of more than 100 plants and animals that are associated with it (Brown 1982). Limited distribution and low economic value of the Madrean Forest has encouraged little fire ecology research.

The dominant tree species in the Madrean Forest whose fire ecology is unknown or confusing include:

Arizona Cypress	Cupressus arizonica,
Apache Pine	Pinus engelmannii,
Chihuahua Pine	P. leiophylla,
Mexican Pinyon Pine	P. cembroides,
Emory Oak	Quercus emoryi,
Arizona White Oak	Q. arizonica,
Silver-leaf Oak	Q. hypoleucoides, and
Net-leaf Oak	Q. rugosa.

Observations made of the fire effects on these species show that they either fail to respond to fire, are outright killed or that their response is variable (Moir 1972, 1974; Niering & Lowe 1984; Roseberry & Dole 1939; Whittaker & Niering 1964, 1965, 1968). There is little in the scientific literature to suggest causes for these variable responses.

Jan van Wagtendonk and Rod Norum (1990) stated that the role of fire in Chiricahua is complex and certainly not fully understood. What is not clear, they said, is whether or not the ecosystems are dependent on fire or rather just fire enduring. Axelrod (1966) notes that the plants of the Madrean Forest, from which the monument's vegetation evolved, are not necessarily all fire tolerant. It is not known how much scorching is necessary to kill the stems of these Madrean species. Before prescribed burn objectives can be written for burns used to simulate natural fires, additional research will have to be undertaken (van Wagtendonk & Norum 1990). This project statement calls for such basic studies of selected species.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Prescribed burns will continue and will be evaluated by post-burn vegetation monitoring. No investigation of ecological fire effects will be carried out pre-burn, and assumptions of fire effects will continue to be based upon Sierra Nevada and Rocky Mountain ecosystem data.

B. Investigate Ecological Fire Effects of Dominant Madrean Species. The resulting knowledge will be integrated into the Fire Management Plan and more accurate ecological objectives will be establish for the monument's prescribed fire program. Fire prescriptions will be based on sound knowledge of fire effects.

6. Description of the Recommended Project or Activity:

Alternative B is the preferred course of action. Investigate the effects of fire on Arizona Cypress (Cupressus arizonica), Apache Pine (Pinus engelmannii), Chihuahua Pine (P. leiophylla), Mexican Pinyon Pine (P. cembroides), Emory Oak (Quercus emoryi), Arizona White Oak (Q. arizonica), Silver-leaf Oak (Q. hypoleucoides), and Net-leaf Oak (Q. rugosa). Observe the reaction of each species to fire, considering the following: ease of kill of mature trees, seed germination response, sprouting response from the root crown, rate of forest re-establishment, secondary fire effects such as insect or fungal invasion, changes in growth rates, changes in leaf color.

Trees growing under different forest conditions should be examined, e.g., in fire excluded sites, non-fire excluded sites, trees growing near the northern limits of their range and trees growing near their center of distribution in the Sierra Madre.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least four other projects listed in this plan. These are as follows:

CHIR-N-06 Analyze Vegetation Changes and Trends
CHIR-N-07 Develop the Fire Management Program
CHIR-N-08 Develop the Vegetation Management Program
CHIR-N-11 Conduct a Monument-wide Fire History Study

9. Funding Requirements:

	Year 1	Year 2	Year 3	Year 4
Personal Services	$14,000	$14,500	$14,500	$15,000
Travel and Per Diem	2,000	2,200	2,400	2,600
Supplies and Equipment	3,000	3,000	3,000	3,000
Publication Costs	0	0	0	2,000
Total	$19,000	$19,700	$19,900	$22,600

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-11

2. Project Title: Conduct a Monument-wide Fire History Study

3. Service-wide Issue(s):

N07 - Disruption of Natural Fire Regimes

4. Problem Statement:

There is a lack of knowledge about the monument's natural fire history. A fire history study was done only for Rhyolite Canyon by Thomas Swetnam (1989). It presented several questions and recommendations for future studies.

Due to the complexity of fire behavior in Chiricahua and complicated by the abrupt topography, fire history in the monument is complex. It is clear that the fire history of Rhyolite Canyon is not likely to be representative of other portions of the monument. Fire chronology information needs to be expanded to cover the entire monument.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Continue with the base funded fire program which includes no output for fire history research.

B. Conduct a Monument-wide Fire History Study. The monument's fire management program will be based on knowledge of fire histories, from both pre-settlement era and suppression-era fires, and from sites throughout the monument. Ecological objectives of prescribed fires and prescribed natural fires will be based on knowledge of the natural fire regime. The fire program will endeavor to restore and maintain biodiversity in the monument.

6. Description of the Recommended Project or Activity:

Alternatives B above is recommended. A research contract will be let for the development of fire chronologies at several sites throughout the monument. Selected trees will be sampled with an increment borer and possibly by cutting out tree sections or wedges. The samples will be analyzed for fire scars, dates of fires, relative season of fires and any other information

obtainable. Several sampling sites will be used in order to cover the likely diversity of fire occurrence. From the tree ring data, inferences will be made as to sizes of fires, length of burning time, fire severity, origin, spread direction, etc.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least eight other projects listed in this plan. These are as follows:

CHIR-N-06	Analyze Vegetation Changes and Trends
CHIR-N-07	Develop the Fire Management Program
CHIR-N-08	Develop the Vegetation Management Program
CHIR-N-09	Conduct an Inventory and Assessment of Plants
CHIR-N-10	Conduct a Fire Ecology Study of Selected Tree Species
CHIR-N-14	Conduct an Inventory and Assessment of Non-native Species
CHIR-N-16	Develop a Geographic Information System
CHIR-C-07	Develop a Historic Landscape Program

9. Funding Requirements:

	Year 1	Year 2	Year 3
Research Contract	$17,500	$18,000	$ 0
Publication Costs	0	2,000	0
Total	$17,500	$20,000	$ 0

10. Annual Project Status and Accomplishments:

An NPS-funded fire history study was done only for Rhyolite Canyon by Thomas Swetnam (1989).

An FY90 SPMA-funded follow-up study was done in Rhyolite Canyon to test the hypothesis that a flood and debris flow had altered the natural fire regime. A final report has not been received.

An FY91 SPMA-funded study has been approved to investigate tree ring phenology in the Madrean forest.

PROJECT STATEMENT

1. Project Number: CHIR-N-12

2. Project Title: Rehabilitate Impacted Sites

3. Service-wide Issue(s):

N22 - Overuse/Impacts to Recreation and/or Landscaped Zones

4. Problem Statement:

The impacts of construction projects, maintenance activities, social trailing, expanding campsites and pullouts, and a variety of visitor use activities over the years have had a negative effect on some natural areas of the monument. These impacts have decreased scenic values in some areas to the point that an active program of rehabilitation is needed. This rehabilitation program should include such activities as restoring the surface profile and replanting native vegetation in a natural pattern over the disturbed area. Some form of access barrier may also be needed to allow the site to begin recovery in an environment free of continued disturbance.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. This alternative would dictate that nothing be done to restore impacted areas to their former state of naturalness. Current funding levels in the monument mandate this option for most impacted sites. It is an unacceptable option however, and should not be allowed to continue.

B. Provide Project Funds to Rehabilitate the Most Severely Impacted Sites. This option would allow the monument staff to address the most serious rehabilitation needs currently existing in Chiricahua National Monument. This would be an acceptable option, and is in fact what has happened in the past, where serious campground impacts have been addressed. It however, fails to provide base funding for the monument to use in keeping ahead of this problem on a continual basis.

C. Provide Project Funds to Rehabilitate the Most Severely Impacted Sites, and Provide Base Increase Funds to Address this Ongoing Problem. This highly preferred option would solve the most pressing problems as in option B but would also allow the monument to make improvements in impacted areas throughout the monument on a sustained basis.

6. Description of the Recommended Project or Activity: Option C. is the recommended solution for this issue. Physically trampled or disturbed areas throughout the monument will be rehabilitated with native vegetation. Priority will be given to heavy visitor use areas such as the campground, the entrance station and scenic pullouts. Native vegetation will be obtained from within the monument to assure natural genetic diversity. Plant material will be obtained as seed, as cuttings and as salvage from construction sites. Rehabilitated areas will be cared for through the initial growing season, or long enough for the site to harden and reestablish as native vegetation cover, naturally growing under existing conditions. Supplemental treatments such as tilling, soil supplements, and watering will be utilized, if needed at all, only on a temporary basis. The rehabilitation techniques employed will be guided by monument's Vegetation Management Plan.

7. Compliance: This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 may be needed if the impacted area to be rehabilitated contains cultural resource values. This issue will be evaluated on a case-by-case basis and all necessary clearances will be obtained before a project is undertaken.

8. Relationships: This project is related to at least four other projects listed in this plan. These are as follows:

CHIR-N-04 Evaluate NPS Options with the King of Lead Mine
CHIR-I-01 Administer the Natural and Cultural Resources Management Program
CHIR-I-02 Increase the Natural and Cultural Resources Management Program
CHIR-I-04 Develop In-monument Plant Nursery

9. Funding Requirements:

Year 1 -- Project funding to fund the rehabilitation of the most severely impacted sites in the monument.

Year 2 -- Park base increase to fund seasonal position in resources management to work on rehabilitation of impacted sites on a regular and routine basis each year to prevent the backlog and reduce the seriousness of potential impact problems.

	Year 1	Year 2	Year 3	Year 4
Personal Services	$17,000	$ 5,000	$ 5,000	$ 5,000
Travel and Per Diem	3,000	1,500	1,500	1,500
Supplies & Materials	5,000	2,000	2,000	2,000
Total	$25,000	$ 8,500	$ 8,500	$ 8,500

10. Annual Project Status and Accomplishments: This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-13

2. Project Title: Conduct an Inventory and Assessment of Birds

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them

4. Problem Statement:

The Chiricahua mountain range, which includes the monument, is internationally recognized for its large diversity of bird life. The unique island-type biotic community and adjacent grasslands support 18 vegetation associations supporting over 300 species of birds and 1,500 species of plants. Tens of thousands of visitors a year travel throughout the range to see a wide range of Southwestern specialty birds such as the Painted Redstart, Thick-Billed Parrot, Red-Faced Warbler, Sulfur-Bellied Flycatcher, Elegant or Eared Trogons, and the 16 species of hummingbirds that frequent the area. Twenty species of hawks and 13 species of owls have been recorded in the range. Chiricahua canyons have recorded some of the highest breeding bird densities in the United States with some canyon corridors approaching 1,200 breeding birds per square mile of habitat. The monument, as an integral part of the range, attracts a large number of "birders" to the area which represent a significant portion of the total annual visitation.

Changes in riparian and adjacent upland ecosystems, including those at Chiricahua National Monument, have resulted in severe reductions or fluctuations in avian species diversity and population densities through most of the Southwest. Important analytical attributes of birds include diurnal activity, songs and prominent displays, trophic specialization, and variation in breeding habitats and behaviors. These attributes are useful for integrating and synthesizing information across diverse environmental gradients generally making bird data some of the best tools for evaluating the biological health of an ecosystem. The long-range effects of prescription burning upon madrean vegetation mosaics are not known. Consequently, area specialty birds which depend upon madrean components may be put into jeopardy by prescription burns. Other activities that reduced and modified the extensive riparian and adjacent upland vegetative communities, and presumably the dependent avifauna,

included human impacts, heavy grazing, and surface water withdrawal.

This project is designed to supplement the basic avifaunal information contained in the monument files by providing more information about the interaction of key avian species (indicator species) within the context of the monument's madrean components.

Project statement I-02 requests funding for the implementation of long-term monitoring and any other management actions recommended as a result of this research. This specific project is limited to a baseline avian survey and assessment, and to the development of monitoring protocols.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Management concerns associated with the biodiversity of avifauna will not be addressed. Management will have little information on which to base management decisions. Consequently, desired objectives in habitat protection, conservation, manipulation or mitigation may be difficult to meet. In addition, inadvertent loss of species diversity may occur without a greater understanding of the biological relationships involved. Additional information about birds for interpretive programs will not be forthcoming.

B. Conduct Avian Biological Inventory and Assessment. This will provide information which will serve as an additional management tool for examining the ecological health of the monument. Emphasis will be placed on riparian corridors and on Southwestern habitats with representative Madrean components. Interpretive information about the avifauna will be made available for visitors. Long-term monitoring protocols will be developed. The monument staff will be trained in the implementation of these protocols.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. Species richness and relative densities for avian species in the monument will be examined. Species that have specialized requirements or utilize madrean vegetative components or that are related to interpretive programs or resources management prescription burn concerns will be studied in relationship to those requirements. Upon completion of the annotated checklist, habitat testing protocols will be developed to monitor the health of selected indicator habitats with madrean components. The effects of prescribed fire on these habitats, and the presumably dependent avifauna, will be examined.

