

DRAFT

Resources of the Cienega Rincon Subarea

Sonoran Desert Conservation Plan

May 2000



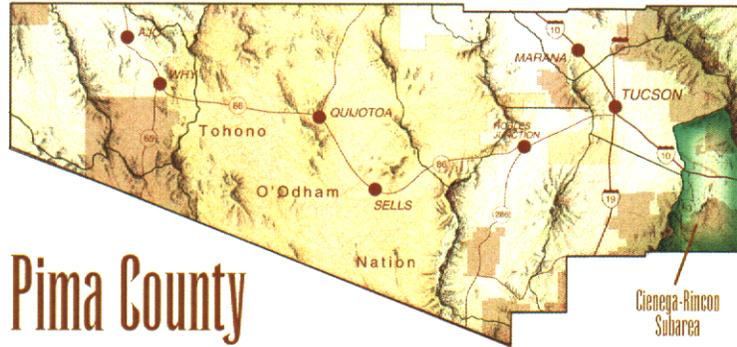
**Pima County
Board of Supervisors**

Mike Boyd, District 1
Dan Eckstrom, District 2
Sharon Bronson, Chair, District 3
Raymond J. Carroll, District 4
Raúl M. Grijalva, District 5

County Administrator
Chuck Huckelberry

Draft 1

Sonoran Desert Conservation Plan



Pima County



Current and former inhabitants of Cienega-Rincon



MEMORANDUM

Date: May 8, 2000

To: The Honorable Chair and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

A handwritten signature in black ink, appearing to read "CHH", is written over the printed name "C.H. Huckelberry".

Re: *Resources of the Cienega-Rincon Valley*

I. **Background**

This memorandum provides a brief summary of a compilation of resource investigations that have been submitted so far, to help develop the Sonoran Desert Conservation Plan within the watershed planning area of the Cienega-Rincon Valley. The Steering Committee, interested members of the public, and stakeholding private citizens and governmental entities are invited to submit additional documents and comments. Presentations at the May 20, 2000 Steering Committee meeting will be followed by subarea land panel meetings for all interested parties so that topics ranging from biological, to riparian, to ranch, to cultural, land and fiscal resources can be discussed in greater detail. Contributions resulting from the subarea process will be forwarded to the Steering Committee, Technical Teams, and the Board of Supervisors for consideration.

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II. Habitat and Corridors Elements

Landowners Position Statements, SDCP and Davidson Canyon Natural Preserve

Attachment 1 is submitted by a group of landowners from the section of private land near the proposed Davidson Canyon Natural Preserve. The Andrada Property Owners Association, representing 240 acres of land east of the Old Sonoita Highway, have forwarded eight position statements which are summarized below:

- "The Sonoran Desert and the Davidson Canyon riparian area are valuable natural resources that contribute to the quality of our lives and should be protected for generations to come"
- "While the Andrada Property Owners respect the rights of the public to enjoy these natural resources, they also request that the public access to the proposed Davidson Canyon Natural Preserve be developed in a way that is respectful of our property rights and privacy of our homes."
- "The Andrada Property Owners have established a set of Covenants, Conditions, Restrictions and Water Rights (CC&Rs) which are consistent with preservation of the Sonoran Desert and the Davidson Canyon Natural Preserve while permitting the homeowners to live in harmony with the environment."
- "Neighboring ranches, the Andrada Ranch and the Bar V Ranch, engage in activities that are consistent with the intent of the Sonoran Desert Conservation Plan and should be supported in an effort to preserve open space."
- "Mining presents a clear and present threat to the Sonoran Desert Conservation Plan and the Davidson Canyon Natural Preserve."
- "Rapid and uncontrolled residential development presents another serious threat to the Sonoran Desert Conservation Plan and the Davidson Canyon Natural Preserve."
- "The State Land Department and State Land Commission must be active and supportive partners in the development of the Sonoran Desert Conservation Plan."
- "Pima County must prioritize a set of interim policies to prevent destruction of critical environments prior to full implementation of the Sonoran Desert Conservation Plan."

The Proposed Las Cienegas National Conservation Area

Attachment 2 is Resolution No. 1999-204, passed by the Board of Supervisors on October 5, 1999, in support of the proposed Las Cienegas National Conservation Area. The legislation proposed by Congressman Jim Kolbe for the Las Cienegas National Conservation Area is a practical and progressive response to natural resource and fiscal management issues in Pima County. It has broad public support and complements the goals of the Sonoran Desert Conservation Plan. The Sonoran Desert Conservation Plan includes six major elements, all of which are found in the land base that makes up the proposed Las Cienegas National Conservation Area. These elements are:

Ranch Conservation	Mountain Park Expansion
Historic and Cultural Preservation	Establishment of Biological Corridors
Riparian Restoration	Critical and Sensitive Habitat Protection

The National Conservation Area legislation provides the opportunity to consolidate public ownership and management of the Cienega watershed and set specific management guidelines to ensure conservation of riparian and grassland ecosystems. It also represents a milestone in the development of the Sonoran Desert Conservation Plan.

The origins of this proposal date back more than a decade. In 1987, Pima and Santa Cruz Counties urged the Arizona Congressional delegation to authorize the Bureau of Land Management (BLM) to acquire the privately-owned Empire-Cienega Ranch. Through subsequent land exchanges, the BLM acquired roughly 42,000 acres of deeded land and assumed management of another 57,000 acres of state grazing land. The acquisition marked the beginning of a local effort to control urban sprawl, maintain open space through ranch conservation, provide for public recreation, and protect native plants and wildlife. Toward this end, Pima County established Colossal Cave Mountain Park and Cienega Creek Natural Preserve and acquired several adjacent ranches at a cost of approximately \$14 million. These acquisitions brought nearly 5,800 acres into public ownership, and included management of over 31,000 acres of State Trust land leased for grazing.

Purpose of the Proposed Las Cienegas National Conservation Area

The proposed Congressional legislation will elevate the conservation status and establish a "Las Cienegas National Conservation Area." If enacted, it will be similar to the 1988 legislation which authorized the 56,000 acre San Pedro Riparian National Conservation Area in Cochise County.

Purpose - The stated purpose for establishing the Las Cienegas National Conservation Area is to "conserve, protect, and enhance for the benefit and enjoyment of present and future generations the unique and nationally important aquatic, wildlife, vegetative, agricultural, archaeological, paleontological, scientific, cave, cultural, historical, recreational, educational, scenic, rangeland, and riparian resources and value of the public land ... while allowing environmentally responsible and sustainable livestock grazing and recreation to continue in appropriate areas."

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Within this opening statement of the legislation, each of the six elements of the Sonoran Desert Conservation Plan finds support, including (1) Corridor Protection for wildlife; (2) Protection of Critical and Sensitive Habitat; (3) Riparian Restoration and water resource protection; (4) Mountain Park and recreation goals; (5) Ranch Conservation; and (6) Historic and Cultural Preservation.

As a watershed unit, the entire Las Cienegas basin also fits well within the ongoing process for developing the Sonoran Desert Conservation Plan. A July 1999 report to the Board described how research was being conducted in subarea planning units based on watersheds, since the riparian link to subareas enhances the ecosystem integrity of the Sonoran Desert Conservation Plan. The Cienega-Rincon watershed planning unit includes lands within the proposed Las Cienegas National Conservation Area.

Habitat and Corridor Considerations of the Las Cienega National Conservation Area

Preserving large blocks of suitable land and important wildlife movement corridors is necessary to maintain the present diversity of plant and animal life in the area. The BLM's acquisition of the Empire-Cienega Ranch in 1988 was a good start in this respect. BLM has, since then, substantially improved habitat conditions for several species of wildlife.

The southeast corner of Pima County plays an important role in the overall conservation plan. Traditionally, grassland in southern Arizona has been subject to extensive development, while mountainous land has been isolated in separate Coronado National Forest units, the so-called "sky islands."

But many wildlife species, principally large mammals and birds, depend at some point in the year upon the availability of lower elevation plant communities lying outside National Forest boundaries. The uplands are habitat for grassland-dependent wildlife such as the Chihuahuan Pronghorn, Baird's Sparrow and Sprague's Pipit.

The Las Cienegas National Conservation Area, particularly if it adopts management goals that are adaptive and developed in a manner consistent with the Sonoran Desert Conservation Plan, will preserve wildlife movement corridors linking a number of mountain ranges to the Cienega Creek corridor and adjacent grasslands. The area involved also allows animals to take advantage of local variations in rainfall and elevation, and to respond to periodic fires.

Riparian Protection as a Result of the Las Cienegas National Conservation Area

Depletion of water tables and surface water diversions have led to the loss of riparian habitat and to the precipitous decline in the populations of many species. The Science Technical Advisory Team for the Sonoran Desert Conservation Plan has received a report which found that over 100 plants and animals in Pima County are vulnerable. A disproportionate number of extirpated native species are (or were) dependent on aquatic habitat which is now lost.

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Riparian habitat itself has been targeted by the Team for protection under the Sonoran Desert Conservation Plan. Another report to the Team confirms the need for such attention; in answer to the question of what percentage of each vegetation community exists in public preserves, riparian habitat was found to be the most unprotected, with a range of 67 percent to 100 percent of the existing community lacking representation in the current system of public land preserves. Threats to the riparian resources and wildlife community within the proposed Las Cienegas National Conservation Area include the following:

1. Much of the proposed National Conservation Area lies outside the Tucson Active Management Area (TAMA), wherein groundwater pumping is restricted and water conservation measures are required. Even within the Tucson Active Management Area, measures are not taken to conserve the shallow water tables upon which riparian areas depend.
2. The Desert Fishes Recovery Team, comprised of scientists from a variety of state and federal agencies, has listed Cienega Creek as its top priority for protection. The remnant cienegas and desert wetlands along this stream are home to the endangered Gila Topminnow and Huachuca Water Umbel as well as the Lesser Long-nosed Bat. The Chiricahua Leopard Frog, Gila Chub, and Yellow-Billed Cuckoo also occur within the proposed National Conservation Area. These are species which may soon become listed as endangered or threatened .
3. In general, mesquite woodlands, fish, frogs and cottonwood trees along Cienega, Davidson, Wakefield, Mescal and Agua Verde Creeks all depend on the presence of a shallow water table..

Potential benefits from the Las Cienegas National Conservation Area include at least that perennial stream segments could be protected and restored, and thus contribute to recovery of several species listed under the Endangered Species Act.

Historic and Archeological Considerations of the Las Cienegas National Conservation Area

Over 615 archaeological sites have been recorded in the proposed National Conservation Area. Most of our knowledge of the life paths of prehistoric culture groups in southern Arizona are based on prehistoric adaptations to the Arizona upland component of the Sonoran Desert. Little research has been conducted in semi-arid and arid grassland environments of the Cienega Valley. Therefore, the potential difference in prehistoric adaptive strategies in grassland and Sonoran Desert environments is not well understood. Preservation of prehistoric sites in the Cienega Valley will allow the various prehistoric adaptive strategies to be studied and compared. Such comparisons are necessary to understand how culture groups respond to different environmental variables. Cienega Valley sites are also ideally situated to address questions relating to the social interaction of prehistoric culture groups occupying the Santa Cruz and San Pedro river valleys.

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The area also contains a number of historic sites worthy of conservation. Over 65 historic period sites associated with ranching, mining, and transportation activities have been identified. These sites include historic ranches (e.g., the Empire, Gardiner, O'Leary, Hopley and Kane ranch), historic towns (e.g., Greaterville and Pantano), mines (such as Total Wreck Mine and other mining claims), and historic travel routes (e.g., the Butterfield Stage Line, Southern Pacific Railroad, and historic road alignments of State Route 83 and 88).

Ranch Conservation Considerations of the Las Cienegas National Conservation Area

The proposed National Conservation Area supports the element of the Sonoran Desert Conservation concept which seeks to keep ranches from being subdivided. Today, ranching is giving way to subdivisions and second home development, and portions of the proposed National Conservation Area near Vail and Empirita Ranch have conditional zoning for urban, commercial, and industrial development. The Empire-Cienega Resource Conservation Area has become a laboratory for the exercise of a conservation ethic which reflects the growing understanding among the ranch community that science-based practices and protection of habitat lead to ecologically sound and financially viable ranching. The Las Cienegas National Conservation Area legislation promotes the continued extension of these practices to other neighboring ranches, while protecting them from urban encroachment.

Public Recreation Considerations of the Las Cienegas National Conservation Area

The proposed Las Cienegas National Conservation Area could facilitate the development of recreation management strategies. The recreation opportunities are numerous. The Arizona Trail corridor will pass through a considerable portion of the proposed NCA. The Arizona Trail is a 750 mile non-motorized recreational trail that stretches from Utah to Mexico, passing through some of Arizona's most scenic back country. The trail is now nearly 70 percent complete. It is open to hikers, equestrians and mountain bicyclists. Fifteen trails listed on the Eastern Pima County Trail System Master Plan (Pima County Ordinance No. 1996-75) cross or are located within the proposed National Conservation Area, including two utility corridor trails that will link with the Arizona Trail. These trails are presently being used for recreational purposes. Hunting areas in eastern Pima County have been reduced by development, but hunting is also occurring within the proposed Area and will be permitted under the proposed legislation.

Summary

By making a long term commitment to conserve natural resources in defined parts of the region, we will also create certainty for other land uses under within the region. The proposed National Conservation Area, consistent with the Pima County Sonoran Desert Conservation Plan initiated by the Board of Supervisors, holds a great deal of promise for the long term stability of the economic and natural resources of our region.

Excerpts, Biological Stress Assessment and Review of Vulnerable Species

Attachment 3 is the Cienega-Rincon chapter from the Biological Stress Assessment, issued by Recon consulting as part of the biological evaluation in March of 2000. The *Biological Stress Assessment* examines past land and water uses, existing uses, and some major uses foreseeable over the next 30 years in an effort to determine the greatest potential threats to vulnerable species within each watershed planning unit. The Cienega-Rincon subarea is discussed in pages 41 through 65 of the text. A summary of the stress analysis is available in Table 32, and reproduced in part below.

Areas and Habitats of Concern	Species, Federal Concern	Sources of Stress
Perennial stream flows	Gila topminnow	Population growth
Shallow ground water areas	Pygmy-owl	Conversion of ranches
Associated aquatic habitats	Huachuca water umbel	Groundwater pumping
Cottonwood-willow riparian areas	Mexican spotted owl	Increased lot splitting
Cienega marshlands	Yellow billed cuckoo	Existing zoning near preserve
Sacaton grassland areas	Lesser long nosed bat	Excavation of Pantano Wash
Cave habitats	Pima pineapple cactus	Recreational uses
Tributary connections		Invasive species
		Developable land near preserve
		High mineral resource areas

Potential threats and stressors to other vulnerable species in the Cienega-Rincon subarea, including species of federal concern, are discussed in the report such as the:

- Gila chub;
- Saiya;
- Apache northern goshawk;
- Needle-spined pineapple cactus;
- Western red bat;
- Box Canyon Muhly;
- Weeping Muhly;
- Pale Townsend's big-eared bat;
- Chiricahua Leopard Frog;
- Lowland Leopard Frog;
- Arizona Shrew; and
- Mexican Garter Snake.

III. Riparian Element

A report issued in April of 2000, entitled *Prioritization of Streams for Conservation in Pima County*, described a number of streams within watershed planning units and prioritized these streams according to their existing contribution to the overall conservation of biological diversity in Pima County. Streams that ranked in the top 20 by the following parameters are recommended for priority consideration in identifying areas for further analysis by the scientists assisting in the development of the Sonoran Desert Conservation Plan:

- perennial stream length and intermittent stream length
- area of hydro-mesoriparian vegetation and of xeroriparian Class A vegetation
- area of shallow groundwater
- presence of native fish.

Over 25 percent of the priority streams within the County are found within the Cienega Rincon subarea.

SDCP Planning Unit	Number of Priority Streams	Percentage of Total
1. Middle San Pedro	8	12
2. Cienega Rincon	17	26
3. Upper Santa Cruz	3	4
4. Middle Santa Cruz	9.5	15
5. Tortolita Fan	5.5	8
6A. Altar Valley	18	28
6B. Avra Valley	2	3
7. Tohono Nation	1	2
8. Western Pima Co.	1	2
Total	65	100

Pima County's Watersheds and Watercourses

Attachment 4 is a chapter of a watershed and watercourse study by authors including Barbara Tellman of the Arizona Water Resources Research Center. Human impacts on the Cienega-Rincon watershed are described, along with existing public and private land uses and projected land uses. The report identifies issues for discussion in achieving a goal of watercourse protection.

The Cienega-Rincon subarea is discussed in pages 81 through 90 of the text. The summaries of the (1) potential and existing impacts on the watercourses within the subarea, and (2) potential options for reducing stress on watercourses within the subarea, are reproduced below.

Potential and existing impacts on the watercourses in the Cienega-Rincon subarea

REGION WITHIN THE SUBAREA	GRAZING	WILDCAT SUBDIVISION	PLANNED SUBDIVISION	COPPER MINE	SAND & GRAVEL MINE	PUMPING	AGRI CULTURE	REC
CIENEGA CREEK	yes	yes	yes	potential	yes	yes		yes
RINCON VALLEY	yes	yes	yes		yes	yes		yes

Potential options for reducing stress on watercourses within the Cienega-Rincon subarea

REGION WITHIN THE SUBAREA	LESS PUMPING (ALT WATER)	NON STRUC FLOODPLAIN MANAGE	LAND USE MANAGE MENT	FEDERAL LAND, PROTECTION	STATE TRUST LAND PROTECTED	OTHER PRESERVE INCREASE	BETTER GRAZING
CIENEGA CREEK	potential	potential	potential	potential		potential	potential
RINCON VALLEY	potential	potential	potential	potential	potential	potential	

Issues suggested for discussion as part of the Sonoran Desert Conservation Plan

- Should efforts be taken to preserve surface water supplies?
- Should alternate sources of water, such as CAP, be provided to landowners?
- Are additional measures needed to prevent damage from downstream flooding?
- What should be done, if anything, to protect watercourses from mining?
- What measures, if any, should be taken to protect limestone caves and springs?
- Should the majority of the watershed become and NCA or have protection?

IV. Ranch Conservation Element

Ranching in the Cienega-Rincon Valley

Attachment 5 includes a descriptive summary of Ranching in the Cienega-Rincon Valley, drafted by Ms. Linda Mayro, the lead staff of the Ranch Conservation Team. Ranches in the area are described, along with grazing allotments, the carrying capacity per square mile by grazing allotment, the role of stock tanks and other ranch related resource topics.

V. Cultural Resources Element

Attachment 6 is a cultural and historic resources inventory report by Mr. David Cushman, the lead staff of the Cultural and Historic Resources Technical Team. Three kinds of resources are described: archaeological sites, historic resources, and traditional cultural resources, which are all defined and quantified within the report. This document includes maps that depict: the zone of archaeological sites in the Cienega-Rincon Valley; general archeological site and survey locations; and archaeological sites in relation to land ownership.

VII. Land Use Considerations

Land Use in the Cienega-Rincon Valley

Attachment 7 is the contribution of Mr. Ben Changkakoti of the Planning Division. This report offers information about current and planned land use, zoning, housing types, viewsheds, infrastructure (including roads, access, water, sanitary sewer, natural gas, telephone and electricity), schools, parks, open space, real estate market conditions, capital improvement projects, and permits issued for residential and commercial activities.

VIII. Conclusion

After subarea meetings are held, additional contributions and comments are received, discrepancies are eliminated in the data of individual reports and resource reports are perfected, a synthesizing subarea evaluation will be drafted that includes landowner goals and suggestions for conservation strategies. This initial presentation of resource information is intended to both educate and serve as an invitation to greater participation in crafting the Sonoran Desert Conservation Plan.

3/25/2000

Andrada Property Owners Association
Position Statements
Sonoran Desert Conservation Plan
&
Davidson Canyon Natural Preserve

The Andrada Property Owners Association, Inc. represents 16 owners of a total 240 acres of land just East of the Old Sonoita Highway. All of the property represented by the Andrada Property Owners is included in the proposed Davidson Canyon Natural Preserve shown on the maps of Pima County's Sonoran Desert Conservation Plan. This paper presents statements of position held by the Andrada Property Owners membership regarding conservation of the Sonoran Desert and establishment of the Davidson Canyon Natural Preserve as a part of the overall conservation plan.

1. The Sonoran Desert and the Davidson Canyon riparian area are valuable natural resources that contribute to the quality of our lives and should be protected and shared for generations to come.

Andrada Property Owners greatly appreciate our environment. The Davidson wash is a beautiful riparian area with perennial water and a rich ecosystem of plant and animal life. These riches can be easily enjoyed by walking or riding horses in the area.

2. While the Andrada Property Owners respect the rights of the public to enjoy these natural resources, they also request that public access to the proposed Davidson Canyon Natural Preserve be developed in a way that is respectful of our private property rights and privacy of our homes.

Once the Preserve is established, it should be fenced and clearly marked. Road and trail access should also be clearly marked with designated areas for parking. Motorized vehicles should be prohibited except on designated access roads. Hunting and shooting should be prohibited within the Preserve.

3. The Andrada Property Owners have established a set of Covenants, Conditions, Restrictions and Water Rights (CC&Rs) which are consistent with preservation of the Sonoran Desert and the Davidson Canyon Natural Preserve while permitting the homeowners to live in harmony with the environment.

Home density is limited to one home per ten acres, access is by deeded easements, and water use is restricted to a single shared well with limits on total usage per acre. Further restrictions on tanks, towers, outbuildings, and commercial activities are all in alignment with the goals of the Sonoran Desert Conservation Plan. We believe our small community provides a model for balance between private property rights and environmental protection. Similar planning should be considered as a part of any further development within the area (see Statements 6, 7, and 8 below).

4. Neighboring ranches, the Andrada Ranch and the Bar V Ranch, engage in activities that are consistent with the intent of the Sonoran Desert Conservation Plan and should be supported in an effort to preserve open spaces.

Cattle grazing on private property and the leased state trust lands of these ranches is a historic use of the land which, when carried out responsibly, does not negatively impact the environment. Conversion of ranch land to other uses, especially uncontrolled residential development, will have a dramatic negative effect on the whole area.

5. Mining presents a clear and present threat to the Sonoran Desert Conservation Plan and the Davidson Canyon Natural Preserve.

Several mining claims have been established across the Davidson Canyon watershed on State Trust Lands immediately to the South of our community. One claim held by Georgia Marble Company includes a marble quarry within a few hundred yards of the Davidson wash. Other claims held by California Portland Cement Company cover hundreds of acres on the hills on both sides of the riparian area. Georgia Marble's application to renew the mining claim at the quarry a few years ago was contested without success by the owner of the Andrada Ranch. At that time, testimony by State Land Commissioner's representatives argued that mining was the best and most productive use of the land and that the land had no residential value. It is the Andrada Property Owners position that mining should be prohibited within the boundaries of the proposed Davidson Canyon Natural Preserve and all existing claims should be terminated by the State Land Department. Mining destroys habitat, increases dust pollution, increases traffic on local roads, creates a dangerous site with blasting, heavy equipment and stored explosives, and, in this case, removes profit to non-resident corporations without contributing to our local community.

6. Rapid and uncontrolled residential development presents another serious threat to the Sonoran Desert Conservation Plan and the Davidson Canyon Natural Preserve.

Recent "wildcat" subdivisions have sprung up on both sides of I-10 near the Old Sonoita Highway exit. Dozens of manufactured homes and mobile homes have been moved onto one-acre lots. Now, another developer is requesting that the "scenic" status of the Old Sonoita Highway be changed near the intersection in order to build closer to the right of way. Recent articles in the Arizona Star (Wildcat Life in Painted Hills, February 20, 2000) have pointed to the dangers of this kind of development, not only to the environment, but to the welfare of the residents who live there.

7. The State Land Department and State Land Commission must be active and supportive partners in development of the Sonoran Desert Conservation Plan.

Dan Beckel and Joe Patterson of the Andrada Property Owners Association have attended all the Sonoran Desert Conservation Plan education series and listened while many stakeholders in the planning have presented their points of view. These stakeholders have included County officials, planning and zoning experts, ethnographers, environmental and conservation experts, Tohono O'dam representatives, fish and game representatives and ranchers. State Land Department representatives have been striking in their absence from all these presentations and discussions. Given that much of the land in Pima County, and particularly the land included in the proposed Davidson Canyon Natural Preserve and its surrounding area is managed by the State Land Department, it is obvious that they must support the conservation planning in order for the plan to be successful. The Andrada Property Owners support a partnership between the State Land Department and the Sonoran Desert Conservation Plan in which any decisions made by the State Land Department for land use will be in congruence with conservation planning. For example, mining and residential development should be eliminated as an option within the Davidson Canyon Natural Preserve. Any sale or trade of land for residential development near the Preserve should include restrictions on use which limit density, water use, and environmental impact.

8. Pima County must prioritize a set of interim policies to prevent destruction of critical environments prior to full implementation of the Sonoran Desert Conservation Plan.

Pima County should begin immediately to identify and prioritize undeveloped properties that will be vital to conservation within the proposed Davidson Canyon Natural Preserve. Efforts should begin immediately to purchase those undeveloped high priority properties from willing sellers. Adjacent to our property is a 114 acre parcel including more than one half mile of the Davidson wash. A well was drilled on that property directly into the bottom of the Davidson wash. Recent inquiries found this parcel to have an out of state owner and a Rico Racketeering lien attached. There may be an opportunity to purchase this land at a reasonable price from a willing seller. Wildcat development of that piece of property would have disastrous effects on the proposed Davidson Canyon Natural Preserve. Delays in efforts to influence use of this property and others like it can only lead to more difficulties at a later date. In those instances in which purchase is not an option, Pima County should begin immediately to educate and recruit private landowners to establish Conservation Easements in high priority areas within the proposed Preserve.

PIMA COUNTY
RESOLUTION NO. 1999- 204

**A RESOLUTION OF THE BOARD OF SUPERVISORS OF PIMA COUNTY, ARIZONA
TO SUPPORT THE PROPOSED LAS CIENEGAS NATIONAL CONSERVATION AREA**

WHEREAS, the Board directed staff on October 27, 1998 to pursue an ongoing relationship with the United States Department of the Interior as part of the process to develop the Sonoran Desert Conservation Plan; and

WHEREAS, on December 3, 1998 the Pima County Board of Supervisors entered into Resolution 1998-250 with the Secretary of the Interior to:

(1) support the underlying purpose of the Endangered Species Act which is to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, and

(2) work with the Department of the Interior to develop the Sonoran Desert Conservation Plan; and

WHEREAS, in 1987 Pima County indicated a desire to preserve and protect the Empire, Cienega, and Empirita Ranches, and such is now consistent with the Ranch Conservation element of the Sonoran Desert Conservation Plan; and

WHEREAS, Pima County through the Flood Control District has purchased over 3000 acres of land along lower Cienega Creek, and the County established Colossal Cave Mountain Park to maintain open space and protect native plants and wildlife; and

WHEREAS, the Cienega Creek watershed provides natural open space and wildlife habitat for species including species that are listed or candidates for protection under the Endangered Species Act;

WHEREAS, the Cienega Creek watershed contributes 3500 acre-feet of groundwater to the Tucson Basin on an annual basis, and has high value worthy of preservation as described by the Riparian Protection, Habitat Protection and Corridor Protection elements of the Sonoran Desert Conservation Plan; and

WHEREAS, Congressional legislation has been proposed to allow the Bureau of Land Management to elevate the status and expand the existing Resource Conservation Area so that it is designated as the Las Cienegas National Conservation Area (NCA) which will:

"Conserve, protect, and enhance ... the unique and nationally important aquatic, wildlife, vegetative, agricultural, archaeological, paleontological, scientific, cave, cultural, historical, recreational, educational, scenic, rangeland, and riparian resources,...while allowing environmentally responsible and sustainable livestock grazing and recreation to continue in appropriate areas."

NOW THEREFORE BE IT RESOLVED THAT THE BOARD OF SUPERVISORS OF PIMA COUNTY, ARIZONA, as follows:

Requests that the Congress of the United States of America, consistent with the larger Sonoran Desert Conservation Plan establish Las Cienegas National Conservation Area.

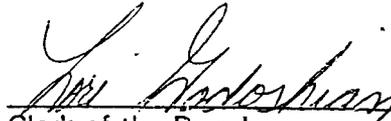
PASSED AND ADOPTED THIS fifth day of October, 1999.

