FINAL
San Andres National Wildlife Refuge
Comprehensive Conservation Plan

Las Cruces, New Mexico

Prepared For:

United States Fish and Wildlife Service
Region 2
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Albuquerque, New Mexico 87103

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COMPREHENSIVE CONSERVATION PLAN APPROVAL
for the
San Andres NWR, Las Cruces, NM
1998

The attached Comprehensive Conservation Plan for the San Andres NWR was prepared for the Service by Research Management Consultants, Inc. (RMCI), Golden, Colorado, under the supervision of Regional and Refuge staff. Maps have been developed by and in cooperation with the U.S. Department of the Army, White Sands Missile Range. The contents and format are found to be in compliance with Service policy on the preparation of Comprehensive Conservation Plans, and is hereby submitted for approval.

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VISION

The San Andres National Wildlife Refuge (SANWR), is located in the southern third of the San Andres Mountains in south central New Mexico, and lies within the northern most extension of the Chihuahuan Desert. This mountain range is one of the largest contiguous, relatively undisturbed Chihuahuan Desert land masses in the United States. The precipitous east escarpment of the range rises above the basin floor about 5,000 feet to an elevation of 8,900 feet above sea level. The land has virtually reverted to its pre-grazing vegetation stands due to the absence of grazing by domestic stock since 1952.

Since the Refuge's establishment in 1941, primary emphasis in resource management has been focused on restoring a remnant population of desert bighorn sheep (*Ovis canadensis mexicana*), a State-listed endangered species in New Mexico. However, desert bighorn sheep populations within the San Andres Mountains have recently decreased to near extinction due primarily to scabies mite infestation and further complicated by drought conditions, predation, and very poor reproduction. While the Refuge most likely will continue to play a role in the recovery and/or reestablishment of healthy populations of this species, the Refuge intends to continue broadening its focus to include all Refuge resources. With a better understanding of natural biodiversity, ecosystem approaches to wildlife and habitat management will continue to become a higher priority for the Refuge. Baseline inventories of various taxonomic groups of flora and fauna will continue to serve the Refuge well to improve understandings of natural regimes of succession, recruitment, and predator/prey relationships on the Refuge and surrounding lands.

Although there is no public use on the Refuge due to the jurisdictional control of the White Sands Missile Range (WSMR), the Service understands that it is especially important that the Refuge maintain contact with the general public through exhibits in high profile areas of the community (e.g., malls, banks, etc.) and educational presentations to schools, civic clubs, and other groups. The future of the Refuge may include the development and eventual construction of an interagency/international visitor center on Interstate 10 near the New Mexico State University. At times there are more than 30,000 vehicles/day that pass by Las Cruces on I-10. This type of exposure would greatly enhance the knowledge of the general public to the existence, mission, and goals of the Service, as well as the San Andres National Wildlife Refuge. The facility could also be equipped with enough office space for biologists from Mexico, who would be working on borderland projects in cooperation with U.S. biologists. Because land ownership pertaining to the Refuge is complex, the Service will have many challenges and opportunities to continue existing partnerships and establish new ones.

There is much to be learned concerning the San Andres Mountain Range and the plant and wildlife resources within it. The Refuge has been and will continue to be an important factor in the overall

effort to protect those unique resources. Because there is restricted access and the lands remain relatively undisturbed, the future will continue to provide the Refuge with opportunities to serve as a natural laboratory in support of research on southwestern flora and fauna, Chihuahuan Desert ecosystems, hydrological status, fire effects (prescribed and natural), and historical/cultural sites. These understandings will provide the Refuge and the Service with the tools necessary to make informed natural resource management decisions in support of the Refuge's purposes and the mission of the National Wildlife Refuge System.

Executive Summary

The Comprehensive Conservation Plan (CCP) for the San Andres NWR will serve as a management tool to be used by the Refuge staff and its partners in the preservation and restoration of the refuge's and the surrounding ecosystem's natural resources. In that regard, the plan will guide management decisions over the next ten to twenty years and set forth strategies for achieving Refuge goals and objectives within that time frame.

The results of the planning process are perhaps best summarized by the following major Refuge goals that are supported by a series of objectives and specific implementation strategies. Those goals include:

GOAL I: *To protect and enhance wildlife, plant and habitat resources within the San Andres Mountains Ecosystem including strategies that benefit native flora and fauna, the status of desert bighorn sheep, neotropical migratory birds and other species of concern.*

GOAL II : *To protect and preserve archeological resources and historical sites.*

GOAL III : *To increase public understanding and awareness of the San Andres National Wildlife Refuge and the San Andres Mountains Ecosystem through effective wildlife education and interpretation initiatives.*

GOAL IV: *To strengthen interagency and jurisdictional relationships in order to coordinate efforts with respect to Refuge and surrounding area issues, resulting in decisions benefitting plant, wildlife, and habitat resources on the Refuge and the San Andres Mountains Ecosystem.*

GOAL V: *To have effective staffing and funding that will result in long-lasting protection, maintenance, and enhancement to wildlife and habitat resources on the Refuge. Effective staffing and funding levels should lead to the achievement of the Refuge Purposes and the Mission of the National Wildlife Refuge System.*

In order to achieve these goals the following objectives have been established:

- Enhancing refuge baseline biological data collection;
- Establishing and protecting an augmentable scabies free desert bighorn population;
- Reducing and eliminating non-native plant and animal species:

- Implementing cost effective fire management strategies for habitat protection and enhancement;
- Continuing cultural resource inventory and monitoring efforts;
- Continuing effective educational outreach;
- Improving coordination efforts with other agencies and stakeholders; and,
- Improving use of internal budgetary reporting mechanisms to achieve effecting staffing and facilities levels.

In order to accomplish the above objectives, the San Andres NWR CCP establishes the following strategies:

- Continue herpetofauna surveys;
- Continue to mist net and band neotropical migratory birds;
- Conduct point count surveys of neotropical migratory birds;
- Conduct small mammals surveys to improve baseline data;
- Conduct annual mule deer and mountain lion surveys to determine population trends and effects on bighorn sheep habitat;
- Continue cooperative efforts with WSMR regarding Land Condition Trend Analysis program transects;
- Gather air quality data from air quality stations on the refuge;
- Participate with New Mexico Department of Game and Fish in efforts to transplant and track radio collared sentinel rams;
- Conduct and promote research on scabies mite in the San Andres Mountains;
- Determine effects of ungulate encroachment and consider establishment of special depredation hunts;
- Reduce salt cedar refuge-wide by at least 20% using various methods of extraction;
- Develop prescribe burn proposals for portions of Bennett Mountain, Black Brushy Mountain and San Andres Mountain approximately 5,000 acres);
- Monitor and evaluate effects of burning strategies;
- Engage in public outreach to foster better understandings of refuge fire management efforts;
- Conduct Global Positioning System (GPS) survey of known archeological and historic sites;
- Construct shelters for historical sites in jeopardy from natural degradation;
- Participate in cooperative effort with state and federal agencies to establish an off site visitor center that would emphasize refuge resources and those of other jurisdictions;
- Construct an information kiosk and associated interpretive information at the San Augustine Pass parking area;
- Improve interagency coordinating efforts; and,
- Secure needed staffing, funding, and facilities to assist in the implementation efforts to achieve plan goals and objectives.

1.0 INTRODUCTION: AREA OF ECOLOGICAL CONCERN AND REGIONAL SETTING

San Andres National Wildlife Refuge (SANWR) was established in 1941 by Executive Order 8646 for the "...conservation and development of natural wildlife resources". The Refuge is located approximately 30 miles northeast of Las Cruces, New Mexico, in Dona Ana County, and encompasses 57,215 acres of the southern portion of the San Andres mountain range. For purposes of this plan, the entire San Andres Mountain Range will be considered the "area of ecological concern."[1] The San Andres mountain range is about 80 miles long, forming an arc six to 12 miles wide that concaves to the east. The mountain range is bordered by the Jornada del Muerto plains to the west and the Tularosa Basin to the east.

Primary emphasis since establishment has been the restoration and management of desert bighorn sheep (Ovis canadensis mexicana), currently a state-listed endangered species in New Mexico. The Refuge in 1970 had an estimated population of 200 desert bighorn sheep. Recent population counts indicated that the sheep populations have been nearly decimated due to scabies infestation, predation, drought conditions, and poor reproduction factors. One of the overriding questions the Refuge must face in the context of this planning effort is determining the Refuge's role as suitable bighorn sheep habitat if supplementation occurs. [2]

The Refuge is surrounded by federal lands belonging to the White Sand Missile Range, (WSMR), which encompasses the Refuge in entirety; the Agricultural Research Service-Jornada Experimental Range (JER) has research rights on approximately 40% of the western half of the Refuge; and the National Aeronautical and Space Administration-White Sands Test Facility (NASA) borders the southwestern corner of the Refuge.

The Refuge serves primarily as a buffer for the WSMR, as no actual missile impacts occur within Refuge boundaries according to the current Memorandum of Agreement (MOA). During special training missions, such as the annual Roving Sands, low-level military aircraft flights do occur over the Refuge, but this has not been a widespread problem. The Refuge is not open to the public due to security restrictions established for the military defense weapons testing that is conducted on WSMR. This also affects access for Refuge staff, especially on the eastern side of the mountains.

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[1] An "Area of Ecological Concern" can be defined as: An essentially complete ecosystem (or set of interrelated ecosystems) of which one part can not be discussed without considering the remainder" [Malheur National Wildlife Refuge Master Plan and environmental Assessment, 1985, pg.7].

[2] Reintroduction of desert bighorn sheep into the Refuge would entail a cooperative effort with the New Mexico Department of Game and Fish and WSMR. The remnant bighorn sheep population at San Andres NWR is part of a state wide distribution of approximately 210 free-ranging sheep including populations in the Hatchet, Peloncillo, and Alamo Hueco Mountains. The San Andres herd is considered unique in that it represents the last indigenous herd in the state. Existing genetic analysis and other biological research is being considered as managers map out the future of this species and whether there is a place for them at San Andres. At some point, managers and biologists will have to decide whether there is enough research to move forward with population augmentation, or whether additional study is necessary.

The JER retains certain research rights over almost half of the Refuge. This land was transferred from the JER to the U.S. Fish and Wildlife Service for the establishment of the Refuge. Due to the type of terrain available and the potential for conflicts between desert bighorn sheep and domestic stock, the JER has not conducted any livestock research on the Refuge. The Refuge does not have boundary fences, which is a detriment to conducting grazing research on-Refuge and/or near its boundaries.

1.1 Refuge and Area of Ecological Concern Challenges and Opportunities

Challenges (not in order of priority)

1. Acquisition of additional staffing needed to accomplish goals;
2. Baseline research for floral and fauna species inventories;
3. Protecting and enhancing desert bighorn sheep habitat;
4. Reestablishment of viable populations of desert bighorn sheep;
5. Effective non-native species control;
6. Preservation and protection of cultural resources.
7. Increasing public awareness and understanding; and
8. Facilities maintenance;

Opportunities

- Develop an off site visitor center in cooperation with other involved agencies;
- Pursue an agreement with WSMR that would allow WSMR to relinquish control of the current property in-holdings within SANWR to SANWR in the event of the cessation of WSMR or curtailment of WSMR jurisdiction over the in-holdings;
- The Service in cooperation with the New Mexico Department of Game and Fish (NMGF), develop an effective strategy to control the exotic species such as Oryx (*Oryx gazella*) on the Refuge;
- The Service in cooperation with the JER, develop policies that will protect and preserve the native habitat on the Refuge; and
- The Refuge, in cooperation with New Mexico Department of Game and Fish (NMGF), develop an effective strategy for the reestablishment and protection of viable populations of State endangered desert bighorn sheep on refuge lands.

2.0 PLANNING PERSPECTIVES AND CONSIDERATIONS

2.1 National Wildlife Refuge System

The Service is the principal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats. The Service manages a diverse network of more than 500 National Wildlife Refuges, a System which encompasses 92 million acres of lands and waters. National Wildlife Refuges are established for specific purposes and provide habitat for thousands of species of birds, mammals, fish, herptofauna, and invertebrates. Other refuges within the immediate area include the Bosque del Apache NWR approximately 100 miles to the north and the Bitter Lake NWR approximately 140 miles to the east.

2.2 The Service & Ecosystem Management

The Service has defined 52 ecosystems within the United States based primarily upon watershed designations. The Upper and Middle Rio Grande Ecosystem (Ecosystem) contains biomes endemic to the desert southwest. The Refuge and the surrounding San Andres Mountains Area of Ecological Concern is a major component of this larger defined Ecosystem.

Based upon a broad set of issues present throughout the entire defined Ecosystem, the Service has developed a management goal and a broad set of sub-goals for those ecosystems. The following is a list reflecting the Service's established the Ecosystem goal and sub-goals:

GOAL -- To protect, restore, and maintain viable levels of biotic diversity within the Upper/Middle Rio Grande Ecosystem.

SUB-GOALS --

1) To recover Federal and State-listed threatened and endangered species and their habitats, and ensure that species not currently listed are managed to avoid future need to list them under the Endangered Species Act;

2) To maintain migratory bird populations at healthy levels;

3) To reverse declining trends in quality and quantity of riparian/wetland habitats; restore, maintain, and enhance the species composition, aerial extent, and spatial distribution of riparian/wetland habitats;

4) To protect, restore, and maintain native fish and aquatic communities, and to promote sport fisheries management where native fish and other aquatic organisms are not adversely affected;

5) To protect, maintain, and restore upland terrestrial communities at the landscape level;

6) To interpret the link between healthy, stable ecosystems and human/community health; and

7) To protect and enhance water quality and quantities for aquatic, wetland, and riparian habitat.

2.3 Planning Perspectives

This planning effort will integrate three perspectives so that the management direction over the next 10 years will produce holistic management approaches for the Refuge lands and to the degree cooperative ventures permit, the San Andres Mountains Ecosystem.

The three management planning perspectives are as follows:

(1) A broad natural resource protection and conservation perspective for the Upper and Middle Rio Grande Ecosystem that relates the Service's overall commitment to protecting and restoring biome and ecosystem functions, structure, and species composition while still providing for sustainable socioeconomic use;

(2) A more narrow yet regional perspective for San Andres Mountains Area of Ecological Concern issues; (i.e., endangered species and biological diversity, non-native species management, water and air quality, inter-jurisdictional cooperation, etc.); and

(3) A focused perspective for the Refuge's habitat and wildlife management activities, cooperative efforts with partners, compatibility of other uses, water rights, research and monitoring, archeological and historical resources, and improving public appreciation of refuge resources.

An understanding of these three perspectives and the relationship between them leads to the formulation of an integral set of refuge goals, objectives, and management actions/strategies for the next 5 to 10 years.

2.4 The Issues

Goals and objectives have been designed to address the Refuge's problems and opportunities inclusive of the following list of the general issues that confront the San Andres NWR programs.

Issue 1. Biological Diversity, Wildlife, and Habitat Management;

- Habitat management and enhancement
- Fire management
- Scientific Data Collection / Data sharing
- Water Rights and Management of Riparian Areas
- Bighorn Sheep population enhancement and protection
- Air quality monitoring

Problems remain with respect to the survivability of healthy populations of the state endangered desert bighorn sheep. The refuge, in coordination with the NMDGF, must develop objectives and strategies that address both the short and long-term survivability of this species. With careful management, the natural diversity of the Refuge biological resources can be enhanced while providing improved habitat for this and other species of concern.

For the long-term however, the foundation of effective habitat management for a diversity of species is an understanding of the species and their interrelationships within the Area of Ecological Concern. The tools suggested for effective habitat management include prescribed burning and management of non-native species. Prescribed burning and control of non-native flora and fauna can be used to enhance the habitat and protect and promote natural diversity.

Extensive baseline scientific data collection needs to be continued on the refuge and surrounding lands. The Refuge will need to continue cooperative research efforts with the Department of the Army by providing support for programs such as the Land Condition Trends Analysis (LCTA) project. A continuation of field data collection using transects and arrays to gather information will be essential to a better understanding. Also at issue is the future of the Refuge's air quality. Air quality is now an important concern because of declining air quality in the El Paso-Juarez metroplex, only 50 miles south of the refuge. Continued monitoring will be vital using a newly established air monitoring station.

Issue 2. Public Use, Recreation, and Wildlife Interpretation & Education;

- Public Awareness
- Educational Outreach

Because the Refuge is closed to the public, public awareness and educational outreach must be centered off the Refuge. The Refuge headquarters has insufficient room and facilities to allow for visitor and educational activities. An off-Refuge visitor and education center, possibly created in cooperation with other local agencies and jurisdictions, would be a logical and efficient way to educate and increase awareness of the public about the San Andres Mountains ecosystem and the U. S. Fish and Wildlife Service.

Issue 3. Interagency and Jurisdictional Relationships;

- Land Acquisition
- Memorandums of Understanding (MOU)

Because of the complex nature of boundaries, and land ownership issues on and around the Refuge, close cooperation with other agencies and jurisdictions is essential. White Sands Missile Range (WSMR) currently has jurisdiction over parcels of land (in-holdings) within the Refuge. Cooperative agreements could be used to allow these in-holdings to eventually fall under the jurisdiction of the Refuge in the event that the WSMR ceased operations or relinquished jurisdiction.

NMGFD considers recovery of a viable healthy population of desert bighorn sheep on the San Andres NWR is considered a necessity for the recovery of the desert bighorn sheep in New Mexico. Strengthening cooperative relationships with NMGFD, WSMR, and other cooperating agencies for the recovery of the desert bighorn sheep is essential.

Issue 4. Cultural Resources Preservation;

Because the Refuge is closed to the public, the protection and preservation of cultural resources is simplified. However, information on the nature and location of the cultural resources for monitoring purposes is limited and needs to be updated and improved. Consideration should be given to constructing protective shelters for some historical sites that are threatened by the elements.

Issue 5. Staffing / Facilities/ and Funding;

Current staffing is inadequate to accomplish the goals of the Refuge. There are only two permanent staff, and the demands on staff time and resources means that some goals and tasks can not be accomplished. The office facilities at the Refuge headquarters are barely adequate for the current staff . Additional staffing would necessitate the expansion of office facilities to accommodate additional personnel.

2.5 The Need for Action

The Service's Refuge Manual states that the purpose of comprehensive conservation planning is to "provide long range guidance for the management of national wildlife refuges." [4 RM 1.1, Planning] Planning provides a road map to facilitate the kind of coordination that is necessary to enhance the efficiency of implementing management actions designed to benefit the San Andres NWR, and the San Andres Mountains Ecosystem. The Service's approach will be to offer management goals, objectives, strategies/management actions that are consistent with ecologically desirable outcomes for the entire San Andres Mountains Ecosystem.

