Kofa National Wildlife Refuge and Wilderness
and
New Water Mountains Wilderness

Interagency Management Plan, Environmental Assessment, and Decision Record

U.S. Department of the Interior
Bureau of Land Management

U.S. Department of the Interior
U.S. Fish and Wildlife Service

Arizona Game and Fish Department

Yuma and La Paz Counties, Arizona
EA Number: EA-AZ-055-95-105

October 1996

Kofa National Wildlife Refuge & Wilderness
and
New Water Mountains Wilderness
Interagency Management Plan

Responsibilities

Signature by the Arizona State Director represents an agreement by the Bureau of Land Management to work cooperatively within the scope of agency jurisdiction, with the U.S. Fish and Wildlife Service, Arizona Game and Fish Department, and the public, to implement public land provisions of the Kofa National Wildlife Refuge & Wilderness and New Water Mountains Wilderness - Interagency Management Plan.

Signature by the Regional Director, Region 2, represents an agreement by the U.S. Fish and Wildlife Service to work cooperatively within the scope of agency jurisdiction, with the Bureau of Land Management and Arizona Game and Fish Department to implement appropriate provisions of this Plan.

As Secretary to the Arizona Game and Fish Commission, signature by the Director of the Arizona Game and Fish Department represents an agreement by the Commission and the Department to work cooperatively with the Bureau of Land Management and U.S. Fish and Wildlife Service to implement provisions of this plan as authorized by Arizona Revised Statutes Title 17.

For lands administered by the Bureau of Land Management, this plan complies with provisions of the Sikes Act and the Master Memorandum of Understanding Between State of Arizona, Arizona Game and Fish Commission and Department of the Interior, Bureau of Land Management.

Approved by: Gary D. Bauer

Denise Meridith, Arizona State Director
Bureau of Land Management

Approved by: Nancy M. Kaufman

Nancy Kaufman, Regional Director, Region 2
U.S. Fish and Wildlife Service

Approved by: Duane Shroufe

Duane Shroufe, Director
Arizona Game and Fish

Finding of No Significant Impact/Decision Record

Kofa National Wildlife Refuge & Wilderness
and
New Water Mountains Wilderness
Interagency Management Plan

Environmental Assessment Number: EA-AZ-055-95-105

Finding of No Significant Impact: Based on the analysis of potential environmental impacts contained in the attached Environmental Assessment, I have determined that impacts are not expected to be significant, therefore an Environmental Impact Statement is not required.

Decision: It is my decision to approve provisions of the Kofa National Wildlife Refuge & Wilderness and New Water Mountains Wilderness - Interagency Management Plan within the jurisdiction of my agency.

Rationale for Decision: Long-term direction is provided for the planning area to: enhance and preserve wilderness values; manage wildlife and habitat and preserve biological diversity; maintain high quality recreational opportunities compatible with special land designations; and minimize environmental impacts from mining. The plan allows for changes to management direction based on monitoring and periodic evaluations.

Plan provisions for lands administered by the Bureau of Land Management (BLM) conform with agency legal mandates.

Plan provisions for lands administered by the U.S. Fish and Wildlife Service (USFWS) conform with agency legal mandates.

Other Alternatives: No Action and Minimal Impact alternatives were also considered.

Stipulations: The proposed action incorporates all mitigation.

Recommended by: Gail Acheson — Jan 17, 1997
Field Manager, Yuma Field Office — Date

Recommended by: Carol Dumberg - Acting — Jan 17, 1997
Kofa National Wildlife Refuge Manager — Date

Approved by: Gary D. Rodriguez — Jan 21, 1997
BLM State Director, Arizona — Date

USFWS Concurrence by: [signature] III, Acting — January 27, 1997
Geographic Manager Gila/Salt/Verde Ecosystem — Date

Approved by: Nancy M. Kaufman — 1/29/97
USFWS Regional Director, Region 2 — Date

The Bureau of Land Management is responsible for the balanced management of the public lands and resources and their various values so that they are considered in a combination that will best serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield; a combination of uses that take into account the long term needs of future generations for renewable and nonrenewable resources. These resources include recreation, range, timber, minerals, watershed, fish and wildlife, wilderness and natural, scenic, scientific and cultural values.

The U.S. Fish and Wildlife Service is an agency of the Department of the Interior with a two-fold mission: to protect and manage wildlife in the interest of the American people and to provide wildlife oriented recreational and educational opportunities to the American people.

The Service currently manages the National Wildlife Refuge System, many National Fish Hatcheries, and several wildlife research centers. Additionally, it monitors and protects endangered species; provides technical help to international, federal, state and local agencies, Native American tribes, and private landowners on fish and wildlife matters; administers a program of federal monetary aid to state wildlife agencies; and enforces federal laws and regulations to protect wildlife and their habitats.

BLM/AZ/PL-97/002

United States Department of the Interior

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U.S. FISH AND WILDLIFE SERVICE
Kofa National Wildlife Refuge
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In reply refer to:
8560 (050)
AZA 25502

Dear Reader:

Contained herein is the Final Kofa National Wildlife Refuge & Wilderness and New Water Mountains Wilderness- -Interagency Management Plan, Environmental Assessment, and Decision Record. Impacts expected from implementing the proposed plan are analyzed in the Environmental Assessment. The Plan will provide long-term management guidance for the Kofa National Wildlife Refuge and New Water Mountains Wilderness.

A draft version of this document was released for public review and comment in January 1996. Comments on the draft plan were analyzed and revisions were made for inclusion in the final document where appropriate. A compilation of the comments is available upon request.

The Environmental Assessment and Decision Record are subject to appeal in accordance with procedures contained in 43 Code of Federal Regulations, Part 4, Subparts E and G. Implementation of this plan will not begin until 30 days after the date of this letter.

The Kofa National Wildlife Refuge and Yuma Field Office staffs thank all who contributed to the development of this document. We encourage your continued participation in the effort to ensure that our natural resources are properly managed for current and future generations.

Sincerely,

Milton Haderlie
Refuge Manager
Kofa National Wildlife Refuge

Gail Acheson
Field Manager
Yuma Field Office

1 Enclosure
1 - Final Kofa National Wildlife Refuge & Wilderness and New Water Mountains Wilderness - Interagency Management Plan

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PREFACE

Adjacent locations and common wilderness management and wildlife habitat concerns led to a coordinated effort between the U.S. Fish and Wildlife Service (Service) and the Bureau of Land management (BLM) to develop one management plan that will cover both (Map 1) the New Water Mountains Wilderness (New Waters) and the Kofa National Wildlife Refuge and Wilderness (Kofa).

A joint Service/BLM management plan document has been published separate from this more detailed version. The joint agency document is shorter and does not contain a full description of agency legal mandates and policies as does this version. This version is meant to be used as the Refuge Manager's working tool as it contains some of the pertinent discussions regarding the major issues. Both documents attempt to integrate both agency concerns and issues in a way that recognizes the differences in legal mandates, but that focuses on the ecological relationship between the two wilderness areas. The plan objectives at the end of both documents are the result of consideration of the resources, the issues relative to the resources, and the respective agency mandates that come into play including the Wilderness Act.

PART I:

The Planning Area, Boundary, and Background: An Area of Ecological Concern[1]

This joint agency management plan is primarily concerned with Kofa NWR the adjacent New Waters. The goals and objectives contained in this document reflect a dominant wilderness management theme and focus on issues pertaining to Kofa and the New Waters, which are contiguous. Kofa consists of 665,400 total acres of which 510,900 acres is designated wilderness and is managed by the Service. The New Waters consist of 24,600 designated wilderness acres and is managed by the BLM. Both areas, along with various adjacent lands, form an ecological area that will be considered in this plan as the "area of ecological concern" (planning area).[2]

Historically, Kofa and the New Waters have played a central wildlife and wildlands conservation role in western Arizona. To counter dwindling populations of desert bighorn sheep in the earlier part of the century, a management theme relating to the recovery of the species had become necessary beyond the establishment of legal protection for the species under the Arizona State Game code.[3] Thus, a clear and dominant strategy for the management of these historically "rocky, waterless sierras..." was designed specifically for the recovery of bighorn sheep populations.[4]

The Kofa Game Range was established in 1939 by Executive Order 8039 specifically for the recovery of bighorn sheep populations. Administrative responsibility for Kofa was shared by

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[1] An Area of Ecological Concern can be defined as: "An essentially complete ecosystem (or set of interrelated ecosystems) of which one part cannot be discussed without considering the remainder." [*Malheur National Wildlife Refuge Master Plan and Environmental Assessment*, 1985, p. 7] For purposes of this plan both the New Water Mountains designated wilderness area, the Kofa NWR, and lands immediately adjacent to them are considered as the Area of Ecological Concern. The S ervice and the BLM realize this Area of Eecological Concern falls into a larger category of watersheds and ecoregions. For purposes of setting effecti ve wildlife and wilderness management objectives, this plan needs to focus on a specifically defined geographical area (i.e., area of ecological concern) which will be termed the "planning area." Mineral Survey 3207, adjacent to the northwest side of the New Waters is also considered within the planning area.

As a point of clarification, the term "area of ecological concern" is an informal term used by the Service in its Comprehensive Managem ent Planning process. It is not to be confused with the BLM's more formalized Area of Critical Environmental Concern (ACEC). An ACEC is an area of national or international significance that is threatened by adverse change -- a red uction or loss of values - unless special management attention is applied. With ACEC status, public land is managed to prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes. The actions prompted by this kind of status are similar to those implied by Wilderness designation. By virtue of Wilderness designation, this kind of special focus is afforded an area.

[2] The La Posa Interdisciplinary Plan addresses management concerns for lands on the west and no rth side of the New Waters and Kofa. Several actions in the La Posa Plan have been coordinated with this planning effort to assist in preserving natural values of this planning area.

[3] According to David Brown, the Arizona bighorn sheep population rece ived legal protection with the establishment of the State Game Code in 1913. He writes: "Although enforcement of the game laws may have been lax, and bighorn sheep continued to be killed for meat and as trophies those populations in desert ranges too arid a nd precipitous for livestock persisted. Isolated and peripheral populations continued to be extirpated..." Brown, David, Early History, in *The Desert Bighorn Sheep in Arizona*, Raymond M. Lee, editor, (Phoenix, AZ..: State of Arizona, 1993); p.5.

[4] Original source, Baird, S.F. 1859. Mammals. p. 1-62 in Emory (1959): Part 2 -- Zoology of the boundary. United States and Mexican boundary survey. Dept. of the Interior. Washington, D.C., as noted in Lee, Raymond M., *The Desert Bighorn Sheep in Arizona*, (Phoenix, Az.: State of Arizona, 1993) p.1.

the Service and the U.S. Grazing Service until 1946. In 1946, the game range came under joint management of the Service and the newly established BLM. The Service and BLM co-managed Kofa until sole jurisdiction of the refuge was given to the Service with Public Law 94-223 in 1976. As with all Federal lands, the BLM still manages mining claim recordation of processes for Kofa. With passage of the Arizona Desert Wilderness Act of 1990, portions of Kofa and New Waters were designated as part of the National Wilderness Preservation System. This gave both the Service and BLM a common legal mandate for managing these specially designated areas.

By implementing this plan, the Service and the BLM will continue important efforts on behalf of the bighorn sheep. Both agencies also hope to engage in several strategies to promote enhancement of natural habitats for a variety of native species. The Wilderness designations imply the implementation of strategies that engender ecological and landscape outcomes that stem from natural processes. Thus, these designations, while not changing the purposes of these areas or the importance of current activities, call for the consideration of these activities within the larger ecological contexts and within national wilderness goals inherent in the Wilderness Act of 1964 and the Arizona Desert Wilderness Act of 1990.

Plan Purpose and Legal Foundations

This document provides management direction for the planning area for the foreseeable future. For refuge purposes, a period of 10 years is determined to be the working timeframe of this plan. All other previous management direction for the planning area is amended and replaced by this plan. Any future management guidance whose sphere of influence covers this planning area shall abide by the provisions of this document and become an amendment thereto.

The Service -- Executive Order 8039[5], the legal authority that established the Kofa National Wildlife Refuge, 6 Refuge Manual 8, the Title 50 43, Code of federal Regulations, Subpart 8560, will provide general management guidance for portions of the project area administered by the Service. Additionally general guidance for the project area will be provided by the Wilderness Act of 1964, the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668 *et seq.*), the Refuge Recreation Act of 1962 (16 U.S.C. 460 *et seq.*), and the Arizona Desert Wilderness Act of 1990.[6]

The BLM -- Direction for the New Waters in this plan is in conformance with the Lower Gila South Resource Management Plan. BLM Manual 8560 will provide general

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[5]Section 1 of Executive Order 8038 states as follows: *" Subject to the conditions expressed in the above mentioned acts and to all valid rights, the following described lands, in so far as title thereto is in the United States, are hereby withdrawn from settlement, locati on, sale, or entry, and reserved and set apart for the conservation and development of natural wildlife resources..."*(Emphasis added)

[6] This CMP document contains a more inclusive list of appropriate citations of law and other general legal guidance relative to the management of national wildlife refuges on page 10.

management guidance for BLM portions of the project area. Additionally, general guidance for the project area will be provided by the Wilderness Act of 1964, the Federal Land Policy Management Act (FLPMA) of 1976 (43 U.S.C. 1701 et seq.), and the Arizona Desert Wilderness Act of 1990.

Expected Planning Outcomes -- The following are the desired outcomes of this planning effort for both the New Water and Kofa areas.

> The planning effort will ensure that wilderness values will be incorporated into the management of both the New Water and Kofa designated wilderness areas.
>
> The planning effort will ensure that all other applicable legal mandates and national policy direction are incorporated in the management of the Kofa NWR and the New Water Wilderness Area.
>
> The planning effort will provide a systematic process for making and documenting decisions for both the Kofa NWR and the New Water Wilderness Area.
>
> The planning effort will determine the capability of the Kofa NWR and the New Water Wilderness Area to further Service and BLM long-range resource plans, and to provide a means of evaluating accomplishments.
>
> The planning effort should provide a systematic process for making and documenting decisions in each area.
>
> The planning effort should establish broad management strategies that are, to the degree possible, consistent with a Sonoran desert ecosystem perspective.
>
> This planning effort should provide a practical basis for budgeting requests to implement management programs leading to the achievement of objectives for both areas.
>
> This planning effort should achieve an optimum level of public acceptance and/or support for the management strategies adopted through effective involvement in the planning process.
>
> The planning effort should facilitate and encourage cooperative, coordinated, and integrated resource conservation planning and management throughout the Area of Ecological Concern.

Planning Perspectives -- The comprehensive management planning effort will integrate various perspectives to produce holistic management approaches for the overall planning area

(i.e., Kofa and New Water areas) and ultimately the surrounding landscape over the next 10 years. The plan includes the following:

Integration of a broad landscape perspective that integrates all natural components of the area of ecological concern including, wilderness and non wilderness areas and the surrounding landscape.

Integration of a more narrow perspective for national wildlife refuge related policy issues that affect management of both wilderness and non wilderness areas

Integration of a more narrow perspective for designated wilderness to be managed by the BLM.

An understanding of these perspectives and the relationships between them leads to the formulation of an integral set of objectives for both the New Waters and Kofa areas for the next 10 years or the foreseeable future.

The comprehensive management plan goals and objectives for Kofa, and Wilderness objectives for the New Waters form the practical basis for the development of reasonable sets of actions by both agencies both individually and cooperatively. The refuge objectives form the basis for realistic and justifiable budget requests. The acquisition of the necessary funding and resources is expected to influence the degrees of intensity of the implementation process for both agencies.

The Issues -- An issue is considered to be a problem or opportunity arising from agency directives, resource conflicts, and expectations as identified in the initial stage of this effort, by agency resource specialists and the public. In addressing the identified issues, there are dominant wilderness and wildlife management themes for the planning area that include guidelines both agencies must follow. The agencies have made an effort to learn what issues are most important to the public within considerations of how the area's resources are to be managed for the long-term.

The issues that were identified were separated into three categories: activity plan issues, and issues solved by policy. Following is the final list of issues.

- **Issue #1: Protection of Wilderness Values** -- The long-term preservation of wilderness values is mandated by the Wilderness Act. The Arizona Desert Wilderness Act of 1990 effected wilderness mandates in specific areas including those that are a part of this project area. Sub-issues include: *Effects of visitor uses, illegal vehicle trespass, monitoring of effects of uses, monitoring effects of uses, need for facilities to protect values, management of exotic species, and opportunities for environmental education and public outreach.*

- **Issue #2: Wildlife and Habitat Management** -- The Service has mandated habitat and wildlife management responsibilities. BLM manages wildlife habitat. In coordination with AGFD, both agencies are striving to manage the range of habitats within the planning area to support a diversity of wildlife including special status species. Included in this issue is the management of the various facilities and associated maintenance of artificial water catchments in and outside the wilderness areas. This plan establishes a range of wildlife and habitat management strategies within the context of wilderness and the surrounding areas. Sub-issues include: *Cooperative management; scarcity of data; desert bighorn sheep; water developments; endangered, threatened, and candidate species*[7]*; management of exotic/ non-native species including pathogenic organisms; and fire management.*

- **Issue #3: Recreation and Public Access** -- Access routes for hunting, wildlife observation, and camping have presented resource protection challenges throughout the refuge and the northwestern portion of the New Waters area. Legal public access needs to be acquired through patented land along the northwest portion of the New Waters. Sub-issues include: *Legal Access; hunting; wildlife observation, camping, and photography; wilderness opportunities for solitude*[8]*, and noncompatible uses of the planning area.*

- **Issue #4: Minerals Management - Active Mining Claims** -- Several unpatented mining claims exist within Kofa. Future activities in these areas could affect visual resource values and wildlife habitat within the planning area. This plan will establish strategies for minimizing impacts of all claims.

- **Issue #5: Minimizing Potential Impacts from Private Lands** -- There are several private inholdings within the non-wilderness portion of Kofa and one private land parcel adjacent to the north end of the New Waters. Future activities in these areas could affect visual resource values and wildlife habitats within the planning area. This plan will establish strategies for eliminating potential impacts from these non-federal lands.

- **Issue #6: Surface Disturbances:** The wilderness portion of the planning area contains several surface disturbances that affect the arrea's natural appearance. This plan

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[7]The major part of the Service's guidance is contained within applicable sections of 50 CFR 25.11, 50 CFR 35 .3, and 6 Refuge Manual 8.8. For the BLM portions of the planning area, sensitive species will be managed under existing policy outlined in BLM Manual 8560.34.

[8] The Wilderness Act defines wilderness as: "A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation (emphasis added); (3) has at least five thousand acres of land or is of sufficient size as to make practicab le its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

determines some strategies for minimizing the effects of existing disturbances on wilderness values.

Issues To Be Resolved Through Existing Policy

Both agencies have existing policies as noted to address the following issues.

Issue #7: Cultural Resource Management -- Several cultural features are contained within the planning area. These areas will be managed in compliance with the Archeological Resource Protection Act and the National Historic Preservation Act of 1966. Cultural resource studies will be authorized on a case-by-case basis and guided by existing policy in BLM Manual 8560.32 on the New Waters, and regulations in 50 CFR 271.63 and 35.11 for the refuge.

Issue #8: Management of Rights of Way -- Guidance for the management of utility easements in nonwilderness portions of Kofa can be found in 50 CFR 29.21. No additional guidance is needed.

Issue #9: Scientific Research -- Studies for management, scientific, educational, or historical/cultural purposes in the New Waters will be guided by BLM Manual sections 8560.18. Studies on the refuge will be guided by 6 Refuge Manual 8.9(h), 50 CFR 27.63, and 50 CFR 35.11..

Issue #10: Law Enforcement and Emergency Services -- There are established wilderness management policies and regulations in BLM Manual 8560.39 and 43 CFR 8560.3, and 6 Refuge Manual 8.8 and 50 CFR 35.5, that provide for law enforcement and emergency access and equipment uses in incidents involving public health and safety and violations of civil and criminal law. No additional guidance is needed.

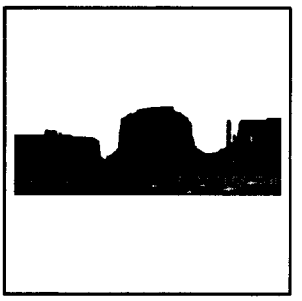
Issue #11: Military Ordnance Contamination -- A possibility of ordnance contamination exists on the Refuge portion of the planning area due to past military activities. Ordnance has previously been recovered from the refuge. In the event that unexploded ordnance is discovered, the Department of Defense will be contacted for its removal using the minimum tool required for safe removal in accordance with 6 Refuge Manual 8.8 - A. This concern is not an issue for the New Waters.

Issue #12: Native American Religious Access -- There have been no instances in which the Service or the BLM has been contacted by Native American tribes for arrangements to access spiritual sites. However, both agencies acknowledge that certain sites within the planning area are considered to be sacred. Both agencies will consider any requests by the Native American tribes in consideration of the Native American Religious Freedom Act.

Issue #13: Military Overflights -- The Arizona Desert Wilderness Act of 1990 states the following: "Nothing in this title shall preclude low level overflights of military aircraft, the designation of new units of special airspace, or the use or establishment of military flight training routes over wilderness areas designated by this title." The Service and BLM will continue to cooperate with the military in pursuing mutually beneficial opportunities to protect the integrity of wilderness airspace and the protection of natural resources within the planning area. .

UNIT 2 -- LEGAL, POLICY, AND ADMINISTRATIVE GUIDELINES AND OTHER SPECIAL CONSIDERATIONS

1. Introduction



This Unit outlines current legal, administrative, and policy guidelines for the management of national wildlife refuges, as well as those that provide guidance to the BLM relative to management of the New Waters. The Unit begins with the more general considerations, such as laws and executive orders for both the Service and BLM, then moves toward those guidelines that specifically apply to the Service and national wildlife refuges.

All of the legal, administrative, policy, and planning guidelines provide the framework within which management activities are proposed and developed. This guidance also provides the basis for a continued and improved partnership between the BLM and the Service and other natural resource agencies.

2. General Guidance Regarding Multi-jurisdictional Cooperation

As demonstrated by the participation of representatives from the Arizona Game and Fish Department (AGFD) at public meetings held for this planning effort, a third agency has a key interest in the development of this management plan. The AGFD, acting under the authority of the Arizona Game and Fish Commission, has responsibilities for the preservation and management of all wildlife species in the State of Arizona. Therefore, the AGFD will play a critical role during the planning and implementation of this plan. For wildlife resources on national wildlife refuges within the State of Arizona, the Service and the AGFD Department have always considered themselves as cooperative wildlife managers.

BLM Lands -- Management guidance for AGFD concerns on BLM portions of the planning area will be guided by the Master Memorandum of Understanding Between State of Arizona, Arizona Game and Fish Commission and Department of the Interior, Bureau of Land Management, March 1987.

Refuge Lands -- AGFD wildlife management concerns pertaining the Service portions of the planning area will be guided by legal and regulatory references cited below.

Multi jurisdictional Goal -- Due to the multi jurisdictional aspects of this planning effort, a specific goal of this plan is to ensure future coordination between the Service, BLM, and AGFD to promote the optimum protection of natural resources in the planning area and to provide for a naturally functioning ecosystem.

2. Legal Mandates

Administration of Kofa and New Waters is ultimately guided by bills passed by the United States Congress and signed into law by the President of the United States. These statutes are considered to be the law of the land, as are Executive Orders promulgated by the President. The following is a list of most of the pertinent statutes establishing legal parameters and policy direction to the National Wildlife Refuge System. Included are those statutes and mandates that pertain to the management of Wilderness and public domain lands.

Summary of Congressional Acts, Treaties, and other Legal Acts Relating 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).
   Migratory Bird Treaty Act of 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).

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

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) September 28, 1962.

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

13. *Wilderness Act of 1964* (16 U.S.C. 1131-1136).

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

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

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

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

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

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

20. *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).

21. *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.

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

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).

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

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

30. *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.

31. *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.*

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

33. *Freedom of Information Act* (5 U.S.C. 552; 88 Stat. 1561.

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

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

36. *Arizona Desert Wilderness Act of 1990.*

Bureau of Land Management Mandates

1. *BLM Manual 8560*

2. *Title 43*, Code of Federal Regulations, Subpart 8560

3. *Wilderness Act of 1964*

4. *Federal Land Policy and Management Act of 1976* (43 U.S.C. 1701 et seq.)

5. *Arizona Desert Wilderness Act of 1990*

State of Arizona Statutes

The following are pertinent sections of Arizona law which help clarify the role of AGFD in wildlife management activities within the State of Arizona.

1. Arizona Revised Statutes, Title 17, Sec. 102

   Section 102 states: "Wildlife, both resident and migratory, native or introduced, found in this state except fish and bullfrogs impounded in private

ponds or tanks or wildlife and birds reared or held in captivity under a permit from the commission, are property of the state and may be taken at such times, in such places, in such manner and with such devices as provided by law or rule of the commission."

2. Arizona Revised Statutes, Title 17, Sec. 201

Section 201 states: "The laws of the state relating to wildlife shall be administered by the game and fish department."

3. Agency Wide Policy Directions

Fish and Wildlife Service Agency Mission

While the Service mission and purpose have been evolving since the early 1900s, it has always held on to a fundamental national commitment to threatened wildlife. The earliest national wildlife refuges and preserves are examples of this. Pelican Island, the first refuge, was established in 1903 for the protection of colonial nesting birds such as the snowy egret and the endangered brown pelican. The National Bison Range was instituted for the endangered bison in 1906, and Malheur NWR 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. During the next several decades, the special emphasis of the Service, then the Bureau of Sport Fisheries and Wildlife, became the restoration of critically depleted migratory waterfowl populations.

The passage of the Endangered Species Act of 1973 refocused the activities of the Service and other government 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, and its scope of wildlife conservation responsibilities was broadened to include endangered species and both game and nongame species. A myriad of other conservation oriented laws followed, including the Fish and Wildlife Conservation Act of 1980, which emphasized the conservation of nongame species.

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

> *"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."*[9]

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[9] Department Manual, 2 AM 2, Organization, 142 DM 1.1

National Wildlife Refuge System: Mission and Goals -- The National Wildlife Refuge System (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 by the President of the United States in Executive Order 12996 to reflect the importance of conserving natural resources for the benefit of present and future generations of people. The Executive Order states:

> *The mission of the National Wildlife Refuge System is to preserve a national network of lands and waters for the conservation and management of fish, wildlife, and plant resources of the United States for the benefit of present and future generations.*

The Executive Order continues by specifying broad guiding principles describing a level of responsibility and concern for the nation's wildlife resources for the ultimate benefit of the people. These principles are as follows:

> *Public Use*: The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation.
>
> *Habitat*: Fish and wildlife will not prosper without high-quality habitat, and without fish and wildlife, traditional uses of refuges cannot be sustained. The Refuge System will continue to conserve and enhance the quality and diversity of fish and wildlife habitat within refuges.
>
> *Partnerships*: America's sportsmen and women were the first partners who insisted on protecting valuable wildlife habitat within wildlife refuges. Conservation partnerships with other Federal agencies, State agencies, Tribes, organizations, industry, and the general public can make significant contributions to the growth and management of the Refuge System.
>
> *Public Involvement*: The public should be given a full and open opportunityi to participate in decisions regarding acquisition and management of our National Wildlife Refuges.

Service Wilderness Objectives (Manual 6 RM 8.2 and 8.3)

> 1. Manage so as to maintain the wilderness resource for future benefit and enjoyment;
>
> 2. Preserve the wilderness character of the biological and physical features of the area;

3. Provide opportunities for research, solitude, and primitive recreational uses;

4. Retain the same level of pre-wilderness designation condition of the area; and,

5. Ensure that the Works of man remain substantially unnoticeable.

BLM Mission and Vision: Ecosystem Management

The BLM is under congressional mandates to provide for orderly use and development of the public lands and to preserve the land and its resources from destruction. The Federal Land Policy and Management Act of 1976 (FLPMA) directs BLM to periodically inventory the lands and to project present and future uses in land use plans. These plans, management framework plans and resource management plans ensure that public lands are managed on a multiple use and sustained yield basis and that the quality of natural resources is preserved. The definition of multiple use is as follows:

> *"...[H]armonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output."*[10]

Like the Service, the BLM has been evolving over the past two decades. New approaches are being implemented, moving away from traditional resource management strategies which emphasized commodity production and commercial use of natural resources. Management objectives were often designed to expedite the development, extraction, and/or production of resources on public lands. Other uses and values such as wildlife and fish habitats, some recreational activities, cultural, scenic, and aesthetic resources were often viewed as constraints or mitigation for more intensive uses. These emphases tended to separate BLM programs along functional lines. This lack of internal coordination detracted from the agency's ability to develop coherent and integrated management strategies with other government agencies, user groups, private landowners, and other interested parties.

In January 1994, the BLM introduced a statement of its new "vision" stating that the BLM is:

> *"...committed to safeguarding the ecological sustainability of the public's lands."*[11]

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[10] Cited from FLPMA, 43 U.S.C. 1702(e); Section 103, FLPMA of 1976.

[11] *Ecosystem Management in the BLM: From Concept to Commitment*, U.S. Department of the Interior, Bureau of Land Management, Washington, D.C., Jim Baca, Director, December 14, 1993.

The BLM's new vision called for the implementation of management actions that would conserve the diversity and protect the integrity of the land. In so doing, the BLM would hope to ensure that present and future generations would continue to derive economic, recreational, social, cultural, and aesthetic benefits from public lands. The major ingredient of this new vision has been the adoption of ecosystem management principles. The BLM expects that ecosystem management will assist them in coordinating efforts to identify and achieve the desired future condition of public lands at multiple geographic levels. The BLM is now engaging in the development of partnerships, sharing management responsibilities, and when appropriate, establishing common management goals with other federal, state, and private land managers, local communities, and other interested parties. This joint agency planning effort is one example of the new approach.[12]

BLM Wilderness Management Goals (BLM Manual 8561):

1. To provide for the long-term protection and preservation of the area's wilderness character under a principle of non-degradation. The area's natural condition, opportunities for solitude, opportunities for primitive and unconfined types of recreation, and any ecological, geological, or other features of scientific, educational, scenic, or historical value present will be managed so that they will remain unimpaired.

2. To manage the wilderness area for the use and enjoyment of visitors in a manner that will leave the area unimpaired for future use and enjoyment as wilderness. The wilderness resource will be dominant in all management decisions where a choice must be made between preservation of wilderness and visitor use.