PIMA COUNTY BOARD OF SUPERVISORS

ATTEST:



Chair of the Board OCT 05 1999



Clerk of the Board

APPROVED AS TO FORM:



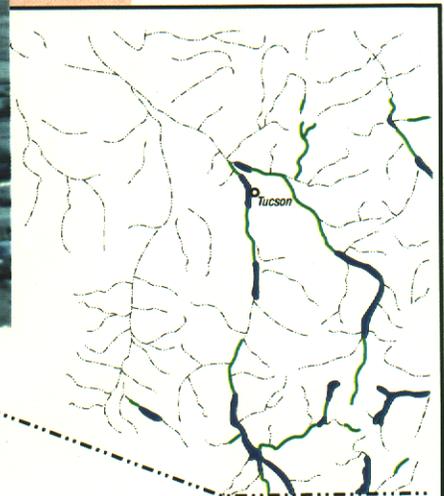
Deputy County Attorney

Biological Stress Assessment

An Overview Discussion of Issues and Concerns

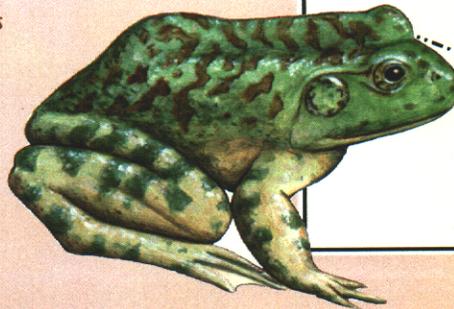
Sonoran Desert Conservation Plan

March 2000



Pima County Board of Supervisors
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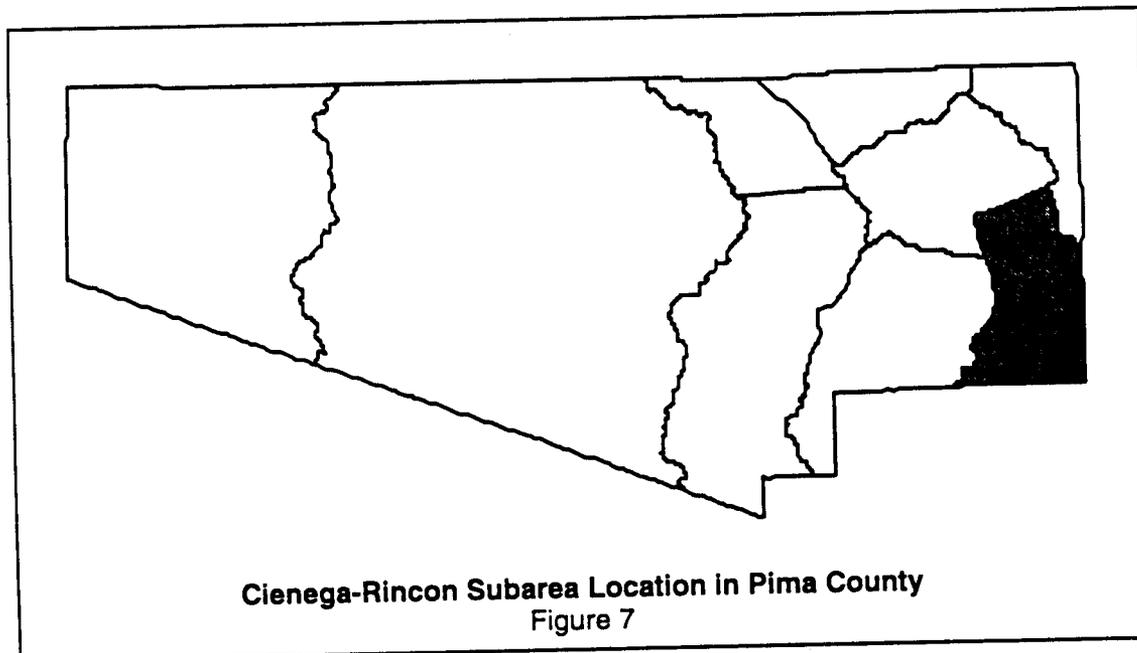
BEFORE 1890

EPHEMERAL FLOW
PERENNIAL FLOW
CIENEGA / RIVERINE MARSH



IV. Cienega-Rincon (Subarea 2)

This subarea is at the eastern edge of Pima County, extending north from the Pima County/Santa Cruz County line to the confluence of the Pantano Wash and Rincon Creek (Figure 7). Landforms defining the subarea include the Rincon Mountains at the north end, the Rincon and Cienega Creek valleys, the Santa Rita Mountains on the west, and the Whetstone Mountains on the east. The communities of Vail and Rocking K are within the subarea.



A. Potential Threats and Stressors

1. Land Use and Landscape Character

Historically ranchland, the land use character of this area has been mostly rural, with relatively undeveloped open valleys surrounded by foothills and mountains. With increased population growth throughout southeastern Arizona, the character has been changing (Figure 8). The limits of the city of Tucson now extend to the west side of the Pantano Wash. With increased development pressure, ranches have been subdivided and split into smaller parcels. Lot splitting and wildcat subdividing have become prevalent means of residential development, particularly in the areas of Vail, Garigan's Gulch, Pistol Hill, elsewhere in the Rincon Valley, and in Davidson Canyon, south of Interstate 10 (I-10).

Pistol Hill is west of Colossal Cave Mountain Park, on the south side of Colossal Cave Road. The limestone soils around Colossal Cave support needlespine pineapple cactus as well as *Agave palmeri* and shindagger, two limestone-loving agaves that are critical food sources for the endangered lesser long-nosed bat and other nectar-feeding bats (USDI-BLM 1999). Increased lot-splitting and unregulated subdividing in the Pistol Hill

area poses particular concern here due to these unique conditions. Some of the land is State Land and could potentially be released for private development.

The Davidson Canyon area is south of I-10 and east of State Route (SR-83). Increasing lot splitting occurs here, particularly in areas where terrain is not a limiting constraint. Significant areas of State Land, which could be released for private development, surround the private land.

Although not illegal, the effects of lot-splitting throughout the subarea are frequently counter-productive to the intent of the "Resource Conservation," "Resource Transition," and "Low Intensity Rural" designations shown for most of these areas by the County's Comprehensive Land Use Plan. Habitat loss, alteration, degradation, and fragmentation frequently result, floodplains are encroached upon, and the increased number of private wells contributes to the decline in groundwater levels.

Rocking K and Vail Valley are large-acreage Specific Plans approved in the last 15 years for the Rincon Valley. The County's Comprehensive Land Use Plan and the Subregion Plan reflect these plans (Pima County 1997). The Specific Plans are planned communities with mixed uses and golf courses. Both plans have open space areas set aside and provisions for preservation and salvage of native vegetation. When built these communities will significantly increase the population in the Rincon Valley.

The Subregion Plan indicates "Rural Transition" and "Low Intensity Rural" for the lands north and south of Cienega Creek, but a zoning plan approved in 1959 reflects much higher intensity uses. The Vail-Posta Quemada Area Master Plan shows industrial, high density residential and medium density residential land uses in the area along the north side of the Cienega Creek (Pima County 1959). Further north into the foothill areas abutting Saguaro National Park, medium to low density residential is noted. Because this is an approved zoning plan, land developers would only have to go through the subdivision platting process to bring this plan into reality. A portion of the Plan area is within the Cienega Creek Preserve, now owned by Pima County, but much of it is private land or State Land, which could potentially be released for private development. Intensive development of this area would be a serious stressor to biological resources, not only in habitat loss and fragmentation, but in its potential effect of declining groundwater levels in the vicinity of Cienega Creek.

One of the conditions of the Rocking K Specific Plan requires the restoration of the two-mile reach of Rincon Creek that is within the Plan boundaries. The goal is to re-establish a riparian woodland dominated by mesquite, Arizona walnut, sycamore, and cottonwood trees. Restoration efforts will focus on heavily disturbed lands along the Creek. Abandoned agricultural fields dominated by invasive species are located along the floodplain. These fields were originally developed in the 1930s for the production of alfalfa and barley. By the 1950s most of the riparian plant community no longer existed in this area. The removal of vegetation, groundwater pumping for irrigation, channelization, and the impoundment of lower Rincon Creek's tributaries are thought to be the principal reasons (U.S. Geological Survey [USGS] 1997).

Two large subdivisions are planned for the area near I-10 and SR-83. One would be located east of SR-83 on both sides of I-10; the other would be on the west side of SR-83, south of I-10. Both projects are indicative of the development pressure in this

subarea. Proximity to Davidson Canyon is of concern, particularly if bank protection and/or other improvements would be required downstream at the I-10 overpass. (See discussion under Davidson Canyon Preserve.)

Ranching and grazing continues in the upper Rincon Creek area. Here, understory vegetation is absent or sparse and cattle crossings at the Creek have caused bank erosion and undercutting of riparian vegetation. Even in areas that are no longer grazed the impacts from past grazing remain, and invasive shrubs such as burrow weed are prevalent. Increased development and poorly managed grazing could result in upstream continuation of channel erosion such as has occurred on the Pantano Wash (Tellman 2000). This would have a negative effect on the remaining riparian habitat and the wildlife it supports.

Ranching and grazing continue to be an important part of the economy and landscape management in the southern portion of the Cienega-Rincon Subarea. Privately owned ranches and grazing allotments on public land comprise large tracts of open grasslands—both Sacaton grassland bottomlands and highland grasslands. Many ranches in the Cienega-Rincon Subarea provide good examples of how carefully managed ranch operation are compatible with conservation values. Grazing does not presently pose a significant stress to Forest lands in the Santa Ritas (U.S. Forest Service [USFS], Graves, 2000). Ranch conversions, lot-splitting and wildcat subdividing, inappropriate grazing, invasive species, and brush encroachment due to fire suppression are sources of stress to grassland communities (USDI-BLM 1999).

Sand and gravel mining along the Pantano Wash has been extensive and ongoing. The extraction of so much aggregate material is considered to be one reason that the channel bed has lowered as much as 14 feet (Tellman 2000). Implications to biological resources would be the continued upstream channel cutting, erosion, and the subsequent loss of adjacent xeroriparian and riparian vegetation.

The mineral resources of the Santa Rita Mountains have been explored and mined for many years. Continued interest in the area exists and is activated when copper prices are high. The historic mining complex of Helvetia is located on the western side of the Santa Ritas, at the northern end. Southeast of Helvetia, and within this subarea, is the Rosemont area—both are within the Helvetia-Rosemont Mining District. ASARCO holds mining claims covering over 2,000 acres at the company's Rosemont Ranch, located approximately one mile west of SR-83 in the headwaters of Davidson Canyon. In 1996 ASARCO sought a land exchange to add to its existing Rosemont holdings for mining and a buffer. The proposition drew heavy opposition. In 1998 the Forest supervisor for Coronado National Forest suspended an agreement to explore the possibilities because the company had not submitted a mining plan for consideration. ASARCO has put off pursuing the plan, and the necessary environmental impact statement, due to depressed copper prices (*Arizona Daily Star* 1998). Interest in the ore body at Rosemont remains, and mining could be an issue at any time in the future.

South of the Helvetia-Rosemont Mining District is the Greaterville Mining District. Both have areas of high to medium mineral resource potential, as do other isolated areas at the north end of the Santa Ritas and on the west side of the Whetstone Mountains (USDI-USFS 1996). Copper is the primary commodity produced from these deposits; gold, silver, tungsten, zinc, and molybdenum are possible byproducts. The Helvetia-

Rosemont District also contains enormous reserves of limestone and marble. The mineral resources are subject to exploration, development, and production under the federal General Mining Law of 1872. Any mining activities within the boundaries of Coronado National Forest, or otherwise having a federal nexus, would be required to develop a mining plan and an Environmental Assessment or Environmental Impact Statement.

Effects on biological resources from mining could include large-scale degradation of intact areas, habitat loss and fragmentation, potential for downstream watershed contamination, and intensive groundwater pumping to support mine operations. Habitats affected could represent the full range from heavily forested areas at higher elevations, riparian canyons, oak woodlands, and grasslands.

2. Transportation

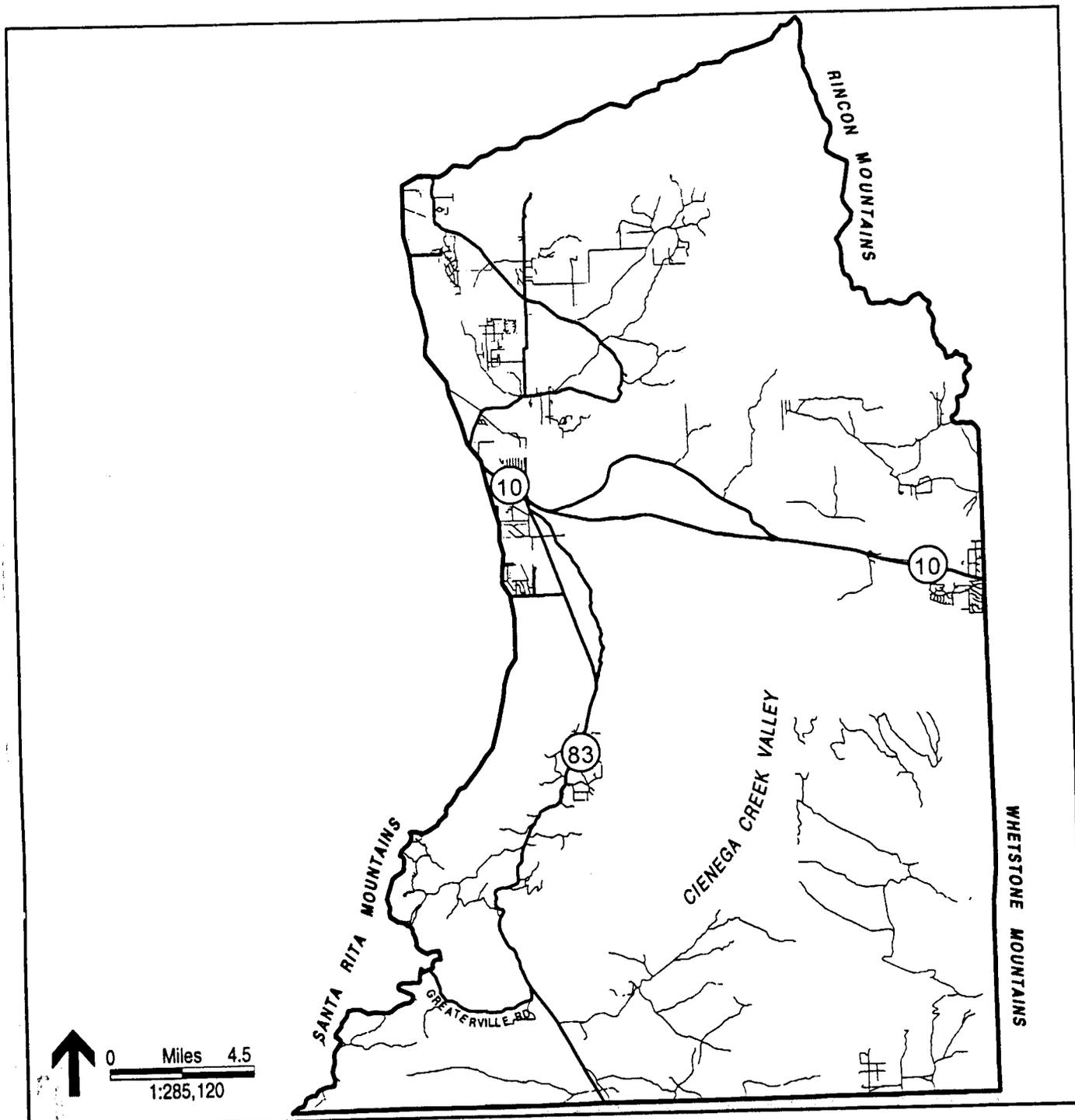
Interstate 10 and SR-83 are the major transportation corridors in the subarea, with limited and dispersed roads, primarily on the western side of the subarea (Figure 9). Colossal Cave Road and Old Spanish Trail are the main roadways in the Rincon Valley. Other paved roads and numerous unpaved roads are found throughout. The Greaterville Road provides east-west access between the Cienega Creek valley and the Upper San Pedro valley, passing through the Greaterville Mining District. If mining in the Rosemont or Greaterville areas becomes active, roads would likely be built and/or improved to provide access. That would serve to further fragment the habitat that the Forest lands provide and could result in habitat loss, particularly of riparian growth in the canyons that existing roads are located.

SR-83 provides access between Nogales, Patagonia, and Sonoita to I-10. Traffic has been increasing along this roadway, in part due to North American Free Trade Agreement (NAFTA). Trucks that are heading from Nogales to eastbound I-10 use SR-83 as a shorter route than driving north to Tucson. With increased trucking activity from Nogales, and increasing populations in the vicinities of Patagonia and Sonoita, there is potential for a continued increase in truck and other traffic. If SR-83 was widened and improved in order to accommodate this traffic, it would be more of a barrier to wildlife movement between the valley grassland habitats along Cienega Creek and the Santa Rita Mountains and foothills. Other effects would be direct habitat loss, alteration, fragmentation, and increased roadkill. This would come in part from drainage crossing improvements that would be required for a wider roadway.

Two tracks of the Southern Pacific railroad are within the subarea, following the general alignment of the Cienega Creek and I-10.

3. Water Uses

Private water companies and individual private wells serve most of the water needs of the Cienega-Rincon Subarea. There are a number of watercourses with perennial flows, mostly along the Cienega Creek and on the western side of the Whetstone Mountains (Figure 10 and Table 9). Areas of shallow groundwater are found in association with the perennial reaches, but also occur along the Rincon Creek, Agua Verde Creek, and along Davidson Canyon. Not only do the perennial flows and associated wetlands provide

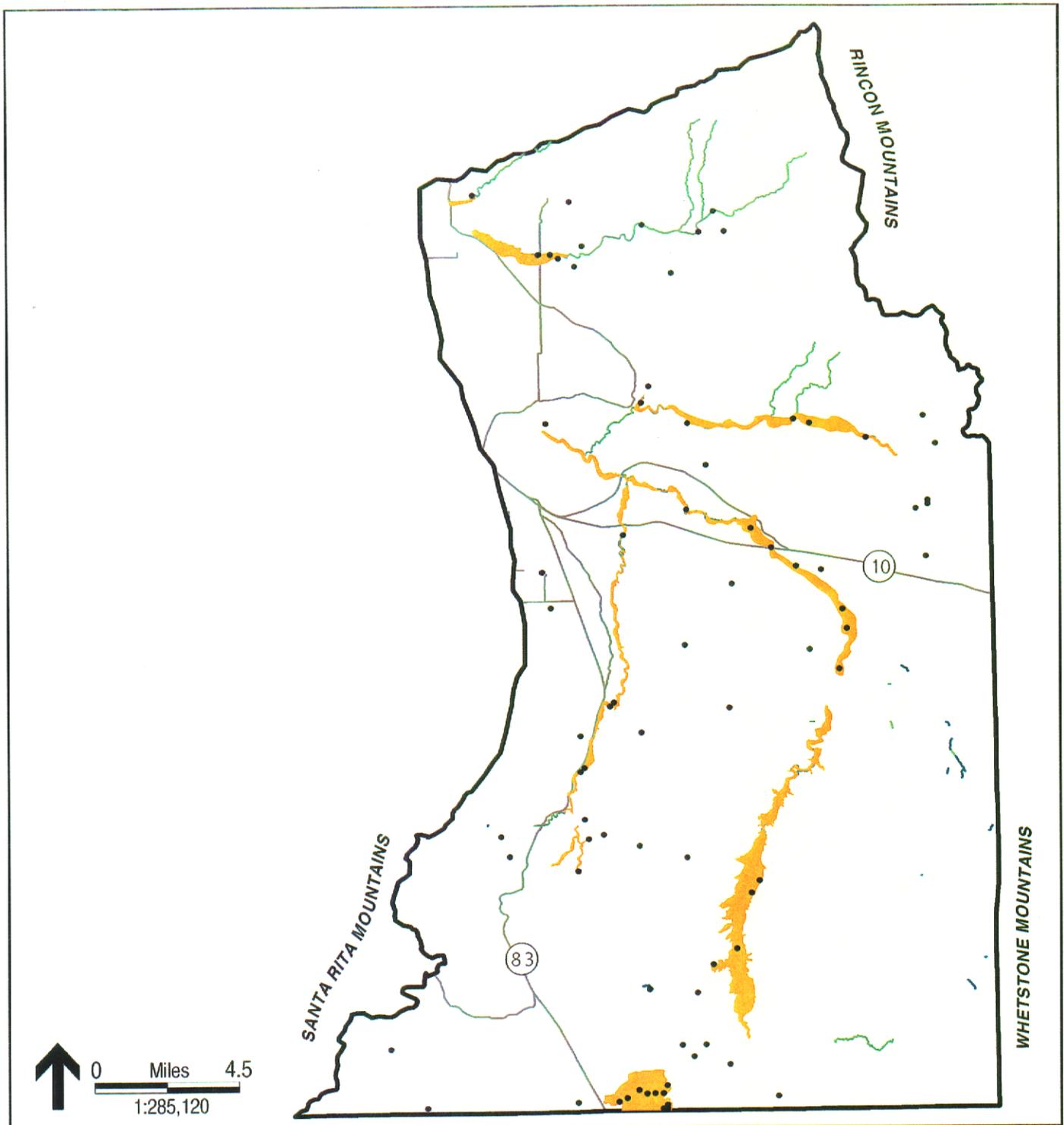


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Road Network in the Cienega-Rincon Subarea

-  Highway or Major Road
-  Local Road

Figure 9



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Surface Groundwater and Streams in the Cienega-Rincon Subarea

- | | |
|---|---|
| <ul style="list-style-type: none"> Suspected Shallow Groundwater Areas
(based on well data and aerial imagery) • Well with Depth to Water less than 50 feet
(ADWR Well 55-Registry and GWSI databases) | <ul style="list-style-type: none"> Perennial Reach Intermittent Reach Major Street or Highway |
|---|---|

Figure 10

TABLE 9
STREAM CHARACTERISTICS IN THE CIENEGA-RINCON SUBAREA

Stream Name	Miles of		Acres of Hydro-		Acres of Class A		Acres of Shallow Groundwater	Pygmy- Owl Habitat	Fish Species	Leopard Frogs
	Perennial Flow	Intermittent Flow	mesoriparian Habitat	Riparian Habitat	Riparian Habitat	Groundwater				
Madrona Canyon	0	3.4	N/A	N/A	N/A	N/A	N/A	No	N/A	Yes
Turkey Creek	0	3.2	N/A	N/A	N/A	N/A	N/A	No	N/A	N/A
Rincon Creek	0	11.3	563	0	0	568	1	No	1	Yes
Paige Creek	0	3	N/A	N/A	N/A	N/A	N/A	No	N/A	N/A
Unnamed tributary to Ash Creek	0	1.2	N/A	N/A	N/A	N/A	N/A	No	N/A	N/A
Cienega Creek (lower)	2.7	4.8	577	56	56	1651	1	No	1	Yes
Chimney Canyon	0	3.3	N/A	N/A	N/A	N/A	N/A	No	N/A	N/A
Davidson Canyon	0.7	1.3	0	27	27	907	2	No	2	?
Posta Quemada Canyon	0.3	0	N/A	N/A	N/A	21	1	No	1	N/A
Agua Verde Creek	0	15	N/A	291	291	1057	N/A	No	N/A	N/A
Cumaro Canyon	0	0	0	26	26	N/A	0	No	0	N/A
Distillery Canyon	0	3.3	N/A	N/A	N/A	N/A	N/A	No	N/A	N/A
Mescal Arroyo	0	0	0	218	218	N/A	0	No	0	N/A
Smitty Spring	0	0.1	0	0	0	N/A	N/A	No	N/A	N/A
Bootlegger Spring	0	0.1	0	0	0	N/A	N/A	No	N/A	N/A
Unnamed Spring	0	0.2	0	0	0	N/A	N/A	No	N/A	N/A
Wakefield Canyon	1.4	0.3	0	37	37	N/A	1	No	1	Yes
Barrel Canyon	0	1.3	0	0	0	N/A	N/A	No	N/A	N/A
Scholefield Spring	0.035	0	N/A	N/A	N/A	N/A	N/A	No	N/A	N/A
Cienega Creek (upper)	7.7	4.6	897	160	160	2911	3	No	3	Yes
Mattie Canyon	1.3	0.4	N/A	N/A	N/A	N/A	3a	N	3a	N/A
Little Nogales Spring	0.2	0	0	0	0	N/A	1	No	1	Yes
Nogales Spring	0.3	0	0	0	0	N/A	1	No	1	Yes
Montosa Canyon	0.2	0	N/A	N/A	N/A	N/A	N/A	N	N/A	N/A
Apache Spring	0.0276	0	N/A	N/A	N/A	N/A	N/A	No	N/A	N/A

TABLE 9
STREAM CHARACTERISTICS IN THE CIENEGA-RINCON SUBAREA
 (continued)

Stream Name	Miles of		Acres of Hydro- mesoriparian Habitat	Acres of Class A		Pygmy- Owl Habitat	Fish Species	Leopard Frogs
	Perennial Flow	Intermittent Flow		Riparian Habitat	Acres of Shallow Groundwater			
Gardner Canyon	0	0.5	N/A	N/A	1210	No	N/A	N/A
Cinco Canyon	0.7	0	N/A	N/A	N/A	No	N/A	N/A
Empire Gulch	1.4	0	N/A	N/A	N/A	No	N/A	N/A
Wild Cow Spring	0.049	0	N/A	N/A	N/A	No	N/A	N/A
Simpson spring	0.4	0	N/A	N/A	N/A	No	N/A	N/A
Mud Spring Canyon	0	2.6	N/A	N/A	N/A	No	N/A	N/A

N/A = not applicable.

aquatic habitat for species which are endangered or rare, they provide a potential site for reintroduction of native fish.

Within the Cienega Creek Preserve surface flows are perennial and Pima County has an instream flow permit, but at the west end of the Preserve the water is diverted and piped to the Vail Valley Ranch development. Perennial flows, and associated riparian habitat, stop just downstream of a subgrade dam and diversion. The water rights are held by the Vail Valley Ranch developers who will use the water for golf course and landscape irrigation (Pima County 2000).

Within the southeast end of the Preserve is the Empirita Ranch area. According to the Cienega Creek Natural Preserve Management Plan (Pima County-Cienega 1994) Pima County's agreement with the prior owner, the Empirita Ranch Limited Partnership, allows the Partnership to construct and operate up to 16 wells within the ranch area. The water can be used to support off-site uses and private development. This presents the possibility of groundwater pumping in this area negatively affecting not only this area's stream flows and the vegetation it supports, but also the downstream perennial flows through the Preserve. The Management Plan identifies maintenance of the perennial stream flow as the most important of the management objectives. It further acknowledges that off-site activities, particularly ground water pumping, will ultimately determine the future of perennial stream flow within the Preserve. Without the stream flow, the associated riparian woodland vegetation would be lost and the habitat values of the preserve would be greatly diminished.

Other concerns with regard to water use are tied to the development potential of private and State Lands, increased lot-splitting, and increased ground water pumping to provide for the water needs of a growing population within the subarea.

4. Recreation

Opportunities for recreation are abundant within the Cienega-Rincon Subarea as provided by the surrounding preserves. Coronado National Forest unreserved areas and Wilderness areas (Rincon Mountain and Mt. Wrightson), Saguaro National Park, Colossal Cave Mountain Park, Cienega Creek Natural Preserve, and BLM's Empire-Cienega Resource Conservation Area (RCA). Additionally, there are State Lands and other BLM lands that receive recreational use. Recreational activities include wilderness experience and backcountry use, bird and wildlife observation, hiking, picnicking and camping, hunting, off-road-vehicle use, cave exploring (in Gardner Canyon area), horseback riding, and mountain biking.

Recreation use within the Cienega Creek Natural Preserve is by permit only, and is limited to a maximum of 50 persons a day (Pima County-Cienega 1994). Presently about 10 people per weekday visit the Preserve (Pima County-Mt. Parks 1999). The Empire-Cienega RCA has no campgrounds or developed facilities, but hiking, camping, bicycling, and hunting are allowed. Its 45,000 acres are under the administration of the BLM.

Recreation use is increasing on Forest lands, particularly in the area of Gardner Canyon and north to the Rosemont area. Irresponsible off-road-vehicle use here has resulted in

habitat loss and degradation, erosion, gulying and disturbance of wildlife. The Forest Service is initiating a program of public education and adding fencing and cattle guards to stabilize the high-use areas.

Sources of biological stress associated with the increasing recreational use of the area include damage to or removal of vegetative communities due to off-road-vehicle use, creation of wildcat trails and roads, primitive camping and vandalism; disturbance of wildlife; and increased potential for wildfires. Caves are being damaged in some areas by theft vandalism and over use (Sonoran Institute 1999).

B. Biological Resources

1. Vegetation and Land Cover

Habitat within the Cienega-Rincon Subarea consists primarily of mixed grass scrub (Figure 11). Areas of higher elevation support stands of pine, oak, oak-pine, and manzanita on the southwestern, western, and northern edges of the subarea. Other habitat types contained within the subarea include palo verde-mixed cacti, creosote-tarbush, creosote-bursage, and mixed scrub communities. Drainages in the south-central and northwest portions of the subarea support sacaton scrub vegetation, cordgrass, and stands of cottonwood willow. Limited agricultural development has taken place in the central drainage of the subarea. Urban development occupies a portion of the eastern edge of the subarea.

