



U.S. Department of the Interior
Bureau of Land Management
U.S. Fish and Wildlife Service

Yuma Field Office
Kofa National Wildlife Refuge

October 1996



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



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

BUREAU OF LAND MANAGEMENT
Yuma Field Office
2555 Gila Ridge Road
Yuma, AZ 85365

U.S. FISH AND WILDLIFE SERVICE
Kofa National Wildlife Refuge
356 West First Street
Yuma, AZ 85365

In reply refer to:
8560 (050)
AZA 25502

APR 15 1997

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

**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

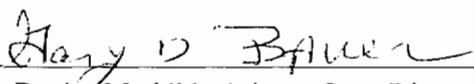
Responsibilities

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: 
Denise Meridith, Arizona State Director
Bureau of Land Management

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

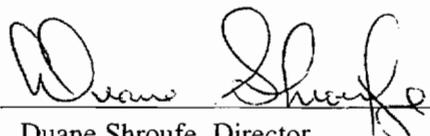
Approved by: 
Duane Shroufe, Director
Arizona Game and Fish

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PART 1 — Background Information

The Planning Area

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). This document focuses on the ecological commonality of the two wildernesses while recognizing the different legal mandates of both administering agencies.

Managed by the Service, the Kofa contains a total of 665,400 acres, including 510,900 acres which are designated wilderness. Managed by the BLM, the New Waters is all wilderness and encompasses 24,600 acres. A mineral land patent covering 475.77 acres is contiguous to the northeastern portion of the New Waters and is also part of the planning area.

A more detailed Comprehensive Management Plan (CMP) for the Kofa National Wildlife Refuge has also been developed as part of the Service's planning requirements. Available separately, the CMP is a compilation of all existing guidance for use by the Refuge Manager that includes the management program outlined in this joint agency planning document.

The La Posa Interdisciplinary Plan addresses management concerns for lands on the west and north 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.

Historical Context

The Kofa and New Waters play a central wildlife and wild lands conservation role in western Arizona. In the earlier part of this century, declining populations of desert bighorn sheep (*Ovis canadensis mexicana*) became a concern. During that time, it was also recognized that a special management focus to address the recovery of desert bighorn sheep had become necessary beyond the establishment of legal protection provided for this species by the Arizona State Game code which had been enacted in 1913. Ultimately, the Kofa Game Range was established in 1939 by Executive Order 8039 specifically for the recovery of bighorn sheep populations.

Administrative responsibility for the Kofa was shared by 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 the 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 processes for the Kofa.

With passage of the Arizona Desert Wilderness Act of 1990, portions of the Kofa and New Water Mountains 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.

Plan Purpose

This document provides management direction for the foreseeable future of the planning area. Direction for the New Waters in this plan is in conformance with the Lower Gila South Resource Management 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.

For the Service, amended and replaced by this plan is the Planning Needs Assessment (1985). For the BLM, amended and replaced plans where they apply to the New Water Mountains Wilderness are: The Yuma District Supplemental Interim Wilderness Fire Management Plan (1992) and the Wildlife Operations and Maintenance Plan for the Trigo Mountains, Muggins Mountains, New Water Mountains, and Eagletail Mountains Wilderness Areas (1993).

Revision of this plan can occur at any time upon mutual agreement of the BLM, the Service, and the AGFD. Minor revision or modification documents will be approved by the BLM Yuma Field Manager, the Kofa Refuge Manager, and the AGFD Regional Supervisor. Major revisions or amendments must be reauthorized by the original signatories.

Legal Guidance

The Wilderness Act of 1964 and the Arizona Desert Wilderness Act of 1990 provide general legal guidance for all wilderness portions of the planning area. However, there are different legal mandates that affect each agency and management will also be guided for each respective jurisdiction as follows:

Executive Order 8039, the legal authority that established the Kofa National Wildlife Refuge, 6 Refuge Manual 8, and Title 50, Code of Federal Regulations, Parts 1 to 199 and Parts 400 to 499, will provide general management guidance for portions of the project area administered by the Service.

Additional general guidance for the Service will be provided by the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668 et seq.), Executive Order 12996, and the Refuge Recreation Act of 1962 (16 U.S.C. 460 et seq.). The Refuge CMP referenced at the beginning of this document contains a more inclusive list of legal mandates that provide management direction for the Kofa.

BLM Manual 8560 and Title 43, Code of Federal Regulations, Subpart 8560 (43 CFR 8560) will provide general management guidance for BLM portions of the project area. Additional BLM guidance will also be provided by the Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S.C. 1701 et seq.).

National Wilderness Management Policies

Each agency also has national wilderness management policies that are expressed as objectives or goals. These national policies are listed below:

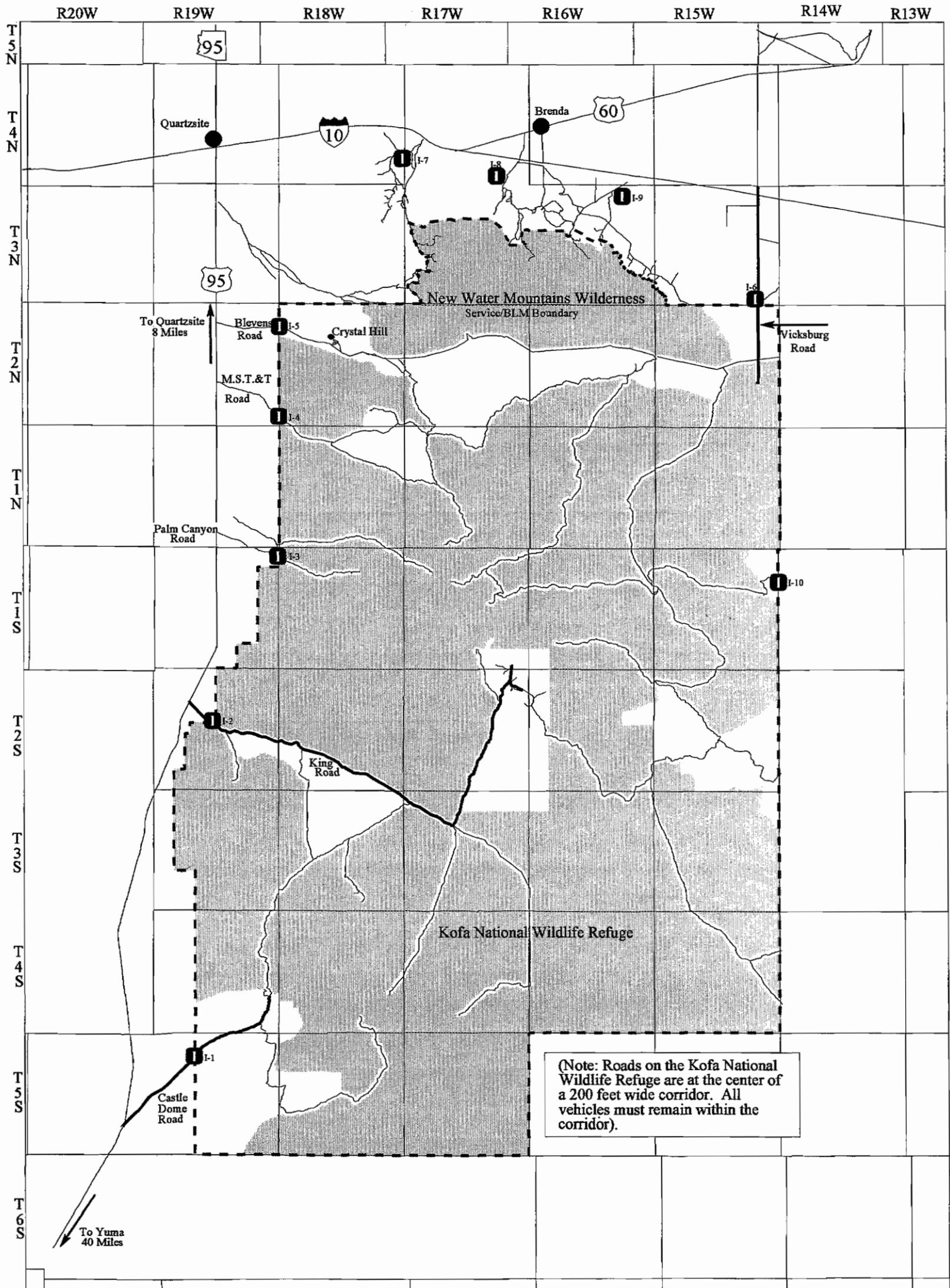
Service Wilderness Objectives (Manual 6 RM 8.2 and 8.3):

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 Wilderness Goals (BLM Manual 8561):

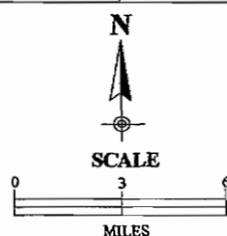
1. Provide for the long-term protection and preservation of the area's wilderness character under a principle of non-degra

PLANNING AREA & ACCESS

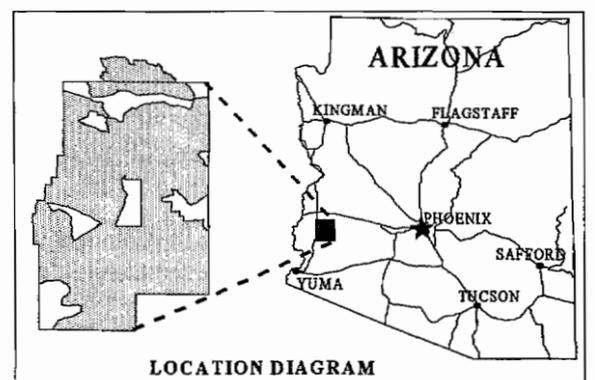


LEGEND	
	Wilderness
	Planning Area Boundary
	Roads
	County Maintained Roads
	Township & Range
	Informational Displays

MAP - 1



UNITED STATES
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YUMA FIELD OFFICE
AUGUST 1996



LOCATION DIAGRAM

dation. 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.