One of the products of this research effort will be a set of long-term monitoring protocols that the monument staff can use to gauge the health of this ecosystem component over time. The goal is to develop a complete long-term monitoring program for the monument that covers all aspects of monument.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least five other projects listed in this plan. These are as follows:

CHIR-N-02	Complete the Annotated Checklist of Birds
CHIR-N-03	Develop a Bibliographic Database and Assessment of Natural Resources
CHIR-N-06	Analyze Vegetation Changes and Trends
CHIR-N-08	Develop the Vegetation Management Program
CHIR-N-16	Develop a Geographic Information System
CHIR-I-02	Increase the Natural and Cultural Resources Management Program

9. Funding Requirements:

	Year 1	Year 2	Year 3	Year 4
Personal Services	$10,500	$11,000	$11,500	$ 0
Travel and Per Diem	3,000	3,000	3,000	0
Equipment and Supplies	1,500	1,500	1,500	0
Publication Costs	0	0	2,000	0
Total	$15,000	$15,500	$18,000	$ 0

Year 1 -- Begin avian studies for species richness and relative densities in selected habitats.

Year 2 -- Continue avian studies as first year, plus select indicator species and special status species (rare, declining or increasing populations, etc.).

Year 3 -- Finish field work, analyze results, develop monitoring protocols, develop interpretive information, and prepare summary report.

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-14

2. Project Title: Conduct an Inventory and Assessment of Non-native Species

3. Service-wide Issue(s):

N05 - Degradation of Park Resources Due to Non-native Plants

4. Problem Statement:

The monument staff has recorded the presence of a few selected non-native species that occur throughout the national monument. Examples of species are: Bromus tectorum, Cyperus esculentus, Cynodon dactylon, Sorghum halpense, Tamarisk chinensis, Verbascum thapsus, Lonicera japonica, Erodium cicutarium, and Tribulus terrestris. Less is known, however, about their abundance, distribution, and population trends. Lacking an inventory, it is likely that additional non-native species occur in the monument but have not yet been detected. Some problems perhaps have not yet been identified because of their subtlety. For example, a non-native insect might compete with and replace a native insect which is essential (a symbiotic partner) in pollinating a native plant.

However, some non-native species problems have been identified. Salt cedar, Tamarisk chinensis, a shrub or small tree, has been recorded recently in the monument. Tamarisk is a major threat to Southwestern riparian habitats. Other non-native plants displaying differing aggressiveness on a case by case basis include Russian thistle, Russian olive, horehound, wooly mullein, puncture vine, filaree, red brome, and bermuda grass. Several of these non-native plant species have been introduced to the monument as a result of past settlement, grazing, farming, excavation, and construction in and around these areas. Cheat-grass, wild barley and fox-tail keenly invade from grazed to ungrazed lands. Arizona Department of Transportation seeds non-native Lehmann Lovegrass (Eragrostis lehmanniana) along highways and it also occurs in these areas.

Known animal non-natives at the monument include house sparrow, rock dove, and starlings. Starlings are known to aggressively replace native primary and secondary cavity nesting bird species. Non-native mammals include feral cats and house mice.
Project statement I-02 requests funding for the implementation of long-term monitoring and any other management actions recommended

as a result of this research. This specific project is limited to a baseline non-native species survey and assessment, and to the development of monitoring protocols.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Without the inventory, gradual or rapid expansion of non-native species might remain unknown. Natural communities will be altered in some cases. Service management policies require removal of non-native species. Recommendations are needed regarding feasibility of eliminating non-native species and establishing natives.

Lacking a thorough non-native species inventory and recommendations for control strategies, little can be done to control or eliminate those species causing the most extensive ecosystem alterations. Such ecosystem changes probably are not irreversible but without baseline information about non-native species, resource managers can only use intuition and speculate on outcomes.

B. Maintain Current Non-native Control Program. Current and recent non-native control at Chiricahua National Monument has been sporadic and infrequent. However, one success has been the removal of Tamarisk chinensis. The monument staff has effectively controlled European honey bees and wasps in close proximity to visitors at the Visitor Center.

C. Complete Proposed Inventory and Carry Out Non-native Control Program. Inventory of non-native plants, their distribution, abundance, and seasonal occurrence, is necessary to understand the extent of these plants and assess any problems. With this information, management can determine which species need to be controlled and which will be tolerated. Some species may be very abundant and widespread, characteristics that make removal infeasible. Staff will also become aware of potential introductions outside the monument which could affect lands under their jurisdiction (e.g., roadside seeding, farming, grazing). Long-term monitoring protocols will be developed for vegetation in Chiricahua National Monument. The monument staff will be trained in the implementation of these protocols.

6. Description of the Recommended Project or Activity:

Alternative C is the recommended course of action. This project can be contracted out, conducted by NPS scientists or through a Cooperative Park Service Unit. The three phases of this project are detailed below.

Phase I -- Complete an inventory of non-native plants and animals. Categorize these into species that are the most aggressive and that actually or potentially cause the greatest ecosystem change or loss of native biotic diversity.

Phase II -- Develop management guidelines with control feasibility and cost evaluations for the highest priority and most threatening non-native species. Include basic information on distribution, rate of spread, etc. Historic aerial and ground photographs may be useful for these determinations. Thoroughly review literature to determine what is known about the ecology of these species. Recommend available management (control techniques) or, if unavailable, recommend control strategies with associated reestablishment of native species where appropriate. Such strategies might include physical removal experiments, prescribed fire, use of herbicides or insecticides, biological control, or some combination of these. Consult with other specialists, as required, to develop sound strategies. Establish experimental treatment plots, where appropriate. Monitor success or failure of the treatment methodology during the course of the study. Train monument personnel to carry out our long-term monitoring of test plots, if appropriate.

Phase III -- Prepare a scientific report providing results from the inventory and evaluations. Also provide the superintendent with written management plans or manuals ("cook books") for removing the most crucial non-native plant and animal species. Finally, provide written material and recommendations for applicability of findings to the interpretive program of the monument. Proper explanation to the public of the problem and solution can develop public support and perhaps even participation in the removal program.

One of the products of this research effort will be a set of long-term monitoring protocols that the monument staff can use to gauge the health of this ecosystem component over time. The goal is to develop a complete long-term monitoring program for the monument that covers all aspects of monument.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least five other projects listed in this plan. These are as follows:

CHIR-N-03	Develop a Bibliographic Database and Assessment of Natural Resources
CHIR-N-06	Analyze Vegetation Changes and Trends
CHIR-N-08	Develop a Vegetation Management Program
CHIR-N-09	Conduct an Inventory and Assessment of Plants
CHIR-I-02	Increase the Natural and Cultural Resources Management Program

9. Funding Requirements:

	Year 1	Year 2	Year 3	Year 4
Personal Services	$ 8,000	$ 8,500	$ 9,000	$ 0
Travel and Per Diem	2,500	2,500	1,500	0
Supplies and Materials	1,500	1,000	1,000	0
Publication Costs	0	0	2,000	0
Total	$12,000	$12,000	$13,500	$ 0

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-15

2. Project Title: Conduct an Inventory and Assessment of Invertebrates

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them

4. Problem Statement:

Invertebrates are a large and diverse group of animals occupying terrestrial and aquatic environments at Chiricahua National Monument. The vast number of species and difficulties of identifying specimens make invertebrates relatively difficult to study. Nonetheless, they are responsible for a number of vital ecosystem functions. The best known groups of invertebrates are probably the Classes Insecta, Crustacea, and Mollusca. Many members of these groups are known because they are economically and medically important as pests. However, the description of species new to science is not atypical among workers specializing in a particular Family or Genus of insect, crustacean, or mollusk. It is highly probably that many taxa in these three groups remain undescribed at Chiricahua.

There are currently no known impacts on health and public safety at Chiricahua, but a number of insects, ticks and other invertebrates are known to cause debilitating and life-threatening diseases elsewhere. Biting insects such as bees and wasps may also threaten hyper-allergic people.

The ecological roll of insects cannot be overemphasized. Furthermore, there is often great interpretive value associated with information about the interesting life histories of many insect species.

Project statement I-02 requests funding for the implementation of long-term monitoring and any other management actions recommended as a result of this research. This specific project is limited to a baseline invertebrate survey and assessment, and to the development of monitoring protocols.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. This alternative entails maintenance of the status quo. No research on native invertebrates would be undertaken.

B. Inventory the Existing Invertebrates. This alternative calls for an inventory of invertebrates at Chiricahua. The project should be phased to concentrate on Families or Orders of invertebrates. Specific taxonomic groups to be inventories should include those that are preserved and studied easily.

Protozoans, although of interest and importance in the monument could only be studied cost-effectively on a very limited scale. This is true of other groups such as the Platyhelminthes and nematode worms as well. A few specialists be available world-wide to study some groups of invertebrates. The studies should be designed to sample the biotic diversity of insects, crustaceans, mollusks and other better known groups of invertebrates. Organisms occupying different environments (i.e., aquatic or terrestrial) will probably be studied most effectively by different specialists.

Long-term monitoring protocols will be developed for vegetation in Chiricahua National Monument. The monument staff will be trained in the implementation of these protocols.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. Researchers will conduct an inventory of native invertebrates at the monument. This effort should initially concentrate on insects, crustaceans, mollusks and other relatively well known groups. Inventories should also be defined by habitats. A variety of collecting techniques should be used to effectively sample the diversity of invertebrates and their habitats. A seasonal sampling regime would allow the researcher to make initial determinations of relative abundance, reproductive strategies, and other natural history attributes. The inventories should be implemented with a comprehensive review of pertinent literature. Data should be analyzed using simple descriptive statistics (e.g., mean, standard deviation, etc.) and the entire set should be presented to NPS. The research should also develop recommendations for subsequent studies which may provide information having management significance. Studies during the last two years of the project should concentrate on taxa of management concern or exceptional scientific interest.

One of the products of this research effort will be a set of long-term monitoring protocols that the monument staff can use to gauge the health of this ecosystem component over time. The goal

is to develop a complete long-term monitoring program for the monument that covers all aspects of monument.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least four other projects listed in this plan. These are as follows:

CHIR-N-03 Develop a Bibliographic Database and Assessment of Natural Resources
CHIR-N-14 Conduct an Inventory and Assessment of Non-native Species
CHIR-N-16 Develop a Geographic Information System
CHIR-I-02 Increase the Natural and Cultural Resources Management Program

9. Funding Requirements:

	Year 1	Year 2	Year 3	Year 4	Year 5
Personal Services	$15,000	$15,500	$16,000	$16,500	$17,000
Travel and Per Diem	3,500	3,700	3,900	4,100	4,300
Supplies and Materials	1,000	1,000	1,000	1,000	1,000
Publication Costs	0	0	500	0	2,000
Total	$19,500	$20,200	$21,400	$21,600	$24,300

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-16

2. Project Title: Develop a Geographic Information System

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them

4. Problem Statement:

Currently there is no automated system for creating, managing, analyzing, and displaying mapped information about the monument's resources. The monument's resources are in a continual state of change which makes it difficult to predict future resource conditions and quantify the effects from external or internal threats. A significant challenge is faced by management when traditional methods are utilized to integrate thematic data composites derived from natural and cultural resource information databases. Resources Management Plans, RMPs, are by their nature limited in illustrating long-term, inconspicuous, and subtle changes in the health of natural and cultural resources. External threat pressures from urbanization, conflicting land use practices, demographic changes, and environmental pollution are increasing at an alarming rate. Primary internal threats result from a wide range of anthropogenic factors. A Geographic Information System (GIS) would be instrumental in detecting changes, analyzing trends, and projecting possible future conditions resulting from these external and internal resource pressures.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. This alternative entails maintenance of the status quo. Monument staff would be forced to rely on traditional techniques and methods that do not illustrate long-term resource changes as effectively as a GIS. Visual patterns and conditions of resources will not be generated. Thematic composites and subsequent derived products could not be effectively produced or compared.

B. Develop Regional GIS System. This would provide management with an effective tool to analyze existing trends and predict future changes. Digitizing photographic and cartographic information will increase the speed that the monument's staff can

collect, prepare, retrieve and manipulate data from different thematic data composites. Cartographic and subsequent data analysis will significantly increase management's ability to document, demonstrate, illustrate and predict long-term changes in the health of the monument's resources. In addition, the automated GIS produces support materials such as maps, tables, charts and graphs which illustrate the resource problems or simply describe monument resources to interested parties.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. Such themes as boundaries, land use, land ownership, fire history, fuel loading, lightening strike frequency, vegetation communities, riparian community stability, climatic gradients, slope and aspect, view-shed, rare or sensitive species, roads, trails, cultural resources, demographic influences on cultural and natural resources, and other external impacts from the surrounding area would be considered for inclusion in the Chiricahua National Monument GIS.

At least two scales of resolution will be initially required to represent and generate the thematic composites. Consideration should be given to the 1:1,200 and 1:24,000 scales for small and large scale resolution as appropriate. Physiographic and political boundaries should be adjusted to include selected natural or cultural features that influence the monument's resources.

This GIS would be developed in cooperation with CPSU/UA, which would likely be responsible for digitizing the necessary data, thematic and composite manipulations, archive storage, and producing final products for use by the monument staff. The CPSU/UA could also provide training to monument staff to familiarize the staff with GIS software and hardware.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is a keystone effort that is related to all other projects listed in this plan.

9. Funding Requirements:

	Year 1	Year 2	Year 3	Year 4
Personal Services	$15,000	$15,500	$16,000	$ 0
Travel and Per Diem	2,000	2,000	2,000	0
Capital Equipment	0	5,000	15,000	0
Digitizing/Photos	4,500	5,000	3,000	0
Supplies and Materials	3,000	3,000	3,000	0
Reproduction	1,500	1,500	1,000	0
Total	$26,000	$32,500	$40,000	$ 0

NOTE: Personal services and digitizing costs may be reduced if SOAR group areas submit similar thematic data composites for batch processing.

