approved 11/86

WHSA

RMP

RESOURCES MANAGEMENT PLAN AND ENVIRONMENTAL ASSESSMENT

FOR

WHITE SANDS NATIONAL MONUMENT

November 1986

Recommended by: Donald S. Hampton
Superintendent, White Sands National Monument

Prepared by: White Sands National Monument Staff and Southwest Region Office of Natural Science

Reviewed by: Southwest Region Offices of History, Archeology, Planning, Maintenance, Interpretation and Resource Management

Approved for Implementation by:
Regional Director, Southwest Region

I. Introduction

A Resource Managment Plan(RMP) documents a park's resources and describes a comprehensive management monitoring and research program for dealing with important cultural and natural resource problems.

The RMP describes and evaluates the current resources program, identifies inadequacies in activities and knowledge and provides for the resolution of the inadequacies based on NPS Management Policies, approved Park Management Objectives, Land Classification, and Management Constraints.

The plan includes both a "Natural" and a "Cultural" Resource section. Each section contains a comprehensive summary component(Overview and Needs) and a series of Project Statements which define individual problems and proposed actions. A specific management plan, the Water Resources Management Profile for the monument is also included. Also included are five year resource programming sheets which: (1) rank projects in order of overall priority of importance, (2) propose a schedule of accomplishment and (3) identify funding and manpower needs required to carry out the recommended actions.

The plan constitutes a contract with and by the Superintendent to deal with the important resource problems of his/her area.

It will be used as one of the fundamental elements in preparing budgets and deciding how to allocate funds and staffing resources to parks.

Because activities proposed in this plan are subject to NEPA compliance, a separate Environmental Assessment component is also included.

A. Management Objectives

Statement for Management and Planning

Purpose of the Park

White Sands National Monument is an ecological island of gypsum sand lying in the almost flat Tularosa Basin between the rugged parallel ranges of the San Andres and Sacramento Mountains in the south-central New Mexico. It was established by Presidential Proclamation in 1933 under the provisions of the Antiquities Act of 1906, in order to preserve the unique geology of the gypsum sand dunes and to protect all of it's other scenic, scientific and educational values.

Management Objectives

General Objectives:

To conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations.

To accomplish this, the following specific objectives will be addressed:

1. Manage, interpret, maintain and promote the aesthetics, the biological ecosystem and the geologic history as primary themes. History, archeology, and recreation resources will be fully protected and also managed.

2. Upgrade visitor facilities at the monument entrance with exhibits, office and restroom expansion, concession expansion and traffic rerouting.

3. Eliminate unessential roads.

4. Continue backcountry camping with major food services, motel accommodations, camping and gasoline sales provided by the local business community.

5. Continue providing an environmental study area as long as the cost/ benefit ratio remains reasonable.

6. Continue coordination with the Department of Defense under the terms of the cooperative use agreement for military testing.

7. Continue efforts for a land exchange with the State of New Mexico for the Dog Canyon property originally obtained for water rights.

8. Study feasibility of land exchanges with White Sands Missile Range for greater administration efficiency.

Visitor Use:

Study means by which additional numbers of people can experience the monument without detriment to the resources.

Continue to provide for recreational use, such as sand surfing and playing on the dunes, within designated areas.

Continue to provide picnic facilities in the heart of the dunes area.

Continue to provide automobile caravan tours to Lake Lucero.

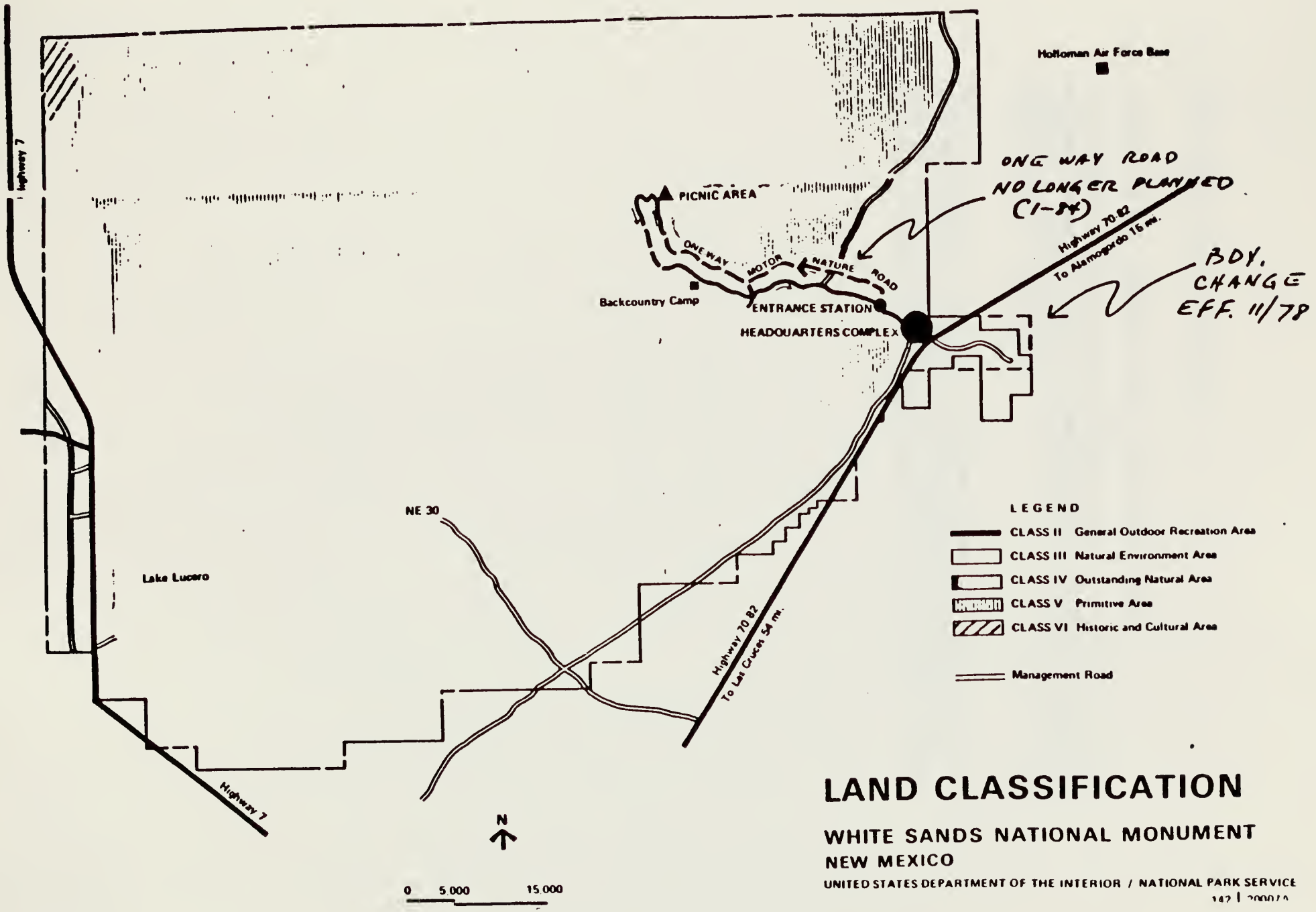
Resource Management:

Continue ongoing research studies to maintain a current approved resource management plan for the monument and to strengthen the interpretive program.

B. Land Classification

The land classification plan for White Sands is based, first, upon establishing as Class IV those lands containing the outstanding natural features for which the monument was principally set aside. Two such areas are indicated on the map: the outstanding Selinite Crystal Beds in the Lake Lucero area, and the spectacular barchan and transverse dunes. A Class II designation is indicated for the motor nature road that leads into the heart of the dunes area, as well as for the picnic and recreation site off the main loop system, the existing headquarters site, and management roads. Class III lands are shown along the periphery of the sand dunes, on the west boundary, the east boundary, the south boundary, and in the Garton Lake area. Class VI lands are indicated in the two Mogollon and Apache remnant sites along the western boundary. The remainder of the monument, which includes the vast alkali flat area, the superb embryonic dunes, and the parabolic dunes, is classified as Class V.

See map on next page for graphic land classification.