3. To manage the area using the minimum tool, equipment, or structure necessary to successfully, safely, and economically accomplish the objective. The chosen tool, equipment, or structure should be the one that least degrades wilderness values temporarily or permanently. Management will seek to preserve spontaneity of use and as much freedom from regulation as possible.

4. To manage nonconforming but accepted uses permitted by the Wilderness Act and subsequent laws in a manner that will prevent unnecessary or undue degradation of the area's wilderness character.

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[12] The new vision outlines the major tenants of ecosystem management including: (1) Sustain the productivity and diversity of ecolog ical systems; (2) Use the best available scientific information as the corner stone for resource allocations and other land management decisions; (3) Involve the public in the planning process and coordinate with other federal, state, and private land owners; (4) Determine desired f uture ecosystem conditions based on historic, ecologic, economic, and social considerations; (5) Work to minimize and repair impacts to the land; (6) Base planning and management on long-term horizons and goals; (7) Reconnect isolated parts of the landscape; and, (8) Practice adaptive management.

The Policy Role of the Arizona Game and Fish Department

A third agency also has a key interest in the development of this management plan. The Arizona Game and Fish Department (AGFD), acting under the authority of the Arizona Game and Fish Commission, has responsibilities for the protection and management of all wildlife species in the State of Arizona.

Cooperative management guidance for BLM portions of the planning area are guided by BLM Manual 8560.34 and the Master Memorandum of Understanding between the Arizona Game and Fish Commission and Department of the Interior BLM, March 1987 (AGFD-BLM MOU). For wildlife resources on national wildlife refuges within the State of Arizona, the Service and the AGFD have always considered themselves as cooperative wildlife managers. Therefore, the AGFD also plays a major role in the development and implementation of this interagency document.

Kofa NWR and New Water Mountains Wilderness Area Purpose Statements

Kofa NWR and Wilderness -- Refuge Purpose Statements are primary to the management of each refuge within the System. The Purpose Statement is the basis on which primary management activities are determined. Additionally, these statements are the foundation from which "allowed" uses of refuges are determined through a defined "compatibility process." Sometimes Purpose Statements are given in the form of a statute, but in many cases, refuges were established by Executive Order. This is the case for the Kofa.

Executive Order 8038. The order states as follows:

> *Section 2. This range or preserve, so far as it relates to conservation and development of wildlife, shall be under the joint jurisdiction of the Secretaries of the Interior and Agriculture, and they shall have the power jointly to make such rules and regulations for its protection, administration, regulation, and improvement, and for the removal and disposition of surplus game animals, as they may deem necessary to accomplish its purposes and not inconsistent with State law, and the range or preserve, being within a grazing district duly established pursuant to the act of June 28, 1934, ch. 865, 48 Stat. 1269, as amended by the act of June 26, 1936, 49 Stat. 1976, shall be under the exclusive jurisdiction of the Secretary of the Interior so far as it relates to the public grazing lands and natural forage resources thereof: Provided, however, that all the forage resources in excess of that required to maintain a balanced wildlife population within this range or preserve shall be available for domestic livestock under rules and regulations promulgated by the Secretary of the Interior under the authority of the aforesaid act of June 28 1934, as amended..."*

New Water Mountains Wilderness Area -- The established purpose for the New Water Mountain Wilderness is implied under the Arizona Desert Wilderness Act of 1990. Its sole purpose is to protect wilderness values.

5. Land, Jurisdictional, and Special Designation Considerations [13]

Lands -- The chief stimulus behind the establishment of the Kofa was the concern for dwindling populations of the desert bighorn sheep throughout all of Arizona, New Mexico, and southern California including the New Water Mountains. Because early explorers usually traveled the river bottoms, valleys, and dry washes, sightings of desert bighorn were not frequent. However, Coues indicates as early as 1867 that the desert bighorn "...has a very extensive range, which includes nearly all the elevated mountains and broken regions."[14]

Originally, the Kofa was under joint management between the BLM and the Service. Since the Kofa's establishment in 1939 (Executive Order 8039, January 25, 1939), the Service has been assigned a cooperative management responsibility for the Kofa Game Range management. Since 1976, the Service has maintained sole responsibility for management of the Kofa[15] For the New Water Wilderness Area, the BLM continues its joint relationship with the Arizona Game and Fish Department in their efforts to protect all wildlife populations within the designated area. The New Water role in Bighorn sheep management is significant as it contains one of the more critical lambing areas.

Rights-of-Way -- *U.S. West (Formerly, Mountain States Telephone and Telegraph)* -- A 100 foot square microwave repeater tower site is located in the Livingston Hills in the northwest corner of the Refuge. The right-of-way includes a 7-mile, 33 foot-wide access road right-of-way from the western boundary to the microwave tower site.

Arizona Public Service -- This right includes a 6-mile, 20 foot-wide 12 KV transmission line right-of-way from the western boundary to the U.S. West microwave tower.

El Paso Natural Gas Company -- This right includes a 130 foot-wide right-of-way that accommodates four buried natural gas pipelines plus a maintenance road which runs 24 miles (east/west) across the entire northern portion of the Refuge.

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[13] Please refer to PART II, Unit 1, Section 3 for a discussion of the problems related to land status and jurisdictional problems and questions.

[14] Coues, E., The quadrupeds of Arizona. Am. Natural. 1:281-292, 351-363, 393-400, 531-541.

[15] Kofa was jointly managed by the Service and the BLM until February 27, 1976 when the Game Range Bill amendments to the National Wildlife Refuge Administration Act (P.L. 94-223) transferred sole jurisdiction to the Service and changed the name to Kofa National Wildlife Refuge.

Southern California Edison Power Company -- This right includes a 160 foot-wide right-of-way accommodating a 500 KV power transmission line running 24 miles (east/west) across the entire northern portion of the refuge parallel to the El Paso Natural gas pipeline.

United States Army/ Yuma Proving Ground -- Yuma Proving Ground shares a 58-mile common boundary on the southern half of the refuge. The Secretary of the Interior has granted the Army permission to use 171,000 acres of the refuge as a buffer/flyover zone for weapons and associated munitions testing.

Private Lands -- There are two non-mineral private holdings within the refuge. Mrs. J.R. Livingston Holds 160 acres (NE 1/4 S24, T2N, R18W). Another 80 acres (W1/2, NE 1/4, S14, T2N, R18W) is privately held by Mrs. Leila Michaels.

Yuma County Highway Department -- Three county roads within the refuge are maintained by the County: (1) Castle Dome Road (5 miles); (2) King Valley Road (17 miles); and, (3) Vicksburg Road (3 Miles). The MST&T Road (8 miles) is maintained by the refuge.

Patented Mining Claims -- Forty-six patented mining claims (865 acres) are located on the refuge. Most of these are located on the southern edge of the Kofa Mountains in the vicinity of the historic King of Arizona Mine and on the southern edge of the Castle Dome Mountains, just south of the Castle Dome.[16]

Adjacent Land Use -- The land areas surrounding the Kofa NWR and the New Water Mountains Wilderness are owned by the State of Arizona, managed by the Bureau of Land management or are under the jurisdiction of the Department of Defense. The surrounding landscape consists primarily of desert range. There are some patented mining claims not included in the New Water Wilderness and some of the surrounding terrain is used for grazing. Like both the Kofa and New Water areas, vegetation is sparse where present consisting mostly of cacti, mesquite, palo verde, and small shrub. The New Water Mountains Wilderness is one part of the La Posa Management Area. The BLM is currently developing a management plan for this area in consideration of its relationship to all surrounding jurisdictions including the Kofa NWR and Wilderness Area.[17]

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[16] Also see Unit 3 Natural Resource Inventory, Mining and Geology

[17] The New Water Mountain Wilderness is considered a part of the La Posa Management Area. The areas western boundary runs along the eastern boundary of the Colorado River Indian Tribe Reservation, through the Dome Rock Mountains, until intersecting with the Yuma Proving Grounds boundary. It continues down the Yuma Proving Grounds western boundary in a southerly direction until intersecting with the Cibola Lake road. Turning east it follows the Cibola Lake road to the eastern boundary of Yuma Proving Grounds and turns south until intersectin g with State highway 95. The eastern boundary starts in the north, runs roughly parallel to Bouse Wash in the Rane grass Plains, staying west of state route 72, until meeting the Vicksburg road. At this point it follows the El Paso Natural Gas pipeline road past New Water pass to Midas Mine. It continues south through the Kofa mountains to De La Ossa Mine to Squaw Peak and through Hidden Valley Hills and attaches to the west boundary of the Kofa NWR, then heads south to the Yuma Proving Grounds boundary. The management area is approximately 67 miles in length.

Special Considerations: Cultural Resources

Kofa NWR and Wilderness -- Both Kofa and the New Waters have cultural resources that fit within three broad categories: prehistoric, historic, and traditional cultural/religious areas.[18] Many of these sites have not been catalogued by either agency. Some, however, have undergone formal evaluation relative to the Archeological Resource Protection Act or the National Historic Preservation Act.[19]

Kofa NWR -- The Service files contain variable records of approximately 92 known or recorded archeological and historic sites on the Kofa Refuge. However, the actual number of reliably locatable sites may ultimately prove to be a good deal less, since more than half of the purported 92 site records are in fact little more than site "leads" offering only vague and incomplete locational references. Sources for this site information comes from the field notes of Malcolm J. and Frederick S. Rogers (1929-1941), and from the more contemporary and reliable site records resulting from linear site surveys conducted in 1977 and 1980-81 for pipeline and transmission line right-of-way projects. The linear survey conducted by Westec Services for the Palo Verde to Devers Transmission Line (1980-81) offers the highest specificity of site information on any portion of the Kofa Refuge. Recent site recording efforts by refuge volunteers Connel and Dawn Bergland also offer an unusually high resolution of information for rock art and other sites in the northern extent of the range.

As would be expected of such a marginal environment, all of the sites are indicative of ephemeral uses of the Kofa range. Cleared circles, rock rings and rock alignments, lithic and pottery scatters, small occurrences of ground stone artifacts and bedrock mortars, foot trails, and rock art sites point to highly transitory occupations either for short-term subsistence gathering purposes, or for travel and trade across the range. Purportedly, notations concerning the existence of several ground "intaglios" (geoglyphs), and also observations about a cremated burial, have been attributed to Malcolm Rogers, but to date there has been no verification of either. The San Diego Museum of Man, the repository for Rogers' field records, is unable to verify the existence of a skull fragment which Rogers once reported seeing at Palm Canyon.

There are no independant archeological dates for any of the Kofa sites. However, a small number of temporally diagnostic artifacts recovered at several locations offer clues to the chronology of the prehistoric occupation here. The majority of the sites point to the late prehistoric time period (A.D. 700 to post-1500) and are recognized as ancestral Yuman. Rogers

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[18] The definitions are as follows: Prehistoric site: Any location with physical remains or evidence of activity by aboriginal peoples prior to European contact. Historic site: Any location with physical remains or evidence of activity by euro-Asian peoples to modern times. Traditional cultural or religious site: Sites generally Native American in origin, range in age from prehistoric to modern, and are important for their sociocultural and religious values.

[19] What assessments have occurred in this area have been conducted by the BLM and a very generic summary narrative can be found in the BLM Lower Gila South Resource Management Plan and Environmental Impact Statement (1985) pp. 37-39. Although the information in the RMP/EIS is for a much broader geographical region than the planning area, it characterizes in its Appendix 17 (pp. 283-285) the specific types of cultural resource sites which can be found on Kofa and the New Waters.

also reported several dart points attributed to the Archaic period (6000 B.C. to A.D. 300). Further detailed analysis of the rock art imagery, particularly in the eastern part of the range, could shed light on a possible Yuman/Hohokam ethnic boundary during the late prehistoric period.

New Water Mountains Wilderness -- Specifically, not much has been formally catalogued by the BLM within the New Water Mountains specifically. The Lower Gila South Wilderness Environmental Impact Statement (EIS) indicates that no National Register eligible cultural resource sites have been identified in the New Waters. Cultural resources were not an issue in the wilderness EIS. However, prehistoric petroglyph sites are present throughout the entire planning area. For example, there is one petroglyph site in the New Waters that dates from approximately 5 B.C. In addition to petroglyphs on several rock panels, this site contains a cave with the remains of a rock wall near the entrance. No additional sites with the same degree of development as this cultural feature are known within this wilderness area. A general inventory of cultural resources in this area would probably result in the discovery of additional sites. Levels of protection are heightened by the new status of the area as designated wilderness. Most of these sites will be inaccessible to motorized traffic.

6. Relationship to Other Plans

The following is an outline of the most prominent of existing planning efforts and documents that influence the future management of the Kofa NWR and the New Water Wilderness area.

Bureau of Land Management Resource Management Planning -- The BLM is and the Service are sister agencies within the Department of Interior. The BLM is responsible for the management of public lands throughout the Western United States. Lands within the Area of Ecological Concern are managed primarily by the Yuma District and Resource Offices. Each of the BLM land areas including designated wilderness is managed in accordance with the agency's Resource Management Planning process as dictated by the Federal Land Policy Management Act.

La Posa Management Area Planning -- As mentioned earlier, the New Water Mountain Wilderness Area is considered a part of the larger BLM La Posa Management Area. The La Posa Management Area is currently under the jurisdiction of the BLM Yuma Resource Area. The stated goal of the plan is as follows:

> *"...to carry out resource management decisions of the Final Yuma District Resource Management Plan. The La Posa plan has been developed in an interdisciplinary arena involving BLM staff and other affected federal, state, and local entities. It will be a link between multiple-use allocation of public land and the actions necessary to implement such allocations. Upon completion of this interdisciplinary management plan, the BLM will be able to set management direction for resources and their use, identify specific*

management actions, and establish the sequence of implementation for the management actions."

Biological Diversity on Federal Lands (Keystone Report) -- Representatives from the Service, the BLM, and other Federal agencies, Congressional committees, environmental organizations, commodity interests, professional associations, and academia, were active participants in a multi-agency dialogue attempting to address conservation of biological diversity on Federal lands. Efforts focused on formulating consensus recommendations for conserving biological diversity on lands managed by the major Federal land management agencies (Service, BLM, U.S. Forest Service, National Park Service, and Department of Defense).

The dialogues produced a document that recommended the development of a national goal to conserve, protect, and restore biological diversity on Federal lands. The participants determined that, because of its intrinsic value, biological diversity is important to sustain the health of ecological systems and to provide for human well-being. Though the conclusions of the report are only recommendations, the Service is considering implementation.[20]

Service (Region 2) Biological Diversity Plan Draft -- In 1991, the Southwest Region initiated an effort to formally establish a region wide plan and program for biological diversity. The effort is ongoing for the region and a final draft is forthcoming.

The draft plan set out a purpose of identifying "goals, objectives, and strategies for the conservation of the natural biological diversity of the Southwest Region, with emphasis on those species and habitats which the Fish and Wildlife Service has primary statutory jurisdiction. This group includes Federally listed threatened and endangered species, migratory birds and anadromous or inter-jurisdictional fishes. On national wildlife refuges and fish hatcheries, Service management authority extends to all fish and wildlife species and their habitats, in coordination with respective State governments.[21]

The plan proposes the following objectives for: Monitoring, Research, Management, Education, Training, Partnerships, and International Partnerships.

Arizona State Comprehensive Outdoor Recreation Plans (SCORP) -- The major purpose of the SCORPs are to provide a comprehensive framework for the orderly planning, acquisition, development, and administration of Arizona's outdoor recreation resource. The 1983 SCORP identified recreation needs and implementation strategies. The need for natural resources conservation was one of the major issues identified and many activities in the plans

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[20] Keystone Center, *Final Consensus Report of the Keystone Policy Dialogue on Biological Diversity on Federal* Lands, Keystone, Colorado, 1991.

[21] Region 2, U.S. Fish and Wildlife Service, Biological Diversity Plan Draft, July 23, 1991.

are aimed at this issue. Priorities relative to wetlands acquisition and protection were included in the Arizona statewide priorities for 1983.

UNIT 3 -- NATURAL RESOURCE INVENTORY

This unit outlines in detail the extensive natural resources currently present within the planning area. Included are current geological, soil, and biological values.

1. Geological Resources

New Water Mountains Geology and Mining -- The northwest trending New Water Mountains, which make up the wilderness area, are in the Basin and Range physiographic province and are composed of Precambrian to Quaternary age rocks. The area is underlain primarily by Quaternary basalt and Cretaceous rhyolite and andesite; smaller amounts of Paleozoic and Mesozoic limestones, shale, sandstone, and quartzite also exist.[22] Terrain is typical of the desert southwest and consists of steep mountains and sandy washes; the highest elevation is 3,639 feet on Black Mesa and the lowest elevation is about 1,800 feet along the periphery in the alluvial washes.

A minerals investigation was conducted by the U.S. Bureau of Mines in 1986, during the time the New Water Mountains were a Wilderness Study Area. At the time of the assessment, two pits were found within the study area, located in the New Water mining district. The assessment report indicated the following:

> *"Many workings were found within 1 mile of the boundary. Little or no production came from these workings; no recent mining activity has taken place. BLM records indicate few mining claims are in the study area; however, about 200 unpatented mining claims are on the periphery. Twenty-three patented claims, the Moore claims, are adjacent to the northern boundary and cover the Eagle Eye Mine. Keith (1978, p. 165) states that about 518 tons of ore containing 175 tons of copper and 514 ounces of silver was produced from the New Water Mountains."* [23]

Kofa NWR Geology and Mining -- The Kofa NWR displays a relief of two major block-faulted mountain ranges (Kofa and Castledome Mountains) typified by extensive exposures of bedrock, sparse vegetative cover, lack of soil development, steep slopes and structurally controlled drainage systems. Elevations range from 680 feet on the desert floor to 4,877 feet atop Signal Peak. Shallow, stony soils and rock outcrops are predominant in the mountainous and steep slope areas. Alluvial fans and valley floors are characterized by deep, gravelly, moderately fine textured soils high in lime concentrations.

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[22] Wilson, E.D., 1960, Geologic map of Yuma County, Arizona: Arizona Bureau of Mines, University of Arizona, scale 1:375,000. From U.S. Bureau of Mines, Mineral Land Assessment, 57-86, Open File Report/ 1986: Mineral Investigation of a Part of the New Water Mountains Wilderness Study Area (AZ-020-125), La Paz County, Arizona.

[23] Mineral Land Assessment, 57-86 cites S. B. Keith, 1978, Index of mining properties in Yuma County, Arizona: Arizona Bureau of Geology and Mineral Technology Bulletin 192, 185 p.

Refuge records indicate that the Kofa NWR has been closed to mineral entry since February 1974. Nevertheless, the unpatented claims continue to be illegally filed occasionally with the BLM. Legitimate mining claims filed prior to February 1974 continue to operate within the refuge, however, there are no patented claims within the designated wilderness within Kofa NWR.[24]

Forty-six patented mining claims totaling approximately 865 acres are located in nonwilderness portions of the refuge. Most of these are located on the southern edge of the Kofa Mountains in the vicinity of the historic King of Arizona Mine and on the southern edge of the Castle Dome Mountains, just south of the Castle Dome. The Service has little control over surface disturbances on patented claims and cannot deny access to the claims or prevent legitimate mining activities.

2. Water Developments

Both the Kofa NWR and the New Water Mountains Wilderness have water resource developments available for use by wildlife. Most of these areas are developed as tanks, catchments, or wells. There are some natural springs as well. Development of wildlife water sources has been carried out on the refuge since it was first established. Throughout the years wildlife managers have believed that the development of water on the refuge has been instrumental in helping to restore the bighorn sheep populations. These water catchments are maintained with the assistance of the Arizona Game and Fish Department and the Arizona Desert Bighorn Sheep Society. In the case of the New Water Mountains Wilderness Area the four tanks present in the wilderness area are monitored by AGFD. In the case of Kofa NWR, water catchments are monitored primarily by refuge personnel. In both cases, water is transported to a limited number of these sites during seasons of extensive drought.[25]

3. Wildlife and Habitat Resources

- **Wildlife Diversity:** Forty-five mammal species, 185 species of birds, and 47 species of reptiles are represented on the planning area.

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[24] The Kofa volcanic geologic type composes more than 45% of the Castle Do me Mts. And virtually all of the Tank Mts. About 29% of the area is andesite, 14% metamorphosed sedimentary rock, less than 7% schist, and the remaining 5% is Quaternary basalt, rhyolite, and granite. U.S. Fish and Wildlife Service, KOFA NWR Desert Tortoise Survey, Castle Dome and Tank Mountains. Also see: The Geologic Map of Yuma County, AZ by Eldred Wilson, 1960. Also, a discussion of two major calderas (collapsed volcanos) and their ash-flow tuffs is given in a 1987 thesis by Michael J. Grubensky: Structure, Geochemistry, and Volcanic History of Mid-tertiary Rocks in the Kofa Region, Southwestern Arizona.

[25] Please see page 30, Wildlife and Habitat Resources of this document for additional details concerning the delivery of water to catchnents.

- **Endangered and/or Threatened Species**: Peregrine falcons have been sighted but they are extremely rare. From time to time Brown pelicans are blown into the Yuma area by summer thunderstorms developing over the Gulf of California to the south.

- **Desert Bighorn Sheep --** The Desert Bighorn (*Ovis canadensis mexicana*) population at Kofa NWR is estimated at 800 to 1,000 sheep. Fourteen years of aerial surveys reflect a stable population with the exception of a low count in 1991. Transplants have been conducted for the past 15 years in coordination with Arizona Game and Fish Department. The refuge provides approximately 20% of Arizona's annual bighorn hunting permits.

Table 1. Kofa NWR Bighorn Sheep Survey Results 1980-1994

Year	Hours	Rams	Ewes	Lambs	Uncl.	Total	Est. # Sheep	Lambs/ 100 Ewes
1980	25.0	125	195	31	1	352		16
1981	36.1	143	229	44	1	417		21
1982	46.9	141	234	51	1	427		23
1983	49.5	147	260	50	1	458		19
1984	50.7	175	284	44	0	503		15
1985	51.2	149	264	61	0	474		23
1986	45.3	168	282	44	2	496		16
1987*	27.8	92	122	19	0	233	874	16
1988*	29.9	98	134	19	0	251	881	14
1989*	28.4	89	150	25	0	264	929	17
1990*	28.5	93	106	39	0	238	788	37
1991*	26.6	69	84	21	3	177	638	25
1992	51.4	139	255	46	0	440	739	18
1993	No survey.							
1994	52.8	151	270	36	2	457	887	14
Total	**550.1**	**1779**	**2869**	**530**	**11**	**5187**		**Avg: 18**

Abbreviated Surveys

Bighorn Sheep Transplantation Program -- Every year since 1979 the with exception of 1991, the refuge has participated in a capture and transplant program of the Bighorn sheep. Refuge employees assist the Arizona Game and Fish Department in the capture using net guns from helicopters. The transplant results are noted in the table below. The animals are then are transported to various locations within Arizona in an effort to assist in the restoration of populations where they are indigenous. For instance, in 1992 all sheep were transported and released near Canyon Lake (Superstition Mountains) east of Phoenix.

TABLE 2

Kofa[1] (K) & New Waters (NW) Bighorn Sheep Removal
Harvest/Transplants 1979-1995

Year	Harvested Rams (K)	Harvested Rams (NW)	Transplanted Rams (K)	Transplanted Rams (NW)	Transplanted Ewes (K)	Transplanted Ewes (NW)	Transplant Location	Grand[2] Total
1979	9		4		4		Colorado/Devils Canyon (NPS)	20
1979			0.00		2		Texas/Black Gap (TX Game and Fish Dept.)	
1980	8		7		11		Arizona/Goat Mountains (USFS)	33
1980			0.00		6		New Mexico/Peloncillo Mtns. (BLM)	
1981	9		3		8		Arizona/ Red Field Canyon (USFS)	28
1981			2		4		Arizona/ Goat Mountains (USFS)	
1982	9		4		0.00		New Mexico/ Peloncillo Mountains (BLM)	24
1982			0.00		10		New Mexico/ Peloncillo Mountains (BLM)	
1983	11		8		16		Arizona / Horse Mesa (USFS)	35
1984	11		8		22		Arizona/ Coffee Flat (USFS)	43
1985	13		6		15		Arizona/ Black Mountain (BLM)	57
1985			7		13		Arizona/ Lion Mountain (USFS)	
1986	12		9		21		Arizona/ Peloncillo Mountains (BLM)	42
1987	14	4	8	5	22	7	(K) Arizona/ Superstition Mountains (USFS)	45
							(NW) Arizona/ Gila Bend Mountains	17
1988	16	4	6	3	24	9	(K) Arizona/ Galiuro Mountain (USFS)	47
							(NW) Arizona/ Gila Bend Mountains	16
1989	14		5		25		Arizona/ Superstition Mountains (USFS)	44
1990	14	3	2	1	13	8	(K) Arizona/ Peloncillo Mountains (BLM)	29
							(NW) Arizona/ Gila Bend Mountains	12
1991	14		0	0	0			14
1992	13		7		17		Arizona/ Superstition Mountains (USFS)	38
1993	15		5		25		AZ/Saucedo Mtns. (USAF)	46
1994	12		7		23		AZ/Granite Wash Mtns. (BLM)	42
1995	16		6		20		AZ/ Harcuvar	42

1. Unless indicated otherwise, the data is for Kofa.
2. Includes mortalities during capture.

- **Desert Mule Deer** -- The refuge conducts an annual desert mule deer survey. This species is also counted during the aerial sheep survey. The Arizona Game and Fish Department participates in these surveys.[26]

Table 3

Kofa (K) & New Waters[1] (NW) Annual Aerial Deer Survey Results 1985-1996

Year	Bucks (K)	(NW)	Does (K)	(NW)	Fawns (K)	(NW)	Unclassified (K)	(NW)	Total (K)	(NW)
1985	42	3	83	19	47	6	12	0	184	28
1986	37	12	102	20	18	12	3	6	160	50
1987	48	9	155	13	48	4	8	1	259	27
1988	29	7	117	9	23	7	5	1	174	24
1989	49	8	121	16	37	5	1	0	208	29
1990	24	6	125	19	17	8	0.00	0.00	166	33
1991	36	4	113	6	62	3	11	0	222	13
1992*	16	0	31	3	10	2	3	0	60	5
1993*	19	1	51	23	25	7	2	0	97	31
1994*	16	2	50	6	21	5	0.00	0.00	87	13
1995	10	2	40	6	14	5	3.00	0	67	13
1996	6	2	19	7	3	1	1.00	0	29	10
TOTAL	290	38	924	100	278	45	37	8	1,529	206

* Modified surveys. Modified surveys in years 1992 through 1994 are a sampling of approximately 16 % of the total surveyable deer habitat.

1. The New Waters has never been independently surveyed for mule deer. The Wilderness has always been included in the aerial surveys for Game Management Unit 44B. In addition to the wilderness, Unit 44B includes the Plomosa Mountains and has a total area of 630 mi.^{2}, of which there is an estimated 524 mi.^{2} of mule deer habitat. Because of the mountainous terrain in the wilderness, aerial surveys are difficult to conduct. Unit 44B is considered a low-density deer unit.

- **Sonoran Desert Tortoise** -- Limited knowledge of this subspecies of the tortoise is the reason for recent emphasis on gathering more data. Abundant data on the Mojave subspecies in California can not be extrapolated to Arizona populations because of racial

[26] In 1992 only 9.3 hours of actual survey were flown. This is about one-half of 18.9 hours needed to fly all available deer habitat (751.46 square miles) in a fixed-wing aircraft. Flights before were based on one-half mile flight grids while in 1992 one-mile wide grids were flown to reduce survey costs. Areas previously flown but considered to be safety hazards for fixed-wing aircraft were not flown this year. Such areas could be surveyed by helicopter or sampled by foot surveys. In 1992 the buc k:doe:fawn ratio (52:100:32) is markedly higher for bucks and slightly higher for fawns than the previous seven-year ratio (32:100:31). In 1993 241 deer were counte d with a buck:doe:fawn ratio of 20:100:49.

differences in habitat selections between the two subspecies. The Mojave tortoise may be a derived taxon and by evolution the latest in subgenus *Xerobates*. Ecologically it may be an outlier population in an unfavorable climate while Arizona's populations may reflect a relatively stable existence in a favorable subtropical climate. Long Term field data on Sonoran tortoises should help answer management and disease questions that are now unanswerable and may serve as a comparison population for challenge tests on Mojave and Sonoran tortoises. In 1990 a tortoise survey was conducted between April and August. Twenty-eight variable length reconnaissance-type transects were drawn in the Castle Dome Mountains. One hundred forty-nine miles, requiring 92 transect hours, were completed in the Lower Colorado Valley and Arizona Upland subdivision communities of the Sonoran Desert scrub biome. The study concluded that tortoises occur in the Castle Dome and Tank Mountains in relatively low densities (probably lower densities than in the Kofa Mountains.,) Only one live tortoise was seen and no URDS signs were noted. Judging from their sign, tortoises were not as active during this period as the Kofa and Livingston Hills populations were to the north. Only two sites of 44 sites surveyed had remains of eggshell fragments. One juvenile shell was found but no other signs, such as juvenile tracks, were found. The survey concluded that the combination of this survey and surveys in 1979 and 1989 indicates the tortoise population at Kofa NWR is healthy and of low density requiring a stabilized habitat. Cover site potential, highest in the less resistant volcanic base material, is the critical limiting factor resulting in patchy, isolated populations. The density/diversity of vegetation and the aspect seem to be of secondary and tertiary importance to distribution. No apparent changes seem warranted.[27]

Habitat Resources

The Sonoran Desert ecosystem is comprised of relatively sparse vegetation throughout with the exception of intermittent stream beds that meander from mountains down through alluvial sediments onto low elevation basins. Creosote, ironwood, paloverde, and mesquite comprise much of the vegetation with many types of cacti, most notably the saguaro, dominating the landscape. Another important part of the habitat landscape are the desert flora that spawn only after spring rains deluge the lands following intense thunderstorms. These thunderstorms are very localized, but expel enough moisture to create ribbons of green throughout the desert landscape along drainage ways and cause the germination of dormant grass and forb seeds producing lush carpets of green albeit for very brief periods of time. During the very dominant dry seasons, the soils form a thin crust which harbor seeds for many years in some cases. The hard rains break the crust freeing the seeds for germination. When the short growing cycle is completed, the ground once again forms into a thin crust. These soils are sometimes called crypto biotic soils.

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[27] In 1992 a radio telemetry research project was initiated on Kofa NWR. Four tortoises were fitted with battery powered radio transmitters which mount on the carapace. All telemetry and map data will be integrated into a computer data analysis system called Map and Image Processing System (MIPS).