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-17

2. Project Title: Design Air Quality Biological Effects Program

3. Service-wide Issues:

N14 - Visibility Impairment and Biological Damage Caused by Air Pollution (includes wet and dry deposition)

4. Problem Statement:

Air quality related values such as healthy native vegetation are primary attractions essential to visitor enjoyment of the monument's natural resources. Air pollution has increased in the Chiricahua region, but the extent of the increase and its effects on the monument's resources are unknown. Pollutants and their sources could include ozone from the Tucson metropolitan area and sulfur dioxide, sulfates, nitrogen oxides and nitrates from copper smelters in southeastern Arizona and northern Mexico. Ozone is having visible impacts on vegetation (particularly Ponderosa Pine) in nearby Saguaro National Monument. Certain lichen species are sensitive to sulfur dioxide. The monument's rhyolite pillars, spires and other formations are covered with lichens. The monument currently monitors airborne particles and visibility.

The management objectives on air quality related values are to protect the monument's resources and to assist in decision making. Tools for accomplishing these objectives include research, data collection, the development of baseline information, and the recording of information. Information is recorded about air quality, point and non-point sources of pollution and meteorology. Baseline information is recorded for the current biological condition and is then compared to future biological changes which are attributable to air pollution.

5. Alternative Actions/Solutions and their Probable Impacts:

A. No Action. Rely on NPS bio-monitoring data from Saguaro National Monument for the same species in Chiricahua. Rely on other Federal and State agencies and other public and private researchers for information on air pollution effects on monument natural resources. This information would not necessarily be representative of biological effects in the monument, and therefore would not provide the superintendent with necessary

information to meet the air quality related values management objectives.

B. Conduct Bio-monitoring Survey. Staff or a contracted researcher will review the monument flora list and compare it with lists of air pollution sensitive plant species for the area. Once sensitive species are identified, Air Quality Division plant ecologist or contractor will conduct a field survey. Locations of sensitive species will be recorded on U.S.G.S. quadrangle maps. Upon completion of the field survey, the NPS Air Quality Division specialist or contractor will recommend an appropriate air quality biological effects program for the monument, which may include such things as the establishment of permanent vegetation plots, a bio-monitoring garden, or conducting fumigation studies (field or laboratory). A permanent biological effects program, implemented in conjunction with Project Statement number N-01, Monitor Air Quality, would help identify current or potential problems that could be mitigated through permit review, regulatory or legislative actions.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. A comprehensive bio-monitoring survey will be conducted at the monument. It will include a review of the monument's flora list (from NP FLORA) and a comparison of those flora with a list of air pollution sensitive species, followed by a field survey to identify and locate air pollution sensitive species in the monument. Completion of the field survey should result in a recommendation to establish a permanent air pollution effects research program at the monument.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least five other projects listed in this plan. These are as follows:

CHIR-N-01 Monitor Air Quality
CHIR-N-06 Analyze Vegetation Changes and Trends
CHIR-N-09 Conduct an Inventory and Assessment of Plants
CHIR-N-16 Develop a Geographic Information System
CHIR-C-11 Evaluate Air Quality Impacts on Cultural Resources

9. Funding Requirements:

	Year 1	Year 2
Personal Services	$13,000	$ 0
Travel and Per Diem	2,500	0
Supplies and Materials	500	0
Publication Costs	1,000	0
Total	$17,000	$ 0

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-18

2. Project Title: Conduct an Inventory and Assessment of Mammals

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them

4. Problem Statement:

Changes in riparian and upland ecosystems have resulted in species composition and population densities through most of mammals in the Southwest. Some mammalian species are of interest because of recreational pursuits (i.e., hunting), they are disease vectors or they cause economic losses. The majority of mammalian species are poorly known by land managers, wildlife managers and the general public.

Chiricahua National Monument has been maintained in relatively pristine condition since its establishment in 1924. However, comparison of modern photos with old photos indicate that this area has been heavily impacted by past cattle grazing and other land uses. Activities that reduced and modified the riparian vegetative communities, and presumably many mammals, included trapping and predator control, grazing, conversion of plant communities and surface water withdrawal.

This project is designed to supplement and develop baseline information on mammals within Chiricahua National Monument, providing more information about the interaction of key mammalian species (indicator species) with the rest of the monument environment.

Project statement I-02 requests funding for the implementation of long-term monitoring and any other management actions recommended as a result of this research. This specific project is limited to a baseline mammals survey and assessment, and to the development of monitoring protocols.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. This alternative entails maintenance of the status quo. Monument staff will rely on the existing scant

database to make management decisions affecting native mammals. No research on native mammals will be conducted.

B. Conduct Mammalian Inventory and Assessment. This study will provide information on native mammals which will serve as an additional management tool for examining the ecological health of the monument ecosystems. It will also provide information on relative abundance and natural history characteristics of species. The inventory will be conducted using non-destructive sampling techniques such as live trapping, mist netting and observation. The contractor will be required to obtain a scientific collecting permit from the superintendent and from the State of Arizona. Long-term monitoring protocols will be developed for vegetation in Chiricahua National Monument. The monument staff will be trained in the implementation of these protocols.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. An inventory of native mammals at Chiricahua will document the occurrence of native mammals and their relative abundance within riparian, and upland habitats. Species that have habitat requirements which are related to interpretive programs or resource management problems will be studied in relationship to those requirements. An annotated checklist suitable for sale at the visitor center will be produced.

One of the products of this research effort will be a set of long-term monitoring protocols that the monument staff can use to gauge the health of this ecosystem component over time. The goal is to develop a complete long-term monitoring program for the monument that covers all aspects of monument.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project. The principal investigator must apply for and receive a scientific collecting permit from the superintendent. Biological specimens for museums and reference use in the monument may be collected only when required.

8. Relationships:

This project is related to at least six other projects listed in this plan. These are as follows:

CHIR-N-03	Develop a Bibliographic Database and Assessment of Natural Resources
CHIR-N-05	Protect Natural Resources from Boundary Effects and Survey Monument Perimeter
CHIR-N-06	Analyze Vegetation Changes and Trends
CHIR-N-14	Conduct an Inventory and Assessment of Non-native Species
CHIR-N-16	Develop a Geographic Information System
CHIR-I-02	Increase the Natural and Cultural Resources Management Program

9. Funding Requirements:

	Year 1	Year 2	Year 3	Year 4
Personal Services	$12,500	$13,000	$13,500	$ 0
Travel and Per Diem	2,500	2,500	2,000	0
Supplies Materials	1,500	1,500	1,000	0
Publication Costs	0	0	2,000	0
Total	$16,500	$17,000	$18,500	$ 0

10. Annual Project Status and Accomplishments:

The CPSU/UA published a technical report by Doug Duncan (1990), Small Mammal Inventory of Chiricahua National Monument.

PROJECT STATEMENT

1. Project Number: CHIR-N-19

2. Project Title: Develop a Water Resources Management Program

3. Service-wide Issue(s):

N12 - Alteration of Natural Flow Regimes/Groundwater Levels

4. Problem Statement:

Chiricahua National Monument at present has no Water Resources Management Plan. It therefore has no guiding document for its water resources management program.

The monument is made up of nearly 12,000 acres of steep, rocky canyons, with visitor use and administrative facilities in the relatively small lowlands in a narrow valley. Water consumption is from three wells maintained by NPS in the canyon bottom. Wells are susceptible to upstream surface contamination from the campground, the monument road and from a private mining operation.

The two main drainages on the monument are Rhyolite Canyon and Bonita Canyon. Both are steep and narrow. The Chiricahua Mountain Range is a disjunct range in the western Chihuahua Desert and is subject to late summer monsoon rains. These rains are typically convection cell thunder storms which drop large amounts of rain on small areas for a short time. This results in summer flash flooding, especially from steep canyons. There is a danger of flash flooding to the monument campground, to the monument roads and to the historic area of Faraway Ranch.

Local anecdotal history indicates that Rhyolite Creek may have been a year round flowing water source a century ago. It is presently an intermittent creek which flows during the wetter months of the year only. Annual rainfall of about 19 inches comes in a late summer rainy season and in a winter rainy season. The loss of perennial riparian habitat, if it has occurred, is a significant occurrence.

The monument's wetlands have yet to be delineated. Such work is necessary to protect monument wetlands resources under national legislation.

A hydrological study needs to be conducted to determine the underlying setting for wetlands protection, for protection of

monument drinking supply, and for integrating knowledge into better ecosystem understanding.

Long-term monitoring of the water resources of the monument will provide a early warning system for unacceptable changes that may occur due to the actions of man, both within and without the monument boundaries.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. The status quo will continue with various monument water resource management projects without an integrating plan or program. The historic loss of perennial riparian habitat will go unresearched. The threats to facilities from flash floods will go unchecked. The threats to drinking water supplies will continue to go unchecked until crisis management is necessary.

B. An integrative Water Resources Management Plan would guide the assorted water resource issues. The NPS Water Quality Division would assist with reviewing the plan and analyzing the flash flood danger to monument facilities. Historical research would help determine the earlier flow of Rhyolite Creek and determine the cause of its decline. The monument's water wells and drinking water quality would be reviewed. Long-term monitoring protocols will be developed for the water resources in Chiricahua National Monument. The monument staff will be trained in the implementation of these protocols.

6. Description of the Recommended Project or Activity:

Alternative B is the preferred alternative. A Water Resources Management Plan will be completed by the resource management specialist and reviewed by the NPS Water Quality Division in Fort Collins, Colorado. The plan will integrate the various water quality issues of the monument. It will guide further actions, set priorities and set standards.

Threat to the campground from flash flooding will be analyzed and appropriate mitigating actions will be recommended. Records will be summarized regarding drinking water quality and the water systems will be reviewed for security. Waste water treatment will be reviewed, especially in light of its possible affect on natural resources. Flood height gauging stations will be set up on both Rhyolite Creek and Bonita Creek and records will be kept as to flood levels, flows and seasons of flow. A program of monitoring the creek's water quality, including silt transport as a measure of erosion, will be instituted. Research will determine the historic flows of Rhyolite Creek and determine the causes of any decline (overgrowth of vegetation due to over

protection from fire has been suggested). NPS actions and responses to possible impacts from outside and upstream mining operations will be determined.

One of the products of this research effort will be a set of long-term monitoring protocols that the monument staff can use to gauge the health of this ecosystem component over time. The goal is to develop a complete long-term monitoring program for the monument that covers all aspects of monument.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least five other projects listed in this plan. These are as follows:

CHIR-N-01 Monitor Air Quality
CHIR-N-06 Analyze Vegetation Changes and Trends
CHIR-N-08 Develop the Vegetation Management Program
CHIR-N-16 Develop a Geographic Information System
CHIR-N-04 Evaluate NPS Options with the King of Lead Mine

9. Funding Requirements:

$15,500 is needed for year one and $17,500 is needed for year two to develop a cooperative agreement with a qualified hydrologist to assist in the development of a Water Resources Management Plan for Chiricahua National Monument and to design long-term monitoring protocols for water resources.

In addition, $4,000 is needed in year one for the purchase and installation of two flood stage gauging stations.

	Year 1	Year 2	Year 3
Personal Services	$12,000	$12,500	$ 0
Travel and Per Diem	2,500	2,500	0
Equipment & Supplies	1,000	1,000	0
Gauging Stations	4,000	0	0
Publication Costs	0	1,500	0
Total	$19,500	$17,500	$ 0

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-20

2. Project Title: Conduct an Inventory and Assessment of Amphibians and Reptiles

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them

4. Problem Statement:

Both upland and riparian amphibians and reptiles (herpetofauna) will be studied in Chiricahua National Monument. Herps are commonly the most poorly understood of the vertebrate species in an area. Since herps are poikilothermous ("cold-blooded") they are easily affected by slight changes in temperature, as between shady and sunny micro-habitats, thus are probably the most reliable vertebrate indicators of habitat change. In addition, many species require moist habitats, during parts or all of their life cycles, especially amphibians such as frogs and toads. Although changes in riparian ecosystems have resulted in severe reductions in species diversity and population densities for many plant and animal species the impacts of these riparian habitat losses on the herpetofauna (amphibians and reptiles) have not been as well documented as for birds. One group of reptiles, rattlesnakes, constitutes a safety hazard for visitors and their distribution needs to be better understood. Understanding distribution and relative stability of amphibian and reptile species is thus an important element of vertebrate biology in relation to resource management and interpretation.

Project statement I-02 requests funding for the implementation of long-term monitoring and any other management actions recommended partially as a result of this research. This specific project is limited to a baseline amphibians and reptiles survey and assessment, and to the development of monitoring protocols for these categories of wildlife.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Baseline information important to interpretive programs will not be gathered. Information that would assist in monitoring of environmental changes and changes in biological

diversity will not be available for resource managers or for interpretation to the visiting public.

B. Conduct Biological Inventory and Assessment of Amphibians and Reptiles. This option will provide additional information to aid management in maintaining biological diversity in the monument as well as providing information for interpretive exhibits and presentations. Long-term monitoring protocols will be developed for vegetation in Chiricahua National Monument. The monument staff will be trained in the implementation of these protocols.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. Species richness and relative densities for amphibians and reptiles in the monument will be examined. Species that have specialized requirements that are of interest to interpretive programs or resource management problems will be studied in relationship to those requirements. A field checklist will be produced.