LAND CLASSIFICATION

WHITE SANDS NATIONAL MONUMENT

NEW MEXICO

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

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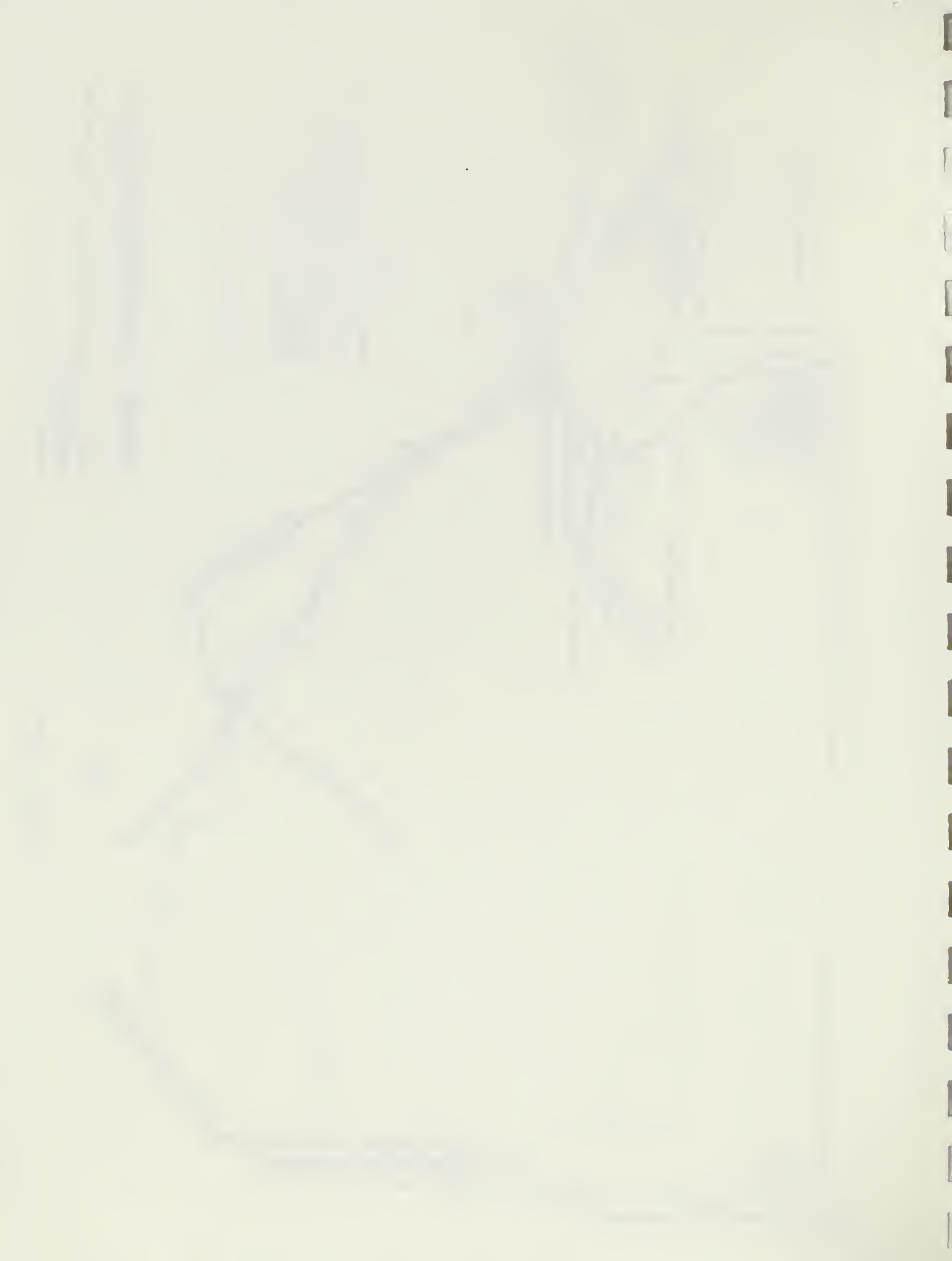

C. Annotated Management Constraints

1. Cooperative Use Agreement, White Sands Missile Range

The agreement restrains NPS development and use in that part of the monument termed the Zone of Cooperative Use. This Master Special Use Agreement is supplemented by a Memorandum of Understanding which is updated yearly or as needed.

2. Public Land Order 703, Federal Register Document 51-3314, filed 3/8/51 published 3/14/51, withdrew for military purposes the lands now included in the Missile Range, which does not include lands embraced within the boundary of the White Sands National Monument.

II. Resource Management Program

This is the heart of the RMP and includes two parts:

A. Natural Resource Management Program

B. Cultural Resource Management Program

Each of which contains an Overview and Needs section and a series of Project Statements.

NATURAL RESOURCES MANAGEMENT PROGRAM

OVERVIEW AND NEEDS

A. Natural Resource Management Program

1. Overview and Needs Section

A great deal of research into the geology and biology of White Sands has been completed (see Appendix B). These studies have made evident some areas which need further study and other areas that now require action.

The most serious threats facing White Sands include: (1) impact to the ecosystem by exotic fauna and flora (2) missile/military operations which impact on the backcountry and cause noise problems and (3) water resources problems.

A major resource management concern is the presence of the exotic African antelope Oryx Gazella, within White Sands National Monument. Hundreds of Oryx, which were introduced by the New Mexico Game and Fish Department into the adjoining White Sands Missile Range now travel through and establish home range within the monument. It has become necessary to start construction of a fence along the park's perimeter. A fence at least sixty(60) miles in length along the south, west, and north boundary would restrict the Oryx movement into the monument as well as control illegal access from neighboring military lands and do a great deal towards protection of archaeological sites and backcountry resources. Funding of $200,000 for the fencing project was approved for FY84. Additional funding was available in FY85. Approximately 24 miles of fence has been constructed on the south and west boundary.

Water resource studies have been programmed to ascertain water rights and to make geohydrological investigations at White Sands. Water plays a paramount role in the maintenance of the dunefield ecosystem. A thorough analysis of the water resources is necessary for sound management and to comply with a requirement of a Basic Ecosystem Survey, NEPA-1969 and Water Quality Acts.

A high priority resource management concern involves the protection of the habitat and the understanding of the ecology of rare plant species including Pediocactus papracanthus, Coryphantha sheeri unicinata, Limonium limbatum and rare vertebrates, the White Sands Pupfish (Cyprinodon tularosa) and Kit Fox (Vulpes macrotis).

Missile impacts, occasional off-road use, and high noise levels including frequent sonic booms are problems which occur because of the monument's proximity to missile testing and flight training facilities. Continued monitoring, law enforcement patrols and cooperation with the military are needed to alleviate this problem.

1.a. The area has a minimum number of "pest" problems. The main being the Mexican Freetail Bat. The growth of Salt Cedar(Tamarisk), occasional influx or problems with insects as ants, roaches, millers, cochineal scale, etc.

Any control methods will begin with natural means, progressing to mechanical means, and on to an artificial or chemical means only if warranted and in compliance with applicable policies, rules and guidelines.

During summer months the Mexican Freetail Bat is abundant around monument buildings and residences. An attempt to keep bats away from park buildings by constructing a "bat house" has been unsuccessful. Continued effort to attract bats to the "bat house" or other methods to rid bats from the park buildings is necessary.

The eradication of the exotic Salt Cedar (Tamarisk) is also a concern. The eradication project was begun in FY83 at the Garton Pond area where approximately six(6) acres were cleared by cutting Salt Cedar to ground level and applying the herbicide "Tordon" to the stumps. This project was contracted out at a cost of $7,200.

Two recent air quality studies provide baseline data necessary to enforce the Clean Air Act. A three-year study of the visibility was completed in 1981 and a two year particulate matter study was completed in 1983. Monument personnel must remain alert to local events which may impact on area air quality.

These major resource management problems and others have been considered and addressed in the White Sands Monument Resource Management Plan.

2. Project Statements

Natural Resources Projects Statements
(listed in priority order)

	Park Code and Project Number*	Project Title
1.	WHSA -N16	Control of Exotic Fauna
2.	WHSA -N3	Water Resources Analysis Project
3.	WHSA -N10	Protection of Cacti and Habitat
4.	WHSA -N12	Backcountry Impaction
5.	WHSA -N18	Bat Control
6.	WHSA -N8	Control of Exotic Plants
7.	WHSA -20	Special Use Permit Monitoring
8.	WHSA -N15	Noise Pollution
9.	WHSA -N17	Air Quality Monitoring
10.	WHSA -N19	Cochineal Scale Infestation Monitoring
11.	WHSA -N9	Nevada Buckmoth Monitoring

* Project Numbers from the 1969 Natural Sciences Study Plan and 1974 Resource Management Plan have been retained if the project was listed in those documents. A list of all projects contained in those plans, along with their appropriate numbers, is included in Appendix B.

1.1 WHSA - N16 - Control of Exotic Fauna

This project has been briefly discussed in the 1974 WHSA RMP under item N-5. Because it has become a more singular problem, the project was given a new number and title in the 1981 WHSA RMP.

1.2 Statement of Problem

Between 1969 and 1977 the New Mexico Department of Game and Fish introduced 93 Gemsbok, Oryx gazella, to White Sands Missile Range north of White Sands National Monument. There are now an estimated 600-800 Oryx within the area, with approximately 100 utilizing the monument at least part of the year.

Research completed under contract PX702900311 on Oryx activity indicates that these exotics are establishing home ranges within the monument, have no natural impediment to increased numbers, are expected to utilize more areas of the monument and may compete with native American Antelope. Increased sightings by monument personnel and visitors of Oryx in the eastern, visitor concentrated areas of the monument indicate that the Oryx are becoming increasingly widespread. The monument Superintendent and the Regional Office of Natural Resources must determine a means of eliminating this exotic as dictated by NPS management policies within the present budget restraints.

1.3 Alternative Actions and Their Probable Impact

1. Continue to Document Specific Sightings Only
   This would do nothing to eliminate the problem but would keep management abreast of any deterioration in the condition. This should continue.

2. Allow Public Hunting of the Oryx on the Monument
   This would violate NPS policies. If public hunting were allowed, special permits would be required and State Game Officers would have to accompany all hunters.

3. Have the animals destroyed by park Service Employees
   This would involve a great deal of cooperation from state officials and probably produce considerable public reation. It would also be a continuing process since nothing would keep new animals from entering along the western park boundary.

4. Have the State Remove the Animals from the Entire Area and Relocate them Elsewhere.
   This would involve a tremendous effort since the herd now numbers 600-800 individuals which are scattered across a 6,000 square mile area. It is also unlikely that the state would be sympathetic to this plan since the Oryx were transplanted as a game species and the program is strongly supported by the State.

5. No Action
   The oryx will continue to spread further eastward into the monument. Their numbers will continue to increase. They have already been reported in the picnic area of the heart of the dunes and Holloman AFB to the east. They will continue to utilize resources making them unavailable to native species. Eventually, if left unchecked, they would have the same effect on the vegetation as would a herd a grazing cattle.

6. Construct a fence to keep the oryx out of the NPS area.

1.4 Recommended Course of Action

The management action what would best achieve the objective of eliminating Oryx Gazella from within the White Sands National Monument would be to fence at least the west half of the northern and all of the west and southern monument boundaries; The animals would then be herded out by helicopter. This would be approximately sixty(60) miles of fencing. Close coordination with the New Mexico Department of Game and Fish and White Sands Missile Range is essential.

The type of fence which is being constructed is a six (6) foot high, ten (10) wire high tensile strength, smooth wire fence open the bottom to about sixteen (16) inches to permit natural migration of American Antelope.

Cost to construct such a fence is moderate. Cost runs approximately three (3) dollars per foot or up to $16,000.00 per mile. An amount of $200,000.00 was approved for construction of a portion along the west boundary. An additional $200,000.00 is needed for the remaining construction.

2.1 WHSA - N3 - Water Resources Analysis Project

This project statement includes a combination of water related problems previously addressed the 1974 WHSA RMP under project N3, N11, and N14. A current water Resources Management Profile is included in Appendix B.