2.6 Expected Planning Outcomes

The following objectives were designed to be consistent with the Service Manual's comprehensive conservation planning objectives. The planning effort should bring about the following outcomes:

- Ensure that legal mandates and national direction are incorporated in the management of the San Andres NWR;
- Ascertain the capability of the Refuge to further Service and Refuge System goals, objectives, and long-range plans and to provide a means of evaluating accomplishments;
- Provide a systematic process for making and documenting Refuge decisions;

- Establishment of broad management strategies that are to the degree possible, consistent with the ecosystem perspective for the area, and should guide the refuge management programs and activities consistent with an ecosystem perspective;

- Provide continuity in the management of the Refuge;

- Provide a practical basis for budgeting requests to implement management programs leading to the achievement of Refuge objectives; and

- Provide an optimum level of public acceptance and/or support for the management strategies adopted through effective involvement in the planning process.

2.7 Public Involvement

In an ongoing effort to involve the local community and officials in the CCP process, the Service and Research Management Consultants Inc.(RMCI) have prepared and distributed a fact sheet in August 1997. The fact sheet describes the CCP process and defined the comment period. The fact sheet was mailed on August 25, 1997 and the Public comment period ended October 8, 1997. Two information repositories have been established and are maintained with information relevant to the Refuge for public review. The repositories are located at the Thomas Branigan Library in Las Cruces New Mexico and the Alamogordo Public Library in Alamogordo, New Mexico. RMCI also continually updates the mailing list based on responses from interested parties. Public meetings will be provided based on public response to the CCP process.

A draft CCP and Environmental Assessment (EA) were released July 1, 1998. The Service published a formal notice in the Federal Register requesting comments and advice from the public.[3] Comments were received, considered, and to the degree possible, they have been incorporated into this document.

[3] Federal Register, Vol 63, No. 126, p 35939, Notice of Intent to Issue 2 Draft Comprehensive Conservation Plans and Associated Environmental Assessments for 2 National Wildlife Refuges in the Southwest Region. This notice pertained to the release of the San Andres NWR and Bitter Lake NWR CCP/ EA draft documents.

3.0 AREA OF ECOLOGICAL CONCERN AND REFUGE RESOURCE DESCRIPTION

The San Andres NWR is located approximately 30 miles northeast of Las Cruces, New Mexico, in Dona Ana County and encompasses 57,215 acres of the southern portion of the San Andres Mountains. The San Andres Area of Ecological Concern is approximately 80 miles long and runs north-south. The mountain range forms an arc six to 12 miles wide that concaves to the east. The western slopes of the mountain range are steep but are relatively gentle compared to the precipitous cliffs and benches that form the eastern side.

Elevation on the Refuge ranges from 4,200 to 8,239 feet above median sea level (MSL). Major east-west canyons delineate five mountain sub-units within the Refuge, which are known (from south to north) as: Bennett, Black Brushy, San Andres, Oñate, and Block mountains.

3.1 Biological Resources

3.1.1 Vegetation

Five general plant communities are found on the San Andres NWR. These include desert shrub, desert riparian, grass-shrub, mountain shrub, and piñon juniper. Merriam's Life Zones represented on the Refuge include both the upper (above 7,000 feet) and lower (below 6,500 feet) Sonoran of the Chihuahuan Desert. Exposed areas are characterized by grass shrub communities dominated by such plants as needle and thread grass (*Stipa comata*), gramma grass (*Botueloua* spp.), mountain mahogany (*Cercocarpus montanus*), prickly pear cactus (*Opuntia* Spp.), agave (*Agave* spp.), yucca (*Yucca* spp.), and ocotillo (*Fouquieria splendens*). Higher elevation slopes are dominated by stands of piñon pine (*Pinus edulis*) and juniper (*Juniperus monosperma*). Riparian vegetation occurs around springs and in major drainages, and includes apache plume (*Fallugia paradoxa*) and desert willow (*Chilopsis linearis*).

3.1.2 Wildlife

Although San Andres NWR was established primarily for the preservation and protection of the desert bighorn sheep (*Ovis canadensis mexicana*), the Refuge provides habitat for a wide variety of other wildlife. Thirty eight species of mammals have been documented on the Refuge, including desert bighorn sheep (*Ovis canadensis mexicana*), desert mule deer (*Odocoileus hemionus crooki*), mountain lion (*Felis concolor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), desert cottontail (*Sylvilagus audubonii*), and a wide variety of rodents that are typical of western mountains and deserts. Recent bird surveys have indicated that 142 different bird species occur on the Refuge. Of those species 142 species, 60 are known to nest on the Refuge. Over 45 species of reptiles occur on the Refuge.

Desert bighorn sheep -- The restoration of the desert bighorn sheep *(Ovis canadensis mexicana)* population in the San Andres Mountains (SAM) is considered paramount to the recovery and delisting of desert bighorn sheep in New Mexico. It is hypothesized that this mountain range has

the potential to maintain the largest single herd of desert bighorn sheep in the state (NMDGF 1995). In 1976 the SAM desert bighorn population was the largest in New Mexico and numbered greater than 180. However, a large-scale die off, attributed primarily to the direct and/or indirect effects of a virulent scabies mite *(Psoroptes ovis)* infestation, reduced the population substantially. The effects of this infestation and efforts to treat bighorn have been reported in numerous publications (Lange et al. 1980, Sandoval 1980, Kinzer et al. 1983.).

Since 1980, the minimum population estimate has remained below 40 individuals. The population increased gradually during the early 1990's however, in 1995 the minimum population estimate declined to 25 and in 1996 the minimum population estimate declined sharply to 3 individuals. In 1997, the minimum population declined further to a single radio-collared ewe (SAE-067, 1989 cohort). Nine of 10 radio-collared bighorn sheep (90%) died during a 15-month period in 1996-97. Factors associated with this high mortality rate were predation by mountain lions, accidents, and continued scabies infestation. It is probable that a similar mortality rate also occurred on the un-collared portion of the population because no un-collared bighorn were seen in the 1996 or 1997 helicopter surveys. Other contributors to the overall population decline have been poor reproduction and an aging population. Furthermore, there was no recruitment into the sheep population during 1995 - 1997.

The desire to eradicate the scabies infestation in SAM desert bighorn has resulted in several capture and treatment operations since 1978. However, attempts to simultaneously treat all desert bighorn sheep on the SAM for scabies have been unsuccessful (Sandoval 1980). Although a substantial portion of the population has been treated during each capture attempt, the inability to kill all mite eggs with a single treatment and/or reinfestation due to contact with untreated bighorn has resulted in a continuously reinfected population.

Because of the multi-agency cooperation required to manage this herd, numerous unpublished reports have been produced by New Mexico Department of Game and Fish, San Andres National Wildlife Refuge (U. S. Fish and Wildlife Service), and White Sands Missile Range (U. S. Army). A review of the San Andres bighorn sheep issue was produced by the Wildlife Management Institute (WMI) with all members of the review team independent of the three principal agencies (Wildlife Management Institute 1992).

NMGFD receives funding annually from USFWS Division of Federal Aid for the purpose of implementing endangered species and other wildlife conservation programs. Over the past two decades Federal Aid resources have been used extensively toward desert bighorn sheep recovery. Also, the WSMR has taken on additional initiatives for habitat conservation and species management including recovery of the desert bighorn sheep.

3.1.3 Baseline inventories

The Refuge has continued extensive efforts to improve baseline data of biological resources. The Refuge has worked on its own transects and arrays using protocols prescribed in its Wildlife

Inventory Plan (December 1992; Appendix G), and Baseline Herpetofauna Survey Report (1997, Appendix H). Transects consist of line intercept and belt transect arrays. Density of cover analyses are also used. With limited staff, the refuge has been able to share information and play a role in WSMR's Land Conditions Trend Analysis project and the Tularosa Basin Ecosystems Paleo-environmental Database efforts. While the former is a continuing biological resources monitoring program to compare before and after scenarios, the latter attempts an understanding of archeological, paleological and cultural resources of the entire Tularosa Basin.

3.2 Climate

The climate of the San Andres NWR and surrounding region is semi-arid. Annual precipitation averages 14.03 inches on the Refuge to approximately 11 inches in the Las Cruces area. The fall and spring are relatively dry with winter and late summer being the wet seasons. Although winter precipitation includes snowfall, snowpack rarely develops. Most of the precipitation occurs in July, August and September in the form of brief but intense thunderstorms. Temperatures range from subfreezing in the winter to well over 100 degrees Fahrenheit in the summer.

Table 1. 1995-1997 Precipitation on the San Andres NWR

Location	1995 Total	1996 Total	1997 Total	Historical Average
Goat Mountain	10.56 " (26.82 cm)	13.38 " (33.99 cm)	18.72 " (47.55 cm)	14.5748" (37.0200 cm)
Little San Nicolas Camp	9.95 " (25.27 cm)	14.10 " (35.81 cm)	19.31 " (49.05 cm)	14.7977" (37.5862 cm)
Ash Canyon	12.50 " (31.75 cm)	12.98 " (32.97 cm)	18.50 " (46.99 cm)	13.7066" (37.0225 cm)
Ropes Springs	10.33 " (26.24 cm)	12.20 " (30.81 cm)	19.53 " (49.60 cm)	13.0530" (34.8148 cm)

3.3 Geology

The geologic structure of the San Andres Mountains is a tilted fault block, uplifted vertically 1-2 miles along the east bounding fault zone, with tilted sedimentary rock bed dipping 10-20 degrees westward into the Jornada del Muerto syncline. Mockingbird Gap, at the north end of the range is a broad pass in a down faulted anticlinal axis. San Augustine Peak, at the south, is in a coarse-grained less resistant phase of the of the Organ Mountains' mozonite batholith. The typical cross section profile of the San Andres Mountains north of the little Saint Nicholas Canyon reveals a

monocline characterized by a relatively gentle slope and a precipitous east facing escarpment overlooking the Tularosa basin. The east escarpment consists of a series of vertical limestone cliffs descending in a "stair-step" arrangement to the alluvial fans that are broken by a network of arroyos and outcrops of Precambrian granite and schist.

3.4 Soils

The soils in the San Andres Mountains are classed as the Rockland-Rough Broken Land soil association. This association is a complex of very shallow soils and exposures of bedrock. The rock formations include limestone, sandstone, basalt, and shale. The outcrops of limestone commonly occur as vertical or nearly vertical exposures and ledges, giving a "stair-step" appearance to the landscape of the of the east escarpment. A thin mantle of stoney, loamy soil occurs between the outcrops of bedrock on very steep slopes, below rock ledges, and in small, narrow valleys.

3.5 Water Management

Water sources within the San Andres NWR consist of either naturally occurring springs and seeps or man-made water catchment units. Forty three natural springs and seeps are located within or adjacent to the Refuge. Over 90 percent of these sources are located on the east facing Tularosa Basin drainage, the remainder are located on the western piedmont. In the past, 18 seeps or springs have been improved by homesteaders, Agricultural Research Service , or the Service. Bisecting the mountains are several east-west drainages or canyons, four of which have permanent water. These canyons with permanent springs (from south to north) are: Little San Nicholas, Ash, San Andres, and Mayberry.

3.6 Cultural and Historic Resources

The history of the San Andres Mountains is rich with legends of lost gold mines and outlaws. The area was occupied as early as 900 A.D. by ancestors of the North American Indians. Remnants of rock houses and mines throughout the range are evidence of heavy mining activity in the area during the late 1800's and early 1900's. The San Andres Mountains are reported to have been frequented by Black Jack Ketchem and Apache Chief Geronimo. Apache Chief Victorio also frequented the San Andres and fought several skirmishes with the U.S. Cavalry.

3.7 Socio-economic Features

The San Andres NWR is located in the southern portion of Dona Ana County approximately 20 miles northeast of Las Cruces (population 72,000). The presence and operation of the Refuge has very limited socio-economic impact on the surrounding communities, particularly with regard to recreational activities. This is due largely to the fact that San Andres NWR is located within the boundaries of the White Sands Missile Range and is therefore restricted to all forms of public use. The primary socioeconomic influence on Las Cruces is the recycling of refuge budget money due

to Refuge personnel living in the area, purchasing of all equipment and supplies, and in contracting local labor to accomplish Refuge projects.

3.8 Land Status

The Refuge lies within the boundaries of the White Sands Missile Range and is therefore closed to all public access. The U.S. Army overlaid Refuge lands when Public Land Order 833 permanently established White Sands Missile Range (known then as the White Sands Proving Grounds) after World War II. The Refuge serves primarily as a buffer for the WSMR, as no actual missile impacts occur within Refuge boundaries. During special training missions, low-level military aircraft flights do occur over the Refuge, but there is no documentation of negative impacts to wildlife resources. The western half of the Refuge, overlays the Jornada Experimental Range (JER) Station, which was established in 1912. The JER retains certain research rights over almost half of the Refuge. This land was transferred from the JER to the Service for establishment of the Refuge. The Lyndon B. Johnson Jet Propulsion Lab, a part of the National Aeronautics and Space Administration (NASA) borders the Refuge in the southwest corner. Refuge staff must pass through NASA lands to enter the Refuge's main access point.

3.9 Refuge Staffing and Facilities

Current staffing at San Andres NWR consists of the following positions:

- Refuge Manager GS-12 PFT
- Wildlife Biologist GS-11 PFT

Resource management issues require that the Refuge Manager and Biologist attend coordination meetings with Department of the Army environmental scientists, New Mexico Game and Fish wildlife managers, and Cooperative Research Unit professionals at New Mexico State University. Biological challenges on the Refuge also require many hours on the Refuge including travel to remote areas which cause the office to be left unattended. Maintenance of facilities, vehicles, and equipment is performed by the Refuge Manager further taking time away from resource management. Current staffing is not adequate to perform the proposed tasks and duties for the San Andres NWR.

The Refuge's headquarters and administrative offices are located between the Village of Organ, New Mexico and the City of Las Cruces along U.S. Highway 70. The headquarters compound consists of an office building that was constructed in 1993, and a 3 bay maintenance garage facility. Above ground fuel storage tanks are also located in the 2.5 acre fenced compound. The distance between the main headquarters/office gate and the Refuge boundary is 10 miles. Other on-Refuge facilities include two cabins and two precipitation collectors.

4.0 LEGAL, POLICY, AND ADMINISTRATIVE GUIDELINES, AND OTHER SPECIAL CONSIDERATIONS

This Section outlines current legal, administrative, and policy guidelines for the management of national wildlife refuges. It begins with the more general considerations such as laws and executive orders for the Service, and moves toward guidelines that apply specifically to the San Andres NWR.

This unit also includes sections dealing with specially designated sites such as historical landmarks and archaeological sites, all of which are regulated/protected by specific law and/or policy. In addition, consideration is given to guidance prompted by other formal and informal natural resource planning and research efforts.

All the legal, administrative, policy, and planning guidelines provide the framework within which management activities are proposed and developed. This guidance also provides the framework for the enhancement of cooperation between the San Andres NWR and other contiguous jurisdictions in the ecosystem, including White Sands Missile Range.

4.1 Legal Mandates

Administration of the refuges takes into account a myriad of bills passed by the United States Congress and signed into law by the President of the United States. These statutes are considered to be the law of the land as are executive orders promulgated by the President. The following is a list of most of the pertinent statutes establishing legal parameters and policy direction to the National Wildlife Refuge System. Included are those statutes and mandates pertaining to the management of the San Andres NWR.

For those laws that provide special guidance and have strong implications relevant to the Service or San Andres NWR, legal summaries are offered below. Many of the summaries have been taken from *The Evolution of National Wildlife Law* by Michael J. Bean.[4] For the bulk of applicable laws and other mandates, legal summaries are available upon request.

Summary of Congressional Acts, Treaties, and other Legal Acts that Relate to Administration of the National Wildlife Refuge System:

1. Lacey Act of 1900, as amended (16 U.S.C. 701).

2. Antiquities Act of 1906 (16 U.S.C. 431).

3. Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711) and 1978 (40 Stat. 755).

4. Migratory Bird Conservation Act, (1929) as amended. (16 U.S.C. 715-715s).

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[4] Bean, Michael J., 1983. *The Evolution of National Wildlife Law*, Praeger Publishers, New York.

5. Migratory Bird Hunting Stamp Act of 1934, (U.S.C 718-718h).

6. Fish and Wildlife Coordination Act, (1934) as amended (16 U.S.C. 661-666).

> *The Act is "the first major federal wildlife statute to employ the strategy of compelling consideration of wildlife impacts. The act authorized 'investigations to determine the effects of domestic sewage, trade wastes, and other polluting substances on wildlife, encouraged the development of a program for the maintenance of an adequate supply of wildlife on the public domain' and other federally owned lands, and called for state and federal cooperation in developing a nationwide program of wildlife conservation and rehabilitation."*[5]

7. Historic Sites Act of 1935 (16 U.S.C. 461).

> *The Act declared it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provided procedures for designation, acquisition, administration, and protection of such sites. National Historic and Natural Landmarks are designated under authority of this Act. As of January 1989, 31 national wildlife refuges contained such sites.*

8. Convention Between the United States of America and the Mexican States for the Protection of Migratory Birds and Game Mammals, (1936) (50 Sta. 1311).

9. Convention of Nature Protection and Wildlife Preservation in the Western Hemisphere, 1940 (56 Stat. 1354).

10. Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742-742j).

11. Refuge Recreation Act, as amended, (Public Law 87-714.76 Sta. 653; 16 U.S.C. 460k-4) September 28, 1962.

> *This Act authorizes the Secretary of the Interior "to administer areas of the System 'for public recreation when in his/her judgement public recreation can be an appropriate incidental or secondary use; provided, that such public recreation use shall be permitted only to the extent that it is practicable and not inconsistent with the primary objectives for which each particular area is established.' Recreational uses 'not directly related to the primary purposes and functions of the individual areas' of the System may also be permitted, but only upon an determination by the Secretary that they 'will not interfere with the primary purposes' of the refuges and that funds are available for their development, operation, and maintenance."*[6]

12. Refuge Revenue Sharing Act of 1964, (16 U.S.C. 715s) as amended (P.L. 95-469, approved 10-17-78).

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[5] Ibid., pp. 181.

[6] Ibid., pp. 125-126.

The Act provides "that the net receipt from the 'sale or other disposition of animals, timber, hay, grass, or other products of the soil, minerals, shells, sand, or gravel, from other privileges, or from leases for public accommodations or facilities in connection with the operation and management of areas of the National Wildlife Refuge System shall be paid into a special fund. The monies from the fund are then to be used to make payments for public schools and roads to the counties in which refuges having such revenue producing activities are located."[7]

13. Land and Water Conservation Fund Act of 1965, as amended (16 U.S.C. 460L-4 to 460L-11), and as amended through 1987.

14. National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee).

This Act, derived from sections 4 and 5 of Public Law 89-669, "consolidated 'game ranges,' 'wildlife ranges,' 'wildlife management areas,' 'waterfowl production areas,' and 'wildlife refuges,' into a single 'National Wildlife Refuge System.' It (1) placed restrictions on the transfer, exchange, or other disposal of lands within the system; (2) clarified the Secretary's authority to accept donations of money to be used for land acquisition; and (3) most importantly, authorized the Secretary, under regulations, to 'permit the use of any area within the System for any purpose, including but not limited to hunting, fishing, public recreation and accommodations, and access whenever he determines that such uses are compatible with the major purposes for which such areas were established."[8]

15. National Historic Preservation Act of 1966 (16 U.S.C. 470).

Public Law 89-665 as repeatedly amended, provided for preservation of significant historical features (buildings, objects, and sites) through a grant in aid program to the States. It established a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation. As of January 1989, 91 historic sites on national wildlife refuges have been placed on the National Register.