One of the products of this research effort will be a set of long-term monitoring protocols that the monument staff can use to gauge the health of this ecosystem component over time. The goal is to develop a complete long-term monitoring program for the monument that covers all aspects of monument.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least three other projects listed in this plan. These are as follows:

CHIR-N-06 Analyze Vegetation Changes and Trends
CHIR-N-16 Develop a Geographic Information System
CHIR-I-02 Increase the Natural and Cultural Resources Management Program

9. Funding Requirements:

	Year 1	Year 2	Year 3	Year 4
Personal Services	$12,500	$13,000	$13,500	$ 0
Travel and Per Diem	3,000	3,000	3,000	0
Equipment and Supplies	1,500	1,500	1,500	0
Publication Costs	0	0	2,000	0
Total	$17,000	$17,500	$20,000	$ 0

Year 1 -- Begin project with cooperator.

Year 2 -- Continue projects with emphasis on rare and poorly known species, using information gathered during the first year.

Year 3 -- Finish field work, design the long-term monitoring protocols, and prepare final report, including information for monument interpretive program.

10. Annual Project Status and Accomplishments:

Dr. Charles Lowe, Department of Renewable Natural Resources, University of Arizona, has conducted a census of herpetofauna in Chiricahua National Monument on NPS contract beginning in 1983. The CPSU/UA is awaiting his final report.

PROJECT STATEMENT

1. Project Number: CHIR-N-21

2. Project Title: Conduct a Survey and Assessment of Soils

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them

4. Problem Statement:

The soils of Chiricahua National Monument have never been surveyed or mapped. No site specific information exists that can be used by the superintendent to make informed decisions regarding location of visitor use facilities, protection of cultural sites and critical habitats, and prevention of soil erosion. This project will also develop data for the monument's geographic information system, and provide baseline information useful in integrating other ecological studies performed at the Chiricahua NM.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. This alternative will force the superintendent to continue to manage the monument without a general soils map and the attendant information a soil survey provides. Better information makes for better management. This no action alternative may well leave the superintendent out of compliance with laws and regulations governing protection of antiquities, water quality, historic landscapes, and visitor safety.

B. Conduct a soil survey and assessment. The information resulting from this survey will contribute significantly to allowing the superintendent to manage the monument resources, both cultural and natural, from a more informed basis. Visitor services facilities can be located in areas of stable soils, areas of high erosive potential can be delineated and protected from humans impacts, and information on soils, which is often a major ecological controlling factor, can be made available to researchers working on other monument problems, thus enhancing their ability to draw solid conclusions from their databases.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. The Soil Conservation Service, the U.S. Forest Service, a university researcher, or a private consultant should be funded to conduct a level III soil survey of the monument. This project can be conducted independent of any other project underway or planned for the monument. Products of this survey should include a detailed soils map, soil series descriptions, and an assessment of the significant properties of the monument's soils as related to cultural site preservation, prehistoric landscape scene preservation, ecological protection, and visitor services development.

This project will first require that low level black and white aerial photography be taken of the monument. Once the photography has been acquired, approximately six person-months of office work with the aerial photographs will be needed to delineate soil associations on a preliminary working map. Following this work, approximately six person-months of field work will be required to ground truth and refine the preliminary map. Following the field work, approximately six person-months will be needed in the office to finalize the maps, prepare the soil series descriptions, prepare an assessment of soil properties relative to managing Chiricahua National Monument, and write the final report. A draft final report should be ready for NPS review within eighteen person-months of project initiation. Professional skills equivalent to or above GS-11 are needed for this project.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This is a baseline project that supports all other Chiricahua National Monument projects that are concerned with ecological components or cultural resources scene preservation. Two projects that are particularly related to this soils study are as follows.

CHIR-N-04 Evaluate NPS Options with the King of Lead Mine
CHIR-N-16 Develop a Geographic Information System

9. Funding Requirements:

	Year 1	Year 2	Year 3
Personal Services	$20,000	$20,000	$ 0
Travel & Per Diem	2,500	2,500	0
Aerial Photography	10,000	0	0
Supplies & Materials	1,000	1,000	0
Publication Costs	0	3,000	0
Total	$33,500	$26,500	$ 0

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-N-22

2. Project Title: Conduct a Survey and Assessment of Geology

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them

4. Problem Statement:

The monument was originally established because its unique geologic features. The area's complex mixture of primarily tuffaceous and ryolitic rocks have weathered into a wonderland of spires, balanced boulders, cliffs and talus slopes that draw scientists and tourists from all over the world. While considerable geologic information about the area has been published, no systematic assessment of the monument's geology has ever been done. What gaps remain in our knowledge of the area? What are the likely geologic effects of episodic acid rain events now common in southeastern Arizona? What valuable interpretive information is available but not now being presented to the visiting public? These and other questions can best be handled by a geologic assessment.

This project will also develop data for the monument's geographic information system, and provide baseline information useful in integrating other ecological studies performed at the Chiricahua National Monument.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. This alternative will force the superintendent to continue to manage the monument without a geology map and the attendant information a such a survey provides. Better information makes for better management. This no action alternative may well leave the superintendent out of compliance with laws and regulations governing protection of antiquities, water quality, historic landscapes, and visitor safety.

B. Conduct a Geologic Assessment. The information resulting from this survey will contribute significantly to allowing the superintendent to manage the monument resources, both cultural and natural, from a solid basis. Visitor services facilities can be located in areas of geologic stability, areas of high erosive

potential can be delineated and protected from humans impacts, and information on geology, which can sometimes be a major ecological controlling factor, can be made available to researchers working on other monument problems, thus enhancing their ability to draw solid conclusions from their databases.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. A USGS, university, or private researcher will be contracted to conduct this geologic assessment. This project will involve reviewing all previous research on the geology of Chiricahua MN and making a professional assessment of its completeness. The study should answer the following questions: 1) What geologic information still requires further research? 2) What effect is acid rain likely to have on the geologic resources of Chiricahua NM? 3) What valuable interpretive information is available but not presented to the visiting public? and 4) What management recommendations resulted from the assessment?

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This is a baseline project that supports all other Chiricahua National Monument projects that are concerned with ecological components or cultural resources scene preservation. One project that is particularly related to this geology study is as follows.

CHIR-N-16 Develop a Geographic Information System

9. Funding Requirements:

	Year 1	Year 2	Year 3
Personal Services	$20,000	$20,000	$ 0
Travel & Per Diem	2,500	2,500	0
Supplies & Materials	1,500	1,500	0
Publication Costs	0	3,000	0
Total	$24,000	$27,000	$ 0

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENTS

CULTURAL -- FUNDED

The following project statements are a description of the cultural resource protection and information program currently funded at Chiricahua National Monument.

CHIR-C-01 Paint CCC Structures

PROJECT STATEMENT

1. Project Number: CHIR-C-01

2. Project Title: Paint CCC Structures

3. Service-wide Issue(s):

C13 - Need for Rehabilitation or Restoration of Historic and Prehistoric Structures, and Cultural Landscapes

4. Problem Statement:

The Visitors Center, all the buildings in the maintenance area, all the non-Mission 66 housing in the residence area, the rest room in the campground, and the campground ranger residence are all CCC era structures. Each of these LCS structures is in need of routine exterior painting. These buildings are of stone construction, but the wood trim around the windows, doors, and roof eaves must be repainted every 5-7 years to prevent undue deterioration due to rain, snow, and sun.

5. Description of the Project:

This project is being carried out using seasonal maintenance employees hired for the purpose. Supervision of the crew is being handled by the Chief of Maintenance. The project will be completed during FY90.

7. Compliance: This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is required and will be obtained before any action is taken with this project.

8. Relationships: This project is related to one other project listed in this plan. This is as follows:

CHIR-C-04 Develop a Historic Structures Preservation Guide

9. Funding Requirements:

	Year 1	Year 2
Personal Services	$13,000	$ 0
Travel and Per Diem	0	0
Supplies & Materials	12,000	0
Total	$25,000	$ 0

10. Annual Project Status and Accomplishments: Funding for this project was provided by Western Region Cultural Cyclic Maintenance funds.

PROJECT STATEMENTS

CULTURAL -- UNFUNDED

The following project statements are a description of the cultural resource protection and information program currently identified and in need of funding at Chiricahua National Monument.

CHIR-C-02	Stabilize and Repair the Historic Stafford Cabin
CHIR-C-03	Finalize the Collections Management Plan
CHIR-C-04	Develop a Historic Structures Preservation Guide, HSPG
CHIR-C-05	Complete the Architectural Section of the Historic Structures Report, HSR
CHIR-C-06	Develop a Cultural Resources Base Map
CHIR-C-07	Develop a Historic Landscape Program
CHIR-C-08	Develop Bibliographic Database and Assessment of Cultural Resources
CHIR-C-09	Produce an Administrative History
CHIR-C-10	Conduct an Archeological and Historic Sites Survey and Assessment
CHIR-C-11	Evaluate Air Quality Impacts on Cultural Resources

PROJECT STATEMENT

1. Project Number: CHIR-C-02

2. Project Title: Stabilize and Repair the Historic Stafford Cabin

3. Service-wide Issue(s):

C12 - Inadequate Preservation Maintenance Programs, Including Stabilization and Cyclic Maintenance

4. Problem Statement:

The Stafford Cabin in Chiricahua National Monument is on the national register of historic places. It has received extremely little preservation treatment over its one-hundred and nine year history--resulting in gross deterioration of the sill logs and many of the structural logs. The cabin is currently on the interpretive program for Faraway Ranch, included on the interpretivevices programs. Because of the rotting condition in the sill and structural logs, the roof has sagged considerably causing further structural deterioration. The stone chimney has fallen once and been propped back up. Chinking and grout is badly deteriorated and in need of replacement. An estimated 40,000 visitors will view this structure on the self-guiding tour of Faraway Ranch.

The Erickson family purchased the cabin from the Stafford children in 1918 and made numerous improvements to the interior for use as a guest cottage. The National Park Service replaced the asphalt shingles in the late 1970s. However, no structural repairs have been made to keep the cabin from collapsing.

The cabin was purchased by the National Park Service in the 1960s. It is located in the bottom of a rocky canyon with riparian woodland and seasonal stream adjacent to the structure. Climate is hot in the summer with heavy thunderstorms and cold in winter with moderate snowfall and subfreezing temperatures.

Ongoing oral history projects for Faraway Ranch and the Stafford family relate to the significance of the structure and its interpretive story.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Structural and sill logs will continue to deteriorate to the point where the building will be unsafe for visitor use and enjoyment and its historic integrity will be lost.

B. Apply preservation and restoration techniques to replace sill logs, floor stringers and flooring. Reinforce the fireplace chimney and other structural logs as required with local resources. The original cabin was constructed with a mixture of Oak, Juniper, and what appears to be Arizona Cypress from the Bonita Canyon area.

6. Description of the Recommended Project or Activity:

Alternative B is the preferred course of action. The preferred action is to fund preservation and restoration proceedings as described above. By so doing, the historic integrity of this national register structure will be retained and monument visitors will continue to appreciate and enjoy its value to the area and the pioneer settlement movement of America. Project funds for restoration are needed immediately to maintain this structure.

7. Compliance:

Environmental compliance following NEPA will be obtained during the initial planning stages once funding is approved. It is unlikely an EA will be required. Compliance under Section 106 of NHPA will be obtained in conjunction with funding approval.

8. Relationships:

This project is related to at least four other projects listed in this plan. These are as follows:

CHIR-C-03	Finalize the Collections Management Plan
CHIR-C-04	Develop a Historic Structures Preservation Guide
CHIR-C-05	Complete the Architectural Section of the Historic Structures Report
CHIR-C-10	Conduct an Archeological and Historic Sites Study and Assessment

9. Funding Requirements:

	Year 1	Year 2
Personal Services	$38,500	$ 0
Travel and Per Diem	1,000	0
Supplies and Equipment	20,000	0
Publication Costs	500	0
Total	$60,000	$ 0

10. Annual Project Status and Accomplishments:

Western Region Division of Cultural Resources Management provided funding in FY90 for a Historian and a Historic Architect to review Stafford Cabin for a Historic Structures Report.

PROJECT STATEMENT

1. Project Number: CHIR-C-03

2. Project Title: Finalize the Collections Management Plan

3. Service-wide Issue(s):

C09 - Need for Collection Management Plans, Collection Storage Plans, Collection Condition Surveys

4. Problem Statement:

To maintain the monument collections in compliance with NPS standards, a Collections Management Plans for Chiricahua National Monument is required. The collections are presently stored in less than desirable conditions, are placed in several locations, and comprise a variety of materials needing specific storage conditions. Storage space at the monument is quite limited. The plan should address utilization of space, security of collections, environmental requirements by object material and care of historic furnishings on exhibit. The plan should make some determination regarding manpower requirements for collections maintenance and program administration.

5. Alternative Actions/Solutions and their Probable Impacts:

A. No action. Monument collections will continue to receive care and management without the direction this required document should provide.

B. Draft and Finalize the Collections Management Plan. A team of curatorial subject matter experts has visited the monument and reviewed conditions. Initial planning documents need to be reviewed and compiled into a plan for approval by monument superintendent and regional and WASO levels.