Table 4

1990 Kofa NWR Water Tank Replenishment: TOTAL = 32,000 Gallons

Gallons of Water	Location
10,000	Charlie Died Tank
8,000	Black Hawk Tank
4,000	Figueroa Tank
6,000	Modesti Tank
4,000	Dixon Spring

In the extremely dry Sonoran Desert ecosystem, water is the primary habitat component and variable. Over the years, wildlife managers have learned to manipulate the conservation of water in the desert for wildlife management purposes. These water conservation efforts are usually in the form of water catchments and wells but include natural springs as well. Kofa NWR has a long history of water hole development projects aimed at improving wildlife numbers and distribution throughout the refuge. Most development projects involve either improvement of natural existing tanks and springs by installing silt dams, sun shades or water retention dams, or by constructing windmill powered wells. Even with these improvements some tanks occasionally go dry during extended dry periods such as occurred in 1990. To prevent large scale wildlife movement away from these areas, or even worse, wildlife die offs, water is hauled to these drought susceptible tanks when needed. Adequate rainfall occurred in both 1991 and 1992 and kept most tanks supplied with water. Until 1992, the refuge staff continued to collect data on the refuge flora by monitoring vegetation along 242 permanent transects located throughout the refuge. These were initiated in 1983 to document the changes resulting from the cessation of grazing on the refuge. Some improvements have been noted, but growth of desert flora is normally extremely slow, taking many years to recover from past land management practices. Since that time, the refuge has instituted a new program using videography to develop a comprehensive picture of the refuge's vegetation resources. It is expected that this information will be extremely useful in determining habitat suitability, conditions, and wildlife uses in the long term.

The refuge has an active program to prevent the entry of cattle and feral burros through fencing. A part of the monitoring program calls for the checking of the boundary fences periodically throughout the year. This program also deters the trespass of off the road vehicles.

UNIT 4 -- PUBLIC USE INVENTORY

The following inventories outline the general baseline activities of the Service and the BLM regarding public and allowable uses of the Kofa NWR and the New Water Mountains Wilderness.

Public Access to Wilderness Areas

New Water Mountains Wilderness Area -- The western boundary of the wilderness can be accessed via the Gold Nugget Road south of Interstate 10 (exit 26). The north-central part of the wilderness can be reached by the Ramsey Mine Road south of Highway 60. The Kofa Wilderness forms the southern boundary of the New Water Mountains Wilderness.

Kofa NWR -- The Kofa NWR wilderness area includes a total of 516,300 acres within the context of the 665,400 total refuge acres. Access to the designated wilderness areas can be made through any one of several roads that have been excepted from the wilderness designation (cherry-stemmed). From Highway 95, there are several routes which can be taken onto the Kofa NWR and in close proximity to designated wilderness. Most of these roads are not graded so that high-clearance and four wheel drive vehicles are recommended.

Mechanized, vehicular traffic is limited to designated roads. Off road vehicle travel is prohibited. All vehicles, including "all terrain vehicles," quadratrac and motorcycles and all operators must be licensed and insured for highway driving. Speed is limited to 25 miles per hour unless otherwise posted. Mountain bicycles are considered vehicles on the refuge.

Recreational Uses of Refuge and Wilderness Areas

New Water Mountains Wilderness Area -- The BLM manages public lands from a multiple use mandate. Thus, lands in the public domain, even those designated as wilderness, allow for the public to gain access and use these lands for recreational purposes such as hunting, wildlife observation, hiking, and camping. The New Water Mountains as a designated wilderness does allow these activities to occur holding to a "leave no trace" ethic. The BLM asks that visitors leave the area as they found it. For instance, if a fire ring is constructed, the BLM asks the visitor to dismantle it and bury the ashes before leaving the area. Visitors are asked to pack out all litter including those that might be considered biodegradable (i.e., orange peels, organic waste). As mentioned earlier, no mechanized transport are allowed on the wilderness areas.

Kofa NWR and Wilderness -- Kofa NWR allows recreational uses that are compatible with the purposes for which the refuge was established. Those that are allowed to occur within designated wilderness must also conform to fundamental wilderness ethics including no mechanized transport, leave no trace, etc. However, unlike lands managed by the BLM, the

refuge system considers wildlife management the primary function of a refuge and all other uses are considered secondary. These must undergo compatibility analysis and the refuge must certify that funding is available for the management of these activities.[28] The Wilderness Act considerations are then overlaid upon the refuge administration legal considerations for those areas of the refuge that are designated as wilderness (i.e., no mechanized transport, leave no trace, minimum tool, etc.).

At Kofa NWR, hunting, camping, hiking, wildlife observation, photography, sightseeing, and environmental education activities would all be allowed and considered compatible with both the purposes of the refuge and the wilderness designation. Part of this planning effort will be to establish monitoring objectives which will assist us in determining the levels of impact that is acceptable relative to uses and degrees of use.

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[28] Public Law 89-669 (National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) authorized the Secretary of the Interior 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 the areas were established." Additionally, Public Law 87-714, the Refuge Recreation Act of 1962, as amended (76 Sta. 653; 16 U.S.C. 460k), prescribes the same compatibility standard with a focus on recreational uses including those that do "not directly relate to the primary purposes and functions of the individual areas," and that do not interfere with the primary purposes' of the refuges." Also under this Act, the refuge must certify that funds are available for their development. [Bean, Michael J., The Evolution of National Wildlife Law, (Praeger, Publishers: New York, 1983)pp. 125-126.

PART II. ISSUE DISCUSSION

Introduction -- The Kofa NWR and the New Water Mountains Wilderness areas each make individual, unique, and significant contributions to the Area of Ecological Concern and the National wilderness system. The potential contribution of each of the areas is strengthened through coordinated and consistent management action. In order to manage resources consistently and efficiently, both the scientific elements of the resource (i.e., biological/natural resource factors) and the policy elements of managing the resource (i.e., overall policy concerns) must be considered in the planning process. Consideration of both results in coordinated management of the refuges, assuring a mix of natural resource gains for wildlife and plant communities within both wilderness areas and the Area of Ecological Concern.

This part of the Kofa NWR/ New Water Mountains Wilderness planning process analyzes the existing information base including agency policy issues, natural resource data, and public access and use data. The analysis, albeit informal, is a series of short discussion points summarizing the problem or opportunity that exists relative to each of the issues outlined earlier in this document. With respect to wildlife and habitat data, much pertains to the management of desert bighorn sheep populations. Other data is more scarce. Part of the purpose of this plan is to set objectives which will call for the collection of needed biological data that reflects the diversity present in these areas.

Issue Analysis -- As indicated earlier, an issue is considered to be a problem or opportunity arising from agency directives, resource conflicts, their resolutions, and public expectations as reflected through their participation. The following narratives attempt to integrate the issue and associated subissues with each agencies' responsibilities relative to those issues. Several of them do not need discussion because policy directives remain clear and subsequent objectives will be set in accordance with those directives.

THE ISSUES

Issue 1: Wildlife and Habitat Management

Cooperative Efforts -- Although habitat management is one of the principle responsibilities of both the BLM and the Service, the BLM has traditionally recognized the States as being the principle manager of wildlife on public domain lands including designated wilderness areas. The Service, on the other hand, considers the State's role with respect to wildlife management on National Wildlife Refuges as concurrent with its own. Both the Service and the BLM have engaged in a continuous and more intense dialogue with the States relative to a myriad of wildlife and habitat management issues including the protection of endangered species. Because of these slightly differing perspectives, it is essential that levels of communication and cooperation between the Service, the BLM, and the Arizona Game and Fish Department remain high concerning a wide array of issues.

Scarcity of Data -- The dominant wildlife and habitat management theme for the Kofa and News Water Mountains for many years has been the preservation of the desert bighorn sheep species. Consequently, information on a wide array of other species and habitats is scarce. As indicated earlier, up to 1992, the refuge staff collected data on the refuge flora by monitoring vegetation along 242 permanent transects located throughout the refuge. But as previously noted, this information is no longer collected because of the tremendous amount of time necessary to physically gather the data. The new aerial videography information will allow for the accurate mapping of the refuge's vegetation resources. This information will be extremely valuable for long term resource and decision making.

There are also surveys conducted, as noted earlier, regarding the status of the Sonoran desert tortoise. Much of the monitoring of this species is currently being done through a radio telemetry research project initiated in 1992. Information collected thus far does not indicate that changes in management are necessary. However, the existing vegetation transects are important sources of information regarding the status of the species on the refuge.

A newer and more recently initiated bat survey will be important in determining the relationship between bat species and the importance of maintaining their accessibility to abandoned mine shafts, even in the context of wilderness. However, in light of the wilderness designation, the refuge must scrutinize more carefully all of its wildlife management activities and their primary and secondary effects upon the wilderness resource. Although the Service has the duty to conduct wildlife management activities, it should do so with a "wilderness ethic" and with a responsibility to determine the minimum tools necessary to accomplish its tasks. If the refuge staff must gain access to an abandoned mine shaft within the wilderness boundaries, then it should document the purpose, the expected duration of the visit, and the minimum tool to be used, all in anticipation of the visit, if possible.

Desert Bighorn Sheep -- The major concentration of wildlife management activities within the project area has been directly related to the management of the desert bighorn sheep. Both the BLM and the Service have participated together since the inception of the Kofa Game Range in the 1930's in efforts to assist the dwindling populations of desert bighorn recover. The Kofa NWR, formerly the Kofa Game Range, was jointly administered by both of these agencies. Only in the 1970's did the Service become the sole manager of the Kofa NWR.[29]

The New Water Mountains wilderness area has always been a contributing factor to the management of desert bighorn populations as it contains an important lambing area for the species. Both agencies participate with the Arizona Game and Fish Department in a desert bighorn transplantation program which is a key factor toward increasing the viability of the species within its statewide range.

There is no question that management of this species remains as one of the principle missions of the Kofa NWR and certainly the New Water Mountains will continue to play a significant role as well. However, the new considerations relative to the Wilderness designations require the Service and the BLM to review management techniques and their compatibility with wilderness principles.

The two principle management techniques to review are the use of mechanical means to survey, capture, and transplant sheep, and secondly, the management of artificial water catchments, access to them, and the use of mechanical methods of refurbishing and maintaining these systems. Both agencies, in cooperation with the State must continue to use the techniques necessary to carry out wildlife management mandates. However, the Service and the BLM are required to declare what "minimum tool" is to be employed. The predominant question for each agency can be stated as: Are the methods currently employed to manage desert bighorn sheep and habitat the minimum necessary to accomplish the objectives?[30] Both agencies are directed to administer their respective areas designated as wilderness so as to:

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[29] Lee, Raymond M. Editor, *The Desert Bighorn Sheep in Arizona* (Phoenix, AZ..: State of Arizona, 1993) . This volume contains a good historical outline of the national efforts to assist in the recovery of this speci es. While their range has been reduced significantly and while much in the way of urban expansion has affected desert bighorn habitat, this volume indicates that the viability of the species is no longer in question as it had been 20 years ago.

[30] **BLM Policy:** The principle direction with regard to abiding by the "minimum tool" concept comes from BLM Manual 8560, Sec tion .1, Goals of Wilderness Management. Section .13 states: "Tools, equipment, or structures may be used for management when they are the minimum necessary for protection of the wilderness resource or when necessary in emergency situations for the health and safety of the visitor. Management must use the minimum tool, equipment, or structure necessary to successfully, safely, and economically accomplish the objective. The chosen tool, equipment, or structure should be the one that least degrades wilderness values temporarily or permanently."

Service Policy: The Service's direction regarding minimum tool is not as explicit in its policy guidelines. The Service defines "minimum tool" as: "The minimum action or instrument necessary to successfully, safely, and economically accomplish wilderness management objectives. The Service policy is explicit enough as to indicate that motorized equipment would not be permitted for wildlife surveys, access by veterinarian to treat sick livestock, inspections by refuge personnel, maintenance activities which can be accomplished on horseback, on foot, or with the use of other non-motorized modes of transportation. [USFWS Wilderness Policy, 8.8, Administrative guidelines].

"...preserve[ing] the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character."[31]

As mentioned earlier, the management of desert bighorn sheep has been and remains historically central to the purpose for which the Kofa NWR was established. In point of fact, the language of the Wilderness Act eludes to the fact that wilderness designation implies that wilderness purposes are "supplemental" to already existing purposes attached to an area. This does not apply so much to BLM designations as they do to national wildlife refuges which have establishing purposes already in place. Thus, the Service is responsible to carry out a dual, but nonetheless interrelated, role of managing for bighorn sheep within the context of wilderness.

In both agency policies, certain uses existing prior to designation are allowed to continue. The BLM policy indicates that use of aircraft may be permitted to continue in wilderness areas where such uses were established prior to the date the area was designated thus allowing the use of helicopters for the netting and transplantation of bighorn sheep. Both policies allow for excepting existing water resource facilities when explicitly recognized by Congress as being acceptable in specific wilderness areas, as in the case of those areas created by the Arizona Desert Wilderness Act of 1990.[32] However, the Service and the BLM have a continuing responsibility to maintain the natural character of the landscape so as to leave the "imprint of man's work substantially unnoticeable.[33] The implication here is not so much the question of the existence of water catchments within wilderness, but rather the method each agency chooses to manage and maintain these existing facilities and manage access to them.

Biological Sustainability -- The Bighorn Sheep survey results from 1980 through 1992 as noted in Table 1, indicates the relative stability of the populations. Human encroachment still looms as the one negative influence upon sheep populations in the southwest and few models exist that can predict habitat utilization and animal movements.[34] While populations in

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[31] Wilderness Act of 1964, Section 4 (b), Public Law 88-577, (16 U.S.C. 1131-1136). Section 4(a) defines the use of wilderness areas as follows: "The purposes of this Act are hereby declared to be within and supplemental to the purposes for which national forests and units of the national park and wildlife refuge systems are established and administered..."

[32] The Arizona Desert Wilderness Act of 1990 recognizes these existing water catchments as acceptable for both the Kofa NWR and the New Water Mountains Wilderness.

[33] Wilderness Act of 1964, Section 2(c)(1): An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable..."

[34] According to Stan Cunningham: "There have been few habitat models developed for bighorn sheep (*Ovis canadensis*). All have assumed that the quality of a given area can be linked to individual habitat attributes, but the criteria selected for each model varied. Three variable were common to all - forage conditions, water availability, and slope (basically food, water, and cover). Other variables considered have been land status, density of canopy (amount of brush), presence or absence of exotic or native ungulates, human disturbance factors, habitat discreteness, and size of area. [Cunningham, Stan, Evaluation of Bighorn Sheep Habitat, in *The Desert Bighorn Sheep in Arizona*, Raymond M. Lee, editor, (Phoenix, AZ.: Arizona Game and Fish Department, 1993)].

protected areas such as Kofa NWR and the New Water Mountains Wilderness, populations in other parts of the State are considered to be under threat due to habitat loss, especially in areas closest to urban expansion. Successes in improving populations at Kofa NWR through intensive water developments have resulted in cooperative arrangements, between the State of Arizona, the Service, and the BLM to transplant sheep to other areas of Arizona as indicated in Table 2. Biologically, there is still concern for the maintenance of current management techniques to foster the continued sustainability of this species. The sustainability has a relationship to potential harvest only in so much as the three agencies assesses population status prior to the allotment of permits for hunters. Surveys and climatic conditions also influence decisions about the number of the species to be hunted as well as transplanted. In short, a key role of the BLM, the Service, and the Arizona Game and Fish Department is to provide conditions for species sustainability and viability in the long run. The BLM, the Service, and the Arizona Game and Fish Department need to develop a long term view of achieving a goal of improving population statuses in transplant destinations so that at some point in the future, the Kofa NWR and the New Water Mountains Wilderness will no longer be the gene pool sources for other potentially sustainable populations in the southwest. The implication here is that as transplant destination populations become wholly sustainable, the natural solitude of these two wilderness areas will no longer be routinely intruded upon by the roaring blades of loud helicopters and the piercing sounds of net guns. Additionally, and more importantly, the sheep themselves will more seldomly experience the strain and stress of an exhausting chase across rugged terrain in hyper thermal conditions. The goal of having self sustaining populations of bighorn sheep throughout their natural and historic range will take continued enhanced cooperative efforts from all three agencies.

Water Developments -- The development of water sources for the bighorn sheep has been an important factor in species recovery since the 1950s. Cooperative efforts between the Arizona Game and Fish Department, the Arizona Desert Bighorn Sheep Society, and various federal agencies have resulted in the development of more than 100 water sources. Werner describes early efforts to involve backpacking materials to the project area limiting the size of developments. More recent efforts have involved the use of helicopters and large crews of volunteer labor resulting in the construction of larger dams that are more likely to provide permanent water sources. Werner states as follows:

> "*Most of the efforts to develop water sources for bighorn sheep in Arizona have been improvements of tinajas, or natural scourholes in bedrock, and apron catchment construction. There are also a few wells with windmills which provide water to bighorn sheep. On an opportunistic basis, structures such as old mine cisterns have been improved to provide access and prevent trapping the bighorn sheep. In one case, a mine cistern provides a backup supply of water which can be pumped into an improved natural tinaja nearby.*" [35]

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[35] Werner, Bill, Water Development, in *The Desert Bighorn Sheep in Arizona*, Raymond M. Lee, editor, (Phoenix, Az.: Arizona Game and Fish Department, 1993)].

The literature indicates that although few habitat models have been developed for bighorn sheep, water was among the three major variables common to available models. However the literature indicates that water distribution should not be rated so highly as to overshadow other important variables. Cunningham states that much of the relative importance of water to the species is based upon other variabilities such as elevation, temperature, and rainfall.[36] There is little question that good distribution of water in otherwise suitable habitat will result in the reduction of stress and increased disease transmission "brought on by the concentration of bighorn sheep around waters and associated bedding and lambing sites."[37] Thus, the agencies should continue to manage and maintain water development areas in such a manner as to ensure that catchments hold permanent sources of water. In seasons of drought, managers should continue to deliver water.

According to Remington, the future of bighorn sheep "is cautiously optimistic." Strategic water development programs and supplemental transplants are key management tools in the restoration of "moribund, low quality populations to historic carrying capacities."[38] However, as wildlife managers maintain water sources for the bighorn sheep, they should keep in mind the responsibilities resulting from wilderness designation. While access to many of the sites on the Kofa NWR are on nonwilderness corridor roads, the sites on wilderness areas should be gained access through and maintained by the minimum tool necessary to accomplish the work. For example, the use of electronic devices to monitor water levels might in fact be the minimum tool necessary to check the status of a particular tank. The alternative would be several trips into the wilderness which might have much more impacts on the landscape, especially if mechanical transport is used. It would be essential that placement of new technologies would have to be as unobtrusive as possible so as not to be evidenced by visitors.

The strategies developed in this plan must balance the need to manage for species health and viability while respecting the requirements and intent of the Wilderness Act. The needs of the species and the requirements of the Act are not necessarily in conflict. In fact, the habitat

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[36] Cunningham states as follows: "Numerous studies have found that bighorn sheep distribution is restricted by water availability during the summer months (Simmons 1969, Bates and Workman 1983, Elenowitz 1984) During the dry June-September period, most bighorn shee p are found within a two-mile radius of permanent water (Blong and Pllard 1968, Leslie and Douglas 1979, Cunningham and Ohmart 1986). Lactating ewes require more water than other bighorn sheep and are nearly always found in close proximity to water sources (Turner and Weaver 1980). Thus, the distribution of available water sources must be considered....Despite these findings, water distribution should not be rated (in point scale) so highly that it overshadows other important areas. Some systems relied so heavily on water distribution that other areas of importance (wintering areas, lambing grounds, summer use areas after monsoons) may have been underscored. Many researchers have pointed out that water distribution has little correlation with bighorn sheep distribution in cooler seasons (McQuivey 1978, Leslie and Douglas 1979, Cunningham and Ohmart 1986. Holl (1982) pointed out that water distribution was a minimal factor in bighorn sheep distribution in an area of higher elevation receiving more rainfall.[Cunningham, Stan, Evaluation of Bighorn Sheep Habitat, in *The Desert Bighorn Sheep in Arizona*, (Phoenix, Az.: Arizona Game and Fish Department, 1993)]

[37] Hansen, C.G., 1971. Overpopulation as a factor in reducing desert bighorn populations. Desert Bighorn Council Trans. P. 46-52, as cited by Bill Werner, Water Development, in *The Desert Bighorn Sheep of Arizona*, Raymond E. Lee, editor, (Phoenix, Az.: Arizona Game and Fish Department, 1993)p 164. The inference here is that carrying capacity increases with the reduction of bighorn sheep density and the inhibiting effects of localized overpopulation.

[38] Remington, Richard, The Future of Bighorn Sheep in Arizona, in *The Desert Bighorn Sheep of Arizona*, Raymond E. Lee, editor, (Phoenix, Az.: Arizona Game and Fish Department, 1993)p. 262.

management work done to benefit bighorn sheep, including water development, could have a positive influence on the natural cycles of predation and succession for a diversity of life in the desert without detraction of wilderness attributes and values.

Endangered, Threatened, or Candidate Species[39] -- The endangered Peregrine falcon occurs on the refuge, although rarely. No other Federally endangered species occur within the project area except for an occasional Brown pelican that is blown in by storms blowing in from the gulf of California. While most of these species are well protected within the boundaries of the Kofa NWR and the New Water Mountains Wilderness areas, the principal concern will continue to be loss of habitat. Wilderness designation has given an added layer of protection within the refuge boundaries. The more BLM and Service land managers can learn about the current trends regarding the full range of habitats in the project area, the better future actions will be toward protecting all species and preempting the need to list any of them as endangered in the future.

Non Native Species -- Only one species has posed difficulty for wildlife managers within the project area. Wild burros have continued to pose the more significant threat to the Kofa and New Water Mountains areas. Burros compete with desert bighorn sheep for water and forage areas. Both the BLM and the Service have made efforts to eliminate burros and devise fencing techniques which prevent the burros from using water sources meant for native wildlife. Other non native threats to the area include salt cedar, and various species of exotic grasses including buffle grass.

As in the case for managing any habitat and wildlife within the project area, both the Service an the BLM must take into account the wilderness context. The method used for non native species elimination should be considered within the backdrop of other alternatives so that the objectives of elimination and respect for the wilderness character can be accomplished together. For instance, the elimination of salt cedar from watering areas and major drainage in the desert calls for aggressive landscape manipulation strategies that need to be considered for their short and long term effects. Both the BLM and the Service should develop strategies that are the minimum tool to accomplish the objectives.

Exotic grasses and weeds will undoubtedly pose difficulties in the conservation of the natural desert landscape. Both agencies will need to develop capabilities which will prevent their spread onto the refuge and wilderness areas. Certainly, improvements in the overall wildlife and habitat data base, and subsequent monitoring and analysis will assist the agencies' managers in better understanding the overall habitat characteristics and suitabilities within the project area. This will lead to the development of better alternative methods of controlling the spread of non native species.

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[39] The major part of the Service's guidance is contained within applicable sections of 50 CFR 25.11, 50 CFR 35.3, and 6 Refuge Manual 8.8. For the BLM portions of the planning area, sensitive species will be managed under existing policy outlined in BLM Manual 8560.34.

Issue Two: Public Use

Accessibility -- Many of the preexisting roadways within the Kofa NWR and Wilderness and the New Water Mountains Wilderness Area were exempted from designation allowing outstanding opportunities to visit interior portions of the wilderness areas which might otherwise be much too far to hike or access on horse back. These "cherry stemmed" roads criss-cross the Kofa NWR in such a way as to allow for management access to water resources and for mine claimants to gain access to mining sites using motorized vehicles.[40]

The New Water Mountains Wilderness being much smaller, has two cherry stemmed roads in the far western section of the wilderness. The western boundary of the wilderness can be accessed via the Gold Nugget Road south of Interstate 10. The north central part of the wilderness can be reached by the Ramsey Mine Road south of Highway 60. The New Water Mountains Wilderness offers many types of primitive recreation, such as extended backpacking and hiking trips, day hikes, and watching wildlife. Opportunities to photograph and hunt deer and desert bighorn sheep, landscape photography, and rock collecting are plentiful. The BLM should begin a monitoring process to assess the various uses, their intensity over time, and the overall impacts.

As noted earlier, public domain lands managed by the BLM are managed from a "multiple use" perspective. Restrictions resulting from wilderness designation are limited to the prohibition of non motorized transport and the "leave no trace" requirement. Refuge wilderness public uses, on the other hand, are subject to a wider array of guidelines.[41] All recreational uses are considered secondary uses and must undergo annual assessments to determine a uses' compatibility with the purposes for which the refuge was established.[42] When a use is allowed to occur on a refuge overlain with wilderness responsibilities, the manager must assess how he or she will monitor the use, its intensity overtime, and the overall impacts. Problem areas on the refuge with respect to access are anticipated to be areas where the public is not aware of a border between BLM and Service lands. For example, BLM La Posa area lands to the north of the Refuge and to the west of the New Water Mountains Wilderness are lands wherein off road motorized recreation takes place. The Refuge has had a number of off road recreationers accidentally enter the refuge. These transition areas need to be more closely monitored to prevent damage to refuge resources caused by these uses. Like the BLM the Service can employ "leave no trace" restrictions, and prohibitions of motorized transport. Perhaps, these transition areas could be clearly posted to prevent intrusions.

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[40] A "cherrystem " road is road exempted from wilderness designation. Many times these roads are dead end roads extending up to and surrounded by wilderness. In the case of Kofa NWR and New Water Mountains Wilderness Areas, the wilderness boundary is 100 feet from the edge of the exempted road. Many of these roads may lead to range developments, mines, or inholdings and water resource developments.

[41] The policy governing compatibility of uses on refuges are: Refuge Recreation Act of 1962, as amended ; Public Law 87-714; 76 Stat 653; 16 U.S.C. 460(k); and the National Wildlife Refuge System Administration Act of 1966 ; Public Law 89-699; (16 U.S.C. 66(dd)-668(ee).

[42] A use may be determined to be compatible if it will not materially detract from or interfere with the purposes of the refuge unit.

Visitation -- Prior to 1993, it was difficult to estimate visitation on the Kofa NWR. A computer-based remote sensing system which was tested for two years did not render accurate data. Moisture and erratic software performance could not be corrected. In addition, the Kofa NWR headquarters is located in the City of Yuma, and it is difficult for field personnel to monitor ingress and egress from the major refuge access points consistently over time. However, in 1993, the Service purchased six traffic counters and installed them at five entrance points on the west boundary, and one on the north side of the refuge. The new counters have rendered reliable data indicating 1993's visitation to be approximately 50,000. But, the numbers of visitation alone do not assist the refuge in determining future management actions. Understanding the number of visitors along with the type, duration, and intensity of uses will be the data necessary to plan effective management actions in the future.

The predominant visitation area on the Kofa NWR is the Palm Canyon Trail. Visitors are comprised primarily of Yuma residents who travel to the site for an afternoon. The road leading to the Palm Canyon area has been exempted from wilderness designation. A developed parking facility exists with interpretive panels.

Compatibility of Uses -- In 1994, the refuge manager determined 3 recreational uses to be not compatible with the purposes for which the refuge was established: (1) rockhounding; (2) horseback riding; and, (3) rock climbing.[43]

- *Rockhounding*. "Rock hounding," or the collection of mineral specimens from the surface, had been allowed, primarily in the Crystal Hill area (non wilderness) of the refuge. However, levels of the activity were such that commercial quantities appeared to have been taken from certain areas of the refuge. There may be a level if properly defined, and with certain restrictions that will allow for the activity to be compatible and thus allowable in non wilderness areas. The Service will need to properly define the limits of the use geographically, restrict the methods, and strictly monitor the affects. The collection ought to be restricted to only surface exposed specimens and all digging by hand or otherwise should continue to be prohibited.

- *Horseback Riding*. Horseback riding with no limitations had been allowed until the refuge manager determined that unlimited use resulted in severe soil disturbance, the introduction of exotic plant seeds, and damage to trees by tethering. With some restrictions in place such as the use of feeding containers, use of pellitized feed, and requirement for site restoration, the use of horses and pack animals could be considered compatible.

- *Rock Climbing*. Rock climbing has not been a popular recreational use on the refuge because of the softness of the rock faces. Rock climbers typically prefer harder granitic

[43] Compatiblility Determinations dated May 24, 1994 and approved September 2 1, 1994, indicated that these uses at that time were not "compatible" with refuge purposes. However, these determinations state: "...As a result of the planning process, modifications of the activity may be identified that would make it compatible." See January 1997 Compatibility Determinations for Rockhounding, Horseback Riding, and Technical Rock Climbing in the Appendix of this document.

surfaces. Nevertheless, the activity has been known to occur. The Service's approach nationally has been to allow the use on national wildlife refuges, provided that permanent anchors and the marking of routes be prohibited. With the establishment of these restrictions, the use can be considered compatible.

Uses determined to be compatible included: (1) Camping; (2) Hiking and Backpacking; (3) Wildlife Photography; (4) Wildlife Observation; (5) Hunting - Big Game; (6) Hunting - Upland Game; (7) Concessions - Guided Sport Hunting; (8) Concessions - Guided Tours.

Wildlife Observation, Camping, Photography, and Opportunities for Solitude[44] -- *Camping*. Although camping has been determined to be compatible, in the future, the refuge may need to consider establishing restrictions on the burning of native wood for campfires. Ironwood in particular is a native plant that is popular because of its hardness, and long burning qualities. It is the campfire wood of preference to many campers. Unfortunately, the species does not regenerate easily, and only under certain conditions. Sooner or later populations will dwindle unless steps are taken to restrict its use on the refuge. Camping presents opportunity for the concentration of sites where tradition has sculpted an imprint upon the landscape in the form of "fire rings." Permission to burn native downed wood could present opportunities for use of motorized saws and other modern tools. On the other hand, the importation of firewood from the outside might present the introduction of exotic insects. Again, because of access limitations, these considerations may not be as much concerns in the New Water Mountains Wilderness as in the Kofa NWR.

Wildlife Observation. Although hunting predominates as the recreation of choice in this area, wildlife observation and the so called non consumptive uses are gaining in popularity in all desert regions. More and more "snow birds" visit the desert southwest from northern climates during the winter months purely for the pleasure of observing. Unmonitored, this type of use will result in high concentrations in a limited number of areas of the wilderness resource and will tend to impact the naturalness as well as reduce the "opportunities for solitude." Nevertheless, concentrations of visitors in a few areas could eventually detract from the landscape's "untrammeled" features thus showing the imprint of man. Monitoring will be a key activity for both agencies' land managers in efforts to allow for appreciation of the wilderness resources with a minimum of impact. Additionally, the Service must monitor each uses' compatibility with refuge purposes.