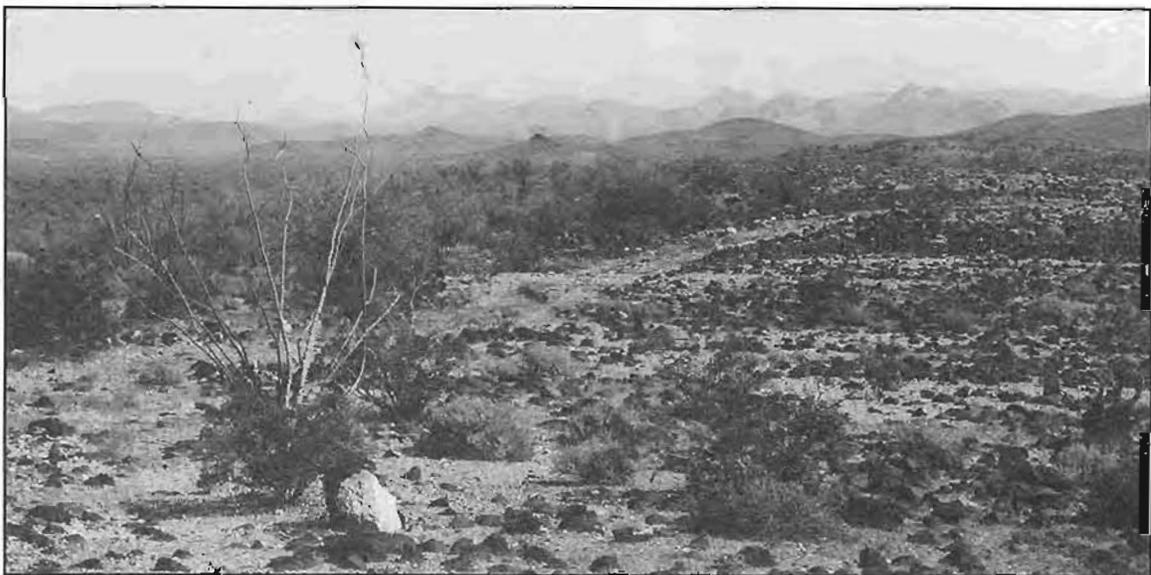
2. Manage the wilderness area for the use and enjoyment of visitors in a manner that will leave the area unimpaired for future use and enjoyment as wilderness. The wilderness resource will be dominant in all management decisions where a choice must be made between preservation of wilderness and visitor use.
3. 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. Manage nonconforming but accepted uses permitted by the Wilderness Act and sub-

sequent laws in a manner that will prevent unnecessary or undue degradation of the area's wilderness character.

Arizona Game and Fish Department Role

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, and Arizona Revised Statutes Title 17, 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.



Looking south at Kofa across a former travel route in New Waters.

PART II — Environmental Setting & Management Situation

Geology

The planning area is in the Basin and Range physiographic province and consists of Precambrian to Quaternary age rocks. There is an underlayment composed primarily of Quaternary basalt and Cretaceous rhyolite and andesite. Smaller amounts of Paleozoic and Mesozoic limestones, shale, sandstone, and quartzite also exist.

Three major block-faulted mountain ranges (Kofa, Castle Dome, and New Water Mountains) typified by extensive exposures of bedrock, sparse vegetative cover, and a lack of soil development are within the planning area. Steep slopes and structurally controlled drainage systems furnish the area's primary relief.

Elevations on the refuge range from 680 feet on the desert floor to 4,877 feet atop Signal Peak. The highest elevation in the New Waters is 3,639 feet on Black Mesa and the lowest elevation is about 1,800 feet on peripheral alluvial washes along the north-eastern wilderness boundary. Shallow, stony soils and rock outcrops are predominant in the mountainous and steep slope areas. Deep, gravelly, moderately fine textured soils high in lime concentrations characterize alluvial fans and valley floors.

Climate

Winter and spring seasons are affected by sparse rainfall from prevailing Pacific frontal storms that have depleted most of their moisture. During the summer, there is a prevailing influence from convectional storms that originate in the tropics. Periods of prolonged drought may occur throughout the year (Brown 1982).

Temperatures range from lows near 25 degrees F. in the months of December and January, to highs that may exceed 115 degrees F. from July through September. Precipitation generally ranges from 2 to 8 inches per year.

Air Quality

The planning area is within a Class II airshed as classified by the Clean Air Act. No site specific air quality data exists for the area. However, the lack of nearby agricultural lands or industrial activities provides for good air quality. The southwestern portion of the refuge may occasionally be affected by dust from military activities on the U. S. Army Yuma Proving Ground.

Water

In the extremely dry Sonoran Desert ecosystem, water is the primary limiting factor. Over the years, wildlife managers have learned to optimize the conservation of water in the desert for wildlife purposes through the management of wildlife water sources. Artificial and natural wildlife water sources are aimed at improving wildlife population health and distributions. Both Kofa and the New Waters have wildlife water sources, natural and developed (Map 2 and Appendix A). The wildlife water sources typically consist of windmill powered wells, modified springs or seeps, and rain water collection systems associated with tanks or naturally occurring pot-holes. Several of these watering areas occasionally go dry during extended dry periods. To prevent large scale wildlife movement away from these areas, or worse, wildlife die-offs, water is hauled to these drought susceptible sites when needed. In a dry year, as much as 10,000 gallons of water may be hauled to individual areas.

Development of wildlife water sources has been carried out on the refuge since it was first established. Throughout the years wildlife managers have managed under the supposition that managed water developments and natural sources for bighorn sheep have been instrumental in helping to restore the species to sustainable populations. All

Kofa waters are monitored primarily by refuge personnel and are maintained with assistance from AGFD and the Arizona Desert Bighorn Sheep Society.

In the New Waters, the four watering areas present in the wilderness are monitored by AGFD. Maintenance of these areas is the responsibility of AGFD with cooperative assistance from BLM.

Vegetation

Comprised of 2 Sonoran Desert subdivisions, the planning area is in a Tropical-Subtropical Desertland climatic zone (Brown 1982). The most arid portion of the Sonoran Desert is the Lower Colorado River Valley subdivision which covers approximately 50 percent of the planning area. The Arizona Upland subdivision accounts for the other 50 percent.

The Sonoran Desert ecosystem is comprised of relatively sparse vegetation throughout, with the exception of tree and shrub corridors along dry washes that descend to alluvial fans and basins from the desert mountains. Creosote, ironwood, palo verde, and mesquite comprise much of the vegetation with many types of cacti, most notably the saguaro, dominating the landscape.

A notable feature of the habitat is the desert flora that emerges only after sufficient winter rains occur. Generally there is enough moisture to provide for the germination of dormant grass and forb seeds that produce an abundant growth of annual vegetation for brief periods.

During the very dominant dry seasons, the soils form a thin crust that harbors seeds for many years in some cases. Generally, if sufficient moisture occurs to soften the crust and penetrate seed coats, germination occurs. When the short growing cycle is completed, the ground once again forms into a thin cryptobiotic crust.

From 1983 to 1992, the refuge staff monitored vegetation along 242 permanent transects to document any changes that would occur from the cessation of grazing on the

refuge. Some improvements have been noted, but the growth of desert vegetation 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 useful for determining habitat suitability, conditions, and wildlife uses in the long-term. However, the videography project will not be finalized until 1999.

Wilderness Values

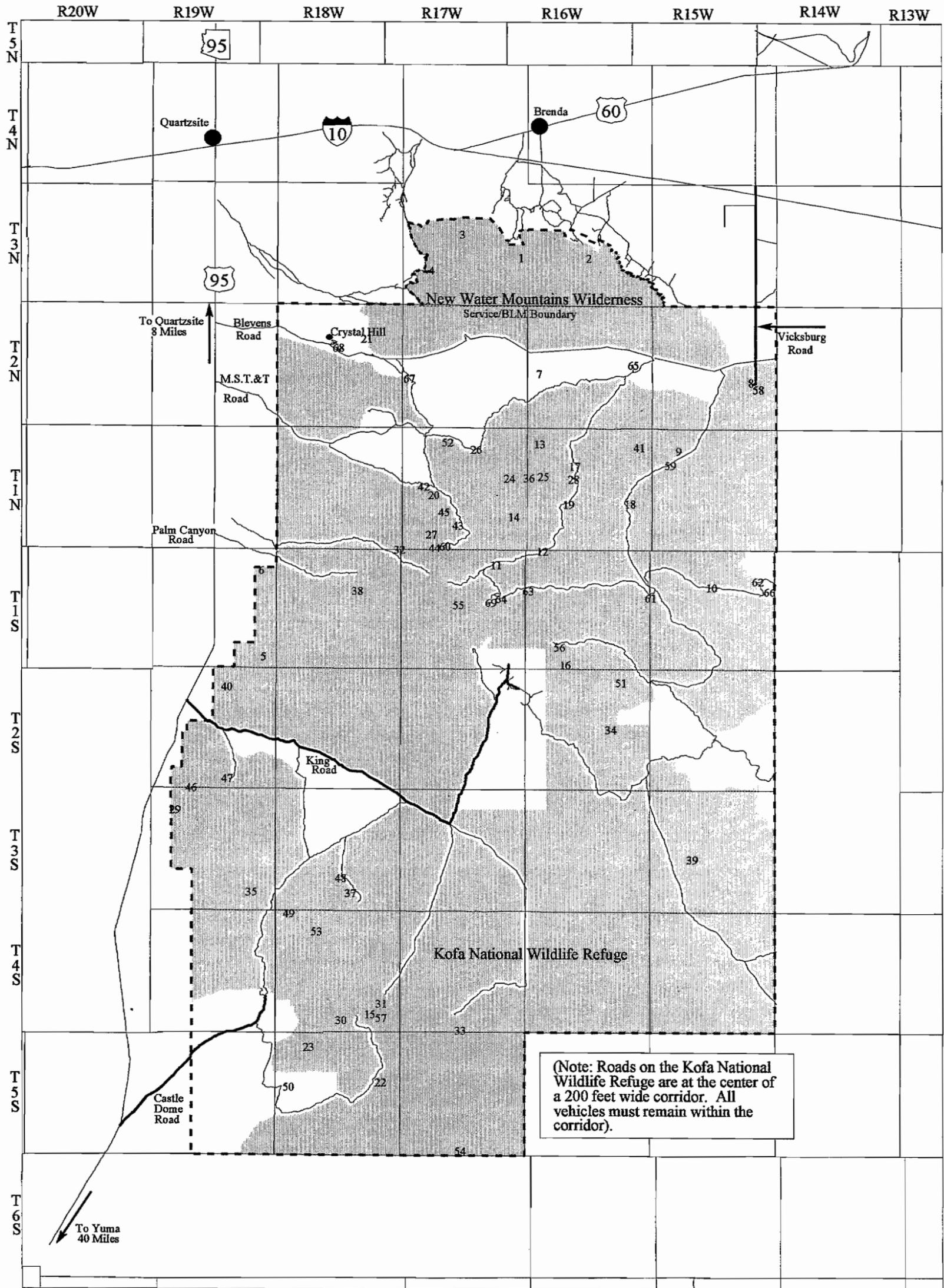
Designated wilderness in the planning area covers approximately 510,900 acres on the Kofa and all 24,600 acres of the New Waters. The wilderness has a predominant natural appearance. However, there are several areas with surface disturbances or debris from past mining and exploration activities and from former vehicle routes (Map 3). Some of the former vehicle routes have begun to blend into the landscape with the camouflaging effects of recently established vegetation. Several surface disturbances are of a magnitude that will require management intervention to minimize adverse visual impacts.