16. National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321-4347).

17. Protection and Enhancement of Environmental Quality Executive Order of 1970 (Executive Order 11514, dated March 5, 1970).

18. Environmental Education Act of 1975 (20 U.S.C. 1531-1536).

19. Use of Off-Road Vehicles on the Public Lands Executive Order of 1972, as amended (Executive Order 11644, dated February 8, 1972, as amended by Executive Order 11989, dated May 24, 1977).

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[7] Ibid., pp. 126.

[8] Ibid., pp. 125.

20. Endangered Species Act of 1973 (16 U.S.C. 1531-1543 87 Stat. 884) P.L. 93-205). The Endangered Species Act as amended by Public Law 97-304, The Endangered Species Act Amendments of 1982, dated February 1983.

According to Bean, the 1973 Act "builds its program of protection on three fundamental units. These include two classifications of species--those that are 'endangered' and those that are 'threatened' --and a third classification of geographic areas denominated 'critical habitats.'"[9]

The Act: (1) Authorizes the determination and listing of species as endangered and threatened, and the ranges in which such conditions exist; (2) Prohibits unauthorized taking, possession, sale, and transport of endangered species; (3) Provides authority to acquire land for the conservation of listed species, using land and water conservation funds; (4) Authorizes establishment of cooperative agreements and grants-in-aid to States that establish and maintain active and adequate programs for endangered and threatened wildlife; and, (5) Authorizes the assessment of civil and criminal penalties for violating the Act or regulations.

Section 7 of the Endangered Species Act requires Federal agencies to insure that any action authorized, funded, or carried out by them does not jeopardize the continued existence of listed species or modify their critical habitat.

21. Floodplain Management Executive Order of 1977 (Executive Order 11988, dated May 24, 1977). Wetlands Preservation Executive Order of 1977 (Executive Order 11988, dated May 24, 1977).

These executive orders require both the protection and the enhancement of wetlands and floodplain. Both were signed in May, 1977. When Federally owned wetlands or floodplain are proposed for lease or conveyance to non Federal public or private parties, both executive orders require that the agency: "(a) reference in the conveyance those uses that are restricted under Federal, State or local... regulations; and (b) attach other appropriate restrictions to the uses of such properties by the ... purchaser and any successor, ... or © withhold such properties from..." lease or disposal (E.O. 11990, 4, E.O. 11988, 3(d). In addition, each agency is required to "avoid undertaking or providing assistance" for activities located in wetlands unless (1) ..."there is no practicable alternative...", and (2)... "the proposed action includes all practicable measures to minimize harm...which may result from such use" (E.O. 11990, 2). The term "agency" is defined in both of these executive orders as having the same meaning as the term "Executive agency" which means an Executive department, a Government corporation, and an independent establishment.

22. The Archaeological Resource Protection Act of 1979 (P.L. 96-95, 93 Sta. 721, dated October 1979). (16 U.S.C. 470aa - 47011).

This Act largely supplanted the resource protection provisions of the Antiquities Act for archaeological items. It established detailed requirements for issuance of permits for any

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[9] Ibid., pp. 331.

excavation or removal of archaeological resources from Federal or Indian Lands. It also established civil and criminal penalties for the unauthorized excavation, removal, or damage of any such resources; for any trafficking in such resources removed from Federal or Indian land in violation of any provision of Federal law; and for interstate and foreign commerce in such resources acquired, transported, or received in violation of any State or local law. Public Law 100-588, approved November 3, 1988, (102 Stat. 2983) lowered the threshold value of artifacts triggering the felony provision of the Act from $5,000 to $500, made attempting to commit an action prohibited by the Act a violation, and required the land managing agencies to establish public awareness programs regarding the value of archaeological resources to the Nation.

23. Fish and Wildlife Conservation Act of 1980 (P.L. 96-366, dated September 29, 1980). ("Nongame Act") (16 U.S.C. 2901-2911; 94 Stat. 1322).

Approved September of 1980, this Act authorized grants for development and implementation of comprehensive State nongame fish and wildlife plans and for administration of the Act. It also required the Service to study potential mechanisms for funding these activities and report to Congress by March, 1984. According to Bean, the Act "strives to encourage comprehensive conservation planning, encompassing both nongame and other wildlife...The impetus for the enactment of this legislation was the perception that animals not ordinarily valued for sport hunting or commercial purposes receive insufficient attention and funds from state wildlife management programs."[10]

Public Law 100-653 (102 Stat. 3825), approved November 14, 1988, amended the Act to require the Service to monitor and assess nongame migratory birds, identify those likely to be candidates for endangered species listing, identify appropriate actions, and report to Congress one year from enactment. It also requires the Service to report at five year intervals on actions taken.

24. Administrative Procedures Act (5 U.S.C. 551-559, 701-706, 1305, 3105, 3344, 4301, 5362, 7521; 60 Stat. 237), as amended (P.L. 79-404, as amended).

25. Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d; 54 Stat.), as amended.

26. Canadian United States Migratory Bird Treaty (Convention Between the United States and Great Britain (for Canada for the Protection of Migratory Birds. (39 Stat. 1702; TS 628), as amended.

27. Clean Air Act (42 U.S.C. 1857-1857f; 69 Stat. 322), as amended.

28. Convention on Wetlands of International Importance Especially as Waterfowl Habitats (I.L.M. 11:963-976, September 1972).

This Convention, commonly referred to as the Ramsar Convention, was adopted in Ramsar, Iran, February 3, 1971, and opened for signature at UNESCO headquarters, July 12, 1972.

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[10] Ibid., pp. 227.

On December 21, 1975, the Convention entered into force after the required signatures of seven countries were obtained. The United Senate consented to ratification of the Convention on October 9, 1986, and the President signed instruments of ratification on November 10, 1986. The Convention maintains a list of wetlands of international importance and works to encourage the wise use of all wetlands in order to preserve the ecological characteristics from which wetland values derive. The Convention is self implementing with the U.S. Fish and Wildlife Service providing U.S. secretariat responsibilities and lead for Convention implementation.

29. Cooperative Research and Training Units Act (16 U.S.C. 753a-753b, 74 Stat. 733), as amended. P.L. 86-686).

30. Federal Aid in Fish Restoration Act (16 U.S.C. 777-777k, 64 Stat. 430).

31. Federal Aid in Wildlife Restoration Act (16 U.S.C. 669-669i; 50 Stat. 917), as amended.

32. Federal Environmental Pesticide Control Act of 1972 (7 U.S.C. 136-136y; 86 Stat. 975), as amended.

33. Federal Land Policy Management Act of 1976 (43 U.S.C. 1701-1771, and other U.S.C. sections; 90 Stat. 2743). Public Law 94-579, October 1976.

34. Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471-535, and other U.S.C. sections; 63 Stat. 378), as amended.

35. Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251-1265, 1281-1292, 1311-1328, 1341-1345, 1361-1376, and other U.S.C. titles; 86 Stat. 816), as amended.

36. Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 7421; 92 Stat. 3110) P.L. 95-616, November 1978.

37. Flood Control Act of 1944 (16 U.S.C. 460d, 825s and various sections of title 33 and 43 U.S.C.; 58 Stat. 887), as amended and supplemented.

38. Freedom of Information Act (5 U.S.C. 552; 88 Stat. 1561).

39. Refuge Trespass Act (18 U.S.C. 41; Stat 686).

40. Transfer of Certain Real Property for Wildlife Conservation Purposes Act of May 1948, (16 U.S.C. 667b-667d; 62 Stat. 240), as amended.

41. Water Resources Planning Act (42 U.S.C., 1962-1962a-3; 79 Stat. 244), as amended.

42. Waterfowl Depredations Prevention Act (7 U.S.C. 442-445; 70Stat. 492), as amended.

43. Clean Water Act of 1972, Section 404.

Under this Act, permits are required to be obtained for discharges of dredged and fill materials into all waters, including wetlands. Implementation of the 404 program involves three other federal agencies in addition to limited state involvement. The Environmental Protection Agency (EPA), the National Marine Fisheries Service, and the Service review permit applications and provide comments and recommendations on whether permits should be issued by the Corps. EPA has veto authority over permits involving disposal sites if impacts are considered unacceptable. EPA also develops criteria for discharges and state assumption of the 404 program. Section 404 regulations were changed in 1984 due to a national lawsuit, and 404 jurisdictions now apply to tributaries of navigable waters and isolated wetlands and waters if interstate commerce is involved. With the new regulations, all washes, drainages, and tributaries of navigable waters, including ephemeral and perennial streams, are included under the 404 program in Texas.

44. The Food Security Act of 1985 (Farm Bill).

45. National Wildlife Refuge System Improvement Act of 1997 (H.R. 1420, 105th Congress).

This law is the first "organic" act for the National Wildlife Refuge System. The Act amends portions of the National Wildlife Refuge System Administration Act and the Refuge Recreation Act, and reiterates into law Executive Order 12996.

4.2 Agency-Wide Policy Directions

Fish and Wildlife Service Agency Mission -- Since the early 1900s, the Service mission and purpose has evolved, while holding on to a fundamental national commitment to threatened wildlife ranging from the endangered bison to migratory birds of all types. The earliest national wildlife refuges and preserves are examples of this. Pelican Island, the first refuge, was established in 1903 for the protection of colonial nesting birds such as the snowy egret and the endangered brown pelican. The National Bison Range was instituted for the endangered bison in 1906. Malheur National Wildlife Refuge was established in Oregon in 1908 to benefit all migratory birds with emphasis on colonial nesting species on Malheur Lake. It was not until the 1930s that the focus of refuge programs began to shift toward protection of migratory waterfowl (i.e., ducks and geese). As a result of drought conditions in the 1930s, waterfowl populations became severely depleted. The special emphasis of the Service (then called the Bureau of Wildlife and Sport Fisheries) during the next several decades was on the restoration of critically depleted migratory waterfowl populations.

The passage of the Endangered Species Act of 1973 refocused the activities of the Service as well as other governmental agencies. This Act mandated the conservation of threatened and endangered species of fish, wildlife, and plants both through Federal action and by encouraging the establishment of State programs. In the late 1970s, the Bureau of Wildlife and Sport Fisheries was renamed the U.S. Fish and Wildlife Service to broaden its scope of wildlife conservation responsibilities to include endangered species, as well as game and nongame species. A myriad of other conservation-

oriented laws followed, including the Fish and Wildlife Conservation Act of 1980, which emphasized the conservation of nongame species.

The Service has no "organic" act to focus upon for the purposes of generating an agency mission. The agency mission has always been derived in consideration of the various laws (as listed in Section 2 of this Unit) and treaties that collectively outlined public policy concerning wildlife conservation. The Department of the Interior Manual states:

> *"The U.S. Fish and Wildlife Service is responsible for conserving, enhancing, and protecting fish and wildlife and their habitats for the continuing benefit of people through Federal programs relating to wild birds, endangered species, certain marine mammals, inland sport fisheries, and specific fishery and wildlife research activities."*[11]

4.2.1 National Wildlife Refuge System: Mission and Goals

The National Wildlife Refuge System is the only existing system of federally owned lands managed chiefly for the conservation of wildlife. The system mission is a derivative of the Service mission. This mission was most recently revised in October 1997, by passage of the National Wildlife Refuge System Improvement Act (P.L. 105-57). This Act followed up on Executive Order 12996 (April 1996) Management of Public Uses on National Wildlife Refuges to reflect the importance of conserving natural resources for the benefit of present and future generations of people.

This Act amends the National Wildlife Refuge System Administration Act of 1966 in a manner that provides an "Organic Act" for the Refuge System. It will ensure that the Refuge System is effectively managed as a national system of lands, waters and interests for the protection and conservation of our nation's wildlife resources.

The Act gives guidance to the Secretary of the Interior in the overall management of the Refuge System. The Act's main components include a strong and singular conservation mission for the Refuge System, a requirement that the Secretary of the Interior maintain the biological integrity, diversity and environmental health of the Refuge System, a new process for determining compatible uses of refuges, and a requirement for preparing comprehensive conservation plans. The Act states first and foremost that the mission of the National Wildlife Refuge System be focused singularly on wildlife conservation.

The Refuge Improvement Act is an overarching Act with both general and specific elements that provide long term management direction for the Refuge System. It became law the day it was signed; however, pending development and approval of final rules and regulations, the Service has issued the following as interim policy guidance with respect to the Act's Sections:

Sec. 1 Purpose

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[11] Departmental Manual 142 DM 1.1.

This Order provides guidance for implementing specific provisions of the National Wildlife Refuge System Improvement Act of 1997, pending development of new policies and regulations responsive to the Act.

Sec. 2 Scope

This policy applies to management of the National Wildlife Refuge System.

Sec. 3 Existing policy

Existing policy and directives for management of the National Wildlife Refuge System remain in force except for those which are in conflict with provisions in the Act, in which case the Act prevails.

Sec. 4 Mission of the National Wildlife Refuge System

The mission of the National Wildlife Refuge System is:

> *"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."*

Sec. 5 Administration of the National Wildlife Refuge System

a. The term "refuge" means a designated area of land, water, or an interest in land or water within the Refuge System, but does not include Coordination Areas.

b. Each refuge shall be managed to fulfill the mission of the Refuge System, as well as the specific purposes for which that refuge was established.

c. Each refuge shall be managed in a manner that maintains the biological integrity, diversity and environmental health of the Refuge System.

d. The status and trends of wildlife resources on each refuge shall be monitored.

e. The purposes of each refuge are the purposes specified in, or derived from, the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge sub-unit.

f. Each refuge shall ensure effective coordination, interaction, and cooperation with neighboring landowners and appropriate state fish and wildlife agencies.

g. Each refuge shall cooperate and collaborate with other Federal agencies and appropriate state fish and wildlife agencies in refuge acquisition and management.

Sec. 6 Public Uses

a. When determined to be compatible, the following six wildlife-dependent recreational uses are the priority general public uses of the Refuge System: hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

b. Compatible priority public uses shall receive enhanced consideration over other public uses in refuge planning and management.

c. Priority public uses are appropriate and legitimate uses of the Refuge System. Refuges are strongly encouraged to seek opportunities to permit these activities when ways can be found to ensure their compatibility. Reasonable efforts should be made to ensure that lack of funding is not an obstacle to permitting these uses through development of partnerships with the States, local communities and private and nonprofit groups.

d. The following general hierarchy between refuge activities and public uses will apply: Priority 1 - activities necessary to fulfill the refuge purposes and the Refuge System mission; Priority 2 - provide opportunities for wildlife-dependent recreational uses, when determined to be compatible. All other public uses will be a lower priority.

e. In providing priority public uses, refuges shall emphasize opportunities for families to experience compatible wildlife-dependent recreation, particularly opportunities for parents and their children to safely engage in traditional outdoor activities, such as fishing and hunting.

Sec. 7 Compatibility

a. Compatibility determinations prepared during the period between enactment of the National Wildlife Refuge System Improvement Act of 1997 (October 9, 1997) and issuance of a new compatibility policy will be made under the existing compatibility standards and process.

Sec. 8 Comprehensive Conservation Planning

> The Act provides that Comprehensive Conservation Plans shall be completed for all refuge units within 15 years from the date of enactment.

4.3 Refuge Purpose Statements [12]

Formal establishment of a unit of the National Wildlife Refuge System is usually based upon a specific statute or executive order specifically enumerating the purpose of the particular unit. However, refuges can also be established by the Service under the authorization offered in such laws as the Endangered Species Act of 1973 or the Fish and Wildlife Act of 1956. In these cases, lands are identified by the Service that have the right elements to contribute to the recovery of a species or the maintenance of habitat types. Oftentimes, the Service works in cooperation with private nonprofit organizations in efforts to acquire suitable lands.

4.4. San Andres NWR Purpose Statement

The Refuge was established in 1941 by Executive Order 8646 for:

> "...the conservation and development of natural wildlife resources."

The primary emphasis of Refuge management activities over the past few years has been the restoration of the remnant population of the state listed desert bighorn sheep. While Refuge focus has broadened recently, the emphasis on desert bighorn sheep has not diminished.

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[12] Refuge purpose statements are primary to the management of each refuge within the refuge system. The purpose statement is the basis upon which primary management activities are determined. Additionally, these statements are the foundation from which "allowed" uses of refuge are determined through a defined "compatibility process."

5.0 SAN ANDRES NWR MANAGEMENT PROGRAM

The following goals, objectives, and strategies are, unless otherwise noted in the text, expected to be implemented throughout the ten to 15 year term of this plan. Due to the fact that the San Andres NWR CCP is a working document, modifications to the following objectives and strategies are anticipated.

5.1 Biological Diversity, Wildlife, and Habitat Enhancement

GOAL I: To protect and enhance wildlife, plant and habitat resources within the San Andres Mountains Ecosystem including strategies that benefit native flora and fauna, the status of desert bighorn sheep, neotropical migratory birds and other species of concern.

Objective 1. In cooperation with NMGFD and WSMR, to establish and protect an augmentable scabies free remnant desert bighorn population leading to the establishment of a widely distributed, self sustaining population comprising greater than 100 sheep in the San Andres Mountains. Achievement of this objective would assist the NMDGD in possibly down-listing the species to threatened once the statewide population exceeds 500.

Strategies

1: In cooperation with NMGFD determine the existing remnant population size through the transplantation of radio collared sentinel rams and subsequent tracking. Rams would be released in March-May to increase probability of encountering extant sheep during the July to October rut. Monitor and confirm that transplanted sheep have remained scabies free for at least two years. Appropriate steps will be taken to minimize scabies infestation of transplanted sheep and the possible transmission of scabies from mule deer populations (RONS projects # 98001 and # 97001).

2: Continue to coordinate with Assistant Regional Director (ARD) for International Affairs regarding funding for sheep management projects based upon anticipated effects of U.S.-Mexico border development on Refuge resources.

3: Conduct and promote research on the scabies mite in the San Andres Mountains to determine if other hosts are present and if there are other factors that may initiate a scabies mite epidemic (RONS projects # 98002).

Objective 2: Continue to accomplish baseline data collection for reference data to allow trend analysis.

Strategies

1: Continue herpetofauna surveys to establish baseline data and conduct the surveys for at least five years (RONS project # 97004).

2: Continue to mist net and band neotropical migratory birds within the San Andres Mountains Ecosystem (RONS project # 97010).

3: Continue to conduct point count surveys of neotropical migratory birds within the San Andres Mountains Ecosystem at a minimum of every two years, in an effort to conduct trend analysis (RONS project # 97005).

4: Conduct small mammals surveys to establish baseline data and conduct the surveys for at least five years (RONS project # 97008).

5: Conduct annual mule deer and mountain lion surveys to determine population trends and the effect on bighorn sheep populations and habitat (RONS project # 97002 and 97003).

6: Continue to work with White Sands Missile Range on data collection and analysis resulting from Land Condition Trend Analysis program transects (RONS project # 97012).