2. Critical Habitat

No areas of Critical Habitat have been designated within the Cienega-Rincon Subarea.

3. Species at Risk

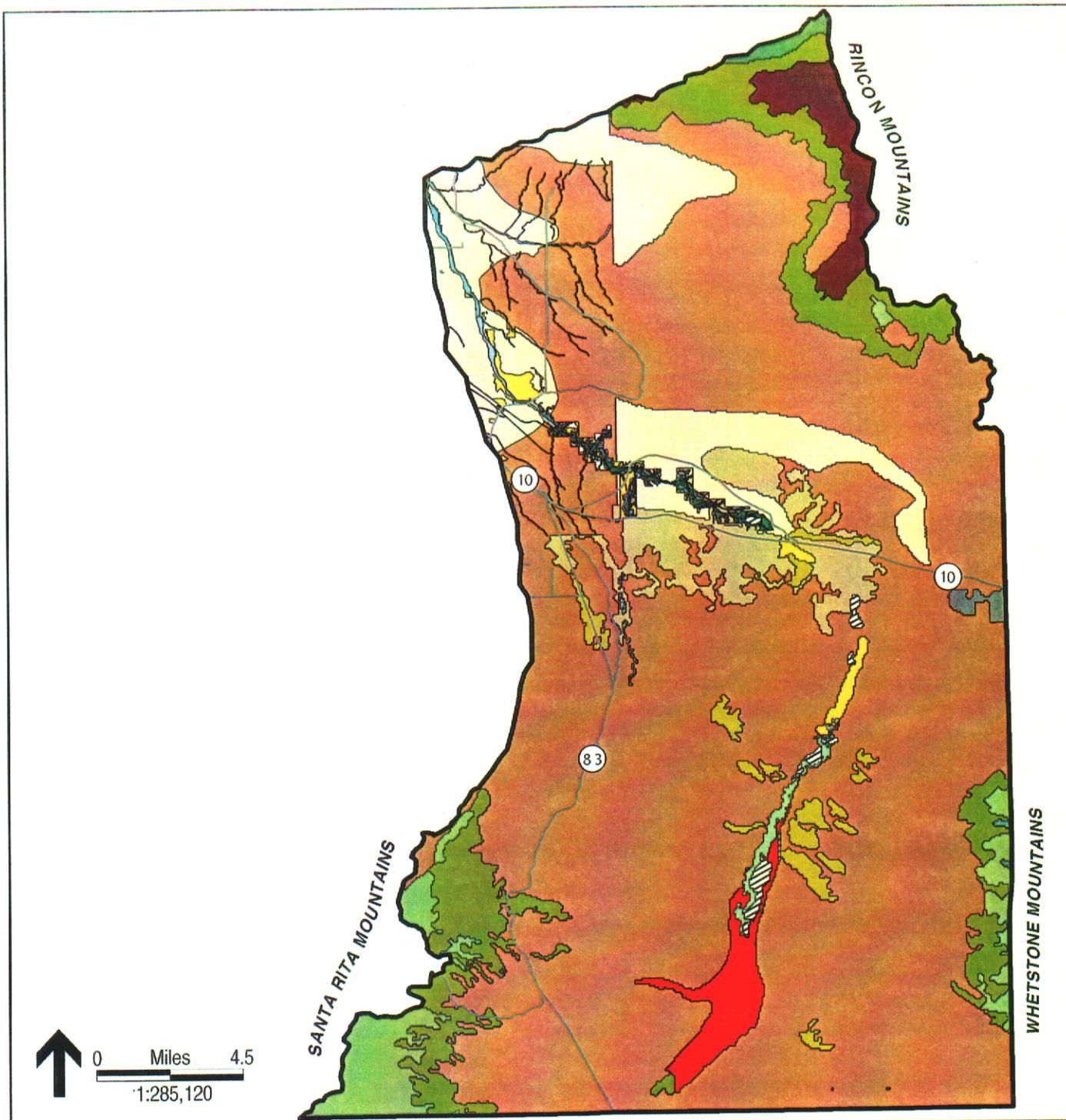
A total of 19 Status 1 and 2 Vulnerable Species occur within the Cienega-Rincon Subarea (Table 10).

C. Existing and Proposed Preserve Areas

There are several proposals, one of great regional and national significance, to expand existing preserve areas and create new ones.

1. Las Cienegas National Conservation Area (NCA)

The creation of Las Cienegas NCA has been proposed by a bill introduced to Congress in September 1999. It would total over 200,000 acres of land and would include the Empire-Cienega RCA, Cienega Creek Natural Preserve, Colossal Cave Mountain Park, State Lands, other BLM land, and private lands (*Arizona Daily Star* 2000). As proposed, the NCA would provide a connecting corridor of land between the Catalina and Rincon mountains, the Cienega and Rincon Creek watersheds, the Santa Rita Mountains, and Forest lands in southeastern Arizona. The NCA would not transfer land out of private ownership or restrict private property rights. It would allow grazing and recreation activities to continue in appropriate areas (Sonoran Institute 2000).



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Vegetation and Land Cover in the Cienega-Rincon Subarea

Vegetation Communities (BLP Classification)

- 122.62 Pine
- 123.31 Encinal (Oak)
- 123.32 Oak-Pine
- 133.32 Manzanita
- 143.14 Sacaton Scrub
- 143.15 Mixed Grass-Scrub
- 143.16 Shrub-Scrub Disclimax
- 153.21 Creosote-Tarbrush

- 153.26 Mixed Scrub
- 154.11 Creosote-Bursage
- 154.12 Paloverde-Mixed Cacti
- 223.21 Cottonwood-Willow
- 223.22 Mixed Broadleaf
- 224.52 Mesquite

- 224.53 Cottonwood-Willow
- 234.71 Mixed Scrub
- 243.53 Cordgrass

Other Land Cover Types

- 999.1 Agriculture
- 999.2 Urban
- 999.3 Water
- Major Road or Highway

Figure 11

TABLE 10
STATUS 1 AND 2 VULNERABLE SPECIES OCCURRING IN THE CIENEGA-RINCON SUBAREA

Scientific Name/Common Name	Pima County Status	State Rank	Listing Status	Potential Threats and Stressors	HDMS Records	Notes
<i>Amoreuxia gonzalezii</i> Saiya	1	S1	FSC FSS SR	Very narrow distribution and small number of individuals. Grazing (plant is palatable to cattle). Degradation of habitat due to livestock grazing. Competition by introduced invasive plants. Javelina consume roots.	Empire Ranch quad 1976. USFS	Limestone endemic.
<i>Gila intermedia</i> Gila Chub	1	S2	FC FSS WSC	Non-native species, competition and predation. Habitat loss by groundwater pumping and channelization. Flooding. Drought. Dredging. Poor water quality. Livestock grazing (trampling by cattle, watershed changes).	Spring Water Canyon quad, Cienega Creek, BLM many records	Probably a viable population in Cienega Creek.
<i>Glaucidium brasilianum cactorum</i> Cactus Ferruginous Pygmy-owl	1	S1	FE FSS WSC	Habitat destruction and alteration, historic and present. Groundwater pumping, channelization, urbanization, historic livestock grazing? Farming and agricultural uses? Wood cutting. Disturbance by bird watchers. Small population subject to stochastic events. Possibility of disease, including emerging diseases, and loss of viable food supply as a result of drought and/or climate change.	Tanque Verde Peak quad 1994 private; 1975 private; 1995 NPS Rincon Peak quad 1999 USFS	Subarea is not included in Critical Habitat

TABLE 10
STATUS 1 AND 2 VULNERABLE SPECIES OCCURRING IN THE CIENEGA-RINCON SUBAREA
(continued)

Scientific Name/Common Name	Pima County Status	State Rank	Listing Status	Potential Threats and Stressors	HDMS Records	Notes
<i>Accipiter gentilis apache</i> Apache northern goshawk	2	S3	F- petitioned, FSS WSC	Habitat destruction by logging and forest clearing. Possibly consequences of fire suppression leading to major timber fires. Organized recreational and sports use. Global climate change. Disturbance by recreationists, cattle grazing, mining, road building and other forest disturbances are site specific threats alleged by Center for Biodiversity.	Mica Mountain quad, 1992, NPS Mt. Wrightson quad, 1991, 1994, 1997 USFS	May occur at high elevation areas, barely within this subarea. Petitioned for listing as endangered, 90-day finding determined that listing was not warranted 6/29/98. Suit filed 2/25/99 to list as endangered.
<i>Coccyzus americanus occidentalis</i> Western yellow-billed cuckoo	2	S3	F- petitioned FSS WSC	Habitat destruction and alteration, historic and present. Groundwater pumping, channelization, urbanization, historic livestock grazing? Farming and agricultural uses? Wood cutting. Reduction of acreage in pecan farming.	Tanque Verde Peak quad, Tanque Verde Wash, 1985 Private The Narrows quad, Cienega Creek 1998 BLM Helvetia quad, Florida Canyon, 1925 USFS Empire Ranch W of Cienega Creek 1998 BLM Spring Water Canyon, several records, Cienega Creek, 1998 BLM Mt. Wrightson quad 1923, 1927 USFS	Positive 90-day finding on petition, 2/17/00

TABLE 10
STATUS 1 AND 2 VULNERABLE SPECIES OCCURRING IN THE CIENEGA-RINCON SUBAREA
(continued)

Scientific Name/Common Name	Pima County Status	State Rank	Listing Status	Potential Threats and Stressors	HDMS Records	Notes
<i>Coryphantha scheeri</i> var. <i>robustispina</i> Pima pineapple cactus	1	S2	FE HS	Narrow distribution, much of which is on private and Indian lands and much of which has been developed. Development, off-road vehicle traffic.	60 records for Pima Co. 15 for this subarea. Vail: 6: 2 private, 3 BOR, 1 State Mount Fagan: 7: 4 BOR, 3 State Helvetia: 2, USFS	May not be a valid variety using today's standards.
<i>Echinomastus erectocentrus</i> var. <i>erectocentrus</i> Needle-spined pineapple cactus	2	S3	SC S SR	Very narrow distribution. Land development and off-road vehicles might impact this species.	Tanque Verde Peak quad Rocking K, 1994 Private Vail quad, 1966, 1981 Private Galleta Flat West quad, Kiper Spring 1981 State Mount Fagan quad, Davidson Canyon, 1990 State The Narrows quad, Pantano, 1941 Private, Cienega Creek drainage, 1990 State	
<i>Lasiurus blossevillii</i> (= <i>borealis</i>) Western red bat	2	S2	FSS WSC	Habitat loss as a result of groundwater pumping, channelization, wood cutting, leading to loss of riparian areas. Farming and agricultural uses, specifically secondary poisoning and reduction of food supply resulting from insecticide use.	Empire Ranch quad, Empire Gulch, 1989 BLM.	This probably is more common on Empire Ranch than the records indicate. Also reported confirmed from Colossal Cave Mountain Park, roosting in trees on Posta Quemada Ranch.

TABLE 10
STATUS 1 AND 2 VULNERABLE SPECIES OCCURRING IN THE CIENEGA-RINCON SUBAREA
(continued)

Scientific Name/Common Name	Pima County Status	State Rank	Listing Status	Potential Threats and Stressors	HDMS Records	Notes
<i>Leptonycteris curasoae yerbabuena</i> Lesser long-nosed bat	2	S2	FE WSC	Alleged to be related to reduction of numbers of maternity colonies and decline in size of remaining maternity colonies in Arizona and Sonora due to exclusion and disturbance. Additionally, thought to be negatively affected by large reductions in acreage of native agaves over large areas of northern Mexico due to excessive harvesting for local manufacture of mescal and tequila. Excessive browsing by livestock on newly emergent flower stalks of Agaves has also been suggested as possibly decreasing foraging opportunities and thus contributing to declines among these bats.	Tanque Verde Peak quad, Box Canyon Crevice 1993 NPS Vail quad, Rincon Mountains 1968, 1988 Private Helvetia quad 2 mi E of Helvetia 1976 USFS Empire Ranch quad, Empire Ranch 1989 BLM Spring Water Canyon quad, Cienega Canal, 1989 BLM Mt. Wrightson quad, Sawmill Canyon (Santa Cruz Co.) 1988 USFS	There was formerly a maternity roost in Colossal Cave. With much effort, bats were excluded and driven away. They may return if the cave is managed properly for them. The Colossal Cave Mountain Park website lists this species as present, not in the cave but roosting in cliffs.
<i>Lilaeopsis schaffneriana recurvata</i> Huachuca Water Umbel	1	S2	FE HS	Groundwater pumping. Habitat loss. Historic channel cutting. Floods. Competition from introduced species. Watershed degradation.	Spring Water Canyon quad. Empire Gulch 1996 BLM	Critical Habitat has been designated, and does not include Pima County
<i>Muhlenbergia dubioides</i> Box Canyon Muhly	1	S1	FSS	Very narrow distribution.	Helvetia 1986 USFS	
<i>Muhlenbergia xerophila</i>	1	S1	FSS	Very narrow distribution.	Mica Mountain quad 1978	

TABLE 10
STATUS 1 AND 2 VULNERABLE SPECIES OCCURRING IN THE CIENEGA-RINCON SUBAREA
(continued)

Scientific Name/Common Name	Pima County Status	State Rank	Listing Status	Potential Threats and Stressors	HDMS Records	Notes
Weeping Muhtly					NPS Helvetia 1990, 1940 USFS	
<i>Plecotus townsendii pallescens</i> Pale Townsend's big-eared bat	2	S3S4	FSC	Disturbance of roosts by recreationists and renewed mining.	Vail quad, Rincon Valley, 1986 Private. Mt. Wrightson quad, Santa Cruz Co. Cave Creek 1986 USFS	This species is probably more common in Pima Co. than records indicate. Reported from Colossal Cave, which it uses as a maternity roost.
<i>Poecilopsis occidentalis</i> Gila Topminnow	1	S2	FE FSS WSC	Non-native species, competition and predation. Habitat loss by groundwater pumping and channelization. Flooding. Drought. Dredging. Poor water quality. Livestock grazing (trampling by cattle, watershed changes).	Tanque Verde Peak quad, Tanque Verde Ridge Rincon Site. 1989 NPS Mica Mountain quad, Madrona Canyon 1987, NPS The Narrows quad, Cienega Creek, 1998, BLM Mescal quad, Wakefield Canyon 1989 BLM Spring Water Canyon quad, Cienega Creek, many records, BLM	After 1989, none were found in 3 surveys of pools at Rincon Site. No records for Madrona Canyon site after 1987 or Wakefield Canyon after 1989 Cienega Creek population is probably viable.
<i>Rana chichahuensis</i> Chiricahua Leopard Frog	1	S3	FC FSS WSC	Disease. Introduced predators/competitors. Loss of habitat, groundwater pumping, water diversions. Center for Biological Diversity alleges threats are:	Helvetia quad, Santa Rita Mts. West Sawmill Canyon 1995 USFS; Box Canyon 1979 USFS. Spring Water Canyon	CBD sued to list as endangered 8/27/99

TABLE 10
STATUS 1 AND 2 VULNERABLE SPECIES OCCURRING IN THE CIENEGA-RINCON SUBAREA
(continued)

Scientific Name/Common Name	Pima County Status	State Rank	Listing Status	Potential Threats and Stressors	HDMS Records	Notes
<i>Rana yavapaiensis</i> Lowland Leopard Frog	2	S4	SC FSS WSC	"continued degradation and destruction of Southwest riparian areas by livestock grazing, groundwater pumping, water diversion, and dams. They are also threatened by exotic species, such as the bull frog and the large-mouth bass, which compete with and prey on the frog"	quad. Cienega Creek. 1989, 1986 BLM. Mt. Wrightson quad, in Santa Cruz Co. several records. In Pima Co., Fish Canyon 1995 USFS Elgin quad. 1 record in Santa Cruz Co., Babocomari River.	
				Groundwater pumping, disease, water pollution, invasive non-native species, ozone loss, unknown causes of population declines	The Narrows quad, Cienega Creek, 1990 BLM 1995 Private Mescal quad, Wakefield Canyon 1998 BLM Helvetia quad, Box Canyon 1979 USFS Empire Ranch quad, Empire Spring 1990 BLM	
					Spring Water Canyon quad, Cienega Creek, several records 1990-1991 BLM	
					Mt. Wrightson Quad, several records in Santa Cruz Co. 1979-1989 USFS	

TABLE 10
 STATUS 1 AND 2 VULNERABLE SPECIES OCCURRING IN THE CIENEGA-RINCON SUBAREA
 (continued)

Scientific Name/Common Name	Pima County Status	State Rank	Listing Status	Potential Threats and Stressors	HDMS Records	Notes
<i>Sorex arizonae</i> Arizona Shrew	2	S2S3	FSC FSS WSC	Limited distribution, poorly known. Fires and floods. Recreational development and camping.	Mt. Wrightson quad, Santa Cruz Co. Stone Cabin Canyon 1923 USFS	Appropriate habitat has not been surveyed using the best available techniques. This species may or may not be present in montane areas in Pima Co.
<i>Strix occidentalis lucida</i> Mexican Spotted Owl	2	S3S4	FT WSC FSS	Habitat destruction by logging. Possibly consequences of fire suppression leading to major timber fires. Organized recreational and sports use and recreational development. Global climate change.	Mica Mountain quad, 4 locations in 1997, all NPS Rincon Peak quad, 1997 NPS Mt. Wrightson quad, several locations all in Santa Cruz Co. 1994 USFS	May occur at high elevation areas, barely within this subarea. Critical Habitat for this species had been designated in 1995, but rescinded in 1998. It may have just barely touched portions of this subarea, but was mostly (if not entirely) within subarea 4. On 3/14/00 a federal judge ordered FWS to determine critical habitat by 1/15/01.
<i>Thamnophis eques megalops</i> Mexican Garter Snake	2	S2S3	FSC FSS WSC	Predation by bullfrogs. Aquatic and riparian habitat degradation and destruction.	Spring Water Canyon quad, Cienega Creek 1986, 1994 BLM Elgin quad, Santa Cruz Co. near Elgin Private	

NOTE: Records are from Heritage Data Management System (HDMS), Arizona Game and Fish Department

Quads: Tanque Verde Peak, Mica Mountain, Vail, Rincon Peak, Galleta Flat West, Mount Fagan, The Narrows, Mescal, Helvetia, Empire Ranch, Spring Water Canyon, Apache Peak, Mt. Wrightson, Sonoita, Elgin, Mustang Mountains

Habitats protected by the NCA would include cienega marshlands, cottonwood-willow riparian woodlands, juniper-oak woodlands, sacaton grasslands, mesquite bosques, and semi-desert highland grasslands. Wildlife species protected include native fish, including the endangered Gila topminnow, endangered lesser long-nosed bat and other bats species, southwestern willow flycatcher, yellow-billed cuckoo, Chiricahua leopard frog, and many other important wildlife species (Sonoran Institute 2000). Underlying this is the overall protection of the watershed, groundwater reserve, and perennial and intermittent flows. Water resources would primarily be protected by limited groundwater pumping, limits on activities at areas of surface flows, minimized impervious road surfaces, and minimized drainageway alterations. A well-functioning watershed is promoted by fewer impervious roadways, and limiting access to many parts of the watershed reduces the likelihood that intact wildlife habitat will be affected by incompatible activities.

One of the driving forces behind the proposal is the desire to prevent the urbanization of the Cienega Creek watershed. Since over half of the proposed NCA area is State Land that is susceptible to lease or sale and development, this is a distinct possibility, especially in light of the increasing growth and pressure as the urbanized area of the Tucson basin continues to expand. The biological stressors associated with urbanization are habitat removal, alteration and fragmentation, increased groundwater pumping and depleted water resources, competition by invasive species, human use, and overuse.

2. Empire-Cienega Resource Conservation Area

This RCA would be fully incorporated into the proposed NCA. Its 45,000 acres have been under the administration of BLM since 1988. Prior to BLM's acquisition the 10 miles of surface flows, riparian woodlands, oak woodlands, and native grasslands were facing biological stress associated with the real possibility of housing and commercial development (USDI-BLM 2000). Presently, grazing with appropriate limitations continues in the RCA. It is an area of few roads (none paved) and little habitat alteration providing habitat to a highly diverse wildlife population. Finding protection here are three native fish (endangered Gila topminnow, Gila chub, and longfin dace), lowland leopard frog, canyon tree frog, numerous reptiles, over 170 species of birds (including the yellow-billed cuckoo), and game and non-game mammals (USDI-BLM 2000).

3. Empire Mountain Park

This park was identified for inclusion as a part of the Sonoran Desert Conservation Concept Plan. The BLM is committed to acquiring additional land in this area. Over 16 sections of State Land have been identified for consideration. The area, south of the Empirita Ranch, is being analyzed and planned for in the content of the Resource Management Plan for the Empire-Cienega Resource Conservation Area.

4. Colossal Cave Mountain Park

The Sonoran Desert Conservation Plan Concept Plan proposes to expand the existing 2,038-acre Park to over 21,000 acres, based on recommendation by County staff and the Rincon Institute. This expansion would include large parcels of State Lands as well as private land. It would provide a direct link between the existing Park and Saguaro National Park to the north, protect two important segments of Rincon and Agua Verde

Creeks, habitats of both the Sonoran and the Chihuahuan Desert, and protect significant areas of unique limestone geology and the species it supports (Pima County-Mt. Parks 1999).

As discussed under Land Use, private and State Lands in the vicinity of the park are being rapidly developed by lot-splitting. This puts at risk "limy" areas containing the needlespine pineapple cactus and two limestone-loving agaves that are critical food sources for the endangered lesser long-nosed bat and other nectar-feeding bats. The increased population also brings with it increased groundwater pumping. The expansion would protect some of the tributary flows of the Rincon Creek as well as segments of Rincon and Agua Verde Creeks.

5. Cienega Creek Natural Preserve

The Sonoran Desert Conservation Concept Plan proposed the Preserve be expanded by approximately 9,000 acres. Representing one of few remaining desert riparian areas with perennial flows, Cienega Creek and the Preserve have extremely high resource and habitat values. A segment of the creek has been designated as a "Unique Water of Arizona" by the Arizona Department of Environmental Quality (ADEQ) due to its significance. The Preserve also includes the portion of Davidson Canyon north of I-10. This canyon extends south and southwest into the Santa Rita Mountains and is an important tributary to Cienega Creek.

The proposed expansion would protect gaps that presently exist within the Preserve, widen the corridor of protection, add assurance that perennial stream flows will continue, and protect additional riparian habitat and adjacent upland habitat. It would also provide an important corridor and link to adjacent open space and preserve areas such as Colossal Cave Mountain Park and the Empire-Cienega RCA. As part of the proposal 1,856 acres of State Land surrounding the Mescal Arroyo to the east would be added to the Preserve and the narrow corridor along Davidson Canyon would be widened to approximately one mile.

6. Davidson Canyon Natural Preserve

Approximately 6,191 acres of State Land and private land would encompass a preserve along 11 miles of Davidson Canyon upstream from I-10. This would provide a critically important link between the Cienega Creek Natural Preserve and the Santa Rita Mountains by protecting a significant riparian corridor. Mining interest in the canyon is of concern, as expressed by ASARCO's plans to develop their Rosemont Ranch area along the canyon. Although those plans have been halted, mineral resources remain and could be developed at some time in the future. That would likely result in habitat destruction and fragmentation of a unique canyon habitat. Several proposals for large subdivisions in close proximity, and a pattern of increasing lot-splitting of private properties in the Davidson Canyon area are indications of the growing development pressure (Pima County-Mt. Parks 1999).

Not protecting this area would result in the loss or degradation of a regionally significant biological corridor and hydrological component. The existing I-10 overpass of the canyon is a good height above the riverbed and thereby provides for wildlife crossing with

adequate distance to mitigate the noise, vibration, and other impacts of the highway. Development impacts to the private land that is located immediately south of I-10 could impair this location as a viable corridor connection, and would be incompatible with the preserve status of the watercourse on the north side of I-10.

7. Santa Rita Mountain Park

This is a 10,703-acre area at the northeast corner of the Santa Rita Mountains. It would be comprised almost entirely of State Land and private lands. The same development pressures that exist for the Davidson Canyon and the intersection of I-10 and SR-83 exist here. Numerous homes have been built on the 1,826 acres of private land within the boundaries of the proposed Park and others are expected to follow. A wildcat subdivision area exists to the west. This Park would flank the west side of Davidson Canyon and would abut the Forest boundary. The biological value of this land is in the dense vegetation along drainages tributary to Davidson Canyon and the open space linkage to that watercourse, Cienega Creek, and the Santa Ritas. The area is known for a large population of bats, large mammals, and a tremendous diversity of plant and other wildlife species. Not protecting this area would bring the edge of the urbanized area in closer proximity to the Cienega Creek watershed and result in habitat loss, alteration, fragmentation, and increased groundwater pumping.

8. Saquaro National Park

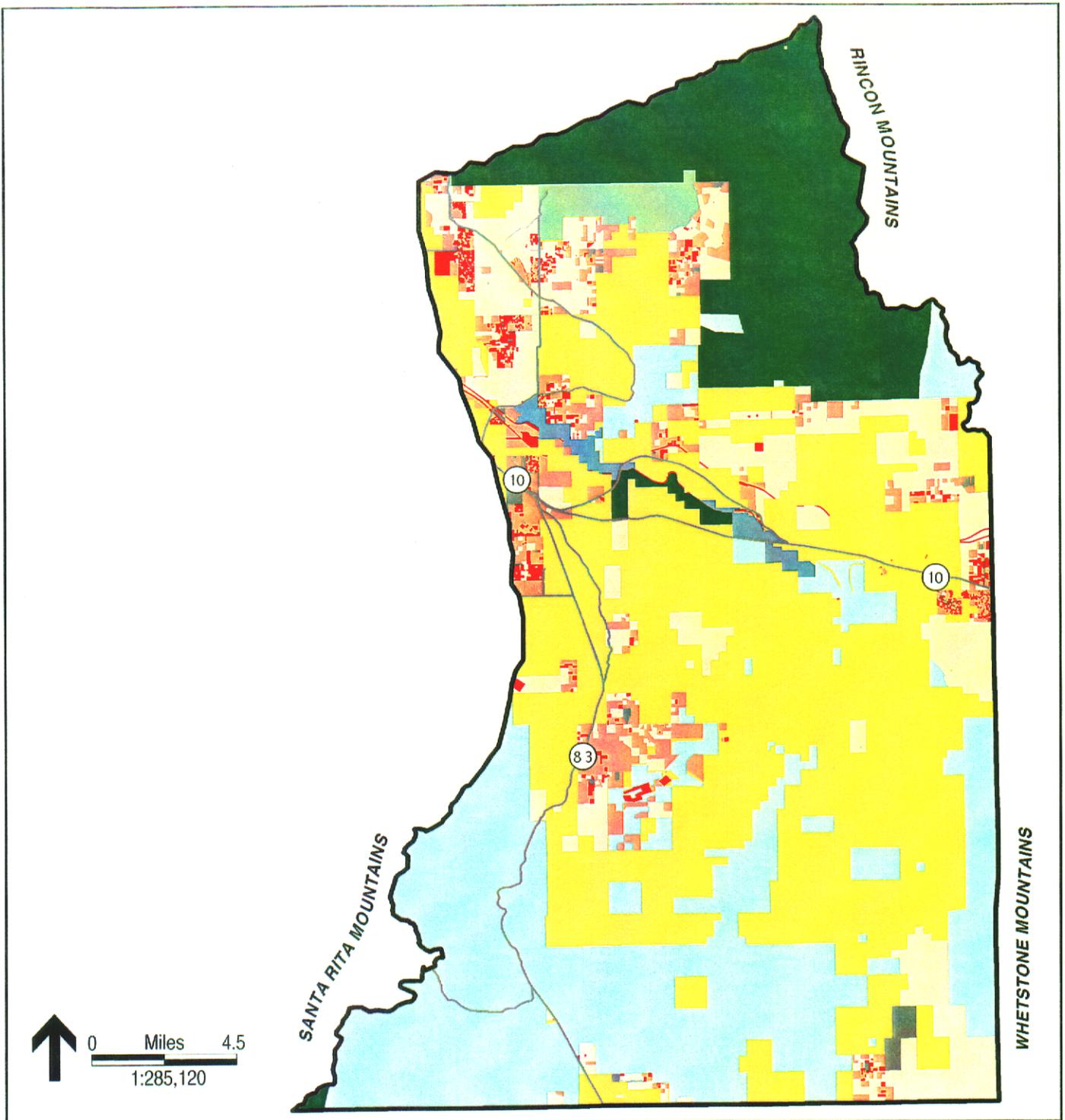
In 1991 legislation was enacted to expand the boundaries of the Rincon Mountain District by acquiring over 4,000 additional acres along the southern edge of the district. The expansion area gives protection to a portion of Rincon Creek and an important tributary, Chimenea Creek. Protection of Chimenea Creek is expected to have a positive effect on the hydrologic and habitat function of its riparian zone and floodplain. Additional trails are proposed but patrols in the creek area are planned to ensure that adverse impacts to riparian vegetation are minor. All existing roads and social trails that are not adopted as trails will be revegetated (USDI-National Park Service [NPS] 1999).