6. Description of the Recommended Project or Activity:

Alternative B is the preferred course of action. Fund and development a Collections Management Plan for the collections at Chiricahua National Monument. By doing so, the collections will have the proper managing guidelines and the impetus to request funds needed to bring the collections management program into compliance with NPS-28 and the NPS Museum Handbook.

7. Compliance:

NHPA compliance under Section 106 is not required for this project. NEPA compliance will not be required for this project, as per 516 DM 2, Appendix 1. NPS-28 and the NPS Museum Handbook will be followed.

8. Relationships:

This project is related to at least three other projects listed in this plan. These are as follows:

CHIR-I-01 Administer the Natural and Cultural Resources Management Program
CHIR-I-02 Increase the Natural and Cultural Resources Management Program
CHIR-I-03 Integrate Program of Long-term Monitoring for Cultural and Natural Resources.

9. Funding Requirements:

	Year 1	Year 2
Personal Services	$3,600	$ 0
Travel and Per Diem	1,200	0
Publication Costs	200	0
Total	$5,000	$ 0

10. Annual Project Status and Accomplishments:

A team of curatorial subject matter experts has visited the monument and reviewed conditions.

PROJECT STATEMENT

1. Project Number: CHIR-C-04

2. Project Title: Develop a Historic Structures Preservation Guide (HSPG)

3. Service-wide Issues:

C06 - Need for Historic Structure Preservation Guides

4. Problem Statement:

Chiricahua National Monument has 26 historic structures on the list of classified structures, LCS. Twelve of these are on the national register of historic places. The main house at Faraway Ranch shelters a considerable collection of original furnishings which are on display. A preservation guideline needs to be developed for programming and execution of routine cyclic maintenance for all 26 designated historic structures within the monument. In addition the lack of formal training for maintenance personnel in this area mandates guidance for the care and preservation of said structures.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action Structural integrity will continue to deteriorate, historic furnishings will be subject to damage and the structures will be unsafe for visitor use and enjoyment.

B. Develop a Historic Structures Preservation Guide. Qualified historical architects, maintenance personnel and conservators will prepare, in conjunction with appropriate monument staff, a comprehensive guide to aid in the maintenance, preservation and restoration techniques for Chiricahua's historic structures, especially the main house at Faraway Ranch and its associated outbuildings used by the visiting public. The Denver Service Center will develop the HSPG. Project funds for implementation are needed immediately to maintain these structures.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. The preferred action is to fund the project (possibly from Regional Cultural Resources Preservation Program or Regional Cultural Resources Cyclic Maintenance) and produce a HSPG for the staff at the

monument level to perform any building maintenance on historic structures. The HSPG will include three major sections: (1) basic inspection and preservation instructions, (2) material specifications, and (3) construction drawings. Cyclic preservation maintenance schedules will be prepared. By implementing the HSPG, the historic integrity of these LCS and national register structures will be preserved, and monument visitors will continue to enjoy them and their contribution to the interpretation of pioneer settlement in America.

7. Compliance:

NEPA compliance will not be required for this project, as per reference 516 DM, Appendix 1. NHPA compliance will be obtained on the completed plan before maintenance actions begin.

8. Relationships:

This project is related to at least five other projects listed in this plan. These are as follows:

CHIR-C-02 Stabilize and Repair the Historic Stafford Cabin
CHIR-C-03 Finalize the Collections Management Plan
CHIR-C-05 Complete the Architectural Section of the Historic Structures Report
CHIR-I-01 Administer the Natural and Cultural Resources Management Program
CHIR-I-02 Increase the Natural and Cultural Resources Management Program

9. Funding Requirements:

$80,000 is needed for Denver Service Center to develop this HSPG.

	Year 1	Year 2
Personal Services	$79,000	$ 0
Travel and Per Diem	000	0
Supplies and Equipment	000	0
Publication Costs	1,000	0
Total	$80,000	$ 0

10. Annual Project Status and Accomplishments:

A Historic American Buildings Survey was completed in 1984 as well as a Historic Structures Report for Faraway Ranch.

PROJECT STATEMENT

1. Project Number: CHIR-C-05

2. Project Title: Complete the Architectural Section of the Historic Structures Report (HSR)

3. Service-wide Issue(s):

C05 - Need for Historic Structures Reports, Assessments of Condition

4. Problem Statement:

The physical history section of the historic structures report (HSR) for the Faraway Ranch at Chiricahua NM has been completed, however the analysis section has not. When the HSR for Faraway Ranch was prepared in 1984, the Architectural section was never completed. The regional historical architect responsible, has since left the region.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. The architectural and engineering significance of the historic structures will not be available for interpretation nor for preparation of the historic structures preservation guide.

B. Complete the HSR architectural section providing needed data for producing the historic structures preservation guide (HSPG) and for interpreting the significance of the structures to monument visitors.

6. Description of Recommended Project:

Alternative B is the recommended course of action. The project will be done by the Denver Service Center. Possible funding sources are Regional Cultural Resources Preservation Program or Regional Cultural Resources Cyclic Maintenance. Needed is a statement of architectural and engineering significance and its relationship to regional or local history. Also needed is a narrative and graphic description of physical evidence from architectural fabric investigation. Finally, a description and record of existing conditions will be compiled, using measured drawings produced by the historic american building survey (HABS). The HSR should include an evaluation of the impact of

the proposed use on the integrity of the structure including the effect of compliance with regulations for human safety, energy conservation, and accessibility.

In addition, the study should include a record of all fabric analyses performed (paint, mortar, etc.) listing basic data for specific recommendations for treatment.

7. Compliance:

NEPA compliance will not be required for this project, as per reference 516 DM, Appendix 1. NHPA, Section 106 clearance must be obtained before any structural alteration occurs.

8. Relationships:

This project is related to at least two other projects listed in this plan. These are as follows:

CHIR-C-02 Stabilize and Repair the Historic Stafford Cabin
CHIR-C-04 Develop a Historic Structures Preservation Guide

9. Funding Requirements:

$20,000 is needed for Denver Service Center to develop this HSR. Much of the data is available in raw form and in several locations. It needs to be consolidated and prepared in final format.

	Year 1	Year 2
Personal Services	$19,000	$ 0
Travel and Per Diem	000	0
Supplies and Equipment	000	0
Publication Costs	1,000	0
Total	$20,000	$ 0

10. Annual Project Status and Accomplishments:

A historic furnishings report and a physical history of the HSR have been completed. In early 1988, Peter Kumble, a University of Arizona graduate student, completed a historic landscape study for the main house at Faraway Ranch. HABS drawings and studies have been completed.

PROJECT STATEMENT

1. Project Number: CHIR-C-06

2. Project Title: Develop a Cultural Resources Base Map

3. Service-wide Issue(s):

C02 - Inadequate Archeological Survey & Inventory, Including Archeological Identification and Evaluation Studies, Overviews, and Assessments

4. Problem Statement:

There is presently no base map for cultural resources at Chiricahua National Monument. There is a hodgepodge of reports, maps, and location descriptions for cultural resources in the monument but no orderly base map. A base map would set the scale for future use if a GIS. It would allow overlays to be made of a standard scale for different cultural resource categories. It would make a single visual impression of where cultural resources are located and thereby better protect them from inadvertent damage.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. The status quo is to search through various documents in order to identify locations of cultural resources, or in the case of an archeological clearance, the lack of artifacts.

B. Develop a base map to be used in a GIS which indicated all known cultural resources in Chiricahua National Monument.

6. Description of the Recommended Project or Activity:

Alterative B is the preferred alternative. A base map will be created at an appropriate scale for a GIS. A master copy will be used on a peg-board and clear plastic overlays will be made for each of several categories of cultural site, zone or property. These will include archeological sites, grave sites, historic zones, historic structures of different category and registration, historic landscape zones, orchards, etc. A master copy will be kept which includes all categories on one sheet.

7. Compliance:

NEPA compliance will not be required for this project, as per reference 516 DM 2, Appendix 1. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least five other projects listed in this plan. These are as follows:

CHIR-N-16 Develop a Geographic Information System
CHIR-N-22 Conduct a Survey and Assessment of Soils and Geology
CHIR-C-07 Develop a Historic Landscape Program
CHIR-C-08 Develop a Bibliographic Database and Assessment of Cultural Resources
CHIR-C-10 Conduct an Archeological and Historic Sites Study and Assessment

9. Funding Requirements:

$6,000 is required in year one to develop the base map and enter the existing data.

A $2,000 base increase is required starting in year two to maintain annual updates of the cultural resource map, and to begin to enter data into a GIS. This does not include setting up the GIS program; see project statement number N-20.

	Year 1	Year 2	Year 3	Year 4
Personal Services	$ 4,000	$ 2,000	$ 2,000	$ 2,000
Travel and Per Diem	1,000	0	0	0
Supplies and Equipment	500	0	0	0
Publication Costs	500	0	0	0
Total	$6,000	$2,000	$2,000	$2,000

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-C-07

2. Project Title: Develop a Historic Landscape Program

3. Service-wide Issue(s):

C11 - Need for Cultural Landscape Report

4. Problem Statement:

The Faraway Ranch Historic Zone in Chiricahua National Monument includes meadow, woodland and riparian corridor around the existing ranch buildings. It is not well known what the historic vegetation mix and general landscape was like. Kumble (1988) reported on the historic landscaping of the yard around the main house.

There is a need to determine, through old photographs and written accounts, what the vegetation and landscape were like in the historic period being interpreted. Only then can we proceed with a vegetation management program in the historic zone which may consider, for example, the use of prescribed burning to maintain the meadow and push back the encroaching woodland.

There are remnants of a fruit orchard in one location. Other historic cultivars may be present in the area but the subject has not been investigated. The historic orchard is in ruin but still alive. It needs to be cared for in a similar manner that the historic buildings are being cared for and not left to ruin.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. The status quo will force a continued lack of knowledge about the appropriate historic landscape and the vegetation of the historic period. The juniper woodland will continue to encroach on the meadow lands and eventually eliminate them. The historic orchard, already old, will eventually die and be replaced by native species. The same may be true of other cultivars which have yet to be identified in the historic zone.

B. Study Existing Historic Cultivars in the Historic Zone. Historic cultivars will be encouraged and maintained in a way appropriate to the time period being interpreted. The historic orchard will be rehabilitated, maintained and interpreted. The landscape of the entire historic zone will be researched to

determine the historic period appearance. Appropriate options for vegetation management to return the area back into historic period appearance will be researched and set forth. A Historic Landscape Plan will be written to guide the research, rehabilitation and maintenance of the historic landscape and historic cultivars.

Maintain the historic plantings around the Faraway Ranch buildings. The ranch is not interpreted as a ruin but as a well kept example of the historic period. The plants associated with the lives and times of that period should also be well kept.

6. Description of the Recommended Project or Activity:

Alternatives B is the preferred course of action. A Historic Landscape Plan will be written by the resource management specialist. Upon approval, it will guide the actions to alter and maintain the vegetative landscape characteristics in the historic zones of the monument. Research will be conducted to identify the historic cultivar species, and efforts to maintain them will be directed by the Historic Landscape Plan. The historic orchard will be rehabilitated and maintained according to the Historic Landscape Plan.

7. Compliance:

NEPA compliance will not be required for this project, as per reference 516 DM 2, Appendix 1. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least seven other projects listed in this plan. These are as follows:

CHIR-N-06 Analyze Vegetation Changes and Trends
CHIR-N-07 Develop the Fire Management Program
CHIR-N-08 Develop the Vegetation Management Program
CHIR-N-09 Conduct an Inventory and Assessment of Plants
CHIR-N-16 Develop a Geographic Information System
CHIR-C-06 Develop a Cultural Resources Base Map
CHIR-I-05 Conduct an Ethnobotanical Study

9. Funding Requirements:

$6,500 is needed in year one for research on historic cultivars, including a field search, literature search, and a report of findings and recommendations.

$9,000 is needed in year one for the rehabilitation of the historic fruit orchard.

$12,000 is needed in year two as a base increase for vegetation manipulation, by prescribed burning, greenhouse plantings, replacement of decadent plants with young clones, or other means, to maintain the entire landscape of the historic zone in a state approaching that of the historic period being interpreted.

	Year 1	Year 2	Year 3	Year 4
Personal Services	$15,000	$ 9,800	$ 9,800	$ 9,800
Travel and Per Diem	2,000	1,200	1,200	1,200
Supplies and Equipment	3,000	1,000	1,000	1,000
Total	$20,000	$12,000	$12,000	$12,000

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-C-08

2. Project Title: Develop Bibliographic Database and Assessment of Cultural Resources

3. Service-wide Issue(s):

C26 - Other (lack of bibliographic management system)

4. Problem Statement:

Sociological, physical, and natural changes within and around Chiricahua National Monument may be adversely impacting the cultural resources of the monument. Numerous resource pressures, generated by divergent interest groups, need to be investigated. Historically, selective but intermittent studies have been continuously conducted since the monument was established in 1924. Currently, the monument does not have the ability to efficiently track the wealth of historical, archeological and technical information that is available. Without the development of an adequate tracking system and information base, management cannot efficiently manage the resource or respond to developing resource problems systematically without duplication of effort. In addition, public interest and cultural preservation groups frequently request bibliographic citations and or information upon which management actions were based. Researchers and other professionals routinely depend upon and utilize the monument's information base as the first step in addressing management concerns. The development of a computerized bibliographic system with the concomitant production of an annotated bibliography will place the monument in a better position to assess past actions and evaluate current programs.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. With this alternative the monument will not have adequate access to current or past informational resources. This increases the time and reduces the cost effectiveness of managements ability to evaluate cultural resource issues.