7: Continue to monitor air quality through the collection and analysis of data gathered from air quality stations on the Refuge (RONS project # 97017).

8: Continue to coordinate with the Assistant Regional Director for International Affairs regarding funding based upon U.S.-Mexico border urban development and its effects on the Refuge and ecosystem environment (RONS project # 97012).

Objective 3: Within 5 years, the Refuge will remove at least 10% of oryx encroaching on Refuge lands and 20% reduction of salt cedar stands. The Refuge will continue working with WSMR to employ the following strategies that will minimize encroachment of non-native flora and fauna on the Refuge.

Strategies

1: In cooperation with WSMR and NMGFD determine areas of the Refuge most affected by ungulate encroachment and consider establishment of special depredation hunts and other methods of removal (RONS project # 97011).

2: Within 5 years, reduce salt cedar at least 20% through the use of various methods including mechanical removal, and herbicides. The actual method of removal will be determined by the Refuge manager on a case-by-case basis (RONS project # 97006).

Objective 4: To implement an aggressive, cost effective, fire management program that will protect human life and property both within and adjacent to the Refuge while allowing prescribed fire management that will maintain, mimic and/or restore natural ecosystem processes. As part of its prescribed burning plan the Refuge intends to conduct two burns per year of no more than 1,000 acres for each burn. Notification will be made to appropriate land owners and involved agencies prior to conducting said burns.

Strategies

1: Utilize wildfires to the extent possible, without risking protection of human life or property, to maintain , mimic, and/or restore natural ecosystem processes (RONS project # 97013).

2: Reduce hazardous fuel accumulations and the potential for wildland fires in areas surrounding developments, facilities, and resources at risk. Develop a fuel break network utilizing natural and existing physical barriers whenever possible (RONS project # 97013).

3: Promote an interagency approach to fire and fire based ecosystem management through the development of cooperative agreements, use of the Incident Command System, and a development of a cooperative fire prevention program with other agencies (RONS project # 97013).

4: Within five years use prescribed burning on approximately 5,000 acres in targeted areas such as the east face and top of Bennett Mountain, the east face of Black Brushy Mountain and the east face of San Andres Mountain. Prescribed burning strategy would allow two burns per year of no more than 1,000 acres for each burn. Continue to develop prescribed burning strategies for other target areas on a case by case basis with caution for riparian areas (RONS project # 97009).

5: To the degree practical, utilize prescribed management fire to maintain, mimic, and/or restore natural ecosystem processes and native plant and animal communities. More specifically to create favorable habitat conditions required by native wildlife especially migratory and nesting birds and bighorn sheep (RONS project # 97013).

6: Monitor and evaluate the effects fire has on Refuge ecosystems. Promote and facilitate scientific investigation and research in order to refine burning prescriptions (RONS project # 97013).

7: Utilize public outreach and educational resources to foster understanding of Refuge fire management policies and strategies.

5.2 Cultural Resources

GOAL II: To protect archeological resources and historical sites.

Objective 1: Continue to monitor known archeological and historical sites for disturbance and/or looting as well as natural degradation.

Strategies

1: Conduct Global Positioning System (GPS) survey of all known archeological and historic sites as well as all roads within the Refuge within three years.

2: Construct shelters for historical sites that may be in jeopardy due to natural degradation e.g. Four Brothers Ranch on Goat Mountain.

5.3 Public Use, Wildlife Interpretation and Education

GOAL III: To increase public understanding and awareness of the San Andres National Wildlife Refuge and the San Andres Mountains Ecosystem through effective wildlife education and interpretation initiatives.

Objective 1: Continue to provide programs/presentations to local schools, civic clubs, and other organizations, in an effort to educate the public about the Service, Refuge, and the local ecosystems.

Strategies

1: Develop a general information brochure about the Refuge for distribution to the general public.

2: Develop a brochure about the plants and wildlife on the Refuge for distribution to children.

3: In a cooperative effort with state and federal agencies, and the New Mexico Visitor's Bureau establish an off site visitor center that would emphasize the Refuge and ecosystems in the Las Cruces region as well as other local activities, sites and interests (RONS project # 970018).

4: In a cooperative effort with other agencies construct an information kiosk at the San Augustine Pass parking area. Construct agency specific exhibits and displays for the exterior of the kiosk (RONS project # 970014).

5.4 Interagency Coordination and Relationships

GOAL IV: To strengthen interagency and jurisdictional relationships in order to coordinate efforts with respect to Refuge and surrounding area issues, resulting in decisions benefitting plant, wildlife, and habitat resources on the Refuge and the San Andres Mountains Ecosystem.

Objective 1: In coordination with other agencies and stakeholders pursue agreements and policies that will resolve Refuge boundary and land status.

Strategies

1: Pursue an agreement with WSMR that would allow WSMR to relinquish control of the current property in-holdings within SANWR to SANWR in the event of the cessation of WSMR or curtailment of WSMR jurisdiction over the in-holdings.

2: The Service in cooperation with the JER, develop policies that will protect and preserve the habitat on the Refuge.

Objective 2. Secure written agreements with Refuge partners, and other governmental agencies for the benefit of threatened and endangered wildlife on the Refuge and the San Andres Mountains Ecosystem. This entails effective agreement on courses of action with NMGF and WSMR.

Strategies

1: Establish MOUs with NMGFD, WSMR and other involved agencies for the recovery and management of the desert bighorn sheep. An MOU should define short and long term roles and responsibilities relative to the recovery and management of the San Andres population of the bighorn sheep. The MOU should enable all parties to engage in any appropriate sharing of data, expertise, funding, equipment and/or manpower to achieve CCP objectives and the goals of the overall species recovery plan.

5.5 Improvement of Staffing and Funding

GOAL V: To have effective staffing and funding that will result in long-lasting research, protection, maintenance, and enhancement to wildlife, and habitat resources on the Refuge. Effective staffing and funding levels should lead to the achievement of the Refuge Purposes and the Mission of the National Wildlife Refuge System.

Objective 1: Utilize the Refuge Operating Needs System (RONS) and other internal Service mechanisms to achieve effective staffing levels.

Strategies

1: Secure staffing at the following level;[13]

- Refuge Manager GS-12 PFT
- **Refuge Operation Specialist/International Affairs GS-11 PFT**
- Administrative Assistant GS-4 PFT
- Wildlife Biologist/GIS/GS-11 PFT
- **Maintenance Worker WG-7 PFT**

2: Secure funding for expansion of office facilities to house additional staff and visiting biologists (RONS project # 97003).

3: Continue to coordinate and work with ARD for International Affairs regarding acquisition of borderlands/ NAFTA funds.

4: Within 2 years, acquire GIS mapping and digitization station to include compatible hardware and software components

[13] (Appendix G, bolding denotes positions not currently authorized)

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Appendix A
Birds of San Andres NWR

San Andres NWR Preliminary Bird Species List

Snow Goose
Turkey Vulture
Sharp-shinned Hawk
Coopers Hawk
Red-tailed Hawk
Golden Eagle
American Kestrel
Prairie Falcon
Montezuma Quail
Scaled Quail
Gambel's Quail
Sandhill Crane
Killdeer
Willet
Spotted Sandpiper
Rock Dove
White-winged Dove
Mourning Dove
Greater Roadrunner
Flammulated Owl
Great-horned Owl
Lesser Nighthawk
Common Nighthawk
Common Poorwill
White-throated Swift
Magnificent Hummingbird
Black-chinned Hummingbird
Costa's Hummingbird
Broad-tailed Hummingbird
Rufous Hummingbird
Red-naped Sapsucker
Williamson's Sapsucker
Ladder-backed Woodpecker
Northern Flicker
Olive-sided Flycatcher
Western Wood-pewee
Least Flycatcher
Hammond's Flycatcher
Dusky Flycatcher
Cordilleran Flycatcher
Black Phoebe
Say's Phoebe
Vermilion Flycatcher
Ash-throated Flycatcher
Cassin's Kingbird
Western Kingbird
Violet-green Swallow
Barn Swallow
Scrub Jay
Pinyon Jay
Clark's Nutcracker
Chihuahuan Raven
Common Raven
Mountain Chickadee
Plain Titmouse
Verdin
Bushtit
Red-breasted Nuthatch
Brown Creeper
Cactus Wren
Rock Wren
Canyon Wren
Bewick's Wren
House Wren
Winter Wren
American Dipper
Ruby-crowned Kinglet
Blue-gray Gnatcatcher
Black-tailed Gnatcatcher
Eastern Bluebird
Western Bluebird
Mountain Bluebird
Townsend's Solitaire
Hermit Thrush
American Robin
Northern Mockingbird
Sage Thrasher
Curve-billed Thrasher
Crissal Thrasher
American Pipit
Cedar Waxwing
Phainopepla
Loggerhead Shrike
Bell's Vireo

Gray Vireo
Solitary Vireo
Warbling Vireo
Orange-crowned Warbler
Virginia's Warbler
Yellow Warbler
Yellow-rumped Warbler
Black-throated Gray Warbler
Townsend's Warbler
American Redstart
Northern Waterthrush
MacGillivray's Warbler
Hooded Warbler
Wilson's Warbler
Yellow-breasted Chat
Hepatic Tanager
Summer Tanager
Western Tanager
Pyrrhuloxia
Rose-breasted Grosbeak
Black-headed Grosbeak
Blue Grosbeak
Lazuli Bunting
Indigo Bunting
Varied Bunting
Green-tailed Towhee
Rufous-sided Towhee
Canyon Towhee
Rufous-crowned Sparrow
Chipping Sparrow
Black-chinned Sparrow
Lark Sparrow
Black-throated Sparrow
Lark Bunting
Song Sparrow
Lincoln's Sparrow
White-throated Sparrow
Golden-crowned Sparrow
White-crowned Sparrow
Dark-eyed Junco
Western Meadowlark
Yellow-headed Blackbird
Brewer's Blackbird
Brown-headed Cowbird
Hooded Oriole
Northern Oriole
Scott's Oriole
House Finch
Pine Siskin
Lesser Goldfinch
American Goldfinch

revised 07/29/97
M. Weisenberger
Wildlife Biologist

Appendix B
Mammals of San Andres NWR

SAN ANDRES NWR **PRELIMINARY** MAMMAL LIST

✔ = documented

INSECTIVORA

SCIENTIFIC NAME	COMMON NAME
Notiosorex crawfordi✔	Desert Shrew

CHIROPTERA

SCIENTIFIC NAME	COMMON NAME
Myotis auriculus	Southwestern Myotis
M. californicus✔	California Myotis
M. ciliolabrum✔	Western Small-footed Myotis
M. evotis	Long-eared Myotis
M. lucifugus	Little Brown Bat
M. volans✔	Long-legged Myotis
M. thysanodes✔	Fringed Myotis
M. velifer	Cave Myotis
M. yumanensis	Yuma Myotis
Lasionycteris noctivagans✔	Silver-haired Bat
Lasiurus borealis	Eastern Red Bat
L. cinereus	Hoary Bat
Pipistrellus hesperus✔	Western Pipistrel
Eptesicus fuscus✔	Big Brown Bat
Euderma maculatum	Spotted Bat
Plecotus townsendii✔	Townsend's Big-eared Bat
Idionycteris phyllotis	Allen's Big-eared Bat
Antrozous pallidus✔	Pallid Bat
Tadarida brasiliensis✔	Mexican Free-tailed Bat
Nyctinomops macrotis	Big Free-tailed Bat

LAGOMORPHA

SCIENTIFIC NAME	COMMON NAME
Sylvilagus audubonii✔	Desert Cottontail
S. floridanus	Eastern Cottontail
Lepus californicus✔	Black-tailed jackrabbit

RODENTIA

SCIENTIFIC NAME	COMMON NAME
E. quadrivittatus	Organ Mountain Chipmunk
Ammospermophilus interpres✔	Texas Antelope Squirrel
Spermophilus spilosoma✔	Spotted Ground Squirrel
S. variegatus✔	Rock Squirrel
Thomomys bottae✔	Botta's Pocket Gopher
Geomys arenarius	Desert Pocket Gopher
Chaetodipus intermedius✔	Rock Pocket Mouse
Dipodomys merriami✔	Merriam's Kangaroo Rat
D. ordii✔	Ord's Kangaroo Rat
D. spectabilis✔	Banner-tailed Kangaroo Rat
Reithrodontomys megalotis✔	Western Harvest Mouse
Peromyscus boylii✔	Brush Mouse
P. eremicus✔	Cactus Mouse
P. maniculatus✔	Deer Mouse
Onychomys leucogaster✔	Northern Grasshopper Mouse
O. torridus✔	Southern Grasshopper Mouse
Sigmodon hispidus✔	Hispid Cotton Rat
Neotoma albigula✔	White-throated Woodrat
N. micropus✔	Southern Plains Woodrat

Erethizon dorsatum✔	Porcupine

CARNIVORA

SCIENTIFIC NAME	COMMON NAME
Canis latrans✔	Coyote
C. lupus	Gray Wolf
Vulpes vulpes✔	Red Fox
V. velox✔	Swift Fox
Urocyon cinereoargenteus✔	Gray Fox
Ursus americanus	Black Bear
Bassariscus astutus✔	Ringtail
Procyon lotor✔	Racoon
Taxidea taxus✔	Badger
Spilogale gracilis✔	Spotted Skunk
Mephitis mephitis✔	Striped Skunk
Conepatus mesoleucus✔	Hognose Skunk
Felis concolor✔	Mountain Lion
Lynx rufus✔	Bobcat

ARTIODACTYLA

SCIENTIFIC NAME	COMMON NAME
Odocoileus hemionus crooki✔	Desert Mule Deer
Antilocapra americana	Pronghorn
Ovis canadensis mexicana✔	Desert Bighorn Sheep
Oryx gazella✔	Gemsbok
Tayassu tajacu sonoriensis✔	Collared Peccary, Javalina

updated 08/12/97
M. Weisenberger

Appendix C
Listed Flora of San Andres NWR

Table 1. Known or Suspected Federally Listed Threatened and Endangered Flora Species within the San Andres Planning Unit, 1998.

FAMILY	KNOWN or EXPECTED	GENUS	SPECIES	COMMON	FEDERAL STATUS	NEW MEXICO STATUS	GENERAL LOCATION
AGAVACEAE	K	Agave	neomexicana	New Mexico Agave	NONE	NONE	frequent on upper bajadas (WSMR species of concern)
AGAVACEAE	K	Yucca	torreyi	Torrey Yucca	NONE	NONE	confined to few populations in San Andrecito and Lead Camp Canyons (WSMR species of concern)
AMARANTHACEAE	E	Tidestromia	suffruticosa	Shrubby Honeysweet	NONE	NONE	verified only near San Nicholas Spring (WSMR species of concern)
APIACEAE	K	Aletes	filifolius	Thread-leaf Indian Parsley	NONE	Plant taxa considered, but not included List 4	infrequent in shade of cliffs, northern exposures
ACERACEAE	K	Acer	grandidentatum	Big-tooth Mountain Maple	NONE	Plant taxa considered, but not included List 4	in tributary to Little San Nicholas Canyon
ASTERACEAE	E	Hymenoxys	vaseyi	Vasey's Bitterweed	NONE	Rare & Sensitive List 2	high slopes below pinyon-juniper treeline
ASTERACEAE	K	Perityle	staurophylla	San Andres Cross Rock Daisy	NONE	NONE	growing on north facing cliff faces (WSMR species of concern)
CACTACEAE	E	Cereus	greggii	Night-blooming Cereus	Species of Concern	Endangered List 1	expected on Refuge at lower elevations in creosote scrubland
CACTACEAE	E	Coryphantha	scheeri var. valida	Scheer's Pincushion Cactus	NONE	Plant taxa considered, but not included List 4	lower elevations in montane shrublands

CACTACEAE	K	Echinocereus	pectinatus var. dasyacanthus	Yellow-flowered Rainbow Cactus	NONE	Plant taxa considered, but not included List 4	rocky upper bajadas
CACTACEAE	K	Echinocereus	rigidissimus	Rainbow Hedgehog Cactus	NONE	NONE	frequent on rocky mid bajadas (WSMR species of concern)
CACTACEAE	K	Epithelantha	micromeris	Button Cactus	NONE	Plant taxa considered, but not included List 4	cracks in limestone boulders above 6000'elevation
CACTACEAE	K	Escobaria	sandbergii	Sandberg's Pincushion Cactus	NONE	Plant taxa considered, but not included List 4	all over limestone hills
CACTACEAE	K	Ferocactus	wislizenii	Southwestern Barrel Cactus	NONE	Plant taxa considered, but not included List 4	rocky bajadas
CACTACEAE	K	Sclerocactus	uncinatus var. wrightii	Cat-claw Cactus	NONE	NONE	frequent on western exposures - upper bajadas (WSMR species of concern)
CACTACEAE	E	Mammillaria	wrightii var. wrightii	Wright's Pincushion Cactus	NONE	Plant taxa considered, but not included List 4	limestone substrate at middle to lower elevations
CACTACEAE	K	Neolloydia	intertexta var. dasyacantha	Pineapple Cactus	NONE	Plant taxa considered, but not included List 4	lower elevations (i.e., east Little San Nicholas Cyn.)
CACTACEAE	E	Sclerocactus	papyracanthus	Grama Grass Cactus	NONE	Plant taxa considered, but not included List 4	in alkali sacaton, burrograss, and grama grasslands lower elevations
CARYOPHYLLACEAE	E	Silene	plankii	Plank's Catchfly	NONE	Rare & Sensitive List 2	on limestone substrate near Ropes Spring and Upper Ash Canyon
FABACEAE	K	Astragalus	castetteri	Castetter's Milkvetch	NONE	Rare & Sensitive List 2	scattered throughout Refuge

LAMIACEAE	K	Hedeoma	pulcherrima	Mescalero Pennyroyal	NONE	Rare & Sensitive List 2	in riparian areas
LAMIACEAE	E	Hedeoma	todsenii	Todsen's Pennyroyal	Endangered	Endangered List 1	expected on Refuge on steep north facing slopes in pinyon-juniper
LOASACEAE	E	Mentzelia	perennis	Gypsum Blazing-star	NONE	Plant taxa considered, but not included List 4	open pinyon-juniper stands
POLYGALACEAE	E	Polygala	rimulicola var. mescalerorum	Mescalero Milkwort	Species of Concern	Endangered List 1	expected on Refuge; found on north facing slopes in Bear Canyon
PORTULACACEAE	K	Talinum	longipes	Long-stemmed Flame Flower	NONE	Rare & Sensitive List 2	expected on Refuge; found growing on limestone
SCROPHULARIACEAE	E	Penstemon	alamosensis	Alamo Beardtongue	Species of Concern	Rare & Sensitive List 2	expected on Refuge; found on north facing slopes in Bear Canyon
STERCULIACEAE	E	Ayenia	microphylla	Little-leaf Ayenia	NONE	Plant taxa considered, but not included List 4	verified only in Lost Man Canyon

