

ACKNOWLEDGEMENTS

This Master Plan evolved over nearly a decade of persistent and focused efforts of many individuals and entities all believing in a shared common goal of conserving and protecting Spur Cross Ranch for future generations. The contents of this Master Plan represents the vision, goals, and objectives of an overwhelming majority of the citizens of Cave Creek who supported the bond election to purchase Spur Cross Ranch in cooperation with the Maricopa County Parks and Recreation Department and the Arizona State Parks Department. Many Cave Creek and area residents, public officials, and public organization staff where actively involved in the master planning process over the past two years. Please see Section XIII for a list of those who participated in developing the Master Plan.

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LIST OF ACRONYMS

A&WWw	Aquatic and Wildlife, Warm Water
ADA	Americans with Disabilities Act
ADEQ	Arizona Department of Environmental Quality
AGFD	Arizona Game and Fish Department
Agl	Agricultural Livestock
amsl	above mean sea level
ANSI	American National Standards Institute
API	Arizona Preserve Initiative
APP	Aquifer Protection Permit
APS	Arizona Public Service
AWQS	Aquifer Water Quality Standards
CCMZ	Cave Creek Management Zone
cfs	cubic feet per second
CCWC	Cave Creek Water Company
CIP	Capital Improvement Program
dB	decibels
dBA	A-weighted sound level
DFLT	Desert Foothills Land Trust
FY	Fiscal Year
E.coli	Escherichia coli
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
°F	degree Fahrenheit
FBC	Full Body Contact
FC	Fish Consumption
FCDMC	Flood Control District of Maricopa County
Forest Service	U.S. Forest Service
GIS	Geographical Information System
GPS	Global Positioning System
Hz	Hertz
IGA	Intergovernmental Agreement

JPC	Joint Planning Committee
LAC	Limits of Acceptable Change
L ₁₀	statistical noise descriptors
L _{eq}	equivalent sound level
L _{max}	maximum sound level
L _{min}	minimum sound level
LOS	Limits of Acceptable Change
Ma	million years ago
MZ	Management Zone
MCPRD	Maricopa County Parks and Recreation Department
MCRT	Maricopa County Regional Trail
NWS	National Weather Service
PDUMZ	Primitive Desert Upland Management Zone
POR	Period of Record
ROS	Recreation Opportunity Spectrum
RUP	Recreational Use Permit
SCRCA	Spur Cross Ranch Conservation Area
SCTMZ	Spur Cross Trail Management Zone
SEL	sound exposure level
STL	State Trust Lands
SWQS	Surface Water Quality Standards
TDUMZ	Threshold Desert Upland Management Zone
TNF	Tonto National Forest
URS	URS Corporation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

LIST OF ACRONYMS

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SECTION I: EXECUTIVE SUMMARY

Introduction

The Spur Cross Ranch Conservation Area (SCRCA) is a 2,154-acre parcel purchased by the State of Arizona, Maricopa County, and Town of Cave Creek (Figure I-1), and is managed by the Maricopa County Parks and Recreation Department (MCPRD) through Intergovernmental Agreements (IGA) between these participants (Appendix A). It should be noted that these existing IGAs will take precedent over the contents of this master plan should a conflict arise pursuant to Sections 1.6, 5.4, 6.1.1, and 6.3 of the IGA developed between the Town of Cave Creek and Maricopa County. Further, quotas or use limits will not be implemented as a part of this master plan rather adaptive management decisions will be made in an effort to protect and conserve the natural and cultural resources of SCRCA.

The SCRCA encompasses all of Sections 5 and 6, and portions of Sections 4, 7, 8, and 9 of Township 6 North, Range 4 East, in Maricopa County as depicted on the New River Mesa 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle. This section briefly describes the scope of the SCRCA Master Plan (hereafter referred to as the Master Plan) and major recommended Master Plan goals. The Master Plan:

1. was developed through a comprehensive public participation process.
2. considered existing and proposed Federal, county, state, and local planning efforts in the region.
3. provides for the long-term monitoring and protection of cultural and environmental resources.
4. provides for non-motorized passive day use recreational activities.
5. embraces existing interpretive and education programs available at SCRCA.
6. utilizes an adaptive management decision-making process to implement Master Plan objectives.

7. provides a process for reviewing, revising, and amending the Master Plan.

Scope of the SCRCA Master Plan

The Master Plan addresses issues and provides recommendations for managing lands within SCRCA that conserve and protect cultural and natural resources while providing for non-motorized day use activities. The Master Plan reflects input received from agencies, stakeholders, and the public received within the two-year planning process that began in February 2002 (Appendix B). The Master Plan provides recommendations for management of environmental and cultural resources within the context of the U.S. Forest Service's Limits of Acceptable Change Process (LAC) and Recreation Opportunity Spectrum (ROS), which were adapted and modified to meet the unique requirements of the Master Plan. The primary focus of the process was on the conservation and protection of environmental and cultural resources and a secondary focus on recreation, interpretive, and educational opportunities for visitors at SCRCA. The Master Plan is intended to provide a framework for management of SCRCA. Admittedly, this framework can be limited to the extent that Master Plan goals can be collaboratively achieved through long-term coordination efforts with surrounding landowners and agencies as well as continued development and participation of volunteer groups with an interest in achieving the vision of SCRCA. The following list contains primary goals addressed within the Master Plan:

1. to continue development of a comprehensive regionally integrated natural and cultural resources management program with adjacent landowners.
2. to provide for the continuity of land management and the transfer of knowledge during changes of SCRCA land managers and staff.
3. to provide for adaptive management, monitoring, and implementation strategies that account for current and future conditions within SCRCA.
4. to manage SCRCA for use and enjoyment of visitors that minimizes adverse impacts to ecological and cultural resources.

SPUR CROSS RANCH CONSERVATION AREA

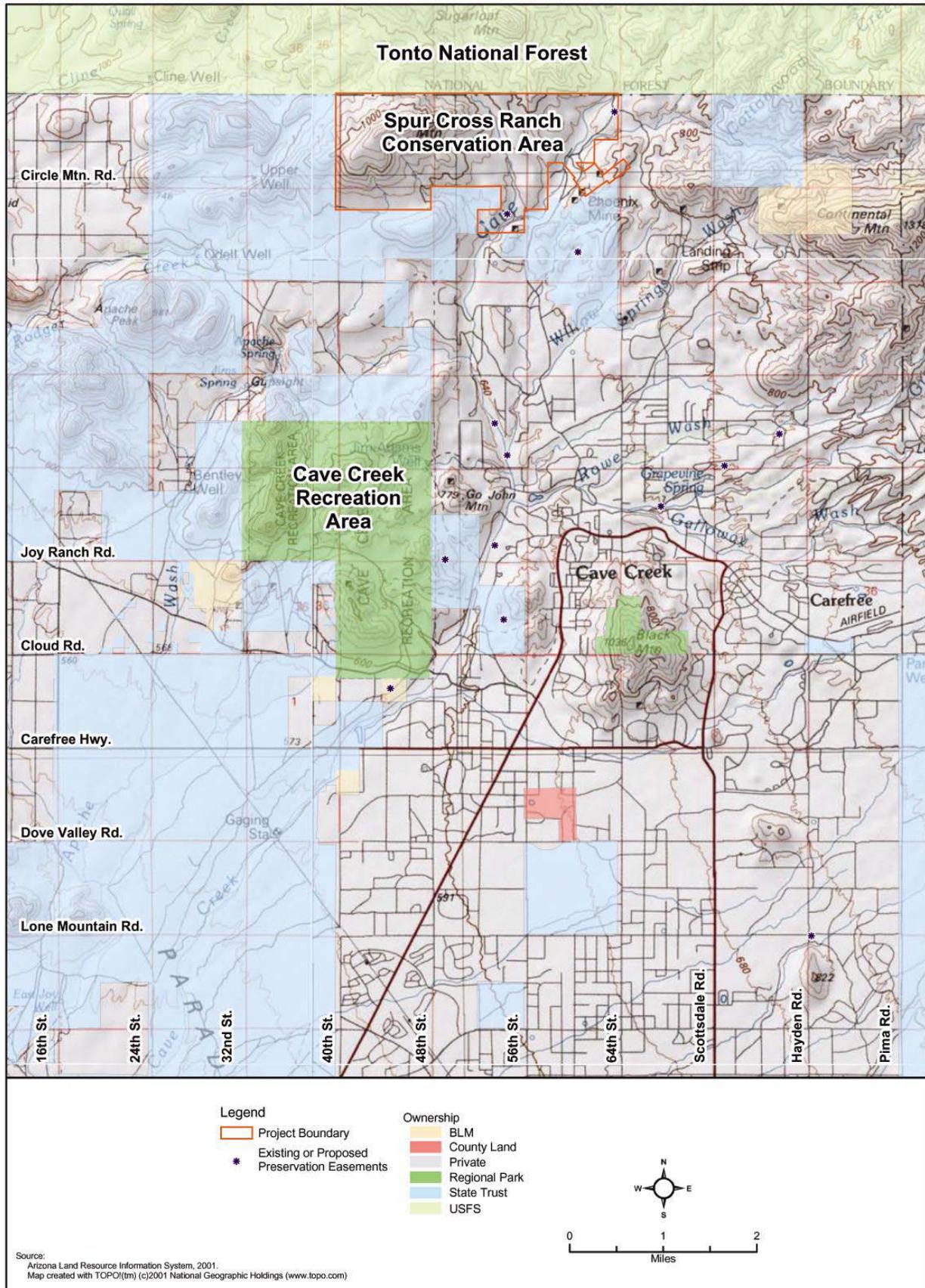


FIGURE I-1: Regional Map

5. to continue a pro-active collaborative approach in addressing the need for baseline environmental and cultural resource data within SCRCA.
6. to develop and implement a Geographic Information System (GIS) and Global Positioning System (GPS) database management system to manage, analyze, interpret, and archive data collected on SCRCA.
7. to ensure that implementation of management recommendations within the Master Plan are consistent with the vision of SCRCA.
8. to provide a process to review, revise, and amend the Master Plan.

It should be noted that long-term and continuous achievement of the vision of SCRCA requires identifying when impacts on environmental or cultural resources occur through long-term monitoring efforts while avoiding impact, and balancing increased visitation on SCRCA. Refinement of goals and objectives contained within this Master Plan should reflect the integration of current data available, incorporation of agency and public comment, as well as evaluation of implemented land management decisions.

SCRCA Master Plan Periodic Reviews

SCRCA land managers will produce an annual report in March for presentation at the Cave Creek Town Council meeting. This report will contain information related to the implementation of master plan goals and objectives during the previous planning year. At a minimum this report will contain the following:

1. Statement related to the types and locations of uses and users on SCRCA.
2. Statement regarding the tasks completed for the previous year.
3. Statement regarding proposed tasks to be completed in the up-coming year.

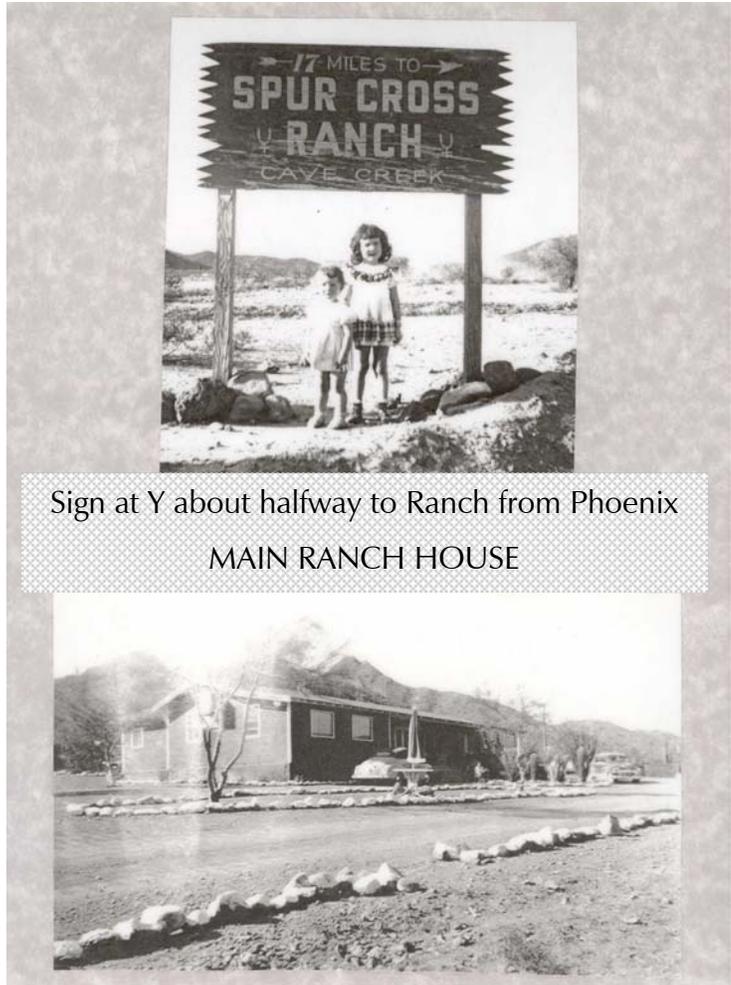
SECTION II: HISTORY OF SCRCA

In 1997, the Town of Cave Creek annexed the SCRCA, in opposition to potential development proposals for the site. To facilitate SCRCA's designation as a conservation area, a unique partnership was formed among MCPRD, State of Arizona, and Town of Cave Creek. The land within the SCRCA was acquired by the three jurisdictions. The Arizona State Parks Board used State Heritage Funds to contribute to the purchase of the property and, under the terms of an IGA with Maricopa County, transferred its legal interest in the property to the County in exchange for its management as a limited use public recreation and conservation area. In addition, Maricopa County and the Town of Cave Creek developed an IGA that outlines the specifics for funding and management of SCRCA (see Appendix A).

Maricopa County owns 70 percent of the SCRCA, and the Town of Cave Creek owns 30 percent of the property. The County has a 60-year agreement with the State and Town to manage SCRCA.

MCPRD and the Town of Cave Creek initiated the effort to develop a Master Plan that would address the conservation and protection of natural and cultural resources on SCRCA while providing for non-motorized passive day-use recreation, interpretation, and educational activities.

A more detailed description of both prehistoric and historic occupation and use of SCRCA is discussed in Section IV.



Sign at Y about halfway to Ranch from Phoenix
MAIN RANCH HOUSE

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SECTION III: OVERVIEW OF THE MASTER PLANNING PROCESS

Vision Statement and SCRCA Master Plan Goals

Vision Statement

Early on in the master planning process, a collaborative vision statement was developed by SCRCA land managers and the public. This vision statement drove the development of management goals and objectives contained within this Master Plan. Following is the publicly adopted vision statement for SCRCA:

“To protect and enhance the conservation area’s archaeological, historical, and natural resources, including the integrity of its ecological processes, while providing opportunities for non-motorized public day-use recreation and education.”

SCRCA Master Plan Goals

The purpose of the Master Plan is to establish goals to guide the management of natural and cultural resources and visitor use on SCRCA. The primary need for the Master Plan is to address the sensitivities of environmental and cultural resources associated with visitation and recreational use within SCRCA.

The Master Plan process began with development of a Joint Planning Committee (JPC). The JPC was fundamental in making decisions related to this master plan. The stakeholders group, in turn, acted as a sounding board for the general public. Through the integration of input from these entities, goals were developed for management of SCRCA. These goals led to the development of objectives to achieve defined management goals. The Master Plan is intended to make management recommendations that will assist SCRCA land managers in achieving the following goals:



I would feel more optimistic about a bright future for man if he spent less time proving that he can outwit Nature and more time tasting her sweetness and respecting her seniority.

E. B. White

Overall Goals

1. To continue identifying and addressing internal and external threats and issues related to ecosystem biodiversity, ecological inventory and monitoring, species management, vegetation management, pest management, potential degradation of cultural, natural, and conservation resource values.
2. To continue development of a comprehensive and integrated natural and cultural resources management program that addresses the interactions among geological, hydrological, biological, and cultural resources within SCRCA.
3. To provide for the continuity of land management and transfer of knowledge during changes of SCRCA land managers and staff.
4. To provide for adaptive management, monitoring, and implementation strategies that account for current and future conditions within SCRCA.
5. To manage SCRCA for use and enjoyment of visitors that minimizes adverse impacts to ecological and cultural resources.
6. To continue a pro-active collaborative approach in addressing the need for baseline environmental and cultural resource data within SCRCA.
7. To develop and implement a GIS database management system to manage, analyze, interpret, and archive data collected on SCRCA.
8. To provide a process to review, revised and amend the Master Plan.
9. Any ground-disturbing activities implemented on SCRCA will consider the conservation and protection of cultural resources.

*Conservation is
humanity caring for the
future.*

Nancy Newhall

Cultural Resource Goals

1. To continue to identify, evaluate, and monitor archaeological, historical, and traditional cultural resources.
2. To maintain a GIS database about cultural resource data contained within SCRCA, and control distribution of that information as needed to prevent vandalism.
3. To continue to develop programs, policies, guidelines, and data to help conserve and protect significant archaeological, historical, and traditional cultural resources.
4. To continue to develop partnerships with agencies and organizations with cultural resources expertise, and programs for volunteer docents and site stewards.
5. To consult with the State Historic Preservation Office, Arizona State Museum, and interested American Indian tribes regarding the status of cultural resources on SCRCA when required.

Biological Resource Goals

1. To continue to identify, inventory, monitor, and promote the conservation of all federal, state and locally listed threatened, endangered, rare, declining, sensitive, fully protected, or candidate species that are native to and present in SCRCA, as well as their habitats.
2. To continue to control non-native vegetation and continued development of an integrated pest management plan.
3. To continue rehabilitation and reclamation of disturbed areas (including obsolete or redundant trails).
4. To develop standard operation procedures for the propagation and monitoring of native vegetation.

5. To seek to perpetuate native plant life (such as vascular plants, ferns, mosses, algae, fungi, and bacteria) as critical components of natural desert ecosystems.

Water Resource Goals

1. To continue to participate in a long-term water monitoring program that would address the quality and quantity of ground and surface water within Cave Creek and its tributaries within SCRCA. To work collaboratively with other entities in identifying data needs and additional analysis.
2. To coordinate watershed and riparian management goals with the Tonto National Forest (TNF), Arizona State Land Department, and private landowners adjacent to SCRCA.

Geological Resource Goals

1. To inventory, interpret, and protect geological resources as an integral component of the ecosystem, including both geologic features and geologic processes.
2. To continue to address geological processes in planning and other management activities to identify hazards to visitors and staff.
3. To inventory and preserve soil resources, and prevent unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources.

Paleontological Resource Goals

1. To inventory, monitor, protect, and preserve, and where appropriate, make available for scientific research these resources.
2. To ensure that the nature and specific location of these resources remains outside of the public domain.

Abandoned Mine Site Goals

1. To continue to develop a monitoring and maintenance program to (a) study the wildlife use of abandoned mine sites and (b) determine how and when a mine site

should be closed to the public, but remain open for wildlife use.

2. To include, as part of the education/interpretation program, the hazards and wildlife opportunities associated with abandoned mine sites.

Visual Resource Goals

1. To maintain the existing scenic quality of SCRCA.
2. To consider adjacent views related to scenic quality on SCRCA.

Acoustical Goals

1. To maintain the integrity of acoustical resources on SCRCA that ensures a quality visitor experience.

Lands Management Goals

1. To prohibit land disposal of SCRCA or reclassification as anything other than a conservation area.
2. To continue to recognize existing prescribed access easements on SCRCA.

Recreational Use Goals

1. To continue to promote, through teaming opportunities, steward programs, docent, and other volunteer groups, and the conservation of natural and cultural resources for the purposes of education, research, and interpretation.
2. To continue to provide visitors at SCRCA accurate information regarding recreational opportunities as well as risks on SCRCA.
3. To continue to institute regulations and restrictions on SCRCA only when monitoring of natural and cultural resources indicates a trend toward unacceptable change to desired management objectives brought about by visitor use.

SECTION III: OVERVIEW OF THE MASTER PLANNING PROCESS

*In God lies the hope of
the world—the great
fresh unblighted
unredeemed
wilderness. The galling
harness of civilization
drops off, and the
wounds heal ere we
are aware.*

**John Muir, from
John of the Mountains
July 1890**

4. To develop and maintain a GIS visitor use database that will assist SCRCA land managers with quantifying and qualifying the types of users and uses on SCRCA.

Interpretation/Education Program Goals

1. To continue development of a comprehensive interpretation and education program.
2. To continue to organize, develop, and support stewardship, docent, and other volunteer programs to support a broad range of visitor interpretive opportunities.
3. To continue to pursue partnerships with school teachers and university programs and others to provide students and the public with current information on cultural and natural resources of SCRCA.

Trail Plan Goals

1. To continue planning for trails that minimize environmental impact.
2. To provide for a variety of guided and unguided recreation opportunities that are practical and consistent with the SCRCA vision.

Fire Management Goals

1. To suppress all fires and implement all fire management actions using methods, equipment, and tactics that cause the least impact on natural and cultural resources.
2. To continue to develop a collaborative fire management strategy with surrounding landowners.
3. To proactively plan for post revegetative treatments after a fire event.

The following sections describe the framework employed to develop management recommendations associated with the conservation and protection of natural and cultural resources on SCRCA.

Limits of Acceptable Change

SCRCA land managers recognized two federally adopted management systems that would be appropriate for employment during the master planning process.

1. The LAC model was used as a planning framework for conservation area planning.
2. The ROS model was used as a planning framework for recreation area planning.

The LAC process (Figure III-1) as well as the ROS recreation area planning process were blended in an effort to achieve a delicate balance between natural and cultural resource protection and conservation and recreational use on SCRCA. The LAC was adopted by the U.S. Forest Service (Forest Service) in 1985 as a process to manage designated wilderness areas within Forest System Lands. The primary focus of the LAC is to ensure that environmental resources are not degraded beyond management thresholds through development of indicators, standards, and long-term monitoring activities. By comparison, the ROS was adopted by the Forest Service in 1986 as a process to manage Forest System Lands with the primary focus on addressing the needs of recreational users at different experience levels within a variety of settings.

A key consideration in the hybridization of the ROS and the LAC was that SCRCA land managers would allow mechanized recreational uses (e.g., mountain bikes), intermittent motorized uses (e.g., administrative vehicles), and potentially Americans with Disabilities Act (ADA) motorized access within SCRCA. These motorized uses are not accounted for within the LAC because the LAC was developed to manage wilderness areas, which prohibits any type of mechanized or motorized activities. Tenants related to the LAC (e.g., indicators, standards, and monitoring activities) were incorporated into tenants of the ROS-related planning for a variety of recreational experiences while conserving and protecting natural and cultural resources. It was through this blending of both systems that the Master Plan maximized interpretive/educational and passive non-motorized recreational activities while specifically identifying

The Limits of Acceptable Change Process



Figure III-1: Limits of Acceptable Change Process

and planning for the sensitivities of environmental resources related to use.

Use quotas or limits will not be implemented on SCRCA. Rather, SCRCA land managers will utilize the following methods to ensure conservation and protection of environmental and cultural resources on SCRCA:

1. Education of users on SCRCA which would include interpretation and site signage.
2. Placement of physical barriers to prevent access into sensitive areas or areas requiring remediation actions.
3. Utilization of trained docents, stewards, and volunteers to guide the general public through sensitive areas.
4. Temporarily closing areas during reestablishment.

The LAC emphasizes a framework for establishing acceptable, appropriate, and measurable resource and social conditions on SCRCA. The LAC process focuses on desired conditions, defines what is, and is not, acceptable, and develops a strategy to prevent unacceptable impact. The premises of the LAC process are:

- some change to existing conditions is inevitable
- the focus is on human-induced change
- the effects of human activities are important
- a diversity of settings is important to maintain
- determining what is acceptable is value-based

The LAC system was used to determine how change to natural and cultural resources over time will be managed for and determine objectives needed to prevent adverse change. The LAC planning process is a participatory process to determine what kind of natural conditions are desired and prescribe measurable objectives to protect or conserve identified conditions. The LAC process consists of the following four major components:

SECTION III: OVERVIEW OF THE MASTER PLANNING PROCESS

1. Identify resource indicators
2. Determine resource standards
3. Prescribe management objectives
4. Implement long-term monitoring programs

The following paragraphs describe these four topics.

Indicators can be measured to track change in conditions caused by human activity. The purpose of indicators is to focus data collection efforts on what is important. Monitoring indicators are a means to ensure that standards are being met.

Standards are developed to ensure desired conditions of SCRCA resources and values are maintained or enhanced. These are measurable statements that describe the resource and experience conditions that are considered realistic, attainable, and acceptable. Standards are developed using the best available knowledge as a result of resource inventories, including ecological limitations, visitor-use patterns, and existing environmental conditions, as well as current literature on resource conditions.

Management objectives are identified and are implemented as needed depending on the resource conditions. In many cases, indirect management actions (such as visitor education) accompany more direct actions (such as site rehabilitation) to achieve desired conditions.

Monitoring programs assist SCRCA land managers with the long-term management of SCRCA resources, by comparing conditions over time to the standard assigned to a resource.

As stated previously, the LAC and ROS processes were employed for the Master Plan to facilitate the balancing of visitor use with the protection and conservation of SCRCA natural and cultural resources.

Management Zones

The design of the implementation program for a hybrid LAC Process included input from the public, agencies, and SCRCA

land managers, and divided SCRCA into four distinct management zones (MZ) (Figure III-2). Each MZ contains a set of management prescriptions that are recommended for SCRCA land managers to consider what types of activities and resource conservation and protection methods apply within each MZ. The four MZ defined for SCRCA are as follows:

- Spur Cross Trail Management Zone (SCTMZ)
- Cave Creek Management Zone (CCMZ)
- Threshold Desert Upland Management Zone (TDUMZ)
- Primitive Desert Upland Management Zone (PDUMZ)

The MZ are based upon the following questions:

- What types of visitor activities are most compatible with the resources contained within a specific geographic area of SCRCA?
- What are the sensitivities of both natural and cultural resources within a MZ related to existing and proposed visitor use?
- What is the likelihood of effective on-site monitoring of natural and cultural resources?

The following general MZ descriptions outline characteristics associated with each MZ. Prescribed MZ recommendations are contained in Table III-1.

Spur Cross Trail Management Zone

The SCTMZ can be characterized as a corridor that extends from the southern main entrance of SCRCA to the TNF boundary that will be managed to accommodate a variety of recreational and interpretive activities. It is 185.95 acres in size. Within this MZ, concentrated activities will occur as it acts as a logical conduit between urban areas and more remote natural areas. It is anticipated that a heightened level of natural and cultural resource monitoring will occur in this MZ as access to sensitive areas is well established along existing trails. Examples of permitted uses within this MZ include:

1. Interpretation opportunities
2. Equestrian and hiking activities
3. Bicycling and other passive day uses

Cave Creek Management Zone

The CCMZ can be characterized as a riparian corridor that extends almost parallel to the SCTMZ in a northeast to southwest direction. It is 123.64 acres in size. It is the most sensitive MZ within SCRCA as it contains one of the last remaining perennial riparian woodlands in Maricopa County as well as very high densities of historic and prehistoric artifacts. This MZ is anticipated to be intensely monitored with a focus on water quality, invasive species, and cultural and biological resource conservation. Examples of permitted uses within this MZ include:

1. Interpretation opportunities
2. Hiking activities
3. Bird watching

Threshold Desert Upland Management Zone

The TDUMZ can be characterized as an area of land west and northwest of the CCMZ. It is 469.85 acres in size. This MZ acts as a buffer and transition zone within SCRCA to the more pristine PDUMZ situated adjacent to it. The TDUMZ is intended to be managed for a variety of recreational and interpretive uses. Activities within this MZ are less restricted than those permitted within the CCMZ, but more restrictive than those associated with the PDUMZ. Examples of permitted uses within this MZ include:

1. Interpretation opportunities

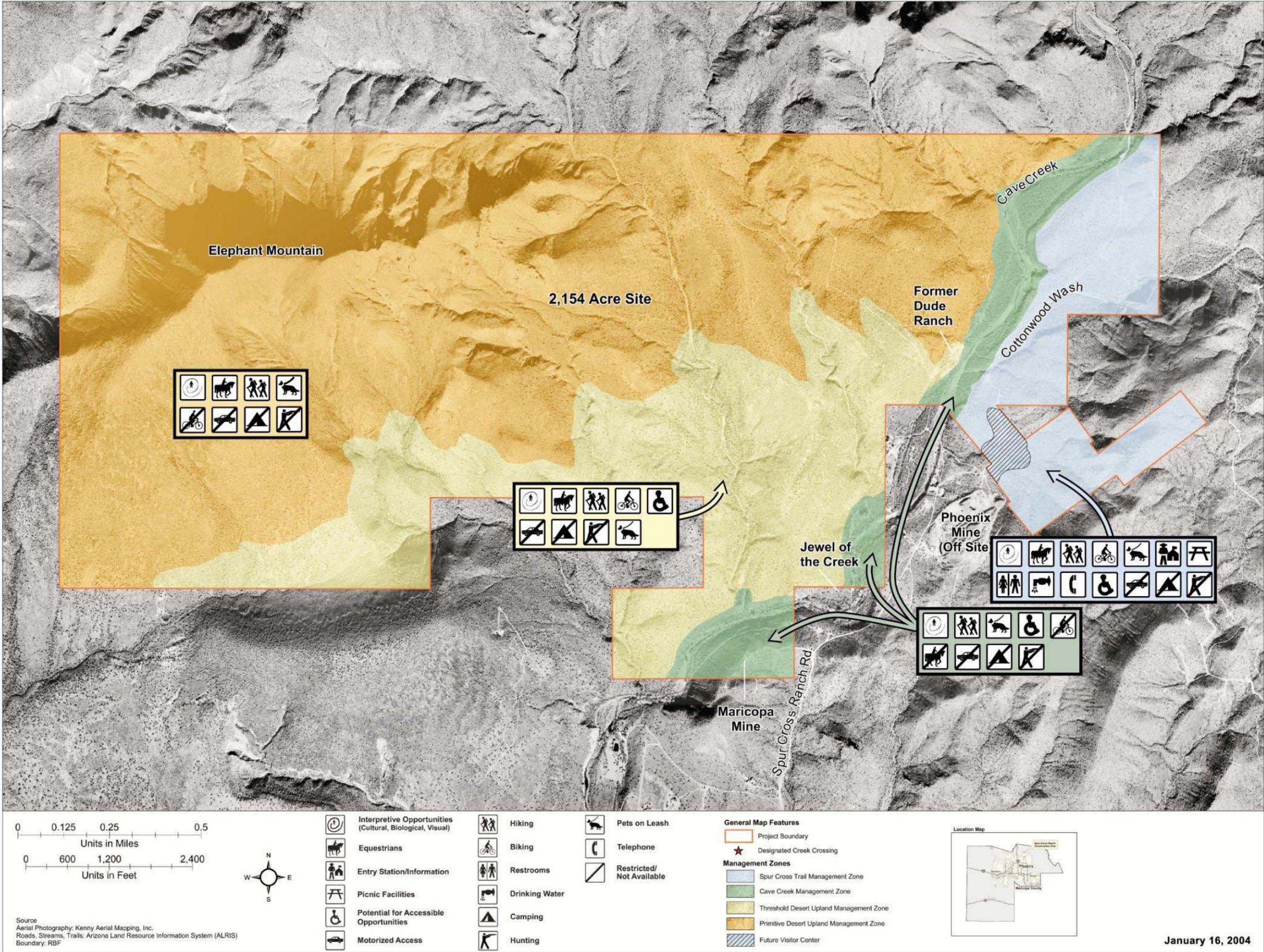


Figure III-2 Management Zones

**Table III-1
SCRCA Management Zone Guidelines**

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES			
		Spur Cross Trail	Threshold Desert Upland	Cave Creek	Primitive Desert Upland
ENVIRONMENTAL RESOURCES					
Resource Setting	<p>Conservation, protection, and enhancement of SCRCA's ecological, cultural, and social values should be accomplished, in part, within the context of surrounding lands (i.e., Tonto NF, state, and private), which may have conflicting management use or objectives (i.e., active grazing allotments, access, fire management, residential use). To meet conservation area objectives, monitoring and implementation programs should be developed within the context of thoroughly understanding the conditions and processes that make up SCRCA's ecological, cultural, and social resources and values.</p> <p>Attainment of the long-term management goals of protecting the ecological integrity of SCRCA will require looking beyond the SCRCA boundary and adopting what is called an ecosystem management approach based within the LAC Process.</p>	<p>The SC Trail MZ can be characterized as a modified natural environment with high day-use recreational opportunities. Designated day-use areas are densest within this MZ, when compared to other MZs. These areas may be primarily clustered within or adjacent to disturbed areas along the SC Trail accessing the Tonto NF.</p> <p>The SC Trail MZ will be maintained as a primary day use, non-motorized trail. Visitor use will be high as the trail functions as a direct link between the Tonto NF and Phoenix area cities. Further, the proposed MCRT interconnects with this MZ.</p> <p>SC Trail connecting the southeastern entrance of SCRCA to the Tonto NF boundary will be maintained to MCPRD standards as a primary trail that interconnects with the proposed MCRT that accesses SCRCA from the southwest boundary of the conservation area. Natural ecological processes are present in the landscape, but share a co-dominant existence with high visitor use, facilities, and other SCRCA land-management activities.</p>	<p>The Threshold Desert Upland MZ acts as a conduit for visitor use within the Primitive Desert Upland, SC Trail, and Cave Creek MZs. The Threshold Desert Upland MZ can be characterized as primarily a natural setting where encounters with other visitors are moderate. Contained within this MZ and delineating the northern boundary of the MZ is the MCRT, connecting the Cave Creek Recreation Area with SCRCA and the Tonto NF.</p> <p>Trails within this MZ provide visitors the opportunity to experience varied resource settings and interconnect with cultural sites ripe for interpretation and educational activities. Natural ecological processes are present in the landscape, but share an intermittent co-dominant existence with frequent day-use encounters.</p>	<p>The Cave Creek MZ is located between the SC Trail and Threshold Desert Upland MZs. Situated within the confines of high to moderate use areas, this MZ can be characterized as a Sonoran Upland Riparian ecosystem.</p> <p>The resource setting within this MZ varies from a modified natural-to-natural setting. Exotic species currently exist within this MZ. Varied patches of native flora species occur within this MZ in differing successional stages.</p> <p>Various fauna species use Cave Creek as a movement corridor. To the casual visitor the resource setting appears ecologically balanced. Cultural resource sites adjacent to and within this corridor range from highly sensitive (i.e., no access) to sites ripe for educational and interpretive opportunities.</p> <p>Given the intermittent reaches of varying ownerships along this corridor, partnerships between the Desert Foothills Land Trust, Tonto NF, state, and other private stakeholders should be aggressively pursued and developed to ensure consistency of long-term management goals within Cave Creek. Visitor use within this MZ will range from low to moderate.</p>	<p>The Primitive Desert Upland MZ can be characterized as a natural setting where the presence of human activities is subordinate to natural and cultural amenities. Secondary trails only connect to adjacent MZs or the Tonto NF. The resource setting within this MZ can be characterized as an Upland Sonoran ecosystem that is mostly undisturbed. Natural ecological processes dominate the landscape and visitor use is low.</p>

**Table III-1
SCRCA Management Zone Guidelines**

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES							
		Spur Cross Trail		Threshold Desert Upland		Cave Creek		Primitive Desert Upland	
Fire Management Plan	<p>Fire management activities conducted at SCRCA will conform to the vision of SCRCA. Actions taken to suppress wildland fires will be conducted in such a way as to protect natural and cultural resources and to minimize the lasting impacts of suppression actions and the fires themselves.</p> <p>The goal of the SCRCA fire management plan is to effectively manage wildland fire and provide for the protection of life, property, and cultural resources, while ensuring the perpetuation of ecosystems and natural resources. In an effort to reduce exotic annual colonizations, application of appropriate native seed mixtures should occur immediately after a fire. The SCRCA fire management plan should specifically address the restoration of natural fire regimes within SCRCA in conjunction with partnerships between local fire departments and the Tonto NF.</p>	Fire suppression activities would be consistent with SCRCA Fire Management Plan.		Fire suppression activities would be consistent with SCRCA Fire Management Plan.		Fire suppression activities would be consistent with SCRCA Fire Management Plan.		Fire suppression activities would be consistent with SCRCA Fire Management Plan.	
		<p>Resource Indicator</p> <ul style="list-style-type: none"> Numbers of lightning and human-caused fires occurring within a year. Acres and type of biological community affected including increased sedimentation and erosion. 	<p>Resource Standard</p> <p>20 percent ground cover achieved within first growing season. 50 to 75 percent ground cover achieved within second growing season. Erosion and sedimentation into tributaries, drainages, and floodways not evident after first growing season.</p>	<p>Resource Indicator</p> <ul style="list-style-type: none"> Numbers of lightning and human-caused fires occurring within a year. Acres and type of biological community affected including increased sedimentation and erosion. 	<p>Resource Standard</p> <p>20 percent ground cover achieved within first growing season. 50 to 75 percent ground cover achieved within second growing season. Erosion and sedimentation into tributaries, drainages, and floodways not evident after first growing season.</p>	<p>Resource Indicator</p> <ul style="list-style-type: none"> Numbers of lightning and human-caused fires occurring within a year. Acres and type of biological community affected including increased sedimentation and erosion. 	<p>Resource Standard</p> <p>20 percent ground cover achieved within first growing season. 50 to 75 percent ground cover achieved within second growing season. Erosion and sedimentation into tributaries, drainages, and floodways not evident after first growing season.</p>	<p>Resource Indicator</p> <ul style="list-style-type: none"> Numbers of lightning and human-caused fires occurring within a year. Acres and type of biological community affected including increased sedimentation and erosion. 	<p>Resource Standard</p> <p>20 percent ground cover achieved within first growing season. 50 to 75 percent ground cover achieved within second growing season. Erosion and sedimentation into tributaries, drainages, and floodways not evident after first growing season.</p>
Cultural Sites	<p>The primary objective of the cultural resources element within the SCRCA Master Plan will be to ensure cultural resources are identified, properly managed, and preserved. This objective will be accomplished through a systematic program of research, planning, and stewardship. Independent of the MZ, cultural sites will be managed consistently in an effort to avoid irreversible degradation of the sites. A variety of access assignments related to the sensitivity of each site inventoried within SCRCA are included in this Master Plan. Some sites will be managed for no public access, whereas others will be managed for intermittent public access.</p>	Guided and unguided opportunities.		Guided and unguided opportunities.		Guided and unguided opportunities.		Guided and unguided opportunities.	
		<p>Resource Indicator</p> <ul style="list-style-type: none"> Stacking or removal of surface artifacts. Defacement of rock art. Effects on visual setting. Effects on acoustical setting. Erosion and fire affects. Increases in trampled and barren ground in and around site. 	<p>Resource Standard</p> <p>Any occurrence will trigger adaptive management protocols.</p>	<p>Resource Indicator</p> <ul style="list-style-type: none"> Same as SC Trail MZ 	<p>Resource Standard</p> <p>Same as SC Trail MZ</p>	<p>Resource Indicator</p> <ul style="list-style-type: none"> Same as SC Trail MZ 	<p>Resource Standard</p> <p>Same as SC Trail MZ</p>	<p>Resource Indicator</p> <ul style="list-style-type: none"> Same as SC Trail MZ 	<p>Resource Standard</p> <p>Same as SC Trail MZ</p>

**Table III-1
SCRCA Management Zone Guidelines**

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES							
		Spur Cross Trail		Threshold Desert Upland		Cave Creek		Primitive Desert Upland	
Exotic Flora Species	Invasive non-native species can cause tremendous damage within SCRCA if gone undetected and treated. Displacement of native plants directly and adversely affects wildlife, which is dependent on often complex food-web relationships. SCRCA land managers will strive to conserve the natural genetic integrity and species composition, consistent with ecosystem processes, including the elimination of non-native plant and animal species wherever possible. Control of exotic plant invasions will require additional cooperation with adjacent land managers.	Identification, eradication, and restoration activities.		Identification, eradication, and restoration activities.		Identification, eradication, and restoration activities.		Identification, eradication, and restoration activities.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		• Presence of any invasive non-native species	Eradication of all invasive non-native species	• Presence of any invasive non-native species	Eradication of all invasive non-native species	• Presence of any invasive non-native species	Eradication of all invasive non-native species	• Presence of any invasive non-native species	Eradication of all invasive non-native species
Acoustical Resources	Natural sounds and serenity have long been regarded as valuable SCRCA resources. They are among the conditions and resources that SCRCA land managers will strive to protect. Just as natural quiet is important to visitor experience and SCRCA appreciation. "Non-natural sounds" (i.e., introduced, human-caused, or mechanically produced sounds) may, depending on the location, volume, and timing, cause direct and indirect negative physiological and behavioral responses in wildlife.	There is a moderate probability of low-level acoustical impacts from users within this MZ. Development of group use areas should be avoided within proximity to Cottonwood Wash and Cave Creek.		There is a moderate probability of acoustical impacts from adjacent users and users along the MCRT.		There is a high probability of acoustical impacts from adjacent users and users along the MCRT.		There is a low to no probability of acoustical impacts from adjacent users (airplanes not considered).	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		• Source of noise (e.g., natural or human-caused).	Should not exceed 60 A-weighted decibels (e.g., normal conversation at 5 feet) (dBA) if human-caused (not including aircraft).	• Source of noise (e.g., natural or human-caused).	Should not exceed 50dBA (e.g., light traffic at 100 feet) if human-caused (not including aircraft).	• Source of noise (e.g., natural or human-caused).	Should not exceed 45dBA (e.g., distant birdcalls) if human-caused (not including aircraft).	• Source of noise (e.g., natural or human-caused).	Should not exceed 40dBA (e.g., distant birdcalls) if human-caused (not including aircraft).

**Table III-1
SCRCA Management Zone Guidelines**

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES							
		Spur Cross Trail		Threshold Desert Upland		Cave Creek		Primitive Desert Upland	
Visual Resources	SCRCA offers dramatic and rare viewing opportunities along trails. Further, inaccessible areas within SCRCA contain natural and cultural amenities that require conservation measures to ensure that scenic integrity is not compromised due to visitor use. The vast majority of land contained within SCRCA retains very high scenic value. Potentially dominant manmade modifications should be avoided in all MZs	Viewshed analysis from other areas within SCRCA toward the Phoenix Mine site should be conducted prior to implementation of specific projects on this site to determine impact levels on other MZs. Ecological restoration efforts to enhance scenic integrity within this MZ are permitted. Human modifications beyond the Phoenix Mine site must remain subordinate to the natural setting. There is a high likelihood of noticing other visitors along the SC Trail and adjacent connector trails. Key viewpoints within this MZ may be appropriate locations for educational/interpretive kiosks.		Human modifications will be subordinate within the natural setting to the casual observer.		Human modifications will be subordinate within the natural setting to the casual observer.		Human modifications will be subordinate within the natural setting to the casual observer (e.g., discrete signage to protect environmental and cultural resources).	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		<ul style="list-style-type: none"> Conclusion of future viewshed analysis based on proposed projects. 	Human modifications can be co-dominant within the foreground viewing Threshold Desert Upland (0 to 300 feet) along the SC Trail. Human modifications beyond 300 feet are required to be subordinate.	<ul style="list-style-type: none"> Conclusion of future viewshed analysis based on proposed projects. 	Human modifications will be subordinate within the foreground viewing Threshold Desert Upland (0 to 300 feet) along MZ trails.	<ul style="list-style-type: none"> Conclusion of future viewshed analysis based on proposed projects. 	Human modifications will be subordinate within the foreground viewing Threshold Desert Upland (0 to 300 feet) along the assumed centerline of Cave Creek.	<ul style="list-style-type: none"> Conclusion of future viewshed analysis based on proposed projects. 	Human modifications will be subordinate within the foreground viewing Threshold Desert Upland (0 to 300 up to 0.25 mile) along MZ trails.

Table III-1
SCRCA Management Zone Guidelines

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES							
		Spur Cross Trail		Threshold Desert Upland		Cave Creek		Primitive Desert Upland	
Biological Resources	<p>Literature and field reviews conducted during the Master Plan indicate that 75 years of commercial activities, particularly grazing and mining, have altered the floral and fauna composition of SCRCA. The Master Plan recommends that as funding and teaming opportunities arise, restoration projects for educational/research purposes should be carried out under the guidance of an professional biologist experienced with managing southwest desert systems and in consultation with appropriate agencies and institutions.</p> <p>SCRCA land managers have committed to conserving natural genetic integrity and species composition, consistent with ecosystem processes. This goal can be achieved through perpetuating natural evolutionary processes and minimizing human interference. Improving inventories of micro and macro invertebrates, implementing an ecosystem approach to managing species of concern, and instituting an active research and recovery program are all consistent with the vision of SCRCA. Conserving viable populations of SCRCA native flora and fauna requires management considerations of activities occurring beyond the SCRCA boundary.</p>	Conservation, restoration, and enhancement activities are rigorous within this MZ as a factor of historical intense visitor use and planned concentrations of designated group use areas.		Conservation, restoration and enhancement activities.		Conservation, restoration and enhancement activities are rigorous within this MZ.		Conservation, restoration and enhancement activities.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		<ul style="list-style-type: none"> Barren and trampled ground adjacent to designated use areas. 	No more than an increase of 20 percent from a previous monitoring survey will be permitted.	<ul style="list-style-type: none"> Barren and trampled ground adjacent to designated use areas. 	No more than an increase of 20 percent from a previous monitoring survey will be permitted.	<ul style="list-style-type: none"> Barren and trampled ground adjacent to designated use areas. 	No more than an increase of 10 percent from a previous monitoring survey will be permitted.	<ul style="list-style-type: none"> Barren and trampled ground adjacent to designated use areas. 	No more than an increase of 10 percent from a previous monitoring survey will be permitted.
Hydrology/ Watershed	<p>Cave Creek and Cottonwood Wash provide an opportunity to understand the long-term relationships between ecological and hydrological processes and visitor use within SCRCA. Watershed management activities within the Tonto NF may have a direct relationship with on-site management objectives. The Master Plan recommends collaboratively working with adjacent land owners in gather and analyzing data associated with water quality and quantity issues associated with riparian areas with SCRCA.</p>	Continued monitoring and resource evaluations. Implementing active management strategies pursuant to adaptive management protocols.		Continued monitoring and resource evaluations. Implementing active management strategies pursuant to adaptive management protocols.		Continued monitoring and resource evaluations. Implementing active management strategies pursuant to adaptive management protocols.		Continued monitoring and resource evaluations. Implementing active management strategies pursuant to adaptive management protocols.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		<ul style="list-style-type: none"> As determined through analysis of existing data currently available from other entities. 	Perpetuation of a healthy riparian ecosystem on SCRCA and surrounding lands.	<ul style="list-style-type: none"> As determined through analysis of existing data currently available from other entities. 	Perpetuation of a healthy riparian ecosystem on SCRCA and surrounding lands.	<ul style="list-style-type: none"> As determined through analysis of existing data currently available from other entities. 	Perpetuation of a healthy riparian ecosystem on SCRCA and surrounding lands.	<ul style="list-style-type: none"> As determined through analysis of existing data currently available from other entities. 	Perpetuation of a healthy riparian ecosystem on SCRCA and surrounding lands.

**Table III-1
SCRCA Management Zone Guidelines**

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES			
		Spur Cross Trail	Threshold Desert Upland	Cave Creek	Primitive Desert Upland
MANAGEMENT					
Managerial Setting/ Docents/ Guided Tours	<p>SCRCA will be managed to avoid irreversible impacts on natural or cultural resources or adverse effects on visitor enjoyment of appropriate and permitted activities. The SCRCA Master Plan provides for resource conservation strategies and recommends corrective actions when unacceptable impacts may occur. The focus of management strategies is designed to guide the conservation, management, and use of SCRCA and continually achieve the vision of SCRCA.</p> <p>Several methods to monitor visitor use and enhance interpretive and educational opportunities can be achieved through efforts from volunteers.</p> <p>Education of the general public through pamphlets, retail brochures related to SCRCA interpretive kiosks, and field classrooms related to the sensitive nature of biological and cultural resources within SCRCA will assist with a long-term, self-perpetuating conservation program.</p>	<p>SCRCA land-management personnel are likely to be noticed frequently within this MZ. Hikes, equestrians, mountain bikers, and guided tours typically would assemble within this MZ. SCRCA personnel would include conservation area rangers, docents, and other volunteers. Maintenance, monitoring, restoration, and educational/interpretive activities also would originate within this MZ. Formal educational and interpretive activities may be scheduled on a recurring basis. Administrative use of vehicles will continue. Permitted non-motorized commercial activities may be allowed that are consistent with the vision of SCRCA.</p>	<p>Land management foot patrols will be scheduled based on the projected intensity of use, time of year, and resource monitoring programs. Volunteer docents may be present within field classrooms. The likelihood of contact between visitors and SCRCA personnel is moderate to high. There is evidence of management activity. Permitted non-motorized commercial activities may be allowed that are consistent with the vision of SCRCA. Administrative use of vehicles will continue.</p>	<p>Conditions will be similar to the Threshold Desert Upland MZ. Administrative use of vehicles will continue.</p>	<p>Infrequent patrols occur within the Primitive Desert Upland MZ. Volunteer docents typically are not present unless as participants in guided tours. Likelihood of contact between visitors and SCRCA personnel is low. There is some evidence of management restrictions. Control and maintenance and compliance activities are scheduled on an "as-needed" basis.</p>

Table III-1
SCRCA Management Zone Guidelines

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES							
		Spur Cross Trail		Threshold Desert Upland		Cave Creek		Primitive Desert Upland	
Structures	The vision of SCRCA, in part, includes conserving its primeval character and influence without dominant improvements developed within incompatible MZs. Facilities proposed within SCRCA will be evaluated based primarily on whether such a facility is (1) required to conserve the primitive desert character or values, (2) provide minimal public service or (3) essential to ensure public safety. Facilities will not be evaluated solely based on administrative convenience, economy of effect, or convenience to the public. Maintenance or removal of historical structures or features will comply with all applicable state and federal law and policy.	Facilities within the SC Trail MZ may include an education center, , engineered water crossings (e.g., Cottonwood Wash, Cave Creek), , information boards, interpretive kiosks, trail head registers, comfort stations, shade structures and stone benches, concession facilities (at visitor center/museum only), gates/fences, utilities including underground telephone, underground electricity, and underground water/gas/fiber optic pipelines/conduit. Americans with Disabilities Act (ADA)-compliant parking may be available within SCRCA by permit only. Existing range fences or other historical structures or features will be evaluated for cultural and biological considerations prior to removal.		No facilities within the Threshold Desert Upland MZ are being considered at this time. When MCRT is implemented minimal facilities may be constructed within proximity of the trail that may include stone benches, and gates/fences. Existing range fences or other historical structures or features will be evaluated for cultural and biological considerations prior to removal.		Facilities within the Cave Creek MZ may include designated creek crossings, and gates/fences. However no facilities are being recommended at this time. Existing range fences or other historical structures or features will be evaluated for cultural and biological considerations prior to removal.		No new structures are anticipated or recommended at this time. Existing range fences or other historical structures or features will be evaluated for cultural and biological considerations prior to removal.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		• Conduct project specific environmental evaluation(s) to determine measurement criteria.	Proposed structure permitted to be a <u>co-dominant</u> element within the existing setting.	• Conduct project specific environmental evaluation(s) to determine measurement criteria.	Proposed structure permitted to be a <u>subordinate</u> element within the existing setting.	• Conduct project specific environmental evaluation(s) to determine measurement criteria.	Proposed structure permitted to be a <u>subordinate</u> element within the existing setting.	Not Permitted	Not Permitted
Sign Materials	Signs can detract from the primitive desert character that is contained within SCRCA and make the imprint of management more noticeable. Only those signs necessary to protect SCRCA resources or for public safety will be permitted within the Primitive Desert Upland MZ. Where signs are used, they will be compatible with their surroundings and be the minimum size possible.	Self-weathering or non-reflective metal signs will be allowed. Embedded low-profile fiberglass signs at designated historic, archaeological sites, or other compatible interpretive features will be allowed.		Self-weathering or non-reflective metal signs will be allowed. Embedded low-profile fiberglass signs at designated historic, archaeological sites, or other compatible interpretive features will be allowed.		Self-weathering or non-reflective metal signs will be allowed. Embedded low-profile fiberglass signs at designated historic, archaeological sites, or other compatible interpretive features will be allowed.		Self-weathering or non-reflective metal signs will be allowed. Embedded low-profile fiberglass signs at designated historic, archaeological sites, or other compatible interpretive features will be allowed.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		• Conclusion of project specific viewshed analysis.	Proposed sign permitted to be a <u>co-dominant</u> element within the existing setting.	• Conclusion of project-specific viewshed analysis.	Proposed sign permitted to be a <u>subordinate</u> element within the existing setting.	• Conclusion of project-specific viewshed analysis.	Proposed sign permitted to be a <u>subordinate</u> element within the existing setting.	• Conclusion of project-specific viewshed analysis.	Proposed sign permitted to be a <u>subordinate</u> element within the existing setting.
Existing Roads Within SCRCA	Existing roads within SCRCA are designated as trails and maintained as such. Trail width and maintenance levels will be maintained to allow for administrative, fire management, and emergency vehicles to pass.	The SC Trail and the trail to First/Second Mesa will be maintained to county parks standards where practical and consistent with conservation values (e.g., visual dominance, flora impacts, etc.). Existing associated prescribed access rights along the SC Trail will be permitted through development of a special use authorization approved by the Town of Cave Creek and Maricopa County.		The existing trail to First/Second Mesa will be maintained to county parks standards.		No roads permitted.		No roads permitted.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Table III-1
SCRCA Management Zone Guidelines**

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES							
		Spur Cross Trail		Threshold Desert Upland		Cave Creek		Primitive Desert Upland	
Trails Standards	Trail standards are necessary to meet SCRCA land management objectives to provide a variety of recreational opportunities consistent with the vision of SCRCA and MCPRD Trails Management Manual. Standards also are necessary to meet LAC criteria by developing a trail system that is consistent with conservation values, including the protection of natural and cultural resources, minimization of erosion along trails, and preservation of the character along individual trails related to visitor use. SCRCA visitors should be willing to accept the conservation area largely on its own terms without modern facilities within more primitive MZs for their comfort or convenience. It should be noted that the trails development on SCRCA is considered a living process and should be addressed as such as trail locations continue to be evaluated through the adaptive management decision-making process.	Barrier free, interpretive, primary and secondary trails may be constructed, maintained, and signed pursuant to MCPRD guidelines as described in the MCPRD Trails Management Manual. The MCRT and SC Trail would accommodate non-motorized day use. Connector trails would be permitted with the Tonto NF and MCRT as well as trails connecting to adjacent MZ. Competitive tracks not permitted.		Conditions would be the same as the SC Trail MZ. Competitive tracks not permitted.		Trails would be available for hiking only.		Connector trails would be established with the Tonto FS and MCRT. Competitive tracks would not be permitted.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		• Environmental impacts associated with visitor use.	Pursuant to MCPRD standards and in concert with the vision of SCRCA.	• Environmental impacts associated with visitor use.	Pursuant to MCPRD standards and in concert with the vision of SCRCA.	• Environmental impacts associated with visitor use.	Pursuant to MCPRD standards and in concert with the vision of SCRCA.	• Environmental impacts associated with visitor use.	Pursuant to MCPRD standards and in concert with the vision of SCRCA.
Access on SCRCA	Currently, gated access onto SCRCA is gained by the (1) existing northern and southern entry gates along SC Trail, (2) existing trails connecting the southwestern corner of SCRCA to the Tonto NF, and (3) along the eastern boundary of SCRCA.								

Table III-1
SCRCA Management Zone Guidelines

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES							
		Spur Cross Trail		Threshold Desert Upland		Cave Creek		Primitive Desert Upland	
Access to the Tonto National Forest	Non-motorized access to the Tonto NF is primarily gained through an existing entry gate on the SC Trail. Additional non-motorized access to the forest will occur in the vicinity of Second Mesa along a trail that connects a southwest entry point to a trail leading to Elephant Mountain then onto the Tonto NF.	Continued non-motorized access.		No access to forest.		No access to forest.		Access to forest as described previous.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		<ul style="list-style-type: none"> Public and agency input. 	Pursuant to adaptive management.	<ul style="list-style-type: none"> Public and agency input. 	Pursuant to adaptive management.	<ul style="list-style-type: none"> Public and agency input. 	Pursuant to adaptive management.	<ul style="list-style-type: none"> Public and agency input. 	Pursuant to adaptive management.
Access to Private Inholdings within the Tonto NF and SCRCA	There is one known prescribed vehicle easement on SCRCA.	Pursuant to MCPRD direction.							
RECREATIONAL AND OTHER ACTIVITIES									
Recreational Uses	Recreational activities will occur on designated trails or at other designated use areas. Cross country travel on or within undesignated ridge tops, saddles, canyons, washes, mines, or caves will be prohibited.	Recreational activities within this MZ would include non-motorized uses. Mountain biking, equestrian use, hiking, and passive recreational use (e.g., bird watching, painting/sketching, photography) would occur within this MZ. Designated day-use group areas would be developed within this MZ clustered in proximity to the SCRCA main entrance or within existing disturbed areas adjacent to the SC Trail. Rock climbing will not be permitted. Geocaching is also not permitted.		Conditions will be the same as for the SC Trail MZ.		Only non-motorized use will be permitted, including hiking and other passive use activities. Equestrian use, mountain biking, and rock climbing will not be permitted. Geocaching is also not permitted.		Only non-motorized or non-mechanized use will be permitted, including hiking, equestrian use, and other passive use activities. Mountain biking and rock climbing will not be permitted. Geocaching is also not permitted.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.	<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.	<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.	<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.
Interpretive, Educational, and Research Opportunities	Individuals or groups that desire to conduct educational or research-based activities must obtain a permit from SCRCA land managers at least 30 to 90 days before the planned field activities. This strategy will allow for review and evaluation of the proposed activity as well as the scheduling of activities in a manner that is consistent with the vision of SCRCA.	Scheduled formal educational programs, guided tours, school field trips (K-12, research, advanced degrees), and programmed docent demonstrations/exhibits would originate within this MZ.		Informal and formal contacts will occur. Kiosks and interpretive signs will be permitted. Scheduled formal programs, guided tours, school field trips (K-12, research, advanced degrees), and docent demonstrations/exhibits will be permitted.		Informal and formal contacts will occur. Kiosks and interpretive signs will be permitted. Scheduled formal programs, guided tours, school field trips (K-12, research, advanced degrees), and docent demonstrations/exhibits will be permitted.		Limited contacts will occur. Discrete interpretation signage will be allowed. Scheduled formal programs, guided tours, and research studies will be permitted.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.	<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.	<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.	<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.