Species Diversity

Forty nine mammal species, 188 species of birds, 41 species of reptiles and amphibians, and 425 taxa of plants are represented in the planning area. Appendices B, C, D and E list animal and plant species confirmed or expected by range distribution within the planning area.

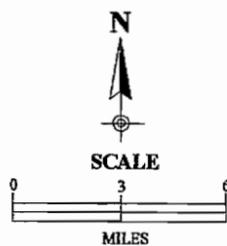
There have been no recent observations of resident or migrating endangered species in the planning area. However, the area provides suitable habitat for the peregrine falcon. Occasionally, brown pelicans are blown onto the refuge by summer thunderstorms developing over the Gulf of California to the south.

WILDLIFE WATERS

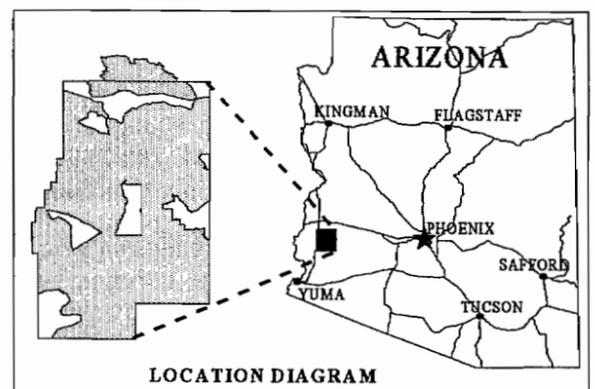


LEGEND

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



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MAP - 2

Desert Bighorn Sheep

Desert bighorn population estimates have remained stable in the planning area with estimates ranging between 700 to 1,100 sheep since 1985. Fourteen years of aerial surveys (Table 1) reflect a stable population with the exception of a low count in 1991. Since 1986, there has been an average of 17 sheep hunting permits issued yearly for the planning area. The New Waters' role in bighorn sheep management is significant as it contains some of the planning area's important lambing grounds (Map 4).

Both the Service and BLM continue a cooperative management relationship with the AGFD in their efforts to protect all wildlife populations. Cooperative wildlife management activities conducted by the AGFD and BLM on wildernesses administered by the

BLM in Arizona are guided by an existing memorandum of understanding.

Sheep Transplantation Program

Every year since 1979, with the exception of 1991, the refuge has participated in a transplant program (Table 2) of bighorn sheep in cooperation with AGFD. Refuge employees assist the AGFD in the capture using net guns from helicopters. The animals are then transported to various locations within the southwestern U. S. in an effort to assist in the restoration of indigenous populations.

Sheep were captured in the New Waters during 1987, 1988, and 1990 (Table 2). The BLM has traditionally participated in capture activities and plans to continue.

Table 1 — Kofa (K) & New Waters (NW) Bighorn Sheep Survey Results 1980-1994

Year	Rams		Ewes		Lambs		Unclassified		Total Observed		Est. # Sheep		Lambs per 100 Ewes	
	K	NW	K	NW	K	NW	K	NW	K	NW	K	NW	K	NW
1980 ¹	125		195		31		1		352				16	
1981	143	7	229	23	44	14	1	0	417	46		85	21	61
1982	141	13	234	38	51	11	1	0	427	66			23	29
1983 ²	147		260		50		1		458				19	
1984	175	17	284	29	44	6	0	0	503	55		69	15	21
1985	149	27	264	31	61	3	0	0	474	79		173	23	10
1986	168	29	282	26	44	7	2	0	496	79		188	16	27
1987*	92	13	122	31	19	10	0	0	233	61	874	92	16	32
1988*	98	21	134	31	19	6	0	2	251	64	881	82	14	19
1989*	89	11	150	15	25	4	0	0	264	32	929	42	17	27
1990*	93	26	106	36	39	10	0	0	238	78	788	112	37	28
1991*	69	24	84	32	21	2	3	0	177	61	638	97	25	6
1992	139	19	255	26	46	4	0	2	440	54	739	117	18	15
1993 ³		19		24		7		0		57		116		29
1994	151	11	270	33	36	7	2	1	459	61	887	124	14	21
Total	1779	237	2869	375	530	91	11	5	5189	793			18avg	25avg

* Modified survey covering approximately half of the refuge's sheep habitat.

1. New Waters data was not compiled for 1980.
2. A survey was not conducted for New Waters in 1983.
3. A survey was not conducted on Kofa in 1993.

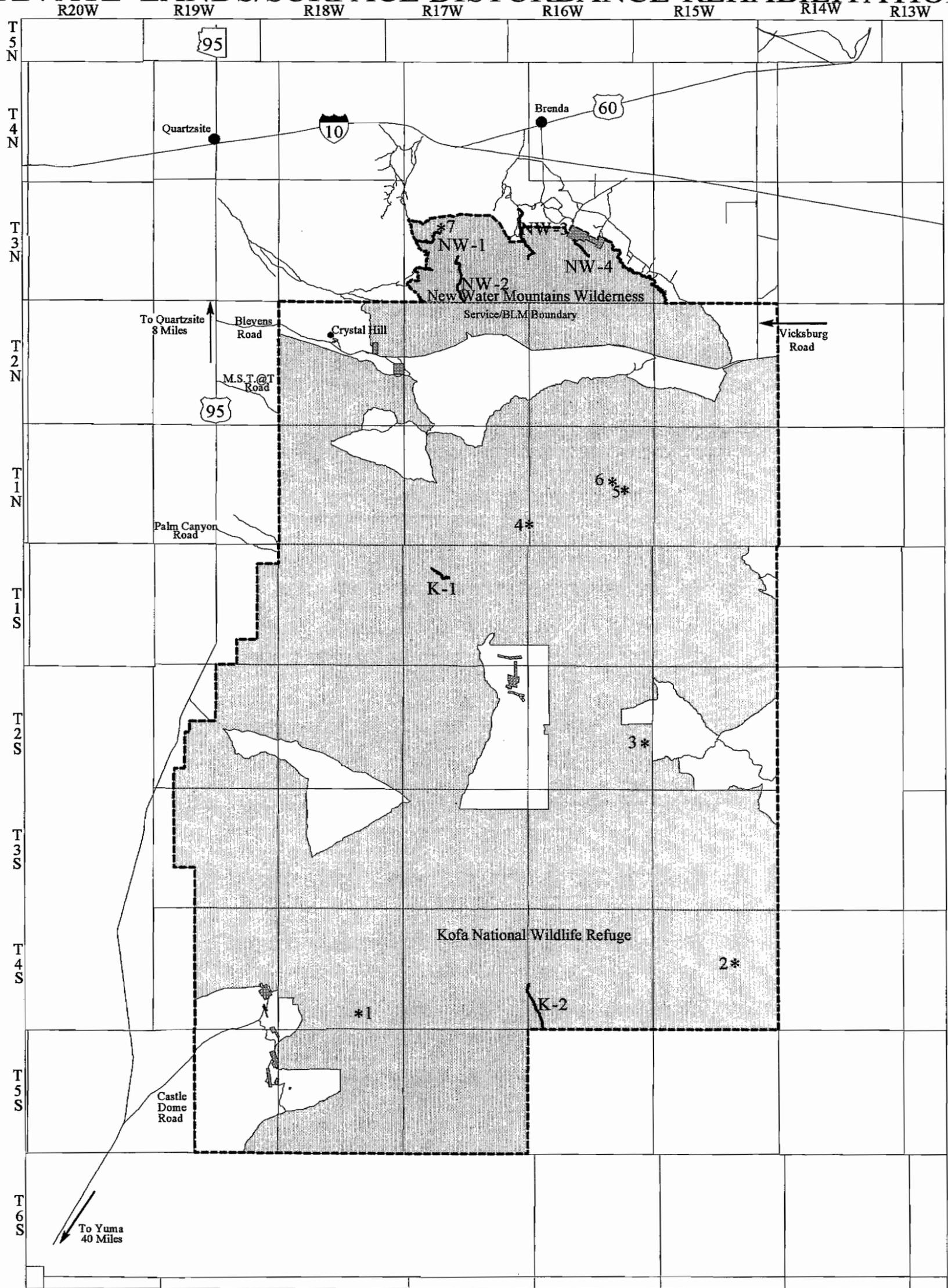
Table 2 — Kofa¹ (K) & New Waters (NW) Bighorn Sheep Removal Harvest/Transplants

Year	Harvested Rams		Transplanted Rams				Ewes	Transplant Location	Grand ² Total
	K	NW	K	NW	K	NW			
1979	9		4		4		Colorado/Devils Canyon (NPS)	20	
1979			0		2		Texas/Black Gap (TX Game and Fish Dept.)		
1980	8		7		11		Arizona/Goat Mountains (USFS)	33	
1980			0		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		New Mexico/Peloncillo Mountains (BLM)	24	
1982			0		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/Giliuro Mountain (USFS)	47	
							(NW) Arizona/Gila Bend Mountians	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.

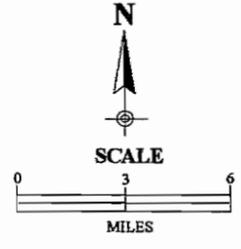
PRIVATE LANDS/SURFACE DISTURBANCE-REHABILITATION



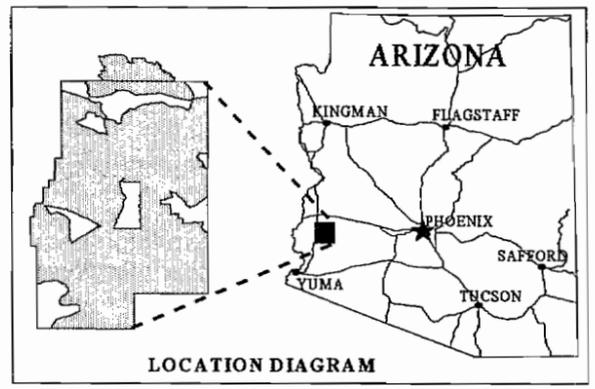
LEGEND

- Private Lands
- Wilderness
- Planning Area Boundary
- Roads
- Township & Range
- Disturbance/Rehabilitation (K-1 K-2, NW-1 thru NW-4)
- * Mining Debris