Hunting. The dominant hunt program in both wilderness areas is the annual bighorn sheep hunt which is managed by the Arizona Game and Fish Department. The hunt season typically

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[44] The Wilderness Act defines wilderness as: "A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation (emphasis added); (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

falls within the first two weeks in December. All bighorn populations are managed by hunt units and permits are subsequently drawn by unit. In Arizona the desert bighorn sheep is a once-in-a-lifetime trophy and the odds of drawing a permit for the Kofa NWR are estimated to be about 1:160. Most hunters spend several days scouting during pre-season and plan on spending the entire hunting season afield. Guided hunts are common, especially for non-residents (limited to 10% of the total sheep permits statewide and 50% in any one unit. The average price for a guided hunt runs about $6,500. The refuge issues a special use permit to guides. Sheep hunting success in the project area is usually high. For instance, the rate for 1993 was 100%. The total number of permits issued for Kofa NWR alone was 15 permits.

Other species hunted in the project area include mule deer, quail, cottontail rabbit, and predators (coyote, and fox). The Kofa NWR deer hunt occurs during the first part of November. The number of deer hunters is considerably more than bighorn sheep. For example, the Arizona Game and Fish Department issued a total of 500 permits (buck only) for the Kofa NWR hunt. Quail season begins around the first week in October during which quail hunters will incidentally take rabbits and predators. Quail availability is determined by the abundance of late winter and early spring rains which produce higher than usual amounts of forage (i.e., grasses).

Summary -- The estimated 50,000 visits for Kofa NWR alone is considerable. Visits to the New Water Mountains Wilderness are probably not as extreme because access by motorized vehicle is not as readily available. However, one hunt permit alone accounts for several visits as hunters scout locations. Depending upon relative concentrations of vehicle visits along the cherry stem roads, wilderness resources could be severely impacted. Even if direct access to the wilderness is achieved through horse or on foot, trails need to be monitored for possible impacts. Both the BLM and the Service should consider the establishment of a visitation monitoring protocol in order to determine if there are impacts to wildlife and habitat resources, and in general, if there are impacts to the general wilderness characteristics. A key question is: At what locations is access occurring, and at what frequency and intensity? Is man's footprint becoming permanent and irreversible? The objectives designed through this planning effort need to direct both agencies to implement strategies that will allow frequent assessments of current conditions, trends and desired conditions.[45]

Any changes proposed in this plan will have to depend upon the relative impacts to any particular area that are tied to one or several secondary uses. Changes in allowable uses will depend upon both compatibility assessments as well as wilderness considerations. Again, a key ingredient is to establish effective monitoring of impacts of any allowed use.

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[45] This planning effort does not rely on any one technique for the development of stand ards for the determination of desired conditions or limitations upon change from current conditions (i.e., Limits of Acceptable Change). The presumption of both agencies for the Kofa NWR and the New Water Mountains Wilderness Area is that the current conditions are for the most part the desired conditions. Objectives developed later in this plan will dictate the activities necessary to prote ct the current condition, monitor impacts, and in some instances implement a change. However, key toward determining future changes in management will depend upon each agency's ability to monitor impacts o f use and their ability to collect reliable data. Again, from the Service's perspective, monitoring of impacts will be broader than those related to wilderness. Refuge monitoring will necessarily be a part of the overall compatibility assessment process.

Issue 3: Minerals Management and Minimizing Impacts of Patented Mining Claims[46]

As indicated earlier, there are no active mining claims within the New Water Mountains Wilderness. The Kofa NWR, however, has several active claims, eight of which are on the designated wilderness. The Service is concerned with the effects of these activities upon refuge wildlife and habitat resources in addition to surface disturbance concerns. Other than to develop cooperative agreements with claim owners, the only possibility of gaining more control over these "in holdings" is to appraise and purchase them. Otherwise mine activities could continue indefinitely perpetuating the disturbances to wildlife, habitat, and what otherwise might be considered natural landscape of these areas.

Minerals Management in Wilderness [47] -- As of December 31, 1983, all units of the National Wilderness Preservation System not already withdrawn from the operation of the mineral location and leasing laws were withdrawn. The present status of almost all wilderness areas is that even though no more claims can be filed, validity must be determined for a considerable backlog of claims. Validity will be determined as mining plans of operation are submitted for approval or patent applications are filed. The nature of most mining operations is incompatible with the preservation concept of wilderness. Heavy machinery is often required, and the surface of the earth is usually changed in a substantial way. That an authorized mining operation occurs in wilderness is not license to proceed constrained only by normal policy considerations. The challenge to the Service and the BLM is to work with the private rights involved and minimize or avoid unnecessary impacts, direct and indirect, on the wilderness resource. It is important that wilderness managers be familiar with the private rights involved.

Valid mineral leases and mining claims -- *Leases*. These leases may continue under the stipulations of the lease to the termination of the lease and have similar rights as mining claims with valid discoveries.

Valid Mining Claims. These claims all have the potential to be patented. Those filed before the effective date of wilderness classification can be patented for both surface and subsurface title. Those filed after wilderness designation can be patented only for the subsurface mineral; in these cases, surface title remains with the government. The rights of claimants at various stages are subject to validity determination by a mineral examiner. Claims can vary from inactive to major extraction without ever going to patent. Because of a variety of tax and private landowner responsibilities that would be imposed on them, some claimants find it to their advantage to extract the mineral without obtaining patent to the land.

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[46] Any future mining activities in the Kofa NWR would be guided by applicable sections of 50 CFR 27.64 and 50 CFR 29.31.

[47] Much of the following information is directly attributable to: *Management of the Wilderness Resource* (Fort Collins: Colorado State University, 1991), pp. (4-12)-(4-15). This handbook was authored as a collaborative effort among the Bureau of Land Mana gement, National Park Service, Fish and Wildlife Service, Forest Service, College of Forestry and Natural Reso urces, and Division of Continuing Education at Colorado State University.

Patented mining claims -- Patented claims are of two types. Those resulting from pre-wilderness claims are, plain and simple, private land and are subject to Section 4 of the Wilderness Act. Those from post-wilderness claims and made after December 31, 1983, are split-estates with the mineral estate being private and being superior to the surface ownership, which remains with the government. Surface reclamation after mineral extraction can be the visible difference between the two. Managing the surface title in split-estates is a major challenge for wilderness managers. At the conclusion of any operation, the surface must be restored as "near as practicable" to its original condition.[48] As difficult as it may be, the wilderness manager's responsibility is to ensure that restoration is accomplished so that the long-term impacts on the naturalness of the wilderness are minimized in scope and duration. That is why it important to cultivate and develop cooperative relationships with all claim owners.

Summary -- In order to protect and maintain wilderness values, both the BLM and the Service will have to attempt several strategies to mitigate and prevent impacts due to the various minerals related activities which can occur within wilderness.

With respect to valid mining claims, and patented claims, the Service must work to develop cooperative relationships with claim owners that result in excavation strategies that are the least harmful to the surrounding area for aesthetic and safety reasons. Should opportunities arise to purchase these rights, the Service should do so. Finally, for those claims that are on designated wilderness, when mining activities are concluded, the Service needs to enforce the provisions of the Wilderness Act which call for restoration of the site. Any claims on public domain lands in the vicinity of the New Water Mountains Wilderness need to be monitored for potential contaminants and other effects to the adjacent wilderness area.

Issue 4: Surface Disturbances -- In addition to surface disturbances related to mining activities, there are many instances within the planning area where disturbances to the natural landscape will tend to degrade the visitor's wilderness experience. Some examples of these disturbances include: developed water catchments, windmills, cabins, utility easements.

The New Water Mountains Wilderness area is small enough that areas where surface disturbances have occurred can readily be corrected. Most of these disturbances are related to the four water developments present within the wilderness. Access to these water developments for maintenance or refurbishment needs to be monitored to prevent the unnecessary compacting of ground. In addition, the BLM should consider in cooperation with the Arizona Game and Fish Department ways to make these developments less obtrusive to the natural landscape.

The Kofa NWR has many water developments in and out of wilderness. The Service needs to give strong consideration to the development of less intrusive strategies for monitoring water

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[48] The Wilderness Act of 1964, Section 4(d)(3).

catchment status and condition. Radio telemetry is a method which would eliminate the need to physically check water tanks and catchments. However, should modern technology be imposed, both agencies must properly declare its use of the minimum tool, and it should be installed in a nonobtrusive manner. If windmills are in need of repair or replacement, care should be taken so as not to upgrade one technology with a more modern one. The more primitive tool needs to take precedent. If a windmill is constructed from wood, it should not be replaced with metal.

All cabins and artificial structures on either wilderness should undergo assessment for historical significance. If any such structure is not historically significant, it should be eliminated from the landscape unless it provides shelter for safety and health purposes.

It is important to properly map utility easements so as to better understand their relationship to the wilderness resource. The Kofa NWR contains six easements in addition to two private non-mineral in holdings, and 46 mining claims. All of these uses present the Service and the BLM with potential conflicts to both the wildlife and wilderness resources. Both agencies must develop cooperative management strategies with the owners of these rights to minimize impacts of their uses upon refuge and wilderness resources.

Issue Five: Cultural Resource Management

It is clear that the most important element of this issue is the fact that the greater portion of the project area has not been effectively assessed for the full range of cultural resources. Site investigations have been at best spotty on the Kofa NWR and almost non existent within the New Water Mountains Wilderness. Objectives need to spell out cultural resource assessment priorities in terms of locations of focus. Research can play a critical role here, however, the caveat being that even this activity must abide by wilderness guidelines.

Issues To Be Resolved Through Existing Policy

Both agencies will appeal to existing policy directives to set objectives for the following issues. Guidance for managing these issues is clear and not much is offered in the way of flexibility. When it is anticipated that management of these issues will conflict with Wilderness Act driven goals and objectives, then the land managers of both agencies will have to determine special strategies that will result in the protection of the wilderness resource. Objectives for the following issues will be set based upon existing policy direction as noted.

Management of Utility Corridors -- Guidance for the management of utility easements in non-wilderness portions of the Kofa NWR can be found in 50 CFR 29.21. This guidance is a good framework from which to develop objectives regarding the management of these corridors by the easement owners. Objectives will be related to the monitoring of corridor use and potential impacts upon native plants including species of concern within wilderness.

In addition to monitoring, the refuge will develop cooperative efforts with easement users to ensure the protection of wilderness values where possible.

Scientific Research -- Studies for management, scientific, educational, or historical/cultural purposes will be guided by applicable BLM Manual sections 8560.18 and 8560.32 for the BLM portions of the planning area. The minimum tool considerations will be applicable.

Studies on the Refuge will be guided by 6 Refuge Manual 8.9(h), 50 CFR 27.63, and 50 CFR 35.11. Cultural resource studies will be authorized on a case by case basis and are subject to compliance with section 106 of the National Historic Preservation Act of 1966. This guidance provides an adequate framework to develop research-related objectives for both wilderness and non wilderness areas of the refuge. However, this plan will set refuge objectives for research with respect to its relative contributions to enhancement of the refuge's baseline wildlife and habitat management data. The minimum tool considerations will be applicable.

Law Enforcement and Emergency Services -- There are established wilderness management policies and regulations in BLM Manual 8560.39 and 43 CFR 8560.3, and 6 Refuge Manual 8.8 and 50 CFR 35.5, that provide for law enforcement and emergency access and equipment uses in incidents involving public health and safety and violations of civil and criminal law. This plan establishes that the guidance set out in these documents is appropriate and adequate for the refuge lands and the New Water area.

Military Ordnance Contamination -- A possibility of ordnance contamination exists on the Refuge portion of the planning area due to past military activities. Ordnance has previously been recovered from the Refuge. In the event that unexploded ordnance is discovered, the Department of Defense will be contacted for its removal using the minimum tool required for safe removal in accordance with 6 Refuge Manual 8.8 - A. This concern is not an issue for the New Water Mountains Wilderness.

Native American Religious Access -- There have been no instances in which the Service or the BLM has been contacted by Native American tribes for arrangements to access spiritual sites. However, both agencies acknowledge that certain sites within the planning area are considered to be sacred. Both agencies will consider any requests by the Native American tribes in consideration of the Native American Religious Freedom Act.

Military Overflights -- The Arizona Desert Wilderness Act of 1990 addresses military overflights. The Act states the following: "Nothing in this title shall preclude low level overflights of military aircraft, the designation of new units of special airspace, or the use or establishment of military flight training routes over wilderness areas designated by this title." Nevertheless, the Service and BLM will continue to cooperate with the military in pursuing mutually beneficial opportunities to protect the integrity of wilderness airspace and the

protection of natural resources within the planning area. This plan hopes to establish objectives for this kind of continuing outreach and cooperation.

PART IV. MANAGEMENT PROGRAM

Management Strategy

The management program is designed to protect natural resources and values of the planning area for the long-term, and to provide for public appreciation of the refuge as appropriate and compatible with the purposes for which it was established. In addition, the management program addresses national goals established for the National Wildlife Refuge System and the National Wilderness Preservation System.

This plan is issue driven. Within the framework of the legal mandates and policy guidelines outlined earlier, plan objectives are established to address planning area issues. Management actions are designed to meet the objectives. With the exception of administering two potentially shared law enforcement positions, each agency is responsible for accomplishing management actions specified for the areas within their respective jurisdiction.

Where possible, target dates to accomplish proposed actions are assigned. Monitoring will be conducted to gauge the effectiveness of management actions and determine if plan objectives are being met. In cases where motorized or mechanized equipment and vehicles are authorized in wilderness, activities should be scheduled for weekday periods instead of weekends to minimize potential impacts to visitors. During maintenance or repair of existing developments, every effort should be made to reduce visual impacts and minimize the need for maintenance that requires the use of motorized or mechanized equipment and vehicles in wilderness.

A rationale is included immediately below several items in this section to provide additional clarification.

Objective 1: Preservation of Wilderness Values:

Maintain or enhance the wilderness values of naturalness, outstanding opportunities for solitude and primitive recreation, and special features of the planning area by:

-Minimizing impacts of recreational use and visual impacts of authorized developments.
-Reducing or eliminating unauthorized vehicle/mechanized use
-Minimizing low level non-military administrative aircraft use through cooperation in scheduling with involved agencies.
-Reducing the frequency and need for administratively authorized motorized travel into wilderness.
-Preventing the establishment of a resident burro population in the New Waters. -Preventing the establishment of exotic plant species, particularly salt cedar. -Providing public education/information to prevent impacts to wilderness from recreational uses by 1997.
-Minimizing visual impacts from mining scars and former vehicle routes.

Rationale: the elements of objective #1 are important aspects of both agencies' responsibilities to carry out mandates of the Wilderness Act of 1964 and the Arizona Desert Wilderness Act of 1990. Meeting this objective will provide long-term preservation of the planning area's wilderness values by addressing aspects of issues 1,2,3,4,5,and 6 (in Part III of this document), and portions of each respective agency's own wilderness management policies.

Management Actions

1. New Waters -- Allow rockhounding as a use on the New Waters but limit use to hand methods that do not cause surface disturbances.

Kofa --Restrict rockhounding as a use on the Kofa NWR to the Crystal Hill area (as delineated on Map 1). Boundaries will be posted as per the following legal description: Township 2 N, Range 18 W, E 1/2 of Section 9; and all of Section 10. No detection equipment or hand tools will be allowed. Only the taking of surface occuring rocks will be permitted. If it is determined in the future that rockhounding activities are degrading the landscape, the Service may determine that rockhounding at any level "materially detracts and/or interferes with the purpose for which the refuge was established" and thus, may determine the use to be not compatible. Rockhounding is eliminated from the remainder of the Kofa NWR. Incorporate information regarding not leaving surface disturbances into agency outreach materials by 1997.

Rationale: Surface disturbances have routinely been left unreclaimed in the New Waters. In reference to rockhounding, BLM Manual 8560.31.E states: "Limit such use to hand methods or detection equipment that does not cause surface disturbance, such as metal detector or Geiger counter. In addition, methods must not be permitted that in any way adversely affect or degrade the wilderness resource or the experiences of visitors in the area."

In reference to rockhounding on the Kofa NWR, restrictions are set in place in accordance with 50 CFR 25.31. Past unrestricted rockhounding has resulted in the removal of large quantities of nonrenewable refuge resources. A compatibility determination was made that this use at past levels is not compatible so as to "materially detract from and/or interferes with the purposes for which the refuge was established." [Refuge Manual 5 RM 20.60] By restricting the use to the Crystal Hill area only, and limiting the activity to hand methods, the use is determined to be compatible. These restrictions are also implemented because it is not lawful to convert national public resources to private/commercial uses depleting resources that are not sustainable or renewable.

2. Continue adequate signing and distribution of information concerning restrictions (Information Displays, Map 1) to unauthorized vehicular/mechanized transport within wilderness areas. Emphasize practices that minimize surface disturbances.

3. Install barriers at the wilderness boundaries where signing alone is not effective in controlling unauthorized vehicle entry. Boulders, berms, plants or other natural materials will be preferred for use as barriers. However, if
these prove ineffective, post and cable barriers will be constructed.

Rationale for Actions 2 and 3: Most of the potential for unauthorized mechanical/vehicle use is on the refuge portion of the planning area. These actions will improve opportunities for solitude, provide for the re-establishment of vegetation on existing surface disturbances, and prevent additional adverse impacts from unauthorized vehicle/mechanical use in wilderness.

4. Control the establishment of salt cedar (Tamarisk) or other exotic plant species at wildlife waters and remove discovered plants physically or with authorized chemicals.

5. Maintain existing burro fences and remove any nuisance burros that expand their range to include the planning area. The use of helicopters for burro removal will be allowed.

Rationale for Actions 4 and 5: By refuge policy, nonindigenous species are to be controlled and if possible removed from refuge lands. Burros are extremely competitive for scarce vegetative and watering resources with native wildlife. Tamarisk is a very aggressive exotic plant species that eventually displaces native vegetation.

6. Education and outreach will include: work with the Arizona Game and Fish Department to include visitor use impacts information in the annual hunting regulations by 1998; develop a joint agency brochure/map by 1998; participate in annual Quartzsite pow wow public information booth.

Rationale: Both agencies recognize the need to improve on efforts that provide public information for promoting practices that minimize adverse impacts to our natural resources and allow greater enjoyment of appropriate recreational and other opportunities. National Wildlife Refuge System goals call for management actions that foster public appreciation for wildlife and habitat resources and that are compatible with refuge purposes.

7. Clean up debris at 6 abandoned unpatented mining sites within Kofa and 1 site within the New Waters (Map 3) by the year 2001.
8. Reclaim 2 former vehicle routes (3.5 miles) in the refuge and 4 former vehicle routes (4.5 miles - Map 3) in the New Waters using hand tools and other non mechanized methods to minimize visual impacts and enhance wilderness values and opportunities.

Rationale for Actions 7 and 8: Past (within the last 40 years) mining activities and former vehicle routes have resulted in disturbances to natural features of the planning area and in some cases could affect public safety. Implementing these actions will provide for the restoration of natural features and enhance wilderness values and opportunities. Wildlife habitat will be enhanced by the revegetation of surface disturbances. There will

also be less potential for adverse impacts to wildlife from continued vehicle use in wilderness.

9. The Service will coordinate with the military to remove military debris as warranted.

10. Pursue options to establish 2 field positions by 1998 for the purpose of implementing resource protection, monitoring, and public outreach provisions of this management plan for the entire planning area.

Rationale: This action will provide for the attainment of resource protection plan provisions and the acquisition of needed data concerning potential conflicts between wildlife and recreation objectives. Issues 1, 2, 3, and 10, and components of objectives 2 and 3, are addressed by this action. Additionally, this proposal falls within the guidelines of current Departmental goals to shift more existing positions to the field level.

Monitoring for Objective 1.

1. Inspect wildlife water sites during routine inspections to check for the establishment of Tamarisk or other exotic plant species and implement action 4 as necessary.

2. During routine patrols of the planning area, monitor existing burro fences for impacts and presence of nuisance burros that expand their range to include the planning area. Implement action 5 as needed.

3. Monitor and document unauthorized uses of the planning area. Implement action 3 if warranted.

4. Monitor and document impacts of all authorized visitor uses within the planning area and recommend needed mitigation during yearly plan evaluations.

5. The Service will monitor rockhounding activity on Crystal Hill.

Objective 2. Wildlife and Habitat Management:

Within a dominant wilderness context, both agencies will maintain and enhance the natural diversity of flora and fauna within the Kofa/New Waters planning area by:

-Managing fire to maintain the areas natural values.
- Preventing the introduction of new exotic pathogens into the area that could adversely impact wildlife.
-Managing the planning area using the minimum tools needed for maintaining an optimal desert bighorn sheep population while providing for maximum viable species diversity.
-Providing for allowable resource uses within an ecologically compatible and sustainable framework while minimizing impacts to wilderness values.

-Identifying sensitive wildlife areas and minimizing visitor use conflicts.
-Eliminating potential impacts to wildlife habitat from probable mining activity on nonfederal lands within the planning area.

Management Actions

1. Reported fires will be monitored by air with minimum altitudes of 1000 feet above ground level, or by foot access. In the New Waters, fires that exceed or are expected to exceed a 5 chain per hour rate of spread will be suppressed. Kofa fires that threaten private property, have other than a low potential for spreading beyond the planning area, or present a significant threat to unique natural resources (i.e., native palms), or health and safety for the public, will be suppressed. Use non-motorized hand tools for suppression activities within wilderness portions of the planning area. Complete the rehabilitation of disturbances caused by fire suppression activities in accordance with BLM Manual 8560.35 and Refuge Manual 6 RM 8.8C, before suppression forces are released.

Rationale: There has been no recorded history of fires in the New Waters. Plant communities within the planning area are not fire adapted and suppressing fires that exceed a 5 chain per hour rate of spread will protect the area's natural values. Fires that have occurred on the refuge have been caused by human activity. These fires have burned themselves out with minimal intervention during the first burning period. There have been no long-term adverse impacts to wildlife or habitat from fire occurrence in the planning area.

2. Bighorn sheep capture and transplant work in the planning area will be considered annually in joint consultations between the AGFD and Kofa staff.

Rationale: Sheep capture within the New Waters is governed by the AGFD-BLM MOU. On the Kofa, the quantity of sheep designated for capture is dependent upon sheep surveys and habitat evaluations conducted on the refuge. The AGFD and the Kofa staff meet and agree upon the number of bighorn to be removed and time periods for capture. Factors to be considered are:
- Estimated population and trends.
- Minimum estimated population of 120 in the New Waters.
- Minimum estimated population of 800 on the refuge.
- Herd demographics (minimum of 50% ewes, 14 lambs:100 ewes).

The preceding factors will be considered but they will not mandate a permit denial or a removal of bighorn sheep.

The Service and AGFD will continue to track the overall level of achievement (i.e., attainment of long range goals) of the efforts to repopulate the desert bighorn in their

natural range. Transplant goals are to reestablish bighorn sheep throughout all suitable historic habitat. To achieve that, the following factors are considered:
- Suitable historic habitat (sufficient area, quality etc.).
- Conflicts with the success of the release (e.g. domestic sheep, human disturbance, etc.).
- Viability of current population in the transplant site.
    - Genetic viability (minimum sheep population of 50).
    - Predator threshold viability (dependent upon local influences).

3. Allow helicopter use as the minimum tool necessary for bighorn sheep capture operations.

Rationale: The use of helicopters to capture sheep for eventual transplantation has aided efforts to recover the desert bighorn in its natural range. Desert bighorn sheep recovery is a primary component of the Kofa's defined purpose. Other methods may incur extended intrusions into the wilderness with means that could be more harmful. For the BLM, this method of capture is defined in the AGFD-BLM MOU.

4. Accomplish routine inspections of all wildlife waters , with the exception of Charlie Died Tank, by non-mechanical means. Maintenance of wildlife waters in wilderness will also be conducted by non-mechanical means with the exception of those listed below:

-At Kofa #1 and Kofa #2, Adam's Well, King Well, and Charlie Died Tank, maintenance, and water supplementation will be allowed by vehicle.
-If needed during drought periods, water will be supplemented at Nugget Tank using motorized equipment or vehicles .
-The access method for emergency situations at wildlife waters will be determined by the Field Manager and/or Refuge Manager on a case-by-case basis, and where applicable, in consultation with AGFD. Maintenance, modification, and/or repair by motorized/mechanical means may be considered on a case by case basis.

5. The Service, BLM, and AGFD will evaluate options to install buried water systems at Charlie Died Tank and Modesti Tank, and improve the visual characteristics and/or reliability of Kofa #1 and #2 by redeveloping or relocating the wildlife waters.

6. Improve, redevelop, or enhance Nugget Tank to minimize visual impacts and reduce the need for water supplementation by 1998. The use of mechanized equipment will be allowed.

Rationale for Actions 4, 5, and 6 : Traditionally, these have been inspected using vehicle transport. Wildlife water sources on the Kofa are important components of wildlife management for the refuge. The Service recognizes the newer context created by wilderness designation. The options to be evaluated will assist in lessening the frequency of administrative use of vehicles and mechanical equipment, still allow for fulfillment of Kofa's important role in the recovery of bighorn sheep.

Inspection of waters by aerial means is not precluded by the wilderness act or by this plan. If aircraft landings are required within designated wilderness, advance approval by the Service or the BLM is necessary unless otherwise stated in this plan. Emergency and safety reasons are the exception.

7. Provide for the following flight operations. A 2 week advance notification of planned flights by AGFD to the appropriate agency is desirable.

- One low level bighorn sheep survey, averaging 8 hours of flight time in the New Waters and 60 hours on the refuge during the period of October 1 through November 30.
- One low-level javelina and mule deer survey, averaging 8 hours of flight time in the New Waters and 15 hours on the refuge during the period from January 1 through March 31.
- In addition, flights for monitoring water levels, supplemental wildlife surveys, or in response to emergency situations may occur if necessary.
- Helicopter landings will be allowed for the retrieval of telemetry equipment from a sick or dead animal.

Rationale: Implementing these provisions will minimize the number of flights over designated wilderness and improve efficiencies in time and money to acquire needed biological information throughout the planning area. Advance approval by the Service or BLM is necessary for aircraft landings within wilderness that are not provided for in this plan. Emergency and safety reasons are the exception.

8. Continue cooperative effort to identify needs and collect baseline data. The Service will complete all phases of the already established aerial videography project by the year 1999.

Rationale: All agencies recognize the need to collect as much relevant scientific data as possible to assist in efforts to manage habitat and wildlife in the planning area for its biologically diverse suitability and capability. The aerial videography project will provide fundamental vegetation baseline data once digitized.

9. Appropriate agencies will coordinate to establish seasonal closures of sensitive habitat to protect wildlife and plant species when needed. Such areas may include drought period water sources, lambing sites (Map 4), abandoned mine shafts and other sensitive habitats.

10. By 1998, inventory abandoned mine sites, the majority of which are outside the wilderness, and install gates in such a way as to allow for continued use of bats and other wildlife. If appropriate, the mine opening may be closed. For those mine openings that are found to be within wilderness, and present a safety hazard to the public, the manager will install the appropriate wildlife amenable gates using the minimum tool. Mechanized/motorized equipment will be allowed for installing gates or closing mine sites.

Rationale for Actions 9 and 10 : These actions will minimize the potential for adverse impacts from visitors on wildlife during crucial periods. The agencies must

be able to maintain the integrity of natural and appropriate manipulative processes so that wildlife, habitat, and wilderness mandates are met. In the case of abandoned mine shafts, closure will minimize risks to human safety.

11. Purchase from willing sellers, private inholdings (Map 3) within the Kofa portion of the planning area. There will be a purchase target of at least 1 inholding per year.

Rationale: This action will provide for the protection of wildlife habitat and visual values of the planning area.

Monitoring for Objective 2

1. Maintain monitoring logs of the administrative use of vehicles and/or mechanized equipment. Evaluate the logs annually and explore options to reduce the need for these type of administrative uses.
2. Monitor burn areas for the establishment of exotic plant species.
3. Monitor visitor uses and intensities of uses as to their effects and/or impacts on natural resources within the planning area. Recommend and implement mitigation to minimize adverse impacts as needed.

Objective 3: Recreation, Legal Access and Public Information:

Maintain high quality opportunities for recreation within the planning area, and where applicable, wildlife dependent , and/or primitive recreation that is compatible with the purposes for which the Kofa NWR and New Water Mountains Wilderness were established. These uses include wildlife observation, hiking, hunting, camping, photography, and solitude. This objective will be accomplished by:

- Providing public information that allows for public enjoyment of recreational opportunities in the planning area while promoting low impact use ethics for visitors.
- Establishing methods that will allow for the public to continually assess the quality of their recreational opportunities and thereby assist in determining appropriate future management decisions.
- Providing legal public access routes that promote dispersed use.
- Acquiring private lands that provide added recreational opportunities.
- Enhancing the quality of recreational opportunities by establishing special programs.
- Maintain environmental standards (air and water quality) to provide for enhanced visitor experience.

Rationale: All recreational activities on National Wildlife Refuges are secondary uses and are allowed when compatible with the primary purposes for which the refuges were established. Any existing recreational use must undergo annual review and any proposed use must undergo compatibility analysis. The above listed uses are those that have been determined to be compatible with the Kofa.

Management Actions

1. Establish (I-8 on Map 1 by 1998) and maintain information and interpretive displays at access points (Map 1) to the planning area as funding and staff levels permit.

2. As staffing and funding allow, conduct routine patrols of the planning area at least once per month.

3. Promote "Leave No Trace!" land use ethics by making appropriate information available at information displays and administrative sites.

4. By the end of 1998, include visitor registers at information displays (Map 1) to provide for public assessment and comment about the quality of their recreational and wildlife appreciation opportunities. Develop an appropriate register form to assist in providing needed monitoring information.

5. Keep existing authorized public access routes (Map 1) open to promote dispersed visitor use and maintain opportunities for solitude.

6. The BLM will pursue options to acquire a public easement through or purchase the entire land parcel described by Mineral Entry Patent 546603, adjacent to the New Waters in the northeast portion of the planning area (Map 3) by 1999.

