

**Sevilleta National Wildlife Refuge  
Comprehensive Conservation Plan**

**San Acacia, New Mexico**

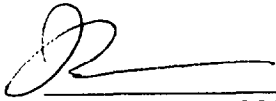
**July 2000**

United States Fish and Wildlife Service  
Southwest Region  
500 Gold S.W.  
Albuquerque, New Mexico 87103

COMPREHENSIVE CONSERVATION PLAN APPROVAL  
for the  
Sevilleta National Wildlife Refuge, San Acacia, NM  
July 2000

The attached Comprehensive Conservation Plan for the Sevilleta NWR parts of which were 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 University of New Mexico Long Term Ecological Research Station. 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.

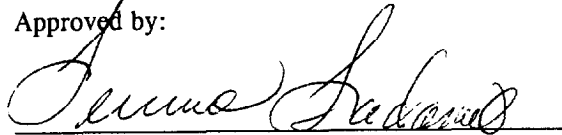
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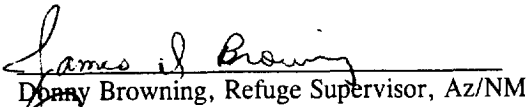
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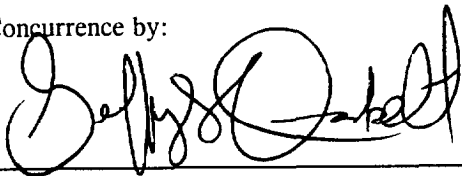
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per Nancy Kaufman  
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## ***Executive Summary***

The comprehensive conservation plan for Sevilleta National Wildlife Refuge will serve as a management tool to be used by the refuge staff and partners in the preservation and restoration of the ecosystem's natural resources. In that regard, the plan will guide management decisions over the next 15 years and set forth strategies for achieving refuge goals and objectives within that time frame. The management actions in this document reflect a need to achieve many objectives, including the following:

- Continue implementation of the Mexican wolf captive propagation program on the refuge, and ensure continued operation within all applicable regulations, protocols, and safety guidelines.
- Preserve refuge habitat diversity and threatened and endangered species habitats by preserving and restoring habitats to their natural condition. This may involve aggressive removal of non-native plants (e.g., salt cedar) and animals (e.g., oryx, Barbary sheep).
- Maintain a viable population of silvery minnows on the Rio Grande within the refuge.
- Evaluate refuge grasslands potential as an introduction site for the endangered northern Aplomado falcon.
- Protect threatened and endangered species on the refuge and adjacent properties through outreach, educational activities, and effective enforcement of fish and wildlife laws.
- Promote and support the introduction of native threatened and endangered species on the refuge.
- Ensure the integrity of all naturally occurring biotic communities on the refuge.
- Maintain migratory bird populations at healthy levels in the Upper/Middle Rio Grande Ecosystem.
- 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.
- Protect, restore, and maintain upland terrestrial communities at the landscape level within the Upper/Middle Rio Grande Ecosystem.
- By the end of FY 2001, (September 30, 2001), assess the refuge's full wilderness attributes, and determine appropriate areas within the full spectrum of the refuge for study and designation as Wilderness Study Areas.

- Included will be the dedication of between 3,000 and 8,000 acres as the Ladron Wilderness Study Area.
- Use sound land use practices and management tools to protect upland terrestrial habitats in the Upper/Middle Rio Grande Ecosystem.
  - Preserve, enhance, and restore hydrological regimes in order to perpetuate a healthy river ecosystem. Use the Rio Grande Initiative to form partnerships that address water management, habitat enhancement and restoration, and impacts of non-native plants and animals on native biodiversity and endangered species.
  - Compile a database of the baseline natural conditions, processes, and species associated within the refuge ecosystems by October 2004.
  - Attain baseline natural conditions, processes, and populations of species in 50 percent of each habitat type by 2010. If attainment is not possible, implement adaptive management strategies designed to attain desired conditions.
  - Restore and maintain natural hydrological regimes.
  - Contribute to the integrity of the Upper Middle Rio Grande Watershed using sound management tools and practices.
  - Develop partnerships, relationships, and communications to improve implementation of refuge wildlife and habitat management goals.
  - Minimize human impacts to refuge ecosystems.
  - Encourage research that improves management and monitoring of species, communities, and processes on the refuge and the Upper Middle Rio Grande.
  - Permit and encourage research from a wide range of interested parties and institutions while protecting the wildlife and plant components of the ecosystem from detrimental human intrusion and manipulative research protocols.
  - Minimize impacts of research activities.
  - Provide the research community a unique opportunity to conduct wildlife-related research that provides the refuge with management direction.
  - Obtain (through purchase or mitigation) sufficient water rights to manage refuge wetlands associated with the Rio Grande.
  - Acquire in-stream flow rights for the perennial portion of the Rio Salado.
  - Protect upland seeps, springs, and wetlands within the refuge.

- Provide the general public with high quality, wildlife-dependent experiences on and off the refuge.
- Provide the general public with high quality environmental education and wildlife dependent experiences on and off the refuge.
- Develop sound management practices to protect cultural resources within the scope of Part 614 of the Service Manual and all applicable federal laws and regulations.
- Minimize obtrusive impacts to refuge lands or adjacent lands.
- Obtain adequate staffing to implement management plans benefitting the Middle Rio Grande Ecosystem both on and off refuge lands.
- Effect improvements to facilities that will result in the enhancement of refuge capabilities and resources including: construction of an (approximately) 8,000-square foot visitor center/administrative complex; two 1,500-square foot staff residences; and a multi-unit living facility for refuge volunteers.
- Develop and apply the Ecosystem Management approach.
- Solicit input from involved agencies, institutions, and groups to help coordinate and evaluate refuge activities.
- Assess the suitability of refuge lands for wilderness designation.

The accomplishment of the above management objectives and the employment of associated actions and strategies will assist in the achievement of the following broad refuge goals:

- GOAL I:** To provide for the enhancement, preservation, and protection of threatened and endangered species as they occur naturally or were historically present on the Sevilleta NWR so that viable, self-sustaining populations can be restored to their natural habitats.
- GOAL II:** To restore and maintain the natural diversity of plants and wildlife as it occurred historically on Sevilleta NWR.
- GOAL III:** To encourage research from bonafide research institutions, to provide an atmosphere conducive

to investigations into environmental processes on the refuge, and to assume a proactive role in facilitating research projects as they occur on the refuge.

**GOAL IV:** To protect existing, and to secure additional, water rights and/or in-stream flow rights as necessary to protect the integrity of the riparian and aquatic habitats on the refuge.

**GOAL V:** To achieve appropriate levels of public uses that are compatible with the purpose for which the refuge was established and with the goals of the National Wildlife Refuge System; and to regulate, as provided by law, all activities, uses, and practices that are potentially harmful to refuge resources.

**GOAL VI:** To establish a formal program for public outreach, identify important public resources, and implement environmental education programs accordingly.

**GOAL VII:** To protect, maintain, and plan for Service-managed cultural resources on Sevilleta NWR for the benefit of present and future generations.

**GOAL VIII:** To protect existing lands associated with Sevilleta NWR for the benefit of fish and wildlife resources; to provide for the acquisition of additional lands; and to ensure the integrity of refuge boundaries relative to adjacent lands.

**GOAL IX:** To effect improvements to funding, facilities, and staffing that will result in enhancement of refuge habitat and wildlife resources, leading to the achievement of the goals of this plan and the goals of the National Wildlife Refuge System.

**GOAL X:** To strengthen interagency and jurisdictional coordination on or near Sevilleta NWR, resulting in decisions benefitting fish and wildlife resources while avoiding duplication of effort.

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# VISION



***"After 25 years of a quiet existence, the Refuge's potential to be a powerhouse in the wildlife and natural resource management and educational arenas is only now being realized. The Refuge will have the programs, the partnerships, and the momentum to develop into one of the foremost environmental research locations in the world. The refuge will serve as an area of natural habitat for native species of the Southwest, and will serve as a unique window allowing observation of this natural landscape and the wildlife that thrive there. Sevilleta NWR truly plays a unique and special role within the whole of the National Wildlife Refuge System."***

***-Vision***

The Sevilleta NWR, located in central New Mexico, is one of the largest refuges in the National Wildlife Refuge System, and is faced with many challenges and opportunities. It is unique because four biomes, the Colorado Plateau Shrub Steppe, Chihuahuan Desert, Great Plains Short Grassland Prairie, and Piñon Juniper Woodland intersect on the refuge. In addition, the Rio Grande flows through the center of Sevilleta NWR, providing a riparian oasis that plays a vital role in the mixed ecosystems.

Since its inclusion into the System, management approaches at Sevilleta NWR have involved basic resource preservation, the provision of opportunities for research, and that of allowing natural restoration processes to occur. While nature will continue to rehabilitate the landscape on its own, proven scientific tools will be employed to encourage the healing processes to enhance habitat and wildlife resources on the refuge.

In 1988, the refuge agreed to host the Long-Term Ecological Research Project. One of 21 LTER locations throughout the United States, the Sevilleta NWR LTER is the only one on a national wildlife refuge. The LTER project conducts a variety of research. The dominant theme examines long-term changes in ecosystem attributes as a result of both natural and artificial disturbances. This partnership of institutions has created a symbiotic relationship in which the research community is provided a unique outside laboratory, and the refuge benefits from the wealth of knowledge provided by the research. With continued cooperation, this partnership is expected to result in the realization of the common goals and objectives of both the refuge and the LTER project.

In 1995, Sevilleta NWR was selected to host the captive Mexican gray wolf management facility. The facility is located in a remote mountainous canyon and is capable of housing up to six family groups. The primary purpose of the facility is to provide an environment that fosters wild characteristics and behaviors so the wolves will be better suited for life in the wild upon release. The U.S. Fish and Wildlife Service predicts it will take approximately 9 years to establish a self-sustaining population of 100 wolves through release of captive animals and natural reproduction in the wild. The refuge will continue to serve as a core component of this program, with refuge staff providing maintenance for all facilities and providing assistance to the animal caretakers to ensure a healthy captive population.

In more recent years, the focus of the refuge has broadened and will continue to broaden to meet its obligations to an ecosystem approach to management. This approach requires a greater understanding of the natural biological diversity on the refuge and surrounding lands that will be acquired through the LTER project. The refuge recognizes that sound relationships and partnerships with adjacent and watershed landowners/stewards are imperative and will continue to coordinate activities with all concerned individuals, agencies, and organizations in a holistic approach.

From its inception, there has been limited public use of the refuge. Waterfowl and dove hunting has been permitted in the riparian area. While these uses will continue, the refuge will begin to incorporate compatible wildlife observation and interpretive activities, including the possible establishment of nature trails in appropriate areas. However, the major contribution of the refuge is to increase public appreciation of wildlife and habitat preservation by means of environmental education and interpretation. The refuge's future lies in serving as a window on the world of research and conservation activities. For this to take place, cooperation between the refuge's major stakeholders must be paramount.

Additionally, the planning and construction of needed facilities and infrastructure improvements will be necessary. Construction of a new office, visitor center, and education center is vital to the successful achievement of the goals common to the Mexican Wolf Recovery Program, the LTER project, and the refuge staff. The education center will foster scientific education to select groups and serve as a classroom for science camps. The visitor center will provide a means for proactive public education on the Mexican Wolf Recovery Program, the LTER project, and the missions and goals of the National Wildlife Refuge System and the Service. A visitor center available to the general public and easily accessible from Interstate 25 will provide the refuge with the opportunity to reach thousands of people.

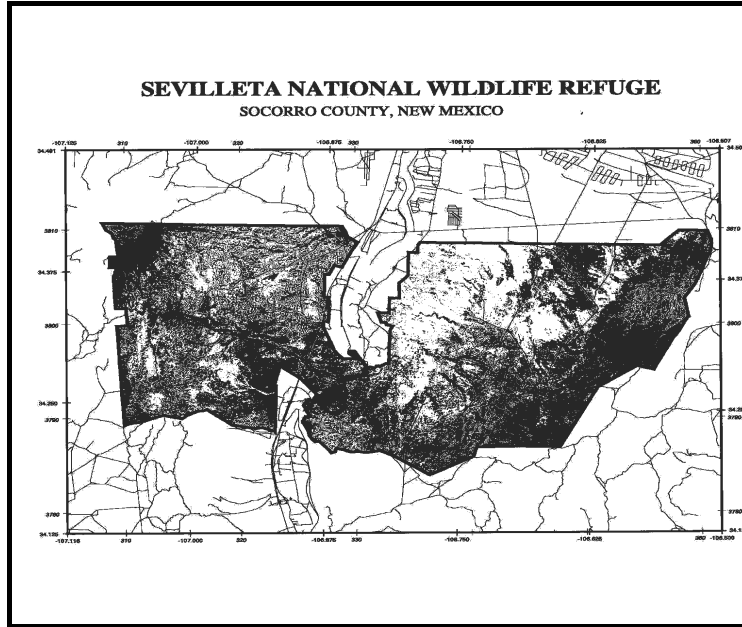
After 25 years of a quiet existence, the refuge's potential to be a powerhouse in the wildlife and natural resource management and educational arenas is only now being realized. The refuge will have the programs, the partnerships, and the momentum to become one of the foremost environmental research locations in the world. The refuge will serve as an area of natural habitat for native species of the Southwest, and will serve as a unique window allowing observation of this natural landscape and the wildlife that thrive there. Sevilleta NWR truly plays a unique and

special role within the whole of the National Wildlife Refuge System.



## 1.0 INTRODUCTION AND REGIONAL SETTING

Sevilleta National Wildlife Refuge was established in 1973 when the Campbell Family Foundation conveyed the property to The Nature Conservancy, who in turn donated it to the U.S. Fish and Wildlife Service. The refuge is unique in that it was set aside “to allow natural ecological processes to prevail . . . and that portions



of the property will be made available to educational institutions and conservation organizations for scientific research and study.” In efforts to meet the covenant requirements and for other management purposes, livestock grazing on the refuge was discontinued over 25 years ago.

Sevilleta NWR is located in central New Mexico, approximately 50 miles south of Albuquerque. Sevilleta

NWR is the seventh largest refuge in the lower 48 states, and runs the full width of the Rio Grande Valley extending from the Sierra Ladrones on the west to Los Pinos Mountains on the east. It is approximately 30 miles in width and 18 miles in length, covering a total of 228,770 acres or 400 square miles. Elevations on the refuge range from 4,430 feet at the Rio Grande to 8,953 feet at Ladrone Peak.



## **2.0 PLANNING PERSPECTIVES AND CONSIDERATIONS**

The Refuge represents one segment of a multi-faceted system within a widespread and highly complex organization. The development of this CCP has incorporated the directives, policies and regulations of the Service, the Refuge System and the purpose for which the Refuge was established to assist in providing guidance to the Refuge for long range management decisions.

### **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 that encompasses 92 million acres of land and water. National wildlife refuges are set up for specific purposes and provide habitat for thousands of species of birds, mammals, fish, and insects. Other refuges within the immediate area include the Bosque del Apache NWR, approximately 40 miles to the south, and the Bitter Lake NWR, approximately 140 miles to the east.

### **2.2 The Service and an Ecosystem Approach to Management**

***The Upper/Middle Rio Grande Ecosystem goal is "To protect, restore, and maintain viable levels of biotic diversity within the Upper/Middle Rio Grande Ecosystem."***

The Service has adopted an ecosystem approach to more effectively achieve its mission of fish and wildlife conservation for future generations. The ecosystem approach is defined as protecting or restoring the natural function, structure, and species composition of an ecosystem, recognizing that all components are interrelated. The approach emphasizes the identification of ecosystem goals that represent resource priorities on which all parts of the Service will collectively focus their efforts. These cross-program partnerships within the Service, as well as partnerships with other entities outside of the Service, provide a broad basis for identification of common resource goals and resources with which to meet those goals in an effective and timely manner.

To implement the ecosystem approach, the Service established ecosystem teams consisting of members representing the various field stations and programs within the Service. Sevilleta NWR is part of the Upper/Middle Rio Grande Ecosystem. The refuge plays an integral role in the coordination and participation of various projects identified by the ecosystem team as priority projects in order to accomplish the overall goal of the team.

Based on a broad set of issues identifiable throughout the entire defined ecosystem, the Service developed a management goal and a set of sub-goals. The ecosystem goal is “To protect, restore, and maintain viable levels of biotic diversity within the Upper/Middle Rio Grande Ecosystem.” Sub-goals of the plan include 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; to maintain migratory bird populations at healthy levels; 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; 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; to protect, maintain, and restore upland terrestrial communities at the landscape level; to interpret the link between healthy, stable ecosystems and human/community health; and to protect and enhance water quality and quantities for aquatic, wetland, and riparian habitat.



### **2.3 Planning Perspectives**

This comprehensive planning effort will integrate three perspectives so that the management direction over the next 15 years will produce holistic management approaches for the Sevilleta NWR. The plan includes:

1. A broad perspective for overall environmental contextual issues (endangered species, biological diversity, water issues, interjurisdictional cooperation, socioeconomic considerations, etc.).
2. A focused perspective for national wildlife refuge- related policy issues that affect the Sevilleta NWR programs (compatibility, endangered species management, water rights, etc.).
3. A local perspective for refuge-related activities and strategies affecting management units (grasslands management, endangered species management, research, maintenance).

An understanding of these three perspectives and the relationship between them will lead to an integral set of refuge goals and objectives for the next 15 years.

## **2.4 The Issues, Challenges, and Opportunities**

The following is a list of the major issues that confront the Sevilleta NWR programs. An issue is defined as any unsettled matter that requires a management decision<sup>1</sup>. Examples include Service initiatives, opportunities, management problems, threats to the resources, conflicts in uses, public concerns, and the presence of undesirable resource conditions.

### **Issue 1. Threatened and Endangered Species Management**

The quantity and variety of habitats on the refuge provide the opportunity for habitat enhancement and the reintroduction of threatened and endangered species. The enhancement and restoration of suitable habitat for several native species would benefit from additional staffing and funding. The Mexican gray wolf captive propagation program currently based on the refuge could also benefit from additional staff and maintenance expenditures to ensure its success. Additional support is needed for public outreach, threatened and endangered species education, and law enforcement.

**Challenge:** The protection and reintroduction of threatened and endangered species will require considerable long-term effort.

### **Issue 2. Wildlife and Habitat Management**

The restoration and maintenance of native habitats on the refuge is essential for effective wildlife management. Historical records, databases, and other information can be used to determine the natural conditions and processes that should be restored on the refuge. This "baseline" assessment is essential for determining what habitat restoration actions should be conducted, and as a method of gauging the success of habitat restoration and maintenance activities. Restoration may involve strategies such as prescribed burning, non-native species control, or hydrological restoration and maintenance. In all cases these management activities must take into account the protection of research instrumentation, high value public lands, and refuge and Mexican

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The list of issues and the corresponding goals in Part III of this CCP are not in any order of priority except to indicate that natural resource issues and goals take precedence by virtue of the ordering of the goals of the National Wildlife Refuge System [Refuge Manual 2 RM 1-4].

wolf facilities. Minimization of human impacts such as roads, public access, and research activities is a major concern.

**Challenge:** Effective habitat restoration and maintenance will require long-term efforts to remove non- native vegetation and animals . These include plants such as salt cedar and animals like oryx and Barbary sheep. Many of the non-native vegetation species are difficult to control and have large seed source reservoirs in the region.

### **Issue 3. Research**

Research is an integral part of refuge purposes and activities. The LTER project is a major component of the refuge and has historically been a major asset.

**Challenge:** There is a need to coordinate research activities to minimize the impact on the natural habitats, and to evaluate and regulate the research conducted at the refuge. With pro-active management, research impacts can be minimized while research efficiency and effectiveness are enhanced.

### **Issue 4. Water Rights and Protection**

Availability of water in arid climates is key to the maintenance of habitats, especially riparian habitats.

**Challenge:** To acquire additional water rights and to protect existing water rights necessary for the management and conservation of riparian and aquatic resources. The refuge's role will be one of working closely with surrounding water users, conservancy districts, and the State of New Mexico toward a flow regime that allows for conservation of natural resources while not impacting other right holders.

### **Issue 5. Compatibility and Public Use**

Historically the refuge has had limited public use and access due to the lack of a visitor center, inadequate road access, and the emphasis on research activities.

**Challenge:** Opportunities exist with the advent of a new visitor center to increase compatible public use. Activities such as hiking, environmental interpretation, hunting, wildlife photography, and wildlife watching could occur at appropriate levels on the refuge. Compatibility determination and documentation to determine appropriate locations and levels of public use activities is needed.

## **Issue 6. Environmental Education and Public Outreach**

Promotion of environmental education is a major goal of the refuge. Activities at a new visitor center as well as public outreach activities and development of a national/international science camp would further the achievement of this goal.

**Challenge:** An environmental educator position for the refuge is seen as vital to the success of the environmental education and public outreach program.

## **Issue 7. Cultural Resources Management**

Less than 1 percent of the Sevilleta NWR has been inventoried systematically for archeological sites. However, selective sampling of refuge lands has identified several major prehistoric sites of national significance.

**Challenge:** There is a need for a comprehensive cultural resources survey to determine the nature and extent of cultural resources on the refuge. Once the cultural resources are surveyed, strategies for protection and management can be developed. Additional land acquisition and appropriate law enforcement are two possible strategies to improve cultural resources protection.

## **Issue 8. Land Protection and Acquisition**

Acquisition of land or easements to allow improved access to the refuge headquarters and research areas is one possible action to alleviate current inadequate access. Acquisition of private land in holdings or adjacent properties that contain valuable habitat or cultural resources is another possible strategy to protect high value resources.

**Challenge:** One objective of this plan is to begin an in-depth analysis of what possibilities exist within a 3,000- to 8,000-acre area. This area could possibly abut an area of BLM lands that are currently under wilderness review.

**Wilderness Opportunities:** As part of its overall comprehensive conservation planning responsibilities, the Service will continue to assess the suitability of its refuge lands for wilderness designation. Wilderness designation provides a high level of resource protection under the provisions of the Wilderness Act of 1964.

Sevilleta NWR, by virtue of its own written deed restrictions and covenants, already has an extremely high level of protection built into its purposes. The purpose of the refuge, as stated in the warranty deed, is as follows:



*“ . . . to preserve and enhance the integrity and the natural character of the ecosystems of the property by creating a wildlife refuge managed as nearly as possible in its natural state, employing only those management tools and techniques that are consistent with the maintenance of natural ecological processes . . . not to be subjected to commercial exploitation . . . and the land and the plants and animals supported by it to be managed to permit the natural ecological successions and processes typical of the area to prevail . . . and that portions of the property will be made available to educational institutions and conservation organizations for scientific research and study.”*

Past and current management has demonstrated a commitment to preserve, enhance, and protect the refuge lands. Management has shown its dedication to the purpose of the refuge as stated in the deed restrictions by not permitting grazing, closing existing ranch roads, removing artificial structures and limiting human influence on the refuge by restricting use and entry through a permit system.

**Sierra Ladron WSA** -- During the development of this plan, wilderness interests have suggested the refuge target up to 13,000 acres near the Sierra Ladron in the extreme northwestern section of the refuge for possible wilderness designation. In review of refuge land uses, a limited area could be targeted for this purpose. A wilderness designation would protect portions of the refuge and preserve its naturalness by legally preventing any artificial developments in this area.

The majority of the 13,000 acre area would appear to be appropriate for wilderness designation. The Sierra Ladron is a steep, rugged, and massive mountain, with no structures present

except for the refuge boundary fence. In the foothills, however, there are numerous ongoing research projects, with many being 10 years in length. Without loss of years of data, it would be virtually impossible to move them since the projects are site specific. Considering all the factors including past, current, and future uses of the area, a 3,000- to 8,000- acre area would better meet refuge and its research cooperators' goals. A 3,000-acre area, which is outside the refuge boundary fence, joins the proposed wilderness area on the Bureau of Land Management's (BLM) property in the extreme northwest corner of the refuge. This is the first option since the wilderness designation would assist in the management of the unfenced area. The second option would be to target the 8,000-acre area and would allow the Refuge to continue its current and future programs and to continue to provide the researchers a stable location for their long-term research.

The final acreage configuration of the Sierra Ladron Wilderness Study Area, would likely need no further study due to its present roadless undeveloped wilderness compatible character. Additionally, this plan does not provide for strategies or approaches that would create permanent improvements, structures, roadways, or the need for motorized access that would diminish the area's wilderness potential. [See Map #1]

***Other Refuge-wide Wilderness Study Possibilities –***

Nevertheless, by virtue of Service policy the refuge is responsible for determining wilderness possibilities for a full spectrum of refuge lands. A bit more time will be necessary to assess the full spectrum of refuge lands keeping in mind current commitments to long term research that necessitate technologies, access, and tools not consistent with the strict requirements of the Wilderness Act of 1964. Any additional Wilderness Study Areas identified will be under focused monitoring and study, however, they will be managed as de facto wilderness in accordance with Service policy and as set forth in the Wilderness Act of 1964.

In the case of all areas identified as Wilderness Study Areas, the refuge would not implement any strategies that would attenuate future wilderness designation.

### **Issue 9. Staffing and Funding**

Sevilleta NWR historically has been understaffed while staff duties and the demands of the refuge have increased. Currently, the refuge staff consists of five permanent full-time employees. Funding for proposed actions is another factor limiting the accomplishment of refuge goals.

**Challenge:** Additional staff is essential to the implementation of the management plan.

### **Issue 10. Interagency Coordination**

Coordination with other agencies and institutions is essential for accomplishing refuge goals and to ensure success in the Southwest Strategies Program.

**Challenge:** The formation of a stakeholders committee may be useful in strengthening and coordinating relationships.

## 2.5 The Purpose and Need for Action

Planning provides a road map to facilitate the coordination necessary for efficient implementation of management actions designed to benefit the Sevilleta NWR. The Service's approach is to offer management goals, objectives, and strategies/management actions that are consistent with ecologically desirable outcomes for the entire Sevilleta NWR. The Refuge Improvement Act of 1997 requires all refuges to have a comprehensive conservation plan.

The purpose of comprehensive management planning is to "provide long range guidance for the management of national wildlife refuges."<sup>2</sup> As such, all lands of the National Wildlife Refuge System are to be managed in accordance with an approved CCP that will guide management decisions and set forth strategies for achieving refuge purposes.<sup>3</sup>

There is a need for a comprehensive cultural resources survey to determine the nature and extent of cultural resources on the refuge. Once the cultural resources are surveyed, strategies for protection and management can be developed. Additional land acquisition and appropriate law enforcement are two possible strategies to improve cultural resources protection. This CCP defines the role that the Service, particularly Sevilleta NWR, will play in the protection and enhancement of the natural resources found on the refuge. Specifically, this document will provide guidance to present and future managers regarding management direction in order to achieve overall landscape goals. Finally, because of the increasing volume of research activity on the refuge, this document provides a forum to define the parameters (i.e., amount and type of research) under which the research programs should operate.

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<sup>2</sup> Refuge Manual 4 RM 1.1

<sup>3</sup> 602 FW 1-3 FWM 201



## 2.6 Plan Decision Guidance

***The decisions made within this CCP are guided by the established purposes of the refuge, the goals and compatibility standards of the System, and other Service policies, plans, and laws directly related to refuge management.***

The decisions made within this CCP are guided by the established purposes of the refuge, the goals and compatibility standards of the System, and other Service policies, plans, and laws directly related to refuge management. This CCP establishes the goals, objectives, management guidelines, strategies, monitoring, and evaluation strategies for the refuge.

The CCP will be used to prepare step-down management plans, revise existing plans, performance standards, and budgets that describe specific actions to be taken by the refuge over the next 15 years. Given that new information and guidance frequently arise, the CCP will be updated as necessary. The effects of major management actions will be documented to provide information to future managers as to the effects of actions taken.

The availability of the draft CCP was published in the *Federal Register*, December 7, 1998 (Volume 63, Number 234), and copies of the draft were sent to citizens, interest groups, and agencies that previously expressed an interest in refuge programs and issues. However, due to the light responses from the review of the draft CCP, an open house was deemed unnecessary. Comments received during the planning process can be found in Appendix M.

## 2.7 Expected Planning Outcomes

The planning effort should bring about the following outcomes, which are all objectives of comprehensive conservation planning:<sup>4</sup>

1. To ensure that management of Sevilleta NWR lands reflects the policies and goals of the System and the purposes for which the refuge was established.
2. To ensure that the Sevilleta NWR contributes to the conservation of biological diversity and to the structure and function of the ecosystem in which it is located.
3. To provide a clear statement of desired future conditions for the Sevilleta NWR as it should be when System and individual unit purposes are accomplished.

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<sup>4</sup> 602 FW 1-3 FWM 201

4. To provide a systematic process to aid decision-making by identifying opportunities, issues, and concerns; collecting, organizing, and analyzing information; and developing and considering a range of management alternatives.
5. To provide a forum for determining the compatibility of uses on the Sevilleta NWR.
6. To ensure other Service programs, other agencies, and the public have opportunities to participate in management decision-making for the Sevilleta NWR.
7. To provide a uniform basis for budget requests for operational, maintenance, and capital development programs that accomplish Sevilleta NWR and System purposes.
8. To provide a basis for monitoring progress and evaluating plan implementation on the Sevilleta NWR.
9. To identify objectives and management strategies for the Sevilleta NWR, leading to their achievement.
10. To provide long-term continuity in the management of the Sevilleta NWR.

## **2.8 Public Involvement**

In an ongoing effort to involve the local community and officials in the CCP process, the availability of the draft CCP was published in the *Federal Register*, December 7, 1998 (Volume 63, Number 234), and drafts were sent to citizens, interest groups, and agencies that previously expressed an interest in refuge programs and issues. Additionally, the refuge has formed a special Stakeholders Committee whose members have a legal (by virtue of Title or Memorandum of Understanding), or research-related stake in refuge programs and management. Currently, the Stakeholders Committee includes the New Mexico Game and Fish Department, the University of New Mexico, New Mexico Institute of Mining and Technology, and The Nature Conservancy.

### 3.0 ECOSYSTEM AND REFUGE RESOURCE DESCRIPTION

Sevilleta NWR is located in central New Mexico, approximately 50 miles south of Albuquerque, New Mexico. The refuge runs the full width of the Rio Grande Valley extending from the Sierra Ladrones on the west to Los Pinos Mountains on the east. The physiography of the area is diverse and includes the Rio Grande and its surrounding bosque canopy, mountains, alluvial fans, Piedmont bajadas, terraces, canyons, arroyos, escarpments, black



lava flows, basaltic buttes, sand dunes, and alkali flats. Because of the diversity of ecosystems and the strong climatic influence exerted by El Niño Southern Oscillation, the refuge has become host to the University of New Mexico's Long-Term Ecological Research project initiated in 1988. Funded by the National Science Foundation, the program focuses on examining the ecological and biotic responses to seasonal, annual, and long-term climate changes. Additional information about the LTER project at the Sevilleta NWR can be found on the LTER internet home page at <http://sevilleta.unm.edu>.

#### 3.1 Vegetation<sup>5</sup>

Major biomes within the Sevilleta NWR include the Great Plains Grassland, Great-Basin Shrub-Steppe, Chihuahuan Desert, Interior Chaparral, and Montane Coniferous Forest. The transition zones (ecotones) between these biomes contain species from each of the bordering biomes, as well as species and characteristics of their own. For the purposes of mapping, the vegetation on the refuge is broken into 13 major map units. The following chart contains a summary of the units, the associated species, and the refuge area covered by each of the units. Location of the units is provided on Map #5 in Appendix G.

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<sup>5</sup> New Mexico Natural Heritage Program and Sevilleta Long-Term Ecological Research Program, 1998. *A Vegetation Classification Map for the Sevilleta National Wildlife Refuge*. Biology Department University of New Mexico, Albuquerque, New Mexico.

Vegetation Classification Units For Sevilleta NWR		
Unit Name	Dominant Species	Refuge Acreage
1. Water or wet ground	None, comprised of rivers, stream channels or tanks	1,270 acres
2. Barren or Sparsely Vegetated	None, contains open alluvial flats of basin bottoms	12,985 acres
3. Great Plains Grasslands (Galleta and Indian Ricegrass Grasslands)	<i>Hilaria jamesii</i> (galleta) <i>Oryzopsis hymenoides</i> (Indian ricegrass) <i>Sporobolus cryptandrus</i> (sand dropseed)	44,790 acres
4. Transition Chihuahuan and Great Basin Grasslands (Black Gramma Grasslands with Galleta)	<i>Bouteloua eriopoda</i> (black grama) <i>Hilaria jamesii</i> (galleta)	32,915 acres
5. Chihuahuan Desert Grasslands (Black Gramma Grasslands)	<i>Bouteloua eriopoda</i> (black grama)	21,343 acres
6. Transition Chihuahuan and Plains Grasslands (Black Gramma Grasslands with Blue Gramma)	<i>Bouteloua eriopoda</i> (black grama) <i>Bouteloua gracilis</i> (blue grama)	22,074 acres
7. Plains Grasslands (Blue Gramma and Hairy Gramma Grasslands)	<i>Bouteloua gracilis</i> (blue grama) <i>Bouteloua hirsuta</i> (hairy grama)	9,003 acres
8. Chihuahuan or Great Basin Lowland/Swale Grasslands (Alkalia or Giant Sacaton Grasslands)	<i>Sporobolus airoides</i> (alkali sacaton) <i>Sporobolus wrightii</i> (giant sacaton) <i>Scleropogon brevifolius</i> (burrograss) <i>Atriplex canescens</i> (fourwing saltbush)	4,219 acres
9. Chihuahuan Desert Shrublands (Creosote bush)	<i>Larrea tridentata</i> (creosote bush) <i>Bouteloua eriopoda</i> (black grama) <i>Erioneuron pulchellum</i> (low woollygrass or fluffgrass)	26,532 acres

Vegetation Classification Units For Sevilleta NWR		
Unit Name	Dominant Species	Refuge Acreage
10. Great Basin Shrublands (Fourwing Saltbush or Broom Dalea)	<i>Atriplex canescens</i> (fourwing saltbush) <i>Psoralea scoparius</i> (broom dalea)	17,611 acres
11. Rocky Mountain Conifer Savanna (One-seed Juniper Woodlands)	<i>Juniperus monosperma</i> (one-seed juniper) <i>Bouteloua gracilis</i> (blue grama) <i>Bouteloua hirsuta</i> (hairy grama)	25,280 acres
12. Rocky Mountain Conifer Woodlands (Piñon Woodlands)	<i>Pinus edulis</i> (two-needle piñon) <i>Juniperus monosperma</i> (one-seed juniper) <i>Quercus turbinella</i> (shrub live oak) <i>Cercocarpus montanus</i> (mountain mahogany)	7,837 acres
13. Rio Grande Riparian Woodlands (Rio Grande Cottonwood and Salt Cedar Riparian Woodland)	<i>Populus deltoides</i> (Rio Grande Cottonwood) salt cedar ( <i>Tamarix ramosissima</i> )	2,188 acres

Over 1,200 species of plants are found on the refuge including 94 species of grasses, the predominant species being blue grama (*Bouteloua gracilis*) and black grama (*Bouteloua eriopoda*). The majority of native riparian woodlands has been replaced by stands of introduced non-native species such as Russian olive (*Eleagnus angustifolia*) and salt cedar (*Tamarix spp.*). A more comprehensive list of plant species is found in Appendix E.

### 3.2 Wildlife



Sevilleta NWR offers a diverse assortment of wildlife species. The various habitats on the refuge support 89 species of mammals, 225 species of birds, 58 species of reptiles, and 15 species of amphibians. Resident wildlife, many of which are commonly seen on the refuge, includes desert bighorn sheep (*Ovis canadensis*), pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), mountain lion (*Felis concolor*), and black bear (*Ursus americanus*). Commonly seen bird species include bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), northern shoveler (*Anas clypeata*), northern pintail (*Anas acuta*), American coot (*Fulica americana*), wood duck (*Aix sponsa*), canvasback (*Aythya valisineria*), redhead (*Aythya americana*), great blue heron (*Ardea herodias*), black-crowned night heron (*Nycticorax nycticorax*), sandhill crane (*Grus canadensis*), killdeer (*Charadrius vociferus*), long-billed dowitcher (*Limnodromus scolopaceus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and burrowing owl (*Athene cunicularia*). Also commonly seen are a variety of insects and reptiles including the endangered Texas horned lizard (*Phrynosoma cornutum*). Species information is based largely on species lists researched and prepared by the LTER project, but it should be noted that wildlife inventory data is ongoing and new species are found periodically. For an inventory of wildlife species, see appendices A through F.



### 3.3 Climate

The climate of the Sevilleta NWR and surrounding region is semi-arid. The average annual precipitation in the valley is 8 inches while the mountain areas receive approximately 14 inches, most of which falls during the monsoon season in July and August. Temperatures can vary greatly, ranging from 0° to over 105° Fahrenheit. The fall and spring are relatively dry with winter and late summer being the wet seasons. Although winter precipitation includes snowfall, snowpack rarely develops.



### 3.4 Geology

The Sevilleta NWR lies in the central portion of the Rio Grande Rift, a northward tapering area extending from northern Chihuahua, Mexico, to southern Colorado. The Sierra Ladrones lie on the western margin of the refuge and the Los Pinos Mountains lie on the eastern margin of the refuge. Contemporaneous with the formation of the Sierra Ladrones, volcanic activity produced the Silver Creek Andesite, a prominent geographic feature extending southward from the Rio Salado. Such large-scale volcanism has been seen throughout the rift.



Faulting has occurred throughout the Rio Grande Rift from between the Quaternary and late Tertiary periods. Those faults that have been identified as having had possible movement in the Quaternary include the Coyote Springs Fault, Loma Pelada Fault, Loma Blanca Fault and the Cliff Fault. Of these, the Loma Pelada Fault, which is defined by a prominent scarp (steep slope or cliff) approximately 1 kilometer east of the microwave relay tower is considered to have had

the most recent movement during the late Quaternary Period. Traces of some faults may be observed as stepwise climbs in the ground surface while driving westward toward the Sierra Ladrones along the northern boundary of the refuge.

#### 3.4.1 Stratigraphy

While small sections of Paleozoic and Mesozoic sediment associated with large fault block uplifts can be seen on both the western and eastern margins of the refuge, the majority of the stratigraphy exposed on the refuge is of Tertiary age. These Santa Fe Group sediments are largely related to the periods of most active rift extension where large basins were created for the accumulation of sediment. These basin fill sediments grade from coarse alluvial fan conglomerates to sandy/gravelly channel deposits to playa lake sediments. Such a sequence from coarse to fine sediment, moving up in a stratigraphic section depicts the filling of the basins and the subsequent reduction in the gradient for sediment transport. The playa lake deposits are high in gypsum and can be seen at numerous locations within the refuge, forming a type of badlands topography. The high gypsum content in these sediments creates a saline environment that is inhospitable to most plant species. The lack of significant

vegetation on these finely textured sediments make them highly susceptible to erosion from high intensity rainfall events typical of the monsoonal season.

### 3.5 Soils

The geomorphology of Sevilleta NWR can be seen as a complex interplay between the extensional tectonic regime that drives the landscape from beneath and the semi-arid climatic regime that drives the system from above. The contrast in tectonic styles between the two mountain ranges that define the refuge boundaries has resulted in strikingly different geomorphic expressions in the Piedmont region of those mountains. In the case of the Sierra Ladrones, the down-dropped block to the east of the mountains has been rotated basinward, creating little

accommodation space at the very base of the mountains for mountain derived sediments. The result of this is that coarse, alluvial sediments released from mountain drainages are transported greater distances from the mountain front before they are deposited. As such, the colluvial and alluvial material shed from the mountain front has the effect of planing off the Piedmont strata as they are transported basinward. The Piedmont region of the Ladrones has since incised into small drainages leaving remnants of the original planar transport surface (pediments) extending as fingers sloping away from the mountain.



At the base of Los Pinos Mountains, by contrast, the mountainward rotation of the down-dropped block created massive accommodation space at the mountain front. As such, the mountain valley drainages, once released from their confining channels at the mountain front, are quickly decelerated and their sediment load deposited in a fan. These alluvial fans are stacked by successive lobes of sediment associated with single event discharges. At the more distal regions of the alluvial fans on the east side of the refuge, the lobes of coarse alluvium give way to a broad bajada surface extending eastward to the Rio Grande Valley. The generally flat and gently-rolling nature of this bajada is attributed to a long duration of eolian sand and dust deposition that has obscured the earlier topography of braided streams and alluvial channels that probably persisted when the fans were more actively prograding.



Eolian deposition is also quite prominent on the west side, north of the Rio Salado drainage that serves as an abundant sand source for the southwesterly winds. Large barchaan sand dunes can be seen prograding northward from the riverbed, while further north from the Salado site the dunes give way to sand sheets that are progressively more stabilized with movement away from the riverbed source. While dune migration has been active during the past 40 years as evidenced by the 1.5 meters of sand covering the old Highway 85, historical records indicate that dune migration was significantly more active during the drought period of the 1950s.

Soils on the refuge are classified into 42 types as presented on the soils map in Appendix G (map 4). While no one type of soil is predominant, it is apparent that the central portion of the refuge has those soils series that are classified as “dry soils and lava flows” (Turney, Yesum, Wink, Bluepoint, Nickel, Caliza, Lozier, Ustifluvents, Gila, and Armijo) while the westernmost portion of the refuge associated with the Sierra Ladrones has the “moist soil and rock outcrop” type of soils series (Puerticito, Cascajo, Rock outcrop, Millet, Sedillo, and Motaqua). The eastern portion of the refuge encompassing Los Pinos Mountains is covered predominately by soils series of the “moist soil” classification (Harvey and Winona).

### **3.6 Water Management**

The Refuge has limited water resources, but even limited water resources in arid grasslands greatly increases wildlife and plant diversity. Water resources on the Refuge consist of natural springs and several man-made wells.

#### **3.6.1 Natural Springs**

Of all the natural resources on Sevilleta NWR, water is the most scarce. There are only 11 springs on the refuge, six on the west side and five on the east (Appendix G). The western springs are located near the refuge boundary and are generally dependable year round even in a drought. The springs on the east side either are not productive or are only wet weather springs. One exception is Cibola Spring, which produces water year round.

### 3.6.2 Man-Made Wells

There are 12 wells in operation on the refuge including 3 on the west side and 9 on the east side (Appendix G). They range in depth from 40 feet to over 350 feet. Wells are not found in the central portion of the refuge due to the extreme depth of the aquifer. In most cases, the existing wells were activated because they were in good condition with an active aquifer. Due to recent seismic activity, some deep faulting occurred resulting in the loss of a major aquifer. Funds were not available and none were requested to re-drill these wells.

Due to development and resource exploitation occurring adjacent to Sevilleta NWR, the refuge continues to maintain windmills for the benefit of wildlife. Wildlife migrations have been effectively stopped on the northern portions of the refuge as a result of subdivisions and highway fencing. To the east and south the adjacent lands are grazed and hunted with few restrictions on off-road vehicles. To the west there is less exploitation and wildlife move freely on and off the refuge. The current refuge management objective is no net gain on man-made wells.

Within the boundaries of Sevilleta NWR, the following wells have been permitted with a 3 acre-foot water right: Partition Well, Bronco Well, 222 Well, Jacks Well, West Mesa Well, Pino Well, Sepultura Canyon Well, Sepultura Flats Well, Cottonwood Well, Goat Draw Well, Dove Springs Well, Tomasino Well, Canyon Well, Red Well, and Montosa Well.

The refuge also has a small waterfowl area called Unit A that was constructed by the Bureau of Reclamation (BOR) in the early 1970s. Refuge landownership includes those lands currently used by the BOR to convey or recover water from the river. Consequently, they have granted the refuge a 2 cubic-foot per second flow-through of irrigation water from October 1 to February 28 in return for permitting their water conveyance systems. Unit A was rehabilitated in 1998 by removal of salt cedar and Russian olive followed by root plowing and raking. New water control structures were installed to allow for water management.

### 3.7 Cultural and Historic Resources Features

Sevilleta NWR contains important archeological sites of the late prehistoric period. It is widely recognized as the location of a number of puebloan occupation sites, considered to be ancestral Piro Indians who occupied the central province of the Rio Grande at the time of Spanish exploration and colonization. The name Sevilleta is itself derived from a nearby Piro settlement, so named by early Spanish colonists who likened the setting of the pueblo to that of the city of Seville, Spain. Sevilleta NWR is also the site of the Mexican period village of La Joyita.

Although less than one percent of the Sevilleta NWR has been inventoried systematically for archeological sites, some selective sampling of refuge lands has identified several major prehistoric sites of national significance. Three small-site excavation projects on the refuge have yielded limited stratigraphic and chronometric information about regional prehistory. The interdisciplinary LTER project may define an even greater role for archeological research on the Sevilleta NWR.

To date, 60 sites have been recorded on the refuge with the Laboratory of Anthropology site records, and there are an additional 15 to 20 unrecorded site leads for which there is minimal information. The first site records were made by H.W. Yeo in the 1930s. Two important surveys on the refuge since then were the survey of sampled units by Human Systems Research (*Reconnaissance Study of the Lower Rio Puerco and Salado Drainages*, Wimberly and Eidenbach, 1980) and the New Mexico Historic Preservation Program Rio Abajo survey by Marshall and Walt (*Rio Abajo, Prehistory and History of a Rio Grande Province*, Marshall and Walt 1984). Limited test excavations have been undertaken by the Office of Contract Archeology, University of New Mexico, at six sites on a pipeline corridor (*Test Excavation of Sevilleta Shelter LA 20896*, Winter, 1981) and a site on the Rio Salado (*Test Excavation and Data Recovery Plan for LA 102366*, Chapman, 1995).

### 3.8 Socioeconomic Features

In 1997, Socorro County had an estimated population of 16,333 of which an estimated 8,650 resided in the City of Socorro<sup>6</sup>. The socioeconomic impact of the refuge on Socorro County consists primarily of the contributions of the indigenous staff, the temporary researchers stationed at the refuge, and the resulting research funding that is expended for supplies and services in the county and the state of New Mexico. Annual salaries totaling \$200,000 are paid to refuge employees who reside in Socorro County. A minimum of another \$35,000 is spent within the county for supplies used by the refuge.

The State of New Mexico, as well as Socorro County, receives the greatest portion of the \$850,000 grant from the National Science Foundation. The one person employed by the University of New Mexico at the Biological Field Station resides in Socorro County. During the summer months as many as 48 researchers reside at the field station. These temporary residents purchase food, clothing, and other essentials in the communities of Albuquerque, Belen, and Socorro. Many of the summer hires become residents of New Mexico and go on to attend the University of New Mexico.

Refuge revenue sharing subsidies from the Department of the Interior are designed to off-set the burden that counties feel when properties are removed from the tax roles through actions taken by the Department. Sevilleta NWR's PILT annual payment to Socorro County is approximately \$160,000. The payment for 1999 was \$100,000.

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U.S. Department of Commerce, Bureau of the Census, Population Estimates Program 1997.

### **3.9 Refuge Staffing**

When the refuge was established in 1973, a GS-9 assistant refuge manager and a WG-7 part-time maintenance worker were hired. In 1978 an engineering equipment operator was brought on duty. All administrative work was accomplished out of Bosque del Apache NWR headquarters with Sevilleta NWR paying for one half of an administrative staff year. In 1986 a GS-4 typing clerk was hired and later updated to a GS-5. Today, the position is classified as a GS-7 administrative office assistant. In 1992 a biologist was added to the refuge staff. In 1999, the biologist position was converted to a Refuge Operations Specialist position GS-11/12. Currently, the refuge staff consists of the following five permanent, full-time employees and two temporary full time employees:

Refuge Manager, GS-13  
Administrative Office Assistant, GS-07  
Refuge Operations Specialist GS-11/12  
Engineering Equipment Operator, WG-10  
Maintenance Worker, WG-08  
Office Clerk, GS-3 (Temporary)  
Writer/Editor, GS-5 (Temporary)



## 4.0 SEVILLETA NWR MANAGEMENT PROGRAM

The following goals, objectives, and strategies are, unless otherwise noted in the text, expected to be implemented throughout the 15-year term of this plan. Because the Sevilleta NWR CCP is a working document, modifications (with appropriate internal and external involvement) to the following objectives and strategies are anticipated. Where applicable, the Refuge Operating Needs System project number has been included with the associated strategy.

**Goal 1: Threatened and Endangered Species Management**

*To provide for the enhancement, preservation, and protection of threatened and endangered species as they occur naturally or were historically present on the refuge so that viable, self-sustaining populations can be restored to their natural habitats.*

### 4.1 Threatened and Endangered Species Management

**Objective 1:** Continue implementation of the Mexican wolf captive propagation program on the refuge, and ensure continued operation within all regulations, protocols, and safety guidelines by providing approximately 20 miles of road maintenance, research facilities, and 30 acres of pen enclosures.

**Rationale for Objective:** Improvements to facilities, roads, and staffing are essential to ensure the continued success of the Mexican wolf captive propagation program on the refuge. Shelters are needed for each of the six wolf pens to allow for successful breeding and birthing. The facility access road does not allow for all-weather access.

### Strategies

- 1: Through various mechanisms, secure necessary personnel (volunteer, technical, professional, veterinary) to ensure the success of the captive propagation program.
- 2: Improve conditions for service personnel working on the wolf program to meet health and safety standards; e.g., roads (RONS #99008).
- 3: Improve the wolf pen facility by construction of two breeding/birthing shelters in each of the six pens (RONS #99009).

**Objective 2:** Preserve refuge habitat diversity including important habitat for threatened and endangered species by preserving and restoring habitats to their natural condition. Provide 100 acres of habitat for southwestern willow flycatchers and provide a 0.75-mile radius buffer zone for any and all peregrine falcon eyries.

***Rationale for Objective:*** There are opportunities to protect and restore habitat for threatened and endangered species such as the southwestern willow flycatcher. Additionally, if peregrine falcon nesting should occur on the refuge a plan is needed to reduce impacts to the eyries.

### **Strategies**

- 1:** Control non-native vegetation using mechanical, biological, and chemical treatments as allowed by refuge policy, guidelines, and deed restrictions.
- 2:** Implement management practices that ensure the survival of and eliminate impacts to naturally occurring threatened or endangered species on the refuge.
- 3:** Restore native plants using natural and horticultural mechanisms.
- 4:** Provide 100 acres of cottonwood/willow habitat for the southwestern willow flycatcher.
- 5:** Provide a 0.75-mile radius buffer zone for all peregrine falcon eyries if the species is documented as nesting on the refuge.

**Objective 3:** Maintain a viable population of Rio Grande silvery minnows on 3 miles of the Rio Grande that occur within the refuge boundaries.

***Rationale for Objective:*** There is an opportunity to enhance habitat for the Rio Grande silvery minnow on 3 miles of the Rio Grande within the refuge.

### **Strategies**

- 1:** Conduct or assist with biannual seine surveys to monitor silvery minnow population status.



- 2: Coordinate annually with water regulatory agencies on the timing and amount of water flows to maximize the beneficial effects on silvery minnow populations.
- 3: Complete the 500-acre bosque/wetland habitat restoration project on Unit A and other areas as funding and staffing allow by 2010.
- 4: Identify and prioritize other bosque/wetland areas to be restored by 2004.

**Objective 4:** Evaluate refuge habitat potential as a reintroduction site for the endangered northern Aplomado falcon (as denoted in Appendix G, map #5).

**Rationale for Objective:** The refuge may prove to be suitable as a reintroduction site for the endangered northern Aplomado falcon, but further study and coordination is needed to make such a determination.

#### Strategies

- 1: Conduct comprehensive prey base and vegetation studies within 5 years (RONS#99021).
- 2: Coordinate activities with necessary agencies and nongovernmental organizations.

**Objective 5:** Protect threatened and endangered species on the refuge and adjacent properties through a 20 percent increase in outreach, educational activities, and effective enforcement of fish and wildlife laws.

**Rationale for Objective:** Education and outreach activities are effective proactive measures that can help protect threatened and endangered species and reduce impacts before they occur rather than after.

#### Strategies

- 1: Conduct investigations of all reported violations concerning threatened and endangered species.

- 2: Increase threatened and endangered species public outreach and educational activities in the community by 20% to broaden public knowledge and prevent future violations.

**Objective 6:** Promote and support the reintroduction of native threatened and endangered species on the refuge.

***Rationale for Objective:*** There are opportunities to reintroduce native threatened and endangered species on the refuge, but further study, planning, and coordination are needed.

### **Strategies**

- 1: Identify and develop suitable introduction programs for native threatened and endangered species being considered for reintroduction on the refuge.
- 2: Implement appropriate introduction programs for native threatened and endangered species, including compliance with all National Environmental Policy Act requirements.

**Goal 2: Wildlife and Habitat Management**

To preserve, restore, and maintain the natural diversity of plants and wildlife as it occurred historically on the refuge.

## 4.2 Wildlife and Habitat Management

**Objective 1:** To ensure integrity of all naturally occurring biotic communities on the refuge by restoration of approximately 250 acres of native habitat by 2004.

**Rationale for Objective:** Removal of non-native species such as salt cedar and Russian olive on selected plots will allow native vegetation to be reestablished. While total elimination of the non-native species encroaching on the refuge would not be a realistic goal in the foreseeable future, a reasonable goal would be 125 acres per year. If additional funding and personnel became available, more habitat restoration could be conducted.

### Strategies

- 1: Conduct all refuge activities in such a way as to minimize impact on any population of naturally occurring plant or wildlife species.
- 2: Plan and execute species specific eradication programs for non-native vegetation such as salt cedar and Russian olive where their presence is detrimental to the natural ecosystems. Restore approximately 125 acres of native habitat annually through the removal of non-native vegetation.

**Objective 2:** To maintain migratory bird populations levels consistent with the Middle Rio Grande Waterfowl Management system and New Mexico Partners in Flight.

**Rationale for Objective:** Participation in regional species management plans and restoration efforts is essential for effective management of migratory species.

### Strategies

- 1: Complete restoration of Unit A wetland by 2010 (RONS #99016 and #99017).
- 2: Develop conservation agreements among appropriate entities to provide breeding, resting, and feeding habitat for migratory bird species by minimizing fragmentation, degradation, and loss of migratory bird habitat (RONS #98001).

- 3: Meet the Sevilleta NWR waterfowl management objectives identified in the Middle Rio Grande Waterfowl Management Plan (Appendix J).
- 4: Monitor songbirds to document residence, breeding, and migration of species in major habitat areas of the refuge (RONS #98001).

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

***Rationale for Objective:*** Restoration and protection of riparian and wetlands habitat is critical in arid and semi-arid areas such as central New Mexico. High quality riparian and wetland habitat is essential for the preservation of species diversity.

### **Strategies**

- 1: Restore and maintain native riparian and wetland habitats on Service lands to not only increase the amount of habitat within the ecosystem, but to serve as demonstration and research areas to develop techniques for riparian restoration and enhancement efforts (RONS #99017 and #99022).
- 2: Develop or encourage a healthy riparian ecosystem along the Rio Grande and its tributaries (Rio Puerco and Rio Salado) within the refuge.
- 3: Complete the bosque wetland habitat restoration project on Unit A and identify other areas that can be restored (RONS #99016 and #99017).

**Objective 4:** To protect, restore, and maintain upland terrestrial communities at the landscape level within the upper/Middle Rio Grande Ecosystem using appropriate land use practices and management tools and through development of cooperative management opportunities with adjacent landowners.

***Rationale for Objective:*** Restoration and maintenance of natural terrestrial habitats on the refuge must involve using prescribed burns to mimic the natural forces that help avoid fragmentation, degradation, and loss of terrestrial habitats.

Additional research and surveys will help build the knowledge base needed for more effective large animal habitat management.

### **Strategies**

- 1:** Implement an average of 3,000 to 5,000 acres of prescribed burns annually. This will serve as a norm. Occasionally, and depending upon objectives in a final approved fire management plan, the refuge could entertain burns of up to 20,000 acres.
- 2:** Initiate a cooperative agreement with federal and state agencies to cooperate on Private Lands Initiatives involving their permittees by 2003.
- 3:** Continue to develop open communications and initiate conservation agreements with private landowners regarding appropriate land use practices for the overall protection of upland terrestrial habitat. Work with surrounding landowners to promote terrestrial biological diversity and ecosystem stability to avoid fragmentation, degradation, and loss of terrestrial habitats.
- 4:** Secure additional lands adjacent to the refuge, as appropriate, and private inholdings as denoted on map #3.
- 5:** Begin monitoring the effects of non-Service sponsored research projects on wildlife populations and associated habitats by 2002.
- 6:** Improve the viability of fish and wildlife resources by developing research that improves management and monitoring of these resources and their habitats, specifically deer, elk, antelope, and predators. This effort will involve six wildlife and six habitat surveys (RONS #97103).

**Objective 5:** Through the Rio Grande Initiative the refuge will preserve, enhance, and restore hydrological regimes that perpetuate a healthy river ecosystem. The Initiative will result in the creation of partnerships that address water management, habitat enhancement and restoration, and impacts of non-native plants and animals on native biological diversity and endangered species.

***Rationale for Objective:*** Habitat restoration and management in the Rio Grande drainage will invariably involve a number of partners to address the water management issues at the core of hydrological restoration. Overall goals of restoring the hydrological flows to a more natural regime may be accomplished with these partnerships and by independent restoration projects on the refuge.

### **Strategies**

- 1:** Use of mechanical, biological, and chemical treatments to remove artificial or non-native structures that may impede natural hydrological flows. This may include removal of earthen dams, windmills, and non-native or dense vegetation (RONS #98602).
- 2:** Improve watershed stability and natural functions by implementing a prescribed burn plan.

**Objective 6:** Compile a database of the baseline natural conditions, processes, and species associated with refuge ecosystems by October 2004.

***Rationale for Objective:*** All management strategies revolve around the goal of restoring habitat to a more natural or baseline condition. Determination of what the baseline condition should be requires a thorough understanding of current conditions as well as past conditions to determine the desired baseline the refuge should try to attain.

### **Strategies**

- 1:** Use the LTER database, historic photos, Natural Resources Conservation Service soil surveys, etc., to determine baseline natural conditions and processes of grassland, riparian, aquatic, woodland, scrubland, and shrubland communities.

- 2: Review historic literature, biological surveys, diaries, and state game and fish files to compile species lists of historic taxa occurring on the refuge.
- 3: Develop monitoring and assessment programs for refuge wildlife, including big game and nongame species such as neotropical migratory birds, shorebirds, waders, nongame mammals, etc.

**Objective 7:** Attain baseline natural conditions, processes, and populations of species in 50 percent of each habitat type by 2010. When attainment is not possible, determine attainable conditions and implement adaptive management strategies.

***Rationale for Objective:*** Once desired baseline conditions are determined, management strategies can be employed to restore habitat to the desired condition. The process of habitat management and restoration will involve continuous effort, monitoring, and flexibility in dealing with the problems that are bound to arise.

### **Strategies**

- 1: Using literature, historical sources, and academic expertise, define the refuge's desired plant/habitat communities and the management technique to attain desired conditions.
- 2: As baseline natural conditions are determined, design a prescribed fire program by spring 2002 to improve the habitat conditions (i.e., return the habitat to the baseline natural condition) in each habitat type (RONS #99005).
- 3: Implement a prescribed burn plan and conduct prescribed burns as necessary in each habitat type.
- 4: Rehabilitate 1,500 acres of refuge riparian and wetland habitat using mechanical, chemical, fire, and biological control methods.
- 5: Minimize construction of new roads and grading of existing roads to allow natural fires to follow their course.

- 6:** Develop and implement management plans and activities (including fire, flood, and water management) to attain desired conditions within each of the six following ecosystems (RONS #99016 and #99020).
- A. riparian
  - B. woodland
  - C. grassland
  - D. shrubland
  - E. scrubland
  - F. aquatic
- 7:** Eradicate invasive non-native vegetation and wildlife (e.g., oryx, Barbary sheep) that is known to have displaced native species and communities. Various means should be considered including management hunts, burning, mechanical and in some cases chemical control when necessary and appropriate.
- 8:** Meet the refuge's commitment to the Middle Rio Grande Waterfowl Management Plan to reduce crop depredation on adjacent private lands by using the Partners for Wildlife Program and other wetland restoration programs.
- 9:** Promote private, state, and federal habitat restoration projects in the refuge's watershed by working with adjacent landowners.

**Objective 8:** Restore and maintain natural hydrological regimes through restoration of eight natural springs by reducing artificial hydrological impediments and removal of non-native vegetation by 2004.

***Rationale for Objective:*** Several of the natural springs on the refuge have had their hydrology altered either by humans or non-native species. Restoration would improve habitat and allow more water for the benefit of native species.

### **Strategies**

- 1:** Implement mechanical, biological, and chemical treatments to remove artificial or non-native structures that impede hydrological flows. This may



include the removal of earthen dams, windmills, non-native vegetation, and dense vegetation.

- 2:** Improve watershed stability and natural functions by implementing a prescribed burn plan to achieve desirable conditions.
- 3:** Develop natural springs through the use of prescribed fire to remove non-native vegetation.
- 4:** Coordinate with Rio Grande regulating agencies to improve flow patterns to ensure riparian and aquatic habitat quality.
- 5:** Conduct biannual removal of non-native and other detrimental vegetation from eight natural springs.

**Objective 9:** By 2015, develop partnerships, relationships, and communications with the Bureau of Land Management, Forest Service, New Mexico Game and Fish Department, New Mexico State Lands Office, other stakeholders, and private landowners to improve implementation of refuge wildlife and habitat management goals through such programs as Partners for Fish and Wildlife and Safe Harbor.

**Rationale for Objective:** Teamwork and cooperation with other agencies and stakeholders is essential to accomplish habitat management goals.

### **Strategies**

- 1:** Initiate Memoranda of Understanding with the BLM, Forest Service, New Mexico Game and Fish Department, and New Mexico State Lands Office (RONS #99019).
- 2:** Initiate conservation agreements with private landowners via such programs as Partners for Fish and Wildlife and Safe Harbor.
- 3:** Work with surrounding landowners to promote terrestrial and aquatic diversity. Encourage management that avoids fragmentation, degradation, and loss of habitat.

**Objective 10:** Minimize human impacts associated with research, road maintenance, construction, and public use on refuge ecosystems. Restrict activities on undisturbed areas.

***Rationale for Objective:*** One of the basic objectives governing all refuge activities is the minimization of environmental impact. With the current research activities and future increases in public use, increased efforts to reduce impact and preserve undisturbed areas will be required.

### **Strategies**

- 1:** Monitor impacts of human activities such as road building, research, wildlife viewing, hunting, and construction on wildlife and their habitats, ecological processes, and vegetation communities.
- 2:** Whenever possible, conduct all refuge activities without negatively impacting refuge species, communities, and processes.
- 3:** Coordinate the timing of research to avoid impacting critical events such as antelope fawning.
- 4:** Reduce the need for additional road construction by using and improving existing roads to minimize repair and construction impacts. Use careful planning to minimize future road construction.
- 5:** Use proven methods to control soil erosion, sediment movement, and contamination of surface and groundwater in areas identified as contaminant sources. Build erosion control structures in areas having significant loss of soils due to erosion as funds and staff are available.

**Objective 11:** Monitor population status of priority species of neotropical migratory birds, shorebirds, and other nongame migratory birds to determine density and population response to management. Incorporate needs of priority species in refuge wildlife and habitat management programs.

***Rationale for Objective:*** The Partners in Flight Plan for New Mexico is currently being drafted. The plan will identify priority groups of bird species with indicator species for management and monitoring consideration. Population objectives will be determined

from this information as specific refuge habitat and species inventories are developed.

### **Strategies**

- 1:** Develop and implement breeding surveys to document species diversity, population levels of indicator species, and trends by habitat type.
- 2:** Incorporate data and data collection methodologies into wildlife inventory plan, and adjust population objectives into wildlife inventory plans and habitat management plans as appropriate.



**Goal 3: Research**

To encourage research by bonafide research institutions and individuals, to provide an atmosphere conducive to investigations into environmental processes on the refuge, and to assume a proactive, role in facilitating research

### 4.3 Research

**Objective 1:** Encourage research that improves management and monitoring of species, communities, and processes on the refuge and the Upper/Middle Rio Grande to comply with deed restrictions.

**Rationale for Objective:** One of the basic purposes of the refuge is to provide opportunities for research. Coordination and management of the research activities on the refuge need to be improved.

#### Strategies

- 1: Integrate research programs (LTER and others) with the refuge's management and monitoring needs and objectives to help control and minimize impacts. Link the LTER computer with the refuge to provide direct access to the LTER database.
- 2: Create and obtain funding for a refuge research coordinator/biologist position by 2003 (RONS #98004).

**Objective 2:** To permit research from a wide range of interested parties and institutions while protecting the plant and wildlife components of the ecosystem from the detrimental human intrusion and manipulative research protocols.

**Rationale for Objective:** Research needs to be regulated and coordinated to ensure that research activities do not unnecessarily impact refuge habitat or species.

#### Strategies

- 1: Permit research at levels determined by the refuge manager to be compatible with the refuge purposes.
- 2: Continue to centralize research activities in localized research zones to reduce or eliminate research impacts on habitat outside of these zones.
- 3: Use the new position of refuge research coordinator/biologist to organize the research activities and reduce impacts outside the selected research zones.