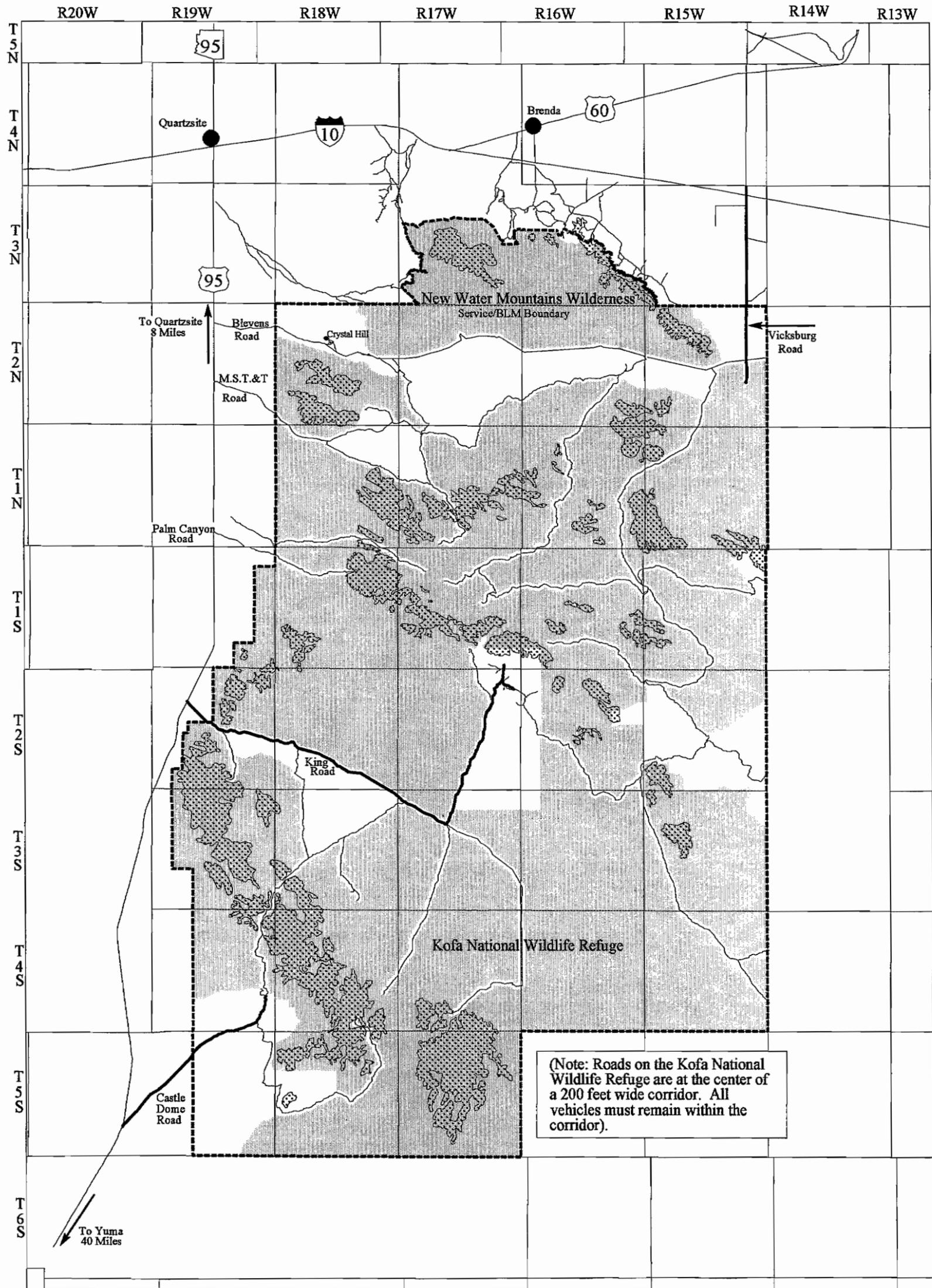
MAP - 3



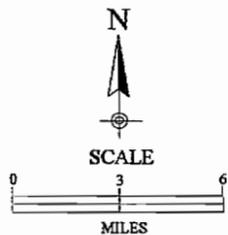
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
YUMA FIELD OFFICE
AUGUST 1996



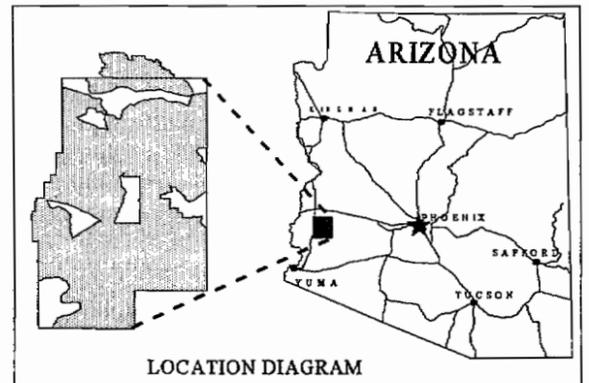
BIGHORN SHEEP LAMBING GROUNDS



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



UNITED STATES
DEPARTMENT OF THE INTERIOR
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MAP - 4

Desert Mule Deer

Annual desert mule deer surveys (Table 3) are conducted on the refuge. This species is also counted during the aerial sheep survey. Wildlife surveys are conducted with AGFD participation. The New Waters is included in wildlife surveys (Table 3) for AGFD Game Management Unit 44B.

In keeping with the special focus on wildlife management and the purpose for which the refuge was established, the Service and AGFD have established an Alternative Hunt Program on the Refuge. The alternative hunt program emphasizes a quality hunting experience by giving managers the option of limiting permits issued to allow increased hunter success. This enhances the range of opportunities for unique wildlife related recreational experiences on the refuge. It is unlikely that the New Waters would be

included in the Alternative Hunt Program.

Sonoran Desert Tortoise

Limited knowledge of this tortoise population is the reason for recent emphasis on gathering more data. Abundant data on the Mojave population in California cannot be extrapolated to Arizona populations because of differences in habitat selections between the two. Long-term field data on Sonoran tortoises should help answer management and disease questions that are now unknown.

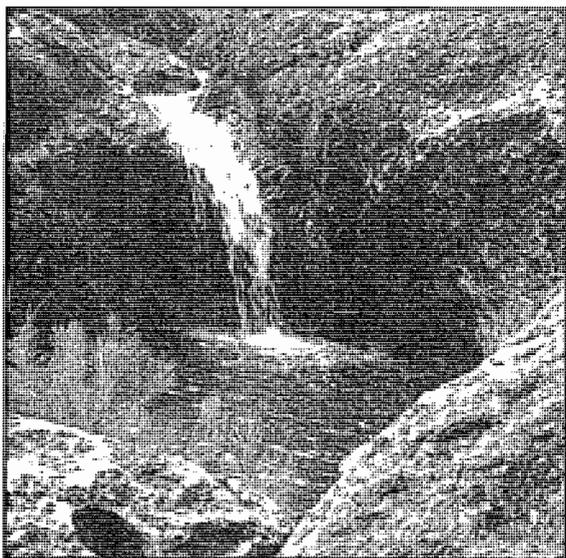
Information from surveys conducted in 1979, 1989, and 1990 indicates the tortoise population at Kofa is healthy and of low density requiring a stabilized habitat. Cover site potential, highest in the less resistant volcanic base material, is the critical limiting factor resulting in patchy, isolated populations. The density/diversity of vegetation and the aspect seem to be of secondary and tertiary importance to distribution.

Table 3 — Kofa (K) & New Waters¹ (NW) Annual Aerial Deer Survey Results 1985-1996.

Year	Bucks		Does		Fawns		Unclassified		Total	
	(K)	(NW)	(K)	(NW)	(K)	(NW)	(K)	(NW)	(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	0	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	0	87	13
1995*	10	2	40	6	14	5	3	0	67	13
1996*	6	2	19	7	3	1	1	0	29	10
Total	332	56	1007	147	325	65	49	8	1713	276

* Modified surveys. Modified surveys in years 1992 through 1996 are a sampling of approximately 16% of the total surveyable deer habitat.

1. 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.



A natural "pothole" in Kofa catches rainwater.

A desert tortoise survey was conducted on a one square mile plot in the New Water Mountains, adjacent to the Wilderness Area. Similar to the Kofa survey, desert tortoise distribution was associated with patchy cover sites. Pre-designation wilderness inventories established that portions of the New Waters were important desert tortoise habitat. In conformance with BLM Policy and the document, Desert Tortoise Habitat Management on the Public Lands: A RANGEWIDE PLAN (1988), the New Waters has been classified as Category II desert tortoise habitat. The management goal for Category II tortoise habitat is to maintain stable, viable populations and halt further declines in tortoise habitat values.

Livestock Grazing

There are portions of two grazing allotments in the New Waters. Neither of the two allotments have any range developments in the wilderness.

The Crowder-Weisser Allotment (#3022) is a perennial-ephemeral allotment and includes about 17,568 acres of the wilderness on the eastern side. Yearlong use has averaged 500 head over the last 10 years. Ephemeral use is authorized by the BLM when conditions warrant. The maximum

number of livestock grazed during the five years preceding 1995 was 2,000 head for 3 months under an ephemeral license. However, due to terrain and distance from water, livestock grazing within wilderness portions of the allotment is minimal.

The Scott Allotment (#3075) is an ephemeral allotment and includes approximately 7,032 acres on the extreme western side of the wilderness. Since 1975, there has been little use of this allotment and since 1980 no use has been applied for. There were no grazing related issues identified for the BLM portion of the planning area.

There is no livestock grazing on the refuge. Livestock that occasionally stray onto the refuge from adjacent BLM allotments are removed. An existing fencing program on the refuge prevents the entry of cattle from refuge boundaries which are adjacent to BLM grazing allotments. The fencing program also deters off-road vehicle violations. Other than routine fence maintenance, there are no grazing issues for the planning area. Vehicle access is necessary on the eastern refuge wilderness boundary for fence maintenance.

Burro Management

The New Waters and Kofa are not within a wild horse or burro herd area. There are no records of burros ever being established in or making transient use of the New Waters.

There are a few resident burros in the refuge. Occasionally, they attempt to expand their range from the U. S. Army Yuma Proving Ground onto the Kofa. Management provisions provide for the removal of non-resident burros by BLM. Most wildlife waters on the refuge contain fences designed to exclude burros.

Public Access

The western boundary of the New Waters has legal public access via the Gold Nugget Road south of Interstate 10 at exit 26. To reach the north-central area, the Ramsey Mine Road south of Highway 60 provides a route

which also connects with primitive roads leading easterly and westerly north of the wilderness boundary. Approximately a 1/3-mile portion of the Ramsey Mine Road crosses private land. Physical access to the Hidden Tank area also requires passage through approximately a 1/2-mile route segment that crosses private land. The southernmost portion of the New Waters is contiguous with the Kofa and this area can be reached by turning east on Blevens Road from Highway 95 (Map 1).

Legal public access to the Kofa is provided by several roads that were left as non-wilderness corridors. From Highway 95, there are several routes that lead to the western refuge boundary and which are in close proximity to designated wilderness. The northeast refuge area can be reached from Interstate 10 as shown on Map 1.

Mechanized, vehicular traffic is limited to designated roads in the planning area and all off-road vehicle travel is prohibited. All vehicles must remain within 100 feet of designated roads. All vehicles, including all terrain vehicles, and motorcycles and all operators must be licensed and insured for highway driving. Speed is limited to 25 miles per hour unless otherwise posted. Bicycles are considered as vehicles. Most of the roads that provide access to the planning area are primitive and high clearance four-wheel drive vehicles are recommended.