> **Rationale:** Providing legal public access would assist in meeting Objective 3 through more dispersed visitor use that would be allowed by making a larger portion of the New Waters legally accessible to the public. This property currently provides some of the more popular camping sites in the BLM portion of the planning area. Also, this action will provide for the protection of wildlife habitat and visual resources of the planning area, and therefore assist in meeting Objective 2.

7. The Service will continue to work with AGFD to manage the Alternate hunt (mule deer) Program on the Kofa portion of the planning area (State Game Management Unit 45).

> **Rationale:** This action will allow for continuation of a quality deer hunt on the Kofa portion of the planning area . The objective is to reduce potential hunter crowding and increase hunter success rates. This action also contributes to the achievement of Objective #2.

8. Prohibit the use of permanent anchors and the marking of routes in support of technical rock climbing and rapelling in the planning area as authorized by 43 CFR 8560.1-2 and 50 CFR 25.21.

9. Allow horses, mules, burros, and llamas as recreational livestock in the planning area under these conditions: The use of feeding containers is required, water is to be packed in for

livestock, and surface disturbances at campsites are to be restored. Use of pelletized feed is recommended.

Rationale: The use of feeding containers will assist in preventing the introduction of exotic plants and pathogens from domestic livestock. Packing in water will eliminate any need for livestock to use water resources developed specifically for wildlife within the planning area. Cumulative habitat/resource degradation will be prevented from continued recreational livestock use. It is recognized that the use of recreational livestock by hunters and other users is one method of transporting game across long distances or as an alternative recreational opportunity. This action contributes to the achievement of Objective 2 and is authorized by 50 CFR 26.33 and 27.52 on Kofa and 43 CFR 8560.1-1 on the New Waters.

10. Allow campfires in the New Waters using dead, down and detached wood. Provide information at wilderness access displays to minimize use of campfires. Visitors to the New Waters will be encouraged to bring their own firewood. The BLM will consider campfire restrictions as a last resort.

11. Allow the use of dead, down, and detached wood for campfires in the nonwilderness corridors and other non wilderness areas within the Kofa NWR. Prohibit wood gathering and the possession of ironwood on Kofa NWR wilderness areas as authorized by 50 CFR 25.21 and 25.31. The Service will require visitors to Kofa NWR designated wilderness areas to bring their campfire wood as authorized by 50 CFR 26.33 or to bring charcoal or propane stoves. No native wood will be removed from the refuge.

Rationale for actions 10 and 11: Generally, campfires are used along nonwilderness corridors and throughout wilderness boundary perimeters where visitor use occurs more often. No data exists that compels the Service to completely disallow the use of dead, down and detached wood for campfires. However, the Service is compelled to conserve wilderness values until additional research can confirm that the resources' sustainability. This action also contributes to the achievement of Objective 2.

12. Enforce 25 mi/hr speed limit on all refuge maintained roads. Recommend to Yuma and La Paz County officials the implementation and enforcement of a 25 mi/hr speed limit on all county maintained roads within the Kofa NWR.

Rationale: The lower speeds on these dirt roads will reduce the number of dust particulates in the air to provide for maintaining air quality and will reduce mortalities to all wildlife, especially reptiles.

Monitoring for Objective 3

1. Inspect campsites where livestock use has occurred. Compile data on adverse impacts and assess the need to establish a special recreation use permit system for livestock on a yearly basis in the Kofa portion of the planning area.

2. Monitor for potential adverse impacts in the vicinity of frequently used campsites throughout the planning area and evaluate to determine if mitigation is needed.

3. Monitor visitor uses and intensities of uses as to their effects and/or impacts on natural resources within the planning area. Recommend and implement mitigation to minimize adverse impacts as needed.

4. Monitor data from public assessments of recreational opportunities in the planning area to assist in determining whether group size limits are warranted.

5. Compile visitor non-compliance data; evaluate annually and implement needed mitigation that will include appropriate interpretive messages at information displays.

Objective 4: Minerals Management

Minimize the environmental impacts of mining activities on all lands and resources within the planning area especially those directly related to wilderness by:

- Acquiring unpatented mining claims within the planning area.
- Monitoring activities on unpatented claims and performing mineral validity examinations if mining operations are proposed..

Management Actions

1. Encourage non-government entities to purchase unpatented claims on the Kofa NWR and allow claims to lapse. Contact at least 2 non-governmental entities by end of 1998.

2. By 1999, the Service will develop a Memorandum of Understanding with the BLM for mining claim validity examinations that would be performed if mining operations are proposed on active claims within Kofa wilderness. Provisions are to be made for project funding.

> **Rationale for Actions 1 and 2:** Implementation of these actions will assist in the resolution of issue 4, and achieve BLM Wilderness Management Goals, and Service Wilderness Management Policy Objectives. Achievement of the objective will result in long-term preservation of the area's wilderness values while allowing both agencies to accomplish wildlife and habitat management mandates.

Monitoring for Objective 4:

Monitoring for the fulfillment of Objective 4 will be accomplished during annual plan evaluations.

PART V. PLAN EVALUATION

In coordination with AGFD, the Yuma Resource Area Manager and the Kofa NWR project leader (refuge manager) will conduct annual evaluations of the plan to:

1. Document completed management actions and adjust schedules for the following year if necessary.

2. Monitor to determine if the plan objectives are being met.

3. Recommend new management actions if needed.

4. Determine if the plan needs to be revised.

Needed revisions will amend the plan and be available for public review before being implemented.

PART VI: IMPLEMENTATION SCHEDULE AND COST ESTIMATES

TABLE 5 - RECURRING TASKS

TASK/ACTIVITY	WORKMONTHS ($3500/MO.)	TASK ASSIGNMENT
Monthly Wilderness Patrols, Facilities Maintenance, Information Displays, Signs	6	Park/Law Enforcement Rangers/ Wilderness Specialist
Participate in annual Quartzsite Pow Wow public information booth	.5	Refuge/Resource Area Staff
Monitoring - Visitor Use, establishment of exotic species	3	Park/Law Enforcement Ranger/ Wilderness Specialist/ Biologists
Plan Evaluation	.5	Area/Refuge Managers/ Interdisciplinary Team/AGFD

TABLE 6 - NON-RECURRING TASKS

TASK/ACTIVITY	TARGET DATE	COSTS	TASK ASSIGNMENT
1. Implement restrictions on: rockhounding; fuel wood gathering; rock climbing; and use of recreational livestock. Develop educational materials for posting at locations I-1 to I-10 on Map 1 to promote low impact uses and inform the public of restrictions .	1998	$ 2,500	Wilderness Specialist/ Refuge and Area Managers
2. Work with AGFD to provide information about fuel wood gathering restrictions on Kofa and requirements for livestock use in planning area for inclusion on yearly hunting regulations.	1998	$ 1,000	State Office/Res. Area Wilderness Specialists/ Area/Refuge Managers
3. Construct information display at location I-8 on Map 1 in New Waters.	1998	$ 400	Park Ranger/Wilderness Specialist
4. Establish visitor registers at locations I-1 to I-10 on Map 1.	1998	$ 900	Refuge Mgr/ Wilderness Specialist
5. Develop BLM/Service MOU for mining validity examinations.	1999	[1]	Refuge/Area Managers
6. Clean up debris at abandoned mining sites on Map 3 as follows: *1 to *6 *7	 1996 to 2001 1997	 $ 15,000 $ 1,000	 Refuge Manager Pk. Ranger/W. Specialist
7. Reclaim former routes K-1 and K-2 and NW-1 to NW-4 on Map 3 as follows: K-1 & K-2 NW-1 to NW-4	 1997 & 1998 1997 to 2000	 $ 5,000 $ 10,000	 Refuge Manager Pk. Ranger/W. Specialist
8. Pursue options to establish 2 field positions on Kofa.	1998	$ 60,000	Refuge Manager
9. Inventory and gate or close abandoned mines on Kofa as appropriate.	1998	$ 25,000	Refuge Manager
10. Improve wildlife waters at Nugget Tank.	1998	$ 5,000	AGFD/BLM
.11. Improve wildlife waters at: Charlie Died Tank Modesti Tank	1998 2000	$ 30,000 $ 30,000	Refuge Manager
12. Improve wildlife waters : Kofa #1 and #2.	To be determined	$ 30,000 $ 30,000	AGFD/ BLM/Service-Wildlife Biologists
.13. Complete Kofa aerial videography project.	1999	$ 5,000	Refuge Manager
. 14. Acquire public easement through or all property on Mineral Entry Patent 546603.	1999	$100,000	State Office Realty Specialist/ Area Manager
15. Acquire private inholdings from willing sellers on Kofa.	2010	[2]	Refuge Manager
16. Acquire active mining claims from willing sellers on Kofa.	2010	[2]	Refuge Manager

1. No operational funding is needed; approximately 1 workmonth will be needed for Tasks 5 and 6.
2. Tasks 16 and 17 are long-term goals and acquisition estimates were not readily available.

PART VII: APPENDICES

APPENDIX A

KOFA NATIONAL WILDLIFE REFUGE AND NEW WATER MOUNTAINS WILDERNESS WILDLIFE WATERS

NEW WATER MOUNTAINS WILDERNESS

Catchments

1.	959 Tank	T. 3 N., R. 17 W., S. 24
2.	Hidden Tank	T. 3 N., R. 16 W., S. 21
3.	Nasca Tank	T. 3 N., R. 17 W., S. 16
4.	Nugget Tank	T. 3 N., R. 17 W., S. 29

KOFA NATIONAL WILDLIFE REFUGE

Catchments

5.	736 (Kofa Mtns # 1)	T. 1 S., R. 19 W., S. 36
6.	737 (Kofa Mtns # 2)	T. 1 S., R. 19 W., S. 12

Dams

7.	Charco # 3	T. 2 N., R. 16 W., S. 20
8.	Charco # 4	T. 2 N., R. 15 W., S. 23
9.	Cholla Tank	T. 1 N., R. 15 W., S. 8
10.	Crowder Dam	T. 1 S., R. 15 W., S. 9
11.	Crowder # 1	T. 1 S., R. 17 W., S. 2
12.	Crowder # 2	T. 1 N., R. 16 W., S. 31
13.	Four Peaks Dam	T. 1 N., R. 16 W., S. 6
14.	Geyser Dam	T. 1 N., R. 17 W., S. 25
15.	Ketcherside Dam	T. 4 S., R. 18 W., S. 35
16.	Kofa Dam	T. 1 S., R. 16 W., S. 32
17.	Owl Head Dam	T. 1 N., R. 16 W., S. 9
18.	Red Rock Dam	T. 1 N., R. 16 W., S. 23

Springs

19.	Alamo Spring	T. 1 N., R. 16 W., S. 20
20.	Budweiser Spring	T. 1 N., R. 17 W., S. 20
21.	Covered Well Spring	T. 2 N., R. 18 W., S. 11
22.	Dixon Spring	T. 5 S., R. 18 W., S. 13
23.	Doc Carter Spring	T. 5 S., R. 18 W., S. 5
24.	High Tank # 2	T. 1 N., R. 17 W., S. 13
25.	Holly Seep	T. 1 N., R. 16 W., S. 18
26.	Jasper Spring	T. 1 N., R. 17 W., S. 3
27.	Tunnel Spring	T. 1 N., R. 17 W., S. 32
28.	Wilkerson Seep	T. 1 N., R. 16 W., S. 16

APPENDIX A (continued) **Tanks**

29.	Black Tank	T. 3 S., R. 19 W., S. 8
30.	Blue Rock Tank	T. 4 S., R. 18 W., S. 34
31.	Castle Rock Dam	T. 4 S., R. 18 W., S. 25
32.	Cereus Tank	T. 1 S., R. 18 W., S. 1
33.	Chain Tank	T. 5 S., R. 17 W., S. 4
34.	Charlie Died Tank	T. 2 S., R. 16 W., S. 23
35.	Chuckwalla Tank	T. 3 S., R. 19 W., S. 35
36.	Drill Hole Tank	T. 1 N., R. 16 W., S. 18
37.	Figueroa Tank	T. 3 S., R. 18 W., S. 34
38.	Fishtail Tank	T. 1 S., R. 18 W., S. 11
39.	Frenchman Tank	T. 3 S., R. 15 W., S. 20
40.	Hidden Valley Tank	T. 2 S., R. 19 W., S. 3
41.	High Tank # 3	T. 1 S., R. 17 W., S. 1
42.	High Tank # 6	T. 1 N., R. 17 W., S. 17
43.	High Tank # 7	T. 1 N., R. 17 W., S. 28
44.	High Tank # 8	T. 1 N., R. 17 W., S. 32
45.	High Tank # 9	T. 1 N., R. 17 W., S. 28
46.	Hollow Rock Tank	T. 3 S., R. 19 W., S. 4
47.	Horse Tank	T. 2 S., R. 19 W., S. 34
48.	Little White Tank	T. 3 S., R. 18 W., S. 27
49.	McPherson Tank	T. 4 S., R. 18 W., S. 6
50.	Modesti Tank	T. 5 S., R. 18 W., S. 18
51.	Moonshine Tank	T. 2 S., R. 16 W., S. 2
52.	Red Hill Tank	T. 1 N., R. 17 W., S. 4
53.	Saguaro Tank	T. 4 S., R. 18 W., S. 8
54.	Salton Tank	T. 5 S., R. 17 W., S. 33
55.	Squaw Tank	T. 1 S., R. 17 W., S. 16
56.	Yaqui Tank	T. 1 S., R. 16 W., S. 29

Wells

57.	Adams Well	T. 4 S., R. 18 W., S. 25
58.	Coyote Peak Well	T. 2 N., R. 15 W., S. 23
59.	Craven Well	T. 1 N., R. 15 W., S. 7
60.	De La Osa Well	T. 1 N., R. 17 W., S. 33
61.	Hoodoo Well	T. 1 N., R. 15 W., S. 18
62.	Hovatter Well	T. 1 S., R. 15 W., S. 12
63.	King Well	T. 1 N., R. 16 W., S. 18
64.	Mid Well	T. 1 N., R. 17 W., S. 14
65.	New Water Well	T. 2 N., R. 16 W., S. 13
66.	Red Raven Well	T. 1 S., R. 15 W., S. 12
67.	Scotts Well	T. 2 N., R. 17 W., S. 19
68.	Twelve Mile Well	T. 2 N., R. 18 W., S. 16
69.	Wilbanks Well	T. 1 N., R. 17 W., S. 14

APPENDIX B

KOFA NATIONAL WILDLIFE REFUGE & NEW WATER MOUNTAINS WILDERNESS
MAMMALS

Reference for the following mammal list is Banks et al. 1987.

Common Name	Scientific Name
Order Chiroptera:	
California Leaf-nosed Bat	*Macrotus californicus*
Yuma Myotis	*Myotis yumanensis*
Little Brown Bat	*Myotis lucifugus*
Cave Myotis	*Myotis velifer*
California Myotis	*Myotis californicus*
Western Pipistrelle	*Pipistrellus hesperus*
Big Brown Bat	*Eptesicus fuscus*
Spotted Bat	*Euderma maculatum*
Pallid Bat	*Antrozous pallidus*
Brazilian Free-tailed Bat	*Tadarida brasiliensis*
Western Mastiff-bat	*Eumops perotis*
Pocketed Free-tailed Bat	*Nyctinomops femorosaccus*
Townsend's Big-eared Bat	*Plecotus townsendii*
Order Lagomorpha:	
Black-tailed Jack Rabbit	*Lepus californicus*
Desert Cottontail	*Sylvilagus audubonii*
Order Rodentia:	
Harris' Antelope Squirrel	*Ammospermophilus harrisii*
Round-tailed Ground Squirrel	*Spermophilus tereticaudus*
Botta's Pocket Gopher	*Thomomys bottae*
Little Pocket Mouse	*Perognathus longimembris*
Arizona Pocket Mouse	*Perognathus amplus*
Long-tailed Pocket Mouse	*Perognathus formosus*
Bailey's Pocket Mouse	*Perognathus baileyi*
Desert Pocket Mouse	*Perognathus penicillatus*
Rock Pocket Mouse	*Perognathus intermedius*
Merriam's Kangaroo Rat	*Dipodomys merriami*
Desert Kangaroo Rat	*Dipodomys deserti*
Southern Grasshopper Mouse	*Onychomys torridus*
Western Harvest Mouse	*Reithrodontomys megalotis*
Canyon Mouse	*Peromyscus crinitus*
Cactus Mouse	*Peromyscus eremicus*
Deer Mouse	*Peromyscus maniculatus*
Brush Mouse	*Peromyscus boylii*
White-throated Woodrat	*Neotoma albigula*
Desert Woodrat	*Neotoma lepida*
Porcupine	*Erethizon dorsatum*
Desert Shrew	*Notiosorex crawfordi*

APPENDIX B (continued)

Order Carnivora

Coyote	*Canis latrans*
Kit Fox	*Vulpes macrotis*
Gray Fox	*Urocyon cinereoargenteus*
Ringtail	*Bassariscus astutus*
Badger	*Taxidea taxus*
Striped Skunk	*Mephitis mephitis*
Western Spotted Skunk	*Spilogale putorius*
Mountain Lion	*Felis concolor*
Bobcat	*Lynx rufus*

Order Artiodactyla:

Mule Deer	*Odocoileus hemionus crooki*
Desert Bighorn Sheep	*Ovis canadensis mexicana*
Collared Peccary	*Tayassu tajacu*
Burro	*Equus asinus*

APPENDIX C

KOFA NATIONAL WILDLIFE REFUGE & NEW WATER MOUNTAINS WILDERNESS
HERPTILES

Sources of information for distribution ranges, common names, and scientific names are Banks et al. 1987, Behler et al. 1989, and Smith et al. 1982.

	Common Name	Scientific Name
Amphibians:		
	Couch's Spadefoot	*Scaphiopus couchii*
	Colorado River Toad	*Bufo alvarius*
	Great Plains Toad	*Bufo cognatus*
	Red-spotted Toad	*Bufo punctatus*
Reptiles:		
	Desert Tortoise	*Gopherus agassizii*
	Western Banded Gecko	*Coleonyx variegatus variegatus*
	Zebra-tailed Lizard	*Callisaurus draconoides rhodostictus*
	Collared Lizard	*Crotaphytus insularis bicinctores*
	Long-nosed Leopard Lizard	*Gambelia wislizenii wislizenii*
	Desert Horned Lizard	*Phrynosoma platyrhinos calidiarum*
	Desert Night Lizard	*Xantusia vigilis vigilis*
	Chuckwalla	*Sauromalus obesus obesus*
	Desert Iguana	*Dipsosaurus dorsalis dorsalis*
	Desert Spiny Lizard	*Sceloporus magister magister*
	Colorado Desert Fringe-toed Lizard	*Uma notata rufopunctata*
	Long-tailed Brush Lizard	*Urosaurus graciosus graciosus*
	Tree Lizard	*Urosaurus ornatus symmetricus*
	Side-blotched Lizard	*Uta stansburiana elegans*
	Western Whiptail	*Cnemidophorus tigris tigris*
	Banded Gila Monster	*Heloderma suspectum cinctum*
	Western Slender Blind Snake	*Leptotyphlops humilis cahuilae*
	Rosy Boa	*Lichanura trivirgata gracia*
	Glossy Snake	*Arizona elegans noctivaga*
	Banded Sand Snake	*Chilomeniscus cinctus*
	Western Shovel-nosed Snake	*Chionactis occipitalis annulata*
	Night Snake	*Hypsiglena torquata ochrorhyncha*
	Common Kingsnake	*Lampropeltis getulus californiae*
	Coachwhip	*Masticophis flagellum piceus*
	Spotted Leaf-nosed Snake	*Phyllorhynchus decurtatus perkinsi*
	Pine - Gopher Snake	*Pituophis melanoleucus affinis*
	Sonoran Coral Snake	*Micruroides euryxanthus*
	Long-nosed Snake	*Rhinocheilus lecontei lecontei*
	Ground Snake	*Sonora semiannulata*
	Western Patch-nosed Snake	*Salvadora hexalepis hexalepis*

Checkered Garter Snake	*Thamnophis marcianus marcianus*

APPENDIX C (continued)

Western Lyre Snake	*Trimorphodon biscutatus lambda*
Sidewinder	*Crotalus cerastes laterorepens*
Western Diamondback Rattlesnake	*Crotalus atrox*
Mojave Rattlesnake	*Crotalus scutulatus scutulatus*
Speckled Rattlesnake	*Crotalus mitchellii pyrrhus*
Black-tailed Rattlesnake	*Crotalus molossus molossus*

APPENDIX D

KOFA NATIONAL WILDLIFE REFUGE AND NEW WATER MOUNTAINS WILDERNESS

BIRD LIST

		S	S	F	W
GREBES					
Pied-billed Grebe	Podilymbus podiceps		x		
PELICANS					
Brown Pelican	*Pelecanus occidentalis*			r	r
HERONS					
Great Blue Heron	*Ardea herodias*			r	r
Snowy Egret	*Egretta thula*		r		r
GEESE AND DUCKS					
Greater White-fronted Goose	*Anser albifrons*				x
Canada Goose	*Branta canadensis*				x
Green-winged Teal	*Anas crecca*				r
Mallard	*Anas platyrhynchos*				x
Northern Pintail	*Anas acuta*	r		o	
Blue-winged Teal	*Anas discors*				r
Cinnamon Teal	*Anas cyanoptera*		o		r
Northern Shoveler	*Anas clypeata*				o
American Wigeon	*Anas americana*				r
Redhead	*Aythya americana*				x
Bufflehead	*Bucephala albeola*		r		r
Red-breasted Merganser	*Mergus serrator*				x
Ruddy Duck	*Oxyura jamaicensis*				x
AMERICAN VULTURES					
Turkey Vulture*	*Cathartes aura*	c	c	c	u
HAWKES AND EAGLES					
Northern Harrier	*Circus cyaneus*			o	o
Sharp-shinned Hawk	*Accipiter striatus*	c	c	c	c
Cooper's Hawk	*Accipiter cooperii*	o	0	c	u
Northern Goshawk	*Accipiter gentilis*			x	
Harris' Hawk	*Parabuteo unicinctus*				r
Red-tailed Hawk*	*Buteo jamaicensis*	c	c	c	c
Ferruginous Hawk	*Buteo regalis*				r
Rough-legged Hawk	*Buteo lagopus*				r
Golden Eagle*	*Aquila chrysaetos*	u	u	u	u

FALCONS					
American Kestrel*	*Falco sparverius*	c	c	c	c
Peregrine Falcon	*Falco peregrinus*	r	r	r	r
Prairie Falcon	*Falco mexicanus*	o	o	o	o
QUAIL					
Gambel's Quail*	*Callipepla gambelii*	c	c	c	c
		S	**S**	**F**	**W**
RAILS AND COOTS					
American Coot	*Fulica americana*				x
PLOVERS					
Killdeer	*Charadrius vociferus*			o	o
STILTS AND AVOCETS					
Black-necked Stilt	*Himantopus mexicanus*				r
American Avocet	*Recurvirostra americana*				r
SANDPIPERS AND PHALAROPES					
Greater Yellowlegs	*Tringa melanoleuca*			r	r
Solitary Sandpiper	*Tringa solitaria*				r
Willet	*Catoptrophorus semipalmatus*		x		
Spotted Sandpiper	*Actitis macularia*		r		o
Long-billed Curlew	*Numenius americanus*			x	
Western Sandpiper	*Calidris mauri*			x	
Wilson's Phalarope	*Phalaropus tricolor*				x
Red-necked Phalarope	*Phalaropus lobatus*				x
(Northern)					
DOVES					
White-winged Dove*	*Zenaida asiatica*		c	c	c
Mourning Dove*	*Zenaida macroura*	c	c	c	u
Common Ground Dove	*Columbina passerina*			o	o
CUCKOOS AND ROADRUNNERS					
Yellow-billed Cuckoo	*Coccyzus americanus*			x	
Greater Roadrunner*	*Geococcyx californianus*	o	o	o	o
OWLS					
Barn owl	*Tyto alba*		o	o	
Flammulated Owl	*Otus flammeolus*			x	
Western Screech-Owl	*Otus kennicotti*	c	c	c	c
Great Horned Owl*	*Bubo virginianus*	u	u	u	u
Elf Owl	*Micrathene whitneyi*		c	c	

Long-eared Owl	*Asio otus*	r	r	r	r
GOATSUCKERS					
Lesser Nighthawk	*Chordeiles acutipennis*		o	o	r
Common Poorwill	*Phalaenoptilus nuttalli*	c	c	c	r
SWIFTS					
Vaux's Swift	*Chaetura vauxi*				o
White-throated Swift*	*Aeronautes saxatalis*	u	u	u	u
HUMMINGBIRDS					
Black-chinned Hummingbird	*Archilochus alexandri*		o	o	
Anna's Hummingbird	*Calypte anna*	o		o	o
Costa's Hummingbird*	*Calypte costae*	c	u	u	u
Rufous Hummingbird	*Selasphorus rufus*		o		o
		S	**S**	**F**	**W**
KINGFISHERS					
Belted Kingfisher	*Ceryle alcyon*			o	o
WOODPECKERS					
Lewis' Woodpecker	*Melanerpes lewis*	r	r	r	r
Red-headed Woodpecker	*Melanerpes erythrocephalus*				r
Gila Woodpecker*	*Melanerpes uropygialis*	c	c	c	c
Red-naped Sapsucker	*Sphyrapicus nuchalis*				r
Ladder-backed Woodpecker*	*Picoides scalaris*	o	o	o	o
Red-shafted Flicker	*Colaptes auratus*	c		c	c
Guilded Flicker*	*Colaptes chrysoides*	c	c	c	c
TYRANT FLYCATCHERS					
Olive-sided Flycatcher	*Contopus borealis*	o			o
Western Wood-Pewee	*Contopus sordidulus*	c	u	c	c
Willow Flycatcher	*Empidonax traillii*		u		u
Hammond's Flycatcher	*Empidonax hammondii*		o		o
Dusky Flycatcher	*Empidonax oberholseri*		u		u
Gray Flycatcher	*Empidonax wrightii*		o	o	o
Cordilleran Flycatcher	*Empidonax occidentalis*		c		c
(Western)					
Black Phoebe	*Sayornis nigricans*		o	o	o
Say's Phoebe *	*Sayornis saya*	c	u	c	c
Vermilion Flycatcher	*Pyrocephalus rubinus*		r		
Ash-throated Flycatcher*	*Myiarchus cinerascens*		c	c	r
Brown-crested Flycatcher*	*Myiarchus tyrannulus*		r	r	
Western Kingbird	*Tyrannus verticalis*		u	u	u
LARKS					
Horned Lark	*Eremophila alpestris*			o	r

SWALLOWS					
Tree Swallow	*Tachycineta bicolor*			x	
Violet-green Swallow	*Tachycineta thalassina*	u	u	u	u
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*			o	o
Cliff Swallow	*Hirundo pyrrhonota*			o	r
Barn Swallow	*Hirundo rustica*				r
JAYS AND CROWS					
Steller's Jay	*Cyanocitta stelleri*			r	r
Scrub Jay	*Aphelocoma coerulescens*	o	r	o	o
Pinyon Jay	*Gymnorhinus cyanocephalus*				r
Common Raven	*Corvus corax*	o	o	o	o
VERDINS					
Verdin*	*Auriparus flaviceps*	c	c	c	c
NUTHATCHES					
Red-breasted Nuthatch	*Sitta canadensis*				o
		S	**S**	**F**	**W**
WRENS					
Cactus Wren*	*Campylorhynchus brunneicapillus*	c	c	c	c
Rock Wren*	*Salpinctes obsoletus*	c	c	c	c
Canyon Wren*	*Catherpes mexicanus*	c	c	c	c
Bewick's Wren	*Thryomanes bewickii*			o	o
House Wren	*Troglodytes aedon*	c		c	u
KINGLETS AND GNATCATCHERS					
Ruby-crowned Kinglet	*Regulus calendula*	c		c	c
Blue-gray Gnatcatcher*	*Polioptila caerulea*	o	o	o	o
Black-tailed Gnatcatcher*	*Polioptila melanura*	c	c	c	c
THRUSHES					
Western Bluebird	*Sialia mexicana*			o	o
Mountain Bluebird	*Sialia currucoides*	o			o
Townsend's Solitaire	*Myadestes townsendi*		o		o
r					
Swainson's Thrush	*Catharus ustulatus*		u		r
Hermit Thrush	*Catharus guttatus*	o		u	o
American Robin	*Turdus migratorius*	o		u	o
MOCKINGBIRDS AND THRASHERS					
Brown Thrasher	*Toxostoma rufum*			x	
Gray Catbird	*Dumetella carolinensis*				r
Northern Mockingbird*	*Mimus polyglottos*	c	u	c	u
Sage Thrasher	*Oreoscoptes montanus*	o		o	o
Bendire's Thrasher*	*Toxostoma bendirei*		u	u	
Curve-billed Thrasher*	*Toxostoma curvirostre*	c	c	c	c

Crissal Thrasher*	*Toxostoma crissale*	o	o	o	o
LeConte's Thrasher	*Toxostoma lecontei*		o	o	
PIPITS					
American Pipit (Water)	*Anthus rubescens*				r
WAXWINGS					
Cedar Waxwing	*Bombycilla cedrorum*		o		o
SILKY-FLYCATCHERS					
Phainopepla*	*Phainopepla nitens*	c	u	c	c
SHRIKES					
Loggerhead Shrike*	*Lanius ludovicianus*	c	c	c	c
STARLINGS					
European Starling*	*Sturnus vulgaris*	o			o
VIREOS					
Gray Vireo	*Vireo vicinior*		r		o
Solitary Vireo	*Vireo solitarius*		o		o
Hutton's Vireo	*Vireo huttoni*				r
		S	**S**	**F**	**W**
Warbling Vireo	*Vireo gilvus*		c		c
Philadelphia Vireo	*Vireo philadelphicus*				x
WOOD-WARBLERS					
Orange-crowned Warbler	*Vermivora celata*		c		c
Nashville Warbler	*Vermivora ruficapilla*		c		u
Lucy's Warbler*	*Vermivora luciae*		r	r	
Yellow Warbler	*Dendroica petechia*		c		c
Yellow-rumped Warbler (Audubon's)	*Dendroica coronata*	c		c	u
Black-throated Gray Warbler	*Dendroica nigrescens*	u	c	u	u
Townsend's Warbler	*Dendroica townsendi*		c		o
Hermit Warbler	*Dendroica occidentalis*		u		u
American Redstart	*Setophaga ruticilla*		x		
Prothonotary Warbler	*Protonotaria citrea*				x
Northern Waterthrush	*Seiurus noveboracensis*		x		
MacGillivray's Warbler	*Oporornis tolmiei*		c		u
Common Yellowthroat	*Geothlypis trichas*		x		
Wilson's Warbler	*Wilsonia pusilla*		c		u
Painted Redstart	*Myioborus pictus*				r
Yellow-breasted Chat	*Icteria virens*				r