**Table III-1
SCRCA Management Zone Guidelines**

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES							
		Spur Cross Trail		Threshold Desert Upland		Cave Creek		Primitive Desert Upland	
American with Disabilities Act	In compliance with the Americans with Disabilities Act of 1990 (ADA), SCRCA land managers may make reasonable accommodations within SCRCA based on topographic and existing trail conditions. All visitors should be aware of the unique and challenging characteristics of SCRCA, including steep terrain; potential interactions with wildlife, horses, and mountain bikes; and sometimes adverse weather. Visitors with sight or other impairment requiring the use of guide animals are advised to make specific inquiries with SCRCA land managers.	Motorized opportunities for accessibility may be available for those meeting ADA criteria..		Motorized opportunities for accessibility may be available for those meeting ADA criteria..		Mechanized opportunities for accessibility may be available to accommodate the ADA where appropriate (e.g. Cottonwood Wash Petroglyph Site).		Motorized or mechanized opportunities may not be available.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.	<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.	<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.	<ul style="list-style-type: none"> Public and agency input. Types of activities being pursued. 	Developed by SCRCA land managers through adaptive management strategies.
Commercial or Concessionaire Activities	Equestrian and hiking opportunities may be considered by SCRCA land managers within the SCTMZ only. If organized groups desire to access other MZ within SCRCA, guided opportunities may be available.								
Hunting or Gathering Activities	Recreational hunting (under AZG&F Department) and gathering activities (under County regulations) are not consistent with conservation area management. The Master Plan recommends retention of the Town of Cave Creek rules and Ordinances that render these activities illegal.	Not Applicable							
Recreation or Commercial Prospecting	Given the high probability of recreational or commercial prospecting activities causing environmental degradation, these activities will not be permitted within any MZ within SCRCA.	Not Applicable							
Mines	The Phoenix and Maricopa Mine sites provide a striking contrast between past industrial land uses adjacent to SCRCA and the overall pristine setting of SCRCA. Educational and interpretive opportunities are present at these sites.	Recreational mine entry is not permitted. Surface interpretation may be possible.		Recreational mine entry is not permitted. Surface interpretation may be possible.		Recreational mine entry is not permitted. Surface interpretation may be possible.		Recreational mine entry is not permitted.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		• N/A	N/A	• N/A	N/A	• N/A	N/A	• N/A	N/A
Parking, Domestic Pets, Pack Animals	ADA-compliant parking and maintenance vehicle parking will occur within the Phoenix Mine Site. Domestic pets will be required to be on a lead within all MZs.	. Pack animals allowed. Domestic pets allowed.		No parking available. Pack animals allowed. Domestic pets allowed.		No parking available. Pack animals not allowed. Domestic pets allowed.		No parking available. Pack animals allowed. Domestic pets allowed.	
		Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard	Resource Indicator	Resource Standard
		• N/A	N/A	• N/A	N/A	• N/A	N/A	• N/A	N/A

**Table III-1
SCRCA Management Zone Guidelines**

FACTOR CONSIDERED	MANAGEMENT CONSIDERATIONS	MANAGEMENT ZONES			
		Spur Cross Trail	Threshold Desert Upland	Cave Creek	Primitive Desert Upland
Social Setting	<p>The social setting will be directly related to recreational management within SCRCA. The primary considerations of use management within SCRCA are related to the sensitivity of natural and cultural resources, potential impact on resources, effectiveness of long-term monitoring programs, and distribution of permitted activities within SCRCA. In an effort to address these considerations, the following section generally describes the use management strategy.</p> <p>SCRCA has been divided into four MZ. To the extent possible, MZ boundaries have been defined according to identifiable topographic features such as ridge tops, drainages, and trail locations in conjunction with the sensitivity of natural and cultural resources within the MZ.</p>	<p>In the context of social setting the SC Trail MZ will be managed to accommodate heavy visitor use. Permitted commercial equestrian and hiker groups will be evident. Mountain bikers, non-commercial equestrians, day hikers accessing SCRCA either from the proposed MCRT or from the main site entry will increase the probability for trail encounters between various users.</p>	<p>In the context of social setting the Threshold Desert Upland MZ will be managed to accommodate high to moderate visitor use. A variety of ecological settings and interpretive opportunities will exist within this MZ. The MCRT forms the northern edge of this MZ while Cave Creek forms the southern edge. The degree of challenge and risk should be moderate, at times requiring a fair amount of outdoor skills.</p>	<p>In the context of social setting conditions are similar to the Threshold Desert Upland MZ; however, dense vegetation and varying topography within this MZ can provide a sense of enclosure to the casual visitor.</p> <p>Two existing crossings of Cave Creek will be managed within either the Threshold Desert Upland MZ (existing trail leading to the Dude Ranch site, First, and Third Mesas) and the SC Trail MZ (just due south of the Tonto NF boundary). The primary reason for the blending of these MZs within the Cave Creek MZ is that the vast reach of Cave Creek within SCRCA will be managed for non-motorized or mechanized activities (emergency and maintenance vehicles excluded) as well as prohibiting equestrian use.</p> <p>Narrow crossing bands have been designated at 24 - 32 feet wide from high water mark to high water mark across Cave Creek to allow for equestrian and bicycle use.</p>	<p>In the context of social setting the Primitive Desert Upland MZ will be managed to accommodate infrequent contacts with day users. The degree of challenge and risk should be moderate, at times requiring a fair amount of outdoor skills.</p>

2. Equestrian and hiking activities
3. Bicycling and other passive day uses

Primitive Desert Upland Management

The PDUMZ can be characterized as a large area of land situated north and west of the TDUMZ. It is the largest MZ within SCRCA and is 1373.97 acres in size. This MZ retains some of the most undisturbed natural settings within SCRCA. Southern access into this MZ would be primarily on existing trails originating from the main entrance of SCRCA, as well as access located in the southwestern corner of SCRCA. Additionally, northern access from and to the TNF exists at two designated access points along the northern boundary of SCRCA. Limited recreational and interpretive activities are afforded within this MZ via existing access. Examples of permitted uses within this MZ include:

1. Interpretation opportunities
2. Equestrian and hiking activities
3. Other passive day uses

Because use limits or quotas will not be implemented as a part of this Master Plan, SCRCA land managers will implement management recommendations contained within Table III-1 and throughout this Master Plan through adaptive management strategies. The following paragraphs generally describe this adaptive management strategy as well as defining day-to-day operational efforts on SCRCA.



Adaptive Management

Adaptive management is a formal, systematic, and rigorous approach to learning from the outcomes of past management actions, accommodating change, and improving management on SCRCA. It involves synthesizing existing knowledge, exploring alternative actions, and making explicit forecasts about alternative outcomes. SCRCA management actions, monitoring, and implementation programs should be carefully designed to generate reliable feedback and clarify factors

contributing to specific outcomes. As a result and over time, management actions are adjusted based on this feedback and improved understandings of recreational use and environmental and cultural conditions. In addition, decisions, actions, and outcomes are carefully documented and communicated to SCRCA staff, so that knowledge gained through experience is passed on, rather than being lost during staffing transitions at SCRCA.

Operational Management

Although recommendations to accomplish operational actions on SCRCA are generally addressed in this Master Plan, such activities are not considered adaptive management decisions. Operational actions are considered day-to-day activities conducted by on-site SCRCA land managers that do not require specialized environmental and cultural resource analysis of effects. Examples of operational actions include policing SCRCA; enforcement of county rules and regulations; enforcement of the Town of Cave Creek ordinances and codes, mapping, surveying, inventorying, and monitoring; collecting, organizing, and analyzing visitor use data; wildland fire suppression activities; emergency response activities; and completing project specific or implementation level plans that have already undergone environmental and cultural resource analysis through the adaptive management decision-making process.

Establishment of both MZs within SCRCA and recommendations for management prescriptions resulted from an intensive public involvement plan employed throughout the Master Plan process. The following sections describe in detail the public participation plan implemented for the Master Plan.

Public Participation Plan

Introduction

For the past two years, numerous opportunities for public input, outreach, and education have been implemented for the SCRCA Master Plan. This report documents and summarizes the

types of public input developed, and a description and summary of each type of public input opportunity.

SCRCA is a unique cultural and natural conservation area with a wealth of archeological resources. Arizona State Parks, Maricopa County, and the Town of Cave Creek purchased SCRCA from private interests to protect the area from commercial development and to continue to allow the public access to this pristine recreation area. With all of the varied interests involved in the protection of SCRCA, providing opportunities for public input to help shape the Master Plan was critical.

Public Outreach Efforts

Press releases, newspaper articles, a project web site, timely newsletters, questionnaires/surveys, and public meetings are all different methods used to communicate to the public regarding the SCRCA Master Plan process. A copy of all documents used to notify the public of upcoming events related to the SCRCA Master Plan process is located in Appendix B, as well as public input received.

Press Releases

Press releases and/or media advisories were sent to all local and regional media outlets. Information contained in the press releases described what stage the project was in, and announced the next opportunity for public input. In addition to the press releases, a paid newspaper advertisement was placed in the *Sonoran News* prior to the first public meeting to ensure local residents were aware of the beginning of the project.

Newspaper Articles

Over 65 newspaper articles and/or editorials have been published in various local newspapers regarding the SCRCA Master Plan since February 2002. Many of the articles depict the conflicting views of the many diverse groups with a stake in the outcome of the Master Plan, encourage participation in the process, and occasionally state views on how the land should be managed.

Project Web Site

Maricopa County Parks and Recreation Department created a project web site that has been promoted throughout the process at www.maricopa.gov/parks/spur_cross/default.asp. The web site announced all upcoming public involvement activities and events, and presented information about the project.

Newsletters

Four newsletters have been produced to date for the SCRCA Master Plan. Each newsletter informed the public on the progress of the project, explains what's been accomplished, what still needs to be accomplished, any outstanding issues, and announces upcoming public input opportunities.

Questionnaires/Surveys

At each public meeting, a comment form, or questionnaire, was distributed to all meeting participants. The purpose of these surveys was to gauge the public's opinion on the various issues facing the project at each milestone. Meeting participants were asked to complete the survey and return it in a timely manner for documentation purposes.

An additional survey was made available to the public at the entrance of the SCRCA. The goal of this survey was to determine what areas are frequented most, and how the respondents traveled to each particular area they indicated on the map (i.e. hiking, horseback riding, jeep tours, mountain biking, etc.).

Public Meetings

Three types of public meetings were conducted for the SCRCA Master Plan: JPC, Stakeholder Committee, and public meetings/open houses. Each type of meeting or committee served a distinct purpose throughout the different phases of the project. A detailed description is provided below.

Joint Planning Committee Meetings

A JPC was formed to identify issues and possible solutions for the SCRCA Master Plan. The JPC included representatives from the Town of Cave Creek, MCPRD, and Arizona State Parks. The JPC has met six times to date to provide direction and input on the Master Plan concepts, and finalize the Master Plan recommendations. Below are the dates of the JPC meetings conducted to date, and what items were discussed at each meeting.

- April 4, 2002
 - Site Visit
 - Project Schedule and Scope of Work
 - Public Involvement Process
 - Data Inventory and Analysis
 - Purchase of 38-Acre Parcel by Town of Cave Creek
 - Preliminary Vision Statement
 - Roles and Responsibilities of JPC
 - Stakeholder Committee

- August 5, 2002
 - Project Schedule
 - Interim Operations Plan
 - Interim Trail Items
 - Scoping Report
 - LAC Management Zones
 - Website

- January 16, 2003
 - Project Schedule
 - Monument Sign Concept Review
 - Cultural Resource Data Gathering
 - Management Zone and Opportunity Classes
 - Opportunity Class Factors
 - Public Meetings
 - Next Steps

- April 29, 2003
 - Project Schedule
 - Recreation Use Preliminary Simulation
 - Review of Stakeholder and Public Meetings
 - Master Plan Alternative Selection

SECTION III: OVERVIEW OF THE MASTER PLANNING PROCESS

- Interim Projects
- Commercial Concessionaires
- Concerns
- Discussion of Site Facilities

- August 20, 2003
 - Primary Trail System
 - Recreation Use Model
 - Master Plan Report Outline
 - Site Facilities Master Plan
 - Next Steps

- October 1, 2003
 - Trail System
 - Facilities
 - Open House
 - Concerns

Stakeholder Committee Meetings

Based on data developed at the onset of the master planning process, a stakeholder committee was formed. The Stakeholder Committee was comprised of representatives of various user groups that are currently active in the SCRCA's interest (i.e., horseback riding, hiking, mountain biking, native American communities, members of local agencies, public, and media).



The Stakeholder Committee was scheduled to meet three times during the process. At the conclusion of the second stakeholder committee meeting, it was determined the final stakeholder committee meeting would be held in conjunction with the next scheduled public meeting. Below are the dates of the Stakeholder Meetings conducted to date, and what items were discussed at each meeting.

- June 13, 2002
 - Overview of Master Plan process
 - Review of public meeting display boards
 - What have we missed?
 - Who else should be on the mailing list
 - Next Steps

- January 23, 2003
 - Progress on Project

- Management Zones
- Opportunity Classes
- Question and Answer Session

Public Meeting/Open Houses

Three public meetings have been conducted to date. The first meeting, a public scoping meeting, was conducted on June 24, 2002 at the Town of Cave Creek Council Chambers. The meeting was a modified open house format, where meeting participants could review display boards and speak with project staff one-on-one before and after a formal presentation. Following the formal presentation, a question-and-answer session was conducted. All questions were documented on a flip chart to ensure accuracy.

The purpose of the meeting was to present the inventory of resources completed to date and solicit comments from the public on their issues, concerns, and possible strategies of the SCRCA. Comments could be submitted in writing, verbally in the question-and-answer session, or through a comment card distributed at the sign-in table. Approximately seventy people attended this meeting.

Based on the input received at this meeting, the first stakeholder committee and JPC meetings, the following issues were determined as important to the users of SCRCA.

- Access
- Public Safety
- Trails
- Protection of Cultural Resources
- Public Relations and Input
- Environmental Protection
 - Biology
 - Soils
 - Acoustical
 - Land Use
 - Cultural

- Mining
 - Visual
 - Water
 - Recreation
- General Information

Second Public Meeting/Workshop

The second public meeting was conducted on January 30, 2003 at the Desert Arroyo Middle School. The meeting format was a workshop, where meeting participants listened to a formal presentation on instructions for the breakout sessions following the presentation. Following the formal presentation, a question-and-answer session was conducted. All questions were documented on a flip chart to ensure accuracy.

The purpose of this meeting was to provide an update on the progress of the SCRCA Master Plan, learn about the research completed to date, review the proposed management alternatives, and to get the public's opinion of on the preferred alternatives being presented. Approximately fifty people attended this meeting.

Based on the input received at this meeting, the second stakeholder committee meeting, the second and third JPC meetings, and comment forms/surveys distributed at the meeting, the following issues were determined as important to the users of SCRCA.

- Trails
- Access
- Resource Conservation
- Special Designation Areas
- Planning Process

Twenty-one comment forms were returned at the close of the meeting. Several questions were asked regarding management zones, opportunity classes, and if you were king for a day how would you manage SCRCA. Meeting participants also were asked to rank their preference of alternatives, and the results of

the management alternative preferences are summarized below:

- 76% stated Alternative 3 was their first choice for a preferred alternative
- 57% stated Alternative 2 was their second choice for a preferred alternative
- 43% stated Alternative 1 was their third choice for a preferred alternative

Third Public Meeting

The third public meeting was conducted on October 16, 2003 at the Good Shepard of the Hills Episcopal Church. This meeting was a modified open house format where meeting participants could review display boards and speak with project staff one-on-one before and after a formal presentation. Following the formal presentation, a question-and-answer session was conducted. All questions were documented on a flip chart to ensure accuracy. Approximately 70 people attended this meeting.

The purpose of the meeting was to get the public opinion on the following:

- Selected preferred alternative for the 2,154-acre site
- Draft preliminary trails system plan
- Phase I trails plan
- Proposed site plans for the main site entry area
- Architectural concepts for the education center

Based on the input received at this meeting, the fourth, fifth, and sixth JPC meetings, and comment forms/surveys distributed at the meeting, the following issues were determined as important to the users of SCRCA.

- Trails
- Fire Management

SECTION III: OVERVIEW OF THE MASTER PLANNING PROCESS

- Agency Cooperation
- Access

Fourteen comment forms were returned at the close of the meeting, and the results are summarized below.

- 85% agreed or strongly agreed to the level of proposed trail development (i.e., restricted access, primary trail, secondary trail, etc.).
- 92% agreed or strongly agreed the earth sheltered/earth material/low visual impact of the Education Center makes sense.
- 93% agreed or strongly agreed to the proposed location of the Education Center and parking facilities.
- 73% agreed or strongly agreed the planning process to date had recognized and/or included the public's ideas.

Participants at this meeting were asked to sign up to participate in "teaming opportunities" to assist in the implementation of the SCRCA Master Plan. The following list provides the number of individuals who volunteered to assist in the implementation of the SCRCA Master Plan and their association disciplines.

- Trails – 14 volunteers
- Hydrological – 2 volunteers
- Interpretation/Education – 4 volunteers
- Cultural Resources – 8 volunteers

Although the master planning process has ended, along with a formal public participation plan, the long-term success of SCRCA will in a large part be driven by the extent the public continues to be involved in decisions that affect SCRCA.

SECTION IV: ENVIRONMENTAL RESOURCES

This section contains cultural and environmental resource reports. Each section is formatted and generally described as follows:

1. Introduction – this section describes the importance for evaluating a particular resource on SCRCA as well as discussion of a framework by which the resource will be discussed.
2. Existing Conditions – this section describes the sensitivity of inventoried resource components associated with a specific resource as well as what the existing conditions of the resource is.
3. Evaluation Methodology and Findings – based on the findings of the previous section, an evaluation was made related to the susceptibility of a resource to be impacted through long-term use of SCRCA. Following, is a discussion of results of this evaluation.
4. Monitoring Strategies and Protection Methods – this section contains a discussion of recommended monitoring strategies and protection methods that are appropriate in the conservation and protection of resources on SCRCA.
5. Implementation – this section contains a discussion of how resource goals can be achieved through recommended implementation of resource objectives.



It is important to note that Table III-1 (Management Zone Guidelines) generally describes guidelines for SCRCA land managers to consider in the long-term management of SCRCA resources; however, it will be through long-term efforts associated with data collection and analysis of data that these guidelines can be more fully refined through the adaptive management decision-making process.

Cultural Resources

Introduction

In comparison to many Maricopa County parks, the SCRCA is small (3.4 square miles), but archaeological sites are dense (an average of about 30 sites per square mile) and those sites are likely to be a major attraction for visitors. A few of the more than one hundred archaeological sites that have been recorded on SCRCA reflect late nineteenth or early twentieth century ranching and mining activities. There are foundations, but no extant historic buildings or structures on SCRCA. More than 90 percent of the archaeological sites reflect the prehistoric occupation of the region. Half of these sites have rock-outlined rooms. Two are village sites with more than 20 rooms, 28 others have an estimated 2 to 10 rooms, and 28 have a single room. Other types of sites include pit house farmsteads or small villages, a fortified hill, agricultural sites, petroglyphs, and artifact scatters.

Many archaeologists interpret the SCRCA region as part of the “northern periphery” of the Hohokam culture that flourished for more than a millennium to the south along the Salt and Gila rivers (Doyel and Elson 1985; Henderson and Rodgers 1979; Spoerl and Gumerman 1984). The Hohokam are famous for the irrigation canals they built, which were among the most extensive and sophisticated pre-Columbian irrigation systems in North America. But the Hohokam also were experts in exploiting upland environments such as those at SCRCA, and their long occupation stands as testimony of their successful adaptation to the hot, arid environment of the Sonoran Desert. Other archaeologists conclude that the “northern periphery” is an inappropriate term because the prehistoric populations of SCRCA and the surrounding region may not have been Hohokam but were more closely affiliated with the Sinagua culture to the north or a more general Central Arizona Tradition, particularly during later periods of occupation (for example, Marshall and Shaw 2002; Whittlesley 2002). Undoubtedly, cultural relationships and patterns of interaction changed over the centuries that aboriginal populations occupied the region.

Several years ago, residential and commercial development of the Spur Cross Ranch was proposed but never was initiated. Review by the State Historic Preservation Office at that time concluded that approximately 90 percent of the archaeological sites recorded in the area had potential to yield important information and suggested the assemblage of sites be considered a district eligible for the National Register of Historic Places (Heathington 1997). Preservation of these important archaeological sites was a major motivation for public acquisition of the ranch property as a partnership of Arizona State Parks, Maricopa County, and the Town of Cave Creek. The designation of the land as a conservation area, rather than a park, reflects the decision to manage the public use of the land to give priority to conserving the cultural and natural resources of the area.

To be sure, the archaeological resources of SCRCA are not spectacular in comparison to ruins in some of the national and state parks of Arizona. Successful public interpretation will have to rely on creating appropriate interpretive themes. The stories that can be learned from such subtle sites can counter the popular media portrayal of archaeology as an “Indiana Jones” treasure hunt rather than a quest to learn about the past.

SCRCA can be used as an informal outdoor classroom to enhance public understanding of how archaeologists reconstruct the unwritten past, how they solve puzzles, and how interpretations of the past change with new evidence and new ideas. Authenticity is a crucial characteristic of public appreciation of the past, and SCRCA is an opportunity for the public to visit real sites in an untrammelled natural landscape, and experience the thrill of seeing real artifacts that were discarded and sites that were abandoned hundreds of years ago.

SCRCA also can be used as a laboratory that archaeologists can use for nondestructive study of archaeological sites, to train archaeological students, and to monitor long-term changes of archaeological resources. SCRCA also offers the opportunity for learning about and respecting the heritage values that archaeological resources have for modern native peoples who are descendants of those groups that lived on the land so long ago.

SECTION IV: ENVIRONMENTAL RESOURCES

Arizona State Parks transferred its ownership to Maricopa County in exchange for an easement to ensure that SCRCA is managed as a limited use public recreation and conservation area. Maricopa County holds 70 percent joint ownership and the Town of Cave Creek holds the other 30 percent. The partners have executed an agreement giving the Maricopa County Parks and Recreation Department responsibility for managing SCRCA for 60 years. The Department retained URS Corporation to assist them in preparing a master plan to guide development and operation of SCRCA. The archaeological studies documented in this report were conducted as a component of that planning effort, and were intended to ensure that the plan facilitated conservation of the SCRCA archaeological resources for the benefit of future generations. The scope of the archaeological investigations included four elements to support the Master Plan development:

1. Reports and files of prior studies were reviewed and copies of the archaeological site records generated by those investigations were compiled. Additionally, Maricopa County mailed letters to interested Native American Tribes in an effort to understand potential issues or concerns with cultural resources on SCRCA.
2. A primary goal was to document the current condition of the archaeological sites through inspection, mapping, and photography to establish a record of base line conditions for implementing the adaptive management strategy that will be used to monitor and control recreational impacts.
3. In conjunction with the fieldwork conducted to document base line information, the suitability of the sites for public interpretation was evaluated. This information was used in developing a plan for recreation trails and public interpretation.
4. An archaeological survey was conducted along the proposed recreational trail network to assess potential impacts of trail development and site visitation.

In addition to supporting development of the SCRCA Master Plan, the investigations documented in this report are intended to support compliance with Arizona Antiquities Act (Arizona

Revised Statutes 41-841 to 41-846, 41-865) and the State Historic Preservation Act (Arizona Revised Statutes 41-862 to 41-864).

Existing Conditions

Project Location

SCRCA encompasses approximately 2,155 acres in north-central Maricopa County (Figure IV-1). Maricopa County and the Town of Cave Creek jointly own the land. SCRCA includes all of Sections 5 and 6, and portions of Sections 4, 7, 8, and 9 of Township 6 North, Range 4 East. This area is depicted on the New River Mesa 7.5-minute USGS topographic quadrangle (Figure IV-2).

Prior Studies

Archaeological and historical site files and records were reviewed at the State Historic Preservation Office, Arizona State Museum, and Arizona State University (ASU). The AZSITE Cultural Resource Inventory, a geographic information system database, also was checked. Copies of reports of prior studies were acquired and reviewed. Several individuals involved in some of the prior studies also were contacted to discuss the history of prior research (Mark Hackbarth, Desert Foothills Chapter, Arizona Archaeological Society, personal communication 2002; Grace Schoonover, Desert Foothills Chapter, Arizona Archaeological Society, personal communication 2002; K.J. Schroeder, Roadrunner Archaeology, personal communication 2002; Arlyn Simon, Arizona State University, personal communication 2002, 2003; Nina Swindler, Navajo Nation Historic Preservation Department, personal communication 2002).

The review identified information about six prior investigations on SCRCA (Table IV-1). Four of these studies were surveys, which in the aggregate constitute almost complete coverage of SCRCA. Two of the projects involved archaeological excavations at four sites. In addition, information was identified about seven other prior surveys adjacent to SCRCA.

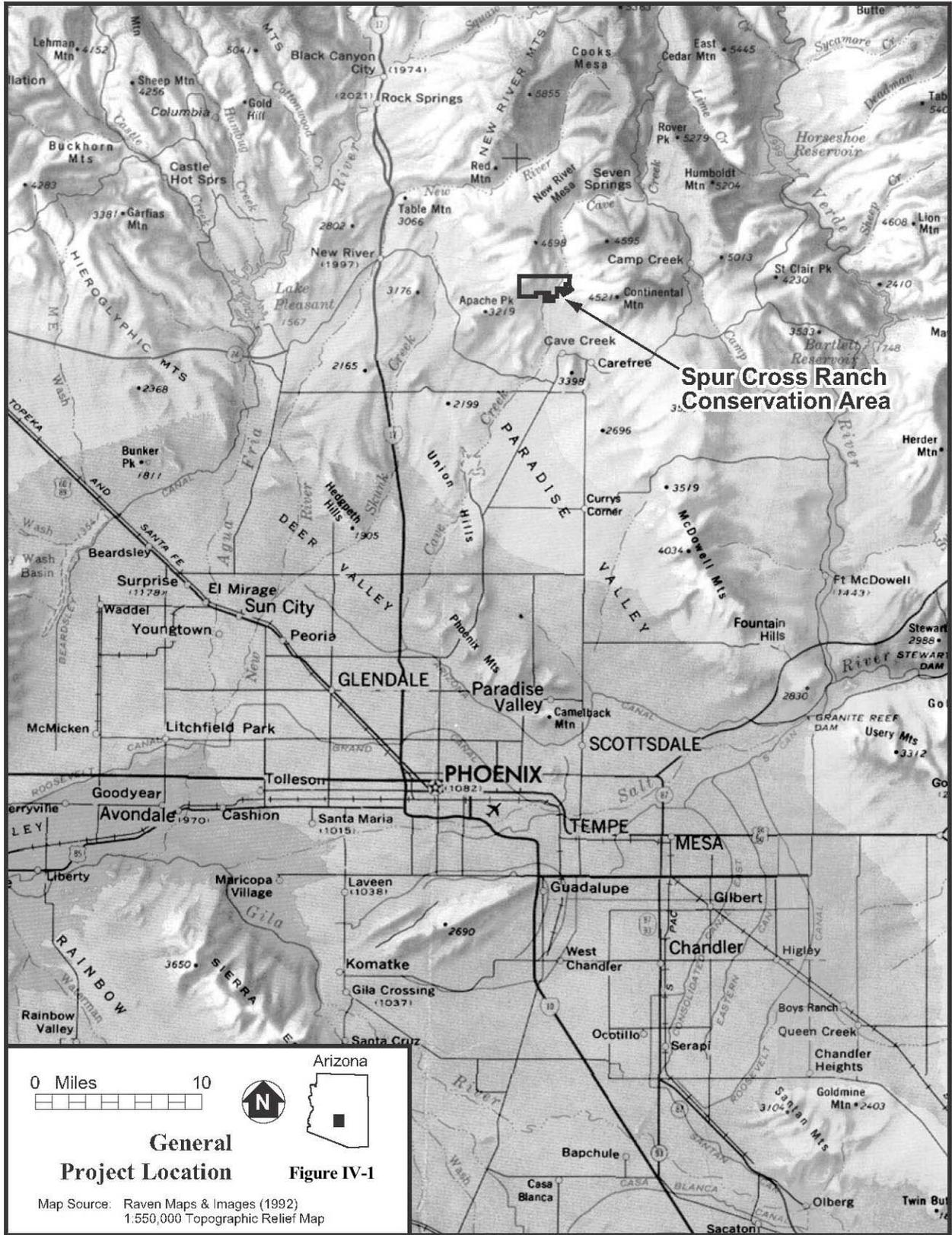
SECTION IV: ENVIRONMENTAL RESOURCES

The first archaeological research on SCRCA, or at least in the vicinity, dates from the late 1930s. Swidler (1992:33) reports that Schroeder recorded what is now known as the Spur Cross Ranch Site and designated AZ U:1:44 (ASM). In 1938 and 1939, Schroeder directed the Salt River Valley stratigraphic survey, which was a project sponsored by the Works Progress Administration, an agency established to provide jobs during the Great Depression. The survey provided data for Schroeder's (1940) Master's Thesis completed at the University of Arizona. Bostwick (1993) provides a list of 108 archaeological sites recorded by the Salt River Valley stratigraphic survey but none are in the U:1 quadrangle and none are in Township 6 North, Range 4 East, where the Spur Cross Ranch Site is located. The late 1930s survey did record two sites in the adjacent T:4 quadrangle, and Schroeder (1940) describes a "boulder site" he designated as Site 83. His description of basalt walls 1 meter high and 0.75 meter thick enclosing a number of smaller room outlines in a complex arrangement is reminiscent of the Spur Cross Ranch Site, but he indicates the site was on a hill just northwest of the Lewis Ranch. The Lewis Ranch was "up the creek three miles" to the north of the Spur Cross Ranch (Gregory 1992:124). Therefore, it is likely that Schroeder passed through SCRCA, but the two sites he recorded were not on the Spur Cross Ranch.

More than three decades later Holiday (1974) conducted the first documented archaeological survey on SCRCA as part of his Master's Thesis research, which involved investigation of sites along Cave Creek. In 1972 he conducted aerial reconnaissance of the region, noting several large sites. In 1974, he visited and recorded four sites on SCRCA, and the site records were incorporated into the Arizona State University files. Three of the sites were multiple-room habitations recorded as sites AZ U:1:12, 19, and 24 (ASU) [and now designated as AZ U:1:44, 45, and 48 (ASM)], and the other was a fortified hilltop recorded as AZ U:1:20 (ASU) [and now designated as AZ U:1:46 (ASM)].

In 1976, the Bureau of Land Management surveyed an 82-acre parcel located adjacent to the southwestern boundary of SCRCA. One archaeological site, designated as AR-02-020-1024 in the BLM site files, was discovered (Kincaid 1976). The site included an area of approximately 2 acres where chalcedony

SPUR CROSS RANCH CONSERVATION AREA



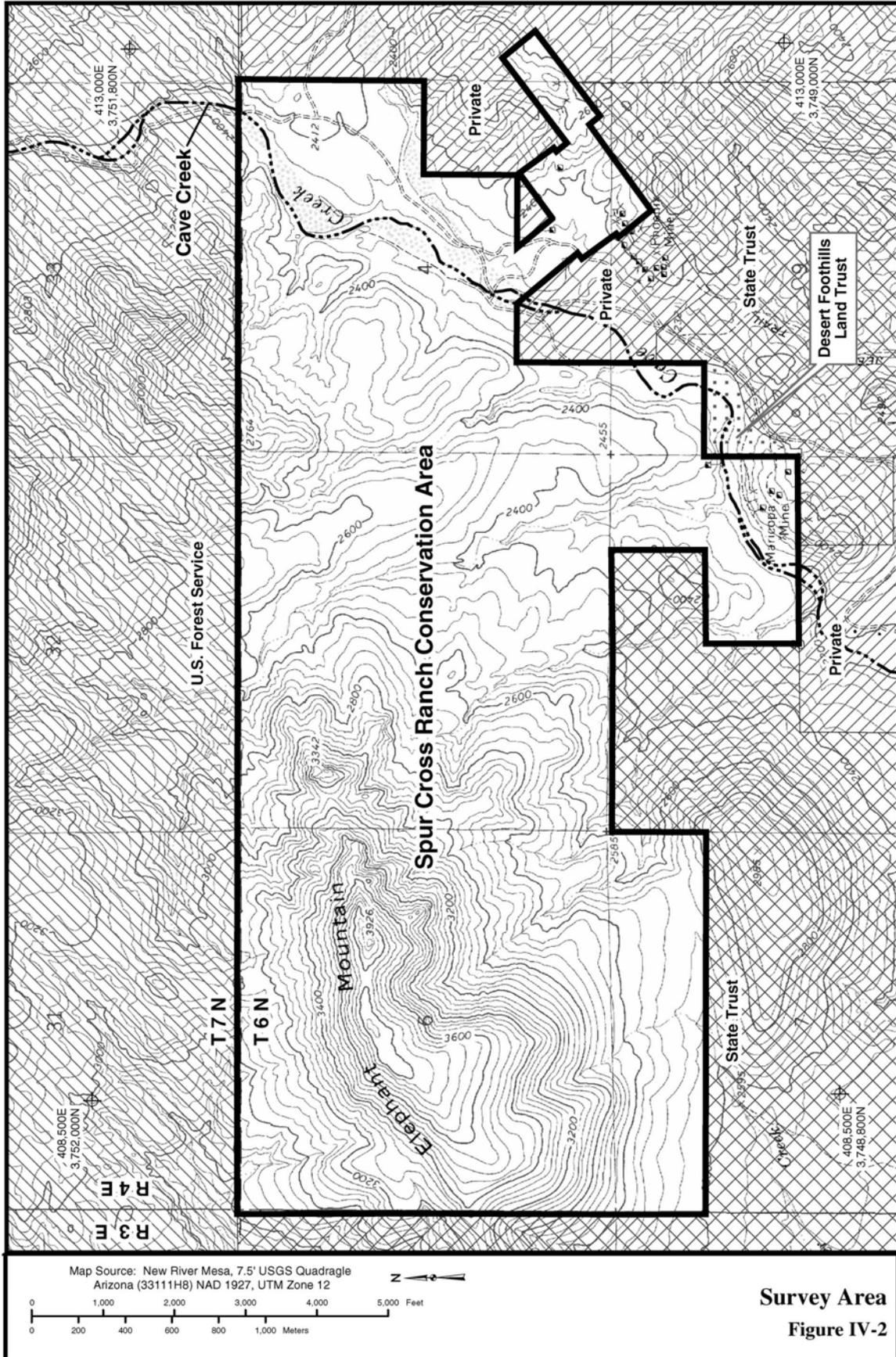
General Project Location

Figure IV-1

Map Source: Raven Maps & Images (1992)
1:550,000 Topographic Relief Map



SECTION IV: ENVIRONMENTAL RESOURCES



Survey Area
Figure IV-2

**Table IV-1
Prior Studies**

Project Name/Number	Organization	Scope	Results	Reference
<i>Studies that included part of SCRCA</i>				
Cave Creek survey (Master's Thesis research)	Arizona State University	aerial and pedestrian reconnaissance	5 sites on SCRCA [AZ U:1:12, 19, 20, 23, 24 (ASU)]	Holliday 1974
Norton Development Company Spur Cross Ranch surveys, 1984-1989 7.3043.SHPO	Arizona Archaeological Society, 1984-1986; Southwest Archaeology Team 1987, Arizona State University 1989	890 acres	53 sites, 5 previously recorded [AZ U:1:12, 19, 20, 23, 24 (ASU)], 48 newly discovered [AZ U:1:57-104 (ASU)]	Lindauer 1990, 1992
Norton Development Company Spur Cross Ranch excavations, 1985-1988	Arizona State University	excavation	3 sites partially excavated, [AZ U:1:12, 19, and 57 (ASU)]	Redman and Minnis 1992; Swidler 1986; 1989
Norton Development Company Spur Cross Ranch excavations	Arizona Archaeological Society	excavation	1 site partially excavated, [AZ U:1:58 (ASU)]	Schroeder personal communication 2002
Pinnacle Group Spur Cross Ranch survey 1996-405.ASM	SWCA Environmental Consultants	1,290 acres	98 sites, 43 previously discovered (as consolidation of 53 sites) [AZ U:1:44-96 (ASM)], 55 newly discovered [AZ U:1:190-244 (ASM)], 84 isolated finds	Crary and Motsinger 1996
Arizona State Trust land survey (MTM Ranch parcel) 1997-505.ASM	Louis Berger & Associates	640 acres	25 sites, 17 previously recorded, 5 on SCRCA [AZ U:1: 82, 86, 198, 232, 241 (ASM)], 8 sites newly discovered, none on SCRCA	Hohmann and Davis 1998

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**Table IV-1
Prior Studies**

Project Name/Number	Organization	Scope	Results	Reference
<i>Studies Adjacent to SCRCA</i>				
State Selection Parcel A-6460 survey	BLM	82 acres	1 site, not on SCRCA	Kincaid 1976
Spur Cross Road Right-of-Way survey 1987-194.ASM	Arizona State Museum	26 acres	2 sites, neither on SCRCA	Bayman 1987
Arizona State Trust land survey (Foster Homestead parcel) 1991-171.ASM / 7.1660.SHPO	Northland	7 acres	2 sites, 1 partially on SCRCA and subsequently designated as part of AZ U:1:245 (ASM), the Liscum townsite	Hackbarth 1991
Spur Cross Road survey 1993-230.ASM	Maricopa County Department of Transportation	~2 miles	no sites identified	Kenny 1993
Desert Foothills Land Trust survey 1996-487.ASM	Louis Berger & Associates	25 acres	10 sites, 3 previously recorded and partially on SCRCA [AZ U:1:82, 198, 232 (ASM)], 7 newly discovered, 1 partially on SCRCA [AZ U:1:245 (ASM)]	Hohmann and Davis 1996
School House Road survey 1997-419.ASM	SWCA Environmental Consultants	27 acres	11 sites, none on SCRCA	Crary and Motsinger 1997
MCDOT Spur Cross Road (Honda Bow Road to 56th Street alignment) survey	URS	23 acres	2 sites, 1 previously recorded, 1 newly discovered, neither on SCRCA	Rogge and others 2002

nodules were quarried and flaked, and an adjacent habitation area covering approximately 10 acres and extending to the south beyond the surveyed parcel.

A five-year episode of intensive archaeological survey and limited excavation was initiated in 1984 in conjunction with the Norton Development Company's proposed construction on the Spur Cross Ranch of a residential and resort community, including a hotel, golf course, houses, and condominiums. This private development had no legal mandate to comply with any archaeological or historic preservation regulations, but company officials envisioned an environmentally and archaeologically sensitive development. The company worked initially with local avocational archaeologists of the Desert Foothills Chapter of the Arizona Archaeological Society based in Cave Creek, and later enlisted Arizona State University's Department of Anthropology to lead the research.

The Norton Development Company planned to preserve some archaeological sites in place, develop an interpretative trail, and incorporate museum displays in the hotel or community room. The company funded archaeological research to mitigate impacts on archaeological sites that would be affected by construction activities. Arizona State University faculty and students contributed to the effort by conducting field schools and undertaking graduate student research projects. The State Historic Preservation Office also provided grant funds to support planning, survey, historic research, and preparation of a draft National Register of Historic Places nomination for the Spur Cross Ranch site. Other professional archaeologists, students, and amateur archaeologists contributed volunteered efforts to surveys and excavations.

The studies sponsored by Norton Development began in 1984 with survey conducted by the Arizona Archaeological Society. Don Dove directed avocational archaeologists in this work, which continued into 1985 and covered a total of approximately 480 acres in the eastern part of the Spur Cross Ranch. The Arizona Archaeological Society conducted a third season of survey in 1986 under the direction of Linda Hohmann. This work covered approximately 200 acres along a north-south ridge to the west of the earlier survey.

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Volunteers from the Southwest Archaeology Team continued the survey in 1987, covering 12 sample transects farther to the west. Michael Sullivan directed this work, which encompassed approximately 120 acres.

In 1988, Owen Lindauer led an Arizona State University effort that surveyed approximately 90 additional acres in two areas along ridges and upper benches of Elephant Mountain. The team also revisited many of the previously recorded sites to supplement and standardize information. A few additional sites were found during these reinspections. Because the earlier surveys had not been reported, the Arizona State University team prepared a report to document all of the survey efforts between 1984 and 1989 as well as the 53 archaeological sites that had been recorded (Lindauer 1990, 1992). All but two historic mining sites and remnants of the Spur Cross Ranch reflected prehistoric occupation. The prehistoric sites included more than 30 sites with 1 to more than 20 rock-walled rooms, a pit house farmstead or small village, 7 agricultural sites with cobble terraces or rock piles, 5 petroglyph sites, 4 artifact scatters, and a fortified hilltop.

Concurrent with the surveys for the Norton Development Company, Arizona State University also conducted archaeological excavations at four sites from 1985 through 1989. The 1985 and 1986 excavation seasons focused on the Spur Cross Ranch Site, which also was referred to as Site 12, because it had been designated AZ U:1:12 (ASU) as a result of Holliday's earlier recording of the site. The site is now designated as AZ U:1:44 (ASM) in the Arizona State Museum survey system.

The initial 1985 fieldwork primarily involved mapping of surface features and controlled collection of artifacts from the surface of the site. Ten 1- by 2-meter test units were excavated within and around the rock-outlined rooms during the 1986 season. Volunteers from the Desert Foothills Chapter of the Arizona Archaeological Society participated in the excavations. A total of 22 rock-outlined rooms in two separate residential compounds were mapped at the site, which is interpreted as the remnants of a small village probably occupied sometime between A.D. 1100-1450 (Swidler 1986, 1989, 1992).

The 1987 excavations involved archaeological testing at a site called Rancheria de Bernier and designated as AZ U:1:57 (ASU). This site is now designated as AZ U:1:49 (ASM) in the Arizona State Museum survey system. The testing indicated the site is the remnants of a small pit house village or farmstead that probably was occupied intermittently during the Gila Butte and Santa Cruz phases of the Colonial period and the Sacaton phase of the Sedentary period (circa A.D. 500 to 1100). Two radiocarbon dates from a pit house post and a hearth yielded dates between A.D. 630 to 870. The Rancheria de Bernier was the only pre-Classic period habitation site identified by the 1980s surveys (Minnis 1992b).

During the 1988 field season, test excavations were conducted at the largest site recorded on SCRCA, which was referred to as Site 19 because Holliday had recorded it as AZ U:1:19 (ASU). It was subsequently designated as site AZ U:1:45 (ASM) in the Arizona State Museum survey system. The site has single rooms, small room clusters, and areas enclosed with compound walls. A total of approximately 25 rooms were mapped, mostly in three long compounds. This site is interpreted as the remnants of a small village occupied at approximately the same time as the Spur Cross Ranch Site (Minnis 1992a).

Under the direction of K.J. Schroeder, the Desert Foothills Chapter of the Arizona Archaeological Society conducted excavations at site AZ U:1:58 (ASU) in 1989. This 10-room site is one of the best preserved on SCRCA. Subsequently, the site was designated as AZ U:1:50 (ASM) in the Arizona State Museum survey system.

After the 1989 season of fieldwork, the Norton Development Company filed for bankruptcy. Arizona State University had no warning about the collapse of the proposed development and was left with an unfinished research program and no funding. Although the excavation efforts were limited to only about 10 to 15 days of fieldwork per year for four years, and the experience and inexperience of the students and volunteers varied considerably, Arizona State University managed to publish a useful report documenting the studies that had been completed for the Norton Development Company (Redman and Minnis 1992). However, the report was described as not a “definitive or final report on the prehistory of the area” because the

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envisioned research program was left unfinished (Redman and Minnis 1992:6). The report also did not incorporate any results of the 1989 excavations by the Arizona Archaeological Society at site AZ U:1:50 (ASM). K.J. Schroeder (Roadrunner Archaeology, Tempe, personal communication, 14 June 2002), who directed the excavations, has completed a partial draft report but it has not been published and many of the collected artifacts and samples remain unanalyzed.

The proposed development by the Norton Development Company stimulated one other survey when it submitted an application to the Arizona State Land Department for a formal right-of-way for Spur Cross Road across State Trust land. Bayman (1987) surveyed the right-of-way, and recorded two archaeological sites south of SCRCA.

In 1991, a 7-acre parcel of State Trust land known as the Foster Homestead was surveyed as part of a planned land transfer (Hackbarth 1991). This parcel is along Cave Creek and abuts the southern boundary of SCRCA. Two sites were discovered during this survey. One was described as a rock-outlined prehistoric field house with a few artifacts, and the other was a dispersed scatter of historic era artifacts and a tent platform.

In 1993, the Maricopa County Department of Transportation again surveyed a length of Spur Cross Road prior to upgrading the road. No archaeological or historical sites were found along the approximately 2 miles that were surveyed south of SCRCA (Kenny 1993).

An intensive survey conducted in 1996 discovered seven archaeological sites and inspected three previously recorded sites on a 25-acre parcel held by the Desert Foothills Land Trust (Hohmann and Davis 1996). Cave Creek flows through this parcel, which has come to be known as the Jewel of the Creek. The parcel abuts SCRCA to the west and north, and three of the previously recorded sites extend onto SCRCA. These include two historic mines and a prehistoric agricultural site. One of the newly discovered sites also extended onto SCRCA. This site, designated AZ U:1:245 (ASM), is a multi-component site with both prehistoric and historic features. The prehistoric features include possible pit house, three possible field houses, a petroglyph boulder, and rock alignments. The historic features

were identified as the remnants of the historic mining town of Liscum (also spelled Liscomb) and recognized as a continuation of the historic artifacts found on the Foster Homestead parcel in 1991. Liscum was associated with the Phoenix Mine (Granger 1983:363).

In 1996, plans for mixed-use development of the Spur Cross Ranch were revived. The Pinnacle Group sponsored an archaeological survey to complete coverage of the Spur Cross Ranch to support planning for the development and supplement the information that had been compiled for the abandoned plans of the Norton Development Company (Crary and Motsinger 1996).

The 890 acres inventoried by the surveys for the Norton Development Company were “spot surveyed” during re-inspection of the 53 sites that had been previously recorded. Based on the re-evaluation, some of those 53 sites were combined leaving a total of 43 discrete sites that were assigned numbers in the Arizona State Museum survey system. Another 55 archaeological sites were discovered during intensive survey of an additional 890 acres. In addition, 84 isolated occurrences, some of which were quite extensive, low-density scatters of artifacts surrounding the larger sites, also were found. Except for approximately 400 acres on the steepest slopes of Elephant Mountain (location not mapped), the additional survey completed survey of the entire SCRCA (Crary and Motsinger 1996:3-1).

The newly discovered sites were similar to those previously recorded on SCRCA and most reflected prehistoric occupation, including 17 habitation or field house sites with rock-outlined rooms, 17 artifact scatters, 11 agricultural sites, and 5 petroglyph sites. Five historic era sites, including two mines, two road segments approximately 300 to 400 feet long, and another site with concrete foundations of undetermined function, also were found.

Like the earlier Norton Development Company proposal, the development planned by the Pinnacle Group was never constructed. The Development Coordination Group took over the project, but abandoned the proposed project before the associated archaeological studies were completed. However,

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site records were filed with the Arizona State Museum and a draft report was finished (Crary and Motsinger 1996). That documentation provided the most complete and current data for the evaluations conducted in conjunction with developing the SCRCA Master Plan.

In 1997, a 640-acre parcel of State Trust land known as the MTM Ranch was surveyed in conjunction with review of an application to renew a special use permit (Hohmann and Davis 1998). Forty acres of this parcel overlap SCRCA, and the rest is immediately adjacent. Eight sites were discovered and 15 previously recorded sites were re-evaluated. In addition, two sites found by an almost concurrent survey along the proposed School House Ranch Road, which passed through the survey area, also were recorded. Five of the previously recorded sites are completely or partially on SCRCA. These include two historic mines, two prehistoric habitation or field house sites, and a prehistoric agricultural site (Hohmann and Davis 1998).

In 1997, a survey for the School House Ranch Road again covered part of the Spur Cross Road corridor. This survey found 11 archaeological sites, all to the south of SCRCA (Crary and Motsinger 1997). The most recent survey was for a Maricopa County Department of Transportation project that involved paving 0.4 mile of Spur Cross Road south of SCRCA. This survey, which partially overlapped several earlier surveys, re-evaluated one previously recorded site and discovered an additional site (Rogge and others 2002).

In summary, the prior studies on SCRCA recorded 98 archaeological sites that have been registered in the Arizona State Museum survey system. Most of the sites reflect prehistoric occupation, but some represent early twentieth-century land uses, related primarily to mining and ranching. Most of the sites are located in the eastern part of SCRCA where Cave Creek flows through the property. Relatively few sites have been identified in the more rugged western part of SCRCA in the vicinity of Elephant Mountain. The prior surveys also indicate that similar sites are found beyond the SCRCA boundaries, but the assemblage of sites recorded on SCRCA is among the largest and best documented in the region.

Culture History Summary

SCRCA is located within a region that archaeologists often refer to as the “northern periphery,” a label for the area that encompasses the northern margins of the Salt River Valley between the Agua Fria River Valley on the west and the Verde Valley on the east. The Agua Fria River, New River, Skunk Creek, Cave Creek, Camp Creek, and the Verde River drain this upland region south to the Salt River. The following sections briefly summarize the cultural history of the region.

Paleo-Indian Period (12,000 to 8,000 B.C.)

Human occupation of central Arizona, as in the rest of the New World, began with a long, seemingly stable life way based on hunting animals and gathering native plant foods. The Paleo-Indian period is poorly represented in the northern periphery, although Peru (1984) claims that the New River Site, located just to the northwest of SCRCA, is a pre-Paleoindian, Old World style “Paleolithic: industry.” His analysis of 640 lithic artifacts collected from the site led him to conclude they represented a unifacial core-tool assemblage very similar to the Tings’un Industry of north China, which is approximately 30,000 years old. Peru’s study indicates the site probably is more than just a quarry workshop at a source of rhyolite toolstone, but the lack of secure chronometric evidence leaves his hypothesis about the great antiquity of the site untested. The Paleo-Indian era is much more confidently defined within the Southwest, although local evidence is limited to rare isolated spear points (for example, Crownover 1994:10-11; Rodgers 1985:10). There is no evidence of a Paleo-Indian occupation on SCRCA.

Archaic Period (8,000 B.C. to A.D. 1)

As the last Ice Age waned, the advent of warmer climate, decreased precipitation, and the extinction of megafauna, such as mammoths, brought about changes in the adaptive strategies that are characteristic of the Archaic era. The Archaic era populations exploited wild plants more intensively, such as grinding seeds into flour, and hunted smaller game such as deer and rabbits.

A few sites dating to the Archaic period have been reported in the northern periphery (Rodgers 1985; Rice and Dobbins 1981). A component of the New River-Stricklin Site, AZ T:4:192 (ASM)/AZ T:4:1 (ASU), near the town of New River, has been interpreted as an Archaic base camp. Limited investigations by Arizona State University at this site recovered charcoal from a hearth that yielded a radiocarbon date of 787 to 405 B.C., which is consistent with recovered late Archaic style points (Kenny 1987). Another feature from a higher terrace at the site yielded a radiocarbon date of A.D. 20 to 250, which in combination with thin plain wares and ceramics identified as Vahki Red indicates continuing occupation during the early part of the Red Mountain or Vahki phases of the Hohokam sequence (Mabry 2000). No evidence of an Archaic occupation has been identified on SCRCA.

Formative and Classic Periods (A.D. 1 to 1150)

During the late Archaic era, domesticated crops began to be grown, particularly corn, beans, and squash. Although this has little impact on subsistence systems for some time, some populations eventually began to rely heavily on farming, and these village-dwelling farmers mark the advent of the Formative and Classic periods. These more sedentary populations began to make pottery vessels, and sites with sherds of broken pottery vessels dominate the archaeological record of the region. The Formative and Classic periods are divided into a series of periods, based on changing styles of pottery and other types of artifacts, as well as different types of architecture. Although the occupant of the northern periphery may not have been Hohokam through the period of occupation, the Hohokam sequence is used as a chronological framework for the following discussion.

Pioneer Period (A.D. 1 to A.D. 775)

The Pioneer period is marked by a move toward a more sedentary lifestyle, manufacture of pottery, and increasing reliance on agricultural products. The Pioneer period is divided into four phases, but an earlier manifestation, the Red Mountain phase, which predates A.D. 300, also has been recognized (Cable and Doyel 1987; Mabry 2000; Mabry and others 1998). From the sites that have been investigated, the Red Mountain

phase appears similar to the numerous terminal Late Archaic sites documented in the Tucson Basin. The relation of the Red Mountain Phase to four succeeding Hohokam phases is unclear. The subsequent phases include Vahki (AD 300-500), Estrella (500-600), Sweetwater (600-700), and Snaketown (700-775) (Dean 1991). Changes primarily in ceramics and architecture signal differences among Pioneer period phases.

Evidence of Pioneer period occupation is scant in the northern periphery. There is evidence of a Pioneer period occupation at the Beardsley Canal Site along the Agua Fria River west of SCRCA, but the primary site occupation dates to the later Colonial period. Swidler and Minnis (1992:11) mention one undocumented site near the confluence of Cave Creek and Cottonwood Wash in the SCRCA where incised ceramics of the Snaketown or subsequent Gila Butte phase were reported.

Colonial Period (A.D. 775 to A.D. 975)

Colonial period phases include Gila Butte (AD 775-850) and Santa Cruz (AD 850-975) (Dean 1991). It is during the Colonial period that domestic architectural units began to be arranged into clusters or courtyard groups (Howard 1985; Wilcox and others 1981), and monumental architecture in the form of ball courts is recognized at some of the more substantial Colonial period villages in the Gila-Salt Basin.

Large Colonial period villages along the lower Agua Fria River and New River, such as the Beardsley Canal Site (Fish 1971; Weed 1972; Green and Efland 1985), Terrace Garden Site (Doyel and Elson 1985, Elson and others 1985), and Palo Verde Ruin, all date to this period. The Rancheria de Bernier Site, AZ U:1:49 (ASM)/AZ U:1:57 (ASU), is the site identified on SCRCA as firmly dating from the Colonial period (Minnis 1992b). This site is a pit house farmstead or small village. The only other site at which possible pit houses have been reported is site AZ U:1:245 (ASM), and it is the only other candidate for a possible Colonial period site.

Sedentary Period (A.D. 975 to A.D. 1150)

The Sacaton phase is the single phase associated with the Sedentary period in the Gila-Salt Basin, although a Santan

phase, transitional to the Classic period, is sometimes defined. The Sedentary period witnessed expansion of settlements and canal irrigation systems as well as the development of various alternate agricultural strategies. The construction of ball courts continued and another form of monumental architecture, the platform mound, was developed. Hierarchical relationships among Sedentary period sites are recognized in the Gila-Salt Basin as well as the Tucson Basin (Doelle and others 1987; Gregory 1991; Howard 1987; Wilcox and Sternberg 1983).

In the northern periphery, the population appears to have increased significantly during the late pre-Classic period, and substantial Sacaton phase sites were located along all of the major drainages. Sites on SCRCA are difficult to date, but many seem to date to the late pre-Classic and subsequent Classic periods.

Classic Period (A.D. 1150 to A.D. 1500)

The Classic period is divided into two phases in the Gila-Salt Basin—the Soho (1150-1300) and Civano (1300-1400). The Classic period contrasts sharply with the pre-Classic periods, exhibiting radical shifts in material culture, architecture, mortuary practices, and settlement patterning. Agricultural intensification occurred in the Gila-Salt and Tucson basins, and it has been argued that the Tucson Basin increased in importance as a regional center at this time (Doelle and Wallace 1991).

Redman and Minnis (1992) conclude that population increased dramatically on SCRCA during the late pre-Classic and Classic periods. There are so many sites that it seems the population may have outstripped the local resources, but Redman and Minnis suggest that the occupations may have been only seasonal.

A late Classic or post-Classic occupation, labeled the Polverón phase, has been identified at a small number of sites in the Gila-Salt Basin (Crown and Sires 1984; Rapp 1996; Sires 1983). Researchers still are attempting to interpret this phase (for example, Chenault 2000; Craig 1995; Henderson and Hackbarth 2000), which is characterized by pit houses constructed on top of apparently abandoned platform mounds,

small clusters of pit house in other settings, and high quantities of obsidian debitage. Red-on-brown decorated wares are common as are Salado polychromes. Hopi yellow wares, although not common, are often present. No Polverón phase sites have been identified at SCRCA.

Models of Formative and Classic Period Occupation of the Northern Periphery

Green (1989:25-29) summarizes three alternative models that archaeologists have developed to account for the prehistoric occupation of the northern periphery. The most traditional model can be labeled the Hohokam expansion model (or Gladwinian model, see Whittlesey 2002). This model posits initial Hohokam settlement of the region during the Colonial period, as an expansion north out of the core area in the Gila-Salt Basin. The model hypothesizes that settlers may have been attracted to what is generally agreed to be the more marginal environment of the northern periphery by a shift to wetter than normal conditions that would have made agriculture possible in the periphery.