Recreation

The National Wildlife Refuge System Administration Act of 1966 (16 U. S. C. 668dd-668ee) allows the Refuge Manager 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." In addition, the Refuge Recreation Act of 1962, as amended (76 Sts. 653; 16 U. S. C. 460k), prescribes the same compatibility standards with a focus on recre-

ational 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 managing recreational activities.

Kofa 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 wilderness management guidelines and ethics. However, unlike the New Waters, wildlife management is the primary function of the Kofa NWR and all other uses are secondary. These uses must undergo compatibility analysis and the refuge must certify that funding is available for the management of these activities. At Kofa, hunting, camping, rock climbing and repelling, hiking, wildlife observation, photography, sightseeing, and environmental education activities are allowed and considered compatible with both the purposes of the refuge and with wilderness designation. Estimates based on traffic counter data indicate that there are approximately 50,000 visitors per year to the refuge. However, visitation has fluctuated from year to year over the past decade. Reliable traffic counters have not been in place on the refuge long enough to determine long term trend information. It is expected that trend information will not be available until 2005.

Rockhounding has been a concern for the Refuge. Unrestricted rock collection in the Crystal Hill area (nonwilderness) has led to the extraction of commercial quantities of minerals. There have also been several instances of visitor use conflicts and public safety concerns that have arisen from this recreational activity in the Crystal Hill area. A compatibility analysis has determined that rockhounding in its current magnitude is not compatible with the purposes for which the refuge was established.

Recreational activities in the New Waters include hunting, wildlife observation, hiking, and camping and rockhounding. As a desig-

nated wilderness, the BLM manages these activities within wilderness management guidelines. It is estimated that there are less than 500 visitors per year to this BLM wilderness.

In addition to being a popular hunting location, recreational access to the Hidden tank area of the New Waters is through patented land described by Mineral Survey 3207. Acquiring this land or an easement would provide legal public access to this portion of the wilderness and increase opportunities for public recreation.

Minerals and Mining

The Kofa has been closed to mineral entry since February 1974. There are several active claims in the refuge that were established before the area was withdrawn from mineral entry. Several of these claims are in the Kofa Wilderness and there is a potential for mining activities to occur in the future. The Service is interested in developing a Memorandum of Understanding with the BLM to have mineral validity examinations performed if future mining operations are proposed on active claims in the Kofa Wilderness.

As with all public lands, the BLM still administers mining claim records and monitors procedures that must be followed by claimants to maintain their claims in an active state. As of June 22, 1995, BLM Arizona State Office records listed 40 claims on the Kofa. Twenty-nine of these claims were declared abandoned for failure to meet the annual filing requirements of the 1872 Mining Law, as amended. These decisions are presently under appeal to the Interior Board of Land Appeals.

A minerals investigation conducted jointly by the U. S. Geological Survey (USGS) and the U. S. Bureau of Mines in 1986 provided an assessment of mineral resources for the New Waters. There are varying degrees of mineralization throughout the planning area. USGS Bulletin 1702-B (1989) contains additional geological information and a pub-

lished account of the mineral assessment conducted in 1986. There are no active mining claims in the New Waters and the Arizona Desert Wilderness Act of 1990 withdrew this area from mineral entry.

Lands

The patented land (Mineral Entry Patent 546603, September 22, 1916; Map 3) adjacent to the northeast portion of the New Waters is within the planning area. This land also adjoins an area described by USGS Bulletin 1702-B as having moderate mineral resource potential.

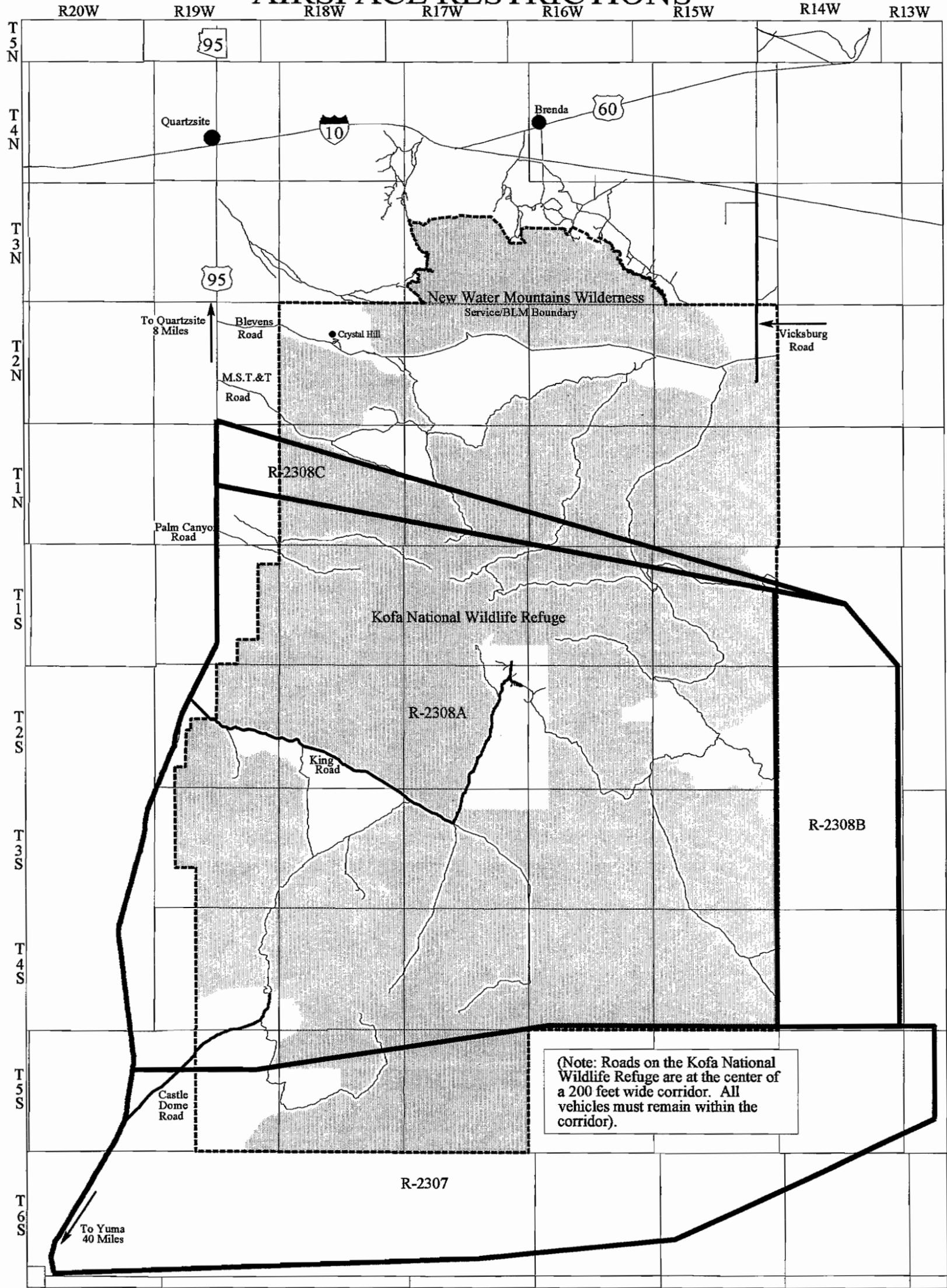
There are several non-Federal inholdings within the Kofa. Forty-six patented mining claims (Map 3) totaling approximately 865 acres are located in nonwilderness portions of the refuge. Most of these are situated on the southern edge of the Kofa Mountains in the vicinity of the historic King of Arizona Mine and on the southern edge of the Castle Dome Mountains. There are two non-mineral private holdings within the refuge totaling 240 acres.

A 58-mile common boundary on the southern half of the refuge exists with the U. S. Army Yuma Proving Ground. The Secretary of the Interior has granted the Army permission to use airspace over 171,000 acres (surface to unlimited altitude; Area R-2307; Map 5) of the refuge as a buffer/flyover zone for weapons and associated munitions testing. An additional 316,660 acres of restricted military airspace (1,500 to 80,000 feet above ground level; Areas R-2308 A and R-2308 C; Map 5) occurs over the refuge.

Three county roads within the refuge are maintained by La Paz and Yuma counties: (1) Castle Dome Road (5 miles); (2) King Valley Road (17 miles); and, (3) Vicksburg Road (3 Miles). The MST&T Road (11 miles), Blevens/Crystal Hill Road (7.6 miles), and Palm Canyon Road (9 miles) are maintained by the refuge.

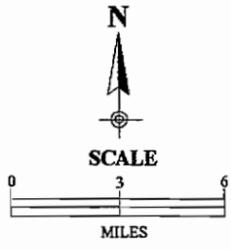
There are several utility rights-of-way within the refuge that are administered by the Service. None of the rights-of-way are within

AIRSPACE RESTRICTIONS

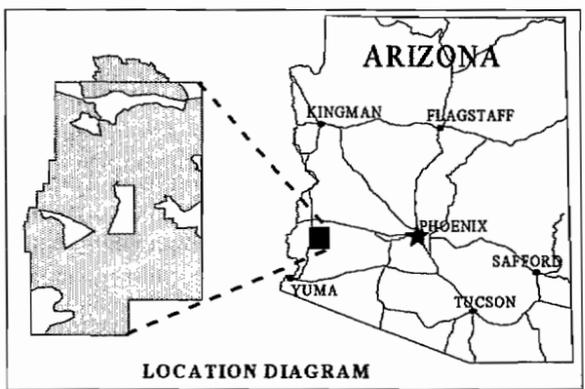


LEGEND

- 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)



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MAP - 5

wilderness. The New Waters does not contain any rights-of-way. Following is a listing of rights-of-way on the refuge:

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 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 that runs 24 miles (east/west) across the entire northern portion of Kofa.

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.

Cultural Resources

Both Kofa and the New Waters have cultural resources that fit within two broad categories: prehistoric sites which contain artifacts or evidence of activity by aboriginal inhabitants prior to European contact and historic locations that may include physical remains or other indications of activities by European/Asian peoples. Many of these sites have not been catalogued by either agency. Some have undergone evaluation relative to the Archeological Resource Protection Act or the National Historic Preservation Act. The planning area does not contain sites that are listed on the National Register.

Service files contain variable records of approximately 92 known or recorded archeological and historic sites on the Kofa Refuge. However, the number of reliably locatable sites may prove to be somewhat less, since more than half of the reported 92 site records offer only vague locational references. This site information comes from the field notes of Malcolm J. and Frederick S. Rogers (1929-1941), and from more recent 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 the refuge. Recent site recording efforts by refuge volunteers Connel and Dawn Bergland also offer detailed information for rock art and other sites in the northern extent of the range.