- 4:** Develop a research protocol, setting guidelines as to how much research will be conducted and when it will occur. By 2003, develop guidelines for planning appropriate research to be conducted on the refuge.
- 5:** Determine the level of impact of ongoing and future research on the refuge.
- 6:** Hold researchers accountable for clean-up and rehabilitation of their research sites.

**Goal 4: Water Rights and Protection**

To protect existing and secure additional water rights and/or in-stream flow rights as necessary to protect the integrity of the riparian and aquatic habitat on the refuge. To maintain the quality of the water and watershed and to measure the usage of surface and subsurface water sources on the refuge.

#### 4.4 Water Rights and Protection

**Objective 1:** Quantify the water needs to maintain 90 acres of existing refuge wetlands. Obtain (by purchase or mitigation) sufficient water rights to manage these wetlands associated with the Rio Grande. Quantify the water needs to restore 500 acres of wetlands associated with the Rio Grande within the refuge by 2005.

**Rationale for Objective:** In order to maintain and restore wetlands, water needs and water rights need to be quantified and assessed. If current water rights are insufficient to accomplish maintenance and restoration objectives, additional water rights may be acquired.

##### Strategies

- 1: Quantify water needs. Collaborate with the Service's Branch of Water Resources, Bosque del Apache NWR, and the Bosque Hydrology Group on the assessment of water needs for the floodplain of the Rio Grande on the refuge.
- 2: Collaborate with the Service's Ecological Services Office, Regional Office, the Service's Water Resources Division, the New Mexico Game and Fish Department, and the New Mexico Office of the State Engineer on the availability of water rights and the potential to purchase or transfer water rights to fulfill needs as defined in the assessment.
- 3: Identify and prioritize wetland areas for future restoration projects.
- 4: Collaborate with the U.S. Army Corps of Engineers on wetland restoration and mitigation projects.

**Objective 2:** Pursue opportunities to protect the in-stream flows of the perennial portions of the Rio Salado, Rio Puerco, and associated tributaries.

**Rationale for Objective:** Any opportunity to protect the in-stream flow of the Rio Salado, Rio Puerco, and associated tributaries should be pursued to maintain and restore the riparian habitat associated with these drainages.

## Strategies

- 1: Collaborate with the Service's Water Resource Division to measure flows on the perennial portion of the Rio Salado within the refuge.
- 2: Collaborate with the Service's Water Resource Division and New Mexico Office of the State Engineer to pursue opportunities for protecting in-stream flows for the Rio Salado, Rio Puerco, and associated tributaries.

**Objective 3:** Map and determine aquifer sources and characteristics of all upland seeps, springs, and other water sources of the refuge.

**Rationale for Objective:** Protection and maintenance of the water sources on the refuge depends on a thorough understanding of the nature and characteristics of the water sources. Acquisition of this information would allow better protection and sustainability.

## Strategies

- 1: Collaborate with the Service's Water Resource Division to identify seeps, springs, and wetlands on the refuge and determine their sources of water.
- 2: If the source of any of these features is regional in extent, coordinate with appropriate entities to protect water sources and ensure long-term sustainability.
- 3: Protect water rights associated with man-made wells.



**Goal 5: Compatibility  
and Public Use**

*To achieve appropriate levels of public use that are compatible with the purpose(s) for which the refuge was established, and with the goals of the National Wildlife refuge System; and to regulate, as provided by law, all activities, uses, and practices that are potentially harmful to refuge resources.*

#### 4.5 Compatibility and Public Use

**Objective 1:** Develop a public use plan by 2004 with opportunities to increase public recreational use, with an emphasis on wildlife interpretation and education, on the refuge by 15 percent by 2004, and 50 percent by 2010.

**Rationale for Objective:** The National Wildlife Refuge Improvement Act of 1997 (Section 5.2) stipulates that refuge managers should facilitate where possible the inclusion of wildlife-dependent compatible public use on refuge lands. Sevilleta NWR presents opportunities to facilitate improvements in the public's appreciation of the refuge. Public uses have been absent in the past due to the lack of facilities and funding and an emphasis on other activities. This has resulted in a lack of public awareness of the refuge's resources.

#### Strategies

- 1: Determine and document the compatibility of all public uses (including all proposals for research) that occur on the refuge (RONS #98003).
- 2: Improve hunting, watchable wildlife, and recreational opportunities on the refuge (RONS #99014, #99007, #99003, and #98003).
- 3: Prepare a compatibility assessment for the opening of San Lorenzo Canyon to public activities such as hiking and environmental interpretation.
- 4: In coordination with The Nature Conservancy, develop a wildlife interpretive master plan that includes the size, scope, and themes that will be integrated with trail development, interpretive signing, and visitor center displays by 2001.



**Goal 6: Environmental Education and Public Outreach**

*To establish a formal program for public outreach, identify important public resources, and implement environmental education programs accordingly.*

**4.6 Environmental Education and Public Outreach**

**Objective 1:** To increase refuge visitation and public outreach by 50 percent by 2010 by providing the general public with high quality environmental education and wildlife-dependent experiences on and off the refuge.

**Rationale for Objective:** Increased environmental education and public outreach has long been a goal of the refuge and a planned visitor center will enable this accomplishment. Better education and outreach will enhance almost all of the activities at the refuge.

**Strategies**

- 1:** Hold annual open house meetings and provide tours and programs.
- 2:** In cooperation with the University of New Mexico and The Nature Conservancy, construct a visitor center to allow increased visitation by environmental education groups (RONS #99006).
- 3:** Determine and document compatibility of outreach activities occurring on the refuge (RONS #98003).
- 4:** If determined compatible, implement an environmental education program that promotes and enhances the refuge endangered species and research programs.
- 5:** Increase environmental education, public outreach programs, and wildlife-dependent programs in the local community.
- 6:** Increase awareness of the refuge's role in environmental research by using special events in partnership with the refuge's Friends Group and other local and national groups (RONS #99004).



**Goal 7: Cultural Resources Management**

*Develop appropriate management practices to protect cultural resources within the scope of Part 614 of the Service Manual and all applicable federal laws and regulations. By 2004 identify and map known cultural sites. By 2010 provide appropriate protection and law enforcement measures to prevent disturbance to sites where human interaction is possible.*

#### 4.7 Cultural Resources Management

**Objective 1:** Develop appropriate management practices to protect cultural resources within the scope of Part 614 of the Service Manual and all applicable federal laws and regulations. By 2004 identify and map known cultural sites. By 2010 provide appropriate protection and law enforcement measures to prevent disturbance to sites where human interaction is possible.

**Rationale for Objective:** Protection of cultural resources is required by regulation, and preservation requires the identification and determination of the resources to be protected and the methods to be used to protect the resources. Much of this information already exists but can be enhanced and organized to allow for more effective protection strategies.

#### Strategies

- 1: Protect all cultural resources on the refuge as mandated under the Archaeological Resource Protection Act (RONS #99011).
- 2: Develop protocols for all management activities that ensure ARPA compliance.
- 3: Conduct a cultural resources survey to determine the nature and extent of resources on the refuge (RONS #99012 and #99010).
- 4: Use appropriate law enforcement measures to protect cultural resources.
- 5: Explore acquisition of inholdings and adjacent properties that contain archeological or other cultural resources (RONS #99018).



**Goal 8: Land Protection and Acquisition**

To protect existing lands associated with the refuge for the benefit of fish and wildlife resources; to provide for the acquisition of additional lands; and to ensure the integrity of refuge boundaries relative to adjacent lands.

#### 4.8 Land Protection and Acquisition

**Objective 1:** Minimize obtrusive visual and mechanical impacts to refuge lands or adjacent lands by vacating 10 miles of seasonal road and concentrating research activities. By 2005 the refuge will complete refuge boundary surveys and fencing. Current private land inholdings will be acquired on a willing-seller basis as lands and funds become available.

**Rationale for Objective:** Road construction and maintenance is a major environmental impact on refuge lands. Reducing the miles of road used and maintained can reduce the overall impact as well as reducing expenditures. Maintenance of the boundary fence will reduce impacts from animal and human trespass.

#### Strategies

- 1: Increase maintenance of refuge boundary fences (RONS #99013).
- 2: On a willing-seller basis, secure additional land adjacent to the refuge boundaries and within boundaries through the Land Acquisition Prioritization System (RONS #98018), and as indicated on Map #3 .
- 3: Acquire land or easements to provide adequate access to the refuge headquarters and approximately 5,000 acres of land along New Mexico State Highway 60 on the north boundary of the refuge (RONS #98003).

**Objective 2:** By the end of FY 2001, (September 30, 2001), assess the refuge's full wilderness attributes, and determine appropriate areas within the full spectrum of the refuge for study and designation as Wilderness Study Areas. Lands so designated would henceforth be managed as de facto wilderness in accordance with Service policy until such time as Congress designates wilderness areas in accordance with the Wilderness Act of 1964.

**Rationale for Objective:** There is an opportunity to afford additional protection to selected refuge lands including those adjacent to proposed Bureau of Land Management (BLM) wilderness study area that abuts the refuge (see Map #1). Assessment of the selected areas of the refuge could result in designation as Wilderness in accordance with the Wilderness Act of 1964, by Congress.

## Strategies

- 1: Between 3,000 and 8,000 acres of refuge land as denoted on Map #1, has been determined to be eligible for submission to the Director as meeting the criteria for a wilderness study area. The final acreage configuration will be called the Sierra Ladron Wilderness Study Area, however, by virtue of the natural condition and character of this final configuration, no further study would be necessary. This area will be managed as de facto wilderness in accordance with Service policy and as set forth in the Wilderness Act of 1964.
- 2: By September 30, 2001, the Service will complete an assessment of the wilderness potential of a broad spectrum of refuge lands other than the area denoted on Map #1 which are already determined to have wilderness potential. The refuge manager will focus on areas not currently committed to active research projects that necessitate equipment, access, and technologies inconsistent with the purposes of wilderness. Most areas should meet roadless area criteria however, areas with roads would not necessarily be excluded from consideration. The result of the assessment will be a decision determining the final composition of the sum total of refuge's lands to be proposed as Wilderness Study Areas. Once determined, the final study area configuration will be managed as de facto wilderness.



**Goal 9: Staffing, Facilities,  
and Funding**

*To effect improvements to funding, facilities, and staffing that will result in enhancement of refuge habitat and wildlife resources, leading to the achievement of the goals of this plan and the goals of the National Wildlife refuge System.*

#### 4.9 Staffing, Facilities, and Funding

**Objective 1:** Hire adequate staffing to implement management plans benefitting the Middle Rio Grande Ecosystem both on and off refuge lands. Priority of staffing will follow the needs of the implementation on the management plan in 1999.

**Rationale for Objective:** In order to accomplish refuge goals and objectives, additional staff will be required. Additionally, foreseeable increases in public use will be difficult to accommodate without additional staff.

#### Strategies

- 1: Obtain staffing at the level listed below (proposed positions are in bold type).

- 1 Project Leader GS-13
- 1 Administrative Staff Asst. GS- 7
- 1 Refuge Operation Specialist GS-12
- 1 Maintenance Worker WG-8
- 1 Equipment Operator WG-10
- 1 Maintenance Worker WG-8**
- 1 Environmental Educator GS-11**
- 1 Outdoor Recreation Specialist GS-12**
- 3 Biological technicians GS-3/4 (Temporary)**
- 1 Office Automation Clerk GS-3/4/5
- 1 Youth Conservation Corps Group Leader GS-05 (Temp)**
- YCC Enrollees**
- Volunteers

**Objective 2:** Improve facilities by constructing at least a 8,000-square foot visitor center and associated facilities by 2001 that will enhance refuge capabilities and resources by providing facilities for interpretive education, research, and public interest.

**Rationale for Objective:** Construction of a visitor center and associated facilities is essential to accomplishing public use and outreach goals.

### **Strategies**

- 1:** Negotiate a Memorandum of Understanding with the University of New Mexico and The Nature Conservancy regarding the joint development of the new administrative building complex at the refuge.
- 2:** Construct a visitor center to allow increased visitation by environmental education groups (RONS #99006).
- 3:** By 2004, construct two 1,500-square foot housing units for two refuge staff and families near the main administrative area. By 2004, construct multi-unit housing facilities to accommodate between five to ten volunteers.
- 4:** Relocate the law enforcement training shooting range to a new location to eliminate the current hazards associated with having the range located near the refuge headquarters ( RONS #99001).

**Goal 10: Interagency Coordination**

To strengthen interagency and jurisdictional coordination on or near the refuge resulting in decisions benefitting fish and wildlife resources while avoiding duplication of effort.

#### 4.10 Interagency Coordination

**Objective 1:** Apply the Upper Rio Grande Ecosystem Management approach to the refuge as appropriate over the next 15 years to protect and enhance native habitats for biological diversity.

**Rationale for Objective:** The Upper Rio Grande Ecosystem Management Plan is involved in the formulation of many basic refuge management decisions and allows for a unified approach to management in the specified ecosystem.

##### Strategies

- 1: Participate in the Service's Ecosystem Management Approach to Conservation.

**Objective 2:** Solicit input from involved agencies, institutions, and groups to help coordinate and evaluate refuge activities over the next 15 years to limit or prevent detrimental effects from current or future activities such as research, threatened and endangered species reintroduction, and non-native species interaction.

**Rationale for Objective:** Coordination with involved agencies and other groups is critical to successful accomplishment of refuge goals. Many activities effect multiple jurisdictions and close interagency cooperation is required.

##### Strategies

- 1: Use the Stakeholders Committee to identify issues and develop alternatives and strategies for possible consideration by the refuge.
- 2: Pursue appropriate Memoranda of Understanding with involved agencies and institutions.



## **5.0 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 those guidelines that apply specifically to the Sevilleta NWR.

This unit also includes sections dealing with specially designated sites such as historical landmarks and archeological sites, all of which carry with them specific direction by 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 Sevilleta NWR and other surrounding jurisdictions in the ecosystem.

### **5.1 Legal Mandates**

Administration of national wildlife 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 the law of the land, as are executive orders promulgated by the President. A list of most of the pertinent statutes establishing legal parameters and policy direction to the National Wildlife Refuge System is included in Appendix L. Included are those statutes and mandates pertaining to the management of the Sevilleta NWR.

For those laws that provide special guidance and have strong implications relevant to the Service or Sevilleta NWR, legal summaries are also offered in Appendix L. Many of the summaries have been taken from *The Evolution of National Wildlife Law* by Michael J. Bean<sup>7</sup>. For the bulk of applicable laws and other mandates, legal summaries are available upon request.

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<sup>7</sup> Bean, Michael J., 1983. *The Evolution of National Wildlife Law*, Praeger Publishers, New York.

## 5.2 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 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. Many 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 on 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.*<sup>8</sup>

### **5.2.1 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.

The Refuge Improvement Act amends the National Wildlife Refuge System Administration Act of 1966 and provides an “organic” act for the System. The act will ensure the 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 System. Its main components include a strong and singular conservation mission for the System; a requirement that the Secretary of the Interior maintain the biological integrity, diversity and environmental health of the 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 overarching, with both general and specific elements that provide long-term management direction for the 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:

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<sup>8</sup> Departmental Manual 142 DM 1.1.

Sec. 1 Purpose

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.

### 5.3 Refuge Purpose Statements<sup>9</sup>

Formal establishment of a unit of the National Wildlife Refuge System is typically based on 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. Often, the Service works in cooperation with private nonprofit organizations in efforts to acquire suitable lands.

Sevilleta NWR was established on December 28, 1973, when the Campbell Family Foundation conveyed the property to The Nature Conservancy, who in turn donated it to the Service. The purpose of the refuge as stated in the warranty deed is as follows:

*. . . to preserve and enhance the integrity and the natural character of the ecosystems of the property by creating a wildlife refuge managed as nearly as possible in its natural state, employing only those management tools and techniques that are consistent with the maintenance of natural ecological processes . . . not to be subjected to commercial exploitation . . . and the land and the plants and animals supported by it to be managed to permit the natural ecological successions and processes typical of the area to prevail . . . and that portions of the property will be made available to educational institutions and conservation organizations for scientific research and study.*

The specific conditions, reservations, and restrictions as stipulated in the warranty deed (Appendix I) by which The Nature Conservancy (Grantor) conveyed 220,200 acres of land in Socorro County, New Mexico, to the United States of America (Grantee) for administration by the Department of the Interior, through the U.S. Fish and Wildlife Service are summarized as follows:

1. Grantor reserves unto itself, all mineral rights including oil, gas, coal, and all other minerals on and underlying the property conveyed to the Grantor.

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<sup>9</sup> Purpose statements are the basis on which primary management activities are determined for each refuge in the System. Additionally, these statements are the foundation from which allowed uses of refuge are determined through a defined compatibility process.

2. Grantor stipulates that the property not be subject to commercial exploitation. Also that portions of the property will be made available to educational institutions and conservation organizations for research and study.
  - A. The granted premises may be open to regulated hunting only upon a finding and determination by the grantee that such hunting will be compatible with the purposes for which the area is established and compatible with the principles of sound wildlife management.
  - B. The use of motor vehicles by other than the Grantee's authorized employees, agents, or independent contractors, shall not be permitted, except on roads and trails designated for public use by the Grantee.
  - C. The Grantee will not use pesticides, herbicides, or other biocides or noxious substances unless their use is dictated by emergency situations, requirements of the law, or paramount management considerations determined by consultation with the Grantor.
3. The property shall not be sold, exchanged, transferred or abandoned, nor shall it be leased or used for any commercial purpose other than where deemed appropriate by the Service and The Nature Conservancy for the purpose of sound wildlife management.
4. Title shall revert in fee simple to the Grantor if the property ceases to be managed as a national wildlife refuge or if the Grantee breaches the aforementioned use regulations.
5. Grantor reserves unto itself and its representatives the right to enter the property to exercise its rights and protect its interests hereunder provided that times and areas of entrance are coordinated with the Grantee. The Grantor agrees to observe reasonable conditions that may be imposed for the protection of the area's wildlife and its habitat.
6. The Grantor may grant exceptions to the above restrictions that apply to all or any part of the

property, provided that any such exception does not impair the natural character of the of the area. In addition, the Grantor may release the lands upon which necessary capital improvements are constructed for the proper administration and management of the property.



## **6.0 PLAN IMPLEMENTATION**

Refuge objectives are intended to be accomplished over the next 15 years. Many of the management activities for Sevilleta NWR will require the development of step-down management plans. Implementation of new management activities will be phased in over time as described within the step-down plans and will be contingent on funding, staffing, and regional and national Service directives. This unit identifies major resource projects or planning to be accomplished within 15 years, estimated initial costs, staffing and funding needs, partnership opportunities, and step-down management plans.

### **Resource Projects**

Listed below are a summary of major resource project needs addressing the goals and objectives of this plan. Each project summary includes a preliminary range of cost estimates and planning links to this CCP. This list only reflects the basic needs identified by the planning team based on available information and are subject to modification depending on future conditions, needs, and cost adjustments.

#### **Project 1. Riparian Habitat Restoration**

Restore and maintain native riparian and wetland habitats, and increase the diversity of wildlife communities along sections of the Middle Rio Grande, Rio Puerco, Rio Salado, and upland seep springs. Restoration management includes removal of non-native vegetation and prescribed fire in some areas. Estimated cost to the Service varies annually depending on the acreage to be restored.

(Planning Links: Goal 1, Objective 2 and 3; Goal 2, Objective 1, 3, 4, 5, 6, and 7)

#### **Project 2. Water Management**

Develop and implement a water management plan. The plan will determine water needs to maintain wetlands acres, and restore riparian habitats of the Rio Grande, and estimate water rights needed for the beneficial use of fish and wildlife. The plan will include water management strategies for the production of quality wetland habitat components, and inventory and monitoring strategies for evaluating the diversity of wetland communities. Estimated cost to the Service: \$150,000 for plan development and implementation (does not include water rights purchase).

(Planning links: Goal 2, Objective 5 and 8; Goal 4, Objective 1, 2, and 3)

### **Project 3. Land Acquisition Plan**

Develop a priority plan for land acquisition of tracts of private lands within or adjacent to refuge boundaries. Acquisition would allow for contiguous management and protection of refuge habitats, wildlife populations and cultural resources, as well as provide visitors with safe access to refuge headquarters or other areas open to the public. Estimated cost of plan development to the Service: \$60,000.

(Planning links: Goal 8, Objective 1 and 2)

### **Project 4. Archeological Survey**

Complete a comprehensive archeological survey of Sevilleta NWR to obtain baseline information for protection of existing resources and resources potentially impact by future public access. This project is essential to meet cultural resource mandates. Estimated cost to the Service: \$75,000 to \$100,000.

(Planning Links: Goal 7, Objective 1)

### **Project 5. Public Use Plan and Visitor Services**

Contingent on the construction of new headquarters, develop a public use plan that emphasizes visitor services at the headquarters, and increased opportunities for wildlife-related recreation activities. Estimated cost to the Service: \$75,000 for plan development; step-down plan will include cost analysis for implementation.

(Planning Link: Goal 5, Objective 1; Goal 6, Objective 1; Goal 9, Objective 2)



## Sevilleta NWR Current and Proposed Funding and Personnel

### Current Staff

The refuge has a current staff of 5 permanent full-time equivalents, 2 temporary full-time employees, 1 to 2 cooperative students or YCC Youths, and 3 to 5 volunteers.

The current staffing level includes the following:

Project Leader	GS-13	PFT
Administrative Assistant	GS-7	PFT
Refuge Operations Spec.	GS-12	PFT
Maintenance Worker	WG-8	PFT
Equipment Operator	WG-10	PFT
Clerk Typist	GS-3	TFT
Writer/ Editor	GS-5	TFT

Approximate annual cost of current staff . . . . . \$315,596

### Proposed Staff

To accomplish the goals and objectives of this plan, the following increase in staff and base funding would be required (salaries are estimates only):

Biological Technician	GS-5/6	PFT
Biological Technician	GS-5/6	PFT
Office Admin. Clerk	GS-4/5	PFT
Outdoor Recreation Planner	GS-7/9/11	PFT*
Biological Technician	GS-5/6/7	PFT*
Maintenance Worker	WG-8	PFT*
Laborer	WG-3	TFT*
YCC Group Leader	WG-5	TFT

Approximate annual cost of proposed staff . . . . . \$345,400

### Current Base Funding and Other Funds

Total annual budget for the refuge varies depending on the Service priorities for the resource projects each year and the national and regional allocation of refuge Operating Needs System and Maintenance Management System funds.

The following is a general breakdown of the annual operation budget of the refuge:

Year	O&M 1261*	MMS 1262*	Volunteer	YCC	NFTA 1231*	Fire 9120 *	ES 1122 *	Total
1999	311.1	54.1	0	15.0	18.0	0.26	25.0	423.5
1998	304.0	61.0	0	0.0	20.0	0.26	75.0	460.3
1997	250.4	62.0	0	0.0	0.0	2.0	0.0	314.4
1996	243.0	60.0	1	7.9	0.0	1.4	0.0	313.3

\*Description of funding categories:

O&M 1261 refers to operations and maintenance funds, including annual fixed costs such as salaries, utilities, and mandatory training and travel.

MMS 1262 refers to Maintenance Management System funds, including routine maintenance and vehicle replacement, maintenance on refuge facilities, and infrastructure.

NFTA 1231 refers to special National Free Trade Agreement funds for migratory bird projects on the refuge such as aplomado falcon recovery.

Fire 9120 refers to fire management funding for prescribed fire.

ES 1122 refers to special funds for habitat improvement projects such as Save our Bosque.

## 6.1 Partnership Opportunities

There are many opportunities to partner with county, state, and federal agencies, nongovernmental agencies, private landowners, and conservation groups to combine efforts on resource issues or projects that would mutually benefit all with the greatest benefits to the area's natural resources. The benefits of the following partnerships or relationships are emphasized:

Partnerships or joint efforts with the Bureau of Reclamation, New Mexico Game and Fish Department, Ducks Unlimited, The Nature Conservancy, private landowners, corporations, Water Conservancy Districts, and county governments could result in the development of conservation easements for the restoration of a corridor of riparian and wetland habitats along the Middle Rio Grande. A contiguous quality wetland and riparian corridor would provide breeding, resting, and feeding areas for waterfowl, geese, and cranes; and restore some of the floodplain characteristics and hydrology of the river. Refuge lands adjacent to the river could serve as demonstration and research areas to develop techniques for restoration and enhancement efforts.

Establishing relationships with private landowners and conservation organizations could result in the development of conservation agreements or other options for land protection, habitat enhancement and restoration, and opportunities for continuity of management. Through agreements, the Service could initiate efforts to work on private lands initiatives with permit holders on state and federal lands managed by the Bureau of Land Management, Forest Service, New Mexico State Forestry Division, New Mexico Game and Fish Department, and State Lands Office.

Continued coordination with the administrators and research investigators of the University of New Mexico's LTER programs would provide the Service a unique opportunity to obtain information on data gaps in refuge biological information and opportunities to meet the needs of the refuge's biological and management programs.

Strengthening partnerships with New Mexico Game and Fish Department could lead to sharing volunteers and a wildlife technician position to conduct activities associated with public use on the refuge wetlands and adjacent La Joya State Waterfowl Management Area; enhancing biological programs and management strategies of habitats and wildlife populations on adjoining lands; sharing research opportunities and information that would mutually benefit management of adjoining resource

areas; coordinating water management to enhance wetland habitats; improving wildlife-oriented recreation opportunities through joint efforts; and coordinating efforts for more efficient law enforcement coverage.

Through improved coordination with the Bureau of Reclamation and other water regulatory agencies, the timing and amount of water flows could be maximized for beneficial use on riparian, wetland, and aquatic communities of the Rio Grande adjacent to the refuge. Improved relationships with area water users and the BR would provide better communication on water issues. A coordinated effort for the protection of water rights and efficient use of this limited resource would benefit all users.

Partnerships and agreements with University of New Mexico and The Nature Conservancy could result in the development of a joint administrative complex and visitor center on the refuge and a larger environmental education program.

Establishing partnerships and strengthening relationships with the Chamber of Commerce, city officials, and other groups from the cities of La Joya, Bernardo, and Socorro would result in the development of a refuge outreach program that would benefit the economic and social components of these communities and assist the refuge in achieving its goals and objectives for environmental education and public use.

### **Step-Down Management Planning**

The following is a list of step-down management plans that include mandatory plans, programmatic plans, and special use plans. Often these plans will require compatibility determinations, environmental assessments, or other supporting justification before they can be implemented. The preparation and execution of these plans is dependent on funding and the availability of staff or technical support.

#### **6.2 Completed Station Step-down Plans and Other Documents**

##### **Station Safety Plan**

This plan describes actions and improvements necessary to make station facilities and operations comply with federal occupational health and safety standards and other applicable regulations. Updated and completed in 1998.

### **Fire Management Plan**

This plan determines the best use of fire in managing and enhancing the refuge habitats. Provides specific strategies, conditions, and parameters for the use of fire to accomplishing habitat objectives for targeted grassland and wetland areas.

### **Sign Plan**

This plan provides a record of all signs installed throughout the refuge and guidelines for sign replacement. Completed between 1980-1984. Needs to be reviewed and updated.

### **Hunting Plan**

This plan addresses specific aspects of the refuge hunting program defining the species to be hunted, season structure, hunting methods, and applicable refuge specific hunting regulations. Completed between 1980-1984. Needs to be reviewed and updated.

### **Migratory Bird Disease Contingency Plan**

This plan describes strategies to be implemented during migratory bird disease outbreaks. Completed between 1980-1984. Needs to be reviewed and updated.

### **Prescribed Fire Environmental Assessments**

An environmental assessment is planned to determine the environmental impacts of prescribed fire as a management tool in restoring and enhancing grassland habitats on the Sevilleta NWR. The primary objective of these environmental assessments are to determine the effects of prescribed fire on human and wildlife populations, endangered bald eagle or other state-listed species, or other species of plants or animals. A Finding of No Significant Impact would determine fire to have no significant environmental effects. If prescribed fire is not deemed a major federal action significantly affecting the quality of human environment within the meaning of section 102 (2) © of the National Environmental Policy Act of 1969, no formal environmental statement will be recommended.

### **Compatibility Determinations (completed between 1992-1994)**

The following programs were determined compatible with the refuge purpose:

Desert Bighorn Sheep Restoration Project  
The LTER Research Program  
Waterfowl and Goose Hunting in Lower Unit A

### **Compatibility Determinations 2000**

The following programs were determined compatible with the refuge purpose. These determinations supersede any previous decisions.

#### *Recreational & Public Uses*

Waterfowl Hunting (125 acre marshland)  
Special Events (i.e., educational events, Sevilleta Annual Open house, Festival of the Cranes, etc.)  
Recreational Vehicle Area for Volunteers (1-2 acres)  
Cemetery Visitation  
Research (Long Term Ecological Research & others)  
Public Education Use  
Hiking (Trails/ San Lorenzo Canyon & small part of wetland)  
Wildlife Observation (Limited Areas)  
Wildlife Photography  
Wildlife Tours (guided/controlled/scheduled)  
New Visitor Center  
Construction and Use of Shooting Range

#### *Program & Management Activities*

Cottonwood & Other Native Plant Planting  
Willow flycatcher surveys  
Exotic (Non-Native) Plant Removal  
Silvery Minnow Study  
Wildlife Releases  
Pronghorn Study  
Herbicide Use  
Removal / Rebuild Berms - Stock Tanks  
Land Acquisition  
Aerial Flight Surveys  
Fence, Sign & Gate installation  
Extend Pole Barn

Well and Windmill Repair  
Prescribed Fires  
Captive Wolf Facility  
Riparian Restoration  
Rio Salado Erosion Control Improvements

The following activity was determined ***not*** compatible:

Burial Activities

### **6.3 Plans and Documents to be Developed in the Future**

#### **Public Use Management Plan**

This plan addresses specific wildlife-related public recreation issues and needs.

#### **Wildlife Interpretive Master Plan with TNC**

In coordination with The Nature Conservancy, develop a wildlife interpretive master plan that includes the size, scope, and themes that will be integrated with trail development, interpretive signing, and visitor center displays.

#### **Refuge Inventory and Monitoring Plan**

This plan describes specific wildlife inventory activities and techniques to be conducted to monitor wildlife populations including specific species population objectives, census/survey methods, data analysis, and reporting requirements.

#### **Wilderness Assessment/Review Plan**

By September 30, 2001, the Service will complete an assessment of the wilderness potential of a broad spectrum of refuge lands other than the area denoted on Map #1 which are already determined to have wilderness potential. The refuge manager will focus on areas not currently committed to active research projects that necessitate equipment, access, and technologies inconsistent with the purposes of wilderness. Most areas should meet roadless area criteria however, areas with roads would not necessarily be excluded from consideration. The result of the assessment will be a decision determining the final composition of the sum total of refuge's lands to be proposed as Wilderness Study Areas. Once determined, the final study area configuration will be managed as de facto wilderness.

#### **Habitat Management Plan**

This plan describes the most appropriate management strategies for habitat protection, enhancement and restoration, emphasizes specific habitats and areas for management activities, provides monitoring methods and evaluation criteria.



### **Cultural Resource Management Plan**

This plan identifies areas with significant sites and develops methods for the management of these resources. The plan also identifies areas with high potential of significant resources and provides the manager with information to make better decisions regarding development or management activities. A comprehensive cultural resource inventory is a prerequisite to the development of the plan as land management activities including public access could impact unidentified or unevaluated resources.

### **Integrated Pest Management Plan**

This plan describes biological, mechanical, or chemical methods for the most effective eradication and control of non-native weeds and woody vegetation and specific pests including those deprecating crops without impacting the natural resources of the area. This plan will include any necessary furbearer reduction for water control management by Service personnel or Department of Agriculture/Wildlife Services. Also included will be necessary control measures for non-native ungulates (e.g., oryx, Barbary sheep). This may include the establishment of a special management hunt to remove any non-native animals.

### **Water Use Plan**

This plan describes annual water management strategies including quantities of water delivered, place of use and timing, and habitat objectives.

### **Compatibility Determination for Interpretive Nature Area Wildlife Observation**

This determines if this public use is compatible with the purposes for which the refuges was established and will not have an adverse affect on habitat, historical resources, or species of plants and wildlife. This needs to be completed if any area within the refuge will be open to the public for wildlife observation.

### **Compatibility Determination for Wildlife Photography**

This determines if this public use is compatible with the purposes for which the refuge was established and the impacts of this use on wildlife, plants, and habitats of the refuge. his needs to be completed if any area within the refuge will be open to the public for wildlife photography.

#### **6.4 Refuge Program Monitoring and Evaluation**

Where possible, the CCP identified and incorporated monitoring and evaluation activities as strategies under the objectives developed for Sevilleta NWR. Each refuge program has specific guidelines described in the appropriate step-down plan. Step-down plans include approaches and methods to monitoring management activities and specific criteria to evaluate the outcomes of the activities. As new information becomes available through baseline data, research, or outcomes of management projects, the existing refuge programs will be adjusted. Step-down plans, including the monitoring and evaluation sections, will require periodic review, program evaluation, and adjustments as necessary.

#### **Monitoring and Evaluation of the CCP**

For this plan to be a useful working document to present and future refuge managers, documentation and accountability must be a priority. It will be valuable to document what objectives were achieved and within what time frame and if the objectives implemented were effective in achieving desired outcomes. The most effective implementation of the CCP will require periodic review, evaluation, and the addition of information as necessary to keep the document as current as the refuge programs that evolve.

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<sup>10</sup> An internal administrative document



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## GLOSSARY

alluvial fan	The deposit from a stream where it exits from a gorge or canyon onto a plain or of a tributary stream at its junction with the main stream.
alternative	A set of objectives and strategies needed to achieve refuge goals and the desired future condition.
biological diversity	The variety of life forms and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.
biome	A major ecological community type such as grasslands.
biotic community	An assemblage of interrelated plants and animals that together inhabit a defined location.
bosque	A small wooded area.
compatible use	A wildlife-dependent recreational use, or any other use on a refuge that will not materially interfere with or detract from the fulfillment of the mission of the Service or the purpose(s) of the refuge.
comprehensive conservation plan	A document that describes the desired future conditions of the refuge, and specifies management actions to achieve refuge goals and the mission of the National Wildlife refuge System.
ecosystem	A dynamic and interrelated complex of plant and animal communities and their associated non-living environment.

Ecosystem Approach	A strategy or plan to protect and restore the natural function, structure, and species composition of an ecosystem, recognizing that all components are interrelated.
ecosystem management	Management of an ecosystem that includes all ecological, social, and economic components that make up the whole of the system.
endangered species	Any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the <i>Federal Register</i> .
environmental assessment	A systematic analysis to determine if proposed actions would result in a significant effect on the quality of the environment.
eolian	Carried, deposited, produced, or eroded by wind.
non-native	A plant or animal species not native to the area and introduced intentionally or unintentionally.
geomorphology	The look and lay of the land.
goals	Descriptive statements of desired future conditions.
habitat	The environment in which a plant or animal naturally occurs, its “living space.”
issue	Any unsettled matter that requires a management decision. For example, a resource management problem, concern, a threat to natural resources, a conflict in uses, or the presence of an undesirable resource condition.



loma	Clay dunes often covered with brushy vegetation.
national wildlife refuge	A designated area of land or water or an interest in land or water within the System, including national wildlife refuges, wildlife management areas, waterfowl production areas, and other areas under Service jurisdiction for the protection and conservation of fish and wildlife, and plant resources. A complete listing of all units of the refuge system may be found in the current <i>Annual Report of Lands Under Control of the U.S. Fish and Wildlife Service</i> .
National Wildlife Refuge Systems	All lands, waters, and interests administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish, wildlife, and plant resources.
no action alternative	An alternative under which existing management would be continued.
non-priority public use	Any use other than a compatible wildlife-dependent recreational use.
objective	A concise statement of what will be achieved, how much will be achieved, when and where it will be achieved, and who is responsible for the work. Objectives are derived from goals and provide the basis for determining management strategies, monitoring refuge accomplishments, and evaluating the success of the strategies. Objectives should be attainable and time specific and should be stated qualitatively to the extent possible. If objectives cannot be stated

	quantitatively, they may be stated qualitatively; actions to be accomplished to achieve a desired outcome.
playa lake	The flat-floored bottom of an undrained desert basin that at times can fill and become a shallow lake.
preferred alternative	The Service's selected alternative identified in the draft comprehensive conservation plan.
priority public use	Compatible wildlife-dependent recreational uses. Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are the priority public uses of the System and shall receive priority consideration in refuge planning and management.
proposed action	The Service proposed action for comprehensive conservation plans is to prepare and implement the CCP.
public involvement	The process by which interested and affected individuals, organizations, agencies, and governmental entities participate in the planning and decision-making process.
purpose of the refuge	The purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donating document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit or refuge sub-unit.
riparian	Of or relating to land lying immediately adjacent to a water body and having specific characteristics of that transitional area, such as riparian vegetation. A

	stream bank is an example of a riparian area.
scoping	A process for determining the scope of issues to be addressed by a comprehensive conservation plan and for identifying the significant issues. Involved in the scoping process are federal, state, and local agencies; private organizations; and individuals.
species	A distinctive kind of plant or animal having distinguishable characteristics, that can interbreed and produce young. A category of biological classification.
strategies	A general approach or specific actions to achieve objectives.
stratigraphy	The layering of one kind of sedimentary rock arranged between beds of other kinds of rock.
tectonic	The forces that change and shape the earth's crust, such as folding and faulting.
terrestrial	Living on or in, or growing from, the land.
threatened species	Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future. A plant or animal identified and defined in accordance with the Endangered Species Act of 1973 and published in the <i>Federal Register</i> .
vegetation	Plants in general, or the sum total of the plant life in an area.

vegetation type	A category of land based on potential or existing dominant plant species of a particular area.
watershed	The entire land area that collects and drains water into a stream or stream system.
wetland	Areas such as lakes, marshes, and streams that are inundated by surface or groundwater for a long enough time each year to support, and do support under natural conditions, plants and animals that require saturated or seasonally saturated soils.
wildlife-dependent recreational use	A use of a refuge that involves hunting, fishing, wildlife observation, photography, or environmental education and interpretation, as identified in the National Wildlife Refuge System Improvement Act of 1997.
wildlife diversity	A measure of the number of wildlife species in an area and their relative abundance.

## ABBREVIATIONS AND ACRONYMS

ARPA	Archeological Resources Protection Act
BLM	Bureau of Land Management
BR	Bureau of Reclamation
CCP	Comprehensive Conservation Plan
ES	Ecological Services
LTER	Long-Term Ecological Research
NEPA	National Environmental Policy Act
NWR	National Wildlife Refuge
NMGFD	New Mexico Game and Fish Department
PILT	Payment in Lieu of Taxes
Service	United States Fish and Wildlife Service
System	National Wildlife Refuge System
TNC	The Nature Conservancy



**Appendix A**  
**Fish Of The Middle Rio Grande**  
Compiled By Sevilleta LTER





Fish faunas of the Middle Rio Grande in New Mexico

<b>Taxa</b>	<b>Common name</b>	<b>residence</b>	<b>population</b>
<b>Acipenseridae</b>			
<i>Scaphirhynchus platorhynchus</i>	shovelnose sturgeon	native	extirpated
<b>Lepisosteidae</b>			
<i>Lepisosteus osseus</i>	long-nose gar	native	extirpated
<b>Anguillidae</b>			
<i>Anguilla rostrato</i>	American eel	native	extirpated
<b>Clupeidae</b>			
<i>Dorosoma cepedianum</i>	gizzard shad	native	common
<i>Dorosoma petenense</i>	threadfin shad	non-native	common
<b>Salmonidae</b>			
<i>Oncorhynchus clarki virginalis</i>	Rio Grande cutthroat trout	non-native	rare
<b>Characidae</b>			
<i>Astyanax mexicanus</i>	Mexican tetra	native	extirpated
<b>Cyprinidae</b>			
<i>Cyprinus carpio</i>	common carp	non-native	common
<i>Cyprinella lutrensis</i>	red shiner	native	common
<i>Dionda episcopa</i>	round-nose minnow	native	extirpated
<i>Gilo pandora</i>	Rio Grande chub	native	rare
<i>Hybognathus amarus</i> *	Rio Grande silvery minnow	native	rare
<i>Macrhybopsis aestivalis</i>	speckled chub	native	extirpated
<i>Notropis jemezianus</i>	Rio Grande shiner	native	extirpated
<i>Notropis orca</i>	phantom shiner	native	extinct

<i>Notropis simus simus</i>	bluntnose shiner	native	extinct
<i>Pimephales promelas</i>	fathead minnow	native	common
<i>Pimephales vigilax</i>	bullhead minnow	non-native	extirpated
<i>Platygobia gracilus</i>	flathead chub	native	common
<i>Rhinichthys cataractae</i>	longnose dace	native	common

### **Catostomidae**

<i>Carpiodes carpio</i>	river carpsucker	native	common
<i>Catostomas (Pontosteus) plebius</i>	Rio Grande sucker	native	rare
<i>Catostomas commersoni</i>	white sucker	non-native	common
<i>Ictiobus bubalus</i>	smallmouth buffalo	native	rare
<i>Moxostoma congestum</i>	gray redbhorse	native	extirpated

### **Ictaluridae**

<i>Ictalurus furcatus</i>	blue catfish	native	extirpated
<i>Ictalurus melas</i>	black bullhead	non-native	common
<i>Ictalurus natalis</i>	yellow bullhead	non-native	common
<i>Ictalurus punctatus</i>	channel catfish	non-native	common
<i>Pylodictis olivarius</i>	flathead catfish	native	common

### **Poeciliidae**

<i>Gambusia affinis</i>	mosquito fish	native	common
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### **Percichthyidae**

<i>Morone chrysops</i>	white bass	non-native	common
<i>Morone saxatilis</i>	striped bass	non-native	common

## **Centrarchidae**

<i>Lepomis macrochirus</i>	bluegill	native	common
<i>Lepomis cyanellus</i>	green sunfish	non-native	common
<i>Lepomis gulosus</i>	warmouth	non-native	common
<i>Lepomis megalotis</i>	long-ear sunfish	non-native	common
<i>Micropterus salmoides</i>	largemouth bass	non-native	common
<i>Pomoxis annularis</i>	white crappie	non-native	common
<i>Pomoxis nigromaculatus</i>	black crappie	non-native	common

## **Percidae**

<i>Perca flavescens</i>	yellow perch	non-native	common
<i>Stizostedion vitreum</i>	walleye	non-native	common

## **Sciaenidae**

<i>Aplodinotus grunniens</i>	freshwater drum	native	common
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\* = federally listed as endangered



**Appendix B**  
**Reptiles Of Sevilleta NWR**  
**(Socorro County)**  
**Compiled By Sevilleta LTER**

**Appendix B**  
**Reptiles of Sevilleta NWR**  
**(Socorro County)**  
Compiled By Sevilleta LTER



## Reptiles of Socorro County

### Scientific Name

### Common Name

#### **Teiidae**

#### **Whiptails**

*Cnemidophorus exsanguis*  
*Cnemidophorus inornatus*  
*Cnemidophorus neomexicanus*  
*Cnemidophorus tessellatus*  
*Cnemidophorus tigris*  
*Cnemidophorus uniparens*  
*Cnemidophorus velox*

Chihuahuan spotted whiptail  
little striped whiptail  
New Mexican Whiptail  
checkered whiptail  
western whiptail  
desert grassland whiptail  
plateau striped whiptail

#### **Colubridae**

#### **Colubrids**

*Arizona elegans*  
*Coluber constrictor*  
*Diadophis punctatus*  
*Elaphe guttata*  
*Gyalopion canum*  
*Heterodon nasicus*  
*Hypsiglena torquata*  
*Lampropeltis getulus*  
*Lampropeltis triangulum*  
*Masticophis flagellum*  
*Masticophis taeniatus*  
*Opheodrys vernalis*  
*Pituophis melanoleucus*  
*Rhinocheilus lecontei*  
*Salvadora grahamiae*  
*Sonora semiannulata*  
*Tantilla nigriceps*  
*Thamnophis cyrtopsis*  
*Thamnophis elegans*  
*Thamnophis marcianus*  
*Thamnophis proximus*  
*Thamnophis sirtalis*

glossy snake  
racer  
ringneck snake  
corn snake  
Chihuahuan hook-nosed snake  
western hognose snake  
night snake  
common kingsnake  
milk snake  
coachwhip  
striped whipsnake  
smooth green snake  
bull (gopher) snake  
long-nosed snake  
Graham patch-nosed snake  
ground snake  
plains black-headed snake  
black-necked garter snake  
western terrestrial garter snake  
checkered garter snake  
western ribbon snake  
common garter snake



**Viperidae**

*Crotalus atrox*  
*Crotalus lepidus*  
*Crotalus mosossus*  
*Crotalus viridis*  
*Sistrurus catenatus*

**Leptotyphlopidae**

*Leptotyphlops dulcis*

**Chelydridae**

*Chelydra serpentina*

**Emydidae**

*Chrysemys picta*  
*Pseudemys scripta*  
*Terrapene ornata*

**Trionychidae**

*Trionyx spiniferus*

**Gekkonidae**

*Coleonyx brevis*

**Anguidae**

*Gerrhonotus kingii*

**Iguanidae**

*Cophosaurus texanus*  
*Crotaphytus collaris*  
*Gambelia wislizenii*  
*Holbrookia maculata*  
*Phrynosoma cornutum*

**Vipers**

western diamondback rattlesnake  
rock rattlesnake  
black-tailed rattlesnake  
prairie (western) rattlesnake  
massasauga

**Slender Blind Snakes**

Texas blind snake

**Snapping Turtles**

snapping turtle

**Box and Water Turtles**

painted turtle  
slider  
western box turtle

**Softshell Turtles**

spiny softshell

**Gecko**

Texas banded gecko

**Alligator Lizards**

Madrean alligator lizard

**Iguanids**

greater earless lizard  
common collared lizard  
long-nosed leopard lizard  
lesser earless lizard  
Texas horned lizard

*Phrynosoma douglassii*  
*Phrynosoma modestum*  
*Sceloporus clarkii*  
*Sceloporus graciosus*  
*Sceloporus magister*  
*Sceloporus poinsettii*  
*Sceloporus undulatus*  
*Urosaurus ornatus*  
*Uta stansburiana*

short-horned lizard  
round-tailed horned lizard  
Clark spiny lizard  
sagebrush lizard  
desert spiny lizard  
crevice spiny lizard  
eastern fence lizard  
tree lizard  
side-blotched lizard

### **Scincidae**

*Eumeces multivirgatus*  
*Eumeces obsoletus*

### **Skinks**

many-lined skink  
great plains skink



**Appendix C**  
**Birds Of Sevilleta NWR**  
**Compiled By Sevilleta LTER**



Sevilleta LTER / Socorro County Bird Checklist - Aug 7, 1997

Scientific Name

Common Name

**PODICIPEDIDAE**

*Aechmophorus occidentalis*

western grebe

*Podiceps nigricolis*

eared grebe

*Podilymbus podiceps*

pied-billed grebe

**PELECANIDAE**

*Pelecanus erythrorhynchos*

American white pelican

**PHALACROCORACIDAE**

*Phalacrocorax olivaceus*

olivaceous cormorant

*Phalacrocorax auritus*

double-crested cormorant

**ARDEIDAE**

*Botaurus letiginosus*

American bittern

*Nycticorax nycticorax*

black-crowned night heron

*Nyctanassa violacea*

yellow-crowned night heron

*Butorides striatus*

green-backed heron

*Egretta caerulea*

little blue heron

*Bubulcus ibis*

cattle egret

*Egretta thula*

snowy egret

*Casmerodius albus*

great egret

*Ardea herodias*

great blue heron

**THRESKIORNITHIDAE**

*Plegadis chihi*

white-faced ibis

**ANATIDAE**

*Cygnus columbianus*

tundra swan

*Anser albifrons*

greater white-fronted goose

## FALCONIDAE

<i>Falco sparverius</i>	American kestrel
<i>Falco columbarius</i>	merlin
<i>Falco mexicanus</i>	prairie falcon
<i>Falco peregrinus</i>	peregrine falcon

## PHASIANIDAE

<i>Callipepla squamata</i>	scaled quail
<i>Callipepla gambelii</i>	Gambel's quail
<i>Phasianus colchicus</i>	ring-necked pheasant
<i>Meleagris gallopavo</i>	wild turkey

## RALLIDAE

<i>Rallus limicola</i>	Virginia rail
<i>Porzana carolina</i>	sora
<i>Gallinula chloropus</i>	common moorhen
<i>Fulica americana</i>	American coot
<i>Fulica atra</i>	Eurasian coot

## GRUIDAE

<i>Grus canadensis</i>	sandhill crane
<i>Grus americana</i>	whooping crane

## CHARADRIIDAE

<i>Charadrius semipalmatus</i>	semipalmated plover
<i>Charadrius vociferus</i>	killdeer
<i>Charadrius montanus</i>	mountain plover

## RECURVIROSTRIDAE

<i>Recurvirostra americana</i>	American avocet
<i>Himantopus mexicanus</i>	black-necked stilt

## SCOLOPACIDAE

<i>Numenius americanus</i>	long-billed curlew
<i>Catoptrophorus semipalmatus</i>	willet
<i>Tringa melanoleuca</i>	greater yellowlegs

<i>Chen caerulescens</i>	snow goose
<i>Chen rossii</i>	Ross's goose
<i>Branta canadensis</i>	Canada goose
<i>Anas platyrhynchos</i>	mallard
<i>Anas strepera</i>	gadwall
<i>Anas crecca</i>	green-winged teal
<i>Anas americana</i>	American wigeon
<i>Anas acuta</i>	northern pintail
<i>Anas clypeata</i>	northern shoveler
<i>Anas discors</i>	blue-winged teal
<i>Anas cyanoptera</i>	cinnamon teal
<i>Oxyura jamaicensis</i>	ruddy duck
<i>Aix sponsa</i>	wood duck
<i>Aythya valisineria</i>	canvasback
<i>Aythya americana</i>	redhead
<i>Aythya collaris</i>	ring-necked duck
<i>Aythya affinis</i>	lesser scaup
<i>Bucephala clangula</i>	common goldeneye
<i>Bucephala albeola</i>	bufflehead
<i>Lophodytes cucullatus</i>	hooded merganser
<i>Mergus merganser</i>	common merganser

## CATHARTIDAE

<i>Cathartes aura</i>	turkey vulture
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## ACCIPITRIDAE

<i>Aquila chrysaetos</i>	golden eagle
<i>Haliaeetus leucocephalus</i>	bald eagle
<i>Ictinia mississippiensis</i>	Mississippi kite
<i>Circus cyaneus</i>	northern harrier
<i>Accipiter striatus</i>	sharp-shinned hawk
<i>Accipiter cooperii</i>	Cooper's hawk
<i>Buteo lineatus</i>	red-shouldered hawk
<i>Buteo jamaicensis</i>	red-tailed hawk
<i>Buteo swainsoni</i>	Swainson's hawk
<i>Buteo lagopus</i>	rough-legged hawk
<i>Buteo regalis</i>	ferruginous Hawk
<i>Pandion haliaetus</i>	osprey



*Chordeiles acutipennis*

lesser nighthawk

## **APODIDAE**

*Chaetura pelagica*

chimney swift

*Aeronautes saxatalis*

white-throated swift

## **TROCHILIDAE**

*Archilochus alexandri*

black-chinned hummingbird

*Selasphorus platycercus*

broad-tailed hummingbird

*Selasphorus rufus*

rufous hummingbird

## **ALCEDINIDAE**

*Ceryle alcyon*

belted kingfisher

## **PICIDAE**

*Colaptes auratus*

northern flicker

*Sphyrapicus thyroideus*

Williamson's sapsucker

*Sphyrapicus varius*

yellow-bellied sapsucker

*Sphyrapicus nuchalis*

red-naped sapsucker

*Picoides pubescens*

downy woodpecker

*Picoides villosus*

hairy woodpecker

*Picoides scalaris*

ladder-backed woodpecker

## **TYRANNIDAE**

*Tyrannus tyrannus*

eastern kingbird

*Tyrannus verticalis*

western kingbird

*Tyrannus vociferans*

Cassin's kingbird

*Myiarchus tyrannulus*

brown-crested flycatcher

*Myiarchus cinerascens*

ash-throated flycatcher

*Myiarchus tuberculifer*

dusky-capped flycatcher

*Contopus borealis*

olive-sided flycatcher

*Contopus sordidulus*

western wood-pewee

*Sayornis nigricans*

black phoebe

*Sayornis saya*

Say's phoebe

*Empidonax wrightii*

gray flycatcher

*Empidonax traillii*

willow flycatcher

<i>Tringa flavipes</i>	lesser yellowlegs
<i>Tringa solitaria</i>	solitary sandpiper
<i>Actitis macularia</i>	spotted sandpiper
<i>Phalaropus tricolor</i>	Wilson's phalarope
<i>Phalaropus lobatus</i>	red-necked phalarope
<i>Limnodromus scolopaceus</i>	long-billed dowitcher
<i>Calidris himantopus</i>	stilt sandpiper
<i>Gallinago gallinago</i>	common snipe
<i>Calidris mauri</i>	western sandpiper
<i>Calidris minutilla</i>	least sandpiper
<i>Calidris bairdii</i>	Baird's sandpiper

## LARIDAE

<i>Stercorarius parasiticus</i>	parasitic jaeger
<i>Larus delawarensis</i>	ring-billed gull
<i>Sterna hirundo</i>	common tern
<i>Sterna forsteri</i>	Forster's tern
<i>Chlidonias niger</i>	black tern

## COLUMBIDAE

<i>Columba livia</i>	rock dove
<i>Zenaida macroura</i>	mourning dove
<i>Columbina passerina</i>	common ground dove

## CUCULIDAE

<i>Geococcyx californianus</i>	greater roadrunner
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## TYTONIDAE

<i>Tyto alba</i>	common barn owl
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## STRIGIDAE

<i>Asio otus</i>	long-eared owl
<i>Bubo virginianus</i>	great horned owl
<i>Athene cunicularia</i>	burrowing owl

## CAPRIMULGIDAE

<i>Phalaenoptilus nuttallii</i>	common poorwill
<i>Chordeiles minor</i>	common nighthawk

<i>Cistothorus palustris</i>	marsh wren
<i>Catherpes mexicanus</i>	canyon wren
<i>Salpinctes obsoletus</i>	rock wren
<i>Campylorhynchus brunneicapillus</i>	cactus wren

## MUSCICAPIDAE

<i>Regulus calendula</i>	ruby-crowned kinglet
<i>Polioptila caerulea</i>	blue-gray gnatcatcher
<i>Polioptila melanura</i>	black-tailed gnatcatcher
<i>Sialia mexicana</i>	western bluebird
<i>Sialia currucoides</i>	mountain bluebird
<i>Myadestes townsendi</i>	Townsend's solitaire
<i>Catharus guttatus</i>	hermit thrush
<i>Turdus migratorius</i>	American robin

## MIMIDAE

<i>Dumetella carolinensis</i>	gray catbird
<i>Mimus polyglottos</i>	northern mockingbird
<i>Oreoscoptes montanus</i>	sage thrasher
<i>Toxostoma curvirostre</i>	curve-billed thrasher
<i>Toxostoma bendirei</i>	Bendire's thrasher
<i>Toxostoma crissale</i>	crissal thrasher

## MOTACILLIDAE

<i>Anthus spinoletta</i>	American pipit (Water)
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## PTILOGONATIDAE

<i>Phainopepla nitens</i>	phainopepla
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## LANIIDAE

<i>Lanius ludovicianus</i>	loggerhead shrike
<i>Lanius excubitor</i>	northern shrike

## STURNIDAE

<i>Sturnus vulgaris</i>	European starling
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## ALAUDIDAE

*Eremophila alpestris*                      horned lark

## HIRUNDINIDAE

*Tachycineta bicolor*                      tree swallow  
*Tachycineta thalassina*                  violet-green swallow  
*Riparia riparia*                              bank swallow  
*Stelgedopteryx serripennis*              northern rough-winged swallow  
*Hirundo pyrrhonota*                      cliff swallow  
*Hirundo rustica*                              barn swallow

## CORVIDAE

*Aphelocoma coerulescens*                scrub jay  
*Gymnorhinus cyanocephalus*              pinyon jay  
*Cyanocitta stelleri*                        Steller's jay  
*Corvus brachyrhynchos*                  American crow  
*Corvus cryptoleucus*                      Chihuahuan raven  
*Corvus corax*                                common raven

## PARIDAE

*Parus inornatus*                              plain titmouse  
*Parus gambeli*                                mountain chickadee

## REMIZIDAE

*Auriparus flaviceps*                        verdin

## AEGITHALIDAE

*Psaltriparus minimus*                      bushtit

## SITTIDAE

*Sitta carolinensis*                        white-breasted nuthatch  
*Sitta canadensis*                        red-breasted nuthatch

## TROGLODYTIDAE

*Troglodytes aedon*                        house wren  
*Thyromanes bewickii*                      Bewick's wren

## VIREONIDAE

<i>Vireo gilvus</i>	warbling vireo
<i>Vireo solitarius</i>	solitary vireo

## EMBERIZIDAE

<i>Vermivora celata</i>	orange-crowned warbler
<i>Vermivora ruficapilla</i>	Nashville warbler
<i>Vermivora virginiae</i>	Virginia's warbler
<i>Dendroica coronata</i>	yellow-rumped warbler
<i>Dendroica nigrescens</i>	black-throated gray warbler
<i>Dendroica townsendi</i>	Townsend's warbler
<i>Dendroica petechia</i>	yellow warbler
<i>Oporornis tolmiei</i>	MacGillivray's warbler
<i>Wilsonia pusilla</i>	Wilson's warbler
<i>Geothlypis trichas</i>	common yellowthroat
<i>Icteria virens</i>	yellow-breasted chat
<i>Pheucticus melanocephalus</i>	black-headed grosbeak
<i>Cardinalis sinuatus</i>	pyrrhuloxia
<i>Guiraca caerulea</i>	blue grosbeak
<i>Passerina cyanea</i>	indigo bunting
<i>Passerina amoena</i>	lazuli bunting
<i>Pipilo chlorurus</i>	green-tailed towhee
<i>Pipilo erythrophthalmus</i>	rufous-sided towhee
<i>Pipilo fuscus</i>	canyon towhee
<i>Poocetes gramineus</i>	vesper sparrow
<i>Passerculus sandwichensis</i>	savannah sparrow
<i>Melospiza melodia</i>	song sparrow
<i>Chondestes grammacus</i>	lark sparrow
<i>Amphispiza bilineata</i>	black-throated sparrow
<i>Amphispiza belli</i>	sage sparrow
<i>Aimophila cassinii</i>	Cassin's sparrow
<i>Aimophila ruficeps</i>	rufous-crowned sparrow
<i>Spizella arborea</i>	American tree sparrow
<i>Spizella passerina</i>	chipping sparrow
<i>Spizella pallida</i>	clay-colored sparrow
<i>Spizella breweri</i>	Brewer's sparrow
<i>Spizella atrogularis</i>	black-chinned sparrow
<i>Junco hyemalis</i>	dark-eyed junco
<i>Zonotrichia albicollis</i>	white-throated sparrow
<i>Zonotrichia leucophrys</i>	white-crowned sparrow
<i>Calcarius ornatus</i>	chestnut-collared longspur
<i>Calcarius mccownii</i>	McCown's longspur

<i>Calamospiza melanocorys</i>	lark bunting
<i>Sturnella magna</i>	eastern meadowlark
<i>Sturnella neglecta</i>	western meadowlark
<i>Xanthocephalus xanthocephalus</i>	yellow-headed blackbird
<i>Agelaius phoeniceus</i>	red-winged blackbird
<i>Euphagus cyanocephalus</i>	Brewer's blackbird
<i>Molothrus ater</i>	brown-headed cowbird
<i>Quiscalus mexicana</i>	great-tailed grackle
<i>Icterus parisorum</i>	Scott's oriole
<i>Icterus galbula</i>	northern oriole
<i>Icterus cucullatus</i>	hooded oriole
<i>Piranga ludoviciana</i>	western tanager
<i>Piranga rubra</i>	summer tanager

### FRINGILLIDAE

<i>Carduelis pinus</i>	pine siskin
<i>Carduelis tristis</i>	American goldfinch
<i>Carduelis psaltria</i>	lesser goldfinch
<i>Carpodacus cassinii</i>	Cassin's finch
<i>Carpodacus mexicanus</i>	house finch
<i>Coccothraustes vespertinus</i>	evening grosbeak
<i>Pyrrhula pyrrhula</i>	Eurasian bullfinch

### PASSERIDAE

<i>Passer domesticus</i>	house sparrow
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**Appendix D**  
**Mammals Of Sevilleta NWR**  
**Compiled By Sevilleta LTER**





## Mammals of Sevilleta NWR

### Scientific Name

### Common Name

#### **Didelphidae**

*Didelphis virginiana*

Virginia opossum

#### **Soricidae**

#### **Shrews**

*Sorex merriami*  
(probable, undocumented)  
*Notiosorex crawfordi*

Merriam shrew  
  
desert shrew

#### **Vespertilionidae**

#### **Common Bats**

*Myotis ciliolabrum*  
*Myotis yumanensis*  
*Myotis lucifugus*  
*Myotis thysanodes*  
*Myotis californicus*  
*Pipistrellus hesperus*  
*Eptesicus fuscus*  
*Lasiurus cinereus*  
*Plecotus townsendii*  
*Antrozous pallidus*

western small-footed myotis  
Yuma myotis  
little brown myotis  
fringed myotis  
California myotis  
western pipistrelle  
big brown bat  
hoary bat  
Townsend's big-eared bat  
pallid bat

#### **Molossidae**

#### **Free-tailed Bats**

*Tadarida brasiliensis*  
*Tadarida macrotis*

Brazilian free-tailed bat  
big free-tailed bat

#### **Leporidae**

#### **Rabbits and Hares**

*Sylvilagus audubonii*  
*Lepus californicus*

desert cottontail  
black-tailed jackrabbit

#### **Sciuridae**

#### **Squirrels**

*Tamias dorsalis*  
*Tamias Quadrivittatus*  
*Ammospermophilus leucurus*

cliff chipmunk  
Colorado chipmunk  
white-tailed antelope squirrel

*Ammospermophilus interpres*  
*Spermophilus pilosoma*  
*Spermophilus variegatus*  
*Cynomys gunnisoni*

Texas antelope squirrel  
spotted ground squirrel  
rock squirrel  
Gunnison prairie dog

### **Geomyidae**

*Thomomys bottae*  
*Geomys arenarius*  
*Cratogeomys castanops*

### **Pocket Gophers**

Botta's pocket gopher  
desert pocket gopher  
yellow-faced pocket gopher

### **Heteromyidae**

*Perognathus flavus*  
*Perognathus flavescens*  
*Chaetodipus intermedius*  
*Dipodomys ordii*  
*Dipodomys spectabilis*  
*Dipodomys merriami*

### **Pocket Mice & Kangaroo Rats**

silky pocket mouse  
plains pocket mouse  
rock pocket mouse  
Ord's kangaroo rat  
banner-tailed kangaroo rat  
Merriam's kangaroo rat

### **Castoridae**

*Castor canadensis*

### **Beaver**

American beaver

### **Muridae**

*Reithrodontomys montanus*  
*Reithrodontomys megalotis*  
*Peromyscus eremicus*  
*Peromyscus maniculatus*  
*Peromyscus leucopus*  
*Peromyscus boylii*  
*Peromyscus truei*  
*Peromyscus nasutus*  
*Onychomys arenicola*  
*Onychomys leucogaster*  
*Sigmodon hispidus*  
*Neotoma micropus*  
*Neotoma albigula*  
*Mus musculus (introduced species)*

### **New World Rats and Mice**

plains harvest mouse  
western harvest mouse  
cactus mouse  
deer mouse  
white-footed mouse  
brush mouse  
pinyon mouse  
northern rock mouse  
Mearn's grasshopper mouse  
northern grasshopper mouse  
hispid cotton rat  
southern plains woodrat  
white-throated woodrat  
house mouse

**Arvicolidae**

*Ondatra zibethicus*

**Voles**

common muskrat

**Erethizontidae**

*Erethizon dorsatum*

**Porcupine**

common porcupine

**Canidae**

*Canis latrans*

*Vulpes velox*

*Urocyon cinereoargenteus*

*Canis lupus baileyi*

**Wolves, Coyotes & Foxes**

coyote

kit fox

gray fox

Mexican gray wolf (captive only)

**Ursidae**

*Ursus americanus*

**Bears**

black bear

**Procyonidae**

*Bassariscus astutus*

*Procyon lotor*

**Racoons and Coatis**

ringtail

common racoon

**Mustelidae**

*Mustela frenata*

*Taxidea taxus*

*Spilogale gracilis*

*Mephitis mephitis*

*Conepatus mesoleucus*

**Weasels, Badgers, Otters and Skunks**

long-tailed weasel

American badger

western spotted skunk

striped skunk

common hog-nosed skunk

**Felidae**

*Felis concolor*

*Lynx rufus*

**Cats**

mountain lion

bobcat

**Dicotylidae**

*Tayassu tajacu*

**Cervidae**

*Cervus elaphus*

*Odocoileus hemionus*

**Antilocapridae**

*Antilocapra americana*

**Bovidae**

*Ovis canadensis*

*Oryx gazella*\*

**Peccaries**

collared peccary (javelina)

**Deer**

elk

mule deer

**Pronghorn**

pronghorn

**Horned Ruminants**

bighorn sheep

gemsbok

\*introduced species



**Appendix E**  
**Plants Of Sevilleta NWR**  
**Compiled By Sevilleta LTER**





## **Plant Checklist for Socorro County, New Mexico**

The Sevilleta National Wildlife Refuge Plant Checklist is based on the master plant database of the Sevilleta Long-Term Ecological Research Project. This database is designed to hold pertinent taxonomic and ecological data of the plants that grow on the Sevilleta National Wildlife Refuge. The original list was taken from Thomas Manthey's masters thesis. The list was augmented by Troy Maddux, Susan Geer and Kimberly Taugher as plants new to the list were collected, accepted, or added from herbarium records by numerous technicians since 1988. Taxa were renamed to conform with John Kartesz checklist names by Greg Shore and James Brunt in May of 1996. Duplicates indicate the presence of a species that was previously recognized as two or more.