2.2 Statement of Issues and Problems

A thorough analysis of the water resources of the monument is necessary for sound management and to comply with requirements of a Basic Ecosystem Survey, NEPA - 1969 and Water Quality Acts.

Activities on the adjacent White Sands Missile Range and Holloman Air Force Base may cause pollution of the water within the monument or may disrupt the flow necessary to monument ecology. Several gullies feed runoff water from the Sacramento Mountain slopes into ponds on Holloman Air Force Base where a wide range of pollutants are introduced. Materials include, but are not limited to, rocket engine fuels, grease, oil sludge, concrete and metal debris. An intermittent stream - Lost River - carries water from one pond toward the Alkali Flats and Lake Lucero, flowing on the surface near the northern boundary of the monument for a short distance and going underground. The habitat of the rare species Limonium Limbatum, sea lavender, is possibly affected in this area. The area is also habitat of the White Sands pupfish. Currently a causway which was interupting this natural flow in the Holloman Air Force Base near White Sands National Monument has been opened.

In addition, regular overflows of the sewage lagoon system on Holloman Air Force Base allows treated sewage waters to enter onto the Monument property near Garton Pond.

Both military installations are involved in research programs, which generate various amounts of debris from missiles, drone aircraft, spent boosters and warheads. Some of these items may contain radioactive or toxic substances. Most warheads are recovered within hours after their impact by military recovery crews; however, much metallic debris remains. Though precipitation in the area is low, moist gypsum sand is highly corrosive and iron alloy metals are rapidly etched. Components thus released are entering the ground water system with unknown effects on the environment.

Maintenance activities within the park may have an effect on the bydrological system also. Wind blown sand creates a continuing road maintenance problem. Removal of sand by heavy equipment is required, and this activity may not only cause aesthetic impaction of the local environment but also disturb the natural hydrological system through soil compaction.

2.3 Alternative Actions and Their Probable Impacts

1. Continue present course of action to remain alert and be aware of any new developments. Continue to work with the military to divert aircraft onto other sections of the range, and speed recovery of new debris and recovery of older materials. Continue to assure that surface water flows into the monument are not interrupted. Continue to maintain the roadway into the dunes to allow visitors access into the heart of the monument. Through the Maintenance Foreman, continue to train equipmetn operators to be discreet in moving shifting sand deposits. This will maintain the status quo but will not abate any of the problems or increase our understanding of the park water resources.

2. No Action will result in continued pollution of the ground water from outside sources with a resulting impact on monument flora and fauna. The effects on an altered water table are unknown.

2.4 Recommended Course of Action

Initiate research to analyze, quantify, qualify and monitor the parks resources and geohydrological system.

A water resources study should analyze at least these basic factors:

1. A study and mapping of the general water system and flow (surface and subsurface) throughout the park, including the major sources and potability of freshwater.

2. The functions of fresh water in the ecosystem such as runoff amount use by and importance to basic faunal and floral systems, etc.

3. The threats from potential water deficiencies, pollution of water including the identification of materials released into the environment from various types of drbris, the effects of the material on plant and animal life and potential dangers from residual build-ups.

4. Determine the extent of the impaction by vehicles on the environment along the maintained roadway, i.e. is the hydrological system blocked by the compaction.

5. Quantification of Federal Water Rights. Currently, approved 10-238's exist for Water Rights studies and Geohydrological investigations.

3.1 WHSA - N10 - Protection of Cacti and Habitat

This project was listed in the 1974 WHSA RMP

3.2 Statement of Issue and Problem

Seventeen species comprise the cactus flora of White Sands National Monument. Many rare species occur within the monument, including two threatened species. The cacti are widely distributed, but there are four sites just outside the dunefield along the busy scenic drive where cacti populations are concentrated. Their showy flowers frequently attract visitors and occasionally removal of plants results.

Much research has been completed, including a map of cacti occurrences, reports on Claret Cup Cactus ecology and population structure. Research on the ecology of Pediocactus papracanthus and Coryphantha sheer var. unicinata has begun and will continue through FY85. The P. papyracanthus is especially desirable to cacti fanciers because of its rarity and unusual structure.

3.3 Alternate Actions and Their Probable Impacts

1. Close the Dunes Drive During Periods of Cactus Flowering. This would be certain to cause an uproar from visitors and be impractical since this road is the only access to White Sands.

2. No Action. This would surely mean a continued loss of plants.

3.4 Recommended Course of Action

To date, 253 individuals, the known population of Claret Cups, have been tagged by the UTEP research team. These plants will be monitored to detect any removal problems and indications of reproductive rates. The areas of critical habitat along the dune front near headquarters, toward the Big Dune Trail and towards Walters Ranch will be treated with increased concern. All areas of cactus habitat will be left in an undisturbed state.

Posted regulations and interpretive programs will point out restrictions on collection of natural objects. Increased law enforcement attention will be given to the delicate area along the roadway.

4.1 WHSA - N12 - Backcountry Impaction

Addressed in the 1974 WHSA RMP

4.2 Statement of Issue or Problem

Visitor access to the backcountry of White Sands National Monument is readily available from a wide variety of uncontrolled points. There are numerous roadways, particularly along the southwestern section of the monument, some of which were made by early ranchers and some resulting from early missile recovery activities. These roads are a scar on the land and encourage inappropriate backcountry travel. On-duty and off-duty military personnel are particularly able to enter the monument. This unauthorized trespass is causing damage to the natural resources; e.g., considerable damage occurs from the removal of selenite crystals. The area's terrain is especially attractive to cross country travel and many roads along the monument boundary offer easy access to the primitive portions of the area. Occasional use by horseback groups pose no serious problems. Use by these groups is monitored closely by the park staff with specific areas designated in the dunes area for horse trailer parking. Annual horse use in the backcountry does not exceed an estimated 100 per year and is day use only.

A related problem is that of impaction to the sensitive interdunal flat areas by foot traffic and occasional illegal off-road vehicles. The ecologically important nitrogen-fixing algal-lichen crust which occurs in the interdunal flats is highly sensitive to disturbance. Research studies indicate that restoration rates of the algal-lichen crust can be 1-3 years after disturbance by foot traffic and 20-40 years after disturbance by vehicle tracks.

4.3 Alternative Actions and Their Probable Impact

1. Close all roads but Scenic Dunes Drive. This would eliminate only the types of travel we are aware of and would not stop off-road entry. It would also be impractical due to the sporadic use of portions of the monument for the retrieval of missiles.

2. Attempt more patrols. This would require increased personnel and travel funding, both are scarce commodities in today's budgets.

3. No Action. This will only allow the impact to continue and the resources to be diminished.

4.4 Recommended Course of Action

Continue to enforce present regulations that restrict off-road vehicular use. Continue to issue citations to offenders. Continue to explain impaction problems to area visitors and neighbors in adjacent communities through interpretive programs and public relations. Continue to identify roads that are not used and which do not serve a necessary purpose. Work out an agreement with the White Sands Missile Range to refrain from using these roads. Bar visitors from using closed roadways through the use of barricades and signing. Obliterate road scars where possible. On the northeast boundary, post and sign at entry points where possible.

Continue to negotiate a Memorandum of Understanding with White Sands Missile Range and Hollowman Air Force Base to include their assistance in patrol of more of our mutual boundary. Construction of the fence mentioned in Project WHSA - N16 would go a long way to solving much of this problem as well.

Monitor the heavily used backcountry areas (e.g. Backcountry Campsite) for signs of serious disturbance with the possibility of relocating or restricting use of such areas.

5.1 WHSA - N18 - Bat Control

5.2 Statement of Issue and Problem

The Mexican Freetail Bat is abundant during warm months around park buildings where they hang from buildings, porches, and ceilings. Since the 1981 RMP when this issue was first addressed as a nuisance, it has become a more pronounced problem. Efforts to eliminate bat roosting sites in park buildings and to induce them to use other facilities have been unsuccessful, as have attempts to rid the area of bats by using sound devices.

In addition to degrading the esthetics of the Spanish-Pueblo styled Visitor Center, the bats present a health problem as carriers of rabies and bubonic plague. Numerous visitor comments and complaints are heard about roosting bats and droppings. The plentiful bat droppings which are found in the visitor center patio, water fountains, restrooms, maintenance and residential buildings require immediate maintenance removal and are a potentially serious public health problem.

5.3 Alternative Actions and Their Probable Impact

1. Destroy the bats. This would be contrary to National Park Service policy since they are native to the area. It could also result in an increase in the number of insects in the immediate area.

2. No Action. This will result in a continuation of bat problems for the park staff and will continue to provide an unnatural roosting place for the bats.

5.4 Recommended Course of Action

Continue seeking the best method of inducing the bats to find another home. Meanwhile, increase efforts to "motivate" bats to use the "Bat House". Continue to screen areas that are especially desired to be free of roosting bats.

6.1 WHSA - N8 - Control of Exotic Plants

6.2 Statement of Issue and Problem

Salt Cedar (Tamarisk) is an exotic plant introduced into the Southwest between 1899 and 1915. Great numbers of Salt Cedar are found at White Sands covering an area of approximately 200 acres. These trees which are reported to have the highest transpiration rate of all deep-rooted trees and are found throughout the monument because of the relatively high water table of the area. A Tamarisk removal project has begun at the Garton Pond area in September 1983 where approximately six(6) acres were cleared by cutting the trees at just above ground level and applying the herbicide "Tordon" to the stump. The cost of this contracted project was $7,200.

A large introduced grass, Arando donax, occurs in a small area of the dunes, and tumbleweeds, Salsola Kali, grow in disturbed soil, especially around the monument headquarters.

6.3 Alternate Actions and Their Probable Impact

1. No Action. This will result in a still thicker spread of the plants until at some point in time we will have what on researcher has forcasted as "Salt Cedar National Monument".

2. Physically Remove All Salt Cedar. This is difficult to accomplish without disturbing large areas of soil and vegetation throughout the park since many of the Salt Cedars are quite large and are located in areas deep within the park and far from any roadway.

3. Chemically "poison" such plants. This would cause introduction of harmful chemicals into the park ecosystem. At present, there are no approved herbicides without special permission from the Regional Office level.