As would be expected of such a marginal environment, all sites indicate past ephemeral uses of the Kofa. 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 occu-



Petroglyphs in the planning area.

pations either for short-term subsistence gathering purposes, or for travel and trade across the area. Notations concerning the existence of several “intaglios” (geoglyphs), and also observations about a cremation site have been attributed to archaeologist Malcolm Rogers; but to date, there has been no verification of either. The San Diego Museum of Man is the repository for Rogers’ field records and the records have not been fully analyzed or interpreted.

There are no independent 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 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.

Not much has been formally catalogued by the BLM within the New Water Mountains. 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. However, prehistoric petroglyph sites occur in the area. In addition to petroglyphs on several rock panels, one site

with occupancy estimated to about the year 5 B.C. 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. A general inventory of cultural resources in this area would probably result in the discovery of additional sites.

Fire

Fire has not played a significant role in the planning area. There are no records of fire incidents within the New Waters. On the refuge, several fires have been caused by human activity. Fires have historically burned out virtually without suppression efforts. It is unlikely that any fires will continue beyond the first 24 hours (initial burning period) due to sparse fuels throughout the planning area.

Law Enforcement and Emergency Services

There have been several cases where emergency services have been needed in the planning area due to visitor accidents and to persons becoming lost. Rock climbing accidents have resulted in 2 fatalities on the refuge.

During the World War II era, military training activities occurred on portions of the refuge and unexploded ordnance has been recovered. There may still be a potential for the discovery of military ordnance.

PART III — 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 are separated into two categories: activity plan issues and issues solved by policy. Following is the final list of issues:

Activity Plan Issues

Issue #1: Preservation of Wilderness Values — The long-term preservation of wilderness values is mandated by the Wilderness Act. Concerns to address are: Effects of visitor uses, illegal vehicle trespass, monitoring of effects of uses, management of exotic species, and opportunities for environmental education, interpretation, 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. Included in this issue is the management of the various facilities and associated maintenance of wildlife waters in and outside the wilderness areas. This plan establishes a range of wildlife and habitat management strategies within the context of wilderness and

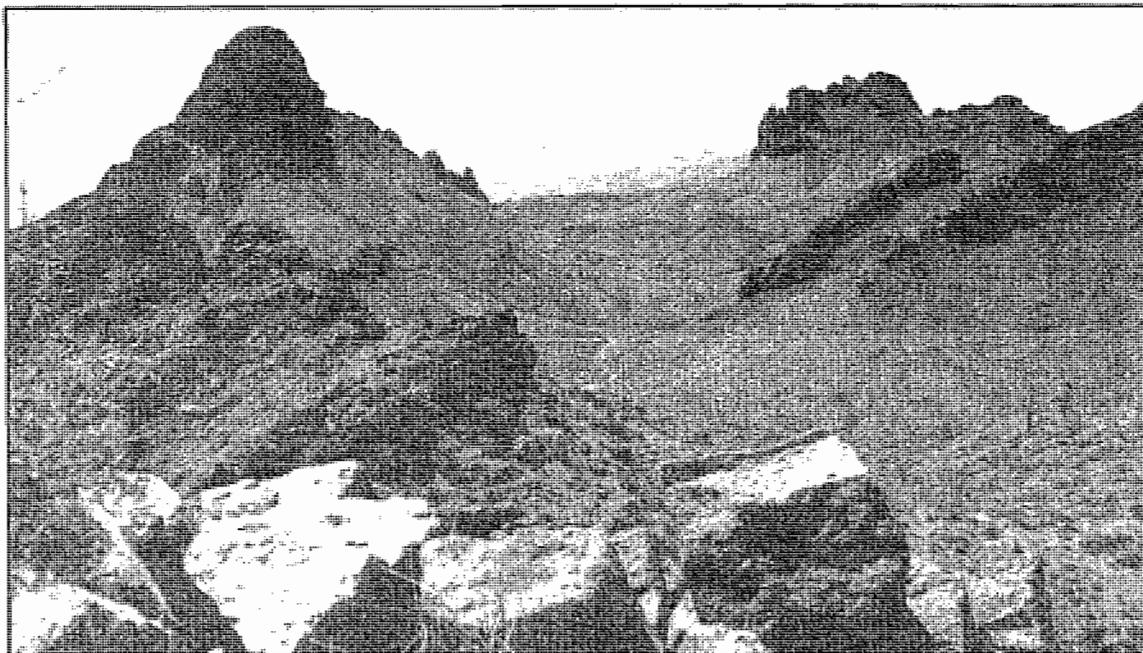
the surrounding areas. Topics of concern include: Cooperative management; scarcity of data; desert bighorn sheep; wildlife waters; endangered, threatened, candidate species, and other sensitive and special status species; management of exotic/ non-native species including pathogenic organisms; and fire 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. Items to address are: Legal access; hunting; wildlife observation, camping, and photography; wilderness opportunities for solitude; and noncompatible uses of the planning area.

Issue #4: Minerals Management - Active Mining Claims — Several unpatented mining claims exist within the 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 area's natural appearance. This plan determines some strategies for minimizing the effects of existing disturbances on wilderness values.



Squaw Peak — Kofa

Issues 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 27.63 and 35.11 for the refuge.

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

Issue #9: Scientific Research — Studies for management, scientific, or educational 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.

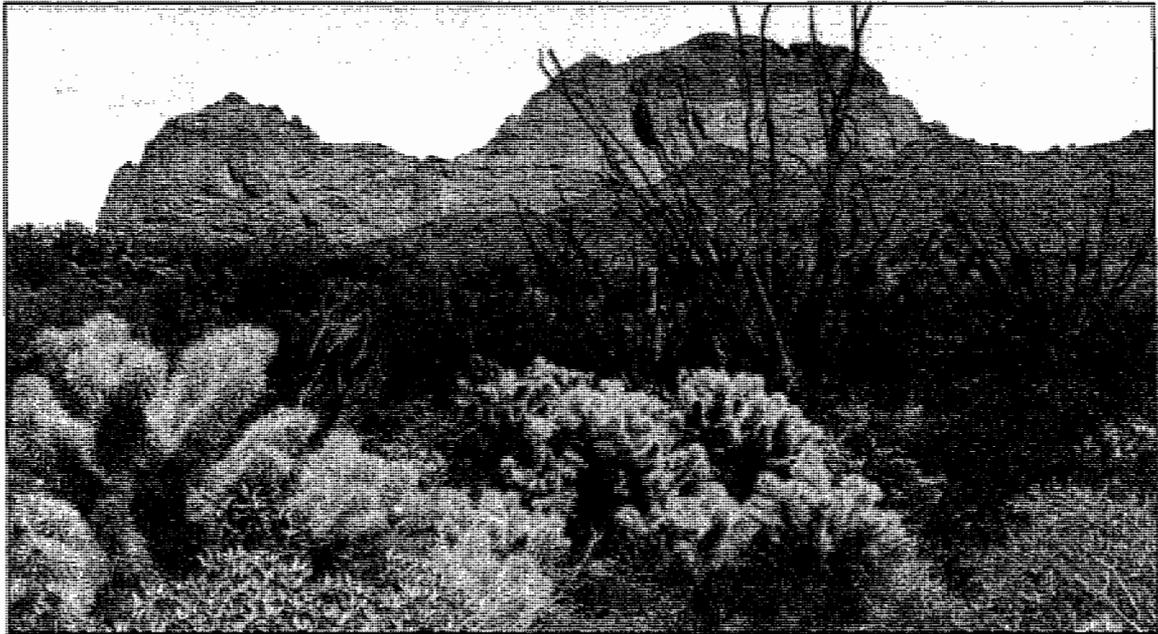
Issue #11: Military Ordnance Contamination — A possibility of ordnance contamination exists on the Refuge portion of the planning area due to past military activities. Ordnance has previously been recovered from the refuge. In the event that unexploded ordnance is discovered, the Department of Defense 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 arrange-

ments to access spiritual sites. However, both agencies acknowledge that certain sites within the planning area are considered to be sacred. Both agencies will provide for Native American access in accordance with the Native American Religious Freedom Act.

Issue #13: Military Overflights — The Arizona Desert Wilderness Act of 1990 states that: “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 BLM and Service 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. The Department of the Interior remains vigilant in working directly with the various military branches to eliminate and/or reduce low level flights that would impact wildlife and other natural resources within the refuge and the planning area as a whole.



Twin Peaks — New Waters

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 week-day 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, especially 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 wilderness manage-

ment 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 (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 occurring 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

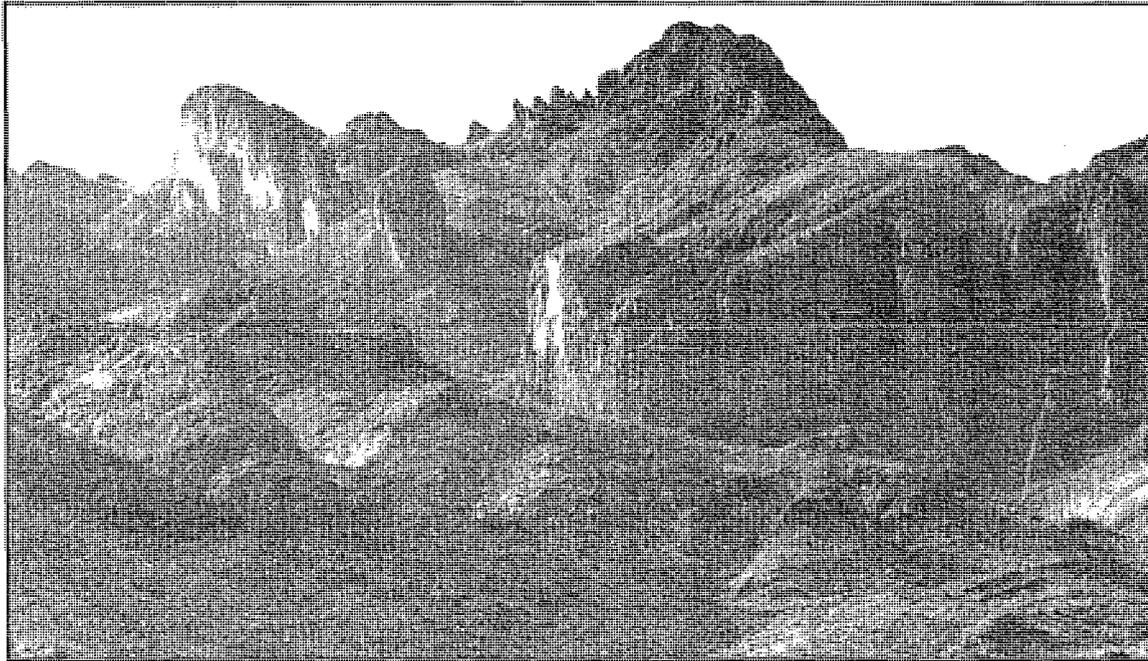
will also be less potential for adverse impacts to wildlife from continued vehicle use in wilderness.