### **Abbreviations For Plant Checklist:**

**PHP (photosynthetic pathway)**

**C3 = Calvin/Benson**

**C4 = Hatch/Slack**

**P3 = probably C3**

**P4 = probably C4**

**LICY (Life Cycle)**

**a = annual**

**ab = annual or biennial**

**ap = annual or perennial**

**b = biennial**

**bp = biennial or perennial**

**LIFM (Life Form)**

**p = perennial**

**G = grass**

**p- = short-lived perennial**

**H = herb**

2

**sp = stem parasite**

**ss = subshrub (woody at the base to partially woody)**

**su = cactus/succulent**

**T = tree**

**V = vine**

**WV = woody vine**

Scientific Name	Common Name	PHP	LICY	LIFM
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**ACANTHACEAE**

<i>Carlowrightia linearifolia</i>	heath wrightwort	C3	p	S
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**AGAVACEAE**

<i>Nolina microcarpa</i>	sacahuista		p	S
<i>Yucca baccata</i>	banana yucca	CAM	p	S
<i>Yucca baileyi</i>	Navajo yucca		p	S
<i>Yucca glauca</i>	small soapweed		p	S

**AIZOACEAE**

<i>Trianthema portulacastrum</i>	desert horsepurslane		a	su
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**ALISMACEAE**

<i>Sagittaria cuneata</i>	arumleaf arrowhead		p	H
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**AMARANTHACEAE**

<i>Amaranthus albus</i>	prostrate pigweed	C4	a	H
<i>Amaranthus albus</i>	prostrate pigweed	C4	a	H
<i>Amaranthus hybridus</i>	slim amaranth	C4	a	H
<i>Amaranthus palmeri</i>	carelessweed	C4	a	H
<i>Amaranthus powellii</i>	Powell's amaranth	C4	a	H
<i>Amaranthus retroflexus</i>	redroot amaranth	C4	a	H
<i>Amaranthus wrightii</i>	Wright's amaranth		a	H
<i>Froelichia floridana</i>	plains snakecotton	C4	a	H
<i>Tidestromia lanuginosa</i>	wooly tidestromia	C4	a	H

**ANACARDIACEAE**

<i>Rhus microphylla</i>	littleleaf sumac	C3	p	S
<i>Rhus trilobata</i>	pubescent squawbush		p	S
<i>Rhus trilobata</i>	skunkbush sumac		p	S
<i>Toxicodendron radicans</i>	eastern poison ivy	C3	p	WV

**APIACEAE**

<i>Aletes acaulis</i>	stemless Indian parsley		p	H
<i>Berula erecta</i>	cutleaf waterparsnip		p	H
<i>Cicuta douglasii</i>	western water hemlock		p	H
<i>Cymopterus acaulis</i>	Fendler's springparsley		p	H
<i>Cymopterus montanus</i>	mountain springparsley		p	H
<i>Harbouria trachypleura</i>	whiskbroom parsley		p	H
<i>Osmorhiza depauperata</i>	bluntseed sweetroot		p	H
<i>Pseudocymopterus montanus</i>	alpine false springparsley		p	H

**APOCYNACEAE**

<i>Amsonia fugatei</i>	San Antonio bluestar		p	H
<i>Amsonia palmeri</i>	Palmer's bluestar		p	H
<i>Apocynum Y</i>	intermediate dogbane		p	H

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Apocynum androsaemifolium</i>	spreading dogbane	C3	p	H
<b>ASCLEPIADACEAE</b>				
<i>Asclepias asperula</i>	Antelopehorns		p	H
<i>Asclepias brachystephana</i>	bract milkweed	C3	p	H
<i>Asclepias engelmanniana</i>	Engelmann's milkweed		p	H
<i>Asclepias involucrata</i>	dwarf milkweed		p	H
<i>Asclepias latifolia</i>	broadleaf milkweed		p	H
<i>Asclepias speciosa</i>	showy milkweed		p	H
<i>Asclepias subverticillata</i>	whorled milkweed		p	H
<i>Sarcostemma cynanchoides</i>	Hartweg's twinevine		p	HV
<b>ASTERACEAE</b>				
<i>Achillea millefolium</i>	Western yarrow		p	H
<i>Acourtia nana</i>	dwarf desertpeony	C3	p	H
<i>Acroptilon repens</i>	hardheads		p	H
<i>Ageratina herbacea</i>	fragrant snakeroot		p	H
<i>Ambrosia acanthicarpa</i>	flatspine burr ragweed		a	H
<i>Ambrosia artemisiifolia</i>	annual ragweed		a	H
<i>Ambrosia confertiflora</i>	weakleaf burr ragweed		p	?
<i>Antennaria marginata</i>	whitemargin pussytoes		p	H
<i>Aphanostephus ramosissimus</i>	plains dozedaisy	C3	ap	H
<i>Artemisia bigelovii</i>	Bigelow's sagebrush		p	S
<i>Artemisia campestris</i>	field sagewort		bp	H
<i>Artemisia carruthii</i>	Carruth's sagewort		p	H
<i>Artemisia dracunculus</i>	wormwood		p	H
<i>Artemisia filifolia</i>	sand sagebrush		p	S
<i>Artemisia frigida</i>	fringed sagewort		p	Hss
<i>Artemisia ludoviciana</i>	foothill sagewort		p	H
<i>Artemisia ludoviciana</i>	white sagebrush		p	H
<i>Aster falcatus</i>	cluster aster		p	H
<i>Aster lanceolatus</i>	Siskiyou aster		p	H
<i>Aster pauciflorus</i>	alkalimarsh aster		p	H
<i>Aster subulatus</i>	annual saltmarsh aster	C3	a	H
<i>Baccharis emoryi</i>	Emory's baccharis		p	S
<i>Baccharis salicifolia</i>	mule's fat		p	S
<i>Baccharis salicina</i>	Great Plains falsewillow		p	S
<i>Baccharis thesioides</i>	Arizona baccharis		p	S
<i>Baccharis wrightii</i>	Wright's baccharis		p	ss
<i>Bahia absinthifolia</i>	Dealbata's bahia	C3	p	H
<i>Bahia absinthifolia</i>	Hairyseed bahia	C3	p	H
<i>Bahia dissecta</i>	ragleaf bahia		ab	H
<i>Bahia pedata</i>	bluntscale bahia		p	H
<i>Baileya multiradiata</i>	desert marigold	C3	ap-	H
<i>Baileya pleniradiata</i>	woolly desert marigold	C3	a	H
<i>Berlandiera lyrata</i>	lyreleaf greeneyes	C3	p	H

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Bidens heterosperma</i>	Rocky Mountain beggarticks		a	H
<i>Bidens laevis</i>	smooth beggartick		a	H
<i>Bidens tenuisecta</i>	slimlobe beggarticks		ap	H
<i>Brickellia baccharidea</i>	resinleaf brickellbush		p	S
<i>Brickellia brachyphylla</i>	plumed brickellbush		p	ss
<i>Brickellia californica</i>	California brickellbush		p	S
<i>Brickellia eupatorioides</i>	false boneset		p	H
<i>Brickellia fendleri</i>	Fendler's brickellbush		p	S
<i>Brickellia floribunda</i>	Chihuahuan brickellbush		p	ss
<i>Brickellia grandiflora</i>	tasseflower brickellbush		p	H
<i>Brickellia microphylla</i>	rough brickellbush		p	ss
<i>Chaetopappa ericoides</i>	rose heath	C3	p	H
<i>Chloracantha spinosa</i>	spiny chloracantha		p	H
<i>Chrysothamnus nauseosus</i>	rubber rabbitbrush		p	S
<i>Chrysothamnus pulchellus</i>	southwestern rabbitbrush		p	H
<i>Cirsium calcareum</i>	Cainville thistle		bp	H
<i>Cirsium neomexicanum</i>	New Mexico thistle		b	H
<i>Cirsium ochrocentrum</i>	yellowspine thistle		b	H
<i>Cirsium undulatum</i>	wavyleaf thistle		b	H
<i>Cirsium wheeleri</i>	Wheeler's thistle		b	H
<i>Conyza canadensis</i>	Canadian horseweed		a	H
<i>Coreopsis tinctoria</i>	golden tickseed		a	H
<i>Cosmos parviflorus</i>	southwestern cosmos		a	H
<i>Dyssodia papposa</i>	fetid marigold		a	H
<i>Eclipta prostrata</i>	false daisy		a	H
<i>Engelmannia pinnatifida</i>	Engelmann's daisy		p	H
<i>Erigeron bellidiastrum</i>	western daisy fleabane		ab	H
<i>Erigeron divergens</i>	spreading fleabane		bp-	H
<i>Erigeron flagellaris</i>	trailing fleabane		b	H
<i>Erigeron flagellaris</i>	trailing fleabane		b	H
<i>Erigeron speciosus</i>	aspen fleabane		p	H
<i>Erigeron subtrinervis</i>	threenerve fleabane		p	H
<i>Flaveria campestris</i>	alkali yellowtops		p	H
<i>Gaillardia pinnatifida</i>	red dome blanketflower		p	H
<i>Gaillardia pulchella</i>	firewheel		p	H
<i>Gnaphalium stramineum</i>	cottonbatting plant		ab	H
<i>Grindelia nuda</i>	curlytop gumweed		p	H
<i>Grindelia squarrosa</i>	curlycup gumweed		b	H
<i>Gutierrezia microcephala</i>	threadleaf snakeweed	C3	p	ss
<i>Gutierrezia sarothrae</i>	broom snakeweed	C3	p	ss
<i>Gutierrezia texana</i>	sticky snakeweed	C3	a	H
<i>Helianthus annuus</i>	common sunflower		a	H
<i>Helianthus ciliaris</i>	Texas blueweed	C3	p	H
<i>Helianthus petiolaris</i>	prairie sunflower	C3	a	H
<i>Helianthus petiolaris</i>	prairie sunflower	C3	a	H
<i>Heliomeris longifolia</i>	longleaf falsegoldeneye		a	H
<i>Heliomeris multiflora</i>	showy goldeneye		p	?

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Heliopsis helianthoides</i>	smooth oxeye		p	H
<i>Heterotheca villosa</i>	bristly hairy goldaster		p	H
<i>Heterotheca villosa</i>	hairy goldenaster		p	H
<i>Hymenoclea monogyra</i>	singlewhorl burrobush		p	ss
<i>Hymenopappus biennis</i>	biennial woollywhite		b	H
<i>Hymenopappus filifolius</i>	fineleaf hymenopappus		p	H
<i>Hymenopappus flavescens</i>	collegeflower		p	H
<i>Hymenoxys odorata</i>	bitter rubberweed	C3	a	H
<i>Hymenoxys richardsonii</i>	Colorado rubberweed		p	H
<i>Isocoma pluriflora</i>	southern jimmyweed		p	H
<i>Isocoma pluriflora</i>	southern jimmyweed		p	ss
<i>Iva ambrosiifolia</i>	ragged marshelder	C3	a	H
<i>Lactuca serriola</i>	prickly lettuce	C3	ab	H
<i>Lactuca tatarica</i>	blue lettuce	C3	p	H
<i>Laennecia coulteri</i>	conyza		a	H
<i>Laennecia schiedeana</i>	pineland marshtail		a	H
<i>Liatris punctata</i>	dotted gayfeather		p	H
<i>Machaeranthera bigelovii</i>	Bigelow's tansyaster		ab	H
<i>Machaeranthera boltoniae</i>	Bolton's tansyaster		a	H
<i>Machaeranthera canescens</i>	hoary aster		bp	H
<i>Machaeranthera canescens</i>	hoary aster		bp-	H
<i>Machaeranthera gracilis</i>	slender goldenweed	C3	a	H
<i>Machaeranthera parviflora</i>	smallflower tansyaster		a	H
<i>Machaeranthera pinnatifida</i>	lacey tansyaster	C3	p	ss
<i>Machaeranthera pinnatifida</i>	lacey tansyaster	C3	p	ss
<i>Machaeranthera pinnatifida</i>	lacey tansyaster	C3	p	ss
<i>Machaeranthera tanacetifolia</i>	tanseyleaf aster	C3	a	H
<i>Malacothrix fendleri</i>	Fendler's desertydandelion	C3	a	H
<i>Melampodium leucanthum</i>	plains blackfoot	C3	p	H
<i>Palafoxia sphacelata</i>	othake		a	H
<i>Parthenium confertum</i>	Gray's feverfew		p	H
<i>Parthenium incanum</i>	mariola	C3	p	S
<i>Pectis angustifolia</i>	narrowleaf pectis	C4	a	H
<i>Pectis papposa</i>	cinchweed fetidmarigold	C4	p	H
<i>Pericome caudata</i>	mountain leaftall		p	H
<i>Picradeniopsis woodhousei</i>	Woodhouse's bahia		p	H
<i>Psilostrophe sparsiflora</i>	greenstem paperflower		p	H
<i>Psilostrophe tagetina</i>	woolly paperflower		p	H
<i>Psilostrophe tagetina</i>	woolly paperflower		p	H
<i>Psilostrophe tagetina</i>	woolly paperflower		p	H
<i>Ratibida columnifera</i>	upright prairie coneflower		p	H
<i>Ratibida tagetes</i>	green prairie coneflower		p	H
<i>Sanvitalia abertii</i>	Albert's creeping zinnia		a	H
<i>Sartwellia flaveriae</i>	threadleaf glowwort		a	H
<i>Schkuhria multiflora</i>	manyflower false threadleaf		p	H
<i>Scorzonera lacinata</i>	Cutleaf vipergrass		a	H

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Senecio multicapitatus</i>	ragwort groundsel		p	ss
<i>Senecio multilobatus</i>	lobeleaf groundsel		p	?
<i>Senecio neomexicanus</i>	New Mexico groundsel		p	?
<i>Senecio neomexicanus</i>	New Mexico groundsel		p	?
<i>Senecio wootonii</i>	Wooton's ragwort		p	?
<i>Solidago canadensis</i>	Canada goldenrod		p	H
<i>Solidago missouriensis</i>	Missouri goldenrod		p	H
<i>Solidago velutina</i>	threenerve goldenrod		p	H
<i>Solidago wrightii</i>	Wright's goldenrod		p	H
<i>Sonchus asper</i>	spiny sowthistle		a	H
<i>Sonchus oleraceus</i>	common sowthistle		p	H
<i>Stephanomeria pauciflora</i>	brownplume wirelettuce	C3	p	H
<i>Stephanomeria pauciflora</i>	brownplume wirelettuce		p	H
<i>Stephanomeria tenuifolia</i>	narrowleaf wirelettuce		p	H
<i>Taraxacum officinale</i>	common dandelion	C3	p	H
<i>Tetranneuris argentea</i>	perkysue		p	H
<i>Thelesperma longipes</i>	longstalk greenthread		p	H
<i>Thelesperma megapotamicum</i>	Hopi tea greenthread		p	H
<i>Thymophylla acerosa</i>	pricklyleaf dogweed	C3	p	S
<i>Thymophylla pentachaeta</i>	fiveneedle pricklyleaf		p-	?
<i>Townsendia annua</i>	annual townsend daisy		a	H
<i>Townsendia eximia</i>	tall townsendia		b	H
<i>Townsendia exscapa</i>	stemless townsendia		p	H
<i>Townsendia formosa</i>	smooth townsend daisy		p	H
<i>Townsendia incana</i>	hoary townsendia		p	H
<i>Tragopogon dubius</i>	yellow salsify		p	H
<i>Tragopogon porrifolius</i>	salsify		p	H
<i>Verbesina encelioides</i>	golden crownbeard	C3	a	H
<i>Verbesina encelioides</i>	golden crownbeard	C3	a	H
<i>Viguiera dentata</i>	toothleaf goldeneye		p	H
<i>Xanthium spinosum</i>	spiny cockleburr	C3	a	H
<i>Xanthium strumarium</i>	Canada cockleburr	C3	a	H
<i>Zinnia grandiflora</i>	Rocky Mountain zinnia	C3	p	ss

**BERBERIDACEAE**

<i>Mahonia haematocarpa</i>	red barberry		p	S
<i>Mahonia repens</i>	Oregongrape		p	S

**BIGNONIACEAE**

<i>Chilopsis linearis</i>	desert willow	C3	p	ST
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**BORAGINACEAE**

<i>Cryptantha cinerea</i>	James' catseye	C3	p-	H
<i>Cryptantha cinerea</i>	James' catseye	C3	p-	H
<i>Cryptantha cinerea</i>	James' catseye	C3	p-	H
<i>Cryptantha crassisepala</i>	Thicksepal catseye	C3	a	H
<i>Cryptantha crassisepala</i>	thicksepal catseye	C3	a	H

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Cryptantha crassisepala</i>	thicksepal catseye	C3	a	H
<i>Cynoglossum officinale</i>	gypsyflower		bp	H
<i>Hackelia pinetorum</i>	Livermore stickseed		p	ss
<i>Heliotropium convolvulaceum</i>	phlox heliotrope		a	H
<i>Heliotropium curassavicum</i>	salt heliotrope		p	H
<i>Lappula occidentalis</i>	desert stickseed	C3	a	H
<i>Lappula occidentalis</i>	flatspine stickseed	C3	a	H
<i>Lithospermum cobrense</i>	smooththroat gromwell		p	H
<i>Lithospermum incisum</i>	narrowleaf gromwell		p	H
<i>Lithospermum multiflorum</i>	manyflowered gromwell		p	H
<i>Tiquilia canescens</i>	woody crinklemat		p	S
<i>Tiquilia hispida</i>	hairy coldenia		p	S

### BRASSICACEAE

<i>Arabis fendleri</i>	Fendler's rockcress		p	H
<i>Camelina microcarpa</i>	littlepod falseflax		a	H
<i>Camelina sativa</i>	gold-of-pleasure		a	H
<i>Capsella bursa-pastoris</i>	shepherd's purse	C3	a	H
<i>Descurainia incana</i>	mountain tansymustard		a	H
<i>Descurainia obtusa</i>	blunt tansymustard		a	H
<i>Descurainia pinnata</i>	western tansymustard	C3	a	H
<i>Descurainia pinnata</i>	western tansymustard	C3	a	H
<i>Dimorphocarpa wislizeni</i>	touristplant	C3	a	H
<i>Draba cuneifolia</i>	wedgeleaf whitlowgrass	C3	a	H
<i>Draba helleriana</i>	Heller's whitlowgrass		p	H
<i>Erysimum asperum</i>	plains wallflower		bp	H
<i>Erysimum capitatum</i>	sanddune wallflower		bp	H
<i>Erysimum inconspicuum</i>	Shy wallflower		bp	H
<i>Lepidium alyssoides</i>	mesa pepperwort		p	H
<i>Lepidium densiflorum</i>	common pepperweed		a	H
<i>Lepidium lasiocarpum</i>	shaggyfruit pepperweed	C3	a	H
<i>Lepidium latifolium</i>	broadleaved pepperweed		p	H
<i>Lepidium montanum</i>	mountain pepperweed		bp	H
<i>Lepidium virginicum</i>	medium pepperweed	C3	a	H
<i>Lesquerella fendleri</i>	Fendler's bladderpod	C3	p	H
<i>Lesquerella fendleri</i>	Fendler's bladderpod		p	H
<i>Lesquerella gordonii</i>		C3	a	H
<i>Lesquerella ovalifolia</i>	roundleaf bladderpod		p	H
<i>Nerisyrenia camporum</i>	mesa greggia		p	H
<i>Nerisyrenia linearifolia</i>	White Sands fanmustard		p	H
<i>Pennellia longifolia</i>	longleaf mock thelypody		b	H
<i>Rorippa nasturtium-aquaticum</i>	watercress		p	H
<i>Rorippa palustris</i>	bog yellowcress		a	H
<i>Schoenocrambe linearifolia</i>	slimleaf plainsmustard		p	H
<i>Streptanthus carinatus</i>	lyreleaf jewelflower		ab	H
<i>Thelypodopsis purpusii</i>	Purpus' tumbledustard		b	H
<i>Thelypodium wrightii</i>	Wright's thelypody		b	H



Scientific Name	Common Name	PHP	LICY	LIFM
<i>Thlaspi montanum</i>	alpine pennycress		p	H
<b>CACTACEAE</b>				
<i>Echinocereus coccineus</i>	Arizona hedgehog cactus	CAM	p	su
<i>Echinocereus coccineus</i>	scarlet hedgehog cactus	CAM	p	su
<i>Echinocereus fendleri</i>	Fendler's hedgehog cactus	CAM	p	su
<i>Echinocereus triglochidiatus</i>	kingcup cactus	CAM	p	su
<i>Echinocereus triglochidiatus</i>	kingcup cactus	CAM	p	su
<i>Echinocereus viridiflorus</i>	nylon hedgehog cactus	CAM	p	su
<i>Escobaria vivipara</i>	Arizona spiny star	CAM	p	su
<i>Escobaria vivipara</i>	spiny star	CAM	p	su
<i>Escobaria vivipara</i>	spiny star	CAM	p	su
<i>Mammillaria heyderi</i>	Heyder's nipple cactus	CAM	p	su
<i>Mammillaria heyderi</i>	little nipple cactus	CAM	p	su
<i>Mammillaria wrightii</i>	Wright's nipple cactus	CAM	p	su
<i>Opuntia clavata</i>	club cholla	CAM	p	su
<i>Opuntia erinacea</i>	grizzly bear pricklypear	CAM	p	su
<i>Opuntia fragilis</i>	pygmy pricklypear	CAM	p	su
<i>Opuntia imbricata</i>	tree cholla	CAM	p	su
<i>Opuntia leptocaulis</i>	Christmas cactus	CAM	p	su
<i>Opuntia macrorhiza</i>	twist spine pricklypear	CAM	p	su
<i>Opuntia phaeacantha</i>	tulip pricklypear	CAM	p	su
<i>Opuntia polyacantha</i>	Juniper prickly-pear	CAM	p	su
<i>Opuntia polyacantha</i>	hair spine pricklypear	CAM	p	su
<i>Opuntia polyacantha</i>	hair spine pricklypear	CAM	p	su
<i>Opuntia polyacantha</i>	hair spine pricklypear	CAM	p	su
<i>Opuntia santa-rita</i>	Santa Rita pricklypear	CAM	p	su
<i>Opuntia tunicata</i>	thistle cholla	CAM	p	su
<i>Sclerocactus intertextus</i>	white fishhook cactus	CAM	p	su
<i>Sclerocactus intertextus</i>	white fishhook cactus	CAM	p	su
<i>Sclerocactus papyracanthus</i>	paperspine fishhook cactus	CAM	p	su
<i>Sclerocactus whipplei</i>	Whipple's fishhook cactus	CAM	p	su
<b>CAMPANULACEAE</b>				
<i>Campanula rotundifolia</i>	bluebell bellflower	C3	p	H
<i>Lobelia cardinalis</i>	Cardinalflower	C3	p	H
<b>CAPPARIDACEAE</b>				
<i>Cleome serrulata</i>	Rocky Mountain beeplant		a	H
<i>Polanisia dodecandra</i>	sandyseed clammyweed	C3	ap	H
<b>CAPRIFOLIACEAE</b>				
<i>Symphoricarpos palmeri</i>	Palmer's snowberry		p	S
<i>Symphoricarpos rotundifolius</i>	roundleaf snowberry		p	S
<b>CARYOPHYLLACEAE</b>				

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Arenaria lanuginosa</i>	spreading sandwort		p	H
<i>Cerastium arvense</i>	field chickweed		p	H
<i>Cerastium brachypodium</i>	shortstalk chickweed		a	H
<i>Drymaria glandulosa</i>	Fendler's drymary		a	H
<i>Paronychia jamesii</i>	James' nailwort		p	ss
<i>Pseudostellaria jamesiana</i>	tuber starwort		p	H
<i>Silene antirrhina</i>	sleepy silene		ab	H
<i>Silene laciniata</i>	Mexican campion		p	H
<i>Silene plankii</i>	Plank's catchfly		p	H
<i>Silene wrightii</i>	Wright's catchfly		p	H
<i>Stellaria longifolia</i>	longleaf starwort		p	H
<i>Stellaria longipes</i>	longstalk starwort		p	H

**CELASTRACEAE**

<i>Glossopetalon spinescens</i>	spiny greasebush		p	S
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**CHENOPODIACEAE**

<i>Allenrolfea occidentalis</i>	iodinebush	C3	p	su
<i>Atriplex argentea</i>	silverscale saltbush	C4	a	H
<i>Atriplex canescens</i>	fourwing saltbush	C4	p	S
<i>Atriplex confertifolia</i>	shadscale saltbush	C4	p	S
<i>Chenopodium album</i>	lambsquarters	C3	p	H
<i>Chenopodium ambrosioides</i>	Mexican tea	C3	ap	H
<i>Chenopodium berlandieri</i>	pitseed goosefoot	C3	a	H
<i>Chenopodium desiccatum</i>	aridland goosefoot	C3	a	H
<i>Chenopodium fremontii</i>	Fremont's goosefoot	C3	a	H
<i>Chenopodium graveolens</i>	fetid goosefoot		a	H
<i>Chenopodium incanum</i>	mealy goosefoot	C3	a	H
<i>Chenopodium leptophyllum</i>	narrowleaf goosefoot	C3	a	H
<i>Chenopodium neomexicanum</i>	New Mexico goosefoot		a	H
<i>Chenopodium rubrum</i>	red goosefoot		a	H
<i>Corispermum hyssopifolium</i>	common bugseed	C3	a	H
<i>Cycloloma atriplicifolium</i>	winged pigweed	C3	a	H
<i>Kochia scoparia</i>	common kochia	C4	a	H
<i>Krascheninnikovia lanata</i>	winterfat	C3	p	S
<i>Salsola kali</i>	prickly Russian thistle	C4	a	H
<i>Sarcobatus vermiculatus</i>	greasewood	C3	p	S
<i>Suaeda calceoliformis</i>	Pursh seepweed	C4	ap-	S
<i>Suaeda suffrutescens</i>	desert seepweed	C4	p	S

**COMMELINACEAE**

<i>Commelina dianthifolia</i>	birdbill dayflower		p	H
<i>Commelina erecta</i>	whitemouth dayflower		p	H
<i>Tradescantia pinetorum</i>	pinewoods spiderwort		p	H
<i>Tradescantia wrightii</i>	Wright's spiderwort		p	H

**CONVOLVULACEAE**

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Convolvulus arvensis</i>	field bindweed	C3	p	HV
<i>Convolvulus equitans</i>	Texas bindweed	C3	p	HV
<i>Cuscuta pentagona</i>	fiveangled dodder		p	spV
<i>Evolvulus nuttallianus</i>	shaggy dwarf morningglory	C3	p	H
<i>Ipomoea coccinea</i>	redstar	C3	p	HV
<i>Ipomoea costellata</i>	crestrrib morningglory		a	HV
<i>Ipomoea purpurea</i>	tall morningglory		a	HV
<b>CRASSULACEAE</b>				
<i>Sedum cockerellii</i>	Cockerell's stonecrop		p	su
<i>Sedum wrightii</i>	Wright's stonecrop		p	su
<b>CUCURBITACEAE</b>				
<i>Cucurbita foetidissima</i>	Missouri gourd	C3	p	H
<b>CUPRESSACEAE</b>				
<i>Juniperus monosperma</i>	oneseed juniper	C3	p	T
<b>CYPERACEAE</b>				
<i>Carex filifolia</i>	threadleaf sedge		p	H
<i>Carex foenea</i>	dryspike sedge		p	H
<i>Carex praegracilis</i>	clustered field sedge		p	H
<i>Cyperus esculentus</i>	chufa flatsedge	C4	p	H
<i>Cyperus fendlerianus</i>	Fendler's flatsedge		p	H
<i>Cyperus odoratus</i>	fragrant flatsedge		p	H
<i>Eleocharis palustris</i>	common spikerush		p	H
<i>Scirpus acutus</i>	hardstem bulrush		p	H
<i>Scirpus americanus</i>	American bulrush		p	H
<i>Scirpus maritimus</i>	saltmarsh bulrush		p	H
<b>ELEAGNACEAE</b>				
<i>Elaeagnus angustifolia</i>	Russian olive	C3	p	T
<b>EPHEDRACEAE</b>				
<i>Ephedra torreyana</i>	Torrey's jointfir	C3	p	S
<i>Ephedra trifurca</i>	longleaf jointfir		p	S
<i>Ephedra viridis</i>	mormon tea		p	S
<b>EQUISETACEAE</b>				
<i>Equisetum laevigatum</i>	smooth horsetail		p	H
<b>EUPHORBIACEAE</b>				
<i>Acalypha neomexicana</i>	New Mexico copperleaf		a	H
<i>Chamaesyce albomarginata</i>	whitemargin sandmat	C4	p	H
<i>Chamaesyce chaetocalyx</i>		C4	p	H
<i>Chamaesyce fendleri</i>	Fendler's sandmat	C4	p	H
<i>Chamaesyce torreyana</i>	Torrey's sandmat	C4	p	H

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Chamaesyce lata</i>	Hoary sandwort		a	H
<i>Chamaesyce lata</i>	hoary sandmat		p	H
<i>Chamaesyce micromera</i>	Sonoran sandmat	C4	a	H
<i>Chamaesyce missurica</i>	Prairie sandmat		a	H
<i>Chamaesyce revoluta</i>	threadstem sandmat		a	H
<i>Chamaesyce serpens</i>	matted sandmat		a	H
<i>Chamaesyce serpyllifolia</i>	thymeleaf sandmat	C4	a	H
<i>Chamaesyce serrula</i>	sawtooth sandmat	C4	a	H
<i>Chamaesyce stictospora</i>	slimseed sandmat		a	H
<i>Croton texensis</i>	Texas croton		a	H
<i>Euphorbia dentata</i>	toothed spurge	C4	a	H
<i>Euphorbia dentata</i>	toothed spurge	C4	a	H
<i>Euphorbia exstipulata</i>	squareseed spurge		a	H
<i>Euphorbia lurida</i>	San Francisco Mountain spurge	C3	?	H
<i>Euphorbia marginata</i>	snow on the mountain	C3	a	H
<i>Euphorbia spathulata</i>	warty spurge		ab	H
<i>Reverchonia arenaria</i>	sand reverchonia	C3	a	H
<i>Tragia ramosa</i>	branched noseburn	C3	p	H

### FABACEAE

<i>Amorpha fruticosa</i>	desert indigobush		p	S
<i>Astragalus albulus</i>	cibola milkvetch		p	H
<i>Astragalus calycosus</i>	Torrey's milkvetch		p	H
<i>Astragalus lentiginosus</i>	speckledpod milkvetch		p	H
<i>Astragalus missouriensis</i>	horn loco milkvetch		p	H
<i>Astragalus nuttallianus</i>	smallflowered milkvetch		a	H
<i>Astragalus nuttallianus</i>	smallflowered milkvetch		a	H
<i>Astragalus praelongus</i>	stinking milkvetch		p	H
<i>Astragalus tephrodes</i>	ashen milkvetch	C3	p	H
<i>Astragalus wootonii</i>	Wooton's milkvetch	C3	ab	H
<i>Caesalpinia drepanocarpa</i>	sicklepod holdback		p	H
<i>Caesalpinia gilliesii</i>	bird-of-paradise shrub		p	S
<i>Caesalpinia jamesii</i>	James' holdback		?	H
<i>Calliandra humilis</i>	dwarf stickpea	C3	p	H
<i>Dalea brachystachya</i>	Fort Bowie prairieclover		a	H
<i>Dalea candida</i>	white prairieclover		p	H
<i>Dalea compacta</i>	compact prairieclover		p	H
<i>Dalea exigua</i>	Chihuahuan prairieclover		a	H
<i>Dalea formosa</i>	featherplume	C3	p	S
<i>Dalea jamesii</i>	James' prairieclover		p	H
<i>Dalea lanata</i>	woolly prairieclover		p	H
<i>Dalea lanata</i>	woolly prairieclover		p	H
<i>Dalea leporina</i>	foxtail prairieclover		a	H
<i>Dalea nana</i>	dwarf prairieclover		p	H
<i>Dalea purpurea</i>	violet prairieclover		p	H
<i>Dalea scariosa</i>	Albuquerque prairieclover		p	H
<i>Dalea wrightii</i>	Wright's prairieclover		p	H

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Desmanthus illinoensis</i>	prairie bundleflower		p	H
<i>Glycyrrhiza lepidota</i>	American licorice		p	H
<i>Hoffmannseggia glauca</i>	Indian rushpea		p	H
<i>Lathyrus lanszwertii</i>	Arizona peavine		p	H
<i>Lotus greenei</i>	Greene's birdsfoot trefoil		p	H
<i>Lotus plebeius</i>	New Mexico birdsfoot trefoil		p	H
<i>Lotus wrightii</i>	Wright's deervetch		p	H
<i>Lupinus brevicaulis</i>	shortstem lupine		a	H
<i>Lupinus kingii</i>	King's lupine		a	H
<i>Medicago lupulina</i>	black medick		p	H
<i>Medicago sativa</i>	alfalfa	C3	b	H
<i>Melilotus officinalis</i>	yellow sweetclover		b	H
<i>Oxytropis sericea</i>	silvery oxytrope		p	H
<i>Parryella filifolia</i>	common dunebroom		p	S
<i>Phaseolus angustissimus</i>	slimleaf bean		p	H
<i>Prosopis glandulosa</i>	western honey mesquite	C3	p	ST
<i>Prosopis pubescens</i>	screwbean mesquite	C3	p	ST
<i>Psoraleidum tenuiflorum</i>	slimflower scurfpea		p	H
<i>Psoralethamnus scoparius</i>	broom dalea		p	S
<i>Senna bauhinoides</i>	twinleaf senna	C3	p	Hss
<i>Sphaerophysa salsula</i>	alkali swainsonpea		p	H
<i>Thermopsis rhombifolia</i>	mountain thermopsis		p	H
<i>Trifolium repens</i>	white clover		p	H
<i>Trifolium wormskioldii</i>	cows clover		p	H
<i>Vicia americana</i>	American vetch		p	H
<i>Vicia ludoviciana</i>	slim vetch		p	H
<i>Vicia pulchella</i>	sweetclover vetch		p	H
<b>FAGACEAE</b>				
<i>Quercus grisea</i>	gray oak	C3	p	ST
<i>Quercus pungens</i>	pungent oak		p	ST
<i>Quercus turbinella</i>	shrub live oak		p	ST
<b>FOUQUIERIACEAE</b>				
<i>Fouquieria splendens</i>	ocotillo	C3	p	S
<b>FRANKENIACEAE</b>				
<i>Frankenia jamesii</i>	James' seaheath		p	S
<b>FUMARIACEAE</b>				
<i>Corydalis aurea</i>	scrambledeggs	C3	ab	H
<b>GARRYACEAE</b>				
<i>Garrya wrightii</i>	Wright's silktassel	C3	p	ST
<b>GENTIANACEAE</b>				
<i>Centaurium calycosum</i>	Arizona centaurium		a	H

Scientific Name	Common Name	PHP	LICY	LIFM
<b>GERANIACEAE</b>				
<i>Erodium cicutarium</i>	redstem stork's bill	C3	ab	H
<i>Erodium texanum</i>	Texas stork's bill		a	H
<i>Geranium caespitosum</i>	pineywoods geranium		p	H
<b>GROSSULARIACEAE</b>				
<i>Ribes aureum</i>	golden currant		p	S
<i>Ribes cereum</i>	wax currant		p	S
<i>Ribes cereum</i>	whisky currant		p	S
<i>Ribes leptanthum</i>	trumpet gooseberry		p	S
<b>HYDRANGEACEAE</b>				
<i>Fendlera rupicola</i>	cliff fendlerbush		p	S
<i>Philadelphus microphyllus</i>	littleleaf mockorange		p	S
<i>Philadelphus occidentalis</i>	western mockorange		p	S
<b>HYDROPHYLLACEAE</b>				
<i>Nama carnosum</i>	sand fiddleleaf		p	su
<i>Nama dichotomum</i>	wishbone fiddleleaf		a	H
<i>Nama hispidum</i>	bristly nama	C3	a	H
<i>Phacelia coerulea</i>	skyblue scorpionweed	C3	a	H
<i>Phacelia coerulea</i>	skyblue scorpionweed		a	H
<i>Phacelia crenulata</i>	cleftleaf wildheliotrope		a	H
<i>Phacelia integrifolia</i>	gypsum scorpionweed		a	H
<i>Phacelia neomexicana</i>	New Mexico scorpionweed		a	H
<b>JUNCACEAE</b>				
<i>Juncus balticus</i>	mountain rush		p	H
<i>Juncus bufonius</i>	toad rush		p	H
<i>Juncus interior</i>	inland rush		p	H
<i>Juncus mexicanus</i>	Mexican rush		p	H
<i>Juncus tenuis</i>	poverty rush		p	H
<i>Juncus torreyi</i>	Torrey's rush		p	H
<b>JUNCAGINACEAE</b>				
<i>Triglochin maritimum</i>	seaside arrowgrass		p	H
<b>KRAMERIACEAE</b>				
<i>Krameria lanceolata</i>	trailing krameria	C3	p	ss
<b>LAMIACEAE</b>				
<i>Agastache micrantha</i>	white giant hyssop		p	H
<i>Agastache pallidiflora</i>	New Mexican giant hyssop		p	H
<i>Clinopodium vulgare</i>	wild basil		p	H
<i>Hedeoma drummondii</i>	Drummond's falsepennyroyal		p	H
<i>Hedeoma pinnatifidum</i>	falsepennyroyal		n	H

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Hedeoma oblongifolia</i>	falsepennyroyal		?	H
<i>Lycopus americanus</i>	American waterhorehound		p	H
<i>Lycopus asper</i>	rough bugleweed		p	H
<i>Marrubium vulgare</i>	horehound		p	H
<i>Mentha arvensis</i>	wild mint		p	H
<i>Monarda fistulosa</i>	mintleaf beebalm		p	H
<i>Monarda pectinata</i>	pony beebalm		a	H
<i>Monardella odoratissima</i>	Pacific monardella		p	H
<i>Salvia henryi</i>	crimson sage		p	?
<i>Salvia reflexa</i>	lanceleaf sage		a	H
<i>Salvia subincisa</i>	sawtooth sage		a	H
<i>Teucrium laciniatum</i>	lacy germander		p	H

**LILIACEAE**

<i>Allium cernuum</i>	nodding onion		p	H
<i>Allium geyeri</i>	Geyer's onion		p	H
<i>Allium macropetalum</i>	largeflower wild onion		p	H

**LINACEAE**

<i>Linum australe</i>	southern flax		a	H
<i>Linum lewisii</i>	prairie flax		p	H
<i>Linum puberulum</i>	plains flax		a	H

**LOASACEAE**

<i>Cevallia sinuata</i>	stinging serpent		p	ss
<i>Mentzelia albicaulis</i>	whitestem blazingstar	C3	a	H
<i>Mentzelia humilis</i>	gypsum blazingstar	C3	p	H
<i>Mentzelia laciniata</i>	cutleaf blazingstar		bp	H
<i>Mentzelia oligosperma</i>	Chickenthief		bp	H
<i>Mentzelia pumila</i>	dwarf mentzelia		b	H

**LORANTHACEAE**

<i>Arceuthobium campylopodium</i>	Western dwarf mistletoe		p	sp
<i>Arceuthobium vaginatum</i>	pineland dwarf mistletoe		p	sp
<i>Phoradendron bolleanum</i>	Bollean mistletoe		p	sp
<i>Phoradendron juniperinum</i>	juniper mistletoe		p	sp
<i>Phoradendron leucarpum</i>	oak mistletoe		p	sp
<i>Phoradendron villosum</i>	Pacific mistletoe		p	sp
<i>Phoradendron villosum</i>	Pacific mistletoe		p	sp

**MALVACEAE**

<i>Malva neglecta</i>	common mallow	C3	ab	H
<i>Malvella leprosa</i>	alkali mallow		p	?
<i>Malvella leprosa</i>	alkali mallow		p	H
<i>Sphaeralcea angustifolia</i>	copper globemallow		p	?
<i>Sphaeralcea coccinea</i>	scarlet globemallow		p	H
<i>Sphaeralcea coccinea</i>	scarlet globemallow		n	H

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Sphaeralcea digitata</i>	slippery globemallow		p	H
<i>Sphaeralcea fendleri</i>	Fendler's globemallow		p	H
<i>Sphaeralcea grossulariifolia</i>	gooseberryleaf globemallow		p	?
<i>Sphaeralcea hastulata</i>	spear globemallow		p	?
<i>Sphaeralcea incana</i>	gray globemallow		p	ss
<i>Sphaeralcea laxa</i>	caliche globemallow		p	ss
<i>Sphaeralcea leptophylla</i>	scaly globemallow		p	?
<i>Sphaeralcea parvifolia</i>	smallflower globemallow		p	?
<i>Sphaeralcea procera</i>	Luna County globemallow		p	?
<i>Sphaeralcea wrightii</i>	Wright's globemallow		p	ss

### NYCTAGINACEAE

<i>Abronia fragrans</i>	snowball sand verbena		p	H
<i>Allionia incarnata</i>	trailing windmills	C4	p	H
<i>Ammocodon chenopodioides</i>	goosefoot moonpod	C3	p	H
<i>Boerhavia erecta</i>	erect spiderling	C4	a	H
<i>Boerhavia intermedia</i>	fivewing spiderling	C4	a	H
<i>Boerhavia purpurascens</i>	purple spiderling		a	H
<i>Boerhavia spicata</i>	creeping spiderling	C4	a	H
<i>Cyphomeris gypsophiloides</i>	red cyphomeris	C3	p	H
<i>Mirabilis albida</i>	white four o'clock		p	H
<i>Mirabilis diffusa</i>	ribbed spreading four o'clock		p	H
<i>Mirabilis glabra</i>	Smooth four o'clock		p	H
<i>Mirabilis glabra</i>	Smooth four o'clock		p	H
<i>Mirabilis linearis</i>	narrowleaf four o'clock	C3	p	H
<i>Mirabilis linearis</i>	narrowleaf four o'clock	C3	p	H
<i>Mirabilis multiflora</i>	Colorado four o'clock	C3	p	H
<i>Mirabilis oblongifolia</i>	mountain four o'clock	C3	p	H
<i>Mirabilis oxybaphoides</i>	smooth spreading four o'clock	C3	p	H
<i>Mirabilis pumila</i>	dwarf four o'clock	C3	p	H
<i>Selinocarpus lanceolatus</i>	gypsum moonpod		p	Hss
<i>Tripterocalyx micranthus</i>	smallflower sandverbena		a	H

### OLEACEAE

<i>Forestiera pubescens</i>	stretchberry		p	S
<i>Fraxinus velutina</i>	velvet ash		p	T
<i>Menodora scabra</i>	rough menodora	C3	p	ss

### ONAGRACEAE

<i>Calylophus hartwegii</i>	Hartweg's sundrops		p	ss
<i>Calylophus lavandulifolius</i>	lavenderleaf sundrops		p	ss
<i>Epilobium ciliatum</i>	hairy willowherb		ap	H
<i>Epilobium saximontanum</i>	Rocky Mountain willowherb		p	H
<i>Gaura coccinea</i>	scarlet beeblossom		p	ss
<i>Gaura parviflora</i>	velvetweed	C3	ab	H
<i>Gaura suffulta</i>	Nealley's kisses		b	H
<i>Oenothera albicollis</i>	whitest eveningprimrose	C3	-	U



Scientific Name	Common Name	PHP	LICY	LIFM
<i>Oenothera cespitosa</i>	tufted eveningprimrose		p	H
<i>Oenothera coronopifolia</i>	crownleaf eveningprimrose		p	H
<i>Oenothera elata</i>	Hooker's eveningprimrose		b	H
<i>Oenothera pallida</i>	pale eveningprimrose		p	H
<i>Oenothera pallida</i>	pale eveningprimrose		p	H
<b>OROBANCHACEAE</b>				
<i>Conopholis alpina</i>	Mexican squawroot		p	rp
<i>Orobanche ludoviciana</i>	manyflowered broomrape		p	rp
<b>OXALIDACEAE</b>				
<i>Oxalis alpina</i>	alpine woodsorrel		p	H
<i>Oxalis stricta</i>	common yellow oxalis	C3	p	H
<i>Oxalis violacea</i>	violet woodsorrel		p	H
<b>PEDALLACEAE</b>				
<i>Proboscidea parviflora</i>	doubleclaw	C3	a	H
<i>Proboscidea sabulosa</i>	Sanddune unicornplant	C3	a	H
<b>PINACEAE</b>				
<i>Pinus edulis</i>	twoneedle pinyon		p	T
<b>PLANTAGINACEAE</b>				
<i>Plantago lanceolata</i>	narrowleaf plantain	C3	p	H
<i>Plantago major</i>	common plantain		ab	H
<i>Plantago patagonica</i>	woolly plantain		a	H
<b>PLUMBAGINACEAE</b>				
<i>Limonium limbatum</i>	Transpecos sealavender		p	H
<b>POACEAE</b>				
<i>Agrostis gigantea</i>	redtop	C3	p	G
<i>Aristida adscensionis</i>	sixweeks threeawn	C4	a	G
<i>Aristida arizonica</i>	Arizona threeawn		p	G
<i>Aristida divaricata</i>	poverty threeawn		p	G
<i>Aristida havardii</i>	Havard's threeawn		p	G
<i>Aristida purpurea</i>	Fendler's threeawn		p	G
<i>Aristida purpurea</i>	Fendler threeawn	C4	p	G
<i>Aristida purpurea</i>	Fendler threeawn	C4	p	G
<i>Aristida purpurea</i>	Fendler threeawn	C4	p	G
<i>Aristida purpurea</i>	Wright's threeawn		p	G
<i>Aristida purpurea</i>	blue threeawn	C4	p	G
<i>Aristida purpurea</i>	purple threeawn	C4	p	G
<i>Aristida ternipes</i>	threeawn	C4	p	G
<i>Avena sativa</i>	common oat	C4	a	G
<i>Blepharoneuron tricholepis</i>	pine dropseed	C4	p	G

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Bothriochloa saccharoides</i>	silver bluestem	C4	p	G
<i>Bouteloua aristidoides</i>	needle grama	C4	a	G
<i>Bouteloua barbata</i>	sixweeks grama	C4	a	G
<i>Bouteloua curtipendula</i>	sideoats grama	C4	p	G
<i>Bouteloua eriopoda</i>	black grama	C4	p	G
<i>Bouteloua gracilis</i>	blue grama	C4	p	G
<i>Bouteloua hirsuta</i>	hairy grama	C4	p-	G
<i>Bromus anomalus</i>	nodding brome		p	G
<i>Bromus lanatipes</i>	woolly brome		p	G
<i>Bromus tectorum</i>	cheatgrass		a	G
<i>Cenchrus carolinianus</i>	coastal sandbur	C4	ap-	G
<i>Cenchrus echinatus</i>	southern sandbur	C4	a	G
<i>Chloris virgata</i>	feather fingergrass	C4	a	G
<i>Dactyloctenium aegyptium</i>	inland saltgrass	C4	p	G
<i>Echinochloa crus-gallii</i>	large barnyardgrass	C4	a	G
<i>Echinochloa crus-pavonis</i>	gulf cockspur grass	C4	a	G
<i>Elymus canadensis</i>	Canada wildrye		p	G
<i>Elymus elymoides</i>	bottlebrush squirreltail		p	G
<i>Enneapogon desvauxii</i>	nineawn pappusgrass	C4	p	G
<i>Eragrostis barrelieri</i>	Mediterranean lovegrass	C4	a	G
<i>Eragrostis intermedia</i>	plains lovegrass	C4	p	G
<i>Eragrostis mexicana</i>	Mexican lovegrass	C4	a	G
<i>Eragrostis pectinacea</i>	desert lovegrass	C4	a	G
<i>Eragrostis pectinacea</i>	tufted lovegrass		a	G
<i>Erioneuron pilosum</i>	hairy woollygrass	C4	p	G
<i>Erioneuron pulchellum</i>	low woollygrass	C4	p	G
<i>Hilaria jamesii</i>	galleta		p	G
<i>Hordeum jubatum</i>	bobtail barley	C3	p-	G
<i>Koeleria macrantha</i>	prairie Junegrass	C4	p	G
<i>Leersia oryzoides</i>	rice cutgrass	C3	p	G
<i>Leptochloa dubia</i>	green spangletop	C4	p	G
<i>Leptochloa mucronata</i>	mucronate sprangletop	C4	a	G
<i>Lycurus phleoides</i>	common wolfstail	C4	p	G
<i>Monroa squarrosa</i>	false buffalograss		a	G
<i>Muhlenbergia arenacea</i>	ear muhly	C4	p	G
<i>Muhlenbergia arenicola</i>	sand muhly		p	G
<i>Muhlenbergia asperifolia</i>	alkali muhly		p	G
<i>Muhlenbergia fragilis</i>	delicate muhly		a	G
<i>Muhlenbergia montana</i>	mountain muhly		p	G
<i>Muhlenbergia pauciflora</i>	New Mexico muhly		p	G
<i>Muhlenbergia porteri</i>	bush muhly	C4	p	G
<i>Muhlenbergia pungens</i>	sandhill muhly		p	G
<i>Muhlenbergia repens</i>	creeping muhly		p	G
<i>Muhlenbergia rigens</i>	deergrass		p	G
<i>Muhlenbergia setifolia</i>	curlyleaf muhly		p	G
<i>Muhlenbergia tenuifolia</i>	slimflower muhly		p	G
<i>Muhlenbergia torrevi</i>	ring muhly		p	G

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Oryzopsis hymenoides</i>	Indian ricegrass	C3	p	G
<i>Oryzopsis micrantha</i>	littleseed ricegrass		p	G
<i>Panicum capillare</i>	witchgrass	C4	a	G
<i>Panicum hallii</i>	Hall's panicgrass		p	G
<i>Panicum obtusum</i>	obtuse panicgrass	C4	p	G
<i>Pascopyrum smithii</i>	western wheatgrass	C3	p	G
<i>Phleum pratense</i>	timothy	C3	p	G
<i>Phragmites australis</i>	common reed	C3	p	G
<i>Piptochaetium fimbriatum</i>	pinyon ricegrass		p	G
<i>Poa arida</i>	plains bluegrass		p	G
<i>Poa bigelovii</i>	Bigelow's bluegrass		a	G
<i>Poa fendleriana</i>	muttongrass		p	G
<i>Poa fendleriana</i>	skyline bluegrass		p	G
<i>Poa reflexa</i>	Nodding bluegrass		p	G
<i>Polypogon monspeliensis</i>	annual rabbitsfoot grass	C3	a	G
<i>Polypogon viridis</i>	beardless rabbitsfoot grass		p	G
<i>Schizachyrium scoparium</i>	New Mexico little bluestem	C4	p	G
<i>Scleropogon brevifolius</i>	burrograss	C4	p	G
<i>Setaria macrostachya</i>	plains bristlegrass		p	G
<i>Setaria viridis</i>	green bristlegrass	C4	a	G
<i>Sorghum halepense</i>	Johnsongrass	C4	p	G
<i>Sporobolus airoides</i>	alkali sacaton	C4	p	G
<i>Sporobolus contractus</i>	spike dropseed	C4	p	G
<i>Sporobolus cryptandrus</i>	sand dropseed	C4	p	G
<i>Sporobolus flexuosus</i>	mesa dropseed		p	G
<i>Sporobolus giganteus</i>	giant dropseed		p	G
<i>Sporobolus nealleyi</i>	Gyp dropseed		p	G
<i>Sporobolus wrightii</i>	giant sacaton	C4	p	G
<i>Stipa comata</i>	needleandthread	C3	p	G
<i>Stipa lettermanii</i>	Letterman's needlegrass		p	G
<i>Stipa neomexicana</i>	New Mexico needlegrass		p	G
<i>Stipa robusta</i>	sleepygrass	C3	p	G
<i>Tragus berteronianus</i>	spiked burr grass		a	G
<i>Tragus racemosus</i>	stalked burr grass		a	G
<i>Tridens muticus</i>	Rough tridens		p	G
<i>Tridens muticus</i>	slim tridens		p	G
<i>Triticum aestivum</i>	common wheat	C3	a	G
<i>Vulpia octoflora</i>	sixweeks fescue	C3	a	G
<i>Vulpia octoflora</i>	sixweeks fescue	C3	a	G

**POLEMONIACEAE**

<i>Eriastrum diffusum</i>	Miniature woolstar		a	H
<i>Gilia flavocincta</i>	lesser yellowthroat gilia	C3	a	H
<i>Gilia mexicana</i>	El Paso gilia		a	H
<i>Gilia rigidula</i>	bluebowls		p	ss
<i>Gilia sinuata</i>	rosy gilia		a	H
<i>Gilia subnuda</i>	coral gilia		bp	H

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Ipomopsis aggregata</i>	skyrocket gilia		b	H
<i>Ipomopsis laxiflora</i>	iron skyrocket		a	H
<i>Ipomopsis longiflora</i>	flaxflowered gilia		a	H
<i>Ipomopsis multiflora</i>	manyflowered gilia		p	ss
<i>Ipomopsis pumila</i>	dwarf gilia		a	H
<i>Phlox gracilis</i>	slender phlox		a	H
<i>Phlox mesoleuca</i>	threadleaf phlox		p	H
<i>Phlox nana</i>	Santa Fe phlox		p	H
<b>POLYGALACEAE</b>				
<i>Polygala alba</i>	white milkwort		p	H
<i>Polygala obscura</i>	velvetseed milkwort		p	H
<b>POLYGONACEAE</b>				
<i>Eriogonum abertianum</i>	Abert's buckwheat	C3	ab	H
<i>Eriogonum alatum</i>	winged buckwheat		p	H
<i>Eriogonum annuum</i>	annual buckwheat		a	H
<i>Eriogonum cernuum</i>	nodding buckwheat		a	H
<i>Eriogonum jamesii</i>	James' buckwheat	C3	p	H
<i>Eriogonum leptophyllum</i>	slenderleaf buckwheat		p	H
<i>Eriogonum polycladon</i>	sorrel buckwheat		a	H
<i>Eriogonum racemosum</i>	redroot buckwheat		p	H
<i>Eriogonum rotundifolium</i>	roundleaf buckwheat	C3	a	H
<i>Eriogonum wrightii</i>	bastardsage	C3	p	H
<i>Polygonum aviculare</i>	prostrate knotweed	C3	a	H
<i>Polygonum convolvulus</i>	black bindweed	C3	a	H
<i>Polygonum lapathifolium</i>	curlytop knotweed		a	H
<i>Polygonum persicaria</i>	spotted ladysthumb	C3	a	H
<i>Rumex acetosella</i>	common sheep sorrel	C3	p	H
<i>Rumex altissimus</i>	pale dock		p	H
<i>Rumex crispus</i>	curly dock	C3	p	H
<i>Rumex hymenosepalus</i>	canaigre dock		p	H
<i>Rumex salicifolius</i>	Mexican dock		p	H
<i>Rumex salicifolius</i>	Mexican dock		p	H
<b>POLYPODIACEAE</b>				
<i>Argyrochosma fendleri</i>	Fendler's falsecloak fern		p	H
<i>Cheilanthes eatonii</i>	Eaton's lipfern		p	H
<i>Cheilanthes feei</i>	slender lipfern		p	H
<i>Cheilanthes fendleri</i>	Fendler's lipfern		p	H
<i>Cystopteris fragilis</i>	brittle bladderfern		p	H
<i>Notholaena standleyi</i>	star cloak fern		p	H
<i>Woodsia neomexicana</i>	New Mexico cliff fern		p	H
<i>Woodsia oregana</i>	Oregon woodsia		p	H
<i>Woodsia plummerae</i>	Plummer's cliff fern		p	H
<b>PORTULACACEAE</b>				

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Portulaca halimoides</i>	silkcotton purslane	C4	a	su
<i>Portulaca oleracea</i>	little hogweed	C4	a	su
<i>Portulaca oleracea</i>	little hogweed		a	su
<i>Portulaca pilosa</i>	kiss me quick	C4	a	su
<i>Talinum parviflorum</i>	sunbright	C3	p	H

**PRIMULACEAE**

<i>Anagallis minima</i>	chaffweed		a	H
<i>Androsace septentrionalis</i>	pygmyflower rock jasmine		ab	H

**RANUNCULACEAE**

<i>Aquilegia elegantula</i>	western red columbine		p	H
<i>Aquilegia triternata</i>	Chiricahua Mountain columbine		p	H
<i>Clematis bigelovii</i>	Bigelow's leather flower		p	?
<i>Clematis columbiana</i>	rock clematis		p	HV
<i>Clematis ligusticifolia</i>	western white clematis		p	HV
<i>Delphinium carolinianum</i>	Carolina larkspur		p	H
<i>Thalictrum fendleri</i>	Fendler's meadowrue		p	H
<i>Thalictrum fendleri</i>	Wright's meadowrue		p	H

**RHAMNACEAE**

<i>Ceanothus fendleri</i>	Fendler's ceanothus		p	S
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**ROSACEAE**

<i>Cercocarpus montanus</i>	hairy mountain mahogany	C3	p	ST
<i>Fallugia paradoxa</i>	Apacheplume	C3	p	S
<i>Fragaria vesca</i>	woodland strawberry		p	H
<i>Holodiscus dumosus</i>	rockspirea		p	S
<i>Petrophyton caespitosum</i>	mat rockspirea		p	S
<i>Potentilla pensylvanica</i>	Pennsylvania cinquefoil		p	H
<i>Prunus serotina</i>	black cherry		p	T
<i>Prunus virginiana</i>	black chokecherry		p	ST
<i>Rosa woodsii</i>	Woods' rose		p	S
<i>Rosa woodsii</i>	Woods' rose		p	S
<i>Rubus idaeus</i>	grayleaf red raspberry		p	S
<i>Rubus parviflorus</i>	thimbleberry		p	ss

**RUBIACEAE**

<i>Galium aparine</i>	stickywilly		a	H
<i>Galium fendleri</i>	Fendler's bedstraw		p	H
<i>Galium mexicanum</i>	Mexican bedstraw		p	H
<i>Houstonia rubra</i>	red bluet		p	H

**RUTACEAE**

<i>Ptelea trifoliata</i>	common hoptree		p	S
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**SALICACEAE**

Scientific Name	Common Name	PHP	LICY	LIFM
<i>Populus acuminata</i>	lanceleaf cottonwood		p	T
<i>Populus angustifolia</i>	narrowleaf cottonwood		p	T
<i>Populus fremontii</i>	Fremont's cottonwood		p	T
<i>Salix amygdaloides</i>	peachleaf willow	C3	p	T
<i>Salix exigua</i>	sandbar willow		p	S
<i>Salix gooddingii</i>	Goodding's willow		p	T
<i>Salix irrorata</i>	sandbar willow		p	S
<b>SANTALACEAE</b>				
<i>Comandra umbellata</i>	pale bastard toadflax		p	rp
<b>SAURURACEAE</b>				
<i>Anemopsis californica</i>	yerba mansa		p	H
<b>SAXIFRAGACEAE</b>				
<i>Heuchera parvifolia</i>	littleleaf alumroot		p	H
<i>Heuchera rubescens</i>	pink alumroot		p	H
<i>Heuchera wootonii</i>	White Mountain alumroot		p	H
<i>Jamesia americana</i>	cliffbush		p	S
<b>SCROPHULARIACEAE</b>				
<i>Castilleja integra</i>	wholeleaf Indian paintbrush		p	Hrp
<i>Castilleja linariifolia</i>	Wyoming Indian paintbrush		p	Hrp
<i>Castilleja minor</i>	lesser Indian paintbrush		a	Hrp
<i>Cordylanthus wrightii</i>	Wright's bird's beak		a	H
<i>Epixiphium wislizeni</i>	ballonbush		p	V
<i>Maurandella antirrhiniflora</i>	roving sailor		p	HV
<i>Mimulus glabratus</i>	roundleaf monkeyflower		p	H
<i>Mimulus guttatus</i>	seep monkeyflower		p	H
<i>Pedicularis centranthera</i>	dwarf lousewort		p	Hrp
<i>Penstemon ambiguus</i>	gilia penstemon		p	H
<i>Penstemon ambiguus</i>	pink plains beardtongue		p	H
<i>Penstemon barbatus</i>	Torrey's penstemon	C3	p	H
<i>Penstemon fendleri</i>	Fendler's penstemon		p	H
<i>Penstemon jamesii</i>	James' beardtongue		p	H
<i>Penstemon virgatus</i>	upright blue beardtongue		p	H
<i>Penstemon whippleanus</i>	Whipple's penstemon		p	H
<i>Scrophularia parviflora</i>	pineland figwort		p	H
<i>Verbascum thapsus</i>	common mullein		b	H
<i>Veronica americana</i>	American speedwell		p	H
<i>Veronica peregrina</i>	neckweed		a	H
<b>SELAGINELLACEAE</b>				
<i>Selaginella densa</i>	Rocky Mountain spikemoss		p	H
<i>Selaginella mutica</i>	bluntleaf spikemoss		p	H
<i>Selaginella underwoodii</i>	Underwood's spikemoss		p	H

Scientific Name	Common Name	PHP	LICY	LIFM
<b>SIMAROUBACEAE</b>				
<i>Ailanthus altissima</i>	tree of heaven		p	T
<b>SOLANACEAE</b>				
<i>Calibrachoa parviflora</i>	seaside petunia		a	H
<i>Chamaesaracha coniodes</i>	gray five eyes		p	H
<i>Chamaesaracha coronopus</i>	greenleaf five eyes		p	H
<i>Chamaesaracha sordida</i>	hairy five eyes		p	H
<i>Datura ferox</i>	Chinese thornapple		ap	H
<i>Datura wrightii</i>	sacred thornapple	C3	ap	H
<i>Lycium pallidum</i>	pale wolfberry		p	S
<i>Lycium torreyi</i>	squawthorn		p	S
<i>Nicotiana trigonophylla</i>	desert tobacco	C3	bp	H
<i>Physalis hederifolia</i>	Fendler's groundcherry		p	H
<i>Physalis longifolia</i>	longleaf groundcherry		p	H
<i>Solanum elaeagnifolium</i>	silverleaf nightshade	C3	p	H
<i>Solanum heterodoxum</i>	New Mexican nightshade		a	H
<i>Solanum jamesii</i>	wild potato		p	H
<i>Solanum rostratum</i>	buffalobur nightshade		a	H
<b>TAMARICACEAE</b>				
<i>Tamarix chinensis</i>	five-stamen tamarisk		p	ST
<b>TYPHACEAE</b>				
<i>Typha angustifolia</i>	narrowleaf cattail		p	H
<b>ULMACEAE</b>				
<i>Celtis laevigata</i>	netleaf hackberry		p	ST
<b>VALERIANACEAE</b>				
<i>Valeriana acutiloba</i>	sharp-leaf valerian		p	H
<b>VERBENACEAE</b>				
<i>Aloysia wrightii</i>	Wright's beebrush	C3	p	S
<i>Glandularia bipinnatifida</i>	Dakota mock vervain		?	H
<i>Glandularia bipinnatifida</i>	Dakota mock vervain		ap-	H
<i>Glandularia bipinnatifida</i>	Dakota mock vervain		p	H
<i>Glandularia gooddingii</i>	southwestern mock vervain		p	H
<i>Glandularia wrightii</i>	Davis Mountain mock vervain	C3	?	H
<i>Tetradlea coulteri</i>	Coulter's wrinklefruit		p	H
<i>Verbena bracteata</i>	bigbract verbena	C3	ap-	H
<i>Verbena macdougallii</i>	MacDougal verbena		?	H
<i>Verbena neomexicana</i>	hillside vervain		?	H
<b>VIOLACEAE</b>				
<i>Hybanthus verticillatus</i>	babyslippers		p	H