6.4 Recommended Course of Action

Continued sustained effort is necessary to control the fast spreading Tamarisk. Close monitoring of the Garton Pond area is necessary to determine the effectiveness of the eradication method. Whenever possible, individual plants should be removed and small stands should be controlled in an environmentally sound and approved manner.

The Arando donax should be monitored to prevent its spread. The area of disturbed soil around headquarters should be limited as much as possible to prevent the spread of tumbleweed and other weedy species.

7.1 WHSA - N20 - Special Use Permit Monitoring

This project is being addressed for the first time in the White Sands RMP.

7.2 Statement of Issue and Problem

In recent years numerous requests are received for commercial motion picture filming, commercial photography, civic and professional organizational group events, dedications, weddings and other special group uses.

To prevent loss or degredation of natural resources, incompatible type uses or hazards to public safety, these activities must by monitored, some continually. This insures protection of resources and the visiting public.

Many of these requests are for use of the park either before or after normal hours of operation. This adds a burden to a small park staff and takes employees away from their normal duties. Any overtime for exempt employees must come from park operating funds. Non-exempt employees often must contribute time due to lack of funding.

Requests average 3-4 monthly and range from half-day events to motion picture productions using park area for 12-14 hours daily for 3-4 weeks at a time.

7.3 Alternative Actions and Their Probable Impact

1. No Monitoring. Allowing groups to use park unsupervised could result in extreme hazards to public safety, destruction of park resources, incompatible type uses and loss of control of public use. Much visitor confusion and complaints would result. This would violate NPS policies and regulations.

2. Prohibit Special Activities. This would result in numerous complaints, many from high level State, Federal and private agencies. Public relations and cooperative efforts in many other areas of park administration would suffer or be made very difficult. This would also result in loss of public image and add to administrative burden in answering correspondence.

7.4 Recommended Course of Action

Monitor group activities as needed attempting to schedule activities during periods of low visitor use and during normal hours of operations when possible. Accept donations to help off-set any unavoidable cost. Keep public informed with tactful explanation and/or news releases as needed.

Park resources and visitor safety would be adequately protected.

8.1 WHSA - N15 - Noise Pollution

This project was addressed in the 1974 RMP

8.2 Statement of Issue of Problem

The silence to be found in the White Sand dunes is one of the important resources of the monument. The special quality of this silence is pecular to the monument; a result a sound absorbing quality of the gypsum dunes. Noise from military aircraft and missile activities shatters this quietude which is so rarely found in today's world. Also, recent studies show that noise pollution can have harmful physical effects on animals as well as people. One researcher believes that frequent sonics booms may adversely effect the fragile algal-lichen crust within the dunefield (see WHSA - N12). The sonic booms can also cause structural damage to buildings in the headquarters area.

8.3 Alternate Actions and Probable Impacts

1. Interpret the situation to visitors and wait for quiet to return.

2. No action. This would result in a continued situation which would limit visitor use and enjoyment of the resource and could have a harmful effect on the health and well being of monument personnel and wildlife.

8.4 Recommended Course of Action

See cooperation from nearby, very active Holloman Air Force Base and the nearby White Sands Missile Range. Seek to minimize sound from aircraft and missile flight testing through agreements, especially as it relates to take off and flight pattern which bring aircraft directly over the monument headquarters area at low altitude.

Initiate studies to obtain data on noise levels at the monument. Implement a "sonic boom" log for documentation purposes.

HB 4430 (pending legislation) to provide for a study of overflights will assist by providing knowledge of the number of overflights and identify the problem for corrective action.

9.1 WHSA - N17 - Air Quality Monitoring Projects

9.2 Statement of Issue

The Clean Air Act has designated White Sands National Monument as a class II area. The National Park Service has recommended to the State of New Mexico that the area be redesignated as a Class I. Because the area exceeds 10,000 acres in size, it cannot be redesignated below Class II. Monitoring which consisted of both visibility and particulate measurements was conducted from 1978-1981. Two National Park Service studies have documented the status of the area's air quality. A three year visibility monitoring project using a multi-filtered contrast telefotometer was conducted between 1978 and 1981. A two year particulate sampling project was completed in 1983. These two projects provide valuable baseline data necessary to enforce the Clean Air Act.

9.3 Alternate Action and Their Impact

1. No action. This would negate efforts which have been in progress since July 1978 and severely inhibit the Superintendent's mandated legal obligation to protect the air quality related values of this area.

9.4 Recommended Course of Action

Continue to remain alert and involved in any local events which may have an impact on air quality, such as activities at Holloman Air Force Base and White Sands Missile Range, local sawmill operations, and projects involving developments of energy resources and water resources. Try to influence the State of New Mexico to accomplish necessary studies for redesignation of the monument to a Class I status.

10.1 WHSA - N19 - Cochineal Scale Infestation Monitoring

This issue is being addressed for the first time in the White Sands RMP due to aesthetic problem in the headquarters area.

10.2 Statement of Issue

A periodic endemic infestation of native Opuntia by cochineal scale insects occurs at White Sands. The infestation appears to have only a temporary negative effect on the host population. Heavy infestations in the summers of 1981 and 1983 have killed a few cacti along the dunefront in the headquarters area.

Local entomologists state that the problem is endemic to the area. In 1981, Regional Office permission was granted to spray the Visitor Center Plant Area cacti with Malathion to control the cochineal scale infestation.

10.3 Alternate Actions and Their Probable Impact

1. Widespread Use of Insecticide. This contrary to National Park Service Policy. Chemical pesticides can cause ecological havoc when used indiscriminately.

2. No Action. A severe infestation could permanently damage the sensitive cacti population as a whole. If necessary, spray the Visitor Center area cacti with insecticide after approval from the Regional Office.

Obtain information of the ecological role for interpretation to visitors.

11.1 WHSA - N9 - Nevada Buckmoth Monitoring

This issue was addressed the the WHSA 1974 RMP.

11.2 Statement of Issue and Problem

The monument contains scattered native cottonwood trees, mostly in the eastern third of the area. A defoliating insect, the Nevada Buckmoth (Hemileuca nevadensis), is active in spring and summer on and near these trees and some years the foliage is severely reduced. This is visible from the scenic drive in places and has caused some visitor comment.

This has been a recurrent problem documented from the 1960's. In the past, Bacillus thuringiensis, a bacterial agent, has been used to control the Nevada Buckmoth. More recently, management has refrained from such control methods and, instead, has simply monitored the infestation as few trees have been killed by the insects.

Recently, researchers from New Mexico State University have shown an interest in the problem and may provide information on the ecological role of the Nevada Buckmoth.

11.3 Alternate Actions and Their Probable Impact

1. Widespread Control with Insectcide. This action will introduce new agents into the ecosystem, whether chemical or biological and is contrary to National Park Service Policy.

2. No Action. A severe infestation could do serious damage to the cottonwood trees which are important to the animals of the area.

11.4 Recommended Course of Action

Continue to monitor the cottonwood trees during the spring and summer for signs of Nevada Buckmoth infestation. If necessary, obtain recommendations from the Regional Office for control methods. Work with the United States Forest Service which has expertise in this field.

Obtain information on the ecological role for interpretation to visitors.

CULTURAL RESOURCES MANAGEMENT PROGRAM

OVERVIEW AND NEEDS

B. Cultural Resource Management Program

1. Overview and Needs Section

As proclaimed in the Statement for Management, White Sands National Monument is primarily a Natural Area. It is a unique set of geological features which is the primary significance of the area. The flora and fauna are also of significance in this highly developed ecological situation where living communities of plants and animals form a complex interdependent life system.

The cultural history and prehistory of the area are also of interest. These include evidence of prehistoric Indian hearth sites and Mongollon Culture Pueblo ruins as well as historic Apache Campsites at scattered fringe locations.

Prelimary surface reconnaissance surveys were conducted in 1973 and 1977 (see Appendix C - Completed Research). Additional Archeological Research has been programmed for the period 1987 through 1989. Much work needs to be done to complete the Cultural Resources Inventory required by EO11593.

Other cultural resource problems, such as protection of the Fairchild site, eligible for the inclusion in the National Register and preservation of the Oliver Lee Ranch home, have not been addressed in this plan since they are located on a detached 440 acre portion of the monument that is managed by another agency and that is scheduled to be transferred to them.

Most of the buildings in the Headquarters area were constructed in 1937 by the WPA. The Visitor Center and adjacent restrooms have been included in the list of classified structures. The significance of the entire headquarters complex (visitor center, comfort station, residential and Maintenance areas) are being evaluated wtih reports expected by 1987.

A National Register nomination and LCS forms will be prepared under contract and a Historic Structures Report will be prepared by DSC. Until the buildings and grounds of the headquarters area have been fully evaluated for their historic and architectural significance, they are to be treated as Cultural Resources and Policies for management of cultural resources will be followed.

2. Cultural Resources Project Statements

Item	Park Code and Project Number	Project Title
1.	WHSA - C1	Archeological Survey
2.	WHSA - C2	Monitor Archeological Impacts
3.	WHSA - C3	Hearth Sampling
4.	WHSA - C4	Historic Building Repair

1.1 WHSA - C1 Archeological Survey of White Sands National Monument

1.2 Statement of Issues and Problems

A comprehensive site survey, as required by E011593, has never been completed for the entire monument. More than 76 sites are knwon from earlier preliminary surveys (1973 and 1977), but the true extent and identification of all the archeological resources within the boundary are not known. An archeological base map for the entire monument does not exist. This information is necessary for management purposes, both in planning and in protection of archeological resources.

1.3 Alternative Actions and Probable Impact

1. Survey of Total Area

An inventory of the total area (approximately 145,000 acres) at this time would be the desired goal. However, the budget constraints will not allow a 100% survey of large NPS areas for archeological sites.

2. Conduct Sample Surveys

Perform a valid stratified survey, designed to be workable and valid, which will arrive at results similar to Alternative #1. Such a survey should include an evaluation of each site's potential for inclusion in the National Register. The details and logistics of such a survey should be worked by the appropriate professionals.