D. Summary of Potential Stressors to Biological Resources

Primary stressors to biological resources within the Cienega-Rincon Subarea include habitat loss, alteration and degradation; habitat fragmentation, human use and overuse, conversion of ranch lands, and a decline in stream surface flows and competition by invasive species. Lower elevation palo verde-cacti communities with invasive non-native grasses are at risk of wildfires. The current ownership and management pattern within the Cienega-Rincon Subarea provides significant conservation protection in the north and along a limited portion of Cienega Creek (Figure 12). The majority of the subarea is status 4a and 3b, with significant areas of higher intensity of use.

Habitats most at risk include cienega marshlands, riparian gallery forests, crinkle-awn grasslands, southwest oak savanna, giant Sacaton grassland bottomlands, healthy highland grassland, cave habitats, and limestone dependent plant communities.

Activities contributing to biological stress are shown on Table 11. These include ground water pumping, diversion of stream flows, mining, historic overgrazing, increasing



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Level of Threat Represented by Conservation Status in the Cienega-Rincon Subarea

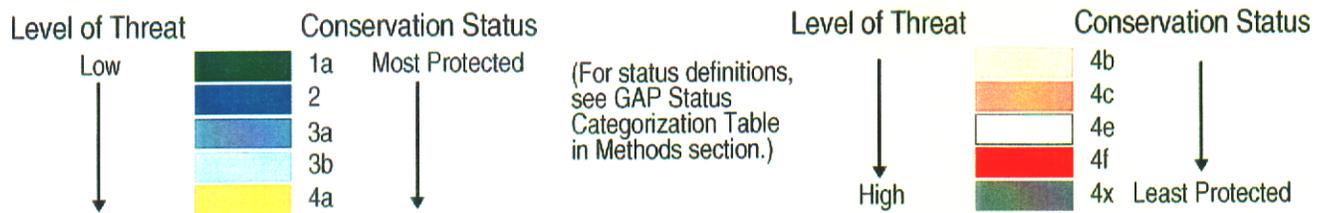


Figure 12

TABLE 11
LAND USE ACTIVITIES WITHIN LAND OWNERSHIP/MANAGEMENT
CATEGORIES OF THE CIENEGA-RINCON SUBAREA

Ownership or Management Category	Land Uses and Activities									
	Conversion of Vegetative Cover	Competition/Predation by Invasive Species	Lot-Splitting & Urbanization	Groundwater Pumping	Water Diversion & Impoundments	Recreational Uses	Mining	Roadways	Livestock Grazing	Removal of Plants
Saguaro National Park East (4,246 acres)	-	x	-	x	x	x	⊙	x	⊙	⊙
Saguaro National Park East Wilderness Area (27,526 acres)										
Coronado National Forest-unreserved (41,674 acres)	-	x	-	x	x	x	x	x	x	x
USFS Rincon Mountain Wilderness Area (14,726 acres)										
USFS Mt. Wrightson Wilderness Area (283 acres)										
Coronado National Forest-Wilderness (41,674 acres)	-	x	-	-	*	x	⊙	x	x	⊙
Colossal Cave Mountain Park (1,896 acres)	-	x	-	x	*	x	-	x	-	-
Cienega Creek Natural Preserve (2,643 acres)	-	x	-	-	x	x	-	x	⊙	x
Cienega Creek Natural Preserve CC&R (1,244 acres)										
Empire-Cienega RCA (31,892 acres)	-	x	-	-	x	x	-	x	x	-
Other BLM Lands (4,188 acres)	-	x	-	x	x	x	x	x	x	x
Pima County Empirita Ranch (366 acres)										
Pima County Open Space (2,553 acres)										
Pima County Unreserved – State Trust Lands (119,873)										
State Land Tucson Unreserved (2,649 acres)	x	x	*	x	x	x	x	x	x	x
Pima County Unreserved – Private Lands (62,158 acres)										
Private Lands Tucson Unreserved (572 acres)	x	x	x	x	x	x	x	x	x	x

x = occurs
 - = does not occur
 * = potential to occur
 ⊙ = historic but not present occurrence

urbanization (both regulated and unregulated subdivision), off-road-vehicle use, recreational activities, fire suppression and fuel build up, removal of plants, and the introduction and spread of exotic species.

Of primary concern in this watershed is the continued presence of surface water in perennial flow areas and cienega marshlands along the Cienega Creek. This is a priority within existing preserve areas, but could be jeopardized by water rights held by non-preserve entities. The possibility of groundwater pumping from wells at the Empirita Ranch, at the southeast end of Cienega Creek Natural Preserve, exists due to the water rights being held by the previous owner. If pumping was maximized here it could easily have a negative effect on the perennial surface flows downstream. The greatest stressor to perennial streams, cienega marshlands, and springs in the subarea is ground water pumping. Acquiring water rights to protect the perennial flows in the subarea would greatly reduce the potential future stress to biological resources.

Increased lot-splitting in the Pistol Hill area of Rincon valley and in Davidson Canyon continue to displace and fragment habitat. The groundwater pumping associated with numerous private wells depletes the aquifer and may affect the surface flows and vegetation of nearby Cienega Creek. The presence of private land and large tracts of State Land adjacent to existing preserves raises the possibility of increased development in areas where biological resource values are high and preserves are proposed for expansion. This is a particular concern in the areas around Colossal Cave Mountain Park and in Davidson Canyon south of I-10. The establishment of Las Cienegas NCA would resolve many of these concerns related to encroaching urbanization.

According to the Sonoran Institute, the Cienega Creek watershed is the only large basin in southern Arizona surrounded by mountains containing extensive amounts of carbonate rock exposures, predominantly limestone (Sonoran Institute 1999). This unusual geology results in caves as well as unique soil and habitat conditions. Two species of limestone-loving agaves that provide forage for nectar-feeding bats, the needlespine pineapple cactus, the rare crinkle-awn grassland, and rock-banded rattlesnake are supported by limy conditions (Sonoran Institute 1999). Caves are always at risk of being degraded due to vandalism and human overuse, but at this time access to caves in Gardner Canyon is by permit only, through the Coronado National Forest (USFS, Graves, 2000).

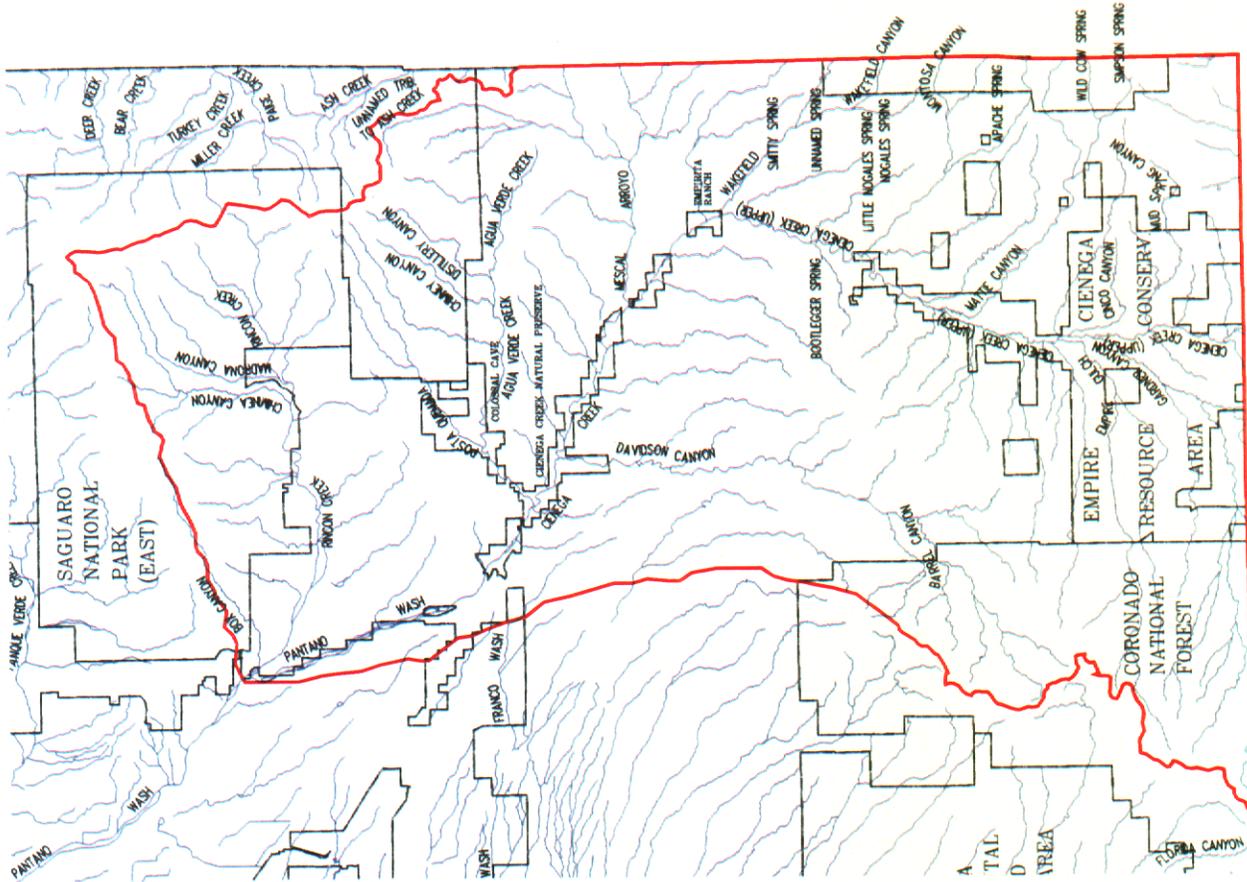
There are a number of areas with high to medium potential for mineral resources in the Santa Rita Mountains. The potential for future development of mining activity exists, particularly at the north end in Davidson Canyon where interest has been recently expressed. Increasing copper prices will increase the risk of habitat loss and degradation resulting from mining activity.

Increased recreation use of the east flank of the Santa Ritas is of concern, particularly in the area of Gardner Canyon and north to the Rosemont area. Irresponsible off-road-vehicle use has resulted in habitat loss and degradation, erosion, gullying, creation of new roads and trails, and disturbance of wildlife. The Forest Service is initiating a program of public education and adding fencing and cattle guards to stabilize the high use areas.

Priority Streams

SDCP PLANNING UNIT 2

-  Washes
-  Watershed Planning Unit
-  Administrative Boundaries



Pinna County Index Map



Scale: 1:70,000

This project was prepared for the Department of Transportation
 by the following individuals:
 Project Manager: [Name]
 Designer: [Name]
 Checker: [Name]
 Date: [Date]





An Overview of Pima County's Watersheds and Watercourses

**Pima County
Sonoran Desert Conservation Plan Report**

April 2000

**Barbara Tellman, Water Resources Research Center, University of Arizona
Clint Glass, CMG Drainage Engineering
John Wallace, J.E. Fuller, Consultants**

Chapter 5

Subarea 2 - Cienega-Rincon

WATERSHED/WATERCOURSE CHARACTERISTICS

THE WATERSHED

The Cienega-Rincon Subarea includes the watersheds of the Pantano Wash and Rincon Creek upstream of their point of confluence near the Drexel Road alignment. The subarea is formed by the Santa Rita Mountain Range to the west and the Rincon and Whetstone Mountain ranges to the east. The subarea starts at the Santa Cruz County line to the south and continues to the confluence of Pantano Wash and Rincon Creek. See Fig. 5-1 for a map of the subarea.

The subarea consists of two fairly distinct regions which will be referred to as the Cienega Region and the Pantano Region for purposes of this discussion. Pantano Wash begins as Cienega Creek and the name changes to Pantano Wash downstream of the Cienega Creek Preserve. The Cienega Creek watershed is the only large basin in southern Arizona surrounded by mountain ranges containing extensive amounts of the kind of limestone that promotes the development of caves, of which Colossal Cave is the best known example locally, but there are numerous others, one of which is a National Natural Landmark. Karchner Caverns on the other side of the Whetstone Mountains is part of this general geologic formation. The caves support some unusual flora and fauna some of which depend on springs associated with the caves. These, in turn, are dependent on a high water table.

Cienega region

The Cienega region is that portion of the subarea between Colossal Cave Road and the Santa Cruz County line. This region can generally be described as a broad grassland valley rising gently to the steeper foothills and mountains of the Santa Rita and Whetstone Mountains ranges. The Cienega Creek through this region is also generally a sand-bed channel but with markedly increased vegetation along its margins. At some locations groundwater levels are close enough to the surface to result in intermittent flow. Such a condition exists within the Cienega Creek Natural Preserve owned by the Pima County Flood Control District and administered by the Pima County Parks and Recreation Department.

Pantano region

The Pantano region is that portion of the subarea between Colossal Cave Road and the Rincon Creek confluence. This area is fairly similar in landform and vegetation community to the Middle Santa Cruz Subarea which includes the lower part of the Pantano Wash. It is characterized by well defined desert arroyos with typical desert brush vegetation including creosote, mesquite, and numerous species of cacti. The Pantano Wash exists through this region as a wide, fairly incised sand-bed channel with sparse vegetation along its margins. Within the Pantano region, the Rincon Creek is a major tributary which drains the Rincon Valley. See Fig. 5-2 for a map of the watershed.

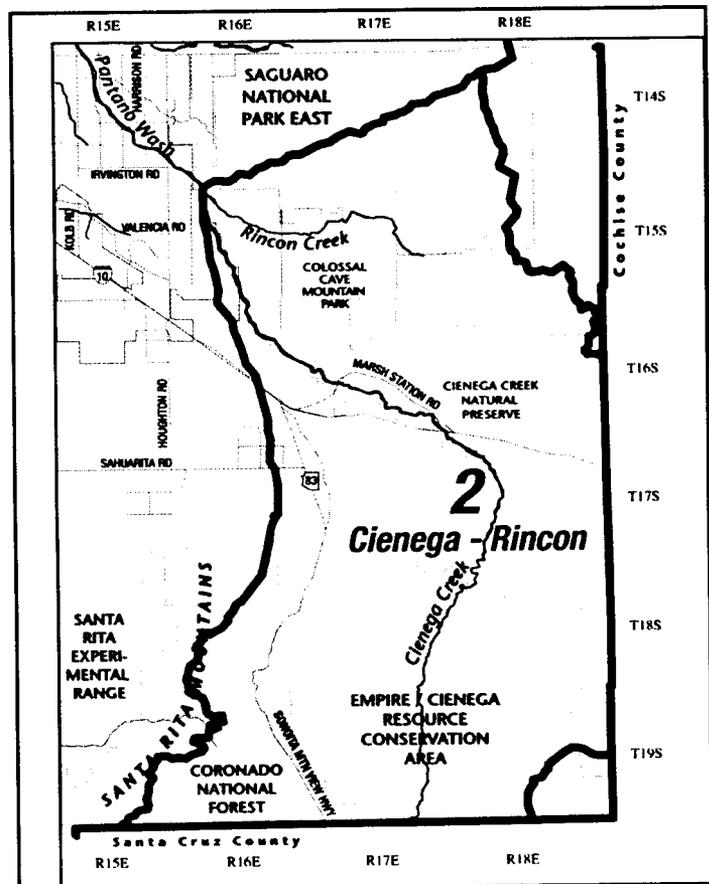


Fig. 5-1. The Cienega-Rincon Subarea.

MAJOR WASH CHARACTERISTICS

The major washes within this subarea are Pantano Wash and its two largest tributaries Cienega Creek and Rincon Creek. The lower reaches of Pantano Wash between the Rincon Creek confluence and Houghton Road have degraded several feet during past decades. This degradation has been related to urbanization along the reaches further downstream and due to in-stream sand and gravel mining. Very little in-stream mining continues today but future degradation should be anticipated as a result of past changes to the channel hydraulics which support higher flow velocities and sediment transport capacity. This degradation could propagate to the upstream reaches if grade controls are not installed.

The cross-section of Cienega Creek has not been severely changed by man-made modifications. Cienega Creek is, however, vulnerable to change such as streambed degradation if proper measures are not taken to prevent the intrusion of significant development within the watershed or the propagation of downstream channel bed degradation. Presently, the broad floodplain areas along the upper reaches of Cienega Creek function to provide overbank flood storage. This decreases soil/sediment loss within the watershed and decreases in downstream peak flow rates.

Rincon Creek has been modified by man-made changes only through the Rocking K Ranch reach east of Old Spanish Trail (a distance of about two miles). In the 1940's this reach was cleared for farming and the wash was channelized around the fields. Several floods that have occurred during the last sixty years have filled in the channel with sediment leaving a broad sheetflow area across the valley floor. The riparian vegetation which was removed to facilitate farming has not recovered to any significant degree. The Rocking K Ranch master plan (approved by the Pima County Board of Supervisors in 1996) proposes modifying the floodplain geometry to include residential development, a golf course, and restoration of 118.5 acres of riparian habitat.

The reach of Rincon Creek west of Old Spanish Trail has degraded a few feet as a result of degradation along Pantano Wash. Up till now, the degradation has not propagated east of Old Spanish Trail because Pima County has installed remedial grade control measures to maintain the existing roadway dip crossing of Rincon Creek. East of the Camino Loma Alta crossing, Rincon Creek largely remains in a natural condition. The floodplain area provides some overbank storage which acts to reduce downstream flood peaks.

TRIBUTARY WASHES

The tributary washes within this watershed are well defined. Distributary sheet flooding is limited to a small area (approximately 1 square mile) within portions of Township 15 South , Range 16 East, Section 34.

HUMAN IMPACTS ON THE WATERCOURSES

FLOOD MANAGEMENT PLANS AND ACTIVITIES

Pima County Flood Control District has acquired floodprone land at the confluence of Pantano Wash and Rincon Creek and at the confluence of Pantano Wash and Tanque Verde Wash in order to prevent downstream flood problems.

Pima County studied the possible impacts of sand and gravel mining in the Pantano Wash in the general vicinity of Vail. Increased needs for construction materials were anticipated with the growth of population in the area, especially Rocking K. The study recommended that if such mining were to occur, the company would have to install grade control structures to minimize problems from erosion. The demand for materials in this area has not yet developed to the point that extensive gravel mining is needed, but may occur at some time in the future. If the City of Tucson annexed the area, the city rules would apply and a new analysis would probably be needed.

Pima County operates a network of precipitation and flow sensors in this area to report storms coming from the east. Rincon Creek and Cienega Creek have numerous sensors as part of this network.

TRANSPORTATION

I-10 runs east-west through the Cienega region. Old Spanish Trail is the major road through the Pantano region, connecting the City of Tucson with I-10 and Saguaro National Park and I-10. Highway 83 runs through the Cienega region, connecting I-10 with Sonoita. There are many urban roads throughout the area.

WATER AND WASTEWATER- RELATED LAND USES

Water supply

Depth to water ranges from surface flows at Cienega Creek to more than 550 feet in the mountain foothills. Most of the area is served by Tucson Water, but significant sections are served by eight private water companies, such as the Spanish Trail Water Company, the Forty Niners Water Company, and the Vail Water Company. There are also many private wells in the area.

Wastewater

There is no large wastewater treatment plant in this area, most of the wastewater from this area goes to the Ina Road and Roger Road Treatment Plants. A very small amount of it returns to the western edge of the area through the city's reclaimed water system which provides water to the Rolling Hills Golf Course and is capable of providing water even farther into this area. Most of the homes in less densely populated areas are on septic systems. The University of Arizona Science Center, The Arizona State Prison and the Pima County Fairgrounds have their own systems.

EXISTING PUBLIC LAND USES

The upper watershed is within the Coronado National Forest in the Santa Rita and Rincon Mountains. This area is managed for multiple use and grazing occurs in the watershed. Mining is allowed in National Forests under the 1872 Mining Law. A proposal was made in the early 1990s to open a mine in the Rosemont area where small-scale mining had occurred historically. As a result of public opposition and economic factors, this proposal is no longer active, but this or another one could be renewed if world copper market conditions change. The Forest here has moderate recreational use, with rather heavy use during hunting season.

At the southern end of the subarea is the 45,000 acre Empire-Cienega Resource Conservation Area (of which 31,906 acres are in Pima County). Since June 1988, the Empire and Cienega ranches (365 acres), along with portions of the adjacent Rose Tree Ranch, have been under the administration of the Bureau of Land Management (BLM). Prior to BLM's acquisition, these rolling grasslands and woodlands faced an uncertain future that almost assuredly included housing and commercial development. Such development would have eliminated the sweeping vistas and substantially harmed the watershed and habitat needed for rare native fish and a rich diversity of other wildlife. Pima and Santa Cruz county supervisors officially requested that BLM become involved in protecting this land. Through BLM's efforts, this area is now under public ownership and is being managed under the principles of multiple use. Grazing is allowed, but very carefully managed to protect the watercourses. Recreation is encouraged, including camping.

Headwaters of the creek bubble to the surface three miles east of the historic adobe ranch house. From that point the stream meanders for 10 miles before again disappearing underground. Its narrow water- course is six to eight inches deep. Occasionally pools of greater depth occur. Three native fish species are found in the stream (both here and in the Pima County section): the Gila topminnow, which is endangered; the Gila Chub, an endangered candidate; and the Longfin Dace. Additional information on the Empire-Cienega Resource Conservation area can be found at <http://tucson.az.blm.gov/e-cinfo.html>.

Pima County's 1,243 acre Cienega Creek Natural preserve was created in 1987 to maintain the running creek water and to preserve the native plants and animals that thrive on it. It is administered by the Pima County Parks Department. Pima County has an instream flow permit for the preserve and ADEQ has designated the creek "unique water." Recreational use of the preserve is limited by parking permits and vehicles are now allowed within the preserve. A management plan directs how the preserve is used and what facilities may be made available in the future. Pima County is attempting to restore native vegetation to some of the lands along the preserve that were farmed or otherwise altered. The area was grazed for many years, but Pima County has now eliminated grazing along the creek. A railroad crosses the creek at the preserve and is one of the attractions for visitors. At the lower end of the preserve is an old submerged dam which has been used for water diversions downstream. This dam has helped retain water within the preserve. Additional information on the Cienega Creek Natural Preserve can be found at <http://www.webofgibraltar.com/cienega/>. Parts of the watershed for the Pantano subsection are in the 67,385 acre Saguaro National Park East. (See Chapter 7 for more information).

The Rincon Mountain Wilderness Area, part of the Saguaro National Park, (36,962 acres) has no public roads but is accessible via hiking trails. The U.S. Forest Service owns some of the upper portions of the watershed. The popular Colossal Cave County Park occupies 1,895 acres in the Rincon Mountains foothills, and includes picnic areas as well as the concession at the cave itself.

EXISTING PRIVATE LAND USES

In the 1920s Vail was a bustling trailhead and railway station, with approximately 400 residents. Little remains of the old town and its small school, but because of rapid growth in the area, the Vail School District has been continually expanding. In the early 1980s IBM built a large facility along I-10 and population growth mushroomed in the area. In 1989 IBM closed the manufacturing part of its operation and growth slowed. In 1995 the University of Arizona took over the mostly vacant IBM facility and the tax base of the school district dropped, but population growth increased, making it difficult to fund new schools. At the present time the district has three elementary schools, a middle school and a charter high school, and has plans to build new elementary, middle and high schools with state financial assistance. At one time residents attempted to incorporate, but this attempt failed. The town itself has some small commercial facilities, but most school children come from low and medium density developments scattered around the area.

The Tucson city limits extend into this subarea in a jagged line, including parts of Pantano Wash. In places city limits reaches to the Saguaro National Park boundary.

During the second half of the 20th century, land use in the Rincon Valley has shifted from ranching to private residential development. Beginning in the 1960s, some of the traditional 40-acre-plus ranches were subdivided into 10 to 20-acre "ranchettes." By the 1980s, several ranches in the valley had been transformed into 1-acre private residential neighborhoods. Development of an extensive mixed-use, resort-oriented planned community on the Rocking K Ranch began in the 1990s. The legacy of cattle ranching can still be seen in the Rincon Valley, even in areas that are no longer grazed. In desert scrub areas, the grasses and wildflowers preferred by cattle are now dominated by unpalatable weedy shrubs such as burro weed. Where grazing still occurs along the more natural upper Rincon Creek, understory species are nearly absent and cattle trails across the creek have caused some bank erosion and undermining of the trees that line the channel. Unchecked development in this area could result in upstream continuation of the channel erosion which has occurred on the Pantano Wash and the attendant threat to public and private improvements. Additional information on the Rincon Valley is available at <http://srnr.arizona.edu/~gimblett/rinproj.html>.

The Pantano Wash through this reach has been the subject of considerable mining for sand and gravel over the years. An approximately 14 foot drop in the bed profile of the stream over the latter half of the 20th century has been attributed in large part to such sand and gravel mining. Channel bed lowering can have dangerous repercussions as underground utilities, roadways, bridge support structures and natural channel bank stability are threatened by the lowering stream.

There are many acres of State Trust Land south of I-10 in this area and some private acreage, mostly ranches, wildcat development, and some subdivisions.

PROJECTED LAND USES

The Pantano subsection

The Comprehensive Plan for this area is highly complex. It calls for Resource Transition Zones along the boundary of the National Park, along with some Resource Conservation Zones along the boundary and along some watercourses. Industrial and commercial zones prevail along I-10 and south from Harrison Road to Nogales Highway in the Middle Santa Cruz Subarea. Zoning densities range from dense in the city portions to rural densities on the outskirts.

Despite the substantial public preserves in the upper part of the subarea, there are still significant areas which will face development pressure in the future, particularly within the Rincon Valley, the upland areas along the upper Pantano Wash. Major rezonings still in effect, although not yet built out are in the Rocking K Ranch Area and the Posta Quemada area. The Rocking K Area which is within city limits in the Rincon Valley, extending to the National Park boundary, was approved in the early 1990s (amidst great public opposition) and provides for enough homes for at least 25,000 people as well as commercial, resort and golf courses uses. Loss of the IBM manufacturing facility in 1989 somewhat lessened the growth pressures in this area, but population growth is again proceeding. Planners

speculate that with designation of much of the Tortolita Fan area as Critical Habitat and difficult to develop, population growth will accelerate in the Rincon Valley.

The Posta Quemada rezoning was approved in the 1950s and is still in effect although the area has not yet been developed. This area abuts the Saguaro National Park on the southwest and includes residential and resort development.

Important management steps to be taken include insuring that the upper Pantano Wash and Rincon Creek are properly managed to control erosion of the streambed and upland areas. The Rincon Institute has taken the initiative to rehabilitate and preserve sections of Rincon Creek and to work with landowners in the area on protection measures.

The Cienega Subsection

Most of this part of the subarea is in public ownership, as described above, and protected from development. There is, however, a significant amount of State Trust Land south of I-10 which could be released for private ownership. This is also true in parts of the Davidson Canyon area where wildcat development is the greatest concern. Private interests also own pumping rights on some of this land and pumping could endanger the flow of the stream.

Downstream of the preserve, the possibility of groundwater pumping could also threaten water supplies for the riparian area. Surface water is currently diverted from the creek downstream of the preserve, but this will be inadequate to supply water to new developments.

Another possible problem for this area would come from new mining operations in the watershed of Davidson Canyon within the National Forest. While this is not currently being actively pursued, this could be a problem in the future.

Opportunities, however, also exist for this area. The Sonoran Institute has done detailed studies of Rincon Creek and restoration efforts are underway, assisted by funding from the Arizona Water Protection Fund. A 600 foot wide riparian woodland corridor along the creek will restore a channel that was destabilized by farming and grazing. The developer's plan will control flood water and erosion without invasive structures. Vegetation will be planted and a multi-use trail system developed.

The County is conducting restoration programs along Cienega Creek to restore an historic mesquite bosque and Sacaton grass habitats. Grazing has been curtailed in the preserve. In addition, Pima County could restore one to five miles of perennial flow within the preserve by acquiring a one-acre inholding with the dam and diversion structure and its water rights. For this to succeed, the Vail Water Company would have to obtain an alternate source of water, preferably effluent or CAP rather than groundwater in the area.

Pistol Hill and Davidson Canyon are both proposed as State Trust Lands which should be set aside for preservation under the Growing Smarter Initiative. (See Chapter 3).