A second model might be labeled the “mixed population model.” Proponents of this model, noting the preponderance of plain wares and relatively small amounts of red-on-buff wares that are the hallmarks of the Hohokam, dispute the identification of the occupants of the northern periphery as Hohokam. Although some Hohokam traits are recognized by proponents of this model, they are characterized as a veneer added to a basic underlying non-Hohokam tradition. Cultural influences from northern Sinagua (or Hakataya) populations are deemed to be as important as those of the Hohokam from the south.

A third model, which could be labeled the “secondary resource zone model,” emphasizes the perceived impermanence of much of the occupation of the northern periphery. Settlement of the region is hypothesized to represent the flexible adaptability of residents of the Hohokam heartland to expand sporadically, and perhaps primarily seasonally, into the northern periphery in response to episodes of above average rainfall.

Green (1989:1097) concludes that the discovery of substantial permanent villages in the northern periphery demonstrates that the secondary resource zone model is inaccurate. Some primary villages along the Agua Fria River in the northern periphery have ball courts, such as the Palo Verde Ruin, the site AZ T:4:10 (ASM) complex, site AZ T:8.:19 (ASM), and possibly the Pasco or Jackass Acres site, AZ T:4:33 (ASU). These sites indicate that at least part of the northern periphery was integrated into the pre-Classic period Hohokam regional system.

Green also suggests that the duplication of resources in the northern periphery with those in the core area argues against the secondary resource zone model. However, it has been shown that ground stone tools may have been an important commodity produced in the northern periphery and traded into adjacent regions, and specialized crops (cotton and agave have been suggested) may have been grown in the periphery. Dense occupation in the core area also may have depleted some native food sources such as cactus, paloverde, and mesquite, along with game animal populations making the less developed periphery a possible replacement source for these foods.

Many researchers have noted a definite decline in Hohokam traits within the northern periphery during the Classic period, and apparently increasing interaction with groups to the north. Large communities, seemingly not Hohokam, developed in the mountains to the north in places like Perry Mesa (Ahlstrom and Roberts 1994).

Bruder (1982) specifically attributes the development of the Classic period Carefree site, a 40-room masonry pueblo in the mountains northeast of Cave Creek, to populations abandoning the northern periphery as climatic conditions deteriorated at the beginning of the Classic period. Bruder hypothesized that the Carefree site location was selected for its agricultural potential but evidence of farming proved to be quite limited, just as it had at pre-Classic sites to the south along Cave Creek (Henderson and Rodgers 1979; Rodgers 1977). However, recent testing yielded evidence of growing corn at three sites within the floodplain of middle Cave Creek and cotton at one of these (Phillips 1998). Phillips suggests that rainfall runoff control techniques may have been used to grow corn on the bajada above the floodplain as well. He points out that wild buckwheat

and perhaps other native plants were encouraged in agricultural fields. Phillips suggests that climatic conditions for farming along Cave Creek were most favorable during the AD 1000s, and were very unfavorable after AD 1200.

Fortified hilltop sites are one of the most intriguing archaeological phenomena in the northern periphery. Many of these hilltop sites were recorded by the Central Arizona Ecotone Project, which involved survey in five areas including northern and southern Daisy Mountain and New River Mesa within the headwaters of Skunk Creek and New River, and Wild Burro Mesa and Indian Mesa along the Agua Fria River to the west (Gumerman and others 1976; Gumerman and Spoerl 1980; Spoerl 1979; Spoerl and Gumerman 1984). The hilltop sites vary considerably and Spoerl hypothesized four separate functions: (1) forts, (2) retreats, (3) habitations, and (4) centers, all seemingly related to defense (Spoerl 1979; Spoerl and Gumerman 1984).

Forts are small sites on isolated buttes or hills that have protective walls or a few rooms, and may have served as lookouts. Retreats have massive walled residential compounds on buttes or hills, but the presence of only a few rooms and artifacts indicate temporary use. Habitations have many rooms and artifact middens, and usually defensive walls to supplement the steep-sided hills or buttes on which they are located. Centers are the largest of the habitations, which appear to have served as central places for local populations.

Van Waarden (1984) investigated the relations of these hilltop sites with the Hohokam villages to the south. She found little evidence of exchange among these sites, suggesting there was little interaction between the hilltop sites and the core villages to the south. Nor do the hilltop occupants seem to have served as guards for the Phoenix Basin Hohokam (Wilcox and others 1998). Van Waarden also found little evidence of conflict between the northern periphery and the Phoenix Basin Hohokam, and instead concluded that the hilltop sites reflected internecine conflict among the occupants of the northern periphery itself.

Wilcox and others (1998) have shown that the hilltop sites of the northern periphery are part of a much larger system of

hilltop sites that extends into the upper Agua Fria drainage to the north of Prescott. They suggest these sites reflect widespread feuding among local populations of the mountainous Transition Zone of central Arizona and probably occasional raids into the Hohokam area to the south from about AD 1100 to 1250. Wilcox and others (1998) hypothesize that this system of hilltop sites was abandoned when the Hohokam achieved sufficient political integration to field a thousand warriors to attack and defeat the populations to the north of their homeland. The subsequent construction of a series of fortified sites during the late Classic period on Perry Mesa in the middle Agua Fria Valley is seen as a response to the Hohokam aggression.

In sum, all of the models of the prehistoric occupation of the northern periphery appear to have some strengths and some weaknesses. There is good evidence of a Hohokam presence in the northern periphery by the late Pioneer period, with a substantial increase in intensity of occupation in the late Colonial Period, continuing into the Sedentary period. Occupation may have expanded and contracted in response to variations in rainfall. Some large, permanently occupied settlements were established in at least parts of the northern periphery at times. Subsistence strategies apparently included a mix of exploiting natural plant foods and game, with agriculture pursued in limited areas of arable soil and a water supply. Rainfall runoff control techniques represented by border gardens and terraces were used as well as ditch irrigation out of the rivers and intermittent washes. Cotton has been suggested as a possible specialized crop, based largely on the abundance of spindle whorls recorded at some sites, but other archaeologists have suggested these may reflect specialized tending of agave and spinning of agave fibers. Ground stone was another commodity of the northern periphery that was traded into the core Hohokam area. The transition to the Classic period appears to have coincided with a decrease in rainfall (Phillips 1998), which may have led to subsistence stress and raiding or warfare.

Protohistoric Period (1500s to 1800s)

The presence of aboriginal populations is well documented to about A.D. 1450, but archaeological evidence of the time period between A.D. 1500 and 1850 is rare. Modern O'odham

(Piman) groups consider themselves descendents of the Hohokam, as do the Hopi, but the relationship between these ethnohistoric groups and the prehistoric populations is difficult to demonstrate archaeologically. O'odham and Hopi oral traditions suggest that internecine warfare played a role in the drastic changes reflected in the archaeological record at the end of the Classic period (Bahr and others 1994; Teague 1993).

When Europeans arrived, the valley was a contested boundary zone between the Akimel O'odham (Pima) and Pee Posh (Maricopas) who resided on the Gila River to the south, the Yavapais who lived to the north and west, and the Apaches located to the northeast and east (Schroeder 1974; Spicer 1962). The few ethnohistoric period sites that have been found in the northern periphery are small scatters of surface artifacts, some of which may be associated with the Western Yavapai (Telles and McConnell 2000). Three sites on SCRCA, AZ U:1:52, 213 and 217 (ASM), have been recorded as having possible Protohistoric period components, but no definitive evidence of this occupation was noted during the re-evaluation.

SCRCA is in an area that was on the northern fringes of Spain's New World Empire for almost three centuries beginning in the sixteenth century. Despite the claims of sovereignty, Spanish settlements in Arizona never extended north beyond Tucson, except for missions among the Hopi from 1629 to 1680 (Spicer 1962:190-194). Although the indirect impacts of the arrival of Europeans in the New World were substantial, Spanish activities north of Tucson were largely limited to exploration, and none of this appears to have reached the project area (Walker and Bufkin 1986).

Historic Period (1800s to 1900s)

Throughout the Spanish era, native groups effectively maintained control over virtually all of Arizona. The Apaches, in particular, were effective in constraining Euro-American settlement to the upper Santa Cruz River Valley from Tucson south, where no more than approximately 1,000 non-Indians were located at the beginning of the nineteenth century (Sheridan 1995:38). In 1795 Father Diego Miguel Bringas recommended that a presidio be built at the confluence of the Gila and Salt rivers to stem the threat of Apaches, but it never

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was pursued. The Spanish were occupied with civil unrest, and fighting for independence broke out early in the nineteenth century. After a decade of conflict, the Mexicans won their independence from Spain in 1821. Although more Mexican ranchers and miners moved north into southern Arizona after independence, Mexican control was less effective than Spain's, and brief, lasting only slightly more than a quarter century.

The establishment of Fort McDowell (originally Camp Verde) along the lower Verde River in 1865 stimulated agricultural activities in the Salt River Valley. A road built between Fort McDowell and Fort Whipple near the territorial capital at Prescott passed through the area where the town of Cave Creek would be established in 1877. The name may be derived from Edward Cave, a local prospector, or from a few large caves that local tribes used for shelter (Granger 1983).

Euro-American settlement initially focused on building irrigation canals among the remnants of canals abandoned by the Hohokam some four centuries earlier. The Phoenix townsite was laid out in 1870 and settlement and agricultural development spread to other parts of the valley. Completion of Roosevelt Dam in 1911 stabilized the irrigation water supply and the Salt River Valley prospered during World War I and in the 1920s. The Phoenix area began growing exponentially after World War II, and the Phoenix metropolitan area has become one of the largest urban centers in the nation (Sargent 1988).

Initial Euro-American settlement activity in the Cave Creek area focused on mining, and by 1876 several mines were staked, including the Phoenix Mine at SCRCA. In the 1890s the largest stamp mill in the territory was operating at the Phoenix Mine. The community of Liscum was established nearby with several saloons, private homes, and a boarding house (Gregory 1992:118-120). The town was large enough to warrant a post office in 1901 and 1902 (Granger 1983:363). It has been said that mines in the Cave Creek area generated more money in paper stock than they did in ore, and shortly after the beginning of the twentieth century most mining activity ended (Gregory 1992:119). Grazing of sheep and cattle, and limited farming also were pursued, but a 10-year drought that began in 1894 thwarted those efforts.

Spur Cross Ranch

The development in central Arizona of tourism and a health industry catering to respiratory diseases brought new life to Cave Creek in the 1920s. The Spur Cross Ranch was the first and became one of the well-known dude ranches that developed in the Cave Creek area. These guest ranches were marketed as an opportunity for eastern tourists to experience life on a western ranch.

Edward K. “Cap” Joyce, Philip K. Lewis, and an unnamed third partner came up with the idea for the Spur Cross Ranch. All three were convicts who met in the state penitentiary while serving time for crimes ranging from killing a man to embezzlement and tax evasion. After their release in 1928, the partners began building the ranch, using materials scavenged from the abandoned Phoenix Mine (Carlson 1988; Gregory 1992).

Joyce had arrived in Arizona as a soldier during World War I. He was from a prominent eastern family, but decided to stay after his military service at Fort Huachuca ended. After establishing the Spur Cross Ranch, Joyce assumed responsibilities for entertainment and publicity. Lewis served as the executive in charge of ranch construction and the administration of ranch business. Immediately after establishing the ranch, Joyce embarked on a 10,000-mile publicity tour throughout the eastern United States. Joyce spoke on radio programs and before civic groups, promoting the ranch as a place where visitors could experience real ranch life (Carlson 1988; Jones 1929).

Joyce and Lewis planned to accommodate up to 50 guests, but when Spur Cross Ranch opened for visitors, construction had not been completed, and they did not have enough capital for maintenance and expansion. Joyce continued to promote the ranch and often asked wealthy ranch visitors, such as W.K. Kellogg of breakfast cereal fame, for loans. Lewis grew tired of running the ranch himself while Joyce was on publicity trips and sold his share to Joyce. Joyce tried breeding horses at the ranch but failed, and eventually Lewis foreclosed on the ranch after Joyce could not make his mortgage payments. Lewis sold the ranch to an insurance man named Knowles, who vacationed at

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another dude ranch operated by Lewis. Knowles was impressed with the green grass that had grown up after a rainy spell. Knowles hired a manager to raise cattle but mismanagement and a return to more normal drier conditions soon led to the demise of the operation (Carlson 1988).

In 1945, Knowles sold the ranch to Warren Beaubian, a Phoenix contractor. Beaubian, along with his wife Billie and six children, moved to the ranch, which included approximately 2,000 acres of deeded land and approximately 10,000 acres of leased rangeland. After remodeling the main ranch building and constructing additional guest cottages, the family once again opened the ranch to guests.

Guests were met at Sky Harbor Airport in the ranch station wagon and driven the 40 miles to the ranch. The ranch was accessed via Spur Cross Road, which was the only road that led to the property. Cabins at the ranch were given names such as Mesquite, Palo Verde, Ocotillo, and Saguaro and accommodated 24 guests. Guest activities included hikes and horseback rides along trails that led to archaeological sites and local springs. A historic photograph depicts signage that directed guests to destinations such as White Springs, Blue Springs, Indian Fort Spring, Indian Fort, and Tank Springs. Audrey Beaubian Woodward remembered that these trails were already established when the Beaubians purchased the ranch. She speculated that the trails were likely formed by cattle traveling to and from water sources and by the previous owners, who probably led trail rides to Skull Mesa in the Tonto National Forest and other destinations of interest.

The Spur Cross Ranch continued to be operated as a working ranch, as well as a guest ranch until it was sold in 1953 after Warren Beaubian died in an airplane crash. The new owners were not interested in operating the dude ranch and demolished the ranch buildings (Garrison 1982; Audrey Beaubian Woodward, daughter of Warren Beaubian and former ranch resident, personal communication 23 July 2003). By 1959, the ranch apparently was assessed as unimproved property (Gregory 1992:125).

Evaluation Methodology and Findings

Methods

The Arizona Archaeology Commission and the State Historic Preservation Office issued guidelines for developing archaeology parks in Arizona. Those guidelines note that archaeological resources are by their very nature fragile and nonrenewable, and “any archaeological site exposed to the elements or use by visitors will be impacted by that experience” (Howard 1997:26). The guidelines also acknowledge that while almost all archaeological sites have scientific values, they may not have qualities necessary to create viable public interpretations (Howard 1997:12). Studies were undertaken to address those issues by compiling base line documentation of the current condition of sites on SCRCA, evaluate their suitability for public interpretation, and assess potential impacts of recreation uses.

Base Line Documentation

A primary goal of the cultural resource component of the master plan development was to document the current condition of the archaeological sites as a base line for the adaptive management strategy being adopted to ensure that recreational use of SCRCA does not degrade those resources. An important aspect of this documentation was to improve the accuracy of the mapped site locations. Global positioning system (GPS) units were used for all mapping. A GeoExplorer III GPS unit was used for most of the fieldwork. This system has an accuracy of ± 5 meters or better with differential correction. When greater accuracy was desired for mapping the large multi-room habitation sites AZ U:1:44 and 45 (ASM), as well as the alignment of the proposed Maricopa County Regional Trail, a GeoExplorer Pro XT GPS unit was used. This system has an accuracy of ± 1 meter or better with differential correction. The mapped data were used to develop a geographic information system database of spatial information about the archaeological resources of SCRCA.

Development of the base line information was initiated by compiling copies of site records for all 98 archaeological sites previously recorded on SCRCA. The site forms and site location map compiled by Crary and Motsinger (1996) were used to find

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and inspect the sites. Eric Cox directed this fieldwork, most of which was conducted between 7 May and 6 June 2002, with supplement fieldwork, primarily for survey of trails, occurring through September 2003. Kimberly Ryan, Amanda Van Gorder, and Heather Louis assisted at various times. A total of 60 person-days of effort were devoted to the fieldwork. Dr. David E. Doyel served as principal investigator at the initiation of the study, and Dr. A.E. (Gene) Rogge assumed that role after Dr. Doyel left URS in August 2002.

After relocating a site, the field crew compared what they found to the original site maps and descriptions to ensure the site identification was correct. At approximately one-third of the sites, the crew found aluminum identification tags placed on the sites during the 1996 survey. Although the field numbers were not always legible, those tags helped confirm the site identifications.

After confirming the site identification, a permanent datum, consisting of a 12- to 16-inch piece of No. 4 rebar (diameter of 0.5 inch), was driven into the ground and topped with an aluminum cap stamped with the ASM site number (Photograph 1). Where possible the datum was placed in the same location where a datum had been established during the 1996 survey. In other cases, the datum was placed in an open area associated with a feature of the site. The location of the site datum was then annotated on the site maps that had been prepared during prior surveys.



Photograph 1. Typical Permanent Datum Established at Sites

Once a datum was set, the site was then inspected, typically by walking across the site at intervals of approximately 5 meters or less. All archaeological features were compared to those plotted on the site maps prepared during prior surveys. Any newly discovered features were added to the site maps. Site boundaries were revised as warranted by the results of the re-inspections. Any disturbances, whether due to human activity or erosion, also were noted. A GPS unit was used to determine the coordinates of the site datum and the locations of any other revisions of the site map. A form was completed to collect standardized information about site conditions, and photographs were taken in the cardinal directions from the datum using a Kodak DC 5000 digital camera. Additional photographs of individual features, such as petroglyphs, were taken where warranted.

Evaluation of Suitability for Public Interpretation

In addition to compiling base line information, another primary goal was to evaluate the suitability of archaeological sites for public interpretation. This information was considered in designating recreational use zones and designing a trail system

that would provide access to sites selected for interpretation and to avoid fragile or sensitive sites that could easily be degraded by visitation. Standardized information regarding suitability for potential public interpretation was recorded on the same form used to document site conditions.

Several factors were considered in rating interpretive suitability on a scale of 1 to 5 (Table IV-2). One of the most important factors was the nature of the archaeological features and the ability for the general public to recognize and appreciate them. The evaluation considered the following questions:

- Does the visual character of the site or the site setting lend itself to public interpretation?
- Can the site be used to interpret interesting aspects of past life ways?
- Is the site part of a cluster of sites that could be jointly interpreted?

Accessibility of the sites for public visitation was another important factor. Distance from entry points and potential trails, and ruggedness of the terrain were considered.

Some sites could be easily damaged if visitors were not closely monitored, and susceptibility of archaeological and other resources to degradation by visitation also was an important factor. The evaluation considered the following questions:

- Can features of the site be easily damaged (such as marring of petroglyphs, dismantling rock walls)?
- Are artifacts on the site susceptible to being taken?
- Would the site be significantly damaged by development of trails or foot traffic?
- Could particularly sensitive human burials be disturbed by visitation?
- Would visitation of the site be compatible with other resource conservation goals?

Table IV-2
Criteria for Evaluating Archaeological Site Interpretation Suitability

Site Class	Criteria for Classification	Potential Management	Access
1 Primary (best)	Sites are large and have visually impressive features, such as rock walls or petroglyphs, which would interest visitors. Some of the sites have been partially excavated.	These sites should be monitored regularly for vandalism and illegal collection of artifacts. Well-defined foot trails to and through these sites and signage could be beneficial. Some of the sites will require stabilization and backfilling—an activity that may be used to provide supervised volunteers with a hands-on archaeological experience.	Access is easy, often via existing trails.
2 Secondary	Sites tend to be smaller field house and agricultural sites that are not as visually impressive as those in the primary category. Some of these sites have been looted or vandalized, but may be used to demonstrate how fragile archaeological resources are.	These sites should be monitored regularly for vandalism and illegal collection of artifacts. Well-defined foot trails to and through these sites and signage could be beneficial. Limited stabilization and backfilling of looter holes may be necessary at some sites—an activity that may be used to provide supervised volunteers with a hands on archaeological experience.	Access may entail longer or more strenuous hiking.
3 Marginal	Sites tend to be small and lack visually impressive features. Sites in this category could be included in guided tours to provide a more comprehensive appreciation of the archaeological record preserved on SCRCA.	These sites should be monitored occasionally for vandalism and illegal collection of artifacts. It may be best to avoid signage or install only minimal signage to leave the setting of these sites largely undisturbed.	Access may be difficult. Only guided tours are recommended to provide proper interpretation or for safety.
4 Limited	Some sites may be pristine with visible features but are fragile and easily damaged by unsupervised visitation (such as the fortified hill top). Other sites in this category may have limited interpretation potential because they are so remote and similar sites are more accessible.	These sites should be monitored occasionally to check for unsupervised visitation. No signage is recommended.	Access is difficult. Only guided tours are recommended to ensure sites are not degraded by visitation.

Table IV-2
Criteria for Evaluating Archaeological Site Interpretation Suitability

Site Class	Criteria for Classification	Potential Management	Access
5 Restricted	Sites where possible human remains have been found on the surface of ground are assigned to this category.	Further investigations should be conducted to confirm whether bone on the surface of these sites is human or not. Consultation with affiliated tribes should be conducted for any confirmed human remains, and the remains should be treated in response to those consultations.	No public visitation should be allowed until human remains are appropriately treated.

Public safety also was a consideration. For example, vandal holes, archaeological excavations that remain open, unstable rock walls and rock piles, and archaeological features such as historic mine shafts can present hazards for recreational visitors. Management recommendations to address safety issues and resource protection were formulated as an aspect of evaluating suitability for public interpretation.

Trail Survey

In addition to the fieldwork conducted to compile base line data and evaluate the suitability of sites for public interpretation, a survey was undertaken along the proposed trail system. The Maricopa County Parks and Recreation Department trail crew flagged the centerline of the new trails, and then accompanied an archaeologist who surveyed a 65-foot-wide (20-meter) corridor along each proposed new alignment. A total of 14.5 miles of existing and new trails (114 acres) were intensively inspected in this manner.

Vegetation generally was sparse, making it easy to inspect the ground surface for artifacts and archaeological features. No artifact collections were made and no subsurface testing was undertaken during the survey.

Results

Base Line Documentation

Eighty-three of the previously recorded sites were found and mapped. The condition of each of these sites is documented with standardized forms, site maps, and photographs that are included in Books 1, 2, and 3 of Appendix D. The distribution of this documentation will be limited to avoid potential vandalism. One additional site, AZ U:1:405 (ASM), was discovered while searching for a previously recorded site. A description of this field house/habitation site is included in Appendix D. Three other sites were found while conducting survey for the proposed trail system, and are discussed below.

In general, the archaeological sites are in relatively good condition, but it is recommended that several factors be

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addressed to stabilize or improve the condition of some sites. The field inspections revealed that the archaeological excavations conducted in the 1980s at the larger multi-room sites, AZ U:1:44, 45, and 50 (ASM), were not backfilled. This probably resulted from the assumption that the sites would be further disturbed by construction of the residential and resort development proposed at that time, or because further excavation was planned when the project was abandoned unexpectedly.

While the open excavation units allow visitors to see the depth of rooms and other features that would otherwise be covered, it has led to erosion that has degraded the condition of the excavated features. Upright slabs at the bases of some walls have fallen and other rock walls outlining rooms have collapsed (Photographs 2 and 3). The dirt and cobbles removed from some of the rooms by the 1980s excavations were piled immediately adjacent to the excavated rooms and are eroding back into the room, exacerbating the damage.



Photograph 2. Collapsed Walls in Excavated Room at Site AZ U:1:50 (ASM)



Photograph 3. Collapsed Walls in Excavated Room at Site AZ U:1:45 (ASM)

The excavations at site AZ U:1:49 (ASM), a pit house farmstead or small village, also were not backfilled (Photograph 4). This has allowed the exposed pit houses to erode into little more than depressions. Numerous artifacts and bone fragments (some possibly human) are eroding out of the back dirt piles.

The exposed excavations also could lead to damage of unexcavated features. For example, a circular feature was noted eroding from a floor of a room excavated at site AZ U:1:50 (ASM) (Photograph 5).

If left unchecked, the open excavation units will continue to erode. It is recommended that a plan be implemented to stabilize selected excavated features that will enhance public interpretation, and to backfill other units to prevent further erosion damage.

A number of sites have evidence of illegal collecting and looting. Some of this damage may be quite old because “digging in the Indian ruins” was one of the advertised activities for guests at the historic Spur Cross dude ranch. However, many of the

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vandal holes appear to be more recent because they were not noted when the comprehensive 1996 survey was conducted.

One of the more blatant examples of vandalism is a boulder with drill scars revealing where petroglyphs were removed (Photograph 6). Each of the six rock-outlined rooms at this site, AZ U: 1:56 (ASM), have had looters' pits excavated into them. Other evidence of vandalism was noted at site AZ U: 1:47 (ASM) where a cross was recently pecked next to aboriginal designs on a petroglyph panel (Photograph 7).

Piles of collected and stacked pottery sherds were noted at some of the larger habitation sites (Photograph 8). Some visitors assume they are helping archaeologists by making such collections, or others may leave them after getting qualms about taking the artifacts. The loss of spatial relationships of artifacts on sites degrades their archaeological integrity.

Modern trash has been left on many sites, especially those close to roads. The appearance of the sites could be easily improved by removing the debris, but any trash collecting activities should be done carefully so that historic era artifacts are not inadvertently removed. Probably during the planning for residential and resort development in the 1980s or 1990s, surveyors used large pieces of plastic pipe and metal fence posts as survey markers. Some of these were left and probably should be removed. In a couple of instances, prehistoric structures were damaged when rocks were taken from prehistoric features to anchor the markers (Photograph 9).



Photograph 4. Unbackfilled Excavations at Site AZ U:1:49 (ASM)



Photograph courtesy of Jennifer Johnston, Maricopa County Parks and Recreation

Photograph 5. Feature (possibly a hearth) Eroding from a Floor at Site AZ U:1:50 (ASM)

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Photograph 6. Vandalized Petroglyph Panel at Site AZ U:1:56 (ASM)

Note petroglyphs remaining on lower left and upper right of boulder face.



Photograph 7. Recently Pecked Cross on Petroglyph Panel at Site AZ U:1:47 (ASM)



Photograph 8. Collected Pottery Sherds at Site AZ U:1:45 (ASM)



Photograph 9. Plastic Pipe Left on Site AZ U:1:86 (ASM)

Cobbles to support this survey marker were taken from a nearby prehistoric structure.

Suitability for Public Interpretation

The evaluation of suitability of the archaeological sites is summarized on Table IV-3. Fourteen sites were evaluated as the best candidates for public interpretation. These sites tend to be the more visually impressive sites with easy to moderate access. Most of the sites are multi-room habitation sites with rock-outlined rooms. Four of these sites have petroglyphs. Historic sites in this category include the Maricopa Mine and the site of the historic mining community of Liscum.

Forty-one sites were evaluated as secondary level candidates for interpretation. These sites are less visually impressive and some have difficult access. Sites in this category that reflect land uses not included in the primary category, such as prehistoric agricultural sites, and the remnants of the historic Spur Cross Ranch, could be viable candidates for public interpretation, particularly if they are situated near other sites selected for interpretation.

Twenty-one sites were classified as having only marginal potential for public interpretation. Sites in this category are visually unimpressive, and often have difficult access. Typically, there are similar types of sites that are better and more accessible candidates for public interpretation.

Nine sites were classified as having limited potential for public interpretation. Most of these are difficult to access. A couple of sites were classified in this category because they are quite susceptible to damage by visitation, but they could be candidates for visitation if access is limited to guided tours. An example of this type of site is the fortified hilltop on Elephant Mountain.

Two sites were classified as restricted because bone, which may be human, was seen or reported earlier on the surface of these sites. Because of the sensitivity of human remains, these sites are not candidates for public interpretation until further investigation determines whether human bone is present and any human remains have been dealt with in consultation with affiliated tribes. Human bones also were recovered from three sites and possibly a fourth site that were partially excavated in the 1980s. Most of these bones were from the pit house

**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

Site Numbers		Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
1	AZ U:1:44 (ASM) AZ U:1:12 (ASU) Spur Cross Ranch Site	Habitation, at least 23 rooms	Yes	Easy	1	Backfill excavations and stabilize, delineate a specific trail within the site, possibly add signage, good for physically challenged visitors
2	AZ U:1:45 (ASM) AZ U:1:19 (ASU)	Habitation, at least 24 rooms and a rock shelter	Yes	Easy	1	Backfill excavations and stabilize, delineate a specific trail within the site, possibly add signage, good for physically challenged visitors
3	AZ U:1:46 (ASM) AZ U:1:20 (ASU)	Fortified hilltop, 3 rooms	Yes	Extreme	4	Stabilize walls, limit visitation to guided tours, delineate a specific trail to and within the site
4	AZ U:1:47 (ASM) AZ U:1:23 (ASU)	Petroglyphs	Yes	Easy	1	Good for visitation
5	AZ U:1:48 (ASM) AZ U:1:24/103 (ASU)	Habitation, 4 rooms	Yes	Moderate	4	Backfill looter's pit, remove trash, larger and more visually impressive sites are located nearby, site is in generally good condition and should be avoided to preserve integrity

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**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

	Site Numbers	Site type¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations²
6	AZ U:1:49 (ASM) AZ U:1:57 (ASU) Rancheria de Bernier	Habitation, at least 3 rooms	Yes	Easy	1/4	Backfill excavations and stabilize, can be used for a "hands on" preservation project or as determined by SCRCA land managers.
7	AZ U:1:50 (ASM) AZ U:1:58 (ASU)	Habitation, 10 rooms	Yes	Easy	1	Backfill excavations and stabilize, delineate a specific trail within the site, possibly add signage, good for physically challenged visitors
8	AZ U:1:52 (ASM) AZ U:1:59/60 (ASU)	Habitation/field house, 1 room	Yes	Extreme	2	Rock walls are still standing and may need stabilization, site visitation should be limited to guided tours
9	AZ U:1:53 (ASM) AZ U:1:61 (ASU)	Habitation/field house, 1 room	Yes	Extreme	2	This site is eroded quite heavily and the walls are collapsing, possible rest stop on way to fortified hilltop site but not visually impressive
10	AZ U:1:54 (ASM) AZ U:1:62 (ASU)	Habitation/field house, 1 room	No	Extreme	n/a	Site not found

**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

	Site Numbers	Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
11	AZ U:1:55 (ASM) AZ U:1:63 (ASU)	Habitation/field house, 1 room	Yes	Easy	2	Not as visually impressive as others, but ease of access could accommodate physically challenged visitors
12	AZ U:1:56 (ASM) AZ U:1:64/65/66/68 (ASU)	Habitation, 6 rooms	Yes	Easy	2	Considerable looting damage and vandalism (petroglyph panel removed), ease of access could accommodate physically challenged visitors
13	AZ U:1:59 (ASM) AZ U:1:67 (ASU)	Spur Cross Ranch, remains of 9 structures	Yes	Easy	2	Little left at this site except for building foundations and split rail fence
14	AZ U:1:61 (ASM) AZ U:1:69/70 (ASU)	Habitation, 2 rooms	Yes	Easy	2	Heavily degraded but easy access could accommodate physically challenged visitors
15	AZ U:1:63 (ASM) AZ U:1:71 (ASU)	Habitation/field house, 1 room	Yes	Easy	1	Only one rock-outlined room, road runs over portion of structure and should be realigned, easy access could accommodate physically challenged visitors

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**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

	Site Numbers	Site type¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations²
16	AZ U:1:64 (ASM) AZ U:1:72 (ASU)	Habitation, 2 rooms (contiguous courtyard)	Yes	Difficult	4	Similar to other sites on SCRCA that are easier to access, trash should be removed, unsuitable for interpretation because of difficult access
17	AZ U:1:65 (ASM) AZ U:1:73 (ASU)	Habitation/field house, 1 room	Yes	Moderate	3	Unable to identify rock-outlined room previously recorded at this site, artifact scatter is not conducive for interpretation
18	AZ U:1:66 (ASM) AZ U:1:74 (ASU)	Habitation/field house, 1 room	Yes	Difficult	4	Backfill looter's holes and stabilize erosion, not conducive for general visitation because of difficult access
19	AZ U:1:67 (ASM) AZ U:1:75 (ASU)	Petroglyphs	No	Easy	n/a	Site not found
20	AZ U:1:69 (ASM) AZ U:1:77 (ASU)	Habitation, 3 rooms	Yes	Moderate	2	Backfill looter's holes, stabilize rock walls, close to site 50 and could be co-interpreted but a defined trail would be needed
21	AZ U:1:70 (ASM) AZ U:1:76/78 (ASU)	Habitation/field house, 1 room	Yes	Moderate	2	Stabilize rock walls, close to site 69 and could be co-interpreted but a defined trail would be needed

**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

Site Numbers		Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
22	AZ U:1:71 (ASM) AZ U:1:79 (ASU)	Agricultural	Yes	Easy	2	Agricultural field system is not visually impressive
23	AZ U:1:72 (ASM) AZ U:1:80 (ASU)	Agricultural	Yes	Moderate	2	Stabilize erosion, agricultural field system is not visually impressive
24	AZ U:1:73 (ASM) AZ U:81 (ASU)	Petroglyphs (4)	No	Extreme	n/a	Site not found
25	AZ U:1:74 (ASM) AZ U:1:82 (ASU)	Habitation, 5 rooms (2 contiguous)	Yes	Easy	1	Site bisected by three roads at SCRCA entrance, stabilize and interpret because of easy access and extent of prior impacts
26	AZ U:1:75 (ASM) AZ U:1:83 (ASU)	Petroglyph (single)	No	Extreme	n/a	Site not found
27	AZ U:1:76 (ASM) AZ U:1:84 (ASU)	Habitation/field house, 1 room	Yes	Difficult	3	Small and wing wall collapsed, stabilize, could be visited by guided tours to fortified hilltop (site 46)
28	AZ U:1:77 (ASM) AZ U:1:85 (ASU)	Habitation, 2 rooms, agricultural, petroglyphs	Yes	Moderate	2	Structures deteriorated, close to Spur Cross Road
29	AZ U:1:78 (ASM) AZ U:1:86 (ASU)	Habitation, 6 rooms	Yes	Difficult	4	One of the most pristine multi-room habitation sites, avoid interpretation to protect

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**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

Site Numbers		Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
30	AZ U:1:79 (ASM) AZ U:1:87 (ASU)	Artifact scatter	Yes	Moderate	5	Dense artifact scatter but not visually impressive, bone fragment noted on site surface may be human, avoid until investigated further
31	AZ U:1:80 (ASM) AZ U:1:88 (ASU)	Agricultural	Yes	Moderate	2	Agricultural field system not visually impressive
32	AZ U:1:81 (ASM) AZ U:1:89 (ASU)	Historic mine	Yes	Difficult	2	Access is difficult and there are better mine sites that can be interpreted
33	AZ U:1:82 (ASM) AZ U:1:90 (ASU)	Historic Maricopa Mine	Yes	Easy	1	Has visible features that could be interpreted, but shafts would need to be made safe by installing barricades
34	AZ U:1:83 (ASM) AZ U:1:91 (ASU)	Habitation, 3 rooms	Yes	Moderate	2	Similar sites are more visually impressive and more accessible
35	AZ U:1:85 (ASM) AZ U:1:93 (ASU)	Habitation/field house, 1 room, petroglyphs, at least 14 panels	Yes	Easy	1	Backfill looter's holes and stabilize, delineate a specific trail within the site, possibly add signage, good for physically challenged visitors
36	AZ U:1:86 (ASM) AZ U:1:94 (ASU)	Habitation, 2 rooms	Yes	Easy	1	Backfill looter's holes and stabilize, delineate a specific trail within the site, possibly add signage, good for physically challenged visitors

**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

Site Numbers		Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
37	AZ U:1:87 (ASM) AZ U:1:95 (ASU)	Habitation/field house, 1 room	Yes	Difficult	2	Nearby site 45 is better and more accessible candidate for interpretation
38	AZ U:1:88 (ASM) AZ U:1:96 (ASU)	Agricultural	Yes	Difficult	2	Site is eroded and not visually impressive, difficult to access
39	AZ U:1:89 (ASM) AZ U:1:97/98/100 (ASU)	Habitation/field house, 1 room	Yes	Difficult	2	Site heavily disturbed, rock-outlined room not positively identified, difficult access
40	AZ U:1:91 (ASM) AZ U:1:99 (ASU)	Agricultural	Yes	Difficult	3	Agricultural terraces are highly degraded and not visually impressive
41	AZ U:1:93 (ASM) AZ U:1:101 (ASU)	Habitation, 2 possible rooms	Yes	Difficult	3	Site is heavily degraded and difficult to access
42	AZ U:1:94 (ASM) AZ U:1:102 (ASU)	Agricultural	Yes	Difficult	2	Terraces are heavily eroded, artifacts are not dense, not visually impressive
43	AZ U:1:96 (ASM) AZ U:1:104 (ASU)	Habitation, 3 rooms	Yes	Moderate	2	Backfill looter's holes, terracing heavily eroded, but could be a rest stop between sites 44 and 49
44	AZ U:1:190 (ASM)	Artifact scatter	No	Moderate	n/a	Site not found
45	AZ U:1:191 (ASM)	Historic concrete features	Yes	Easy	2	Site function not identified, may be related to pumping and storing water

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**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

	Site Numbers	Site type¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations²
46	AZ U:1:192 (ASM)	Artifact scatter	No	n/a	n/a	Site not found
47	AZ U:1:193 (ASM)	Artifact scatter	Yes	Moderate	3	Not visually impressive
48	AZ U:1:194 (ASM)	Agricultural	Yes	Difficult	2	Heavily eroded, but very accessible and could be co-interpreted with nearby historic mine
49	AZ U:1:195 (ASM)	Habitation, 2 rooms	Yes	Moderate	3	Backfill looter's holes, heavily disturbed, abundant and diverse artifacts, access less than ideal
50	AZ U:1:196 (ASM)	Habitation/field house, 1 possible room	Yes	Difficult	4	Not visually impressive and similar sites more accessible
51	AZ U:1:197 (ASM)	Artifact scatter	Yes	Difficult	2	Not visually impressive, difficult access
52	AZ U:1:198 (ASM)	Historic Mine	Yes	Moderate	2	Situated along a trail and could be co-interpreted with site 77, pits would need to be barricaded for safety
53	AZ U:1:199 (ASM)	Artifact Scatter	No	n/a	n/a	Site not found
54	AZ U:1:200 (ASM)	Habitation/field house, 1 room	Yes	Difficult	3	Not visually impressive, difficult access

**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

Site Numbers		Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
55	AZ U:1:201 (ASM)	Artifact scatter	Yes	Extreme	3	This site is on the northern slope of Elephant Mountain and is an ephemeral artifact scatter that was unable to be clearly defined
56	AZ U:1:202 (ASM)	Habitation/field house, 1 room	Yes	Extreme	4	Highly eroded, structure no longer recognizable
57	AZ U:1:203 (ASM)	Habitation/field house, 1 room	Yes	Easy	2	Good condition but small, nearby site 45 is larger multi-room habitation and better candidate for interpretation
58	AZ U:1:204 (ASM)	Petroglyphs (single panel)	No	n/a	n/a	Site not found
59	AZ U:1:205 (ASM)	Habitation/field house, 1 room	Yes	Easy	2	Easy access, could be co-interpreted with nearby pit house village (site 49) and remnants of Spur Cross Ranch (site 59)
60	AZ U:1:206 (ASM)	Agricultural	Yes	Difficult	2	Excellent example of terraced field system close to site 44, terracing is substantial and easy to see
61	AZ U:1:207 (ASM)	Artifact scatter	Yes	Difficult	3	Not visually impressive, difficult access
62	AZ U:1:208 (ASM)	Artifact scatter	No	n/a	n/a	Site not found

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**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

Site Numbers		Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
63	AZ U:1:209 (ASM)	Habitation/field house, 1 room	No	n/a	n/a	Site not found
64	AZ U:1:210 (ASM)	Artifact scatter	Yes	Easy	3	Almost entirely obliterated by road and vehicle turn around area
65	AZ U:1:211 (ASM)	Agricultural	Yes	Easy	2	Not visually impressive
66	AZ U:1:212 (ASM)	Habitation/field house, 1 room, petroglyph	Yes	Extreme	4	Similar sites are more accessible
67	AZ U:1:213 (ASM)	Habitation/field house, 1 possible room	Yes	Moderate	5	Degraded, human bone previously reported on site surface but not found during condition assessment, avoid until investigated further
68	AZ U:1:214 (ASM)	Agricultural	Yes	Difficult	3	Similar sites are more visually impressive and more accessible
69	AZ U:1:215 (ASM)	Habitation/field house, 1 room	Yes	Moderate	3	Site partially on private property, better candidates for interpretation

**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

	Site Numbers	Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
70	AZ U:1:216 (ASM)	Historic road	Yes	Easy	3	Highly eroded, road segment no longer recognizable
71	AZ U:1:217 (ASM)	Artifact scatter	Yes	Moderate	3	Not visually impressive
72	AZ U:1:218 (ASM)	Artifact scatter	No	n/a	n/a	Site not found
73	AZ U:1:219 (ASM)	Historic mine	Yes	Easy	2	Candidate for interpreting historic mining, clean up modern trash, barricade mine entrances
74	AZ U:1:220 (ASM)	Agricultural	No	n/a	n/a	Site not found
75	AZ U:1:221 (ASM)	Artifact scatter	No	n/a	n/a	Site not found
76	AZ U:1:222 (ASM)	Petroglyphs	Yes	Moderate	1	Visually impressive, 10 petroglyph panels display multiple designs, could be co-interpreted with "Jewel of the Creek"
77	AZ U:1:223 (ASM)	Artifact scatter	Yes	Moderate	3	Not visually impressive
78	AZ U:1:224 (ASM)	Habitation, 2 rooms (contiguous, L-shaped)	Yes	Moderate	3	Disturbed, similar sites are more visually impressive and accessible
79	AZ U:1:225 (ASM)	Habitation/field house, 1 room	Yes	Easy	2	Stabilize erosion and possibly the rock-outlined room that is difficult to see, easy access could accommodate physically challenged visitors

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**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

Site Numbers		Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
80	AZ U:1:226 (ASM)	Petroglyphs	Yes	Difficult	3	Visually impressive, could be co-interpreted with site 64, but access through vegetation along Cave Creek and short uphill climb is difficult
81	AZ U:1:227 (ASM)	Agricultural	Yes	Difficult	2	Similar sites are more accessible
82	AZ U:1:228 (ASM)	Agricultural	Yes	Difficult	2	Good example of field terraces, but access is difficult
83	AZ U:1:229 (ASM)	Agricultural	Yes	Difficult	2	Similar sites are better and more accessible candidates for interpretation
84	AZ U:1:230 (ASM)	Agricultural	Yes	Moderate	2	Not visually impressive, similar sites better and more accessible candidates for interpretation
85	AZ U:1:231 (ASM)	Historic road	Yes	Easy	3	Historic roadbed obliterated by new road
86	AZ U:1:232 (ASM)	Agricultural	Yes	Moderate	2	Similar sites are better and more accessible candidates for interpretation
87	AZ U:1:233 (ASM)	Artifact scatter	No	n/a	n/a	Site not found
88	AZ U:1:234 (ASM)	Artifact scatter	No	n/a	n/a	Site not found
89	AZ U:1:235 (ASM)	Artifact scatter	No	n/a	n/a	Site not found
90	AZ U:1:236 (ASM)	Habitation/field house, 1 room	Yes	Extreme	3	Not visually impressive, similar sites are better and more accessible candidates for interpretation

**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

Site Numbers		Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
91	AZ U:1:237 (ASM)	Habitation/field house, 1 room	Yes	Easy	2	Small and degraded, but easy access could accommodate physically challenged visitors
92	AZ U:1:238 (ASM)	Habitation/field house, 1 room	Yes	Easy	2	Site is small but along a trail, could be co-interpreted with nearby sites 85 and 86
93	AZ U:1:239 (ASM)	Agricultural	Yes	Moderate	2	Not visually impressive, similar sites better and more accessible candidates for interpretation
94	AZ U:1:240 (ASM)	Petroglyphs	Yes	Moderate	1	Visually impressive, large boulder with multiple panels and designs
95	AZ U:1:241 (ASM)	Habitation, 2 possible rooms	Yes	Moderate	3	Similar sites are better and more accessible candidates for interpretation
96	AZ U:1:242 (ASM)	Habitation/field house, 1 room	Yes	Easy	2	Easy access, but not visually impressive
97	AZ U:1:243 (ASM)	Artifact scatter, petroglyph panel	Yes	Moderate	2	Not visually impressive, but could be co-interpreted with more visible sites nearby
98	AZ U:1:244 (ASM)	Artifact scatter	Yes	Extreme	3	Highly eroded, only a few artifacts could be found

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**Table IV-3
Evaluation of Archaeological Sites Potential for Public Interpretation**

Site Numbers		Site type ¹	Location Verified	Access	Interpretation Suitability 1=primary (best) 2=secondary 3=marginal 4=limited 5=restricted	Management Recommendations ²
99	AZ U:1:245 (ASM)	Possible pit houses, possible field houses (3), petroglyphs, historic Liscum townsite	Yes	Easy	1	Combination of prehistoric features with remnants of historic Liscum mining community, easy access from Spur Cross Road
100	AZ U:1:405 (ASM)	Habitation/field house, 1 room	newly discovered	Extreme	4	Similar sites are better and more accessible candidates for interpretation
101	AZ U:1:406 (ASM)	Agricultural/ single petroglyph	newly discovered	Moderate	2	Not visually impressive, similar sites better and more accessible candidates for interpretation
102	AZ U:1:407 (ASM)	Habitation/field house, 1 room, petroglyphs	newly discovered	Moderate	1	Site contains three bedrock metates, petroglyphs, and what appears to be highly erode field house, near proposed trail
103	AZ U:1:422 (ASM)	Habitation, 2 rooms	newly discovered	Moderate	2	Similar sites are better and more accessible candidates for interpretation
		¹ all sites prehistoric unless identified as historic				
		² all sites should be monitored in accordance with the adaptive management strategy to avoid degradation of site conditions				

farmstead or small village site, AZ U:1:49 (ASM). No bones were found on these sites when they were re-evaluated.

The other 16 of the 103 sites were not found. Therefore, they are not candidates for interpretation at this time. Many are small artifact scatters that would not be good candidates for public interpretation even if they were found.

Trail Survey and Assessment

The master plan defines a network of trails for recreational users, as well as for management and maintenance purposes. Trails provide major benefits by providing access so that archaeological sites can be publicly interpreted. At the same time, trail development and use can directly impact archaeological resources if they are not appropriately designed, and visitation also can degrade the integrity of archaeological resources if not managed properly. An assessment of the relation of the trail system to archaeological sites is summarized in Table IV-4.

The trail plan includes various trails . One of these is a segment of the Maricopa County Regional Trail that is being developed to connect recreation areas throughout the county. The trail system also will provide three points of access to the Tonto National Forest, which borders SCRCA to the north. Maximizing use of existing travelways and trails was a major factor in designing the trail network. Other factors that were considered included topography, scenery, potential for archaeological and environmental interpretation, and potential for adverse impacts on archaeological and biological resources.

All recreation use of SCRCA will be limited to trails. Trails classified as primary will be 4 feet wide, and most trails classified as secondary will be 2 feet wide that is consistent and practical with the vision of SCRCA or as directed by SCRCA Land Managers. Exceptions include proposed new Trails 5 and 7, which would be 4 feet wide. Where trail segments follow existing roads, the width of the existing roads will be maintained to provide for emergency vehicle access and to serve as firebreaks. Mechanical equipment will be used to clear new 4-foot trails. The narrower, secondary trails will be cleared with hand tools.

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Some existing trails will be closed and revegetated in conjunction with development of the trail system. These include wildcat footpaths that are damaging archaeological features such as rock walls (Photograph 10). Revegetation of these paths and marking of more appropriate paths should eliminate this problem.



Photograph 10. Example of Wildcat Trail Damaging Rock-Outlined Rooms at Site AZ U:1:44 (ASM)

**Table IV-4
Archaeological Sites along the Proposed Trail System**

Trail Number	Nearby Sites AZ U:1:_(ASM)	Potential for Site Interpretation and Potential Impacts
1 existing secondary guide only	82 intersected 77, 213, 222, 243 adjacent	Trail 1 follows an existing road that runs from the Maricopa Mine (site 82) to the Jewel of the Creek. The trail provides access to primary interpretive Site 82. Primary interpretive site 222 (petroglyphs), and secondary interpretive Sites 77 and 243 are adjacent and could be interpreted to provide broader perspective of prehistoric occupation of SCRCA. There may be human bone on the surface of Site 213 and should be avoided until further study. Other existing trails will be closed and rehabilitated in conjunction with development of Trail 1.
2 new secondary guide only	85 intersected 77, 86, 198, 241 adjacent	Trail 2 intersects the primary interpretive site 85, a multi-room prehistoric habitation site. The trail within this site will replace wildcat trails. The trail also could be used to provide access to primary interpretive Site 86, another habitation site, and secondary interpretive Sites 77, another habitation site with agricultural features and petroglyphs, and 198, a historic mine near the junction with Trail 1. Site 241, another small field house/habitation site is near the trail but is rated as having only marginal value for interpretation due to erosion that makes the site difficult to recognize.
3 new primary (regional) self guided	59, 74, and 217 intersected 88, 89, 214, 406, and 422 adjacent	Trail 3, the Maricopa County Regional Trail, intersects Site 217, an artifact scatter of marginal interpretive value, Site 59, the remnants of the historic Spur Cross Ranch rated as having secondary interpretive value, and Site 74, a prehistoric site rated as having primary interpretive potential. The artifact concentrations at Site 217 are approximately 5 meters away from the trail, and warrants frequent monitoring. Trail 3 will follow an existing road through Site 59, which could be interpreted with signs and used as a rest area along the trail. Site 74 is an ideal site to interpret because of its location at the entrance to SCRCA. The other sites are all of secondary (88, 89, 406 and 422) or marginal (214) value for interpretive potential because they are not visually impressive. The potential for impacts due to use of the trail is low, but immediately adjacent Sites 89, 214 and 406 warrant regular monitoring. Two short segments of existing trail will be closed and rehabilitated.

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**Table IV-4
Archaeological Sites along the Proposed Trail System**

Trail Number	Nearby Sites AZ U:1:_(ASM)	Potential for Site Interpretation and Potential Impacts
4 existing secondary guide only	45 intersected	Trail 4 provides access to Site 46, a fortified hilltop on Elephant Mountain. The site is rated as having limited suitability for interpretation because of its fragile nature, but limited access to guided uses will protect the site from visitation impacts. The eastern end of the existing trail will be closed, rehabilitated, and replaced with Trail 5 to avoid crossing Sites 44 and 94.
5 new secondary self guided	45, 87, 94, 223 adjacent	Trail 5 is a proposed replacement for the northern portion of Trail 6, which is designated as guide-only because it crosses Site 45. A primary purpose of Trail 5 is to provide access to the Tonto National Forest. Although Sites 45, 87, 94, and 223 are near this trail, the terrain is expected to keep people from inadvertently straying into the sites, but they should be monitored for impacts.
6 existing primary self guided/ guide only	45 intersected 50, 85, 86, 203, 238 adjacent	The trail intersects primary interpretive Site 45, a partially excavated, multi-room prehistoric habitation rated as having primary interpretive potential. The segment through this site is restricted to only guided use. The southern segment of Trail 6, which provides access to Sites 85, 86, and 238, also will be restricted to guided use. These sites are prehistoric habitations rated as having primary or secondary interpretive potential. Trail 6 also provides easy access to Site 50, another partially excavated, multi-room prehistoric habitation rated as having primary interpretive potential. The trail within the site will be designed to eliminate current wildcat trails that cross through structures and damage the site. The trail passes near Site 203, another prehistoric habitation rated as having secondary interpretive potential. All of the sites along this trail warrant frequent monitoring.

**Table IV-4
Archaeological Sites along the Proposed Trail System**

Trail Number	Nearby Sites AZ U:1:_(ASM)	Potential for Site Interpretation and Potential Impacts
7 new secondary self guided	59, 225 intersected 49, 56, 407 adjacent	Trail 7 runs through a mesquite bosque along Cave Creek. This trail provides access to Site 49, a partially excavated pit house farmstead or small village rated as having primary interpretive potential, and Site 407, which has petroglyphs, bedrock metates, and a possible field house and also is rated as having primary interpretive potential. Site 56, another multi-room habitation rated as having secondary interpretation potential, is near the trail. The trail also crosses Site 59, the remnants of the historic Spur Cross Ranch, and Site 225, a field house/habitation site rated as having secondary interpretation potential because it is not visually impressive. All of the sites along the trail warrant frequent monitoring.
8 existing primary (regional) self guided	71, 72, 74, 225 intersected 47, 191 adjacent	Trail 8 will connect the Maricopa County Regional Trail to the Tonto National Forest. The trail intersects Sites 71, 72, 74, and 225. Site 74 is a prehistoric habitation site at the entrance to SCRCA and rated as having primary interpretive potential. Interpretation would include a guided loop through the site. Sites 71 and 72 are prehistoric agricultural sites, and Site 225 is a field house/habitation site. All three are rated as having secondary interpretation potential because they are difficult to recognize, and Site 225 has been heavily eroded. Site 47, a petroglyph site rated as having primary interpretive potential would be accessed by a guided only loop. Site 191 includes historic concrete foundations of uncertain function, and is rated as having secondary interpretation potential. This site is unlikely to be damaged by visitation. All the sites along this trail should be monitored regularly for impacts.
9 new/existing secondary self guided/ guide only	230 and 240 adjacent	Trail 9 will provide an overlook of Cottonwood Wash and will not impact Site 230, an ephemeral agricultural site that is degraded, hard to recognize, and rated as having secondary interpretation potential. A guided-only extension of the trail will provide access to Site 240, a boulder covered with petroglyphs. This site, known as Schoonover Rock, is a primary interpretation site.

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**Table IV-4
Archaeological Sites along the Proposed Trail System**

Trail Number	Nearby Sites AZ U:1:_(ASM)	Potential for Site Interpretation and Potential Impacts
10 new secondary guide only	245 intersected	Trail 10 will replace current wildcat trails within Site 245, which is rated as having primary interpretation potential. The site includes prehistoric features and remnants of the mining community of Liscum.
11 new secondary guide only	44 intersected	Trail 11 will provide access to primary interpretive Site 44, a partially excavated, multi-room prehistoric habitation. The trail will replace the current wildcat trails that cross through structures and damage the site.

The trails provide opportunities to publicly interpret 12 sites identified as suitable for such uses. These include the three partially excavated, large multi-room habitation sites with rock-outlined rooms, AZ U:1:44, 45, and 50 (ASM). Two others are unexcavated habitation sites with rock-outlined rooms. Site AZ U:1:74 (ASM) is at the entrance to SCRCA and could become a focal point of visitor orientation, and the other site, AZ U:1:85 (ASM), is along Trail 6. Two petroglyph sites also could be interpreted. Site AZ U:1:47 (ASM) is along a loop of the Maricopa County Regional Trail near the SCRCA entrance, and the other is Schoonover Rock, site AZ U:1:240 (ASM), along Trail 9. The fortified hilltop site, AZ U:1:46 (ASM), is another site along Trail 4. A small but interesting site with bedrock metates (grinding slicks), petroglyphs, and an eroded field house/habitation room is located along Cave Creek along Trail 7. The multi-component site AZ U:1:245 (ASM), along Trail 10, offers other opportunities to interpret prehistoric habitation features and petroglyphs as well as the historic Liscum townsite. Other historic sites include the remnants of the Spur Cross Ranch, site AZ U:1:59 (ASM), at the intersection of Trail 3 and 7, and the Maricopa Mine, site AZ U:1:82 (ASM), along Trail 1. Several other sites located near the trail system also could be considered for future interpretation.

Unguided visitation is proposed at only three archaeological sites: (1) the historic Spur Cross Ranch, (2) the partially excavated site AZ U:1:50 (ASM), and (3) site AZ U:1:407 (ASM) along Cave Creek. Access to the other sites will be by guided tours only.

Survey for the trail system discovered three archaeological sites. These include site AZ U:1:406 (ASM), an agricultural site with one petroglyph, site AZ U:1:407 (ASM), which includes three bedrock metates, petroglyphs, and what appears to be an eroded field house, and site AZ U:1:422 (ASM), a field house/habitation site. Descriptions of these sites are included in Appendix D. Trails were realigned to avoid sites AZ U:1:406 and 422 (ASM). The trail was modified slightly so that site AZ U:1:407 (ASM), located in a mesquite bosque along Cave Creek, could be developed without adversely affecting the site.

The Maricopa County Regional Trail will bisect site AZ U:1:217 (ASM). Crary and others (1996) mapped two rock rings and a

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hearth within the artifact scatter at this site when it was originally discovered , but inspections in 2002 and 2003 failed to find any rock features. No artifacts are present within the trail corridor through the site.

The Maricopa County Regional Trail also will pass within 25 meters of site AZ U:1:214 (ASM), an agricultural field system, and within 100 meters of sites AZ U:1:89 and 200 (ASM), two habitation sites, and site AZ U:1:91 (ASM), another agricultural field system. Survey of the trail identified one pottery sherd adjacent to site AZ U:1:200 (ASM) and another sherd and piece of flaked stone in the alignment near site AZ U:1:91 (ASM). Development of the trail is not expected to adversely affect any of these four sites.

Monitoring Strategies and Protection Methods

The primary goal of the cultural resources element of the master plan is to ensure that cultural resources are identified, evaluated, properly managed, and preserved. SCRCA has been divided into four management zones to promote conservation of natural resources. This strategy is compatible with, but not entirely sufficient for, avoiding irreversible degradation of archaeological resources.

A dynamic adaptive management strategy of systematic research, planning, and stewardship is proposed for managing cultural resources. This strategy must measure and evaluate recreational usage and react to reinforce or improve those aspects of the physical, managerial, and social settings that enhance visitor experiences, and make modifications to correct any negative elements of visitor experiences or degradation of the cultural and natural resources on SCRCA. A key management tool will be monitoring of archaeological site conditions. The frequency of monitoring should be consistent with the degree of threat. Because recreational uses will be limited to the trail system, the trails will be the focus of both the benefits of public interpretation of the archaeology and history of the region, and the potential negative impacts of any inappropriate visitor behavior. Accordingly, more frequent monitoring should focus on sites along the trail system where potential visitation and impacts are greatest. Because archaeological resources can be degraded by other factors such

as erosion or wildfire, the monitoring program should include less frequent, but regular monitoring of all resources.