3. No Action

Failure to complete the survey will result in continuing loss of the potential for greater understanding of the environment and human occupations of the White Sands area, as a result of the loss of data for interpretive and management purposes.

1.4 Recommended Course of Action

A stratified archeological survey, including testing, should be accomplished through contact with a qualified institution. In view of the large acreage involved, the survey will probably take several years. During the past few years, the interpretive use of aerial photography in archeology has become a major cost-effective tool in large inventory surveys in the Southwest. Detailed orthophotographic maps, based on stereophotographic imagery, have proven particularly useful in low relief terrain (typical of desert basins) and in regions where mapping control points and/or mapped man-made features are scarce. Both conditions generally pertain within the White Sands National Monument.

Stereo-aerial photography can be a great utility in locating and interpreting the distributions of particular site types which have a high surface visibility. In the White Sands, numerous hearth sites have been recorded, of generally high visibility, due to the sharp contrast between pure gypsum sands and those stained by carbonized organic materials. A detailed analysis of these types of features prior to the initiation of field work will assist in the development of a more effective survey design, as well as allowing the most expedient sampling of these sites for environmental and chronological reconstruction.

2.1 WHSA - C2 Monitor Imports On Archeological Sites (at WSNM)

2.2 Statement of Issue Or Problem

Modern activities threaten sites, both in the dunes and in the bajada community, in the western area of the monument. Illegal entry from the military boundary surrounding the monument frequently results in "pothunting" and intentional or accidental damage by vehicles. Likewise, the impact and recovery operations of the missile range create a threat. Military alterations of natural drainage patterns have affected the erosional pattern across downslope lands containing the Lake Lucero Site. Protection of these sites must be improved, and an inventory and sampling program completed, to avoid the loss of the unique opportunity to reconstruct the environmental and chronological prehistory of the area.

2.3 Alternative Actions and Probable Impact

1. Increase patrols and signing to upgrade protection of the area.

Since the "off-limits" signs along the southern and western boundaries are ineffective, antiquities signs should be placed along the boundary in appropriate places, and every effort should be made to take punitive actions against violaters. Increased patrols will be needed within energy restraints. Continue to initiate cooperative relations with the White Sands Missile Range and Holloman Air Force Base to point out the problem and gain their support. Map and document all cultural resources and continue to accompany all recovery operations, and discourage impacts in the cultural resource areas.

2. Program the Continuation of the Oryx Fence.

The fencing project proposed in WHSA-16, Exotic Oryx Control, will greatly reduce the potential for damage due to illegal entry along the monument border. The impact from both human and oryx trespass will be minimized.

3. No Action

Adverse impact and deterioration of the resource will continue in correlation to military and oryx use of the area.

2.4 Recommended Course of Action

A combination of both Alternatives #1 and #2 should be incorporated as soon as funding and manpower allows.

3.1 WHSA - C3 Hearth Sampling

3.2 Statement of Issue Or Problem

Hearth and other sites, although relatively stable, deteriorate through weathering when disturbed by human activity. This means loss of the site integrity and the stratographic record. With each passing year, the weather and human activity take away a record that cannot be reconstructed.

3.3 Alternative Actions

1. Inventory and excavate all hearth sites.

The size and complexity of this would be entirely dependent on the number of the hearth sites located by WHSA - C2. The obligation of funding and manpower to fulfill this could be excessive at this time of extreme budgeting limitations.

2. Conduct Stratified Inventory and Excavation of Hearth Sites.

This should be done so as to ascertain a basis for the numbers and contents of each, retaining a number of sites for future investigation, using new methods and a higher state of technology.

3. No Action

This Alternative would provide no information, and would condone continued degradation and loss of this resource.

3.4 Recommended Course of Action

The stratified survey and discretionary excavation of the hearth sites, including chronological and paleo-environmental data collection, will achieve the most beneficial results, in correlation to funding availability. From a strictly ideal archeological perspective, the inventory of cultural resources and related studies would be most effective in the following order of priorities:

1. New aerial photography, using scale of 1:1000.
2. Preparation of orthophotographic base maps.
3. Remote sensing interpretation.
4. Chronological and paleo-environmental studies.
5. Inventory survey of high priority areas - those with high site density and/or remote from modern activity.
6. Completion of inventory.

4.1 WHSA - C4 Historic Building Repair

4.2 Statement of Issue or Problem

The present buildings are constructed of adobe, covered with stucco, and are a continuous maintenance problem. The difference in contraction rates between adobe and stucco, the vibrations from low-flying aircraft, and the soil-water table level (a bowl of jelly effect) combine to create a continued cracking of the stucco.

4.3 Alternative Actions and Probable Impact

1. Replace all stucco, as cracking occurs. The funding required for this would be excessive, since it would be required every few years - ranging from one to four years interval for each building - and costing $10,000 to $40,000 per building.

2. Repair, seal, and replace stucco as needed. The fine cracks which develop should be sealed with a protective coating (such as trico-plex or other developed coating) to exclude surface water, allow breathing, and maintain aesthetics. Large cracks would be sealed prior to covering.

3. No Action

This is unacceptable.

4.4 Recommended Action

Repair, seal, and replace stucco as needed, with a cover coat applied. The use of a covering material (tri-plex or other) has been used since the buildings were constructed. The covering may not be historic, but, then, neither is the replacement stucco. The use of a covering material is also an efficient use of Federal funds, and does not waste or abuse the use of the taxpayers' money. Total replacement of stucco can be accomplished as necessary.

III. RESOURCES PROGRAMMING SHEET

Park: White Sands National Monument
Region: Southwest
State: New Mexico
Date: February 1985

Natural Resources

Cultural Resources

RMP Reference Number	Project & Activity Title	Pkg. #	Action Type*	Priority	FY 1985 Funded		Next FY 1986 Budgeted		Next FY 1986 Additional Required		Next FY 1987 Planned		Next FY 1987 Additional Required		Next FY 1988 Planned		Next FY 1988 Additional Required		Next FY 1989 Planned		Next FY 1989 Additional Required	
					WY	$1000	WY	$1000	WY	$1000	WY	$1000	WY	$1000	WY	$1000	WY	$1000	WY	$1000	WY	$1000
WHSA-N16	Control of Exotic Fauna	123	A	1	.1	255			.2	500				400			.2	400				
WHSA-N3	Water Resources Analysis			2																		
N3-1	Geohydrological Inves.	136	C	2-1		0	.05	30														
N3-2	Monitor Ground Water Levels	145	B	2-2	.1	2	.1	6														
N3-4	Quant. of Water Rights	SWR 178	C	2-4	0	2	0	2														
WHSA-N10	Protection of Cacti and Habitat	124	C	3	0	4																
WHSA-N18	Backcountry Impaction		B	4	.1	1.5	.1	1.5			.1	1.5			.1	1.5			.1	1.5		
WHSA-N12	Bat Control		B	5	.05	.1	.05	1														
WHSA-N8	Control of Exotic Plants	SWR 144	A	6	.05	9				5				5								
WHSA-N20	Special Use Permit Monitoring		B	7	.3	4.5	.3	4.5			.3	4.5			.3	4.5			.3	4.5		
WHSA-N15	Noise Pollution		B	8	.01	.15	.01	.15			.01	.15			.01	.15			.01	.15		
WHSA-N17	Air Quality Monitoring		B	9	.02	.3	.02	.3			.02	.3			.02	.3			.02	.3		
WHSA-N19	Cochineal Scale Monitoring		B	10	.02	.3	.02	.3			.02	.3			.02	.3			.02	.3		
WHSA-N9	Nevada Buckmoth Monitoring		B	11	.02	.3	.02	.3			.02	.3			.02	.3			.02	.3		

III. RESOURCES PROGRAMMING SHEET

Park: White Sands National Monument
Region: Southwest
State: New Mexico
Date: February 1985

Natural Resources

Cultural Resources

RMP Reference Number	Project & Activity Title	Pkg. #	Action Type *	Priority	FY 1985 Funded		Next FY 1986 Budgeted		Next FY 1986 Additional Required		Next FY 1987 Planned		Next FY 1987 Additional Required		Next FY 1988 Planned		Next FY 1988 Additional Required		Next FY 1989 Planned		Next FY 1989 Additional Required	
					WY	$1000	WY	$1000	WY	$1000	WY	$1000	WY	$1000	WY	$1000	WY	$1000	WY	$1000	WY	$1000
WHSA-C1	Archaeological Survey	117	A	1		0		0				25		60				30				30
C- 2	Monitor Archeological Impacts		B	2				0														
C-3	Hearth Sampling		C	3		0		0														
C-4	History Blg. Repair		H	4																		

A - Management Action
B - Monitoring
C - Research

IV. ENVIRONMENTAL ASSESSMENT MATRICES

The following is a summary of the environmental impact narrative evaluations which are found in the individual project statements. With the exception of projects N16, N18, N19 and N9 only the recommended action components have been evaluated. Project N16, Control of Exotic Fauna is the resource management concern of highest priority; N18, Bat Control, has been significantly redefined; N19 is a new project; and N9 is reinstated as a resource management concern after being omitted in the 1981 RMP.

No impact category (soils, wildlife, etc.) appears to be significantly affected by the cumulative impact of all proposed actions.

For the purpose of revision of the 1981 Resource Management Plan, no public comment was solicited. In 1981, the following persons and agencies were consulted in the preparation of this plan:

Lt. Robert Andreoli, Environmental Health, Holloman Air Force Base

Mr. Peter Eidenbach, Human Systems Research

Mr. Narciso Garcia, FE, White Sands Missile Range

Dr. William Reid, University of Texas at El Paso

ENVIRONMENTAL ASSESSMENT MATRIX

PROJECT STATEMENT TITLE: Control of Exotic Fauna(WHSA - N16)

EED FOR THE PROPOSAL: Exotic African Gemsbok, Oryx Gazella, transplanted onto White Sands Missile Range by the New Mexico Game and Fish Department have moved into the Monument and established home range. Their number is increasing and they are consuming resources to the detriment of other native species such as Mule Deer and Pronghorns.