Appendix D
Listed Fauna of San Andres NWR

Endangered Species of San Andres NWR

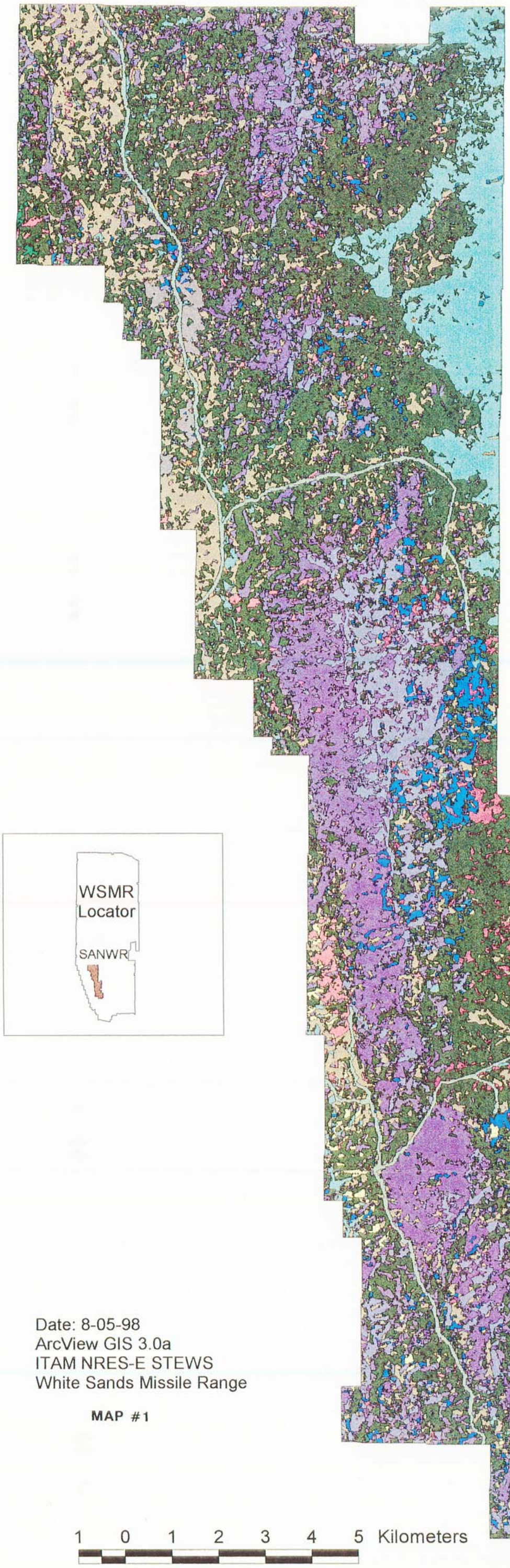
Federal and state listed fauna

Common Name	Scientific Name	Federal Status	New Mexico Status
Desert Bighorn Sheep	*Ovis canadensis ssp. mexicana*	None	Endangered
Fringed Myotis	*Myotis thysanodes ssp. thysanodes*	Species of concern	None
Long-legged myotis	*Myotis volans ssp. interior*	Species of concern	None
Small-footed myotis	*Myotis ciliolabrum ssp.melanorhinus*	Species of concern	None
Western Townsend's Big-eared Bat	*Plecotus townsendii ssp. pallescens*	Species of concern	None
Loggerhead Shrike	*Lanius ludovicianus*	Species of concern	None
Costa's Hummingbird	*Calypte costae*	None	Threatened
Gray Vireo	*Vireo vicinior*	None	Threatened
Bell's Vireo	*Vireo bellii*	None	Threatened
Texas Horned Lizard	*Phyrnosoma cornutum*	Species of concern	None

Appendix E
Maps

New Mexico Natural Heritage Program Vegetation Map

SAN ANDRES NWR



Vegetation Classification

- Acacia Shrubland
- Creosotebush Shrubland
- Foothill-Montane Temperate Grasslands
- Fourwing Saltbush Shrubland
- Interior Chaparral
- Juniper Woodland
- Lowland Basin Grasslands
- Mesquite Shrubland
- Mimosa Shrubland
- Mixed Foothill-Piedmont Desert Grasslands
- Mixed Lowland Desert Scrub
- Montane Scrub
- Montane Valley Dune Woodland
- Piedmont Desert Grasslands
- Piedmont Temperate Grasslands
- Pinyon Pine Woodland
- Ponderosa Pine Forest
- Road Disturbance
- Tarbush Shrubland

N

Date: 8-05-98
ArcView GIS 3.0a
ITAM NRES-E STEWS
White Sands Missile Range

MAP #1

1 0 1 2 3 4 5 Kilometers

Desert Bighorn Sheep Habitat

Gunsight Peak

Strawberry Peak

Gardner Peak

San Andres Peak

N

MAP #2

SAN ANDRES NWR

Paved Road
Unpaved Road
Sheep Habitat
San Andres National Wildlife Refuge
White Sands Missile Range

Date: 8-05-98
ArcView GIS 3.0a
ITAM NRES-E STEWS
White Sands Missile Range

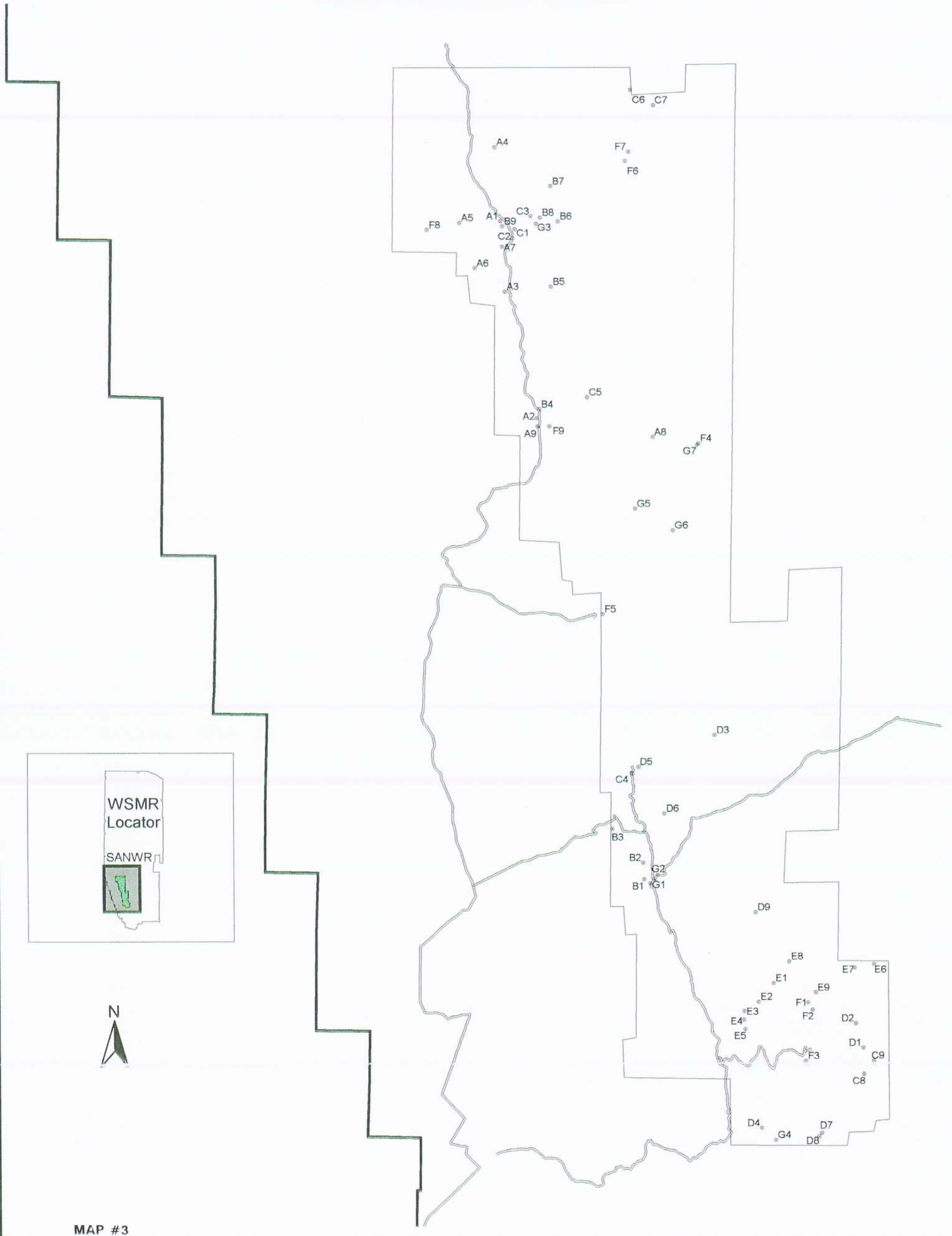
WSMR Locator

SANWR

2 0 2 4 6 8 10 Kilometers

SANWR Springs

SAN ANDRES NWR



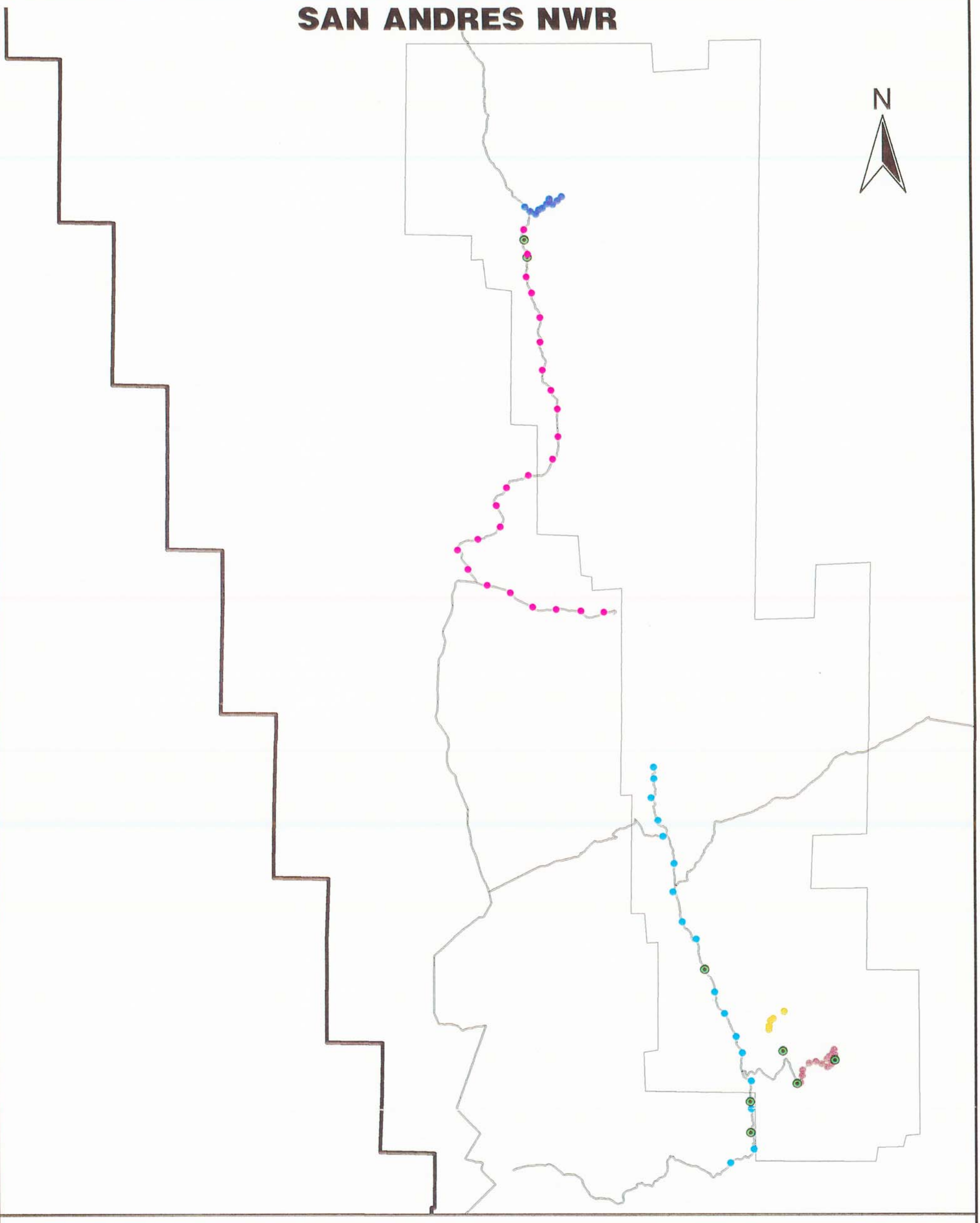
MAP #3

Date: 8-05-98
ArcView GIS 3.0a
ITAM NRES-E STEWS
White Sands Missile Range

San Andres National Wildlife Refuge
Spring
Road
WSMR Boundary

Bird and Herp Survey Sites

SAN ANDRES NWR

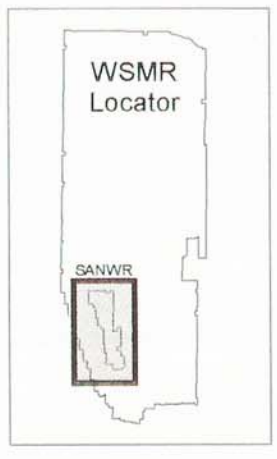


MAP #4

- Rope Springs Bird Point Route
- Herp Array
- Goat Mountain Bird Point Route
- Rock House Spring Bird Point Route
- Mayberry Bird Point Route
- Little San Nicholas Canyon Bird Point Route
- WSMR Boundary
- Road
- San Andres National Wildlife Refuge

Date: 8-05-98
ArcView GIS 3.0a
ITAM NRES-E STEWS
White Sand Missile Range

2 0 2 4 6 8 10 Kilometers



HSR Survey Sites

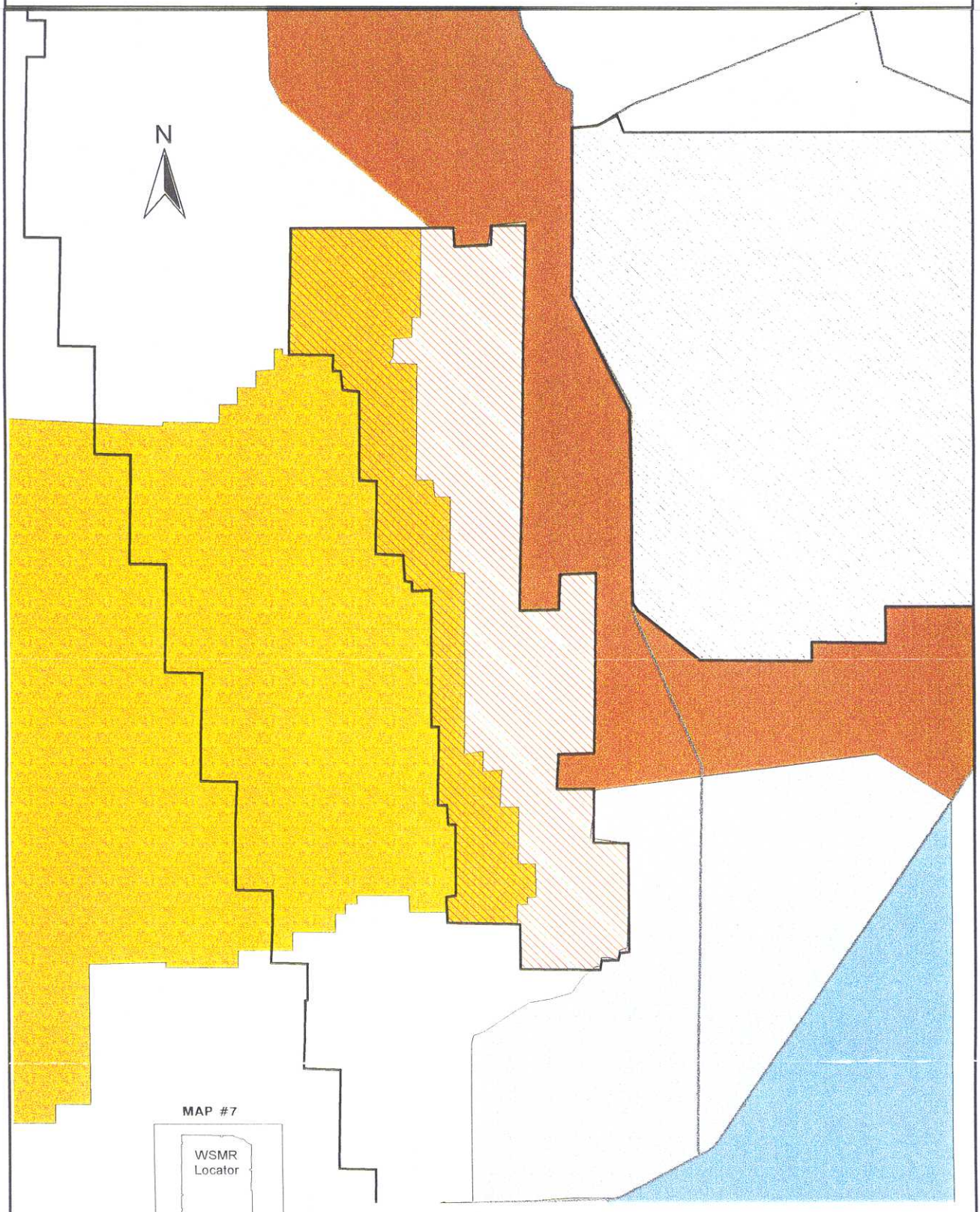
(Boundaries Approximate)

San Andres National Wildlife Refuge Springs Location Map Table.