Indicators of degradation include (1) defacement of petroglyphs, (2) staking or removal of surface artifacts, (3) collapsing of walls or rock features, (4) unauthorized excavations, (5) increase in vegetation trampling, extent of barren ground, or wildcat trails, and (6) erosion damage. The information compiled during the preparation of this Master Plan about the current condition of the archaeological sites on SCRCA can serve as a base line for the monitoring program to be used in gauging the impacts of recreation, and reacting as needed to better protect resources. All archaeologists know that more time spent in recording a site results in recognition of more features and attributes of a site. Experience may show that more detailed mapping and finer grained documentation of the archaeological resources may be warranted to increase the effectiveness of monitoring. Quantitative measures should be used where possible. For example, measures such as tracking the number of visitors, regular comparison of photographs taken from fixed photo points such as the datum markers placed in each site, and periodic counting of artifacts within sample units.

Archaeologists recognize that the surface manifestations of sites change over time, but how much and how fast they change, and what factors cause changes are poorly understood. An added benefit of periodic, detailed monitoring could be the collection of data to better understand the natural and human factors that cause such changes.

The adaptive management strategy must result in modifications if monitoring detects signs of resource degradation. One response would be to enhance visitor knowledge about proper "site etiquette." Signs, brochures, or mandatory orientations could be used to emphasize the rules of proper conduct when visiting archaeological sites. The Arizona Archaeological Society (2003) has prepared site etiquette guidelines that could be easily adopted. Another option is to monitor visitor behavior more closely by allowing only guided tours to particularly sensitive resources. Another option would be to emphasize site etiquette in interpreting site AZ U:1:74 (ASM), located at the entrance to SCRCA. The site is a prehistoric habitation with four rock-outlined rooms constructed around a central courtyard. The site also has petroglyphs and a relatively dense scatter of

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artifacts. The integrity of the site has been compromised by illegal artifact collecting and by three roads that cut through it. The resulting loss of information could be used to stress the consequences of disturbing nonrenewable archaeological resources. The site could be used to provide general orientation and other information to visitors as well.

Implementation

Six objectives have been defined to guide the management of cultural resources as the master plan is implemented. All reflect the dynamic adaptive management strategy that will be used to monitor recreational and educational use of SCRCA and respond as needs for changes are identified.

Objective 1. Continue to identify, evaluate, and monitor archaeological, historical, and traditional cultural resources.



Prior studies have recorded a total of 103 archaeological sites on SCRCA. Although that probably is close to a total inventory, repeat surveys at SCRCA has shown that more intensive searching has identified a few additional sites not recognized during earlier surveys. Experience elsewhere has shown that when vegetation is removed by wildfire, archaeological sites are much more visible and recorded site densities are higher than those recorded in unburned areas. Certainly, more intensive survey would reveal more information about already known sites.

More formal evaluation of the significance of the recorded archaeological sites in consultation with the State Historic Preservation Office is warranted. It would be appropriate to nominate the sites to the Arizona and National Registers of Historic Places (which have essentially identical criteria for listing) as a district.

The significance of the SCRCA for traditional cultures is poorly understood. Consultations with tribal groups that are culturally affiliated with the SCRCA region would provide a better understanding of any traditional cultural values and could yield interesting perspectives for public interpretation.

Objective 2. Maintain a Geographic Information System database about cultural resource data contained within

SCRCA, and control distribution of that information as needed to prevent vandalism.

The information compiled during preparation of the Master Plan has been compiled in a geographic information system database. This database is a powerful management tool, and should be updated as new information is acquired. Distribution of sensitive detailed information about site locations should be limited by “need-to-know” criteria to prevent unauthorized artifact collection and excavation.

Objective 3. Continue to develop programs, policies, guidelines, and data to help conserve and protect significant archaeological, historical, and traditional cultural resources.

Because archaeological resources were a major reason for developing SCRCA, they warrant continuing efforts to protect and preserve them, as well as interpret them for visitors. The program warrants the efforts of a professional archaeologist, especially during the crucial initial years of operation. For example, construction and rehabilitation of trails and any other ground-disturbing activities should be archaeologically monitored. Archaeological expertise also is needed in developing public interpretation because it is important to convey authentic information rather than fanciful speculations. It is recommended that the County hire or retain the requisite archaeological expertise.

Objective 4. Continue to develop partnerships with agencies and organizations with cultural resources expertise, and programs for volunteer docents and site stewards.

Arizona State University conducted survey and archaeological excavations on SCRCA over a five-year period in the 1980s. The County could provide SCRCA as an “outdoor laboratory” for student training and research. The University could assist the County by providing faculty expertise. The University retains artifact collections made in the 1980s, and a partnership could provide the University an opportunity to complete unfinished aspects of the research program that ended abruptly with the bankruptcy of Norton Development Company in 1989. The artifacts collected during the 1980s excavations and surveys currently are held in perpetuity by the University for the Norton Development Company. Because the company is bankrupt, the

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University may be interested in clarifying the status of the artifacts, and some artifacts might be made available for use in a visitor center at SCRCA. The University's Museum Studies Program also could assist with display development and design of materials for public education in an informal setting.

The Desert Foothills Chapter of the Arizona Archaeological Society and members of the Arizona Site Stewards Program coordinated by the State Historic Preservation Office helped to establish SCRCA and have a vested interest in the management of the archaeological resources on SCRCA. Members of both groups commonly work with professional archaeologists, have extensive training in proper site etiquette and archaeological methods, and have invaluable experience as site stewards and docents. Both groups could provide invaluable assistance in conducting guided tours, monitoring site conditions, and a variety of other tasks. Both groups have expressed interest in volunteering their time and talents (Mark Hackbarth, personal communication 2002).

American Indian tribes are other possible partners. Tribes could be given opportunities to tell visitors their perspectives about past life ways and connections to the archaeological sites that were occupied by their ancestors. Visitor experiences are likely to be enhanced by such interaction.

Objective 5. Consult with the State Historic Preservation Office, Arizona State Museum, and interested American Indian tribes regarding the status of cultural resources on SCRCA.

Because Arizona State Parks retains an easement to ensure that SCRCA is managed as a limited use public recreation and conservation area, the facility must be managed and operated in compliance with the State Historic Preservation Act (Arizona Revised Statutes 41-861 through 41-864). This Act directs State agencies to develop, in consultation with the State Historic Preservation Officer, programs to inventory and nominate archaeological and historical resources to the Arizona Register of Historic Places. The Act stipulates that agencies will consider impacts of their plans on properties listed on or that meet the criteria for listing on the State Register, and provide the State Historic Preservation Officer 30 working days to review such plans to ensure that prehistoric, historic, architectural, and culturally significant values will be preserved or enhanced.

Administrative Rule R12-8-206 addresses the Arizona Register, and the State Historic Preservation Office has issued guidelines for implementing the State Historic Preservation Act.

In accordance with the State Historic Preservation Act, the Master Plan should be submitted to the State Historic Preservation Office for review. It may be useful to develop an agreement about procedures for regular periodic review rather than for every individual activity at SCRCA that could affect an archaeological site.

Because SCRCA is land owned by Maricopa County and the Town of Cave Creek, the Arizona Antiquities Act (Arizona Revised Statutes §41-841 through 41-847) must be addressed in managing the archaeological resources of SCRCA. The Antiquities Act stipulates that excavation or removal of artifacts from archaeological sites on state, county, or municipal corporation land is illegal without a permit from the Director of the Arizona State Museum. The Act also requires the person in charge of construction or other activities on such lands to report the discovery of archaeological or historical sites and artifacts to the Director of the Arizona State Museum. Therefore, it is important to ensure that any archaeological studies undertaken on SCRCA are conducted under the terms of a duly authorized permit, and in accordance with standards and guidelines issued by the Arizona State Museum.

Amendments of the Antiquities Act enacted in 1990 specifically address human remains, funerary objects, sacred objects, and objects of cultural patrimony on state land. Discovery of such remains and cultural items must be reported to the Director of the Arizona State Museum, who will consult with affiliated groups to determine the disposition of such remains. Administrative Rules 8-101 to 8-207 implement the Arizona Antiquities Act.

Excavations conducted in the 1980s recovered some human bones and they remain in the collection houses at Arizona State University, and possible human bone has been identified on the surface of two additional sites. The Arizona State Museum should be notified of the discovery of human remains, and it may be appropriate to work with the Arizona State Museum to develop a burial agreement with affiliated tribes to establish procedures for treating any additional human remains that

might be found during the operation of SCRCA. Arizona State University also may want to take the opportunity to clarify the status of human bones in the collections housed at the University and implement appropriate treatment.

Biological Resources

Introduction

There may be people who feel no need for nature. They are fortunate, perhaps, but for those of us who feel otherwise, who feel something is missing unless we can hike across land disturbed only by our footsteps or see creatures roaming freely as they have always done, we are sure there should be wilderness.

Margaret E. Murie

This section summarizes the biological resources of SCRCA. The intent of this summary is to establish existing biological conditions, formulate monitoring techniques to determine if and when management action must be taken to keep conditions within standards, and the development of management actions to ensure that all indicators are maintained within specified standards.

SCRCA is located in the Sonoran Desert Ecoregion, which includes the Sonoran desertscrub habitat (McNab and Avers 1994). The Sonoran desertscrub habitat occurs in southwestern Arizona, southeastern California, most of Baja, California, and the western half of the State of Sonora, Mexico. The Sonoran Desert in the United States reaches from extreme southeastern California across the western two-thirds of southern Arizona. Arizona contains more Sonoran desertscrub habitat than any other state in North America, putting Arizona in a position of great responsibility for protecting and maintaining this habitat.

The Sonoran Desert has the greatest diversity of vegetative growth of any desert in the world (Nabham & Plotkin 1994). As many as 3,500 native species of plants occur within the Sonoran Desert (Phillips and Comus 2000). In addition, the Sonoran Desert is home to 130 species of mammals, more than 500 species of birds, 20 amphibian species, approximately 100 species of reptiles, and 30 native freshwater fish species (Phillips and Comus 2000). The Sonoran Desert is recognized as an exceptional birding area within the United States. Forty-one percent (261 of 622) of all terrestrial bird species found in the United States can be seen here during some part of the year.

Threats to the ecoregion include cattle grazing, agriculture, excessive ground water pumping, urbanization, and mineral extraction. The urban and suburban areas of Phoenix continue

to expand rapidly. Residential development on bajadas is eliminating the habitat of bajadas-dependent species such as cholla cacti (*Opuntia*) and columnar cacti such as saguaro (MacMahon 1988). Rocky habitat areas preferred by Gila monsters and bighorn sheep are prime real estate for development. Expanding urbanization is pushing agricultural operations further into the desert and along riparian areas such as the Gila River, with tremendous impacts on wildlife habitat. About 60 percent of riparian habitat in the United States alone has been altered by agriculture, grazing, excessive groundwater pumping, and urbanization. Riparian habitats are threatened by trampling, grazing, and fouling by domestic livestock; water diversion and dam building; conversion for agriculture; and introduced species such as the Tamarisk tree (*Tamarix chinensis*) (Noss and Peters 1995). Riparian woodland habitats have suffered the worst, by far, and are now one of the rarest habitats in North America. Furthermore, the introduction of invasive animal and plant species could displace native fauna and flora through direct competition.

Existing Conditions

Elevations range from 3,900 feet at Elephant Mountain to 2,200 feet at the lower reach of Cave Creek. The project area is characterized by steep to very steep hills, one prominent mountain (Elephant Mountain), numerous ephemeral washes, and one main riparian area (Cave Creek). There are many rock outcrops and cliffs, as well as a number of mines and shafts on the abandoned Maricopa Mine and Phoenix Mine.

SCRCA is located within the Lower Salt watershed (USGS Cataloging Unit: 15060106). Cave Creek is one of Maricopa County's last remaining perennial streams, and is the primary drainage at SCRCA. The creek enters the northeastern boundary of Spur Cross and flows south-southwest through SCRCA. Biologically, Cave Creek can be generalized into three zones: (1) upper reach, (2) middle reach, and (3) lower reach. The upper reach of Cave Creek supports a 30- to 50-meter band of riparian vegetation dominated by Fremont cottonwood and Goodding willow in a narrow channel for approximately ½ mile in length starting at the Tonto National Forest boundary. Canopy height is approximately 15 to 20 meters. Flowing water was observed in this stretch of the creek during field

investigations. The stream channel is largely free of emergent vegetation, with only a few areas of cattail stands. The middle reach of the creek is characterized by a broad floodplain and mesquite bosque. The mesquite bosque varies in width, but can be as wide as ¼ mile in places. The middle reach is drier than either the upper or lower reach. Water does not typically flow for any substantial distance; however, several large pools of water did occur in this stretch of the creek. The dry creek channel supports scattered stands of burrobrush. This reach is approximately 2½ miles in length.

The lower reach of Cave Creek includes a cottonwood-willow stand downstream of the “Jewel of the Creek.” This section of the creek is characterized by a narrow stream channel of approximately 1 mile in length flanked by steep hills. Vegetation in this reach is a dense stand of Fremont cottonwood and Goodding willow. Thick stands of emergent vegetation such as cattail and bullrush dominate the stream channel. Flowing water was observed from the Jewel of the Creek to the southern property boundary.



Several dry ephemeral washes feed into Cave Creek from the west. A small portion of Cottonwood Creek drains into Cave Creek to the east. Several springs also occur within the ephemeral wash system of SCRCA.

Upland areas are characterized by steep rocky hills intersected by dry ephemeral washes. Vegetation in these areas is predominantly paloverde-saguaro community. An area of tobosa semidesert grassland is located on the southern and northern slopes of Elephant Mountain. Also, juniper/chaparral vegetation occurs on the shaded and cooler north-facing slope of Elephant Mountain.

Terrestrial Vegetation

SCRCA is located in the Arizona Upland subdivision of the Sonoran desertscrub biome (Brown 1994). Overall diversity of this area as measured by the number of species and landscape patterns is typical of desert landscapes (Scheiner and Rey-Benayas 1994). Table IV-5 provides a partial list of plant species currently found in SCRCA. Current vegetation patterns in SCRCA have experienced limited modification. However, significant portions of Cave Creek and upland areas have been

influenced by past disturbances, including the mining, livestock grazing, vehicular traffic, and a former commercial dude ranch operation.

**Table IV-5
Plants of SCRCA**

Common Name	Scientific Name	Common Name	Scientific Name
Whitethorn Acacia	<i>Acacia constricta</i>	Yellow Sweetclover	<i>Melilotus officinalis</i>
Cat-claw Acacia	<i>A. greggii</i>	Bush Muhly	<i>Muhlenbergia porteri</i>
Triangle-leaf Bursage	<i>Ambrosia deltoidea</i>	Deer Grass	<i>Muhlenbergia rigens</i>
Arizona Fiddleneck	<i>Amsinckia intermedia</i>	Ironwood	<i>Olneya tesota</i>
Fourwing Saltbush	<i>Atriplex canescens</i>	Pencil Cholla	<i>Opuntia arbuscula</i>
Wild Oat	<i>Avena</i> spp.	Teddy Bear Cholla	<i>O. bigelovii</i>
Seep Willow	<i>Baccharis salicifolia</i>	Engelmann Prickly Pear	<i>O. engelmannii</i>
Desert Broom	<i>B. sarothroides</i>	Chain Fruit Cholla	<i>O. fulgida</i>
Sideoats Grama	<i>Bouteloua curtipendula</i>	Desert Christmas Cactus	<i>O. leptocaulis</i>
Mustard	<i>Brassica</i> spp.	Staghorn Cholla	<i>O. versicolor</i>
Crucifixion Thorn	<i>Canotia holacantha</i>	Common Reed	<i>Phragmites australis</i>
Saguaro	<i>Carnegiea gigantea</i>	Arizona Sycamore	<i>Platanus wrightii</i>
Desert Hackberry	<i>Celtis pallida</i>	Fremont Cottonwood	<i>Populus fremontii</i>
Foothill	<i>Cercidium microphyllum</i>	Velvet Mesquite	<i>Prosopis velutina</i>
Mountain Mahogany	<i>Cercocarpus</i> spp.	Oak	<i>Quercus</i> spp.
Bermuda Grass	<i>Cynodon dactylon</i>	Sumac	<i>Rhus</i> spp.
Brittlebush	<i>Encelia farinosa</i>	Goodding Willow	<i>Salix gooddingii</i>
Desert Buckwheat	<i>Eriogonum deserticola</i>	Russian Thistle	<i>Salsola kali</i>
Fish-hook Barrel	<i>Ferocactus</i>	Bullrush	<i>Scirpus olneyi</i>

**Table IV-5
Plants of SCRCA**

Common Name	Scientific Name	Common Name	Scientific Name
Cactus	<i>wislizenii</i>		
Ocotillo	<i>Fouquieria splendens</i>	Plains Bristlegrass	<i>Setaria Macrostachya</i>
Velvet Ash	<i>Fraxinus velutina</i>	Jojoba	<i>Simmondsia chinensis</i>
Curly Mesquite	<i>Hilaria belangeri</i>	Salt Cedar	<i>Tamarix chinensis</i>
Tobosa Grass	<i>Hilaria mutica</i>	Cattail	<i>Typha domingensis</i>
Burrobush	<i>Hymenoclea monogyra</i>	Canyon Grape	<i>Vitis arizonica</i>
Arizona Walnut	<i>Juglans major</i>	Banana Yucca	<i>Yucca baccata</i>
One-seed juniper	<i>Juniperus monosperma</i>	Desert Zinnia	<i>Zinnia acerosa</i>
White Ratany	<i>Krameria grayi</i>	Graythorn	<i>Ziziphus obtusifolia</i>
Creosote Bush	<i>Larrea tridentata</i>		

The vegetation was classified into seven associations that represent subsets of the Arizona Upland biotic community, semidesert grassland biotic community, and conifer woodland biotic community (Figure IV-3). Association differentiation was based on dominant vegetation and physiography. It should be noted, however, that while the vegetation associations are recognizable, they are not completely distinct. No hard line exists between each association, rather the vegetation compositions transition from one association to another within an ecotone. The seven associations (described below) offer a description of the vegetation within SCRCA area that accurately depicts the vegetation composition and provides a useful tool for land use planning.

Burrobush Riparian Association – This association includes the rocky open channel and sand bars of Cave Creek dominated by burrobush (*Hymenoclea salsola*). Other plant species present include yellow sweetclover (*Melilotus officinalis*), desert broom (*Baccharis sarothroides*), and bursage (*Ambrosia deltoidea*). This association is subject to scouring from storm events, which inhibits the growth of large trees and dense shrubs while maintaining a dynamic vegetation composition.

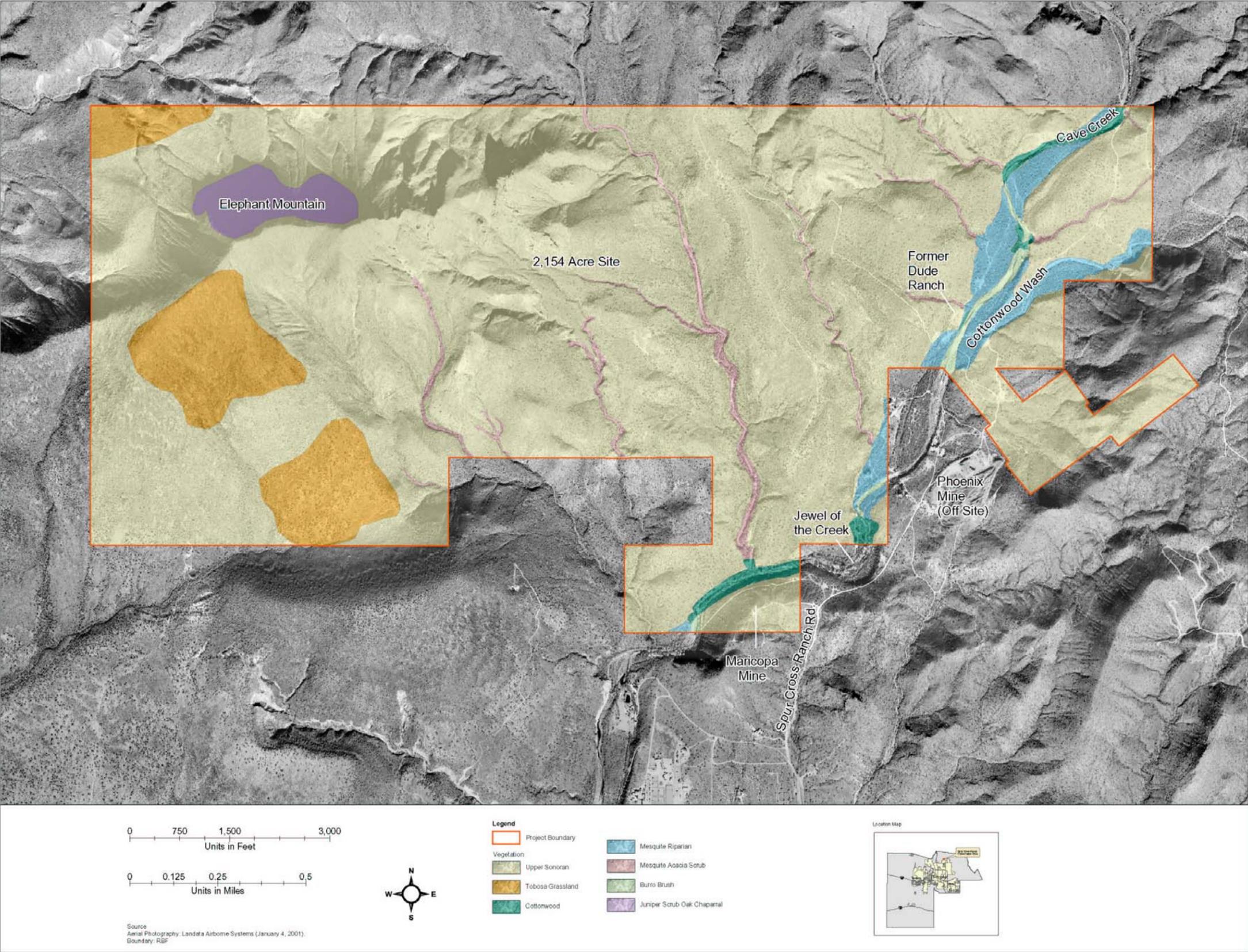


Figure IV-3: Vegetation Communities

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Mesquite Riparian Association – This community is an open to fairly dense, drought-deciduous streamside thorn thicket dominated by velvet mesquite (*Prosopis velutina*) that occurs along flat terraces parallel to Cave Creek. Mesquite riparian forest vegetation is generally associated with well-developed watercourses of intermittent or ephemeral stream flow. Trees present are generally 16 to 20 feet tall or taller. Other plant species present include desert hackberry (*Celtis pallida*), catclaw acacia (*Acacia greggii*), burrobush, and graythorn (*Ziziphus obtusifolia*).

Cottonwood Riparian Association – Cottonwood riparian association is found along the upper one-third and lower one-third of Cave Creek within SCRCA. This association is dominated by Fremont cottonwood (*Populus fremontii*) and Goodding willow (*Salix gooddingii*). Other plant species present include Arizona sycamore (*Platanus wrightii*), velvet ash (*Fraxinus velutina*), seep willow (*Baccharis salicifolia*), and desertbroom. An understory of cattail (*Typha domingensis*) and bullrush (*Scirpus olneyi*) occur in major areas of this association.

Mesquite Acacia Scrub Riparian Upland Association – This vegetation association represents the richest areas of upland habitat. Due to drainage patterns, the small stream channels and slopes are areas of higher moisture than surrounding areas. The densest vegetation is often in the smaller channels that are not subject to large amounts of scouring. Important species in this association include velvet mesquite, catclaw acacia, and desert hackberry. Several springs occur within this association. Springs occur in dense stands of bullrush, cattail, Fremont cottonwood, seep willow, and velvet mesquite.

Sonoran Upland Association – This vegetation association is dominated by foothill paloverde (*Cercidium microphyllum*) and saguaro (*Carnegiea gigantea*). This vegetation type is the most widespread, occurring throughout nearly all upland habitat. Although this association is fairly heterogeneous in its undisturbed state, grazing appears to have decreased plant species diversity for this association within SCRCA. Other species present in this association include jojoba (*Simmondsia chinensis*), Engelmann prickly pear (*Opuntia engelmannii*), ocotillo (*Fouquieria splendens*), and cholla cactus (*Opuntia* spp.).

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Tobosa Grassland Upland Association – Semidesert grassland composed primarily of tobosa grass (*Hilaria mutica*) is found on the north and south slopes of Elephant Mountain. Woody plants, leafy succulents, and cacti have invaded parts of this association.

Juniper Scrub Oak Chaparral Upland Association – On the north face of Elephant Mountain is an association of mixed juniper, oak, and chaparral vegetation. Dominant plant species include one-seed juniper (*Juniperus monosperma*) and oak (*Quercus* spp.).

SCRCA Wildlife

SCRCA supports a diversity of wildlife. The presence of water in the creek is vital to area wildlife and attracts many birds (Table IV-6), mammals (Table IV-7), and reptiles/amphibians (Table IV-8). Wildlife in the area includes birds such as red-tailed hawk, Gila woodpecker, and cactus wren; small mammals such as black-tailed jackrabbit, rock squirrel, and kangaroo rat; amphibians and reptiles such as desert tortoise, Gila monster, and lowland leopard frog.



Birds

SCRCA has long provided important habitat for birds, and 76 species were observed during field investigations in April 2002 (Table IV-6). Common nesting species include red-tailed hawk (*Buteo jamaicensis*), gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), greater roadrunner (*Geococcyx californianus*), great horned owl (*Bubo virginianus*), black-chinned hummingbird (*Archilochus alexandri*), western kingbird (*Tyrannus verticalis*), verdin (*Auriparus flaviceps*), northern mockingbird (*Mimus polyglottos*), northern cardinal (*Cardinalis cardinalis*), Abert's towhee (*Pipilo aberti*), black-throated sparrow (*Amphispiza bilineata*), and house finch (*Carpodacus mexicanus*).

A wide variety of raptors use SCRCA. The peak season is winter, when, in addition to the resident red-tailed hawks, wintering Harris's hawks (*Parabuteo unicinctus*), northern harriers (*Circus cyaneus*), Cooper's hawks (*Accipiter cooperii*), Swainson's hawk (*Buteo swainsoni*) and American kestrel (*Falco sparverius*) all may be present. Also of note are turkey vulture (*Cathartes aura*),

western screech (*Otus kennicotti*), great horned owl, and common raven (*Corvus corax*).

Summer-resident birds include a number of neotropical migrants, such as common yellowthroat (*Ceothlypis trichas*), yellow warbler (*Dendroica petechia*), broad-billed hummingbird (*Cynanthus latirostris*), and black phoebe (*Sayornis nigricans*) that are restricted to riparian habitats. Three shorebird species and one waterfowl species have been recorded at SCRCA, great blue heron (*Ardea herodias*), killdeer (*Charadrius vociferous*), spotted sandpiper (*Actitis macularia*), and mallard (*Anas platyrhynchos*).

Mammals

Current knowledge of the mammalian fauna of SCRCA (Table IV-8) is limited and comes mainly from incidental observations of the more conspicuous species. To date, researchers have conducted some live trapping, but no nocturnal road cruising, infrared-triggered photography, or other systematic survey work has been undertaken.

SCRCA's most conspicuous mammal is the black-tailed jackrabbit (*Lepus californicus*). Desert cottontail (*Sylvilagus audubonii*) is also seen regularly; round-tailed ground squirrel (*Spermophilus tereticaudus*), coyote (*Canis latrans*), collared peccary (*Tayassu tajacu*), mule deer (*Odocoileus hemionus*), and striped skunk (*Mephitis mephitis*) less so. Bat species observed include California leaf-nosed bat (*Macrotus californicus*) and western pipistrel (*Pipistrellus hesperus*) were observed in the abandoned Phoenix Mine near SCRCA.

Amphibians and Reptiles

Present knowledge of SCRCA's herpetofauna (Table IV-8) is incomplete. The commonly observed lizards are the desert spiny lizard (*Sceloporus magister*), Gila monster (*Heloderma suspectum*), and side-blotched lizard (*Uta stansburiana*).

Snakes observed include common kingsnake (*Lampropeltis getula*), gopher snake (*Pituophis catenifer*), and western diamondback rattlesnake (*Crotalus atrox*). The common turtle seen in SCRCA is the Sonoran mud turtle (*Kinosternon sonoriense*).



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**Table IV-6
Birds of SCRCA**

Common Name	Scientific Name	Common Name	Scientific Name
Ardeidae		Corvidae	
Great Blue Heron	<i>Ardea herodias</i>	Scrub Jay	<i>Aphelocoma coerulescens</i>
Anatidae		Common Raven	<i>Corvus corax</i>
Mallard	<i>Anas platyrhynchos</i>	Remizidae	
Charadriidae		Verdin	<i>Auriparus flaviceps</i>
Killdeer	<i>Charadrius vociferus</i>	Troglodytidae	
Scolopacidae		Cactus Wren	<i>Campylorhynchus brunneicapillus</i>
Spotted Sandpiper	<i>Actitis macularia</i>	Canyon Wren	<i>Catherpes mexicanus</i>
Cathartidae		Bewick's Wren	<i>Thryomanes bewickii</i>
Turkey Vulture	<i>Cathartes aura</i>	House Wren	<i>Troglodytes aedon</i>
Accipitridae		Muscicapidae	
Northern Harrier	<i>Circus cyaneus</i>	Black-tailed Gnatcatcher	<i>Poliophtila melanura</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Mimidae	
Cooper's Hawk	<i>Accipiter cooperii</i>	Northern Mockingbird	<i>Mimus polyglottos</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>	Curve-billed Thrasher	<i>Toxostoma curvirostre</i>
Swainson's Hawk	<i>Buteo swainsoni</i>	Ptilonotidae	
Harris' Hawk	<i>Parabuteo unicinctus</i>	Phainopepla	<i>Phainopepla nitens</i>
Falconidae		Sturnidae	
American Kestrel	<i>Falco sparverius</i>	European Starling	<i>Sturnus vulgaris</i>
Prairie Falcon	<i>Falco mexicanus</i>	Vireonidae	
Phasianidae		Solitary Vireo	<i>Vireo solitarius</i>
Gambel's Quail	<i>Callipepla gambelii</i>	Emberizidae	
Columbidae		Yellow Warbler	<i>Dendroica petechia</i>
Rock Dove	<i>Columba livia</i>	Yellow-rumped Warbler	<i>Dendroica coronata</i>
White-winged Dove	<i>Zenaida asiatica</i>	Black-throated Gray Warbler	<i>Dendroica nigrescens</i>
Mourning Dove	<i>Zenaida macroura</i>	Townsend's Warbler	<i>Dendroica townsendi</i>
Cuculidae		MacGillivray's Warbler	<i>Oporornis tolmiei</i>
Greater Roadrunner	<i>Geococcyx californianus</i>	Common Yellowthroat	<i>Ceothlypis trichas</i>
Tytonidae		Wilson's Warbler	<i>Wilsonia pusilla</i>
Barn Owl	<i>Tyto alba</i>	Northern Cardinal	<i>Cardinalis cardinalis</i>

**Table IV-6
Birds of SCRCA**

Common Name	Scientific Name	Common Name	Scientific Name
Strigidae		Pyrrhuloxia	<i>Cardinalis sinuatus</i>
Western Screech Owl	<i>Otus kennicotti</i>	Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Great Horned Owl	<i>Bubo virginianus</i>	Varied Bunting	<i>Passerina versicolor</i>
Caprimulgidae		Green-tailed Towhee	<i>Pipilo chlorurus</i>
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	Brown Towhee	<i>Pipilo fuscus</i>
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	Abert's Towhee	<i>Pipilo aberti</i>
Apodidae		Chipping Sparrow	<i>Spizella passerina</i>
White-throated Swift	<i>Aeronautes saxatalis</i>	Brewer's Sparrow	<i>Spizella breweri</i>
Trochilidae		Black-throated Sparrow	<i>Amphispiza bilineata</i>
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	Song Sparrow	<i>Melospiza melodia</i>
Anna's Hummingbird	<i>Calypte anna</i>	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Costa's Hummingbird	<i>Calypte costae</i>	Dark-eyed Junco	<i>Spizella atrogularis</i>
Broad-billed Hummingbird	<i>Cynanthus latirostris</i>	Western Meadowlark	<i>Sturnella neglecta</i>
Picidae		Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Gila Woodpecker	<i>Melanerpes uropygialis</i>	Brown-headed Cowbird	<i>Molothrus ater</i>
Ladder-backed Woodpecker	<i>Picoides scalaris</i>	Bronzed Cowbird	<i>Molothrus aeneus</i>
Northern Flicker	<i>Colaptes auratus</i>	Great-tailed Grackle	<i>Quiscalus mexicanus</i>
Tyrannidae		Northern Oriole	<i>Icterus galbula</i>
Black Phoebe	<i>Sayornis nigricans</i>	Western Tanager	<i>Piranga ludoviciana</i>
Say's Phoebe	<i>Sayornis saya</i>	Passeridae	
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	House Sparrow	<i>Passer domesticus</i>
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>	Fringillidae	
Gray Flycatcher	<i>Empidonax wrightii</i>	House Finch	<i>Carpodacus mexicanus</i>
Western Flycatcher	<i>Empidonax difficilis</i>	Lesser Goldfinch	<i>Carduelis psaltria</i>

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**Table IV-7
Mammals of SCRCA**

Common Name	Scientific Name	Common Name	Scientific Name
Phyllostomidae		Cricetidae	
California Leaf-nosed Bat	<i>Macrotus californicus</i>	White-throated Wood Rat	<i>Neotoma albigula</i>
Vespertilionidae		Mexican Vole	<i>Microtus mexicanus</i>
Western Pipistrel	<i>Pipistrellus hesperus</i>	Canidae	
Ursidae		Coyote	<i>Canis latrans</i>
Black Bear	<i>Ursus americanus</i>	Gray Fox	<i>Urocyon cinereoargenteus</i>
Leporidae		Mustelidae	
Black-tailed Jackrabbit	<i>Lepus californicus</i>	Striped Skunk	<i>Mephitis mephitis</i>
Desert Cottontail	<i>Sylvilagus audubonii</i>	Felidae	
Sciuridae		Mountain Lion	<i>Felis concolor</i>
Rock Squirrel	<i>Spermophilus variegatus</i>	Bobcat	<i>Lynx rufus</i>
Round-tailed Ground Squirrel	<i>Spermophilus tereticaudus</i>	Tayassuidae	
Heteromyidae		Collared Peccary	<i>Tayassu tajacu</i>
Arizona Pocket Mouse	<i>Perognathus amplus</i>	Cervidae	
		Mule Deer	<i>Odocoileus hemionus</i>

Lowland leopard frog (*Rana yavapaiensis*) was the only amphibian observed at SCRCA. Bullfrogs (*Rana catesbeiana*) were not observed at SCRCA.

Evaluation Methodology and Findings

A qualitative inventory of biological resources at SCRCA was conducted in April 2002. A group of URS Corporation ecologists conducted a habitat evaluation and vegetation inventory in the field, and noted presence of animal species. Animal data were collected by noting sightings and signs during the field inventory.

**Table IV-8
Amphibian and Reptiles of SCRCA**

Common Name	Scientific Name	Common Name	Scientific Name
Ranidae		Iguanidae	
Northern Leopard Frog	<i>Rana pipens</i>	Desert Spiny Lizard	<i>Sceloporus magister</i>
Lowland Leopard Frog	<i>Rana yavapaiensis</i>	Side-Blotched Lizard	<i>Uta stansburiana</i>
Bufo		Tree Lizard	<i>Urosaurus ornatus</i>
Woodhouse Toad	<i>Bufo woodhousei</i>	Colubridae	
Great Plains Toad	<i>Bufo cognatus</i>	Gopher Snake	<i>Pituophis melanoleucus</i>
Kinosternidae		Common Kingsnake	<i>Lampropeltis getulus</i>
Sonoran Mud Turtle	<i>Kinosternon sonoriense</i>	Viperidae	
Testudinidae		Western Diamondback Rattlesnake	<i>Crotalus atrox</i>
Desert Tortoise	<i>Gopherus agassizii</i>	Tiger Rattlesnake	<i>Crotalus tigris</i>
		Speckled Rattlesnake	<i>Crotalus mitchellii</i>

The following sections contain information related to specific areas within SCRCA that may require the application of adaptive management prescriptions related to enhancing biological resources.

Water Quality – The small numbers of aquatic invertebrates and amphibians could be an indication of water quality problems. Given the proximity of mines to Cave Creek, leeching of chemicals into the creek is a possibility.

Mines – These areas can support a variety of wildlife including bats, snakes, small mammals, large mammals, birds, and lizards. Of particular interest are mines shafts of sufficient length and depth that provide a constant temperature and increased humidity levels necessary to support a diversity of bat species. California leaf-nosed bat and pipistrel bat were observed in a mineshaft at the Phoenix Mine.

Cliffs – Cliffs provide roosting and nesting habitat for a number of bird species, including migrating and resident raptor species. White wash from bird feces was observed on several cliffs in SCRCA.

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Fences – Numerous barbed wire fences in the interior of SCRCA, in varying degrees of disrepair, pose a source of injury for deer, javelina, and other large mammals.

Roads and Trails – Disturbance along roads and jeep trails is more apparent because unlike other areas, native vegetation is not recovering from impacts. Ongoing disturbance is encouraging establishment of invasive plant species. In addition, vehicles using the roads and jeep trails may transport invasive species seeds into and within SCRCA. Storm runoff is often channeled along roads and jeep trails causing erosion and depositing sediment into Cave Creek. Vehicle traffic also compacts soil and impedes native plant establishment.

Residences – Residential areas near SCRCA may provide a source of non-native and invasive plants used for landscaping such as fountain grass (*Pennisetum setaceum*). Seeds from these non-native and invasive plants could be easily transported into SCRCA. Domestic pets also can have significant impact on native fauna. Unleashed dogs can harass, injure or even kill wildlife species. Domestic cats can be significant predators of native bird and small mammal species. Non-native fish species released from backyard ponds can be transported into Cave Creek during large storm events. Non-native fish can devastate native fish populations and be very difficult to eradicate. Likewise, stocking of backyard ponds with bullfrogs can have an equally harmful effect on both native fish and amphibians.

Dude Ranch – Three areas in or near the mesquite bosque were cleared in the 1930s and used as a guest ranch until the 1950s. There is revegetation occurring in this area, but the plant community contains several invasive plant species such as Bermuda grass (*Cynodon dactylon*), wild oats (*Avena* spp.), and Russian thistle (*Salsola kali*). Soil compaction and building debris inhibit plant growth.

Equine Access –Equestrian trails should not be located within Cave Creek or its immediate vicinity.

Invasive Plant Species – There are a number of exotic plants in the riparian zone, particularly Bermuda grass and wild oats, although salt cedar (*Tamarix ramosissima*) is low. Neither buffleggrass (*Cenchrus ciliaris*) nor fountain grass (*Pennisetum setaceum*) has been observed within SCRCA, but they have

been identified in nearby Cave Creek Recreation Area. In addition, Russian thistle is present in disturbed areas of SCRCA including the former dude ranch. Prickly pear cactus, while a native species, has colonized overgrazed upland habitats.

Cowbirds – Brown-headed cowbird (*Molothrus ater*) and bronzed cowbird (*Molothrus aeneus*) were observed near horse stables adjacent to SCRCA. Brood parasitism by brown-headed cowbirds and bronzed cowbirds reduces reproductive success in many passerines that nest in fragmented habitats and ecological edges, such as those found in SCRCA.

Threatened and Endangered Species – No threatened or endangered species were observed on SCRCA during field investigations in April 2002. Systematic surveys for threatened and endangered species should be conducted. If suitable habitat is present, reintroduction should be considered.

Riparian Vegetation – Historical use by livestock, adjacent and upstream mining activities, and other human uses have affected the riparian vegetation along Cave Creek. The broadleaf gallery is young and limited in extent to the upper one-third and lower one-third of Cave Creek. It is composed largely of Fremont cottonwood and Goodding willow with substantial numbers of velvet ash and few Arizona sycamores. This riparian forest should mature naturally. However, areas devoid of riparian forest species may require plants to recover.

Upland Vegetation – Cattle-grazing has changed the type and amount of vegetation locally found. Englemann prickly pear cactus is the dominant plant species in some overgrazed areas where shrubby desertland may have dominated 80 years ago. However, most upland areas have retained their desertland aspect.

The following sections discuss biological objectives that would assist in meeting the goal of ecosystem management on SCRCA.

Monitoring Strategies and Protection Methods

As stated previously, management of biological resources within SCRCA is to focus on restoring and enhancing valuable riparian and upland habitat while providing public recreation. Development plans are contingent on the establishment of a

viable and robust riparian environment. Thus restoration work is of paramount importance. The overarching goal for the biological management of SCRCA is to re-create the mosaic of habitats characteristic of the Sonoran Desert ecosystem as discussed in the previous sections.

A variety of habitat types are achievable within SCRCA because of the diversity of landforms within the conservation area (from wetland to riparian and desert upland to grassland). By restoring native plant communities, habitat will be provided for native plant and animal communities like birds, fish, small mammals, amphibians, and reptiles.

This biological resource evaluation establishes five objectives, each of which has associated recommendations for specific actions to be implemented. The objectives and actions are described in the following sections.

Implementation

The following section outlines recommended objectives to achieve the biological resources goals.

Objective 1: Identify Data Gaps

Although some data on SCRCA resources are already available, much information still needs to be collected to support sound management of SCRCA's biological resources. The actions listed below are required to fill important data gaps. They will be carried out as funding permits.

Actions

Develop a prioritized list of biological data needs and obtain data needed to fill important data gaps that should include the following activities:

- Perform a complete floral survey of SCRCA
- Perform a complete survey of vertebrates and invertebrates currently in SCRCA
- Establish permanent vegetation plots, including exclosures free of jackrabbit herbivory and other disturbances, to monitor successional changes in vegetation

- Develop annual narratives of restoration efforts and wildlife responses

Objective #2: Restoration of Terrestrial Habitat

SCRCA contains several riparian vegetation communities that can be expanded. Such riparian communities are in serious decline regionally but are required by endangered species like the southwestern willow flycatcher and the yellow-billed cuckoo. Loss of habitat equates directly with a decrease in carrying capacity and a concomitant reduction in diversity and abundance of aquatic communities. The preservation and enhancement of native aquatic habitat is critical in maintaining viable native aquatic communities.

Livestock grazing has negatively impacted upland communities. In many upland locations, natural native species composition and structure have been replaced with prickly pear dominated areas. Although livestock grazing no longer is permitted in SCRCA, livestock from grazing allotments on the Tonto National Forest occasionally cross onto SCRCA property.

Introduction of non-native plant species such as salsola and tamarix has challenged the survivability of native species. As non-native species have expanded their ranges, native species have been displaced from their usual habitats. This is due to both competitive advantages inherent in weedy, non-native/invasive species and to changes in the physical characteristics of the environment.

As much as possible, allow areas to revegetate naturally. Within each community, seek to establish appropriate ecological conditions and processes that will allow the native vegetation to develop and persist on its own. Use selective, targeted interventions (e.g., removal of non-natives, plantings, seeding, fertilization) to help guide development of the vegetation in the desired direction.

Use native plant species appropriate to the river valley and local genetic stock for revegetation efforts throughout SCRCA.

Management goals should be continually reevaluated to identify areas of flexibility within which habitat can be protected. Physical creation of habitat should be approached cautiously to

assure that needs of the target species, population, or community are met. Consultation with a qualified aquatic or terrestrial ecologist is important prior to any modification or enhancement action.

Terrestrial Community-Specific Actions

Emergent Wetland

- Control cattails, as needed, along Cave Creek. Seek to maintain an approximate even mix of open water and emergent vegetation. If cattail control is needed, possible approaches include mechanical removal, burning, and, as a last resort, chemical control.
- Direct recreational access should not be permitted in emergent wetlands.
- Recommended plant species for areas that have saturated soils and shallow standing water:
 - i. Cattail (*Typha* sp.)
 - ii. Bullrush, rush (*Scirpus* sp., *Juncus* sp.)
 - iii. Sedges (*Carex emoryi*, *Cyperus* sp.)

Cottonwood/Willow Riparian Forest

- Restore riparian forest/woodland communities along Cave Creek and seek to have a range of successional stages.
- Establish clusters of cottonwoods and willows along the middle reach of Cave Creek through pole plantings, and then allow them to spread on their own through natural regeneration.
- Clear all salt cedar from Cave Creek, and aggressively remove any new salt cedar seedlings.
- Recreational access should be limited to hiking and interpretive opportunities.
- Recommended plant species:
 - i. Fremont cottonwood (*Populus fremontii*)
 - ii. Goodding willow (*Salix gooddingii*)

- iii. Velvet ash (*Fraxinus velutina*)
- iv. Arizona walnut (*Juglans major*)
- v. Arizona sycamore (*Platanus wrightii*)

Mesquite Acacia Scrub

- Monitor and control, as needed, the spread of salt cedar.
- Recreational activities compatible with mesquite acacia scrub include hiking, interpretive opportunities, and limited equestrian use.
- Recommended plant species:
 - i. Desert hackberry (*Celtis pallida*)
 - ii. Catclaw acacia (*Acacia greggii*)
 - iii. Burrobush (*Hymenoclea monogyra*)
 - iv. Graythorn (*Ziziphus obtusifolia*)

Mesquite Riparian

- Thin mesquite stands as recommended in the Mesquite Bosque Management Plan.
- In mesquite-dominated areas with scattered salt cedar, remove all salt cedar with hand tools followed by treatment of the cut stumps with Garlon® 4.
- Recreational access should be limited to hiking and interpretive opportunities.
- Recommended plant species:
 - i. Velvet mesquite (*Prosopis velutina*)
 - ii. Desert hackberry (*Celtis pallida*)
 - iii. Catclaw acacia (*Acacia greggii*)
 - iv. Burrobush (*Hymenoclea monogyra*)
 - v. Graythorn (*Ziziphus obtusifolia*)

Tobosa Grassland

- The existing fence along the northern boundary with the Tonto National Forest should be repaired and a 3-strand

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barbed-wire fence (with the bottom strand smooth) or other suitable barrier to livestock movement, but not wildlife movement, should be built where needed around the rest of the park perimeter.

- Seek to re-establish tobosa in plots one to five acres in size at disturbed upland sites.
- Recommended plant species:
 - i. Tobosa grass (*Hilaria mutica*)
 - ii. Sideoats grama (*Bouteloua curtipendula*)
 - iii. Bush muhly (*Bouteloua curtipendula*)
 - iv. Curly mesquite (*Hilaria belangeri*)
 - v. Plains bristlegrass (*Setaria macrostachya*)

Juniper Scrub Oak Chaparral

Juniper scrub oak chaparral is a healthy vegetation community. No revegetation action is needed.

Objective 3: Restoration of Wildlife Habitat

- A. Protect, extend, and enhance the diversity of habitats to benefit native wildlife communities.
- B. Manage activities that remove dead wood in a manner compatible with biological quality and ecosystem integrity.
- C. Control or eliminate, where possible, non-native vegetation.
- D. Protect, extend, and enhance the diversity of habitats to benefit native wildlife communities.
- E. Control or eliminate, where possible, non-native wildlife species.

Protect, Extend, and Enhance the Diversity of Habitats to Benefit Native Wildlife Communities

The goal of vegetation management is to allow areas to revegetate naturally to the extent possible. In some areas of SCRCA, vegetation is sparse and limited to early successional stages, usually because the land was disturbed by the mining,

vehicle traffic, or dude ranch operations. In such cases, vegetation communities should be expanded from adjacent areas into these disturbed areas. In addition, desired native plants can be seeded or planted as appropriate based on soil characteristics and water availability.

Monitoring the success of revegetation or restoration is critical to developing effective management techniques. All such efforts should be monitored for a time period long enough to evaluate success. Baseline information should be collected for comparison to future data; this baseline should include records regarding date of planting, source of material, species and numbers of planting, and some quantification of plant size. Additional data should be collected at regular intervals and used in an assessment of the success or failure of the project.

General Actions

- Minimize fragmentation of habitats. SCRCA should keep landscape fragmentation to a minimum. Even narrow barriers such as roads or gaps in habitat can prevent dispersal. For example, large mammals such as mule deer (Rost and Bailey 1979) and foxes (Storm et al. 1976) avoid roads. The best strategy for conserving the biological diversity of SCRCA is to preserve an unbroken corridor along Cave Creek since it provides a dispersal corridor for many organisms. In addition, tributary washes of Cave Creek should be preserved as movement corridors for wildlife.
- Maintain a diversity of animal habitats and species. In general, preserving a diversity of plant communities will preserve a diversity of animal habitats and species will be maximized if plant diversity is maximized (Diamond 1986). However, to preserve a specific animal species, focus must be placed on the habitat requirements of each species. There are two primary reasons for this phenomenon. First, different species require different habitats, so increasing the number of habitats increases the number of species that can live in the area. Second, some animals require several different landscape and vegetation types to survive. Where animals hunt or forage for food can be quite different from where they find shelter to raise their young. It is therefore recommended that plant species diversity be maintained.

- Conserve areas representing mosaics of all vegetation classification types. Many animals require different habitat types, and preserving these nearby to one another will help maintain species dependent on heterogeneity (Búrquez and Quintana 1994). An animal will frequently use different vegetation types for eating, resting, and reproduction. Maintaining mosaics of different vegetation types can ensure that more species will have their needs met. However, predicting which species will decline if different habitats are not maintained would require a detailed analysis of each species; this was beyond the scope of this study. Also, many other important smaller, less conspicuous species were not observed during this study. Being less conspicuous does not mean they are unimportant. Small organisms are often the most important in keeping ecosystems functioning normally (Wilson 1992). For example, Heske et al. (1994) has shown that removal of desert rodents such as kangaroo rats can alter the entire plant and animal community. Detailed wildlife analysis was beyond the scope of this study, but preserving mosaics of vegetation would decrease the probability of disturbing animal species diversity.

Specific Actions

- Develop recommended native vegetation communities for known soil conditions and water availability:
- Unvegetated areas of the Maricopa Mine are composed largely of steep, rock-strewn slopes with little or no topsoil. Adjacent vegetation is upper sonoran. Poor topsoil conditions and difficult access means this area should be allowed to re-vegetate naturally.
- Vegetation within the former dude ranch is limited to early successional stages with a few scattered trees. Soil compaction and building debris inhibit plant growth. Adjacent vegetation is mesquite riparian.
- Dirt roads occur in nearly all vegetation communities in SCRCA. Revegetation will be dependent on the degree of soil erosion and slope of the road.
- Species for revegetation should be native to the region and selected from those that occur in the area from sites of

similar elevation, soil type, and moisture regime. Local genetic stock should be used, when possible, in all revegetation projects.

- SCRCA should either have the expertise and facilities or use another organization such as the Native Plant Society to help them with revegetation efforts.

Manage Activities that Remove Dead Wood in a Manner Compatible with Biological Quality and Ecosystem Integrity

A variety of animals reproduce, forage, and find shelter in tree cavities. For example, in cottonwood riparian habitats, cavity-nesting birds comprise 32 to 435 of the breeding birds. Cavity trees are standing dead trees (snags) and trees with dead limbs. Both provide the majority of substrate for animals that use cavities. Dead and downed logs also provide a valuable biological component. Snags and dead limbs of cottonwood and willow have more value for cavity nesters than do some introduced tree species. Removal of snags and dead limbs for safety and appearance considerations is a potential concern. In addition, there is a need to determine the appropriate balance between the desirable amount of dead material available for forest processes while maintaining low fuel loads to prevent high intensity fires.

Actions

- Cavity trees should be well distributed throughout forest stands to meet the territorial requirements of different species. Also, it is important to protect areas with clusters of cavity trees to maintain habitat for species that require secondary nest sites.
- In mature riparian forests with low density dead wood component, snags could be created by girdling selected trees and limbs, or nest boxes could be provided for selected species. This type of management should be approached with caution because primary excavators may not always use such created snags, nor do the primary excavators use nest boxes.

- Inventories of cavity trees should be conducted throughout SCRCA. Areas of high value to cavity nesters should be identified.

Control or Eliminate, Where Possible, Non-native Vegetation

The exotic plant *Tamarix* sp., or salt cedar, can displace many native floodplain species because it grows quickly and produces dense shade. This prevents the establishment of other species beneath the canopy, resulting in a salt cedar monoculture. This can decrease the diversity of species in the area and the diversity of habitats available. In spite of this, salt cedar does provide habitat, especially for some bird species, in the absence of preferred vegetation. In addition, once salt cedar is removed, many areas are slow to revegetate, creating extensive hardpan areas. This may be due to the excessive soil disturbance required for salt cedar removal or changes in soil salinity that may prevent germination of some species.

Prickly pear is a native species that is common in some overgrazed parts of SCRCA, especially in upland areas. Prickly pear is a native plant commonly found on dry, sandy soils, and it can be troublesome on overgrazed rangelands. Prickly pear cactus is pervasive throughout the western states and can especially become a problem in pastures that have been overgrazed or where other disturbances have made conditions favorable for invasion and/or the spread of cactus.

Actions

- Continue the systematic removal of salt cedar through foliar application of Arsenal® and cut-stump application of Garlon® 4, but work should be performed on small areas and coupled with revegetation efforts.
- Prickly pear cactus can be controlled using a reduced herbicide rate. The recommended herbicide for prickly pear control is picloram (Tordon 22K), which is manufactured by Dow AgroSciences. When the herbicide is applied at the lower rate, it takes longer to achieve the same degree of control. Because cactus has a slow metabolism and grows in dry areas, the full effect of a single treatment is not seen for four to five years. Picloram remains active in the soil and plant for several years, and the cactus plant continues to

weaken until death occurs or the effect diminishes to the point where the plant is able to regain its health.

Protect, Extend, and Enhance the Diversity of Habitats to Benefit Native Wildlife Communities

SCRCA contains important riparian and upland wildlife habitats. Riparian communities are in serious decline regionally but are required by endangered species like the southwestern willow flycatcher and the yellow-billed cuckoo. In addition, upland habitat provides habitat for the endangered cactus ferruginous pygmy-owl. Moreover, riparian and upland communities provide important breeding and migratory habitat for native wildlife species.

Livestock grazing, mining, and recreational uses have degraded both riparian and upland wildlife habitats within SCRCA and must be restored. The first phase of restoration is to ensure the biotic health of Cave Creek. The small numbers of aquatic invertebrates and amphibians in Cave Creek could be an indication of water quality problems perhaps resulting from nearby past mining activities. Numerous fences in the interior of SCRCA, in varying degrees of disrepair, pose a source of injury for deer, javelina, and other large mammals.

Actions

- *Cave Creek*
 - Sustain and enhance existing cottonwood and wetland communities throughout the Cave Creek riparian zone. These communities are an integral component of the riparian ecosystem, not only increasing its diversity but also enhancing the value of surrounding plant communities for wildlife. They provide habitat for a high diversity and abundance of wildlife, many of which are rare and declining.
 - Existing cottonwood and wetland communities should be identified as areas of high biological value as well as areas of high potential for enhancement of these values. Existing communities should be evaluated for their existing biological use and for factors that limit their full potential; measures should then be developed to

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optimize biological values. Human management, water management, and vegetation management are measures that can appreciably increase these values.

- *Wildlife Movement Corridors*
 - Secondary washes provide a system of corridors for the dispersal of wildlife and connections to Cave Creek. The small washes in this area provide excellent wildlife habitat. The variety of drainage size increases the species diversity in this area. Because the corridors are narrow, less than 30 feet in many cases, buffer zones of surrounding vegetation should be maintained. The connections among these corridors should not be interrupted.
- *Cliff Areas*
 - Maintain cliff areas throughout SCRCA. The cliff areas are important wildlife habitat, and special attention should be paid to their preservation. These areas should not be disturbed by human activities, as it is habitat for many animal species. Because a number of these species are sensitive to human disturbance, a buffer zone between the cliff and future adjacent development should be created.
- *Special Status Species*
 - SCRCA contains habitat for a number of special status species (Table IV-9). The U.S. Fish and Wildlife Service (USFWS) maintains a list of endangered, threatened, and candidate species protected under and Endangered Species Act. The Arizona Game and Fish Department (AGFD) has compiled a list of wildlife species of concern in Arizona. Management of these special status species would need to be on a species-specific basis that is beyond the scope of this project. Furthermore, specific management actions should be coordinated with either the USFWS or the AGFD.

**Table IV-9
Special Status Species**

Species	Status	Habitat
Cactus Ferruginous Pygmy-Owl <i>Glaucidium brasilianum cactorum</i>	Endangered	Mature cottonwood/willow, mesquite bosques, and Sonoran Desertscrub
Desert Pupfish <i>Cyprinodon macularius</i>	Endangered	Shallow springs, small streams, and marshes. Tolerates saline and warm water
Gila Topminnow <i>Poeciliopsis occidentalis occidentalis</i>	Endangered	Small streams, springs, and cienegas vegetated shallows
Lesser Long-Nosed Bat <i>Leptonycteris curasoae yerbabuena</i>	Endangered	Desert scrub habitat with agave and columnar cacti present as food plants
Southwestern Willow Flycatcher <i>Empidonax traillii extimus</i>	Endangered	Cottonwood/willow and tamarisk vegetation communities along rivers and streams
Gila Chub <i>Gila intermedia</i>	Proposed Endangered	Pools, springs, cienegas, and streams
Yellow-Billed Cuckoo <i>Coccyzus americanus</i>	Candidate	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries)
Lowland Leopard Frog <i>Rana yavapaiensis</i>	Wildlife Species of Concern	Cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers
Western Red Bat <i>Lasiurus blossevillii</i>	Wildlife Species of Concern	Riparian and other wooded areas
Western Yellow Bat <i>Lasiurus xanthinus</i>	Wildlife Species of Concern	Not clearly understood; may be associated with Washington fan palm trees, other palms or other leafy vegetation such as sycamores, hackberries and cottonwoods which provide roost sites
California Leaf-nosed Bat <i>Macrotus californicus</i>	Wildlife Species of Concern	Mostly found in the Sonoran Desertscrub; primarily roost in mines, caves, and rock shelters
Sonoran Desert Tortoise <i>Gopherus agassizii</i>	Wildlife Species of Concern	Occurs primarily on rocky slopes and bajadas of Sonoran Desertscrub

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- *Bats*
 - Bats are becoming more and more dependent on abandoned mine sites for suitable habitat. Many bat species, including endangered species, have been observed using abandoned mines either as permanent roosts or temporary stops during migration (Belwood and Waugh 1991) Abandoned mines provide microclimates similar to caves, suitable for rearing young, hibernation, and rest stops during migration in the spring and fall. Closure of mine openings without a biological survey can trap and destroy an entire colony of bats.