Scientific Name	Common Name	PHP	LICY	LIFM
<b>VITACEAE</b>				
<i>Parthenocissus quinquefolia</i>	Virginia creeper		p	WV
<i>Vitis arizonica</i>	canyon grape		p	WV
<b>ZANICHELLACEAE</b>				
<i>Zannichellia palustris</i>	horned pondweed		p	H
<b>ZYGOPHYLLACEAE</b>				
<i>Kallstroemia californica</i>	California caltrop		a	H
<i>Kallstroemia parviflora</i>	warty caltrop	C4	a	H
<i>Larrea tridentata</i>	creosotebush	C3	p	S
<i>Tribulus terrestris</i>	puncturevine	C4	a	H



**Appendix F**  
**Threatened And Endangered Species Of Socorro County**  
Compiled By Sevilleta LTER



Listed Species in Socorro County

Scientific Name Common Name Status

<i>Idionycteris (=Plecotus) phyllotis</i>	Allen's (Mexican) big-eared bat	SC
<i>Cynomys ludovicianus arizonensis</i>	Arizona black-tailed prairie dog	SC
<i>Mustela nigripes</i>	Black-footed ferret	E
<i>Geomys bursarius arenarius</i>	Desert pocket gopher	SC
<i>Myotis thysanodes</i>	Fringed myotis	SC
<i>Myotis evotis</i>	Long-eared myotis	SC
<i>Myotis volans</i>	Long-legged myotis	SC
<i>Zapus hudsonius luteus</i>	New Mexican meadow jumping mouse	SC
<i>Myotis lucifugus occultus</i>	Occult little brown bat	SC
<i>Eutamias quadrivittatus australis</i>	Organ Mountains Colorado chipmunk	SC
<i>Plecotus townsendii pallescens</i>	Pale Townsend's (=western) big-eared bat	SC
<i>Ondatra zibethicus ripensis</i>	Pecos River muskrat	SC
<i>Myotis ciliolabrum</i>	Small-footed myotis	SC
<i>Euderma maculatum</i>	Spotted bat	SC
<i>Myotis yumanensis</i>	Yuma myotis	SC
<i>Falco peregrinus anatum</i>	American peregrine falcon	E
<i>Falco peregrinus tundrius</i>	Arctic peregrine falcon	E(S/A)
<i>Ammodramus bairdii</i>	Baird's sparrow	SC
<i>Haliaeetus leucocephalus</i>	Bald eagle	T
<i>Chlidonias niger</i>	Black tern	SC
<i>Buteo regalis</i>	Ferruginous hawk	SC
<i>Sterna antillarum</i>	Interior least tern	E
<i>Lanius ludovicianus</i>	Loggerhead shrike	SC
<i>Strix occidentalis lucida</i>	Mexican spotted owl	T
<i>Charadrius montanus</i>	Mountain plover	C
<i>Falco femoralis septentrionalis</i>	Northern aplomado falcon	E
<i>Accipiter gentilis</i>	Northern goshawk	SC
<i>Charadrius melodus</i>	Piping plover	T
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	E
<i>Plegadis chihi</i>	White-faced ibis	SC
<i>Grus americana</i>	Whooping crane	XN
<i>Platygobio (=Hybopsis) gracilis</i>	Flathead chub	SC
<i>Agosia chrysogaster*</i>	Longfin dace	SC
<i>Hybognathus amarus</i>	Rio Grande silvery minnow	E w/PCH
<i>Bufo microscaphus microscaphus</i>	Arizona southwestern toad	SC
<i>Phrynosoma cornutum</i>	Texas horned lizard	SC
<i>Rana chiricahuensis</i>	Chiricahua leopard frog	SC
<i>Exosphaeroma thermophilus</i>	Socorro isopod	E

<i>Tryonia alamosae</i>	Alamosa springsnail	E
<i>"Fontelicella" chupaderae</i>	Chupadera springsnail	C
<i>"Fontelicella" neomexicana</i>	Socorro springsnail	E
<i>Amsonia fugatei</i>	Fugate's blue-star	SC
<i>Chenopodium cycloides</i>	Sandhill goosefoot	SC

Index

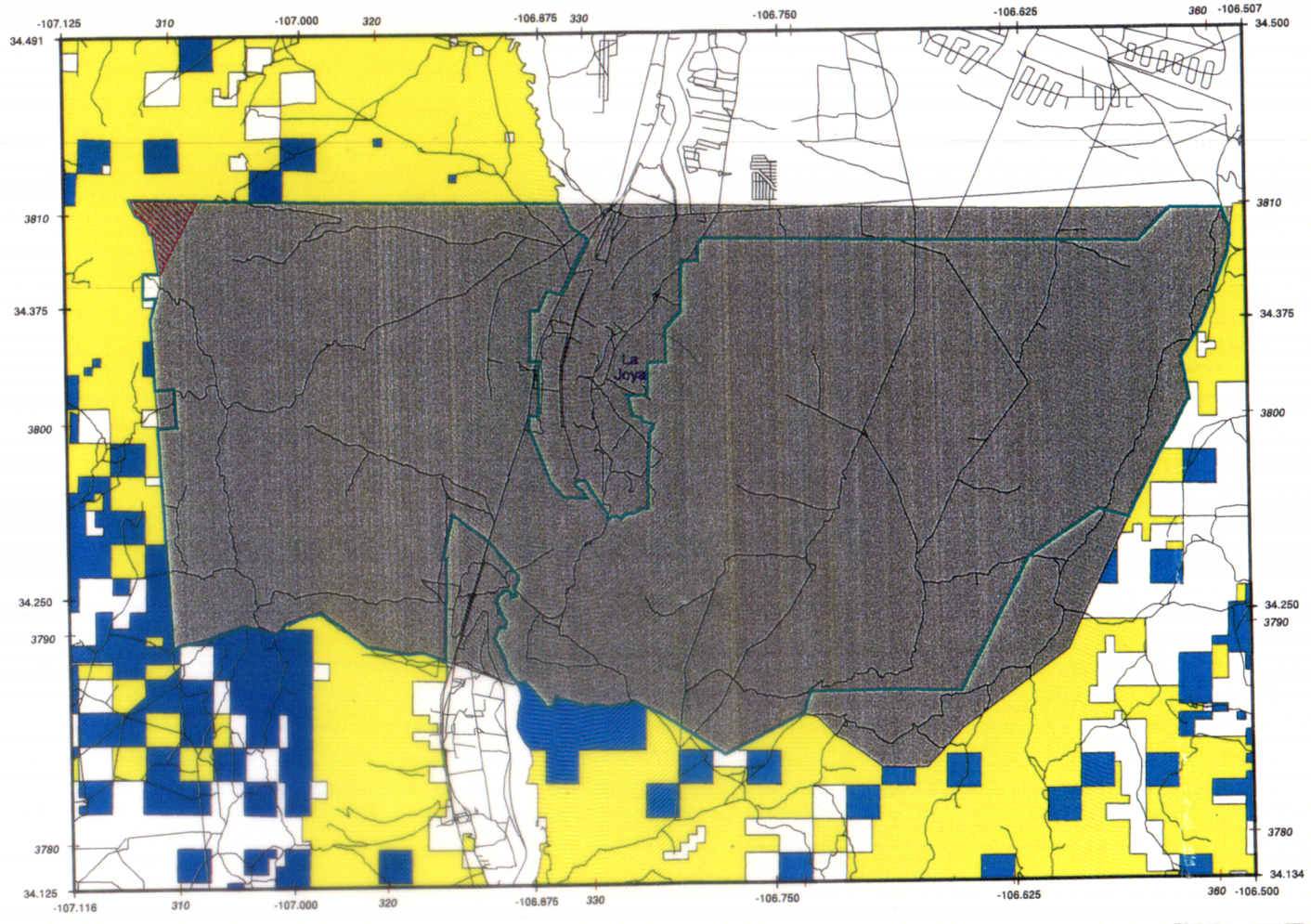
E	=	Endangered
PE	=	Proposed Endangered
T	=	Threatened
SC	=	Species of Concern
C	=	Candidate Species
PCH	=	Proposed Critical Habitat
XN	=	Nonessential Experimental
SA	=	Similarity of Appearance

**Appendix G**  
**Maps**



# SEVILLETA NATIONAL WILDLIFE REFUGE

## SOCORRO COUNTY, NEW MEXICO



**LEGEND**

**Land Status:**

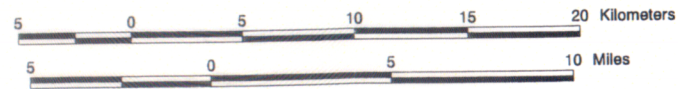
- Bureau of Land Management
- Private Land
- Sevilleta Land Grant
- State Land
- Sevilleta NWR Boundary
- Wilderness Proposal

Compiled by:  
 Sevilleta LTER Center  
 University of New Mexico  
 April 5, 1999

Based on BLM Land Status  
 Maps at 1:100,000 Scale  
 RGIS Coverage No. LOS0001

1927 North American Datum  
 Lat/Long Decimal Degrees  
 10,000-meter UTM Grid, Zone 13

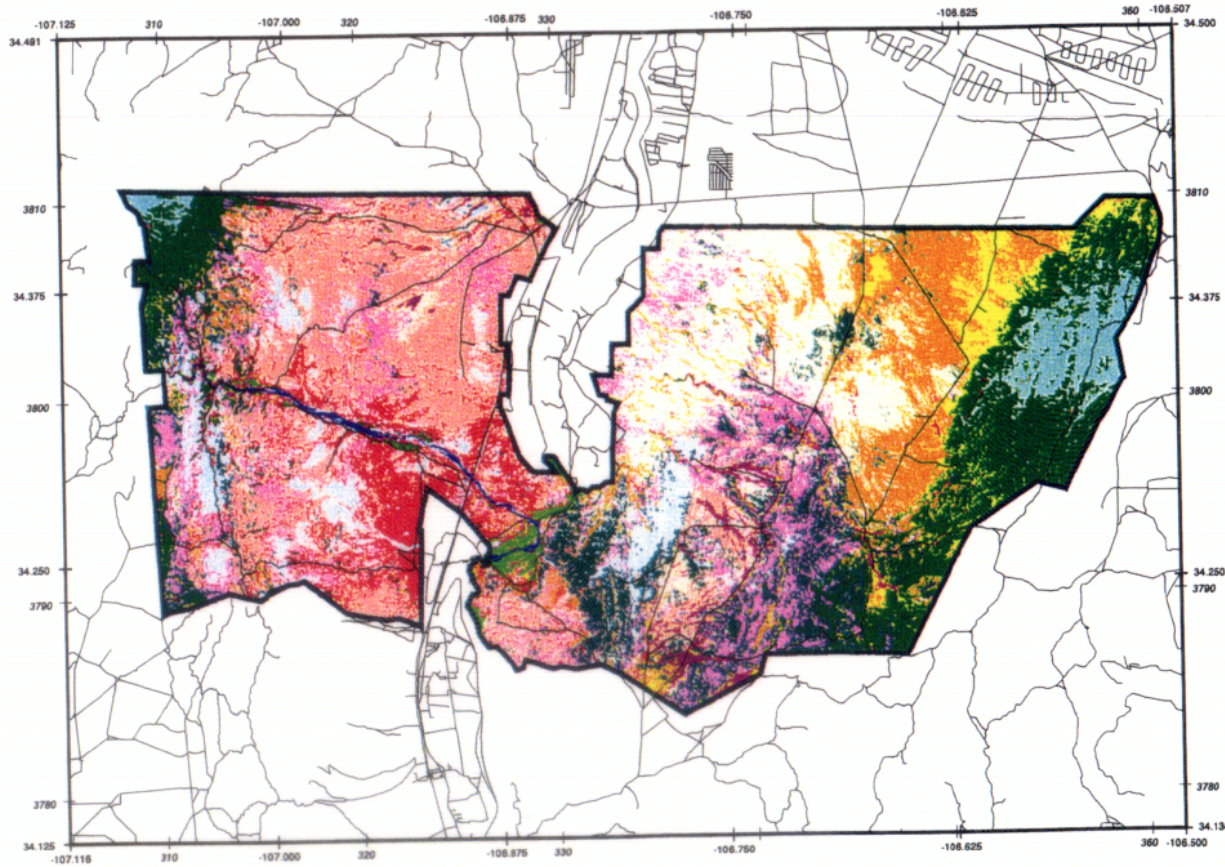
### Land Status





# SEVILLETA NATIONAL WILDLIFE REFUGE

## SOCORRO COUNTY, NEW MEXICO



### LEGEND

**Vegetation Classes:**

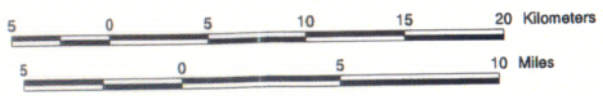
1	Water or Wet Ground
2	Barren or Sparsely Vegetated
3	Deep Basin Grasslands (Salsola and Indian Ricegrass Grasslands)
4	Transition Chihuahuan and Great Basin Grasslands (Black Grama Grasslands with Galata)
5	Chihuahuan Desert Grasslands (Black Grama Grasslands)
6	Transition Chihuahuan and Plains Grasslands (Black Grama Grasslands with Blue Grama)
7	Plains Grasslands (Blue and Hairy Grama Grasslands)
8	Chihuahuan or Great Basin Lowland/Desert Grasslands (Alkali or Giant Sarcobatus Grasslands)
9	Chihuahuan Desert Shrublands (Creosotebush Shrublands)
10	Great Basin Shrublands (Flourishing Saltbush or Broom Yucca)
11	Rocky Mountain Conifer Savanna (Creosote Juniper Woodlands)
12	Rocky Mountain Conifer Woodlands (Piñon Woodlands)
13	Rio Grande Riparian Woodlands (Ochotona and Salt Cedar Riparian Woodlands)



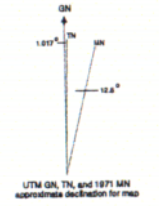
1927 North American Datum  
Lat/Long Decimal Degrees  
10,000-meter UTM Grid, Zone 13

Map created by the Sevilleta Long Term Ecological Research (LTER) Program and the New Mexico Natural Heritage Program (NHNHP) of the Department of Biology at the University of New Mexico, Albuquerque, NM (January, 1999). Map based on unsupervised classification of computed Normalized Difference Vegetation Indices (NDVI's) of twelve composite Landsat Thematic Mapper (TM) images dating from 1987-1993. Validation vegetation data collected from 252 field plots between 1994 and 1997. Additional project support provided by the Sevilleta National Wildlife Refuge and the New Mexico Chapter of The Nature Conservancy. Pixel resolution is 28.5 meters, and Minimum Map Unit size is 0.5 hectares.

## Sevilleta Vegetation Map



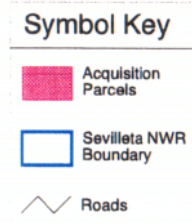
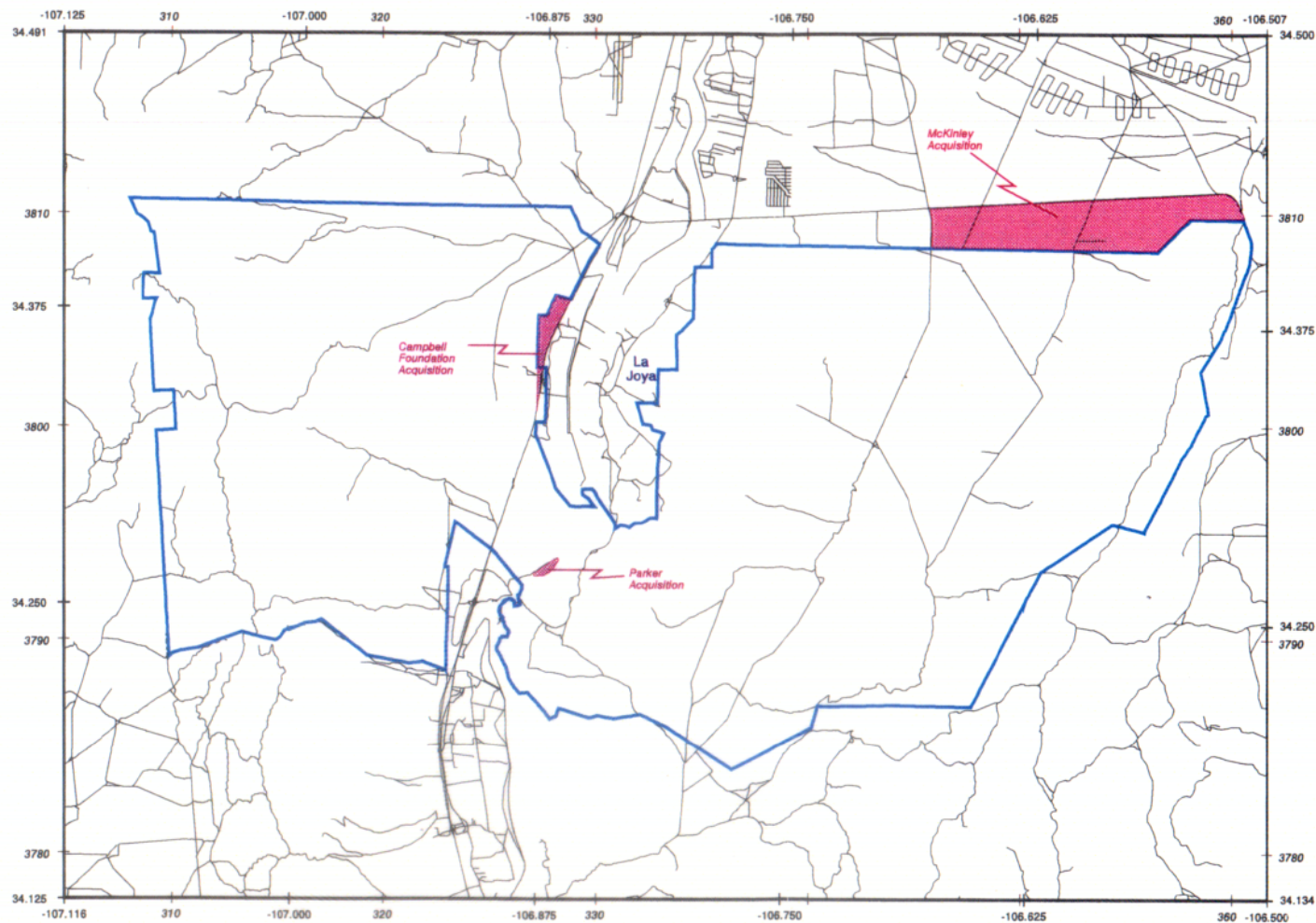
Scale = 1:250000





# SEVILLETA NATIONAL WILDLIFE REFUGE

SOCORRO COUNTY, NEW MEXICO

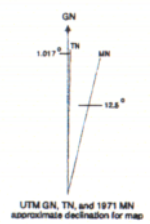
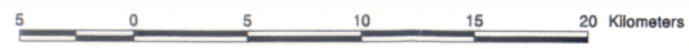


Compiled by:  
Sevilleta LTER Center  
University of New Mexico  
April 5, 1999

Based on USGS and  
BLM Quadrangles

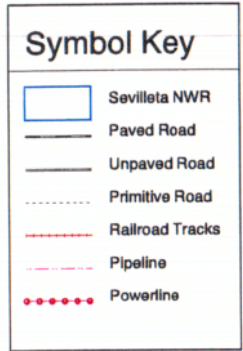
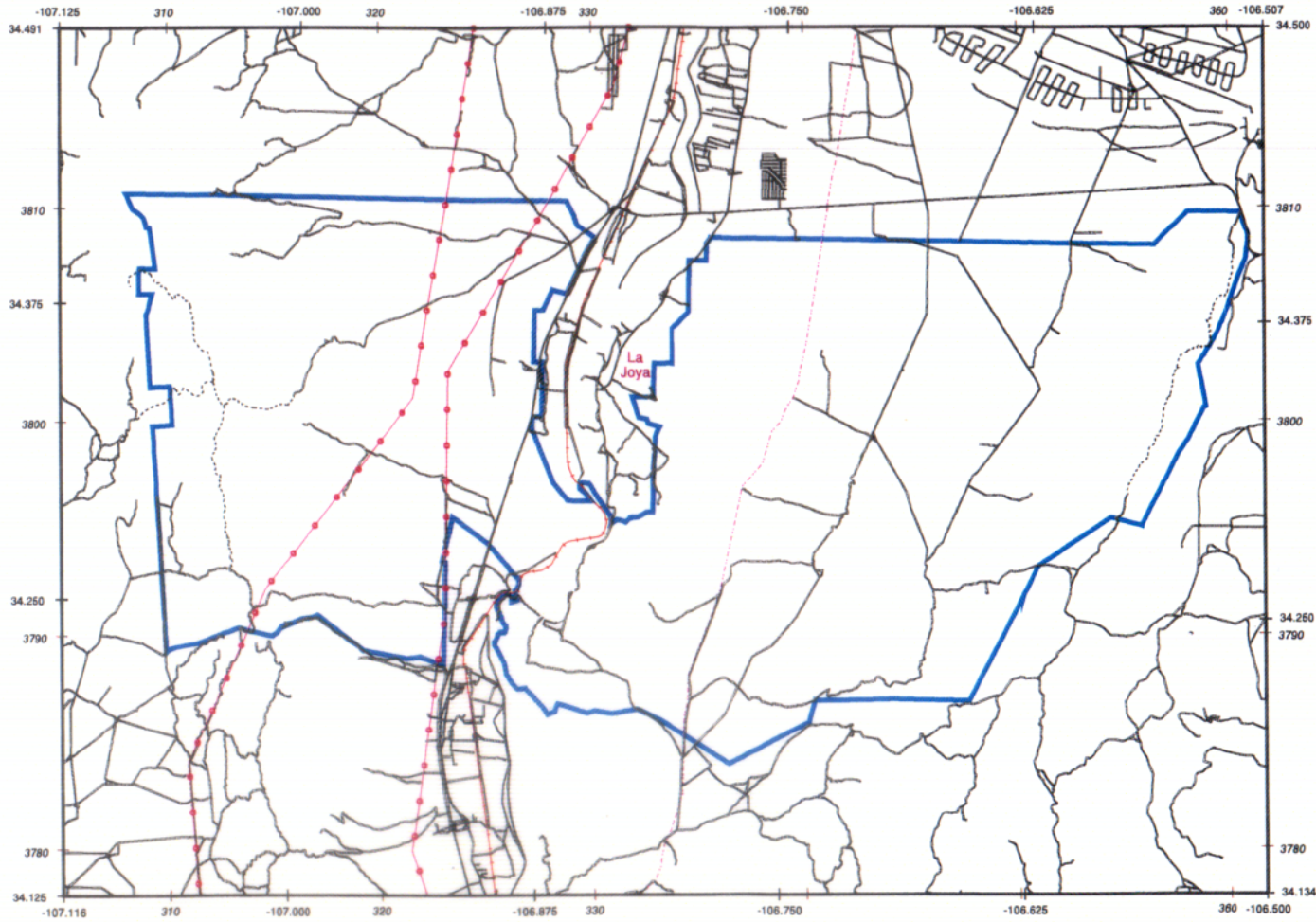
1927 North American Datum  
Lat/Long Decimal Degrees  
10,000-meter UTM Grid, Zone 13

## Proposed Land Acquisitions



# SEVILLETA NATIONAL WILDLIFE REFUGE

## SOCORRO COUNTY, NEW MEXICO

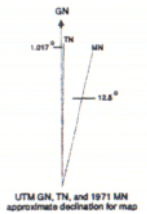


Compiled by:  
 Sevilleta LTER Center  
 University of New Mexico  
 April 2, 1999

Based on USGS Quadrangles  
 and GPS Survey Data

1927 North American Datum  
 Lat/Long Decimal Degrees  
 10,000-meter UTM Grid, Zone 13

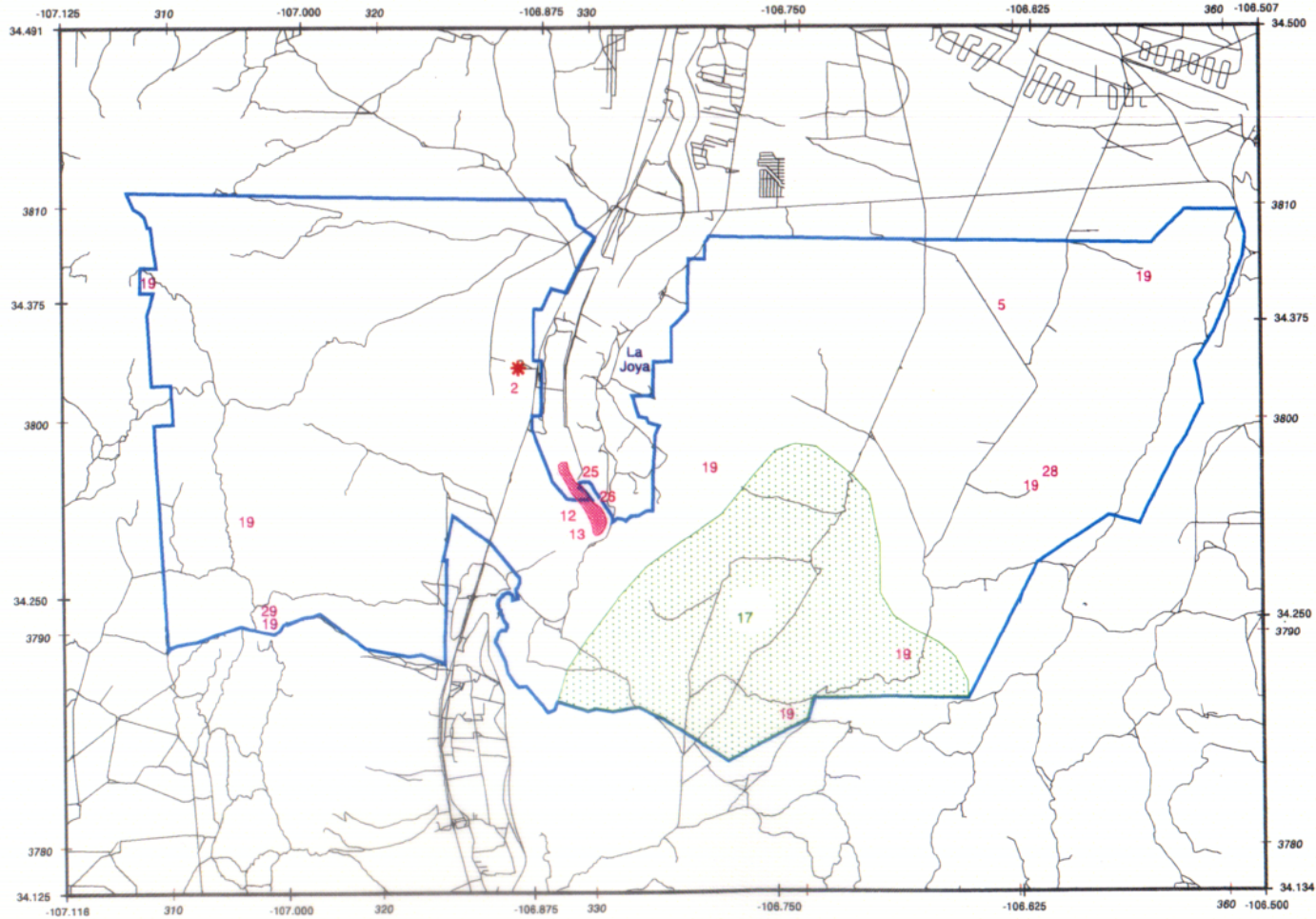
### Transportation/Utility Network





# SEVILLETA NATIONAL WILDLIFE REFUGE

## SOCORRO COUNTY, NEW MEXICO



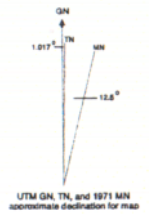
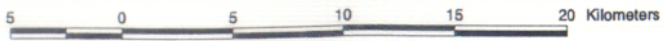
Symbol Key	
2	Gun Range
5	Wolf Road, 20 miles
12	Removal of Exotic Vegetation
13	Wetland Restoration BOR
17	A. Falcon Recovery
19	Seep Spring
25	Unit A Public
28	Unit A Public Use
29	Wolf Birthing Shelters
29	San Lorenzo Canyon
★ Headquarters Centralized:	
1	Visitors Center
3	Interagency Coordinator
4	Habitat Management Coordinator
6	Entrance Road Acquisition
7	Pave Entrance Road
8	Restroom Facilities
9	Prescribed Burn Plan
10	Water Management Plan
11	Implement WM Plan
14	Visitors Center Environmental Ed.
15	Bird Monitoring
16	Boundary Survey
18	Archeological Surveys
20	V.C. Outreach Cultural Resource
21	Archeological Overview
22	LAPS
23	NAWCA
24	Ungulate Survey
27	Archeological Site Nomination
30	Radios

Compiled by:  
 Sevilleta LTER Center  
 University of New Mexico  
 April 5, 1999

Based on USGS and  
 BLM Quadrangles

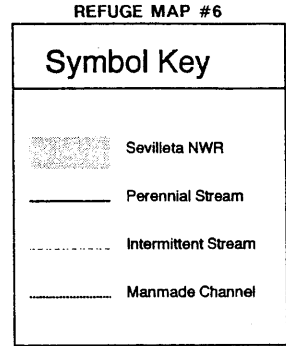
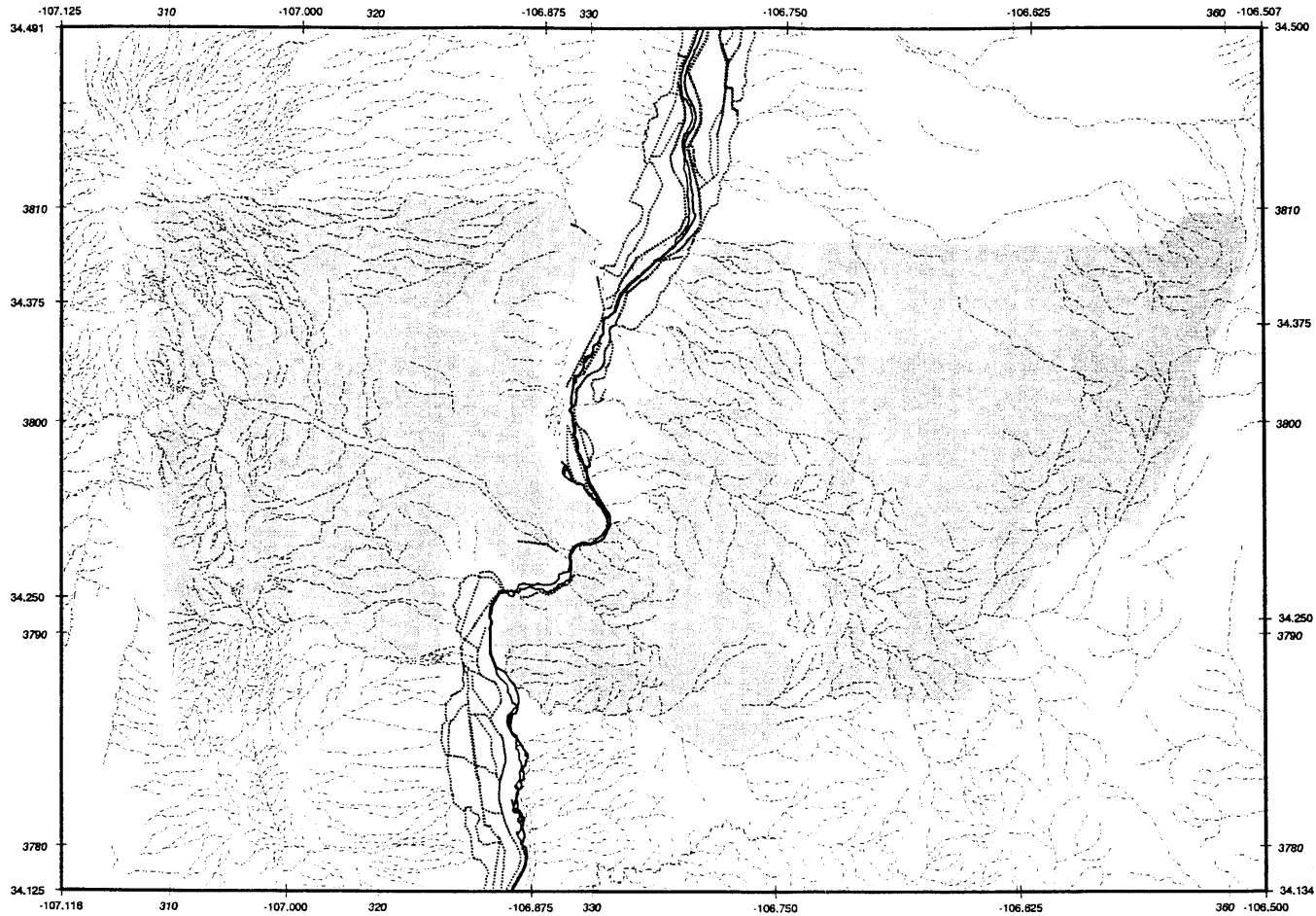
1927 North American Datum  
 Lat/Long Decimal Degrees  
 10,000-meter UTM Grid, Zone 13

### Sevilleta NWR Special Projects



# SEVILLETA NATIONAL WILDLIFE REFUGE

SOCORRO COUNTY, NEW MEXICO

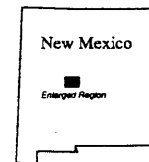


Compiled by:  
Sevilleta LTER Center  
University of New Mexico  
July 1998

Based on USGS Quadrangles  
and GPS Survey Data

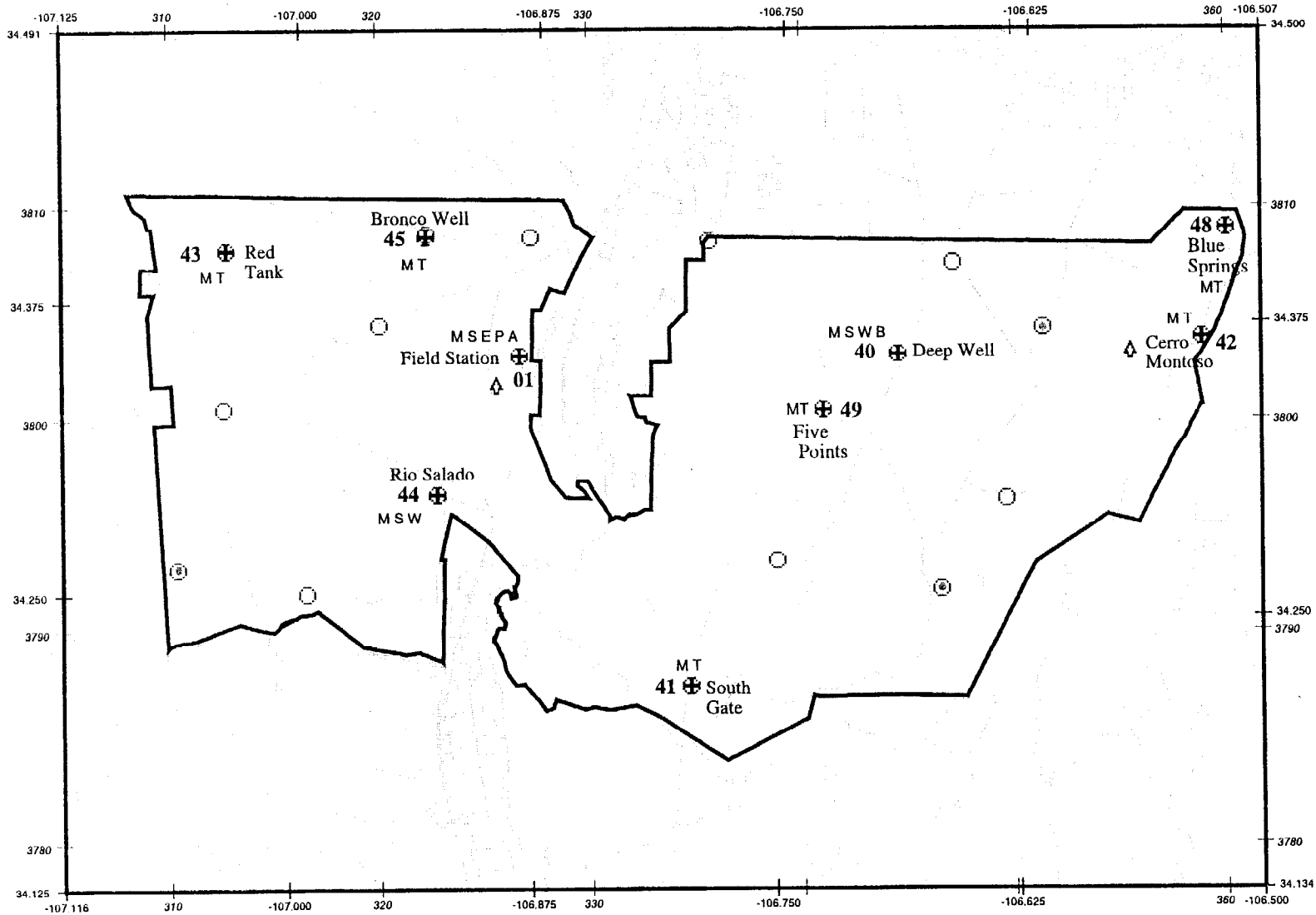
1927 North American Datum  
Lat/Long Decimal Degrees  
10,000-meter UTM Grid, Zone 13

## Streams Network



# SEVILLETA NATIONAL WILDLIFE REFUGE

## SOCORRO COUNTY, NEW MEXICO



### Symbol Key

- Funnel Gauge
- ⊗ Funnel & Tipping Rain Gauge
- ⊕ Meteorological Site (Instrumentation at Site)
  - M - Meteorological Station \*
  - T - TDR Probes
  - S - Continuous Measuring TDR
  - W - Wet/Dry Collector
  - E - Evaporation Pan
  - P - Sun Photometer
  - B - Bowen Ratio Station
  - A - Atmospheric Pressure
- △ Radio Repeater

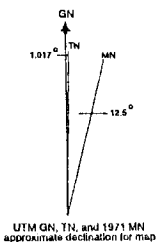
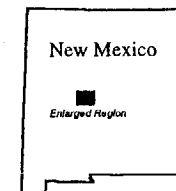
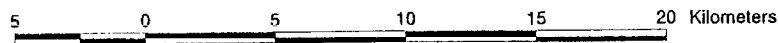
\* Each meteorological station measures air temperature, relative humidity, wind speed, wind direction, solar flux, precipitation and soil temperature at 1 and 10 cm

Compiled by:  
Sevilleta LTER Center  
University of New Mexico  
June 2000

Based on USGS Quadrangles  
and GPS Survey Data

1927 North American Datum  
Lat/Long Decimal Degrees  
10,000-meter UTM Grid, Zone 13

## All Meteorological Sites














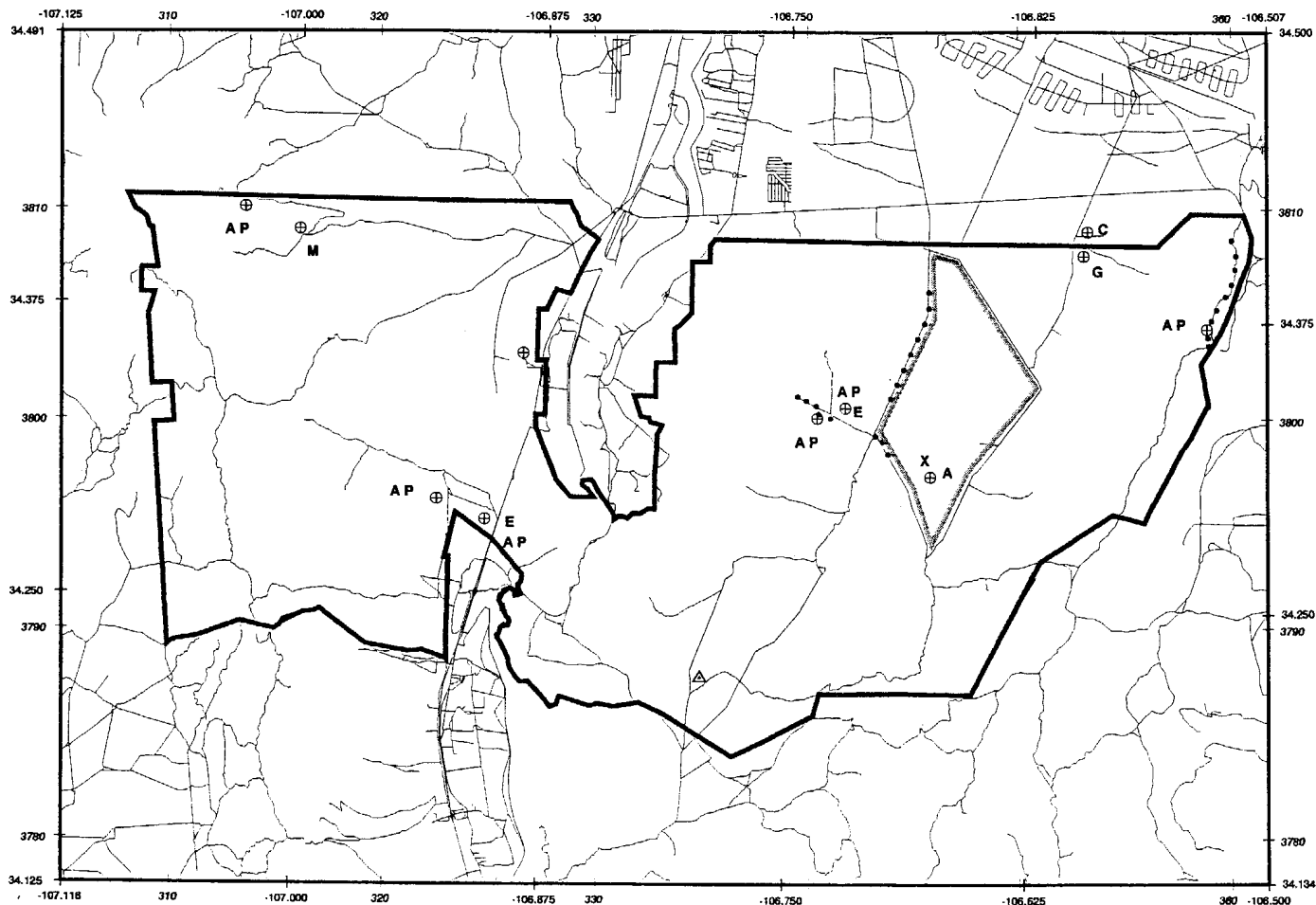
# SEVILLETA NATIONAL WILDLIFE REFUGE

## SOCORRO COUNTY, NEW MEXICO

UNM LTER MAP #2

### LEGEND

-  Coyote and Rabbit Survey Route
-  Bird Transect Plots
-  Prairie Dog Study
-  Rodent Webs
-  Arthropod Traps
-  Small Mammal Enclosures
-  Rodent Parasite Collections
-  Grasshopper Transects
-  Mouse Enclosures
-  Cattle Enclosures
-  Antelope Enclosures



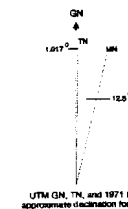
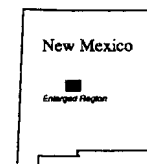
Compiled by:  
Sevilleta LTER Center  
University of New Mexico  
July 1998

Based on USGS Quadrangles  
and GPS Survey Data

1927 North American Datum  
Lat/Long Decimal Degrees  
10,000-meter UTM Grid, Zone 13

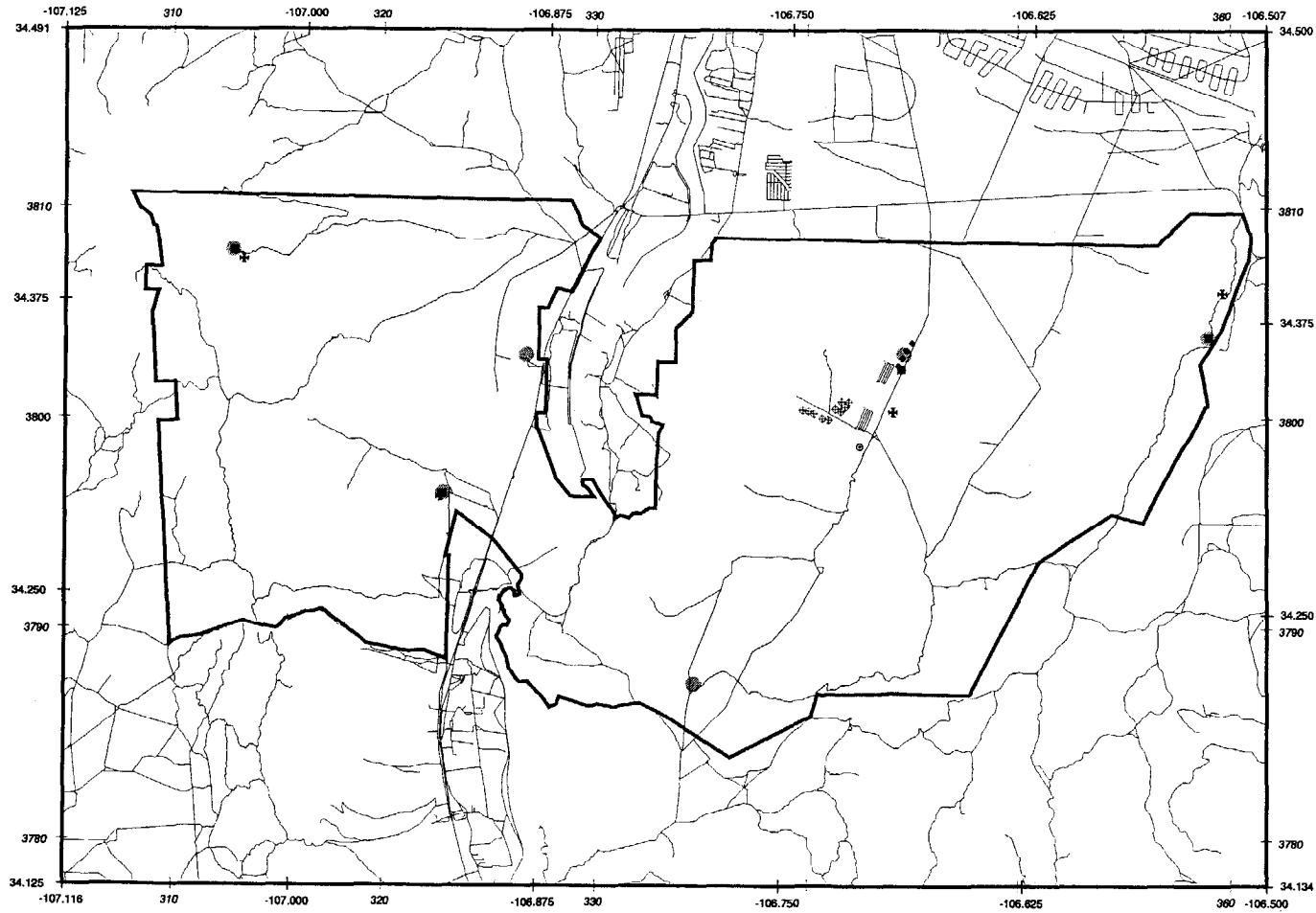
## Animal Studies

5 0 5 10 15 20 Kilometers



# SEVILLETA NATIONAL WILDLIFE REFUGE

SOCORRO COUNTY, NEW MEXICO



UNM LTER MAP #3

### Symbol Key

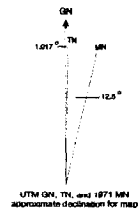
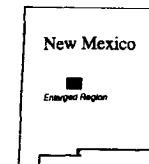
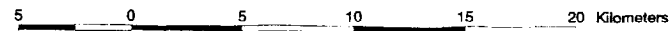
- Plant Litter Decomposition
- ◆ Long Term Intersite Decomposition (LIDET)
- ⊕ Grassland/Cresote Soil Carbon Nitrogen Study
- ⊕ Soil Surface Dynamics
- Precipitation Chemistry Funnel
- ▨ Termite Transects
- ⊙ Cryptogamic Crust Study

Compiled by:  
Sevilleta LTER Center  
University of New Mexico  
August 1998

Based on USGS Quadrangles  
and GPS Survey Data

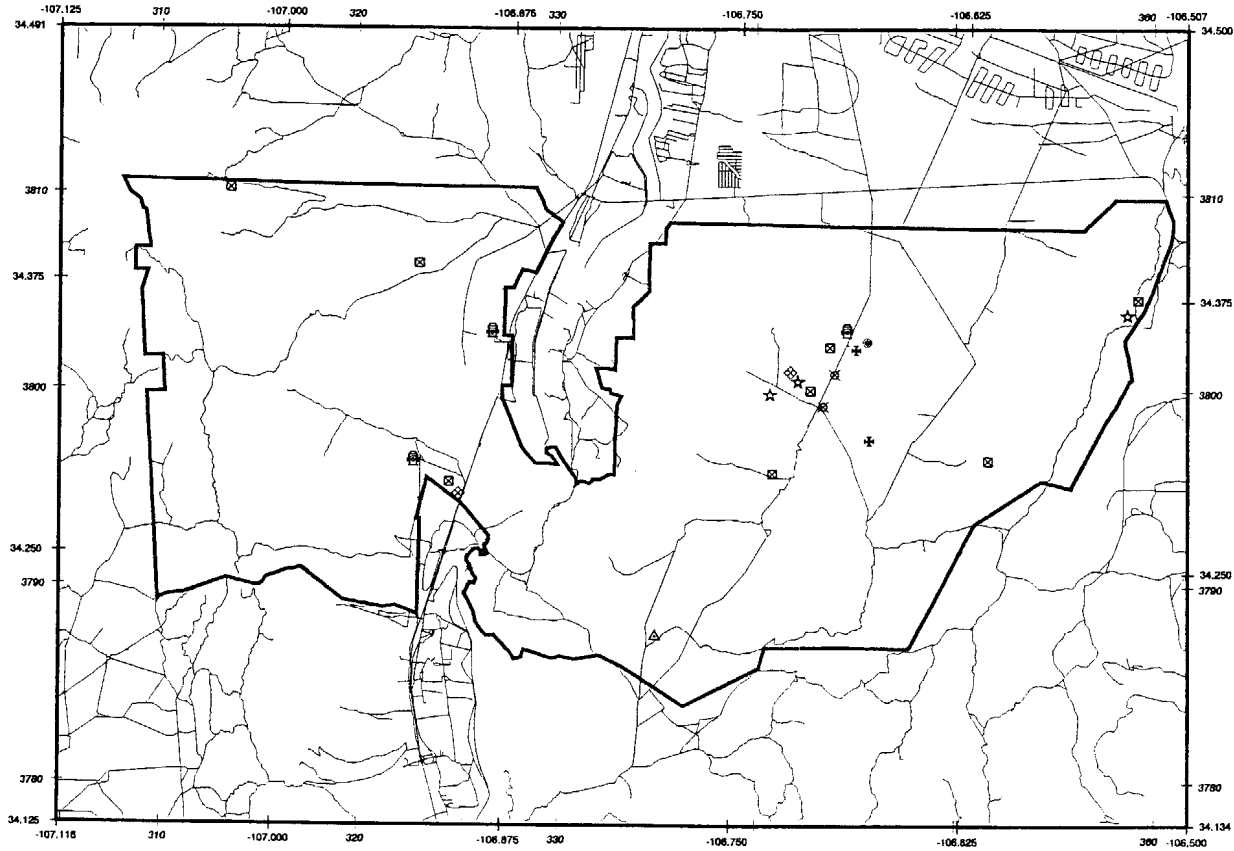
1927 North American Datum  
Lat/Long Decimal Degrees  
10,000-meter UTM Grid, Zone 13

## Nutrient Cycling Study Sites



# SEVILLETA NATIONAL WILDLIFE REFUGE

## SOCORRO COUNTY, NEW MEXICO



UNM LTER MAP #4

### Symbol Key

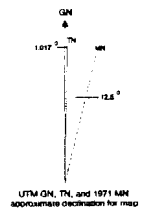
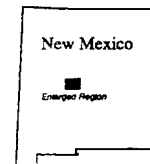
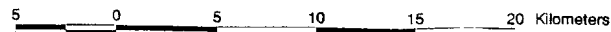
- ☒ LTER Core Plant Transects
- Deep Well Burn Plant Transects
- ◇ Small Mammal Exclosure Vegetation Plots
- ⊗ Plant Removal Study Vegetation Plots
- ⊕ NPP/Biomass Mowing Vegetation Plots
- ⊞ Water Balance Modeling Vegetation Plots
- ☆ NPP/Biomass Quadrat Vegetation Plots
- △ Prairie Dog Town Plant Transects

Compiled by:  
Sevilleta LTER Center  
University of New Mexico  
July 1998

Based on USGS Quadrangles  
and GPS Survey Data

1927 North American Datum  
Lat/Long Decimal Degrees  
10,000-meter UTM Grid, Zone 13

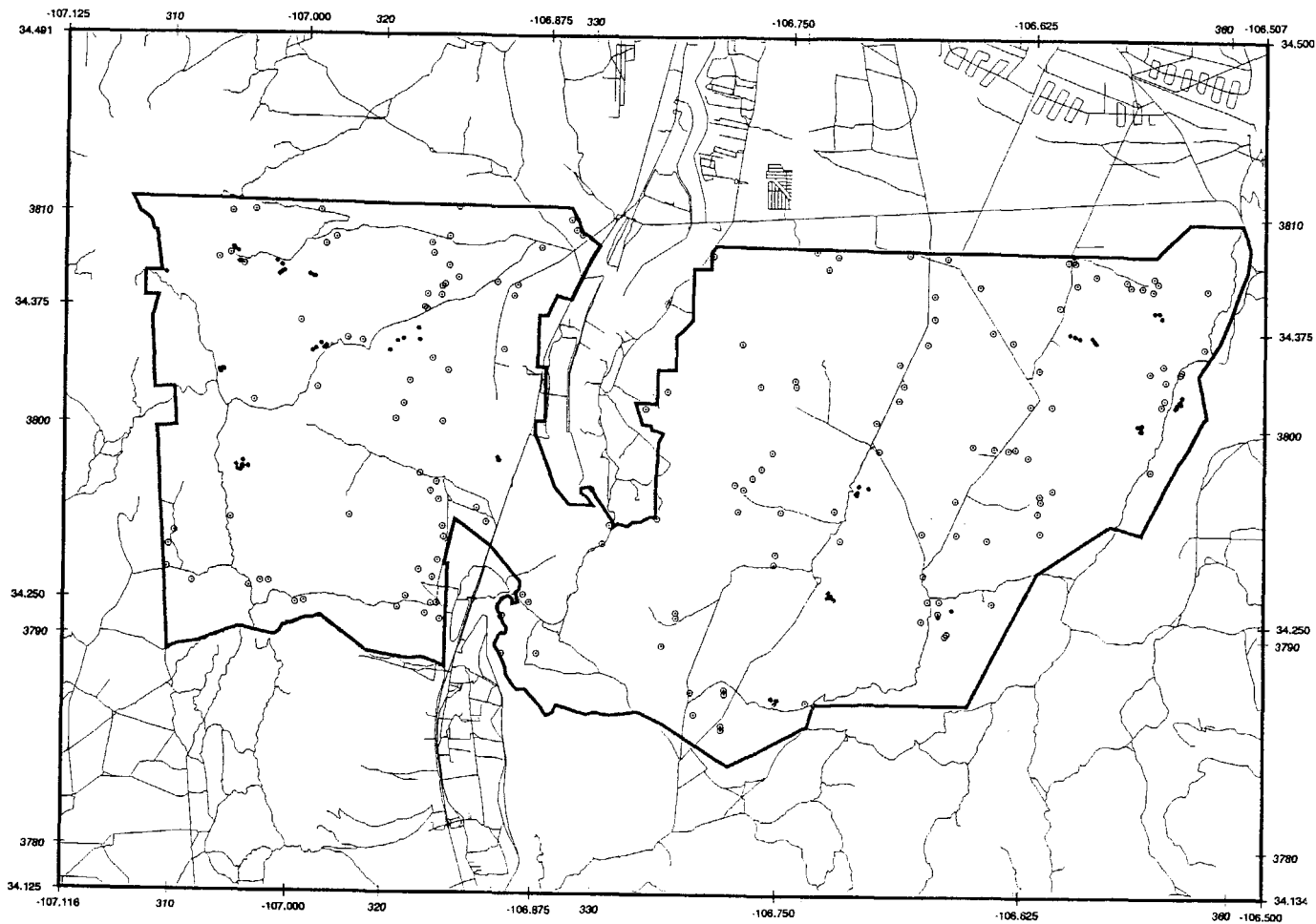
## Plant Studies Sites





# SEVILLETA NATIONAL WILDLIFE REFUGE

## SOCORRO COUNTY, NEW MEXICO



UNM LTER MAP #5

### Symbol Key

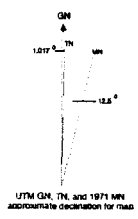
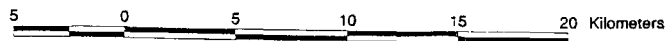
- Sevilleta LTER Plots
- NMNHP Plots

Compiled by:  
Sevilleta LTER Center  
University of New Mexico  
July 1998

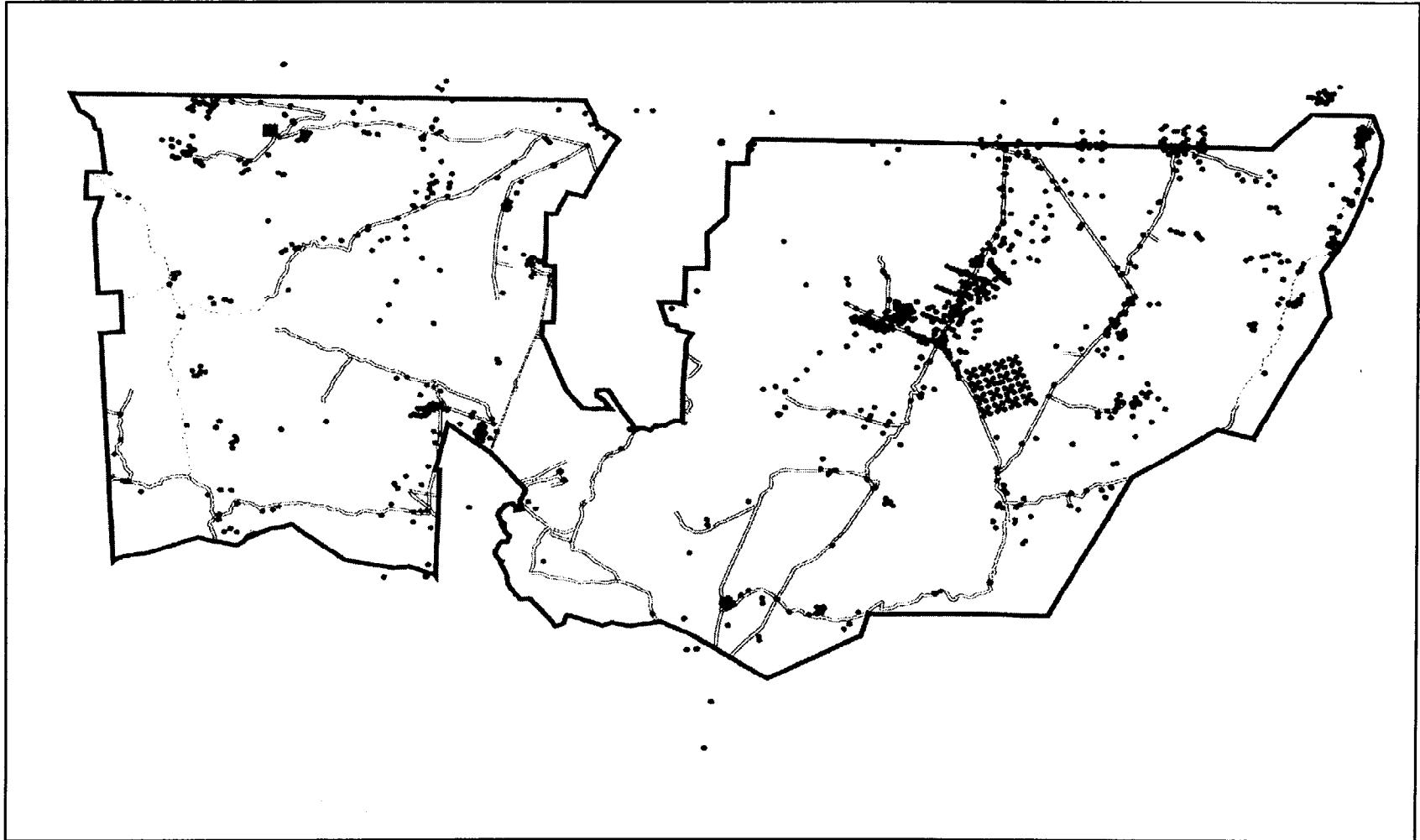
Based on USGS Quadrangles  
and GPS Survey Data

1927 North American Datum  
Lat/Long Decimal Degrees  
10,000-meter UTM Grid, Zone 13

## Vegetation Mapping Project Plots



**SEVILLETA NATIONAL WILDLIFE REFUGE**  
**SOCORRO COUNTY, NEW MEXICO**



**GPS Research Sites**



**Appendix H**  
**Sevilleta NWR**  
**Refuge Operating Needs (RONS)**



**Unfunded Operating Needs - Listed by Station Rank**  
**Sevilleta NWR**

Orgcode: 22522 Type: NWR State(s): NM District: New Mexico

**1 PUBLIC EDUCATION & RECREATION : Provide Visitor Services**

**MEASURES: 25000 new visitors will be served; 1500 existing visitors will be served; 100 % will support the top 6 priority public uses**

This project involves the construction of a new office/visitor center to replace current building and trailer used to house refuge operations. The office space is inadequate for current staff with no room for volunteers or visitor contact. Additionally the building is a health and safety issue due to age, outdated code violations and Hanta virus protection. Construction of a new office/visitor contact center is needed to meet all federally mandated safety, health, access and energy standards and to accommodate refuge staff and program needs. Contingent on a new office complex are associated costs (see notes below).

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....	1,500		
Operations: Personnel Costs.....	50	68	
Equipment Cost.....	10		
Facility Cost.....	300		
Services/Supplies.....	150		
Miscellaneous Costs.....	80	50	
<b>TOTAL Operations Cost.....</b>	<b>590</b>	<b>118</b>	<b>708</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....	0.5	\$23
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....	0.8	\$23
Maintenance/Equipment Operation.....	0.6	\$23
<b>TOTAL FTEs Needed.....</b>	<b>1.9</b>	<b>\$68</b>

**EMPHASIS:** 0% Critical health & safety - deferred maintenance; 100% Critical health & safety - capital improvement; 0% Critical resource protection - deferred maintenance; 0% Critical resource protection - capital improvement; 0% Critical mission - deferred maintenance; 0% Compliance & other deferred maintenance; 0% Other capital improvements

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
	20					20		60			100

**PLANNING LINKS:** Station Goal/Objective; Station CCP approved 10/97+

Draft 1998 CCP-Goal 6. Environmental Education and Public Outreach, Objective 1, Strategy 2, 3 and 4.

**PROJECT #:** .....98002.... **RANK - STATION:** .....1..... **DISTRICT:** .....999... **REGION:** .....999... **NATIONAL:** .....999...

**2 PLANNING & ADMINISTRATION : Comprehensive Conservation Planning**

**MEASURES:** 100 % of CCP will be completed; 1 stations will be covered

Development of a refuge habitat management plan (HMP) linked to national and international habitat priorities to be initiated in the year 2000. This will involve close coordination with the Long-term Ecological Research Station to incorporate existing data, determine data gaps and develop GIS/GPS products to support HMP's.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	30	67	
Equipment Cost.....	3		
Facility Cost.....			
Services/Supplies.....	3		
Miscellaneous Costs.....	1	1	
<b>TOTAL Operations Cost.....</b>	<b>37</b>	<b>68</b>	<b>105</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....	0.3	\$14
Biologists.....	1.0	\$46
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....	0.3	\$8
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>1.6</b>	<b>\$67</b>

**EMPHASIS:** 0% Critical health & safety; 100% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
				100							100

**PLANNING LINKS:** Station CCP approved 10/97+; Other Major Plan

1998 Draft CCP- Goal 2. Wildlife and Habitat Management. Objective 8. Strategy 6.

Year 2001 Service Habitat Management Priorities (White Papers)

**PROJECT #:** .....99020..... **RANK - STATION:** .....2..... **DISTRICT:** .....999..... **REGION:** .....999..... **NATIONAL:** .....999.....