Id Key	Study Name	Elevation	Easting	Northing
A1	J-4	5100	351088	3658468
A2	Lead Camp	5120	352147	3622415
A3	J-5;Deer Spring	5320	351214	3626294
A4	J-1	5420	350940	3630740
A5	Und	5260	349850	3628416
A6	J 6	5320	350304	3627021
A7	Und	0	351134	3627686
A8	KL 18	5140	355668	3621833
A9	Horse	5110	352174	3622159
B1	Salt Canyon	5490	355336	3608270
B2	Salinas	5530	355311	3608774
B3	Burro	5530	354382	3609815
B4	Und	5085	352233	2622688
B5	Und - SA -1	5040	352610	3626450
B6	Crawford	4900	352839	3628463
B7	Unnamed	5240	352620	3629540
B8	Unnamed	4980	352299	3628578
B9	J 3	5050	351150	3628309
C1	San Andrecito	5040	351523	3628219
C2	Mayberry	5080	351461	3627950
C3	Unnamed	5140	352008	3628619
C4	Undoc	5600	355000	3611510
C5	San Andres	4960	353629	3623057
C6	KL14	5280	355072	3632495
C7	KL 17/Lizard Head/Bairds seep	5180	355763	3632027
C8	Bennett 1	6520	362000	3602295
C9	Bennett 2	6570	362300	3602700
D1	SA 2	6630	361984	3603097
D2	Ewe Skull	6570	361750	3603840
D3	Coyote 2	5320	357489	3612685
D4	Prosser	5270	358884	3600643
D5	Ash - Upper	5620	355191	3611710
D6	Ash - South	5280	355955	3610285
D7	Faust	5720	360705	3600481
D8	Fossil	5280	360635	3600380
D9	Coyote #1	5600	358712	3607255
E1	Unnamed	5200	359252	3605074
E2	Joe Taylor	5360	358796	3604505
E3	San Nicholas	5440	358374	3604220
E4	KL 20	5480	358530	3603958
E5	KL 19	5540	358400	3603670
E6	Unknown	6080	362300	365650
E7	Columbine	5360	361716	3605549
E8	Little San Nicholas	5070	359733	3605742
E9	Lower Goat	5690	360532	3604785
F1	Goat	5810	360296	3604483
F2	Upper Goat	6170	360441	3604253
F3	Red	6350	360235	3602690
F4	Dugout 1	5005	357053	3621640
F5	Ropes	5650	354114	3616387
F6	KL 16	5550	354906	3630310
F7	KL15	5440	355003	3630603
F8	J 2	0	348860	362820
F9	J 7	0	352540	3622160
G1	Unnamed Cottonwood	0	355530	3608140
G2	Unnamed Cottonwood	0	355760	3608400
G3	Unnamed Crawford	4970	352170	3628385
G4	Mines by Prosser	0	359310	3600280
G5	White Rock 1	7000	355120	3619630
G6	White Rock 2	5760	356260	3618960
G7	Dugout 2	0	357010	3621590

Small Game/Varmint Hunt Areas

(Boundaries Approximate)



Date: 8-05-98
ArcView GIS 3.0a
ITAM NRES-E STEWS
White Sand Missile Range

WSMR Boundary
San Andres National Wildlife Refuge
White Sands National Monument
Road
Jornada Experimental Range
Hunt Areas:
Unit 1
Unit 3
Unit 4

2 0 2 4 6 8 10 Kilometers

SAN ANDRES NWR

Facility Locations

RAD Site Complex

Tar Shack

N

SW 30 Obs Tower

San Andres Peak Obs Tower

Mar Well

SAMS Site

Nick Site

Zebra Site

Little San Nicholas Camp

NE Bennett Obs Tower

Goat Mtn Drinker

Cedar Site

Fox Site

MAP #8

- Facility
- Unpaved Road
- Paved Road
- White Sands Missile Range Boundary
- San Andres National Wildlife Refuge

Date: 8-05-98
ArcView GIS 3.0a
ITAM NRES-E STEWS
White Sands Missile Range

WSMR Locator

SANWR

1 0 1 2 3 4 5 Kilometers

SAN ANDRES NWR

Jurisdictional Boundaries

N

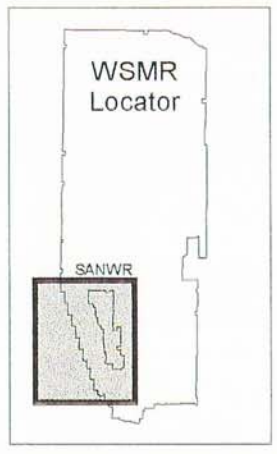
SAN ANDRES NWR

MAP #9

- Road
- WSMR Boundary
- San Andres National Wildlife Refuge
- Jornada Experimental Range
- JER Research Rights

Date: 8-05-98
ArcView GIS 3.0a
ITAM NRES-E STEWS
White Sand Missile Range

2 0 2 4 6 8 10 Kilometers



Appendix F
Refuge Operating Needs (RONS)

Record View

22521 San Andres NWR **NM**

Proj #: 97001 Type: NWR District: New Mexico

ACTIVITY: *1) MONITORING & STUDIES*
Surveys & Censuses

MEASURES: 1 new survey(s) will be conducted
50 % of effort will be off-refuge

DESCRIPTION:
A complete survey of the San Andres Mountains needs to be done on an annual basis for desert bighorn sheep. The survey needs to be conducted by helicopter and would require about 6 days to accomplish. The desert bighorn sheep is State-listed as endangered. This is the only indigenous population in the state. This species is an indicator of some significant changes within the San Andres Mountains ecosystem. At minimum, we need to know how many and where they are on an annual basis. This would also include doing ground surveys for verification of numbers.

FUNDS & STAFF NEEDED:	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$0	$30	0.5
Subsequent Years:		$20	0.3

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
75	0	0	25	0	0	0	0	0	100

PLANNING LINK:
- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☒ Legal Mandate

The San Andres NWR was established by Executive Order 8646 dated January 22, 1941 "for the conservation and development of natural wildlife resources." The primary reason for establishing the refuge was for management emphasis on desert bighorn sheep and their habitat. The San Andres sheep, being state-listed endangered, are a primary management population for the New Mexico Game and Fish, as well as the

RANK - STATION: 1 **DISTRICT:** 999 **REGIONAL:** 24 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97002 Type: NWR District: New Mexico

ACTIVITY: *1) MONITORING & STUDIES*

Surveys & Censuses

MEASURES: 1 new survey(s) will be conducted

50 % of effort will be off-refuge

DESCRIPTION:

Since the desert mule deer is a primary prey source for mountain lions an annual survey needs to be done to determine numbers, productivity and survivability (general/gross), and distribution. The "health" of the mule deer population in the San Andres Mountains can have a significant effect on whether or not the desert bighorn sheep population may be more at risk from predation by mountain lions. Although the refuge is closed to hunting, there are other hunts held in the San Andres Mtns. that could be indirectly affecting wildlife species on the refuge.

FUNDS & STAFF NEEDED:

	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$0	$20	0.4
Subsequent Years:		$15	0.3

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
0	0	0	25	0	0	75	0	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources," including ensuring the "health" of the ecosystem and its inhabitants. Mule deer are indicators of the health of the ecosystem and its management. The U/MRG ecosystem Goal #5 supports the accomplishment of this project.

RANK - STATION: 4 **DISTRICT:** 999 **REGIONAL:** 118 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97003 Type: NWR District: New Mexico

ACTIVITY: *1) MONITORING & STUDIES*

Surveys & Censuses

MEASURES: 1 new survey(s) will be conducted

50 % of effort will be off-refuge

DESCRIPTION:

Since the mountain lion plays a significant role in the San Andres ecosystem, an annual survey of them should be accomplished. This would be done on the ground by setting up transects that would be surveyed for tracks/scat/scrapes. Recent information gathered during the 10-year mountain lion study that was just completed would be used in this effort.

FUNDS & STAFF NEEDED:	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$0	$10	0.5
Subsequent Years:		$10	0.5

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
0	0	0	25	0	0	75	0	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The Refuge was established "for the conservation and development of natural wildlife resources", which includes management efforts for the mountain lion. The mountain lion population and dynamics have a direct effect on the State-listed desert bighorn sheep. At a minimum, we need to know the relative numbers of lions in the area. The U/MRG ecosystem Goal #5 supports the accomplishment of this project.

RANK - STATION: 5 **DISTRICT:** 999 **REGIONAL:** 149 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97004 Type: NWR District: New Mexico

ACTIVITY: *1) MONITORING & STUDIES*

Surveys & Censuses

MEASURES: 8 new survey(s) will be conducted

0 % of effort will be off-refuge

DESCRIPTION:

The refuge has not done a survey/census for herptile species. This would be an effort to document all herptile species on the refuge. A survey would be done with the use of wings, drop-buckets, walk-in traps, etc. The surveys would be done for 4-5 days at a time with the traps being checked 1-2 times within a 24-hour period depending on the time of year. This project is important since not much is known about which herptile species occur within this area. We could then determine why the species occur in their respective habitats and how that contributes to the ecosystem.

FUNDS & STAFF NEEDED:

	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$0	$2	0.4
Subsequent Years:		$2	0.4

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
0	0	0	50	0	0	50	0	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The Refuge was established "for the conservation and development of natural wildlife resources". This includes herptile species, which are an integral part of the ecosystem. The U/MRG ecosystem Goal #5 supports the accomplishment of this project.

RANK - STATION: 8 **DISTRICT:** 999 **REGIONAL:** 225 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97005 Type: NWR District: New Mexico

ACTIVITY: *1) MONITORING & STUDIES*

Surveys & Censuses

MEASURES: 3 new survey(s) will be conducted

10 % of effort will be off-refuge

DESCRIPTION:

The refuge recently completed an intensive 3-year survey of all birds on the refuge. Now that the refuge has baseline data, the refuge needs to continue to monitor bird populations that use the refuge. This would give an indication as to the health of the ecosystem and bird populations. Transects used for the intensive 3-year study would continue to be used for the annual surveys. If this is not done, valuable information would be lost, especially in regards to species of birds discovered here that were not previously known to occur here.

FUNDS & STAFF NEEDED:

	Construction Cost ($000)	Operations Cost ($000)	FTEs Needed
First Year:	$0	$2	0.2
Subsequent Years:		$2	0.2

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
10	0	70	10	0	0	10	0	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources" which includes all bird species. The U/MRG Ecosystem Goal #2 refers to maintaining migratory bird populations at healthy and supportable levels. By doing annual surveys of migratory bird populations, we could contribute to the "maintenance" of them and their continued existence.

RANK - STATION: 9 **DISTRICT:** 999 **REGIONAL:** 241 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97006 Type: NWR District: New Mexico

ACTIVITY: *3) HABITAT MANAGEMENT*

Control Pest Plants

MEASURES: 20 acres will be treated

1 species will be targeted

DESCRIPTION:

Riparian areas of the refuge have been invaded by saltcedar (*Tamarix pentandra*). This exotic species is displacing the native cottonwoods, ash, New Mexico olive and other vegetation. This is also having an effect on the species of wildlife occurring in those areas. The saltcedar will be cut and/or pulled out, then followed up with an herbicide treatment. All work will be done by hand, since the areas are remote and located in sensitive areas.

FUNDS & STAFF NEEDED:	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$0	$5	1.5
Subsequent Years:		$5	1.5

OUTCOMES:	ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
	0	0	50	25	0	0	25	0	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources" which includes controlling exotic plant species. The U/MRG ecosystem Goal #3 is to "reverse declining trends in quality and quantity of riparian/wetland habitats by restoring, maintaining and enhancing species composition." Treatment and control of saltcedar would definitely support these goals and purposes.

RANK - STATION: 10 **DISTRICT:** 999 **REGIONAL:** 270 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97008 Type: NWR District: New Mexico

ACTIVITY: *1) MONITORING & STUDIES*

Surveys & Censuses

MEASURES: 1 new survey(s) will be conducted

50 % of effort will be off-refuge

DESCRIPTION:

A small mammal species inventory is needed for baseline data for the refuge and surrounding area. Some work has already been done by NBS, but is very piece-meal. This would entail trapping, collecting, identifying (to species), and reporting all small mammals within the San Andres Mountains. The work would include surveying/censusing bats and mapping their roosting sites (potential/known) i.e.caves/old mines

FUNDS & STAFF NEEDED:

	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$0	$40	1.0
Subsequent Years:		$20	0.5

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
10	0	0	50	0	0	40	0	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources." The U/MRG ecosystem Goal #5 - "Protect, maintain, and restore upland terrestial communities at the landscape level" would support the accomplishment of this project.

RANK - STATION: 11 **DISTRICT:** 999 **REGIONAL:** 288 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97009 Type: NWR District: New Mexico

ACTIVITY: *3) HABITAT MANAGEMENT*

Prescribed Burning

MEASURES: 5000 acres will be burned

1 burn(s) will be conducted

DESCRIPTION:

There is a need to evaluate habitat management on the refuge, especially in regards to vegetation changes i.e. increase in growth of woody plants. Fires have been strictly controlled on the White Sands Missile Range (WSMR) due to fears by the U.S. Army relative to wildfires. We think this has significantly changed the vegetation on the refuge, as well as the lands of WSMR. An evaluation should be made as to the possible changes that have occurred in vegetational growth and how that has affected the fauna and flora within the area (if it has affected them). A prescribed fire program should be instituted, as necessary.

FUNDS & STAFF NEEDED:	Construction Cost ($000)	Operations Cost ($000)	FTEs Needed
First Year:	$0	$30	
Subsequent Years:		$10	

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
0	0	25	50	0	0	25	0	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources." The control of wildfires has changed the natural process by which fires have naturally occurred and setback the growth of vegetation on the refuge. This has probably changed the occurrence of some fauna and other types of flora on the refuge. The U/MRG ecosystem Goal #5 supports the accomplishment of this project.

RANK - STATION: 13 **DISTRICT:** 999 **REGIONAL:** 322 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97010 Type: NWR District: New Mexico

ACTIVITY: *4) FISH & WILDLIFE MANAGEMENT*

Bird Banding

MEASURES: 0 waterfowl will be banded

500 other birds will be banded

DESCRIPTION:

The refuge has recently completed an intensive 3-year bird survey. However, due to some efforts to mist-net birds, we are finding some additional species. The refuge will continue to mist-net and band passerines, in an effort to determine where these birds come from and go to. This will also give the refuge/Service a more complete picture as to the species of birds using the refuge and what time of year they are using the refuge.

FUNDS & STAFF NEEDED:

	Construction Cost ($000)	Operations Cost ($000)	FTEs Needed
First Year:	$0	$5	0.5
Subsequent Years:		$5	0.5

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
0	0	50	25	0	0	15	10	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources." This project supports the establishing order of the refuge by providing necessary information for the conservation and development of natural wildlife resources. The U/MRG ecosystem Goal #2 supports this project.

RANK - STATION: 12 **DISTRICT:** 999 **REGIONAL:** 305 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97011 Type: NWR District: New Mexico

ACTIVITY: *4) FISH & WILDLIFE MANAGEMENT*

Predator & Exotic Control

MEASURES: 1 species will be targeted

50 animals will be removed

DESCRIPTION:

The oryx (*Oryx gazella*) was introduced in the late-1960's onto the WSMR, which borders the refuge. Since the refuge does not have a boundary fence, the oryx have now moved onto it. This is an exotic species that could be having some detrimental effects on refuge wildlife and habitat. However, this is unknown since no studies have been done to evaluate the potential effects of the presence of oryx. Some things that need to be looked at include: parasites, interactions w/other big game, diseases, etc.

FUNDS & STAFF NEEDED:

	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$0	$30	1.0
Subsequent Years:		$30	1.0

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
0	0	0	25	0	0	75	0	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

Since the refuge was established "for the conservation and development of natural wildlife resources", it is apparent that by accomplishing this project the refuge would be abiding by its establishing order. The U/MRG ecosystem Goals #3, 5, and 8 support the accomplishment of this project.

RANK - STATION: 14 **DISTRICT:** 999 **REGIONAL:** 337 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97012 Type: NWR District: New Mexico

ACTIVITY: *5) COORDINATION ACTIVITIES*
Interagency Coordination

MEASURES: 16 issue(s) will be coordinated
(no second measure)

DESCRIPTION:
Since the refuge is the only Fish and Wildlife Service office in this part of the state, it is considered by the public and other agencies to be the representative of the Service for all issues. We have to coordinate with federal agencies such as the Dept. of Defense, Bureau of Land Management, U.S.Bureau of Reclamation, U.S.Forest Service, Natural Resources Conservation Service, Animal Damage Control, Agricultural Research Service, NASA, National Park Service, etc. State agencies that we deal with include: New Mexico Game & Fish, New Mexico State Univ., State Land Office, etc.

FUNDS & STAFF NEEDED:	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$0	$2	0.0
Subsequent Years:		$2	0.0

OUTCOMES:	ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
	15	10	25	25	0	0	20	5	0	100

PLANNING LINK:
- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources" which includes coordinating with other agencies and groups as to projects/operations that might affect refuge management. The U/MRG Ecosystem Goals support the accomplishment of this project.

RANK - STATION: 15 **DISTRICT:** 999 **REGIONAL:** 345 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97013 Type: NWR District: New Mexico

ACTIVITY: *6) RESOURCE PROTECTION*

Wildfire Preparedness

MEASURES: 2 fire(s) expected on-refuge

5 fire(s) expected near refuge

DESCRIPTION:

Dependent upon the type of year we have, relative to precipitation, the refuge has had wildfires in the past that have not received priority due to surrounding land fires. Priority for attacking/fighting fires is on the WSMR lands due to the presence of facilities/equipment. However, the refuge also has facilities that need to be protected in the event of a wildfire. Also included in this project would be the maintenance of refuge roads that would serve as fire breaks.

FUNDS & STAFF NEEDED:

	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$0	$10	0.0
Subsequent Years:		$5	0.0

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
0	0	25	50	0	0	25	0	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources" which includes managing habitat with prescribed fire, if necessary. The U/MRG Ecosystem Goal #1, 3, and 5 support the accomplishment of this project.

RANK - STATION: 16 **DISTRICT:** 999 **REGIONAL:** 361 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97014 Type: NWR District: New Mexico

ACTIVITY: *8) PUBLIC EDUCATION & RECREATION*

Outreach

MEASURES: 50000 people will be reached

2 special event(s) will be hosted

DESCRIPTION:

Since the refuge is not open to the public, it is imperative that some means of outreach be employed that would reach a large number of people and not require an exhorbitant amount of funding to accomplish or maintain. A kiosk is currently planned for the San Augustine Pass parking area on State Hwy. 70. The second phase of the project would involve the construction of agency specific exhibits/display panels (exterior). This would provide an opportunity for exposure of the Service/Refuge to the public. This area is a major stopping point during missile testing roadblocks and as a scenic viewpoint.

FUNDS & STAFF NEEDED:

	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$10	$0	0.0
Subsequent Years:		$1	0.0

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
10	0	25	25	0	0	25	15	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources" which includes interpretation of our natural resources for the public. The U/MRG Ecosystem Goal #6 supports the accomplishment of this project.

RANK - STATION: 17 **DISTRICT:** 999 **REGIONAL:** 373 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97015 Type: NWR District: New Mexico

ACTIVITY: *9) PLANNING & ADMINISTRATION*

Comprehensive Management Planning

MEASURES: 100 % of a CMP will be completed

1 station(s) will be included

DESCRIPTION:

The refuge has never undergone a comprehensive management planning effort. Since the refuge does not have a public recreation program or grazing program, and is not accessible for minerals exploration, the planning effort would not require as much time by the planners. However, we would have to deal with the Dept. of Defense and the Agricultural Research Service, due to previous and current land management restrictions, which could require more time and effort. A comprehensive management plan is necessary and imperative to providing a course/focus for management of the refuge.

FUNDS & STAFF NEEDED:

	Construction Cost($000)	Operations Cost($000)	FTEs Needed
First Year:	$0	$50	1.0
Subsequent Years:		$1	1.0

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
15	0	25	25	0	0	25	10	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources" which includes planning for the management of natural resources. The U/MRG Ecosystem goals support the accomplishment of this project.

RANK - STATION: 7 **DISTRICT:** 999 **REGIONAL:** 191 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97016 Type: NWR District: New Mexico

ACTIVITY: *9) PLANNING & ADMINISTRATION*
General Administration

MEASURES: _____ (no first measure)
_____ (no second measure)

DESCRIPTION:
General administration of the refuge takes a lot of time, money and effort to accomplish. Especially when you have a small number of people (2) to run a refuge: administratively, biologically, facilities/equipment maintenance, law enforcement, coordination (local/region/international), and public outreach still need to be accomplished. As far as most people (and agencies), the refuge is the Fish and Wildlife Service.