TANAGERS					
Hepatic Tanager	*Piranga flava*			o	
Western Tanager	*Piranga ludoviciana*		c	u	c
CARDINALS AND GROSBEAKS					
Northern Cardinal	*Cardinalis cardinalis*			o	
Pyrrhuloxia	*Cardinalis sinuatus*	r			r
Rose-breasted Grosbeak	*Pheucticus ludovicianus*		x		
Black-headed Grosbeak*	*Pheucticus melanocephalus*		u	o	u
Blue Grosbeak	*Guiraca caerulea*			r	
Lazuli Bunting	*Passerina amoena*		c		u
TOWHEES AND SPARROWS					
Green-tailed Towhee	*Pipilo chlorurus*	u	u	u	o
Rufous-sided Towhee	*Pipilo erythrophthalmus*	u	u	o	o
Canyon Towhee*	*Pipilo fuscus*	c	c	c	c
Abert's Towhee	*Pipilo aberti*		x		
Rufous-crowned Sparrow	*Aimophila ruficeps*	r	r	r	r
Chipping Sparrow	*Spizella passerina*	c	c	u	o
Brewer's Sparrow	*Spizella breweri*	c		c	u
Black-chinned Sparrow	*Spizella atrogularis*	o	o	o	o
Vesper Sparrow	*Pooecetes gramineus*	u		o	r
Lark Sparrow	*Chondestes grammacus*		o	o	o
Black-throated Sparrow*	*Amphispiza bilineata*	c	c	c	c
Sage Sparrow	*Amphispiza belli*			u	u
Lark Bunting	*Calamospiza melanocorys*				x
Savannah Sparrow	*Passerculus sandwichensis*				x
Fox Sparrow	*Passerella iliaca*		o		o
Lincoln's Sparrow	*Melospiza lincolnii*				o
		S	**S**	**F**	**W**
White-throated Sparrow	*Zonotrichia albicollis*				x
White-crowned Sparrow	*Zonotrichia leucophrys*	c	u	u	o
Dark-eyed Junco (Oregon)	*Junco hyemalis*	o		c	u
Dark-eyed Junco (Gray-headed)	*Junco hyemalis*			o	o
BLACKBIRDS AND ORIOLES					
Red-winged Blackbird	*Agelaius phoeniceus*	r			r
Western Meadowlark	*Sturnella neglecta*			o	o
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*			o	o
Rusty Blackbird	*Euphagus carolinus*			r	u
Brewer's Blackbird	*Euphagus cyanocephalus*				o
Brown-headed Cowbird	*Molothrus ater*	u	u	o	o
Great-tailed Grackle	*Quiscalus mexicanus*	o		o	o
Hooded Oriole*	*Icterus cucullatus*		o	o	r
Bullock's Oriole	*Icterus bullockii*		u	c	u
Scott's Oriole*	*Icterus parisorum*	c	c	u	o
FINCHES					
Purple Finch	*Carpodacus purpureus*			r	r

Cassin's Finch	*Carpodacus cassinii*			u	u
House Finch*	*Carpodacus mexicanus*	c	c	c	c
Pine Siskin	*Carduelis pinus*				o
Lesser Goldfinch	*Carduelis psaltria*	o	o	u	r
Lawrence's Goldfinch	*Carduelis lawrencei*		u		
oAmerican Goldfinch	*Carduelis tristis*		x		
OLD WORLD SPARROWS					
House Sparrow	*Passer domesticus*	o		o	o

SEASONS

S (Spring) March-May
S (Summer) June-August
F (Fall) September-November
W (Winter) December-February

STATUS

c - common
u - uncommon
o - occasional
r - rare
x - accidental
* - confirmed refuge nester

APPENDIX E

KOFA NATIONAL WILDLIFE REFUGE AND NEW WATER MOUNTAINS WILDERNESS

PLANTS

POLYPODIOPHYTA (Ferns)

Polypodiaceae (Fern Family)

Notholaena californica D.C. Eaton California Cloak Fern
Notholaena parryi D.C. Eaton [=Cheilanthes parryi (D.C. Eaton) Domin], Parry's Cloak Fern

PINOPHYTA (Gymnosperms)

Ephedraceae (Joint-fir Family)

Ephedra fasciculata A.Nels. Mormon Tea
Ephedra nevadensis Wats. Nevada Joint-fir

MAGNOLIOPHYTA (Flowering Plants)

LILIOPSIDA (Monocots)

Typhaceae (Cat-tail Family)

Typha angustifolia L. Narrow-leaved Cattail

NAJADACEAE (Naiad Family)

Najas marina L. Holly-leaved Water Nymph

Poaceae (Grass Family)

Aristida adscensionis L. Six-weeks Three-awn
Aristida arizonica Vasey. Arizona Three-awn
Aristida purpurea Nut. var. glauca (Nees.) A. Holmgr. & N. Holmgr. Reverchon Three-awn
Aristida parishii Hitchc. Parish Three-awn
Aristida ternipes Cav. var. ternipes Spider Grass
Aristida ternipes Cav. var. minor (Vasey) Hitchc.
Avena fatua L. Wild Oat
Bothriochloa barbinodis (Lag.) Herter Cane Beardgrass
Bouteloua aristidoides (H.B.K.) Grisb. Six-weeks Needle Grass
Bouteloua barbata Lag. Six-weeks Grama
Bouteloua curtipendula (Michx.) Torr. Side-oats Grama
Bouteloua curtipendula (Michx.) Torr. var. caespitosa Gould & Kapadia
Bouteloua trifida Thurb. Red Grama
Bromus arizonicus (Shear) Stebbins Arizona Brome
Bromus rubens L. Red Brome, Foxtail Chess
Cenchrus insertus M.A. Curtis, Field Sandbur
Chloris virgata Swartz. Feather Fingergrass
Cynodon dactylon (L) Pers. Bermuda Grass, Pata de Gallo
Digitaria californica (Benth.) Chase Cotton-top
Diplachne dubia (H.B.K.) Nees. Green Sprangletop
Diplachne fascicularis (Lam.) Gray Beaded Sprangletop

Diplachne viscida Scribn. [=Leptochloa viscida [Scribn.) Beal] Sticky Sprangle Top
Echinochloa colonum (L.) Link. Jungle Rice
Enneapogon desvauxii Beauv. Spike Pappusgrass

Eragrostis cilianensis (All.) Mosher. Stink Grass
Eragrostis pectinacea (Michx.) Nees. [incl. E. diffusa Buckl.] Spreading Lovegrass
Eriochloa aristata Vasey
Eriochloa lemmoni Vasey & Scribn. var. gracilis (Fourn.) Gould (E. gracilis) Small Southwestern Cupgrass
Erioneuron pulchellum (H.B.K.) Tateoka Fluff Grass
Heteropogon contortus (L) Beauv. Tangle-head
Hilaria rigida (Thurb.) Benth. Big Galleta
Leptochloa filiformis (Lam.) Beauv. Red Sprangletop
Mulenbergia microsperma (DC.) Kunth Littleseed Muhly
Mulenbergia porteri Scribn. Bush Muhly
Panicum arizonicum Scribn. & Merr. Arizona Panicum
Panicum capillare L. var. occidentale Rybd. Witchgrass
Panicum obtusum HBK. Vine Mesquite
Pennisetum setaceum (Forsk.) Chiov. Fountain Grass
Phalaris caroliniana Walt. Carolina Canary Grass
Phalaris minor Retz. Littleseed Canary Grass
Poa biglelovii Vasey & Scribn. Bigelow's Bluegrass
Schismus arabicus Nees. Arabian Grass
Schismus barbatus (L.) Thell. Mediterranean Grass
Setaria macrostachya H.B.K. Plains Bristlegrass
Sorghum halepense (L.) Pers. Johnson Grass
Sporobolus airoides Torr. Alkali Sacaton
Sporobolus contractus Hitchc. Spike Dropseed
Stipa speciosa Trin. & Rupr. Desert Needlegrass
Tridens eragrostoides (Vasey & Scribn.) Nash
Tridens muticus (Torr.) Nash Slim Tridens
Vulpia octoflora (Walt.) Rydb. var. octoflora Six-weeks Fescue
Vulpia octoflora (Walt.) Rydb. var. hirtella (Piper) Henr. Six-weeks Fescue

Cyperaceae (Sedge Family)

Cyperus aristatus Rottb.
Cyperus esculentus L. var. esculentus Chufa
Cyperus rotundus L. Purple Nut Grass, Purple Nut Sedge

Arecaceae(Palm Family)

Washingtonia filifera Wendl. California Fan Palm, Desert Palm

Liliaceae (Lily Family)

Allium parishii Wats. Onion
Calochortus kennedyi Porter Desert Mariposa
Dichelostemma pulchellum (Salisb.) Heller Bluedick, Coveria
Hesperocallis undulata Gray Ajo, Desert Lily

Agavaceae (Agave Family)

Agave deserti Englem. Desert Agave
Agave deserti Englem. ssp. simplex Gentry Desert Agave
Nolina bigelovii (Torr.) Wats Bigelow Nolina

MAGNOLIOPSIDA (Dicots)
Salicaceae (Willow Family)

Salix gooddingii Ball var. gooddingii Goodding Willow

Fagaceae (Oak Family)

Quercus turbinella Greene Scrub Live Oak, Turbinella Oak
Quercus turbinella ssp. ajoensis (C.H. Muell) Felger & Lowe

Urticaceae (Nettle Family)

Parietaria hespera Hinton Pellitory

Viscaceae (Mistletoe Family)

Phoradendron californicum Nutt. Desert Mistletoe

Aristolochiaceae (Birthwort Family)

Aristolochia watsoni Woot. & Standl. Indian Root

Polygonaceae (Buckwheat Family)

Chorizanthe rigida (Torr.) Torre & Gray Rigid Spiny Herb
Chorizanthe brevicornu Torr. Brittle Spine Flower
Eriogonum deflexum Torr. var. deflexum Skeleton Weed
Eriogonum fasciculatum Benth. var. polifolium (Benth.) Torr. & Gray Flat-top, Buckwheat-bush
Eriogonum inflatum Torre & Frem. Desert Trumpet
Eriogonum insigne Wats. [=E. deflexum Torr. ssp. insigne (Wats.) Stokes]
Eriogonum maculatum Heller. Angle-stemmed Buckwheat
Eriogonum wrightii var. pringlei Coult & Fish Pringle Buckwheat
Eriogonum wrightii Torr. var. wrightii Wright Buckwheat
Eriogonum thomasii Torr. Thomas Eriogonum
Eriogonum trichopes Torr. Little Trumpet
Polygonum argyrocoleon Steud. Silversheath Knotweed
Rumex crispus L. Curly Dock

Chenopodiaceae (Goosefoot Family)

Atriplex canescens (Pursh) Nutt. Wingscale, Cenizo, Chamiso
Atriplex elegans (Moq.) D. Dietr. ssp. elegans Wheelscale Saltbush
Atriplex hymenelytra (Torr.) Wats. Desert Holly
Atriplex polycarpa (Torr.) Wats. All Scale, Cattle Spinach
Chenopodium murale L. Nettleleaf Goosefoot
Salsola iberica Sennen & Pau Russian Thistle

Amaranthaceae (Amaranth Family)

Amaranthus fimbriatus (Torr.) Benth. var. fimbriatus Fringed Amaranth, Pig Weed
Amaranthus graecizans L. Prostrate Pigweed, Cochino, Quelite Manchado
Amaranthus hybridus L. Spleen Amaranth, Quelite Morado
Amaranthus palmeri Wats., Palmer's Amaranth, Careless-weed, Bledo, Quelite
Tidestromia lanuginosa (Nutt.) Standl. Woolly Tidestromia
Tidestromia oblongifolia (Wats.) Lindl. Honey-sweet

Nyctaginaceae (Four O'Clock Family)

Acleisanthes longiflora Gray Yerba-de-la-Rabia, Angel Trumpet
Allionia incarnata L. Trailing Four-O'Clock, Windmills

Boerhaavia coccinea Mill. Red Spiderling
Boerhaavia coulteri (Hook.f.) Wats. Coulter Spiderling
Boerhaavia erecta L. var. intermedia (Jones) K. & P. Five-winged Ringstem

Boerhaavia intermedia Jones Five-winged Ringstem
Boerhaavia triquetra Wats. Spiderling
Boerhaavia wrightii Gray Large-bracted Boerhaavia
Commicarpus scandens L.
Mirabilis bigelovii Gray var. bigelovii Wishbone Bush
Mirabilis multiflora (Torr.) Gray Colorado Four-O'Clock

Aizoaceae (Carpet Weed Family)

Trianthema portulacastrum L. Verdolaga Blanca, Horse Purslane

Caryophyllaceae (Pink Family)

Silene antirrhina L. Sleepy Catchfly

Ranunculaceae (Crowfoot Family)

Anemone tuberosa Rydb. Desert Windflower
Clematis drummondii Torr. & Gray Texas Virgin Bower
Delphinium parishii Gray
Delphinium scaposum Greene Barestem Larkspur

Berberidaceae (Barberry Family)

Berberis haematocarpa Woot. Red Barberry
Berberis harrisoniana Kearney & Peebles Kofa Mountain Barberry

Papaveraceae (Poppy Family)

Argemone pleiacantha Greene ssp. pleiacantha [=A. platyceras Link & Otto] Prickly Poppy
Eschscholtzia californica Cham. ssp. mexicana (Greene) C.Clark Mexican Gold Poppy, Amapola del Campo
Eschscholtzia minutiflora Wats. Little Gold Poppy

Brassicaceae (Mustard Family)

Arabis perennans Wat. Rock Cress
Brassica tournefortii Gouan. Mustard
Capsella bursa-pastoris (L.) Medic. Shepherds Purse, Paniquesillo
Caulanthus lasiophyllus (Hook & Arn.) Payson [=Thelypodium lasiophyllum (H.& A.) Greene]
Descurainia pinnata (Walt.) Britt. spp. ochroleuca (Woot.) Detling.
Descurainia pinnata (Walt.) Britton Yellow Tansy Mustard
Draba cuneifolia Nutt. ex Torr. & Gray var. integrifolia Whitlow Grass
Lepidium lasiocarpum Nutt. var. lasiocarpum C.L. Hitchc. Sand Peppergrass
Lepidium lasiocarpum Nutt. var. wrightii (Gray) C.L. Hitchc. Peppergrass, Pepperwort
Lesquerella gordoni (Gray) Watts Gordon Bladderpod
Sisymbrium altissimum L. Tumble Mustard
Sisymbrium irio L. London Rocket
Stanleya elata Jones Desert Plume

Stanleya pinnata (Pursh) Britt. Desert Plume
Streptanthella longirostris (Wats.) Rybd. Long-beaked Twist Flower
Thysanocarpus curvipes Hook. var. elegans (F&M) Robins Fringe Pod

Cleomaceae (Capper Family)

Wislizenia refracta Engelm. Jackass Clover

Resedaceae (Mignonette Family)

Oligomeris linifolia (Vahl) Macbr. Linear-leaved Cambess

Crossosomataceae (Crossosoma Family)

Crossosoma bigelovii Wats. Bigelow Ragged Rock Flower, Rhyolite Bush

Rosaceae (Rose Family)

Prunus fasciculata (Torr.) Gray Desert Range Almond

Fabaceae (Pea Family)

Mimosoideae (Mimosa Subfamily)

Acacia constricta Benth. Mescat Acacia, White Thorn
Acacia greggii Gray var. arizonica Isely [A. greggii Gray] Catclaw acacia, Devil's-claw
Calliandra eriophylla Benth. False Mesquite, Fairy Duster
Prosopis glandulosa Torrey var. torreyana (Benson) M.C. Johnst. Western Honey Mesquite
Prosopis velutina Woot. [P.juliflora (Swartz) DC. var. velutina (Woot) Sarg.] Velvet Mesquite

Caesalpinioideae (Senna Subfamily)

Cercidium floridum Benth. Blue Palo-verde
Cercidium microphyllum (Torr.) Rose & Johnst. Foothill Palo-verde, Little-leaf Palo-verde, Yellow Palo-verde
Senna covesii (Gray) Irwin & Barneby [=Cassia covesii Gray] Coues' Cassia, Desert Senna
Hoffmanseggia glauca (Ort.) Eifort [= H. densiflora Benth.] Hog Potato, Camote-de-Raton
Parkinsonia aculeata L. Jerusalem Thorn, Retama, Mexican Palo-verde

Papilionoideae (Bean Subfamily)

Astragalus coccineus Brandg. Scarlet Locoweed
Astragalus nuttallianus DC. var. imperfectus (Rybd.) Barneby Nuttall Locoweed
Coursetia microphylla Gray
Dalea mollis Benth. Silk Dalea
Dalea mollissima (Rydb.) Munz [=D. neomexicana (Gray) Cory ssp. mollissima (Rydb.) Wiggins]
Dalea neomexicana (Gray) Cory
Lotus rigidus (Benth) Greene Desert Rock Pea
Lotus salsuginosus Greene var. brevivexillus Ottley Deer Vetch
Lotus strigosus (Nutt.) Greene var. tomentellus (Greene) Hairy Lotus
Lupinus arizonicus Wats. ssp. arizonicus var. arizonicus Arizona Lupine

Lupinus sparsiflorus Benth. Lupine
Lupinus sparsiflorus Benth. ssp. mohavensis Dziekanowski & Dunn Lupine
Marina parryi (T.& G.) Barn. Parry Dalea
Melilotus indicus (L.) All. Alfalfilla, Annual Yellow Sweet Clover
Olneya tesota A.Gray Desert Ironwood, Palofierro, Palo-de-Hierro
Phaseolus acutifolius Gray Bean
Phaseolus filiformis Benth. Bean

Phaseolus wrightii Gray Bean
Psorothamnus spinosus (Gray) Barneby [=Dalea spinosa Gray] Smoke-tree, Smoke-thorn

Krameriaceae (Ratany Family)

Krameria grayi Rose Y. Painter White Ratany
Krameria parvifolia Benth. var. impartata Macbr. Range Ratany, Little-leaved Ratany

Geraniaceae (Geranium Family)

Erodium cicutarium (L.) L' Her. Heron Bill, Filaree, Alfilaria, Afilerillo
Erodium texanum Gray Large-flowered Stork's Bill

Oxalidaceae (Wood Sorrel Family)

Oxalis albicans H.B.K. Wood Sorrel
Oxalis stricta L. Yellow Wood Sorrel, Chanchaquilla

Linaceae (Flax Family)

Linum lewisii Pursh. Blue Flax

Zygophyllaceae (Caltrop Family)

Fagonia laevis Standl. Fagonia
Kallstroemia californica (Wats.) Vail. California Caltrop
Kallstroemia grandiflora Torr. Arizona Poppy, Orange Caltrop, Summer poppy
Larrea divaricata Cav. ssp. tridentata Felger & Lowe Creosote Bush, Greasewood, Hediondilla, Gobernadora

Rutaceae (Rue Family)

Thamnosma montana Torr. & Frem. Turpentine Broom

Simaroubaceae (Simarouba Family)

Castela emoryi (A.Gray) Moran & Felger [=Holacantha emoryi Gray] Crucifixion Thorn, Corona-de-Cristo, Rosario

Malpighiaceae (Malpighia Family)

Janusia gracilis Gray Janusia, Propeller bush

Polygalaceae (Milk Wort Family)

Polygala macradenia Gray Milk wort

Euphorbiaceae (Spurge Family)

Argythamnia clariana Jepson

Argythamnia lanceolata (Benth.) Muel. Arg. Lance-leaved Ditaxis
Bernardia incana Morton [=B. myricaefolia (Scheele) Wats.] Bernardia
Euphorbia arizonica Engelm.
Euphorbia eriantha Benth. Desert Poinsettia
Euphorbia heterophylla L. var. heterophylla Painted Spurge, Catalina
Euphorbia polycarpa Benth. var. hirtella Boiss
Euphorbia polycarpa Benth. var. polycarpa Small-seeded Sand Mat
Euphorbia setiloba Engelm. Bristle-lobed Sand Mat

Tetracoccus fasciculatus (Wats.) Croizat var. hallii (T.S. Brand.) Dressler Purple Bush
Tragia nepetaefolia Cav. Tragia

Simmondsiaceae (Simmondsia Family)

Simmondsia chinensis (Link) Schneid Coffee Berry, Goat Nut, Deer-nut, Jojoba

Anacardiaceae (Cashew Family, Sumac Family)

Rhus trilobata Nutt. var anisophylla (Greene) Jeps. Squaw Bush

Celastraceae (Bitter-sweet Family)

Canotia holacantha Torr.

Rhamnaceae (Buck Thorn Family)

Ceanothus greggii Gray Buck Brush, Deer Brier
Colubrina californica Johnst. California Snake Bush
Condalia globosa Johnst. var. pubescens Johnst. Bitter Condalia Desert Mahogany
Ziziphus obtusifolia (Hook. ex T.& G.) A. Gray var. canescens (A. Gray) M.C. Johnst. Gray-leaved Abrojo, Gray Thorn

Malvaceae (Mallow Family)

Abutilon californicum Benth.
Abutilon incanum (Link.) Sweet ssp. incanum Indian Mallow, Pelotazo
Abutilon incanum (Link) Sweet ssp. pringlei (Hochr.) Felger & Lowe
Abutilon parvulum Gray
Herissantia crispa (L.) Brizicky [=Bogenhardia crispa (L.) Kearney, Gayoides crispum (L.) Small, Abutilon crispum Sweet]
Hibiscus coulteri Harv. Desert Rose Mallow
Hibiscus denudatus Benth. var. denudatus Rock Hibiscus
Horsfordia alata (Wats.) Gray Pink Felt Plant
Horsfordia newberryi (Wats.) Gray Yellow Felt Plant
Malva parviflora L. Little Mallow
Sphaeralcea ambigua Gray var. ambigua Desert Mallow, Apricot Mallow
Sphaeralcea ambigua (Gray) var. rosacea (Munz & Johnst.) Kearney Rose Mallow
Sphaeralcea coulteri (Wats.) Gray Coulter Globe Mallow
Sphaeralcea emoryi Torr. var. emoryi Emory Globe Mallow
Sphaeralcea emoryi Torr. var. californica (Parish) Shinners

Sterculiaceae (Cacao Family)

Ayenia compacta L. [=A. pusilla L.]

Tamaricaceae (Tamarix Family)

Tamarix chinensis Loueiro [T. pentandra sensu K. & P.] Salt Cedar

Koeberliniaceae (Junco Family)

Koeberlinia spinosa Zucc. var. spinosa All Thorn
Koeberlinia spinosa Zucc. var. tenuispina K. & P. Crown-of-thorns, Crucifixion-thorn, Corona-de-cristo

Loasaceae (Stick Leaf Family)

Eucnide urens Parry Sting Bush
Mentzelia albicaulis Dougl. Small-flowered Blazing Star
Mentzelia involucrata Wats. Sand Blazing Star
Mentzelia nitens Greene var. jonesii (Urban & Gilg) J. Darl.
Mentzelia nitens Greene var. nitens Venus Blazing Star
Petalonyx linearis Greene Long-leaved Sandpaper Plant

Cactaceae (Cactus Family)

Carnegiea gigantea (Engelm.) Britt. & Rose Saguaro
Echinocereus engelmanii (Parry) Lemaire Engelmann Hedgehog Cactus
Echinocereus engelmanni (Parry) Lemaire var. acicularis L. Benson Engelmann Hedgehog Cactus, Strawberry Cactus
Ferocactus acanthodes (Lemaire) B.& R. var. acanthodes
Ferocactus acanthodes (Lemaire) Britt & Rose var. lecontei (Engelm.) Lindsay Compass Barrel, Bisnaga
Mammillaria grahamii Engel. var. grahamii
Mammillaria microcarpa Engelm. Fishhook Cactus, Pincushion Cactus
Mammillaria tetrancistra Engelm. Corky-seed Pincushion Cactus
Neolloydia johnsonii (Parry) L. Bensen Johnsons Pineapple Cactus
Opuntia acanthocarpa Engelm. & Bigel Buckhorn Cholla
Opuntia acanthocarpa Engelm. & Bigel var. coloradensis L. Benson Buckhorn Cholla
Opuntia basilaris Engelm. & Bigel. var. basilaris Beavertail Cactus
Opuntia bigelovii Engelm. Teddy Bear Cactus, Bigelow Cholla, Jumping Cholla
Opuntia chlorotica Engelm & Bigel Pancake Pear, Clock-face Prickly Pear, Silver-dollar Cactus
Opuntia echinocarpa Engelm. & Bigel var. echinocarpa Silver Cholla, Golden Cholla
Opuntia leptocaulis DC. Desert Christmas Cactus
Opuntia phaeacantha Engelm. var. discata (Griffiths) Benson & Walkington [=O.engelmannii Salm-Dyck non sensu Benson] Englemann Prickly Pear
Opuntia ramosissima Engelm. Diamond Cholla
Opuntia stanlyi Engelm. var. kunzei (Rose) Benson Kunze Cholla, Devil Cholla
Opuntia stanlyi L. Benson var. peeblesiana Benson Devil Cholla
Opuntia wigginsii L. Benson
Peniocereus greggii (Engelm.) Britt. & Rose var. transmontanus Desert Night-blooming Cereus

Onagraceae (Evening Primrose Family)

Camissonia boothii (Dougl.) Raven Booth Primrose
Camissonia boothii (Dougl.) Raven ssp. condensata (Munz) Raven
Camissonia boothii (Dougl.) Raven ssp. decorticans (H.& A.) Raven Woody Bottle-washer
Camissonia brevipes (Gray) Raven. Yellow Cups
Camissonia cardiophylla (Torr.) Raven Heart-leaved Primrose
Camissonia chamaenerioides (Gray) Raven Long-capsuled Primrose
Camissonia clavaeformis (Torr. & Frem.) Raven
Camissonia refracta (S. Wats.) Raven Narrow-leaved Primrose
Oenothera primiveris Gray Large Yellow Desert Primrose

Apiaceae (Parsley Family)

Bowlesia incana Ruiz & Pavon Hairy Bowlesia
Daucus pusillus Michx. Rattlesnake Weed, American Carrot

Garryaceae (Silk Tassel Family)

Garrya flavescens Wats. Quinine Bush, Silk Tassel

Fouquieriaceae (Ocotillo Family)

Fouquieria splendens Engelm. ssp. splendens Ocotillo, Coach Whip

Oleaceae (Olive Family)

Forestiera sp. (verisim. pubescens Nutt.) Desert Olive, Tanglebush
Forestiera shrevei Standl.
Menodora scabra Gray
Menodora scabra Gray var. ramosissima Steyerm.
Menodora scoparia Engelm. Broom Twinberry

Gentianaceae (Gentian Family)

Centaurium calycosum (Buckl.) Fern. Canchalagua, Buckley's Centaury

Asclepiadaceae (Milkweed Family)

Asclepias albicans Wats. White-stemmed Milkweed
Asclepias nyctaginifolia Gray Four O'Clock Milkweed
Asclepias subulata Decne. Desert Milkweed, Ajamete
Matelea parvifolia (Torr.) Woodson Angle-pod
Sarcostemma cynanchoides Decne. ssp. hartwegii (Vail) Shinners [=Funastrum cynanchoides (Decne.) Schlechter and F. heterophyllum (Engelm.) Standl.] Climbing Milkweed

Convolvulaceae (Morning Glory Family)

Cuscuta sp. Dodder
Ipomoea coccinea L. Star Glory, Scarlet Creeper, Scarlet Morning Glory

Polemoniaceae (Phlox Family)

Eriastrum diffusum (Gray) Mason ssp. diffusum
Eriastrum eremicum (Jepson) Mason Desert Phlox
Gilia flavocincta A. Nels Gilia
Gilia scopulorum Jones Rock Gilia
Gilia sinuata Dougl. Gilia

Gilia stellata Heller NCN
Langloisia setosissima (Torr. & Gray) Greene Bristly Longloisia
Linanthus bigelovii (Gray) Greene
Linanthus demissus (Gray) Greene

Hydrophyllaceae (Water Leaf Family)

Eucrypta chrysanthemifolia (Benth.) Greene var. bipinnatifida (Torr.) Constance Torrey Eucrypta
Eucrypta micrantha (Torr.) Heller Small-flowered Eucrypta
Nama demissum Gray var. demissum Brand.
Nama demissum Gray var. deserti Brand. Purple Mat
Nama hispidum Gray var. hispidum
Nama hispidum Gray var. spathulatum (Torr.) C.L. Hitch Hispid Nama

Phacelia ambigua Jones var. ambigua Notch-leaved Phacelia, Scorpionweed
Phacelia ambigua Jones var. minutiflora (Voss) Atwood Notch-leaved Phacelia
Phacelia crenulata Torr. var. crenulata Scorpionweed
Phacelia cryptantha Greene. Small-flowered Phacelia
Phacelia distans Benth var. australis Brand. Wild Heliotrphe
Phacelia neglecta Jones
Phacelia pedicellata Gray
Phacelia rotundifolia Torr. Round-leaved Phacelia
Pholistoma auritum (Lindl.) Lilja var. arizonicum (Jones) Constance

Boraginaceae (Borage Family)

Amsinckia intermedia Fisch. & Meger Coast Fiddleneck
Amsinckia tessellata Gray Checker Fiddleneck
Cryptantha angustifolia (Torr.) Greene Nievitas, Narrow-leaved Cryptantha
Cryptantha barbigera (Gray) Greene var. barbigera Bearded Cryptantha
Cryptantha holoptera (Gray) Macbr. Rough-stemmed Cryptantha
Cryptantha maritima Greene var. maritima White-haired Forget-me-not
Cryptantha maritima Greene var. pilosa White-haired Cryptantha
Cryptantha pterocarya (Torr.) Greene Wing Nut Cryptantha
Cryptantha pterocarya (Torr.) Greene var. cycloptera (Greene) Macbr. Wing Nut Cryptantha
Cryptantha racemosa (Wats.) Greene Woody Cryptantha
Lappula redowskii (Hornem.) Greene var. desertorum (Greene) Stickseed
Pectocarya heterocarpa Johnst. Hairy-leaved Comb Bur
Pectocarya platycarpa Munz & Johnst. Broad-nutted Comb Bur
Pectocarya recurvata Johnst. Arch-nutted Comb Bur
Plagiobothrys jonesii Gray Jones Popcorn Flower
Tiquilia canescens (DC.) A. Richardson Shrubby Coldenia