**3 COORDINATION ACTIVITIES : Interagency Coordination**

**MEASURES:** 229000 acres will be affected; 50 % effort will be for uplands; 25 % effort will be for wetlands; 25 % effort will be for deepwater/riverine habitats

This project would establish a staff position to coordinate with the many entities conducting research and cooperative projects on refuge lands. The responsibilities of this position would also include the review of approximately 75 permits issued annually for research on refuge lands. Coordination with researchers/cooperators and evaluation of research permits is necessary to determine compatibility with the goals and objectives of the draft CCP and future habitat planning efforts. Additional responsibilities would include facilitating meetings of the refuge advisory team to review CCP accomplishments by the refuge and Service partners.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		31	
Equipment Cost.....	3		
Facility Cost.....			
Services/Supplies.....			
Miscellaneous Costs.....	1	1	
<b>TOTAL Operations Cost.....</b>	<b>4</b>	<b>32</b>	<b>36</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....	0.6	\$28
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....	0.1	\$3
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>0.7</b>	<b>\$31</b>

**EMPHASIS:** 50% Critical health & safety; 50% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
						100					100

**PLANNING LINKS:** Station CCP approved 10/97+

1998 Draft CCP - Goal 10. Interagency Coordination. Goal 3. Research, Objective 1, Strategy 2, Objectives 2, 3, and 4.

**PROJECT #:** 98004 **RANK - STATION:** 3 **DISTRICT:** 999 **REGION:** 500 **NATIONAL:** 999



**4 RESOURCE PROTECTION : Law Enforcement**

**MEASURES: ; .5 miles of boundary posted/maintained; 1 sites will be better secured**

Current location of shooting range used for training law enforcement personnel is too close to refuge shop/office and research station creating a hazardous situation for visitors and refuge/research staff. This project involves relocating the range to a discrete area at a safe distance from the high use areas of the refuge headquarters. Relocation will involve clearing vegetation and leveling ground at an alternate site, fencing, the construction of barricades for targets and shelters for instructors/trainees and the construction of an all weather road to the site.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		11	
Equipment Cost.....	5		
Facility Cost.....			
Services/Supplies.....	10		
Miscellaneous Costs.....	3	1	
TOTAL Operations Cost.....	18	12	30

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	0.3	\$11
TOTAL FTEs Needed.....	0.3	\$11

**EMPHASIS:** 100% Critical health & safety; 0% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
	10	25	20			20	25				100

**PLANNING LINKS:** Station CCP approved 10/97+

Draft 1998 CCP- Goal 8. Land Protection and Acquisition, Objective 1, Strategy 1, and Goal 10. Interagency Coordination.

**PROJECT #:** 99001    **RANK - STATION:** 4    **DISTRICT:** 999    **REGION:** 999    **NATIONAL:** 999

**5 FISH & WILDLIFE MANAGEMENT : Reintroductions**

**MEASURES: 15 mammals will be released**

Approximately 15-20 Mexican gray wolves are in captivity at any time in preparation for release into the wild. It is necessary to be able to reach the pens during all times of the year for feeding and administering veterinary aid to the captive animals. The roads leading to the area are in very poor condition which poses a safety threat to Service personnel attending the wolves. This project proposes to upgrade the route (approximately 20 miles) to the pens to a safe, all weather condition.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		26	
Equipment Cost.....	40		
Facility Cost.....	30		
Services/Supplies.....	15	5	
Miscellaneous Costs.....	5	5	
<b>TOTAL Operations Cost.....</b>	<b>90</b>	<b>36</b>	<b>126</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	0.7	\$26
<b>TOTAL FTEs Needed.....</b>	<b>0.7</b>	<b>\$26</b>

**EMPHASIS:** 0% Critical health & safety - deferred maintenance; 0% Critical health & safety - capital improvement; 0% Critical resource protection - deferred maintenance; 0% Critical resource protection - capital improvement; 0% Critical mission - deferred maintenance; 0% Compliance & other deferred maintenance; 0% Other capital improvements

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
	100										100

**PLANNING LINKS:** Station CCP approved 10/97+

1998 Draft CCP- Goal 1. Threatened and Endangered Species, Objective 1, Strategy 3.

**PROJECT #:** ...99008... **RANK - STATION:** ...5... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...

**6 RESOURCE PROTECTION : Land Acquisition Support**

**MEASURES:** 1 tracts will be involved; 25 acres will be involved

Currently, the access road to the refuge is unpaved, requires passage through a narrow tunnel with impeded vision and "doubles back" from the main highway, Interstate 25. This situation poses a safety threat to the public driving to the refuge offices. By acquiring a private land tract along Interstate 25, the Service would be able to secure access to the refuge headquarters/ associated facilities and subsequently construct a direct, paved route from the highway.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....			
Equipment Cost.....			
Facility Cost.....	50		
Services/Supplies.....			
Miscellaneous Costs.....	10		
<b>TOTAL Operations Cost.....</b>	<b>60</b>		<b>60</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>		<b>\$0</b>

**EMPHASIS:** 0% Critical health & safety - deferred maintenance; 0% Critical health & safety - capital improvement; 0% Critical resource protection - deferred maintenance; 0% Critical resource protection - capital improvement; 0% Critical mission - deferred maintenance; 0% Compliance & other deferred maintenance; 0% Other capital improvements

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
						50		50			100

**PLANNING LINKS:** Station CCP approved 10/97+

1998 Draft CCP-Goal 6. Environmental Education and Public Outreach, Objective 1, Strategy 2, and Goal 8. Land Protection and Acquisition, Objective 2, Strategy 3.

**PROJECT #:** .....98003..... **RANK - STATION:** .....6..... **DISTRICT:** .....999..... **REGION:** .....38..... **NATIONAL:** .....999.....

**7 PUBLIC EDUCATION & RECREATION : Provide Visitor Services**

**MEASURES:** 25000 new visitors will be served; 1500 existing visitors will be served; 80 % will support the top 6 priority public uses; 20 % will support non-priority public uses

Approximately .5 miles of gravel road lead from Interstate 25 to the refuge office. For the safety of visitors to refuge headquarters, this project proposes to pave this section of the road. The grade of the road is dangerous for drivers with minimal experience on gravel roads.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		5	
Equipment Cost.....	5		
Facility Cost.....	30		
Services/Supplies.....	5	5	
Miscellaneous Costs.....	5	5	
<b>TOTAL Operations Cost.....</b>	<b>45</b>	<b>15</b>	<b>60</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....	0.1	\$5
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>0.1</b>	<b>\$5</b>

**EMPHASIS:** 0% Critical health & safety - deferred maintenance; 0% Critical health & safety - capital improvement; 0% Critical resource protection - deferred maintenance; 0% Critical resource protection - capital improvement; 0% Critical mission - deferred maintenance; 0% Compliance & other deferred maintenance; 0% Other capital improvements

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
								100			100

**PLANNING LINKS:** Station CCP approved 10/97+

1998 Draft CCP- Goal 6. Environmental Education and Public Outreach, Objective 1, Strategy 1.

**PROJECT #:** ...99006... **RANK - STATION:** ...7... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...

**8 PUBLIC EDUCATION & RECREATION : Provide Visitor Services**

**MEASURES:** 2500 new visitors will be served; 800 existing visitors will be served; 100 % will support the top 6 priority public uses

With the expanding public education and public use programs, it will be necessary to provide visitors with restroom facilities that can be moved to various sites. The refuge already has research crews stationed at remote areas of the refuge for long periods of time. Additionally, Service personnel attend the wolf site on a daily basis and require restroom facilities. Future programs include open houses, celebrations, various refuge week activities, and outdoor classrooms. This project proposes to acquire 6 portable restrooms to be used in remote areas for those activities.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....			
Equipment Cost.....			
Facility Cost.....	20		
Services/Supplies.....			
Miscellaneous Costs.....	1	1	
TOTAL Operations Cost.....	21	1	22

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....		\$0
TOTAL FTEs Needed.....		\$0

**EMPHASIS:** 0% Critical health & safety - deferred maintenance; 0% Critical health & safety - capital improvement; 0% Critical resource protection - deferred maintenance; 0% Critical resource protection - capital improvement; 0% Critical mission - deferred maintenance; 0% Compliance & other deferred maintenance; 0% Other capital improvements

OUTCOMES*:	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
				20				40		40	100

**PLANNING LINKS:** Station CCP approved 10/97+; Other Major Plan

1998 Draft CCP- Goal. Compatibility and Public Use. Objective 1, Strategy 2 and 3. Goal 6. Environmental Education and Public Outreach. Objective 1. Strategy 3 and 4.

Year 2001 Service Public Use Priority Recommendations (White Papers)

**PROJECT #:** .....99015..... **RANK - STATION:** .....8..... **DISTRICT:** .....999... **REGION:** .....999... **NATIONAL:** .....999...

**10 RESOURCE PROTECTION : Water Rights Management**

**MEASURES:** 100 % effort will be for identification

This project proposes to develop a water management plan in a joint effort with New Mexico Game and Fish Game for the La Joya Management Area and the adjoining refuge wetlands. The program involves determining water needs to maintain wetland acres, securing the use of Rio Grande water rights to restore riparian areas and maintain wetland habitats, develop water delivery/pass through strategies to attain desired water levels conducive to the production of quality wetland habitat components. A coordinated water management plan is necessary to ensure the success of Middle Rio Grande River riparian/wetland restoration efforts.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	10	68	
Equipment Cost.....	10		
Facility Cost.....			
Services/Supplies.....	3		
Miscellaneous Costs.....	3		
<b>TOTAL Operations Cost.....</b>	<b>26</b>	<b>68</b>	<b>94</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....	0.5	\$23
Biologists.....	0.3	\$14
Resource Specialists.....	0.5	\$28
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....	0.1	\$3
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>1.4</b>	<b>\$68</b>

**EMPHASIS:** 0% Critical health & safety; 80% Critical resource protection; 20% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
		40	40	10					10		100

**PLANNING LINKS:** Station CCP approved 10/97+; FWS Ecosystem Goal/Plan; Other Major Plan

1998 Draft CCP- Goal 2. Wildlife and Habitat Management. Objective 2. Strategy 1,2,3,8,9,10, and 11.

Objectives of the Middle Rio Grande Waterfowl Management Plan

Middle Rio Grande Ecosystem: Bosque Biological Management Plan- recommendations for hydrology and aquatic resources.

**PROJECT #:** .....99016..... **RANK - STATION:** ....10.... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...

**11 HABITAT MANAGEMENT : Water Level Management**

**MEASURES:** 90 new acres will be managed; 2 new units will be managed; 200 existing acres will be managed better

Implementation of the water management plan would include manipulation of timing, duration and depth of water in units to produce desired wetland habitat components, monitoring aquatic plant/invertebrate diversity, water quality and waterfowl/marsh bird responses to water management strategies. Implementation of this plan will result in restoring sections of the middle Rio Grande riparian ecosystem, restoring and enhancing quality waterfowl habitat and reducing the potential for depredation of private lands by snow geese and other waterfowl.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	19	19	
Equipment Cost.....	15		
Facility Cost.....			
Services/Supplies.....			
Miscellaneous Costs.....	1	1	
<b>TOTAL Operations Cost.....</b>	<b>35</b>	<b>20</b>	<b>55</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....	0.3	\$11
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	0.2	\$8
<b>TOTAL FTEs Needed.....</b>	<b>0.5</b>	<b>\$19</b>

**EMPHASIS:** 0% Critical health & safety; 50% Critical resource protection; 50% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
		40	25	10					25		100

**PLANNING LINKS:** Station CCP approved 10/97+; Other Major Plan; FWS Ecosystem Goal/Plan

1998 Draft CCP- Goal 2. Wildlife and Habitat Management. Objective 2. Strategy 1,2,3,8,9, and 10.

Objectives of the Middle Rio Grande Waterfowl Management Plan

Middle Rio Grande Ecosystem: Bosque Biological Management Plan- recommendations for hydrology and aquatic resources.

**PROJECT #:** ...99017... **RANK - STATION:** ...11... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...

**12 HABITAT MANAGEMENT : Pest Plant Control**

**MEASURES:** 150 acres will be treated; 150 acres infested by target species; 20 acres will be treated chemically; 130 acres will be treated mechanically

Exotic vegetation has invaded the riparian areas along the middle Rio Grande River and its tributaries. The native cottonwood forests along the river ("the Bosque") are limited as a result of altered flood plain dynamics and the inability for native seed germination. This project involves mechanically and chemically removing exotic vegetation from section of the middle Rio Grande River and 2 tributaries within refuge boundaries (Rio Puerco, Rio Salado). Approximately 150 acres will be cleared. Willow and cottonwoods will be pole planted to restore native riparian habitat and associated wildlife populations.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	14	47	
Equipment Cost.....	70		
Facility Cost.....			
Services/Supplies.....	15	5	
Miscellaneous Costs.....	2	1	
<b>TOTAL Operations Cost.....</b>	<b>101</b>	<b>53</b>	<b>154</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	1.2	\$47
<b>TOTAL FTEs Needed.....</b>	<b>1.2</b>	<b>\$47</b>

**EMPHASIS:** 0% Critical health & safety; 80% Critical resource protection; 20% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
	5			85			10				100

**PLANNING LINKS:** Station CCP approved 10/97+; FWS Ecosystem Goal/Plan; Other Major Plan

- \*1998 Draft CCP: Goal 2. Wildlife and Habitat Management, Objectives 1,2,3,6,8,9, and 10.
- \*Middle Rio Grande Ecosystem: Bosque Biological Plan- management recommendations for hydrology, aquatic and terrestrial resources.
- \*Rio Grande Waterfowl Management Plan

**PROJECT #:** .....98602.... **RANK - STATION:** ....12.... **DISTRICT:** ...999.. **REGION:** 1998 **NATIONAL:** ...999..



**13 HABITAT RESTORATION : Wetland Restoration**

**MEASURES:** 150 refuge acres will be restored

As part of a joint effort with the Bureau of Reclamation, this project proposes to prepared areas along the middle Rio Grande River that have had exotic vegetation removed (RONS #98602) for impounding water and planting native riparian vegetation. This will involve leveling sections of the landscape, constructing impoundments, installing water control structures to move drainwater from Canal 7 into adjacent river flood plain areas and producing a landscape elevation and soil salinity map of the area necessary for success in re-vegetation efforts. Native willows and cottonwoods will be pole planted in suitable areas.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	5	84	
Equipment Cost.....	60		
Facility Cost.....			
Services/Supplies.....	10	5	
Miscellaneous Costs.....	10	10	
<b>TOTAL Operations Cost.....</b>	<b>85</b>	<b>99</b>	<b>184</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....	0.5	\$23
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	1.6	\$61
<b>TOTAL FTEs Needed.....</b>	<b>2.1</b>	<b>\$84</b>

**EMPHASIS:** 0% Critical health & safety; 73% Critical resource protection; 25% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WE	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
		10	15	40					35		100

**PLANNING LINKS:** Station CCP approved 10/97+; FWS Ecosystem Goal/Plan

1998 Draft CCP- Goal 2. Wildlife and Habitat Management, Objectives 1,2,3,6,8,9,10, and 11.

Middle Rio Grande Ecosystem: Bosque Biological Plan- management recommendations for aquatic and hydrologic resources

**PROJECT #:** ..99022... **RANK - STATION:** ...13... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...

**14 PUBLIC EDUCATION & RECREATION : Provide Visitor Services**

**MEASURES: 25000 new visitors will be served; 1500 existing visitors will be served; 80 % will support the top 6 priority public uses; 20 % will support non-priority public uses**

The Sevilleta NWR is located within 60 miles of Albuquerque (.5 million population) and along a major interstate highway. Logistically, it is ideally located to encourage visitation and provide the public with information on the refuge programs, the mission and facilities of the Service in Region 2. Contingent on construction of new headquarters, the development of visitor services would be essential. These would include interpretive and interactive displays on the endangered Mexican gray wolf, silvery minnow and willow flycatcher, the area's ecosystems and archaeology, and the long term environmental research station programs.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	50	73	
Equipment Cost.....	20		
Facility Cost.....	110		
Services/Supplies.....	40		
Miscellaneous Costs.....			
<b>TOTAL Operations Cost.....</b>	<b>220</b>	<b>73</b>	<b>293</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....	0.5	\$23
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....	0.8	\$35
Law Enforcement.....		\$0
Clerical/Administrative.....	0.5	\$15
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>1.8</b>	<b>\$73</b>

**EMPHASIS:** 0% Critical health & safety - deferred maintenance; 0% Critical health & safety - capital improvement; 0% Critical resource protection - deferred maintenance; 0% Critical resource protection - capital improvement; 0% Critical mission - deferred maintenance; 0% Compliance & other deferred maintenance; 0% Other capital improvements

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
	15					5		80			100

**PLANNING LINKS:** Station CCP approved 10/97+; FWS Ecosystem Goal/Plan; Other Major Plan

Draft 1998 CCP -Goal 6. Environmental Education and Public Outreach, Objectives 1, Strategies 1-4.

Year 2001 National Public Use Program Priorities (white papers)

**PROJECT #:** .....99002..... **RANK - STATION:** ....14.... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...

**15 MONITORING & STUDIES : Surveys & Censuses**

**MEASURES: 6 wildlife surveys will be conducted; 6 habitat surveys will be conducted**

Monitor passerine birds to determine diversity and density of bird species breeding, migrating and resident in major habitat areas of the refuge. One breeding bird route has been delineated for the refuge and this will be surveyed annually as part of the biological program.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	12	23	
Equipment Cost.....	1		
Facility Cost.....			
Services/Supplies.....			
Miscellaneous Costs.....	2	2	
<b>TOTAL Operations Cost.....</b>	<b>15</b>	<b>25</b>	<b>40</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....	0.8	\$23
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>0.8</b>	<b>\$23</b>

**EMPHASIS:** 0% Critical health & safety; 100% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
			80	20							100

**PLANNING LINKS:** FWS Ecosystem Goal/Plan; Station CCP approved 10/97+; Other Major Plan  
 1998 Draft CCP: Goal 2. Wildlife and Habitat Management, Objective 2, Strategy 4.  
 Middle Rio Grande Ecosystem: Biological Plan -recommendations for monitoring and research  
 Development of Habitat Management Plans

**PROJECT #:** 98001 **RANK - STATION:** 15 **DISTRICT:** 999 **REGION:** 432 **NATIONAL:** 999

**16 RESOURCE PROTECTION : Land Acquisition Support**

**MEASURES: 5 tracts will be involved; 200 acres will be involved**

Several areas of the refuge are in boundary disputes with adjacent landowners. This project involves a survey of these areas and correction of the fence line with 4 stand wire, metal fence posts. Several areas are overgrown with exotic vegetation and will require the removal of salt cedar in order to correct the fence line. Approximately 40 miles of the refuge boundary needs to be surveyed and fenced.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		28	
Equipment Cost.....	40		
Facility Cost.....			
Services/Supplies.....	90	90	
Miscellaneous Costs.....	1	1	
<b>TOTAL Operations Cost.....</b>	<b>131</b>	<b>119</b>	<b>250</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....	0.1	\$5
Biologists.....		\$0
Resource Specialists.....	0.1	\$5
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	0.5	\$19
<b>TOTAL FTEs Needed.....</b>	<b>0.7</b>	<b>\$28</b>

**EMPHASIS:** 0% Critical health & safety; 100% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
				50		50					100

**PLANNING LINKS:** Station CCP approved 10/97+

1998 Draft CCP- Goal 8. Land Protection and Acquisition. Objectives 1, Strategy 2-5.

**PROJECT #:** .....99013..... **RANK - STATION:** ....16... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...

**17 FISH & WILDLIFE MANAGEMENT : Reintroductions**

**MEASURES: ; 100 birds will be released**

In an effort to determine potential habitats to establish aplomado falcons in former historic ranges, this study will investigate components of grassland habitats on the refuge and suitable off refuge lands. Components of current aplomado falcon territories in Mexico will be compared statistically to potential habitats in the U.S. This will involve vegetation surveys of grassland habitats, and inventories of grassland bird populations for prey bases at potential reintroduction sites. This project also involves coordination with NM Game & Fish and other agencies in recovery efforts for the falcon.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	15	19	
Equipment Cost.....	10		
Facility Cost.....			
Services/Supplies.....	2	1	
Miscellaneous Costs.....	2	1	
<b>TOTAL Operations Cost.....</b>	<b>29</b>	<b>21</b>	<b>50</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....	0.5	\$19
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>0.5</b>	<b>\$19</b>

**EMPHASIS:** 0% Critical health & safety; 50% Critical resource protection; 50% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
	100										100

**PLANNING LINKS:** Other Major Plan; Station CCP approved 10/97+

1998 Draft CCP- Goal 1. Threatened and Endangered Species. Objective 4. Strategy 1.

Aplomado Falcon Recovery Plan

**PROJECT #:** .....99021..... **RANK - STATION:** .....17..... **DISTRICT:** .....999..... **REGION:** .....999..... **NATIONAL:** .....999.....

**18 RESOURCE PROTECTION : Cultural Resource Management**

**MEASURES:** 20 investigations will be conducted; 8 sites will be documented

Several construction and habitat management projects will be implemented on refuge lands. Archaeological surveys are necessary for all construction sites ( visitor center, RV area, trailer pads, parking areas, gun range relocation), boundary disputes and habitat restoration projects on refuge lands. This project is necessary to meet the requirements of the Archaeological Resource Protection Act.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		26	
Equipment Cost.....	8		
Facility Cost.....			
Services/Supplies.....	2	2	
Miscellaneous Costs.....	1	1	
<b>TOTAL Operations Cost.....</b>	<b>11</b>	<b>29</b>	<b>40</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....	0.5	\$23
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....	0.1	\$3
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>0.6</b>	<b>\$26</b>

**EMPHASIS:** 0% Critical health & safety; 100% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
						100					100

**PLANNING LINKS:** Station CCP approved 10/97+; Legal Mandate

1998 Draft CCP- Goal 7. Cultural Resource Management, Objective 1. Strategy 3.

Archeological Resource Protection Act

**PROJECT #:** .....99012.... **RANK - STATION:** ....18.... **DISTRICT:** .....999... **REGION:** .....999.. **NATIONAL:** .....999..

**19 HABITAT RESTORATION : Upland Restoration**

**MEASURES:** 20 refuge acres will be restored

Approximately 18 seep springs are located on refuge lands. These springs fill with silt and the encroachment of vegetation. Silt, cattails, other emergent vegetation are to be cleared out of the seep springs to restore the hydrology and allow water to flow in these upland areas, arroyos, and washes. Debris, brush, salt cedars and other exotics will be removed from the surrounding area. These springs provide natural watering areas for resident mammals, and restore native habitat for migrating and nesting birds. Approximately 20 acres of native wildlife habitat will be restored.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	20	20	
Equipment Cost.....	2		
Facility Cost.....			
Services/Supplies.....	1		
Miscellaneous Costs.....	1		
<b>TOTAL Operations Cost.....</b>	<b>24</b>	<b>20</b>	<b>44</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....	0.3	\$9
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	0.3	\$11
<b>TOTAL FTEs Needed.....</b>	<b>0.6</b>	<b>\$20</b>

**EMPHASIS:** 0% Critical health & safety; 100% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
			30	30			40				100

**PLANNING LINKS:** FWS Ecosystem Goal/Plan; Station CCP approved 10/97+

1998 Draft CCP - Goal 2. Wildlife and Habitat Management, Objectives 1-10

Middle Rio Grande Ecosystem Plan: Bosque Biological Management Recommendations for hydrology, aquatic and terrestrial resources.

**PROJECT #:** ....98006... **RANK - STATION:** ...19... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...

**20 PUBLIC EDUCATION & RECREATION : Outreach**

**MEASURES:** 2000 participants will be at group presentations; 2500 people will view off-site exhibits; 45 news releases will be issued; 30 TV or radio spots will be developed; 5 other special events will be hosted

The Sevilleta NWR is in the process of developing a "friends group" and a more extensive volunteer program to assist with education programs and public outreach activities. These efforts are to gain public recognition and support of the refuge, it's mission and programs. To conduct off site education, the refuge would like to develop a portable display panel, acquire an exhibit tent, and develop an informational kiosk about the refuge and the Service at 2 rest stops along the Interstate near the refuge headquarters.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	10	57	
Equipment Cost.....	20		
Facility Cost.....			
Services/Supplies.....	1		
Miscellaneous Costs.....	1	1	
<b>TOTAL Operations Cost.....</b>	<b>32</b>	<b>58</b>	<b>90</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....	0.3	\$14
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....	0.8	\$35
Law Enforcement.....		\$0
Clerical/Administrative.....	0.3	\$9
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>1.4</b>	<b>\$57</b>

**EMPHASIS:** 0% Critical health & safety; 50% Critical resource protection; 50% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	<u>ES</u>	<u>WF</u>	<u>OMB</u>	<u>HEC</u>	IAF	<u>SDA</u>	<u>RW</u>	<u>PED</u>	FAR	PRC	<u>TOT</u>
	25	5	5	5		5	5	50			100

**PLANNING LINKS:** Station CCP approved 10/97+; Other Major Plan

1998 draft CCP: Goals 6. Environmental Education and Public Outreach- Objective 1, Strategies 4 and 5.

Year 2001 National Public Use Plan Priorities (white papers)

**PROJECT #:** .....99004..... **RANK - STATION:** ...20... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...



**21 RESOURCE PROTECTION : Cultural Resource Management**

**MEASURES:** ; 30 sites will be documented

The development of a national cultural resource overview assessing the archaeological inventory of refuge lands is integral in the planning and management of these lands. It is necessary for the implementation of the refuge CCP and future HMP's to assess what is known of the archaeology of the area, and necessary methods to protect sensitive areas.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		26	
Equipment Cost.....	5		
Facility Cost.....			
Services/Supplies.....	5		
Miscellaneous Costs.....	1		
<b>TOTAL Operations Cost.....</b>	<b>11</b>	<b>26</b>	<b>37</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....	0.5	\$23
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....	0.1	\$3
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>0.6</b>	<b>\$26</b>

**EMPHASIS:** 0% Critical health & safety; 100% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
						100					100

**PLANNING LINKS:** Station CCP approved 10/97+

1998 Draft CCP- Goal 7. Cultural Resource Management, Objective 1, Strategy 1 and 2.

**PROJECT #:** ...99010... **RANK - STATION:** ...21... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...

**22 RESOURCE PROTECTION : Land Acquisition Support**

**MEASURES:** 5 tracts will be involved; 500 acres will be involved

Development of a priority plan for refuge land acquisitions targeting areas of conservation concern such as riparian areas, sensitive biological or archaeological sites and private inholdings or lands strategically located near existing refuge boundaries. When the refuge was established 25 years ago, many of the original boundaries were never surveyed for the land transaction.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		23	
Equipment Cost.....	10		
Facility Cost.....			
Services/Supplies.....	10		
Miscellaneous Costs.....	1	1	
<b>TOTAL Operations Cost.....</b>	<b>21</b>	<b>24</b>	<b>45</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....	0.5	\$23
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>0.5</b>	<b>\$23</b>

**EMPHASIS:** 0% Critical health & safety; 80% Critical resource protection; 20% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
				60		40					100

**PLANNING LINKS:** Station CCP approved 10/97+

1998 Draft CCP- Goal 8. Land Protection and Acquisition. Objective 1. Strategy 4. Goal 7. Cultural Resource Management. Objective 1. Strategy 4.

**PROJECT #:** .....99018..... **RANK - STATION:** .....22..... **DISTRICT:** .....999..... **REGION:** .....999..... **NATIONAL:** .....999.....

**23 COORDINATION ACTIVITIES : Interagency Coordination**

**MEASURES:** 300 acres will be affected; 50 % effort will be for wetlands; 50 % effort will be for deepwater/riverine habitats

Coordination of federal, state and private entities for partnerships in the development of a detailed grant proposal for the North American Wetland Conservation Act to restore approximately 300 acres of riparian habitat along the middle Rio Grande River. This section of the river corridor has been dramatically affected by human activities. In order to decrease fragmentation and protect, enhance and restore riparian and wetland areas, new partnerships must be explored for a coordinated approach to a large scale habitat restoration project.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		40	
Equipment Cost.....	3		
Facility Cost.....			
Services/Supplies.....	5		
Miscellaneous Costs.....	2		
<b>TOTAL Operations Cost.....</b>	<b>10</b>	<b>40</b>	<b>50</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....	0.3	\$14
Biologists.....	0.5	\$23
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....	0.1	\$3
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>0.9</b>	<b>\$40</b>

**EMPHASIS:** 0% Critical health & safety; 100% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
				80					20		100

**PLANNING LINKS:** Station CCP approved 10/97+; FWS Ecosystem Goal/Plan

1998 Draft CCP- Goal 2. Wildlife and Habitat Management, Objective 11.

Middle Rio Grande Ecosystem- Bosque Biological Plan- management recommendations for hydrology, aquatic and terrestrial resources.

**PROJECT #:** .....99019..... **RANK - STATION:** .....23..... **DISTRICT:** .....999..... **REGION:** .....999..... **NATIONAL:** .....999.....

**24 MONITORING & STUDIES : Surveys & Censuses**

**MEASURES: 6 wildlife surveys will be conducted; 6 habitat surveys will be conducted**

Investigate the population status, recruitment and movements of deer, elk and antelope occurring on the refuge to determine use of major habitat types regarding the availability of forage base and species competition, the value of natural vs. man-made water areas. This information is vital to determine the need for habitat restoration and to evaluate the results of various land management practices.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		12	
Equipment Cost.....	2		
Facility Cost.....			
Services/Supplies.....	10	8	
Miscellaneous Costs.....	5	3	
<b>TOTAL Operations Cost.....</b>	<b>17</b>	<b>23</b>	<b>40</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....	0.4	\$12
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>0.4</b>	<b>\$12</b>

**EMPHASIS:** 0% Critical health & safety; 80% Critical resource protection; 20% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
				20			80				100

**PLANNING LINKS:** Station CCP approved 10/97+; FWS Ecosystem Goal/Plan; Other Major Plan

1998 Draft CCP: Goal 2. Wildlife and Habitat Management, Objective 5.  
Strategy 5. Goal 3. Research, Objective 1.

Middle Rio Grande Ecosystem: Biological Plan -recommendations for terrestrial resources  
Development of Habitat Management Plans

**PROJECT #:** .....97103..... **RANK - STATION:** ....24.... **DISTRICT:** ...999... **REGION:** ....81.... **NATIONAL:** ...999...

**25 HABITAT RESTORATION : Wetland Restoration**

**MEASURES:** 125 refuge acres will be restored

Exotic vegetation along a section of the refuge adjacent to the middle Rio Grande River has been removed, and water control structures installed to infiltrate the area with water diversions to restore approximately 90 acres of wetland habitat and 35 acres of riparian habitat. Phase II of this project includes subsequent spraying with herbicides to remove resprouting exotics, constructing impoundment dikes, rip rap, mow dikes, disc for moist soil management, plant food plots, and pole planting willows and sapling cottonwoods along water edges. This will provide habitat for migrating waterfowl and nesting bird species including the southwestern Willow flycatcher.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		53	
Equipment Cost.....	20		
Facility Cost.....			
Services/Supplies.....	10	10	
Miscellaneous Costs.....	1	1	
<b>TOTAL Operations Cost.....</b>	<b>31</b>	<b>64</b>	<b>95</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....	0.3	\$14
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	1.0	\$39
<b>TOTAL FTEs Needed.....</b>	<b>1.3</b>	<b>\$53</b>

**EMPHASIS:** 0% Critical health & safety; 80% Critical resource protection; 20% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
	5	25	20	35						5	90

**PLANNING LINKS:** FWS Ecosystem Goal/Plan; Station CCP approved 10/97+

1998 Draft CCP: Goal 2. Wildlife and Habitat Management, Objectives 1,2,3,6,8,9 and 10.

Middle Rio Grande Ecosystem: Bosque Biological Management Recommendations for hydrology, aquatic resources and terrestrial resources.

**PROJECT #:** ...98005... **RANK - STATION:** ...25... **DISTRICT:** ...999... **REGION:** ...23... **NATIONAL:** ...999...

**26 PUBLIC EDUCATION & RECREATION : Provide Visitor Services**

**MEASURES:** 3000 new visitors will be served; 100 % will support the top 6 priority public uses

The refuge has restored and enhanced a 90 acres wetland/riparian area in cooperation with several other partners. This area is to be further developed as one of the few public use areas on the refuge with a bird observation and hunting areas, parking and nature trail. This wetland is within 3 miles of Interstate 25 and the refuge headquarters which makes it a potentially excellent public use area logistically. This project proposes to upgrade 3 miles of road used by the public to drive to the Unit A public use area.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		15	
Equipment Cost.....	10		
Facility Cost.....			
Services/Supplies.....	10	3	
Miscellaneous Costs.....	1	1	
<b>TOTAL Operations Cost.....</b>	<b>21</b>	<b>19</b>	<b>40</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	0.4	\$15
<b>TOTAL FTEs Needed.....</b>	<b>0.4</b>	<b>\$15</b>

**EMPHASIS:** 100% Critical health & safety; 0% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
										100	100

**PLANNING LINKS:** Station CCP approved 10/97+

1998 Draft CCP- Goal 5. Compatibility and Public Use, Objective 1, Strategy 2 and 3.

**PROJECT #:** ...99007... **RANK - STATION:** ...26... **DISTRICT:** ...999... **REGION:** ...999... **NATIONAL:** ...999...

**PUBLIC EDUCATION & RECREATION : Provide Visitor Services**

**MEASURES:** 2500 new visitors will be served; 90 % will support the top 6 priority public uses; 10 % will support non-priority public uses

During 1998, 90 acres of wetlands and 30 acres of riparian habitat were restored along the middle Rio Grande River. This area provides habitat for migrating waterfowl, cranes and neotropical birds as well as nesting habitat for other birds. The proximity of this site to the refuge headquarters and a major highway provides quick access for the public to visit the area and view wildlife. This project proposes for the refuge to better serve the public by providing several interpretive signs, a short nature trail, parking area, access road improvement, portable restroom and universally accessible bird observation and hunting areas

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....	10	29	
Equipment Cost.....	4		
Facility Cost.....	20		
Services/Supplies.....	4	4	
Miscellaneous Costs.....	2	1	
<b>TOTAL Operations Cost.....</b>	<b>40</b>	<b>34</b>	<b>74</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....	0.3	\$14
Law Enforcement.....	0.1	\$6
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	0.3	\$9
<b>TOTAL FTEs Needed.....</b>	<b>0.7</b>	<b>\$29</b>

**EMPHASIS:** 0% Critical health & safety - deferred maintenance; 0% Critical health & safety - capital improvement; 0% Critical resource protection - deferred maintenance; 0% Critical resource protection - capital improvement; 0% Critical mission - deferred maintenance; 0% Compliance & other deferred maintenance; 0% Other capital improvements

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
								30		70	100

**PLANNING LINKS:** Station CCP approved 10/97+; FWS Ecosystem Goal/Plan; Other Major Plan

Draft 1998 CCP: Goal 5. Compatibility/Public Use, Objective 1, Strategy 2.

Middle Rio Grande Waterfowl Management Plan

Year 2001 National Public Use Priorities Plan (White Papers)

**PROJECT #:** .....99003..... **RANK - STATION:** .....27..... **DISTRICT:** .....999... **REGION:** .....999... **NATIONAL:** .....999...

**28 RESOURCE PROTECTION : Cultural Resource Management**

**MEASURES: 15 investigations will be conducted; 5 sites will be documented**

The Sevilleta National Wildlife Refuge and adjacent areas contain many significant historic and prehistoric archaeological sites. This project proposed to acquire funding to provide detailed documentation and nomination of these sites (such as La Huerta and San Acacia Pueblo) to the National Register for national recognition of the significance of the area and the protection of these areas for perpetuity.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		23	
Equipment Cost.....			
Facility Cost.....			
Services/Supplies.....	1		
Miscellaneous Costs.....	1		
<b>TOTAL Operations Cost.....</b>	<b>2</b>	<b>23</b>	<b>25</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....	0.5	\$23
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>	<b>0.5</b>	<b>\$23</b>

**EMPHASIS:** 0% Critical health & safety; 100% Critical resource protection; 0% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
						100					100

**PLANNING LINKS:** Station CCP approved 10/97+

1998 Draft CCP - Goal 7. Cultural Resource Management, Objective 1. Strategy 1 and 2.

**PROJECT #:** .....99011..... **RANK - STATION:** ....28... **DISTRICT:** ...999.. **REGION:** ...999.. **NATIONAL:** ...999..



**29 FISH & WILDLIFE MANAGEMENT : Reintroductions**

**MEASURES: 15 mammals will be released**

Currently 6 pens have been constructed to hold groups of wolves for the purposes of captive breeding. These pens do not have adequate soil substrate for the wolves to build dens for giving birth and to remove themselves from the heat. This project proposes to construct 2 breeding/birthing shelters in each pen for that purpose.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		9	
Equipment Cost.....	10		
Facility Cost.....	35		
Services/Supplies.....	2		
Miscellaneous Costs.....	3	1	
<b>TOTAL Operations Cost.....</b>	<b>50</b>	<b>10</b>	<b>60</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	0.3	\$9
<b>TOTAL FTEs Needed.....</b>	<b>0.3</b>	<b>\$9</b>

**EMPHASIS:** 0% Critical health & safety - deferred maintenance; 0% Critical health & safety - capital improvement; 0% Critical resource protection - deferred maintenance; 0% Critical resource protection - capital improvement; 0% Critical mission - deferred maintenance; 0% Compliance & other deferred maintenance; 0% Other capital improvements

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
	100										100

PLANNING LINKS: Station CCP approved 10/97+

1998 Draft CCP- Goal 1. Threatened and Endangered Species, Objective 1, Strategy 4.

**PROJECT #:** .....99009..... **RANK - STATION:** .....29..... **DISTRICT:** .....999..... **REGION:** .....999..... **NATIONAL:** .....999.....

**30 PUBLIC EDUCATION & RECREATION : Provide Visitor Services**

**MEASURES:** 2000 new visitors will be served; 150 existing visitors will be served; 100 % will support the top 6 priority public uses

San Lorenzo Canyon is a red rock canyon with several springs designated as a Bureau of Land Management (BLM) Special Management Area. It is located along the refuge's southwestern boundary. This canyon receives between 75-150 visitors annually using a primitive road with no facilities on a day use basis. Access into the canyon is provided by a county road which enters into the canyon and essentially becomes part of the sandy wash. This project proposes to improve the existing road, construct sections of the road out of the wash, resign the refuge boundaries to designate the area for public use, provide directional signs from I-25, and an interpretive sign for the area.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....		36	
Equipment Cost.....	30		
Facility Cost.....			
Services/Supplies.....	30		
Miscellaneous Costs.....	2	2	
<b>TOTAL Operations Cost.....</b>	<b>62</b>	<b>38</b>	<b>100</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....	0.3	\$11
Law Enforcement.....	0.1	\$6
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....	0.5	\$19
<b>TOTAL FTEs Needed.....</b>	<b>0.9</b>	<b>\$36</b>

**EMPHASIS:** 80% Critical health & safety; 0% Critical resource protection; 20% Critical mission; 0% Other important needs

<b>OUTCOMES*:</b>	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
								10		90	100

**PLANNING LINKS:** Other Major Plan; Station CCP approved 10/97+

1998 Draft CCP- Goal 5. Compatibility and Public Use. Objective 1, Strategy 3.

Year 2001 Public Use Priority Recommendations (White Papers)

**PROJECT #:** .....99014..... **RANK - STATION:** .....30..... **DISTRICT:** .....999..... **REGION:** .....999..... **NATIONAL:** .....999.....

**31 PLANNING & ADMINISTRATION : General Administration**

MEASURES: ; 12 ; 1

This project is to comply with the National Telecommunications and Information Administration to replace high band VHF radios with digital narrowband digital radios. This project will purchase 12 radios and one base station.

**ADDITIONAL FUNDS NEEDED (\$000):**

	One-Time	Recurring Base	First Year Need
Construction Costs.....			
Operations: Personnel Costs.....			
Equipment Cost.....	50		
Facility Cost.....			
Services/Supplies.....			
Miscellaneous Costs.....			
<b>TOTAL Operations Cost.....</b>	<b>50</b>		<b>50</b>

**ADDITIONAL PERMANENT STAFF NEEDED:**

	FTEs	Cost (\$000)
Managers.....		\$0
Biologists.....		\$0
Resource Specialists.....		\$0
Education/Recreation Staff.....		\$0
Law Enforcement.....		\$0
Clerical/Administrative.....		\$0
Maintenance/Equipment Operation.....		\$0
<b>TOTAL FTEs Needed.....</b>		<b>\$0</b>

EMPHASIS: 100% Critical health & safety; 0% Critical resource protection; 0% Critical mission; 0% Other important needs

OUTCOMES*:	ES	WF	OMB	HEC	IAF	SDA	RW	PED	FAR	PRC	TOT
	10	5	10	35		5	10	10	5	10	100

PLANNING LINKS: Legal Mandate

mandated by the National Telecommunications and Information Administration.

PROJECT #: ...28105... RANK - STATION: ...31... DISTRICT: ...999... REGION: ...1999... NATIONAL: ...999...



**Appendix I**  
**Warranty Deed**



WARRANTY DEED

THIS INDENTURE, made this 28<sup>th</sup> day of December, in the year of our Lord one thousand nine hundred and seventy-three, between THE NATURE CONSERVANCY, a non-profit corporation of the District of Columbia, hereinafter referred to as the Grantor, party of the first part, and THE UNITED STATES OF AMERICA, hereinafter referred to as the Grantee, party of the second part.

WITNESSETH, that the said party of the first part, for and in consideration of mutual benefits accruing to both parties, hereby grants with warranty covenants, unto the party of the second part and its assigns forever, all the following described parcels of land and real estate situate, lying and being in the County of Socorro and the State of New Mexico:

(Except as otherwise noted, all references to legal subdivisions within the exterior boundaries of the Sevilleta Grant do not refer to Federal or official surveys.)

TRACTS 10, 10-I, 10-II, 10-III, 10-IV, and 10-V, described below lying within the exterior boundaries of the Sevilleta Grant, as established by the United States Survey of said Grant and as confirmed by the United States Court of Private Land Claims in Cause No. 55, entitled "Felipe Padilla et al., v. The United States," on December 4, 1893, and patented by the United States of America to Carlos Gabaldon and others on February 8, 1907, filed for record in the office of the County Clerk of Socorro County, New Mexico, in Book 68, pages 101 and 102,

*from*  
*Campbell Family Foundation*  
*Lillian Campbell Knapp*  
*Francis*  
*B. H. Isaac*

TRACT (10):

That property known as the Sevilleta or Sevilleta De La Joya Grant, located in the County of Socorro and the State of New Mexico, more particularly described as follows:

Beginning at the Northwest corner of the Sevilleta Grant as established by the United States Survey of said Grant as confirmed by the United States Court of Private Land Claims in Cause No. 55 entitled "Felipe Padilla et al., v. The United States," on December 4, 1893, and patented by the United States of America, to Carlos Gabaldon and others on February 8, 1907, filed for record in the office of the County Clerk of Socorro County, New Mexico, in Book 68, pages 101 and 102, said place of beginning, according to subsequent surveys, being in Section 6, Township 2 North, Range 2 West, N. M. P. M.

Thence following the West boundary line of said Grant in a Southerly direction a distance of 12,234.0 feet, more or less, to the Northwest corner of a tract of land known as the E. E. Esquibel Tract, which point bears North 9°04' West 1,097.4 feet from the 11 Mile point on said West Grant line;

Thence South 74°30' East a distance of 1,500 feet;

Thence South 9°04' East a distance of 1,500 feet;

Thence South 74°30' East a distance of 3,000 feet the Northeast corner of a tract of land belonging to E. E. Esquibel;

Thence South 15°30' West a distance of 4,500 feet;

Thence North 74°30' West a distance of 4,500 feet to the West boundary line of said Grant;

Thence in a Southerly direction, following the said West Grant boundary line, a distance of 12,540.0 feet, more or less, to the Northwest corner of a tract of land belonging to Miguel Sarracino, which bears North 4°30' West 3,000.0 feet distance from the closing corner of the Grant line and Sections 5 and 8, Township 1 North, Range 2 West;

Thence North 85°30' East a distance of 3,000 feet;

Thence South 4°30' East 6,000 feet;

Thence South 85°30' West a distance of 3,000 feet to a point on said West Grant line;

Thence following the said West Grant line in a Southerly direction a distance of 34,520 feet, more or less, to the Southwest corner of said Grant;

Thence following the South Grant line in an Easterly direction a distance of 18,180.0 feet, more or less, to the Southwest corner of tract of land belonging to Herminio Padilla, said point being M. C. 30 on the South boundary of said Grant in Section 12, Township 1 South, Range 2 West, N. M. P. M.;

Thence North 32°55' West 1,030.0 feet;

Thence North 16°00' East 2,900 feet;

Thence North 57°00' East 2,903 feet;

Thence South 83°36' East 3,172 feet;

Thence South 49°21' East 6,072 feet;

Thence South 80°21' East 2,904 feet;

Thence South 3,432 feet to a point on the South Grant line, being M. C. 24;

Thence following said South boundary line in an Easterly direction to the Southwest corner of a tract of land known as the Jose Torres Tract, which point is 509.52 feet South and East along said Grant line from Mile Post 8;

Thence North 43°05' East 2,300.03 feet;

Thence South 58°30' East 6,632.1 feet to a point on the said South Grant line;

Thence Northerly direction, following said South Grant line, to the Southwest corner of a tract of land known as the Stapleton Tract, being Meander Corner 8 on said Grant line;



Thence North 15°39' East 3,520 feet to the Northwest corner of said tract;

Thence North 87°39' East 10,012.0 feet to the Northwest corner of tract of land known as the Conant Tract;

Thence North 89°20' East a distance of 12,087.10 feet to the Southwest corner of a tract of land conveyed by Thomas D. Campbell and wife to John W. Conant, on December 30, 1940, recorded in Book 127 Deeds, Socorro County, New Mexico, at page 542;

Thence North 26°31' East 21,862.0 feet;

Thence North 56°06' East 13,490.0 feet;

Thence East 5,570.2 feet to the East Grant boundary line and the closing corner on the North line of Section 30, Township 1 North, Range 4 East;

Thence North and East along the East Grant line a distance of 47,176.0 feet to a tract of land known as the J. J. Contreras Tract;

Thence North 10°40' West 515.0 feet;

Thence North 34°10' West 1,045.2 feet;

Thence North 15°00' West 1,462.8 feet to a point on the North boundary line of said Grant, which bears West 264.6 feet distant from the 32½ mile corner;

Thence following the North Grant line in a Westerly direction 18 miles, plus 5,100 feet, more or less, to the Rio Puerco;

Thence meandering Northwesterly along the line between the Belen and Sevilleta Grants in the Rio Puerco 7,556.0 feet, more or less, to a point 6,943.9 feet East of the intersection of the N. M. P. M. and the North line of the Sevilleta Grant;

Thence following the North Grant line in a Westerly direction 12 miles plus 4,514.00 feet, more or less, to the Northwest corner, the place of beginning.

EXCEPTING from the above-described lands the following:

BEGINNING at a point where the West line of the tract of land known as the Ascott Valley Land and Improvement Company Tract intersects the North boundary line of the Sevilleta Grant, whence the 11 Mile Corner on the North boundary of said Grant, bears West 10 chains (660 feet) distant;

Thence South 23°22' West 260.89 chains (17,218.74 feet);

Thence West 160 chains (10,560 feet);

Thence South 24°05' West 223.42 chains (14,745.72 feet); to the Southwest corner of said Ascott Tract;

Thence East 250 chains (16,500 feet);

Thence North  $21^{\circ}05'$  East 283.43 chains (18,705.72 feet);

Thence South  $76^{\circ}58'$  East to the closing corner with the West boundary line of a tract of land known as the Castillo Tract, deeded June 9, 1941, by Thomas D. Campbell to Teofilo G. Castillo;

Thence South and West along the West line of said Castillo Tract to its intersection with the boundary line of the Middle Rio Grande Conservancy District along the North of the East half of Section 30, Township 2 North, Range 1 East;

Thence West to the North quarter corner, of said Section 30;

Thence South along the West boundary of the Middle Rio Grande Conservancy District through the middle of Section 30 and the North half of Section 31, and continuing thence South to the intersection in the North half of Section 7, Township 1 North, Range 1 East, with the North boundary line of the tract of land conveyed on October 26, 1940, by Thomas D. Campbell and wife to the State Game Commission of New Mexico, recorded in Book 127, Deed Records, Socorro County, New Mexico, at page 522, which is the Northwest corner of said tract and bears South 560.30 feet distant from the South quarter corner Section 6, Township 1 North, Range 1 East;

Thence South 1,961.70 feet distant to Corner No. 2 of said tract;

Thence South  $21^{\circ}01'$  East 8,778 feet distant to Corner No. 3 of said tract, which is 500 feet distant East of section corner common to Sections 17, 18, 19 and 20, to Township 1 North, Range 1 East;

Thence South  $40^{\circ}03'$  East 3,366.20 feet distant to Corner No. 4, the Southeast corner of said tract;

Thence East 2,640.0 feet distant to the West boundary line of said Middle Rio Grande Conservancy District;

Thence South to the East Quarter Corner of Section 29, Township 1 North, Range 1 East;

Thence West one mile;

Thence South to the intersection with the North boundary line of the tract of land known as Bursum Company Tract described in deed from Thomas D. Campbell and wife to Bursum Company, recorded September 15, 1941, in Book 130, Deed Records, Socorro County, New Mexico, page 51;

Thence Northwesterly around said Bursum Company Tract and around that tract known as the Leandro Esquibel Tract, as shown by deed from Thomas D. Campbell to Leandro Esquibel dated September 16, 1940, recorded in Book 130, page 6, Socorro County, New Mexico, and also Northwesterly and around that tract of land

known as the E. E. Esquibel Tract, as shown by deed from Thomas D. Campbell to E. E. Esquibel under date of November 10, 1940, recorded in Book 127, Deed Records, Socorro County, New Mexico, at page 386;

Thence continuing around said tracts in an Easterly and Southerly direction to a point on the Southerly line of the said Leandro Esquibel Tract intersected by the dividing line between Sections 26 and 27 of Township 1 North, Range 1 West;

Thence South a distance of  $4\frac{1}{2}$  miles, more or less, to the South boundary line of the said Sevilleta Grant and the closing corner of the East line of Section 15, Township 1 South, Range 1 West;

Thence South and East along the South boundary of said Grant line to the Southeast corner of a tract of land known as the Arsenio Baca Tract, as described in deed from Thomas D. Campbell and wife to Arsenio Baca recorded on September 15, 1941, in Book 130, Deed Records, Socorro County, New Mexico, page 47, which is M. C. 16 on the South boundary of said Grant;

Thence North along the East side of said Arsenio Baca Tract a distance of 16,640 feet to the South boundary line of tract of land known as the Everheart Tract, as described in a deed from Thomas D. Campbell to T. B. Everheart under date of August 13, 1941;

Thence South  $77^{\circ}50'$  East a distance of 1,600 feet;

Thence North  $19^{\circ}10'$  East 3,322 feet to the intersection with the said Middle Rio Grande Conservancy District line, which is the base line;

Thence East 1,254 feet to the Southeast corner of Section 32, Township 1 North, Range 1 East;

Thence North one mile;

Thence East one mile;

Thence North 6,270 feet, more or less, to the South boundary of the tract of land known as the Jose I. Barcla Tract, as conveyed by Deed from Thomas D. Campbell and wife to Jose I. Barcla under date of August 29, 1941, recorded in Book 130, Deed Records, Socorro County, New Mexico, at page 44;

Thence East one mile;

Thence North along the East side of said Barcla Tract a distance of 13,315 feet to the Northeast corner of said tract;

Thence West 2,410.0 feet;

Thence North  $19^{\circ}40'$  West a distance of 4,557 feet;

Thence North  $63^{\circ}59'$  West 1,393.0 feet;

Thence South  $76^{\circ}17'$  West 1,744 feet, more or less, to the Middle Rio Grande Conservancy District line;

Thence North along said Conservancy District line 4,620'; thence East 1320' to the East one-quarter corner of Section 33, Township 2 North, Range 1 East;

Thence East 1,320 feet to the East quarter corner of said Section 33;

Thence North one-half mile; thence East one mile; thence North one mile; thence East one-half mile; thence North one-half mile; thence East one-half mile; thence North one mile; thence East one-half mile;

Thence North one-half mile to the half mile corner East from Station O on the North boundary of said Grant line;

Thence West along said Grant line a distance of  $3\frac{1}{2}$  miles, more or less, to the Rio Puerco; thence meandering in a Northwesterly direction along the Rio Puerco and the boundary of said Grants to its intersection with the South boundary line of the tract of land sometimes designated as that tract reserved for T. B. Catron in approximately the center of Section 8, Township 2 North, Range 1 East;

Thence West along said South line of said T. B. Catron Tract and the North line of the tract of the Ascott Valley Land and Improvement Company Tract a distance of 110.38 chains (7,285.08 feet), more or less;

Thence North  $23^{\circ}22'$  East a distance of 3,000.36 feet, more or less, to the North boundary line of said Sevilleta Grant;

Thence West along said Grant line to the point of beginning.

TRACT (10-I):

That land described in a warranty deed from Ascott Valley Land and Improvement Company to Campbell Farming Corporation dated May 28, 1958 and recorded June 9, 1958 in Book 199, pages 254-257 and further identified as "TRACT NO. ONE" or "Large Tract" containing 9,574.261 acres, more or less, and "TRACT NO. TWO" or "Small Tract" or T. B. Catron Tract, containing 425.739 acres, said two tracts containing in all, 10,000 acres, more or less.

TRACT (10-II):

That land described in an Administrator's Deed from Holm O. Bursum, Jr., Administrator to Campbell Farming Corporation dated July 27, 1959, and recorded in Book 127, pages 339-341 and is further identified as the "First Tract" or the H. O. Bursum 1,782.304-acre tract, near the Village of San Acacia.

TRACT (10-III):

That land described in a warranty deed from Doloritas Padilla, widow of Merino Padilla, deceased, dated November 20, 1949, and also described in a warranty deed from Adam Padilla, Isabel

Padilla and Elijo Padilla, heirs of Hermino Padilla, deceased, dated November 29, 1949, to Thomas D. Campbell, said land being also described in a quitclaim deed from Thomas D. Campbell and Bess B. Campbell, his wife, to Campbell Farming Corporation dated July 1, 1953, and being the same land described in Tax Deed 4664 dated January 8, 1948, and recorded February 4, 1948, in Book 147, page 305, said tract containing 1,170.73 acres, more or less.

TRACT (10-IV):

That land described as an EXCEPTION in a quitclaim deed from Campbell Farming Corporation to Campbell Family Foundation dated December 31, 1964, and recorded June 22, 1965, and is also the same land identified as the H. O. Bursum 2,930.946-acre tract described in an Administrator's Deed from Holm O. Bursum, Jr., Administrator, to Campbell Farming Corporation dated July 27, 1959, and recorded in Book 127, pages 339-341, containing 2,930.946 acres, more or less.

TRACT (10-V):

That land described as an EXCEPTION in a quitclaim deed from Campbell Farming Corporation to Campbell Family Foundation dated December 31, 1964, and recorded June 22, 1965, and is the same land described in a deed from Thomas D. Campbell to Pat Esquibel dated January 10, 1941, and containing 207.00 acres, more or less.

The above six tracts contain a net area of 220,200 acres, more or less.

The above described land is acquired for administration by the Secretary of the Interior, through the Bureau of Sport Fisheries and Wildlife.

EXCEPTING therefrom the North half of Sections 3 and 4, in Township 1 North, Range 1 East, and in the East half of the Southeast quarter of Section 33, all of Section 3, the Northwest quarter of Section 35, the West half of Section 26, and the Northwest diagonal half of the Northeast quarter of Section 26, and the Southeast quarter of Section 23, all in Township 2 North, Range 1 East, and

EXCEPTING these parcels lying within the limits of the Middle Rio Grande Conservancy District.

TO HAVE AND TO HOLD, the said premises above bargained and described, with the appurtenances, unto the said party of the second part, and its assigns forever.

SUBJECT to the following:

1. All reservations, restrictions, leases and easements of record and all rights-of-way and easements known to Grantee or apparent on the ground.
2. The Grantor also reserves unto itself, all mineral rights including oil, gas, coal, and all other minerals (including metallic, non-metallic industrial minerals and rocks), on and underlying the property, conveyed to the Grantor by the Campbell Family Foundation by deed dated December 29, 1973.

Bill Hildebrand

Dir. Refuge  
Twp. Plans  
864-4021  
NM 87831

3. The purpose of this donation is to preserve and enhance the integrity and the natural character of the ecosystems of the above property by creating a wildlife refuge managed as nearly as possible in its natural state, employing only those management tools and techniques that are consistent with the maintenance of a natural ecological process. In addition, it is the intent of the Grantor that the property not be subjected to commercial exploitation. The intent of the Grantor is that the land and the flora and fauna supported by it be managed to permit the natural ecological successions and processes typical of the area to prevail. The Grantor has therefore determined that administration of the area as a national wildlife refuge under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) would best meet its objectives and the public interest in the preservation and sound management of the Sevilleta Grant and the Grantee hereby agrees that the Sevilleta Grant shall be held and administered by it in perpetuity as a part of the National Wildlife Refuge System. Consistent with the regulations and policies of the National Wildlife Refuge System, and subject to review and approval of each research proposal by the Grantee in consultation with the Grantor, portions of the property will be made available to educational institutions and conservation organizations (such as Montana State University, University of North Dakota and the Smithsonian Institution) for scientific research and study. However, the Grantee's administration and management of the property as a unit of the National Wildlife Refuge System shall be limited by the following use regulations:

- a. The granted premises may be opened to regulated hunting only upon a finding and determination by the Grantee that such hunting will be compatible with the purposes for which the area is established and compatible with principles of sound wildlife management.
- b. The use of motorized vehicles by other than the Grantee's authorized employees, agents or independent contractors, shall not be permitted except upon roads and trails designated for public use by the Grantee.
- c. The Grantee shall not use pesticides, herbicides, or other biocides or noxious substances unless their use is dictated by (a) emergency situations, (b) requirements of law, or (c) paramount management considerations determined after consultation with the Grantor.
- d. The property shall not be sold, exchanged, transferred or abandoned. Nor shall it be leased or used for any commercial purpose other than where deemed appropriate by the Bureau and The Nature Conservancy for the purposes of sound wildlife management.

PPN  
ALL

4. The conveyance is made upon the express condition that the property will be administered by the Grantee as a national wildlife refuge under the requirements of the above Act, and the use regulations set forth in paragraph 3 above. If the property shall cease to be administered as a national wildlife refuge or should the Grantee breach the aforementioned use regulations, the title of the Grantee and its successors and assigns, shall cease and determine, and the title shall revert in fee simple to the Grantor. Such reversion is not to be automatic. The Grantor shall give written notice of any breach of condition to the Grantee, and the Grantee will be given a reasonable time to cure such breach. If such breach shall not be cured within a reasonable time, Grantor may apply to any court having jurisdiction for an order of reentry for condition broken. The Grantor's failure to give notice of the breach of a particular condition does not extinguish Grantor's right to give notice of breach of any other condition or of the particular condition at a later time.

5. Grantor and its employees, agents, or independent contractors, shall have the right to enter the property to exercise its rights and protect its interests hereunder. However, the times and areas of entrance will be coordinated in advance with the manager-in-charge, and the Grantor agrees to observe reasonable conditions which may be imposed for the protection of the area's wildlife and its habitat.

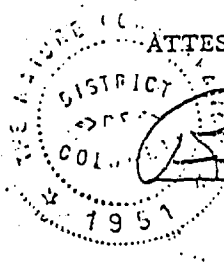
6. The Grantor may grant exceptions to the above restrictions, provided that any such exception does not impair the natural character of the area. Said exceptions may apply to all or any part of the area. If the construction of capital improvements by the Grantee is necessary for the proper administration and management of the property, the Grantor may release the lands upon which the capital improvements are constructed from the provisions of paragraph 4 above by filing a release in writing describing the land so released.

This conveyance is made subject to the restrictions, conditions, and reservations as more fully set forth in the Deed from the Campbell Family Foundation to The Nature Conservancy dated December 28, 1973.

IN WITNESS WHEREOF, the Grantor has caused this Deed to be executed in its name and on its behalf by Patrick F. Noonan, its President, and its corporate seal to be hereunto duly affixed and attested by its officer thereunto duly authorized on this 23<sup>rd</sup> day of December, 1973.

THE NATURE CONSERVANCY

By Patrick F. Noonan  
Patrick F. Noonan  
Its President

ATTEST:  
  
Richard G. Taurig  
Richard G. Taurig  
Assistant Secretary





**Appendix J**  
**Middle Rio Grande**  
**Waterfowl Management Plan**




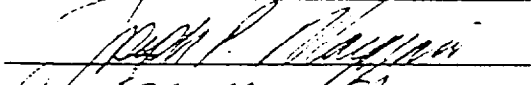
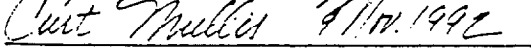
ABN

A Plan for the Management of Waterfowl,  
Sandhill Cranes, and other Migratory Birds  
in the  
Middle Rio Grande Valley of New Mexico

Prepared jointly by:

New Mexico Department of Game and Fish  
U.S. Fish and Wildlife Service, Region 2  
APHIS-Animal Damage Control, New Mexico District

July, 1992

Approved:  New Mexico Department of Game and Fish  
 U.S. Fish and Wildlife Service  
 Curt Muller 7/17/1992 APHIS-Animal Damage Control

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## I. INTRODUCTION

### A. Purpose

The purpose of this document is to provide a cooperative planning structure and overall guidelines for managing populations of wintering waterfowl and cranes in the Middle Rio Grande Valley (MRGV). The plan sets forth objectives for wintering waterfowl and cranes on state and federal refuges and private lands. This is the second revision of the plan originally prepared in 1981 and updated in 1987. This plan utilizes management strategies developed and successfully tested since 1987 to meet goals and objectives set forth for these populations in full coordination with the New Mexico Department of Game and Fish (NMDG&F), the U.S. Fish and Wildlife Service (USFWS) and the Animal Plant Health Inspection Service-Animal Damage Control (APHIS-ADC). This plan is fully compatible with and supportive of the North American Waterfowl Management Plan and species management plans currently in effect.

### B. Planning Area Description

The 1981 Rio Grande corridor planning area (from Santa Fe, N.M. to El Paso, TX.) was constricted in 1987 to encompass the valley floor from the southern boundary of the Isleta Indian Reservation to the upper reaches of Elephant Butte Reservoir. Through a greater understanding of species habitat use patterns and population dynamics over the last five years, however, it is now apparent that the river corridor planning area should be enlarged northward through Albuquerque to Cochiti Reservoir (Figure 1).

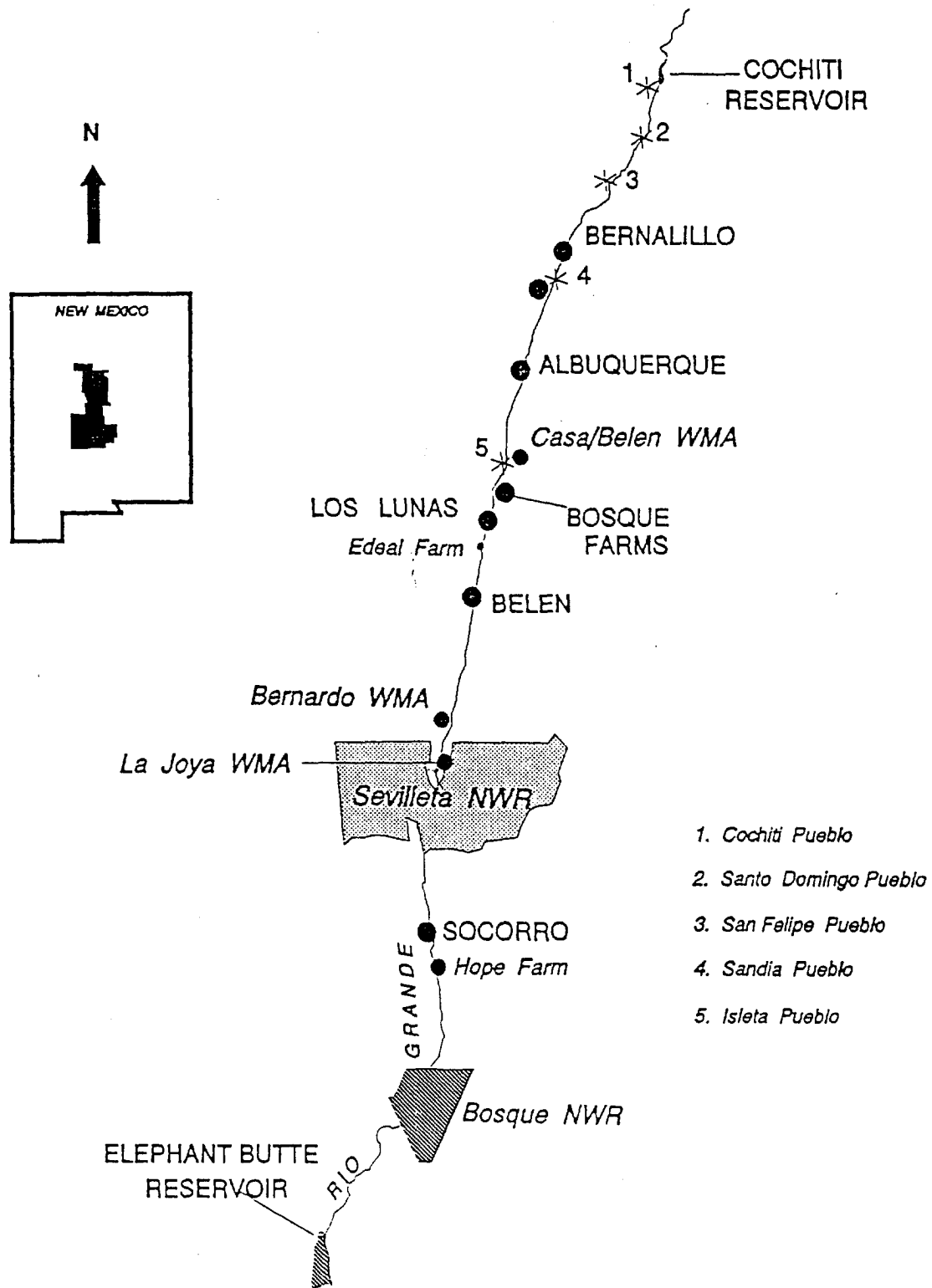


Figure 1. Middle Rio Grande Planning Area



Within that river corridor, this plan specifically addresses waterfowl and crane management on State of New Mexico and Federal properties where specific management actions will occur and on private lands where the majority of APHIS-ADC management actions will occur and where inter-agency outreach programs will be directed towards meeting goals for species population levels and distributions and hunter harvest.