- *Specific Bat Actions*
 - Manage the abandoned Maricopa Mine for bats.
 - Conduct a biological survey for bats in coordination with AGFD to check for bat habitation prior to closure of the mine opening. If bat activity is confirmed, the typical response is to construct a bat gate. Bat gates may be different sizes, shapes, or designs but usually involve a steel grid with openings large enough to allow passage for the bats, yet small enough to prevent human entry. Gates often are installed on mine openings with no visible signs of bat habitation in order to maintain ventilation patterns that may be essential to adjacent or connecting areas that do contain bats.

Control or Eliminate, Where Possible, Non-native Wildlife Species

Introduction of alien species may become a significant problem at SCRCA. Aliens compete with native species for shelter and food, and their presence can result in outright displacement of native species.

Brood parasitism by the brown-headed cowbird is a significant and widespread threat to nesting birds. Although some host species seem capable of simultaneously raising both cowbirds and their own chicks, such is not the case with most species. In most cases, parasitism causes complete nest failure or the successful rearing of only cowbird chicks (Arcese et al. 1996).

Therefore, once a nest is parasitized, it has almost no chance of producing young. Cowbird nest parasitism is a significant threat to the endangered southwestern willow flycatcher.

Actions

- Routes and vectors of alien species introductions should be identified and closed. A control program needs to be developed to prioritize efforts on the alien species most apt to threaten native species, and determine the situations where success is most likely.
- Any cowbird control program should be coordinated with AGFD. AGFD has implemented successful cowbird trapping programs throughout the state as part of the southwestern willow flycatcher recovery program.

Objective 4: Monitor Ecological Factors that Affect Biotic Communities

Develop a coordinated program to monitor the interrelationship of environmental factors and biological quality (with emphasis on diversity and abundance of native species) and ecosystem integrity (with emphasis on restoring and maintaining ecological processes).

Studies will be required that evaluate the success or failure of restoration efforts, along with the systematic monitoring of environmental factors that have the greatest impact on biodiversity and ecosystem integrity.

Actions

- Changes in the composition of plant and animal communities in different habitat areas including incidental sightings and regular surveys of mammals, herpetofauna, and birds.
- Other factors to be addressed are changes in soil moisture and soil salinity; water-quality parameters that affect aquatic communities, like nutrient levels, salinity, turbidity, temperature, and dissolved oxygen; and the extent and impact of recreational use.

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- It is especially important to monitor surface water quality. As stated previously, if water quality deteriorates, it will certainly have a profound effect on the aquatic communities. It also will affect many of the vegetation communities.
- SCRCA personnel and volunteers can conduct much of the long-term ecological monitoring. The monitoring program needs to be designed in a way that allows participants with different levels of familiarity with the taxa under study to contribute effectively. Where the monitoring work requires particular skills or levels of taxonomic familiarity, those skills and levels of familiarity must be clearly identified.

Objective 5: Integrate Biological Management with Recreation Goals

Manage recreational activities in SCRCA in a manner compatible with SCRCA's biological quality and ecosystem integrity.

Actions

- Wherever possible, place developed facilities such as a visitor center in areas that are currently devoid of vegetation rather than clearing vegetated areas to accommodate such facilities.
- Select an alignment for the main public-use trail such that it passes through or near all of the major habitat types in SCRCA but, at the same time, avoids sensitive areas. Use particular care in selecting the alignment with respect to riparian and wetland areas.
- Seek sites for wildlife viewing areas that provide opportunities for observing SCRCA's wildlife with minimal disturbance to the wildlife. Elevated wildlife viewing areas, for example, might be located at sites remote from, but overlooking, sensitive areas of Cave Creek.

Control access to sensitive vegetation areas, such as recently seeded/planted areas and areas supporting species with few representatives.

- Time construction work to avoid periods when any potential impacts to federally listed species that, in the future, may occur at SCRCA.

Water Resources

Introduction

Cave Creek is one of the last remaining perennial stream ecosystems in Maricopa County and is irreplaceable. Figure IV-4 describes flood plains contained within SCRCA associated with Cave Creek and Cottonwood Wash. Groundwater is the assumed source of perennial flow in Cave Creek; therefore, preservation of the existing groundwater flow to the creek appears to be key to preserving the creek ecosystem. Without perennial surface water, riparian and aquatic life will be limited. In order to better understand the water resources of SCRCA, URS performed a reconnaissance investigation of Cave Creek within the conservation area. The purpose of this effort was to gather data quickly that could be used to determine any present impact to the stream from existing conditions or any future management.

Existing Conditions

Geography and Geology

Elevations within SCRCA range from about 3,926 feet above mean sea level (amsl) on Elephant Mountain to 2,190 feet amsl at the bottom of Cave Creek. The land is rugged and composed of steep-sided mountains and deep-gullied washes, with broad, intervening slopes. The dominant vegetation of the area varies between upland desert and juniper, woodland plant communities, with saguaros and paloverde trees giving way to junipers as elevation increases (Brown and Associates 1995; Pearthree and Dempsey 1996). Higher densities of paloverdes accompany some of the larger desert washes and define the transition from upland to riparian environments. Cottonwood willow gallery forests are quite well developed along the perennial reach of Cave Creek.

I know it is a daring thing—for a man whose life lasts 40, 50, 60, 70, or 80 years—to be talking in terms of eternity, but that is indeed what we are doing. We are thinking of the eternity of the past that now exists in these areas of wilderness, and we have the presumption to say that we are going to do our best to make it possible for those areas from the eternity of the past to exist on into the eternity of the future. That is our faith.

Howard Zahniser
Author of the
Wilderness Act

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Bedrock of SCRCA is made up of Precambrian metamorphic and granitic rocks similar to bedrock units of the Carefree area, about 3 miles east of SCRCA (Doorn and Pewe 1991). The bedrock has been planed into an extensive, gently sloping pediment surface, the Pinnacle Peak pediment, presumed to extend under the surficial deposits south to the McDowell Mountains (Doorn and Pewe 1991). Lying on this surface are slope-forming colluvium and alluvial units of Cave Creek and its tributaries, and several sets of older river terraces. The latter were likely formed by Quaternary Period erosion of Cave Creek, controlled in turn by regional downcutting of the Salt and Verde rivers (Pearthree and Demsey 1996).

Precipitation in the Cave Creek watershed is best represented by the Flood Control District of Maricopa County (FCDMC) weather station at Cottonwood Wash (Station number 4920, Period of Record [POR], June 16, 1993, to present). These data give an average mean precipitation of 7.94 inches over the 10-year period with a range between 1.93 and 18.2 inches. This average is similar to the average for the National Weather Service (NWS) Sky Harbor International Airport station of 7.65 inches. No temperature or evaporation measurements are made at the FCDMC station.

The closest NWS station to SCRCA is at Carefree, Arizona (Station number 021282, POR = June 1, 1962 to December 31, 2002), approximately 3 miles west of SCRCA. The Carefree Basin is slightly less arid with a mean annual rainfall of 12.79 inches. Average minimum January temperature is 40 degrees Fahrenheit (°F) and average July maximum temperatures are 101°F. Evaporation in the Salt River Valley is voluminous and a large part of any summer precipitation immediately evaporates. Mean annual open-water evaporation at Lake Pleasant, about 25 miles northwest of SCRCA, is about 85 inches. In 2001, the annual cumulative evapotranspiration for Phoenix was 74.95 inches.

- The region experiences several rainfall “seasons” (Schmidli 1996). During the winter, fall, and early spring, about 50 to 60 percent of the total annual precipitation for central Arizona

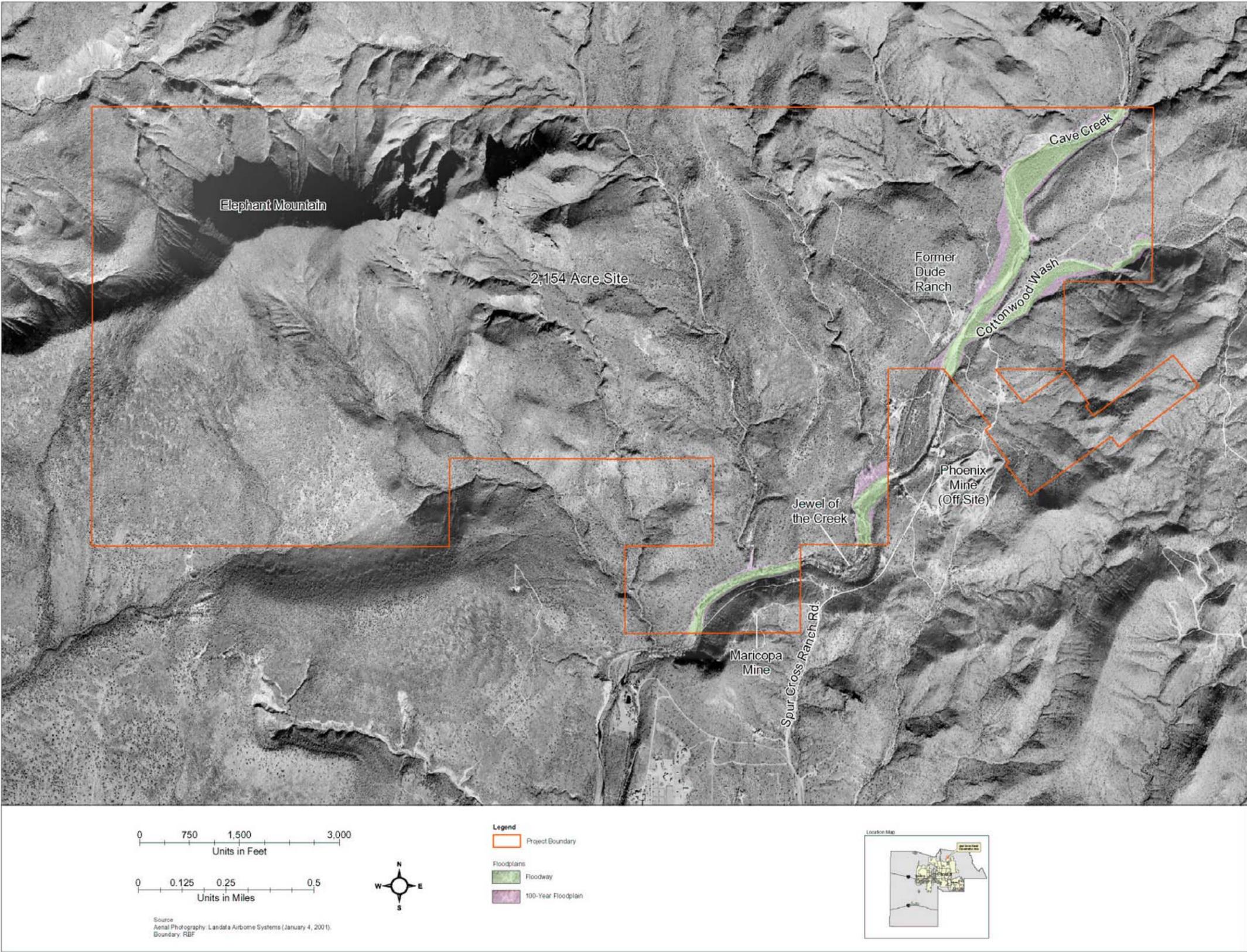


Figure IV-4: SCRCA Flood Plains

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falls in the form of cold-front storms that originate in the Pacific Ocean. This precipitation is following the same jet stream that brings storms through southern California and the Sierra Nevada Mountains, but depleted of moisture as they travel eastward. Because of their longer duration, these storms tend to produce the highest amount of runoff. In May and June, the continental high pressure ridge over northern Mexico tends to deflect the storm track northward, creating a dry season.

During July, the sub-tropical ridge moves farther east and the Mexican Monsoon begins affecting southern Arizona. Circulation of air masses around the continental high creates a storm track that brings moisture from the Gulf of California. These moist air masses, further concentrated by surface heating and uplift over the central mountains, build dramatically into the July and August thunderstorms that sweep through central Arizona, the lower Salt River Valley, and Cave Creek watershed. Commonly, SCRCA experiences almost half of its total annual precipitation during the months of July, August, and September.

In October and November, a winter pattern is re-established. In some years, this period experiences a second dry spell, in others, both winter and monsoonal-type storms can occur. Some of the most destructive flooding in the Phoenix historical record has occurred during this time of the year (Schmidli 1996). Because of the high winter temperatures, snowfall in the Salt River Valley is extremely uncommon, but the late winter can occasionally bring trace amounts of quickly melting snowfall in the mountains around Cave Creek.

Hydrology

The high evapotranspiration described above, combined with transmission losses through the streambed, conspire to reduce the runoff produced by most storms entering the Cave Creek watershed. Most of Cave Creek and its tributary streams are ephemeral, meaning that they only flow in direct response to storm runoff. Further, because of the initial transmission losses mentioned, the only summer storms that produce runoff are very local, high intensity, cloud bursts that rapidly saturate the ground and produce immediate overland flow. Again, such behavior is common in central Arizona.

Despite this, not all of Cave Creek is ephemeral and there are several reaches along its length that maintain a perennial flow. This includes a 0.5-mile segment that cuts the southern end of SCRCA and the Sonoran Desert Foothills Trust property. This reach, called the “Jewel of the Creek,” supports a very well preserved remnant of Sonoran riparian woodland (Minckley and Brown 1994) along with riparian scrubland, strand, and emergent aquatic vegetation. The source of this surface water appears to be a locally high water table or artesian condition, which is causing discharge through the streambed (Nelson and Douglas 2000; Brown & Associates 1995). The suggestion of artesian conditions seems unlikely given the absence of obvious confining beds in adjacent outcrops, but cannot be ruled out without further investigation. Regardless, flow in the middle of the reach is only a few cubic feet per second (cfs) and losses to evapotranspiration and infiltration appear to exceed any inflow at the southern end of the reach, effectively terminating the wet stream near the southern end of SCRCA.

During storm events, flow is often much increased. Stream flow records come from the USGS gaging station near the confluence of Cave Creek and Cottonwood Wash, (09512280, POR = October 1, 1980 to September 30, 2002), which is upstream of the perennial reach. Mean annual stream flows over the 20-year period of record average at 6.86 cfs with a range from 0.69 to 50.9 cfs, a distinctly high period from about 1990 to 1995, and a pronounced low since then. The early 1990s are well known from data along the Salt and Gila rivers as a period of unusually high discharge in those watersheds, including the catastrophic floods of 1993 (>120,000 cfs on the Gila). The early 1980s also were a time of high flows along the Salt and Gila rivers. If the period of 1990 to 1995 is removed from the sample, the mean drops to 3.54, almost half of the previous number, but the post-1995 annual means are still below average.

Annual peak flows from the same station are distributed similar to the annual mean flows, although overall greater. Ranked discharges indicate that the highest discharge recorded by the USGS at SCRCA was about 9,200 cfs on January 8, 1993, the day before the peak of the January 1993 flood on the Salt and Gila rivers. Mean monthly flows, averaged by month over the POR, are seasonally similar to precipitation patterns and suggest the higher efficacy of winter storms in producing stream flows.

The period of record for the USGS station is short, but these stream flow records suggest that rainfall/runoff patterns for Cave Creek are similar to the behavior of the main stem Salt and Gila rivers. Tributary flow from systems like Cave Creek is believed responsible for peak flow timing exhibited by large dryland river systems (Graf 1987). In simple terms, the main stem streams only flow when fed by tributaries, with local direct sheet flow less of a significant source. Urbanization of these tributary watersheds exacerbates these peak flows, as less rainfall is lost in the tributary watersheds to infiltration and evapotranspiration.

Presumably, if SCRCA is maintained as a recreational area, the amount of impervious surface in the watershed will be kept low and runoff to Cave Creek will not increase. This will allow SCRCA to hold and absorb precipitation that otherwise would run directly to the more urbanized downstream lands. Thus, it seems likely that maintaining the current hydrologic function of SCRCA can help mitigate flooding and reduce peak flows downstream of the area in Cave Creek, Maricopa County, and the Phoenix Metropolitan area.

Hydrogeology

The hydrogeology of Cave Creek at SCRCA is not unique for the watershed but it is unique for this part of Maricopa County. As previously noted, it has been suspected that the perennial section of the creek, the Jewel of the Creek, flows because of discharges from groundwater to the streambed. The suggestion is reasonable based upon the field evidence collected for this investigation; however, the full story seems slightly more complex.

Groundwater data in SCRCA have been collected previously for a number of regional studies. However, no hydrogeological field data have been collected from the site and general geologic data are limited to the surficial deposit map of Pearthree and Demsey (1996). Without an adequate hydrogeological conceptual model, projections of the groundwater behavior in SCRCA remain speculative, at best. The current conditions suggest that a modest and well-constrained amount of hydrogeological information is needed to answer important management questions and will be discussed in more detail in the following sections.

SECTION IV: ENVIRONMENTAL RESOURCES

Wells are not abundant across SCRCA. The Arizona Department of Water Resources database lists four wells within the region. One is abandoned and another is a monitoring well that supported the Phoenix Mine aquifer protection permit. A fifth well, located near the headquarters of the old dude ranch, is not on the register. Only two of the wells, the Norm Foster domestic well and the Cross Tree Farm well, have adequate data to use for this investigation.

Water surface elevations at the three wells along Cave Creek (Dude Ranch, Cross Tree Farm, and Foster) suggest groundwater elevations that decline in a downstream direction. Comparing this gradient to the topographic gradient of the streambed suggests that the location of the perennial reach might be determined by the intersection of the water table with the streambed. In other words, either a local rise in the water table or an abrupt decrease in streambed elevation could produce a section of the creek in which groundwater was upwelling to the stream. This suggestion is strengthened by the lack of any specific spring or seep flowing to the upstream end of the perennial reach. Better resolution of the groundwater gradient and geology in the vicinity of the Jewel Reach would test this speculation.

Groundwater data from the Foster and Cross Tree Farm have been collected since 1990. This period of record is not sufficient to test statistical significance but depth to water has increased over the time period by 5 to 20 feet. This much difference over the last 10 years is difficult to explain as random fluctuations. The data also suggest that groundwater declines have principally occurred since 1996, the period of declining stream flow.

During the spring of the very dry, 2002 water year, measurements were made of the water level in the Dude Ranch well on a biweekly basis in an attempt to evaluate the sensitivity of local groundwater levels to changes in stream flow. The well is complete with a 6-inch metal casing to a depth of 35.75 feet below the top of the casing, which is set in a concrete collar. The construction details of the well are not known and the well hydrogeology is similarly unclear. Thus the data should be considered only as illustrative. Nevertheless there was very good qualitative correlation between the behavior of the well and the stream during the period of observation.

Observations began on April 21, 2002, about 14 days after the last flow-producing storm had moved through the area. The streambed was covered by an ephemeral pond extending from the part of the stream adjacent to the Dude Ranch well to the west side access road, about 1,200 feet. On May 11, 2002, the water level elevation in the well was at 2,276.7 feet amsl. The downstream end of the pond had retreated about 500 feet upstream and the pond surface was now about 1.7 feet below the water level of the well, suggesting a positive gradient from the stream bank to the creek. By May 25, 2002, the pond had retreated another 125 feet and had been reduced to a series of wet spots and puddles; the water level elevation at the well was down to 2,275.5 feet amsl, about the same as the pond. On June 8, 2002, the streambed was completely dry, although the underside of cobbles were moist and the elevation of the well was now lower than the streambed. By June 28, 2002, there was no moisture in the stream. Water levels continued to decline in the well until September 28, 2002, when the next significant storm occurred.

During the same time period, the perennial stretch of the creek continued to flow but the downstream end of the reach also retreated upstream. On April 22, 2002, the Jewel of the Creek reach was flowing over a 4,000-foot length. By June 28, 2002, this had been reduced about 1,000 feet upstream where the creek emerged from a cattail stand. From this point on, the perennial reach did not retreat.

Taken as a whole, there appears to be an intuitive relationship between the decrease in local groundwater levels and the behavior of the stream. It seems reasonable that, similar to other dryland streams in the arid Southwest, temporary bank storage of storm water is a critical reservoir for stream flow during periods of drought (Whiting and Pomeranets 1997). This perched water supply could be helping to keep the perennial section of the stream flowing by absorbing and subsequently releasing storm water directly to the stream. Ephemeral ponds, which showed strong evidence of use by javelina and other mammals, clearly seem to be sustained by this source.

This seems supported by local observations. Long-term residents report that after an upstream storm, the ephemeral pond of SCRCA seem to “appear” with a one- or two-day lag (Bob Guilden, personal communication, June 2002, SCRCA

Interpretive Guide). On the other hand, the Jewel Reach seems to be sustained by a less transient source of groundwater. Although it was reduced by the lack of storm water in 2002, it appeared to stabilize around a consistent flow as the water levels in the Dude Ranch well continued to drop. Thus the regional groundwater dynamics might have a role in sustaining this part of the creek. Whether this is due to a separate aquifer, unconfined or artesian, topographically or geologically controlled, and the impact of development on this source remain unanswerable at this time.



Water Quality

The area around SCRCA has been a locus of precious metals mining and exploration since at least 1880 with recent activity from 1984 to 1985 at the Phoenix Mine. During the most recent period two cyanide heap leach pads, with earthen impoundments for solution storage, were operated at the property ADEQ in 2001. Considerable volumes of mining tailings remain at both sites. Soil sampling indicates that levels of lead, arsenic, and mercury at the Phoenix Mine site and copper at the Maricopa Mine site exceed health-based, soil cleanup advisories (Smith Consultants 2002; URS 2001, 2002). The suspicion that such problems might lead to groundwater contamination led ADEQ to require an Aquifer Protection Permit (APP No. P-100571) for the closure of the Phoenix Mine site, which precipitated the construction of five monitoring wells at the mine site.

The APP investigation and permitting extended from 1987. Initially, four wells were installed, MW-5, MW-6, MW-7, and MW-8. In 1997, MW-9 was added. The permit was issued in 2001 with MW-9 as the point of compliance and this well will be sampled for at least three years if no exceedences are detected.

The results for the well monitoring by ADEQ indicate that problems with arsenic and mercury do appear to extend to the groundwater, with both metals regularly exceeding Arizona Aquifer Water Quality Standards (AWQS). The source of these metals has not been directly tied to the mine site but this is presumed by the ADEQ APP unit project managers. Lead has been detected in the Foster home well but not at the other wells and not at levels above AWQS. Consistently high levels of

nitrate also were found in all monitoring wells and are presumed to come from the breakdown of released cyanide (ADEQ 2001). Absence of nitrate in the stream above detection limits suggested to ADEQ that the problem was limited to the region around the mine.

The Dude Ranch well was sampled during SCRCA Phase II Environmental Site Assessment (ESA) and unknowns about the well construction and accuracy must be repeated from the previous section. Nevertheless, there were no indications of contamination by metals or nitrates in these samples.

Surface water quality at SCRCA also has been the subject of attention by ADEQ. Cave Creek, from the headwaters to Cave Creek Dam, 12 miles below SCRCA, is listed by ADEQ as having an Aquatic and Wildlife, Warm Water Fisheries (A&Ww), Fish Consumption (FC), Full Body Contact (FBC) and Agricultural Livestock (Agl) designated use under the Clean Water Act. In order to indicate the degree of attainment for the stream, ADEQ maintains a surface monitoring site located directly upstream of the Maricopa Mine. No water quality data are collected at any nearby site. Data from the ADEQ Surface Water Monitoring program suggest that there are no water quality criteria exceedences of the stream above the mine, although one sample showed fecal Coliform and Escherichia coli (E. coli) at detectable levels.

Data from the Phase II ESA completed for the SCRCA land acquisition also do not show any water quality exceedences in the stream adjacent to the Phoenix Mine. However, copper was present in the sample taken from the reach adjacent to the Maricopa Mine. This fact, combined with the soil sampling results for copper from the ESA, suggest that the tailings may contain copper at levels high enough to pose a threat to stream water quality in the perennial reach. Positive results also were found for Coliform in all samples and E. coli in three of the stream samples but well below any current or past Arizona Surface Water Quality Standards (SWQS). Coliform standards have been struck from the latest SWQS reflecting research indicating that they are non-unique indicators of human waste contamination (ADEQ 1998). Problems also exist with E. coli in some soils and animal waste contamination (Oshiro and Fujioka 1995). In any case, it is not clear where these microbes would be coming from as the values are from stations above SCRCA.

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Because of the potential for metals contamination within SCRCA, verification samples were taken from two places along the perennial reach and from the shallow, subsurface below the streambed. The filtered subsurface sample was extracted using a driven, mini-piezometer (Grimm 1996). These devices are simply poly-vinyl chloride tubing, open at one end, that is pushed into the sediment of the streambed and hand pumped to extract a sample of hyporheic, or shallow subsurface, water. This method generally gives good quality data but is not an U.S. Environmental Protection Agency (EPA) or ADEQ-approved method for sampling groundwater. The values reported here probably represent a screening level of data quality relative to more traditional methods of groundwater sampling.

Despite this, one of the surface samples does show copper levels well in excess of the aquatic surface water quality standard for warm water fisheries, one of the four designated uses of Cave Creek. None of the streambed water samples showed high copper values. Arsenic, cyanide, and lead were not detected and nitrate was found in only one sample well below water quality standards.

These data must be interpreted in light of the biological condition of the stream. Although no formal bioassessment has been attempted in the perennial reach, the diversity and abundance of the riparian plant community is qualitatively superb (Nelson and Douglas 2000; Brown & Associates 1995). Cave Creek itself has been evaluated by ADEQ Surface Water Bureau as maintaining “good” habitat values in 1996. In an informal survey of in-stream biota (Sorenson to Gunn, personal communication, May 22, 2002, MCPRD), the presence of Ephemeroptera (mayflies) and Trichoptera (caddisflies) were recorded, the two indicator species of stream health commonly used by the EPA (Plecoptera, or stoneflies, are not found in Maricopa County). Exotics were not found in this survey and the aquatic habitat was judged as “relatively clean,” based upon the informal biological survey.

In summary, there appears to be a groundwater problem with nitrate, mercury, and arsenic in the area directly around the Maricopa Mine site, but no indication that this problem is affecting any groundwater downgradient of the site or in the stream. A possible source of contamination by septic tank discharge should be investigated. There also appears to be a

problem with copper in the stream in the perennial reach of Cave Creek. Despite this, it does not appear that these conditions are limiting aquatic or riparian life in any obvious way.

Evaluation Methodology and Findings

Based upon the existing conditions detailed in the previous section, there appears to be three potential impacts on water resources of SCRCA that would be expected from any changes in management strategies for the resource. These are as follows:



1. Changes in surface water flows in the creek because of changes in the impervious surfaces within the management area, for example increases in parking lots, roads, or other built visitor facilities, or increased development outside of SCRCA that is allowed to discharge runoff onto the conservation area.
2. Changes in the water quality of Cave Creek because of increased natural erosion of the tailings, disturbance of the tailings associated with operation and maintenance of the recreation area, or other impacts that cause the tailings to enter the stream ecosystem and elevate concentrations of metals, or from increased crossings of the stream leading to degradation of the stream bank or bed.
3. Changes in the hydrogeology of the resource area that cause flows in Cave Creek to diminish or change in such a way that the ecosystem is deprived of in-stream flow.

Each of these impacts involves a specific disturbance to the existing hydrological or hydrogeological function of the stream ecosystem resulting in the degradation of the riparian and aquatic biota that rely upon it. Given the unique nature of the Cave Creek resource to both SCRCA and county, it is assumed that these impacts would be highly severe if they caused permanent, or substantial temporary damage, to the resource.

Unfortunately, none of these impacts can be quantitatively addressed at this time. There are two reasons for this lack of knowledge. First, there is no rainfall/runoff model existent for the Cave Creek watershed that could predict the changes in creek discharge as a function of increased road density or

impervious surfaces in the surrounding areas. Such a model is routinely produced for large-scale developments, floodplain mapping projects, or non-point source pollution studies. Because the results of such a model are not available, only qualitative statements can be made, and these are speculative. It should be understood that this conceptual gap hampers the prediction of both the total volume of flow in Cave Creek and the specific volume of runoff transported contaminated sediment that would be moved from the tailings to the creek.

Second, because there is insufficient conceptual understanding of the hydrogeological system operating at SCRCA, it is impossible to determine how much protection is required to preserve the existing discharges of groundwater to the stream. It is not clear at this time how much stream flow is generated by runoff, how much is supplied by temporary storage of storm water in the local subsurface (i.e., bank storage), and how much is derived from the regional groundwater system.

Also impossible to quantify is the source of the two positives for bacteria in the creek that would point to wastewater or sewerage discharge. It is reported in the literature that *E. coli* false positives can be found in streams contaminated by non-human wastes or soils; however, a survey of septic systems upstream of SCRCA would be a prudent step.

Given all this, all that can be said regarding the three impacts to water resources listed above is that if development of the adjacent land in the Cave Creek watershed continues unabated, there will be some degradation of the resource, regardless of the management of SCRCA. There are clearly steps that could be taken to determine the level of action required to avoid these impacts; however, all of these begin with a clearer understanding in the hydrologic and hydrogeologic function of Cave Creek.

Monitoring Strategies and Protection Methods

In order to address the three potential impacts to the aquatic and riparian resource at SCRCA, it is necessary to first establish whether or not a problem exists. Overall, the data suggest that there is currently no threat to the public health from the existing conditions in the stream. However, the biological health of the system is less obvious. Although there is some indication that

copper pollution in the perennial reach of Cave Creek is present, there is insufficient data to fully assess the conditions of the stream. Further, there is insufficient information on the ecological condition of the aquatic and riparian biota of the stream. Finally, there is insufficient information on the overall hydrogeological pathways to the stream that copper could use to cause impairment of the biota.

Implementation

It should be noted at the outset, that there is not at this time a body of evidence indicating there is a problem in the perennial reach or any place along Cave Creek at SCRCA. Based upon reconnaissance data, the diversity and vigor of the riparian and aquatic community are outstanding. However, it is just this quality of the resource at the time that it was purchased by the county that makes a conservative approach to its protection advisable.

The following section contains recommended objectives to assist SCRCA land managers in achieving water resources goals.

Objective #1 – Conduct a Bioassessment of Cave Creek

A bioassessment of the stream, utilizing methodology specific to ephemeral or intermittent streams, could be designed to address data gaps discussed in the previous sections. The investigation could be phased such that data collection and analysis were contingent upon the discovery of impairment to the stream. One approach to meeting the hydrological goal of SCRCA is to use standard metrics, such as the EPA (Barbour et al. 1999) or Forest Service/Bureau of Land Management (Pritchard 1998) methodologies to determine if an immediate problem in stream health is apparent. Although the results are not diagnostic, this step would determine if a rapid response was needed to isolate the sources of pollutants and protect the stream.

As part of this step, a monitoring station should be established somewhere near the downstream end of the perennial reach. The station should consist of a discharge monitoring device (flume, weir or similar structure) to measure flow through the

reach and a water quality sampling station. Combined with the upstream meteorological and hydrological data collected by the FCDMC and USGS, the data collected from this new station would indicate if any diminution of flow was occurring on a real-time basis and alert SCRCA land managers to any potential flow impairment.

"Land really is the best art."

**Andy Warhol,
America, 1985**

Based upon an examination of long-term hydrological trends for the area, data should be collected from these two stations over a representative period (at least two years) to establish baseline conditions for the stream. If these data and analyses indicate a healthy stream, further action may not be necessary and any protective measures could be specified at that time. If there is some suggestion of either a flow or water quality impairment to the site, an ecological risk assessment, involving hydrogeological modeling of pollutant transport and recharge to the stream, could be designed using conventional computer-based tools.

Objective #2 – Identify Funding Sources

There are a number of very creative ways to fund and administer the prescriptive measures outlined in the preceding section. First, the USGS and FCDMC both have monitoring stations in or near SCRCA that provide data on storm water discharge and precipitation. SCRCA could negotiate a memorandum of understanding or cost-sharing arrangement with both of these agencies to expand their capability.

The ADEQ, Surface Water Quality Bureau, has in the past collected chemical water quality data from a station upstream of SCRCA. In addition, there have been biological data collected from the perennial reach on a non-periodic basis. The fact that the stream might not be attaining the water quality criteria for its designated use suggests that Cave Creek could be placed upon the ADEQ-monitored streams list, allowing the use of Federal Clean Water Act grant money. The ADEQ has a very specific protocol for adding streams to the list for monitoring; however, the quality and uniqueness of the resource is one important trigger that might be applicable to Cave Creek.

One important source of partnership resources is the Desert Foothill Land Trust. Because of the contiguous nature of the Desert Foothill Land Trust and SCRCA reaches, it is irrational not to co-manage the perennial reach. The Desert Foothill Land

Trust holds extremely high stewardship responsibility for the Jewel of the Creek and has expressed strong interest in assuring that SCRCA is managed in a way compatible with their interests. It seems logical that a combined funding effort between SCRCA, the Town of Cave Creek, and Desert Foothill Land Trust might be an extremely attractive target for either granting or charitable agencies.

Finally, there has been interest expressed (Nancy Grimm, personal communication, 2002) that members of the National Science Foundation-sponsored, Arizona State University-administered Phoenix Long-Term Ecological Research Project in assisting in this work. A Phoenix Long-Term Ecological Research Project research site is located downstream of SCRCA and measures the utilization of nitrogen by the stream ecosystem. An expansion of scope for this project that would complement the needs of SCRCA might be attractive to the Arizona State University researchers and could provide numerous benefits.

Geologic and Soil Resources

Introduction

Geology

Geologic processes are the natural physical and chemical forces that act within natural systems, as well as upon human developments, across a broad spectrum of space and time. Such processes include but are not limited to erosion and sedimentation, karst processes, seismic, and volcanic activity. Two exceptional geologic resources on SCRCA include “Gunn’s Window” and “The Nutcracker.”



The geology of SCRCA is complex and diverse due to igneous and metamorphic activity and structural deformations associated with these activities. Figure IV-5 describes the topographic characteristics on SCRCA. Erosional geologic processes have altered the landscape resulting in outcrops of rocks ranging from Precambrian to Recent ages. SCRCA geology is characterized by isolated mountains and ridges separated by alluvium-filled, irregular large valley-like depressions.

Soils

The soils of SCRCA are a critical component of the physical resources found within SCRCA. They provide a rooting material for the vegetation, as well as the necessary nutrients for this vegetation. The soils also function as a reservoir for water and absorb and neutralize natural organic wastes and debris. Wildlife of SCRCA depend on productive soils to support adequate vegetation for food, cover, and mineral nutrients. Long-term monitoring of these productive soils is important to the continued health of the vegetation, water, and wildlife resources of SCRCA.

Consequently, the most important soil resource management issue is to guard against the two major and relatively irreversible impacts to these fragile desert soils, wind, and water erosion. Susceptibility to erosion is related to the presence or absence of protective coverings such as vegetation or preservation of cryptobiotic crusts.

Cryptobiotic Crusts

Cryptobiotic soil crusts assist in a number of environmental functions. Those contributions are concentrated in the soil's thin top layer, the surface interface between soil and air. In addition to aiding in soil stability and combatting wind and water erosion, soil crusts can contribute to atmospheric nitrogen and carbon fixation, provide other plant nutrients, aid in soil-plant-water interactions, increase water retention, promote some seedling germination, and increase plant growth.

Unfortunately the interwoven mat of sheath material characteristic of cryptobiotic crusts is easily damaged. Visitors at SCRCA that inadvertently trample a well-developed patch of cryptobiotic soil crust can erase decades of growth. Once an area of crust is damaged, it is extremely prone to wind and water erosion.

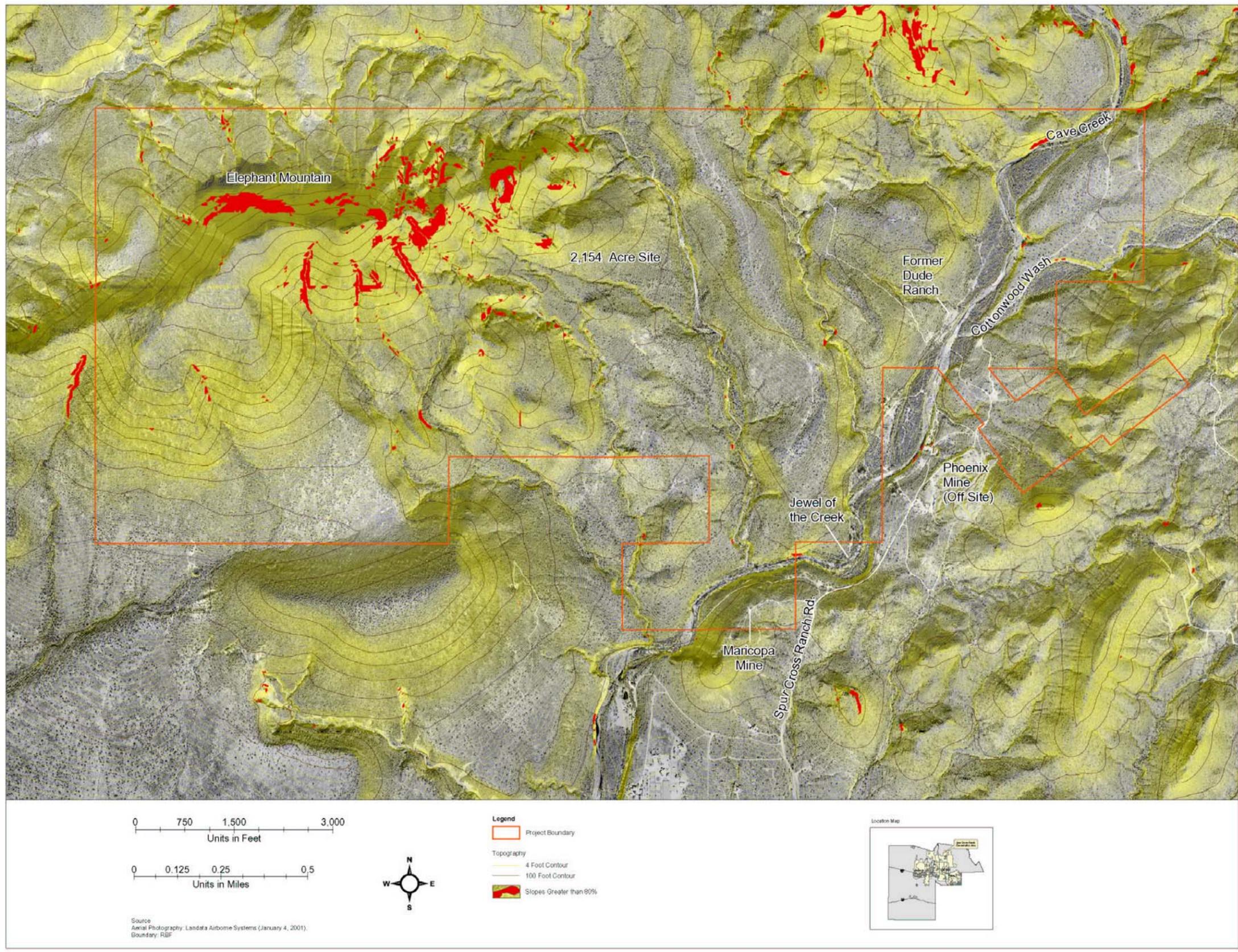


Figure IV-5: Topography

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Existing Conditions

Geology

Regional Physiography

Arizona is characterized by three physiographic provinces—Colorado Plateau, Basin and Range, and a so-called Transition Zone—having characteristics intermediate between the two physiographic provinces (i.e., Colorado Plateau and Basin and Range). These physiographic provinces have influenced the geomorphic features and geologic history of SCRCA.

Colorado Plateau Province – The Colorado Plateau Province occupies approximately the northeastern 40 percent of Arizona and is not developed in SCRCA. Distinctive characteristics of the Colorado Plateau include thick sequences of Paleozoic and Mesozoic sedimentary rocks, and a relatively stable cratonic platform having monoclines and uplifts as significant tectonic features.

Basin and Range Province – The Basin and Range Province occupies approximately the southwestern 40 percent of Arizona and is the dominant physiographic terrain in SCRCA. The Basin and Range Province is characterized by northwest-trending block-faulted mountain ranges separated by deep, alluvium-filled basins. Mountains in and around SCRCA generally are composed of Precambrian (Proterozoic) to Tertiary igneous or metamorphic rocks bounded by block-faulted and folded Mesozoic to Cenozoic sedimentary rocks or Tertiary volcanic rocks.

Transition Zone Province – The Transition Zone Province bisects Arizona from northwest to southeast, occupies approximately 20 percent of the state, and is present north of but not developed in SCRCA. The Transition Zone is a geologically complex area where the monocline and uplift tectonic characteristics of the Colorado Plateau are developed on Precambrian basement rocks and Mesozoic granitic rocks. The geology of the Transition Zone is complicated by extensive block faulting encompassing and/or overlain by Tertiary volcanic and sedimentary rocks. The Mogollon Rim (north of SCRCA) is a sharp escarpment at the southern limit of the Colorado Plateau

where exposures of Paleozoic and Mesozoic sedimentary rocks overlook deep canyons, mesas, and valleys within the Transition Zone.

The following sections describe rock characteristics identified within SCRCA within the Basin and Range Province

Precambrian (Proterozoic)

Precambrian rocks exposed in SCRCA include Early Proterozoic (1,650 to 1,750 million years ago [Ma]) granites, metamorphics, gabbros, gneisses, metasedimentary, and metavolcanics; Middle Proterozoic (1,400 Ma) granitics; and Middle Proterozoic (1,400 to 1,100 Ma) sedimentary rocks. Precambrian rocks typically host metallic and other minerals and have been mined for gold, silver, gems, and other minerals at several locations in SCRCA. Formations within SCRCA include:

- *Union Hills Group [Xmv]* – a thick sequence of undifferentiated, typically weakly altered andesitic flows, breccias and tuffs that grade laterally to a volcanic greywacke that overlies the Precambrian basement in SCRCA. Ages range from 1,730 to 1,720 Ma. This rock type is located on the southeastern fringes of SCRCA within the SCTMZ.
- *Granite and Granodiorite Intrusives [Xg]* – regionally named, such as Four Peaks Granite and Maricopa Granite. This rock type can be a pinkish gray, coarse-grained porphyritic granite with potassium feldspar phenocrysts. This rock type is located along Cave Creek and also occupies portions of the north/northeastern edges of SCRCA.

Tertiary [T]

Outcrops of Tertiary-age volcanic rocks are extensive throughout SCRCA as a result of active tectonism that formed the Basin and Range province. Emplacement of plutonic rocks also occurred during the middle Tertiary. In contrast, Tertiary sedimentary rocks typically were deposited in local basins, some of which formed between detachment-fault blocks associated with extensional tectonism. A description of the formation within the Tertiary rock type inventoried within SCRCA follows:

- *Middle Tertiary Volcanic Sediments [Tvs]* – generally reddish fanglomerates and conglomerates containing volcanic clasts,

intercalated with andesite flows and tuffs. These volcanoclastic deposits can range from 28 to 23 Ma. This rock type is located primarily within the central and northwestern portions of SCRCA.

Quaternary [Qt And Qm]

Rocks of Quaternary age in SCRCA are very localized, and have a range of thicknesses from a few hundred to greater than 1,000 feet. Quaternary deposits include alluvial and colluvial sands, silts, and gravels; piedmont slope and valley border fan conglomerates grading from proximal bouldery alluvium to distal sand-silt-clay mixtures; basin floor playa and lacustrine mudstones and siltstones; fine-grained eolian sand sheets and dunes; terrace, valley fill, floodplain, and channel sand, silt and clay deposits along natural desert drainages; and angular cobble- and boulder-size talus deposits. The surface accumulation and local abundance of these sediments make them preferred sources for construction aggregate and other industrial materials. Middle Pleistocene [Qm] alluvium is present primarily along the southwestern and south-central fringes of SCRCA.

Soils

Soils in SCRCA are generally well-drained sandy-loams, loams, and gravels formed in alluvium and colluvium from igneous volcanic and metamorphic bedrock (Cave Creek General Plan 2003). Soil associations within SCRCA range from severe to slight soil erosion potential. More specifically the soils within SCRCA include:

- Lehman's Rock Outcrop Complex (e.g., Elephant Mountain)
 - This soil type is highly compatible with wildlife management and has a moderate erosion potential. Characteristic plant species include tobosa, jojoba, curly mesquite, blue paloverde, slim tridens, sideoats grama, whitethorn, Christmas cactus, barrel cactus, big galleta, and white brittlebush.
- Continental Cobble Clay Loam – This soil type is highly compatible with wildlife management and has a slight erosion potential. Characteristic plant species include tobosa and treeawn.

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- Gran-Wickenburg-Rock Outcrop Complex – This soil type is highly compatible with wildlife management and has a moderate erosion potential. Characteristic plant species include bush muhly, Arizona cottontop, slim tridens, flattop buckwheat, sideoats grama, desert globemallow, mormon-tea, and jojoba.
- Gran-Wickenburg Complex – This soil type is highly compatible with wildlife management and has a slight erosion potential. Characteristic plant species include littleleaf paloverde, desert globemallow, range ratany, and Mormon tea.
- Arizo Cobbly Sandy Loam (e.g., Cave Creek) – This soil type is highly compatible with wildlife management, yet has a severe erosion potential. Extra care should be taken to prevent gulying and channeling. Characteristic plant species include desert willow, cottonwood, burrowbrush, and catclaw acacia.
- Eba Very Gravelly Loam – This soil type is highly compatible with wildlife management and has a moderate erosion potential. Characteristic plant species include triangle bursage and buckhorn cholla.

Evaluation Methodology and Findings

The previous geological and soils overview consisted of collecting relevant information and researching published documents to characterize these resources on SCRCA. Following is a discussion of resource findings.

From both a geologic and soils perspective, these resources on SCRCA are relatively intact. However, given the severe-to-moderate erosion potentials in Cave Creek and soils surrounding Elephant Mountain it will be critical to monitor conditions within these areas to avoid rill and gully formations associated with use.

Some cultural resource sites have been susceptible to both wind and water erosion. As described in the cultural resources section, these areas should be prioritized as it relates to stabilization of site erosion.

Additionally, the geology and soil composition within SCRCA lends itself to enhancing wildlife habitat. Current conditions, as previously stated, suggest that wildlife habitats within SCRCA are intact with only small areas that may require revegetation efforts to assist with the stabilization of soils.

Finally, as discussed in the hydrology section, soil contamination associated with past mining activities on SCRCA may currently contribute to a reduction in water quality within Cave Creek.

Monitoring Strategies and Protection Methods

The following section describes monitoring strategies associated with geological and soil resources on SCRCA.

SCRCA land managers will continue to inventory, preserve, and protect geological and soil resources as integral components of the natural systems, including both geologic features and geologic processes. SCRCA land managers will work with interested partners to assess the impacts of natural processes and human-related events on geologic and soil resources; continue to maintain and restore the integrity of existing geologic and soil resources; and continue to interpret geologic and soil resources for visitors which includes educating visitors about the importance of conserving these resources.

Implementation

The following section contains recommended objectives to assist SCRCA land managers in achieving geologic and soil resources goals.

Objective #1 – SCRCA land managers will seek to inventory and preserve its soil resources, and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources. In particular, areas of existing disturbance and potentially sensitive soils, such as cryptogamic crusts, will be highlighted for possible restoration or protection. Potential impacts on soil resources will be monitored as necessary.

Objective #2 – SCRCA land management prescriptions will be taken to prevent or mitigate adverse, potentially irreversible,

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impacts on soils through the identification of areas susceptible to erosion. Conservation and soil amendment practices may be implemented to reduce impacts.

Objective #3 – Importation of off-site soil or soil amendments may be used to restore damaged sites. Off-site soil may be salvaged soil, not soil removed from pristine sites, unless the use of pristine-site soil can be achieved without causing any overall ecosystem impairment. Prior to using any off-site materials, SCRCA land managers will develop a prescription and select the materials that are necessary to restore the physical, chemical, and biological characteristics of original native soils without introducing any exotic species.

Objective #4 – When soil excavation/disturbance is an unavoidable part of an approved facility development project (i.e., signs, visitor center, gates), SCRCA land managers will limit the excavation to the minimum amount necessary, and avoid erosion or off-site soil migration during and after the development activity.

Objective #5 – During and following periods of rain, SCRCA land managers will make a determination as to the suitability of trails for use. SCRCA land managers will temporarily close trails or other access routes for short periods of time allowing for moisture absorption if it has been determined that these areas will be damaged as a result of use.



Objective #6 – SCRCA land managers will site future trails in areas that minimize soil erosion potentials on both natural and cultural resources.

Objective #7 – SCRCA land managers will evaluate potential effects within Cave Creek associated with potential soil contamination associated with past mining activities. This effort may require coordination with surrounding landowners.

Visual Resources

Introduction

The following sections describe an overview of visual resources (i.e., landscape character and sensitive viewers) within and

around SCRCA. For the purposes of this master plan it is important to consider landscape features (e.g., Skull Mesa) and sensitive viewpoints (i.e., residential areas) outside and adjacent to SCRCA, as background views could be affected by future management actions on surrounding lands.

Existing Conditions

Landscape Character Type

SCRCA is located in the Sonoran Desert Landscape Character Type. Notable natural features include Elephant Mountain (designated as a “Special Area” in the 1988 Mimbres-Arizona 1988 Cave Creek General Plan), Skull Mesa, and Cave Creek. The majority of the natural landscape settings within SCRCA can be characterized as visually intact with very few noticeable man-made modifications.

The prominent vegetation community can be characterized as southwestern desertscrub, lower Sonoran and riparian woodland, upper Sonoran as described by Charles Lowe (1964). The vegetative pallet is comprised of numerous species of desert trees (foothill paloverde, ironwood, saguaro, and mesquite), cacti (barrel, cholla, prickly pear), creosotebush, brittlebush, and grasslands on foothill and mountain slopes. Within both Cave Creek and Cottonwood Wash, dense riparian woodland is present including tree species such as cottonwood and willow.

Noticeable man-made modifications in SCRCA include areas along SCTMZ (i.e., portable office and kiosk), fences and gates, mines, as well as exiting travel routes, and cultural resource features. Located adjacent to SCRCA, man-made modifications include residential areas and the Phoenix Mine site as well as roads and infrastructure facilities.

The following sections describe more specifically the natural landscape features that have created the visual fabric within SCRCA.

Landscape Character Subtypes

Within SCRCA, the Sonoran Desert Landscape Character Type can be further divided into landscape character “subtypes.” Three primary subtypes of landscape character occur within

SCRCA that includes the desert valley lands, desert mountain lands, and desert river lands. The following sections describe these subtypes.

Desert Valley Lands Subtype

The desert valley lands subtype comprises primarily the valley floor of the Sonoran Desert. This subtype generally surrounds and encompasses island-like eminences of the mountain lands subtype. The desert valley lands subtype is least abundant within SCRCA and occurs primarily on the southern sloping fringes of SCRCA.

This subtype is typically and regionally comprised of very wide valley plains, which contain landforms of valley rivers, and arroyos that are tributary to major rivers (e.g., Cave Creek). The dominant impression of this subtype is that of a wide slightly sloping plain with minimal topographic relief and absence of surface water. One exception to this is Cave Creek that will contain water almost year-round. The presence of water in Cave Creek adds a very rare and distinct layer of visual interest within the overall arid Sonoran Desert Landscape Character Type.

As stated previous, valley plains are dissected by rivers and dry arroyos. These drainages are typically ephemeral features that contain water only for short periods of time immediately following the summer monsoons and winter rains. For the remainder of the year these drainage features remain mostly dry.

Desert Mountain Lands Subtype

The desert mountain lands subtype encompasses distinctive mountains of the Sonoran Desert and is the dominant subtype within SCRCA. These mountain features are generally widely separated by valley plains and, like islands in a sea, rise majestically from the desert floor. Within and surrounding SCRCA, such landmarks include Elephant Mountain and Skull Mesa. This subtype also includes other eminences of lesser size and scale, such as desert foothills which drain to Cave Creek and Cottonwood Wash (i.e., First and Second Mesas).

Mountains of this subtype characteristically are comprised of a steep and rugged dissected upper mountain slopes joined in the lower elevations by a series of rolling foothills, and a slightly upward sloping bajada comprised of a series of alluvial fans that form a skirt around the base of the mountain. These desert bajadas are typically drained by a combination of sheet flow and numerous shallow drainage channels that contribute to their characteristic slightly rolling topography. These drainage features are highly susceptible to changes in their form and location within the bajada depending on rainfall intensity and erosion susceptibility.

Desert River Lands Subtype

The desert river lands subtype contains drainages found within SCRCA. These drainages include primarily the Cave Creek and Cottonwood Wash. These form or are part of a large tributary system that drains a majority of the mountain and valley lands of the Sonoran Desert within SCRCA to Cave Creek.

This subtype characteristically includes large-scale entrenched river channels (i.e., Cave Creek) along with a related broad floodplain terrace system. These two landforms usually, but not always, occur together in parallel. Natural segments of Cave Creek and Cottonwood Wash contained within this subtype are typified by a high potential for lateral migration and establishment of new river channel landforms within the floodplain terrace.

By understanding the natural and cultural features that create the existing visual setting within SCRCA, an evaluation related to the relative scenic value or quality of the setting was determined.

Evaluation Methodology and Findings

Scenic Quality

Scenic quality is described as the distinct elements contained within a particular subtype, either natural or man-made, that constitute the visual content of a given setting. Scenic quality is determined by evaluating the uniqueness and diversity of interest of a particular landscape in terms of landform, vegetation, water, cultural features, and the effects of adjacent

scenery as defined in the USDA Forest Service Scenery Management System, 1996. Specific evaluations are then rated from the most distinctive landscape to the least distinctive.

Based on the following criteria, the study area was characterized into the following scenic quality classes to identify the relative scenic value of landscapes within SCRCA. Generally, landscapes representative of Class A illustrate areas containing the greatest amount of diversity (i.e., Cave Creek and Elephant Mountain) while Class C illustrates areas with the least visual interest and diversity (i.e., flat desert scrub land).

- Class A – Areas of outstanding diversity or interest; characteristic features of landform, rock, water, and vegetation are distinctive or unique in relation to the surrounding region. These areas contain considerable variety in form, line, color, and texture.
- Class B – Areas of above average diversity or interest providing some variety in form, line, color, and texture. The features are not considered rare in the surrounding region, but provide adequate visual diversity to be considered fairly unique.
- Class C – Areas of minimal diversity or interest where representative features have limited variation in form, line, color, or texture in the context of the surrounding region.

All land inventoried within the study area can be characterized as Class A or B landscapes (Figure IV-6).

Monitoring Strategies and Protection Methods

Visitors come to SCRCA for a variety of reasons, but most leave with a sense that SCRCA is a unique and intact natural landscape setting. SCRCA land managers should ensure that any proposed facilities to be installed within SCRCA are compatible with prescribed management recommendations related to visual resources.

Implementation

Generally speaking, the Spur Cross Trail Management Zone is most compatible with co-dominant facilities (e.g., ramadas,

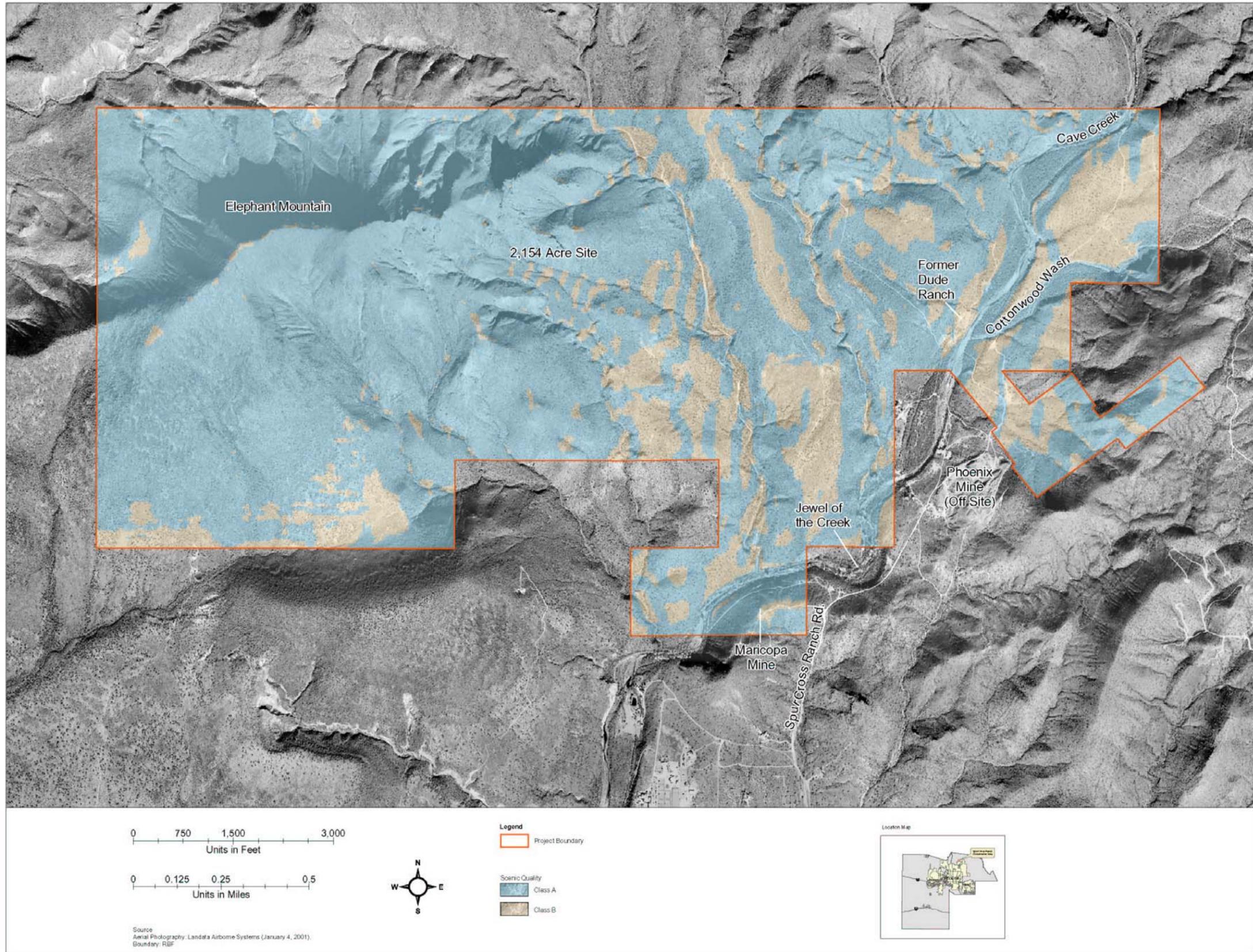


Figure IV-6: SCRCA Scenic Quality

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visitor center, information kiosks, and restrooms), whereas the Primitive Desert Upland Management Zone, Threshold Desert Upland Management Zone, and Cave Creek Management Zone are most compatible with subordinate facilities (e.g., small discrete signs, minor trail improvements, trailhead signs).