A group of residents in the Sonoita-Cienega Creek area have proposed creation of the Las Cienegas National Conservation Area (NCA) including the BLM Empire-Cienega Resource Conservation Area and other lands within the watershed. The Sonoran Institute held workshops for about 200 people to explore the options and preferences of attendees and also produced a report on various aspects, utilizing both public and expert technical opinions. The element of greatest concern was the water supply for the area, followed by wildlife, landscape integrity and other features. People felt that if the water supply was compromised, the other values would also be compromised and that acquisition of water rights was crucial. The most contentious issues were the extent and type of recreation that should be allowed (e.g., off-road vehicle access) and overgrazing issues. The proposal is moving through Congress with support from the Arizona delegation. A proposal to instead create a National Monument by Executive Order has been dropped in favor of the NCA approach.

ISSUES FOR DISCUSSION

WATER SUPPLIES

What measures, if any, should be taken to preserve surface water supplies in the Cienega Creek and Rincon Creek watersheds? Should alternate sources of water, such as CAP water, be provided to landowners in these areas? Should efforts be made to use wastewater in these areas either through the city's reclaimed system or through a local treatment facility? Should acquisition of the Cienega Creek Preserve inholding have priority?

POPULATION GROWTH IN THE RINCON VALLEY AND POSTA QUEMADA RANCH

Zoning is already in place for thousands of homes and other facilities in these areas. Are additional measures needed to prevent damage to the watershed and to prevent new downstream flooding? What restrictions should be placed on new zonings?

DEVELOPMENT IN DAVIDSON CANYON

Should measures be taken to restrict wildcat development in the Davidson Canyon area in order to prevent flooding problems in Cienega Creek or to restrict groundwater pumping which might affect the flow of the creek?

MINING

What actions, if any, should local governments take action in the future to protect parts of this area from new copper mining? How should new sand and gravel mining in the Vail region of Pantano Wash be handled?

PROTECTION OF THE CAVES AND SPRINGS

What measures, if any, should be adopted to protect the limestone caves and springs in the foothills area from development?

NATIONAL CONSERVATION AREA

Should the majority of the Cienega Creek watershed become a National Conservation Area, or have other additional protected designation?

Region Within the Subarea	Grazing	Wildcat Subdivision	Planned Subdivision	Copper Mine	Sand & Gravel Mine	Pumping	Agriculture	Recreation
Cienega Creek	X-	X+	X+	P	X+	X+		X+
Rincon Valley	X-	X+	X+		X+	X+		X+

Key: X = Existing X+ = Existing with potential to increase X- = Existing with potential to decrease
X+- = Existing with potential to increase or decrease P = Potential

Fig. 5-3. Generalized Matrix of Potential and Existing Impacts on Watercourses in the Cienega-Rincon Subarea

Region Within the Subarea	Alternate Water Less Pumping	More Non-structural Floodplain Management	Stricter Land Use Management	Federal Public Lands Expansion	State Trust Land Preserved	Other Preserves Increase	Better Grazing Management
Cienega Creek	X	X	X	X		X	X
Rincon Valley	X	X	X	X	X	X	

Key: X = Is possible and could have significant impact if it occurred.

Fig. 5-4. Generalized Matrix of Potential Options for Reducing Stress on Watercourses in the Cienega-Rincon Subarea

Ranching in the Empire-Cienega Valley: Descriptive Summary

Introduction:

The Empire-Cienega Valley was historically one of the most significant ranching valleys in eastern Pima County. Today it remains largely rural, and is characterized by significant unfragmented expanses of natural open space, comprised principally of ranchlands and public preserves. Once threatened by massive development, the potential for the valley to retain its natural open space and ranching tradition is today greatly enhanced by efforts by Pima County and Santa Cruz County and the Bureau of Land Management to consolidate public ownership of the Empire-Cienega Ranch for conservation purposes.

Proposed for development in 1969 by the Gulf America Corporation (GAC), the Empire-Cienega ranches then comprised about 90 square miles in Pima and Santa Cruz counties, which GAC proposed to develop into a "satellite community" for a population of 180,000 residents. Concerns about impacts to ground-water, transportation, services, and environmental impacts resulted in one of Pima County's biggest development battles, with ranchers and environmentalists joining together in the opposition. Although portions of the Empire Plan were approved, no construction was begun, and the bankruptcy of GAC forced the sale of the Empire and Cienega ranches. These were purchased by Anamax Mining Company, which abandoned the GAC plans and later put the ranches up for sale. In 1986, Pima County contemplated acquisition of these ranches as floodprone lands to assist in controlling downstream urban flooding problems and to conserve ground-water. In 1988, through subsequent land exchanges, the BLM acquired roughly 42,000 acres of these deeded lands and assumed management of another 57,000 acres of state trust grazing lands that it manages as a resource conservation area and leases to local ranchers for livestock grazing.

Farther downstream in the Empire-Cienega valley, Pima County established Colossal Cave Mountain Park and Cienega Creek Preserve and acquired the nearby Posta Quemada and Empirita ranches, which are also leased as working cattle ranches. The acquisition of these ranches by BLM and Pima County marked the beginning of local efforts to control urban sprawl, maintain open space, continue sustainable ranching, allow public recreation, and protect cultural and natural resources.

Because of the valley's unique environmental qualities, including two of southern Arizona's perennial streams, the Secretary of Interior visited the Empire-Cienega Resource Conservation Area in January 1999 to consider the effort to establish a National Conservation Area (NCA). Since that time, Congressman Jim Kolbe and his staff have been working with the community and the Sonoita Valley Planning Partnership to develop legislation to establish the Las Cienegas National Conservation Area. This legislation (HR 2941) was introduced on September 24, 1999. If approved, the Las Cienegas NCA would protect more than 300 square miles, some 200,000 acres, in the Cienega Creek and Babocomari River watersheds, while allowing responsible and sustainable livestock grazing and recreation to continue.

As a consequence of these actions by Congressman Kolbe, the BLM, Pima County, Santa Cruz County, and local residents, a significant portion, some 63 percent of the land area of the Empire-Cienega Valley is likely to be conserved for its natural and cultural values and open space, while providing a working landscape for ranching and livestock grazing.

Historical Summary:

The initial occupation of the valley by the prehistoric Archaic peoples dates perhaps as early as 8500 B.C., and while there are no Paleoindian occupation sites that have been identified, Paleoindian use of the valley perhaps as early as 10,000 B.C. is suggested by the presence of at least one isolated Clovis projectile point found in the eastern edge of the Santa Rita Mountains. More than 600 archaeological and historical sites have been found in the Empire-Cienega valley, dating to the Archaic, Early Agricultural, Hohokam, Protohistoric and Historic periods. A substantial number of these sites date to the Archaic period, followed by the Hohokam who occupied villages and smaller hamlets from about A.D. 300 to 1450 and farmed along the Cienega Creek floodplain and near spring sites in the adjacent mountains. Following the Hohokam collapse, little is known of the area until the Spanish missionaries and explorers entered the region in the 1690s and encountered Piman or Tohono O'odham peoples who are likely to be the descendants of the Hohokam. Arriving about the same time as the Spanish, the Apache, too, frequented southeastern Arizona, which later became part of the homeland of the Chiricahua Apache.

With the acquisition of this region by the United States following the 1854 Gadsden Purchase, some of the first Americans to enter the area were prospective miners in search of gold and silver. Lured to the region by Spanish accounts of rich ore bodies and the discovery of gold and silver elsewhere in southern Arizona, prospectors staked numerous small claims in the Santa Rita and other nearby mountain ranges; however, because of increased Apache raiding, mining, ranching, and agriculture in the Empire-Cienega valley was nearly precluded until after the Civil War. Settlement of the Empire-Cienega Valley with miners, homesteaders, and ranchers began in earnest in the 1870s when mines were re-opened and new mines developed and ranches were established under the Homestead Act of 1862 and the Desert Land Act of 1877. In 1874, the Greaterville gold placers were located, and by the late 1870s copper was being exploited at Helvetia, Twin Buttes, Silverbell, and elsewhere. The first mine in the Rosemont area was the Narragansett in 1879. With the coming of the railroad through the northern part of the valley in 1880, miners and ranchers were able to ship ore and livestock to distant markets, further encouraging the development of mining and ranching in the valley.

Good grass and permanent water attracted cattlemen and sheepmen to the Empire-Cienega Valley that was initially called "Stock Valley." Sanford, Kane, and Gardiner started some of the first ranches there, but certainly of greatest importance to the history of the Empire-Cienega Valley is the establishment of the Empire Ranch by Edward Nye Fish. Initially comprised of only 160 acres in 1870, Walter Vail, in partnership with Herbert Hislop, purchased the Empire Ranch and 612 head of cattle in 1876 and began an aggressive expansion of his ranch holdings. Vail continued to buy up surrounding ranches until the Empire Ranch controlled nearly one thousand square miles of range stretching from the Mexican border to the Rincon Mountains. More than 50,000 head of cattle grazed on the Empire Ranch at its height of operation. Vail understood that to get a good return in Western ranching, one had to make a sizable investment in land, cattle, and improvements. A shrewd businessman, Vail expanded his vast land base and operated the Total Wreck Mine, which yielded substantial wealth in silver and allowed Vail to diversify his holdings. Like his land holdings, Vail also created an expansive ranch headquarters as more space was needed and as a reflection of his growing wealth. Today, the ranch headquarters survives and is listed on the National Register of Historic Places. In 1928, the Vail family sold the Empire Ranch to the Boice family,

owners of the Chiricahua Cattle Company, who ran the ranch for 40 years until it was sold to the Gulf American Corporation for development in 1969. Today, the Empire-Cienega valley continues its ranching tradition and is home to about 28 ranches, including the lands that once comprised the Empire Ranch. The valley is comprised of 318,535 acres (497.7 square miles).

Land & Environmental Setting:

Located to the southeast of the urban Tucson Basin and running parallel to the Santa Cruz valley, the Cienega Creek in the Empire-Cienega Valley flows north from its headwaters near a divide to the east of Sonoita in Santa Cruz County. It continues to flow north into Pantano Wash and then the Rillito River, which joins the Santa Cruz River. Fortunately, erosion and significant flooding events have not caused the Cienega Creek in its upper reaches to become deeply channelized as has occurred in other valleys. Unlike the urbanized Tucson area, the Empire-Cienega valley is largely rural and undeveloped with an estimated population of only 3312 people. Its principal settlements are located at Vail, Mescal, and Sonoita, just south of the Pima County line. There are no Indian lands; however, public preserves comprise a significant portion of the valley. Suburban areas in the northwest portion of the subarea adjacent to the eastern edge of the Tucson metropolitan area represent the only urbanized areas in the valley.

The Empire-Cienega Valley is bounded by Saguaro National Park - East on the north, the Cochise County line and the Whetstone Mountains on the east, the Santa Cruz County line and the Sonoita area on the south, and the Santa Rita Mountain Range and the Empire Mountains on the west. The Empire-Cienega Valley watershed reflects a significant range in elevation from 2848 to 8596 feet. As with much of the Basin and Range province of the greater Southwest, the rugged mountain terrain and river valley support a variety of environmental zones and vegetation types, ranging from the Cienega Creek floodplain to higher elevation evergreen forests of the Santa Rita, Rincon, and Whetstone mountain ranges that surround the valley. Much of the valley is characterized by a broad, gently sloping bajada that accommodates broad expanses of grasslands that extend into the foothills of the surrounding mountain ranges.

Table 1. Major Vegetation Zones in the Empire-Cienega Valley Watershed in Pima County

▶ Agriculture/Pasture	1042 acres	0.3 percent
▶ Urban	693	0.2
▶ Mixed Scrub	4330	1.3
▶ Water surface	485	0.1
▶ Creosote-Tarbush	13,216	4.1
▶ Cottonwood-Willow	1585	0.5
▶ Paloverde Scrub	25,431	8.0
▶ Creosote-Bursage	8,750	2.7
▶ Deciduous/Riparian	279	0.0
▶ Scrub Grassland	222,876	70.0
▶ Mixed Broadleaf	131	0.0
▶ Manzanita	5626	1.7
▶ Oak- Pine Forest	10,096	3.2
▶ Evergreen Forest	<u>23,995</u>	<u>7.5</u>

TOTAL 318,535 acres 99.6 percent

Because of the range in elevation, rainfall, too, is highly variable ranging from about 13 inches

annually at the lowest elevations to an estimated 31 inches at the highest elevations. Most of the rainfall in this watershed is estimated to average about 15 - 23 inches annually. This amount of rainfall covers nearly 92 percent of the subarea acreage.

Water is available from a number of springs found mostly in the Santa Rita and Empire mountains on the west side of the valley and in the Whetstone Mountains to the east and the Rincon Mountains on the north. Surface water covering some 485 acres is found along some 77 miles of perennial and intermittent streams that include Cienega Creek, Davidson Canyon, Pantano Wash, Mescal Arroyo, Agua Verde Creek, Posta Quemada Creek, and Rincon Creek. Shallow ground water has been identified in 8387 acres of the valley. Numerous stock tanks and wells supplement these natural water sources for cattle and wildlife use. Domestic wells account for approximately 141 wells that are recorded with the Arizona Department of Water Resources.

Table 2. Natural & Constructed Water Sources in the Empire-Cienega Watershed in Pima County

<u>Springs</u>	<u>Intermit-Streams</u>	<u>Peren-Strrms</u>	<u>Surf. Water</u>	<u>Stock Tanks</u>	<u>Shallow Grnd-Water</u>	<u>Wells</u>
55	ca. 60 mi.	ca. 17 mi.	485 ac	587	8387 acres	1196

As a consequence of its natural environmental setting that includes an abundance of grassland totaling about 70 percent of the major vegetation type in the valley, numerous natural and created water sources, and a range of environmental zones, which can be seasonally grazed, ranching in the Empire-Cienega Valley watershed continues to be a significant and sustainable land use.

Land Base & Land Uses:

Nearly all of the Empire-Cienega Valley subarea is located in unincorporated Pima County, except for the northwest portion of the subarea largely to the west of Pantano Wash, which has been annexed into the City of Tucson. The balance of the watershed, like much of Pima County, is comprised of a mosaic of land ownership including federal, state, and private lands, and a significant portion of this land is publicly owned. Approximate acreages are provided below for each kind of ownership.

Table 3. Land Ownership & Jurisdictions in the Empire-Cienega Valley

National Forest	53,715 acres	16.8 percent
National Parks	30,866	9.7
Pima County	5,910	1.8
BLM	36,741	11.5
State Lands	125,584	39.4
Private Lands	65,703	20.6
Unknown	<u>16</u>	<u>0.0</u>
TOTAL	318,535 acres	99.8 percent

Vail, Mescal, and Sonoita in Santa Cruz County are the principal settlements in the Empire-Cienega Valley watershed, and the total population in the entire valley is currently estimated

at only 3,312 people. Private lands, comprising some 21 percent of the land base, are located throughout the valley. While some 48 percent of these private lands, 31,398 acres, are classified as used for ranching or agricultural purposes, some 52 percent, 34,305 acres, of all private lands are categorized as non-agricultural lands. A significant area of these non-ranching private lands characterizes much of the northwest portion of the subarea within and adjacent to the City of Tucson boundary and the Interstate 10 corridor. This area, which is experiencing urbanization from the Tucson metropolitan area, essentially marks where the transition from ranching to real estate development is occurring. Some of these lands such as the Rocking K and Vail Valley Ranch Specific Plan areas have been zoned for high density development and formally platted, and other areas in the valley reflect both formal subdivisions and lot-splitting or wildcat subdivision areas. Elsewhere in the Empire-Cienega Valley, clusters of private lands that are not used for ranching are found to the east of Highway 83 and northwest of the Empire Mountains in the area to the south of the interchange at I-10 and Highway 83. Other clusters occur near Mescal along the I-10 corridor and to the south of the Whetstone Mountains. There are a total of 5704 parcels and 41 subdivisions recorded with the Pima County Assessor's Office. Platted subdivisions cover some 7209 acres.

Ranches:

As noted earlier, much of the Empire-Cienega Valley was utilized by Apache bands, and no permanent O'odham or Spanish settlements were established here. It was not until the Gadsden Purchase of 1854 that the Empire-Cienega Valley experienced its first significant wave of immigrants who were largely American mining prospectors; however, permanent settlement of the region did not occur until after the Civil War.

With the establishment of the Butterfield Stageline and later the Southern Pacific Railroad in 1880 across the northern portion of the valley, the Empire-Cienega Valley became more easily accessible for exploration and settlement. With the success of the Empire Ranch and local silver, gold and copper mines at Greaterville, Total Wreck, and Rosemont, the rail stop at Vail provided rail access to ranchers and miners who could ship cattle and ore to distant markets. This resulted in greatly increased productivity in ranching and great wealth for those ranchers like Walter Vail who had the foresight to buy land, water, and mineral rights to expand and diversify their holdings. The principal routes in the valley, the east-west I-10/railroad corridor and the north-south State Highway 83 reflect these early routes of travel and shipping.

Much of the original Empire Ranch continues to be used in ranching. Today, some 28 ranches, many of which include lands from the original homesteads and the Empire holdings, continue in operation in this subarea. Lands used in ranching include some 31,398 acres of private lands, 25 state trust land grazing leases, 4 state trust land grazing permits, about 16 BLM leases of various parcels, and 14 National Forest leases.

These ranches are listed in the following table and are identified by either their ranch name or the name of the grazing lease. Please note that relatively small ranches comprised of only private lands are not noted below; however, their use of private lands in ranching is included in the total acreage in ranch use calculated for the entire watershed.

Table 4. Ranches in the Empire-Cienega Valley Watershed in Pima County

<u>Ranch/Lease Name</u>	<u>Private Land</u>	<u>State Lease</u>	<u>BLM</u>	<u>National Forest Lease</u>
Agua Verde	X	X		X
Andrada*	X	X		
Apache Springs				X
Cienega Creek	X	X	X	
Clyne		X		
Cross Station	X	X		
Cumero*				X
Dykman*		X		
Empire	X	X	X	
Empirita	X	X	X	
Gardner Canyon	X			X
Jay - Six	X	X		
L Pierce		X		
Lopez*		X		
M Pierce		X		
Martin Cattle Co.	X	X		
Martin	X	X		
Mescal				X
Miller	X	X		
Oak Tree				X
Posta Quemada	X	X		
Rincon Peak	X	X	X	X
Rosemont	X	X	X	
Sands Ranch	X	X		X
Sullivan	X	X		
Thurber	X			X
Willow Springs*				X
X-9 Ranch	X	X		

* Indicates ranches that overlap into adjacent watersheds.

These larger ranches, which include principally cow-calf and some steer or stocker types of livestock operations, all utilize grazing and ranch management plans under which they implement their state and federal grazing leases.

Except for Saguaro National Park, the Cienega Creek Preserve, and Colossal Cave Park, platted and wildcat or lot-split subdivision areas, and the townsite areas, the Empire-Cienega Valley watershed has 243,758 acres of ranch or agricultural lands, or about 77 percent of the entire watershed. Lands not used in ranching or agriculture comprise some 74,777 acres or about 23 percent of the Empire-Cienega Valley watershed.

Of all private lands in the Empire-Cienega Valley totaling 65,703 acres, approximately 31,398 acres, or 48 percent, are used in ranching, and 34,305 acres, or about 52 percent, have other uses. Virtually all of the state trust lands, except for about 1400 acres, appear to be used in grazing, much of the BLM lands, except for 2280 acres, and National Forest lands totaling some 53,715 acres are designated in grazing leases. Forest lands used in grazing leases distinguish between "capable" range land and "incapable" range land due to rugged terrain and poor access in the higher elevations. For the purposes of this analysis, however, it is assumed that approximately 53,715 acres of National Forest lands are available for grazing in this watershed.

Table 5. Ranchlands in the Empire-Cienega Valley Watershed in Pima County

<u>Land Owner</u>	<u>Ranch Use</u>	<u>Non-Ranch Use</u>	<u>Total</u>
National Forest	53,715 ac	(Rugged terrain?)	53,715 ac
State Trust Land	124,184	1,400	125,584
County Park		5,910	5,910
BLM Lands	34,461	2,280	36,741
National Parks		30,866	30,866
Private Owners	31,398	34,305	65,703
Unclassified	_____	16?	16
	TOTAL 243,758 ac	74,777 ac	318,535 ac

Ranch improvements that have been made include ranch headquarters, residences, stables, corrals, irrigated pasture, fencing for lease boundaries and pasture rotation, roads and fire breaks, erosion control, and development of stock tanks and wells as water resources for cattle and wildlife. While many of these improvements have not been quantified for this report, water sources that are critical to the success of ranching and for maintaining wildlife have been researched. It has been noted above in Table 2 that natural water sources are relatively abundant in the mountain areas, with 55 springs located mostly in the surrounding mountains, and there are about 77 miles of perennial and intermittent streams. To supplement natural water sources, approximately 587 stock tanks have been constructed over time. Wells, recorded for both domestic use, for cattle and wildlife, and other uses number 1196 for the entire Empire-Cienega Valley.

The "animal unit capacity," which defines the number of animals that can be grazed on leased ranch lands is determined by range managers for the US Forest Service, the BLM, and the State Land Department in cooperation with the rancher or lease holder. This capacity is not static but reflects current range conditions that are determined by a variety of factors including soils types, tendency to erosion, natural vegetation and forage types, elevation, rainfall, the success of grazing rotation, and the recovery of natural forage following periods of grazing or catastrophic events such as fire. Periodic review of these and other factors determines the animal unit capacity or permitted use and determines the upper limit of how many cattle can be grazed to maintain the viability of the rangeland. It does not necessarily mean that ranchers always graze at the permitted maximum level. More often than not, many ranchers graze animals at lower than the permitted levels to further ensure the stability and health of the rangeland. If lands are overgrazed such that range health is compromised, the consequences of diminished capacity and lower economic viability for the rancher in future years are obvious.

Based on current state and federal grazing lease numbers, the current animal unit capacity of the Empire-Cienega Valley watershed ranges from 3 to 16 animals per square mile depending on the terrain, location of the lease, the health of the range, rainfall, and how it is used. At the present time the 14 National Forest grazing allotments, 16 BLM leases, and 29 State grazing leases or permits allow for a maximum of 4250 animals to be grazed in the entire Empire-Cienega Valley watershed in Pima County. When this number is considered together with the total acreage of 243,758 acres or 381 square miles, dedicated to ranching, the maximum average number of animals allowed to be grazed is approximately 11 animals per

square mile. Grazing capacity corresponds with higher elevation and rainfall as shown on the enclosed figure. However, please note again that this number reflects only today's range conditions and lease terms. The total number of animal units is likely to be changed in the future dependent on climate, rainfall, vegetation cover, and range health.

Table 6. Animal Units Allowed to be Grazed in the Empire-Cienega Valley in Pima County

<u>Range of AUs Allowed</u>	<u>Acres/Sq.Miles in Grazing</u>	<u>Total AUs Allowed</u>	<u>Avg.AU/Sq.Mi.</u>
3 - 16	243,758 ac. or 381 Sq.Mi.	4250	11.1

In addition to grazing, federal and state public lands may be used for hunting, fishing, hiking, riding, and other recreational uses. Although these kinds of uses have not yet been fully quantified, statistics provided by the BLM indicate that a sample of nearly 6600 visitors signed-in just at the Empire Ranch between 1993-1998. While this number appears to be quite low for a five year period, it is likely that recreational use of public lands in the Empire-Cienega Valley watershed is actually much higher. The BLM acknowledges that this is not an accurate count, but is useful as an indicator of recreational uses. If this represents even a 50 percent sample, there may be approximately 2650 visitors to the Empire Ranch area annually.

Current Farms:

At the present time, there are only very limited areas where irrigated agricultural lands are noted. Available GIS data for vegetation suggest there are some 1115 acres of land that were once irrigated for crops and pasture in the Empire-Cienega Valley. However, current Assessor records show only 60 acres classified for agricultural use today, and that 689 acres once in production are no longer in agricultural use. While these data do not fully agree, it may be concluded that irrigated agriculture was never a predominant land use. GIS data suggest that irrigated farms once occurred at the Rincon Creek and Cienega Creek confluence, near Vail, and along the Cienega Creek at Empirita Ranch and elsewhere.

Using Assessor records, the total area in the Empire-Cienega Valley that was ever in agricultural use as croplands or irrigated pasture was 749 acres. Approximate acreages for current and historically irrigated agricultural lands are provided below.

Table 7. Current Farms or Irrigated Pasture in the Empire-Cienega Valley in Pima County

<u>Acres Ever in Agriculture</u>	<u>Food or Fiber Crops</u>	<u>Irrigated Pasture</u>	<u>COT parcels/farms</u>
749 ac*	?	60 ac	162 ac

* GIS vegetation data suggest 1115 acres.

Development Pressure & Threats to Ranching:

Development pressure in the Empire-Cienega Valley watershed in Pima County is variable, but certainly dependent on transportation corridors, proximity to the urbanizing Tucson area, and

in areas adjacent to existing platted or wildcat subdivisions. As noted above, growth and urbanization is greatest in the northwest portion of the watershed near the Tucson City limits. Here, the specific plan areas for Rocking K Ranch and Vail Valley Ranch, totaling about 6220 acres, will result in the eventual development of these and adjacent areas into residential and commercial uses. While some of these lands are still grazed, ranching will not be viable for long as the transition of ranchlands to real estate continues to increase.

In fact, there are no long-term State or BLM grazing leases in the northwest portion of the watershed area, and it is just those ranches and grazing leases that adjoin the urban area that are most vulnerable to development. With increasing land values in these areas and higher development potential, the State Land Department has established 5 year time limits on 16 grazing permits called Special Land Use Permits (SLUPs) throughout the metropolitan area. These lands have been essentially reclassified for commercial use by the ASLD in anticipation of sale or lease of these lands for commercial or residential development. Portions of six state SLUPs for grazing, known as the Dykman, Lopez, Martin, and Jay-6 Ranch permits, occur in this subarea. The two Lopez grazing SLUPs totaling some 9111 acres are located within the incorporated boundaries of the City of Tucson and partially in the Empire-Cienega watershed. The Dykman SLUP totaling 2156 acres is located along the I-10 corridor just south of the Lopez SLUPs, and is partially within the City of Tucson incorporated limits and partially within the Empire-Cienega watershed. The Martin SLUP of 1349 acres lies south of Cienega Creek and north of I-10. The two Jay-6 SLUPs totaling 1913 acres of State land occur within the Empire-Cienega Valley on the far eastern end of Pima County along the I-10 corridor. Under the terms of the SLUP, the rancher can be evicted in 30 days even if the 5 year permit is still current, and there will not be any reimbursements for any improvements to the land, as is customary for long-term grazing leases. Should these State SLUPs be sold or leased for development, a total of 14,530 acres of State land straddling the Empire-Cienega Valley and the Middle Santa Cruz Valley and within the Empire-Cienega Valley will be removed from grazing use, diminishing the animal unit capacity regionally by about 180 head of livestock.

As a consequence of existing, planned, and anticipated development, the "urban boundary" in the northwest portion of the Empire-Cienega Valley may be defined by the boundaries of Saguaro National Park, the X-9 Ranch, and the Posta Quemada Ranch. However, as development continues along the I-10 corridor, these northern ranch areas may become increasingly isolated from ranching areas to the south.

At the present time, there are 41 platted subdivisions comprising some 7209 acres in the entire Empire-Cienega Valley watershed in Pima County, and there are a total of approximately 5704 recorded parcels of land. Approximately 692 acres have already been characterized as urbanized area in this portion of the Empire-Cienega Valley.

Areas of ranchland fragmentation may be defined as those parcels that are not used in ranching and that have been subdivided or have the potential to be subdivided. Approximately 34,305 acres, or 52 percent, of all of private lands are currently not used in ranching and may be developed. When reviewed on a map, these areas of non-ranch private land holdings cluster in the urbanizing northwest portion of the watershed including the Rocking K and Vail Valley Ranch specific plan areas, to the east at Jay-6 Ranch, at the "New Tucson" subdivision north of Sahuarita Road, in the subdividing area northwest of the Empire mountains, near Gardiner Canyon, and near Vail, Mescal, and Sonoita. With these exceptions, the Empire-Cienega Valley is comprised of largely unfragmented ranchlands south of I-10 and east of the Empire Mountains. This natural open space comprising much of the proposed National

Conservation Area is extensive and uninterrupted, crossing the valley from east to west to the boundaries of the National Forest and from north to south from the Rincon Mountain Wilderness Area south to Santa Cruz County.

At the present time, there are two Pima County Specific Plan areas, Rocking K Ranch (4438 acres) in the vicinity of Rincon Creek and Vail Valley Ranch (1782 acres) north of the Vail townsite, that will be eventually developed into planned communities comprised of mixed residential, commercial, and resort oriented uses. Portions of these specific plan areas are currently leased for grazing, where the developer retains and uses ranch land designation by the Assessor's Office to lower property taxes while waiting for the opportune time to develop the area for high density residential or commercial use. When developed, nearly 6220 acres will be converted from grazing to planned community development.