1. **New Mexico Department of Game & Fish and Federal Properties**

These areas include the La Joya, Bernardo, Belen, and Casa Colorada NMDG&F Waterfowl Areas (DGFWAs) and the Sevilleta (SEV) and Bosque del Apache (BDA) National Wildlife Refuges (NWRs). A 1992 inventory of habitat capabilities for meeting feeding and roosting requirements and ultimately, for providing the management control for waterfowl, sandhill cranes and other migratory birds on these areas is outlined here (table 1). It should be noted that the maximum acreage available for the production of corn or wheat is dictated by commitments to sharecroppers on acreage cooperatively farmed at Bosque del Apache NWR and at Casa Colorada and Belen DGFWAs and requisites for the maintenance of productive farmland through the incorporation of legume crops at all managed areas.

Table 1. Feeding and Roosting Habitat Acreages on Managed Areas in the Middle Rio Grande Valley, N.M., 1992

Acres	Wetland Feeding Habitat	Alfalfa Feeding Habitat	Corn Feeding Habitat	Impoundment Roost Habitat	River Roost Habitat
Bosque del Apache NWR	1305	900	325	1459	582
Sevilleta NWR	125	--	--	--	625
La Joya DGFWA	409	--	--	409	--
Bernardo DGFWA	152	293	144	152	--
Casa Colorada DGFWA	--	278	122	--	--
Belen DGFWA	--	155	50	--	--
Bureau of Reclamation	--	--	--	--	6788
<b>Total Acres</b>	<b>1991</b>	<b>1626</b>	<b>641</b>	<b>2020</b>	<b>7995</b>

## 2. Private Lands

A 1990 inventory of important habitats on private lands (N.M. Dep. Agricul, Agric. Stat. Serv. 1990, Las Cruces) provides insight into the reasons why waterfowl and large numbers of sandhill cranes utilize these areas through winter months (table 2).

Table 2. Important Cropland Habitats on Private Lands in the Middle Rio Grande Valley, N.M., 1990

Acres	Corn	Chili	Wheat	Hay	Sorghum
Bernalillo County	900	200	--	5000	--
Sandoval County	800	200	50	6000	--
Socorro County	900	300	750	13800	100
Valencia County	1300	--	350	13700	--
<b>Total Acres</b>	<b>3900</b>	<b>700</b>	<b>1150</b>	<b>38500</b>	<b>100</b>

### C. Authority

With approval by agency officials of this plan, responsibilities for setting annual management strategies within the framework of all federal and state laws and within the authority of the New Mexico State Game Commission at the La Joya, Bernardo, Belen, and Casa Colorada DGFWAs and the Sevilleta and Bosque del Apache NWRs will be those of the Joint Committee for Management of Waterfowl, Sandhill Cranes, and other Migratory Birds comprised of one field representative of each agency . This responsibility will include

recommendations for the annual establishment of hunting locations and time frames, crop production and manipulation schemes, water management scenarios and bird harassment activities.

**D. Planning Scope and Management Implementation**

This revised plan will span a five-year period with revisions implemented as necessary. Within that planning framework, meetings will be held by field representatives of the Joint Committee for Management of Waterfowl, Sandhill Cranes and other Migratory Birds to set management strategies based on the analysis of previous years management and hunter harvest data and specific yearly predictions or conditions.

**E. Endangered Species**

Endangered species which occur in the management area include:

**-State Listed Species:**

- Rio Grande silvery minnow.....(Hybognathus amarus)
- brown pelican.....(Pelecanus occidentalis)
- olivaceous cormorant.....(Phalacrocorax olivaceus)
- bald eagle.....(Haliaeetus leucocephalus)
- common black-hawk.....(Buteogallus anthracinus anthracinus)
- American peregrine falcon.....(Falco peregrinus anatum)
- arctic peregrine falcon.....(Falco peregrinus tundrius)
- whooping crane.....(Grus americana)
- piping plover.....(Charadrius melodus circumcinctus)
- southwestern willow flycatcher...(Empidonax traillii extimus)
- Bell's vireo.....(Vireo bellii)
- meadow jumping mouse.....(Zapus hudsonius luteus)

**-Federally Listed Endangered Species**

- American peregrine falcon.....(Falco peregrinus anatum)
- bald eagle.....(Haliaeetus leucocephalus)
- whooping crane.....(Grus americana)

**-Federal Candidate Species (Category 1)**

- meadow jumping mouse.....(Zapus hudsonius luteus)
- southwestern willow flycatcher...(Empidonax traillii extimus)

Management actions proposed in this plan will not affect species listed in this section with the exception of the whooping crane. Provisions have been made in this plan to provide protection and safe feeding habitat for this species in the management area. Listed raptors which might occur in management areas will have ample adjacent quality habitats available if disturbance occurs. Wetland associated species included in this list should benefit from coordinated wetland management actions geared towards enhancing habitats for these species.

#### **F. Management Tools**

Several management tools have proven their effectiveness in realizing population objectives and distribution patterns for light geese and sandhill cranes in the MRGV. These tools allow the formation of management strategies both on refuges and on private lands to meet annual objectives set by the committee.

##### **1. Food Management**

Since coordinated agency management began in 1987, timely corn manipulations have proven an effective tool for managing population levels and distributions of light geese and sandhill cranes in the MRGV. Time frames for these manipulations are tied to species dietary needs where corn, rich in carbohydrates and a highly digestible energy food, becomes the principal food resource used during cold mid-winter months (figure 2). This period has been identified as December, January and February (DJF) for light geese and November, December, January and February (NDJF) for sandhill cranes. Delayed manipulations can

reduce overall MRGV populations and result in a wide distribution through the valley. Early manipulations can congregate birds in a specific area and encourage an overall population buildup. There are two types of corn manipulations. Mowing allows for multi-species feeding; whereas, bumping corn allows for cranes to feed freely while discouraging goose feeding due to predation pressures.

### Corn Production, 1987-1991 Middle Rio Grande Valley Managed Areas

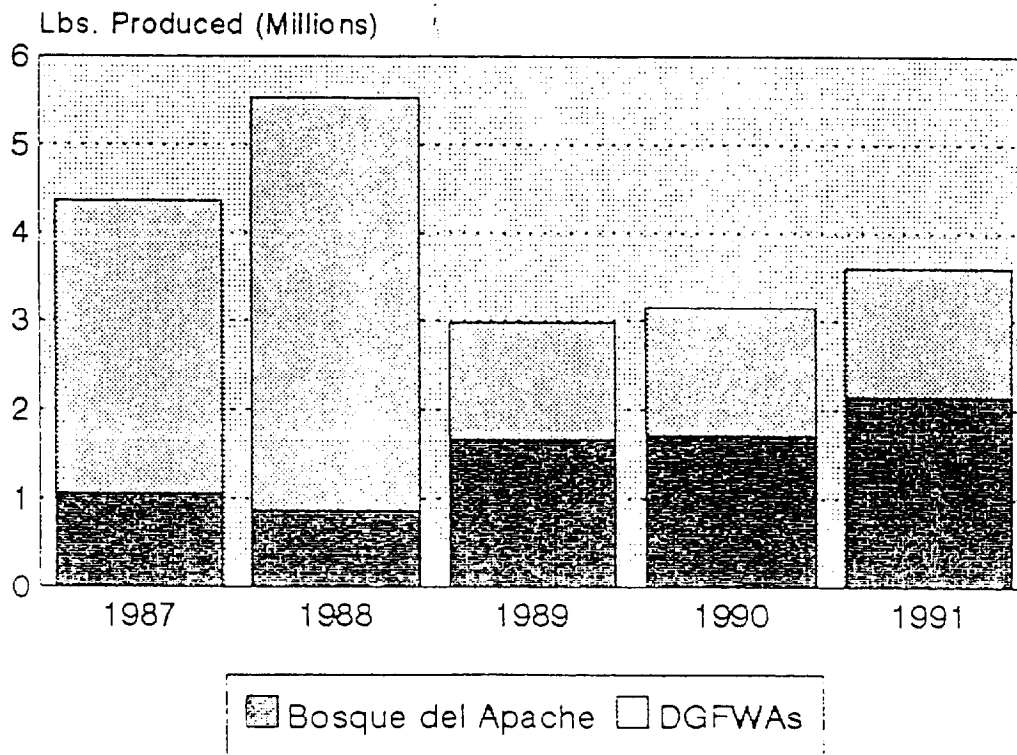


Figure 2. Corn Production on Managed Areas in the Middle Rio Grande Valley, N.M., 1987-1991.

The availability of winter wheat is an important influencing factor in light goose movements from November through early December. Large acreages can play a major role in determining early season light goose population distributions in the MRGV. Alfalfa is also an important food resource for light geese until plant senescence generally in late November. Although alfalfa acreage is abundant both on refuges and private lands in the MRGV, light goose use is restricted to relatively safe, un hunted acreage. Sandhill cranes are often seen in alfalfa fields and account for the majority of alfalfa depredation complaints. Although depredations can occur here, more commonly cranes feed on chufa tubers prevalent in poorly drained portions of these fields.

Moist soil food plants produced on managed impoundment and agricultural acreages can dramatically affect population levels and distribution patterns in the MRGV. Examples include American 3-square bulrush (Scirpus pungens), produced in impoundments and highly sought by light geese during November and early December and chufa (Cyperus esculentus), produced in poorly drained cropland areas and highly sought by sandhill cranes during mild weather periods throughout the winter season. Timely water level manipulations within these areas during milder weather can determine the extent of use and encourage bird movements to and from managed areas.

## 2. Hunting

Hunting throughout the MRGV has expanded for both waterfowl and

sandhill cranes in recent years and can influence population dynamics both positively and negatively. Although valued from a recreational standpoint throughout the MRGV, the effectiveness of hunting as a management tool on managed areas is dependent on several factors including the size of the area hunted, the timing and duration of the hunt, the complexity of the management program and the integration of crop management into the program. Hunting on private lands can also have a significant impact on bird population dynamics in the MRGV. Crop depredations can be efficiently controlled through hunting activity forcing birds back to managed areas accomplishing desired movements patterns within and out of the MRGV. At the same time, proper hunter management by private land owners can result in a sustained bird harvest from a particular site which is attracting birds in the valley providing revenue for the landowner and harvest opportunity for the hunter.

### 3. Water Management

The availability of roosting areas for waterfowl and sandhill cranes can significantly affect distribution patterns of birds in the MRGV. Major impoundment roost sites include traditional areas at Bosque del Apache NWR and at La Joya DGFWA where large acreages are devoted to the production of moist soil food plants and the maintenance of roost sites for waterfowl and sandhill cranes. Of tremendous influence in the distribution and maintenance of population levels in the MRGV is the presence of roosting habitat on the Rio Grande particularly for sandhill



cranes. Populations respond much more readily to management actions throughout the valley when river roosting habitat is limited. Due to the wide scope of aquatic wildlife supported at Bosque del Apache NWR and La Joya DGFWA, limiting the amount of flooded acreage at these sites is not desirable although reserved for extreme management problems such as disease.

#### 4. Bird Harassment

The disturbance of light geese and sandhill cranes to accomplish desired population level goals and distributions has been used on managed areas sporadically since 1986 and on private lands to control crop depredation problems for many years. Although effective in moving light geese from managed areas, disturbance activities have tended to compound sandhill crane depredation problems on private lands. Since 1987, crop management has proven a much more effective and economical means of moving birds. Bird harassment continues to be reserved as a management tool in extreme cases where other management forms are ineffective.

## II. GOALS, OBJECTIVES, AND STRATEGIES

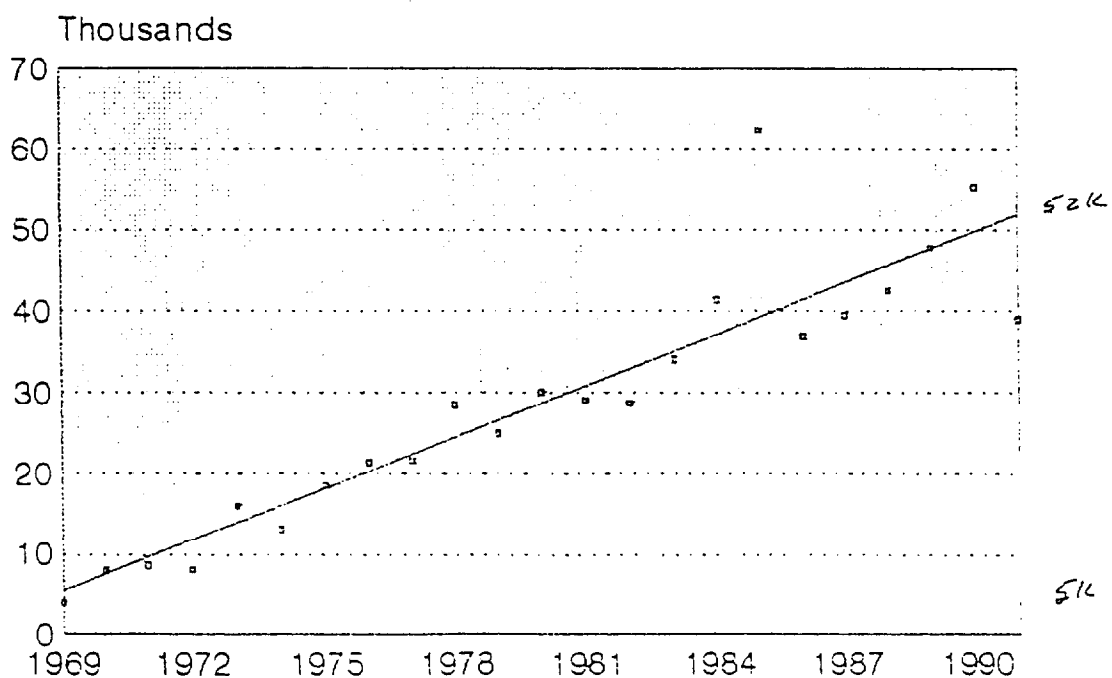
### A. Snow Geese (Chen caerulescens) and Ross' Geese (Chen rossii)

This category encompasses all "white geese" utilizing the MRGV planning area. From 1975 to 1985 this population experienced rapid growth resulting in food shortages, crop depredation problems and disease (figure 3). During this period, virtually

the entire population wintered at Bosque del Apache NWR with limited use seen outside this traditional wintering area. Responding to these population growth problems, a disturbance program was initiated in 1986 at Bosque del Apache NWR resulting in the redistribution of geese to north valley DGFWAs. Utilizing crop manipulations as the major management form, this distribution has since been maintained. Between 1980-1986, an excellent correlation ( $r=.98$ ) was found between early population

### Peak Light Goose Populations (Ground Surveys) Middle Rio Grande Valley, N.M.

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$r=.91$

Figure 3. Peak Light Goose Populations in the Middle Rio Grande Valley, N.M., 1969-1991.

peaks and average DJF population data. By using the formula  $y = .533x + 3773.268$  (where  $x$  is the observed valley population peak occurring by the second week of December) managers can predict  $y$  (the average valley DJF populations) within 10 to 14% of the actual average. Such predictions can be made sufficiently early in the season to adjust some management options for anticipated population levels.

#### 1. Recent Light Goose Population Trends

The 1987 Plan for the Management of Waterfowl, Sandhill Cranes, and other Migratory Birds in the MRGV set an average DJF population goal of 24,000-28,000 light geese equivalent to an early season peak of about 40,000 birds. At higher populations, increased levels of management intensity would be used to reduce the population. Also, an important objective of the plan was to improve flock distribution in the MRGV where 35% of the flock would be wintered at BDA and 65% on DGFWAs. Annual management strategies have since been formulated to conform with these specific directives. To assess bird response to various management actions employed from 1987 to 1990, the MRGV light goose population was closely monitored both in the MRGV and Mexican Highland wintering areas through intensive population surveys supported by a weekly assessment of neckbanded individuals.

Based on the regression formula  $y = .553x + 3773.268$ , peak populations of 39,400 in 1987-88 and 42,400 in 1988-89 corresponded to predicted average DJF populations within the

objective framework. These average populations were surpassed, however, in 1987-88 by 11% and in 1988-89 by 17% (figure 4). During these years, cropland acreage was available and manipulated in excess of objective needs. Delayed crop manipulations initially reduced populations 30% in 1987-88 and 11% in 1988-89, but birds returned responding to abundant manipulated crops leased by the NMDG&F at the Los Lunas Corrections Facility in an unhunted, predator-free environment. During the 1987-88 and 1988-89 winters, 65% and 62% of wintering

Peak Light Goose Populations vs DJF Averages in the Middle Rio Grande Valley, New Mexico 1980-1986. ( $r=0.98$ )

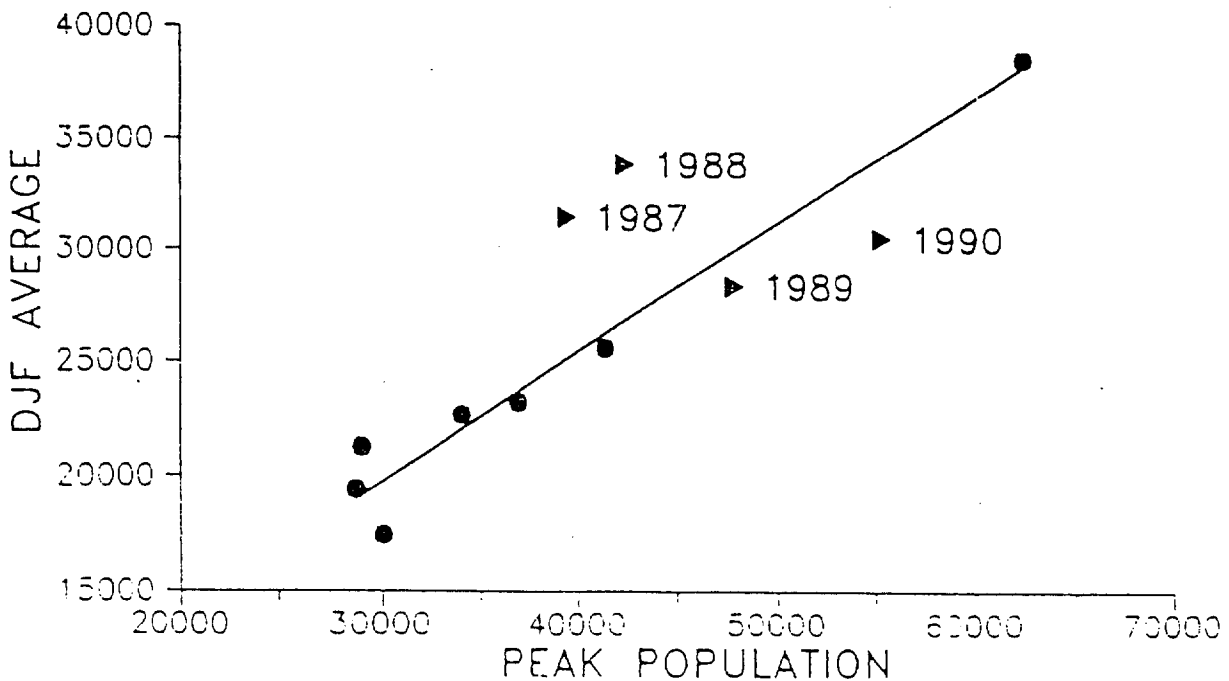


Figure 4. 1987-1990 Average Populations in Relation to 1980-1986 Peak vs DJF Average Populations in the Middle Rio Grande Valley, N.M.

geese were maintained in the north MRGV respectively, consistent with plan objectives.

Using the same regression formula, average DJF populations above objective levels were predicted from peaks of 47,800 in 1989-90 and 55,275 in 1990-91 requiring reductions in wintering populations through altered crop manipulation strategies.

Delayed crop manipulations combined with flock disturbance at the Los Lunas Corrections Facility, which was phased out of the MRGV

Table 2. Availability of Mowed Corn for Light Geese on Managed Areas in the Middle Rio Grande Valley, N.M., 1987-1990.

## Availability of Mowed Corn for Light Geese

Middle Rio Grande Valley Managed Areas, 1987-1990

YEAR	BERNARDO	CASA COLORADA/ BELEN	LOS LUNAS	BOSQUE DEL AFACHE	OFFER VS LOWER %
1987	+++		+++		
	++++	-----	++++	-	65 35
1988	++++	----	-----	-	62 38
1989	---			-	34 66
1990	-----			-----	41 59

+ = 100,000 Lbs.

1989-90 and 39% in 1990-91 from early season peaks. Lower DJF numbers were maintained through crop manipulations directed at supporting only remaining birds resulting in averages within +1% in 1989-90 and +8% in 1990-91 of population goals. Without the Los Lunas Corrections Facility supporting geese, however, only 34% of the wintering population was maintained on north MRGV managed areas in 1989-90 and 41% in 1990-91 (table 3).

Observations of neckbanded individuals showed frequent movements of large numbers of light geese from BDA to all portions of the MRGV particularly during late November and December. This indicates that improved hunter opportunity existed on private lands as birds moved back and forth searching for food.

The 1991-92 population peaked at only 38,920, 30% lower than the previous season. This peak corresponded to an average DJF population of 25,300 birds, well within the objective framework. Delayed crop manipulations reduced the peak population by 29% with an average population of 24,000 easily supported on MRGV managed areas through the remainder of the season. Similar to the previous two winter seasons, only 40% of the population was supported in the north MRGV. A more limited cropland habitat base and sustained hunting programs on DGFWAs contributed to lower proportions sustained in the north MRGV from 1989-1992. This also occurred despite efforts at BDA to force geese north through crop manipulation efforts which favored cranes.

Light goose use of private lands for sustained periods is limited to the Price's and Ideal's Dairy in the north valley where

to the Price's and Ideal's Dairy in the north valley where hunting is prohibited and winter wheat acreage is available. In the south valley, sustained use by light geese for brief periods occurs at Hope Farm where hunting is allowed with landowner permission.

Populations of light geese in the MRGV have cycled twice since 1981 crashing in 1986 and 1991 (figure 5). These years were preceded by poor productivity in Arctic breeding areas closely associated with the amount of snow cover in early June and incidences of disease which were high in 1985 and 1990 in the

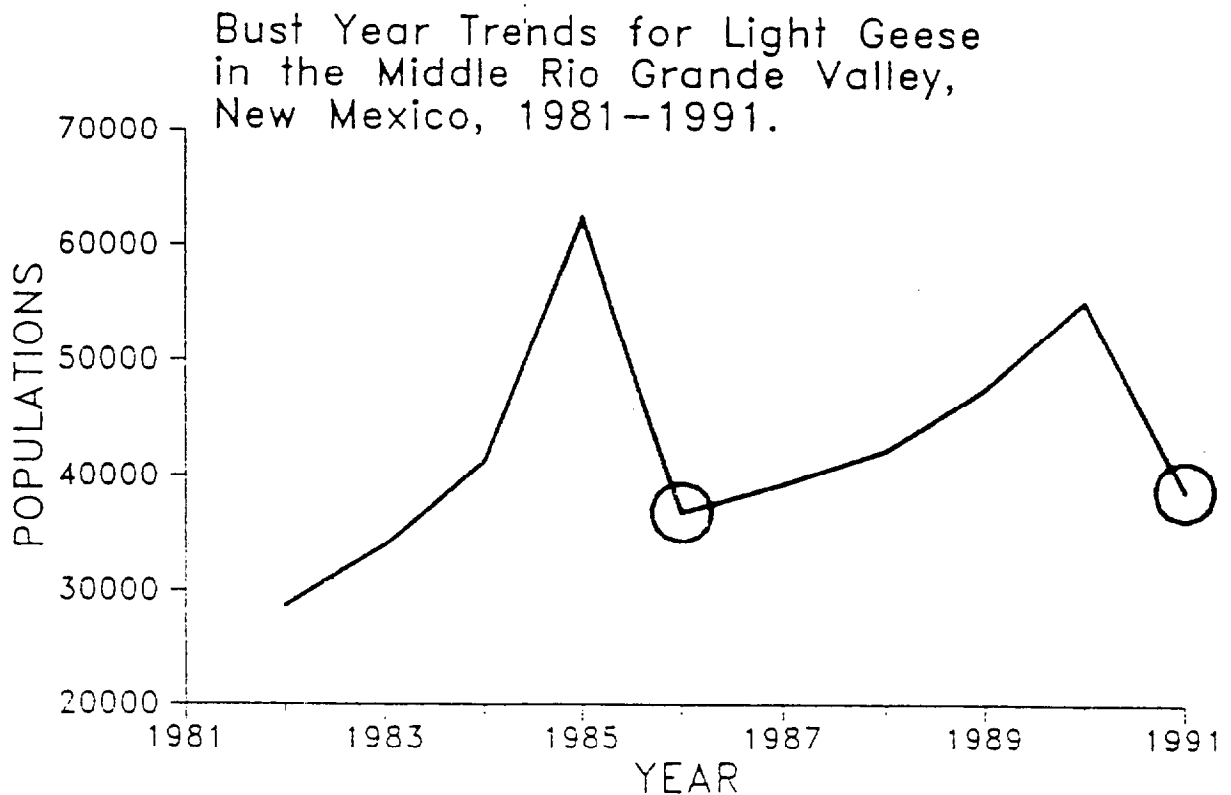


Figure 5. Light Goose Populations in the Middle Rio Grande Valley, N.M., 1981-1991.

MRGV. These cycles lend some long term predictability for light goose management planning in the MRGV.

Higher population goals for light geese in this plan reflect the ability of DGFWAs to support 65% of an average DJF populations of 31,000 geese which corresponds to a peak of 49,000 birds.

Populations above this level result in greater occurrences of avian cholera particularly at BDA.

## 2. Goal for the Middle Rio Grande Valley

Maintain a mean monthly population of 24,000 to 31,000 light geese during December, January and February (DJF).

Objective 1: Improve the existing distribution of snow geese for a more equitable use pattern of cropland habitats, to improve hunter opportunity and harvest potential and to lower crop depredations and disease potential. Maintain a valley-wide distribution of 35% of the wintering birds on BDA and 65% on DGFWAs.

Strategies: At specific population levels, the following management actions are to be implemented:

Level 1: Predicted DJF mean 24,000 - 31,000 birds (37,000 - 49,000 bird peak).

-No restrictions on beginning corn manipulation date at upper valley DGFWAs. No corn manipulations for light geese at BDA.

Level 2: Predicted DJF mean 31,000 - 34,000 birds (49,000 - 55,000 bird peak).



-No corn manipulations before mid-December at upper valley DGFWAs to reduce DJF populations to level 1 status. No corn manipulations for light geese at BDA except for emergency disease avoidance measures.

Level 3: Predicted DJF mean greater than 34,000 birds (greater than 55,000 bird peak).

-No corn manipulations before late December at upper valley DGFWAs to reduce DJF populations to level 1 status. No corn manipulations for light geese at BDA except for emergency disease avoidance measures.

-Consider initiating passive and active harassment operations on DGFWAs and Federal properties to aid in achieving level 1 population status.

Objective 2: Monitor light goose population size, composition movements, and harvest to determine success of management efforts.

Strategies:

- Sewilletta*
1. Conduct weekly coordinated surveys of light geese in all major use areas.
  2. Determine percentage of color phases within the population to aid in determining breeding colony origin.
  3. Determine percentage of Ross' geese in the population to monitor status of the species in New Mexico.
  - 7 4. Continue participation in annual productivity surveys.

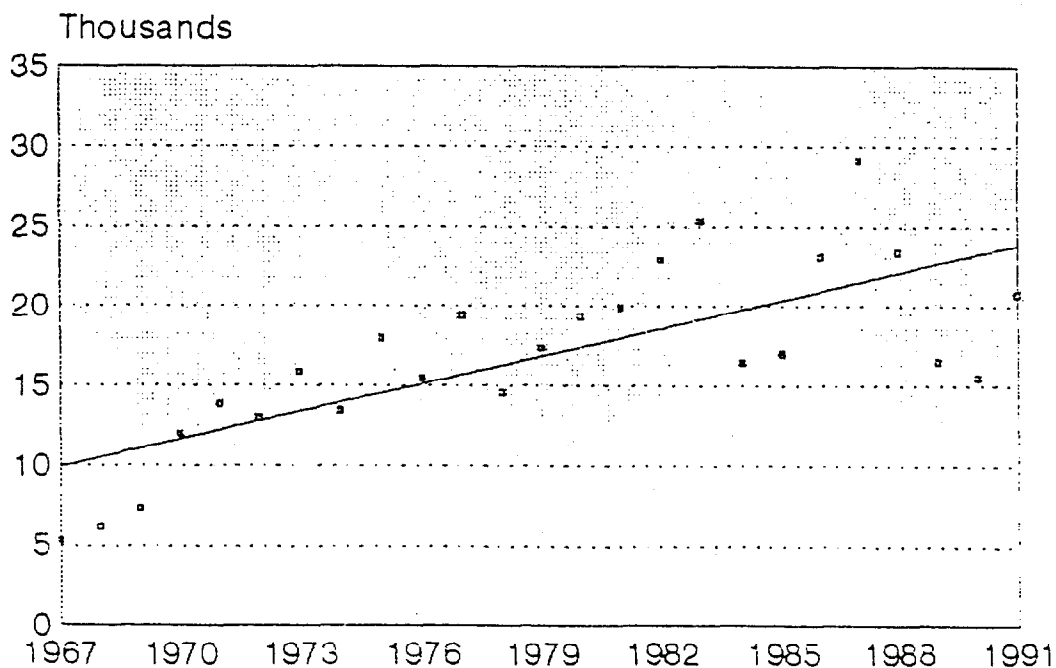
5. Determine conditions of light geese migrating through and wintering in the MRGV to assess the affects of intensive population management techniques employed.
6. Determine the light goose harvest on DGFWAs and Federal refuges.
7. Initiate an inter-agency outreach program to encourage the development of private lands hunting programs.



**B: Sandhill Cranes (Grus canadensis)**

The MRGV is the principal wintering area for the Rocky Mountain

### Peak Sandhill Crane Populations (Aerial Surveys) Middle Rio Grande Valley, N.M.



$r = .75$

Figure 6. Sandhill Crane Populations in the Middle Rio Grande Valley, N.M., 1967-1991.

Population (RMP) of greater sandhill cranes (Grus canadensis tabida). On the wintering grounds the RMP cranes mix with and cannot be managed apart from the midcontinent population of sandhills. For this reason, all subspecies (Grus canadensis tabida, G. c. rowani, and G. c. canadensis) will be managed in the MRGV as one population. The number of cranes wintering in the MRGV determined from NMDG&F aerial surveys has grown from 5,300 in 1967 to 20,700 during the 1991-1992 winter season. An all time peak of 29,000 was recorded in 1987 (figure 6).

#### 1. Recent Sandhill Crane Population Trends

The 1987 Plan for the Management of Waterfowl, Sandhill Cranes, and other Migratory Birds in the MRGV set an average NDJF population goal of 15,000-19,000 birds. At higher populations, the Pacific Flyway would be re-petitioned to increase the MRGV harvest allotment. 65% of the flock would be wintered at BDA and 35% on DGFWAs.

Unlike light geese, large numbers of sandhill cranes winter on private lands in the MRGV. Three years (1989-1991) of detailed aerial surveys throughout the valley show 38% of the population on private lands during early migration periods and 23% on private lands by late December. Total populations during this same period have averaged 22,600 birds with 64% of the population in the lower valley and 36% in the upper valley. NDJF ground counts since 1987 on managed areas have averaged 19,039 over the subsequent five year period with 54% of the population on managed areas found at BDA.

Through active ADC response to depredation complaints on private lands, depredation problems have been reduced dramatically since 1989. Hunting on private lands, however, remains the most effective depredation control strategy. Although the general federal framework for the general RMP crane season allows for a 30-day season between September 1 and January 31, hunting on private lands in the MRGV is restricted to October to protect whooping cranes which generally arrive in the MRGV during the first two weeks of November. This restriction is reviewed annually through the section 7 consultation process mandated by the Endangered Species Act relying on whooping crane recovery team recommendations. The whooping crane population now includes twelve birds, ten of which winter in predictable protected locations in the MRGV. An extension of the season into later winter months would require the lifting of this restriction in future Section 7 consultations.

Whooping  
crane  
No

Currently, nesting areas for the RMP population of greater sandhill cranes are in the sixth consecutive year of drought and the worst in this century. Extremely poor reproductive success this season will compound downward recruitment trends experienced over this period. The present late October hunting season dates being during migration, likely allow harvest of a greater percentage of lesser and Canadian sandhill cranes than would a season extended into winter months. Therefore a later hunt season's harvest would likely contain a larger percentage of greater sandhill cranes and increase the chance of exceeding the

allowable harvest allotment. An extension of the current season should be thoroughly evaluated in view of six consecutive years of poor reproductive success which has negatively impacted the RMP population.

To more reasonably reflect existing population levels in the MRGV and to fully utilize available corn at BDA (corn production intended for the maintenance of sandhill cranes at BDA has risen sharply with abundant reserves left unutilized since 1989), population goals have been scaled upward for the NDJF winter period. Objectives for maintenance of 65% of the population at BDA will continue as before.

## 2. Goal for the Middle Rio Grande Valley

Maintain a mean monthly population of 17,000 to 22,000 sandhill cranes during November, December, January and February (NDJF).

Objective 1: Protect and improve existing sandhill crane wintering habitat in the MRGV to distribute cranes in the MRGV 65% at BDA and 35% on DGFWAs.

### Strategies:

Level 1: 17,000 to 22,000 birds.

-Support all cranes on Federal and DGFWAs through provision of feeding and roost sites.

Level 2: Over 22,000 birds.

-Should the population's composition shift or if current level hunts do not succeed, re-petition the Pacific Flyway to increase harvest allotment.

Objective 2: Minimize problems associated with sandhill crane crop depredation.

Strategies: All population levels.

1. Respond immediately to depredation complaints on private lands to break feeding or roosting patterns before they become established.
2. APHIS-ADC, as the lead agency, will handle all private lands depredation complaints in the MRGV. Responses initiated by DGFWA and BDA personnel will be immediately referred to APHIS-ADC for follow-up.
3. Demonstrate the use of depredation control methods and materials to affected landowners.
4. Work with the whooping crane recovery team in investigating the possibility of extending the current sandhill crane hunt period on private lands through late January or the initiation of special depredation hunts to control serious depredation problems. Assess the impact of a season extension on the RMP population working with the appropriate technical committees of the Pacific and Central Flyways.
5. Continue to monitor sandhill crane flock size, racial composition, and extent of depredations to determine success of the above strategies.

#### C. Dabbling Ducks

The MRGV provides wintering habitat for mallards (Anas platyrhynchos), Northern pintail (Anas acuta), cinnamon teal (Anas cyanoptera), green-winged teal (Anas crecca), Northern

shoveler (Anas clypeata), gadwall (Anas strepera) and American wigeon (Anas americana). All species are closely associated with the river, ponds, lakes, and marshes of the valley. Wintering populations average between 12,000 and 44,000 birds, largely dependent of flyway weather conditions. Diving ducks occur in much smaller numbers and are not considered in this plan.

#### 1. Fall Ducks

The fall dabbling duck population in the MRGV is defined as dabbling ducks recorded between 1 September and 15 December. After 15 December the composition shifts to one of predominately mallards which feed on corn produced in agricultural areas. The fall population is supported entirely in impoundment areas on moist soil produced annual and perennial plants and is regarded as a barometer for wetland habitat status. Since 1986, dabbling numbers are estimated to have averaged about 14,000 birds during the fall period in the MRGV. Recently, wetland management areas at BDA and La Joya DGFWA have been rehabilitated, providing moist soil management capabilities. This management program has been very successful in reversing downward trends in dabbling duck numbers in the MRGV. This success culminated during fall 1990 when a peak of 60,000 birds was estimated in the MRGV, the highest fall dabbling peak seen since the early 1950's. Since active moist soil management began in 1987, there have also been some encouraging population composition shifts which indicate a greater response by some dabbling species of concern including northern pintails, green-winged teal and cinnamon teal (fig. 7).

## Fall Dabbling Use Composition

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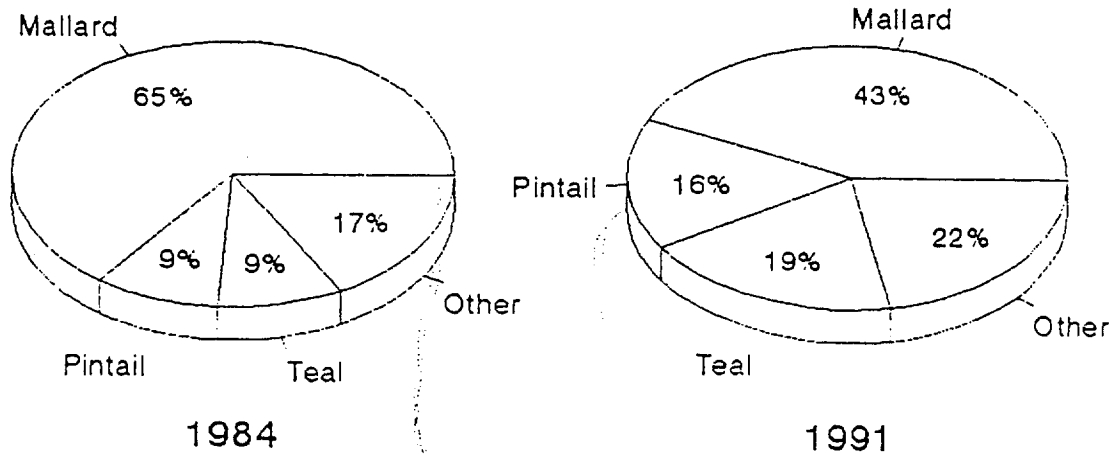


Figure 7. Fall Dabbling Use Composition in 1984 and 1991 at Bosque del Apache NWR, N.M.

The future for fall dabblers in the MRGV is promising. As moist soil management techniques are refined and this management is expanded, tremendous potential exists to support larger populations during fall and spring periods which would ordinarily move more quickly through the MRGV to and from Mexican wintering areas. Efforts will continue to support and maintain migratory dabblers during these important stages of their life cycles and return them to breeding grounds in good physiological condition.



## 2. Mallards

Mallards continue to dominate dabbling duck populations from mid-December through February comprising an average of 69% of all ducks in the MRGV during this period. These wintering birds come primarily from the High Plains Mallard Management Unit of the Central Flyway. For the last decade the trend of this population has been inexorably downward, probably for the most part because of declining habitat conditions on the breeding grounds.

Mallards are dependent on available corn in the MRGV establishing early morning and late evening feeding flights to and from managed areas. The average winter population of mallards in the MRGV since 1986 is estimated at 15,800 with average peaks of 19,800 birds. Future management efforts in the MRGV will center on maximizing the availability of ample food in the form of corn for this population to assure continued dominance of the species in hunter bags and a return to breeding grounds in good physiological condition.

## 3. Goal for the Middle Rio Grande Valley

### Fall Dabblers

Maintain an average fall population (1 September-15 December) of 18,000 birds in the MRGV.

### Mallards

Maintain an average winter population (15 December-29 February) of 16,000 birds in the MRGV.

Objective 1: Increase the amount and improve the quality of existing habitat available for all dabblers.

Strategies:

1. Improve existing marsh habitats where feasible on DGFWAs and federal properties through continued moist soil management practices.
2. Assure ample corn is available and manipulated during late afternoon hours for mallards on managed areas.
3. Initiate cooperative agreements between other agencies (Middle Rio Grande Conservancy District, U.S. Corps of Engineers, U.S. Bureau of Reclamation, etc.) and Indian pueblos to maintain suitable habitat for dabblers by water level management of wetlands under their control.
4. Continue to demonstrate successful moist soil management practices and facilitate information transfer among all cooperators for the overall benefit of dabbler resources in the MRGV.

Objective 2: Continue to monitor population size, health, and species composition to determine success of management efforts and additional management needs.

Strategies:

1. Conduct weekly coordinated surveys for all dabbler ducks in all major use areas to determine population levels, distributions and species composition.
2. Evaluate banding data from winter banding projects for mallards conducted in the early 1980's at Bosque del Apache and compare this data with that generated from earlier banding projects which established the High Plains Mallard

Management Unit.

3. Maintain the MRGV as a non-toxic shot zone.

#### D. Whooping Cranes

In 1975 the FWS and the Canadian Wildlife Service began a cooperative experimental project with the objective of establishing a secondary migratory breeding flock of whooping cranes to ensure survival of the species through expansion of limited breeding and wintering distributions in the wild. The experiment involved transferring eggs from nesting grounds at the Wood Buffalo National Park in Canada and from captive rearing facilities at the Patuxent Wildlife Research Center to sandhill crane nests at Grays Lake National Wildlife Refuge in Idaho. The whooping crane chicks were then reared and brought to the MRGV by greater sandhill crane pairs in hopes the young whoopers would eventually form pair bonds and establish a breeding flock which would migrate annually from breeding areas at Grays Lake NWR to the MRGV of New Mexico.

#### 1. Recent Whooping Crane Population Trends

Since 1975, cross-fostered females of age 4 through 11 years have passed through a spring nesting season on 30 occasions without breeding. Males in contrast, have exhibited typical breeding season activities. The last successful fledgling and migration of a cross-fostered whooper chick to the MRGV was in 1986. Since then extreme drought in Rocky Mountain greater sandhill crane breeding range has taken its toll on the egg transfer program. Drought, which essentially halted recruitment and high adult

mortality rates due to accidents and disease resulted in the abandonment of the egg transfer program in 1989. Population modeling initiated to determine whether the population might become self-sustaining, (given that typical female breeding activities and survival rates of first year birds were the same as the wild flock) showed only six breeding pairs after 50 years with 30 eggs transferred annually. Given existing low recruitment rates and high mortality rates, modeling indicates the existing population will become extinct.

In efforts to promote pairing in the remaining population, wild-captured females were translocated to male breeding territories with experiments in forced pairing unsuccessful. The lack of pairing has been attributed to improper sexual imprinting in female whoopers, the small number of females in the population, and their scattered distribution which has provided limited opportunity for contact with compatible mates.

Currently, a proposal to initiate a "guide bird" study exists involving the transfer of properly sexually imprinted captive-reared chicks (with live whooping crane role models) to male whooping crane territories at Grays Lake NWR in hopes that these adults will raise the chicks and show the migration route to these young birds. If the technique shows promise, it might be used to establish migratory flocks in other locations selected for expansion of breeding and wintering habitat in the wild.

It is unknown at this time whether the study will be initiated or what the fate of the remaining birds in the flock will be.

Currently, there are twelve birds left in the population. Of this number, eight birds winter at Bosque del Apache, two winter at the Belen/Casa Colorada DGFWAs, one winters near Lemitar, N.M. and one bird may be wintering in the Asension area of Chihuahua, Mexico.

Regardless of the fate of the remaining birds wintering in the MRGV as the experiment draws to a close, all agencies remain committed to the protection of the remaining birds in undisturbed wintering sites in the valley. Although ten of the remaining eleven birds in the MRGV have predictable associations to unhunted protected areas, the chance of accidental shooting by hunters remains; therefore, adherence to the Sandhill Crane Operational Hunt and Whooping Crane Contingency Plans will continue.

## 2. Goal for the Middle Rio Grande Valley

Incorporate into the 1992 update of the Plan for Management of Waterfowl, Sandhill Cranes and other Migratory Birds in the MRGV, the protection of the twelve remaining whooping cranes in undisturbed managed areas.

Objective 1: Maintain areas where whooping cranes will find adequate food and minimal disturbance on roost areas.

### Strategies:

1. Provide nonhunted grain feeding habitat on Bosque del Apache NWR and DGFWAs.
2. Bump enough corn as needed to make grain accessible on

managed areas used by whooping cranes in the MRGV.

Objective 2: Protect whooping cranes during sandhill crane and waterfowl hunting seasons.

1. Maintain provisions for the protection of whooping cranes set forth in the Sandhill Crane Operational Hunt and Whooping Crane Contingency Plans.
2. Continue cooperative law enforcement activity throughout the valley.
3. Maintain cooperative and regular conservation education efforts (news articles, audio and video public service announcements, posters, pamphlets, etc.) directed at making the public aware of whooping cranes; their endangered status, and how to identify them.
4. Continue the cooperative training program required for snow goose hunters on managed areas and for sandhill crane hunters throughout the MRGV.
5. Maintain the MRGV as a non-toxic hunting zone.
6. Continue to follow procedures outlined in the Sandhill Crane Operational Hunt and Whooping Crane Contingency Plans to protect whooping cranes which appear in areas open to sandhill crane hunting.

#### E. Canada Geese

The MRGV population of Canada geese (Branta canadensis) has historically been associated with the Hi-Line population. An increasing number of Short-Grass Prairie population birds also winter in the planning area. The population of Canada geese in

the MRGV decreased from about 10,000 birds in the mid 1960's to less than 1,000 birds in 1981. Peak population estimates since then have consistently recorded about 2,500 birds.

#### Goal for the Middle Rio Grande Valley

Restore the wintering population of Canada geese to levels which existed in the early 1960's (10,000 birds).

Objective 1: Protect existing wintering habitat for Canada geese.

#### Strategies:

1. Assure that operational plans (Master Plans) on DGFWAs and Federal refuges consider the importance of managing habitats (including the protection of feeding and roosting areas) for Canada geese as well as for other, more numerous, species.
2. Provide technical information and assistance, where feasible, to other agencies and private owners of land of critical importance to Canada geese to assure consideration of the needs of these birds in land use planning and management efforts.

Objective 2: Encourage the growth of the Canada goose population by reducing mortality and competition with other species for habitat resources and through the encouragement of year-round use within the MRGV.

#### Strategies:

1. Adjust waterfowl hunting regulations to favor the restoration Canada geese.
2. Incorporate important Canada goose foods into moist soil

plant production plans on managed areas.

3. Where feasible, implement marsh management beneficial to nesting efforts.

Note: Until Canada geese increase to desired levels the crops necessary to support the population objective level will be considered food resources available for use by other migrating species.

#### **F. Marshbirds, Shorebirds, and Waterbirds**

These general categories include a diversity of birds which use a wide variety of wetland habitats. All are afforded protection by State and Federal law. With the rehabilitation of water conveyance and impoundment systems at Bosque del Apache NWR in 1987 and La Joya DGFWA in 1989, wetland management programs specifically directed at enhancing or creating habitats for these species was renewed. Management centers on the maintenance of optimum water levels with timely fluctuations to provide needed breeding and foraging habitats for these groups of migratory birds. The program also incorporates moist soil management which follows drawdown and flooding regimes dependent on the successional state of existing marsh vegetation. Examples of how this might apply to these general categories of birds is illustrated by the availability of mudflats for shorebirds during spring drawdowns for annual vegetation; by the availability of moderately dense to dense emergent vegetation and associated invertebrate resources for breeding marshbirds such as rails and bitterns; and fisheries resources concentrated through mid-summer



drawdowns for waterbirds such as egrets, cormorants and herons. Although numbers of marshbirds, shorebirds and waterbirds are relatively low compared with waterfowl resources, the diversity of species is high with many species breeding in the MRGV. It should be recognized that although MRGV populations may be low in comparison to continental populations, the importance of subpopulations which move through the MRGV may not yet be realized.

*John C. King new in formation on this?*

**Goal for the Middle Rio Grande Valley**

Preserve and improve habitat for marshbird, shorebird, and waterbird populations.

Objective 1: Determine existing population levels and species composition in the MRGV.

*White King Cove?*

**Strategies:**

1. Compile existing survey data in the MRGV to determine species composition, seasonality, use patterns, and breeding status.
2. Determine data gaps and initiate surveys and/or investigations to develop meaningful population goals.
3. Contribute MRGV survey data for these species to international databases such as the International Shorebird Register and the Colonial Bird Register.

Objective 2: Consider the needs of marshbirds, shorebirds and waterbirds in the development of operational plans for DGFWAs and Federal refuges and acquisition planning for new management areas.

Strategies:

1. Share available planning technology among agencies such as GIS data input, reporting and gap analysis systems and the Moist Soil Management Advisor planning and database system.
2. Coordinate wetland management activities among wetland complexes in the MRGV based on objectives 1 and 2 to assure adequate habitats exists for these groups of wetland dependent species.

G. Disease Prevention

Concentrations of wintering species can act to spread avian tuberculosis, avian cholera, and avian botulism. Similarly, management actions implemented to move birds out of the MRGV or redistribute birds within the valley can result in sufficient population stress to initiate a disease outbreak. Management actions on all managed areas will be directed toward prevention of losses to migratory waterfowl and crane populations caused by disease.

Goal for the Middle Rio Grande Valley

Objective 1: Minimize disease outbreaks for all species of wintering waterfowl and cranes in the MRGV.

Strategies:

1. Maintain continuous water flow within feeding and roosting impoundments to dilute or remove disease organisms.
2. Develop independent water management capabilities on individual impoundments to isolate problem areas and reduce the risk of contamination to other management units within

complexes.

3. Provide food and roost habitat at several dispersed sites so that large numbers of light geese and sandhill cranes will not be feeding or roosting at single sites.
4. Plan corn manipulation strategies including delayed manipulations with the threat of disease always in mind. Anticipate outbreaks from food denial stress with contingencies for making large acreages of corn available to minimize losses.

#### H. Public Use

Public use interests in migratory birds in the MRGV are growing as a result of concentrated populations of waterfowl and sandhill cranes to the limited habitats of the MRGV. Providing a balance between user groups and the management of waterfowl and sandhill cranes based on existing habitat capabilities is an important goal of this plan.

##### 1. Hunting

The improvement of light goose hunting quality and harvest are important objectives for managed areas in the MRGV. Current hunting programs, however, either compromise overall species and public use management programs on specific management areas or fall far short of goals to improve the overall hunt program. Specifically, concerns over conflicts with sandhill crane and dabbling duck management programs and wildlife observation at BDA combined with the potential for initiating quality hunting program at DGFWAs in the upper valley have resulted in

recommendations that light goose hunting activity be concentrated on managed areas in the upper valley. Current managed area light goose hunting programs provide an estimated 980 hunter days/year harvesting about 400 geese per season for a harvest rate of about .41 birds/hunter.

There are several constraints which determine the maximum number of hunter days possible through regulated hunting at DGFWAs. The light goose season length is 107 days, the maximum allowed under the Migratory Bird Treaty Act. Within this period, generally extending from early November to mid-February, corn manipulations must also occur to support light geese in the upper valley.

Federal migratory bird hunting regulations prohibit crop manipulations within hunt areas until ten days following complete removal of all such feed. This restriction therefore reduces the 107 day hunt season to approximately 30 days on DGFWAs. A likely hunt scenario would provide three separate ten day hunt periods within the 107 day period. Experience has shown that consecutive days of hunting quickly drive geese from a hunt area. To maintain geese in a hunt area and improve harvest rate potential, a maximum of four staggered hunt days within a ten day hunt period is recommended. These constraints combined with a regulated number of blinds in hunt areas result in a maximum of 1080 potential hunter days at DGFWAs.

To provide the assurance of a higher standard of hunting on managed areas in the MRGV, quality hunting must be defined for the purposes of this plan as a regulated program consisting of

set numbers of blinds and hunters with a reasonable goose harvest expectation. It is generally recognized that the regulated hunting program at BDA has provided a quality hunt experience while remaining hunt programs have not. Over the course of ten years of field hunting at BDA, a hunting environment similar to that proposed at upper valley DGFWAs, hunter harvest has averaged .74 birds/hunter. The following strategies outlined for hunting on managed areas in the MRGV must assure at least the .74 birds/hunter harvest rate over the course of an annual hunting season to assure the hunt was a quality experience for each level described. To improve harvest rates, all efforts will be made to deprive geese of any existing free feeding opportunities at BDA to move birds north to DGFWAs. The number of hunt days within a ten day hunt period may also be reduced at DGFWAs in the upper valley which, if continued, would dictate opening hunting at BDA the following season to maintain the minimum goal for hunter use days in the MRGV.

#### **Goal for the Middle Rio Grande Valley**

Maintain 810-1080 quality hunter days/year on managed areas in the MRGV.

Objective 1: Improve the existing light goose hunt program on managed areas in the MRGV by assuring a regulated hunt program with a harvest rate of at least .74 birds/hunter while avoiding conflicts with other species and public use management programs.

Strategies: To maintain harvest levels of at least .74

birds/hunter, the following management strategies will be implemented to provide 810-1080 hunter days/year on managed areas in the MRGV.

Level 1: 810-1,080 hunter days with harvest levels of at least .74 birds/hunter.

-Attempt to eliminate all free feeding opportunities at BDA to move birds north to DGFWAs.  
-Hunt upper valley DGFWAs reducing the number of hunter days/10 day hunt period as needed to maintain minimum harvest levels.

Level 2: Below 810 hunter days.

-Attempt to eliminate all free feeding opportunities at BDA to move birds north to DGFWAs.  
-Hunt upper valley DGFWAs and BDA to raise the number of quality hunter days to level 1 status.

Objective 2: Improve the level of quality hunting for light geese on private lands in the MRGV.

Strategies:

1. Discourage feeding by light geese on all un hunted managed areas in the MRGV. *How*
2. Encourage landowners to develop quality hunt programs for economic gain through the maintenance of habitats attractive to light geese and proper hunter management to maintain high hunter harvest rates.
3. Integrate information on ethical hunting practices and successful hunting strategies into existing hunter training

courses.

## 2. Wildlife Observation

Over 100,000 visits to view concentrated waterfowl and sandhill crane populations are estimated on managed areas in the MRGV during winter months. Although wildlife observation is an important public use activity on all managed areas, considerable visitation occurs at Bosque del Apache NWR which is recognized internationally as an exceptional wildlife viewing area. A major portion of the refuge management program is devoted to providing quality wildlife oriented experiences to visitors through an extensive auto tour loop through important waterfowl and sandhill crane habitats with viewing platforms and exhibits strategically placed to interpret wildlife oriented themes. This type of public use is expected to increase substantially through the decade on all managed areas in the MRGV. An important goal of this plan is to provide all visitors to managed areas with a high quality wildlife oriented experience. Such a high public use demand within the limited habitats available in the MRGV has the potential to negatively impact wildlife resources. It is essential that comprehensive public use management programs be developed to avoid negative impacts while still providing visitors with the type of exceptional viewing opportunities possible in the MRGV. Providing the public with an understanding of population and habitat management programs outlined in this plan should be an important objective of all interpretive programs.

\*  
Comments  
w/ DMD/lat  
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For state

## Goal for the Middle Rio Grande Valley

Provide visitors with quality wildlife observation opportunities on all managed areas in the MRGV.

Objective 1: Improve existing wildlife observation opportunities on managed areas in the MRGV while avoiding conflicts with other species and public use management programs.

*How about a State?*

### Strategies:

1. Encourage existing heavy public visitation at BDA where facilities and staff are in place to handle current use levels and plans are being formulated to accommodate growing demands.
2. Continue the improvement of wildlife observation programs on DGFWAS.
3. Provide the public with an understanding of population and habitat management programs outlined in this plan.

Objective 2: Develop a comprehensive public use management plan to avoid negative impacts to wildlife resources on managed areas in the MRGV.

### Strategies:

1. Determine waterfowl, sandhill crane, and other migratory bird habitats and population use patterns sensitive to negative impacts generated from public use activities.
2. Coordinate public use planning with all agencies on managed areas to assure facility development plans are consistent in



avoiding negative impacts to species outlined in this plan and to assure consistency of interpretive themes.

### III. OPERATIONAL PLANNING AND RESPONSIBILITIES

As with the 1981 and 1987 Middle Rio Grande Valley Management Plans, implementation of this revision will require additional planning effort by organizational units with administrative responsibility for specific actions recommended in the plan. Although the plan presents goals, objectives, and strategies for the Middle Rio Grande Valley by species (or groups of species) and public use, the different actions proposed in the plan may be summarized by function:

- A. Protection and improvement of existing habitat for all species listed in the plan.
- B. Acquisition of additional habitat to enhance populations, disperse populations, or otherwise facilitate the management of listed species.
- C. Public education and information dissemination concerning the importance and MRGV management strategies of all species, and some of the problems associated with their management.
- D. Possible adjustments in current hunting regulations, including bag limits and open seasons.
- E. Wildlife resource and public use field investigations and application of field data to upgrade or realign management priorities among listed species regarding:
  - 1. species population trends, distributions, habitat conditions, productivity/mortality rates, disease

potentials, depredation problems, species composition, seasonality, use patterns, breeding status, etc. and appropriate database management.

2. public use trends and existing and potential resulting negative wildlife resources impacts and appropriate database management.

✓  
Data

F. Continued or enhanced law enforcement effort to alleviate problems caused by illegal harvest or environmental contamination.

G. Improved coordination of wildlife and public use management practices and regulatory responsibilities among State and Federal agencies.

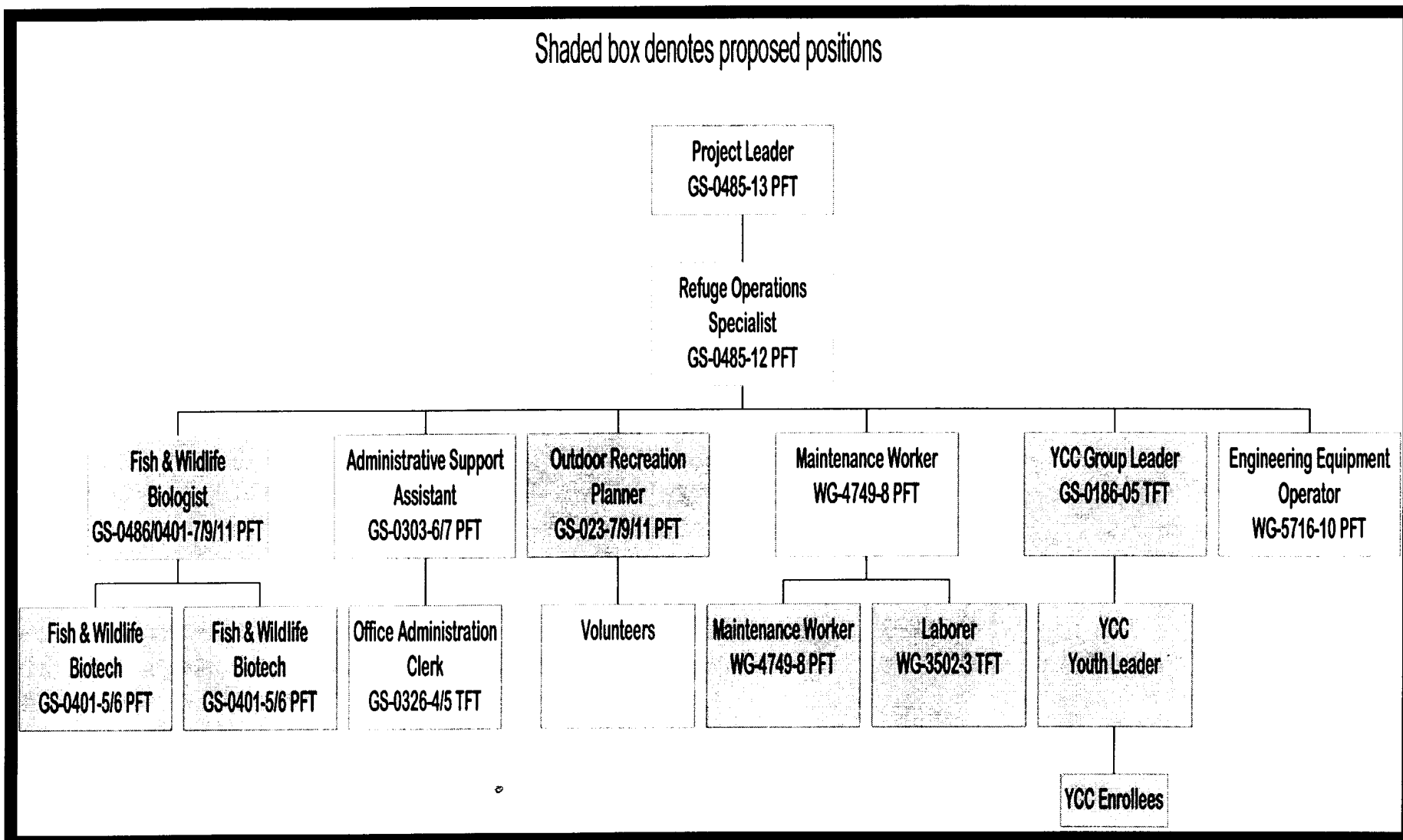
Table 4 presents a prioritized list of these general actions, references the species or groups of species to which they apply, and delineates the organizational entity with administrative responsibility for the action.

**Appendix K**  
**Proposed Full Staffing Level Chart**



# Proposed Full Staffing Level Sevilleta NWR

Shaded box denotes proposed positions





**Appendix L**  
**Legal Mandates**





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 Sevilleta NWR.

For those laws that provide special guidance and have strong implications relevant to the Service or Sevilleta NWR, legal summaries are offered below. Many of the summaries have been taken from *The Evolution of National Wildlife Law* by Michael J. Bean.<sup>1</sup> 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).
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."<sup>2</sup>*

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.*

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<sup>1</sup> Bean, Michael J., 1983. *The Evolution of National Wildlife Law*, Praeger Publishers, New York.

<sup>2</sup> *Ibid.*, pp. 181.

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."<sup>3</sup>*

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

*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."<sup>4</sup>*

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*

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<sup>3</sup> Ibid., pp. 125-126.

<sup>4</sup> Ibid., pp. 126.

*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.'"<sup>5</sup>*

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).

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.'"<sup>6</sup>*

*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*

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<sup>5</sup> *Ibid.*, pp. 125.

<sup>6</sup> *Ibid.*, pp. 331.

*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 Stat. 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 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."*<sup>7</sup>

*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. 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.*

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<sup>7</sup> Ibid., pp. 227.

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; 70 Stat. 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.*

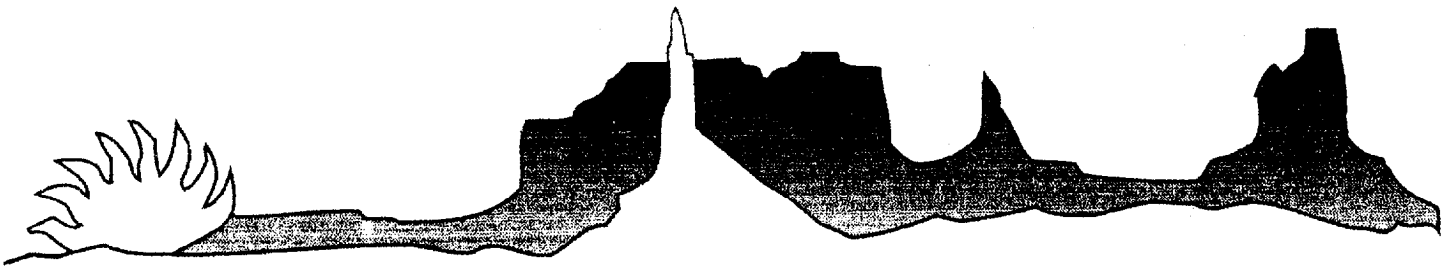
46. American Indian Religious Freedom Act: P.L. 95-341(1978), 92 Stat. 469, 42 USC 1996.
47. Executive Order 13007-Indian Sacred Sites. May24, 1996.
48. Native American Graves Protection and Repatriation Act (NAGPRA): {HR 5237} P.L.101- 601(1990), 104 Stat. 3048. 25 USC 3000-3013, 18 USC 1170.
49. 36 CFR 79: Curation of Federally-Owned and Administered Collections (55 FR 37616).





**Appendix M**  
**Public Comments**





## RIO GRANDE CHAPTER OF THE SIERRA CLUB

Mr. Paul Wharry  
Research management Consultants, Inc.  
6667 South Cherry Way  
Littleton, CO 80121

Dear Mr. Wharry,

The purpose of this letter is to comment on the Draft Comprehensive Conservation Plan and Environmental Assessment for the Sevilleta National Wildlife Refuge (NWR). Specifically, I would like to address the fact that the plan makes no mention of potential wilderness on the Sevilleta NWR. Having worked on the Sevilleta NWR myself, I am aware of its wilderness resources and I consider their omission to be a major oversight.