Verbenaceae (Vervain Family)

Aloysia gratissima (Gill & Hook.) Troncoso var. schulzae (Standl.) Moldenke
Aloysia wrightii (Gray) Heller Oreganillo, Wright Lippa
Glandularia gooddingii (Brig.) Solbrig Goodding Verbena
Verbena bracteata Lag. & Rodr. Prostrate Vervain

Lamiaceae (Mint Family)

Hedeoma nanum (Torr.) Brig ssp. californicum Stewart [=H. thymoides Gray] Mock-Pennyroyal
Hyptis emoryi Torr. Desert Lavender
Monardella arizonica Epling.
Salazaria mexicana Torr. Paper-bag Bush, Bladder-sage
Salvia columbariae Benth. Chia
Teucrium gladulosum Kellogg Germander

Solanaceae (Nightshade Family, Potato Family)

Chamaesaracha sordida (Dunal) Gray
Datura meteloides DC Sacred Datura, Tolguacha, Western Jimson
Lycium andersonii Gray var. andersonii Anderson Thornbush
Lycium andersonii Gray var. deserticola C.L. Hitchc ex Munz Narrow-leaved Thornbush, Squawberry
Lycium berlandieri Dunal. Berlander Thornbush
Lycium exsertum Gray

Lycium fremontii Gray. Fremont Thornbush
Lycium torreyi Gray Squaw Thorn
Nicotiana trigonophylla Dunal var. palmeri (Gray) Jones Desert Tobacco, Tabaquillo
Nicotiana trigonophylla Dunal var. trigonophylla Desert Tobacco
Physalis crassifolia Benth. [incl. var. cardiophylla (Torr.) Gray] Thick-leaved Ground Cherry
Physalis lobata Torr. Purple Ground Cherry
Solanum douglasii Dunal. Nightshade

Scrophulariaceae (Figwort Family)

Antirrhinum filipes Gray Twining Snapdragon
Keckiella antirrhinoides (Benth.) Straw ssp. microphylla (Gray) Straw [=Penstemon microphyllus Gray) Bush Penstemon
Maurandya antirrhiniflora H. & B. Blue Snapdragon Vine
Mimulus guttatus DC Common Monkey Flower, Seep-spring Monkey Flower
Mohavea confertiflora (Benth.) Heller Ghost Flower
Penstemon pseudospectabilis Jones ssp. pseudospectabilis Keck Mohave Beard Tongue
Penstemon parryi Gray
Penstemon subulatus Jones Scarlet Bugler
Veronica peregrina L. ssp. xalapensis (HBK.) Pennell. Neckweed, Necklace Weed

Bignoniaceae (Bignonia Family)

Chilopsis linearis (Cav.) Sweet Var. arcuata Desert Willow, Desert Catalpa, Mimbre

Martyniaceae (Unicorn Plant Family)

Proboscidea altheaefolia (Benth.) Decne. Desert Unicorn Plant, Elephant Tusks
Proboscidea arenaria (Engelm.) Decne. Unicorn Plant

Orobanchaceae (Broom-rape Family)

Orobanche cooperi (Gray) Heller. [=O. ludoviciana Nutt. var. cooperi] Burro Weed Strangler, Broom Rape, Cancer-root

Acanthaceae (Acanthus Family)

Anisacanthus thurberi (Torr.) Gray Chuparosa, Desert Honeysuckle
Carlowrightia arizonica Gray
Justicia californica Benth. Chuparosa, Honeysuckle

Plantaginaceae (Plantain Family)

Plantago insularis Eastw. Wooly Plantain, Indian Wheat
Plantago purshii R. & S. Pursh Plantain

Rubiaceae (Madder Family)

Galium proliferum Gray Great Basin Bedstraw
Galium stellatum Kell. var. eremicum Hilend & Howell Desert Bedstraw

Cucurbitaceae (Gourd Family)

Brandegea bigelovii (Wats.) Cogn. Brandegea
Cucurbita digitata Gray Finger-leaved Gourd

Campanulaceae (Bellflower Family)

Nemacladus glanduliferus Jeps. var. orientalis McVaugh Thread Plant

Asteraceae (Sunflower Family)

Acourtia thurberi (Gray) Reveal & King
Acourtia wrightii (Gray) Reveal & King Brownfoot
Ambrosia ambrosioides (Cav.) Payne Canyon Ragweed
Ambrosia confertiflora DC Slimleaf Bursage
Ambrosia dumosa (A. Gray ex Torr.) Payne White Bursage
Ambrosia ilicifolia (Gray) Payne Holly-leaved Bursage
Artemisia ludoviciana Nutt. Wormwood
Baccharis sarothroides Gray Broom Baccharis, Desert Broom
Baileya multiradiata Harv. & Gray Wild Marigold, Desert Baileya
Baileya pleniradiata H & G Wooly Marigold
Bebbia juncea (Benth.) Greene Chuckwalla's Delight
Brickellia atractyloides Gray
Brickellia californica (Torr. & Gray) Gray Pachaba
Brickellia coulteri Gray
Brickellia desertorum Coville. Desert Brickellia
Brickellia frutescens Gray var. frutescens Shrubby Brickellia
Calycoseris wrightii Gray White Tack Stem
Centaurea melitensis L. Malta Star Thistle, Tocalote
Chaenactis carphoclinia Gray Pebble Pincushion
Chaenactis carphoclinia Gray var. attenuata (Gray) Jones Pebble Pincushion
Chaenactis stevioides Hook. & Arn. var. brachypappa (Gray) Hall Esteve Pincushion
Chaenactis stevioides H & A var. stevioides Esteve Pincushion
Cirsium neomexicanum Gray

Conyza coulteri Gray
Dyssodia pentachaeta (DC.) Robins var. belenidium (DC.) Strother Thurber Dyssodia
Dyssodia porophylloides Gray San Felipe Dyssodia, Fetid Dogweed
Encelia farinosa Gray ex Torr. var. farinosa Brittle Bush, Incienso
Encelia frutescens Gray var. frutescens Rayless Encelia
Ericameria cuneatus (Gray) McClatchie, var. spathulata (Gray) Hall Desert Rock Goldenbush
Ericameria laricifolia (Gray) Shinners Turpentine Brush
Erigeron divergens Torr. & Gray Fleabane, Wild Fleabane
Erigeron lobatus A. Nels. Fleabane
Eriophyllum lanosum Gray Woolly Eriophyllum, Woolly Daisy
Geraea canescens Torr. & Gray Desert Sunflower, Hairy-headed Sunflower
Gnaphalium chilense Spreng. Small-flowered Cudweed, Cotton Batting
Gnaphalium palustre Nutt., Lowland Cudweed
Gutierrezia sarothrae (Pursh.) Britt. & Rusby Broom Snakeweed
Hymenoclea monogyra T. & G.
Hymenoclea salsola T. & G. var. salsola
Hymenoclea salsola Torr. & Gray var. pentalepsis (Rydb.) Benson Burro Brush, Cheesebush
Lactuca serriola L. Prickly Lettuce, Wild Lettuce
Machaeranthera pinnatifida (Hook) Shinners ssp. pinnatifida var.pinnatifida [=Haplopappus spinulosis (Pursh) DC ssp. spinulosus] Spiny Goldenbush
Machaeranthera pinnatifida (Hook) Shinners ssp. gooddingii (A.Nels) Turner & Hartman, var. gooddingii [=H. spinulosus ssp. gooddingii]
Malacothrix californica DC. var. glabrata Eaton Desert Dandelion
Malacothrix fendleri Gray Malacothrix
Malacothrix stebbinsii Davis & Raven
Microseris lindleyi (DC) A.Gray [=M. linearifolia (DC) Gray] Silver Puffs
Monoptilon bellioides (Gray) Hall Mohave Desert Star
Pectis papposa Harv. & Gray Chinchweed
Perityle emoryi Torr. Emory Rock Daisy
Peucephyllum schottii Gray Pigmy Cedar, Desert Fir
Pleurocoronis pluriseta (Gray) King & Robinson Arrow Leaf
Porophyllum gracile Benth. Odora
Psathyrotes ramosissima (Torr.) Gras Velvet Rosette
Psilostrophe cooperi (Gray) Greene Paper Flower
Rafinesquia californica Nutt. California Chicory
Rafinesquia neomexicana Gray Desert Chicory, Desert Dandelion
Senecio mohavensis Gray Mohave Groundsel
Senecio vulgaris L. Common Groundsel
Sonchus oleraceus L. Annual Sow Thistle
Stephanomeria exigua Nutt var. exigua [=Lygodesmia exigua Gray] Annual Mitra
Stephanomeria pauciflora (Torr.) A. Nels. Desert Straw
Stylocline micropoides Gray Desert Nest Straw
Tessaria sericea (Nutt) Shinners [=Pluchea sericea (Nutt)] Arroweed
Trichoptilium incisum Gray Yellow Head
Trixis californica Kellogg Trixis

Viguiera deltoidea Gray var. parishii (Greene) Vasey & Rose Parish Viguiera
Xanthium strumarium L. (X. saccharatum) Common Cocklebur
Xylorhiza tortifolia (Torr. & Gray) Greene [= Machaeranthera tortifolia (Gray) C & K] Mohave Aster, Desert Aster

APPENDIX F **PLAN PARTICIPANTS***

BUREAU OF LAND MANAGEMENT

Yuma Resource Area

Kent Biddulph	Supervisory Natural Resource Specialist
Dave Daniels*	Surface Protection Specialist
Debbie DeBock*	Realty Specialist
Joy Gilbert	Resource Area Manager
Boma Johnson*	Archaeologist
Teryl McCalment	Staff Assistant
Ron Morfin*	Wilderness Specialist (Team Co-leader, Writer)
Roger Oyler*	Range Conservationist
Dave Smith*	Wildlife Biologist

Yuma District Office

Don Applegate	Resource Advisor
Barbara Bowles	Cartographic Specialist
Dave Curtis	Environmental Planning Coordinator
Lynn Levitt	Fire Management Officer
Brenda Smith	Resource Advisor

Arizona State Office

Jeff Jarvis	National Wilderness Program Leader
Ken Mahoney*	Senior Technical Specialist - Wilderness

FISH AND WILDLIFE SERVICE

Kofa National Wildlife Refuge

Milton Haderlie*	Refuge Manager
Mike Hawkes*	Assistant Refuge Manager
Ron Kearns*	Wildlife Biologist

Regional Office - Albuquerque

Tom Baca*	Natural Resource Planner (Team Co-leader, Writer)
Dom Ciccone	Associate Manager AZ/NM Refuges
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ARIZONA GAME AND FISH DEPARTMENT

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APPENDIX G

PUBLIC INVOLVEMENT

During May 1993, the FWS and BLM decided to coordinate planning efforts to develop one management plan that would cover both Wildernesses. By October 1993, planning issues at the agency staff level in preparation for proposed public meetings were identified. These meetings provided opportunities for other governmental agencies, private organizations, and the general public to express their concerns about the area and to identify additional planning issues. The meetings allowed for the public to become involved at the beginning of the planning process and provided for a better assessment of data and personnel needed to develop a draft plan.

In February 1994, public meetings were held in Quartzsite, Yuma, and Phoenix. Approximately 30 persons attended the Yuma meeting. The Quartzsite meeting was attended by 3 persons from the Arizona Game and Fish Department (AGFD). There were 2 persons from the AGFD, 1 person each from the Sierra Club and the Arizona Desert Bighorn Sheep Society, and 1 additional private individual at the Phoenix meeting. Concerns addressed at the public meetings were included in the issues section of this interagency management plan.

APPENDIX H

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ENVIRONMENTAL ASSESSMENT

I. INTRODUCTION

Background

The Kofa Game Range was established by Presidential Order in 1939 and was expanded and renamed the Kofa National Wildlife Refuge (Kofa) with Public Law 94-223 in 1976. Congress gave wilderness designation to portions of Kofa and the New Water Mountains with the Arizona Desert Wilderness Act of 1990. An interagency management plan was developed by the Bureau of Land Management (BLM) and U.S. Fish and Wildlife Service (Service) in a cooperative effort with the Arizona Game and Fish Department (AGFD) to provide management guidance for Kofa and the adjacent New Water Mountains Wilderness (New Waters). This environmental assessment analyzes the potential impacts of proposed actions and management alternatives that were considered for the plan.

Background information including location, access, and a management situation description is provided on pages 1 through 20 of the plan.

Purpose and Need for the Proposed Action

National BLM and Service wilderness policies stipulate that management plans be developed for designated wildernesses. The proposed action's purpose is to provide for the preservation and enhancement of the planning area's natural features, processes, and public opportunities within the constraints of applicable laws and regulations.

II. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Proposed Action

The proposed action is to adopt and implement the Kofa National Wildlife Refuge & Wilderness and New Water Mountains Wilderness - Interagency Management Plan. In general, the proposed action would provide for long-term protection and enhancement of wilderness values and wildlife habitat in the planning area. Actions to restore disturbances resulting from former vehicle trails and mining activities are addressed. The proposed plan also includes measures to protect cultural resource values and addresses monitoring and maintenance needs for existing wildlife waters .

Opportunities for solitude and primitive unconfined recreation would be maintained under the proposed action. Measures to prevent the introduction and establishment of exotic species are addressed. Strategies to minimize environmental impacts from mining activities are prescribed. Scenic qualities and values of naturalness would be enhanced. Proposed management actions that could have environmental effects are listed below.

1. Rockhounding would be allowed in the New Waters but would be limited to hand methods that do not cause surface disturbances. On Kofa NWR, rockhounding would be restricted to the Crystal Hill area, but eliminated

from the remainder of the refuge. Information regarding not leaving surface disturbances would be incorporated into agency outreach materials by 1998.

2. Adequate signing and distribution of information concerning restrictions to unauthorized vehicular/mechanized transport within wilderness areas would be continued (Information Displays, Map 1). Practices that minimize surface disturbances would be emphasized.

3. Barriers would be installed at the wilderness boundaries where signing alone is not effective in controlling unauthorized vehicle entry. Boulders, berms, plants or other natural materials would be preferred for use as barriers. However, if these prove ineffective, post and cable barriers would be constructed.

4. The establishment of salt cedar (Tamarisk)or other exotic plant species at wildlife waters would be controlled and discovered plants would be removed by physical or authorized chemical means. An environmental assessment would be needed for identified sites.

5. Existing burro fences would be maintained and any nuisance burros that expand their range to include the planning area would be removed.

6. Education and outreach would include: working with the Arizona Game and Fish Department to include visitor use impacts information in the annual hunting regulations by 1998; developing a joint agency brochure/map by 1998; participating in annual Quartzsite pow wow public information booth.

7. Cleaning up debris at 6 abandoned unpatented mining sites within Kofa and 1 site within the New Waters (Map 3) would be accomplished by the year 2001.

8. Two former vehicle routes (3.5 miles) in the refuge and 4 former vehicle routes (4.5 miles - Map 3) in the New Waters would be reclaimed using hand tools and other non mechanized methods to minimize visual impacts and enhance wilderness values and opportunities.

9. The Service would coordinate with the military to remove military debris as warranted.

10. Options to establish 2 field positions by 1998 for the purpose of implementing resource protection, monitoring, and public outreach provisions of this management plan for the entire planning area would be pursued.

11. Reported fires would be monitored by air with minimum altitudes of 1000 feet above ground level, or by foot access. In the New Waters, fires that exceed or are expected to exceed a 5 chain per hour rate of spread would be suppressed. Kofa fires that threaten private property, have other than a low potential for spreading beyond the planning area, or present a significant threat to unique natural resources (i.e., native palms) or, health and safety for the public, would be suppressed. Non-motorized hand tools would be used for suppression activities within wilderness portions of the planning area. The rehabilitation of disturbances caused by fire suppression activities would

be completed in accordance with BLM Manual 8560.35 and Refuge Manual 6 RM 8.8C, before suppression forces are released.

12. Bighorn sheep capture and transplant work in the planning area would be considered annually in joint consultations between the AGFD and Kofa staff.

13. Helicopter use would be allowed as the minimum tool necessary for bighorn sheep capture operations.

14. Routine inspections of all wildlife waters , with the exception of Charlie Died Tank, would be accomplished by non-mechanical means. Maintenance of wildlife waters in wilderness would also be conducted by non-mechanical means with the exception of those listed below:

-At Kofa #1 and Kofa #2, Adam's Well, King Well, and Charlie Died Tank, maintenance, and water supplementation would be allowed by vehicle.
-If needed during drought periods, water would be supplemented at Nugget Tank using motorized equipment or vehicles
-The access method for emergency situations at wildlife waters will be determined by the Field Manager and/or Refuge Manager on a case-by-case basis, and where applicable, in sonsultation with AGFD. Maintenance, modification, and/or repair by motorized/mechanical means may be considered on a case by case basis.

15. The Service, BLM, and AGFD would evaluate options to install buried water systems at Charlie Died Tank and Modesti Tank, and improve the visual characteristics and/or reliability of Kofa #1 and #2 by redeveloping or relocating the wildlife waters.

16. Nugget Tank would be imrpoved, redeveloped, or enhanced to minimize visual impacts and reduce the need for water supplementation by 1998. The use of mechanized equipment would be allowed.

17. The following flight operations would be provided for. A 2 week advance notification of planned flights by AGFD to the appropriate agency is desirable.

- One low level bighorn sheep survey, averaging 8 hours of flight time in the New Waters and 60 hours on the refuge during the period of October 1 through November 30.
- One low-level javelina and mule deer survey, averaging 8 hours of flight time in the New Waters and 15 hours on the refuge during the period from January 1 through March 31.
- In addition, flights for monitoring water levels, supplemental wildlife surveys, or in response to emergency situations would occur if necessary.
- Helicopter landings would be allowed for the retrieval of telemetry equipment from a sick or dead animal. Advance approval by the Service or BLM is necessary for aircraft landings within designated wilderness that are not provided for in this plan. Emergency and safety reasons are the exception.

18. Cooperative efforts to identify needs and collect baseline data would be continued. The Service would complete all phases of the already established aerial videography project by the year 1999.

19. Appropriate agencies would coordinate to establish seasonal closures of sensitive habitat to protect wildlife and plant species when needed. Such areas would include drought period water sources, lambing sites (Map 4), abandoned mine shafts and other sensitive habitats.

20. By 1998, inventory abandoned mine sites, the majority of which are outside the wilderness, and install gates in such a way as to allow for continued use of bats and other wildlife. If appropriate, the mine opening may be closed. For those mine openings that are found to be within wilderness and present a safety hazard to the public, the manager will install the appropriate wildlife amenable gates using the minimum tool. Mechanized/motorized equipment would be allowed for installing gates or closing mine sites.

21. Private lands (Map 3) within the Kofa portion of the planning area would be purchased from willing sellers. There would be a purchase target of at least 1 property per year.

22. The BLM would pursue options to acquire a public easement through or purchase the land parcel described by Mineral Entry Patent 546603, adjacent to the New Waters in the northeast portion of the planning area (Map 3) by 1999.

23. Information and interpretive displays would be established and maintained at access points to the planning area as funding and staff levels permit.

24. As staffing and funding allow, monthly patrols of the planning area would be conducted.

25. "Leave No Trace!" land use ethics would be promoted by making appropriate information available at information displays and administrative sites.

26. Visitor registers would be included at information displays (Map 1) to provide for public assessment and comment about the quality of their recreational and wildlife appreciation opportunities.

27. Existing authorized public access routes (Map 1) would be kept open to promote dispersed visitor use and maintain opportunities for solitude.

28. The Service will continue to work with AGFD to manage the Alternate hunt (mule deer) Program on the Kofa portion of the planning area (State Game Management Unit 45.

29. Technical rock climbing and repelling would be allowed in the planning area with the provision that permanent anchors are not used and that routes are not marked.

30. Horses, mules, llamas, and burros would be allowed as recreational livestock in the planning area under these conditions: The use of feeding containers would be required, water would be packed in for livestock, and surface disturbances at campsites are to be restored. Use of pelletized feed is recommended.

31. Campfires would be allowed in the New Waters using dead, down and detached wood. Information would be provided at wilderness access displays to minimize use of campfires. Visitors to the New Waters would be encouraged to bring their own firewood. The BLM would consider campfire restrictions as a last resort.

32. The gathering of dead, down, and detached wood in nonwilderness portions of Kofa will be allowed. The Service would require that visitors to designated wilderness on Kofa bring their campfire wood or bring charcoal or propane stoves. No native wood would be allowed to be removed from the Refuge.

33. Non-government entities would be encouraged to purchase unpatented claims on the Kofa NWR and allow claims to lapse. At least 2 non-governmental entities would be contacted by end of 199 8.

34. By 1999, the Service would develop Memorandum of Understanding with the BLM to perform mining claim validity examinations within designated wilderness on the Kofa NWR and make provisions for project funding.

35. Implementation of a 25 mile per hour speed limit on county maintained roads would be recommended to Yuma and La Paz County officials.

Alternative A - No Action

Under the no action alternative, management guidance would be provided by the Wilderness Act of 1964, the Wilderness Arizona Desert Wilderness Act of 1990, and national BLM and Service resource management policies. No specific actions would be proposed for rehabilitating existing disturbances, protecting natural and cultural resources, or maintaining existing wildlife waters. However, due to existing laws, agreements, and national wilderness management policies for the maintenance of wildlife waters and wildlife management activities, wildlife management provisions would be the same as the proposed action for this alternative.

Current conditions and values would be potentially maintained under this alternative. Under this alternative, wood gathering and the possession of ironwood would continue to be allowed throughout the Refuge for campfires. Rockhounding as a recreational activity would continue to be allowed throughout the Refuge.

Alternative B - Minimal Human Impacts

Actions that would provide the maximum protection for existing natural resource and cultural values were considered for this alternative. Campfires and rockhounding would not be permitted throughout the planning area. Camp

cooking on the Refuge would be allowed using only charcoal in grills or propane burners and stoves. Technical rock climbing and repelling would not be permitted on portions of the planning area administered by the Service. A permit system for the use of recreational livestock (only horses, burros mules,and llamas would be allowed) would be instituted on all the planning area to monitor and limit potential impacts to natural values and wildlife.

Measures for the rehabilitation of surface disturbances and maintenance of existing developments as described in the proposed action would also apply for this alternative.

III. AFFECTED ENVIRONMENT

A description of the affected environment can be found on pages 1 through 20 of the proposed Kofa National Wildlife Refuge & Wilderness and New Water Mountains Wilderness Interagency Management Plan.

IV. ENVIRONMENTAL CONSEQUENCES

The following critical elements have been analyzed and would not be affected by the proposed action and alternatives: areas of critical environmental concern; cultural resources; prime or unique farmlands; floodplains; Native American religious concerns; threatened or endangered species; solid or hazardous wastes; water quality; wetlands or riparian zones; and wild and scenic rivers.

Impacts of the Proposed Action

Wilderness values and wildlife habitat would be enhanced and preserved for the foreseeable future under provisions of the proposed action.

Limitations on rockhounding as a recreational use on the Refuge would prevent potential cumulative impacts to the landscape (visual), wildlife habitat, and archeological resources. Recreational opportunities for rockhounding on Kofa would be displaced to some extent. . Limiting rockhounding activities on the New Waters to those that do not result in surface disturbances would minimize potential impacts to wilderness values and wildlife habitat while continuing to provide for a wide spectrum of recreational opportunities.

Providing public information at access points concerning wilderness restrictions on the use of motorized or mechanized equipment and promoting practices that minimize surface disturbances should assist in allowing the natural rehabilitation of existing disturbances as would the construction of barriers when needed. Coordinating activities among the agencies involved in developing this plan should strengthen the effectiveness of public education and outreach efforts.
Barriers to prevent motorized vehicle violations and educational displays would be located outside the wilderness. Visual impacts from the barriers and displays would be mitigated by using plants, berms, or low profile materials

with low visual contrasts. Promoting "Leave No Trace" and "Tread Lightly" land use ethics within the planning area would assist in preventing new visitor use impacts to natural values and would protect cultural resources. The barriers and promotion of a low impact land use ethic would provide for the enhancement of wilderness values and wildlife habitat by allowing weathering processes to reclaim minor surface disturbances. Minimal impacts to visual resources from the barriers and displays would be offset by the long-term benefits of enhancing and preserving wilderness values, opportunities for primitive recreation, and compatible wildlife dependent activities. The construction of berms as barriers would not significantly affect erosion potentials due to the gravelly nature of planning area soils. There would also be no significant impacts to air quality.

The potential adverse impacts to air quality would be minimized by enforcing a 25 mi/hr speed limit on all refuge roads. The Service will recommend to the Yuma and La Paz County Boards of Supervisors that a 25 mi/hr speed limit be implemented and enforced on county maintained roads within Kofa. Preventing new or continued surface disturbances from vehicle activity would reduce the potential for increased soil erosion or impacts to air quality from dust. With respect to water quality, potable water is not provided to the public and it is not expected that public activities will degrade water sources for wildlife.

Coordination between the Service and military for the removal of military debris would assure public health and safety while providing for minimum environmental impacts from these activities. There would be short-term impacts to solitude from wilderness patrols and other monitoring activities that would be offset by the long-term benefits of enhancing and maintaining wilderness values and opportunities for primitive recreation.

Monitoring reported fires at minimum altitudes of 1000 feet above ground level and suppressing fires that threaten private property or pose more than a low possibility for spread beyond the planning area boundary would minimize the potential for adverse impacts from fire related activities. In the event that fire suppression activities are required, resulting disturbances would be rehabilitated.

Preventing the introduction and establishment of exotic species by removing discovered tamarisk and other exotic plant species would protect the ecological integrity of the planning area. The use of chemicals for tamarisk control would be in accordance with guidance in BLM Manual 8560.34 and 50 CFR 35.7.

Maintaining burro use at levels existing at the time of wilderness designation would also protect vegetation resources and prevent soil disturbances that would be associated with the establishment of a burro herd. Impacts to wilderness values from the use of helicopters for burro management activities would be temporary.

The rehabilitation of former vehicle routes in wilderness and cleanup of mining debris would restore natural values of the affected areas. Minimizing

visual impacts of existing developments and reducing maintenance needs requiring mechanized or motorized equipment and vehicles would enhance natural values and opportunities for solitude. Due to gravelly soil textures, there would be no increased potential for soil erosion or significant effects on air quality. Precluding the continued use of these former vehicle routes would minimize the potential for increased erosion or possible affects on air quality from dust.

Temporary adverse impacts to wilderness values from proposed rehabilitation efforts would be limited to the vicinity of existing disturbances for the duration of each project and would ultimately result in the long-term enhancement of natural values. Opportunities for unconfined primitive recreation would continue and improve as the rehabilitation of existing surface disturbances occurs.

Allowing the use of motorized or mechanized equipment and vehicles for maintenance, improvement, reconstruction, relocation, or emergency water supplementation at existing wildlife waters would temporarily impact wilderness visitors (loss of solitude) and wildlife (stress) but would provide for maintaining species diversity for the long-term. Over the long-term, temporary adverse impacts from water source maintenance, improvement, reconstruction, or relocation activities would be offset by actions designed to reduce visual impacts from any developments and minimize maintenance needs. There are short-term wildlife impacts (stress) from sheep captures that are justified by the continued successful efforts to preserve sheep populations. The administrative use of helicopters for wildlife surveys, and sheep captures would also result in short-term disturbances to wildlife and wilderness visitors. These short-term impacts would be offset by the long-term benefits of providing information to allow for informed wildlife management decisions and further efforts to preserve bighorn sheep populations. Seasonal closures to protect sensitive wildlife habitat during critical periods would temporarily affect recreational opportunities for the duration of the closures but would ultimately benefit wildlife.

Cooperative efforts to identify needs and collect baseline data would improve our knowledge of natural resource management and assist in the timely identification of resource protection issues. An inventory of abandoned mine sites and the identification and implementation of appropriate actions would result in the protection of wildlife habitat and improve public safety. The use of visitor registers to provide for public assessment of existing recreational opportunities or resource conditions would assist the BLM and Service in making resource management decisions that would be more acceptable for the public.

Keeping existing public access routes open would assist in dispersing visitor use and maintaining opportunities for solitude. Acquiring legal public access to the Hidden Tank area through patented land (or acquisition of the land) in the northeast of the planning area would allow for continued public enjoyment of the area and/or the protection of important sheep lambing grounds. The potential for adverse impacts to natural values, recreational opportunities, and wildlife habitat would be minimized.

Continuing the Alternative Hunt Program (mule deer) on Kofa would improve the quality of recreational opportunities. Allowing technical rock climbing and repelling with the provision that permanent anchors not be used and trail marking not be practiced would preserve natural values. Restricting wood gathering and the possession of ironwood on Kofa to nonwilderness corridors and other nonwilderness areas, and requiring visitors to bring their own campfire wood for wilderness area camping would protect wildlife habitat and natural values. Being that visitor use in the New Waters is substantially lower than Kofa, dead, down, and detached wood use would continue to be permitted in the New Waters unless there was an increase in potential for adverse impacts to wildlife habitat.

The acquisition of mining claims and patented lands in the planning area (on a willing seller basis), would minimize the potential for adverse impacts to wildlife habitat and natural values (and all environmental factors analyzed in this assessment) in addition to providing increased recreational opportunities. The development of a Memorandum of Understanding between the Service and BLM to conduct mining claim validity examinations on Kofa would minimize the potential for adverse impacts from nonviable mining operations.

Impacts of Alternative A - No Action

Current conditions and opportunities would be maintained under Alternative A. With this alternative, existing laws, regulations, and policies would be followed without an integrated management strategy. Impacts from wildlife management activities would be the same as the proposed action. There would be an continued potential for the introduction of exotic species.

There would be no temporary adverse impacts from rehabilitation efforts or barrier construction at wilderness boundaries. In the long-term, there would be a lower quality of naturalness due to the continuing presence of existing human disturbances. Over a course that may take several centuries, weathering processes would eventually restore the natural appearance of surface disturbances. The lack of site displays to promote "Leave No Trace" and "Tread Lightly" would lessen the opportunity for providing visitor information that would assist in enhancing and maintaining existing natural values. Efforts to control unauthorized vehicle use in wilderness would be substantially more difficult.

As rockhounding would continue throughout the refuge in this alternative, there would be a continued potential threat to the archeological resources of the Refuge, which could be purposefully or inadvertently taken in violation of the Archeological Resources Protection Act and Refuge regulations. In addition, less control over illegal vehicle use in the area creates the possibility of undesirable intrusions into various bighorn sheep lambing grounds in the northern portion of the Refuge during critical periods. There would be a continued potential for cumulative adverse impacts to the natural landscape.