More specifically, the following objectives should be achieved in the long-term management of visual resources within SCRCA.

Objective #1 – Conduct project specific viewshed and visibility analysis to determine the compatibility of the proposed project within the existing natural setting.

Objective #2 – Consider residential adjacent views when determining project compatibility.

Objective #3 – Avoid siting large infrastructure type projects on SCRCA (i.e., cellular towers, power lines) that detract from the natural setting. Determine whether or not these types of projects meet a critical need and are not redundant.

Objective #4 – Avoid the construction of trails on slopes greater than 15 percent.

Objective #5 – Avoid the development of new facilities that would detract from the existing setting associated with cultural resource sites.

I want Spur Cross to be preserved, but I want people to have access to it and to the trails.

Cave Creek Resident

Acoustical Resources

Introduction

This section describes the existing acoustical environment within SCRCA. The following discussion describes the fundamentals of acoustics; the results of a detailed site reconnaissance, sound level measurements, acoustical calculations, and monitoring strategies; and protection methods recommended for conservation of acoustical resource within SCRCA.

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human activities. Whereas acoustical resources within SCRCA (i.e., sounds of water within Cave Creek or the sound of wind

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through Cottonwood trees) is a desired acoustical condition to be conserved and protected on SCRCA.

Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise; the perceived importance of the noise and its appropriateness in the setting, the time of day, and the type of activity during which the noise occurs; and the sensitivity of the individual.



Sound is a physical phenomenon consisting of minute vibrations, which travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by a number of variables including frequency and intensity. Frequency describes the sound's pitch and is measured in Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. An increase (or decrease) in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds.

The sound exposure level (SEL) is the concentration of all energy measured into one second. This measurement typically is taken of transient events, such as trains, planes, or trucks passing. Table IV-10 describes relative noise levels associated with various points of origin.

Table IV-10
Sound Levels of Typical Noise Sources and Noise Environments
(A-Weighted Sound Levels)

Noise Source (at a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (relative to a reference loudness of 70 decibels*)
Military Jet Take-off with After-burner (50 feet)	140	Carrier Flight Deck	
Civil Defense Siren (100 feet)	130		
Commercial Jet Take-off (200 feet)	120		<u>Threshold of Pain</u> *32 times as loud
Pile Driver (50 feet)	110	Rock Music Concert	*16 times as loud
Ambulance Siren (100 feet)	100		<u>Very Loud</u> *8 times as loud
Newspaper Press (5 feet)			
Power Lawn Mower (3 feet)			
Motorcycle (25 feet)	90	Boiler Room	*4 times as loud
Propeller Plane Flyover (1,000 feet)		Printing Press Plant	
Diesel Truck, 40 miles per hour (mph) (50 feet)			
Garbage Disposal (3 feet)	80	High Urban Ambient Sound	*2 times as loud
Passenger Car, 65 mph (25 feet)	70		<u>Moderately Loud</u> *70 decibels (Reference Loudness)
Living Room Stereo (15 feet)			
Vacuum Cleaner (3 feet)			
Electronic Typewriter (10 feet)			
Normal Conversation (5 feet)	60	Data Processing Center	*1/2 as loud
Air Conditioning Unit (100 feet)		Department Store	
Light Traffic (100 feet)	50	Private Business Office	*1/4 as loud
Bird Calls (distant)	40	Lower Limit of Urban Ambient Sound	<u>Quiet</u> *1/8 as loud
Soft Whisper (5 feet)	30	Quiet Bedroom	
	20	Recording Studio	<u>Just Audible</u>
	10		<u>Threshold of Hearing</u>

Existing Conditions

SCRCA is generally a quiet landscape, with occasional, short-term interruptions of the natural quiet. Acoustical resources on SCRCA primarily include sounds associated with water within Cave Creek. Depending on the atmospheric conditions, the closeness to a noise source, and topographic features, visitors generally experience very little human-caused noise while visiting SCRCA. Occasional over flights of commercial jets at cruising altitudes, small private aircraft, and rare military jets at low altitudes may be heard. Because of SCRCA remoteness, most areas are well away from traffic and its noise within proximity to the main entrance. The following sections more specifically discuss the existing acoustical conditions on SCRCA.

Evaluation Methodology and Findings

A series of sound level measurements were taken on May 3 and 4, 2002 at the site to quantify the existing noise environment. A Larson Davis Model 720 American National Standards Institute (ANSI) Type 2 Integrating Sound Level Meter was used as the data collection device. The meter was mounted on a tripod approximately 5 feet above ground level to simulate the average height of the human ear. The sound level meter was calibrated before and after the measurement period. Results of the measurements are summarized in Table IV-11.

Table IV-11
Sound Level Measurements (dBA)

ID	Time	L _{eq}	L _{min}	L _{max}	L5	L10	L50	L90
	9:35-9:50 Friday	37.7	31.4	54.0	43.8	38.9	32.6	31.8
	13:00- 13:15 Friday	42.7	32.3	59.4	48.6	46.3	38.4	34.5
	8:45-10:00 Saturday	49.1	31.3	76.2	54.3	50.3	55.0	32.3
ML3	13:40- 13:55 Friday	48.1	32.8	62.6	54.9	52.5	41.9	39.5
	10:10- 10:30 Saturday	49.5	33.0	60.8	55.0	52.9	42.2	40.1
ML4	15:10- 16:10 Friday	41.6	34.7	66.7	45.1	43.0	398.1	37.0
	12:00- 13:00 Saturday	39.4	34.2	59.6	41.5	39.9	37.5	35.8
ML5	2:20-2:35 Friday	42.5	32.0	68.7	47.7	44.2	36.0	32.0
	9:10-10:10 Saturday	43.9	31.2	69.0	48.4	45.5	36.3	32.3

ML1 This measurement was taken at the gravel pit near the current public parking area. The entrance to SCRCA is located to the north, the gravel pits and public parking are located to the north and east, a horse corral is located to the south, and the dirt access road is located to the west. A residence is located across the Cave Creek to the west. The noise sources during this measurement period was one plane overflight, birds vocalizing, intermittent sawing at residence to the west, and some horse vocalizations. The measurement period was 15 minutes between 09:35 and 09:50 AM on May 3, 2002. The 15 minute L_{eq} was 37.7 dBA.

ML2 This measurement location is on the top of a First Mesa near a cultural resources area. Two measurements were taken at this location, one on Friday, May 3, 2002, between 1:00 and 1:15 PM, and one on Saturday, May 4, 2002, between 8:45 and 10:00 AM. Noise sources at this location consisted of jeeps

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passing by on dirt road, people talking from tours, plane overflights, and birds vocalizing. The 15 minute L_{eq} on Friday was 42.7 dBA and 49.1 dBA on Saturday.

ML3 This measurement location is on a small mesa just above Cave Creek at the Dude Ranch by the jeep tour guides. Two measurements were taken at this location, one on Friday, May 3, 2002, between 1:40 and 1:55 PM, and one on Saturday, May 4, 2002, between 10:10 and 10:30 AM. Noise sources at this location consisted of birds vocalizing, people talking, jeeps passing by, and one plane overflight. The 15 minute L_{eq} on Friday was 48.1 dBA and 49.5 dBA on Saturday.

ML4 This measurement location is near the Maricopa Mine near Cave Creek. Two measurements were taken at this location, one on Friday, May 3, 2002, between 3:10 and 4:10 PM, and one on Saturday, May 4, 2002, between 12:00 and 1:00 PM. Noise sources at this location consisted of a few plane overflights, birds vocalizing, and leaves rustling in the wind. The hourly L_{eq} on Friday was 41.6 dBA and 39.4 dBA on Saturday.

ML5 This measurement location is within Cave Creek. Two measurements were taken at this location, one on Friday, May 2, 2002, between 2:20 and 2:35 PM, and one on Saturday, May 4, 2002, between 9:10 and 10:10 AM. Noise sources at this location consisted of jeeps, aircraft overflights, people talking, dogs barking, and vocalizing birds. The 15 minute L_{eq} on Friday was 42.5 dBA and 43.9 dBA on Saturday.

Three measurements were taken as a jeep tour passed by at a distance of 10 feet to determine source levels of jeeps. One measurement (Test 1) was taken as a jeep was crossing a rocky wash; thus the primary noise source was the engine and the tires going over rocks. The duration of the measurement was 17 seconds, the SEL was 69.2 dBA, and the L_{eq} was 59.8 dBA. One measurement (Test 2) was taken as the jeep was going up a steep, rocky hill; thus the primary noise source was the raised revolutions per minute of the engine. The duration of the measurement was 19.5 seconds, the SEL was 70.1 dBA, and the L_{eq} was 68.5 dBA. One measurement (Test 3) was taken as the jeep was going downhill, on a rocky slope; thus the primary noise source was the lower gear of the engine going downhill.

The duration of the measurement was 18.5 seconds, the SEL was 70.1 dBA, L_{eq} was 67.8 dBA.

Monitoring Strategies and Protection Methods

SCRCA land managers will strive to preserve the natural quiet and sounds associated with the physical and biological resources of SCRCA. Proposed activities causing excessive or unnecessary sounds in or adjacent to SCRCA should be monitored, and action would be taken to prevent or minimize unnatural sounds adversely affecting SCRCA resources and values or visitor enjoyment.

Implementation

The following objectives should be achieved to ensure degradation of natural acoustical resources are not affected as a result of land management activities.

Objective #1 – Where practical, avoid using equipment that exceeds acoustical standards prescribed within each management zone.

Objective #2 – Avoid creating man-made sources of noise that could potentially affect breeding or nesting sensitive bird species.

Objective #3 – Evaluate all future potential projects that generate noise for compatibility with management zone prescriptions associated with noise.

Planning needs to preserve the natural environment and limit people and vehicles. I suggest no outside vehicles west of the fence and very limited vehicle use past the gate.

Cave Creek Resident

Land Ownership and Use

Introduction

Available throughout SCRCA are existing land uses, both cultural and present day. Some of these land uses are important for providing visitor access (trails), assisting in interpretation and education programs, and day-to-day administrative uses by SCRCA land managers. Pursuant to the IGA between Maricopa County and the State of Arizona, SCRCA is 70 percent owned by Maricopa County and 30 percent owned by the Town of Cave Creek. SCRCA will be

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managed by Maricopa County as a conservation easement pursuant to A.R.S. 33-271 et seq for a period of 60 years which began on January 9, 2001.

Additionally and pursuant to the IGA between Maricopa County and the Town of Cave Creek, residents of the Town of Cave Creek will have access to SCRCA land uses without charge for a period of 20 years from the date an entrance fee was first imposed on SCRCA visitors.



All existing land uses within SCRCA currently meet, substantially, the overall vision of SCRCA. The desired future land use condition within SCRCA is one of conservation and protection of natural and cultural resources while providing for a variety of recreation activities, interpretive and educational experiences.

Existing Conditions

Most all land east, south, and west of SCRCA is State Land with interspersed parcels of private property and either existing or proposed DFLT conservation areas (Figure IV-7). Land to the north of SCRCA is managed by the Tonto National Forest and provides for a wide variety of recreational, interpretive, and educational activities. Included within the Tonto National Forest and just north of SCRCA's northern gate along Spur Cross Trail is the 6-L Ranch private in-holding. The following sections describe other substantive land use considerations that occur adjacent to or within SCRCA.

Residential, Commercial, and Industrial Land Uses

South of SCRCA and along Spur Cross Road occurs interspersed low-density residential areas (e.g., Foster's property) and commercial areas (e.g., Spur Cross Ranch Stables). The Phoenix Mine Site and West Side Claim Mine Site are located adjacent to and south of the main entrance to SCRCA. This approximate 38-acre parcel of land has been purchased by the Town of Cave Creek as of the date of this report. Undeveloped land and DFLT Jewel of the Creek occur within this area as well.

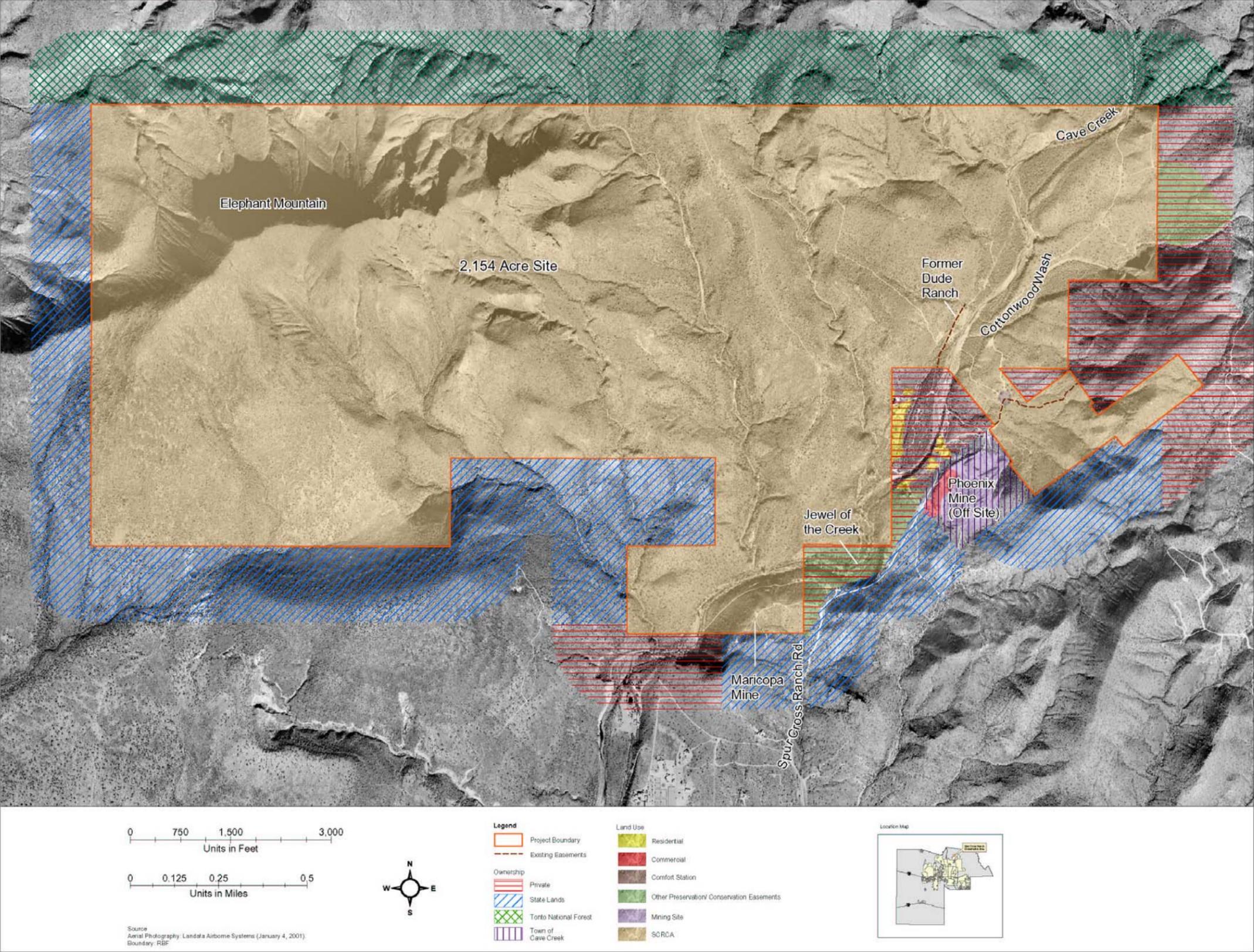


Figure IV-7: SCRCA Land Ownership and Use

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Existing Mine Sites on SCRCA

As a factor of regional geologic conditions, SCRCA mineral extraction activities have been a part of past land uses on SCRCA. Following is a list of mine sites within SCRCA:

1. Maricopa Mine Site located adjacent to Cave Creek and south of Jewel of the Creek
2. Parcel 12 – Catherine Mine Site (M.S. 4096)
3. Parcel 13 – Columbian Mine Site (M.S. 2685)
4. Parcels 14 and 15 – Mashackety Mine Site – 2 parcels (M.S. 2685)

It should be noted that Phoenix and West Side Claim Mine Sites (M.S. 2727) (i.e., south of SCRCA’s main entrance) parcels have been purchased by the Town of Cave Creek as of the date of this Master Plan. This area is currently being used as parking for visitors to SCRCA. For more detail related to existing easements or mine sites, please refer to Appendix E (Existing Easements on SCRCA), Land Survey dated 2001.

Zoning and Cave Creek General Plan

Housing development within the Town of Cave Creek is anticipated to increase by 60 percent in the next 10 to 15 years. Additionally, some estimates reflect a doubling of population in Maricopa County within the next 10 to 20 years. At a minimum, estimates indicate a population of 4.5 million by 2020. As such, it is critical to consider the existing conditions within and surrounding SCRCA as it relates to rapid future development in the region.

At the time the land survey was conducted for SCRCA (2001), this parcel of land was zoned Rural 43 and Rural 190 by the County. The Cave Creek General Plan, although not adopted by voters during the March 11, 2003 vote, has designated SCRCA as an open space. Through the executed IGA between the County and State, SCRCA currently is a designated Conservation Area.

The Cave Creek General Plan outlines desired future conditions related to land uses within the Town of Cave Creek. Substantive land use elements identified with the draft General Plan that may have an effect on SCRCA related to increased visitor use on SCRCA may include:

1. The development and annexation of Cahava Ranch (southwest of SCRCA)
2. State Land developed to the south and west of SCRCA
3. Adoption of the Town Core Plan with a focus on a regional trail plan
4. Limiting development densities in areas surrounding SCRCA (i.e., State Land)
5. The identification of State Land that could be reclassified as conservation areas

Evaluation Methodology and Findings

In 1995, Maricopa Association of Governments drafted a vision of open space within Maricopa County. The document titled *Desert Spaces: An Open Space Plan for the Maricopa Association of Governments* represents a culmination of this vision. Related to this vision of conservation and protection of open spaces in concert with municipality general plans, this section discusses how existing and proposed land uses adjacent to SCRCA and at a regional scale may affect management of SCRCA with a focus on open space and increased visitor use.

When considering State Land available for development, primarily on the southern and western edges of SCRCA, opportunity exists for consideration of this land, which would balance conservation with development. When considering designated open space (not including State Land) regionally, SCRCA occurs on the northern edge of a proposed interconnecting regional trail (i.e., MCRT). This trail would ultimately connect nine County parks.

In 1995, Arizona State Parks conducted a statewide analysis of parks and conservation areas. The document titled *1995-1996*

Survey of Arizona State Park Visitors is a culmination of statistical data collected that describe recreation users, recreational activities, demographic profiles of visitors, and most importantly the origin of visitors. This report concludes that over half (51.5 percent) of visitors to Arizona State Parks are *not* residents of Arizona. It is within this context that SCRCA land managers must continually plan for not only local adjacent land use influences on SCRCA, but also understanding that SCRCA occurs within a geographical area that lends itself to continually being visited by out-of-state users.

Monitoring Strategies and Protection Methods

Section V discusses in detail monitoring strategies and protection methods associated with recreational use on SCRCA. Those recommendations have direct application to this discussion as continuing to collect, organize, and analyze visitors data will assist SCRCA land managers in understanding trends of regional visitors as well as potential effects associated with future land development adjacent to SCRCA.

Implementation

This section discusses land use objectives applicable to SCRCA. In the context of the origins of SCRCA as a conservation area jointly owned by Maricopa County and the Town of Cave Creek through an IGA developed with Arizona State Parks, it is appropriate to mirror and assimilate applicable objectives contained within the following four documents:

1. *An Open Space Plan for the Maricopa Association of Governments, 1995*
2. *Maricopa County 2020, Eye to the Future*
3. *Town of Cave Creek, General Town Update, 2002*
4. *The Tonto National Forest Land Management Plan*

Following are recommended objectives to achieve the recreation resources goals.

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Objective #1 – Provide effective notice of public hearings and meetings associated with potential changes to land uses associated with or adjacent to SCRCA.

Objective #2 – Support rural low-density residential development adjacent to SCRCA that complement and enhance rural development patterns and western lifestyle if unsuccessful in reclassifying as a conservation area.

Objective #3 – Encourage rural character and design for proposed and existing facilities on SCRCA.

Objective #4 – Prioritize potential conservation areas for acquisition based on their proximity to SCRCA preserve areas of open space through acquisition or encouraged protection of State Trust Land.

Objective #5 – Enhance and protect existing viewsheds (e.g., Elephant Mountain) and ridge lines by minimizing land uses that are not visually compatible with the existing setting.

Objective #6 – Continue to work with jurisdictions of Phoenix, Scottsdale, Carefree, Cave Creek, and the Tonto National Forest to identify and develop connections to countywide and local trails that access either directly or indirectly SCRCA.

Objective #7 – Minimize land uses that adversely affect natural or cultural resources on or adjacent to SCRCA.

SECTION V: RECREATION OPPORTUNITIES

Introduction

Outdoor recreation is on the increase worldwide as people have more leisure time, greater mobility, and more disposable income. In addition there is a proliferation of new types of recreation such as mountain bike riding, snow boarding, canyoning, and other emerging activities that have different environmental requirements and are often in conflict with more traditional outdoor activities. As visitor numbers increase, there is a simultaneous increase in environmental impacts, which include crowding and conflicts between different recreational types and users. These circumstances make recreation management a complex problem. Managers of natural areas must accommodate increasing visitor use while at the same time, maintaining environmental quality and assuring visitors have the high-quality experience they anticipate.

Conventional methods used in the design and planning of resource management facilities have depended on user surveys and traffic counts to estimate visitor uses. However, these methods fall far short of the real needs of managers who need to comprehensively evaluate the cascading effects of the flow of visitors through a sequence of sites and estimating the effects of increasing visitor flows through time. Managers require information on the spatial nature of the visitor to adequately manage for both the experience and to protect the recreation setting. This information includes the destination, arrival and departure times, number of visitors in a party, type of activity, day-use activities, etc. These spatial dynamic parameters likewise are imperative for constructing models to represent current conditions and testing out future management scenarios to reduce social and ecological impacts in a setting. In addition, managers need to know if designed capacities for parking, visitor centers, roads, and day-use facilities can accommodate projected visitor numbers. Crowding, conflicts between different recreation modes, impacts on environments, and seasonal effects such as day-length and weather are all factors land managers must consider in the design and location of new

It must be remembered that there is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage, than the creation of a new system. For the initiator has the enmity of all who would profit by the preservation of the old institutions and merely lukewarm defenders in those who would gain by the new ones.

Machiavelli



facilities as well as the long-term monitoring and management of existing facilities.

There are many options available to land managers to deal with heavy visitor use. New sites can be developed, a system of reservations can be implemented; areas can be closed so sites can recover from over use; facilities can be expanded or sites can be hardened to accommodate larger numbers of visitors. Each of these strategies will have different impacts on the overall system. The complex interrelationships between these decisions are almost impossible for a manager to predict. It is in this context where simulation of recreation behavior is of real value.

This report documents the development of a pilot project to examine the visitor flow patterns of recreation visitation in SCRCA. This study utilizes existing and proposed trail data and estimates of visitor numbers at various entrances into SCRCA to simulate their interactions throughout the year. Since very little is known about visitor use patterns in SCRCA at present, the data used to construct the simulation were derived from those knowledgeable about how the area is currently being used. Once a complete monitoring plan is developed and implemented for SCRCA, the model developed and described herein can be rerun to derive a baseline simulation of current conditions.

Why Travel Simulation Modeling?

Understanding the spatial/temporal distribution of use is of fundamental importance to SCRCA land managers. The kind and amount of visitor use has profound effects on the quality of the natural resources, visitor experiences, and facilities in SCRCA. Therefore, it is critical to be able to monitor the flow of visitation, in space and over time, and to be able to predict how distributions are likely to change in response to both management actions and factors that are not subject to managerial control. In some situations this is easily done. However, the ease of monitoring and predicting use declines as the complexity of traffic flow increases and the degree to which traffic flow is tightly controlled by management decreases. Moreover, the importance of being able to monitor and predict visitor flow is particularly pronounced in places where

biophysical conditions and experiential conditions are highly sensitive to intensity of use.

Increasingly, travel simulation modeling is gaining recognition as an important tool for recreation planning and management. Although travel simulation models for recreation areas have been experimented with for more than three decades, in the last decade the cost of modeling has plummeted and capabilities have soared. Specifically, simulation models can be used to:

- Provide land managers a better understanding of the baseline spatial and temporal patterns of visitor use.
- Help predict how distributions of visitor use are likely to change in response to both management actions and factors not subject to managerial control.
- Allow for testing the feasibility and effectiveness of management plan alternatives.
- Allow for monitoring of hard-to-measure parameters (e.g., people at one time at a certain attraction or walking on particular trails) by using easily measured indicators (e.g., number of visitors entering SCRCA or parking at the visitor center).
- Support the planning and management of visitor use in situations where monitoring and predicting visitor flow is difficult.
- Improve communication of implications of management prescriptions to the public. Help with communication of management scenario implications – gives a visual explanation that can be powerful.
- Link regional trail systems as it may relate to uses on SCRCA.
- Assist with cost analysis associated with capital improvement budgets.
- Assist the evaluation of management actions.
- Provide an understanding of problems and potential casual factors – leads to better solutions.

- Data that are collected on visitor use is useful with or without modeling.
- Modeling helps increase creativity in management scenarios without increasing risks.
- Modeling has strong application to site-level design.

Appendix G contains a more detailed discussion of the recreation use model developed for SCRCA.

Monitoring Strategies and Protection Methods

Discussion

An examination of the results of the simulation outputs for all the areas monitored reveals relatively low levels of use. Recreation use is dispersed evenly across the landscape. Without real data about visitor use levels, it is hard to say anything significant about visitor encounters or impacts. However, based on the levels of use being simulated, there is potential for a number of encounter interactions between recreation groups to occur. What is required, however, is to have more accurate data about visitation through inventory and monitoring and to carefully examine the critical sites or destinations that would be anticipated to be visited frequently and monitor use at those sites as well. Both sets of data would provide a more thorough and substantive set of quantitative information for examining visitor use levels and those associated social and environmental impacts.

Validation Study of the Simulation

The validity of the simulation outputs can be determined only by how accurately they replicate the current use patterns. In other words, a measure of how good the simulation outputs are is directly related to how well it replicates the pattern of the data that are used to develop the simulations. While the simulation currently replicates accurately the typical trips outlined in Table G-1, further field studies will have to be undertaken to calibrate and validate the model. Along with this model validation, it is suggested to include other recreation

groups not currently involved in the study, more local or public input on their knowledge of the area, and more refinement on the trips already in the database.

Long-Term Monitoring in SCRCA

A long-term monitoring program needs to be developed to collect data that can be used for model calibration and verification. Since this model will be built on visitor use levels projected from expert judgment, this is by no means enough data to adequately simulate visitor use patterns. Many years worth of data should be considered essential for having a more accurate, reliable, and defensible model. While the data for the 2003 application could be considered a benchmark in terms of organizing visitation data, a long-term monitoring program needs to be established to systematically collect data on visitor use patterns. One outcome of this project will be to identify where long-term monitoring sampling could be established and protocols for organizing data that could feed directly into the simulation environment. Change detection is an important component of any monitoring program and RBSim could identify where and how much change is occurring in various locations. A combination of automated counter pads, observation, and trailhead registries would provide a more comprehensive view of visitor flow patterns in SCRCA.

Implementation

Introduction

As stated in the previous section, it is critical for SCRCA land managers to continue to collect, organize, and analyze use data on SCRCA. Some methods to implement this goal may include the following:

- Require permits be issued for specific uses
- Install automated use sensors on SCRCA
- Collect, organize, and analyze use data from trailhead registries

It should be noted that in compliance with the Americans with Disabilities Act of 1990, SCRCA land managers will allow, as appropriate, the use of wheelchairs and other mechanized or motorized apparatuses on SCRCA as permitted by Maricopa County and consistent with the SCRCA Master Plan. Visitors with sight or other impairments requiring the use of guide animals on SCRCA should make specific inquiries at the SCRCA Office in Cave Creek.

Following is a discussion of objectives that could assist SCRCA land managers with understanding and managing visitor use on SCRCA in concert with the vision of SCRCA as well as tenants contained within the LAC.

Objective #1: Implement Use Permits

A recreational use permit (RUP) would be required for all organized events on SCRCA, and for group activities over a certain size. Organized events may include school groups, hiking clubs, bicycle rides, scouting groups, and other similar types of group gatherings. Additionally, organized events may be required to (1) post a bond covering the costs of the event, such as restoration, rehabilitation cleanup and other costs, and (2) provide liability insurance to protect the County against liability arising from the event.

The primary purpose of the RUP is to provide information to SCRCA land managers that will be used to populate the visitor use database related to SCRCA. Further, the RUP will assist SCRCA land managers in reviewing potential environmental impacts of the activity and ensuring protection of SCRCA natural and cultural resources. Generally speaking, the RUP would serve as a means of gathering information needed for environmental compatibility review, and to provide SCRCA land managers an opportunity to stipulate certain conditions associated with activities to prevent adverse impacts on SCRCA natural and cultural resources.

One approach to evaluate whether or not a RUP is required would be to implement a decision tree as follows:

1. *Is the group activity an “organized event”?* If yes, a special use permit is needed. If no, go to question 2.

2. *Are fewer than 15 individuals participating in the group activity? If yes, go to question 4. If no, go to question 3.*
3. *Are more than 25 individuals involved in the group activity? If yes, a special use permit is needed. If no, go to question 4.*
4. *Are more than 10 unique modes of travel (e.g., bicycles, horses, stock animal, or other mechanized mean) being used by the group? If yes, a special use permit is needed. If no, a permit is not needed.*

If the group size or activity requires that a special use permit be issued (see questions above), SCRCA land managers may require a fee be charged to the group. Fees for a RUP would cover administrative costs in processing the RUP. It is recommended that for non-Cave Creek residents a fee that is consistent with MCPRD fee schedule be applied . Nonprofit events or group activities that provide education and interpretation on natural and cultural resources of the desert may be considered eligible for a fee waiver.

Objective #2: Implement Automated Counter Pad Technology

There are a number of technological advancements that are being developed at the time of the writing of this document that provide mechanical ways to count visitors. A number of those technologies have been explored in a variety of research projects. But the STIL Trail Counter Pad/Data Logger is an exceptional choice in areas where there is sparse land cover. The Trail Counter Pad is a robust, sensitive, person-counting system designed for long-term, maintenance-free operation in remote environments. It is a fully sealed system (IP67), maintenance-free, and made of strong durable materials. Only a minimal deflection of the counter pad is required to advance the counter. A battery life in excess of 10 years and the full sealing allows this logger and counter system to be completely buried. This subsurface installation makes the unit undetectable and, therefore, immune to vandalism, environmental damage, and mischievously enhanced counts. It is typically buried beneath 150 millimeters of soil.

Objective #3: Implement Trailhead Registries

Existing and proposed trail locations on SCRCA lend themselves to installing trailhead registries. As with the RUP system and the pad counter, this strategy would further assist SCRCA land managers in collecting use data at specific locations within SCRCA. These data could contain the following information:

1. Date and time of use
2. Number of visitors
3. Visitor destination
4. Visitor activity

This objective is most likely to be implemented within a relatively short time frame when compared to the previous two methods. Additionally, meeting this objective would result in immediate results. However, visitors forgetting to sign in would lead to under-deflated use values. By implementing Objectives 1 and 2 would provide a means to cross-reference data collected at trailheads with actual use data provided by issuance of a RUP, as well as data collected by underground pads.

Objective #4: Implement Use Regulations

The following section describes recommended regulations that would assist SCRCA land managers in reducing impacts on natural and cultural resources within SCRCA associated with visitor use.

1. SCRCA land managers advocates Leave No Trace principles.
2. Bicycling is allowed on SCRCA only within the TDUMZ and the SCTMZ.
3. Equestrian or hiking commercial or concessionaire activities that are practical and consistent with the vision of SCRCA may be considered an appropriate use of SCRCA as determined by SCRCA land managers.

4. All caving or mining research activities must be approved in advance by SCRCA land managers.
5. It is the responsibility of all visitors to know and obey posted regulations while at SCRCA. These regulations are considered the terms and conditions of using SCRCA. Further, all visitors must be aware of the unique and challenging characteristics of SCRCA, including steep terrain; potential interactions with wildlife, mules, and horses; other recreationalists; and weather conditions.
6. A use permit to conduct archaeological or other studies is required prior to initiating any such activity.
7. Open flames and/or smoking are prohibited on SCRCA.
8. Drinking alcoholic beverages is prohibited on SCRCA.
9. Trash must be packed (carried) out. Burning or burying of trash or toilet paper is prohibited.
10. Use of firearms, and/or bows and arrows is prohibited.
11. Geocaching is prohibited on SCRCA.
12. Pets must be under physical restraint (i.e., on a leash) at all times.
13. Leaving a trail or walkway to shortcut between portions of the same trail or walkway, or to shortcut to an adjacent trail or walkway, is prohibited.
14. Throwing or rolling rocks or other items inside caves or mines, into valleys, or canyons, down hillsides or mountainsides, is prohibited.
15. Feeding, touching, teasing, frightening, or intentionally disturbing wildlife is prohibited. Unattended food must be stored properly to prevent access by wildlife.
16. Possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state any plants, rocks, animals, or mineral, cultural, or archaeological resources is prohibited. Walking on, entering, traversing, or climbing on an archaeological resource is prohibited.

SECTION V: RECREATION OPPORTUNITIES

17. Writing, scratching, or otherwise defacing signs, buildings, or other property is prohibited.
18. Violating a closure, designation, use, or activity restriction or condition, or schedule of visiting hours, is prohibited.
19. Use of soap in any side stream or within 100 feet of any side stream junction with Cave Creek or Cottonwood Wash is prohibited.
20. All trails within SCRCA are closed to use for competitive travel or timed events.
21. Disposing of human waste within 100 feet of a water source, high-water mark of a body of water, or a use area, or within sight of a trail is prohibited.

SECTION VI: TEAMING AND RESEARCH OPPORTUNITIES

Introduction

Open communication with adjacent landowners, interested agencies, education institutions, and the general public have been highlighted throughout this Master Plan. The planning, monitoring, and implementation of Master Plan goals and objectives involves a collaborative effort among SCRCA land managers and interested teaming individuals/groups, research groups, and/or Federal (including Native American Tribes), state, local agencies, and municipalities. Continued development of a comprehensive teaming program can be time consuming, but will ultimately lead to a shared vision of natural and cultural resource protection and conservation practices within SCRCA as well as collateral benefits associated with management of these resources on adjacent lands.

In wilderness is the preservation of the world.

**Henry David
Thoreau
(1817 - 1862)**

Although existing Memorandums of Understanding and IGAs are in place associated with adjacent land owners or services that directly affect SCRCA (e.g., TNF and Rural Metro), watershed scale isolated resource management practices may preclude a holistic ecosystem management perspective which would enable a more comprehensive approach to (1) the sharing of existing data, (2) the identification of data needs, and (3) monitoring and implementation of adaptive management strategies that could benefit regional and local ecosystems that work in concert with agency goals and objectives.

One approach to capitalizing on the existing teaming and research synergy that currently exists would be to:

1. continue to involve the public, scientists, resource specialist, and Native American Tribes in future land management decisions related to SCRCA.
2. to more fully develop a conduit to exchange information and data between teaming and research entities.



SCRCA land managers must continually recognize the benefits of integrating teaming partners and researchers in the long-term management of SCRCA that may assist in reconciling SCRCA goals and objectives with other land management plans or initiatives. It has been long recognized that consequences of isolated land management practices sometimes fall short in terms of working toward and simultaneously prioritizing land management goals. Through realization of shared teaming and research opportunities, a continuous long-term self-perpetuating process of involvement and feedback can assist in achieving a balance of ecosystem and societal goals.



Teaming and Research Opportunities

Some opportunities associated with developing a comprehensive teaming and research program associated with SCRCA would include:

- Opportunities to exchange available data that could reveal data gaps and data interrelationships associated with SCRCA resources that extend far beyond political boundaries.
- Opportunities to continue to expand and share databases associated with visitor use, cultural, and environmental resources data among adjacent landowners.
- Opportunities to participate in collaborative decision-making processes associated with SCRCA.
- Opportunities to continue to identify and implement current trends associated with agency-adopted best management practices of natural and cultural resources.
- Opportunities for interested groups and individuals to become active participants in the adaptive management decision-making process associated with SCRCA.

Teaming and Research Objectives

A primary goal associated with teaming and research opportunities on SCRCA is to continually interact with interested parties with a focus on developing shared objectives that are in concert with the SCRCA vision. The following

sections describe specific objectives that may be pursued in the achievement of this goal.

Objective #1: Continue Development of a Teaming and Research Program

Throughout the Master Planning process various individuals and entities expressed interest in teaming on research-based activities associated with SCRCA. Outreach efforts should be exercised to bring these participants together to discuss development of a more specific teaming and research program. The following list represents individuals that have expressed an interest in participating in teaming and research opportunities on SCRCA during the Master Planning process (contact information can be obtained from the SCRCA Supervisor):

Trails Teaming

Jean Anderson
Terry Smith
Ken Mouw
Rita Gosnell
June Clark
Pat Jones
Tom O'Reilly

George Ross
Frank Ziskovsky
Thomm Clark
Frank Signard
Jean Pearson
Todd Gilson
Bill Lazenby

*The supreme
reality of our time
is ... the
vulnerability of our
planet.*

John F. Kennedy

Hydrological Teaming

Gail Clement

Tom McQuire

Interpretation/Education Teaming

Mark Hackbarth

Brenda Poulos

Tom McQuire

Jay Williams

Cultural Resources Teaming

Brenda Poulos
Grace Meeth
John Caughlin
Sue Mueller

Mark Hackbarth
George Ross
Jean Paisley
Judy Darbyshire

Community Outreach Teaming

Jean Paisley

Biological Resources Teaming

Angie McIntire

Other Teaming

Arlene Patton

Objective #2: Open Discussion of Issues Associated with SCRCA

SCRCA land managers should continually discuss issues, at both a local and regional level (with internal [i.e., agencies] and external [i.e., the public] teaming and research constituents), associated with current conditions on SCRCA, environmental risks (including cultural resources), adaptive management decisions, and data analysis efforts and recommendations.

Objective #3: To Continue to Build on Existing Data Collection Efforts

SCRCA land managers should continue to build on existing data collection efforts associated with SCRCA that are contained in this Master Plan as well as data collection efforts associated within the Cave Creek Watershed.

Objective #4: To Continue to Embrace Teaming and Research Opportunities

SCRCA land managers should continue to encourage, create, and coordinate teaming and research opportunities to (1) achieve consistency in these efforts, (2) build public trust, and (3) obtain public opinion.

SECTION VII: VOLUNTEER AND EDUCATION OPPORTUNITIES

Introduction

As discussed in previous sections, projected increases in population within the region are anticipated to rise significantly over the next two decades. A recent study conducted by Arizona State Parks indicates that by the year 2025, the projected population of Arizona will be 7.7 million people and by 2050, it will be 11 million people. This is an increase of 125 percent since 2000 (Arizona State Parks 2003 Statewide Comprehensive Outdoor Recreation Plan).



This report goes on to state that urban sprawl is one of the primary factors contributing to the decline in natural open space. Further, when surveyed, in 2003 64 percent of the respondents indicated they had visited a park or outdoor recreation area an average of 6.5 times in three months. This equates to approximately 3.3 million residents making 21 million visits to Arizona parks in a three-month period or 84,000,000 visits in a year.

Of the parks visited, 66 percent visited either a nature-oriented park or an open space park. SCRCA could be classified within one or both of these types of facilities. Additionally, 45 percent of respondents want to see available money spent fixing up existing facilities. When asked what some of the major problems with parks are, the top two answers were (1) too much trash and litter, and (2) not well maintained. Numbers 6 and 7 on the list were not enough parks and too crowded. Additionally, when considering where money should be dedicated within the parks system, respondents indicated that existing facilities should be improved.

It is through interpretation understanding...it is through understanding protection....and it is through protection conservation.

Author Unknown

Further, when respondents were asked where they go to recreate or visit a cultural site, 62 percent said local parks, 37 percent said county parks, and 75 percent said a National Forest. Finally, when asked how far they travel to visit a state park, 36 percent said they travel 1 to 5 miles and 18 percent said 6 to 50 miles. Admittedly, these numbers reflect visitation

SECTION VII: VOLUNTEER AND EDUCATION OPPORTUNITIES

to state parks; however, this study also indicated that visitors rarely know who owns and/or manages a park they are visiting. This suggests that all recreation areas are subject to similar findings.

What specific conclusions can be drawn from this analysis? SCRCA occurs between a heavily populated metropolitan area and a National Forest. Interspersed between these two areas occurs numerous recreation/preservation facilities. Designated parks or open spaces, as well as proposed open spaces, which occur within the regional context of SCRCA include the following:

1. Tonto National Forest – adjacent to SCRCA to the north
2. Cave Creek Recreation Area – 3 miles to the southwest
3. Phoenix Sonoran Preserve – 10 miles to the southwest
4. McDowell Mountain Regional Park – 15 miles to the southeast
5. Reach 11 – 20 miles to the south
6. McDowell Mountain Sonoran Preserve – 25 miles to the southeast
7. DFLT Preservation Easements – various distances within a 1- to 20-mile radius

Not considering the over 50 percent of out-of-state visitation (i.e., greater than 50 miles to travel to a destination), nearly 54 percent of in-state residents travel between 1 and 50 miles to reach their destination (36 percent 1 to 5 miles, 18 percent 6 to 50 miles). Based on the above findings and the proximity of SCRCA to other regionally visited facilities, one could argue that of the 84,000,000 visits a year to state parks from Arizona residents, even a very small percentage would result in a very large projected visitation rate at SCRCA. Admittedly, the densities of designated open spaces and parks within the region may suggest that visitation to these areas is dispersed and not highly concentrated in one particular area. On the other hand, densities of these areas also lend themselves to perhaps more frequent visitation as recreational opportunities vary greatly from facility to facility.

Understanding that current public sentiment suggests that recreational facilities need to be improved and that too few facilities are available, one could argue that (1) existing staffing requirements are not adequate to keep pace with rapid increase in both population and outdoor recreational activities, and (2) the numbers of facilities available are not adequate in terms of increased outdoor recreational activities. SCRCA is proposed to be open to the public in early 2004. Once opened, SCRCA would be added to the list of regional facilities currently available for use. The focus of this section is to describe how SCRCA land managers can continue to develop a comprehensive volunteer program as well as discuss how educational programs could foster a far-reaching synergy of common ground to achieve the vision of SCRCA. It will be through the efforts of volunteer monitoring, public education, and collaborative partnerships that SCRCA will continue to maintain its ecological and cultural integrity in perpetuity independent of increased visitor use.

Volunteer Opportunities

Currently, a number of volunteer groups and organizations contribute time and resources to achieving the vision of SCRCA. A comprehensive database of resources available to volunteers should continue to be developed and coordinated through SCRCA land managers. The following list identifies (but is not limited to) volunteer groups and individuals that have assisted SCRCA land managers during the master planning process:

1. Arizona Archeological Society, Cave Creek Branch
2. Cave Creek Audubon Society
3. Cave Creek Site Stewards
4. Arizona State University Center for Environmental Studies
5. Boy Scouts and Girl Scouts of America (various troops)
6. Arizona Chapter of the Nature Conservancy
7. Wild West Jeep Tours
8. Desert Foothills Land Trust
9. Tonto National Forest

SECTION VII: VOLUNTEER AND EDUCATION OPPORTUNITIES

10. Spur Cross Stables
11. Cave Creek Saddle Club
12. G.M. Clement & Associates
13. Arizona Horseman's Association
14. Spur Cross Trail Rides
15. Residents of Cave Creek

This Master Plan assumes that these and other groups will continue to work collaboratively with SCRCA's land managers in the conservation and protection of natural and cultural resources on SCRCA. Through the continued participation with volunteer groups, projected increases in use on SCRCA can be addressed proactively. Further, these volunteers can continue to assist SCRCA land managers in the creation of a synergy of common ground through the education of visitors on SCRCA. The following section discusses education opportunities on SCRCA.

Educational Opportunities

SCRCA land managers will continue to develop and maintain an effective public education program designed to promote and perpetuate public awareness of and appreciation for SCRCA natural and cultural resources. Research organizations, academic groups, and environmental experts should continue to contribute to the body of knowledge continually developing for SCRCA. Educational efforts will continue to (1) focus on the fostering of an understanding of the concepts of the conservation area that includes achieving a deep understanding and respect for SCRCA natural and cultural resources, (2) a willingness to exercise self restraint in demanding access to it, and (3) an ability to adhere and contribute to adaptive management decisions.

There are three main ideas to which new and existing visitors to SCRCA need to be educated with the goal that they will come to understand these ideas and incorporate them into their conservation practices during visits to SCRCA: (1) conservation area values, (2) personal safety, and (3) resource protection and conservation.

Conservation Area Values

An essential role of interpretation and education in SCRCA is to promote and perpetuate the vision of SCRCA. SCRCA values may and should mean something different to different people, but three central themes have consistently emerged in conservation area planning: (1) *experiential*, the direct value of the conservation area experience; (2) the value of conservation areas as a *scientific* resource; and (3) the *symbolic* and *spiritual* values of a conservation area (Hendee 1990).

As such, visitors to SCRCA should familiarize themselves with information associated with the sensitivities of resources contained on SCRCA and the importance of conserving and protecting these resources. SCRCA land managers should continue to educate the public about SCRCA through interpretive hikes, literature, and web-site information available to them.

Personal Safety

Personal safety is always the responsibility of the individual, and much depends on pre-trip preparations. It is important that users of SCRCA have access to current trail information, maps, and weather conditions. Additionally, rules, regulations, and county policies related to types and locations of specific uses on SCRCA should be available to visitors upon arrival.

Resource Protection and Conservation

Resource protection is essential to the conservation of SCRCA's natural and cultural resources. Protection and conservation of natural and cultural resources for current and future use is the very basis of the vision of SCRCA. It is important that visitors to SCRCA understand the purpose and parameters of SCRCA and to leave it in the same condition as *when they arrived*. As stated previously, this Master Plan assumes that SCRCA land managers will, among other things, subscribe to the Leave No Trace open space principles to visitor use. The following section highlights key tenants within the Leave No Trace principle:

Leave No Trace

1. Plan ahead and prepare for expected conditions

A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community.

Aldo Leopold

SECTION VII: VOLUNTEER AND EDUCATION OPPORTUNITIES

2. Pack It In ... Pack It Out
3. Take only photographs ... leave only footprints
4. Understand posted rules and regulations
5. Repackage food into reusable containers
6. Travel on the most durable surfaces
7. Stay on designated trails
8. Do not create shortcuts or wildcat trails
9. Step to the inside of the trail when encountering horses or pack animals
10. Deposit human waste in holes 6 to 8 inches deep, and at least 200 feet from water or trails
11. Use toilet paper sparingly, and pack it out
12. Respect the resource; leave plants, rocks, and artifacts where found and in the condition they were found
13. Do not build structures, furniture or dig trenches
14. Keep loud noise to a minimum
15. Report any signs of smoke or fire to the area supervisor

Most outdoor visitors are familiar with these concepts as Federal agencies subscribe to a similar outdoor ethic for public land. Arguably, the list is not completely comprehensive and as of the date of this Master Plan, should continue to evolve. SCRCA land managers should continue to add to the above list as conditions and use continually evolve on SCRCA.

SECTION VIII: TRAILS PLANNING

Introduction

SCRCA has over 8.5 miles of established trails (Figure VIII-1). Most existing trails have received little, if any, stabilization or rehabilitation since the County and Town of Cave Creek purchased the land. Consequently, these trails are in various states of development and most all require some level of improvement to bring them up to MCPRD standards. Meeting trail standards are necessary to meet MCPRD management objectives to provide a variety of multi-use recreational opportunities consistent with the protection of natural and cultural resources while providing for the safety of its users. As stated previously, the SCRCA trails plan is considered a living process. As such, SCRCA land managers will continually evaluate the need to construct, maintain, or rehabilitate (i.e., remove) trails on SCRCA, utilizing the adaptive management decision-making process in concert with MCPRD policy regarding the involvement of the public during the decision-making process.



As stated in Section III, because use limits or quotas will not be implemented as a part of this master plan, SCRCA land managers will implement management recommendations contained within Table III-1 (see Section III) and throughout this master plan through adaptive management strategies.

Purpose of the Trails Plan

The purpose of the trails plan is to determine the desired future condition of the trail system on SCRCA, including trail access points and service road access, and to prescribe actions to achieve the planned condition that meets the vision of SCRCA. It covers trails and access points within SCRCA only; as such, MCPRD has no holdings (right-of-way, easement, permit, or other) adjacent to or in proximity to SCRCA for purposes of trail-related recreation. This trails plan was developed in concert with goals and objectives contained within this Master Plan.

As trail planning efforts evolve as a result of implementing Master Plan goals and objectives, refinements to the trails plan

I am in favor of preservation of the site but we have to use it to educate people about preservation. People should not have access to all areas. There needs to be education and compromise.

**Archaeology
Society Member**

also will occur. The trails plan will be consistent with all applicable Federal, state, and county laws, and MCPRD rules and policies related to trails as well as the IGA associated with SCRCA.

Regional Trail Plans

Regional trail systems that are planned or currently interconnect with SCRCA include (1) the Maricopa County Regional Trail (from Cave Creek Recreational Area); (2) Town of Cave Creek Trails Plan (as described within the General Plan dated 2003); (3) the TNF trail system (to Adams Spring, Guns Seep, Line Stone Spring, Rondo Spring, and Peterson Spring); (4) the DFLT trails plan within the Jewel of the Creek; and (5) State Land south of SCRCA to Spencer Seep. It should be noted that various water sources for both wildlife and horses exist outside of SCRCA boundaries. Water sources on SCRCA will be limited to the Education Center until feasibility studies are conducted to determine whether or not the development of water sources along SCRCA trails is practical and consistent with the vision of SCRCA.

Given the various on-going agency trail plans being developed, it will be critical for SCRCA land managers to continue to coordinate with these entities on the locations, desired uses, potential associated impacts, and long-term maintenance along existing or proposed trails.

Trail Planning Policies and Criteria

Policies

Determining if there should be a trail and where it should be located can be an involved process. Laws and regulations, MCPRD policies and standards, environmental protection, visitor desires and experiences, safety, engineering, and costs all must be considered to produce a functional, quality trail. Below are some of the policies that will control trail development and management on SCRCA.

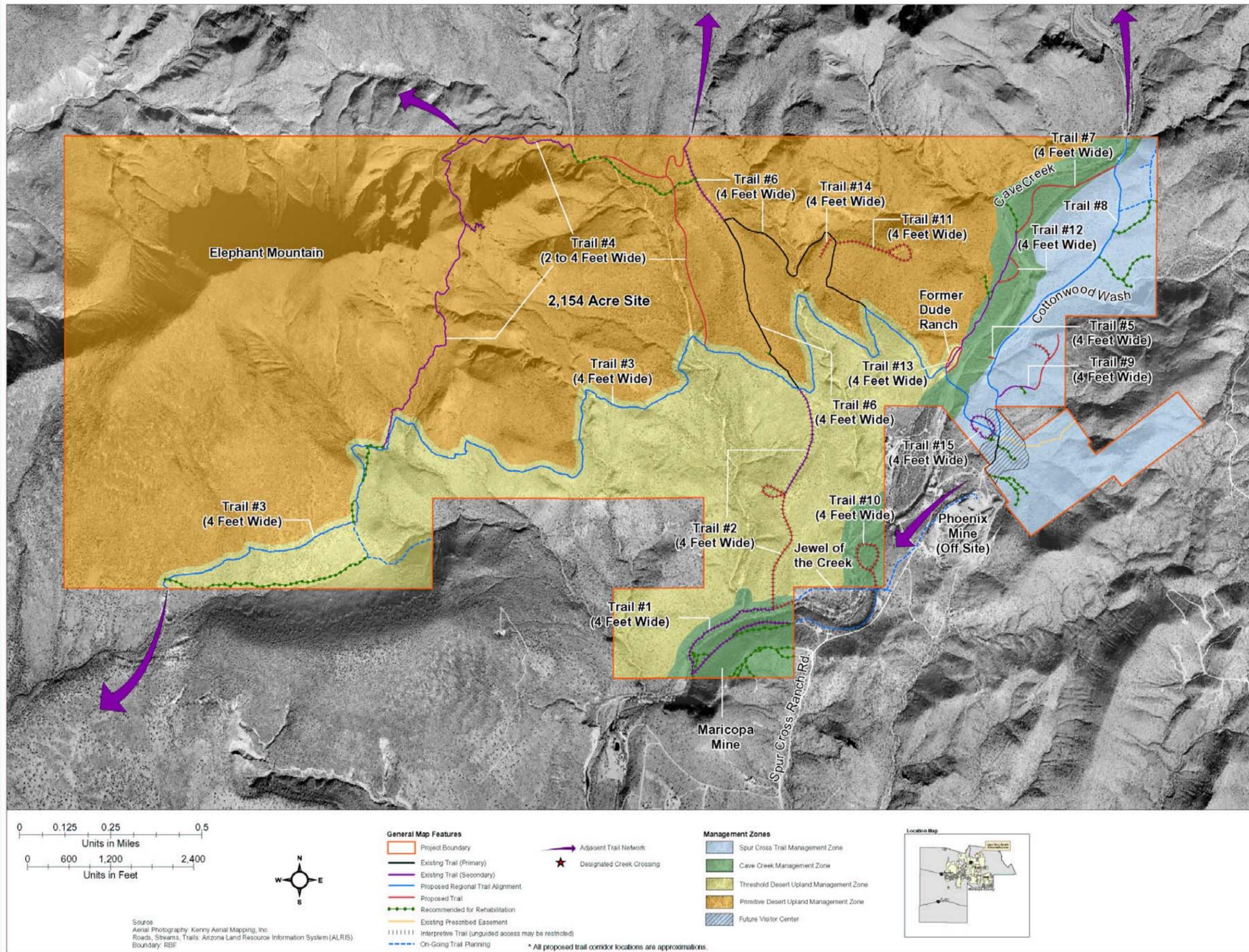


Figure VIII-1: SCRCA Trails Plan

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Type of Use

MCPRD policy encourages designating trails for multiple-use whenever possible. This means pedestrians, equestrians, and cyclists should be allowed to use all of the designated trails in SCRCA as authorized within each MZ (see Figure III-1) and in concert with the vision of SCRCA. Where essential, for visitor safety or special use conditions, use may be restricted (e.g., interpretive or barrier-free trails, and trails linking to a facility with such restrictions).

Standards

Standards and specifications for classifications of trails are directed by the MCPRD Trails Manual. Classifications are listed as primary, secondary, interpretive and barrier-free trails, and competitive track. A summary of standards and objectives for each classification is found in Table VIII-1.

Table VIII-1
SCRCA Trail Standards and Specifications

	Barrier-Free Trail	Interpretive Trail	Primary Trail	Secondary Trail
Management Objectives	To provide outdoor recreation and remove barriers for visitors with mobility, sight, and hearing limitations. Have sitting benches and a hardened surface. Low speed. Non-motorized. ¹	To provide educational recreation away from distracting use and activities. Low speed. Non-motorized. ¹	To provide leisurely outdoor recreation which allows for side-by-side travel and easy passing. Medium speed. Non-motorized. ¹	To provide leisurely outdoor recreation in areas that may be distant from an access point or have rugged topography. Medium speed. Non-motorized.
Experience Objectives	To feel safe, socialize, and be surrounded by nature.	To anticipate, discover, gain environmental awareness, and be a part of nature.	To exercise, socialize, and be surrounded by nature.	To be adventurous, discover, obtain solitude, be remote, and be a part of nature.
User Types	Pedestrians, including the physically disabled and toddlers.	Pedestrians.	Multi-use (hikers, equestrians, and bicyclists). ³	Multi-use (hikers, equestrians, and bicyclists). ³
Tread Construction and Maintenance Standards	5% maximum sustained grade. 8% (for 1/10 th or less of total length) max. grade. ⁵ 7-foot (two-way), or 5-foot (one-way) width.	10% maximum sustained grade. 15% max. grade. ⁵ 4-foot width.	10% maximum sustained grade. 15% max. grade. ⁵ 4-foot width.	15% maximum sustained grade. 20% max. grade. ⁵ 2-foot width.

¹ Except for wheelchairs, and administrative and emergency use.

² Except for administrative and emergency use.