Alternative Actions / Impact Catagories	Proposed Action Fence Western and Southern boundary. Herd Oryx out by helicopter.	No Action	Alternative 1 Document sightings only.	Alternative 2 Allow public hunting.	Alternative 3 Have NPS destroy Exotics	Alternative 4 Have State remove and relocate Oryx.
Soils	Temporary disturbance where vehicles travel to install fence and maintain it later.	Continued formation of "trails" marking Oryx routes.	Same as No Action.			
Wildlife	Fence must be of a type to allow natives to pass through. More resources will then be available for them.	Less resource available as they are used by Exotic.				
Plant Communities	Temporary disturbance of individuals along fence line.	Disturbed and eaten as Exotics continue to expand their range.				
Noise Levels	Helicopter work will cause noise that may frighten other wildlife during herding.					
Air Quality	Temporary disturbance of surface dust and sand during heli-					

ENVIRONMENTAL ASSESSMENT MATRIX

PROJECT STATEMENT TITLE: Control of Exotic Fauna(WHSA -N16) cont.

NEED FOR THE PROPOSAL:

Alternative Actions / Impact Catagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
				Allow public hunting	Have NPS destro exotics	Have State remove and relocate Oryx
Social-Economic				Violation of NPS Policies	Negative public reaction	Large expense and probable PR problems.

ENVIRONMENTAL ASSESSMENT MATRIX

PROJECT STATEMENT TITLE: Water Resources Analysis (WHSA - N3)

NEED FOR THE PROPOSAL: Military operations on neighboring White Sands Missile Range and Holloman Air Force Base threaten to pollute monument water resources. Also, pumping of ground water for experimental waste and energy developments in local communities is being considered.

Alternative Actions / Impact Catagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Research to Analyze and Monitor water resources.					
Water Quality	No affect other than a few drill holes to monitor flow levels.					
Soils	Possible disturbance if drilling rig must be moved to areas not accessable by roadways.					

ENVIRONMENTAL ASSESSMENT MATRIX

PROJECT STATEMENT TITLE: Protection of Cacti and Habitat(WHSA -N10)

NEED FOR THE PROPOSAL: Cacti are frequently removed illegally. Some varieties of threatened cacti and several species exhibiting range extentions are included in those taken.

Alternative Actions / Impact Catagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Monitor Plants and protecting Habitat					
Visitor Use	During flowering periods some visitors may be contacted when observed in habitat areas. Some curtailment of use in study area may occur.					

ENVIRONMENTAL ASSESSMENT MATRIX

ROJECT STATEMENT TITLE: Backcountry Impaction(WHSA -N12)

EED FOR THE PROPOSAL: Illegal entry and backcountry travel cause damage to environment

Alternative Actions / Impact atagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Continue current action to inform public and work with Military neighbors					
Visitor Use	No appropriate use will be affected since the "roads" at issue are closed anyway. Missile Recovery will be almost exclusively by helicopter which causes temporary noise and blowing dust. The fence if constructed, will have the effects mentioned in Project WHSA-N16.					

ENVIRONMENTAL ASSESSMENT MATRIX

ROJECT STATEMENT TITLE: Bat Control (WHSA - N18)

EED FOR THE PROPOSAL: Bats are a nuisance around buildings where they hang during the evenings creating a health hazard and creating maintenance problems.

Alternative Actions / mpact atagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Initiate research and continue to tempt them to roost in other areas.		Destroy the bats	Research to determine how to get them to leave with sound		
Wildlife			Obviously will affect the bats but may also cause increase in insects around Visitor Center and residences	If bats leave, insects may increase		
Employee Health		Continued exposure to possible rabies and Bubonic Plague	More insect related problems	More insect related problems		
Maintenance	Cost of construction of new home for bats	Continued clean-up of bat guano-lost time and funds.				

ENVIRONMENTAL ASSESSMENT MATRIX

ROJECT STATEMENT TITLE: Control of Exotic Plants (WHSA - N8)

EED FOR THE PROPOSAL: Salt Cedar(Tamarisk) is establishing itself within the Monument. It is spreading into even the most remote sections of the park.

Alternative Actions / Impact Catagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Physical removal of small stands and monitor.					
Plant Communities	More water will be available for native vegetation					
Soils	Some temporary disturbance of soil around area of removal					
Wildlife Habitat	"Artificial" habitat will be lost to minor degree. The number of plants that can be removed physically is so small that very little affect is likely to occur. This amount more to a "wait and see" policy					

ENVIRONMENTAL ASSESSMENT MATRIX

PROJECT STATEMENT TITLE: Special Use Permit Monitoring (WHSA - N20)

NEED FOR THE PROPOSAL: Numerous requests for commercial filming, photography, civic organizational events and special use groups are received. Many are for use either before or after normal hours of operation, all require at least occasional monitoring to insure compliance with permit or NPS regulations.

Alternative Actions / Impact Catagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Monitor groups as needed	No Monitoring	Don't permit activity			
Soils	Minimal disturbances	Occasional disruption of park activities degredation of park resources and public safety hazards	No disturbance — complete protection.			
Wildlife	Minimal disturbances	Same as soils	Same as soils			
Plants	Minimal disturbances	Same as soils	Same as soils			
Visitor Use	Permitted use contrary to NPS regulations need explaining	Loss of control of public use	Numerous complaints, public and other agency pressure			
Management	Exempt employees away from regular duties or area must bear overtime expense. Same for non-exempt and also must contribute time occasionally.	Employee performs normal duties and tours.	Same as no action.			

ENVIRONMENTAL ASSESSMENT MATRIX

ROJECT STATEMENT TITLE: Noise Pollution (WHSA - N15)

EED FOR THE PROPOSAL: Nearby Air Base results in continued low altitude fly overs of Monument.

Alternative Actions / Impact atagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Seek cooperative with Holloman Air Force Base and WSMR to minimize					
	No adverse affects					

ENVIRONMENTAL ASSESSMENT MATRIX

ROJECT STATEMENT TITLE: Air Quality Monitoring Project (WHSA - N17)

EED FOR THE PROPOSAL: To protect area air quality in accordance with Clean Air Act, ammended 1979

Alternative Actions / mpact atagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Establish baseline data through monitoring					
Air Quality	Prevent future degregation and loss of visual resources	Would leave NPS with no means of establishing loss in air quality related values -violate Clean Air Act.				

ENVIRONMENTAL ASSESSMENT MATRIX

PROJECT STATEMENT TITLE: Archaeological Survey (WHSA -C1)

NEED FOR THE PROPOSAL: A survey of Cultural Resources as required by E011593 has not been completed

Alternative Actions / Impact Catagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Complete the survey using remote sensing and sampling.					
	This project has already been approved and determined to have no significant input in the 1974 RMP for White Sands National Monument.					

ENVIRONMENTAL ASSESSMENT MATRIX

PROJECT STATEMENT TITLE: Nevada Buckmoth Monitoring (WHSA - N9)

NEED FOR THE PROPOSAL: Some years, the Nevada Buckmoth severely defoliates the native cottonwoods which are important to the wildlife of the area.

Alternative Actions / Impact Catagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Continue to monitor buckmoth effect on cotton-woods		Widespread use of insecticide			
Plantlife	Keep abreast of problem; take appropriate action if necessary		Introduction of new agents into the ecosystem. Use of chemical pesticides is against NPS policy			
Wildlife		Severe defoliation may have negative effect on animals that use cotton-woods for food and shelter.	Introduce agents to ecosystem			

ENVIRONMENTAL ASSESSMENT MATRIX

PROJECT STATEMENT TITLE: Cochineal Scale Infestation Monitoring (WHSA - N19)

NEED FOR THE PROPOSAL: Sensitive cacti populations are hosts for scale infestation resulting in loss of some plants

Alternative Actions / Impact Catagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Monitor cochineal scale infestation and effect on cacti populations		Widespread use of insecticide.			
Plants and Wildlife	Keep park personnel abreast of effect of scale infestation; take appropriate action if necessary.	Could permanently harm sensitive cacti populations	Will introduce chemicals to environment. Contrary to NPS policy.			

ENVIRONMENTAL ASSESSMENT MATRIX

PROJECT STATEMENT TITLE: Nevada Buckmoth Monitoring (WHSA - N9)

NEED FOR THE PROPOSAL: Some years, the Nevada Buckmoth severely defoliates the native cottonwoods which are important to the wildlife of the area.

Alternative Actions / Impact Catagories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Continue to monitor buckmoth effect on cotton-woods		Widespread use of insecticide			
Plantlife	Keep abreast of problem; take appropriate action if necessary		Introduction of new agents into the ecosystem. Use of chemical pesticides is against NPS policy			
Wildlife		Severe defoliation may have negative effect on animals that use cotton-woods for food and shelter.	Introduce agents to ecosystem			

ENVIRONMENTAL ASSESSMENT MATRIX

JECT STATEMENT TITLE: Cochineal Scale Infestation Monitoring (WHSA - N19)

D FOR THE PROPOSAL: Sensitive cacti populations are hosts for scale infestation resulting in loss of some plants

Alternative Actions / act agories	Proposed Action	No Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Monitor cochineal scale infestation and effect on cacti populations		Widespread use of insecticide.			
ants and ldlife	Keep park personnel abreast of effect of scale infestation; take appropriate action if necessary.	Could permanently harm sensitive cacti populations	Will introduce chemicals to environment. Contrary to NPS policy.			

A. OVERVIEW - ENVIRONMENTAL IMPACTS

The following is a review of all actions proposed within the White Sands National Monument Resources Management Plan and outlined in the four categories described in this plan.

I. THOSE ACTIONS WHOSE IMPLEMENTATION WILL HAVE A SIGNIFICANT AND MEASURABLE EFFECT ON THE ENVIRONMENT OR ARE HIGHLY CONTROVERSIAL.

All natural and cultural resource projects were considered on their own merits. Project N-16, control of exotic fauna by building a fence is the only project which will have a significant and measurable effect on the environment. All actions fall into Categories II, III and IV. Some actions fall into a combination of these categories.

II. THOSE ACTIONS WHICH WILL CONTINUE EXISTING MAINTENANCE OR MANAGEMENT ACTIONS (CONTINUE MAINTENANCE).

Projects N-3, N-8, N-10, N-12, and N-18 fall into this category. All but N-3 are on-going and include continued activities by the Park Staff and are of management or maintenance in character.