There should be an inventory of roadless lands on the Sevilleta NWR to assess the values and characteristics consistent with those outlined in the 1964 Wilderness Act. One area of particular concern is the Sierra Ladron roadless area. The Sevilleta portion of this area is over 13,000 acres in size and is contiguous with the much larger (over 36,000 acres) Sierra Ladron Bureau of Land Management (BLM) Wilderness Study Area (WSA) and additional roadless BLM lands. Wilderness designation for Sierra Ladron is a high priority for the Sierra Club. It is among New Mexico's most unique, remote, and biologically important landscapes.

It is worth noting that wilderness designation would be consistent with the current management of this particular area as a reintroduction site for rare desert bighorn sheep. In addition, the value of NWR wilderness can be illustrated by the four other NWR wilderness units in New Mexico which provide important values for wildlife and humans.

In conclusion I would ask that the Fish and Wildlife Service inventory all of the lands within the Sevilleta National Wildlife Refuge for wilderness characteristics. The Service should then make a recommendation as to which lands deserve full wilderness designation. Included among those recommended for permanent protection under the Wilderness Act should be the Sevilleta NWR's roadless lands on Sierra Ladron.

Sincerely

Martin Heinrich  
Wilderness Chair  
Rio Grande Chapter of the Sierra Club  
3817 Simms Ave. SE  
Albuquerque, NM 87108

Mr. Paul Wharry  
Research Management Consultants, Inc.  
6667 South Cherry Way  
Littleton, CO 80121

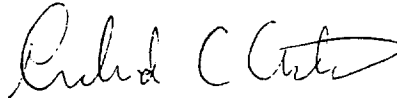
Dear Mr. Wharry,

This letter is a comment on the the November 30, 1998 Draft Comprehensive Conservation Plan and Environmental Assessment for the Sevilleta National Wildlife Refuge. Many many of the plans and goals in the draft are highly laudable. However, I feel that there is a very significant omission in that the Wilderness Act (P.L. 88-577, dated September 3, 1964) and the possibilities that it presents for the Refuge are not considered.

Specifically, the document does not address the important issue of Wilderness designation for more than 13,000 roadless acres of the Refuge in the Sierra Ladrones which indents into the Sierra Ladrones Bureau of Land Management (BLM) Wilderness Study Area (WSA) and other roadless lands. The Ladrones WSA is currently managed as Wilderness and is a high priority for both the BLM and by public advocacy groups such as the New Mexico Wilderness Alliance (NMWA) and the Wilderness Society for inclusion into the National Wilderness Preservation System. The acreage at issue, although only a small percentage of the Refuge, is characteristic of the increasingly rare natural Federal lands that Congress is obliged to protect for future generations via Wilderness Designation. The Sevilleta should pursue such designation for this area to ensure its future management as Wilderness consistent with the 36,000+ acres in the WSA and in adjoining BLM roadless areas. Incidentally, there is no stipulation in the Wilderness Act that an area previously closed to general public entry cannot remain closed after its designation as Wilderness.

There is a highly relevant precedent for Wilderness designation of lands in the National Wildlife Refuge system in Socorro county; the Bosque del Apache has for almost 20 years incorporated three units of Wilderness. These lands have proved to be both a valuable buffer for wildlife and a recreational resource for the Bosque and its visitors. I have no doubt that joint Wilderness designation of both BLM and FWS lands in the Ladrones would be similarly beneficial to the goals of the Sevilleta NWR as stated in the planning document as well as to the Citizens of New Mexico and the rest of the United States.

Sincerely  
Rick Aster  
NMWA Board Member  
1207 Vista Drive  
Socorro, New Mexico 87801



12/26/98  
1283 Wingate Rd.  
Las Cruces, NM 88001  
505/523-1595  
Fax 505/523-5406  
e-mail: "mbarlow@zianet.com"

Subject; Sevilleta National Wildlife Refuge  
Draft Comprehensive Conservation Plan and  
Environmental Assessment, dated 11-30-98;  
Comments Due 1-4-99

Mr. Lou Bridges, Project Coordinator  
Research Management Consultants, Inc.  
1746 Cole Blve., Bldg 21, Ste 300  
Golden, CO 80401

Dear Mr Bridges;

I understand that the subject DCCP&EA does not contain any language for wilderness consideration of Sevilleta although it is adjacent to a BLM WSA. and other roadless lands.

This appears to me to be a serious oversight that would impenge the integrity of your consulting entity.

I trust that you will correct this gross oversight immediately.

Furthermore, a 30 day period for comments is inadequate and an apparent intent to circimvent as much public input as possible.

I hope you will get your act together.



Sincerely Yours,  
Mel Barlow

WILD1.WPS



Ms. Julie Hicks  
3817 Simmons Ave SE  
Albuquerque, NM 87108  
(505) 232-7151


Mr. Paul Wharry  
Research management Consultants, Inc.  
6667 South Cherry Way  
Littleton, CO 80121

Dear Mr. Wharry,

I am writing regarding the Draft Comprehensive Conservation Plan and Environmental Assessment for the Sevilleta National Wildlife Refuge. I would like to raise the issue of wilderness designation for Sierra Ladron on the Sevilleta Refuge. Not to consider wilderness designation for this area would be a travesty, especially when considering that the refuge roadless portion of Sierra Ladron abuts the enormous and spectacular BLM Sierra Ladron Wilderness Study Area which is almost sure to achieve eventual wilderness status.

Please consider adding a section to plan regarding the management of defacto wilderness areas within the refuge. Also, I would ask that you recommend the Sierra Ladron area to Congress for permanent wilderness designation. All other roadless areas on the refuge should be studied for potential wilderness protection.

Sincerely

  
Julie Hicks

A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community ...

Aldo Leopold

# NEW MEXICO WILDERNESS ALLIANCE



January 2, 1999

Mr. Lou Bridges, Project Coordinator  
Research Management Consultants, Inc.  
1746 Cole Blvd. Bldg. 21, Suite 300  
Golden, CO 80401

Dear Mr. Bridges,

This letter is a formal comment on the November 30, 1998 Draft Comprehensive Conservation Plan and Environmental Assessment for the Sevilleta National Wildlife Refuge (NWR) by the New Mexico Wilderness Alliance. Although many of the plans and goals in the draft are highly laudable, there is a very significant omission in that the Wilderness Act (P.L. 88-577, dated September 3, 1964) and the possibilities that it presents for the Refuge are not considered.

Specifically, the document does not address the important issue of Wilderness designation for more than 13,000 roadless acres of the Refuge in the Sierra Ladrones, which indent into the Sierra Ladrones Bureau of Land Management (BLM) Wilderness Study Area (WSA) and other roadless lands. The Sierra Ladrones WSA is currently managed as Wilderness and is a high priority for both the BLM and by public advocacy groups such as the New Mexico Wilderness Alliance and the Wilderness Society for inclusion into the National Wilderness Preservation System. Although only a small percentage of the Refuge, the acreage at issue is characteristic of the increasingly rare natural Federal lands that Congress is mandated to protect for future generations via Wilderness Designation. The Sevilleta NWR should consider pursuing such designation for this area to ensure its future management as Wilderness consistent with the 36,000+ acres in the WSA and in adjoining BLM roadless areas.

There is a highly relevant precedent for Wilderness designation of lands in the National Wildlife Refuge system in Socorro County, in that the Bosque del Apache NWR has for almost 20 years incorporated three units of Wilderness. These lands have proved to be both a valuable buffer for wildlife and a recreational resource for Bosque del Apache visitors. Joint Wilderness designation of both BLM and FWS lands in the Sierra Ladrones would be similarly beneficial to the goals of the Sevilleta NWR as stated in the document, as well as to the Citizens of New Mexico and the rest of the United States.

The New Mexico Wilderness Alliance requests that the potential for Wilderness designation and management of the Sierra Ladrones portion of the Sevilleta NWR be fully considered and included in the Final Comprehensive Conservation Plan and Environmental Assessment for the Sevilleta NWR.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert E. Howard". The signature is fluid and cursive, with a large initial "R" and "H".

Robert E. Howard, M.D., Ph.D., Chairperson  
New Mexico Wilderness Alliance  
14 Reno Place  
Santa Fe, New Mexico 87505

## NEW MEXICO NATURAL HISTORY INSTITUTE

A Nonprofit Corporation

1750 Camino Corrales  
Santa Fe, New Mexico 87505-7502

29 December 1998

Mr. Paul Wharry  
Research Management Consultants, Inc.  
6667 South Cherry Way  
Littleton, Colorado 80121

*Comment on Draft Comprehensive Plant,  
Sevilleta National Wildlife Refuge*

Dear Mr. Wharry:

We find the Draft Comprehensive Plan for the Sevilleta Refuge to be full of good goals and objectives but confusing in its presentation. Ecosystem management is, we think, misunderstood in the document. Though not a "legal mandate" for the Refuge, we think that you err in omitting possible actions under the Wilderness Act of 1964. We discuss these points.

The stated goals seem comprehensive and good. They overlap somewhat, partly because you have distinguished Goal 1 from Goal 2 though 1 is logically part of 2. Goals 4 and 9 (and 8 in part) are not goals but are mere strategies to achieve other goals. The "objective" "Restore and maintain natural hydrological regimes" is a goal toward which the "goal" "Protect existing and secure additional water rights" is in fact a strategy.

Similarly there is confusion between objectives and strategies. A notable example is on p. 48 (and p. 8): "Document the need for additional staffing" is a strategy by which to "Acquire additional base funding to meet the staffing needs," rather than the other way around.

Some of the goals are so broad as to be applicable anywhere and are not given any shape by supporting text for application to the Sevilleta. A major example is Goal 2 which calls for restoration of native flora and fauna: nowhere does the draft plan hint at what flora and fauna (other than those already covered under Goal 1) are in need of restoration. Are there any?

The summary (pp. 7-9) is particularly confusing. Goals should precede objectives. Objectives can only be clear if related to their goals, as is done on pp. 36-50. As presented in the summary several objectives are repetitive between themselves. For instance, "Protect, restore, and maintain upland terrestrial communities..." is included in "Use sound land use practices and management tools to protect upland terrestrial habitats..." "Provide the general public with high quality wildlife dependent experiences" is included in "Provide the general public with high quality environmental education and wildlife dependent experiences."

Ecosystem management (EM) is mentioned on pp. 5, 8, 11, and 50. On p. 50 it is misplaced under "Interagency Coordination," with which it has little to do. Apparently you are understanding (or misunderstanding, we would say) the main thrust of EM to be "big area," in this case the "Upper/Middle Rio Grande Ecosystem." We understand the main thrust to be on ecology and sustainability, not on geography. In the burgeoning literature on EM are many definitions of EM, for instance "Management of ecological entities and processes to achieve and sustain desirable ecosystem structure, composition, and function, while providing, to the extent possible, those commodities and services desired by the public."



Nothing about size, there. The journal Conservation Biology is a good place to examine the EM concept, for instance at 8: 27-38, 9: 255-262, 11: 48-58, and 11: 41-47; also the journals Ecological Applications and Journal of Forestry. EM is a strategy—a mandated strategy—for achieving Goal 2 (Restore and maintain natural diversity). If the strategy includes coordination outside Refuge boundaries, fine; but that fact should not demote EM from the centrally important Goal 2 to the low-level “goal” (or better, strategy) of interagency coordination. If you do insist that EM must be related to some one area or “ecosystem,” you should define that area or ecosystem. The Rio Grande and its floodplain might reasonably be taken as an ecosystem, the “Upper/Middle Rio Grande Ecosystem” (p. 11), but then you speak (on p. 7, for instance) of “upland terrestrial communities” in the Rio Grande Ecosystem. That seems to leave the “ecosystem” undefined. The Refuge lowlands are part of a riverine ecosystem; uplands belong to the Chihuahuan Desert and other ecosystems. What ecosystem are you talking about?

The Wilderness Act of 1964 applied only to lands then managed by the government, so there has been no requirement that Sevilleta lands be reviewed for wilderness. But wilderness designation provides an excellent tool to achieve Refuge goals. Large parts of Bitter Lake and Bosque del Apache refuges are designated wilderness, and a BLM wilderness study area (recommended by the Bureau for wilderness designation) occupies most of the Sierra Ladrones. We recommend that in Section 5.8 (Land Protection) or 5.10 (Interagency Coordination), study of the Ladron Mountain area adjacent to BLM lands for wilderness designation be included as an objective or strategy, with some cutoff (in the year 2004?) for formulating a recommendation to the Secretary of Interior.

**Details:**

p. 10 claims that the Refuge achieves an elevation of 9176 feet. Not true. The Refuge's highest point is a mile south of that peak at about 8650 feet. The correct (USGS-approved) name of the mountain range is Sierra Ladrones, not Ladron Mountains.

p.18. Your account of geology is full of errors, omissions, and incorrect phrasing.

In the middle of p. 19, the bajada surface must extend westward, not eastward, to the river.

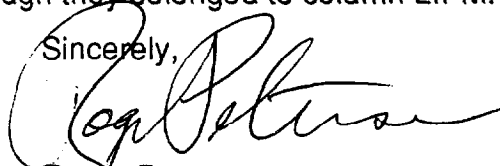
pp. 20, 38, & 39 call for restoration of Unit A wetland. I can't find Unit A. In the legend of the Special Projects map it is said to be near headquarters. Is there wetland near headquarters?

On the same Special Projects map a large area is speckled. What does that mean?

To be meaningful the Transportation/Utility Network map should show the Refuge boundary.

In the Plant Checklist appendix, abbreviations p and p- are correctly used in the column headed LICY but they are explained as though they belonged to column LIFM.

Sincerely,



Roger Peterson  
Secretary

December 12, 1998

Mr. Paul Wharry  
Research Management Consultants, Inc.  
6667 South Cherry Way  
Littleton, CO 80121

Re: Sevilleta National Wildlife Refuge (SNWR)  
Comprehensive Conservation Plan (CCP)

Dear Mr. Wharry,

I. This is a formal request to have the Socorro Soil and Water Conservation District (SSWCD) and the La Joya Acequia (LJA), both governmental subdivisions of the State of New Mexico, included as partners, participating in the development of the SNWRCCP.

The total area of the SNWR is included in the SSWCD which is mandated by state law to "conserve and develop the natural resources of the state" section 73-20-26 B5 NMSA 1978. The LJA runs the length of the private land that lies in the center of the SNWR, is the quasi governing authority in this area, and has statutory responsibilities over it's 1700 acres of irrigable land.

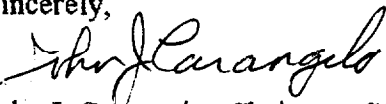
Both entities welcome the presence of the SNWR and are prepared to assist in the development of the CCP, and will provide constructive, co-operative participation where our interest and statutory responsibilities are involved. In addition this would put the USFWS in compliance with the code of Federal Regulations, specifically 40 CFR-1506.2 and also be in line with many of the objectives of your CCP.

II. The content and quality of the included maps should be improved.

III. On a public relations matter, it would be desirable to have the village of La Joya shown on all maps. The SNWR was once the Sevilleta de La Joya Spanish land grant. The present inhabitants and descendants of the grantees still have strong ties to the land and are extremely sensitive about losing the identity of themselves or their village.

IV. The informational content of the CCP is excellent. Basically the balance is a superficial overview of intent, containing insufficient detail to allow any substantive agreement or disagreement with the aims, goals, objectives, etc. of the CCP. The partnerships requested will assist in the development of the details resulting in a minimum of controversy.

Sincerely,

  
John J. Carangelo- Chairman, SSWCD  
Mayordomo LJA

Mr. John J. Carangelo  
P.O. Box 24  
La Joya, NM 87028

Tel 505-864-5904  
Fax 505-864-5904  
email marjon@flash.net

# **T & E, Inc.**

**Box 1498**

**Cortaro, Arizona 85652**

**Tel.: (520) 572-0998**

**FAX: (520) 572-0962**

**~~E-mail: twetten@t-e.com~~**

**January 4, 1999**

**Mr. Paul Wharry  
Research Management Consultants Inc.  
6667 South Cherry Way  
Littleton, Colorado 80121**

**Re: Sevilleta National Wildlife Refuge Draft  
Comprehensive Plan**

**Dear Mr. Wharry:**

**Your statement that Sevilleta NWR has the potential to be a powerhouse in the wildlife and natural resource management and education arenas is if not perfect, is an understatement. Nevertheless this potential can not be realized if the area does not receive proper treatment to preserve or enhance the naturalness of the refuge and its environs.**

**Your draft plan addresses most of our primary concerns for the area, and we think it is well conceived. We wish to reiterate three points upon which the whole plan is dependent. These should be top priorities for the refuge.**

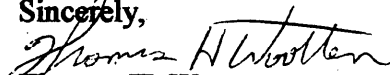
- 1) Preservation of the naturalness of the area is paramount. One current disruption of naturalness is the research being conducted on the refuge. We support research on the refuge but feel it is imperative that the refuge gain the needed staff to insure strategies 1,2, and 5 and 8 under objective 3, under 5.3 "Research" are carried out. There are examples of research materials being left in the area, too many roads are being constructed, and the refuge does not even have a record of what research has been done, is being done or is intended to be done. Centralizing the research activities and assuring that control is in the hands of refuge personnel who will look at resource protection foremost is absolutely imperative.**
- 2) Obtaining exclusive water rights and rights for "instream flow" is critical to maintaining and restoring the natural ecosystems. Your plan underscores this. We suggest that this be a top priority for the refuge.**

***A not for profit corporation dedicated to the appreciation and preservation of our native flora and fauna***

- 3) Given the goal of increasing public education and outreach, we again emphasize the need for staff to manage this addition. Expanding the operations of the refuge should only be done with the additional required staff or at a minimum, assurance that they are coming on board.

Finally, our big surprise and disappointment comes not at an inclusion but an omission from your plan. Nowhere do we see mention or recommendation for considering any part of the refuge as wilderness designated under the Wilderness Act (Public Law 88-577). We are surprised since management of this refuge has always been tied closely to Bosque del Apache NWR where Wilderness designation has proven very valuable in protecting the naturalness of that refuge. Especially the northwestern part of Sevilleta, which abuts the Sierra Ladrone Wilderness Study Area (designated by BLM), should be added to our New Mexico Wilderness System. Other areas of the refuge also likely have wilderness qualities and we believe wilderness designation is the most effective tool available to accomplish your primary goal, preservation of the species and naturalness of the refuge. Please consider this as an addition to your otherwise excellent plan.

Sincerely,

  
Thomas H. Wootten  
President

*Please note our change of address.*



# National Wildlife Refuge Association

Dedicated to the protection and perpetuation of the National Wildlife Refuge System

---

c/o Great Meadows NWR  
Weir Hill Road  
Sudbury, MA 01776

January 7, 1999

Research Management Consultants, Inc.  
1746 Cole Blvd., Suite 300  
Golden, CO 80401

Dear Sir,

I was recently sent a draft copy of the Comprehensive Conservation Plan and Environmental Assessment for the Sevilleta National Wildlife Refuge in Socorro County, NM. There were no accompanying instructions that I could find, but I presume it was sent for review and comment. Frankly, my time is limited, and I have been away from the area for almost 25 years, so my comments will lack specificity. Nonetheless, I have glanced through the CCP/EA and would like to offer some general comments.

I was supervisor of the U.S. Fish and Wildlife Service's (FWS) Albuquerque Realty Office in 1973 and thus directed the FWS' activities relating to the establishment of the Sevilleta NWR. While a number of people were involved in the acquisition of the Sevilleta land grant and the establishment of the refuge, the principals involved were Mrs. Elizabeth Ann Campbell Knapp, as president of the Campbell Family Foundation, Pat Noonan, as president of The Nature Conservancy, and me on behalf of the FWS.

I mention the above as we three negotiated the purpose, objectives, and terms of the donation and long term land stewardship. The degraded condition of the land imposed its own conditions. Collectively, we agreed the Sevilleta held great promise if sensitively managed and protected for decades, if natural processes were allowed to occur, and if public uses were limited for the foreseeable future (and beyond?). The primary uses to be encouraged were research and education. Our purposes and vision were cemented in the conditions, reservations, and restrictions set forth in the December 1973 warranty deed from TNC to the USA. They were crafted by TNC and the FWS in order to: 1) ensure the purposes and vision were followed; 2) provided the FWS, at the same time, maximum management flexibility; and 3) minimize political interference with management operations. I wrote an article (attached) for the 1974 spring issue of The Nature Conservancy magazine explaining what we did, how and why we did it, and what our early vision was.

In my judgement, the CCP/EA captures the original purposes for setting up this refuge by the donors (CFF and TNC) and the FWS, and it embraces the legislative requirements for national wildlife refuges.

A caution I would interpose would center on public use, of whatever type. Loosen controls too quickly and too much and you play hell trying to get things under control again. I visited Sevilleta a year ago and was impressed by its recovery over the past 25 years, but the patient is far from healed. That fact, and the research activities on-going and to come, means that special care, concern and study must be given any increased public use activity. With respect to Public Use, I see potential conflicts in 5.2 Wildlife Habitat Management Objective 12 and those goals and objectives listed under 5.5 Compatibility and Public Use. A visitor center will add pressures, though I believe the right type of visitor center in the right location is a positive development. But again, care. The National

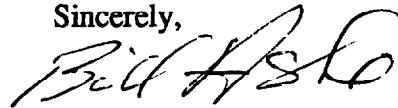
Wildlife Refuge System Improvement Act of 1997, with its emphasis on public use and the six "compatible wildlife dependent uses" may present its own pressures and problems. Finally, I am not sure we were thinking of a housing facility for TNC "and their clients" when we set up the refuge. I would like to see the compatibility determination on that one (can we work in membership drive for TNC?).

The CCP/EA cites in several places "the Campbell Family Foundation sold the property to TNC, who in turn donated it to the FWS..." Actually, it is more accurate to say the CFF conveyed, not sold, the property to TNC. Due to the compressed work schedule, and the fact it was to be a donation to the FWS, no detailed appraisal of the property was made at the time, but we estimated its value as between \$6 and \$12 million. TNC's payment of \$500,000 to CFF covered some of the latter's expenses and not its land value. I used the word conveyed, not sold, in my draft article to TNC's magazine. They changed the word, without my concurrence. It was the one and only change in my draft. However, it brought the wrath of Mrs. Knapp down on my head. It was a sensitive issue the the CFF for years [ and may still be. I suggest the word conveyed. It's more accurate. (For example, the CFF conveyed a \$6-12 million property to TNC for \$500,000 - for transfer to the FWS for use as a national wildlife refuge. The \$500,000 covered some of CFF's expenses. Was that a sale or a donation? It's the latter in b=my book, and in CFF's.)

On page 29, under the NWRS Improvement Act of 1997, it states "This law is the first "organic" act for the National Wildlife Refuge System." And it is. On the very next page, second paragraph, it states "The Service has no "organic" act to focus upon..." Two paragraphs later it changes again. A reason for the inconsistency?

Thanks for the opportunity to comment. It's like walking an old, familiar trail.

Sincerely,



William C. Ashe  
Director

cc: T. Tadano, FWS  
FWS, Refuges, Region 2

**Written Comments to the Sevilleta National Wildlife Refuge  
Draft Comprehensive Conservation Plan & Service  
Responses**

**Correspondence 1:**

*I understand that the subject DCCP & EA does not contain any language for wilderness consideration of Sevilleta although it is adjacent to a BLM WSA and other roadless lands. This appears to me to be a serious oversight that would impinge the integrity of your consulting entity. I trust that you will correct this gross oversight immediately. Furthermore, a 30 day period for comments is inadequate and an apparent intent to circumvent as much public input as possible.*

**Correspondence 2:**

*I would like to address the fact that the plan makes no mention of potential wilderness on the Sevilleta NWR . . . . I consider their omission to be a major oversight.*

*There should be an inventory of roadless lands on the Sevilleta NWR to assess the values and characteristics consistent with those outlined in the 1964 Wilderness Act. One area of particular concern is the Sierra Ladron roadless area. The Sevilleta portion of this area is over 13,000 acres in size and is contiguous with the much larger (over 36,000 acres) Sierra Ladron Bureau of Land Management (BLM) Wilderness Study Area (WSA) and additional roadless BLM lands. Wilderness designation for Sierra Ladron is a high priority for the Sierra Club. It is among New Mexico's most unique, remote, and biologically important landscapes. It is worth noting that wilderness designation would be consistent with the current management of this particular area as a reintroduction site for rare desert bighorn sheep. In addition, the value of the NWR wilderness can be illustrated by the four other NWR wilderness units in New Mexico which provide important values for wildlife and humans.*

**Correspondence 3:**

*Many many of the plans and goals in the draft are highly laudable. However, I feel that there is a very significant omission in that the Wilderness Act and the possibilities that it presents for the Refuge are not considered.*

*Specifically, the document does not address the important issue of Wilderness designation for more than 13,000 roadless acres of the Refuge in the Sierra Ladrones which indents into the Sierra Ladrones Bureau of Land Management (BLM) Wilderness Study*

*Area (WSA) and other roadless lands. . . . The Service should pursue such designation for this area to ensure its future management as Wilderness consistent with the 36,000 acres in the WSA and in adjoining BLM roadless areas. Incidentally, there is no stipulation in the Wilderness Act that an area previously closed to general public entry cannot remain closed after its designation as Wilderness.*

**Correspondence 4:**

*Please consider adding a section to the plan regarding the management of defacto wilderness areas within the refuge. Also, I would ask that you recommend the Sierra Ladron area to Congress for permanent wilderness designation. All other roadless areas on the refuge should be studied for potential wilderness protection.*

**Service Response to Correspondence 1-4:**

During the development of this plan, wilderness interests have suggested the refuge target up to 13,000 acres near the Sierra Ladron in the extreme northwestern section of the refuge for possible wilderness designation. In review of refuge land uses, a limited area could be targeted for this purpose. A wilderness designation would protect portions of the refuge and preserve its naturalness by legally preventing any artificial developments in this area.

The majority of the 13,000 acre area would appear to be appropriate for wilderness designation. The Sierra Ladron is a steep, rugged, and massive mountain, with no structures present except for the refuge boundary fence. In the foothills, however, there are numerous ongoing research projects, with many being 10 years in length. Without loss of years of data, it would be virtually impossible to move them since the projects are site specific. Considering all the factors including past, current, and future uses of the area, a 3,000- to 8,000- acre area would better meet refuge and its research cooperators' goals. A 3,000-acre area, which is outside the refuge boundary fence, joins the proposed wilderness area on the Bureau of Land Management's (BLM) property in the extreme northwest corner of the refuge. This is the first option since the wilderness designation would assist in the management of the unfenced area. The second option would be to target the 8,000-acre area and would allow the Refuge to continue its current and future programs and to continue to provide the researchers a stable location for their long-term research.

The final acreage configuration of the Sierra Ladron Wilderness Study Area, would likely need no further study due to its present roadless undeveloped wilderness compatible character. Additionally, this plan does not provide for strategies or



approaches that would create permanent improvements, structures, roadways, or the need for motorized access that would diminish the area's wilderness potential. [See Map #1]

***Other Refuge-wide Wilderness Study Possibilities –***

Nevertheless, by virtue of Service policy the refuge is responsible for determining wilderness possibilities for a full spectrum of refuge lands. A bit more time will be necessary to assess the full spectrum of refuge lands keeping mind current commitments to long term research that necessitate technologies, access, and tools not consistent with the strict requirements of the Wilderness Act of 1964. Any additional Wilderness Study Areas identified will be under focused monitoring and study, however, they will be managed as de facto wilderness in accordance with Service policy and as set forth in the Wilderness Act of 1964.

In the case of all areas identified as Wilderness Study Areas, the refuge would not implement any strategies that would attenuate future wilderness designation.

The consulting firm had nothing to do with the Service's original decision to forgo a wilderness option, knowing full well that wilderness designation is a Congressional process. The 30-day comment period was not meant to circumvent public input and, in fact, the Service extended the period to allow for additional comments. We appreciate the interest in both wilderness and the National Wildlife Refuge System.

**Correspondence 5:**

*The stated goals seem comprehensive and good. They overlap somewhat, partly because you have distinguished Goal 1 from Goal 2 though 1 is logically part of 2. Goals 4 and 9 (and 8 in part) are not goals but are mere strategies to achieve other goals. The "objective" "Restore and maintain natural hydrological regimes" is a goal toward which the "goal" "Protect existing and secure additional water rights" is in fact a strategy. . . . Similarly, there is confusion between objectives and strategies. . . . We recommend . . . study of the Ladron Mountain area adjacent to BLM lands for wilderness designation be included as an objective or strategy, with some cut off for formulating a recommendation to the Secretary of the Interior.*

### **Service Response:**

Thank you. It is always very difficult when attempting to be comprehensive not to have overlap between various goals and their subsequent objectives. This plan attempts to cover all bases and in doing so has a built in redundancy that can be confusing to the reading public, but is a way to ensure that no matter what topic is being considered, the resource need is being taken care of. Good contingency management always requires some level of redundancy. With respect to the goal and objective statements and how they are crafted, the Service considers the higher value as the “restoration” and the lesser value as the approach of “protection” in order to achieve the restoration.

Regarding the “confusion between objectives and strategies,” the Service has crafted some of its objectives to carry within them a certain level of specificity with regard to a major management approach. For instance, acquiring additional water rights is indeed a strategy for protecting hydrologic regimes; however, it is an extremely important approach and should be incorporated into the objective statement.

The Service has incorporated a wilderness study objective in the final CCP.

### **Correspondence 6:**

*This is a formal request to have the Socorro Soil and Water Conservation District and the La Joya Acequia, both governmental subdivisions of the State of New Mexico, included as partners, participating in the development of the CCP. . . . Both entities welcome the presence of the SNWR and are prepared to assist in the development of the CCP, and will provide constructive, cooperative participation where our interest and statutory responsibilities are involved . . . . The content and quality of the included maps should be improved. . . . the informational content of the CCP is excellent. Basically the balance is a superficial overview of intent, containing insufficient detail to allow any substantive agreement or disagreement with the aims, goals and objectives of the CCP.*

### **Service Response:**

The refuge manager agrees as does the Service as a whole that as adjacent jurisdictions, both the Socorro Soil and Water Conservation District and the La Joya Acequia are important stakeholders in the development of the plan and the management of the refuge. The Service honors your request and will be including both entities in the completion and implementation process of the CCP.

The maps in the draft were only draft maps. Hopefully those provided in the final document will be an improvement.

Comprehensive plans are meant to be specific but not so specific as to disallow adaptive management when necessary. Hopefully, the CCP is specific enough to call for specific approaches to be undertaken in order to achieve a more general objective and goal. With respect to those strategies that might affect our stakeholders, implementation will not occur without coordination with the potentially affected landowners and jurisdictions. That in itself is one of the goals of the CCP.

### **Correspondence 7:**

*Your statement that Sevilleta NWR has the potential to be a powerhouse in the wildlife and natural resource management and education arenas is if not perfect, is an understatement. Nevertheless this potential can not be realized if the area does not receive proper treatment to preserve or enhance the naturalness of the refuge and its environs. . . . One current disruption of naturalness is the research being conducted on the refuge. We support research on the refuge but feel it is imperative that the refuge gain the needed staff to insure strategies. . . . Centralizing the research activities and assuring that control is in the hands of refuge personnel who will look at resource protection foremost is absolutely imperative. . . . Obtaining exclusive water rights and rights for “instream flow” is critical to maintaining and restoring the natural ecosystems. Your plan underscores this. We suggest that this be a top priority for the refuge. . . . Given the goal of increasing public education and outreach, we again emphasize the need to staff to manage this addition. . . . Finally, our big surprise and disappointment comes not at an inclusion but an omission from your plan. Nowhere do we see mention or recommendation for considering any part of the refuge as wilderness designated under the Wilderness Act. . . . Please consider this as an addition to your otherwise excellent plan.*

### **Service Response:**

Management of national wildlife refuges is primarily based on the “purposes for which they are established.” In Sevilleta NWR’s case, the purposes are tied directly to the warranty deed and associated restrictive covenants. Included in these restrictions is the charge that the refuge be managed for “naturalness.” However, another purpose noted in the covenants is that the refuge be a resource for scientific research. We believe the goals, objectives and strategies effectively balance the Refuge’s duty to both purposes. With respect to instream flow rights, we agree it is a top priority. Increases in staffing and funding to accomplish the full scope of this plan will be necessary. Our expectation is that

the plan can be used as a tool to assist in acquiring increases in staffing and funding.

The majority of the 13,000 acre area would appear to be appropriate for wilderness designation. The Sierra Ladron is a steep, rugged, and massive mountain, with no structures present except for the refuge boundary fence. In the foothills, however, there are numerous ongoing research projects, with many being 10 years in length. Without loss of years of data, it would be virtually impossible to move them since the projects are site specific. Considering all the factors including past, current, and future uses of the area, a 3,000- to 8,000- acre area would better meet refuge and its research cooperator's goals.

The final acreage configuration of the Sierra Ladron Wilderness Study Area, would likely need no further study due to its present roadless undeveloped wilderness compatible character. Additionally, this plan does not provide for strategies or approaches that would create permanent improvements, structures, roadways, or the need for motorized access that would diminish the area's wilderness potential. [See Map #1]

***Other Refuge-wide Wilderness Study Possibilities –***

Nevertheless, by virtue of Service policy the refuge is responsible for determining wilderness possibilities for a full spectrum of refuge lands. A bit more time will be necessary to assess the full spectrum of refuge lands keeping mind current commitments to long term research that necessitate technologies, access, and tools not consistent with the strict requirements of the Wilderness Act of 1964. Any additional Wilderness Study Areas identified will be under focused monitoring and study, however, they will be managed as de facto wilderness in accordance with Service policy and as set forth in the Wilderness Act of 1964.

In the case of all areas identified as Wilderness Study Areas, the refuge would not implement any strategies that would attenuate future wilderness designation.

**Correspondence 8:**

*In my judgement, the CCP/EA captures the original purposes for setting up this refuge by the donors, Campbell Family Foundation and The Nature Conservancy (CFF and TNC), and the FWS; and, it embraces the legislative requirements for national wildlife refuges. A caution I would interpose would center on public use, of whatever type. Loosen controls too quickly and too much and you play hell trying to get things under control again. I visited Sevilleta a year ago and was impressed by its recovery over the past 25 years, but the patient is far from healed. In fact, and the research activities on-going and come, means that special care, concern and*

*study much be given any increased public use activity. With respect to Public Use, I see potential conflicts. . . . A visitor center will add pressures, though I believe the right type of visitor center in the right location is a positive development. But again, care. The National Wildlife Refuge System Improvement Act of 1997, with its emphasis on public use and the six "compatible wildlife dependent uses" may present its own pressures and problems.*

**Service Response:**

The public use aspects of the program are those that enhance the refuge's capacity to be in the forefront as a wildlife education and research powerhouse. The Service will continue to restrict public access to the refuge as a whole but allow controlled access in areas of the refuge nearer to the visitor center and headquarters to be a window on the many diverse aspects of this unique refuge. In all cases, the goal will be to educate those members of the public who do have access. This will mean the need to have an interpretive master plan in place as described in the CCP. Additionally, research activities will continue to be restricted generally to areas on the refuge that already have road access. It is interesting to note that on this almost 229,000-acre refuge, less than 5 percent of the lands are used for research projects. The refuge does not expect pronounced increases in lands on the refuge committed to any specific research projects over the next 20 years.

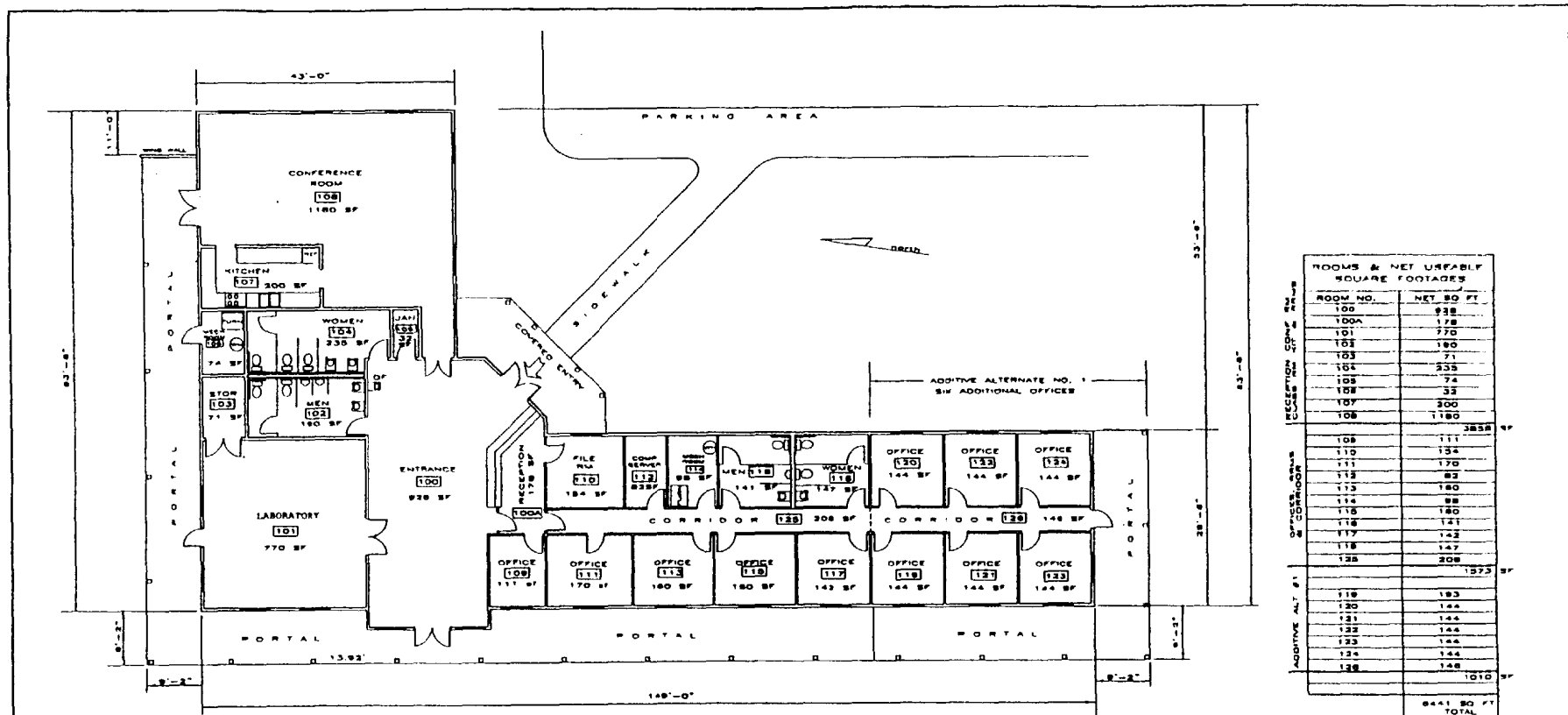


## **Appendix N**

**Memorandum of Understanding (MOU) between the USFWS, The Nature Conservancy, and University of New Mexico, For Planning, Construction And Management of a Joint Use Visitor, Administration, and Interpretation Facility**

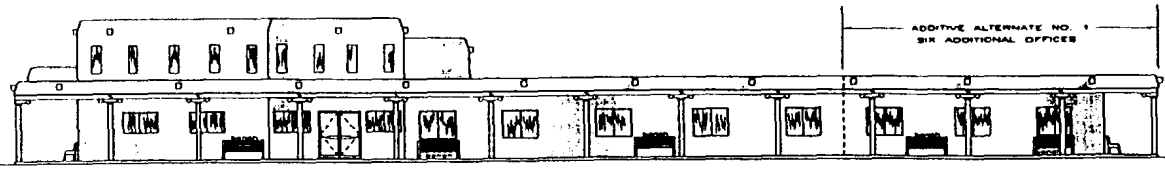






ROOMS & NET USEABLE SQUARE FOOTAGES	
ROOM NO.	NET SQ FT
100	920
100A	178
101	770
102	190
103	71
104	230
105	74
106	35
107	300
108	1180
3858	
109	111
110	152
111	170
112	83
113	180
114	88
115	180
116	121
117	122
118	147
119	308
1573	
120	183
121	144
122	144
123	144
124	144
125	144
1010	
8441 SQ FT TOTAL	

FLOOR PLAN  
1/8" = 1'-0"



EXTERIOR ELEVATION  
1/8" = 1'-0"



U.S. FISH AND WILDLIFE SERVICE	
DIVISION OF ENGINEERING	
BEVILLETTA NATIONAL WILDLIFE REFUGE	
COUNTY NEW MEXICO	
NEW OFFICES AND CLASSROOM BLDG	
DESIGN PHASE	
FLOOR PLAN AND ELEVATION	
DATE	SCALE
DESIGNED BY	CHECKED BY
DRAWN BY	DATE
PROJECT NO.	SCALE
DATE	SCALE
DATE	SCALE



MEMORANDUM OF UNDERSTANDING BETWEEN  
THE U.S. FISH AND WILDLIFE SERVICE,  
THE NATURE CONSERVANCY, AND THE UNIVERSITY OF NEW MEXICO,  
LONG TERM ECOLOGICAL RESEARCH PROGRAM,  
SEVILLETA RESEARCH FIELD STATION

For the Planning, Construction, and Management of a Joint Use  
Visitor/Administrative and Interpretive Educational Facility at Sevilleta National  
Wildlife Refuge

**Article I. Preamble**

This Memorandum of Understanding (MOU) is made and entered into between **Sevilleta National Wildlife Refuge**, herein referred to as **The Refuge**, under the auspices of the **U.S. Fish and Wildlife Service**, herein referred to as **The Service**, acting pursuant to authorities granted in the National Wildlife Refuge System Improvement Act of 1997, (Public Law 105-57), and the National Wildlife Refuge Administration Act (Public Law 86-669), as amended; **The Nature Conservancy**, herein referred to as **TNC**, acting pursuant to authorities and responsibilities specified in the warranty deed dated December 28, 1973, between TNC and the United States of America; and **The University of New Mexico (UNM), Department of Biology, Sevilleta Research Field Station**, herein referred to as the **Research Field Station**, acting pursuant to its responsibilities in accordance with UNM's Mission and State law, and operating under the terms and conditions of Permit M-4 (*Exhibit A*), to operate and maintain a biological research facility on **The Refuge**. When considered jointly in this MOU, the above-referenced entities will hereinafter be referred to as **The Parties**.

**Article II. Recitals**

**Whereas**, the primary purpose of this MOU is to define all project contingencies, terms, short- and long-term site management/maintenance requirements, agency responsibilities, any stipulations, and the roles of **The Parties**, leading to the planning, construction, and management of a joint-use, visitor/administrative and interpretive educational facility ("facility") at **The Refuge**.

**Whereas**, this MOU informally established and defines tentative or proposed monetary, equipment, and in-kind contributions by **The Parties**, *it does not provide for a final obligation of funds by The Parties*. Final obligations will be defined pursuant to this MOU and after **The Parties** have agreed to and approved cost estimates based upon project scope, plans and specifications developed by **The Service**.

**Whereas, The Service** owns and controls lands legally defined within the State of New Mexico, to be the Sevilleta National Wildlife Refuge as detailed in the Warranty Deed, hereto attached and marked *Exhibit B*.

**Whereas, The Service** received such title from **TNC** for inclusion into the National Wildlife Refuge System, subject to certain restrictive covenants also detailed in such Warranty Deed, including the provision allowing research activities consistent with regulations and policies of the National Wildlife Refuge system, and subject to review and approval of each research proposal by **TNC** in consultation with **The Refuge**.

**Whereas, UNM** coordinates research activities under the National Science Foundation (NSF) sponsored Long Term Ecological Research Program (LTER); and whereas such research activities on **The Refuge** are authorized and subject to the provisions defined in Permit M-4 (*Exhibit A*), executed June 1, 1991, for a term of 25 years.

**Whereas, The Refuge** is in severe and dire need of a new administrative facility and the Comprehensive Conservation Plan for **The Refuge** calls for the development and construction of a new facility to accommodate administrative and visitor needs.

**Whereas, it is recognized that The Service's** funding alone could not provide for any more than a basic administrative facility; and, expansion of said facility to include educational outreach facilities, classroom facilities, interpretive displays, and additional offices for **TNC** purposes, necessitates contributions and participation from **the Research Field Station** and **TNC**.

**Whereas, it is recognized that MOU** cooperation will assist in maximizing resources for both planning and construction of a facility that benefits **The Refuge** and **The Parties**, while conforming to and supporting the purposes for which **The Refuge** was established, and therefore, such construction would be compatible as defined by the National Wildlife Refuge System Improvement Act of 1997.

**Whereas, The Research Field Station** and **TNC** have expressed an interest in collaborating with **The Service** and **The Refuge**, through the provision of financial and in-kind assistance, leading to the construction of a joint-use, visitor/administrative and interpretive educational facility engendering interpretive programs, displays, educational outreach, and outdoor and indoor classroom opportunities accessible to **The Parties** fostering the uniqueness of **The Refuge's** biological and other natural resources.

### **Article III. Financial Contributions/Cost Sharing of The Parties**

**Administrative/Visitor/Educational Complex:** Contingent upon appropriation of funds by the Congress and the relative size and proportion of subsequent contributions by **The Parties**, **The Service** agrees to plan, design and construct at a minimum, a 6,000 sq. ft. administrative/visitor complex to include classroom/laboratory facilities, interpretive area, conference room, and office to support **Refuge** purposes and programs, and that can accommodate the **Research Field Station** and **TNC** needs as defined herein. These facilities will be planned and developed with participation from all of **The Parties**. The size of said facilities and the number of amenities could be larger or smaller depending on the ultimate funding available. **The Parties** hereby agree as follows:

1. That **The Service** may contribute up to \$927,000, or amounts equal to Congressional appropriations for this project.
2. That subject to availability of funds, the **Research Field Station** will support the development of the facility by providing computer and research training/educational equipment for use by the **Research Field Station**, **The Service** and **TNC** staff for the purpose of contributing to **The Refuge** educational outreach, research training, and **Refuge** interpretive programs.
3. That subject to approval by **UNM** and the receipt of funding from the National Science Foundation (NSF), The **Research Field Station** will contribute approximately \$100,000 annually to operate the Schoolyard (LTER) Program. If successful in obtaining an NSF Schoolyard Grant, funds would provide salary money for an Educational Coordinator, who would coordinate efforts with **The Refuge** to conduct a public educational outreach program.
4. That subject to approval by **UNM** and the receipt of funds from NSF, The **Research Field Station** will contribute up to \$275,000 for equipment, interpretive displays and otherwise in support of the construction of the planned facility. This funding would include a "cost-share" contribution by **TNC** of up to \$150,000 to serve as a non-federal matching share in The **Research Field Station's** NSF grant request. **TNC** contribution is subject to approval by **TNC's** governing board.
5. That the **Research Field Station** contributes expertise and data management capability of its scientists and researchers in the development and operation of **Refuge** educational and research training programs. The extent and scope of such contributions will be defined at a later date.
6. That an appropriate ratio or portion of the financial contributions from **The Service**, the **Research Field Station** and **TNC** will be used to provide appropriate computer multimedia equipment, interpretive displays, laboratory facilities, and

classroom furnishings. These amenities will be planned and developed with participation from all of **The Parties**.

7. **The Service** will make available to the **Research Field Station** administrative space at no cost as necessary to help meet the **Research Field Station's** needs to carry out its research programs as contemplated in this Agreement and as permitted pursuant to Permit M-4. The administrative space provided by **The Service** shall include without cost all appropriate utilities, maintenance, janitorial services, telephone lines, access to common areas and similar amenities. This office space will be planned and developed with participation from **The Research Field Station**.

#### **Article IV. Visitor/Administrative Complex Amenities**

**The Parties** hereby agree that the planned complex should contain the following amenities:

1. Office space to accommodate current and future Refuge program staff.
2. Office space to accommodate the **Research Field Station** personnel who will participate in **The Refuge** program in educational outreach, research education, and research program administration.
3. A conference room able to accommodate a minimum capacity of 50, accessible to all **Parties**.
4. A classroom/laboratory facility to support habitat and wildlife research educational efforts by **The Refuge** and the **Research Field Station**.
5. An interpretive display/exhibit area with state-of-the-art interpretive displays focusing on large-scale ecological processes associated with Sevilleta NWR resources, to be contributed by **The Parties** at their election.
6. An interpretive "nature" trail near the joint-use, visitor/administrative and interpretive educational facility to educate visitors about the species and biological communities present on the Sevilleta NWR. The trail could be used to inform visitors about some of the ecological systems which support the biodiversity of the region, along with some of the significant stresses impacting such systems.
7. Flowing from the Final Comprehensive Conservation Plan, **The Parties** will develop a cooperative agreement to fund Refuge interpretive master plan to coincide with joint use, visitor/administrative and interpretive educational facility development to the degree possible.

## **Article V. Duration of Agreement**

This Agreement shall commence on the date of last signature and will remain effective for a period ending concurrently with Permit M-4; and, may be renewed as appropriate for a term matching any renewed term of Permit M-4.

## **Article VI. Reversion and/or Removal of Improvements**

At the termination (for any reason) during the term of this Agreement and/or expiration of any subsequent renewal term, any improvements constructed by TNC pursuant to this Agreement and including those buildings and improvements provided for by Permit M-4 shall either be removed or become the sole property of the United States Government. With appropriate notice from **The Service** following termination of this Agreement and/or termination of subsequent renewal periods, TNC may be required to remove any buildings and/or improvements not deemed necessary for continued administration of **The Refuge's** programs. At termination, each of UNM and TNC may, at its election, remove its equipment and personal property, or allow it to become the sole property of the U.S. Government.

## **Article VII. Access, Management Roles and Responsibilities**

1. **The Service** and **The Refuge** shall have primary responsibility for the operation and management of the Visitor/Administrative Complex.
2. Both the **Research Field Station** and TNC shall have general daytime access to and may request special permission to access and use classroom or conference room facilities during evening or weekend time frames, without cost. **The Refuge** will do everything possible to accommodate the **Research Field Station** and/or TNC requests for use of visitor center facilities.
3. The **Research Field Station** will use reasonable efforts to provide backup and maintenance expertise for computer hardware and software within that facility, within the scope of its resources and abilities available at **The Refuge**.
4. The **Research Field Station** staff authorized by **The Refuge** shall have no-cost primary access to dedicated office space within the administrative portion of the complex as provided for in Article III(2) and Article IV(2) of this Agreement.

## **Article VIII. General Stipulations**

1. **The Parties** to this Agreement shall comply with all applicable water, ground, and air pollution laws and regulations of the United States, the State of New Mexico and local authorities.
2. Nothing in this Agreement shall constitute nor be construed as any surrender of the jurisdiction and supervision of **The Service** over the lands described herein.

## **Article IX. Agreement Administration**

1. The execution, modification, and administration of this Agreement must be authorized and accomplished by the Contracting Officer, Southwest Region, U.S. Fish and Wildlife Service, P.O. Box 1306, Albuquerque, NM 87103-1306.

## **Article X. Changes, Interpretation, or Amendments**

- A. Changes or amendments to this Agreement shall be in writing and be signed by the U.S. Fish and Wildlife Service Southwest Regional Director; a delegated representative and the New Mexico State Director of TNC or delegated representative; and an authorized representative of UNM. The amendment shall cite the agreement date and title, and shall set forth the exact nature of the change and/or amendment. No oral statement by any person shall be interpreted as amending or otherwise affecting the terms of the agreement. Any party to this Agreement may request that it be amended, whereupon **The Parties** shall consult to consider such amendments.
- B. The obligations of any party to this Agreement are contingent upon the availability of appropriated funds, funds granted by the NSF, and funds approved by TNC's Board of Directors, from which payments can be made to fulfill the purposes of this Agreement. No legal liability on the part of any party may arise for performance under this Agreement until funds are made available for such performance. **The Parties** to this Agreement agree to make their best efforts to obtain such funds.

## **Article XI. Disputes**

At any time during implementation of the measures stipulated in this Agreement, should any objection to any such measure or its manner of implementation be raised by a party to this Agreement, permitted users, or members of the public, **The**



**Service**, in consultation with **TNC** and the **Research Field Station**, will take the objection into account and consult as needed with the objecting party and all parties concerned for possible resolution. In no event shall breach of this Agreement give rise to liability for damages between **The Parties**.

**Article XII. Early Termination**

This Agreement may be terminated at any time, by mutual consent of all **The Parties**. A Notice of Request to Consider Early Termination must be made to all **The Parties** in writing and given at least 120 days prior to the date of proposed termination.

**Article XIII. Effective Date**


In WITNESS THEREOF, **The Parties** hereto have caused this Agreement to be executed by their duly authorized officers on the day and year stated below. This Agreement supersedes any previous agreement on the subject matter set forth.

  
\_\_\_\_\_  
For Nancy Kaufman  
U.S. Fish and Wildlife Service  
Southwest Regional Director

Date 3/20/00

  
\_\_\_\_\_  
University of New Mexico

Date 1/27/00

  
\_\_\_\_\_  
William R. Waldman, State Director  
The Nature Conservancy

Date MARCH 24, 2000



PERMIT (M-4)  
TO  
UNIVERSITY OF NEW MEXICO  
FOR  
BIOLOGY RESEARCH FIELD STATION  
AND  
LONG TERM ECOLOGICAL RESEARCH SITE

The SECRETARY OF THE INTERIOR, through his authorized representative the Regional Director, U.S. Fish and Wildlife Service (Service), Albuquerque, New Mexico, in accordance with applicable authorities and regulations published October 1, 1990, in Title 50, Code of Regulations (CFR) 29.21, does hereby grant a permit to the UNIVERSITY OF NEW MEXICO, herein referred to as "Permittee", for the construction, operation, and maintenance of a biology research facility to be located on lands of the Sevilleta National Wildlife Refuge in Socorro County, New Mexico. The location, description and site plan of the facilities are contained in "Exhibit B", and the "Plan of Operation" is attached as "Exhibit C", all of which is attached to and made a part of this permit.

By accepting this permit, Permittee agrees to the following terms and conditions, as well as the applicable General terms and conditions attached as Exhibit "A":

1. The Refuge Manager, Sevilleta National Wildlife Refuge (Refuge), is the coordinating official having immediate jurisdiction over and administrative responsibility for the wildlife refuge lands.
2. The Permittee is responsible for submitting their "Operating Plan" to the Regional Director for approval. The Permittee, Refuge Manager, and/or the Regional Refuge Management Staff will schedule an annual conference for the sole purpose of conducting a review of the "Operating Plan".
3. Permittee shall comply with all State and Federal laws applicable to the project for which this permit is granted, to the lands which are included in the facility, and the lawful existing regulations thereunder.
4. Access to the facility will be made available to the coordinating official at all times for safety, security, and compliance purposes.
5. Unless otherwise addressed in an "Operating Plan", all persons utilizing the facility will be researchers/students operating under an approved research program or activity. Non-conflicting use of the facility by the Service may be considered within the scope of the Permittee's "Operating Plan".
6. Permittee is responsible for correcting any problems identified by the Service which result from the construction or maintenance of the facility.
7. No herbicides or pesticides shall be used on the facility herein authorized without prior approval of the Regional Director.



## EXHIBIT A

### PERMIT GENERAL TERMS AND CONDITIONS

- (a) The permittee shall comply with State and Federal laws and existing regulations applicable to the project and the refuge lands which are included in the permit.
- (b) The permittee shall clear and keep clear the lands covered by the permit to the extent and in the manner directed by the refuge manager. The permittee shall dispose of all vegetation and other material cut, uprooted, or otherwise accumulated during the construction and maintenance of the project, in such a manner as to prevent fire hazards.
- (c) The permittee shall do everything reasonably within his power, both independently and upon request of any duly authorized representative of the United States, to prevent and suppress fires on or near lands to be occupied under the permit. Construction and maintenance forces, reasonably obtainable, shall be made available for the suppression of such fires.
- (d) The permittee shall not disturb or remove any public land survey monument or refuge boundary monument, unless and until the applicant has requested and received, from the Regional Director, approval of measures to be taken to perpetuate the location of aforesaid monument.
- (e) The permittee shall take soil and resource conservation and protection measures on the land covered by the permit as request by the refuge manager. This shall include weed control.
- (f) The permittee shall rebuild and repair roads, fences, structures, and trails destroyed or injured by construction work. Upon written request by the Regional Director, permittee shall build and maintain necessary and suitable crossings for all roads and trails that intersect the works constructed, maintained, or operated under the permit.
- (g) The permittee shall pay the United States the full value for all damages, to the lands or other property of the United States, caused by him or by his employees, contractors, or employees of contractors, and to indemnify the United States against liability for damages to life, person, or property arising from the occupancy or use of the lands under the permit; except where a permit is granted to a State or other Government agency which has no legal power to assume such a liability with respect to damages caused to lands or property. Such agency, in lieu thereof, agrees to repair all such damages.
- (h) All or any part of the permit may be terminated by the Regional Director for: failure to comply with any or all of the terms or conditions of this permit; non-use for a 2-year period; or abandonment of the permit. In the event of non-compliance, the Regional Director will notify the permittee, in writing, of the corrections needed. The permittee shall have a 60-day period to complete corrective action from the date of notification. However, in the event of extenuating circumstances--such as adverse weather conditions, disturbance of wildlife during periods of peak

- (r) The use and occupation of the said premises shall be without cost or expense to the Grantor, under the general supervision and subject to the approval of the officer having immediate jurisdiction over the premises, and subject also to such rules and regulations as he may from time to time prescribe.
- (s) The permittee shall, at its own expense and without cost or expense to the Grantor, maintain and keep in good repair and condition the premises herein authorized to be used.
- (t) Any interference with or damage to property under control of the Grantor incident to the exercise of the privilege herein granted shall be promptly corrected by the permittee to the satisfaction of the said officer.
- (u) The permittee shall pay the cost, as determined by the said officer, of producing and/or supplying any utilities and other services furnished by the Grantor or through Grantor facilities for the use of the permittee.
- (v) No additions to or alterations of the premises shall be made without the prior consent of the said officer.
- (w) If for any reason it should be deemed necessary or expedient for the Grantor to perform functions and/or render services which are the responsibility of the permittee, the said officer may, in lieu of the reimbursement, require the permittee to furnish the personnel and/or materials required for the performance of said functions and/or for the rendering of said services. In addition to furnishing personnel and/or materials, the permittee shall reimburse the Grantor for any costs incurred by the Grantor in connection with said functions and/or services. Selection of such personnel will be subject to the approval of the said officer.
- (x) On or before the date of expiration of this permit or its relinquishment by the permittee, the permittee shall vacate the said premises, remove its property therefrom, and restore the premises to a condition satisfactory to the said officer, ordinary wear and tear and damage beyond the control of the permittee excepted. However, if this permit is revoked, the permittee shall vacate the premises, remove its property therefrom, and restore the premises as aforesaid within such time as the Regional Director may designate.
- (y) It is understood that the requirements of this permit pertaining to maintenance, repair, and restoration of the premises and reimbursement for utilities and other services shall be effective only insofar as they do not conflict with any agreement pertaining to such matters made between local representatives of the Grantor and permittee in accordance with existing regulations.





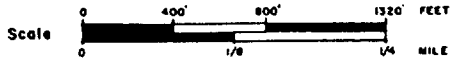




UNITED STATES DEPARTMENT OF THE INTERIOR  
 FISH AND WILDLIFE SERVICE  
 SEVILLETA NATIONAL WILDLIFE REFUGE

**CAMPBELL FAMILY FOUNDATION**  
 (10)  
 62.5 ACRES

SOCORRO COUNTY, NEW MEXICO  
 NEW MEXICO PRINCIPAL MERIDIAN



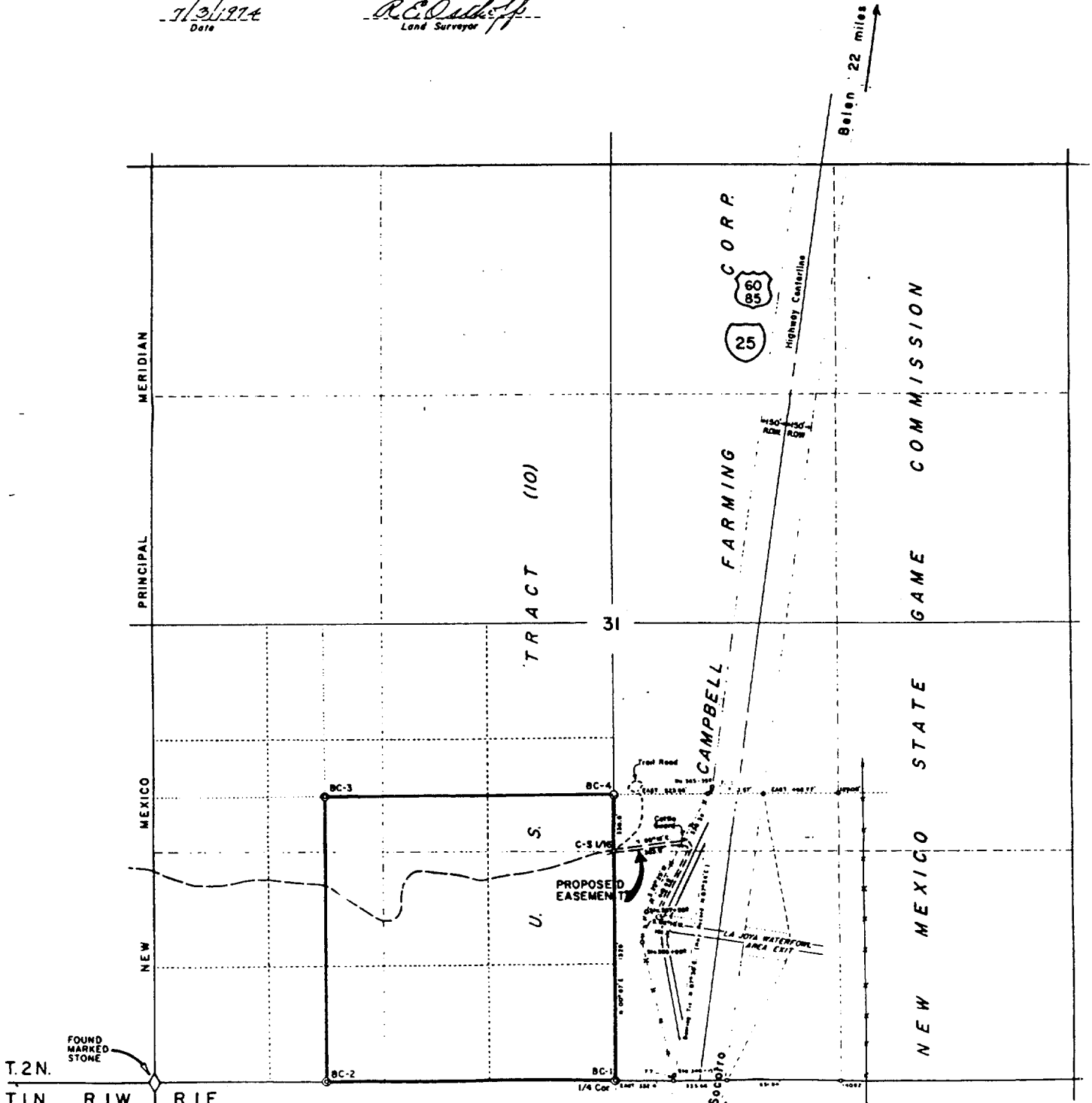
THIS MAP was compiled from New Mexico State Highway Commission Right of Way Plats, surveys by Bureau of Land Management, U.S. Geological Survey, W. E. West, and 1974 surveys by the U.S. Fish and Wildlife Service.

1/31/974  
 Date

*R.E. Oudehoff*  
 Land Surveyor

**PROPOSED  
 Improvement Site Tract**

Area is located in Township 2 North, Range 1 East, Section 31.  
 SE 1/4 SW 1/4, E 1/2 E 1/2 SW 1/4 SW 1/4, S 1/2 S 1/2 NE 1/4 SW 1/4,  
 SE 1/4 SE 1/4 NW 1/4 SW 1/4 for total of 62.5 Acres.  
 All of proposed site lies within Tract 10.