FUNDS & STAFF NEEDED:

	Construction Cost ($000)	Operations Cost ($000)	FTEs Needed
First Year:	$0	$200	4.0
Subsequent Years:		$200	4.0

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
15	0	25	25	0	0	25	10	0	100

PLANNING LINK:
- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources" which requires personnel to do the job effectively and efficiently. The U/MRG Ecosystem goals support the accomplishment of this project.

RANK - STATION: 3 **DISTRICT:** 999 **REGIONAL:** 79 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

Proj #: 97017 Type: NWR District: New Mexico

ACTIVITY: *1) MONITORING & STUDIES*

Studies & Investigations

MEASURES: 1 new study(ies) will be conducted

0 % of effort will be off-refuge

DESCRIPTION:

Air quality is an unknown in the area of the refuge and is a contributing factor as the health of the ecosystem. With the population growth in the El Paso, TX/Juarez, Mexico/Las Cruces, NM area, the air quality is getting worse. We need to get some baseline data for the San Andres Mtns. to see if changes in the future can be attributed to air quality. Changes in air quality could affect the growth of vegetation, which could affect the occurrence of certain species in the San Andres Mountains.

FUNDS & STAFF NEEDED:

	Construction Cost ($000)	Operations Cost ($000)	FTEs Needed
First Year:	$30	$25	1.0
Subsequent Years:		$25	1.0

OUTCOMES:

ES	WF	OMB	HEC	IAF	SDA	RFW	PED	PRC	TOT
15	0	25	25	0	0	25	10	0	100

PLANNING LINK:

- ☐ Station CMP
- ☒ Station Goal/Objective
- ☐ Station Step-down Mgmt Plan
- ☐ Recovery Plan
- ☒ Ecosystem Goal/Plan
- ☐ Legal Mandate

The refuge was established "for the conservation and development of natural wildlife resources" which includes determining air quality on the refuge. The U/MRG Ecosystem goals support the accomplishment of this project.

RANK - STATION: 6 **DISTRICT:** 999 **REGIONAL:** 165 **NATIONAL:** 999

Record View

22521 San Andres NWR NM

HQ:

Proj #: 97018 Type: NWR District: New Mexico

ACTIVITY: *PUBLIC EDUCATION & RECREATION*
7.a. Provide Visitor Services

BUDGET CATEGORY: People

MEASURES: 500,000 new visitors will be served
0 existing visitors will be served

TITLE: Construction of new visitor center with other cooperative agencies.

DESCRIPTION:

A visitor center should be built in Las Cruces on Interstate 10. This would provide a major outreach effort for the Fish & Wildlife Service, since there are no USFWS facilities along Interstate 10 in the entire southwestern U.S. and possibly the entire I-10 system. The visitor center could also serve as a link between U.S. and Mexico efforts, serving as an administrative office for personnel from both countries that are working on wildlife/habitat related studies.

FUNDS NEEDED ($1000s):

	One-Time	Recurring Base	First Year Need
Construction Costs.....	$500,000		$500,000
O&M: Personnel Costs.....		$31	
Equipment/Facility Cost....			
Contracts/Services.....			
Miscellaneous Costs.....	$10	$10	
TOTAL O&M Costs.....	$10	$41	$51

PERMANENT STAFF NEEDED (FTEs):

	Number (1/10s)	FTE Cost
Managers.....	0.3	$20
Biologists.....	0.2	$11
Resource Specialists.....		$0
Education/Recreation Staff.....		$0
Law Enforcement.....		$0
Clerical/Administrative.....		$0
Maintenance/Equipment Operation.....		$0
TOTAL FTEs Needed.....	0.5	$31

Record View

22521 San Andres NWR NM

HQ:

Proj #: 98001 Type: NWR District: New Mexico

ACTIVITY: *MONITORING & STUDIES*

1.a. Surveys & Censuses

BUDGET CATEGORY: Wildlife

MEASURES: 1 wildlife surveys will be conducted
1 habitat surveys will be conducted
50 % of survey will be off-refuge

TITLE: Restoration of Desert Bighorn Sheep Population

DESCRIPTION:

The desert bighorn sheep population within the San Andres Mountains and the San Andres National Wildlife Refuge has declined precipitously to near extinction. This was the last indigenous population of desert bighorn sheep within the state. We are now proposing to restore the population of sheep by doing habitat modification and then augmenting the population with sheep from the State's Red Rock facility. This will require constructing a holding pen (< 1 acre) at the San Nicholas Camp site; helicopter time; purchase of radio collars; and hiring of a bio-tech to monitor the sheep while they are penned and to monitor sheep while in the field.

FUNDS NEEDED ($1000s):	One-Time	Recurring Base	First Year Need
Construction Costs.....			
O&M: Personnel Costs.....		$30	
Equipment/Facility Cost....	$20		
Contracts/Services.....			
Miscellaneous Costs.....	$5	$1	
TOTAL O&M Costs.....	$25	$31	$56

PERMANENT STAFF NEEDED (FTEs):	Number (1/10s)	FTE Cost
Managers.....		$0
Biologists.....	1.0	$30
Resource Specialists.....		$0
Education/Recreation Staff.....		$0
Law Enforcement.....		$0
Clerical/Administrative.....		$0
Maintenance/Equipment Operation.....		$0
TOTAL FTEs Needed.....	1.0	$30

-Record View

22521 San Andres NWR NM

HQ:

Proj #: 98002 Type: NWR District: New Mexico

ACTIVITY: *MONITORING & STUDIES*
1.b. Studies & Investigations

BUDGET CATEGORY: Wildlife

MEASURES: 1 studies will be conducted
25 % of effort will be off-refuge

TITLE: Scabies mite cross transmission re: desert bighorn sheep & deer study

DESCRIPTION:

The desert bighorn sheep is State-listed endangered. They have declined precipitously to near extinction within the San Andres Mountains. The initial cause was scabies mite, but other additive factors has included predation, drought, and no production. What is not known: Where did the scabies come from? Why did it become so virulent? Are there other hosts? Is there a transfer of mites between desert mule deer and desert bighorn sheep? What role does the habitat play? At this point in time, it is critical to know whether the mite is transmitted from deer to sheep. This would determine future management options for the desert bighorn sheep.

FUNDS NEEDED ($1000s):	One-Time	Recurring Base	First Year Need
Construction Costs.....	$80		$80
O&M: Personnel Costs.....		$11	
Equipment/Facility Cost....			
Contracts/Services.....	$80	$50	
Miscellaneous Costs.....			
TOTAL O&M Costs.....	$80	$61	$140

PERMANENT STAFF NEEDED (FTEs):	Number (1/10s)	FTE Cost
Managers.....		$0
Biologists.....	0.2	$11
Resource Specialists.....		$0
Education/Recreation Staff.....		$0
Law Enforcement.....		$0
Clerical/Administrative.....		$0
Maintenance/Equipment Operation.....		$0
TOTAL FTEs Needed.....	0.2	$11

Record View

22521 San Andres NWR NM

HQ:

Proj #: 98003 Type: NWR District: New Mexico

ACTIVITY: *PLANNING & ADMINISTRATION*
8.b General Administration

BUDGET CATEGORY: Gen. Admin

MEASURES: 1

TITLE: Construction of New Administrative Office

DESCRIPTION:

The Refuge is currently undergoing a change in complexity and growth in staff. The current office can only accommodate 3 personnel. A new office is needed to be able to effectively and efficiently accomplish the needed work required to manage the Refuge. An office is required that can house 5 personnel with a library/conference room, restrooms, and small visitor reception area.

FUNDS NEEDED ($1000s):	One-Time	Recurring Base	First Year Need
Construction Costs.....	$250		$250
O&M: Personnel Costs.....		$31	
Equipment/Facility Cost....			
Contracts/Services.....			
Miscellaneous Costs.....	$20		
TOTAL O&M Costs.....	$20	$31	$51

PERMANENT STAFF NEEDED (FTEs):	Number (1/10s)	FTE Cost
Managers.....	0.3	$20
Biologists.....	0.2	$11
Resource Specialists.....		$0
Education/Recreation Staff.....		$0
Law Enforcement.....		$0
Clerical/Administrative.....		$0
Maintenance/Equipment Operation.....		$0
TOTAL FTEs Needed.....	0.5	$31

Appendix G
Proposed Staffing Chart

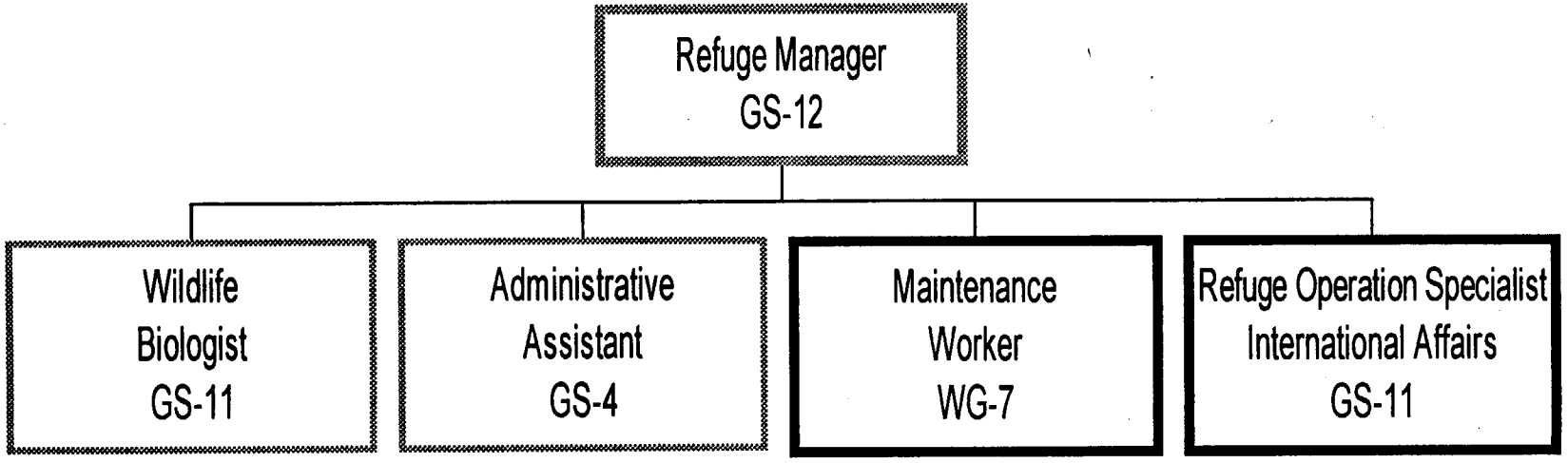
Proposed Staffing

Bolding denotes positions not currently authorized.

- Refuge Manager GS-12 PFT
- **Refuge Operation Specialist/international Affairs GS-11 PFT**
- Administrative Assistant GS-4 PFT
- Wildlife Biologist GS-11 PFT
- **Maintenance Worker WG-7 PFT**

San Andres NWR
Proposed Staffing

Bolded Box Denotes Positions Not Currently Authorized



U.S. FISH AND WILDLIFE SERVICE
ENVIRONMENTAL ACTION MEMORANDUM

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and have determined that the action of approval of the proposals reflected in the San Andres National Wildlife Refuge Comprehensive Conservation Plan and in the proposed management framework alternative in the attached Environmental Assessment:

_____ is a categorical exclusion as provided by 516 DM 6 Appendix 1 section B(4). No further documentation will be made.

__X__ is found not to have significant environmental effects as determined by the attached Environmental Assessment and Finding of No Significant Impact.

_____ is found to have special environmental conditions as described in the attached Environmental Assessment. The attached Finding of No Significant Impact will not be final nor any actions taken pending a 30 day period for public review (40 CFR 1501.4(e)(2)).

_____ is found to have significant effects, and therefore a "notice of Intent" will be published in the Federal Register to prepare an Environmental Impact Statement before the project is considered further.

_____ is denied because of environmental damage, Service policy, or mandate.

_____ is an emergency situation. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.

Other supporting documents: **Finding of No Significant Impact, San Andres NWR Comprehensive Conservation Plan and Environmental Assessment**

Jeffrey A. Ashwell 9/28/98
Director/Regional Director Date

(1) Tom Bates 9/24/98
Initiator Date

(2) Tom Accone 9/24/98
Acting Geographic ARD AZ/ NM Date

(3) [signature] 9/25/98
NEPA Coordinator/ Region 2 Date

Finding of No Significant Impact

Comprehensive Conservation Plan and Environmental Assessment for San Andres National Wildlife Refuge

The U.S. Fish and Wildlife Service has developed a Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) for the San Andres National Wildlife Refuge. Through a program of consultation and public involvement, the Service has outlined the various problems and opportunities (i.e., issues) confronting the refuge. The CCP and EA outlines these issues and how the Service intends to address them over the next 10 to 20 years.

Approval of this CCP constitutes the definition of appropriate management approaches and establishment of refuge goals, objectives and strategies leading to the achievement of the refuge's purposes and mission of the National Wildlife Refuge System. The CCP formalizes six goals which will result in: (1) Restoration, enhancement, and protection of biological diversity, land, wildlife and habitat; (2) Protection of archeological and cultural resources; (3) Provision of increased wildlife education and interpretation initiatives; (4) Strengthening and maintenance of effective relationships with other governmental agencies and stakeholders; (5) Improvements to refuge staffing and funding. Approval of the CCP establishes a management program inclusive of the following objectives:

- Enhancing refuge baseline biological data collection;
- Establishing and protecting an augmentable scabies free desert bighorn population;
- Reducing and eliminating non-native plant and animal species:
- Implementing cost effective fire management strategies for habitat protection and enhancement;
- Continuing cultural resource inventory and monitoring efforts;
- Continuing effective educational outreach;
- Improving coordination efforts with other agencies and stakeholders; and,
- Improving use of internal budgetary reporting mechanisms to achieve effecting staffing and facilities levels.

In order to achieve the objectives, the CCP establishes the following strategies:

- Continue herpetofauna surveys;
- Continue to mist net and band neotropical migratory birds;
- Conduct point count surveys of neotropical migratory birds;
- Conduct small mammals surveys to improve baseline data;
- Conduct annual mule deer and mountain lion surveys to determine population trends and effects on bighorn sheep habitat;
- Continue cooperative efforts with WSMR regarding Land Condition Trend

Analysis program transects;

- Gather air quality data from air quality stations on the refuge;
- Participate with New Mexico Department of Game and Fish in efforts to transplant and track radio collared sentinel rams;
- Conduct and promote research on scabies mite in the San Andres Mountains;
- Determine effects of ungulate encroachment and consider establishment of special depredation hunts;
- Reduce salt cedar refuge-wide by at least 20% using various methods of extraction;
- Develop prescribe burn proposals for portions of Bennett Mountain, Black Brushy Mountain and San Andres Mountain approximately 5,000 acres);
- Monitor and evaluate effects of burning strategies;
- Engage in public outreach to foster better understandings of refuge fire management efforts;
- Conduct Global Positioning System (GPS) survey of known archeological and historic sites;
- Construct shelters for historical sites in jeopardy from natural degradation;
- Participate in cooperative effort with state and federal agencies to establish an off site visitor center that would emphasize refuge resources and those of other jurisdictions;
- Construct an information kiosk and associated interpretive information at the San Augustine Pass parking area;
- Improve interagency coordinating efforts; and,
- Secure needed staffing, funding, and facilities to assist in the implementation efforts to achieve plan goals and objectives.

Based on a review and evaluation of the information contained in the CCP and EA, I have determined that the approval of the individual or cumulative approaches reflected in the Proposed Alternative and CCP Goals, Objectives and Strategies, is not deemed to constitute a major Federal action which would significantly affect the quality of the human environment within the meaning of Section 102(2) (c) of the National Environmental Policy Act (NEPA). Therefore, an Environmental Impact Statement is not required. However, it is the intent of the Service to revisit questions of potential significant environmental consequences in accordance with NEPA upon consideration of the implementation of site specific proposals called for and discussed in the final plan document.

ACTING Regional Director, Region 2 Date 9/28/05
U.S. Fish and Wildlife Service

eamfonsi.

Environmental Assessment

EA 1.0 Background

San Andres National Wildlife Refuge (SANWR) was established in 1941 by Executive Order 8646 for the "...conservation and development of natural wildlife resources." The Refuge is located approximately 30 miles northeast of Las Cruces, New Mexico, in Dona Ana County, and encompasses 57,215 acres of the southern portion of the San Andres Mountains. The San Andres mountain range is about 80 miles long, forming an arc six to 12 miles wide that concaves to the east. The mountain range is bordered by the Jornada del Muerto plains to the west and the Tularosa Basin to the east.

Primary emphasis since establishment has been the restoration and management of desert bighorn sheep (Ovis canadensis mexicana), currently a state-listed endangered species in New Mexico. The Refuge in 1970 had an estimated population of 200 desert bighorn sheep. Recent population counts indicated that the sheep populations have been nearly decimated due to scabies infestation, predation, drought conditions, and poor reproduction. One of the overriding questions the Refuge must face in the context of this planning effort is determining the Refuge's role as suitable bighorn sheep habitat if supplementation occurs.[1]

The Refuge is surrounded by federal lands belonging to the White Sand Missile Range (WSMR), which also overlays the Refuge in entirety; the Agricultural Research Service-Jornada Experimental Range (JER) has research rights on approximately 40% of the western half of the Refuge; and the National Aeronautical and Space Administration-White Sands Test Facility (NASA) borders the southwestern corner of the Refuge.

The Refuge serves primarily as a buffer for the WSMR, as no actual missile impacts occur within Refuge boundaries according to the current Memorandum of Agreement (MOA). During special training missions, such as the annual Roving Sands, low-level military aircraft flights do occur over the Refuge, but this has not been a widespread problem. The Refuge is not open to the public due to security restrictions established for the military defense weapons testing that is conducted on WSMR. This also affects access for Refuge staff, especially on the eastern side of the mountains.

The JER retains certain research rights over almost half of the Refuge. This land was transferred from the JER to the U.S. Fish and Wildlife Service for the establishment of the Refuge. Due to the type of terrain available and the potential for conflicts between desert bighorn sheep and

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[1] Reintroduction of desert bighorn sheep into the Refuge would entail a cooperative effort with the New Mexico Department of Game and Fish and WSMR. The remnant bighorn sheep population at San Andres NWR is part of a state wide distribution of approximately 210 free-ranging sheep including populations in the Hatchet, Peloncillo, and Alamo Hueco Mountains. The San Andres herd is considered unique in that it represents the last indigenous herd in the state. Existing genetic analysis and other biological research is being considered as managers map out the future of this species and whether there is a place for them at San Andres. At some point, managers and biologists will have to decide whether there is enough research to move forward with population augmentation, or whether additional study is necessary.

domestic stock, the JER has not conducted any livestock research on the Refuge. The Refuge does not have boundary fences, which is a detriment to conducting grazing research on-Refuge and/or near its boundaries.