III. THOSE ACTIONS WHICH WILL INITIATE NEW MAINTENANCE OR MANAGEMENT ACTIONS (NEW MAINTENANCE).

Project N-16, control of exotic fauna by building a fence is the only project in this category.

IV. THOSE ACTIONS WHICH WILL ENTAIL RESEARCH

Projects N-3, N-8, N-9, N-10, N-12, N-16, N-17, N-18, N-19, and N-20 fall into this category. These projects all include investigations into various phases of the area's systems and may, when completed, result in further and different management determinations. These could then require an Environmental Assessment in the future when the Resources Management Plan is reviewed or up-dated.

DETERMINATION: With the Exception of Project N-3, all projects and actions proposed in the White Sands National Monument Resources Management Plan and outlined above are research or maintenance in character and do not significantly affect the environment or cause controversy. Therefore, in accordance with the following paragraph from "Environmental Assessment and Statements Guidelines", (NPS -12, December 22, 1976, Chapters 3, Pages 3 and 4).

....."Routine maintenance and operation of Parks, small changes in programs for managing resources and providing for visitor use and similar continously occurring minor actions.....must be taken in ways to insure protection and enhancement of environmental quality, but a written documentation of their environmental impacts is not required."

Due to its significant impact on the environment, Project N-3, control of exotic fauna by building a fence will require at least a Biological Assessment and a Cultural Assessment to be done by the Southwest Regional Office UMR and PCA.

B. REVIEW, DATES AND CHANGES

The Resources Management Plan will be reviewed annually by the Superintendent and the Regional Resources Management Plan Coordinator. Necessary changes will be incorporated with the plan upon approval of the Superintendent and the Regional Director.

The Resources Management Plan will be revised and fully updated at intervals of not less than five years.

Resources Management Plan Coordinator — Date 1 DEC 1986

Recommended by: _____ 12/2/86

Acting Chief, Natural Resources, Southwest Region — Date

Recommended by: _____

Chief, Southwest Cultural Resources Center — Date

Concurred by: _____ 12/22/86

Associate Regional Director, Park Operations — Date

Approved by: _____ 12/23/86

Regional Director, Southwest Region — Date

V. APPENDICES

Appendix material consisting of establishing documents, copies of Memorandum of Understanding with the Department of Defense, a listing of completed research, the bibliography of publications, the listing of collections and locations and the check lists for flora and fauna are available in Southwest Regional Office and White Sands National Monument.

APPENDIX A

Water Resources Management Profile

for

White Sands National Monument

Recommended by: _____ 12-15-86
Superintendent, White Sands National Monument — Date

Approved by: _____ 12/23/86
Regional Director, Southwest Region — Date

I. Authorization:

White Sands National Monument was established by Presidential Proclamation No. 2025 of January 18, 1933 (47 Stat. 255) to preserve, for the benefit and enjoyment of the American people, the most impressive portion of the world's largest gypsum desert.

The purpose of the monument is further delineated in the National Park Service Organic Act of 1916, as: ".....to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

II. Physical Description of the Water Resource

A. Watershed: The monument is located within the Tularosa Basin, a closed basin within the Rio Grande drainage system (Region 13, ASA 02). All groundwaters are within the Basin and Range Physiographic Province of Intermontane Plateaus.

B. Climate: [1] White Sands National Monument's climate is characterized as arid. The average annual precipitation is 7.76 inches (1939 - 1979). More than 50% of the annual precipitation occurs during the months of July to September inclusive.

Yearly average temperature is 59.7°F (1944 - 1979) with the maximum average monthly temperature occurring in July (80.6°), and the minimum average monthly temperature occurring in December (39.6° F).

Lake evaporation is about 75 inches per year.[2]

C. Geology: Tularosa Basin is a structural trough formed by the downfaulting of a large central block of a north-south trending anticline (covering 6,500 square miles). Tularosa Valley is bounded on the east by the Hueco and Sacramento Mountains and on the west by the San Andres, Franklin, and Organ Mountains, on the north by a broad, high topographic divide, and on the south by a narrow divide which separates it from the Hueco Bolson sediments in Texas. Surface elevation ranges from 3,900 feet to over 12,000 feet in the mountains.

The central portion of the Basin is underlain by unconsolidated bolson sediments of Quarternary age. These sediments were deposited in Ancient Lake Otero with alluvial sediments at the base of the mountains.

The lacustrine sediments within the basin consist mainly of silt and clay with large amounts of secondary gypsum. Groundwater is high in total dissolved solids due to the present of gypsum (140°/00).[3]

D. Water: Surface water is limited to mountain runoff within the Tularosa Basin. Perennial flows do occur in small streams on the west flanks of the Sacramento Mountains near Sierra Blanca. At this time none of these waters reach the monument with the exception of waters in the Lost River Arroyo. ~~Holloman Air Force Base has constructed a 3-foot dike across the arroyo near the property line separating Air Force and monument properties which effectively prevents flow in the arroyo from reaching the monument.~~

Garton Lake at the monument is about two surface acres in area, fed by the flow from Garton Well. See Section IV 2, for further discussion.

Groundwater aquifers within the Basin are in the bolson sediments and in the bedrock. The bolson deposits are unconsolidated to poorly consolidated in the alluvial deposits. In the central portion of the basin the water is extremely mineralized. Water of reasonably good quality (TDS 1000 mg/l), is found near the sides of the basin in sections of thick coarse grained sediments. Recharge to groundwater regime is from precipitation runoff from the adjacent mountains.

Shallow groundwater table within the monument is responsible for the establishment of vegetation which in turn stabilizes the gypsum sands dunes (the prime resource of the monument).

E. Soils:[4] Soils are light in color and are primarily clay or shale. Caliche (secondary carbonate deposits) is frequently found in the soils. The major soil associations defined by the U. S. Soil Conservation Service are Pintura-Hueco-Wink, Yesum-Holloman, Peak or Russler, Pintura-Dona Ana-Berino, and at the monument, Gypsum.

F. Floodplain Identification and Management: None

III. Management of Water Resources and Legal Aspects:

A. Prior to 1952, White Sands National Monument had a poor quality well which provided water for sanitary purposes until it ultimately ran dry. Drinking water was imported from Alamogordo.

In 1952 the National Park Service constructed a seven mile water line extending from the monument to Holloman Air Force Base. Contract No. AF-29 (001)581 was entered into between the National Park Service and Air Force, for the Air Force to sell water to the monument, Alamogordo City water was being transported to Holloman Air Force Base. In 1972, the National Park Service changed its point of diversion from Alamogordo water line to an Air Force water line which had been constructed between 1951 and 1972.

In 1975 the monument consumed 3.6 million gallons. Future demand, based primarily on visitation increases, is estimated to be 4.3 and 5.5 million gallons by the years 1985 and 2000 respectively.[5]

B. Water Quality: White Sand's water source has a chemical quality which is within the recommended limits of the 1962 Public Health Service Drinking Water Standards as adopted by EPA. Chemical analyses are made every three years by a state-approved laboratory. Water samples are collected twice a month by the park staff for bacteriological analysis by a state-approved laboratory.

To minimize the threat of groundwater pollution, existing sewage lagoons were lined in 1981. It is estimated that approximately 2.7 million gallons of sewage is processed through the lagoons. Sewage loading is expected to increase to 3.2 and 4.2 million gallons by the years 1985 and 2000 respectively.

C. Water Rights: All claims to surface and groundwaters by the National Park Service is made in accordance with Federal reserved water rights policy or in accordance with the appropriate water rights statutes of the State of New Mexico.

Water claims under the Federal reserved water rights policy is applicable for about 95% of the monument. Lands records where the National Park Service may claim rights to water under the Federal reserved water rights doctrine are on file in the Water Resources Section of the Southwest Regional Office.

State Surface Waters:[6]

The National Park Service currently holds title to 440 acres at a detached area known as the Dog Canyon Tract. The acquisition (by declaration of taking and condemnation), of this tract of land was made in 1940, at which time the United States also obtained the following water rights:

1. License No. 1193 for a maximum of 2,640 acre feet per year of flood waters of Dog Canyon Arroyo. Maximum rate of diversion is 100 cfs. The water is to be used for irrigation purposes. Priority date claimed - June 11, 1919.

2. License No. 386, which granted an appropriation of 3.20 cfs of water from Dog Canyon (flood waters from July 1 - September 1) for the irrigation of 20 acres of land in Section 8 and 17 of Township 18 South, Range 10 East, NMPM, Priority date - February 10, 1910.

To date, the National Park Service has not made use of any water from Dog Canyon Tract; however, the National Park Service has issued a

Special Use Permit to the Air Force for groundwater exploration. At this time the Air Force has drilled one test well on the tract without success.

In addition, the U. S. owns Garton Lake, an artificial lake which is being maintained by an uncontrolled artesian flowing well. State water laws apply on any water use from this well.

State Groundwater - The monument is located within an undeclared underground water basin. No filing or declaration as owner of a water right is necessary under State law.

IV. Water Resources Problem Identification:

1. The following problem has been identified and recorded in the 1982 revision of the Resource Management Plan for the monument:

WHSA-N-3 Water Resources Analysis Project - refer to page 14 RMP.

2. The second problem concerns Garton Lake Well. Garton Lake was formed in 1916 when an exploratory oil well struck an artesian formation containing warm, highly mineralized water. The well was not capped, but allowed to flow at the rate of about 1100 gpm. At some point, a clay dike was constructed to contain the water, and the area became an anomalus oasis in the gypsum sands of the monument, giving rise to a marsh and water-dependent wildlife habitat. In 1972 it was declared a National Environmental Study Area (NESA) featuring aquatic ecology.