T.2N.  
 T1N R1W R1E



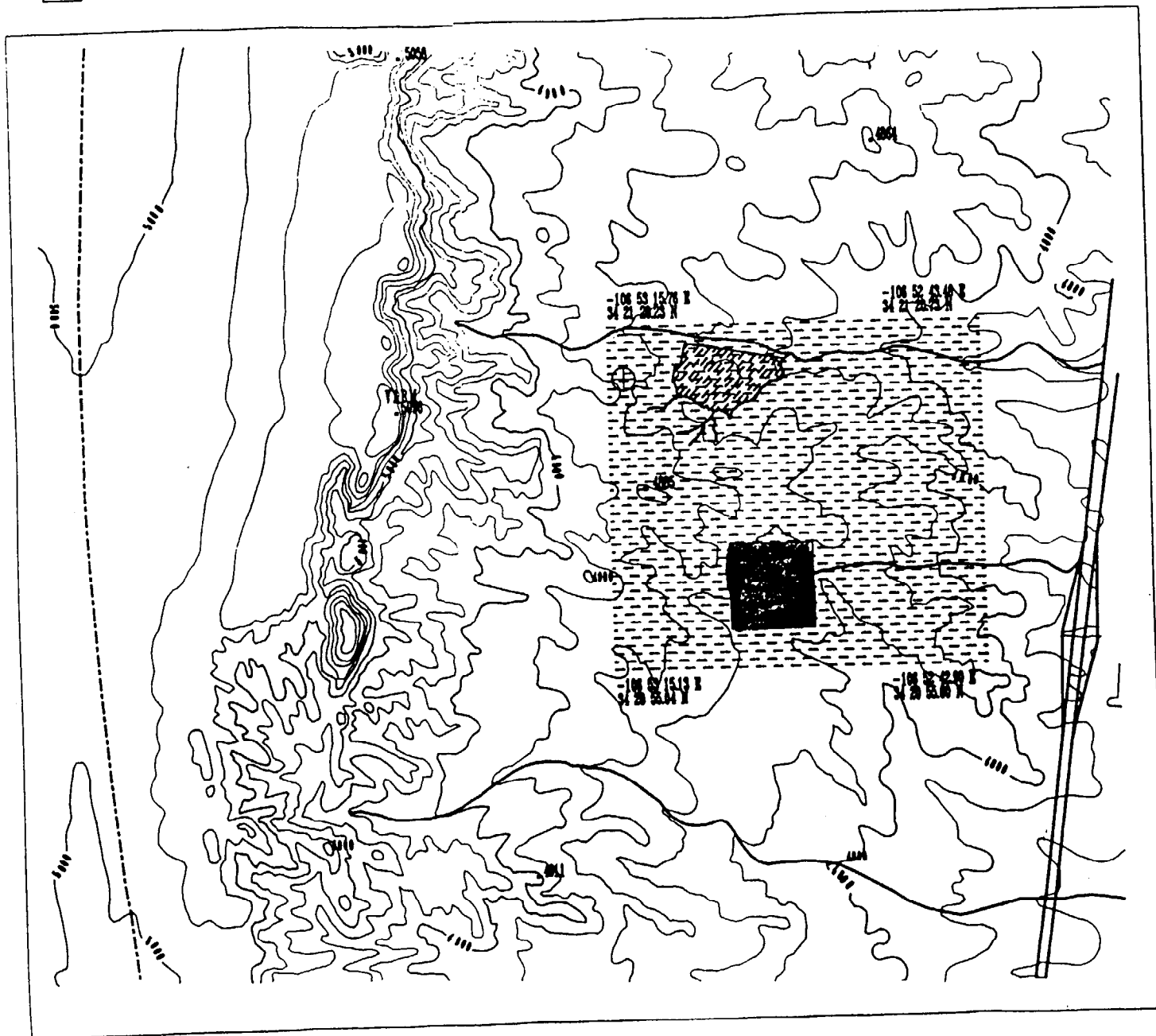
Impact Easement Area



Proposed UNM Field Station Site



USFWS Headquarters



0 kilometers 0.5

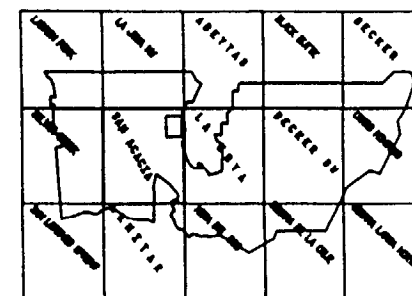
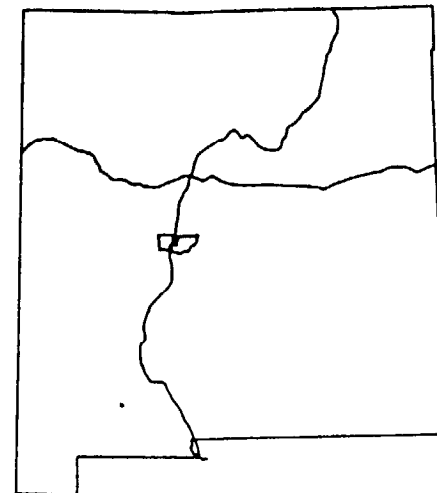
Scale 1:10312  
Contour Interval 20M

Reference Point:  
East Quarter Section  
R1V, T2N, Sec 34

The University of New Mexico - Department of Biology

# Sevilleta Field Station Site Map

Sevilleta National Wildlife Refuge, Socorro County, New Mexico



USGS 7.5 Minute Quadrangles

# SEVILLETA NATIONAL WILDLIFE REFUGE

SOCORRO COUNTY, NEW MEXICO

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
107°05' R 2 W

UNITED STATES  
FISH AND WILDLIFE SERVICE  
106°35' R 4 E

R 1 W 106°55'

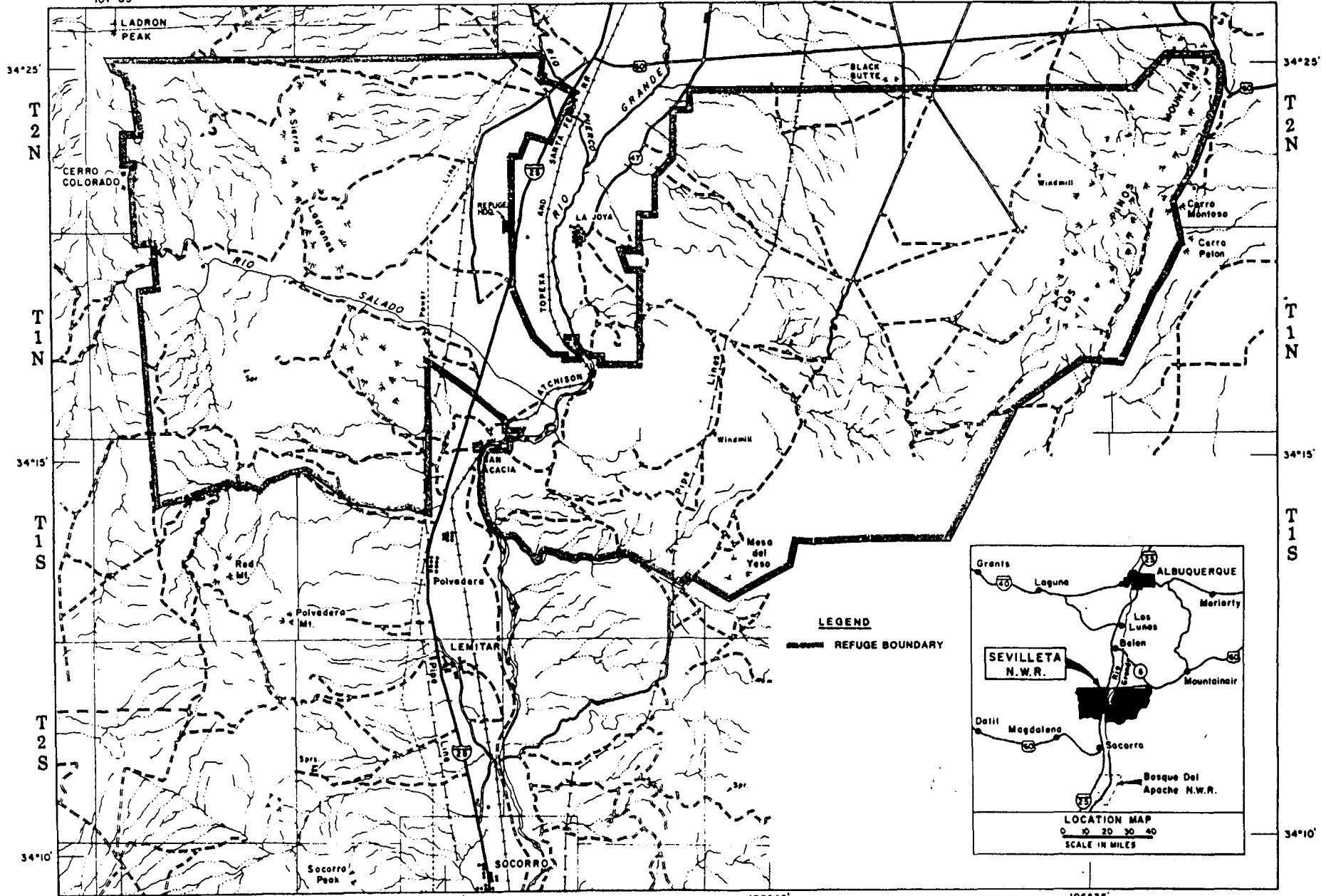
R 1 E

106°45' R 2 E

R 3 E

106°35'

R 4 E



**LEGEND**

REFUGE BOUNDARY

COMPILED IN THE DIVISION OF REALTY  
FROM U.S.G.S. QUADRANGLES AND OTHER  
OFFICIAL INFORMATION.

NEW MEXICO PRINCIPAL MERIDIAN

0 10,000 20,000 30,000 40,000 FEET

0 2 4 6 MILES



MEAN  
DECLINATION  
1989

ALBUQUERQUE, NEW MEXICO JANUARY 1975  
REVISION: 8/80

2R N.MEX. 872 404

**EXHIBIT "C"**



SEVILLETA FIELD RESEARCH STATION  
PLAN OF OPERATION

Department of Biology, University of New Mexico  
and  
U.S. Fish and Wildlife Service

SECTION 1. ADMINISTRATION

(A) Organization

Authority for formulating and implementation Field Station policies will follow a "chain of command" consisting of the University of New Mexico (UNM) Associate Provost for Research (formerly Vice-President for Research), the Station Director, the Station Manager, and the Station Caretaker. An "external" Advisory Committee will monitor Field Station operations and recommend changes in policy or direction as needed. Future changes, addenda, or deletions to this Plan of Operation must be approved by both the Sevilleta Refuge Manager and the Station Director.

(B) Administrator's Responsibilities:

UNM Associate Provost for Research will (1) approve employment of all administrative personnel, (2) advise Station Director of UNM policies affecting station operations, and (3) receive and review annual reports and recommendations from Station Director and Advisory Committee.

The Station Director will (1) establish station policy and coordinate planning in consultation with Advisory Committee and Station Manager, (2) supervise overall station operations via regular contact with Station Manager and Station Caretaker, (3) oversee preparation of funding requests relating to station operation, and (4) prepare annual reports of activities and budget status for Associate Provost for Research.

The Station Manager will (1) run station on a day-to-day basis, (2) oversee operation of physical plant, major equipment, and personnel, (3) manage user schedules, contracts, purchasing, and financial accounting, (4) prepare annual budgets, and (5) supervise Station Caretaker.

The Station Caretaker will be directly responsible for (1) station operations, including maintenance of facilities, equipment, landscaping, and utilities, (2) preparing facilities for incoming researchers, (3) maintaining appearance and cleanliness of laboratory and residence buildings and grounds, and (4) maintaining security and enforcing station regulations.

The Advisory Committee, consisting of (1) the UNM Biology Department Chairperson, (2) a representative from the U.S. Fish and Wildlife Service (FWS), (3) a representative from The Nature Conservancy, and (4) the Sevilleta Long-Term Ecological Research Principal Investigator, shall periodically meet with the Station Director and provide recommendations concerning Station policy and direction.





# Final Environmental Assessment

## Sevilleta NWR Comprehensive Conservation Plan





## Finding of No Significant Impact

### **Comprehensive Conservation Plan and Environmental Assessment for Sevilleta National Wildlife Refuge**

The U.S. Fish and Wildlife Service has developed a Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) for the Sevilleta 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 15 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) Enhancement, preservation, and protection of threatened and endangered species as they occur naturally or were historically present on the Sevilleta NWR; (2) Restoration and maintenance of the natural diversity of flora and fauna as it occurred historically; (3) Encouragement of research from bonafide research institutions, to provide an atmosphere conducive to investigations into environmental processes on the Refuge, and to assume a proactive role in facilitating research projects as they occur on the Refuge; (4) Protection of existing and the acquisition of additional water rights as is necessary to protect the integrity of the riparian and aquatic habitats on the Refuge. (5) The achievement of appropriate levels of public uses that are compatible with the purposes for which the Refuge was established and with the Mission of the National Wildlife Refuge System; (6) Establishment of a formal program for public outreach, and the identification of important public resources; (7) Protection and maintenance of refuge cultural resources; (8) Protection of existing lands associated with Sevilleta NWR and the acquisition of additional lands; (9) Improvements to funding, facilities and staffing that will result in enhancement of Refuge habitat and wildlife resources; and, (10) Strengthening interagency and jurisdictional coordination on or near the Sevilleta NWR.

Some of the specific changes to the existing program changes include but are not necessarily limited to the following objectives:

- Continue implementation of the Mexican wolf captive propagation program on the Refuge, and ensure continued operation within all applicable regulations, protocols, and safety guidelines.
- Preserve Refuge habitat diversity and threatened and endangered species habitats by preserving and restoring habitats to their natural condition.
- Maintain a viable population of Silvery minnows on the Rio Grande within the Refuge.
- Provide up to 100 acres of additional cottonwood/willow habitat for the southwestern willow flycatcher.
- By the end of FY 2001, (September 30, 2001), assess the refuge's full wilderness attributes, and determine appropriate areas within the full spectrum of the refuge for study and designation as Wilderness Study Areas. Included will be the

dedication of between 3,000 and 8,000 acres as the Ladron Wilderness Study Area.

- Evaluate Refuge grasslands potential as an introduction site for the endangered northern Aplomado falcon.
- Protect threatened and endangered species on the Refuge and adjacent properties through outreach, educational activities and effective enforcement of fish and wildlife laws.
- Promote and support the introduction of native threatened and endangered species on the Refuge.
- Insure the integrity of all naturally occurring biotic communities on the Sevilleta NWR.
- Maintain migratory bird populations at healthy levels in the Upper/Middle Rio Grande Ecosystem.
- 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.
- Protect, restore, and maintain upland terrestrial communities at the landscape level within the Upper/Middle Rio Grande Ecosystem.
- Utilize sound land use practices and management tools to protect upland terrestrial habitats in the Upper/Middle Rio Grande Ecosystem.
- Preserve, enhance and restore hydrological regimes in order to perpetuate a healthy river ecosystem. Utilize the Rio Grande Initiative to form partnerships which address water management, habitat enhancement and restoration, and impacts of non-native flora and fauna on native biodiversity and endangered species
- Compile a data base of the baseline natural conditions, processes, and species associated within refuge ecosystems.
- Attain baseline natural conditions, processes, and populations of species in 50% of each habitat type by 2010. If attainment is not possible, implement adaptive management strategies designed to attain desired conditions.
- Contribute to the integrity of the Upper Middle Rio Grande Watershed using sound management tools and practices.
- Map and determine aquifer sources and characteristics of upland seeps, springs, and other water sources on the Refuge.
- Quantify water needs to maintain 90 acres of existing Refuge wetlands and to restore 500 acres of wetlands associated with the Rio Grande.
- Acquire in-stream flow rights for the perennial portion of the Rio Salado, Rio Puerco and other tributary streams.
- Develop partnerships, relationships, and communications to improve implementation of Refuge wildlife and habitat management goals.
- Minimize human impacts to Refuge ecosystems.
- Encourage research that improves management and monitoring of species, communities and processes on the Refuge and the Upper Middle Rio Grande.
- Permit and encourage research from a wide range of interested parties and

institutions while protecting the faunal and floral components of the ecosystem from the detrimental aspects of human intrusion and manipulative research protocols.

- Minimize impacts of formal research activities.
- Provide the research community a unique opportunity to conduct wildlife related research which provides the Refuge with management direction.
- Provide the general public with high quality, wildlife-dependent experiences on and off the Refuge.
- Provide the general public with high quality environmental education and wildlife-dependent experiences on and off the Refuge.
- Develop sound management practices to protect cultural resources, within the scope of Part 614 of the Service Manual and all applicable Federal laws and regulations.
- Minimize obtrusive impacts to Refuge lands or adjacent lands.
- Document the need for additional staffing.
- Obtain adequate staffing to implement management plans benefitting the Middle Rio Grande Ecosystem both on and off Refuge lands.
- Effect improvements to facilities that will result in the enhancement of Refuge capabilities and resources, including: the construction of a 8,000 square foot visitor center/ administrative complex; two 1,500 square foot staff residences; and a multi-unit living facility for refuge volunteers;
- Relocate the law enforcement training shooting range to a new location to eliminate the current hazards.

Two other alternatives were considered and analyzed with respect to their environmental consequences:

**Alternative B (No Action):**

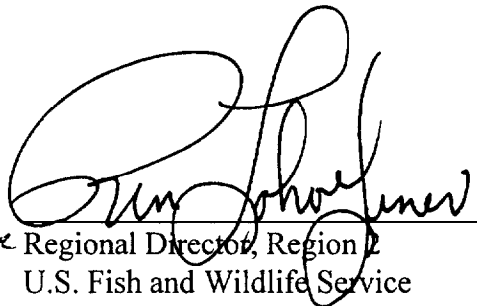
This alternative would focus on the continuation of management of existing conditions, staffing, and facilities and would involve implementation of limited fire management strategies, limited non-native species removal efforts, limited data survey, collection and analysis; and limited educational outreach and interpretive efforts. Some of the biological initiatives noted in the proposed alternative would be implemented within the limitations of current staffing and funding. The refuge would continue to remain closed to the public with the exception of the current limited waterfowl hunting program. There would be only the replacement of the current administrative offices with no visitor center, classroom, and conference room components. The cooperative effort between the University of New Mexico Long Term Ecological Research Center would continue under the existing Special Use Permit.

**Alternative C:**

This alternative would call for a significant reduction in the number of refuge

access for research purposes only. The Refuge staff would serve as a facilitator of research efforts through the maintenance of existing facilities only and by monitoring compliance of refuge users with the Restrictive Covenants within the Title. Essentially, the Service's role would be reduced to custodial status. All populations would be allowed to thrive under purely natural conditions. There would be no need for improved staffing or facilities improvements.

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.

  
for Regional Director, Region 2  
U.S. Fish and Wildlife Service

8/4/00  
Date

## EA 1.0 Purpose and Need for the Proposed Action

**The actions proposed for implementation on a national wildlife refuge are ideally designed to meet the “purposes for which the refuge was established.”**

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] 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 necessary to enhance the efficiency of implementing management actions designed to benefit the Sevilleta National Wildlife Refuge and the surrounding area of ecological concern.

## EA 2.0 Background and Resource Issues

Sevilleta NWR is located in central New Mexico, approximately 50 miles south of Albuquerque. Sevilleta NWR is the seventh largest refuge in the lower 48 states, and runs the full width of the Rio Grande Valley extending from the Sierra Ladrones on the west to the Los Pinos Mountains on the east. It is approximately 30 miles in width and 18 miles in length, covering a total of 228,770 acres or 400 square miles. Elevations range from 4,430 feet at the Rio Grande to 9,176 feet at the peak of the Sierra Ladrones.

Sevilleta NWR was established in 1973 when the Campbell Family Foundation conveyed the property to The Nature Conservancy, who in turn donated it to the U.S. Fish and Wildlife Service. The refuge is unique in that it was set aside “. . . to allow natural ecological processes to prevail . . . and that portions of the property will be made available to educational institutions and conservation organizations for scientific research and study.” In efforts to meet the covenant requirements and for other management purposes, livestock grazing on the refuge was discontinued over 25 years ago.

As part of the planning process, a number of management issues were identified. The comprehensive conservation plan associated with this environmental assessment addresses those issues, acknowledging that within the next 15 years the refuge will be faced with a number of challenges and opportunities including but not limited to the following:

## **Issue 1. Threatened and Endangered Species Management**

The quantity and variety of habitats on the refuge provide the opportunity for habitat enhancement and the reintroduction of threatened and endangered species. The enhancement and restoration of suitable habitat for several native species would benefit from additional staffing and funding. The Mexican gray wolf captive propagation program currently based on the refuge could also benefit from enhancements to partnerships, additional staff, and funds and maintenance expenditures to ensure the program's success. Additional support is needed for public outreach, threatened and endangered species education, and law enforcement.

**Challenge:** To protect and reintroduce threatened and endangered species within an array of funding and staffing scenarios. Success will require a sustained effort.

## **Issue 2. Wildlife and Habitat Management**

The restoration and maintenance of native habitats on the refuge is essential for effective wildlife management. Historical records, databases, and other information can be used to determine the natural conditions and processes that should be restored on the refuge. This baseline assessment is essential for determining what habitat restoration actions should be conducted, and can be used as a method of gauging the success of habitat restoration and maintenance activities. Restoration may involve strategies such as prescribed burning, non-native species control or removal (e.g., depredation hunts to remove trespassing oryx), or hydrological restoration and maintenance. In all cases these management activities must take into account the protection of research instrumentation, high value public lands, and refuge and Mexican wolf facilities. Minimization of human impacts such as roads, public access, and research activities is a major concern.

**Challenge:** To reduce salt cedar and other non-native vegetation in view of large seed sources and the prolific nature of these species to invade and dominate over more natural regimes; and reduce numbers of trespassing oryx, Barbary sheep, and other non-native animals.



### **Issue 3. Research**

Research is an integral part of refuge purposes and research activities remain a strong component. The Long-Term Ecological Research program has had a significant presence on the refuge for a number of years and will continue to serve as a research project clearinghouse for other major research institutions and interests.

**Challenge:** To take a stronger and more pro-active role in coordinating research activities to minimize the impact on the natural habitats, and to evaluate and regulate the research conducted on the refuge. Wildlife- and habitat-related research should be emphasized to the degree possible, thereby improving the quality of wildlife and habitat decision-making.

### **Issue 4. Water Rights and Protection**

As is the case for most of the western United States, lands in New Mexico have limited water resources. Water is a key factor in the maintenance of habitats. The existence of a highly regulated riparian corridor effects the ability of the Refuge to manage adjacent habitats. Water rights are appropriated by the State of New Mexico depending on availability, whether there are pre-existing rights, and the projected uses.

**Challenge:** To acquire additional water rights and to protect existing water rights necessary for the management and conservation of riparian and aquatic resources. The refuge's role will be one of working closely with surrounding water users, conservancy districts, and the State of New Mexico toward a flow regime that allows for conservation of natural resources while not impacting other right holders.

### **Issue 5. Compatibility and Recreational Uses**

Historically, the refuge had limited recreational use and access to protect the natural ecological processes, as well as protect the integrity of the research that takes place on the refuge. Currently, the refuge allows waterfowl and dove hunting, wildlife photography, wildlife observation, and environmental educational activities in the riparian area of the refuge.

While the deed restrictions, which have become integral with the refuge's purposes, do not prohibit the integration of recreational uses on the refuge, it is clear that recreational uses should only be allowed that contribute to keeping the refuge's naturalness. As the

refuge adds new recreational uses to its management agenda, it will have to consider the compatibility of those uses to the refuge purposes and the purposes of the National Wildlife Refuge System.

**Opportunities:** Opportunities exist with the construction of a new visitor center to increase the public's understanding of the refuge's purpose and role in the ecosystem, as well as its role within the National Wildlife Refuge System. Ideally, the visitor center can be a focal point for limited wildlife education-oriented access.

**Challenge:** The challenge will be for the refuge to monitor visitation as it increases and begins to compete with other refuge activities that are of a higher priority. The refuge will have to be ready to consider curtailing these activities should they begin to dominate other priorities and negatively affect refuge habitat and wildlife resources.

#### **Issue 6. Environmental Education and Public Outreach**

Promotion of environmental education is a new goal of the refuge. Activities at a new visitor center as well as public outreach activities and development of a national/international science camp would further the achievement of that goal.

**Opportunities:** Adding an environmental educator position to the refuge staff would ensure the success of the proposed environmental education and public outreach program. Through a combination of funding and staff enhancements, and partnerships with the LTER, this opportunity could become a reality.

#### **Issue 7. Cultural Resources Management**

Less than 1 percent of the refuge has been inventoried systematically for archeological sites. However, selective sampling of refuge lands has identified several major prehistoric sites of national significance.

**Challenge:** There is a need for a comprehensive cultural resources survey to determine the nature and extent of cultural resources on the refuge. Once the cultural resources are surveyed, strategies for protection and management can be developed. Additional land acquisition and appropriate law enforcement are two possible strategies to improve cultural resources protection.

## Issue 8. Land Protection, Acquisition, and Wilderness Designation

**Acquisition.** While the refuge is sizeable, areas surrounding it are subject to private uses that can cause problems for wildlife managers. Additionally, in holdings and access to them continue to present management issues. Acquisition of private land in holdings or adjacent properties that contain valuable habitat or cultural resources are ways the refuge could eliminate any land use conflicts and protect high value wildlife and habitat resources.

Acquisition Opportunities. There are several opportunities for the Service to acquire lands adjacent to the refuge's northern boundaries, lands near the current headquarters access corridor, and a few in holdings.

**Wilderness.** As part of its overall comprehensive conservation planning responsibilities, the Service continues to assess the suitability of its refuge lands for wilderness designation. Wilderness designation provides a high level of resource protection under the provisions of the Wilderness Act of 1964. Sevilleta NWR, by virtue of its own written deed restrictions and covenants, already has an extremely high level of protection built into its purposes. The purpose of the refuge, as stated in the warranty deed, is as follows:

*To preserve and enhance the integrity and the natural character of the ecosystems of the property by creating a wildlife refuge managed as nearly as possible in its natural state, employing only those management tools and techniques that are consistent with the maintenance of natural ecological processes. . . . Not to be subjected to commercial exploitation. . . and the land and the flora and fauna supported by it to be managed to permit the natural ecological successions and processes typical of the area to prevail . . . and that portions of the property will be made available to educational institutions and conservation organizations for scientific research and study.*

Past and current management has demonstrated the commitment to preserve, enhance, and protect the refuge lands. Management has shown its dedication to the purpose of the refuge as stated in the deed restrictions by not permitting grazing, closing existing ranch roads, removing artificial structures, and limiting human influence on the refuge by restricting use and entry through a permit system.

**Sierra Ladron WSA** -- During the development of this plan, wilderness interests have suggested the refuge target up to 13,000 acres near the Sierra Ladron in the extreme northwestern section of the refuge for possible wilderness designation. In review of refuge land uses, a limited area could be targeted for this purpose. A wilderness designation would protect portions of the refuge and preserve its naturalness by legally preventing any artificial developments in this area.

The majority of the 13,000 acre area would appear to be appropriate for wilderness designation. The Sierra Ladron is a steep, rugged, and massive mountain, with no structures present except for the refuge boundary fence. In the foothills, however, there are numerous ongoing research projects, with many being 10 years in length. Without loss of years of data, it would be virtually impossible to move them since the projects are site specific. Considering all the factors including past, current, and future uses of the area, a 3,000- to 8,000- acre area would better meet refuge and its research cooperator's goals. A 3,000-acre area, which is outside the refuge boundary fence, joins the proposed wilderness area on the Bureau of Land Management's (BLM) property in the extreme northwest corner of the refuge. This is the first option since the wilderness designation would assist in the management of the unfenced area. The second option would be to target the 8,000-acre area and would allow the Refuge to continue its current and future programs and to continue to provide the researchers a stable location for their long-term research.

The final acreage configuration of the Sierra Ladron Wilderness Study Area, would likely need no further study due to its present roadless undeveloped wilderness compatible character. Additionally, this plan does not provide for strategies or approaches that would create permanent improvements, structures, roadways, or the need for motorized access that would diminish the area's wilderness potential. [See Map #1]

***Other Refuge-wide Wilderness Study Possibilities –***

Nevertheless, by virtue of Service policy the refuge is responsible for determining wilderness possibilities for a full spectrum of refuge lands. A bit more time will be necessary to assess the full spectrum of refuge lands keeping mind current commitments to long term research that necessitate technologies, access, and tools not consistent with the strict requirements of the Wilderness Act of 1964. Any additional Wilderness Study Areas identified will be under focused monitoring and study, however, they will be managed as de facto wilderness in accordance with Service policy and as set forth in the Wilderness Act of 1964.

In the case of all areas identified as Wilderness Study Areas, the refuge would not implement any strategies that would attenuate future wilderness designation.

#### **Issue 9. Staffing and Funding**

Historically, Sevilleta NWR has had a small staff while staff duties and demands of the refuge have increased substantially. Currently, the Refuge staff consists of five permanent full-time employees. Acquisition of funding for proposed actions is another factor limiting the accomplishment of refuge goals.

**Challenge:** While additional staff and increased funding will be key to full implementation, the challenge will be to try to achieve goals and objectives within a wide array of funding and staffing situations.

#### **Issue 10. Interagency Coordination**

Coordination with other agencies and institutions and the development of partnerships will continue to be essential to the successful implementation of strategies in the CCP.

**Opportunities:** The formation of a Sevilleta NWR Stakeholders Committee will be useful as a tool to coordinate formal and informal responsibilities and for disseminating information.



### **EA 3.0 Description of the Proposed Action and Alternatives**

Each of the alternatives that follow represent a possible scenario for future management of the Refuge. The alternatives were designed to fulfill the broad Refuge Goal Statements delineated earlier and that stemmed from the issues considered in the planning process.

#### **EA 3.1 Alternative A (Proposed Action):**

The proposed action is to adopt and implement the actions making up the Sevilleta NWR CCP. The objectives and strategies detailed in that 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 the following objectives:

Continue implementation of the Mexican wolf captive propagation program on the refuge, and ensure continued operation within all applicable regulations, protocols, and safety guidelines.

Preserve refuge habitat diversity and threatened and endangered species habitats by preserving and restoring habitats to their natural condition. This may involve aggressive removal of non-native plants (e.g., salt cedar) and wildlife (e.g., oryx, Barbary sheep).

Maintain a viable population of silvery minnows on the Rio Grande within the refuge.

Provide up to 100 acres of additional cottonwood/willow habitat for the southwestern willow flycatcher.

By the end of FY 2001, (September 30, 2001), assess the refuge's full wilderness attributes, and determine appropriate areas within the full spectrum of the refuge for study and designation as Wilderness Study Areas. Included will be the dedication of between 3,000 and 8,000 acres as the Ladron Wilderness Study Area.

Evaluate refuge grasslands potential as an introduction site for the endangered northern aplomado falcon.

Protect threatened and endangered species on the refuge and adjacent properties through outreach, educational activities and effective enforcement of fish and wildlife laws.

Promote and support the introduction of native threatened and endangered species on the refuge.

Ensure the integrity of all naturally occurring biotic communities on the Sevilleta NWR.

Maintain migratory bird populations at healthy levels in the Upper/Middle Rio Grande Ecosystem.

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.

Protect, restore, and maintain upland terrestrial communities at the landscape level within the Upper/Middle Rio Grande Ecosystem.

Use sound land use practices and management tools to protect upland terrestrial habitats in the Upper/Middle Rio Grande Ecosystem.

Preserve, enhance, and restore hydrological regimes to perpetuate a healthy river ecosystem. Use the Rio Grande Initiative to form partnerships that address water management, habitat enhancement, and restoration, and impacts of non-native plants and animals on biological diversity and endangered species.

Compile a database of the baseline natural conditions, processes, and species associated within refuge ecosystems by October 2004.

Attain baseline natural conditions, processes, and populations of species in 50 percent of each habitat type by 2010. If attainment is not possible, implement adaptive management strategies designed to attain desired conditions.

Contribute to the integrity of the Upper/Middle Rio Grande Watershed using sound management tools and practices. Map and determine aquifer sources and characteristics of upland seeps, springs, and other water sources on the refuge.

Quantify water needs to maintain 90 acres of existing refuge wetlands and to restore 500 acres of wetlands associated with the Rio Grande.

Acquire in-stream flow rights for the perennial portion of the Rio Salado, Rio Puerco, and other tributary streams. Develop partnerships, relationships, and communications to improve implementation of refuge wildlife and habitat management goals.

Minimize human impacts to refuge ecosystems.

Encourage research that improves management and monitoring of species, communities, and processes on the refuge and the Upper/Middle Rio Grande.

Permit and encourage research from a wide range of interested parties and institutions while protecting the plants and wildlife of the ecosystem from detrimental human intrusion and manipulative research protocols. Minimize impacts of formal research activities.

Provide the research community a unique opportunity to conduct wildlife-related research, which in turn provides the refuge with management direction.



Provide the general public with high quality, wildlife-dependent experiences on and off the refuge.  
Provide the general public with high quality environmental education and wildlife-dependent experiences on and off the refuge.  
Develop sound management practices to protect cultural resources, within the scope of Part 614 of the Service Manual and all applicable federal laws and regulations.  
Minimize obtrusive impacts to refuge lands or adjacent lands.  
Document the need for additional staffing.  
Obtain adequate staffing to implement management plans benefitting the Upper/Middle Rio Grande Ecosystem both on and off refuge lands.  
Improve facilities to enhance refuge capabilities and resources, including the construction of a 8,000- square foot visitor center/ administrative complex; two 1,500-square foot staff residences; and a multi-unit living facility for refuge volunteers.  
Relocate the law enforcement training shooting range to a new location to eliminate the current hazards.

The implementation of the above management approaches among others, and employment of strategies associated with those approaches should assist in the achievement of the following broad refuge goals:<sup>1</sup>

- Goal I:** *To provide for the enhancement, preservation, and protection of threatened and endangered species as they occur naturally or were historically present on the Sevilleta NWR so that viable, self-sustaining populations can be restored to their natural habitats.*
- Goal II:** *To restore and maintain the natural diversity of plants and animals as it occurred historically on the Sevilleta NWR.*
- Goal III:** *To encourage research from bonafide research institutions, to provide an atmosphere conducive to investigations into environmental processes on the refuge, and to assume a pro-active role in facilitating research projects as they occur on the refuge.*

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<sup>1</sup>Strategies detailed in Section 5.0 (Pages 36-50) of the Draft Sevilleta NWR Comprehensive Conservation Plan, which accompanies this document, are hereby incorporated by reference for future consideration within the context of the National Environmental Policy Act.

- Goal IV:** *To protect existing, and to secure additional water rights and/or in-stream flow rights as necessary to protect the integrity of the riparian and aquatic habitats on the refuge.*
- Goal V:** *To achieve appropriate levels of public uses that are compatible with the purpose(s) for which the refuge was established and with the goals of the National Wildlife Refuge System; and to regulate, as provided by law, all activities, uses, and practices that are potentially harmful to refuge resources.*
- Goal VI:** *To establish a formal program for public outreach, identify important public resources, and implement environmental education programs accordingly.*
- Goal VII:** *To protect, maintain, and plan for Service-managed cultural resources on Sevilleta NWR for the benefit of present and future generations.*
- Goal VIII:** *To protect existing lands associated with Sevilleta NWR for the benefit of fish and wildlife resources; to provide for the acquisition of additional lands; and to ensure the integrity of Refuge boundaries relative to adjacent lands.*
- Goal IX:** *To improve funding, facilities, and staffing that will result in enhancement of refuge habitat and wildlife resources, leading to the achievement of the goals of this plan and the goals of the National Wildlife Refuge System.*
- Goal X:** *To strengthen interagency and jurisdictional coordination on or near the Sevilleta NWR resulting in decisions benefitting fish and wildlife resources while avoiding duplication of effort.*

### **EA 3.2            Alternative B: Current Management Scenario (No Action Alternative)**

This alternative would focus on the continuation of management of existing conditions, staffing, and facilities and would involve limited fire management strategies; limited non-native species removal efforts; limited data survey, collection and analysis; and limited educational outreach and interpretive efforts. This alternative would not involve the establishment or implementation of management hunts to remove non-native wildlife such as oryx or Barbary sheep. Salt cedar would be removed only on a limited basis. Some of the biological initiatives noted in the proposed alternative would be implemented within the limitations of current staffing and funding. The refuge would continue to remain closed to the public with the exception of the current waterfowl and dove hunting program. There would be only the replacement of the current administrative offices. New construction would not include a visitor center, classroom, and conference room components. The cooperative effort between the University of New Mexico Long-Term Ecological Research Center would continue under the existing Special Use Permit.

### **EA 3.3            Alternative C (Custodial Status Alternative)**



This alternative would call for a significant reduction in the number of refuge-sponsored management strategies. Refuge management would consist of allowing access for research purposes only. Refuge staff would serve as facilitators of research efforts through the maintenance of existing facilities only and by monitoring compliance of refuge users with the restrictive covenants within the title. Essentially, the Service's role would be reduced to custodial status. All populations would be allowed to thrive under purely natural conditions. There would be no need for improved staffing or facilities. Hunting activities would continue under the supervision of the New Mexico Game and Fish Department in accordance with applicable state and federal laws. No new construction would occur to replace existing office facilities.



## **EA 4.0            Affected Environment**

Sevilleta NWR is located in central New Mexico, approximately 50 miles south of Albuquerque, New Mexico. The refuge runs the full width of the Rio Grande Valley extending from the Sierra Ladrones on the west to the Los Pinos Mountains on the east. The physiography of the area is diverse and includes the Rio Grande and its surrounding bosque canopy, mountains, alluvial fans, Piedmont bajadas, terraces, canyons, arroyos, escarpments, black lava flows, basaltic buttes, sand dunes, and alkali flats. Because of the diversity of ecosystems and the strong climatic influence exerted by the El Niño Southern Oscillation, the refuge has become host to the University of New Mexico's LTER project initiated in 1988. Funded by the National Science Foundation, the program focuses on examining the ecological and biotic responses to seasonal, annual, and long-term climate changes. Additional information about the LTER project at the Sevilleta NWR can be found on the LTER internet home page (<http://sevilleta.unm.edu>).

### **EA 4.1            Vegetation<sup>2</sup>**

Major biomes within the Sevilleta NWR include the Great Plains Grassland, Great-Basin Shrub-Steppe, Chihuahuan Desert, Interior Chaparral, and Montane Coniferous Forest. The transition zones (ecotones) between these biomes contain species from each of the bordering biomes and well as species and characteristics of their own. For the purposes of mapping, the vegetation on the refuge is broken into 13 major map units. The following chart contains a summary of the units, the associated species, and the refuge area covered by each of the units. Location of the units is provided on Map #2 in Appendix G.

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<sup>2</sup> New Mexico Natural Heritage Program and Sevilleta Long-Term Ecological Research Program, 1998. *A Vegetation Classification Map for the Sevilleta National Wildlife Refuge*. Biology Department University of New Mexico, Albuquerque, New Mexico.

Vegetation Classification Units For Sevilleta NWR		
Unit Name	Dominant Species	Refuge Acreage
1. Water or wet ground	None, comprised of rivers, stream channels or tanks	1,270 acres
2. Barren or sparsely vegetated	None, contains open alluvial flats of basin bottoms	12,985 acres
3. Great Plains Grasslands (Galleta and Indian Ricegrass Grasslands)	<i>Hilaria jamesii</i> (galleta) <i>Oryzopsis hymenoides</i> (Indian ricegrass) <i>Sporobolus cryptandrus</i> (sand dropseed)	44,790 acres
4. Transition Chihuahuan and Great Basin Grasslands (Black Gramma Grasslands with Galleta)	<i>Bouteloua eriopoda</i> (black grama) <i>Hilaria jamesii</i> (galleta)	32,915 acres
5. Chihuahuan Desert Grasslands (Black Gramma Grasslands)	<i>Bouteloua eriopoda</i> (black grama)	21,343 acres
6. Transition Chihuahuan and Plains Grasslands (Black Gramma Grasslands with Blue Gramma)	<i>Bouteloua eriopoda</i> (black grama) <i>Bouteloua gracilis</i> (blue grama)	22,074 acres
7. Plains Grasslands (Blue Gramma and Hairy Gramma Grasslands)	<i>Bouteloua gracilis</i> (blue grama) <i>Bouteloua hirsuta</i> (hairy grama)	9,003 acres
8. Chihuahuan or Great Basin Lowland/Swale Grasslands (Alkalia or Giant Sacaton Grasslands)	<i>Sporobolus airoides</i> (alkali sacaton) <i>Sporobolus wrightii</i> (giant sacaton) <i>Scleropogon brevifolius</i> (burrograss) <i>Atriplex canescens</i> (fourwing saltbush)	4,219 acres
9. Chihuahuan Desert Shrublands (Creosote bush)	<i>Larrea tridentata</i> (creosotebush) <i>Bouteloua eriopoda</i> (black grama) <i>Erioneuron pulchellum</i> (low woollygrass or fluffgrass)	26,532 acres
10. Great Basin Shrublands (Fourwing Saltbush or Broom Dalea)	<i>Atriplex canescens</i> (fourwing saltbush) <i>Psoralea scoparius</i> (broom dalea)	17,611 acres

Vegetation Classification Units For Sevilleta NWR		
Unit Name	Dominant Species	Refuge Acreage
11. Rocky Mountain Conifer Savanna (One-seed Juniper Woodlands)	<i>Juniperus monosperma</i> (oneseed juniper) <i>Bouteloua gracilis</i> (blue grama) <i>Bouteloua hirsuta</i> (hairy grama)	25,280 acres
12. Rocky Mountain Conifer Woodlands (Piñon Woodlands)	<i>Pinus edulis</i> (two-needle piñon) <i>Juniperus monosperma</i> (one-seed juniper) <i>Quercus turbinella</i> (shrub live oak) <i>Cercocarpus montanus</i> (mountain mahogany)	7,837 acres
13. Rio Grande Riparian Woodlands (Rio Grande Cottonwood and Salt Cedar Riparian Woodland)	<i>Populus deltoides</i> (Rio Grande cottonwood) <i>Tamarix ramosissima</i> (salt cedar)	2,188 acres

Over 1,200 species of plants are found on the refuge including 94 species of grasses, the predominant species being blue grama (*Bouteloua gracilis*) and black grama (*Bouteloua eriopoda*). The majority of native riparian woodlands has been replaced by stands of introduced non-native species such as Russian olive (*Eleagnus angustifolia*) and salt cedar (*Tamarix spp.*). A more comprehensive list of plant species is found in Appendix E.

## **EA 4.2 Wildlife**

Sevilleta NWR offers a diverse assortment of wildlife species. The various habitats on the refuge support 89 species of mammals, 225 species of birds, 58 species of reptiles, and 15 species of amphibians. Resident wildlife commonly seen on the refuge includes desert bighorn sheep (*Ovis canadensis*), pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), mountain lion (*Felis concolor*), and black bear (*Ursus americanus*). Commonly seen bird species include bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), northern shoveler (*Anas clypeata*), northern pintail (*Anas acuta*), American coot (*Fulica americana*), wood duck (*Aix sponsa*), canvasback (*Aythya valisineria*), redhead (*Aythya americana*), great blue heron (*Ardea herodias*), black-crowned night heron (*Nycticorax nycticorax*), sandhill crane (*Grus canadensis*), killdeer (*Charadrius vociferus*), long-billed dowitcher (*Limnodromus scolopaceus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and burrowing owl (*Athene cunicularia*). Also commonly seen are a variety of insects and reptiles including the endangered Texas horned lizard (*Phrynosoma cornutum*). Species information is based largely on species lists researched and prepared by the LTER project, but it should be noted that wildlife inventory data is ongoing and new species are found periodically. For an inventory of wildlife species, see Appendices A through F.

## **EA 4.3 Climate**

The climate of the Sevilleta NWR and surrounding region is semi-arid. The average annual precipitation in the valley is 8 inches while the mountain areas receive approximately 14 inches, most of which falls during the monsoon season in July and August. Temperatures can vary greatly, ranging from 0° to over 105° Fahrenheit. The fall and spring are relatively dry with winter and late summer being the wet seasons. Although winter precipitation includes snowfall, snow-pack rarely develops.

## **EA 4.4 Geology**

The Sevilleta NWR lies in the central portion of the Rio Grande Rift, a northward tapering area extending from northern Chihuahua, Mexico, to southern Colorado. The Sierra Ladrones lie on the western margin of the refuge and the Los Pinos Mountains lie on the eastern margin of the refuge. Contemporaneous with the formation of the Sierra Ladrones, volcanic activity produced the Silver Creek Andesite, a prominent geographic feature extending southward from the Rio Salado. Such large-scale volcanism has been seen throughout the rift.



Faulting occurred throughout the Rio Grande Rift from between the Quaternary and late Tertiary periods. Those faults identified as having had possible movement in the Quaternary include the Coyote Springs Fault, Loma Pelada Fault, Loma Blanca Fault and the Cliff Fault. Of these, the Loma Pelada Fault, which is defined by a prominent scarp (steep slope or cliff) approximately 1 kilometer east of the microwave relay tower, is considered to have had the most recent movement during the late Quaternary Period. Traces of some faults may be observed as step-wise climbs in the ground surface while driving westward toward the Sierra Ladrones along the northern boundary of the refuge.

#### **EA 4.4.1 Stratigraphy**

While small sections of Paleozoic and Mesozoic sediment associated with large fault block uplifts can be seen on both the western and eastern margins of the refuge, the majority of the stratigraphy exposed on the refuge is of Tertiary age. These Santa Fe Group sediments are largely related to the periods of most active rift extension where large basins were created for the accumulation of sediment. These basin fill sediments grade from coarse alluvial fan conglomerates to sandy/gravelly channel deposits to playa lake sediments. Such a sequence from coarse to fine sediment, moving up in a stratigraphic section depicts the filling of the basins and the subsequent reduction in the gradient for sediment transport. The playa lake deposits are high in gypsum and can be seen at numerous locations within the refuge, forming a type of badlands topography. The high gypsum content in these sediments creates a saline environment that is inhospitable to most plant species. The lack of significant vegetation on these finely textured sediments makes them highly susceptible to erosion from high intensity rainfall events typical of the monsoonal season.

#### **EA 4.5 Soils**

The geomorphology of Sevilleta NWR can be seen as a complex interplay between the extensional tectonic regime that drives the landscape from beneath and the semi-arid climatic regime that drives the system from above. The contrast in tectonic styles between the two mountain ranges that define the refuge boundaries have resulted in strikingly different geomorphic expressions in the Piedmont region of those mountains. In the case of the Sierra Ladrones, the down-dropped block to the east of the mountains has been rotated basinward, creating little accommodation space at the very base of the mountains for mountain-derived sediments. The result is that coarse, alluvial sediments released from mountain drainages are transported greater distances from the mountain front before they are

deposited. The colluvial and alluvial material shed from the mountain front has the effect of planing off the Piedmont strata as they are transported basinward. The Piedmont region of the Ladrones has since incised into small drainages leaving remnants of the original planar transport surface (pediments) extending as fingers sloping away from the mountain.

At the base of Los Pinos Mountains, by contrast, the mountainward rotation of the down-dropped block created massive accommodation space at the mountain front. As such, the mountain valley drainages, once released from their confining channels at the mountain front, are quickly decelerated and their sediment load deposited in a fan. These alluvial fans are stacked by successive lobes of sediment associated with single event discharges. At the more distal regions of the alluvial fans on the east side of the refuge, the lobes of coarse alluvium give way to a broad bajada surface extending eastward to the Rio Grande Valley. The generally flat and gently-rolling nature of this bajada is attributed to a long duration of eolian sand and dust deposition that has obscured the earlier topography of braided streams and alluvial channels that probably persisted when the fans were more actively prograding.

Eolian deposition is also quite prominent on the west side, north of the Rio Salado drainage that serves as an abundant sand source for the southwesterly winds. Large barchaan sand dunes can be seen prograding northward from the riverbed, while further north from the Salado site the dunes give way to sand sheets that are progressively more stabilized with movement away from the riverbed source. While dune migration has been active during the past 40 years as evidenced by the 1.5 meters of sand covering the old Highway 85, historical records indicate that dune migration was significantly more active during the drought period of the 1950s.

Soils on the refuge are classified into 42 types as presented on the soils map in Appendix G (map 4). While no one type of soil is predominant, it is apparent that the central portion of the refuge has those soils series that are classified as “dry soils and lava flows” (Turney, Yesum, Wink, Bluepoint, Nickel, Caliza, Lozier, Ustifluvents, Gila, and Armijo) while the westernmost portion of the refuge associated with the Sierra Ladrones has the “moist soil and rock outcrop” type of soils series (Puerticito, Cascajo, Rock outcrop, Millet, Sedillo, and Motaqua). The eastern portion of the refuge encompassing Los Pinos Mountains is covered predominately by soils of the “moist soil” classification (Harvey and Winona).

## **EA 4.6 Water Management**

The Refuge has limited water resources, but even limited water resources in arid grasslands greatly increases wildlife and plant diversity. Water resources on the Refuge consist of natural springs and several man-made wells.

### **EA 4.6.1 Natural Springs**

Of all the natural resources on Sevilleta NWR, water is the most scarce. There are only 11 springs on the refuge, six on the west side and five on the east (Appendix G). The western springs are located near the refuge boundary and are generally dependable year round even in a drought. The springs on the east side either are not productive or are only wet weather springs. One exception is Cibola Spring, which produces water year round.

### **EA 4.6.2 Wells**

There are 12 wells in operation on the refuge including 3 on the west side and 9 on the east side (Appendix G). They range in depth from 40 feet to over 350 feet. Wells are not found in the central portion of the refuge due to the extreme depth of the aquifer. In most cases, the existing wells were activated because they were in good condition with an active aquifer. Due to recent seismic activity, some deep faulting occurred resulting in the loss of a major aquifer. Funds were not available and none were requested to re-drill these wells.

Due to development and resource exploitation occurring adjacent to Sevilleta NWR, the refuge continues to maintain windmills for the benefit of wildlife. Wildlife migrations have been effectively stopped on the northern portions of the refuge as a result of subdivisions and highway fencing. To the east and south the adjacent lands are grazed and hunted with few restrictions on off-road vehicles. To the west there is less exploitation and wildlife move freely on and off the refuge. The current refuge management objective is no net gain on wells.

Within the boundaries of Sevilleta NWR, the following wells have been permitted with a 3 acre-foot water right: Partition Well, Bronco Well, 222 Well, Jacks Well, West Mesa Well, Pino Well, Sepultura Canyon Well, Sepultura Flats Well, Cottonwood Well, Goat Draw Well, Dove Springs Well, Tomasino Well, Canyon Well, Red Well, and Montosa Well.

The refuge also has a small waterfowl area called Unit A that was constructed by the Bureau of Reclamation (BOR) in the early 1970s. Refuge land ownership includes those lands currently used

by the BOR to convey or recover water from the river. Consequently, the BOR granted the refuge a 2 cubic-foot per second flow through of irrigation water from October 1 to February 28 in return for permitting their water conveyance systems. Unit A was rehabilitated in 1998 by removal of salt cedar and Russian olive followed by root plowing and raking. New water control structures were installed to allow for water management.

#### **EA 4.7 Cultural and Historic Resources**

Sevilleta NWR contains important archeological sites of the late prehistoric period. It is widely recognized as the location of a number of pueblo peoples occupation sites, considered to be ancestral Piro Indians who occupied the central province of the Rio Grande at the time of Spanish exploration and colonization. The name Sevilleta is itself derived from a nearby Piro settlement, so named by early Spanish colonists who likened the setting of the pueblo to that of the city of Seville, Spain. Sevilleta is also the site of the Mexican period village of La Joyita.

Although less than one percent of the Sevilleta NWR has been inventoried systematically for archeological sites, some selective sampling of refuge lands has identified several major prehistoric sites of national significance. There have been three small site excavation projects on the refuge that have yielded limited stratigraphic and chronometric information about regional prehistory. The presence of the interdisciplinary LTER project may yet define an even greater role for archeological research on the Sevilleta NWR.

To date, 60 sites have been recorded on the refuge with the Laboratory of Anthropology site records, and there are an additional 15 to 20 unrecorded site leads for which there is minimal information. The first site records were made by H.W. Yeo in the 1930s. Two important surveys on the refuge since then were the survey of sampled units by Human Systems Research (*Reconnaissance Study of the Lower Rio Puerco and Salado Drainages*, Wimberly and Eidenbach, 1980) and the New Mexico Historic Preservation Program Rio Abajo survey by Marshall and Walt (*Rio Abajo, Prehistory and History of a Rio Grande Province*, Marshall and Walt 1984). Limited test excavations have been undertaken by the Office of Contract Archeology, University of New Mexico, at six sites on a pipeline corridor (*Test Excavation of Sevilleta Shelter LA 20896*, Winter, 1981) and a site on the Rio Salado (*Test Excavation and Data Recovery Plan for LA 102366*, Chapman, 1995).

#### **EA 4.8 Socioeconomic Features**

In 1997, Socorro County had an estimated population of 16,333 of which an estimated 8,650 resided in the City of Socorro<sup>3</sup>. The socioeconomic impact of the refuge on Socorro County consists primarily of the contributions of the indigenous staff, the temporary researchers stationed at the refuge, and the resulting research funding expended for supplies and services in the county and the State of New Mexico. Annual salaries totaling \$200,000 are paid to refuge employees who reside in Socorro County. A minimum of another \$35,000 is spent within the county for supplies used by the refuge.

The State of New Mexico as well as Socorro County receives the greatest portion of the \$850,000 grant from the National Science Foundation. The one person employed by the University of New Mexico at the Biological Field Station resides in Socorro County. During the summer months as many as 48 researchers reside at the field station. These temporary residents purchase food, clothing, and other essentials in the communities of Albuquerque, Belen, and Socorro. Many of the summer hires become residents of New Mexico and go on to attend the University of New Mexico.

Payment In Lieu of Taxes subsidies from the Department of the Interior are designed to off-set the burden that counties feel when properties are removed from the tax roles through actions taken by the Department. Sevilleta NWR's annual PILT payment to Socorro County is approximately \$160,000.

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<sup>3</sup> U.S. Department of Commerce, Bureau of the Census, Population Estimates Program 1997.

#### **EA 4.9            Refuge Staffing**

When the refuge was established in 1973, a GS-9 assistant refuge manager and a WG-7 part-time maintenance worker were hired. In 1978 an engineering equipment operator was brought on duty. All administrative work was accomplished out of Bosque del Apache NWR headquarters with Sevilleta NWR paying for one half of an administrative staff year. In 1986 a GS-4 typing clerk was hired and later updated to a GS-5. Today, the position is classified as a GS-7 administrative office assistant. In 1992 a biologist was added to the refuge staff to carry out a biological program. Currently, the refuge staff consists of the following five permanent, full-time employees:

Refuge Manager, GS-13  
Administrative Office Assistant, GS-07  
Refuge Operations Specialist, GS-11/12  
Engineering Equipment Operator, WG-10  
Maintenance Worker, WG-08

## **EA 5.0 Environmental Consequences**

The following brief discussions and informal analysis pertains 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 result in consequences to various components of the refuge's biological program.

***Wilderness.*** Wilderness designation would add another layer of protection over areas that are already well protected by virtue of the refuge's closure to general access. Areas targeted for possible designation need to be strategic so as not to hinder access to research areas. Overall wilderness designation of targeted areas would ensure the continuation of natural processes.

***Mexican Wolf Captive Breeding.*** The continued role of the refuge in Mexican wolf captive breeding will affect the ability of the Service in reintroduction and recovery efforts. Efforts to enhance interpretation of the refuge's role will contribute to a better understanding of the program's overall importance to ecosystem conservation.

***Endangered Species Management.*** Continued strengthening of the refuge's program to maintain viable populations of the endangered silvery minnow along the refuge's stretch of the Rio Grande will result in overall preservation of habitat diversity. Additionally, objectives concerning the provision and protection of cottonwood and willow habitat will result in habitat protection for the southwestern willow flycatcher. The proposal also calls for additional studies and surveys with respect to the Aplomado falcon recovery program and whether or not the refuge can play a role.

***Improvement to Natural Resource Baseline Information and Preservation of Habitat Diversity.*** The refuge status and size lend a level of protection to the naturally occurring biotic communities. The proposed action, however, strengthens the integrity of all naturally occurring biotic communities at landscape levels. Improvements to baseline information will assist in the development of management approaches for the future. Benefits will accrue to upland terrestrial habitats and wildlife populations, migratory bird populations, migratory waterfowl, riparian and wetland habitats, plant communities, native

grasslands and unique vegetation communities, and natural hydrological regimes.

***Partnerships and Improved Coordination.*** The strengthening of cooperative relationships will ensure effective implementation of programs and strategies designed to benefit wildlife and habitat resources. As a major national and international host for scientific research, the refuge will need extensive coordination and assistance from partners in order to meet respective needs, eventually benefitting wildlife and habitat resources.

***Research.*** Improvements to working relationships with research partners will allow the Service to appropriately engage in communicating the value of such research to the public. Ultimately, better understanding of biological needs and the importance of natural resources will result in stronger support for these efforts. Continued strengthening of research efforts will result in improved baseline information on a myriad of wildlife species, vegetation communities, meteorological data, and soils composition and edaphic qualities. Monitoring and evaluation will undoubtedly ensure improved understanding of nature's adaptive qualities and will provide managers and researchers with the tools to make future decisions.

***Fire Management.*** Prescribed burning would be designed to enhance habitat while eliminating unwanted fuel and preventing unwanted wild fires. Suppression and pre-suppression strategies (e.g., firebreaks) would be conducted in accordance with Service policy and designed to minimally affect habitat resources. Pre-suppression strategies would be designed to maximize suppression capabilities in the event of a fire outbreak. As fire does affect the occurring cycle of succession, consequences to the immediate ground covers are considered to be moderate and temporary. Prescribed fire is intended to mimic naturally occurring fires, where possible.

***Wildlife Interpretation and Educational Outreach.*** Proposed enhancements will improve the public's awareness and understanding of refuge resources. Wildlife interpretive trails in the San Lorenzo Canyon area will temporarily disturb existing vegetation regimes as construction of the dirt trail will involve minor clearing of vegetation for a foot path. This project will open up another window of opportunity for the public to appreciate the vastness of the refuge's diversity. Increasing opportunities for compatible hunting, wildlife observation, and wildlife interpretation will positively benefit resources by increasing support for wildlife and habitat resources. The development of a joint use visitor/environmental education/administrative facility



will result in stronger cooperation between stakeholders and the Service.

Construction of a visitor center/administrative complex will replace approximately .82 acres of mesquite/creosote/native grasses with a building pad of approximately 8,000 square feet with an asphalt paved parking area with a capacity for approximately 28 vehicles.

***Other Management Actions.*** Little or no consequences to biological resources are anticipated from any other action noted in the proposed alternative.

#### **EA 5.1.2 Air Quality**

If Alternative A is adopted, expanded use of fire as a management tool on the refuge would cause slight and temporary consequences to the refuge's air quality. Prescribed fires would be managed and monitored in accordance with the Service's fire management policy, and under further guidance from an approved Fire Management Plan. Lack of a good pre-suppression and suppression capability would probably result in larger and more intense fires. Road maintenance and improvements might cause a very slight but temporary profusion of particulate matter.

Construction of a visitor center/administrative complex will replace approximately .82 acres of mesquite/creosote/native grasses with a building pad of approximately 8,000-square feet with an asphalt paved parking area with a capacity for 28 vehicles. During the construction phase, top soils will be disturbed and, depending on wind activity, will increase particulates in the air. These effects can be considered temporary.

#### **EA 5.1.3 Water Quality**

Alternative A provides for better monitoring of water quality standards. The improvement in understanding and baseline data will contribute to improvements in water quality in the long term.

#### **EA 5.1.4 Wetland and Riparian Preservation and Enhancement**

Alternative A provides for the continuation of and enhancement to activities that improve the Service's wetland and riparian resources. These improvements will serve both aquatic and riparian habitats along with fish and wildlife species.

### **EA 5.1.5 Cultural Resources**

The cultural resources of Sevilleta NWR are important 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. Goal 7 of the proposed action calls for the specific protection of all refuge cultural resources inclusive of a cultural resources survey to better understand these important resources.

### **EA 5.1.6 Socioeconomics**

It is expected that Alternative A's proposal for the construction of a joint use visitor/environmental education/administrative facility will increase visitation to the refuge. This projected increase in visitation, along with an effective interpretive component to such an administrative complex/visitor contact station, will add to the region's growing eco-tourism industry. Although visitation will be controlled to some degree, and will be focused on wildlife education and interpretation, the refuge's goal of becoming a world leader in providing opportunities for ecosystem-level wildlife research will result in national and international interest in what the Socorro, New Mexico, area has to offer. The internationally recognized Festival of the Cranes, held each fall in Socorro, is based at the Bosque del Apache NWR and generates thousands of dollars for the overall economy. On a broader basis, research has demonstrated that for eco-tourism alone, visitors may spend between \$21 and \$145 during a visit to a given 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<sup>4</sup>. 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 improve refuge-sponsored efforts to collect baseline data or improve understandings of the refuge's plants and animals. Removal of non-native species and prescribed fire would be limited. Failing to remove fuels via prescribed burns

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<sup>4</sup> Kerlinger, Paul, Phd., Ted Eubanks, R.H. Payne, 1994, *The Economic Impact of Birding Ecotourism on Communities Surrounding Eight National Wildlife Refuges*. New Jersey Aud ubon Society.

could result in destruction of important habitat as a result of the build-up of forage creating the possibility of a large-scale wildfire.

This alternative would provide for the basic level of protection of resources at the refuge. The relationship with the University of New Mexico Research Field Station would continue as before with only the minimum of interaction necessary to ensure the compatibility of research taking place on the refuge. Current levels of staff and funding would allow only the highest resource priorities to be attended. As in the case of the proposed alternative, wilderness designation would add another layer of protection over areas that are already well protected by virtue of the refuge's closure to general access. Areas targeted for possible designation need to be strategic so as not to hinder access to research areas. Overall wilderness designation of targeted areas would ensure the continuation of natural processes.

Construction of a replacement administrative building will replace approximately .7 acres of mesquite/creosote/native grasses with a building pad of approximately 5,000-square feet with an asphalt paved parking area with a capacity for 20 vehicles.

#### **EA 5.2.2 Air Quality**

Any prescribed burning would have only minor and temporary consequences to air quality. Burns would be done according to an approved fire plan.

Construction of a replacement administrative building (no visitor center component) will replace approximately .7 acres of mesquite/creosote/native grasses with a building pad of approximately 5,000-square feet with an asphalt paved parking area with a capacity for 20 vehicles. During construction, top soils will be disturbed and, depending on wind, will increase particulates in the air. These effects can be considered temporary.

#### **EA 5.2.3 Water Quality**

No action in this alternative would have consequences to the refuge's overall water quality. If actions such as pumping from existing surface waters were to occur, silt could be stirred causing temporary increases in particulate densities temporarily effecting light and heat transferences.

#### **EA 5.2.4 Wetland and Riparian Preservation and Enhancement**

The refuge would continue efforts on a more limited basis to rehabilitate existing wetlands. The movement of soils might cause some temporary siltation within existing waters increasing particulate densities temporarily occluding light and heat transferences.

#### **EA 5.2.5 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**

Visitation would be strictly on a case-by-case permit basis, as there would be no enhancements to public recreational and environmental educational programs. The adoption of Alternative B would not affect the economy of Socorro County or the immediate area.

### **EA 5.3 Alternative C**

#### **EA 5.3.1 Biological Resources**

As this alternative calls for the refuge to be managed in a purely custodial framework, the Service would no longer engage in its own active data collection and analysis. Data collection and analysis would be limited to work done through research outlets. Indirectly, opportunities to better understand the Sevilleta NWR ecological components would be lost. This loss of opportunity would include knowledge regarding a variety of plant and animal species.

Cooperative efforts between the refuge and the Long-Term Ecological Research Center would continue. However, the refuge would only facilitate LTER activities by providing security and maintenance to refuge infrastructure. Long-term consequences would be in the form of opportunity costs based on projected benefits of pooled resources of a true partnership.

#### **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**

No activities would affect water quality on the refuge.

**EA 5.3.4 Wetland and Riparian Preservation and Enhancement**

No activities would improve existing wetlands.

**EA 5.3.5 Cultural Resources**

No cultural assessments would occur. Research that would continue through the University of New Mexico Research Field Station could conflict with cultural resource sites.

**EA 5.3.6 Socioeconomics**

Visitation would be rare and strictly on a case-by-case permit basis. There would be no enhancements to public recreational and environmental educational programs. The adoption of Alternative C would not affect the economy of Socorro County or the immediate area.



## **EA 6.0 Cumulative Impacts, Mitigation, and Consultation and Coordination**

This section discusses the cumulative effects and mitigation proposed for the preferred alternative. In addition, it provides information regarding consultation and coordination that has occurred with other Federal and State agencies, tribes, interested stakeholders and the public.

### **EA 6.1 Cumulative Impacts**

Cumulative impacts include impacts on the environment 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 15 years, each activity may be given additional NEPA consideration, where appropriate. At that time, 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, 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 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 availability of the draft CCP was published in the *Federal Register*, December 7, 1998 (Volume 63, Number 234), and copies were sent to citizens, interest groups, and agencies that previously expressed an interest in refuge programs and issues. Eight letters were received from various private citizens and interest groups. These letters are included in this document and within the CCP as appendices.

Additionally, the refuge has formed a special Stakeholders Committee whose members have a legal (by virtue of Title or Memorandum of Understanding), or research-related stake in refuge programs and management. Currently, the Stakeholders Committee includes the New Mexico Game and Fish Department, the University of New Mexico, New Mexico Institute of Mining and Technology, and The Nature Conservancy. Comments received on the draft were considered and incorporated as appropriate. The written comments, along with Service responses, are included in Appendix M of the final CCP.



**EA 7.0 Document Preparation**

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