³ Certain trails may be restricted where essential.

⁴ Use is restricted during organized events.

⁵ For specified short distances where essential.

The following sections contain definitions of trail characteristics:

Classification: A category of management objectives and standards directing the design, construction, and maintenance of designated trails aimed at providing an appropriate visitor experience.

Maximum sustained grade: Maximum inclination allowed for the tread. Grade is a function of rise over run expressed as percent (i.e., rise/run = %).

Neighborhood gate: An access point that connects a park trail or trail spur to a public right-of-way, such as a road shoulder, adjacent to the park boundary.

Through gate: An access point that connects a park trail to a legal, public, long-term trail outside of the park.

Trail: A recreational facility designed, constructed, and maintained to serve non-motorized modes of transportation. Motor travel is permitted for suitable wheelchairs and administrative and emergency vehicles.

Tread: Maintained surface of trail; may be natural earth or imported material.

Perimeter Access Points

Access points may be developed to allow connecting trails from the SCRCA trail system to adjacent land if compatible with the vision of SCRCA. Trail access points may be added along SCRCA boundaries only if:

1. There is a demonstrated public need and demand.
2. The access is legally guaranteed, long term for the general public.
3. Other adjacent landowners concur with the establishment of access.
4. Effects on environmental and cultural resources have been evaluated.

Note that County Board of Supervisors action established a new fee schedule effective April 1, 2001. All persons, except Cave Creek residents, entering SCRCA at any entry point are subject to payment of an entry fee.

Washes

Wash trails have specifications equal to primary trail standards. Since natural openings of wash bottoms typically exceed specifications for primary trails, the primary standards are considered minimum specifications for wash trails. Where vegetation growth or other obstacles encroach upon the trail width, action is taken to remove the obstacles to meet the minimum specifications for tread width and vegetation clearance width.

Trail Signs

The signs marking the trail system will be consistent with the M CPRD Trail Manual standards to the extent they are consistent to this Master Plan. This includes colors of beige on brown, trail name and directional arrows on junction signs, and trail name and user type on terminus signs. Regulatory or warning signs may be posted on trails where essential.

Trail Planning Criteria

Trail planning includes analyzing the physical, social, and managerial situations, or settings, which exist in the present and may exist in the future. Many aspects of these settings are interrelated. For example, a trail built on an easily erodible hillside causes not only soil loss but also could expose a sensitive cultural resource feature otherwise covered.

Section XI (Site Facilities) contains a detailed discussion of existing and proposed trails on SCRCA. This section provides a general overview of the types of trails available on SCRCA. Types and locations of trails on SCRCA were based on the following criteria:

- Overall consistency with SCRCA vision statement
- Specific consistency with environmental and cultural resources goals and objectives

There should be a plan to balance environmental concerns and recreation like hiking, horse riding and mountain biking. There should be controlled access and no motorized vehicles. There should be no road improvements, just better signage on existing trails.

Cave Creek Resident

- The sensitivity of a resource to receive an adverse impact associated with use along trails
- Existing condition of a trail
- Historic and projected use along trails
- Type of recreational use along trails
- Public and agency input

Other Trail Considerations

Maintenance

Trail maintenance on SCRCA will be scheduled as required to avoid impact on environmental or cultural resources. Routine maintenance work includes repair of eroded tread, clearance of encroaching vegetation, and installing surface water control structures (waterbars, dips). Reconstruction is heavy maintenance that brings a severely degraded or improperly constructed trail into compliance with the standards according to its classification. This may involve reconstructing tread to comply with standard gradient and width, constructing tread stabilizing structures (walls, rip-rap, block and fill), and/or re-aligning segments of tread.

Rehabilitation of Trails

Undesignated paths and routes not planned for inclusion into the trail plan will be rehabilitated and “naturalized” by scarifying the tread, planting native vegetation, and/or scattering native debris as directed by the MCPRD Trails Manual.

Control of Off-Trail Use

As per Park Rules R-118-3 and R-118-4, horses and bicycles shall stay on designated trails, and shortcutting by any trail user is prohibited in SCRCA. Trail user education and, if necessary, law enforcement will be used to attain compliance. Signs will be posted at rehabilitated paths, roads, and undesignated washes if these areas are subject to continued use after closure.

Trail Names

New names will be chosen for trails established in SCRCA. For the purposes of this Master Plan, trails have been numbered.

Types of Trails on SCRCA

Most existing trails on SCRCA are consistent with the vision of SCRCA. Some trails will become redundant trails once the fully developed trails plan is implemented on SCRCA (see Figure VIII-1). These trails have been labeled as “recommended for rehabilitation.” As the trails plan is developed over time, SCRCA land managers will permanently close redundant trails, trail segments, or trails determined to be inconsistent with the vision of SCRCA.

Some trails on SCRCA have been identified as restricted access. These trails will not be open to the unguided public. These trails permit “guided-only” access to sensitive archaeological sites. Conversely, there are trails on SCRCA that can be accessed by the unguided public that offer cultural resource interpretive opportunities.

The MCRT bisects SCRCA in a southwest to northeast direction. This trail provides for multiple day use activities. This trail also interconnects to other secondary trails along its length to provide access into relatively remote areas of SCRCA.

Trail Planning Objectives

The following section describes trail planning objectives that should be considered by SCRCA land managers in existing and future development of trails within SCRCA.

Objective #1: Coordinate existing or proposed trails planning efforts with surrounding landowners.

Objective #2: Maintain a GIS and GPS inventory of existing trails which will assist SCRCA land managers in determining (1) if the trail is providing the types of recreational opportunities sought at SCRCA, and (2) does the trail need improvements to avoid adverse environmental impact.

The hour is late, the opportunities diminish with each passing year, and we must establish here a common market of conservation knowledge which will enable us to achieve our highest goals and broadest purposes. With each day that passes the natural world shrinks as we exert greater artificial control over our environment.

Stewart L. Udall

SECTION VIII: TRAILS PLANNING

Objective #3: Prioritize trails planning, construction, and maintenance in terms of (1) conserving and protecting natural and cultural resources, and (2) providing for a variety of recreational activities and interpretive opportunities.

Objective #4: Consider looping trails to avoid development of wildcat trails.

Objective #5: Plan for and provide trails that address a variety of accessibility challenge levels that are consistent with resource goals.

Objective #6: Utilize stewards, docents, and volunteers to assist with the monitoring and maintenance of existing trails and the construction of proposed trails. Encourage and support local organizations in adopting trails to provide maintenance and environmental/cultural resource monitoring on a continuous basis.

SECTION IX: COMMERCIAL ACTIVITIES

Throughout the master planning process the JPC, stakeholders, and the public considered extensively the use of SCRCA for commercial and/or concessionaire purposes. Overwhelmingly, input received indicated a preference to not permit commercial or concessionaire types of activities that could be in striking contrast with the vision of SCRCA. As stated previous, SCRCA was codified as a “conservation easement” through ARS 33-271 (see page 4 Section 5.2 of the IGA developed between the Arizona State Parks Board and Maricopa County in Appendix A).

ARS 33-271 states a “conservation easement means imposing limitations or affirmative obligations for conservation purposes or to preserve the historical, architectural, archaeological, or cultural aspects of real property.” Further, “conservation purposes means any of the following activities which yield a significant public benefit:

- (a) Preserving land areas for outdoor recreation by, or the education of, the general public.
- (b) Protecting a relatively natural habitat of fish, wildlife or plants or similar ecosystems.
- (c) Preserving open space, including farmland and forest land if the preservation is either:
 - i. for the scenic enjoyment of the general public.
 - ii. Pursuant to a clearly delineated federal, state, or local governmental conservation policy.”

Further, in the document by The Department of Research and Planning, City of Deluth entitled *The Language of Open Space, A Glossary to Help You Say Exactly What You Mean*, Second Edition May 1975, the term “conservation easement” can be defined as a liberty, privilege, or advantage which a party or the general public may have regarding the land of another person. Easements typically will include restrictions that are implemented to protect and conserve elements that the easement was originally developed for.

Further, due to public use on SCRCA being limited to trails and that the capacity of these trails are limited, commercial activities would create an undesirable level of competition for space among the users. SCRCA land managers generally will discourage commercial activities and consider those that may be consistent and practical with the vision of SCRCA on a case-by-case basis.

It is recommended that commercial or concessionaire activities occur within the Spur Cross Trail Management Zone. Other activities (e.g., motorized tours) were not considered compatible with the vision of SCRCA based on past environmental degradation caused by such activities (i.e., noise, oil droppings from vehicles, soil compaction, conflicts with other users on trails, cultural resource site impacts, etc.).

Based on all these points, it was decided by the JPC that only a couple of commercial and/or concessionaire activities would be consistent and practical with the vision of SCRCA; for example, both equestrian and hiking commercial activities would meet the vision of SCRCA as directed by SCRCA land managers.

SECTION X: OPERATIONAL PLANNING

Introduction

SCRCA land managers are responsible for implementing objectives contained within this Master Plan in an effort to conserve and protect natural and cultural resources while ensuring the health and safety of visitors to SCRCA. Operational planning by SCRCA land managers is an integral part of implementing objectives contained within this Master Plan. Day-to-day activities by SCRCA land managers will ensure that resource conditions are being continually evaluated and adverse impacts will be avoided as resource databases are developed that track resource changes.



As previously stated in Section III, examples of operational planning efforts include policing and enforcement of county rules and regulations, mapping, surveying, inventorying, monitoring; collecting, organizing, and analyzing visitor use data; wildland fire suppression activities; emergency response activities; and completing project specific or implementation level plans that have already undergone environmental and cultural resource analysis through the adaptive management decision-making process. The primary operational planning activities that will be discussed in this section include:

1. Resource monitoring activities
2. Health and safety activities
3. Fire management plan and fire suppression activities

“If future generations are to remember us with gratitude rather than contempt, we must leave them more than the miracles of technology. We must leave them a glimpse of the world as it was in the beginning not just after we got through with it.”

President Lyndon B Johnson on the signing of the Wilderness Act, 1964

Resource Monitoring Activities

Monitoring by itself cannot mitigate the impacts that may occur on natural and cultural resources on SCRCA. Monitoring is not an end product; it is a method for tracking and evaluating resource conditions so SCRCA land managers can develop appropriate actions for protection of these resources. Law enforcement, public education, and steward programs provide avenues for preventing impacts. Monitoring efforts on SCRCA

are assumed to be conducted by not only SCRCA staff, but also by the educated public through steward programs. One goal of the Master Plan would be to develop a comprehensive steward program that would entail day-to-day monitoring activities associated with guided or unguided hikes through SCRCA. Appendix F contains an example field monitoring form that may assist SCRCA land managers and stewards of SCRCA with day-to-day monitoring activities. These forms would be completed as hikes occur and the data submitted on these forms would be gathered and evaluated by SCRCA land managers to determine whether mitigation would need to be applied to issue areas.

The following paragraphs generally discuss the monitoring activities recommended for (1) visitors, (2) cultural resources, (3) biological resources, and (4) water resources. It is important to note that through application of adaptive management strategies, SCRCA land managers will continually refine monitoring techniques as visitor use increases over time.

Visitor and Trails Monitoring

Visitor Monitoring

In keeping with the SCRCA vision statement, SCRCA will be managed so visitors are provided a variety of recreational and interpretive opportunities. Additionally, these opportunities occur within a variety of natural settings from remote settings to settings that occur in areas concentrated with visitors. Recommended standards for maintaining or enhancing these settings is described for each MZ, please refer back to Table III-1. Several techniques to monitoring visitor use at SCRCA have been described in Section V (Recreation Opportunities) and are applicable to this discussion. Fundamentally, SCRCA land managers will be required to continually gather and analyze use data on a day-to-day basis.

Over time this visitor use database will provide accurate information related to the duration and frequency of use, the type of use, peak use periods, and the specific locations of use. Correlations between use data and recognizable impact trends should become apparent over time to SCRCA land managers. These trends should continually be evaluated based on the sensitivity of a specific resource to receive an adverse impact.

Once an evaluation is complete, implementation of mitigation would logically follow to avert or avoid impact.

Trails Monitoring

Approximately 8.5 miles of established trails exist in SCRCA. Adjacent to and within the SCRCA, some trails contain historic/prehistoric features, and most trails have received little or no stabilization or rehabilitation work. Section VIII contains information related to the existing and proposed trail network on SCRCA as well as recommended objectives. A part of the recommended objectives would be for SCRCA land managers to develop a more comprehensive inventory of existing trails. This inventory, in turn, would be correlated with a trails monitoring program. This monitoring program could utilize SCRCA staff, site stewards, or volunteer groups to conduct day-to-day monitoring activities utilizing the same or modified field monitoring form (Appendix F).

Based on the annual analysis of the trail monitoring program, SCRCA land managers would conduct efforts associated with stabilizing trails as required utilizing the adaptive management process (previously discussed in Section III). Because the existing and proposed trail network within SCRCA is considered a living component of the Master Plan, accurate information related to visitor use and existing trail conditions is of critical importance in the evaluation of new trail locations and the need for new trails.

Archeological Site Monitoring

Many existing or future impacts on cultural resources from visitor use can be reduced or eliminated through visitor education, physical deterrents, stabilization and restoration techniques, or site access restrictions. Generally, the mitigation strategy that is least intrusive to the visitor and the site will be tried first (e.g., education and interpretation), and the results will be monitored to see if the desired results (elimination or substantial reduction of impacts) are achieved. If monitoring reveals that desired results have not been achieved, more direct forms of mitigation can be implemented (i.e., site closure). If none of the intervention techniques achieve the desired results, mitigation may involve recovering and preserving information



from the site by means of a professional archaeological excavation. In some instances, it may be possible to stabilize a site and protect its integrity without complete excavation, but some level of archaeological excavation is usually required as a component of stabilization. This method should be implemented as a last resort and consultation with Native American Tribes regarding site excavation should occur prior to implementation.



In Section IV, Cultural Resources, a comprehensive report discusses the sensitivity of cultural resources on SCRCA. Recommendations related to cultural resource conservation and protection are contained within that report (and Appendix D). SCRCA land managers and site stewards should familiarize themselves with the contents of that report to ensure known sites are not adversely impacted. Additionally, Appendix C contains photographs and photograph log. This appendix was included to provide SCRCA land managers, as well as site stewards, a current photograph of the existing conditions of inventoried sites and through day-to-day monitoring activities; refer to these photographs to determine whether or not adverse change is occurring.

A goal of the Master Plan is to continually improve management and protection of cultural resources by (1) identifying sources of impacts on archaeological sites, (2) prioritizing sites for future monitoring and treatment, and (3) providing information for the development and implementation of plans to mitigate impacts and prevent or substantially reduce those impacts in the future.

Unlike visitor use monitoring objectives, for example, levels of acceptable change on archaeological sites do not vary by management zone. Because all cultural resources on SCRCA are highly susceptible to change, the monitoring program should continually evolve and become more comprehensive as use on SCRCA increases over time.

Monitoring Water Resources

A goal of this Master Plan is to establish a schedule for monitoring water quality and quantity in SCRCA, specifically associated with the regional Cave Creek Watershed and locally along Cave Creek and Cottonwood Wash.

The objectives of the water resource inventory and monitoring program are as follows:

- Comprehensively inventory all SCRCA water resources
- Develop baseline water resource data on water quality and quantity for a wide variety of management needs including identification and mitigation of human health hazards, identification and mitigation of human impacts to the resource, soil contamination, and water rights issues
- Develop and maintain data for stream flow and water chemistry within Cave Creek and Cottonwood Wash
- Interpret water resources data on SCRCA as it relates to applying mitigation to avert or avoid impact
- Identify future research and monitoring needs

The water quality and flow data monitoring program may include analysis of discharge, conductivity, dissolved solids and oxygen, alkalinity, turbidity, and temperature. Water quality information may include bacterial analyses for fecal coliform and streptococcus, chemical analyses of several variables, and testing for heavy metals within riparian areas.

Health and Safety Activities

A goal of the SCRCA Master Plan is to provide a reasonable level of public safety, consistent with conservation area values and in accordance with MCPRD Policies. The saving of human life will take precedence over all other management actions. Admittedly, visitors at SCRCA must accept it largely on its own terms, and accept certain risks, including possible dangers that are inherent in various elements and conditions that comprise a conservation area experience. Management efforts will focus on educating visitors about conditions and possible risks associated with recreating on SCRCA.

Atmospheric conditions (temperature and aridity) of SCRCA, the topography and remoteness, combined with the challenges

inherent in remote travel, sometimes result in unexpected events that may require the need for emergency services.

For the purposes of this Master Plan, “emergency situations” include:

- responses to those in need of medical or physical assistance when threats to human health and safety are reasonably assumed
- responses to those who are determined to be unjustifiably overdue and threats to human health and safety are reasonably assumed
- any response to downed aircraft and any response to an “unknown emergency” (e.g., mirror flash, radio distress signal)
- any reported disaster
- responses to wildfire which threatens life, property, cultural resources, or natural resources

While personal safety is always the responsibility of the individual, SCRCA land managers can reduce this risk by providing relevant, pre-trip information, including accurate trail information, maps, and appropriate advice for hikes.

Fire Management Plan and Fire Suppression Activities

Fire Management Plan

Sonoran Desert vegetation types are not considered dependent or adapted to fire. Fires within this vegetation type can significantly alter vegetation composition and the ecosystem as a whole. Desert vegetation such as saguaro cactus, paloverdes, and creosote are very susceptible to fire and may take as long as a century to reestablish. Recurring fires could entirely eliminate these species from the vegetative community.

The goal of the SCRCA fire management plan is to effectively manage and prevent wildland fires and provide for the

protection of life, property, natural and cultural resources, while managing for the perpetuation of natural ecosystems once a fire has occurred. As such, all human or lightning-caused fires will be suppressed within SCRCA or on adjacent lands.

SCRCA land managers would continue to coordinate with the Daisy Mountain and Rural Metro Fire Departments as well as continue to keep in place the existing IGA with the Tonto National Forest related to fire suppression activities associated with combining fire suppression resources. Further, the County has recently purchased a fire suppression vehicle. This vehicle should be in operational condition and staffed within a 10-minute response time of SCRCA between the months of April and October.

Fire Suppression Activities

Actions taken to suppress wildfires will be conducted in such a way as to protect natural and cultural features, and to minimize the lasting impacts of suppression actions and the fires themselves. Some key points to fire suppression activities are as follows:

- Suppression tactics will be utilized that limit damage or disturbance to wildlife habitat and riparian areas.
- No heavy equipment will be used except along existing trails that are wide enough to accommodate this equipment without additional disturbance to adjacent areas.
- All archaeological sites will be protected from disturbance associated with fire suppression activities.
- Related to Cave Creek and Cottonwood Wash, it is recommended that aerial drops of fire suppression slurry *not* be targeted within these riparian corridors, given the high sensitivity of fauna and flora species being adversely affected by the chemical make-up of this slurry.
- The construction of fire lines within SCRCA should be avoided except in the protection of human life.

In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.

The Wilderness Act of 1964

SECTION X: OPERATIONAL PLANNING

- Because this ecosystem is not fire resistant, prescribed burning should not be allowed on SCRCA or within 2 miles of its boundary.

Upon containment of a fire and immediately following containment (within 72 hours), SCRCA land managers will evaluate the effects of the fire and implement soil stabilization efforts and vegetative rehabilitation efforts. As a part of the environmental resource monitoring program, areas affected by fire will be closely monitored to determine the success of mitigative efforts or to identify where additional mitigation may need to be applied in an effort to avert or avoid additional resource damage. Within this ecosystem it could take as long a five years to comprehensively understand the effects of fire, particularly on saguaros and paloverde trees.

SECTION XI: FACILITY MASTER PLAN

Introduction

In order to fulfill the mission and vision of SCRCA, a certain level of public accommodation should be provided for the benefit of the public. However, by its very nature a conservation area should remain true to its primary goal. For SCRCA that goal is to protect and preserve the resources and setting of the site in its native Sonoran Desert environment. Throughout the master planning process the Facility Master Plan—the proposed physical buildings and public accommodations—has been envisioned as a support component to the SCRCA Master Plan and not as an architectural feature in and of itself sited on the conservation area.



The thoughts discussed and displayed below are for design concept only. The SCRCA Master Plan is not intended to tie the facility development of SCRCA to this design specifically. Instead, the Facility Master Plan outlines sensitivity to the environment, native materials, minimal disturbance to the site, and provide views out onto SCRCA. The ultimate design should consider rain water harvesting, construction materials for paving and walls that blend and fade into the site, windows that disappear, planted soil roofing, and visibility analysis to simulate appropriate architecture and site development, to name but a few.

Ancient trails, worn down over decades, should remain open for people and horses to use. Some of these trails were in existence prior to statehood. It is disgusting to see them fenced off.

Preliminary Facility Program

The Facility Master Plan as a support component of SCRCA has been preliminarily programmed to provide a modest level of visitor comfort and accommodation. The identified program includes the features described in Table XI-1.

Scottsdale Resident

SECTION XI: FACILITY MASTER PLAN

<p align="center">Table XI-1 Preliminary Facility Program</p>		
Facility	Purpose	General Description
Entry Station	<ul style="list-style-type: none"> • Initial public contact at Spur Cross Ranch • General information • Fee collections 	<ul style="list-style-type: none"> • Enclosed building (air conditioned) • Size: 200 square feet • Include restroom if separate building • Near central parking area • Not necessarily an individual building • Possibly integral with Education Center • Park Ranger substation
Education Center	<ul style="list-style-type: none"> • Educational and interpretive exhibits and programs of cultural and environmental features of SCRCA • SCRCA headquarters/staff office • Public Restrooms 	<ul style="list-style-type: none"> • Exhibit Area: displaying the cultural and environmental features of SCRCA, Arizona State University artifacts • Gift Shop: revenue opportunity, concessionaire, reservations • Facility Office: ranger staff, docent/volunteers • Public Restroom • Opportunity for Cave Creek Museum, et al. to be adjacent neighbor • General Parking • Size: 5,000 square feet
Outdoor Stage Area	<ul style="list-style-type: none"> • Outdoor audio/visual programs 	<ul style="list-style-type: none"> • Outdoor area with tiers of seating rising gradually outward from a central stage • Lighting for evening use • Capacity: up to 100
Trailhead Staging Area	<ul style="list-style-type: none"> • Equestrian corral and parking area • Trailhead for hikes/rides 	<ul style="list-style-type: none"> • Parking area • Single vehicle parking for 50-75 • Vehicle w/ horse trailer parking for

<p align="center">Table XI-1 Preliminary Facility Program</p>		
Facility	Purpose	General Description
	onto SCRCA or TNF	<p>30</p> <ul style="list-style-type: none"> • Horse circulation area
Trails	<ul style="list-style-type: none"> • Opportunity for interpretation and passive recreation 	<ul style="list-style-type: none"> • Primary Trails • Spur Cross Trail • Multi-use • Vehicular - Emergency and maintenance • Maricopa County Regional Trail • Multi-use • Secondary Trails • Interpretive and/or guided routes • Multi-use • Barrier-free • Primitive Trails • Provide loop trails instead of doubling back
Maintenance Area	<ul style="list-style-type: none"> • Secure area for storage of equipment 	<ul style="list-style-type: none"> • Maintenance staff staging area on Phoenix Mine Site • Town • Enclosed (fence/wall) area • Size: 10,000 square feet • Enclosed equipment shop/building • Size: 750 square feet
Signage/Kiosks	<ul style="list-style-type: none"> • Provide interpretation of SCRCA features and site information 	<ul style="list-style-type: none"> • All weather • Design and materials to be compatible with opportunity classes • Lower visual impact only in Primitive Desert Upland O.C. (waypoints, site markers, include degree of difficulty) • Higher visual impact allowable in Spur Cross Trail O.C. (kiosks) • Use of universal Trail Assessment Process

Facility Site Master Plan

As discussed above, it is a primary goal that the proposed facility should have a minimum impact on the setting of SCRCA and its surroundings. When the Town of Cave Creek purchased the adjoining Phoenix Mine, a major consideration for that purchase was to provide an opportunity to develop facility components, when appropriate, off SCRCA proper. Additionally, proposed development on the Phoenix Mine site will help to restore the “front door” of SCRCA to an acceptable level and as economically feasible. The proposed Facility Site Master Plan (Figure XI-1) meets those goals by siting the general vehicle and horse trailer parking areas on the Phoenix Mine site. Consideration should be given to maximize the use of permeable paving surfaces whenever possible, i.e., crushed stone horse trailer parking (ABC) and walking paths (granite), and permeable asphalt. The Education Center is sited on SCRCA in an area between two small washes to fit into the site with minimal disturbance to the natural desert setting. Accordingly, accessible parking is located nearby the Education Center. The maintenance facility for MCPRD is located on the Phoenix Mine Site that is partially disturbed by previous uses. This is the current location of the temporary site office. Simple drainage crossings for Spur Cross Trail and paths are recommended to be constructed of multiple, smaller diameter galvanized pipe, which have been treated or painted to resemble rust in order to blend with native rock materials. Optionally, the crossings could be simple prefabricated low vehicular bridges with a rustic and rusted early twentieth century period façade treatments. All facility development and improvements that occur on SCRCA will follow the Cave Creek Zoning Ordinance.

Education Center

The proposed concept plan for the proposed Education Center can be characterized as a *portal* delicately inserted into the desert setting (Figure XI-2). The very idea of building in a conservation area seems counter intuitive. The need exists, however, and we believe that within this careful balancing act something very special can occur. The aspiration is for a simple

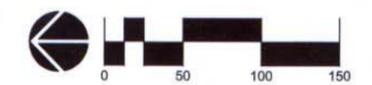


Figure X1-1: Concept Site Plan

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architectural style that feels like it belongs in this pristine environment.

At its most basic level, the Education Center is a building that provides a transition - a *portal*. It is a simple line in the landscape, which marks the passage from where ever you came, into a pristine and protected desert environment (Figure XI-3). At a more pragmatic level it is a place for education, food and water, restrooms, and offices.

The siting of the Education Center is near the beginning of the existing Spur Cross Trail on SCRCA. It recedes into the hillside along the path - literally carved into the desert. You approach the Education Center hardly aware of its presence. It is not a building that screams - here I am! It whispers, as you "happen" upon it. A rusted steel retaining wall holds back the hillside. The resultant space is for outdoor discussions, classes, a place for refreshment, a setting for picnic lunches for school children, and the Education Center proper. Here the programmed facilities for the Education Center, entry station, comfort station, outdoor stage, and picnic area will be developed as one facility. The walls of the Education Center are envisioned as 4-feet thick rammed earth - constructed of the dirt excavated from the hillside for the building's overall footprint. Each and every decision, whether it is about window placement or what roofing material to use, will be scrutinized from an environmental perspective. The project will set an example for every visitor of how to build in the desert, and more importantly a respect for the natural environment of SCRCA. Other design elements could include native rock for flooring and/or outdoor paving, as well as for low retaining and seat walls. The building's roof could be designed as an earthen roof, which would lessen the visual impact of the building when seen from a distance. The courtyard that surrounds the building and which is enclosed by the steel retaining wall should provide trellised areas for shade.

Visitors to SCRCA will enter the Education Center to view displays, talk with a docent, register for a walk, or simply relax before and after a walk along the regional trail or one of the many guided hikes given by an interpretive ranger. For convenience or after hours, a solitary window opening onto Spur Cross Trail can be provided as an entry station to collect

user fees or give guidance. After passing the visitor center, and nearby, an accessible self-guided trail is possible through site 74.

The Education Center and other building improvements that occur on SCRCA will follow the Cave Creek Zoning Ordinance Chapter 5 – Development Standards, Chapter 8 – Open Space Zoning Districts, and others as applicable.

Landscape Character



As discussed in Section IV, SCRCA is located in the Arizona Upland subdivision of the Sonoran Desertscrub biome (Brown 1994), which is one of the most picturesque deserts in the world and is commonly referred to simply as the Sonoran Desert. Predominantly, SCRCA is comprised of a plant material palette known as the Paloverde-Cacti-Mixed Scrub Series. As the name implies this series is dominated by *Cercidium microphyllum* (Foothills Paloverde) as well as the sentinel *Carnegiea gigantea* (Saguaro). Additionally, almost as an overlay plant material palette, SCRCA is penetrated along Cave Creek Wash and its tributaries by streamside associations of subtropical riparian habitats, which contain predominantly Burrobush, Mesquite, and Cottonwood. SCRCA, by its very nature as a biological conservation area, must always remain as a natural representative of its surroundings, both macro and micro.

The landscape character for SCRCA is to remain as natural and primitive to its natural setting as possible. Landscape development that is to occur along with facility development is to remain natural in plant selection, setting, grouping, and order as follows:

- Selection—plant materials are to conform to the natural biotic communities found at SCRCA. No introduced species should be considered. This should even apply to near native species such as *Cercidium microphyllum* X *Cercidium floridum* X *Parkinsonia aculeata* (Desert Museum Paloverde), which is a popular hybrid.
- Setting—plant material selections should conform to the specific micro plant community associations where they are being placed.

- Grouping—plant materials should be proposed in groupings and spacing that are natural in occurrence. Standard landscape design practices of proposing plant material massing should be avoided unless the massing replicates a natural grouping.
- Order—formal or forced configurations of plant materials should be avoided.



All facility development and improvements that occur on SCRCA will follow the Cave Creek Zoning Ordinance Chapter 12 – Native Plant Preservation, Salvage and Landscape Regulations.

Signage and Graphics

The overall signage program developed for the SCRCA employs design and material use that are compatible across all the management zones identified in the Master Plan. Because the management zones range from the Spur Cross Trail zone, which will receive the highest daily use impact, Cave Creek zone, Threshold Desert Upland zone, and finally the Primitive Desert Upland zone – each with successively lower impact and use, the signage system developed offers minimal visual impact throughout the overall conservation area to ensure compatibility with all ranges of use (Figure XI-4). All signs that occur on SCRCA will follow the Cave Creek Zoning Ordinance Chapter 15 – Sign Regulations.

Wayfinding

The wayfinding sign types make use of natural rusted steel that will improve with age, weather and will not be compromised by occasional visitor vandalism. Combined with this structural steel element are a series of add-on features:

- Sign and map panels that are embedded graphics in UV polycarbonate. These panels are warranted against fading for up to 10 years, even in the Arizona sun, and stand up to extreme weather and vandalism. All sign panels are mounted within metal frame structures accessible to park staff so that

messages can be changed and/or panels can be repaired if necessary.

- Guest register of fabricated, painted metal. This unit is designed to attach to various sign elements as required and provides a weather-proof, covered enclosure for an 8 ½-inch x 11-inch notepad for visitor registration.
- Iron Ranger Fee Collection Element/Brochure Holder of fabricated, natural rusted steel (or painted steel). This item serves a combined purpose and is designed to attach to appropriate sign elements as required. It provides a weather-proof, covered enclosure for 4-inch x 9-inch brochure/map as well as a slot for insertion of area fees. This unit allows for a locked slider that can be accessed by staff for the removal of deposited fees.

Interpretive

The interpretive elements employ the same materials as the wayfinding signage elements – natural rusted steel and graphic embedded panels. There are two levels of interpretive sign elements:

- Large unit with text/image panel - this element is to be used in higher impact zones where visitor counts are higher and impact has already occurred to an area for interpretation.

SCR education center conceptual floor plan



- SUN - NATURAL MATERIALS - PASSAGE - BLUE SKY - TRAIL - WATER HARVESTING - SHADE - VIEWS - ARRIVAL - PLACE - CULTURE - EARTH -



jones studio + URS 1.16.04

Figure XI-2: SCR Education Center Floor Plan

SCR education center 'sketch' perspective



- CONSERVATION - VEGETATION - MINE ENTRY - EXCAVATION - STONE - EDUCATION - PRAGMATICS - IMPRESSIONS - VISITOR - HORSEBACK -



jones studio + URS 1.16.04

Figure XI-3: SCR Education Center 'Sketch' Perspective

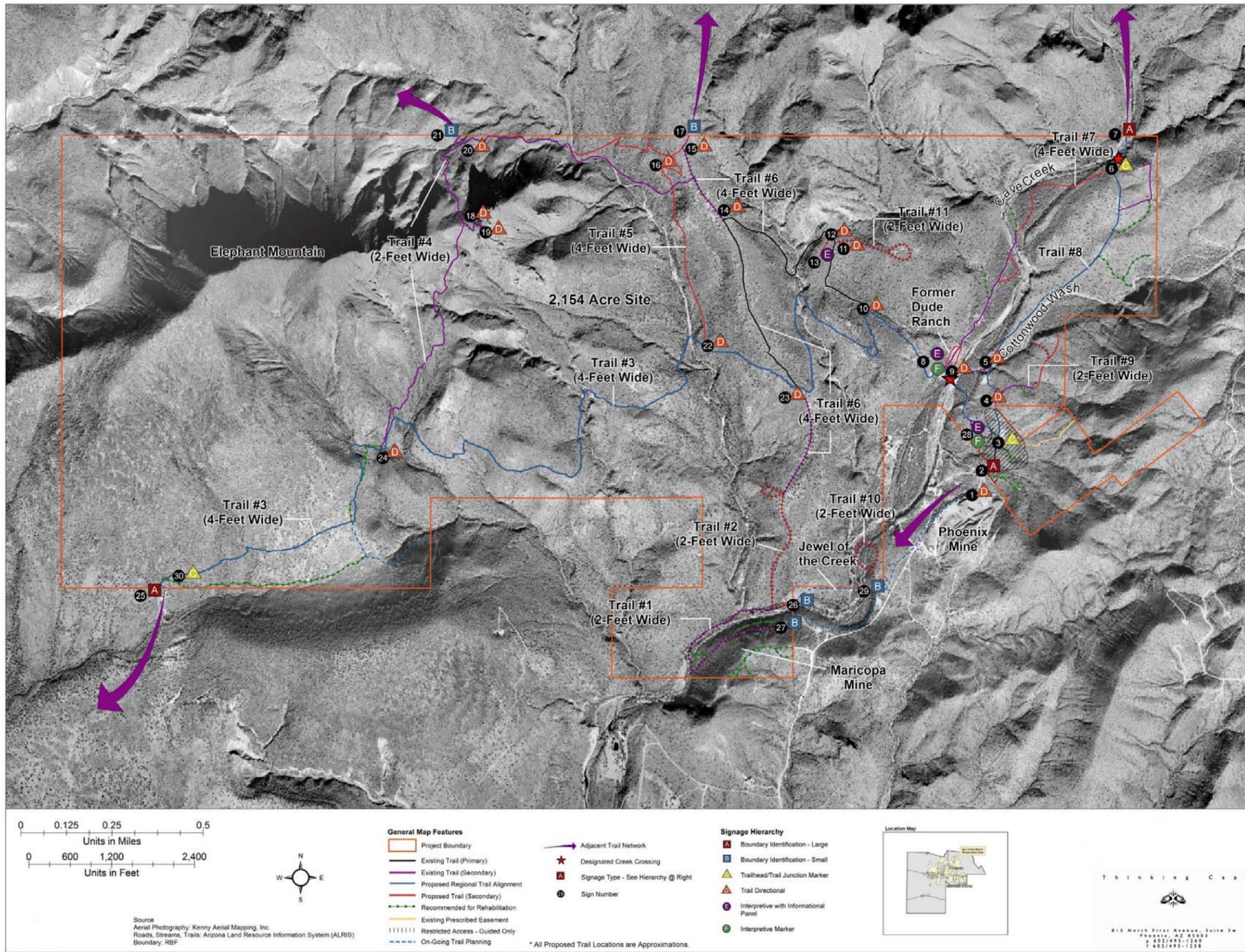


Figure XI-4: Preliminary Signage Plan

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- Small interpretive marker - this element is to be used in both high impact areas and more sensitive areas that require visitor interpretation. It is low in profile and offers little visual impact. This unit will be numbered and will correspond to a printed map available to area visitors.

Hierarchy Outline

- Type A - Boundary Identification – Large (Figure XI-5) (quantity 3 – 1 of 3 has no add-on components) – this element provides identification of Spur Cross boundary and area regulations. The large configuration of this sign type will incorporate regulations for area use, symbol indication of permitted trail uses, emergency contact information. In addition, this sign type may incorporate any or all add-on components: guest register, brochure holder, fee collection units. *
- Type B - Boundary Identification - Small (Figure XI-6) (quantity 5 - 1 of 5 incorporates guest register unit*) – this element provides identification of Spur Cross boundary. The small configuration of this sign type always incorporates boundary identification, but not full regulations as on large configuration, and may include add-on components as noted above. *
- Type C - Trailhead/Trail Junction Marker (Figure XI-7) (quantity 3) – this element is a trailhead or major trail junction marker that includes area trail map panel, environmental sensitive regulations for area use, symbol indication of permitted trail uses, and guest register component. *
- Type D - Trail Directional/Regulatory (Figure XI-8) (quantity 15) – this element provides trail information such as indications of guided/self tour, area closed notation, area sensitivity notation, trail junction directional, destination identification, distance information. (For those elements that are strictly directional in nature, trail use symbols and mileage information to nearby destinations are to be incorporated.)

- Type E - Interpretive with Informational Panel (Figure XI-9) (quantity TBD) – this element provides major interpretive information at appropriate impact level sites. This sign type incorporates text and image panel that can be read on-site for interpretive information. At present, this sign type is only indicated for site #74 at the location of the future visitor center and at site #59 at the location of the historical ranch.
- Type F - Interpretive Marker (Figure XI-10) (quantity TBD) – this element provides indication of interpretive site by incorporating a numbering system that corresponds with printed interpretive literature. At present, this sign type is only indicated for site #59 at the location of the historical ranch, and at site #50.

*This signage hierarchy will incorporate a series of adaptable units that may be added to large or small boundary identification, major regulatory, or trailhead sign types. These units include guest register unit, fee collection unit (iron ranger), and brochure holder. These units are considered add-on components and may or may not be used on every sign type noted above.

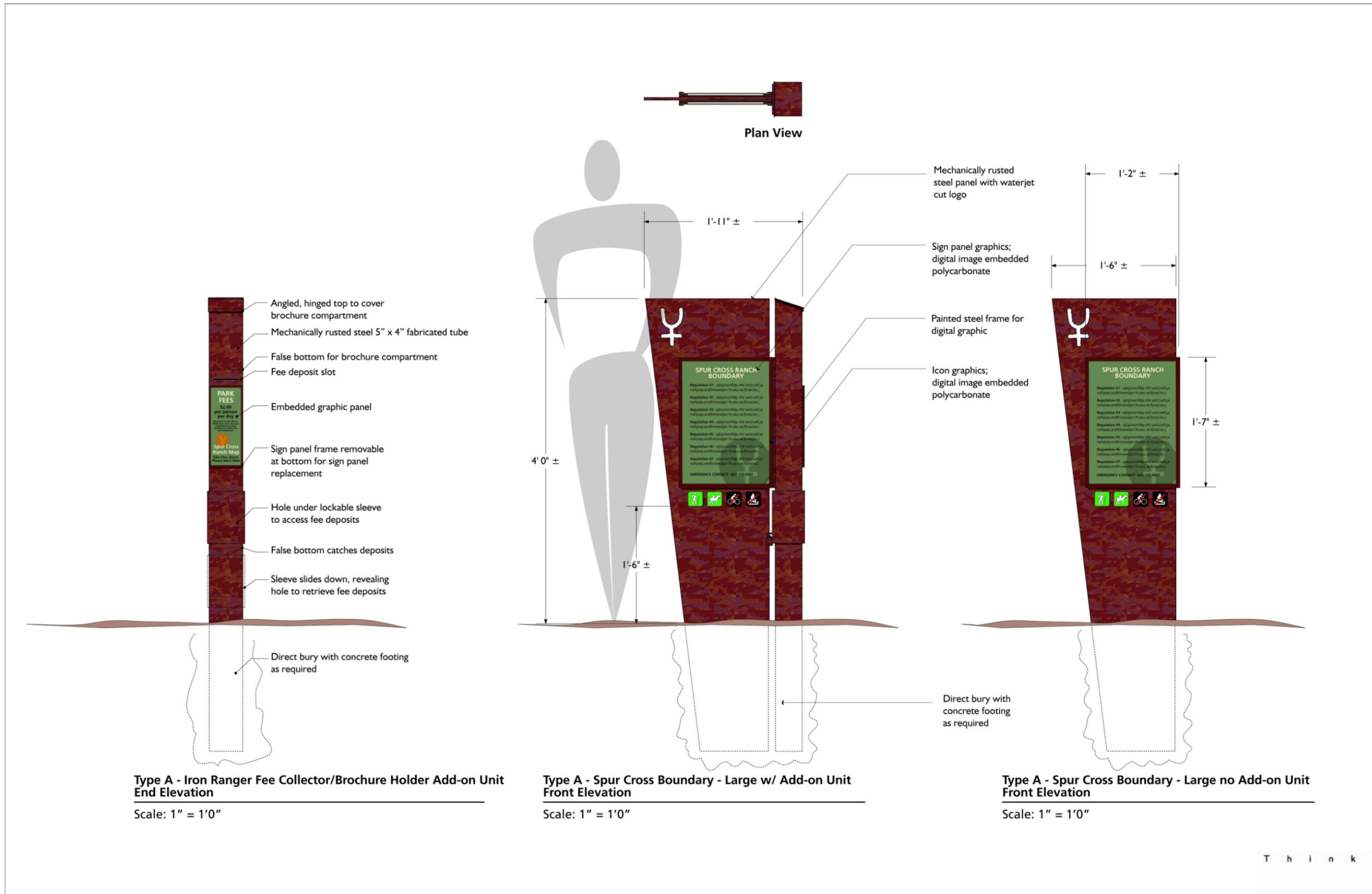


Figure XI-5: Type A

T h i n k i n g C a p s



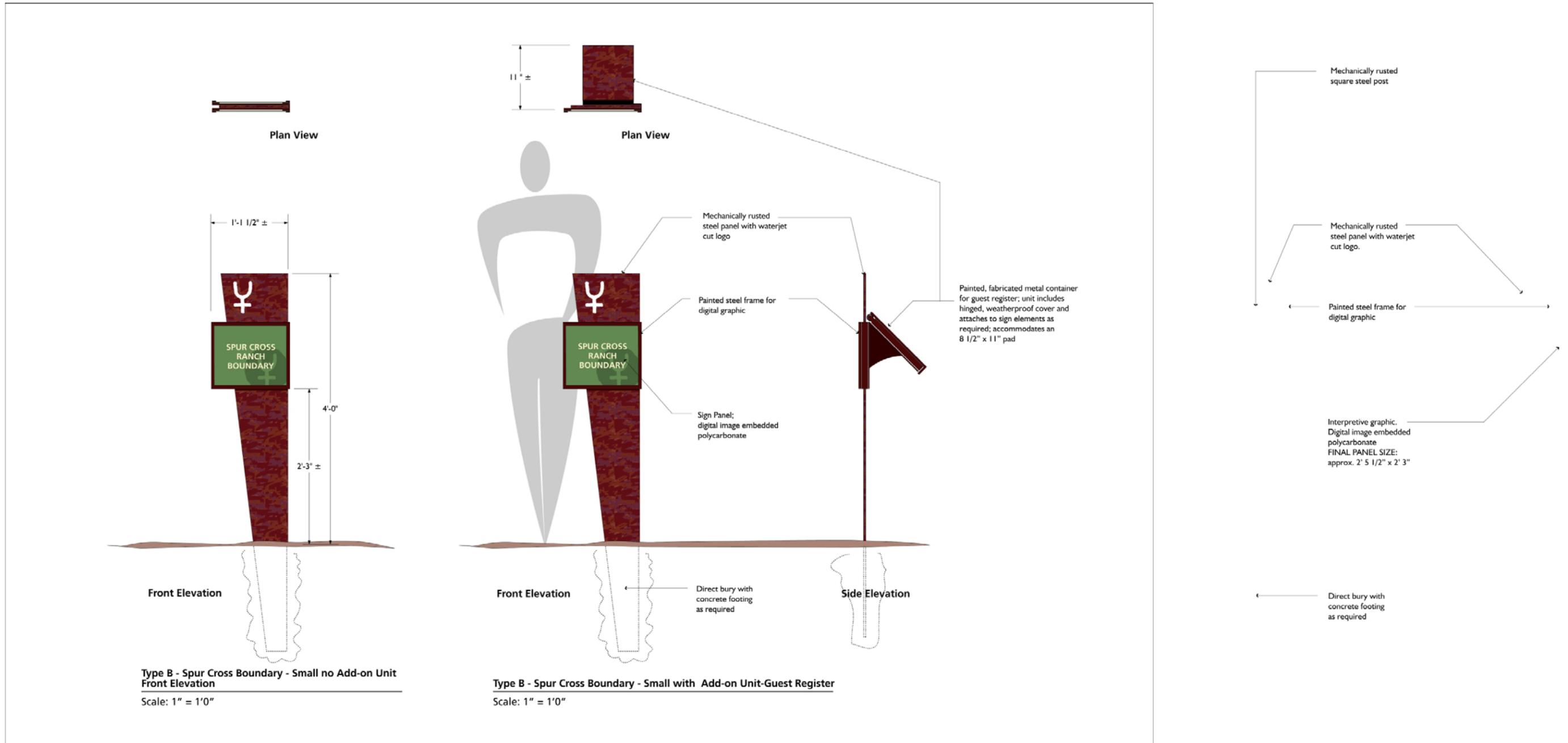
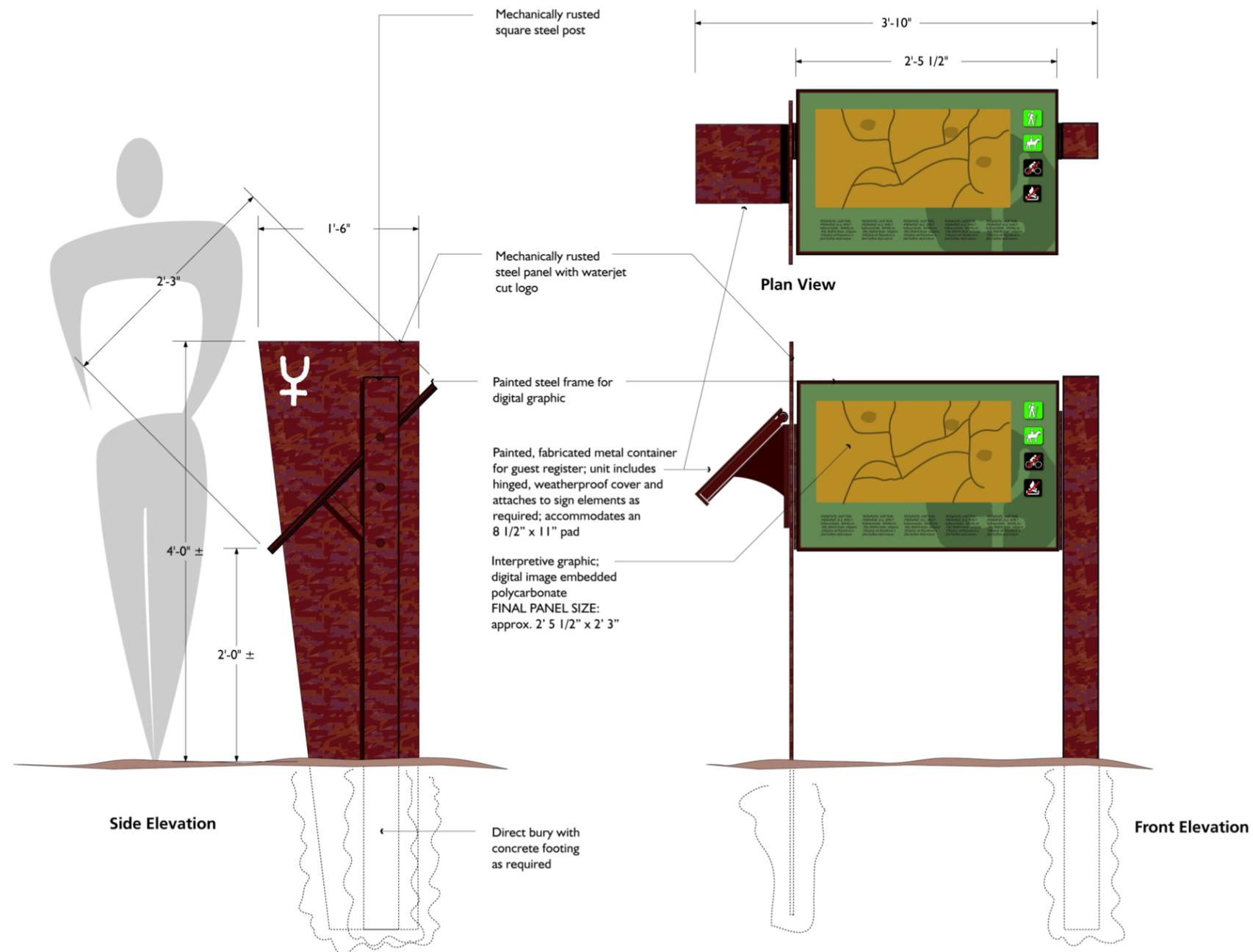


Figure XI-6: Type B

T h i n k i n g C a p s





Type C - Trailhead/Trail Junction - with Add-on-Guest Register
Scale: 1" = 1'0"

Figure XI-7: Type C

T h i n k i n g C a p s



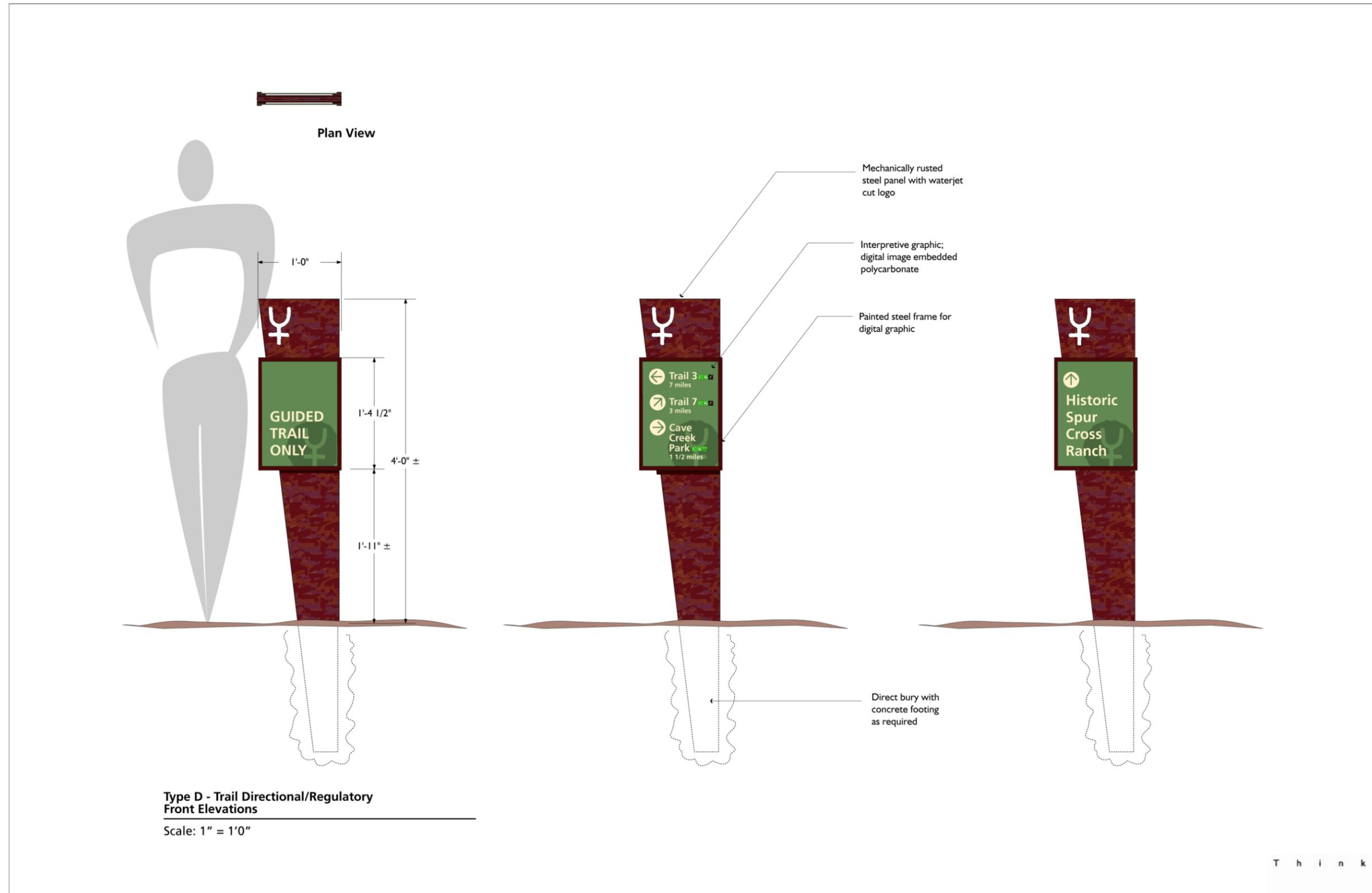
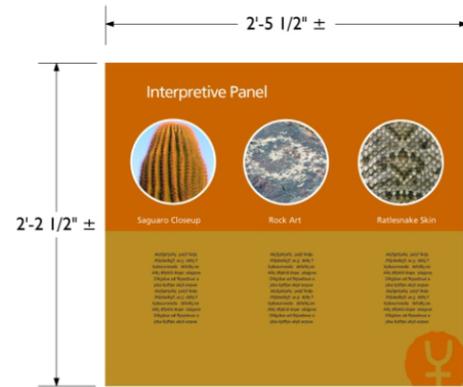
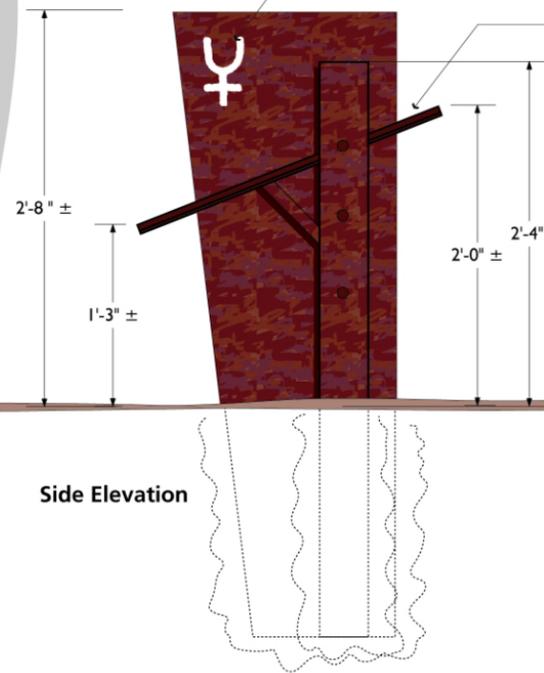
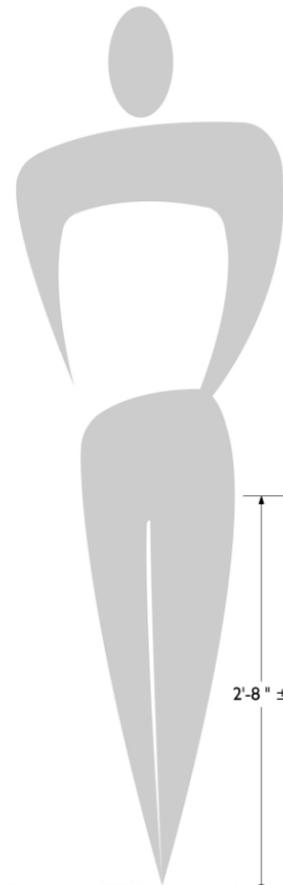


Figure XI-8: Type D





Example of intended interpretive panel layout. Circular windows are employed for imagery to correspond with the area logo graphic. Panel is divided into text and image area as shown. Interpretive panels employ color palette distinct from the wayfinding signage elements to delineate interpretive information from wayfinding messages.