The uncontrolled artesian flow from the well has been decreasing over the past 70 years. This may be due to (1) the continuous flow having decreased the pressure in the artesian aquifer system (Sprester, 1980); (2) fracturing of the formation with explosives used to clear any obstruction within the well; (3) by the well "plugging itself"; or by some combination of the above. Chances are remote that regional overpumping is causing the reduction in flow: due to the heat and high mineral content of the water, the aquifer would not be tapped directly for a municipal supply and although the aquifers in the Tularosa Basin are somewhat interconnected. The depth and location of the Garton Well (greater than 500 feet) puts it well out of the area of greatest competition (personal communication, Francis West, Chief Hydrologist, Office of the Engineer of the State of New Mexico, 8/23/82).

V. Recommended Strategies for Water Resources Protection

WHSA-W-1 Garton Lake Well

Four alternatives are discussed:

1. No action. If the well is allowed to continue to flow as it has been for the past 70 years, eventually flow will cease altogether. If Garton Lake's function as a NESA is viewed as important, this is an untenable alternative. It it is viewed as acceptable for the lake to dry up, terminating the NESA, then there is a question as to why the well should be allowed to flow until its inevitable cessation some years hence.

2. Cap the existing well. If the NESA is viewed as dispensable, take action to dispense with it. One argument against this approach is that a sudden shutoff may result in the death of numbers of wildlife habituated to using the site, whereas a gradual diminution may allow wildlife to adjust to the absence of the lake.

3. Reline well and reduce lake surface area (recommended in Sprester, 1980). Sprester recommended that the well be filled with bentonite, redrilled and recased so that a more consistent and substantial flow is available. The lake should be reduced in size so that portion of it will be certain to remain full. This can be done by constructing a clay dike through the present lake area. Overflow from the lake would be permitted to support a marsh as an aspect of the ecology of the NESA. This alternative is viable only if the loss of artesian flow is due to fill in or collapsing of the existing well.

4. Abandon existing well and drill a new well. Abandoning existing well is routine, drill a new well only if NPS is reasonably sure that drilling deeper will result in a flowing artesian well.

WHSA-W-2 Monitor Ground Water Levels

Recommend. Plans to construct desalination plants in order to supply over one million acre feet per year of water for agricultural purposes. Is expected to lower brackish groundwater levels within the monument. It is recommended that an estimated 10 shallow observation wells equipped with water level recorders be installed to monitor the diurnal fluctuation of groundwater levels for at least three to five years to serve as baseline data. Information is needed to pursuade potential developers of the groundwater to other viable alternatives which will minimize or reduce their potential effect on existing groundwaters within the monument.

VI. References Cited:

1. Climatological Data - New Mexico Annual Summary, 1979, NOAA Weather Bureau, U. S. Department of Commerce.

2. Map 8, (Gross Annual Lake Evaporation), New Mexico Water Resources, Assessment for Planning Purposes, Data developed by the SCS River Basin staff in cooperation with New Mexico State Engineer.

3. Hydrologic Control over the Origin of Gypsum at Lake Lucero, White Sands National Monument, New Mexico by Roger J. Allmendinger, April 22, 1971.

4. Hydrologic Evaluation of Garton Lake, White Sands National Monument, New Mexico - Forrest R. Sprester P.E., Captain USAFR, BSC. USAF Hospital, Environmental Health Service, Holloman AFB, New Mexico.

5. 1975 Assessment of Water and Land Resources, Southwest Region, National Park Service.

6. Water Rights Docket #1. Dog Canyon Water Rights, Southwest Region, National Park Service.

DETERMINATION

It is determined that none of the actions outlined above significantly affect the natural environment nor cause controversy.

NO ENVIRONMENTAL ASSESSMENT WILL BE PREPARED.

Recommended by: N/A
Hydraulic Engineer, Southwest Region — DATE

Concurred by: [signature] 12-15-86
Superintendent, White Sands National Monument — DATE

Concurred by: [signature] 12/23/86
Associate Regional Director, Park Operations — DATE

Approved by: [signature]
Regional Director, Southwest Region — DATE

APPENDIX - B Information Baseline

BASIC THEMATIC MAP FILE

Regional Features
Population Centers
Political Subdivisions
Land Use
Outdoor Recreation Facilities
Transportation, Communication, Utilities
Overnight Accomodations
Land Ownership

PARK SPECIFIC MAP FILE

Topography. Topographic features of White Sands National Monument and the surrounding area are mapped on U.S.G.S. map No. N3230 - W10600/30, N. Mex. Point of Sands, scale 1/125000, dated 1946. In addition, the topography may be discerned from the map entitled "White Sands Missile, New Mexico, Master Plan Basic Information Maps, White Sands National Monument", scale 1" - 4000ft., Jan. 1964. These maps are available at Park Headquarters. Topographic maps of the actual dune area are unavailable because of the nature of the actively shifting dunes.

Geology. The geologic significance of White Sands National Monument lies in the ever-shifting gypsum sand dunes and in Lake Lucero as a source of gypsum. Maps and diagrams dealing with the giology of the White Sands may be found in the U.S.G.S. Water-Supply Paper 343, "Geology and Water Resources of Tularosa Basin, New Mexico", by O.E. Meinzer and R.F. Hare, 1915, and "Hydrologic Control over the Origin of Gypsum at Lake Lucero", by R.J. Allmendinger, M.S. Thesis, New Mexico Institute of Mining and Technology, 1971. Copies of these reports are available in the park library.

Land Use and Ownership. Land Status and Boundary Maps, which denote status of lands within the boundaries of the park, are on file at Park Headquarters. Updated recent land status and boundary changes are available at the Division of Land Acquisition, National Park Service, Santa Fe, N.M. The most recent Land Status Map is dated March 1979.

Soils. A general soil map of White Sands National Monument is included in "Soil Survey of White Sands Missile Range, New Mexico". This map provides soil information to the association level and was compiled by the U.S. Soil Department of Army and the New Mexico Agricultural Experiment Station, 1976. This report is available in the park library.

Hydrology. Hydrological features within White Sands National Monument and adjacent areas may be discerned from White Sands Ouadrangle - 102 in " Quadrangle Maps of the State of New Mexico", prepared by the New Mexico State Highway Department Planning Division in cooperation with U.S. Department of Commerce, Bureau of Public Roads, 1960. These features are also found in "White Sands National Monument", scale 1" - 4000 ft., Jan. 1964. Both of the maps are available at Park Headquarters.

Vegetation. Vegetation maps illustrating plant disturbances, associations, and succession are found in the VEGETATIVE COVER portion of "White Sands National Monument, Natural Resources Inventory and Analysis, Final Report" compiled by the University of Texas at El Paso (UTEP), Biological Sciences, Laboratory for Environmental Biology, 1979. In Appendix 6.2 of the UTEP report are plant species distribution maps.

Wildlife. There are no overall wildlife maps of White Sands National Monument. Distribution and range maps for individual species have been prepared by various investigators. Appendix 6.3 of "White Sands National Monument, Natural Resources Inventory and Analysis", Contract CX702980023, 1979, includes Mammal Species Distribution Maps. This report and other pertinent ones are available in the park library.

Cultural. Maps showing archaeological site locations are included in the following reports: "Evaluation of the Archaeological and Related Resources of the Dog Canyon Detached Portion of White Sands National Monument", Contract No. CX700030220, Sept. 1973; " Evaluation of the Archaeological Potential of White Sands National Monument", Contract No. CX700030220, Dec. 1973; "Archaeologic Reconnaissance in White Sands National Monument", Contract No. CX702970060, 1980. All of the above were prepared by Human Systems Research, Inc. and are available in the park library and at the Southwest Regional Office, National Park Service, Santa Fe, N.M.

Recreation, Development and Support Facilities. Maps of these facilities are included in the Master Plan for White Sands National Monument. The Master Plan, though, is outdated and in need of revision.

NARRATIVE FILE

Climate. Daily temperatures, maximum and minimum, as well as daily precipitation are recorded at White Sands National Monument. This information is compiled monthly in "Climatological Data", prepared by the National Oceanic and Atmospheric Administration and the National Climate Center, Asheville, N.C. These monthly reports are on file in the park library. Climate summary sheets are available at Park Headquarters, and are given and mailed to interested persons on request.

Geology. Narrative treatment of the geology of the White Sands is presented in the booklet "Lake Lucero" by Pete Hendrickson, 1976. This booklet is sold at Park Headquarters. The works of Dr. Edwin McKee best present the processes involved in dune movement, notable among his papers is "Structures of Dunes at White Sands National Monument", 1966. Several other reports on the geology of the area are available in the park library.

Land Use and Ownership. The use and ownership of land within White Sands National Monument is documented in the monument's Master Plan. The Master Plan, though, is in need of revision.

Soils. The best treatment on the soils of White Sands National Monument is provided in "White Sands National Monument, Natural Resources Inventory and Analysis", prepared by the Laboratory for Environmental Biology at UTEP, 1979. This exhaustive report is available in the park library and at the Southwest Regional Office, National Park Service, Santa Fe, N.M.

Hydrology. The hydrological factors within White Sands National Monument are presented in "Hydrologic Control ocer the Origin of Gypsum at Lake Lucero", R.J. Allmendinger, 1971. and in "Hydrologic Evaluation of Garton Lake", F. Sprester, 1980. These reports are available in the park library.

Vegetation. Numerous theses', papers, reports discussing the vegetation of White Sands area are available in the park library. Notable among them are: "Flora of White Sands National Monument", E.R. Schaffner, 1948; the many works on plant physiology by Lora M. Shields; and the above mentioned report by the UTEP Laboratory for Environmental Biology.

Wildlife. As with the vegetation of the White Sands, there are numerous scientific papers discussing the wildlife. While the majority of papers relate to individual species, some are general. All are available in the park library. Among the "general" category are: "Annotated List of Mammals of the Tularosa Basin, New Mexico", W.F. Blair, 1941; "Notes on Animal Occurrance and Activity in the White Sands" R.E. Bugbee, 1942; and the above mentioned UTEP natural resources inventory report. In addition, a wildlife observation card file is maintained by the monument staff.

Cultural Values. The archaeological and historical resources of White Sands National Monument are detailed in the Human Systems Research, Inc. reports listed in the Cultural section of the Park Specific Map File. In addition, the disturbance history, relevant historical factors and historic sites are documented in "White Sands National Monument, Natural Resources Inventory and Analysis", UTEP Laboratory for Environmental Biology.