In addition to the proposed specific plan areas and existing subdivisions, the Arizona State Land Department (ASLD) has identified various parcels for either sale, trade, or commercial lease that total some 7857 acres in this watershed. While the BLM has parcels located throughout the valley, the proposed Las Cienegas NCA, if approved, will incorporate these parcels into a long-term conservation area.

As for State Trust Land, the ASLD has identified four Special Land Use Permit (SLUPs) areas located in the developing northwest portion of the watershed and one at the eastern end of the watershed. As described above, these State SLUPs are grazing lands in transition that have been reclassified by ASLD for commercial use. These State lands comprise some 7857 acres within the watershed. While virtually all of the BLM land is likely to remain in ranch use or as open space due to the proposed establishment of the Las Cienegas NCA, there is a much higher probability that the ASLD parcels identified for commercial use will be developed because of their proximity to the developing urban area and their location along the I-10 corridor.

In summary, the development pressure in the Empire-Cienega Valley watershed in Pima County is variable at the current time. In the southern and middle portions of the Empire-Cienega Valley, development pressure is relatively low due to the stability of ranch land use, largely unfragmented private and public lands, the lack of committed high density zoning, and the distance from any major transportation corridors such as Interstate 10 or even the Sonoita Highway. The principal threat to the stability of ranching in these portions of the valley is likely to be due in the future to the transition of private ranchlands to real estate, especially in the areas adjacent to existing development and the Sonoita Highway.

In the northern portion of the Empire-Cienega Valley, urbanization is occurring near the Tucson City limits and in the vicinity of the Rocking K Ranch and Vail Valley Ranch specific plan areas, and along the I-10 corridor. A land value analysis was recently completed for this assessment that demonstrates that land values are increasing and sufficiently high in these areas that private land owners are selling land for development rather than retaining their land for agricultural or ranching use. Generally land values are highest in the platted subdivision and specific plan areas north of I-10 and lowest in the lot-split subdivisions farther to the south.

Ranchland Conservation Potential:

The establishment of the Las Cienegas National Conservation Area will contribute greatly to the potential for much of the Empire-Cienega Valley to remain a viable area for sustainable

ranching. Other factors that support sustainable ranching in the proposed NCA include the relative stability and long-term tenure of ranch lands comprised of private lands, State lands, BLM, and National Forest leases; the limited acreage of public lands designated for sale or commercial use outside the proposed NCA; low population pressure outside the urbanizing northwestern portion of the valley; the relatively long distance and access to the valley south of I-10 from the Tucson area; its proximity to existing preserves that allow grazing; a high proportion of productive grasslands; good average rainfall; and relatively high grazing capacity.

The natural open space of ranchlands will further enhance the existing preserves that surround the valley, which include Saguaro National Park, Cienega Creek Preserve, Colossal Cave Mountain Park, Posta Quemada Ranch, Empirita Ranch, Coronado National Forest, and the existing Empire-Cienega Resource Conservation Area.

Assuming that the Las Cienegas NCA is approved, it is likely that the potential for sustainable ranching is very high in the Empire-Cienega Valley watershed in comparison to some of the other subareas of Pima County. Other portions of the Empire-Cienega Valley, however, will continue to be susceptible to fragmentation and development as discussed above.

Summary & Conclusions:

To conclude, the Empire-Cienega Valley watershed continues to support stable and sustainable ranching operations in large part because of its environmental setting and the connectivity of its ranchlands and open space. The valley is located in a rich and varied environment that expresses a range of environmental zones from riparian bottomlands to high elevation evergreen forests, offering the opportunity to use different areas of the valley for grazing as forage becomes available seasonally. The principal vegetation type is scrub grasslands, which comprises some 70 percent of the vegetation in the subarea. Numerous water sources, both natural and constructed, provide water to both cattle and wildlife throughout the watershed in all elevations.

Except for the urbanizing northwest portion and other small subdivisions, the valley remains largely rural, and significantly, some 243,758 acres, approximately 77 percent of the land in the subarea, are used in ranching and agriculture. This includes 31,398 acres, or 48 percent, of all private lands. Some 74,777 acres of public and private lands, or approximately 23 percent, of the valley are not used for ranch purposes. Public lands and preserves available for grazing account for 212,360 acres or 67 percent of the valley.

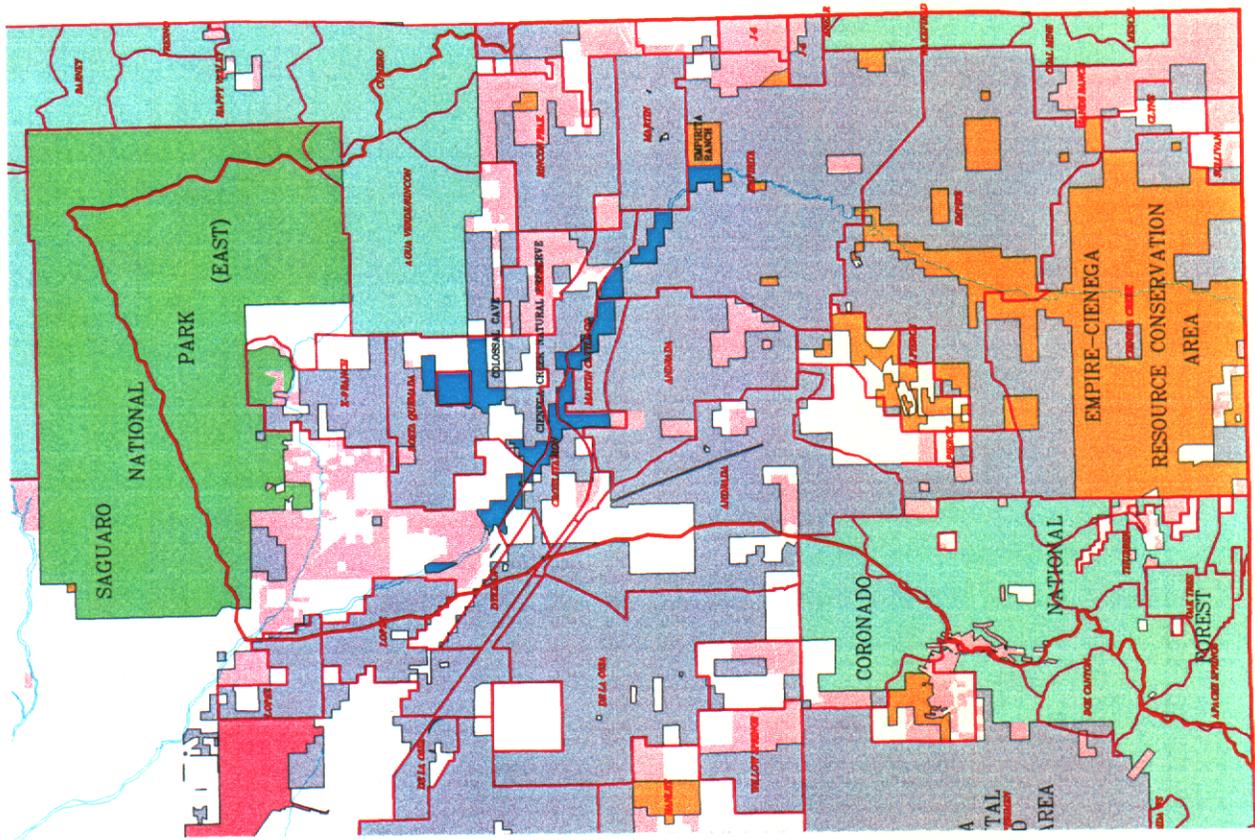
At the present time there is limited threat from development pressure in the middle and southern portions of the valley; however, urbanization characterizes the northwestern portion of the valley. Population is currently very low at 3,312 people, although it is expected to grow significantly in the northwest with the development of Rocking K Ranch and Vail Valley Ranch.

The Empire-Cienega Valley watershed currently has a high potential to continue sustainable ranching due in large measure to the proposed establishment of the Las Cienegas National Conservation Area.

Pima County Ranches

SDCP PLANNING UNIT 2

- Planning Unit Boundary
- Ranch Boundaries
- Major Washes
- BLM
- County Park
- Tribal Nations
- Military Reservations
- National Forest Lands
- National Parks and Monuments
- National Wildlife Refuge
- Private Lands
- State Lands
- State Park
- Ranch Use



Pima County Index Map



Index Map Scale: 1:1,000,000

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Scale: 1:70,000

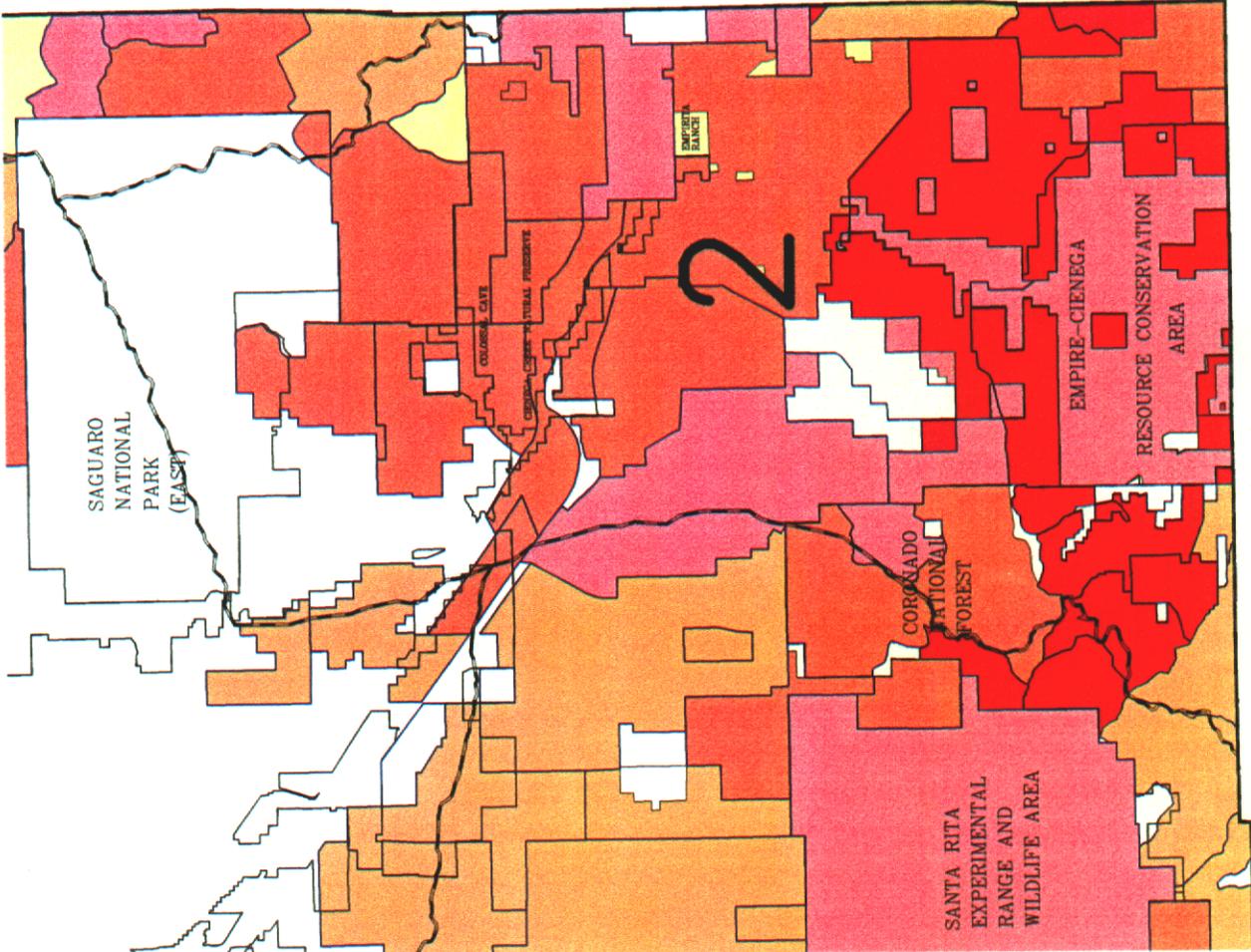


Pima County Technical Services
 201 North Stone Avenue, 2nd Floor
 Tucson, Arizona 85701
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 Tucson, Arizona 85724-4600

Carrying Capacity per Square Mile by Grazing Allotment

SDCP PLANNING UNIT 2 Cienega-Rincon

-  Administrative Boundaries
-  Grazing Allotment
-  Planning Boundary
-  Not Grazed
-  1 to 3 AUs
-  4 to 6 AUs
-  7 to 9 AUs
-  10 to 12 AUs
-  13 to 15 AUs
-  16 or greater AUs



Pinna County Index Map



Index Map made by author

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Scale 1:70,000



Pinna County Technical Services
811 North Stone Avenue, 8th Floor
Tucson, Arizona 85724
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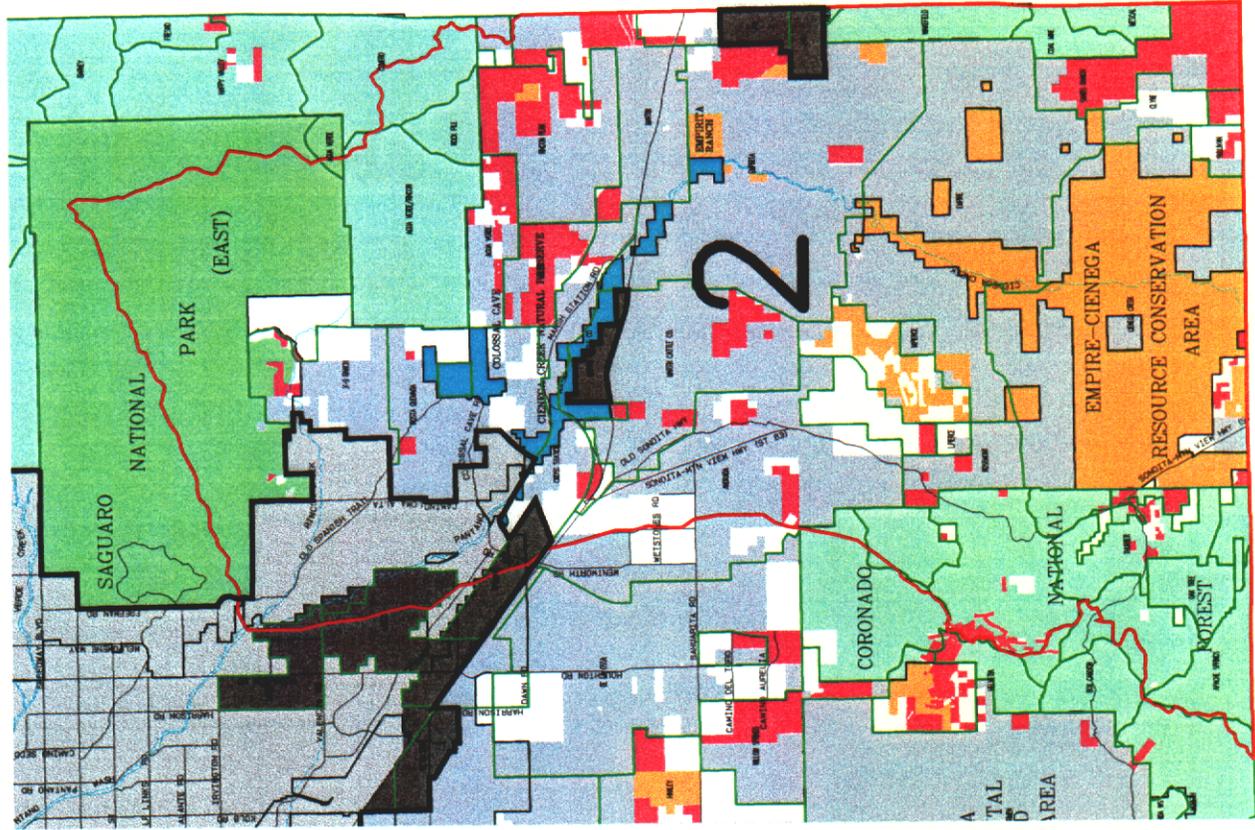


The Projected Urban Boundary Defined by Grazing Allotments and Ranch Lands in Pima County, 2005.

SDCP PLANNING UNIT 2

- Urban Boundary
- Major Roads And Streets
- Major Washes
- Grazing Allotments
- Sonoran Desert Conservation Planning Unit Boundaries
- BLM
- COUNTY PARK
- GOLDWATER CUNNEY RANGE
- INDIAN LANDS
- MILITARY RESERVATIONS
- NATIONAL FOREST LANDS
- NATIONAL PARKS AND MONUMENTS
- NATIONAL WILDLIFE REFUGE
- PRIVATE LANDS
- STATE LANDS
- STATE PARK
- RANCH USE
- AGRICULTURAL USE
- Urban Boundary
- ASLD / SLUP's

STATISTICS FOR UNIT 2
ACRES OF ASLD/SLUP's 7, 817



Scale 1: 70,000

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**Sonoran Desert Conservation Plan
Cienega Rincon Valley Subarea
Cultural and Historical Resources Inventory Report
March 14, 2000**

FINAL DRAFT

Purpose: The purpose of this report is to describe in summary form what is known about three kinds of cultural resources in the Cienega Rincon Valley subarea: archaeological sites, historic resources, and traditional cultural places, each of which is defined below. This report is intended to provide baseline information needed to consider cultural resources in the Sonoran Desert Conservation Planning process.

Subarea: The subarea defines the watersheds formed by the Santa Rita and Empire Mountains on the west, the Whetstone mountains on the east and the Rincon Mountains to the north and drains Cienega Creek and Pantano Wash, the subarea’s primary watercourses. The southern boundary of the planning unit is marked by the Pima County/Santa Cruz County line and its northern limit passes through the Eastern District of the Saguaro National Park as indicated on the map entitled, “**Modern Communities, Transportation, and Ownership.**” This area encompasses approximately 498 square miles.

The Cienega Rincon subarea contains approximately 318,519 acres, within which land status is broken down as presented in the table below. As is the case for much of eastern Pima County, state land makes up the majority of the land base, followed by private lands and National Forest lands. National Parks and Monuments, public lands administered by the Bureau of Land Management, Pima County lands, and a small holding of military property follow in order of rank.

Table 1. Cienega Rincon Valley Land Ownership by Acreage and Percent		
Ownership	Acres	Percentage
Bureau of Land Management	36,741	11.5
Military Reservations	16	<1
National Forest Lands	53,715	16.7
National Parks/Monuments	30, 866	9.6
Private Land	65,703	20.6
State Lands	125,584	39.4
County Lands	5,910	1.8
Total	318, 519	100

The year 2000 population estimate for the Cienega Rincon Valley subarea is 3,312. There are several communities in the subarea as mentioned above, including the historic town of Vail located on the west side of the subarea adjacent to the Southern Pacific railroad line. Newer settlements, such as Mescal, exist on the eastern limit of the subarea adjacent to I-10, in Davidson Canyon along the Sonoita Mountain View Highway to the south, and north of I-10 in the vicinity of Old Spanish Trail

where urban expansion of the Tucson metropolitan area is rapidly occurring. Additional population is distributed within the subarea on private ranches in close association with state trust and federal lands open to grazing. Historically, the subarea has depended upon a mixture of ranching, mining, farming, and since the end of the 19th century, railroad related commerce and transportation services. Ranching continues in the subarea today and just over 1000 acres remain in cultivation along the Cienega Creek.

Cultural Resources: This section presents information and analysis of current data on archaeological sites, historic resources and traditional cultural places within the subarea.

Archaeological sites

Definition: "Archaeological sites are any material remains of past human life or activities which are preserved in their original setting that are important to understanding prehistory or history. These sites or districts may include occupation sites, work areas, farming sites, burials and other funerary remains, artifacts, campsites, hearths, rock art, intaglios, trails, battle sites, religious or ceremonial sites, caves and rock shelters, the architectural or other remains of structures of all kinds, such as pit houses, pueblo rooms, adobe or rock foundations, and other domestic features, usually dating from prehistoric or aboriginal periods, or from historic periods at least 50 years old, for which only archaeological vestiges remain" (Preserving Cultural and Historic Resources, Pima County, May 1999).

Archaeologists learn about the past by collecting and analyzing information in two ways: through survey and by excavation. Survey involves inspecting the ground surface in a particular area and recording concentrations of artifacts and features (hearths, roasting pits, pit houses, etc.) as archaeological sites. A site represents the physical remains of past human behavior in a single location dating to one or more periods of use through time. Surveys are often done systematically by groups of archaeologist who walk the land in regularly spaced lines looking for artifacts. Some surveys, however, are judgmental in that archaeologists only look where sites are expected to be found and not elsewhere. In all cases, survey offers an extensive perspective on past land use.

The second kind of information on archaeological sites is gained through excavation. This is the systematic recording, recovery, and analysis of artifacts and features from within a site's limits. Critical information is gained by understanding the spatial relationship of all artifacts and features within a three dimensional context. This enables interpretation about how the site was used, by whom, when, whether the site was used more than once and what happened after it was abandoned. Often, archaeological sites are not fully excavated but are only partially sampled. This saves what is left of the site for future investigations. Archaeological excavation provides highly detailed information about the use of one limited spatial area during one or more use episodes. Archaeologist use survey information in conjunction with site excavation information to build regional time lines over broad areas such as a river valley.

Survey data: There are two kinds of surveys that archaeologists perform: Linear and block. Linear survey involves inspecting a right-of-way for construction of a road, sewer line, telephone cable or

other linear feature. These surveys tend to be done in compliance with legal mandates requiring environmental studies during project planning. Block survey involves examining non-linear properties ranging in size from a few acres to 1000s of acres. These are typically done either in compliance with legal mandates, or through academic or preservation related research projects. The Map entitled “**Archaeological Survey Locations**” shows the areas within the subarea that have been archaeologically surveyed. Linear surveys are evident on the map in blue and block surveys appear in purple. Overall, the map demonstrates that federal lands in the Coronado National Forest and Saguaro National Park Eastern District have received the bulk of formal survey in the past. Presented below is a breakdown of survey data by acreage and survey type including the percentage of the subarea that has been investigated.

Table 2. Cienega Rincon Valley Subarea Survey Acreage by Survey Type			
Survey	Number	Acreage	Percent of Subarea
Linear	40	2983	0.9
Block	56	34,696	10.9
Total	96	37,854	11.8

The total acreage figures indicate that more than 88 percent of the area has not been formally investigated. This limits what can be said about cultural resources in general and archaeological sites in particular. However, recent survey along Cienega Creek within the Cienega Creek Natural Preserve and on Bureau of Land Management lands to the south, will add thousands of acres to the survey totals. This work, which has yet to be published, was conducted by a graduate student at the University of Arizona and represents only the latest research in an area that has received considerable attention, much of it within the last twenty years.

Archaeological research in the Rincon Valley area began in the 1920s with excavation at the Tanque Verde ruin, a late prehistoric Hohokam village site located south of Saguaro National Park Eastern District. Between the mid 1960s and the early 1990s, the Saguaro National Park (then a monument) was the subject of multiple survey and follow up excavation projects that resulted in the discovery of hundreds of new archaeological sites along the hilly flanks of the Rincon Mountains. With the expansion of the Tucson metropolitan area to the south and east in the 1980s and 1990s, private development has also prompted archaeological survey in the Rincon Valley. The proposed Rocking K Ranch subdivision is the most notable example. Survey conducted between 1988 and 1996 has covered approximately 5800 acres of private and state lands during which 83 archaeological sites were recorded dating from the Late Archaic through to the end of the Hohokam sequence, a period covering approximately 4000 years. More recently, private development just south of Rocking K has identified another 25 sites on 1750 acres within the proposed Rancho del Lago subdivision, adding new data on prehistoric settlement along the Pantano Wash.

Between 1975 and 1982, archaeological investigation within the northern Santa Rita Mountains on

the west side of the subarea revealed prehistoric uses of the uplands. A 23 square mile area of National Forest land was surveyed for the proposed Anamax-Rosemont land exchange, leading to the identification of 621 cultural manifestations dating to Archaic, Hohokam, and Historic Periods (see discussion below). Excavation of 10 Archaic sites demonstrated ancient use of the highlands at least 7000 years ago. The Cienega Creek itself has received its share of research attention beginning in the 1920s with investigations conducted by archaeologists from the University of Arizona. In the 1950s, survey and testing along the Creek identified pre-ceramic (Archaic) sites buried under the deep alluvium covering the Cienega Creek flood plain. In 1982, a number of these ancient sites were excavated to investigate the origins of agriculture in prehistory. More recently, beginning in 1995, a doctoral student at the University of Arizona surveyed thousands of acres along Cienega Creek and several of its tributaries. Over 600 archaeological sites have been newly recorded, dating from approximately 8500 B.C. to the present day. This effort confirms both the antiquity and the richness of Cienega Creek and its tributaries. In sum, archeological survey and follow up research continues to demonstrate the importance of the subarea as a source of information on the past.

Site data: The following is a summary of archaeological data for the subarea that is presented by gross time period and site function. The data have been broken down by the number of identifiable components or occupations, not by the number of sites per se. Since a site can be occupied more than once over time, the number of components is a more accurate reading of settlement and land use intensity. This information uses data from the Arizona State Museum, University of Arizona.

Table 3. Cienega Rincon Valley Subarea Archaeological Component Data Time Period by Site Function					
PERIOD	Prehistoric	Historic	Both	Unknown	Total
FUNCTION					
Agriculture	7	8	1	4	20
Art	2	1	1	5	9
Communication	0	1	1	0	2
Disposal	4	4	0	2	10
Government	0	5	0	0	5
Habitation	16	12	1	8	37
Resource Processing	29	6	1	22	58
Resource Procurement	9	5	1	12	27
Religion	2	0	0	0	2
Storage	1	0	0	0	1
Transportation	0	3	0	0	3
Unknown	133	8	5	53	199
Total	203	53	11	106	373

As can be seen in Table 3, prehistoric components outnumber the historic by four to one, and in a few cases, components from both major time periods are present on the same site. In all, Resource Processing, Habitation, and Resource Procurement, are the most common of the identifiable functions, indicating that residential needs, the acquisition of critical resources (either food or non-food items) and the processing of those resources were the primary activities in the subarea during both prehistoric and historic times. This is followed by Agricultural uses, Disposal (trash dumps) and Art (rock art) in order of their representation. The "Unknown" category consists of artifact scatters, such as pottery and stone chips, where function cannot be assessed. That so many components (199) have unidentifiable functions and cannot be accurately dated (106) is to be expected because the data presented here are collected during survey where only surface characteristics of sites are recorded without the benefit of subsurface excavation.

**Table 4. Cienega Rincon Valley Subarea
Prehistoric Archaeological Site and Component Data**

TIME PERIODS	PaleoIndian 12,000 B.C. - 8,000 B.C	Archaic 8,000 B.C.- A.D. 200	Ceramic A.D. 200- A.D. 1540	Unknown	Total
Components	0	20	84	99	203
Sites	0	50	260	220	620

Table 4 presents information on both the number of prehistoric components in the subarea as reported by the Arizona State Museum, and new data on the number of archaeological sites found along the Cienega Creek. The site data are shown as raw counts and not further broken down into components. For this reason, the two data sets are not totaled together. As a whole, the data presented here clearly indicate that portions of the subarea area in proximity to permanent water were heavily occupied throughout much of the prehistoric sequence. Missing from the prehistoric sequence is any evidence of occupation of the subarea during the PaleoIndian Period.

While no sites dating to the PaleoIndian Period have yet been reported in the subarea, four sites dating to this time period are known in the San Pedro River Valley to the east. The term "PaleoIndian" describes the earliest period of human occupation in the Americas. This was a time following the end of the last ice age when the environment was cooler and wetter than it is today. Many species of now extinct animals including mammoth, horse, camel, bear, bison, and lions lived during this period. Numerous archaeological sites found in the west indicate that hunting these large animals was an important part of the subsistence of PaleoIndian people and as such archaeologists refer to them as "big game hunters." While very little is known about these people, it is believed that they lived in small groups or bands by hunting and gathering as food became seasonably available throughout the year. Archaeological evidence suggest that they were highly mobile covering thousands of square miles in a year as they moved across the landscape. Early in the succeeding Archaic Period, the environment became warmer, the large game animals disappeared, and modern plant and animal species were established.