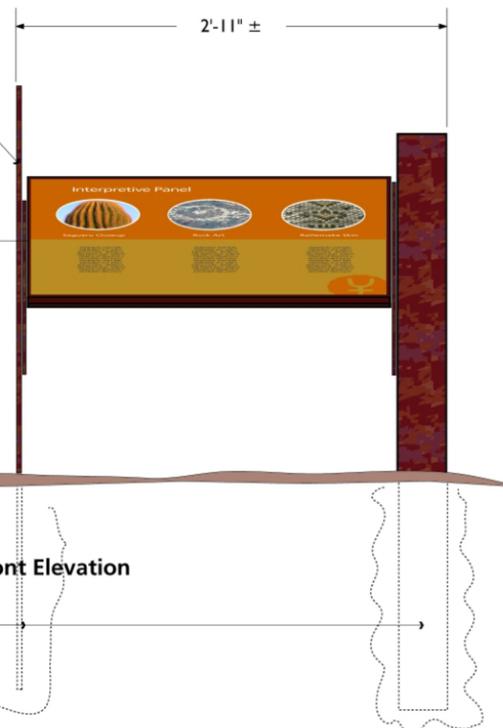


Side Elevation

Mechanically rusted square steel post



Plan View



Front Elevation

Direct bury with concrete footing as required

Type E - Interpretive with Informational Panel

Scale: 1" = 1'0"

Figure XI-9: Type E

T h i n k i n g C a p s



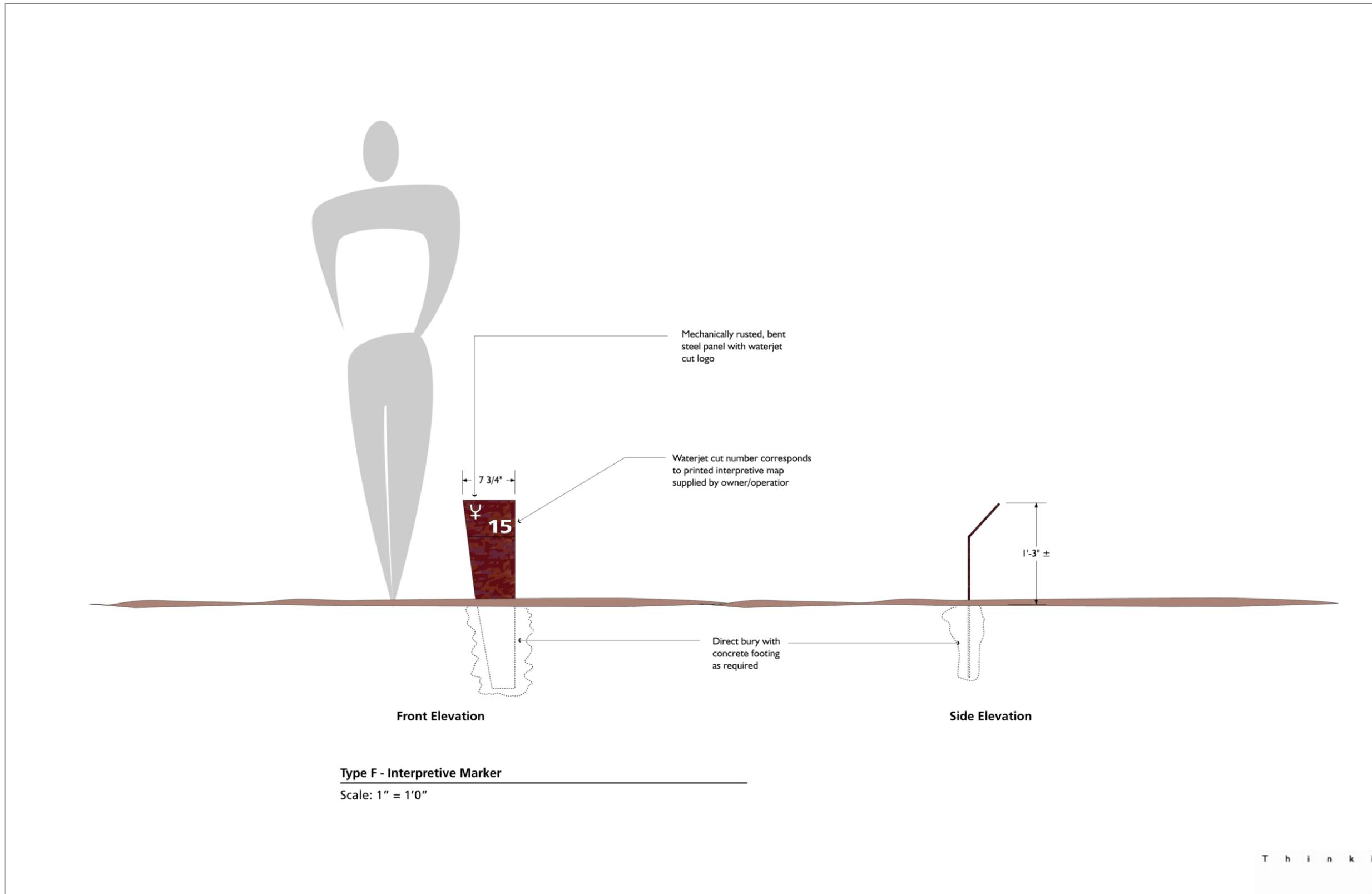


Figure XI-10: Type F

T h i n k i n g C a p s





Figure XI-11: Monument Sign

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Sign Location Inventory Key

Location Number	Sign Type	Description
1	D	Directional from parking to Spur Cross entry point Incorporates: distance to entry and trail use symbols
2	A	Denotes Spur Cross boundary/entry Incorporates: Regulatory messages, emergency contact information, trail use symbols, and add-on components – brochure holder and fee collection (iron ranger)
3	C	Denotes trailhead point Incorporates: Overall Spur Cross trail map panel, regulatory messages, trail use symbols and <i>add-on component</i> – guest register
4	D	Denotes - Guided Trail Only
5	D	Denotes – Area Closed
6	C	Denotes major trail junction point Incorporates: Overall Spur Cross trail map panel, regulatory messages, trail use symbols, trail information for the Tonto National Forest to the north and <i>add-on component</i> – guest register
7	A	Denotes Spur Cross boundary/entry Incorporates: Regulatory messages, emergency contact information, trail use symbols – no add-on components
8	E/F	Type E Denotes on-site interpretive information Incorporates: Interpretive text and image panel on sign structure Type F

SECTION XI: FACILITY MASTER PLAN

Location Number	Sign Type	Description
		Denotes interpretive location reference to printed literature for interpretive program Incorporates: Number corresponding with printed literature
9	D	Denotes – Trail direction Incorporates: Trail use symbols and distance information
10	D	Denotes – Trail direction Incorporates: Trail use symbols and distance information
11	D	Denotes - Guided Trail Only
12	D	Denotes – Self-Guided Trail
13	F	Type F Denotes interpretive location reference to printed literature for interpretive program Incorporates: Number corresponding with printed literature
14	D	Denotes - Guided Trail Only
15	D	Denotes - Guided Trail Only
16	D	Denotes – Trail direction Incorporates: Trail use symbols and distance information
17	B	Denotes – Spur Cross boundary/entry only
18	D	Denotes - Guided Trail Only
19	D	Denotes – Sensitive Area! Incorporates: description and warning info about sensitive nature of area if visitors have ventured beyond the posting of “Guided Trail Only”
20	D	Denotes – Trail direction

Location Number	Sign Type	Description
		Incorporates: Trail use symbols and distance information
21	B	Denotes – Spur Cross boundary/entry only Incorporates: <i>Add-on component</i> – guest register
22	D	Denotes – Trail direction Incorporates: Trail use symbols and distance information
23	D	Denotes – Trail direction Incorporates: Trail use symbols and distance information, also denotes Guided Trail Only to the south trail
24	D	Denotes – Trail direction Incorporates: Trail use symbols and distance information
25	A	Denotes Spur Cross boundary/entry Incorporates: Regulatory messages, emergency contact information, trail use symbols, and add-on components – brochure holder, and fee collection (iron ranger)
26	B	Denotes – Spur Cross boundary/Guided Trail only
27	B	Denotes – Spur Cross boundary/Guided Trail only
28	E/F	Type E Denotes on-site interpretive information Incorporates: Interpretive text and image panel on sign structure Type F Denotes interpretive location reference to printed literature for interpretive program Incorporates: Number corresponding with printed literature

SECTION XI: FACILITY MASTER PLAN

Location Number	Sign Type	Description
29	B	Denotes – Spur Cross boundary/entry only
30	C	Denotes major trail junction point Incorporates: Overall Spur Cross trail map panel, regulatory messages, trail use symbols, information for the regional trail system and Cave Creek Park to the south and <i>add-on component</i> – guest register

Infrastructure

Water

Initial coordination occurred with the Cave Creek Water Company (CCWC) to extend water service to SCRCA. The CCWC contact for this area is Dave Adams, 480-488-3331. An existing 12-inch water line was constructed in Spur Cross Road as far north as the south property line of SCRCA, near the Maricopa Mine. The Town of Cave Creek is considering the construction of a municipal water storage tank on a portion of the Phoenix Mine site.

For off-site improvements, the existing water line will be extended as a 12-inch water line along the Spur Cross Road right-of-way approximately 2,000 feet to the southwest property line of the Phoenix Mine site (Figure XI-12). The line is proposed as a 12-inch for the connection to the potential municipal water tank. At this time, the full cost of the 12-inch water line is identified in the Section XII – Capital Improvement Program of this report. Cost sharing should be considered between the Town’s SCRCA and Public Works Department funding sources.

For on-site improvements, the proposed 8-inch water line will continue across the Phoenix Mine site in Spur Cross Road approximately 800 feet approximately to the Education Center vicinity. Additional lateral water lines with fire hydrants are recommended to provide fire protection to the parking areas.

Sanitary Sewer

The proposed sewage collection system for the Education Center should consist of a 6-inch sewer pipe, manhole(s), septic tank, and leach field to serve the facility with the following assumptions:

Type of Facility Served	Applicable Unit	Gallons per Day per Unit	Total Gallons per Day
Office Building	5 Employees	20	100
Public Restroom			
Womens	3 Toilets	200	600
Mens	2 Toilets 1 Urinal	200 200	400 200
Total			1,300

- Septic Tank Sizing (per Arizona Administrative Code, Title 18, Chapter 9, Article 3)

$$1300 \text{ Gallons} \times 2.1 = 2,730 \text{ (or 5,000 gallons)}$$

The septic tank and leach field will be located in an appropriate location in the vicinity of the Education Center. Leach field requirements can be calculated after a soil percolation rate has been tested. The approximate leach field area may be on the order of 50 feet by 75 feet. Permitting for the septic system will be required through Maricopa County Environmental Services.

If deemed appropriate, a smaller septic system could be constructed for the maintenance facility.

Electrical

Initial coordination occurred with Arizona Public Service (APS) to bring single-phase power to the SCRCA. The APS contact for this area is Kim Smallwood – Design Project Leader, Customer Construction East, 602-493-4451. The closest APS single-phase

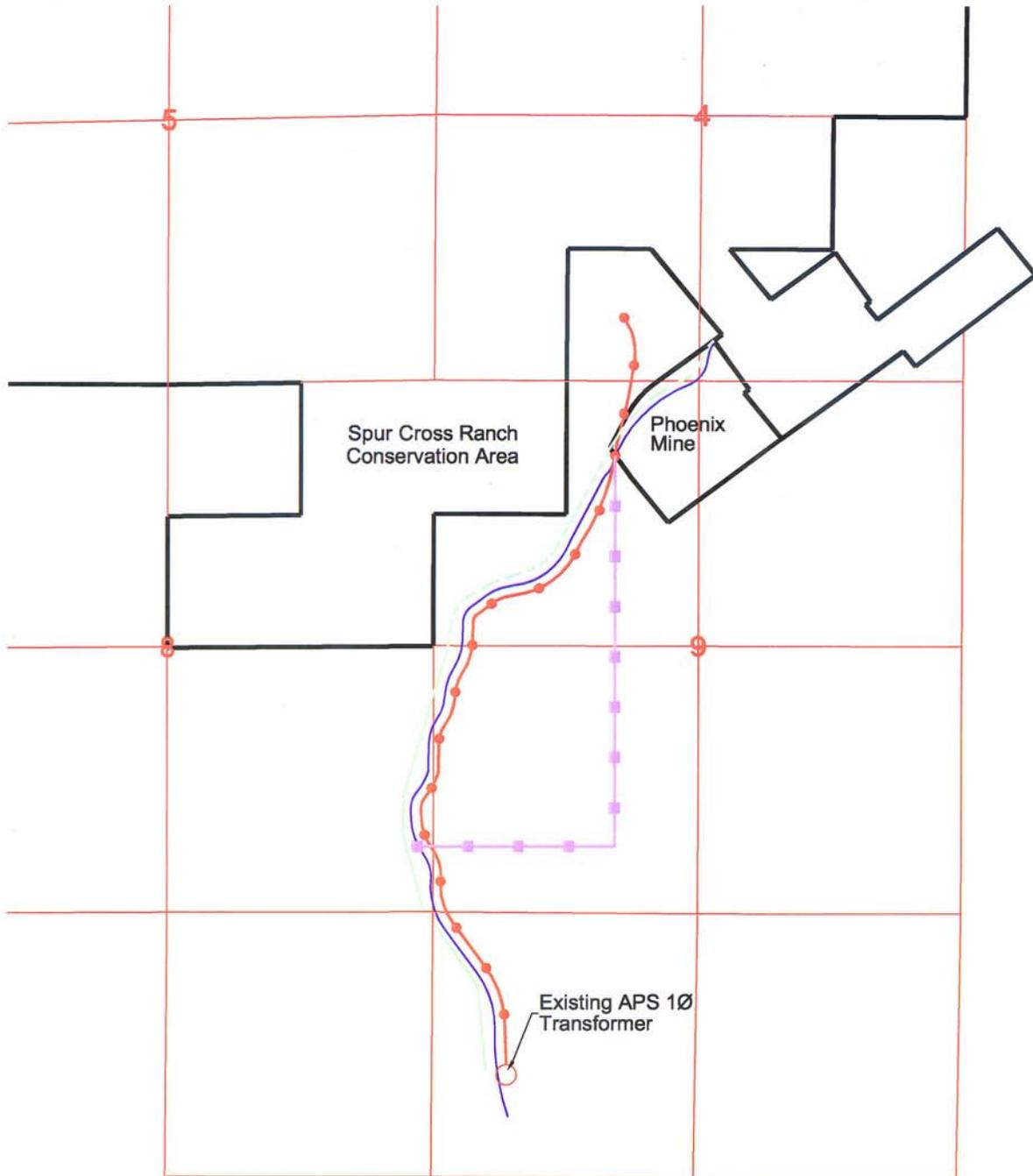
utility transformer is overhead and is located at 44404 N. Spur Cross Rd., approximately 6,767 feet from the SCRCA property line (see Figure XI-12). This power would be brought in overhead with APS incurring cable costs for the first 1,000 feet. Initial load calculations for each programmed facility as well as outdoor lighting have been studied. At 120/240 volts single-phase, it is estimated that an 800A Service Entrance Section will be required. See Appendix H for estimated electrical calculations.

Although no large power needs are anticipated, such as motor installations that would require three-phase service, the closest three-phase utility transformer, cabinet MSC12079 is located on the southeastern corner of Spur Cross Road and Camino De La Cruz Drive, approximately 8,580 feet from the SCRCA property line. According to APS, three-phase power if required, would be brought in underground. With motor installations, loads, and voltage drop taken into consideration, it is estimated that four 4-inch conduits would be needed. Again, only if needed, it is estimated that the cost of this conduit along with trench and backfill would be approximately \$595,000. Conductor costs would be incurred by APS. Three-phase costs are not included in the facility cost estimate, Section XII.

Telecommunications

Initial coordination occurred with Qwest to bring telephone service to SCRCA. The contact for Qwest is presently Carson Ortega, 602-630-1426. Mr. Ortega will be changing positions in the near future and Andy Andrade, 602-630-5093, will be taking his place. According to Qwest, the closest Qwest facilities are near the southwest corner of the Phoenix Mine site, which is approximately 1,900 feet away from the Education Center (see Figure XI-12). Onsite Qwest lines can be buried in a common trench with APS, where the customer will then be responsible for the cost from the property line on.

Should three-phase power be required and run underground, Qwest would also follow in the APS trench, running their cables underground. In that case, the customer would be responsible for the cost of all Qwest conduit and any trenching where Qwest could not be combined in the same trench as APS.



LEGEND

- Spur Cross Road
- Existing Overhead Electric Line 1Ø
- Existing 12" Water Line
- - -●- - - Proposed 12" Water Line
- - -■- - - Proposed 8" Water Line
- - -■- - - Existing Telephone

Figure X-I-12: Infrastructure

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SECTION XII: ESTIMATE AND CAPITAL IMPROVEMENT PROGRAM

Introduction

The following pages summarize the implementation strategy for development of the Facility Master Plan. The Order of Magnitude Estimate is presented as a very general approximation of the potential development costs associated with the proposed facilities. The Capital Improvement Program (CIP) is presented as a general guide for potential priority of development at SCRCA.

Order of Magnitude Cost Estimate

The estimate as presented identifies an order of magnitude estimate for two major areas of the SCRCA. The first grouping identifies On-Site Development, which includes all development that is proposed to occur on both SCRCA and the Phoenix Mine site. The second grouping identifies Off-Site Development, which includes all support and infrastructure development that is proposed to occur off SCRCA and the Phoenix Mine site proper. All values presented are in 2003 dollars with no escalation.

Seven and One-Half Year Capital Improvement Program

The CIP as presented identifies a schedule of priorities to guide the development of the facilities. Fiscal Year (FY) 2004, although half over, is included to identify priorities that are known to be immediate priorities even as the Master Plan is being concluded. As a matter of simplicity, design efforts are budgeted for the FY prior to construction.

With the exception of the Education Center, all proposed improvements are budgeted to be constructed in the 7-1/2 year CIP. This is based upon a yearly contribution of \$250,000 to the Capital Reserve Account from the Town of Cave Creek's 1/2-cent

SECTION XII: ESTIMATE AND CAPITAL IMPROVEMENT PROGRAM

sales tax, which is used solely for the purchase and maintenance of SCRCA. The CIP does not take into account possible funding grants for the CIP, which could include Historic Preservation, Heritage Funds, and Land and Water Conservation Fund grants to name but a few. Without additional funding sources, the Education Center will likely not be completed until after FY 2012.

Priorities

FY 2004 Design / FY 2005 Construction

- Equestrian Trailhead/Trailer Parking
- Boundary Signage
- Monument Sign
- Secondary Trails (First One-Half)
- Interpretive Trails (First One-Half)

FY 2005 Design / FY 2006 Construction

- Primary Trails (First One-Half)
- Rehabilitated Trails (First One-Half)
- Water Line, 12-inch and 8-inch

FY 2006 Design / FY 2007 Construction

- Maintenance Facility
- Secondary Trails (Second One-Half)
- Interpretive Trails (Second One-Half)

FY 2007 Design / FY 2008 Construction

- Primary Trails (Second One-Half)
- Rehabilitate Trails (Second One-Quarter)
- Trailhead, Trail Directional, and Interpretive Signage

FY 2008 Design / FY 2009 Construction

- No Activity

FY 2009 Design / FY 2010 Construction

- No Activity

FY 2010 Design / FY 2011 Construction



- Spur Cross Road and Landscaping
- Vehicle Parking Areas and Landscaping
- Landscaping of Trailer Parking
- Off-site Electrical
- On-Site Electrical Switch Gear and Parking Lighting

FY 2012+ Design and Construction

- Education Center and Landscaping
- Sewer and Telephone Infrastructure
- Security Lighting

SECTION XII: ESTIMATE AND CAPITAL IMPROVEMENT PROGRAM

Preliminary Facility Development Order of Magnitude Estimate

Project Title: Spur Cross Ranch Conservation Area Master Plan								
Project Job Number: 12749-024			Project Location: Maricopa County, Arizona					
Initial Date: 12/5/03			Computations by: AKR/MGP					
Revision Date: 1/16/04			All Values Represent 2003 Dollars					
Item	Description	Quantity	Unit	Unit Cost	Cost	Total Cost w/ 25% Contingency	16% Design, Permitting, & Const. Admin.*	Extended Cost
On-Site Development (SCRCA & Phoenix Mine)								
Education Center								
1.	Building Core	5,000	SF	\$200.00	\$ 1,000,000	\$ 1,250,000	\$ 200,000	\$ 1,450,000
2.	Retaining Wall for Building and Courtyard	5,760	SF	\$14.00	\$ 80,640	\$ 100,800	\$ 16,128	\$ 116,928
3.	Excavation	2,963	CY	\$3.00	\$ 8,889	\$ 11,111	\$ 1,778	\$ 12,889
Education Center Total					\$ 1,089,529	\$ 1,361,911	\$ 217,906	\$ 1,579,817
Maintenance Facility								
4.	Maintenance Building	750	SF	\$100.00	\$ 75,000	\$ 93,750	\$ 15,000	\$ 108,750
5.	Wall & Fencing	400	LF	\$100.00	\$ 40,000	\$ 50,000	\$ 8,000	\$ 58,000
6.	4" Aggregate Base Course	1,200	SY	\$8.00	\$ 9,600	\$ 12,000	\$ 1,920	\$ 13,920
7.	Fencing, Miscellaneous Facility Construction	1	LS	\$20,000.00	\$ 20,000	\$ 25,000	\$ 4,000	\$ 29,000
Maintenance Facility Total					\$ 144,600	\$ 180,750	\$ 28,920	\$ 209,670
Spur Cross Road								
8.	Subgrade Preparation / Misc. Grading (6" Depth)	3,310	SY	\$2.00	\$ 6,620	\$ 8,275	\$ 1,324	\$ 9,599
9.	4" Aggregate Base Course	3,310	SY	\$8.00	\$ 26,480	\$ 33,100	\$ 5,296	\$ 38,396
10.	Chip Seal (Dust Control)	1,335	SY	\$2.00	\$ 2,670	\$ 3,338	\$ 534	\$ 3,872
11.	4" Wide White Paint Stripe	500	LF	\$0.30	\$ 150	\$ 188	\$ 30	\$ 218
12.	24" CMP Culvert Pipe	300	LF	\$45.00	\$ 13,500	\$ 16,875	\$ 2,700	\$ 19,575
13.	24" Flared End Sections	12	EA	\$300.00	\$ 3,600	\$ 4,500	\$ 720	\$ 5,220
Roadway Total					\$ 53,020	\$ 66,276	\$ 10,604	\$ 76,880
Vehicle Parking Areas								
14.	Subgrade Preparation / Misc. Grading (6" Depth)	4,140	SY	\$2.00	\$ 8,280	\$ 10,350	\$ 1,656	\$ 12,006
15.	2" AC/4" ABC Asphaltic Pavement	4,140	SY	\$15.00	\$ 62,100	\$ 77,625	\$ 12,420	\$ 90,045
16.	4" Wide White Paint Stripe	810	LF	\$0.30	\$ 243	\$ 304	\$ 49	\$ 353
17.	4" Wide Yellow Paint Stripe	240	LF	\$0.30	\$ 72	\$ 90	\$ 14	\$ 104
18.	Preformed H/C Symbol	5	EA	\$100.00	\$ 500	\$ 625	\$ 100	\$ 725
19.	8' Wide Concrete Sidewalk	5,520	SF	\$3.00	\$ 16,560	\$ 20,700	\$ 3,312	\$ 24,012
Parking Areas Total					\$ 87,755	\$ 109,694	\$ 17,551	\$ 127,245
Equestrian Trailhead/Trailer Parking								
20.	Subgrade Preparation / Misc. Grading (6" Depth)	7,580	SY	\$2.00	\$ 15,160	\$ 18,950	\$ 3,032	\$ 21,982
21.	4" Aggregate Base Course	7,580	SY	\$8.00	\$ 60,640	\$ 75,800	\$ 12,128	\$ 87,928
22.	Equestrian Site Furnishings (Hitching Posts, Water Troughs, Etc.)	1	LS	\$5,000.00	\$ 5,000	\$ 6,250	\$ 1,000	\$ 7,250
Equestrian Trailhead Total					\$ 80,800	\$ 101,000	\$ 16,160	\$ 117,160
Landscape Development								
23.	36" Box Trees	50	EA	\$450.00	\$ 22,500	\$ 28,125	\$ 4,500	\$ 32,625
24.	24" Box Trees	200	EA	\$250.00	\$ 50,000	\$ 62,500	\$ 10,000	\$ 72,500
25.	5-Gal. Material (Shrubs)	1,000	EA	\$18.00	\$ 18,000	\$ 22,500	\$ 3,600	\$ 26,100
26.	1-Gal. Material (Groundcovers)	2,000	EA	\$7.00	\$ 14,000	\$ 17,500	\$ 2,800	\$ 20,300
27.	Drip Irrigation System (per Emitter)	4,100	EA	\$12.00	\$ 49,200	\$ 61,500	\$ 9,840	\$ 71,340
Landscape Development Total					\$ 153,700	\$ 192,125	\$ 30,740	\$ 222,865

**Preliminary Facility Development
Order of Magnitude Estimate**

Item	Description	Quantity	Unit	Unit Cost	Cost	Total Cost w/ 25% Contingency	16% Design, Permitting, & Const. Admin.*	Extended Cost
Utilities - Water								
28.	8" Ductile Iron Pipe	1,400	LF	\$25.00	\$ 35,000	\$ 43,750	\$ 7,000	\$ 50,750
29.	8" Gate Valve w / Box and Cover	5	EA	\$800.00	\$ 4,000	\$ 5,000	\$ 800	\$ 5,800
30.	Fire Hydrant Assembly	6	EA	\$2,000.00	\$ 12,000	\$ 15,000	\$ 2,400	\$ 17,400
Utilities - Sewer								
31.	6" Sewer Pipe	600	LF	\$25.00	\$ 15,000	\$ 18,750	\$ 3,000	\$ 21,750
32.	Sanitary Sewer Manhole	2	EA	\$2,000.00	\$ 4,000	\$ 5,000	\$ 800	\$ 5,800
33.	Septic Tank (5,000 Gal)	1	EA	\$10,000.00	\$ 10,000	\$ 12,500	\$ 2,000	\$ 14,500
34.	Leach Field	1	LS	\$30,000.00	\$ 30,000	\$ 37,500	\$ 6,000	\$ 43,500
Utilities-Electric								
35.	Electrical Switch Gear & Equipment	1	LS	\$25,000.00	\$ 25,000	\$ 31,250	\$ 5,000	\$ 36,250
36.	Parking Area Lights (inc. conduit & conductors)	15	EA	\$3,500.00	\$ 52,500	\$ 65,625	\$ 10,500	\$ 76,125
37.	Area Security Lights	8	EA	\$3,000.00	\$ 24,000	\$ 30,000	\$ 4,800	\$ 34,800
Utilities-Telephone								
38.	4" PVC Conduit	1,900	LF	\$12.50	\$ 23,750	\$ 29,688	\$ 4,750	\$ 34,438
Utilities Total					\$ 235,250	\$ 294,063	\$ 47,050	\$ 341,113
Signage								
39.	Boundary Identification - Large, Sign Type A	3	EA	\$1,700.00	\$ 5,100	\$ 6,375	\$ 2,550	\$ 8,925
40.	Boundary Identification - Small, Sign Type B	5	EA	\$500.00	\$ 2,500	\$ 3,125	\$ 1,250	\$ 4,375
41.	Trailhead / Trail Junction Marker, Sign Type C	3	EA	\$7,500.00	\$ 22,500	\$ 28,125	\$ 11,250	\$ 39,375
42.	Trail Directional / Regulatory, Sign Type D	15	EA	\$2,000.00	\$ 30,000	\$ 37,500	\$ 15,000	\$ 52,500
43.	Interpretative with Informational Panel, Sign Type E	10	EA	\$3,500.00	\$ 35,000	\$ 43,750	\$ 17,500	\$ 61,250
44.	Interpretative Marker, Sign Type F	12	EA	\$500.00	\$ 6,000	\$ 7,500	\$ 3,000	\$ 10,500
45.	Monument Sign	1	LS	\$30,000.00	\$ 30,000	\$ 37,500	\$ 15,000	\$ 52,500
Signage Total					\$ 131,100	\$ 163,875	\$ 65,550	\$ 229,425
Trails								
46.	Primary Trails	5.03	MILE	\$20,000.00	\$ 100,600	\$ 125,750	\$ 20,120	\$ 145,870
47.	Secondary Trails	6.56	MILE	\$15,000.00	\$ 98,400	\$ 123,000	\$ 19,680	\$ 142,680
48.	Interpretative Trail	0.50	MILE	\$30,000.00	\$ 15,000	\$ 18,750	\$ 3,000	\$ 21,750
49.	Rehabilitated Trail	2.33	MILE	\$15,000.00	\$ 34,950	\$ 43,688	\$ 6,990	\$ 50,678
Trails Total					\$ 248,950	\$ 311,188	\$ 49,790	\$ 360,978
On-Site Development Total					\$ 2,224,704	\$ 2,780,882	\$ 484,271	\$ 3,265,153
Off-Site Development								
Water Line Extension								
50.	12" Ductile Iron Pipe	1,980	LF	45.00	\$89,100	\$ 111,375	\$ 17,820	\$129,195
51.	12" Gate Valve w/ Box and Cover	4	Ea.	1,200.00	\$4,800	\$ 6,000	\$ 960	\$6,960
Water Line Extension Total					\$93,900	\$117,375	\$18,780	\$136,155
Electrical Service (1-Phase Power)								
52.	Trench and Backfill	6,767	LF	2.00	\$13,534	\$ 16,918	\$ 2,707	\$19,625
53.	4" PVC Conduit (2 Total)	13,544	LF	12.50	\$169,300	\$ 211,625	\$ 33,860	\$245,485
Electrical Service Total					\$182,834	\$228,543	\$36,567	\$265,110
Off-Site Development Total					\$276,734	\$345,918	\$55,347	\$401,265
Summary								
On-Site Development Total					\$2,224,704	\$2,780,882	\$484,271	\$3,265,153
Off-site Development Total					\$276,734	\$345,918	\$55,347	\$401,265
Summary Total					\$2,501,438	\$3,126,800	\$539,618	\$3,666,418

SECTION XII: ESTIMATE AND CAPITAL IMPROVEMENT PROGRAM

**Preliminary Facility Development
7 1/2-Year Capital Improvement Program**

Project Title: Spur Cross Ranch Conservation Area Master Plan													
Project Job Number: 12749-024			Project Location: Maricopa County, Arizona										
Initial Date: 12/5/03			Computations by: AKR/MGP										
Revision Date: 1/16/04			All Values Represent 2003 Dollars										
Item	Description	Total Cost w/ 25% Contingency	16% Design, Permitting, & Const. Admin.* **	Extended Cost	FY2004 (Quarters 3 & 4)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012+
On-Site Development (SCRCA & Phoenix Mine)													
Education Center													
1.	Building Core	\$ 1,250,000	\$ 200,000	\$ 1,450,000									\$ 1,450,000
2.	Retaining Wall for Building and Courtyard	\$ 100,800	\$ 16,128	\$ 116,928									\$ 116,928
3.	Excavation	\$ 11,111	\$ 1,778	\$ 12,889									\$ 12,889
	Education Center Total	\$ 1,361,911	\$ 217,906	\$ 1,579,817	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,579,817
Maintenance Facility													
4.	Maintenance Building	\$ 93,750	\$ 15,000	\$ 108,750			\$ 7,500	\$ 101,250					\$ -
5.	Wall & Fencing	\$ 50,000	\$ 8,000	\$ 58,000			\$ 4,000	\$ 54,000					\$ -
6.	4" Aggregate Base Course	\$ 12,000	\$ 1,920	\$ 13,920			\$ 960	\$ 12,960					\$ -
7.	Fencing, Miscellaneous Facility Construction	\$ 25,000	\$ 4,000	\$ 29,000			\$ 2,000	\$ 27,000					\$ -
	Maintenance Facility Total	\$ 180,750	\$ 28,920	\$ 209,670	\$ -	\$ -	\$ 14,460	\$ 195,210	\$ -	\$ -	\$ -	\$ -	\$ -
Spur Cross Road													
8.	Subgrade Preparation / Misc. Grading (6" Depth)	\$ 8,275	\$ 1,324	\$ 9,599							\$ 662	\$ 8,937	\$ -
9.	4" Aggregate Base Course	\$ 33,100	\$ 5,296	\$ 38,396							\$ 2,648	\$ 35,748	\$ -
10.	Chip Seal (Dust Control)	\$ 3,338	\$ 534	\$ 3,872							\$ 267	\$ 3,605	\$ -
11.	4" Wide White Paint Stripe	\$ 188	\$ 30	\$ 218							\$ 15	\$ 203	\$ -
12.	24" CMP Culvert Pipe	\$ 16,875	\$ 2,700	\$ 19,575							\$ 1,350	\$ 18,225	\$ -
13.	24" Flared End Sections	\$ 4,500	\$ 720	\$ 5,220							\$ 360	\$ 4,860	\$ -
	Roadway Total	\$ 66,276	\$ 10,604	\$ 76,880	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,302	\$ 71,578	\$ -
Vehicle Parking Areas													
14.	Subgrade Preparation / Misc. Grading (6" Depth)	\$ 10,350	\$ 1,656	\$ 12,006							\$ 828	\$ 11,178	\$ -
15.	2" AC/4" ABC Asphaltic Pavement	\$ 77,625	\$ 12,420	\$ 90,045							\$ 6,210	\$ 83,835	\$ -
16.	4" Wide White Paint Stripe	\$ 304	\$ 49	\$ 353							\$ 25	\$ 329	\$ -
17.	4" Wide Yellow Paint Stripe	\$ 90	\$ 14	\$ 104							\$ 7	\$ 97	\$ -
18.	Preformed H/C Symbol	\$ 625	\$ 100	\$ 725							\$ 50	\$ 675	\$ -
19.	8' Wide Concrete Sidewalk	\$ 20,700	\$ 3,312	\$ 24,012							\$ 1,656	\$ 22,356	\$ -
	Parking Areas Total	\$ 109,694	\$ 17,551	\$ 127,245	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 8,776	\$ 118,470	\$ -

**Preliminary Facility Development
7 1/2-Year Capital Improvement Program**

Item	Description	Total Cost w/ 25% Contingency	16% Design, Permitting, & Const. Admin.* **	Extended Cost	FY2004 (Quarters 3 & 4)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012+
Equestrian Trailhead/Trailer Parking													
20.	Subgrade Preparation / Misc. Grading (6" Depth)	\$ 18,950	\$ 3,032	\$ 21,982	\$ 1,516	\$ 20,466							\$ -
21.	4" Aggregate Base Course	\$ 75,800	\$ 12,128	\$ 87,928	\$ 6,064	\$ 81,864							\$ -
22.	Equestrian Site Furnishings (Hitching Posts, Water Troughs, Etc.)	\$ 6,250	\$ 1,000	\$ 7,250	\$ 500	\$ 6,750							\$ -
	Equestrian Trailhead Total	\$ 101,000	\$ 16,160	\$ 117,160	\$ 8,080	\$ 109,080	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Landscape Development													
23.	36" Box Trees	\$ 28,125	\$ 4,500	\$ 32,625							\$ 1,125	\$ 15,188	\$ 16,313
24.	24" Box Trees	\$ 62,500	\$ 10,000	\$ 72,500							\$ 2,500	\$ 33,750	\$ 36,250
25.	5-Gal. Material (Shrubs)	\$ 22,500	\$ 3,600	\$ 26,100							\$ 900	\$ 12,150	\$ 13,050
26.	1-Gal. Material (Groundcovers)	\$ 17,500	\$ 2,800	\$ 20,300							\$ 700	\$ 9,450	\$ 10,150
27.	Drip Irrigation System (per Emitter)	\$ 61,500	\$ 9,840	\$ 71,340							\$ 2,460	\$ 33,210	\$ 35,670
	Landscape Development Total	\$ 192,125	\$ 30,740	\$ 222,865	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,685	\$ 103,748	\$ 111,433
Utilities - Water													
28.	8" Ductile Iron Pipe	\$ 43,750	\$ 7,000	\$ 50,750		\$ 3,500	\$ 47,250						\$ -
29.	8" Gate Valve w / Box and Cover	\$ 5,000	\$ 800	\$ 5,800		\$ 400	\$ 5,400						\$ -
30.	Fire Hydrant Assembly	\$ 15,000	\$ 2,400	\$ 17,400		\$ 1,200	\$ 16,200						\$ -
Utilities - Sewer													
31.	6" Sewer Pipe	\$ 18,750	\$ 3,000	\$ 21,750									\$ 21,750
32.	Sanitary Sewer Manhole	\$ 5,000	\$ 800	\$ 5,800									\$ 5,800
33.	Septic Tank (5,000 Gal)	\$ 12,500	\$ 2,000	\$ 14,500									\$ 14,500
34.	Leach Field	\$ 37,500	\$ 6,000	\$ 43,500									\$ 43,500
Utilities-Electric													
35.	Electrical Switch Gear & Equipment	\$ 31,250	\$ 5,000	\$ 36,250							\$ 2,500	\$ 33,750	\$ -
36.	Parking Area Lights (inc. conduit & conductors)	\$ 65,625	\$ 10,500	\$ 76,125							\$ 5,250	\$ 70,875	\$ -
37.	Area Security Lights	\$ 30,000	\$ 4,800	\$ 34,800									\$ 34,800
Utilities-Telephone													
38.	4" PVC Conduit	\$ 29,688	\$ 4,750	\$ 34,438							\$ 2,375	\$ 32,063	\$ -
	Utilities Total	\$ 294,063	\$ 47,050	\$ 341,113	\$ -	\$ 5,100	\$ 68,850	\$ -	\$ -	\$ -	\$ 10,125	\$ 136,688	\$ 120,350
Signage													
39.	Boundary Identification - Large, Sign Type A	\$ 6,375	\$ 2,550	\$ 8,925	\$ 1,913	\$ 7,013							\$ -
40.	Boundary Identification - Small, Sign Type B	\$ 3,125	\$ 1,250	\$ 4,375	\$ 938	\$ 3,438							\$ -
41.	Trailhead / Trail Junction Marker, Sign Type C	\$ 28,125	\$ 11,250	\$ 39,375				\$ 8,438	\$ 30,938				\$ -
42.	Trail Directional / Regulatory, Sign Type D	\$ 37,500	\$ 15,000	\$ 52,500				\$ 11,250	\$ 41,250				\$ -
43.	Interpretative with Informational Panel, Sign Type E	\$ 43,750	\$ 17,500	\$ 61,250				\$ 13,125	\$ 48,125				\$ -
44.	Interpretative Marker, Sign Type F	\$ 7,500	\$ 3,000	\$ 10,500				\$ 2,250	\$ 8,250				\$ -
45.	Monument Sign	\$ 37,500	\$ 15,000	\$ 52,500	\$ 11,250	\$ 41,250							\$ -
	Signage Total	\$ 163,875	\$ 65,550	\$ 229,425	\$ 14,100	\$ 51,700	\$ -	\$ 35,063	\$ 128,563	\$ -	\$ -	\$ -	\$ -



SECTION XII: ESTIMATE AND CAPITAL IMPROVEMENT PROGRAM

**Preliminary Facility Development
7 1/2-Year Capital Improvement Program**

Item	Description	Total Cost w/ 25% Contingency	16% Design, Permitting, & Const. Admin.* **	Extended Cost	FY2004 (Quarters 3 & 4)	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012+
Trails													
46.	Primary Trails	\$ 125,750	\$ 20,120	\$ 145,870		\$ 5,030	\$ 67,905	\$ 5,030	\$ 67,905				\$ -
47.	Secondary Trails	\$ 123,000	\$ 19,680	\$ 142,680	\$ 4,920	\$ 66,420	\$ 4,920	\$ 66,420					\$ -
48.	Interpretative Trail	\$ 18,750	\$ 3,000	\$ 21,750	\$ 750	\$ 10,125	\$ 750	\$ 10,125					\$ -
49.	Rehabilitated Trail	\$ 43,688	\$ 6,990	\$ 50,678		\$ 1,748	\$ 23,592	\$ 1,748	\$ 23,592				\$ -
	Trails Total	\$ 311,188	\$ 49,790	\$ 360,978	\$ 5,670	\$ 83,323	\$ 97,167	\$ 83,323	\$ 91,497	\$ -	\$ -	\$ -	\$ -
	On-Site Development Total	\$ 2,780,882	\$ 484,271	\$ 3,265,153	\$ 27,850	\$ 249,203	\$ 180,477	\$ 313,595	\$ 220,059	\$ -	\$ 31,888	\$ 430,483	\$ 1,811,600
Off-Site Development													
Water Line Extension													
50.	12" Ductile Iron Pipe	\$ 111,375	\$ 17,820	\$ 129,195		\$ 8,910	\$ 120,285						\$ -
51.	12" Gate Valve w/ Box and Cover	\$ 6,000	\$ 960	\$ 6,960		\$ 480	\$ 6,480						\$ -
	Water Line Extension Total	\$ 117,375	\$ 18,780	\$ 136,155	\$ -	\$ 9,390	\$ 126,765	\$ -					
Electrical Service (1-Phase Power)													
52.	Trench and Backfill	\$ 16,918	\$ 2,707	\$ 19,625							\$ 1,354	\$ 18,272	\$ -
53.	4" PVC Conduit (2 Total)	\$ 211,625	\$ 33,860	\$ 245,485							\$ 16,930	\$ 228,555	\$ -
	Electrical Service Total	\$ 228,543	\$ 36,567	\$ 265,110	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 18,284	\$ 246,827	\$ -
	Off-Site Development Total	\$ 345,918	\$ 55,347	\$ 401,265	\$ 0	\$ 9,390	\$ 126,765	\$ 0	\$ 0	\$ 0	\$ 18,284	\$ 246,827	\$ 0
Summary													
	On-Site Development Total	\$ 2,780,882	\$ 484,271	\$ 3,265,153	\$ 27,850	\$ 249,203	\$ 180,477	\$ 313,595	\$ 220,059	\$ 0	\$ 31,888	\$ 430,483	\$ 1,811,600
	Off-site Development Total	\$ 345,918	\$ 55,347	\$ 401,265	\$ 0	\$ 9,390	\$ 126,765	\$ 0	\$ 0	\$ 0	\$ 18,284	\$ 246,827	\$ 0
	Summary Total	\$ 3,126,800	\$ 539,618	\$ 3,666,418	\$ 27,850	\$ 258,593	\$ 307,242	\$ 313,595	\$ 220,059	\$ 0	\$ 50,171	\$ 677,310	\$ 1,811,600
	Capital Reserve Account				\$ 175,000	\$ 250,000							
	Capital Reserve Carry-Over (Prior Year)				\$ 0	\$ 147,150	\$ 138,558	\$ 81,316	\$ 17,721	\$ 47,662	\$ 297,662	\$ 497,491	\$ 70,182
	Capital Reserve Account (FY End)				\$ 147,150	\$ 138,558	\$ 81,316	\$ 17,721	\$ 47,662	\$ 297,662	\$ 497,491	\$ 70,182	

* Interpretive Signage Design, Permitting, and Const. Admin. Is Adjusted to 40%

** Design (8.0%) is Budgeted in the Year Prior to Construction (30% for Interpretive Signs)

SECTION XIII: PLANNING TEAM

Introduction

The SCRCA Master Plan process employed an extensive public participation plan to identify issues and concerns with SCRCA related to the conservation and protection of natural and cultural resources while providing for passive non-motorized day use recreation activities, interpretive, and education opportunities. This section contains the names and organizations of those who participated in the planning process.

Joint Planning Committee

Maricopa County Parks and Recreation Department

Roxana Rojo	Project Manager
John Gunn	SCRCA Supervisor
Ken Mouw	Engineering Manager

Town of Cave Creek

Ralph Mozilo	Vice Mayor
Lu Cartharius	Citizen

Arizona State Parks Department

Jay Ream	Assistant Director
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Arizona State Parks (other than JPC Members)

Ken Travous, Director

Maricopa County (other than JPC Members)

Maricopa County Board of Supervisors

Fulton Brock, District 1 Chairman

SECTION XIII: PLANNING TEAM

Don Stapley, District 2
Andrew Kunasek, District 3
Max Wilson, District 4
Mary Rose Wilcox, District 5

Maricopa County and Parks and Recreation Department

Bill Scalzo, Director
Allen Ockenfels, Trails Planner
Joe Ballengee, Trails Technician

Maricopa County Parks and Recreation Commission

Jack Stapley
Randy Virden
Laurel Arndt
Marcus Dell'Artino
Celeste Hamilton
Anne Lynch
Raul Chayrez

Town of Cave Creek (other than JPC Members)

Vincent Francia, Mayor
Grace Meeth, Town Council
Gilbert Lopez, Town Council
Terry Smith, Town Council
Shea Stanfield, Town Council
Jay Williams, Town Council
Usama Abujbarah, Town Manager

Stakeholders, Residents, and the General Public

Table XIII-1 contains the names of individuals who contributed to the planning process.

**Table XIII-1
Stakeholders, Residents, and the General Public**

Ms.	Alkin	Sue	Resident
Honorable	Allen	Carolyn	AZ House of Representatives
Ms.	Anderson	Jean	ASHA
Mr.	Anderson	Wayne	Town of Cave Creek
Mr.	Anderson	Lee	Spur Cross Stables
Ms.	Anderson	Rhonda	Spur Cross Stables
Mr.	Ardens	Jerry	ASHA
Mr.	Baker	Michael	Volunteers for Outdoor AZ
Mr.	Barcha	Ron	Resident
Mr.	Barela	Ron	Resident
Ms.	Barr	Sandy	Sierra Club – Gold Canyon Chapter
Mr.	Beadle	Paul	Resident
Ms.	Berry	Heather	Resident
Ms.	Bitton	Deb	Cave Creek Trail Rides
Mr.	Blackburn	James H.	Resident
Ms.	Bleeker	Jan	Arizona Mule Association
Mr.	Bourney	James	Maricopa Association of Governments
Ms.	Bradle	Mary	Resident
Ms.	Bradley	Stephanie	Resident
Mr.	Bradstock	Susie	Resident
Mr.	Brooks	Lloyd	Equine Consulting Services
Ms.	Bruess	Tina	Carefree/Cave Creek Chamber of Commerce
Mr.	Bune	Chuck	Eastside Landowners
Ms.	Burke	Bonnie	Resident
Mr.	Buskirk	Dale	Resident
Ms.	Byrne	Nan	Friends of Spur Cross
Mr.	Cafarella	Bob	City of Scottsdale Preservation Office
Ms.	Calhoun	Jean	The Nature Conservancy
Mr.	Cardis	Nicholas	Resident

SECTION XIII: PLANNING TEAM

**Table XIII-1
Stakeholders, Residents, and the General Public**

Mr.	Caughlin	John	Resident
Ms.	Chandler	Lori	Resident
Mr.	Charpio	Donald	Bureau of Land Management
Mr.	Childress	Ed	Resident
Dr.	Clark	Thom	Resident
Ms.	Clark	June	Resident
Ms.	Clement	Annette	Resident
Ms.	Clement	Gail	G. M. Clement & Associates
Mr.	Coder	Christopher	Yavapai-Apache Nation
Mr.	Cook	Chris	Yavapai-Apache Nation
Mr.	Cooper	Kyle	Arizona Game & Fish Department
Mr.	Cox	Robert	Resident
Mr.	Creighton	Bill	Resident
Mr.	Crook	Jim	ASHA
Ms.	Cryan	Da	Resident
Ms.	Cunningham	Theresa	Resident
Ms.	Darbyshire	Judy	AAS, FOS, SHPO/Site Stewards
Mr.	Dell'Artino	Marcus	Maricopa County Parks and Recreation Department
Mr.	Doyle	Mike	MCSO Search & Rescue
Mr.	Dreiseszun	Herb	Resident
Mr.	Egan	Charles	Resident
Ms.	Elam	Lila	Site Steward Coordinator
Mr.	Enos	Dallas	Salt River Pima-Maricopa Indian Community
Mr.	Estes	Chris	Resident
Ms.	Etal	Maureen Sue	Resident
Ms.	Fabrici	Carolyn	Resident
Ms.	Faeth	Laurie	The Nature Conservancy
Mr.	Farnsworth	Wayne	Arizona Public Service
Mr.	Ford	Dan	Rural Metro

**Table XIII-1
Stakeholders, Residents, and the General Public**

Mr.	Foster	Cindy	Resident
Mr.	Foster	Gary	Resident
Mr.	Foster	Norman	Resident
Mr.	Fox	Ed	Pinnacle West Capital Corp.
Mr.	Frank	Mark	Arizona Department of Water Resources
Mr.	Freedman	Joe	Resident
Mr. and Mrs.	Gary	Norman	Resident
Mr.	George	Jay	Cave Creek Water Company
Mr.	Gilbert	Gary	Salt River Pima-Maricopa Indian Community
Honorable	Gnant	Randall	AZ Senate
Mr.	Gordon	John	Cave Creek United School District
Ms.	Gosnell	Rita	Resident
Mr.	Green	Ronald	Resident
Dr.	Grim	Nancy	ASU Center for Environmental Studies
Mr.	Hackbarth	Mark	Arizona Site Stewards
Mr.	Halama	David	Arizona Game & Fish Department
Ms.	Halfman	Mary	Resident
Mr.	Hamilton	Clay	The Hopi Tribe
Mr.	Haughey	Russ	Arizona Game & Fish
Ms.	Hayden	Nancy	Yavapai-Prescott Indian Tribe
Honorable	Hayworth	J.D.	U.S. House of Representatives
Ms.	Hazelton	Jacque	Resident
Mr.	Heaney	Joe	Resident
Mr.	Henry	Tom	Resident
Ms.	Henry	Nena	Rio Verde Horse Association
Mr.	Huff	William	Resident
Mr.	Hulen	Thom	Desert Foothills Land Trust
Mr.	Hurst	Joshua	Arizona Game & Fish

**Table XIII-1
Stakeholders, Residents, and the General Public**

Mr.	Iger	Jonathon	Resident
Ms.	Jackson	Lynn	Cave Creek Trails/Saddle Club
Ms.	Johnson	Evelyn	Cave Creek Museum
Mr.	Johnson	Cliff	6L Ranch
Ms.	Johnson Grove	Janet	Tonto National Forest
Mr.	Jones	Clark	Resident
Mr.	Jones	Pat	Resident
Mr.	Jones	Steve	Desert Foothills Land Trust
Mr.	Jones, Sr.	Ernest	Yavapai-Prescott Indian Tribe
Mr.	Keen	Larry	Resident
Mr.	Keller	Greg	Arizona State Land, Planning, Real Estate Division
Mr.	Kennedy	John	Arizona Game & Fish
Ms.	Kingham	Deborah	AQHA, Happy Hoofers, AZ Cowgirls
Ms.	Kipen	Judy	Hiker & Trail Rider, Cave Creek Saddle Club
Ms.	Kisic	Isabela	Arizona Commission of Indian Affairs
Mr.	Klertz	Carl	Resident
Mr.	Krichbaum	Rick	Resident
Ms.	Krol	Debra	Arizona Commission of Indian Affairs
Mr.	Kullman	Joe	Scottsdale Tribune
Honorable	Kunasek	Andrew	Maricopa County Board of Supervisors – District 3
Mr.	Kuwanwisiwma	Leigh	The Hopi Tribe
Honorable	Kyl	John	Senator John Kyl's Office
Ms.	Laizure	Nancy	Resident
Mr.	Langhammer	Fred	Resident
Mr.	Lare	Dan	URS Corporation
Ms.	Lee	Brenda	Resident
Ms.	Lehman	Michelle	Arizona Public Service

**Table XIII-1
Stakeholders, Residents, and the General Public**

Ms.	Leisel	Lana	Resident
Mr.	Lewis	Barnaby	Gila River Indian Community
Mr.	Lockart	Kevin	Bike Barn
Mr.	Lopez	Delvin	U.S. Forest Service, Cave Creek Ranger District
Mr.	Lorance	Dick	Coalition of Arizona Bicyclists
President	Makil	Ivan	Salt River Pima-Maricopa Indian Community
Ms.	Mannes	Amy	Arizona Department of Water Resources
Ms.	Maree	Tahana	Sun Bunny Studio
Ms.	Markowitz	Andrea	Resident
Ms.	Marquez	Kathrine	Yavapai-Apache Nation
Ms.	Mattson	Marcy-Jean	Fort McDowell Yavapai Nation
Ms.	McCafferty	Sheila	Arizona State Land Department
Honorable	McCain	John	Senator John McCain's Office
Mr.	McCormick	Sandy	Resident
Mr.	McCormick	Gary	Resident
Mr.	McGeary	Dennis "Mac"	Glendale Hiking Club
Mr.	McGuire	Thomas	Docent and Cave Creek Resident
Ms.	McIntire	Angie	Arizona Game & Fish Department
Ms.	McNeely	Kay	Arizona Department of Water Resources
Ms.	Meeth	Grace	Town of Cave Creek
Mr.	Miller	Vern	Resident
Mr.	Miller	Brian	Town of Cave Creek
Ms.	Miller	Joanne	Arizona State Historic Preservation Office
Ms.	Miller	Patsy	Foothills Community Foundation
Mr.	Mills	Gretchen	Black Mountain Conservancy

**Table XIII-1
Stakeholders, Residents, and the General Public**

Mr.	Mills	Dave	Black Mountain Conservancy
Ms.	Montiel	Alida	Inter Tribal Council of Arizona, Inc.
Ms.	Moodey	Lillian	Arizona State Land Department
Ms.	Mooreman	Bonnie	Resident
Mr.	Morgan	Edward C.	Resident
Mr.	Morgart	Terry	The Hopi Tribe
Mr.	Morris	G.E.	Arizona Morgan Horse Association
Ms.	Mozilo	Patricia	AAS, Site Steward, Cave Creek Saddle Club
Mr.	Mueller	Fred	Desert Awareness Committee/Board of Adjustment
Ms.	Mulchay	Ann	Resident
Ms.	Newcomer	Jean	Resident
Mr.	Noonan	Michael P.	Cave Creek Bikes
Ms.	O'Brien	Barbara	Resident
Mr.	O'Reilly	Tom	Cave Creek Saddle Club
Ms.	Overholser	Sonia	Mountain Bikers Association of Arizona
Mr.	Owings Family		Resident
Ms.	Paisley	Jim	Resident
Ms.	Paisley	Jean	Resident
Mr.	Palmer	Kyle	Arizona Department of Environmental Quality – Water Quality
President	Pattea	Clinton	Fort McDowell Yavapai Nation
Mr.	Peacock	Rick	Wild West Jeep Tours
Mr.	Pearson	Jon	Town of Carefree
Ms.	Pearson	Jean	Resident
Mr.	Pello	Lee	Resident
Mr.	Pello	Rich	Resident

**Table XIII-1
Stakeholders, Residents, and the General Public**

Mr.	Peters	Scott	Resident
Mr.	Pfeifer	Fred	APS Hiking Club
Ms.	Phelps	Melanie	Foothills Community Foundation
Mr.	Pixley	Hank	Resident
Ms.	Poulos	Brenda	Cave Creek Branch of Arizona Archaeological Society
Mr.	Randall	Art	Wild West Jeep Tours
Mr.	Ray	Earl	Salt River Pima-Maricopa Indian Community
Mr.	Reams	Jay	Arizona State Parks
Ms.	Reane	Carli	Resident
Ms.	Reznik	Joanne	Resident
Mr.	Richardson	Alan	Desert Advocate
Mr.	Riggs	Curtis	The Sonoran News
Mr.	Ringo	Johnny	Carefree Adventures
Ms.	Rojo	Roxana	Maricopa County Parks & Recreation Department
Mr.	Rosenbaum	Fred	Desert Foothills Land Trust
Mr.	Rosenthal	Gerald	Resident
Ms.	Ross	Michelle	Resident
Mr.	Ross	George	Red Dog Homeowners Association
Mr.	Rubins	Ira	Arizona Parks & Recreation Association
Ms.	Russ	Donna	Cave Creek Saddle Club
Mr.	Russel	Aaron	Yavapai-Apache Nation
Ms.	Sams	Mary Alice	Resident
Mr.	Schneeman	John	Arizona Department of Water Resources
Ms.	Schoonover	Grace	Cave Creek Branch of Arizona Archaeological Society
Mr.	Schuetz	Bob	APS Hiking Club
Mr.	Schwartz	I.	Resident

**Table XIII-1
Stakeholders, Residents, and the General Public**

Ms.	Seitts	P.A.	Desert Foothills Land Trust
Mr.	Siderits	Karl	Tonto National Forest
Mr.	Sigmund	Frank	Resident
Mr.	Simpson	Randy C.	Resident
Ms.	Smillie	Patricia	CCSC
Mr.	Smith	Terry	Cave Creek Westside Trail Coordinator
Ms.	Smith	Karen	Arizona Department of Environmental Quality – Water Quality
Mr.	Smith	Joseph C.	Arizona Department of Water Resources
Mr.	Smith	Wesley	Resident
Mr.	Sopletean	Caleb	Desert Advocate
Mr.	Sorchych	Don	Sonoran News
Ms.	Stanfield	Shea	Cave Creek Town Council
Mr.	Steuter	Don	Sierra Club
Ms.	Stuckey	JoAnn	Cave Creek Museum
Ms.	Stump	Nancy	Governor's Office
Ms.	Svitak	Susan	Desert Foothills Land Trust
Ms.	Sydenham	Deb	Arizona Department of Commerce
Mr.	Taylor	Carl	Tonto National Forest
Mr.	Taylor, Jr.	Wayne	The Hopi Tribe
Mr.	Thurber	Walter	Resident
Ms.	Thurmond	Wendy	Resident
Mr.	Thurmond	Tim	Resident
Ms.	Tischer	Mary Lynn	Resident
Mr.	Tower	Art	Arizona State Land Department
Ms.	Vaccani	Maria	Resident
Mr.	Van Ausdale	Bill	Maricopa County Parks and Recreation Department, Deputy Director

**Table XIII-1
Stakeholders, Residents, and the General Public**

Mr.	Walker	Jim	Resident
Ms.	Walton	Sherrie	Resident
Ms.	Watrus	Sondra	Cave Creek Saddle Club
Ms.	Williams	Christine	Resident
Mr.	Wilson	Dave	Resident
Mr.	Wilson	Dow	Resident
Ms.	Woodward	Audrey	Resident
Mr.	Yarchin	Joe	Arizona Game & Fish Department
Ms.	Yoke	Lorenda	Trail Horse Adventures
Mr.	Ziskovsky	Frank	Cave Creek Saddle Club

Planning Consultants

URS Corporation

Michael Park	Project Manager
Richard Knox	LAC Coordinator
Dr. Gene Rogge	Cultural Resources
Eric Cox	Cultural Resources
Dr. Mark Murphy	Water Resources
Dr. Joseph Platt	Biological Resources
Jean Charpentier	Biological Resources
Annie DeChance	Public Involvement
Shenya Wisdom	Acoustical Resources
Dan Lare	Design Principal
Robert Pankonin	Landscape Architecture
James English	Landscape Architecture
Al Robinson	Civil Engineering
Peter Martinez	GIS
Jenn Wennerlund	GIS
Richard Stuhan	GIS
Anita Richardson	GIS
Patty Renter	GIS
Jen Pyne	Peer Review

Shirley Wiley	Technical Editing
Meg Quarrie	Word Processing
Lisa Uribe	Word Processing

Partners for Strategic Action

Peggy Fiandaca	Public Involvement
Curtis Dunham	Public Involvement

University of Arizona

Dr. Randy Gimblett	Recreation Modeling
--------------------	---------------------

Jones Studio

Neal Jones	Architecture
Eddie Jones	Architecture
Brian Farling	Architecture

Thinking Caps

Ann Morton	Graphic Design
Lisa Ranzenberger	Graphic Design

CR Engineers

Catherine Alcorn	Electrical Engineering
Carol Geno	Electrical Engineering

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More information on the RBSim approach can be obtained at the following URL:

<http://www.snr.arizona.edu/~gimblett/RBSimBibliography.htm>