B. Develop Computerized Bibliographic Information System. This will increase managements ability to respond effectively to cultural resource issues. An adequate information base can prevent duplication of effort and prevent costly mistakes. Adequate and effective access to informational resources are a

mandatory prerequisite for efficient and cost effective management. Time frames in examining resource issues can be significantly reduced with the production of an annotated bibliography and the creation of a computer information tracking system. In addition, the bibliographic assessment would summarize the strengths and highlight the weakness in the existing information base. Information management is a critical first step in developing cost effective solutions.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended solution for this issue. A computerized bibliographic system will be developed, with the concomitant production of an annotated bibliographic assessment. As stated above the bibliographic assessment would summarize the strengths and highlight the weakness in the existing information base. This action would increase the effectiveness of all management programs.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This is a keystone project that will support all other resource management activities and programs at Chiricahua National Monument.

9. Funding Requirements:

	Year 1	Year 2
Data Entry Costs	$ 5,500	$ 0
Capital Equipment	5,000	0
Bibliographic Assessment and Summary	3,000	0
Bibliographic Software (Scimate)	900*	0
Bibliographic Search Costs	700	0
Publication Costs	500	0
Total	$15,600	$ 0

*This software can serve both the cultural and natural resources information management needs simultaneously. This funding is

also requested under N-03 but will need to be provided only by whichever project is funded first.

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-C-09

2. Project Title: Produce an Administrative History

3. Service-wide Issue(s):

C08 - Need for Historic Resource Studies and Administrative Histories

4. Problem Statement:

Chiricahua National Monument has no Administrative History. Such a document can be a very valuable resource in explaining the historic reasons why certain practices are in place in a monument. This document should properly record what verbal and written agreements were made with landowners, neighboring communities, etc. at the time of establishment of the monument. It should also record any significant subsequent matters that affect how and why Chiricahua National Monument operates in specific unique areas. A manager newly assigned to the monument should find that this document is the most succinct source from which to get a briefing on the past milestones, agreements, commitments, etc. that shape everyday life in a monument. It is NPS policy that every area have an up-to-date Administrative History as soon as possible.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. The impact of this option is failure to comply with NHPA requirements, management with lack of understanding of past problems and their solution, lack of "institutional memory."

B. Fund and Accomplish Study. This option will meet WASO directive on administrative histories and will accomplish compliance with National Historic Preservation Act.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended solution for this issue. A qualified historian from a university or private practice should be contracted with to prepare an Administrative History for Chiricahua National Monument. Service-wide guidelines for writing Administrative Histories should be followed.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least one other project listed in this plan. This is as follows:

CHIR-I-01 Administer the Natural and Cultural Resources Management Program

9. Funding Requirements:

	Year 1	Year 2	Year 3
Personal Services	$16,000	$ 3,700	$ 0
Travel and Per Diem	3,000	500	0
Supplies and Materials	1,000	0	0
Publication Costs	0	800	0
Total	$20,000	$ 5,000	$ 0

10. Annual Project Status and Accomplishments:

An administrative history of the Faraway Ranch portion of the monument is being written by monument volunteer Richard Murray. It is not expected to be finished until 1991 or later.

PROJECT STATEMENT

1. Project Number: CHIR-C-10A & -10B

2. Project Title: Conduct an Archeological and Historic Sites Survey and Assessment

3. Service-wide Issue(s):

C02 - Inadequate Archeological Survey & Inventory, Including Archeological Identification and Evaluation Studies, Overviews, and Assessments

4. Problem Statement:

Currently, the only area of the monument that has had a complete historic sites survey is lower Bonita Canyon, including the campground and visitor center areas, Silver Spur Meadow, the Stafford Cabin area, and Faraway Ranch to the monument entrance gate. The rest of the monument has not been surveyed to know if there are any significant historic sites and what condition they are in. It is possible at this time that the monument is losing sites due to weathering, erosion, vandalism, vegetation encroachment or wildlife/livestock damage. Also, at this time there are no documents to assist the monument in making decisions so as to avoid damaging cultural sites during development or construction work. Without surveying, assessing, and monitoring sites, we cannot protect these potentially important monument resources.

Currently, the only area of the monument that has had an archeological survey and assessment is the Faraway Ranch purchase of 440 acres (Baumler 1984). The rest of the monument has not been surveyed to know if there are any significant archeological sites and what condition they are in. It is possible at this time that the monument is loosing sites due to erosion; vandalism; vegetation encroachment; wildlife or livestock damage. Also, at this time there are no documents to assist the monument in making decisions so as to avoid damaging cultural sites due to development or construction work. Without surveying, assessing, and monitoring sites, we cannot protect these important monument resources (Legal mandates for arch. sites).

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Without a complete archeological and historic sites survey and assessment, the remaining monument cultural

resources cannot be studied and protected. There is a chance that with no action, some valuable resources will be lost.

B. Conduct Monument-wide Survey of Historic Sites and an Assessment by Contracting Out to Professional Archeologists. The contractors may not be familiar with NPS guidelines and policies but would be familiar with archeological and historic sites field survey techniques. The cost would likely be greater than that of alternative C. The survey would have the same impact as alternative C.

C. Conduct a Monument-wide Survey of Archeological and Historic Sites and an Assessment with NPS Staff Professionals. By using NPS staff the surveyors would be familiar with NPS guidelines and policies. The cost would likely be less than that of alternative B. The survey would help to guide the monument in making decisions as to development and construction projects by providing information on areas that should be avoided to protect cultural resources. A survey would also allow the monument to know what cultural resources were present, their significance, their condition and what measures, if any, needed to be taken to preserve them. This work will also involve the designing of monitoring protocols for the monument to use.

6. Description of the Recommended Project or Activity:

Alternative C is the recommended course of action. A thorough archeological and historic sites survey will be completed. The professional survey team from will consist of a combination of WACC and monument personnel trained in cultural resource management and research. All parts of the monument that are feasible (depending on terrain) will be surveyed, and the located sites will be fully documented as to what they are--surface finds, size, condition, disturbances, topography, vegetation, unusual features, etc. The site will be mapped and photographed. The final report will include all of the above information from field notes, photographs, maps and recommendations on monitoring and preservation work for each site. The monument staff will be responsible for monitoring and protecting all archeological and historic sites in the monument.

7. Compliance:

NEPA compliance will not be required for this project, as per reference 516 DM 2, Appendix 1. All necessary NHPA compliance documents will be approved, including Section 106 requirements, before proceeding with this project.

8. Relationships:

This project is related to at least four other projects listed in this plan. These are as follows:

CHIR-N-16 Develop a Geographic Information System
CHIR-C-03 Finalize the Collections Management Plan
CHIR-C-04 Develop a Historic Structures Preservation Guide
CHIR-C-06 Develop a Cultural Resources Base Map

9. Funding Requirements:

This is a three year project including field work and report writing.

CHIR-N-10A - Historical Sites Survey

	Year 1	Year 2	Year 3	Year 4
Personal Services	$20,000	$20,500	$21,000	$ 0
Travel & Per Diem	3,000	3,000	3,000	0
Supplies and Materials	500	500	500	0
Publication Costs	0	0	1,000	0
Total	$23,500	$24,000	$25,500	$ 0

CHIR-N-10B - Archeological Survey

	Year 1	Year 2	Year 3	Year 4
Personal Services	$20,000	$20,500	$21,000	$ 0
Travel & Per Diem	3,000	3,000	3,000	0
Supplies and Materials	1,000	1,000	1,000	0
Publication Costs	0	0	1,000	0
Total	$24,000	$24,500	$26,000	$ 0

10. Annual Project Status and Accomplishments:

Mark F. Baumler (1984) of WACC conducted an archeological survey of the Faraway Ranch purchase property of 440 acres.

PROJECT STATEMENT

1. Project Number: CHIR-C-11

2. Project Title: Evaluate Air Quality Impacts on Cultural Resources

3. Service-wide Issues:

C17 - Control of Environmental Impacts (wildfire, natural erosion, animal damage, insects, vegetation, acid rain, etc.)

4. Problem Statement:

Atmospheric deposition (acid rain) has caused harmful effects on cultural resources in many areas of the world. No information is available on the effects of atmospheric deposition on the cultural resources of Chiricahua National Monument. Lack of this knowledge prevents an evaluation of present and future threats to cultural resources. Lack of knowledge also prevents action to prevent or mitigate damage to cultural resources. Failure to understand the impact of atmospheric deposition could result in eventual destruction of primary cultural resources of the monument.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. Failure to evaluate and monitor effects of atmospheric deposition on cultural resources will result in a lack of baseline data. Lack of this data will prevent action being taken to mitigate the harmful effects.

B. Initiate a Long-term Study of Acid Rain Effects on Cultural Resources. A long-range study, done under contract with a university or other agency, and with the assistance of the WASO Cultural Resources Office and the WASO Air Quality Office, would be initiated at several key locations within the monument to monitor deterioration of stone masonry, galvanized steel and other mineral elements of both prehistoric and historic structures known to be vulnerable to the chemistry of acid rain. The study would also include a literature search for information on materials found in the units which are sensitive to atmospheric deposition.

This study, when implemented in conjunction with Project Statement number N-2, Monitor Air Quality, will help satisfy the unit's existing air quality related management objectives.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. A study of the possible harmful effects of atmospheric deposition should begin as soon as possible in order to determine whether there are such effects at present and to provide a baseline for determining changes in the future (e.g., any harmful effects that may result from continuation of present conditions, or as a result of increased atmospheric deposition; any improvements that might result from emission reductions).

7. Compliance:

Protection and preservation of the prehistoric and historic structures of NPS units 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.

8. Relationships:

This project is related to at least four other projects listed in this plan. These are as follows:

CHIR-N-01 Monitor Air Quality
CHIR-N-16 Develop a Geographic Information System
CHIR-N-17 Examine the Biological Effects of Air Pollution
CHIR-C-04 Develop a Historic Structures Preservation Guide

9. Funding Requirements:

$20,000 is needed in year one for consultation with NPS Air Quality Division and with Cultural Resources Specialists to evaluate impacts and to set up a monitoring system.

	Year 1	Year 2
Personal Services	$14,000	$ 0
Travel and Per Diem	2,000	0
Supplies and Equipment	3,000	0
Publication Costs	1,000	0
Total	$20,000	$ 0

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENTS

INTEGRATED -- FUNDED

The following project statements are a description of the integrated resource protection and information program currently funded at Chiricahua National Monument.

CHIR-I-01 Administer the Natural and Cultural Resources Management Program

PROJECT STATEMENT

1. Project Number: CHIR-I-01

2. Project Title: Administer the Natural and Cultural Resources Management Program

3. Service-wide Issue(s):

N24 - Other Issues (Insufficient professional staff)
C24 - Insufficient Professional Staff

4. Problem Statement:

The complexity of natural and cultural resources management at Chiricahua National Monument requires active administration in an organized program by a resources management specialist. This requires funding, FTEs, recruitment, training, support, equipment, supplies & materials, overview, supervision, transportation, and office space. The resources management division in Chiricahua National Monument is responsible for managing natural and cultural resources at both Chiricahua NM and Fort Bowie NHS. This division currently has only one base funded FTE, and minimal support for project implementation. Additional assistance is provided by the Division of Interpretation in managing the monument collections and protecting the cultural resources at Faraway Ranch.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No action. This alternative would completely abdicate the service's responsibility to protect and preserve the resources of Chiricahua National Monument. It is therefore an unacceptable alternative.

B. Continue to Manage Resources of Chiricahua National Monument. If the status quo is maintained, base funding will continue for one resources management specialist to work on the natural and cultural resources programs at both Chiricahua National Monument and Fort Bowie National Historic Site. This is currently base funded at the monument level. An increase in the base funding of the natural resources program at Chiricahua is addressed in I-02.

6. Description of the Recommended Project or Activity:

Option B is the recommended solution for this issue. This will ensure that a basic level of protection and management is provided the natural and cultural resources of Chiricahua National Monument for the foreseeable future. However, what is really needed is a base increase to allow for the development of a modern and fully effective Division of Resources Management in the monument. This base increase is requested in project statement I-02. If that increase is funded, the resources management division will be able to respond in a pro-active way to natural resources issues of highest concern. The staff will be adequate to coordinate and plan the natural resources management programs, manage data, and also effectively implement emergency actions in the field which are of high priority but which are too sudden in their appearance to have approved project statements.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to all other projects listed in this plan, since it is the basic framework through which the entire resources management program is administered in Chiricahua National Monument. A base funding increase request for this project is listed in I-02.

9. Funding Requirements:

This project receives $23,100 in base funding at the monument level for one GS-9 resources management specialist, whose time is split between natural and cultural resources and between Chiricahua NM and Fort Bowie NHS--50% going to natural resources projects at Chiricahua (50% of $33,000, or $16,500 for salary, benefits and support); and 20% going to cultural resources projects at Chiricahua (20% of $33,000, or $6,600 for salary, benefits, and support), totalling $23,100 ($18,000 salary, $2,000 travel, and $3,000 supplies).