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.



Twin Spires Canyon — Kofa

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 wilderness portions of 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 consultations between the AGFD and Kofa/BLM 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 evalu-

ate 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, while allowing 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 need-

ed.

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



Native Palms — Kofa

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 rappelling 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 non-wilderness 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 non-wilderness 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 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 permit system for livestock use 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

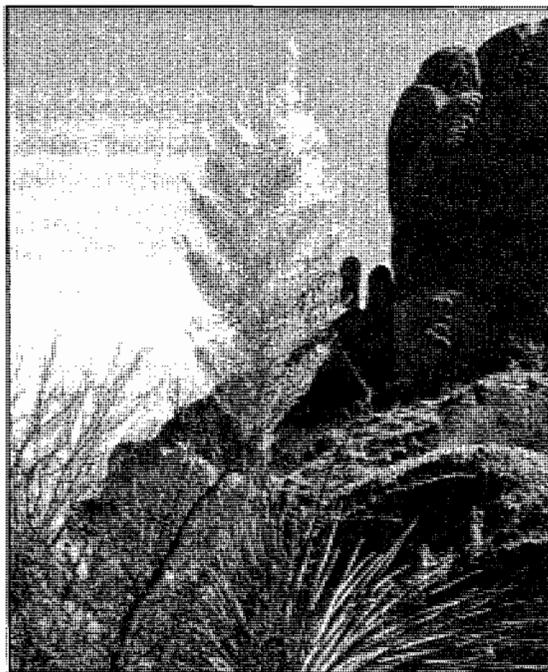
Monitoring for the fulfillment of Objective 4 will be accomplished during annual plan evaluations.

PART V — Plan Evaluation

In coordination with AGFD, the Yuma Field 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.



Nolina — Kofa

Part VI — Implementation Schedule and Cost Estimates

Table 4 — 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 5 — 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 Field 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/ Field/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 Manager/ Wilderness Specialist
5. Develop BLM/Service MOU for mining validity examinations.	1999	¹	Refuge/Field 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. Repair gabion and improve water collection system at Nugget Tank.	2000	\$ 5,000	AGFD/Biologists
11. Improve water developments at: Charlie Died Tank Modesti Tank	1998 2000	\$ 30,000 \$ 30,000	Refuge Manager
12. Relocate water developments Kofa #1 and #2. Kofa #1 Kofa #2	2004 2005	\$ 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/ Field 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., sec. 24
2. Hidden Tank	T. 3 N., R. 16 W., sec. 21
3. Nasca Tank	T. 3 N., R. 17 W., sec. 16
4. Nugget Tank	T. 3 N., R. 17 W., sec. 29

Kofa National Wildlife Refuge

Catchments

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

Dams

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

Springs

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

Tanks

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

Wells

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

Appendix B

Kofa National Wildlife Refuge and 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	<i>Macrotus californicus</i>
Yuma Myotis	<i>Myotis yumanensis</i>
Little Brown Bat	<i>Myotis lucifugus</i>
Cave Myotis	<i>Myotis velifer</i>
California Myotis	<i>Myotis californicus</i>
Western Pipistrelle	<i>Pipistrellus hesperus</i>
Big Brown Bat	<i>Eptesicus fuscus</i>
Spotted Bat	<i>Euderma maculatum</i>
Pallid Bat	<i>Antrozous pallidus</i>
Brazilian Free-tailed Bat	<i>Tadarida brasiliensis</i>
Western Mastiff-bat	<i>Eumops perotis</i>
Pocketed Free-tailed Bat	<i>Nyctinomops femorosaccus</i>
Townsend's Big-eared Bat	<i>Plecotus townsendii</i>
Order Lagomorpha	
Black-tailed Jack Rabbit	<i>Lepus californicus</i>
Desert Cottontail	<i>Sylvilagus audubonii</i>
Order Rodentia	
Harris' Antelope Squirrel	<i>Ammospermophilus harrisi</i>
Round-tailed Ground Squirrel	<i>Spermophilus tereticaudus</i>
Botta's Pocket Gopher	<i>Thomomys bottae</i>
Little Pocket Mouse	<i>Perognathus longimembris</i>
Arizona Pocket Mouse	<i>Perognathus amplus</i>
Long-tailed Pocket Mouse	<i>Perognathus formosus</i>
Bailey's Pocket Mouse	<i>Perognathus baileyi</i>
Desert Pocket Mouse	<i>Perognathus penicillatus</i>
Rock Pocket Mouse	<i>Perognathus intermedius</i>
Merriam's Kangaroo Rat	<i>Dipodomys merriami</i>
Desert Kangaroo Rat	<i>Dipodomys deserti</i>
Southern Grasshopper Mouse	<i>Onychomys torridus</i>
Western Harvest Mouse	<i>Reithrodontomys megalotis</i>
Canyon Mouse	<i>Peromyscus crinitus</i>
Cactus Mouse	<i>Peromyscus eremicus</i>
Deer Mouse	<i>Peromyscus maniculatus</i>
Brush Mouse	<i>Peromyscus boylii</i>

White-throated Woodrat
Desert Woodrat
Porcupine
Desert Shrew

Neotoma albigula
Neotoma lepida
Erethizon dorsatum
Notiosorex crawfordi

Order Carnivora

Coyote
Kit Fox
Gray Fox
Ringtail
Badger
Striped Skunk
Western Spotted Skunk
Mountain Lion
Bobcat

Canis latrans
Vulpes macrotis
Urocyon cinereoargenteus
Bassariscus astutus
Taxidea taxus
Mephitis mephitis
Spilogale putorius
Felis concolor
Lynx rufus

Order Artiodactyla

Mule Deer
Desert Bighorn Sheep
Collared Peccary
Burro

Odocoileus hemionus crooki
Ovis canadensis mexicana
Tayassu tajacu
Equus asinus

Appendix C

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

Western Patch-nosed Snake
Checkered Garter Snake
Western Lyre Snake
Sidewinder
Western Diamondback Rattlesnake
Mojave Rattlesnake
Speckled Rattlesnake
Black-tailed Rattlesnake

Salvadora hexalepis hexalepis
Thamnophis marcianus marcianus
Trimorphodon biscutatus lambda
Crotalus cerastes laterorepens
Crotalus atrox
Crotalus scutulatus scutulatus
Crotalus mitchellii pyrrhus
Crotalus molossus molossus

Appendix D

Kofa National Wildlife Refuge and New Water Mountains Wilderness

Bird List

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

		S	S	F	W
Falcons					
American Kestrel*	<i>Falco sparverius</i>	c	c	c	c
Peregrine Falcon	<i>Falco peregrinus</i>	r	r	r	r
Prairie Falcon	<i>Falco mexicanus</i>	o	o	o	o
Quail					
Gambel's Quail*	<i>Callipepla gambelii</i>	c	c	c	c
Rails & Coots					
American Coot	<i>Fulica americana</i>				x
Plovers					
Killdeer	<i>Charadrius vociferus</i>		o	o	
Stilts & Avocets					
Black-necked Stilt	<i>Himantopus mexicanus</i>			r	
American Avocet	<i>Recurvirostra americana</i>			r	
Sandpipers & Phalaropes					
Greater Yellowlegs	<i>Tringa melanoleuca</i>		r	r	
Solitary Sandpiper	<i>Tringa solitaria</i>			r	
Willet	<i>Catoptrophorus semipalmatus</i>	x			
Spotted Sandpiper	<i>Actitis macularia</i>	r		o	
Long-billed Curlew	<i>Numenius americanus</i>		x		
Western Sandpiper	<i>Calidris mauri</i>		x		
Wilson's Phalarope	<i>Phalaropus tricolor</i>				x
Red-necked Phalarope (Northern)	<i>Phalaropus lobatus</i>			x	
Doves					
White-winged Dove*	<i>Zenaida asiatica</i>		c	c	c
Mourning Dove*	<i>Zenaida macroura</i>	c	c	c	u
Common Ground Dove	<i>Columbina passerina</i>		o	o	
Cuckoos & Roadrunners					
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>		x		
Greater Roadrunner*	<i>Geococcyx californianus</i>	o	o	o	o
Owls					
Barn owl	<i>Tyto alba</i>	o	o		
Flammulated Owl	<i>Otus flammeolus</i>		x		
Western Screech-Owl	<i>Otus kennicotti</i>	c	c	c	c
Great Horned Owl*	<i>Bubo virginianus</i>	u	u	u	u
Elf Owl	<i>Micrathene whitneyi</i>	c	c		
Long-eared Owl	<i>Asio otus</i>	r	r	r	r

		S	S	F	W
Goatsuckers					
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	o	o	r	
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	c	c	c	r
Swifts					
Vaux's Swift	<i>Chaetura vauxi</i>			o	
White-throated Swift*	<i>Aeronautes saxatalis</i>	u	u	u	u
Hummingbirds					
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	o	o		
Anna's Hummingbird	<i>Calypte anna</i>	o		o	o
Costa's Hummingbird*	<i>Calypte costae</i>	c	u	u	u
Rufous Hummingbird	<i>Selasphorus rufus</i>	o		o	
Kingfishers					
Belted Kingfisher	<i>Ceryle alcyon</i>		o	o	
Woodpeckers					
Lewis' Woodpecker	<i>Melanerpes lewis</i>	r	r	r	r
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>			r	
Gila Woodpecker*	<i>Melanerpes uropygialis</i>	c	c	c	c
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>			r	
Ladder-backed Woodpecker*	<i>Picoides scalaris</i>	o	o	o	o
Red-shafted Flicker	<i>Colaptes auratus</i>	c		c	c
Guillemot Flicker*	<i>Colaptes chrysoides</i>	c	c	c	c
Tyrant Flycatchers					
Olive-sided Flycatcher	<i>Contopus borealis</i>	o			o
Western Wood-Pewee	<i>Contopus sordidulus</i>	c	u	c	c
Willow Flycatcher	<i>Empidonax traillii</i>	u		u	
Hammond's Flycatcher	<i>Empidonax hammondii</i>	o		o	
Dusky Flycatcher	<i>Empidonax oberholseri</i>	u		u	
Gray Flycatcher	<i>Empidonax wrightii</i>	o	o	o	
Cordilleran Flycatcher (Western)	<i>Empidonax occidentalis</i>	c		c	
Black Phoebe	<i>Sayornis nigricans</i>	o	o	o	
Say's Phoebe *	<i>Sayornis saya</i>	c	u	c	c
Vermilion Flycatcher	<i>Pyrocephalus rubinus</i>	r			
Ash-throated Flycatcher*	<i>Myiarchus cinerascens</i>	c	c		r
Brown-crested Flycatcher*	<i>Myiarchus tyrannulus</i>	r	r		
Western Kingbird	<i>Tyrannus verticalis</i>	u	u	u	
Larks					
Horned Lark	<i>Eremophila alpestris</i>			o	r