Sites dating to the Archaic Period are well represented in the subarea with 20 known components and 50 additional sites. The Archaic Period represent a time span of almost 8000 years during which human beings adjusted their way of living in response to new environmental conditions. In order to survive, people became generalists in their subsistence practices, hunting and gathering a wide variety of plants and animals and becoming more efficient in how they processed their food as indicated by the presence of grinding stones found on sites of this period. Again, people appeared to have lived in small groups by hunting a gathering wild plants and animals over large areas through a seasonal round. Sites from the early and middle parts of the Archaic are rare in southern Arizona suggesting low population levels in response to the unfavorable environmental conditions believed to exist at that time; however, toward the end of the period several significant changes occurred laying the foundation for subsequent cultural development. First, the environment stabilized by

4500 years ago approaching modern conditions by that time. Second, population levels appear to have increased and some evidence suggests that people roamed within more restricted territories as a result. Third, by approximately 3500 years ago, people began to experiment with growing their own food as a supplement to their diet. This change also co-occurred with more permanent settlement along well watered reaches of the major drainages in the region.

A total of 84 components and 260 sites dating to the Ceramic Period in prehistory are known within the Cienega Rincon Valley subarea. The sheer number of sites and site components dating to this period in prehistory indicates that the subarea was strongly favored by ceramic period populations. The Ceramic Period covers the time between the adoption of ceramic technology in the third and fourth centuries after Christ to the end of the prehistoric sequence around A.D 1540. It was during the early part of the period, between approximately A.D. 200 to A.D. 700, that Archaic Period populations completed the transition from mobile hunting and gathering to settled, village based, agricultural existence in southern Arizona and elsewhere. The principal pottery bearing people in the region during prehistory were the Hohokam, who emerged as a distinct culture in the eighth century and dominated central and southern Arizona until around A.D. 1450. The Hohokam flourished along the river valleys of southern Arizona but were also well adapted to the desert lands to the west. They lived in settled, permanent villages, grew their own food using irrigation and dry farming techniques, developed a rich ceremonial life, and traded extensively with their neighbors throughout the region. A period of environmental instability during the A.D. 1300s is believed have weakened the agricultural economy to the point where the Hohokam were no longer able to produce food in sufficient quantities and with enough consistency to support large populations and the culture collapsed around A.D 1450.

Following the collapse of the Hohokam, the region is believed to have been occupied in very low numbers by an O’odham (upper Piman speaking) people whose settlement and subsistence practices reflect a return to an earlier, simpler way of living. Life continued to involve the cultivation of crops supplemented by hunting a gathering, but the level of technical sophistication and social and religious cohesion characteristic of the Hohokam is missing in these later populations. These people are believed to be the descendants of the Hohokam, but are recognized as separate culture groups. Archaeologists know very little about the period that represents the end of the Hohokam and the beginning of the Spanish Colonial presence in southern Arizona. It appears to have been a time of flux when the vacuum left by the disappearance of the Hohokam was filled by groups that the Spanish recognized as the Sobaipuri and the Tohono O’odham in the 17th and 18th centuries. No components dating to late prehistoric times are known in the Cienega Rincon Valley subarea.

Table 5. Cienega Rincon Valley Subarea Historic Archaeological Component Data			
Euro-American	Native American	Unknown	Total
32	1	20	53

Table 5 presents archaeological data on the Historic Period, spanning the years between A.D. 1540 and 1950. European settlement of the Cienega Rincon Valley subarea dates from the latter half of the 19th century. Trails existed over the Rincon Mountains and the Cienega Creek was used since Spanish Colonial times to connect the Tucson area with the San Pedro River Valley. The Mormon Battalion, for instance, constructed a wagon road through Cienega Creek in 1846. While several early ranches were established in the eastern Tucson Basin as early as the 1860s, large scale ranching in the area did not begin until the 1870s. Several notable examples include the Empire Ranch, the Cienega Ranch, and the Tanque Verde Ranch. Smaller ranches and farmsteads were established during the 1870s, but it was the coming of the railroad in 1880 and the cessation of Apache hostilities in 1886, that opened the area up to new settlement. The largest settlement in the eastern Tucson Basin was at Pantano, founded in the early 1880s by the Southern Pacific Railroad company; it was abandoned in the 1950s. Historic use of the Rincon Valley in the 1880s and 1890s involved homesteading and ranching, with dairy farming, woodcutting, and quicklime production being the focus of economic activity.

The Cienega Creek saw the San Antonio and San Diego Stage Company pass through it in 1857 and the succeeding Butterfield Overland Mail line in 1859. Freight from Mesilla New Mexico was carried through the valley in the 1860s and 1870s. Ranches, such as the Empire ranch mentioned above, were established in the Cienega at this time along with others in the area including the Sanford, Kane and Gardiner Ranches, all of which were absorbed during the 1880s and 1890s by the expansion of the Empire ranch. Mining, while not an important activity in the lower Cienega, occurred along its western margins in the Empire and Santa Rita Mountains, and communities associated with these enterprises also flourished for a time before disappearing from the valley in the early 20th century.

A total of 32 Historic Period components have been identified in the subarea by the Arizona State Museum. Twelve of these are Habitations, six are Resource Processing (mortar/metate, roasting pit, kiln, ore processing, etc), two are transportation (roads, trails, stage stops, etc.) related features and three are related to government (public buildings, park, plaza, big house, etc.). Four historic Native American occupations have also been identified, three of which are believed to be Tohono O'odham. There are also two components that could not be securely identified as to cultural affiliation. The low numbers of components dating to the historic time period is probably a reflection of research bias and not a lack of resources dating to this time period. Recent research in the area conducted within the Cienega Natural Preserve and to the south along Cienega Creek confirms this observation. Sixty-five Historic Period sites have been newly recorded including several identified as Sobaipuri and Apache in origin. Also recorded were the remains of ranches (Empire, Gardiner, O'Leary, Hopley and Kane), historic towns (Greaterville and Pantano), mines (Total Wreck) historic travel routes (Butterfield Stage Line and Southern Pacific Railroad) and historic road alignments (State roads 83 and 88).

The map entitled **"Cienega Rincon Valley Subarea Archaeological Sensitivity Zones"** shows the distribution of all known sites and components reported from all sources for the subarea. This map demonstrates that clusters of archaeological sites exist on the landscape, most notably in association

with the major drainages and their tributaries. Its important to remember that the pattern of site distribution evident in this figure is more a reflection of where archaeological surveys have been conducted than the actual pattern of land use in the past. Nonetheless, there is enough data to illustrate the co-occurrence of sites with water and additional investigation of springs and the secondary drainages in the subarea will no doubt produce more evidence of intensive occupation. While this figure lacks topographic relief, the pattern of settlement in the subarea is similar to that seen in other basins in the region. Two areas of main occupation are suggested, one at the ecotonal break between the upper bajada areas and the mountain highlands in association with known springs, and the other along the valley's primary drainage. This pattern of settlement between the valley bottom and upper bajadas is consistent with historic Winter/Summer village locations practiced by Tohono O'odham in historic times.

Historical Resources

Definition: "Historical resources are sites, districts, structures, objects, or other evidences of human activities that represent facets of the history of the nation, state, or locality. Also places where significant historical or unusual events occurred even though no evidence of the event remains, or places associated with persons significant in our history that have gained importance in the last 50 years" (Preserving Cultural and Historic Resources, Pima County, May 1999).

Historical resources are largely constructed or engineered elements of the built environment including buildings used for residential purposes, such as houses, but also commercial stores, industrial facilities, civic centers, and places of worship. Roads, bridges, irrigation canals, mining works, and railroad tracks are also historical resources. Information on these places is recovered through drawings and design plans, photographs, maps, surveys, and personal recollections.

The Cienega Rincon Valley subarea has a number of places of historic importance including occupied historic communities, abandoned settlements or ghost towns, places that have been recognized for their historic value and registered on the National Register of Historic Places, and a historic trail. These are represented on the attached map entitled, "**Historic Communities, Ghost Towns, National Register Properties, and Trails.**"

Historic communities:

- The town of Vail, Arizona, is located south of Pantano Wash and adjacent to the southern Pacific railroad line. The community owes its existence to the railroad and was originally a station along the line between Tucson and El Paso beginning in 1881. The Southern Pacific Railroad received permission to cross ranch land owned by brothers Walter and Edward Vail in 1880, hence the name of the settlement. This station was located between the Empire and Rita stations on old maps of the area. By 1883, a post office was opened in nearby Pantano, now a historic archaeological site. Today, Vail continues to exist as a small settlement in a rapidly growing area (Excerpted from "Arizona's Names" by Byrd Howell Granger, The Falconer Publishing Company, 1983)

Ghost Towns:

Many historic communities developed, even thrived, only to be abandoned. These places were typically mining towns, or in some cases, milling towns, that boomed until economic forces eliminated the reason for their existence. Established during the later part of the 19th century and early 20th century, these places remain time capsules that reflect a by-gone era. The following descriptions are excerpted from "Ghost Towns of Arizona" by James E. and Barbara H. Sherman, University of Oklahoma Press, 1969.

- **Greaterville**

The discovery of placer gold in the foothills of the Santa Rita mountains in 1874 sparked the creation of the Greaterville Mining District. Within a few years, hundreds of miners settled in the village of the same name. Mining continued until the gravel bearing deposits were depleted in the 1880s. In its hey day, the town offered several dance halls, saloons, shops, and in 1882 a school opened. The post office opened in 1879, closing in 1946. Mining at a much reduced level has continued off and on and a small number of families still occupy this once bustling community.

- **Rosemont**

Starting in the 1870s, copper ore was pulled from the Santa Rita Mountains at Rosemont camp, a small community located in the southwest corner of the subarea. In its day, Rosemont supported 150 people, had a school, a hotel, and some stores. Mining continued for several decades before the mines closed down and the community was abandoned. The post office opened in 1894 and closed in 1910.

- **Total Wreck**

In 1879, silver/lead ore was discovered in the Empire Mountains. Named after the appearance of the hill in which the deposits were found, Total Wreck began mining operations in 1881 after the arrival of the railroad. By 1883, there were two hundred residents, fifty houses, three stores, three hotels, four saloons, a butcher shop and a lumber yard. By the end of 1884, the mine was closed. The post office opened in 1881 and was closed in 1890.

National Register properties:

The National Register of Historic Places was created as a part of the National Historic Preservation Act of 1966. It is the nation's premier honor roll for places deemed of national, regional, or local historic importance. The criteria for listing include: a) association with a person who has contributed to history; b) association with an event important to history; c) associated with the work of a master artist or craftsman or typical of a style or type of workmanship; d) yielding or having the potential to yield information important to history or prehistory. Listing in no way effects the rights of private property owners to do what they wish with their property. Federal agencies; however, are required to consider the effects of their actions on listed properties. The following descriptions are excerpted from the individual National Register nomination forms available at the State Historic Preservation Office in Phoenix, Arizona.

- Empire Ranch

The Empire Ranch is located among rolling grasslands adjacent to the Empire Gulch, an intermittent stream in the middle of the Cienega Valley. Started in 1876 as 160 acre holding, the ranch became one of the largest in the west eventually covering an area 60 miles north/south by 30 miles east/west stretching from the Rincon Mountains to the Mexican Border. Owned initially by a number of men, the ranch was bought in 1881 by Walter Vail, after which the town of Vail is named in part (see above). Vail expanded the ranch in the mid 1880s, taking time to also serve in the territorial legislature and on the Pima County Board of Supervisors. Vail was killed in a street car accident in Los Angeles in 1906. The adobe ranch house was listed on the National Register of Historic Places in 1975.

- Cienega Bridge

The Cienega Bridge was built in 1921 as part of the Borderland Highway project across southern Arizona. The bridge is a concrete and reinforced steel structure designed as a medium-span concrete arch with a two-span concrete girder viaduct over a branch of the Southern Pacific Railroad. It was one of three virtually identical open-spandrel concrete arches that were built in Pima, Pinal, and Yavapai counties, although the Cienega bridge was the longest with a span of 146 feet. The bridge was nominated to the National Register for its significance to local transportation history and placed on the National Register of Historic Places in 1988.

- Colossal Cave Historic District

Discovered in 1879, by a local ranch hand looking for stray cows, Colossal Cave consists of 39 miles of subterranean caverns and connecting tunnels, two miles of which are currently open to the public. Attempts to develop the cave for public access began in earnest in 1917 and by 1922 a formalized trail system was in place. Between 1934 and 1937, the Civilian Conservation Corps occupied a portion of the nearby Posta Quemada cattle ranch, and implemented an ambitious plan to upgrade and expand the visitor's facilities. The results transformed Colossal Cave into a modern tourist destination. Of note is the visitor's center, a two-story building of southwestern vernacular design constructed from shaped stone quarried from the local hillside. Other facilities built by the CCC include picnic and barbecue areas, rock walls, paths and footbridges, as well as the trail and lighting system in the cave itself. These historic features and those of the Posta Quemada Ranch complex were nominated as a historic district for their tourism, educational, and ranching themes and placed on the National Register of Historic Places in 1992. The cave is now a part of Pima County's Park system and is open to the public.

- Kentucky Camp Historic District

Located on the Coronado National Forest, the Kentucky Camp Historic District includes buildings, structures, and archaeological sites relating to hydraulic placer mining in southeastern Arizona. Kentucky Camp was constructed as the headquarters of the Santa Rita Water and Mining company which was founded in 1902 to revitalize the worked-out Greaterville gold placers with intensive hydraulic mining. Despite its ambitious scale of operations, the endeavor proved an economic failure and closed in 1906. The District includes elements that together represent the system of

hydraulic mining employed at the Kentucky Camp. The site was nominated to the National Register of Historic Places because of its association with early 20th century mining technology and listed in 1995.

- Rincon Mountain Foothills Archaeological District

The Rincon Mountain Foothills Archaeological District is located within the Saguaro National Park Eastern District. The nomination was prepared as a result of multiple archaeological surveys that were conducted in the Park from the mid 1960s to the late 1970s. These efforts resulted in the discovery of 110 historic and prehistoric archaeological sites dating from the Archaic, Ceramic (Hohokam) and Historic Periods within a 25 square mile area, making it the largest property listed on the National Register in the subarea. The District was listed in 1979 for its potential to yield information important to understanding the history and prehistory of the eastern Tucson Basin.

- Upper Davidson Canyon Archaeological District

This district is a by-product of a proposed land exchange in the Coronado National Forest in the mid 1970s that required survey of approximately 23 square miles. The Davidson Canyon portion of that survey proved so rich in archaeological sites, that in 1980 it was excluded from the proposed land exchange and set aside for listing on the National Register. A total of 29 prehistoric sites dating from the Archaic and succeeding Ceramic (Hohokam) Period are included within 1300 acres. The district was listed in 1992 for its potential to yield information important to understanding prehistoric use of the upland areas in southern Arizona.

Historic Trails

- Butterfield Stage Line

The Butterfield Overland Company was one of the first continental mail carriers. It opened in 1858 connecting St. Louis, Missouri and San Francisco, California; however, by 1861 it had ceased operations. In Arizona, the company used parts of existing trails to forge a route some 437 miles in length. In 1869, Wells Fargo operated over the old Butterfield stage lines and in the 1870s, the Southern Pacific railroad surveyed along the approximate route. In the Cienega Rincon subarea, the trail followed the south side of Cienega Creek for most of its length, crossing to the north to follow Mescal Arroyo. Vestiges of the Cienega Creek stage stop, located adjacent to the creek in the vicinity of Marsh Station Road, still exists (excerpted from "Retracing the Butterfield Overland Trail Through Arizona," by Gerald T. Ahnert, Westernlore Press, 1973).

Rural Historic Landscapes:

There may also be individual ranches or farmsteads within the subarea that qualify as having importance to the history of the settling of the Cienega Rincon Valley subarea. Some of these may be part of larger historic landscapes that are recognizable entities that have historic value. Historic Landscapes a special subcategory of historic resources. As defined by the National Park Service, a rural historic landscape is "that portion of the exterior natural environment that has been modified, influenced, or given special cultural meaning by people who shaped the landscape to serve human

needs. A rural historic landscape is a geographical area that historically has been used by people or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways and natural features. Historic landscapes may reflect the beliefs, attitudes, traditions, and values of these people.”

The most likely candidates for places with these values in the subarea are ranches where the connection between historic ranch properties, ranch lands and ranching as a traditional activity remains intact. Examples where these connections may still be demonstrated are the Empire Ranch, the Empirita Ranch and the Posta Quemada Ranch.

Traditional Cultural Places

Definition: “A traditional cultural place is a historic site or district that is important because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. The traditional cultural significance of an historic property is derived from the role the property plays in a community's historically rooted beliefs, customs, and practices” (Preserving Cultural and Historic Resources, Pima County, May 1991).

Pima County has been occupied by indigenous peoples for thousands of years and the modern descendants of these prehistoric cultures still live in the region today. All of Pima County is claimed as ancestral lands by the Ak-Chin Indian Community, the Gila River Indian Community, and the Tohono O’odham Nation. The Tohono O’odham claim direct ancestral affiliation with the prehistoric Hohokam Indians who inhabited much of southern and central Arizona. Other Indian groups also claim ancestral ties to the Pima County area including the Zuni of central western New Mexico and the Hopi of northeastern Arizona based on oral histories and myth that identify southern Arizona as a place of origin for these tribes. The Apaches also lived in the region for hundreds of years and therefore they too can claim an ancestral connection to the land and the places of traditional value to them that it may contain. Other groups with potential claims to places of traditional cultural value include the Hispanic and Anglo communities.

Places of traditional cultural value, as defined, are special to the community and must often remain secret to non-members; this is particularly true among Native Americans. These might be places where in the past natural resources were collected for ceremony or where natural features on the landscape are still recognized as having significance. Other places with traditional cultural value of particular importance to Native Americans are rock art sites and all archaeological sites containing human graves. Two of the components within the subarea are identified as prehistoric rock art localities, and an additional 16 were used for habitation purposes, which often contain human graves. It is reasonable to assume, that Native Americans would identify these places as having traditional cultural value. Again, recent survey information suggests that many more places with these kinds of values may exist in the Cienega Creek area.

Discussion: The next map, entitled “**Archaeological Sites and Land Ownership**” shows the

distribution of sites in relation to land status. Most of the 361 components reported in the subarea by the Arizona State Museum are on federal or state lands, with a significant clustering of sites in the northwest of the subarea located on private lands. Legal protections against unauthorized disturbances are afforded archaeological sites and other cultural and historical resources on federal and state lands with varying degrees of efficacy, but only one law, the Arizona State Burial Protection Act, applies on private land. Cultural resources on county lands are also covered by legal protections defined under county law and policy. Data are presented in the table below showing the number of archaeological components by land status and degree of legal protection for cultural resources.

Table 6. Cienega Rincon Subarea Archaeological Components by landownership and legal protection		
Jurisdiction	No. of Archaeological Sites	Protection Status/Level
BLM	12	Protected/high
National Forest Lands	61	Protected/high
National Parks/Monuments	117	Protected/high
State Lands	41	Protected/moderate
County owned Lands	30	Protected/moderate
Private Lands	100	Unprotected/low
Total	361	

A total of 191 of the 361 components have high protection status, reflecting the high percentage of federal lands in the subarea (37.8%), but also the effort that has been made by the federal agencies to identify cultural resources on these lands. Seventy-one components are moderately protected from public and private actions, 30 of which are within county park lands at Colossal Cave or are located within Pima County's Cienega Creek Natural Preserve. The remaining 100 components have low protection status. Since state lands can be sold for development, and private lands are subject only to local zoning, 141 of the 361 known archaeological components may be affected by future development in the subarea. Furthermore, since the majority of the land base in the subarea has never been archaeologically surveyed, potentially hundreds, even thousands of sites that exist but have never been recorded could be affected. One way to estimate this number is to divide the number of square miles surveyed in the subarea (59.1) by the number of reported archaeological components (361) to get an estimate of 6.1 archaeological components per square mile. With a total of 498 square miles in the subarea, this produces a total estimate of 3,037 components for the subarea, approximately 1200 of which are on state land (39.4%) and 670 (20.6%) are on private land. Thus, almost 1900 potential archaeological components are vulnerable. While crude, this provides

some means of measuring the potential loss of archaeological resources in the subarea.

The loss of cultural and historical resources and the threat of further loss in the Cienega Rincon Valley subarea can be summarized as follows.

Resource Loss:

- Relatively low levels of public and private development have occurred in the Cienega Rincon Valley subarea, with the exception of residential growth north of I-10. The presence of the Saguaro National Park on the northern margins of the subarea area, the listing of six National Register properties, combined with the creation of parks (Colossal Cave), preserves (County Natural Preserve) and conservation areas (Empire-Cienega), have contributed to a greater sensitivity towards natural and cultural resources conservation in the Cienega-Rincon subarea.

Resource Threat:

- The greatest area of threat continues to be in the north and west of the subarea where large scale platted communities are being constructed. Subdivision housing and the construction of public infrastructure is occurring and will continue to occur in this area as the Tucson Metropolitan area pushes to the south and east. Potentially hundreds of archaeological sites and other cultural resources will be affected. The fact that private land can be subdivided and developed without platting under current state law, and that state trust land is vulnerable to sale for the highest and best use, increases the potential for resource loss in the future. On the southern end of the subarea, development pressures are far less intense and thus less of a threat to cultural and historical resources.

Because the distribution of the majority of cultural resources is unknown, assessing risk and making conservation recommendations is difficult. In effort to predict areas with high sensitivity for cultural and historical resources, proximity to water is used as a predictor under the assumption that in the desert places closer to water will tend to have been used more heavily by past human populations than places more removed from water sources. The map entitled "**Cultural Resources High Sensitivity Areas**" identifies zones within the subarea that are predicted to be highly sensitive for cultural resources. These include Cienega Creek and Pantano Wash, areas around shallow ground water in the vicinity of Davidson Canyon and along Agua Verde Creek, and springs, almost all of which are located in the foothills of the surrounding mountains. Different buffers widths are used for the sensitivity model. As the major drainages in the subarea, the Cienega Creek and Pantano Wash each are buffered by two miles on either side for a total of four miles in width. One mile buffering is used for the areas with the shallow ground water along the Agua Verde and Davidson Canyon tributaries, and all springs are buffered with a one mile area. While the model is simplistic, given human needs for water and the pattern of distribution for archaeological sites in particular, the high sensitivity areas as shown are predicted to capture most cultural and historical resources within the Cienega Rincon Valley subarea. A comparison of this map with the archaeological sensitivity zone map and the map showing the distribution of historic resources confirms that much of the subarea determined to be sensitive is included in the buffered areas.

Summary: The most important observation that can be made about cultural and historic resources in the Cienega Rincon Valley subarea is how little is actually known of the area. Only about 12 percent of the area has been previously investigated. Even with new survey data from Cienega Creek, the majority of the landscape and the cultural resources it contains remains unknown to archaeologists. Comparison of the maps showing archaeological survey and site locations and land ownership demonstrates that where investigations are conducted, archaeological sites are found, leading to a further conclusion that more inspection will result in more sites being identified. This is aptly demonstrated by the new survey results along Cienega Creek reported here. Despite the limited degree of archaeological survey coverage, what information has been collected demonstrates that over 10,000 years of human history is well represented in the Cienega Rincon Valley subarea enhancing its importance as a place with high scientific and educational value.

The town of Vail is a historic community that is a product of Euro-American frontier settlement in 19th century with potential archaeological and architectural assets. Three ghost town sites important to the history of mining occur within the subarea and six places have been listed on the National Register of Historic Places for their importance to the history and prehistory of the region. The subarea also contains one of the few historic trails used to open the West. Lastly, Native American claims identify the Cienega-Rincon Valleys as part of their traditional use areas and the possibility that places with traditional cultural value exist in the subarea is high, especially those places associated with the archaeological record. In short, the subarea, while still mostly unrecorded has rich cultural and historical resource values that will only increase as more data are collected. Since the majority of the Subarea is composed of state trust lands, and since these lands are potentially convertible into private lands for development, there is a further need to identify cultural and historical resources, evaluate their significance, and where warranted protect them for future generations. To this end, it is worth noting that the proposed National Conservation Area now before Congress is sufficient in size and scope to encompass most of the predicted high sensitivity areas for cultural resources and would thus extend a measure of protection for these resources in a manner that is consistent with the goals of the Sonoran Desert Conservation Plan.

Cienega Rincon Valley Subarea Archaeological Sensitivity Zones

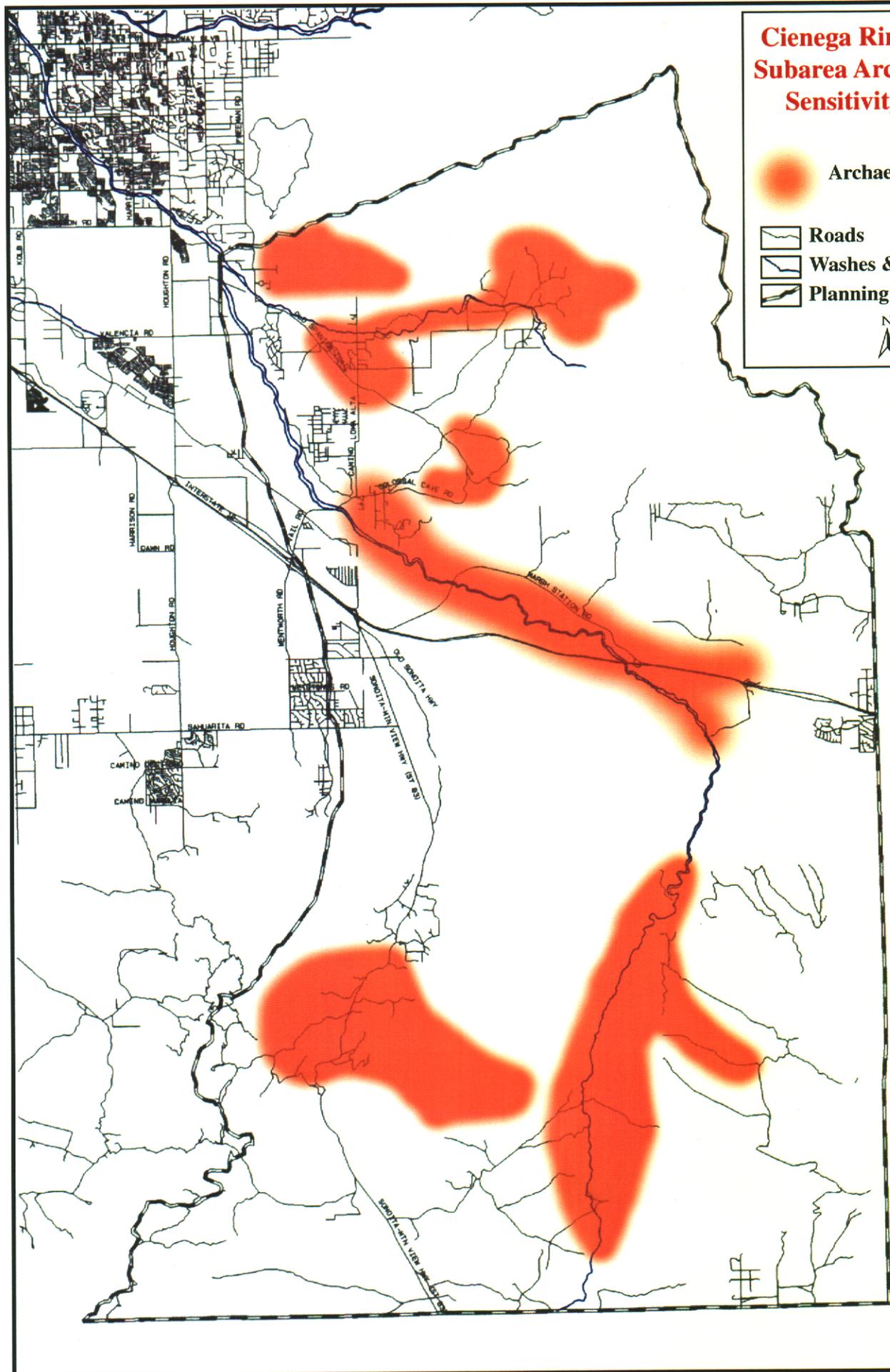
 Archaeological Zone

 Roads

 Washes & Streams

 Planning Unit Boundary

N



Cultural Resources High Sensitivity Areas

SDCP PLANNING UNIT 2

-  Shallow Ground Water
-  2 Mile Buffer - Major Washes
-  1 Mile Buffer - Springs
-  Streets And Roads
-  Major Washes
-  Subarea Boundary
-  Springs
-  Archaeological Sites

STATISTICS FOR UNIT 2
ACRES OF BUFFERED WASH SPRINGS
AND SHALLOW GROUND WATER: 172,183 AC.