This project also receives $17,500 in park base funding for one GS-7 Faraway ranger and monument curator, who spends 60% of her time on cultural resource activities in the Faraway Ranch area

and in managing the monument collections. The component totals $17,500 ($16,500 salary, $500 travel, and $500 support).

These annual expenditures are tabulated as follows:

	Year 1	Year 2	Year 3	Year 4
Personal Services	$34,600	$34,600	$34,600	$34,600
Travel and Per Diem	2,500	2,500	2,500	2,500
Supplies and Equipment	3,500	3,500	3,500	3,500
Publication Costs	0	0	0	0
Total	$40,600	$40,600	$40,600	$40,600

10. Annual Project Status and Accomplishments:

In July 1988 Chiricahua National Monument added one FTE for a resources management specialist GS-9 position. A new division of resources management was established.

PROJECT STATEMENTS

INTEGRATED -- UNFUNDED

The following project statements are a description of the integrated resource protection and information program currently identified and in need of funding at Chiricahua National Monument.

CHIR-I-02	Increase the Natural and Cultural Resources Management Program
CHIR-I-03	Integrate Program of Long-term Monitoring for Cultural and Natural Resources
CHIR-I-04	Develop In-monument Plant Nursery
CHIR-I-05	Conduct an Ethnobotanical Study
CHIR-I-06	Conduct a Visitor Survey

PROJECT STATEMENT

1. Project Number: CHIR-I-02

2. Project Title: Increase the Natural and Cultural Resources Management Program

3. Service-wide Issue(s):

N24 - Other Issues (Insufficient professional staff)
C24 - Insufficient Professional Staff

4. Problem Statement:

The complexity of natural resources management at Chiricahua National Monument requires active administration in an organized program by a resources management specialist. This requires funding, FTEs, recruitment, training, support, equipment, supplies & materials, overview, supervision, transportation, and office space. The resources management division covers both natural and cultural resources at both Chiricahua NM and Fort Bowie NHS. It has only one base funded FTE, and very minimal support for project implementation.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No action. If the status quo is allowed to continue, important resources management problems will continue to go unsolved. Administrative planning and coordination will continue minimally from the office, but little will be accomplished in a pro-active sense in field projects. Even the division's planning and coordination effectiveness will dwindle as needed supplies and materials are not sustained.

B. Increase the Funding for the Resources Management Division. Provide for (a.) a thorough and consistently professional program, with adequate staff and supplies for addressing issues of too sudden onset to be covered by individual project statements, for (b.) adequate support to maintain a resources management office as a center of coordination, data collection, compliance and protection, and for (c.) a minimum of three weeks of resources management workshops and training annually.

6. Description of the Recommended Project or Activity:

Alternative B above is the recommended alternative. The resources management division will be able to respond in a pro-active way to natural resources issues of highest concern. The staff will be adequate to coordinate and plan the natural resources management programs, manage data, and also effectively implement actions in the field which are of high priority but which are too sudden in their appearance to have approved project statements.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to all other projects listed in this plan, since it is the basic framework through which all resources management activities are administered in Chiricahua National Monument. It is a request to add to the base funding of I-01.

9. Funding Requirements:

Funding for Alternative B includes a base increase for support of the division in the form of seasonal technicians, supplies and equipment, vehicle, telephone, electricity, etc. Seasonal staff (1.5 FTEs) will be programmed at 71% for natural resources management and 29% for cultural resources projects.

The seasonal staff is programmed as one nine-month GS-5 bio tech and one five-month GS-5 bio tech, for a total of 14 months of GS-5 with benefits. Also requested is one four-month GS-4 resources management seasonal with benefits. A total of $400 per month is requested for supplies and materials. Also needed is a GSA pickup truck plus mileage and travel costs.

This amount will allow for the operation of the resources management division which deals with at Chiricahua NM. Additional funding is also requested in the Fort Bowie NHS Resources Management Plan to support activities in that monument.

	Year 1	Year 2	Year 3	Year 4
Personal Services	$25,700	$25,700	$25,700	$25,700
Travel and Per Diem	4,500	4,500	4,500	4,500
Supplies and Equipment	4,800	4,800	4,800	4,800
Publication Costs	0	0	0	0
Total	$35,000	$35,000	$35,000	$35,000

10. Annual Project Status and Accomplishments:

In July 1988 Chiricahua National Monument added one FTE for a resources management specialist GS-9 position. A new division of resources management was established.

PROJECT STATEMENT

1. Project Number: CHIR-I-03A and -03B

2. Project Title: Integrate Program of Long-term Monitoring for Cultural and Natural Resources

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Ecosystems and Threats to Them
C19 - Inadequate Cultural Resources Monitoring Programs

4. Problem Statement:

This Resources Management Plan calls for the conduct of a wide variety of studies to delineate and quantify cultural and ecological values of Chiricahua National Monument. These studies will also recommend long-term monitoring protocols for each of the respective components. However, if these individual protocols are not integrated into a coherent and unified program for the monument the value of these studies is greatly depreciated. Monitoring can provide the superintendent with a direct measure of the health and stability of the monument's resources. Such an integrated monitoring program must be carefully designed and coordinated in order to minimize the costs while maximizing the returns. This project is needed in order to focus the necessary professional judgement and experience on this specific resources management problem in a manner that can address the multidisciplinary needs of the program and provide for the staff needed to implement an integrated monitoring effort.

5. Alternative Actions/Solutions and Their Probable Impacts:

a. No Action. This option entails continuing to operate the monument without any systematic or programmatic long-term monitoring program. Periodic inspections of the major ruins are conducted and cyclic maintenance is carried out on them. However, no monitoring of the natural resources that constitute the "scene" for Chiricahua has been designed or implemented.

b. Integrate Individual Monitoring Protocols into a Unified Long-Term Monitoring Program. This option would ensure that the superintendent and staff are able to manage Chiricahua's natural resources from an empirical knowledge base. Informed decisions are more likely to protect the historic scene in the monument

over the long run than are educated guesses and intuition. Currently, such a monitoring system does not exist.

6. Description of the Recommended Project or Activity:

Option b is the recommended solution for this issue. The first step in this project is to evaluate the several protocols that will be developed individual studies outlined in this plan (N-06, N-09, N-13, N-14, N-15, N-18, N-20, N-21, N-22, C-07, and C-10). The best of these protocols should be integrated into an overall long-term monitoring program for the monument to provide an empirical assessment of general ecosystem health and trends. In an area as small as Chiricahua this monitoring system should be designed to be relatively simple but effective. The monument is not likely to gain the staff necessary to conduct an intense and detailed monitoring system. Therefore, emphasis will be on simplicity by focusing on only the most useful components for reflecting general ecological condition. Finally, the funds necessary for training monument staff and implementing this monitoring program must be obtained in the monument base budget.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of Interior. NHPA compliance under Section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least eleven other projects listed in this plan. These are as follows:

CHIR-N-03	Develop Bibliographic Database and Assessment of Natural Resources
CHIR-N-09	Conduct inventory and Assessment of Plants
CHIR-N-13	Conduct inventory and Assessment of Birds
CHIR-N-14	Conduct inventory and Assessment of Non-native Species
CHIR-N-15	Conduct Inventory and Assessment of Invertebrates
CHIR-N-18	Conduct inventory and Assessment of Mammals
CHIR-N-20	Conduct inventory and Assessment of Amphibians and Reptiles
CHIR-N-21	Conduct inventory and Assessment of Soils
CHIR-N-22	Conduct inventory and Assessment of Geology
CHIR-C-07	Develop a Historic Landscape Program
CHIR-C-10	Conduct an Archeological and Historic Sites Study and Assessment

9. Funding Requirements:

CHIR-I-03A

Year 1 -- Contract to design and test program: $35,000

	Year 1	Year 2
Contract to design and test program	$35,000	$ 0

CHIR-I-03B

Year 2+ -- Permanent increase of $8,500 to park base to implement the integrated monitoring program. This money is to provide seasonal support for the permanent Resources Management position requested under project statement I-02 in implementing the monitoring program.

	Year 1	Year 2	Year 3	Year 4
Personal Services	$ 0	$7,000	$7,000	$7,000
Travel and Per Diem	0	500	500	500
Supplies & Materials	0	1,000	1,000	1,000
	$ 0	$8,500	$8,500	$8,500

10. Annual Project Status and Accomplishments: This report will be initiated once action begins on a project.

PROJECT STATEMENT

1. Project Number: CHIR-I-04

2. Project Title: Develop In-monument Plant Nursery

3. Service-wide Issue(s):

N08 - Loss of Cultural Landscapes
C13 - Need for Rehabilitation or Restoration of Historic and Prehistoric Structures, and Cultural Landscapes

4. Problem Statement:

The need to maintain the historic landscape scene around Faraway Ranch, including the fruit orchards that date from the historic occupation era, means that the monument must have the means (a functional plant nursery) available to propagate cuttings from the historic cultivars for maintenance and replacement purposes. While it is possible to purchase commercially available specimens of all of the plant species of historic landscape significance at Faraway Ranch, this would not preserve the genetic strains of the historic vegetation. Modern plant nursery techniques of clonal propagation make it relatively easy and straightforward to preserve genetic purity for well beyond the lifespan of an individual plant specimen. This is the only truly acceptable approach for managing the historic landscape scene within the National Park Service.

In addition to providing plant materials for maintaining historic landscapes, a plant nursery is also needed to provide plants for revegetating areas of the monument that have been impacted by construction or other surface disturbing activities. Protecting gene pools from unnatural dilution or loss requires that plant materials from local genetic stock be used for revegetation activities rather than importing commercially produced plants of unknown genetic history.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. Buy All Plant Materials from Commercial Sources. This option would preclude the need for building in-monument nursery facilities. Unfortunately, it would also preclude the protection of historic cultivars at Faraway Ranch or the protection of gene pool integrity throughout the natural areas of the monument.

B. Provide Chiricahua Plant Materials to Commercial Nurseries to Raise for the Monument's Use. This option would preclude the need for an in-monument nursery while still providing historic cultivars for Faraway Ranch and local genetic material for the natural areas of the monument. The disadvantage of this option is that the National Park Service can not control the actions of the commercial nursery and would therefore be at some potential risk of changing priorities, low quality control, or business failures causing a loss of materials. The volume of material needed by the monument is not large, but plants must be available in a dependable and timely manner as project needs arise.

C. Build and Operate an In-monument Plant Nursery. This option would require the construction of a small plant nursery facility at Chiricahua National Monument. This nursery would be operated by the Resources Management Specialist and would provide historic cultivar clones for the Faraway Ranch and locally produced plant material for revegetation activities in the natural areas of the monument.

6. Description of the Recommended Project or Activity: Option C. is the recommended solution for this issue. This action will involve constructing a small plant nursery facility that can be used to propagate native plant materials for use by the monument staff in maintaining the historic landscape around Faraway Ranch, including the orchards, and for rehabilitating impacted sites throughout the monument as the need arises. A small base increase is also requested to operate the nursery on an annual basis.

7. Compliance: This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships: This project is related to at least five other projects listed in this plan. These are as follows:

CHIR-N-04 Evaluate NPS Options with the King of Lead Mine
CHIR-N-12 Rehabilitate Impacted Sites
CHIR-C-07 Develop a Historic Landscape Program
CHIR-I-01 Administer the Natural and Cultural Resources Management Program
CHIR-I-02 Increase the Natural and Cultural Resources Management Program

9. Funding Requirements:

	Year 1	Year 2	Year 3	Year 4
Construction Costs	$15,000	$ 0	$ 0	$ 0
Personal Services	5,000	5,000	5,000	5,000
Travel and Per Diem	0	0	0	0
Supplies & Materials	2,000	2,000	2,000	2,000
Total	$22,000	$7,000	$7,000	$7,000

10. Annual Project Status and Accomplishments: This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-I-05

2. Project Title: Conduct an Ethnobotanical Study

3. Service-wide Issue(s):

N20 - Lack of Basic Data: Insufficient Understanding of Park Resources and Threats to Them
C04 - Need for Ethnographic Overview and Assessments, Oral Histories, and Life Histories

4. Problem Statement:

Chiricahua National Monument contains both natural and cultural areas. The prehistoric and historic use of the area is varied and complex. In order to best interpret and manage the monument for both its historic and natural attributes, it is important to understand the ethnobotany of the area. The ways in which people have used native plants in the area would give valuable information as to their importance and history. Also the stories of introduced non-native plants and their uses would link the historic or prehistoric story with the present management dilemma of non-native species. Some of each category were cultivated plants and retaining remnant populations of these in the historic area near the Faraway Ranch would add to the area's interpretation. It would also give more information on the people themselves.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No action. Without an ethnobotanical study, valuable information would not be available in making decisions as to managing different areas of the monument in regards to the vegetation. Decisions would be made without access to the whole picture of past use of the plants. Monument visitors would remain uninformed about the apparent natural scene around the historic structures of the monument.

B. Conduct an Ethnobotanical Study. This would provide needed information on past plant uses which would greatly aid in making land management decisions and would add to the knowledge and interpretive potential of the area. This would especially be helpful in managing the Faraway Ranch Historic District.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. The ethnobotanical study will be conducted in stages, by first researching the different people who used the area. Life ways of the prehistoric and historic cultures will be investigated through literature search. This will develop the story of how people have used the land which is now Chiricahua National Monument, i.e. for hunting and gathering, water collecting, permanent residency, gardening, farming, range livestock grazing, for riding stock, for vineyards, orchards, etc. It is important to learn which areas of the monument were occupied or used, and in what ways.