		S	S	F	W
Swallows					
Tree Swallow	<i>Tachycineta bicolor</i>		x		
Violet-green Swallow	<i>Tachycineta thalassina</i>	u	u	u	u
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		o	o	
Cliff Swallow	<i>Hirundo pyrrhonota</i>		o		r
Barn Swallow	<i>Hirundo rustica</i>			r	
Jays & Crows					
Steller's Jay	<i>Cyanocitta stelleri</i>			r	r
Scrub Jay	<i>Aphelocoma coerulescens</i>	o	r	o	o
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>			r	
Common Raven	<i>Corvus corax</i>	o	o	o	o
Verdins					
Verdin*	<i>Auriparus flaviceps</i>	c	c	c	c
Nuthatches					
Red-breasted Nuthatch	<i>Sitta canadensis</i>				o
Wrens					
Cactus Wren*	<i>Campylorhynchus brunneicapillus</i>	c	c	c	c
Rock Wren*	<i>Salpinctes obsoletus</i>	c	c	c	c
Canyon Wren*	<i>Catherpes mexicanus</i>	c	c	c	c
Bewick's Wren	<i>Thryomanes bewickii</i>			o	o
House Wren	<i>Troglodytes aedon</i>	c		c	u
Kinglets & Gnatcatchers					
Ruby-crowned Kinglet	<i>Regulus calendula</i>	c		c	c
Blue-gray Gnatcatcher*	<i>Polioptila caerulea</i>	o	o	o	o
Black-tailed Gnatcatcher*	<i>Polioptila melanura</i>	c	c	c	c
Thrushes					
Western Bluebird	<i>Sialia mexicana</i>			o	o
Mountain Bluebird	<i>Sialia currucoides</i>	o			o
Townsend's Solitaire	<i>Myadestes townsendi</i>	o		o	r
Swainson's Thrush	<i>Catharus ustulatus</i>	u		r	
Hermit Thrush	<i>Catharus guttatus</i>	o		u	o
American Robin	<i>Turdus migratorius</i>	o		u	o
Mockingbirds & Thrashers					
Brown Thrasher	<i>Toxostoma rufum</i>			x	
Gray Catbird	<i>Dumetella carolinensis</i>			r	
Northern Mockingbird*	<i>Mimus polyglottos</i>	c	u	c	u
Sage Thrasher	<i>Oreoscoptes montanus</i>	o		o	o
Bendire's Thrasher*	<i>Toxostoma bendirei</i>	u	u		
Curve-billed Thrasher*	<i>Toxostoma curvirostre</i>	c	c	c	c
Crissal Thrasher*	<i>Toxostoma crissale</i>	o	o	o	o
LeConte's Thrasher	<i>Toxostoma lecontei</i>	o	o		

		S	S	F	W
Pipits					
American Pipit (Water)	<i>Anthus rubescens</i>			r	
Waxwings					
Cedar Waxwing	<i>Bombycilla cedrorum</i>	o		o	
Silky Flycatchers					
Phainopepla*	<i>Phainopepla nitens</i>	c	u	c	c
Shrikes					
Loggerhead Shrike*	<i>Lanius ludovicianus</i>	c	c	c	c
Starlings					
European Starling*	<i>Sturnus vulgaris</i>	o			o
Vireos					
Gray Vireo	<i>Vireo vicinior</i>	r		o	
Solitary Vireo	<i>Vireo solitarius</i>	o		o	
Hutton's Vireo	<i>Vireo huttoni</i>			r	
Warbling Vireo	<i>Vireo gilvus</i>	c		c	
Philadelphia Vireo	<i>Vireo philadelphicus</i>			x	
Wood-Warblers					
Orange-crowned Warbler	<i>Vermivora celata</i>	c		c	
Nashville Warbler	<i>Vermivora ruficapilla</i>	c		u	
Lucy's Warbler*	<i>Vermivora luciae</i>	r	r		
Yellow Warbler	<i>Dendroica petechia</i>	c		c	u
Yellow-rumped Warbler (Audubon's)	<i>Dendroica coronata</i>	c		c	u
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	u	c	u	u
Townsend's Warbler	<i>Dendroica townsendi</i>	c		o	
Hermit Warbler	<i>Dendroica occidentalis</i>	u		u	
American Redstart	<i>Setophaga ruticilla</i>	x			
Prothonotary Warbler	<i>Protonotaria citrea</i>			x	
Northern Waterthrush	<i>Seiurus noveboracensis</i>	x			
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	c		u	
Common Yellowthroat	<i>Geothlypis trichas</i>	x			
Wilson's Warbler	<i>Wilsonia pusilla</i>	c		u	
Painted Redstart	<i>Myioborus pictus</i>			r	
Yellow-breasted Chat	<i>Icteria virens</i>			r	
Tanagers					
Hepatic Tanager	<i>Piranga flava</i>		o		
Western Tanager	<i>Piranga ludoviciana</i>	c	u	c	

Cardinals & Grosbeaks

Northern Cardinal	<i>Cardinalis cardinalis</i>		o		
Pyrrhuloxia	<i>Cardinalis sinuatus</i>	r			r
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	x			
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	u	o	u	
Blue Grosbeak	<i>Guiraca caerulea</i>		r		
Lazuli Bunting	<i>Passerina amoena</i>	c		u	

Towhees & Sparrows

Green-tailed Towhee	<i>Pipilo chlorurus</i>	u	u	u	o
Rufous-sided Towhee	<i>Pipilo erythrophthalmus</i>	u	u	o	o
Canyon Towhee*	<i>Pipilo fuscus</i>	c	c	c	c
Abert's Towhee	<i>Pipilo aberti</i>	x			
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	r	r	r	r
Chipping Sparrow	<i>Spizella passerina</i>	c	c	u	o
Brewer's Sparrow	<i>Spizella breweri</i>	c		c	u
Black-chinned Sparrow	<i>Spizella atrogularis</i>	o	o	o	o
Vesper Sparrow	<i>Poocetes gramineus</i>	u		o	r
Lark Sparrow	<i>Chondestes grammacus</i>	o	o	o	
Black-throated Sparrow*	<i>Amphispiza bilineata</i>	c	c	c	c
Sage Sparrow	<i>Amphispiza belli</i>			u	u
Lark Bunting	<i>Calamospiza melanocorys</i>			x	
Savannah Sparrow	<i>Passerculus sandwichensis</i>			x	
Fox Sparrow	<i>Passerella iliaca</i>		o		o
Lincoln's Sparrow	<i>Melospiza lincolnii</i>			o	
White-throated Sparrow	<i>Zonotrichia albicollis</i>				x
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	c	u	u	o
Dark-eyed Junco (Oregon)	<i>Junco hyemalis</i>	o		c	u
Dark-eyed Junco (Gray-headed)	<i>Junco hyemalis</i>			o	o

Blackbirds & Orioles

Red-winged Blackbird	<i>Agelaius phoeniceus</i>	r			r
Western Meadowlark	<i>Sturnella neglecta</i>			o	o
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>		o	o	
Rusty Blackbird	<i>Euphagus carolinus</i>			r	u
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>			o	
Brown-headed Cowbird	<i>Molothrus ater</i>	u	u	o	o
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	o		o	o
Hooded Oriole*	<i>Icterus cucullatus</i>	o	o	r	
Bullock's Oriole	<i>Icterus bullockii</i>	u	c	u	
Scott's Oriole*	<i>Icterus parisorum</i>	c	c	u	o

Finches

Purple Finch	<i>Carpodacus purpureus</i>			r	r
Cassin's Finch	<i>Carpodacus cassinii</i>			u	u
House Finch*	<i>Carpodacus mexicanus</i>	c	c	c	c
Pine Siskin	<i>Carduelis pinus</i>			o	
Lesser Goldfinch	<i>Carduelis psaltria</i>	o	o	u	r
Lawrence's Goldfinch	<i>Carduelis lawrencei</i>	u		o	
American Goldfinch	<i>Carduelis tristis</i>	x			

Old World Sparrows

House Sparrow	<i>Passer domesticus</i>			o	o	o
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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* Rydb. 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 bigelovii 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

Areaceae (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 thomasi 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 gordonii (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* (Rydb.) 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
Psoralea spinosa (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) Shinnery

Sterculiaceae (Cacao Family)

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

Tamaricaceae (Tamarix Family)

Tamarix chinensis Loureiro [*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 engelmannii (Parry) Lemaire Engelmann Hedgehog Cactus

Echinocereus engelmannii (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) Shinnars [=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 barbiger (Gray) Greene var. *barbiger* 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
Carlwrightia arizonica Gray
Justicia californica Benth. Chuparosa, Honeysuckle

Plantaginaceae (Plantain Family)

Plantago insularis Eastw. Woolly 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 Bailey

Baileya pleniradiata H & G Woolly 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) Shinnery 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) Shinnery ssp. *pinnatifida* var. *pinnatifida* [= *Haplopappus spinulosus* (Pursh) DC ssp. *spinulosus*] Spiny Goldenbush
Machaeranthera pinnatifida (Hook) Shinnery 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) Shinnery [= *Pluchea sericea* (Nutt)] Arrowweed
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

Interdisciplinary Planning Team

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*	Wilderness Specialist

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
Joe Mazzoni	Assistant Director Region 2, Refuges and Wildlife
Dick Steinbach	Refuge Program Specialist
Dave Siegel	Archaeologist
Jill Simmons	Writer/Editor

Arizona Game and Fish Department

Region IV - Yuma

John Hervert	Wildlife Program Manager
John Kennedy*	Habitat Program Manager
Deanna Pflieger*	Wildlife Manager
Larry Phoenix	Wildlife Manager
Richard Remington	Wildlife Manager Supervisor 3
Jimmy Simmons	Wildlife Manager
Lowell Whitaker	Wildlife Manager

*Member of Core Interdisciplinary Planning Team

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.

A draft plan was released for a 45-day public review and comment period on January 26, 1996. The comment period was then extended to May 8, 1996. Comments received on the draft plan were analyzed by the Interdisciplinary Team and appropriate revisions were made for inclusion in the final document. A compilation of the comments is available upon request.

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 & 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 consultations between the AGFD and Kofa/BLM 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 consultation 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 improved, 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 1998.
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, 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 distur-

bances 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 non-wilderness 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.

This alternative would not prohibit 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 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 F 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.

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 Cicherson Jan 17, 1997
Field Manager, Yuma Field Office Date

Recommended by: Caryl Dambing - Acting Jan 17, 1997
Kofa National Wildlife Refuge Manager Date

Approved by: Harry D. Roberts Jan 21, 1997
BLM State Director, Arizona Date

USFWS Concurrence by: Jeff Fontaine III, Acting Jan 22, 1997
Geographic Manager Gila/Salt/Verde Ecosystem Date

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Yuma Field Office
2555 East Gila Ridge Road
Yuma, AZ 85365-2240

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