In this alternative, continuing to allow the collection of dead and downed native ironwood throughout the refuge would eventually result in the complete depletion of this slowly disappearing resource.

In this alternative, there is no prohibition to the placement of permanent anchors or bolts in support of technical rock climbing and repelling. There would be noted impacts to rock faces if this level of activity would occur.

Impacts of Alternative B - Minimal Human Impacts

While Alternative B would provide the most protection for natural resources and wilderness values from potential adverse impacts, there would be restrictions on the full range of compatible uses in the planning area. Under this alternative campfires and overnight camping would be restricted. Only day-use would be permitted. This could result in decreased visitor use and therefore provide outstanding opportunities for solitude. On the Refuge, wood burning for campfires would be completely eliminated. Camp cooking would be allowed using charcoal grills or propane burners and stoves. These restrictions would eliminate damage caused in the collection of dead and downed wood and would minimize potential visual impacts from campfire rings.

In this alternative, the elimination of technical rock climbing and repelling would prevent the possibility of damage to rock faces and surfaces by the use of temporary and permanent bolts and anchors.

Provisions for the rehabilitation of surface disturbances and maintenance of existing developments as described in the proposed action would also apply for this alternative. Therefore, potential impacts described in these categories for the proposed action would also apply here.

Cumulative Impacts

Cumulative impacts include impacts on the environment which result from incremental impacts 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 the proposed action would eliminate the potential for cumulative impacts to wildlife habitat, naturalness, visual resources, and wilderness values from rockhounding activities on Kofa. Different policies are being proposed by the BLM and Service for rockhounding because of the difference in mandates and the significant difference in magnitude of visitor use occurring in each jurisdiction.

The same case applies for different firewood gathering policies between the agencies. Prohibiting firewood gathering on Kofa wilderness also addresses the substantial potential for cumulative adverse impacts to wildlife habitat from this activity because of the magnitude of visitor use. It should be noted that the casual observer or visitor who returns to Kofa each year would

not likely notice the adverse impacts of firewood gathering because the impacts are cumulative and gradual, occurring over the long-term.

In general, the proposed action provides for the protection, enhancement, and maintenance of wilderness values, wildlife habitat, and visual and cultural resources within the planning area. The potential occurrence of adverse cumulative impacts is also minimized.

V. CONSULTATION AND COORDINATION

Information about consultation, coordination, and public involvement can be found in Appendix and Appendix G of the proposed Kofa National Wildlife Refuge & Wilderness and New Water Mountains Wilderness - Interagency Management Plan.

Environmental Justice

Consideration was given to local minority and low income groups which may be adversely affected by the proposed action or alternative. The interdisciplinary planning team determined that none of the proposed actions or alternatives would adversely affect these groups.

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established: JANUARY 25, 1939**

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: NATURAL RESOURCES COLLECTION - ROCK HOUNDING

Individuals collecting, by hand, mineral specimens from the surface of the ground.

Anticipated Impacts on Refuge Purpose(s):

This activity will result in small quantities of mineral material being removed from the refuge. There will be a minimal amount of soil disturbance in the area where collection takes place.

Determination: This use is compatible X . This use is not compatible_____. (Check One)

The following stipulations are required to ensure compatibility:

1. Rockhounding is limited to the Crystal Hill area (Township 2 North, Range 18 West, East 1/2 of Section 9; and all of Section 10) of the Refuge. Rockhounding is not permitted throughout the remainder of the refuge.
2. No detection equipment or tools will be allowed.
3. Only the taking of surface occurring rocks will be permitted.

Justification:

Prepared by: Milton Haderlie Refuge Manager Milton Haderlie 12/13/96
(Name / Title / Signature / Date)

Reviewed by: Tom Baca, Natural Resource Planner 1/21/97
(Name / Title / Signature / Date)

James A. Young Geographic Mgr/AZ 1/21/97
(Name / Title / Signature / Date)

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE Date Established: JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: OUTDOOR RECREATION - TECHNICAL CLIMBING

Individuals participating in mountain climbing activities that require the use of climbing equipment.

Anticipated Impacts on Refuge Purpose(s):

Wildlife along the route of travel may be temporarily disturbed/displaced.

Determination: This use is compatible X . This use is not compatible_____. (Check One)

The following stipulations are required to ensure compatibility:

. The use of permanent anchors is prohibited.

2. Marking routes of travel is prohibited.

Justification:

Under the current level of use this activity has an insignificant impact on refuge resources.

Prepared by: Milton Haderlie Refuge Manager Milton Haderlie 12/13/96
(Name / Title / Signature / Date)

Reviewed by: TOM BACA, NATURAL RESOURCE Planner 1/21/97
(Name Title / Signature / Date)

James A. Young GM - AZ.
(Name / Title / Signature / Date)

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE Date Established: JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: OUTDOOR RECREATION - HORSEBACK RIDING

Horseback riding associated with big game hunting and wildlands/wildlife observation.

Anticipated Impacts on Refuge Purpose(s):

Soil disturbance will occur in areas where horses are tethered. People participating in this activity will cause a minimal impact to the resources.

Determination: This use is compatible X . This use is not compatible_____. (Check One)

The following stipulations are required to ensure compatibility:

1. The use of feeding containers is required.
. Water is to be packed in for livestock use.
3. Surface disturbance at camp sites will be restored.
4. Use of pelletized feed is recommended.

Justification:

Use of horses as pack animals permits a greater number of people to enjoy the natural resources of the Refuge.

	(Name	Title	Signature	Date)
Prepared by:	Milton Haderlie	Refuge Manager	Milton Haderlie	12/13/96
Reviewed by:	Jon Bass	Natural Resource Planner		1/21/97
	JAMES A. YOUNG	GEOGRAPHIC MGR-AZ.	James A. Young	1/21/97

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: OUTDOOR RECREATION - CAMPING

Individuals remaining on the refuge overnight while participating in a wildlife oriented activity.

Anticipated Impacts on Refuge Purpose(s):

Small quantities of wood will be consumed in cooking fires. There will be minor soil disturbance adjacent to public access roads where people camp. There will be some disturbance/displacement of wildlife associated with the camping activity.

Determination: This use is compatible X . This use is not compatible ____ . (Check One)

The following stipulations are required to ensure compatibility:

Comply with all refuge public use regulations.

Justification:

Because of the remote, isolated nature of the refuge people participating in valid wildlife oriented activities may be required to remain overnight.

Prepared by: Milton Haderlie / Refuge Manger / Milton K Haderlie / 05/24/94
(Name / Title / Signature / Date)

Reviewed by: Richard A Sternbach / RPS / 9/15/94
(Name / Title / Signature / Date)

[illegible] / [illegible] / 9/21/94
(Name / Title / Signature / Date)

RECREATION ACT FUNDING ANALYSIS FORM

Station Name: KOFA NATIONAL WILDLIFE REFUGE

Date Established: January 25, 1939

Purpose(s) for which refuge established:

"...reserved and set apart for the conservation and development of natural wildlife resources."

Recreational Use(s) Evaluated: OUTDOOR RECREATION - CAMPING

Funding required to administer and manage the recreational use(s):

-- Occasional grading of Palm Canyon Road, MST & T Road and Crystal Hill Road as moisture conditions permit, to allow access by standard automobile for all public use activities. $3,000/year.

-- Law enforcement is incidental to administrative activities.

-- Publication of refuge public use leaflet covering all public use activities. $300/year.

-- Administrative support. $500/year for all public use activities.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage recreational use(s).

by: Milton K Hadenlie

date: June 7, 1994

9/21/94

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: OUTDOOR RECREATION - HIKING AND BACKPACKING

People hiking throughout the refuge.

Anticipated Impacts on Refuge Purpose(s):

Wildlife along the route of travel may be temporarily disturbed/displaced. There will be a minimal amount of soil disturbance in popular areas.

Determination: This use is compatible X . This use is not compatible_____. (Check One)

The following stipulations are required to ensure compatibility:

Comply with all refuge public use regulations.

Justification:

Under current levels of use this activity has an insignificant impact on refuge resources. The activity allows the public to observe the natural wildlife resources conserved and developed within the refuge.

	(Name	/ Title	/ Signature	/ Date)
Prepared by:	Milton Haderlie	Refuge Manager	Milton K. Haderlie	05/24/94
Reviewed by:	Richard A. Steinbach		RPS	9/15/94
	[illegible]		[illegible]	9/21/94

RECREATION ACT FUNDING ANALYSIS FORM

Station Name: KOFA NATIONAL WILDLIFE REFUGE

Date Established: January 25, 1939

Purpose(s) for which refuge established:

> "...reserved and set apart for the conservation and development of natural wildlife resources."

Recreational Use(s) Evaluated: OUTDOOR RECREATION - HIKING AND BACKPACKING

Funding required to administer and manage the recreational use(s):

-- Occasional grading of Palm Canyon Road, MST & T Road and Crystal Hill Road as moisture conditions permit, to allow access by standard automobile for all public use activities. $3,000/year.

-- Law enforcement is incidental to administrative activities.

-- Publication of refuge public use leaflet covering all public use activities. $300/year.

-- Administrative support. $500/year for all public use activities.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage recreational use(s).

by: Milton K Haderlie

date: June 7, 1994

9/21/94

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: OUTDOOR RECREATION - HORSEBACK RIDING

Horseback riding associated with big game hunting and wildlands/wildlife observation.

Anticipated Impacts on Refuge Purpose(s):

Soil disturbance (severe where horses are tethered), introduction of exotic plant seeds in feed, damage to trees that horses are tied to.

Determination: This use is compatible_____. This use is not compatible X . (Check One)

The following stipulations are required to ensure compatibility:

This activity is not compatible as currently conducted. This activity will be addressed in the comprehensive plan now being prepared along with NEPA documentation. As a result of that planning process, modifications of the activity may be identified that would make it compatible.

Justification:

	(Name	Title	Signature	Date)
Prepared by:	Milton Haderlie	Refuge Manager	Milton K Haderlie	05/24/94
Reviewed by:	Richard A. Steinlach	RPS		9/15/94
				9/21/94

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: OUTDOOR RECREATION - WILDLIFE PHOTOGRAPHY

People visiting the refuge will take pictures of the animals, plants and scenery.

Anticipated Impacts on Refuge Purpose(s):

This activity will lead to a wider knowledge about the refuge and the resources that are being conserved and developed. Photographers may temporarily disrupt the activity of refuge wildlife.

Determination: This use is compatible X . This use is not compatible_____. (Check One)

The following stipulations are required to ensure compatibility:

1. All public use regulations are to be complied with.
2. Filming for commercial purposes must comply with 50 CFR 27.71.

Justification:

Under the current levels of use this activity has an insignificant impact on refuge resources.

	(Name	/ Title	/ Signature	/ Date)
Prepared by:	Milton Haderlie	Refuge Manager	Milton L. Haderlie	05/24/94
Reviewed by:	Richard A. Steinbach		RPS	9/15/94
				9/21/94

RECREATION ACT FUNDING ANALYSIS FORM

Station Name: KOFA NATIONAL WILDLIFE REFUGE

Date Established: January 25, 1939

Purpose(s) for which refuge established:

"...reserved and set apart for the conservation and development of natural wildlife resources."

Recreational Use(s) Evaluated: OUTDOOR RECREATION - WILDLIFE PHOTOGRAPHY

Funding required to administer and manage the recreational use(s):

-- Occasional grading of Palm Canyon Road, MST & T Road and Crystal Hill Road as moisture conditions permit, to allow access by standard automobile for all public use activities. $3,000/year.

-- Law enforcement is incidental to administrative activities.

-- Publication of refuge public use leaflet covering all public use activities. $300/year.

-- Administrative support. $500/year for all public use activities.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage recreational use(s).

by: Milton K Haderlie

date: June 7, 1994

9/21/94

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: OUTDOOR RECREATION - TECHNICAL CLIMBING

Individuals participating in mountain climbing activities that require the use of climbing equipment.

Anticipated Impacts on Refuge Purpose(s):

This activity is carried out during the time of the year when bighorn ewes are lambing in the general area of the activity. This activity has the potential for significant impact on the bighorn sheep population.

Determination: This use is compatible_____. This use is not compatible __X__. (Check One)

The following stipulations are required to ensure compatibility:

This activity has been permitted in the past. This issue will be addressed in the comprehensive management plan now being prepared along with the NEPA documentation. As a result of that planning process, modifications to the activity may make it compatible.

Justification:

Prepared by: Milton Haderlie, Refuge Manager — Milton K Haderlie — 05/24/94
(Name / Title / Signature / Date)

Reviewed by: Richard A. Steinbach, RPS, — 9/15/94
(Name / Title / Signature / Date)

[illegible] — [illegible] — 9/21/94
(Name / Title / Signature / Date)

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: OUTDOOR RECREATION - WILDLIFE OBSERVATION

Viewing of refuge wildlife by members of the visiting public.

Anticipated Impacts on Refuge Purpose(s):

The participating public will be more aware of wildlife resources being conserved and developed on the refuge. People participating in this activity will cause a minimal impact to the resources.

Determination: This use is compatible X . This use is not compatible____. (Check One)

The following stipulations are required to ensure compatibility:

Comply with all refuge public use regulations.

Justification:

Under the current levels of use this activity has an insignificant impact on refuge resources.

Prepared by: Milton Haderlie / Refuge Manager / Milton K Haderlie / 05/24/94
(Name / Title / Signature / Date)

Reviewed by: Richard A Stenbarts / RPS / 9/15/94
(Name / Title / Signature / Date)

[illegible] / [illegible] / 9/21/94
(Name / Title / Signature / Date)

RECREATION ACT FUNDING ANALYSIS FORM

Station Name: **KOFA NATIONAL WILDLIFE REFUGE**

Date Established: **January 25, 1939**

Purpose(s) for which refuge established:

> **"...reserved and set apart for the conservation and development of natural wildlife resources."**

Recreational Use(s) Evaluated: OUTDOOR RECREATION - WILDLIFE OBSERVATION

Funding required to administer and manage the recreational use(s):

-- Occasional grading of Palm Canyon Road, MST & T Road and Crystal Hill Road as moisture conditions permit, to allow access by standard automobile for all public use activities. $3,000/year.

-- Law enforcement is incidental to administrative activities.

-- Publication of refuge public use leaflet covering all public use activities. $300/year.

-- Administrative support. $500/year for all public use activities.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage recreational use(s).

by: Milton K Haderlie

date: June 7, 1994

9/21/94

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: NATURAL RESOURCES COLLECTION - ROCK HOUNDING

Individuals collecting mineral specimens from the surface of the ground by hand, and with the aid of hand tools in the Crystal Hill area.

Anticipated Impacts on Refuge Purpose(s):

This activity removes mineral specimens from the refuge and may disturb wildlife habitat.

Determination: This use is compatible_____. This use is not compatible X . (Check One)

The following stipulations are required to ensure compatibility:

This activity has been permitted in the past but has reached levels where significant impacts are occurring. This issue will be addressed in the comprehensive plan now being prepared, along with the applicable NEPA document. As a result of that planning process, modifications of the activity may be identified that would make it compatible.

Justification:

	(Name	/ Title	/ Signature	/ Date)
Prepared by:	Milton Haderlie	Refuge Manager	Milton F. Haderlie	05/24/94
Reviewed by:	Richard A. Steinbach		RPS	9/15/94
	[illegible]		[illegible]	9/21/94

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: HUNTING - BIG GAME

Individuals participating in regulated mule deer and desert bighorn sheep hunts.

Anticipated Impacts on Refuge Purpose(s):

Big game hunting is a major part of the refuge conservation program. This activity will result in the removal of individual animals from the hunted populations but will have beneficial effects on the populations as a whole.

Determination: This use is compatible X . This use is not compatible ____ . (Check One)

The following stipulations are required to ensure compatibility:

1. Comply with all refuge public use regulations.
2. Comply with all state and refuge hunting regulations.

Justification:

Regulated hunting of big game animals is a recognized use of a renewable natural wildlife resource. It has had no long term adverse effects on big game populations.

Prepared by: Milton Haderlie Refuge Manager Milton K Haderlie 05/24/94
(Name / Title / Signature / Date)

Reviewed by: Richard A Steinbach RDS 9/15/94
(Name / Title / Signature / Date)

[illegible] 9/21/94
(Name / Title / Signature / Date)

RECREATION ACT FUNDING ANALYSIS FORM

Station Name: **KOFA NATIONAL WILDLIFE REFUGE**

Date Established: **January 25, 1939**

Purpose(s) for which refuge established:

> **"...reserved and set apart for the conservation and development of natural wildlife resources."**

Recreational Use(s) Evaluated: HUNTING - BIG GAME

Funding required to administer and manage the recreational use(s):

-- Publication of Refuge Hunting Leaflet. $600/year for all hunts.

-- Law Enforcement is not a cost because it would be required at a comparable or greater level if the refuge was not open to hunting.

-- Administrative Cost. $200/year for all hunts.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage recreational use(s).

by: Milton K Haderlie

date: June 7, 1994

[illegible] AVD/DNW
9/21/94

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: HUNTING - UPLAND GAME

Individuals participating in regulated hunting of upland game animals (Gambel's quail, cottontail rabbit, fox and coyote).

Anticipated Impacts on Refuge Purpose(s):

Upland game hunting is a major part of the refuge conservation program. This activity will result in the removal of individual upland game animals from the hunted populations, but will not negatively impact the populations as a whole.

Determination: This use is compatible X . This use is not compatible ____. (Check One)

The following stipulations are required to ensure compatibility:

1. Comply with all refuge public use regulations.
2. Comply with all state and refuge hunting regulations.

Justification:

Regulated hunting of upland game animals is a recognized use of a renewable natural wildlife resource. It has no long term adverse effects on the upland game populations.

Prepared by: Milton Haderlie / Refuge Manager / Milton K Haderlie / 05/24/94
(Name / Title / Signature / Date)

Reviewed by: Richard A Steinbach / RPS / 9/15/94
(Name / Title / Signature / Date)

[illegible] / [illegible] / [illegible] / 9/21/94
(Name / Title / Signature / Date)

RECREATION ACT FUNDING ANALYSIS FORM

Station Name: KOFA NATIONAL WILDLIFE REFUGE

Date Established: January 25, 1939

Purpose(s) for which refuge established:

> "...reserved and set apart for the conservation and development of natural wildlife resources."

Recreational Use(s) Evaluated: HUNTING -UPLAND GAME

Funding required to administer and manage the recreational use(s):

-- Publication of refuge hunting leaflet. $600/year for all hunts.

-- Law enforcement is not a cost because it would be required at a comparable or greater level if the refuge was not open to hunting.

-- Administration costs. $200/year for all hunts.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage recreational use(s).

by: Milton K Haderlie

date: June 7, 1994

Joseph P. Wagner DNA/DNA
9/21/94

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: CONCESSIONS - GUIDED SPORT HUNTING

Providing guide services for individuals participating in refuge hunts.

Anticipated Impacts on Refuge Purpose(s):

This activity results in increased hunter success. Individual animals are removed from the hunted populations, but this will not have an adverse, long-term impact on the populations.

Determination: This use is compatible X . This use is not compatible ____ . (Check One)

The following stipulations are required to ensure compatibility:

1. Comply with all refuge public use regulations.
2. Possess a valid state guide license.
3. Comply with all state and refuge hunting regulations.
4. Guides must obtain and comply with a refuge special use permit.

Justification:

Guides provide a service to non-resident and other hunters less familiar with the refuge. This increases the quality of their hunting experience and makes the hunt safer for those less knowledgeable about the desert environment.

Prepared by: Milton Haderlie / Refuge Manager / Milton K Haderlie / 05/24/94
(Name / Title / Signature / Date)

Reviewed by: Richard A Steinbach / RPS / 9/15/94
(Name / Title / Signature / Date)

[illegible] / [illegible] / 9/21/94
(Name / Title / Signature / Date)

RECREATION ACT FUNDING ANALYSIS FORM

Station Name: **KOFA NATIONAL WILDLIFE REFUGE**

Date Established: **January 25, 1939**

Purpose(s) for which refuge established:

> **"...reserved and set apart for the conservation and development of natural wildlife resources."**

Recreational Use(s) Evaluated: CONCESSIONS - GUIDED SPORT HUNTING

Funding required to administer and manage the recreational use(s):

-- Issuance of Special Use Permits. $50/year.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage recreational use(s).

by: Milton K Haderlie

date: June 7, 1994

[illegible] 9/21/94

COMPATIBILITY DETERMINATION

Station Name: KOFA NATIONAL WILDLIFE REFUGE **Date Established:** JANUARY 25, 1939

Establishing Authority: EXECUTIVE ORDER 8039

Purpose(s) for which Established: "...reserved and set apart for the conservation and development of natural wildlife resources."

Description of Proposed Use: CONCESSIONS - GUIDED TOURS

Tours conducted by Sierra Club and other organizations.

Anticipated Impacts on Refuge Purpose(s):

This action will lead to a greater knowledge and appreciation of the resources being conserved and developed on the refuge. People participating in this activity will cause minimal impact to refuge resources.

Determination: **This use is compatible** X . **This use is not compatible** ____ . **(Check One)**

The following stipulations are required to ensure compatibility:

1. Comply with all refuge public use regulations.
2. Providers of tours must obtain and comply with the terms of a Special Use Permit.

Justification:

This activity provides the public an opportunity to gain more knowledge about the refuge and its resources.

Prepared by: Milton Haderlie Refuge Manager Milton Haderlie 05/24/94
(Name / Title / Signature / Date)

Reviewed by: Richard A Steinbach RPS, 9/15/94
(Name / Title / Signature / Date)

9/21/94
(Name / Title / Signature / Date)

RECREATION ACT FUNDING ANALYSIS FORM

Station Name: **KOFA NATIONAL WILDLIFE REFUGE**

Date Established: **January 25, 1939**

Purpose(s) for which refuge established:

> **"...reserved and set apart for the conservation and development of natural wildlife resources."**

Recreational Use(s) Evaluated: CONCESSIONS - GUIDED TOURS

Funding required to administer and manage the recreational use(s):

-- Issuance of Special Use Permits. $20/year.

Based on a review of the refuge budget allocated for recreational use management, I certify that funding is adequate to ensure compatibility and to administer and manage recreational use(s).

by: Milton K Haderlie

date: June 7, 1994

9/21/94

PLANNING AREA & ACCESS

R20W R19W R18W R17W R16W R15W R14W R13W

T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S

95 10 60

Quartzsite

Brenda

I-1 I-2 I-3 I-4 I-5 I-6 I-7 I-8 I-9 I-10

New Water Mountains Wilderness

Service/BLM Boundary

To Quartzsite 8 Miles

Bleyens Road

M.S.T.&T Road

Vicksburg Road

Palm Canyon Road

King Road

Kofa National Wildlife Refuge

Castle Dome Road

To Yuma 40 Miles

(Note: Roads on the Kofa National Wildlife Refuge are at the center of a 200 feet wide corridor. All vehicles must remain within the corridor).

U.S. DEPARTMENT OF THE INTERIOR March 3, 1849

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

U.S. FISH & WILDLIFE SERVICE DEPARTMENT OF THE INTERIOR

LEGEND

- Wilderness
- Planning Area Boundary
- Roads
- County Maintained Roads
- Township & Range
- Informational Displays

MAP - 1

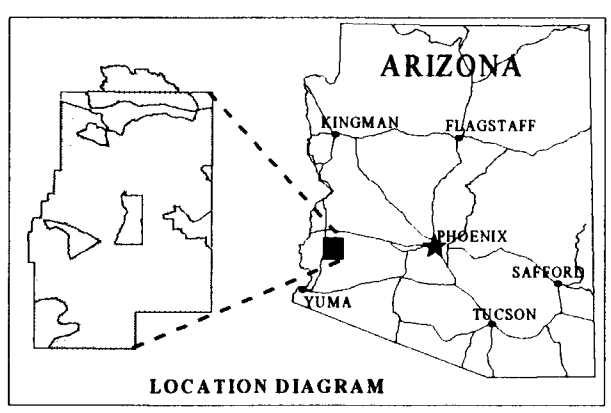
N

SCALE

0 3 6

MILES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
YUMA FIELD OFFICE
AUGUST 1996



LOCATION DIAGRAM

BIGHORN SHEEP LAMBING GROUNDS

R20W R19W R18W R17W R16W R15W R14W R13W

T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S

95 10 60

Quartzsite

Brenda

New Water Mountains Wilderness
Service/BLM Boundary

To Quartzsite
8 Miles

Bleyens
Road

M.S.T.&T
Road

Vicksburg
Road

Palm Canyon
Road

King
Road

Kofa National Wildlife Refuge

Castle
Dome
Road

To Yuma
40 Miles

(Note: Roads on the Kofa National Wildlife Refuge are at the center of a 200 feet wide corridor. All vehicles must remain within the corridor).

U.S. DEPARTMENT OF THE INTERIOR
March 3, 1849

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

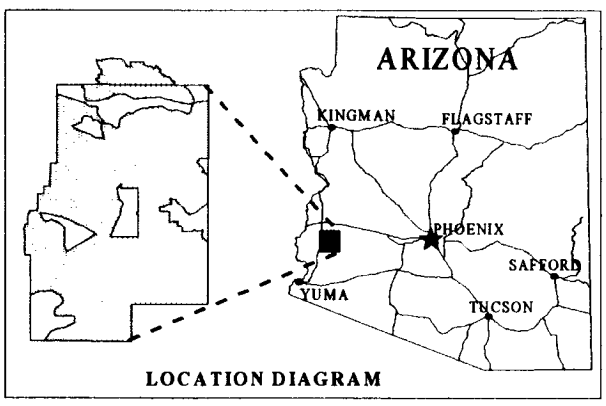
U.S.
FISH & WILDLIFE
SERVICE
DEPARTMENT OF THE INTERIOR

LEGEND
- Wilderness
- Lambing Grounds
- Planning Area Boundary
- Roads
- County Maintained Roads
- Township & Range

N

SCALE
0 3 6
MILES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
YUMA FIELD OFFICE
AUGUST 1996



LOCATION DIAGRAM

MAP - 4

PRIVATE LANDS/SURFACE DISTURBANCE-REHABILITATION

R20W R19W R18W R17W R16W R15W R14W R13W

T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S

95 10 60

Quartzsite

Brenda

*7 NW-1 NW-2 NW-3 NW-4

New Water Mountains Wilderness

Service/BLM Boundary

Bleyens Road

M.S.T.&T Road

Vicksburg Road

Palm Canyon Road

6* 5* 4* K-1 K-2 *1 2*

Kofa National Wildlife Refuge

Castle Dome Road

To Yuma 40 Miles

U.S. DEPARTMENT OF THE INTERIOR March 3, 1849

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

U.S. FISH & WILDLIFE SERVICE DEPARTMENT OF THE INTERIOR

LEGEND

- Private Lands
- Wilderness
- Planning Area Boundary
- Roads
- Township & Range
- Disturbance/Rehabilitation
- * Mining Debris

MAP - 3

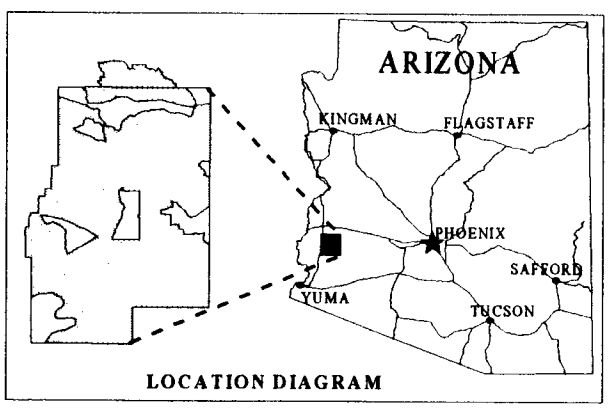
N

SCALE

0 3 6

MILES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
YUMA FIELD OFFICE
AUGUST 1996



LOCATION DIAGRAM

WATER DEVELOPMENTS

R20W R19W R18W R17W R16W R15W R14W R13W

T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S

Quartzsite

Brenda

95 10 60

New Water Mountains Wilderness

Service/BLM Boundary

To Quartzsite 8 Miles

Bleyens Road

M.S.T.&T Road

Vicksburg Road

Palm Canyon Road

King Road

Castle Dome Road

Kofa National Wildlife Refuge

(Note: Roads on the Kofa National Wildlife Refuge are at the center of a 200 feet wide corridor. All vehicles must remain within the corridor).

To Yuma 40 Miles

U.S. DEPARTMENT OF THE INTERIOR March 3, 1849

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

U.S. FISH & WILDLIFE SERVICE DEPARTMENT OF THE INTERIOR

LEGEND

- Wilderness
- Planning Area Boundary
- Roads
- County Maintained Roads
- Township & Range
- 1-69 See Appendix A

N

SCALE

0 3 6

MILES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
YUMA FIELD OFFICE
AUGUST 1996

ARIZONA

KINGMAN FLAGSTAFF PHOENIX SAFFORD YUMA TUCSON

LOCATION DIAGRAM

MAP - 2

AIRSPACE RESTRICTIONS

R20W R19W R18W R17W R16W R15W R14W R13W

T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S

95 10 60

Quartzsite

Brenda

New Water Mountains Wilderness

Service/BLM Boundary

To Quartzsite 8 Miles

Blevens Road

M.S.T.&T Road

Vicksburg Road

R-2308C

Palm Canyon Road

Kofa National Wildlife Refuge

R-2308A

King Road

R-2308B

Castle Dome Road

(Note: Roads on the Kofa National Wildlife Refuge are at the center of a 200 feet wide corridor. All vehicles must remain within the corridor).

R-2307

To Yuma 40 Miles

U.S. DEPARTMENT OF THE INTERIOR March 3, 1849

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

U.S. FISH & WILDLIFE SERVICE DEPARTMENT OF THE INTERIOR

LEGEND

- Wilderness
- Planning Area Boundary
- Roads
- County Maintained Roads
- Township & Range
- Airspace Restriction Boundary

R-2308A & C (1,500 to 80,000 ft above ground level)

R-2308B (surface to 80,000 ft above ground level)

R-2307 (surface to unlimited altitude)

N

SCALE

0 3 6

MILES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
YUMA FIELD OFFICE
AUGUST 1996

ARIZONA

KINGMAN FLAGSTAFF PHOENIX SAFFORD YUMA TUCSON

LOCATION DIAGRAM

MAP - 5