The refuge will be faced with a number of challenges and opportunities throughout the next 10 to 20 years including but not limited to the following:

- Acquisition of additional staffing needed to accomplish goals;
- Baseline research for floral and faunal species inventories;
- Protecting and enhancing desert bighorn sheep habitat;
- Reestablishment of viable populations of desert bighorn sheep;
- Effective non-native species control;
- Preservation and protection of cultural resources.
- Increasing public awareness and understanding; and
- Facilities maintenance;
- Develop an off site visitor center in cooperation with other involved agencies;
- Pursue an agreement with WSMR that would allow WSMR to relinquish control of the current property in holdings within SANWR to SANWR in the event of the cessation of WSMR or curtailment of WSMR jurisdiction over the in holdings;
- The Service in cooperation with the New Mexico Department of Game and Fish (NMGF), develop an effective strategy to control exotic species such as Oryx (*Oryx gazella*) on the Refuge; and
- The Service in cooperation with the JER, develop policies that will protect and preserve habitat on the Refuge.
- The Refuge, in cooperation with New Mexico Department of Game and Fish (NMGF), develop an effective strategy for the reestablishment and protection of viable populations of State endangered desert bighorn sheep on refuge lands.

To address these issues, the Service has released a final Comprehensive Conservation Plan (CCP) for the San Andres NWR. This final Environmental Assessment (EA) serves as a companion document. Both of these documents were published in draft form July 1, 1998, and submitted to the public for review and comment prior to the issuance of a final CCP.[2] Based upon input received during the comment period, the Service has made adjustments to its proposed alternative.

EA 2.0 Purpose and Need for the Proposed Action

The Service's Refuge Manual states that the purpose of comprehensive planning is to "provide long range guidance for the management of national wildlife refuges." [4 RM 1.1, Planning]

[2]Federal Register, Vol 63, No. 126, p 35939, Notice of Intent to Issue 2 Draft Comprehensive Conservation Plans and Associated Environmental Assessments for 2 National Wildlife Refuges in the Southwest Region. This notice pertained to the release of the San Andres NWR and Bitter Lake NWR CCP/ EA draft documents.

Refuge comprehensive plans contain the set of issue-based management goals, objectives, strategies, and actions proposed for the short and long term. These constitute a proposed "management program" that is designed to address refuge issues (problems and opportunities) that will lead to the achievement of the refuge purposes, and ultimately, the mission of the National Wildlife Refuge System. Planning facilitates the kind of coordination that is necessary to enhance the efficiency of implementing management actions designed to benefit the San Andres NWR and the surrounding area of ecological concern.

EA 3.0 Description of the Proposed Action & Alternatives

EA 3.1 Alternative A : (Proposed Action)

The proposed action is to adopt and implement the actions making up the San Andres NWR CCP. The objectives and strategies detailed in the plan will provide for short and long term conservation and enhancement of refuge resources and values in the planning area. The management actions within the proposed alternative reflect a need to achieve objectives of:

- Enhancing refuge baseline biological data collection;
- Establishing and protecting an augmentable scabies free desert bighorn population;
- Reducing and eliminating non-native plant and animal species:
- Implementing cost effective fire management strategies for habitat protection and enhancement;
- Continuing cultural resource inventory and monitoring efforts;
- Continuing effective educational outreach;
- Improving coordination efforts with other agencies and stakeholders; and,
- Improving use of internal budgetary reporting mechanisms to achieve effecting staffing and facilities levels.

Notable proposed strategies in this alternative include:[3]

- Continue herpetofauna surveys;
- Continue to mist net and band neotropical migratory birds;
- Conduct point count surveys of neotropical migratory birds;
- Conduct small mammals surveys to improve baseline data;
- Conduct annual mule deer and mountain lion surveys to determine population trends and effects on bighorn sheep habitat;
- Continue cooperative efforts with WSMR regarding Land Condition Trend Analysis program transects;

[3]The complete set of goals, objectives and strategies included in the proposed alternative can be referred to in Section 5.0 San Andres NWR Management Program, (pg. 30 through 35), San Andres NWR Comprehensive Conservation Plan, which accompanies this document.

- Gather air quality data from air quality stations on the refuge;
- Participate with New Mexico Department of Game and Fish in efforts to transplant and track radio collared sentinel rams;
- Conduct and promote research on scabies mite in the San Andres Mountains;
- Determine effects of exotic ungulate encroachment and consider establishment of special depredation hunts;
- Reduce salt cedar refuge-wide by at least 20% using various methods of extraction;
- Develop prescribed burn proposals for portions of Bennett Mountain, Black Brushy Mountain and San Andres Mountain approximately 5,000 acres);
- Monitor and evaluate effects of burning strategies;
- Engage in public outreach to foster better understandings of refuge fire management efforts;
- Conduct Global Positioning System (GPS) survey of known archeological and historic sites;
- Construct shelters for historical sites in jeopardy of natural degradation;
- Participate in cooperative effort with state and federal agencies to establish an off site visitor center that would emphasize refuge resources and those of other jurisdictions;
- Construct an information kiosk and associated interpretive information at the San Augustine Pass parking area;
- Improve interagency coordinating efforts; and,
- Secure needed staffing, funding, and facilities to assist in the implementation efforts to achieve plan goals and objectives.

These actions, among others, and achievement of the above objectives would assist in the achievement of the following larger goals:

Goal 1: To protect and enhance wildlife, plant and habitat resources within the San Andres Mountains Ecosystem including strategies that benefit native flora and fauna, the status of desert bighorn sheep, neotropical migratory birds and other species of concern.

Goal 2 : To protect and preserve archeological resources and historical sites.

Goal 3 : To increase public understanding and awareness of the San Andres National Wildlife Refuge and the San Andres Mountains Ecosystem through effective wildlife education and interpretation initiatives.

Goal 4: To strengthen interagency and jurisdictional relationships in order to coordinate efforts with respect to Refuge and surrounding area issues, resulting in

decisions benefitting plant, wildlife, and habitat resources on the Refuge and the San Andres Mountains Ecosystem.

Goal 5: To have effective staffing and funding that will result in long-lasting protection, maintenance, and enhancement of wildlife and habitat resources on the Refuge. Effective staffing and funding levels should lead to the achievement of the Refuge Purposes and the Mission of the National Wildlife Refuge System.

EA 3.2 Alternative B: (No Action Alternative)

This alternative would focus on the continuation of management of existing conditions, staffing, and facilities and would involve implementation of only limited fire management strategies, limited non-native species removal efforts, limited data survey, collection and analysis; and limited educational outreach and interpretive efforts. Bighorn sheep would continue to be monitored and tracked, however, in this alternative, the remnant sheep populations would be allowed to die off. No transplantations would be allowed to occur until strategies have been developed to ensure reintroduced populations could be scabies free. The refuge would not engage in cooperative efforts to establish an off-site visitor center or interpretive kiosks and displays.

EA 3.3 Alternative C

This alternative would call for no active management strategies. Refuge management would consist of allowing access for research purposes only. Management would be reduced to custodial status. No efforts to reintroduce bighorn sheep would be considered. All populations would be allowed to thrive under purely natural conditions. There would be no need for staffing or facilities improvements.

EA 4.0 Affected Environment

A description of the affected environment can be found in *Section 3.0)* of the Final Comprehensive Conservation Plan for San Andres NWR.

EA 5.0 Environmental Consequences

The following brief discussions and informal analyses pertain to key environmental issues and their relationship with each of the Alternatives considered in this document.

EA 5.1 Alternative A (Proposed Action)

EA 5.1.1 Biological Resources

Implementation of this alternative will have no negative consequences to refuge biological resources and will result in several positive long term influences.

Non Native Species Removal. Efforts include the removal of oryx, trespass cattle, and salt cedar. These efforts would positively effect bighorn sheep habitat. Elimination or reduction in trespass cattle and oryx will reduce or eliminate unwanted competition for bighorn sheep and mule deer habitat. The removal of non native plant species is necessary to prevent them from establishing themselves so as to replace native species. The removal of salt cedar would essentially remove unwanted fuel thus protecting natural willow stands in riparian areas from fire. Removal would positively effect habitat for neotropical migratory bird species. Use of mechanical means and/or herbicides would be selective and any impacts would be minor and temporary.

Transplantation of Desert Bighorn Sentinel Rams. This alternative calls for the release of 4 sentinel rams, singly, throughout the entire range of the San Andres Mountains for the purpose of locating any remaining bighorn sheep. Ultimately, this would help determine extant population size and the relative persistence of scabies. This may create problems with respect to possible fertilization of extant ewes by the sentinel rams. The rams would remain on the San Andres Mountains throughout a 2-year monitoring period. It is speculated that the mortality of rams (transplanted from Red Rocks Wildlife Area) could be high especially if released individually on large tracts of habitat. Sterilization of the rams is an option to prevent fertilization of ewes however, the base population of the San Andres Mountains herd would not increase during the sentinel ram study. The rams would ultimately be competitive surplus requiring disposal or euthanization to eliminate the potential of sterile rams dominating the rut at either the source or transplant sites. Another problem is the possible transmittal of scabies mite from the extant population to the sentinel rams from either the extant sheep or cross transmission of mites from infected mule deer. While many limitations and difficulties remain, this strategy attempts to preserve what may be a unique gene pool while (1) proactively determining

the locations and extent of remaining remnant animals, (2) attempting to treat for scabies infestation, and (3) attempting to augment the population. Much can be learned about the desert bighorn species and its limiting factors in the San Andres Mountains environment. By implementing this proposal, the environmental consequences to a wide-range of biological resources are positive on the whole. Nothing in this proposal is likely to negatively effect biological resources.

Improvements to Data Collection and Analysis. Enhancing existing data collection and analysis efforts will result in positive consequences to refuge biological resources. Cooperative efforts between jurisdictions will undoubtedly contribute to better understandings of the refuge's resources.

Fire Management. Nothing proposed in this alternative pertaining to fire management would permanently impact refuge biological resources. Prescribed burning would be designed to enhance habitat while eliminating unwanted fuel, thus preventing unwanted wild fires. Suppression and pre-suppression strategies would be conducted in accordance with Service policy and designed to minimally affect habitat resources (i.e. firebreaks). Pre-suppression strategies would be designed to maximize suppression capabilities in the event of a fire outbreak. Impacts would be moderate and temporary and would be designed to enhance natural biological diversity.

Enhancement of Opportunities for Wildlife Interpretation and Educational Outreach. These proposed enhancements will have little or no effect on biological resources except to improve the public's awareness and understanding of them. Construction of kiosks, signs and interpretive panels would be off refuge and of limited scope and not result in any negative impacts to the refuge biological resources. A proposed interagency visitor center near Las Cruces would also be off-site and not impact refuge resources.

Other management actions. Nothing noted in the management program for the refuge would negatively affect refuge wildlife, plant, and habitat resources.

EA 5.1.2 Air Quality

Expanded uses of fire as a management tool on the refuge would cause slight and temporary impacts to refuge's air quality if Alternative A is adopted. Prescribed fires would be managed and monitored in accordance with Service policy. Lack of a good pre-suppression and suppression capability would probably result in larger and more intense fires. Road upgrades might cause a very slight but temporary profusion of particulate matter into the air.

EA 5.1.3 Water Quality

Alternative A provides for the general improvement of the refuge's wetland and riparian areas to include better monitoring of water quality standards. Nothing in the alternative is anticipated to negatively impact water quality on Service lands.

EA 5.1.4 Wetland & Riparian Preservation and Enhancement

Alternative A provides for the continuation of and enhancement to activities that improve the Service's wetland and riparian resources. Nothing in the alternative is anticipated to negatively impact wetland resources.

EA 5.1.5 Cultural Resources

The cultural resource component of the San Andres NWR lands is significant and any site specific proposals that might alter or effect the landscape will have to be considered in the context of potential effects to cultural and archeological resources. However, nothing in the proposed alternative is anticipated to negatively effect the refuge's cultural, historical, and archeological resources. Goal 2 of the proposed action calls for the specific protection of all refuge cultural resources.

EA 5.1.6 Socioeconomics

Nothing in the proposed alternative is anticipated to have negative effects to the economic or social context of the refuge lands. It is expected that the alternative's proposal for the construction of an off-refuge joint agency visitor facility will provide a positive economic benefit to the overall economic region. An effective

interpretive component to such a visitor center could be considered an important addition to the overall region's growing ecotourism industry. For ecotourism alone, visitors can spend between $21 and$145 dollars during a visit to the local community. All refuges, like other federal lands, are important economic assets to both the national economy and the economies of the communities in which they are located.[4] A combination of local visitors and those from farther away provide a source of revenue, enhancing the multiplier effect created by the constant flow of money.

EA 5.2 Alternative B (No Action)

EA 5.2.1 Biological Resources

Alternative B offers a basic level of protection for the biological resources on the refuge although without a set of updated goals and strategies. Under this alternative, there would be no short term pro-active efforts to find, treat, and augment desert bighorn sheep on the refuge. Extant sheep could potentially die-off. Any decisions to reintroduce bighorn sheep on the refuge would be delayed to a future date. Unfortunately, this strategy might result in the demise of what could be a unique gene pool. Additionally, much would be lost pertaining to better understanding the relationship between sheep and scabies mite infestation.

Efforts with respect to the removal of non-native species would be limited. Thus, the continuing encroachment of salt cedar, trespass cattle, and oryx would continue to present threats to native species and habitats. Efforts to use prescribed fire would be limited. Failing to remove fuels via prescribed burns could result in destruction of important habitat as a result of large scale wild fire.

Continuing existing strategies and approaches at current levels could have potential long-term negative effects on biological resources. This alternative does not provide an overall strategic context. Management would continue without the benefit of organized objectives and strategies. The lack of such a strategic context of publicly accepted goals and strategies would make it more difficult for land managers to implement resource priorities and to obtain the funding to make needed improvements.

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[4]Kerlinger, Paul Phd, Ted Eubanks, R.H. Payne, 1994, The Economic Impact of Birding Ecotourism on communities Surrounding Eight National Wildlife Refuges, New Jersey Audubon Society.

Indirectly, this would slow progress towards improving habitat and wildlife conditions refuge wide.

EA 5.2.2 Air Quality

There are no negative impacts anticipated to air quality by adoption of Alternative B.

EA 5.2.3 Water Quality

No negative effects are anticipated if Alternative B is adopted. Without a strategic context, it is difficult to determine the priority of this issue.

EA 5.2.4 Wetland & Riparian Preservation and Enhancement

Under Alternative B the refuge would continue efforts on a more limited basis to rehabilitate existing wetlands. Nothing proposed in this alternative is anticipated to have negative effects on the human environment.

EA 5.2.5 Cultural Resources

Under this alternative, there would be no effects from the management of the refuge's cultural resources. All cultural resource assessments would have to be conducted in accordance with Service policy and in coordination with the State Historic Preservation Officer.

EA 5.2.6 Socioeconomics

The adoption of Alternative B would not result in the employment of strategies that would negatively affect the human environment including the economy of the Las Cruces area.

EA 5.3 Alternative C

EA 5.3.1 Biological Resources

No direct negative consequences would occur to biological resources if this alternative is implemented. However, as this alternative calls for the refuge to be managed in a purely custodial

framework, the Service would no longer engage in active data collection and analysis. Data collection and analysis would be scaled down to include primarily university research efforts. Indirectly, opportunities to better an understanding of the San Andres Mountains area of ecological concern would be lost. This loss of opportunity would include knowledge regarding a variety of plant and animal species.

As there would be no direct intervention with respect to existing and future populations of desert bighorn sheep, it is likely that extant sheep would die-off. This would result in the loss of a potentially unique gene pool.

Much would be lost in the way of understanding scabies mite infestation. No efforts would be made to reduce or remove non-native plant and animal species. Thus, salt cedar could accumulate to levels that threaten native vegetation through competition or by serving as fuel for wildfire. Oryx and trespass cattle would continue to compete with mule deer and bighorn sheep for forage and water. These are all indirect negative consequences that would have to be considered.

EA 5.3.2 Air Quality

There would be no direct effect to air quality as a result of the adoption of Alternative C.

EA 5.3.3 Water Quality

Nothing in the alternative is anticipated to negatively impact water quality on Service lands.

EA 5.3.4 Wetland & Riparian Preservation and Enhancement

Nothing in the alternative is anticipated to negatively impact wetland resources.

EA 5.3.5 Cultural Resources

Nothing in this alternative is anticipated to negatively effect the refuge's cultural, historical, and archeological resources.

EA 5.3.6 Socioeconomics

Adoption of this alternative would have no negative impacts on the local economies.

EA 6.0 Cumulative Impacts, Mitigation and Consultation and Coordination

EA 6.1 Cumulative Impacts

Cumulative impacts include impacts on the environment which result from incremental effects of the proposed action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. Implementing Alternative A would reduce any potential for cumulative impacts because of the strategic approach to managing refuge programs. This would be a change from the issue-by-issue, problem-by-problem fragmented approach inherent in the No Action alternative.

Where site development activities are to be proposed during the next 5 to 10 years, each activity would be given any additional appropriate NEPA consideration. At that time, any required mitigation activities if any are necessary, would be designed into the specific project to reduce the level of impacts to the human environment and to protect fish and wildlife and their habitats.

EA 6.2 Mitigation Measures

Mitigation measures are necessary when effects are anticipated to be at the threshold of significance. Nothing proposed in Alternative A would produce environmental impacts that are near any level of significance so as to warrant mitigation measures. However, the activities listed below help reduce the risks that any negative effect will occur. Long-term monitoring will help in determining actual effects and how the Service should respond.

- The refuge would closely regulate any proposed activities to lessen any potential impacts such as restricting use to seasons and locations when known breeding and nesting activities are at a minimum.

- The refuge would prohibit any activities in areas where endangered species would be negatively affected.

EA 6.3 Consultation and Coordination

In an ongoing effort to involve the local community and officials in the CCP process, the Service and RMCI have prepared and distributed a fact sheet in August 1997. The fact sheet describes the CCP process and defined the comment period. The fact sheet was mailed on August 25, 1997 and the Public comment period ended October 8, 1997. Two information repositories have been established and are maintained with information relevant to the Refuge for public review. The repositories are located at the Thomas Branigan Library in Las Cruces New Mexico and the Alamogordo Public Library in Alamogordo, New Mexico. RMCI also continually updates the mailing list based on responses from interested parties. Public meetings will be provided based on public response to the CCP process. A draft CCP and Environmental Assessment (EA) were released July 1, 1998. The Service published a formal notice in the Federal Register requesting comments and advice from the public.[5] Comments were received, considered, and to the degree possible, they have been incorporated into this document.

EA 7.0 EA Document Preparation

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[5]Federal Register, Vol 63, No. 126, p 35939, Notice of Intent to Issue 2 Draft Comprehensive Conservation Plans and Associated Environmental Assessments for 2 National Wildlife Refuges in the Southwest Region. This notice pertained to the release of the San Andres NWR and Bitter Lake NWR CCP/ EA draft documents.