Secondly, the plants will be surveyed in the monument herbarium and in field to find out which ones are native, are disturbance species or are introduced. Their common ethnobotanical uses will be determined and special local uses will be proposed. A final report will be produced. It will include a heavily annotated species list indicating the various plants present in the monument, their likely uses by different cultures that have lived in the monument, their natural habitat, their introduction story if non-native, and a line drawing or other identification of each. This study will add valuable information on the people and plants and would be a tool in making management decisions.

7. Compliance:

NEPA compliance will not be required for this project, as per reference 516 DM 2, Appendix 1. NHPA compliance under section 106 is likewise not required for this project.

8. Relationships:

This project is related to at least four other projects listed in this plan. These are as follows:

CHIR-N-04 Develop a Vegetation Management Program
CHIR-N-09 Conduct an Inventory and Assessment of Plants
CHIR-C-07 Develop a Historic Landscape Program
CHIR-C-10 Conduct a Monument-wide Historic Sites Survey and Assessment

9. Funding Requirements:

Conducting ethnobotanical study will require the research and field work of a professional botanist, plus consultation with anthropologists, archeologists and historians, plus report and printing costs. It can be completed in two years, assuming field

work can be done during various times of the year to observe different stages of flowering, fruiting and seed set.

	Year 1	Year 2	Year 3
Personal Services	$12,000	$12,500	$ 0
Travel and Per Diem	2,000	2,000	0
Supplies and Materials	500	500	0
Publication Costs	0	1,000	0
Total	$14,500	$16,000	$ 0

10. Annual Project Status and Accomplishments:

This report will be initiated once action begins on this project.

PROJECT STATEMENT

1. Project Number: CHIR-I-06

2. Project Title: Conduct a Visitor Survey

3. Service-wide Issue(s):

N22 - Overuse/Impacts to Recreation and/or Landscaped Zones

C10 - Need for Specialized Studies for Unique or Complex Management Issues

4. Problem Statement:

Available baseline visitor data is at a premium. Visitor use information provides managers with highly valuable insight into a host of visitor characteristics including demographics, perceptions, expectations, satisfactions, and behavior. Knowledge of these aspects enhances the manager's abilities to: (1) provide the user public with high quality recreational experiences, and (2) preserve and protect the values which attract visitors and for which Chiricahua National Monument was established.

Visitor use information is helpful under any level of visitation, but its value increases greatly as visitation grows. Visitation at the monument has roughly doubled since 1970, with the 1988 total exceeding 65,000. The trend for sharply increased visitation is expected to continue indefinitely, thereby steadily increasing the already great need for essential baseline visitor information.

5. Alternative Actions/Solutions and Their Probable Impacts:

A. No Action. The historical lack of baseline visitor information continues, further suppressing monument personnel in their efforts to sensitively and effectively manage visitors while providing them with quality visits.

B. Conduct Day Use Visitor Survey. Using a mail-back or on-site interview questionnaire design, conduct a thorough interview of monument visitors. This type of study is widely used in public recreation areas nationally because of its flexibility, comprehensiveness, and relative ease of administration and interpretation of results. Such surveys can be tailored to

provide managers with precisely what they need to know concerning their visitor population. Survey information can identify visitor related problems and form the basis for appropriate management actions.

6. Description of the Recommended Project or Activity:

Alternative B is the recommended course of action. Conduct the visitor use survey tailored to the perceived visitor use informational needs of monument personnel. The survey instrument would be constructed off-site by NPS/CPSU personnel or a private contractor. The initial contact would be made by the social scientist on-site according to specified random distribution guidelines. All questionnaire data would be computerized and results generated using appropriate social science software.

7. Compliance:

This project is categorically excluded from NEPA compliance, Departmental Categorical Exclusions, 516 DM, Chapter 2, Appendices 1 and 7, U.S. Department of the Interior. NHPA compliance under section 106 is likewise not required for this project. However, the formal OMB approval steps for expending federal dollars to gather information from the public will have to be complied with prior to initiation of this study.

8. Relationships:

This project is not related to any other project listed in this plan.

9. Funding Requirements:

	Year 1	Year 2
Survey Questionnaire Construction	$ 3,000	$ 0
Questionnaire Execution	6,000	0
Data Analysis	5,000	0
Travel and Per Diem	3,500	0
Computer Support	1,000	0
Mailing Costs	3,000	0
Publication Costs	2,000	0
Total	$23,500	$ 0

10. Annual Project Status and Accomplishments:

A visitor survey was done for both Chiricahua and Fort Bowie by Ervin H. Zube, et. al. (1987).

APPENDIX 1

CULTURAL RESOURCES STATUS SUMMARY CHARTS

The following four pages contain the required charts:

1. Summary Chart for Historic and Archeological Sites
2. Summary Chart for Historic Structures
3. Summary Chart for Museum Collection Objects
4. Summary Chart for Cultural Landscapes

CHIRICAHUA NATIONAL MONUMENT

SUMMARY CHART FOR ARCHEOLOGICAL SITES

Significance			Condition					Impacts				Documentation		
	Total	Acreage	Good	Fair	Poor	Des.	Unk.	Sev.	Mod.	Low	Unk.	Good	Fair	Poor
National	Unk													
State and Regional	Unk													
Local	Unk													
Not Evaluated	7	Unk.	3	3	1			4		3		2	4	1
TOTALS	7	Unk.	3	3	1			4		3		2	4	1

Total number of Sites 7 -- Seven known sites. An Archeological Survey has never been done for Chiricahua National Monument.

Number of Prehistoric Sites 3

1. Garfield Peak Indian site; Condition-1; Impacts-3; Documentation-2
2. Indian caves above campground; C-2; I-1; D-2
3. West boundary archeological site -- fenced into private land for protection; bulldozed, possibly by archeologists, by permission; C-3; I-1; D-2

Number of Historic Sites 4

1. Cemetery near entrance; Condition-1; Impacts-3; Documentation-1
2. Grave of Mary Bridger near of Bonita Park; C-1; I-3; D-3
3. CCC camp / Silver Spur Lodge; C-2; I-1; D-2
4. Faraway Ranch Historic District; C-2; I-1; D-1

Number of National Register of Historic Places Nominations 1 -- One National Register Form (nomination) listing each structure on the LCS as contributing structures, and listing all other NPS structures as non-contributing structures.

CHIRICAHUA NATIONAL MONUMENT

SUMMARY CHART FOR STRUCTURES

Significance		Condition				Impacts				Documentation		
Level	Total	Good	Fair	Poor	Unk.	Sev.	Mod.	Low.	Unk.	Good	Fair	Poor
National												
National Cont.												
State												
Local	12	9		3		10	1	1		12		
Undetermined	14	14				14				14		
TOTALS	26	23		3		24	1	1		26		

Total number of Structures 26 -- on the List of Classified Structures (LCS).
Number of Prehistoric Structures 0 -- an archeological survey has never been done.
Number of Historic Structures 26 -- 12 structures are on the National Register of Historic Places (NR).

1. Faraway Ranch Barn; NR; good; severe
2. Faraway Ranch Bunkhouse; NR; good; severe
3. Cap Magazine; good; severe
4. Comfort Station; good; severe
5. Faraway Ranch Cowboy House; NR; good; severe
6. Echo Canyon Trail; good; severe
7. Equipment Shed; good; severe
8. Faraway Ranch Foot Bridge; NR; poor; removd
9. Faraway Ranch Garage & Shed; NR; good; sevr
10. Gas and Oil House; good; severe
11. Geologic Exhibit Building; good; severe
12. Faraway Ranch Main House; NR; good; severe
13. Maintenance Storage and Laundry; good; severe
14. Faraway Ranch Neil's Office; NR; good; severe
15. Powder Magazine; good; severe
16. Faraway Ranch Power House; NR; good; severe
17. Residence B-2; good; severe
18. Residence B-3; good; severe
19. Residence B-4; good; severe
20. Seasonal Quarters; good; severe
21. Shop and Maintenance Office; good; severe
22. Stafford Cabin; NR; poor; moderate
23. Faraway Ranch Storage Building; NR; good; sevr
24. Faraway Ranch Swimming Pool; NR; poor; modert
25. Visitor Center; good; severe
26. Faraway Ranch Workshop; NR; good; severe

CHIRICAHUA NATIONAL MONUMENT

SUMMARY CHART FOR OBJECTS

Documentation*	ARCH	ETHN	HIST	ARCHV	BIOL	PALEO	GEOL	Total
Registration Date Only								0
Registration & Catalog Data	100	10	2,200		75	5	50	2,440
Total Items Cataloged	100	10	2,200		75	5	50	2,440
Backlog to be Cataloged	10		500		900		15	1,425
Total Collection Summary	110	10	2,700		975	5	65	3,865

* Form 10-254 Submitted to National Catalog at Harpers' Ferry
Note: Approximately 12,000 objects have been sent to WACC.

Condition**	ARCH	ETHN	HIST	ARCHV	BIOL	PALEO	GEOL
% Excellent			5				
% Good	60	50	40		70	100	90
% Fair	30	50	40		10		
% Poor	10		10		5		
% Unknown			5		10		10

** The percentage of collection in the following categories

CHIRICAHUA NATIONAL MONUMENT

SUMMARY CHART FOR CULTURAL LANDSCAPES

Significance		Condition				Impacts				Documentation		
		Good	Fair	Poor	Unknown	Sev.	Mod.	Low	Unk.	Good	Fair	Poor
National												
State and Regional												
Local												
Not Evaluated	1				1				1			1
TOTALS	1				1				1			1

The Faraway Ranch Historic District contains several structures on the National Register of Historic Places, however it has never been evaluated as a cultural landscape.

Within the Faraway Ranch Historic District are the Faraway Ranch, the Stafford Cabin, and Camp Bonita. The CCC Camp at Silver Spur Meadow is not in the Faraway Ranch Historic District.

APPENDIX 2

CULTURAL RESOURCES DOCUMENTATION CHECKLIST

TITLE	CURRENT AND APPROVED	NEEDS REVISION	NEEDED
PLANNING DOCUMENTS			
Preauthorization and Authorization	X		
Statement for Management (SFM)	X		
Outline for 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 Hist. & Life Hist.		X	

TITLE	CURRENT AND APPROVED	NEEDS REVISION	NEEDED
BASIC CULTURAL RESOURCE DOCUMENTS (cont.)			
Ethnographic Program			X
Historical Base Map			X
Historic Resource Study (HRS)			X
Monument Administrative History		X	
Scope of Collection Statement		X	
SPECIAL RESOURCE STUDIES AND PLANS			
Archeo. & 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	X		
Hist. Struct. Preservation Guide (HSPG)			X
Historic Structure Report		X	
Social Impact Study			X
Special History Study			X
Traditional Use Study		X	

APPENDIX 3

LIST OF RELATED ACTION PLANS

1988. Scope of Collections Statement, Chiricahua National Monument. 20 pp.

1988. The Camp at Bonita Canyon. An archeological data recovery study by the Western Archeological and Conservation Center, Tucson, Arizona.

1988. Statement for Interpretation, Chiricahua National Monument. 58 pp.

1987. Statement for Management, Chiricahua National Monument, Revised 1987. Approved by the Acting Regional Director May 20, 1987. 28 pp.

1986. Cultural Resources Management Plan, Updated February 1986, Chiricahua National Monument, Arizona. 38 PP.

1986. Natural Resources Management Plan, Amended 1986, Chiricahua National Monument, Arizona. Approved by the Regional Director September 5, 1986. 34 pp. + 30 page amendment.

1985. Land Protection Plan, December 1985, Chiricahua National Monument. Approved by the Regional Director December 20, 1985. 6 pp. + appendix, maps and photos.

1982. Fire Management Plan, Chiricahua National Monument, 1982. Approved by the Regional Director July 12, 1982. 49 pp. + maps.

1979. Chiricahua National Monument, Boundary Study, Boundary Analysis Booklet. 27 pp. with maps.

1977. Statement for Management, Chiricahua National Monument. Approved by the Regional Director August 19, 1977.

1971. Wilderness Recommendations for Chiricahua National Monument, Arizona, December 1971. 47 pp. with maps.

APPENDIX 4

ANNUAL PROJECT STATUS AND ACCOMPLISHMENTS REPORT

List of Completed Projects:

Rehabilitation of Faraway Ranch, CRMP-1
-- funded and mostly completed

Intrusion/Fire Alarm System, CRMP-3
-- funded and accomplished at Faraway Ranch

Museum Collections Care and Security, CRMP-4
-- funded and accomplished

Preserve Faraway Manuscript and Photo Collection, CRMP-5
-- funded with Fee Revenues and accomplished

Design and Install Heating System for Faraway, CRMP-6
-- funded and accomplished

Design and Construct Faraway Parking Lot and Access Trail, CRMP-9
-- partially completed with park base funding

Oral History Project, CRMP-12
-- funded with Non-NPS funds--SPMA grant and accomplished

Interpretive Media and Faraway Ranch Furnishings, CRMP-13
-- funded and accomplished

Rehabilitation of Faraway Cowboy House, CRMP-14
-- partially completed with park base

Collections Housekeeping Plan, C-02
-- completed in-house

Faraway Ranch General Management Plan, C-04
-- completed in-house

APPENDIX 5

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