Pinna County Index Map



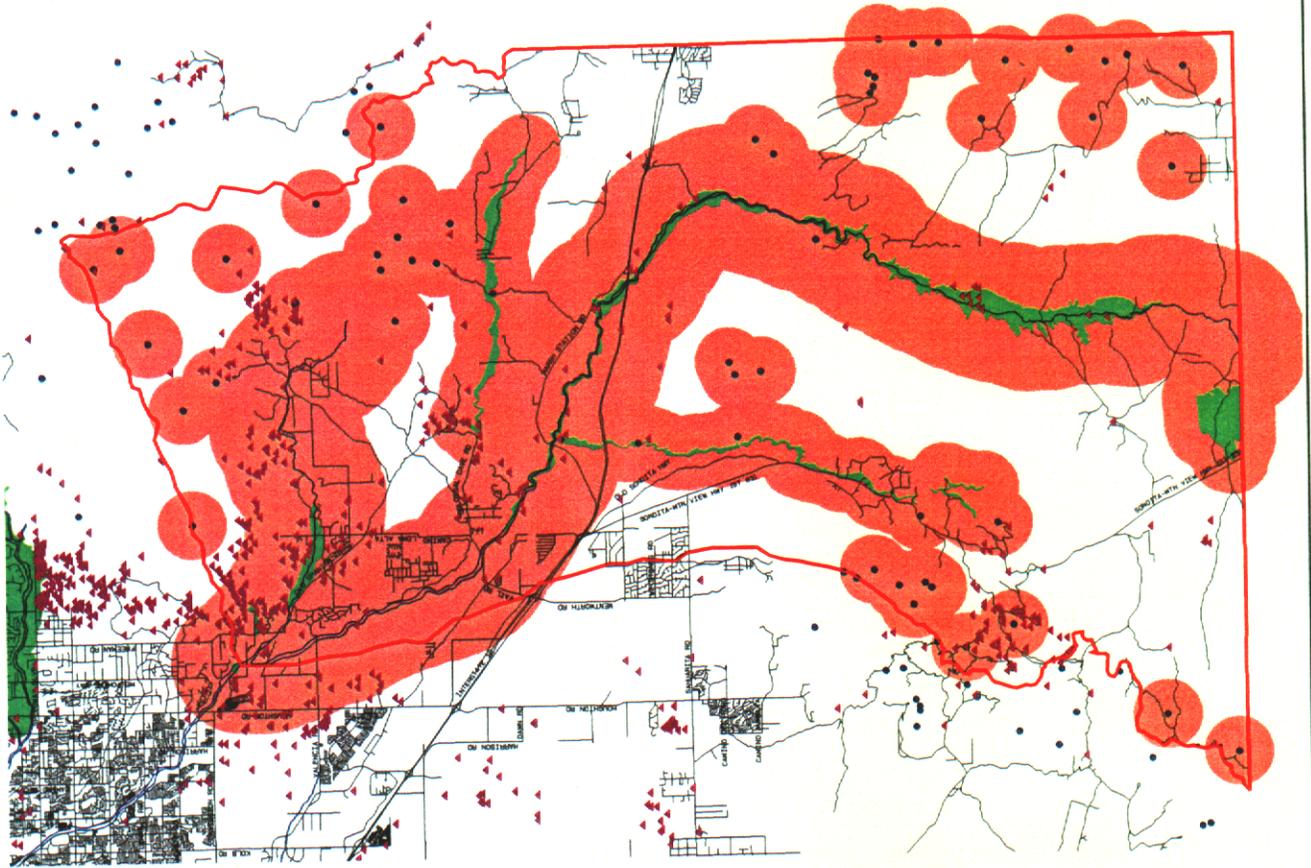
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Scale 1: 70,000



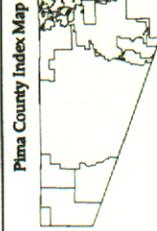
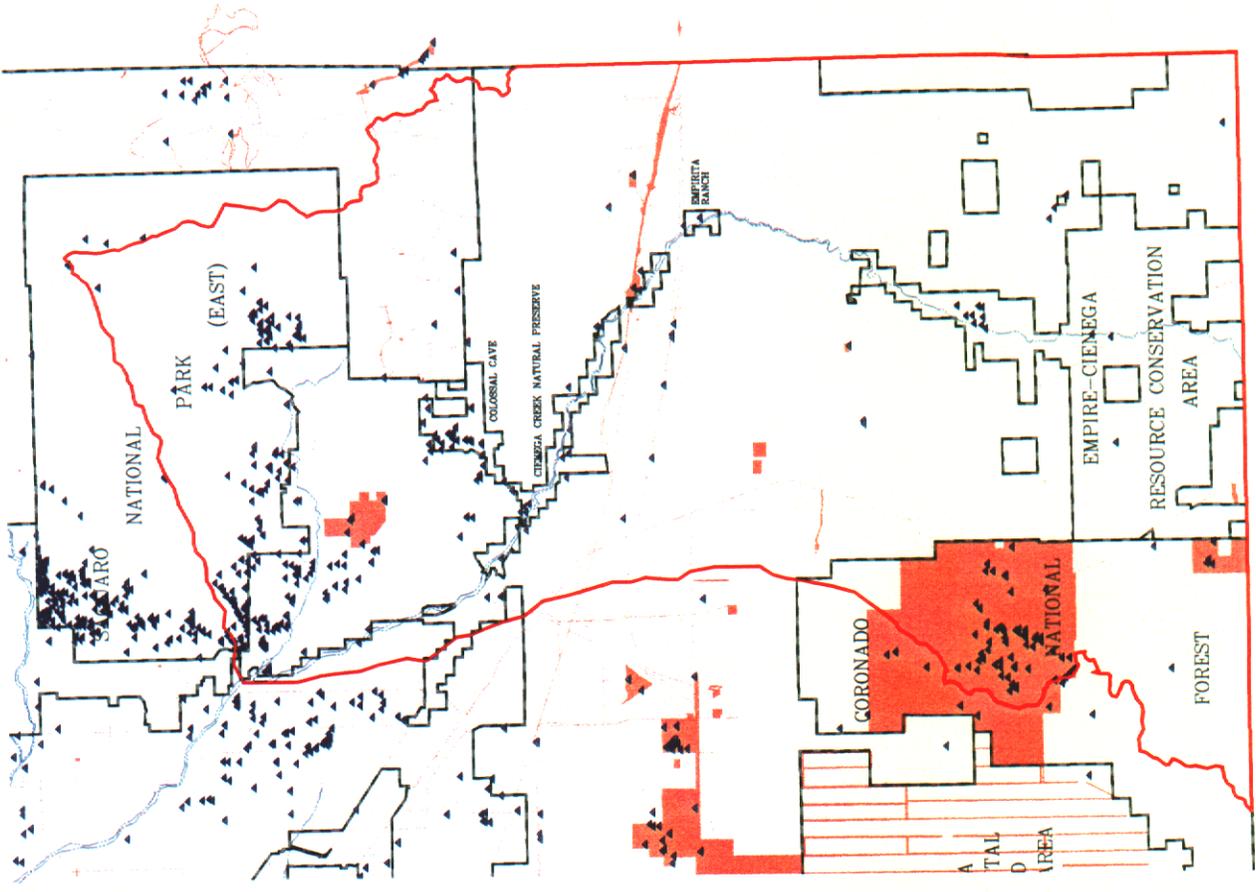
Pinna County Technical Services, Inc.
1000 S. W. 10th St., Suite 100
Milledgeville, GA 30651
Phone: 706-342-3420
FAX: 706-342-3421



Archaeological Survey and Site Locations

SDCP PLANNING UNIT 2

-  Major Washes
-  Linear Archaeology Surveys
-  Polygonal Archaeology Surveys
-  Archaeology Sites



Scale: 1:70,000

North Arrow

Map Date: 11/10/2009

Prepared by: [unreadable]

Checked by: [unreadable]

Approved by: [unreadable]



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Archaeological Sites and Land Ownership

SDCP PLANNING UNIT 2

- Watershed Planning Boundary
- Archaeology Sites
- BLM
- COUNTY PARKS
- INDIAN LANDS
- GOLDWATER GUNTERY RANGE
- MILITARY RESERVATIONS
- NATIONAL FOREST LANDS
- NATIONAL PARKS AND MONUMENTS
- NATIONAL WILDLIFE REFUGE
- PRIVATE LANDS
- STATE LANDS
- STATE PARKS

JURISDICTION	# OF SITES
BLM	12
COUNTY PARK	36
GOLDWATER GUNTERY RANGE	0
MILITARY RESERVATIONS	0
NATIONAL FOREST LANDS	61
NATIONAL PARKS AND MONUMENTS	117
NATIONAL WILDLIFE REFUGE	100
PRIVATE LANDS	41
STATE LANDS	0
COUNTY OWNED LAND	0
TOTAL	361

Pima County Index Map



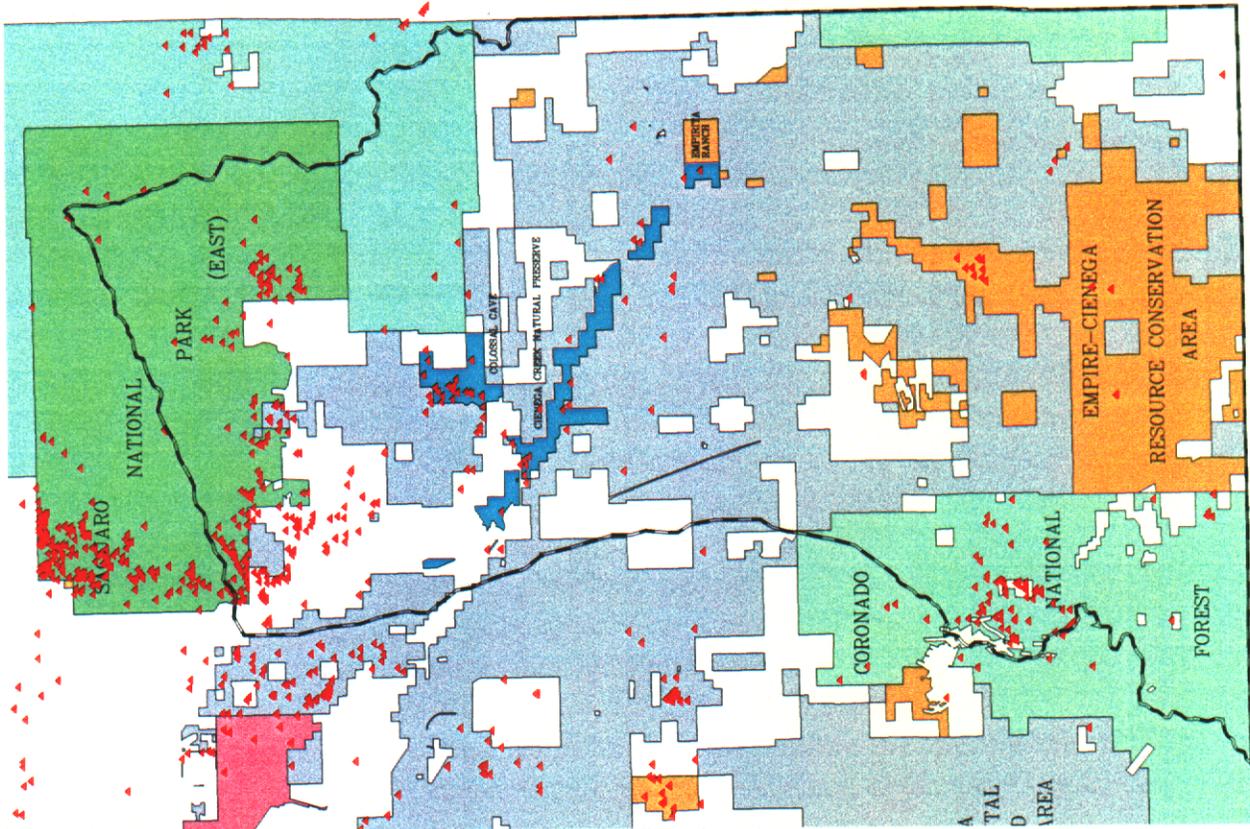
Index Map Scale: 1:50,000



Scale: 1:70,000



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One Mile Buffer ~ Springs And Major Washes

SDCP PLANNING UNIT 2

-  Streets And Roads
-  Minor Washes
-  Major Washes
-  Subarea Boundary
-  Archaeological Sites
-  Springs

 One Mile Buffer Around Springs And Major Washes

Number Of Sites Within Buffered Wash Area: 125
 Number of Sites Within Buffered Spring Area: 79
 Total Number of Archaeology sites: 361

Pima County Index Map

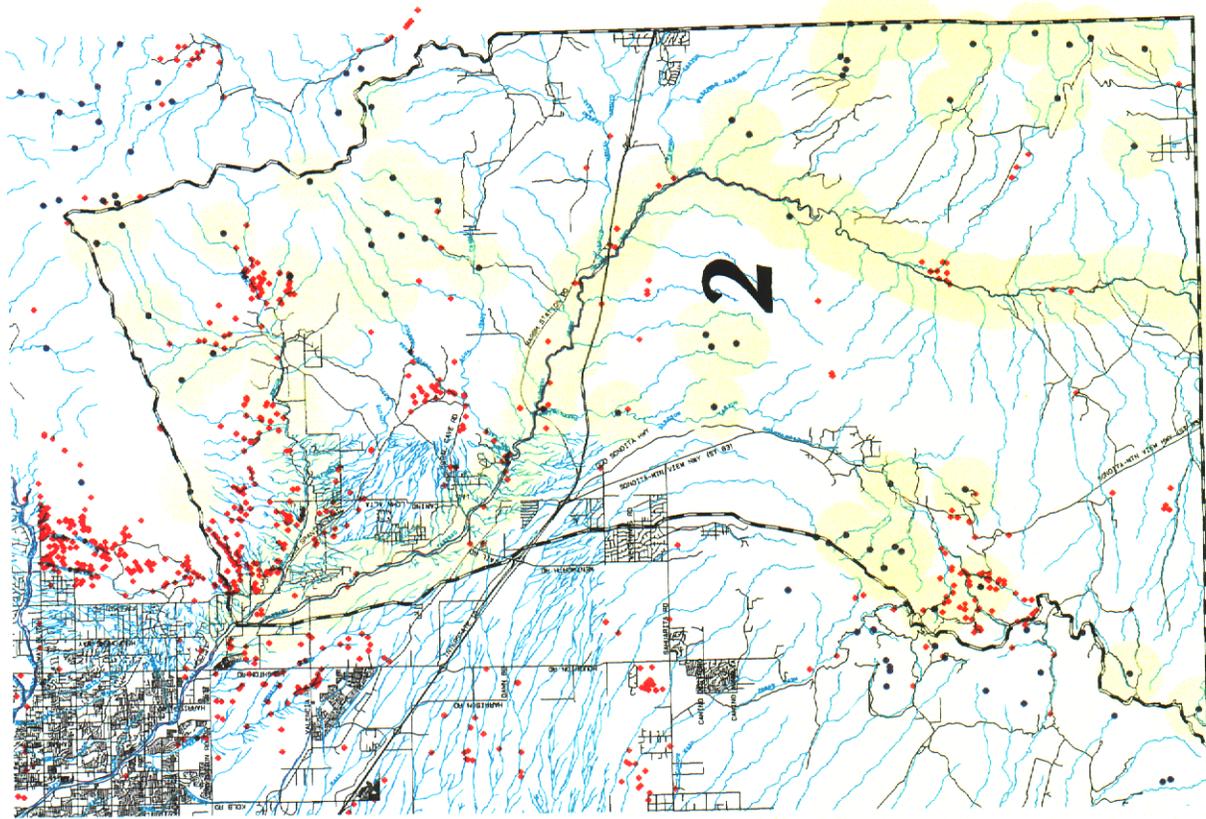


Scale 1: 70,000

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Sonoran Desert Conservation Plan

Cienega-Rincon Watershed Sub-area Report

Draft

Pima County

March 2000

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Appendices

Draft

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End Notes

I. SUMMARY

The Cienega-Rincon Watershed lies in the south-eastern part of eastern Pima County, immediately west of Cochise County and south of the Saguaro National Park East. Land ownership is comprised primarily of State Trust Land.

The current land use for the sub-area is predominantly vacant land, mostly property that belongs to the State Land Trust. In the Cienega-Rincon Sub-area, land development has occurred primarily on five percent of the land, primarily on the north side of Interstate 10. The maximum development activity in varying densities, regulated and unregulated, occur in T15S, R16E; the northern half of T16S, R16E; and, the western half of T16S, R17E. The maximum density of residential uses occur in the form of medium and low intensity urban. In the past three years, rezoning of approximately 7,900 acres of land has occurred, permitting a total of 12,302 dwelling units. The acquisition and conservation of ranches have been successful in the prevention of urban sprawl.

The planned land uses for the sub-area include Medium/High and Low Intensity Urban, Low Intensity Rural, some Medium Intensity Rural, Resource Conservation, Resource Transition, and some Commercial Activity Centers. Zoning on vacant land is predominantly RH Rural Homestead; GR-1 Rural Residential; Specific Plans (Rocking K and Vail Valley); IR Institutional Reserve; and SH Suburban Homestead. Other districts include CR-1 Single Residential; CR-4 Mixed Dwelling Type; CI-1 Light Industrial/Warehouse; and, CI-2 General Industrial.

The low-lying areas vary in altitude ranging between 800 and 1,350 meters above the mean sea level (MSL). The mountain ranges vary in altitude between 1,400 and 2,600 meters above MSL.

The perennial streams in the Cienega-Rincon watershed are Apache Spring, Cienega Creek, Davidson Canyon, Empire Gulch, Mattie Canyon, Posta Quemada, Scholefield Spring and Wakefield Canyon. The intermittent springs in the watershed are Agua Verde Creek; Barrel, Box, Chimenea and Chimney canyons; Cienega Creek; Davidson, Distillery, Gardner, Madrona, Mattie and Mud Spring canyons; Rincon Creek; and, Sycamore and Wakefield canyons.

Interstate 10 roughly bisects (horizontally) the watershed, connecting metro Tucson to Cochise County. Other roads include Old Spanish Trail, Colossal Cave Road, Camino Loma Alta, Sahuarita Road and Marsh Station Road. The watershed is served by private wells and by a few water companies. The Cienega-Rincon Watershed Sub-area includes some large trunk sewers near the westerly edge, as well as a number of existing developments. Both the Rocking K and Vail Valley developments will be extending large trunk sewers past undeveloped land to their sites. Electricity, telephone and gas services are provided by Tucson Electric Company, US West and Southwest Gas Company, respectively. Individual propane tanks are also in use. The Vail Unified School District covers the northwestern majority of the watershed.

Currently, a total of nine capital improvement projects are underway, funded through various bonds with a total budget of over \$10 Million dollars.

Residential construction in the sub-area declined by almost 50 percent between 1998 and 1999, as revealed by the number of permits issued. There has been minimal commercial construction.

II. SITE INVENTORY AND ANALYSIS

A. Location

The Cienega Rincon Watershed sub-area lies in the south-western part of eastern Pima County, immediately west of Cochise County and south of the Saguaro National Park East. It extends from the Saguaro National Park East, due south to the county boundary with Santa Cruz County encompassing an area of approximately 318,535 acres.¹

B. Ownership

Land ownership is comprised primarily of State Trust Land. Others include the lands of the Bureau of Land Management; some small parcels of Federal land; Saguaro National Park East (partial); Coronado National Forest (partial); Cienega Creek Preservation area; county land; and, private land (including a considerable amount of ranch property).

C. Land Use and Zoning

1. Land Use

The current land use for the sub-area is predominantly vacant land, mostly property that belongs to the State Land Trust, public preserves and ranch property. Vacant land, public preserves and agricultural land combined constitutes approximately 95 percent of the total land (public preserves = 50 percent, vacant land = 35 percent and agricultural land = 10 percent). Other uses include rural uses, miscellaneous government, industrial, mobile home parks and subdivisions, small portions of single family residences and very little commercial (as shown in **Table 1** and the *Map of Committed Land*).

Land development in the watershed has occurred on five percent of the land, primarily on the north side of Interstate 10. The maximum development activity in varying densities occur in the Township-Range of T15S, R16E; the northern half of T16S, R16E; and, the western half of T16S, R17E. In terms of acreage, land development has occurred equally in regulated as well as unregulated land, but under the existing land use scenario, more dwellings are slated to be built in regulated subdivisions. Mobile homes fulfill the housing demands of a sizable portion of the watershed's population.

Over the past three years, rezoning of approximately 7,900 acres of land has occurred permitting a total of 12,302 dwelling units. Based on the number of dwelling units, at an average of 2.5 persons per dwelling, the projected population of the area is estimated to be 30,750 residents, in addition to the existing population and population resulting from unregulated development.

The major developments are the regulated subdivisions of Rocking K and Vail Valley on 6,220 acres an estimated 11,172 dwelling units (over 78 percent of the total rezoned land). These two developments are expected to accommodate a population of approximately 27,930 residents.

Developments, south of I-10, have occurred in an area southwest of the intersection of I-10 and Sonoita Mountain View Highway (State Highway 83) in what is called New Tucson. A development of approximately five square miles, it includes subdivided as well as wild-cat lots. Single family residences on subdivided land zoned CR-1 Single Family residential account for approximately 1,600 acres of land. About 320 acres are zoned for SR Suburban Ranch, and the remainder of about 1,600 acres is lot-split with single family residences and mobile homes.

In an area of approximately 11 square miles, east of State Highway 83 approximately seven miles south of its intersection with I-10, there is a fair amount of wild cat, lot-splitting on land zoned RH Rural Homestead. The density of development is very low, with views of the Santa Rita Mountains to the southwest and the Empire Mountains to the south. There are also regulated and unregulated developments on both sides of I-10 where Pima and Cochise counties share their boundaries. Mobile homes constitute a majority of the dwelling units in this area.

Table 1

EXISTING LAND USE: CIENEGA-RINCON WATERSHED					
LAND USE	JURISDICTION	ACRES	JURISDICT.	ACRES	TOTAL ACRES
RURAL	PIMA COUNTY	7,260.90			7,260.90
0.2 TO 0.4 RAC	PIMA COUNTY	1,117.68	TUCSON	3.62	1,121.30
0.4 TO 0.75 RAC	PIMA COUNTY	362.22			362.22
0.75 TO 1.25 RAC	PIMA COUNTY	781.22			781.22
1.25 TO 3.0 RAC	PIMA COUNTY	10.09			10.09
AGRICULTURAL	PIMA COUNTY	31,764.08			31,764.08
COMMERCIAL	PIMA COUNTY	502.10			502.10
DED. OPEN SPACE	PIMA COUNTY	82.95			82.95
INDUSTRIAL	PIMA COUNTY	446.22	TUCSON	248.63	694.85
INSTITUTIONAL	PIMA COUNTY	51.70			51.70
MISC. GOVERNMENT	PIMA COUNTY	889.27			889.27
OTHER	PIMA COUNTY	60.56	TUCSON	3.91	64.47
PARK	PIMA COUNTY	1,182.91			1,182.91
PARTIAL	PIMA COUNTY	72.62			72.62
PUBLIC PRESERVE	PIMA COUNTY	158,254.89			158,254.89
TRANS FACILITIES	PIMA COUNTY	922.13			922.13
UTIL/TELECOMM	PIMA COUNTY	135.27			135.27
VACANT	PIMA COUNTY	101,027.23	TUCSON	2,670.46	103,697.69
VACANT-JURISDICTION	PIMA COUNTY	6,024.00	TUCSON	251.39	6,275.39
VACANT-STATE	PIMA COUNTY	502.43	TUCSON	25.43	527.86
CHK	PIMA COUNTY	2,845.84	TUCSON	12.52	2,858.36
TOTAL					317,512.27

The watershed was intended for residential development of a large magnitude, where the plan proposed 100,000 residences. The effectuation of this plan would have added an additional 250,000 residents. There were initiatives taken by the County to opt for conservation of the land and the prevention of urban sprawl.

Industrial land in the watershed accounts for no more than a square mile and commercial land is almost non-existent.

Another significant land use is that of ranching and ranch conservation. "Pima County has participated in a number of ranch conservation efforts,...."² In the Cienega-Rincon watershed, the County's past ranch conservation efforts include the Cienega, Empire, Empirita and Posta Quemada ranches.

The Empire and Cienega ranches were purchased in an effort to prevent urban sprawl and the depletion of groundwater, which let the Board of Supervisors in the late 1980s "to propose acquisition and increase the Flood Control District tax levy in anticipation of ranch acquisition."³

The Empirita ranch was originally established as the Kane and Siemond ranches. In 1990, the Pima County Flood Control District purchased the Empirita ranch. The initial intent of purchase was that of the area's riparian and flood storage values, but "it was quickly realized that this rich upland environment has significant environmental, open space, and cultural resource values that would require additional close management."⁴ There was an agreement between the Flood Control District and a local southern Arizona rancher to manage 360 acres of deeded land "for its resource value, while permitting limited grazing on those portions of the ranch that could sustain such use."⁵ This was one of the early endeavors undertaken by the County to curb urban sprawl and conserve ranches. These ranches are now part of a Federal conservation area.

The Posta Quemada ranch was acquired for its quality riparian woodland values. The ranch "comprises of 469 deeded acres and almost 8,000 acres of State grazing leased lands that were turned over to the Pima County Parklands Foundation to manage."⁶ This arrangement has allowed for the successful protection of sensitive riparian areas as well as the continued support for local ranching.

The acquisition and conservation of these ranches have primarily lent to the successful prevention of urban sprawl. It has, with equal importance, prevented the undue tapping into the Cienega watershed which is a source of the underwater subflow into the Tucson Basin. Furthermore, it has provided an educational element where the public is afforded the opportunity to experience and understand the practices of a working ranch.

2. Planned Land Use

The planned land uses for the sub-area include Medium/High and Low Intensity Urban, Low Intensity Rural, some Medium Intensity Rural, Resource Conservation, Resource Transition,

and some Commercial Activity Centers. **Table 2** shows that Low Intensity Rural (LIR) and Resource Conservation (RC) account for most of the planned land use.

A large portion of vacant state land, immediately north and northwest of the Empire Cienega Resource Conservation Area has been planned as resource conservation land. This would create an area of protected and semi-protected land on the entire length of the watershed, along a north-south axis. It would connect the existing natural preserves of the Saguaro National Park East, Coronado National Forest, Colossal Cave Park, Cienega Creek Preservation Area and the Empire Cienega Resource Conservation Area.

There are approximately 133,295 acres of land, currently available in the watershed for non-preservation and non-agricultural land uses, as shown in **Table 2**. Of this, a total of 44,528.69 acres have been planned for Resource Conservation (33.4) and 13,158.34 acres for Resource Transition (with a maximum development density of 0.3 RAC). A total of 47,182.42 acres, or 35.4 percent, have been planned for Low Intensity Rural development (with a maximum density of 0.3 RAC). This indicates that the overall development intent for the watershed is one of a low-density, residential, with exception of Rocking K and Vail Valley.

At the current time, Activity Centers (commercial) account for a total of approximately 1,373 acres and Industrial (urban) reflects 11.72 acres, indicating a low-density, low-intensity area.

Table 2

PLANNED LAND USE: CIENEGA-RINCON WATERSHED		
JURISDICTION	PLANNED LAND USE	ACRES
PIMA COUNTY	CAC	649.75
PIMA COUNTY	DR	307.21
PIMA COUNTY	I	11.72
PIMA COUNTY	LIR	47,182.42
PIMA COUNTY	LIU-0.3	1,101.84
PIMA COUNTY	LIU-0.5	2,829.00
PIMA COUNTY	LIU-1.2	173.94
PIMA COUNTY	LIU-3.0	4,110.84
PIMA COUNTY	MFC	714.09
PIMA COUNTY	MHIU	780.93
PIMA COUNTY	MIR	3,672.23
PIMA COUNTY	MIU	5,021.80
PIMA COUNTY	NAC	9.35
PIMA COUNTY	RC	44,528.69
PIMA COUNTY	RT	13,158.34
PIMA COUNTY	OUTSIDE PLAN AREA	9,041.59
TOTAL		133,293.74

3. Zoning

Zoning, on vacant land, is predominantly RH Rural Homestead. Other vacant land, in excess of 1,500 acres, include SP Specific Plan, GR-1 Rural Residential, IR Institutional Reserve and SR Suburban Ranch (as shown in **Table 3**).

Industrial land, zoned either CI-1 Light Industrial/Warehouse or CI-2 General Industrial, accounts for approximately one square mile (with 390 acres vacant); and, less than 250 acres are zoned commercial (with about 100 acres vacant).

Currently, of the watershed's total land area of 318,535 acres, approximately 133,290 acres are vacant, but have zoning designations. Of the total vacant land, 117,400 acres (88 percent) are zoned RH Rural Homestead i.e. land earmarked for low-density residential uses. The combined industrial and commercial vacant land measures less than a square mile. The remaining vacant land includes single family residential, mobile homes, multifamily, etc. comprising of less than 1.5 percent of the total vacant land.

Table 3

ZONING ON VACANT LAND: CIENEGA-RINCON WATERSHED		
JURISDICTION	ZONING DISTRICT	ACRES
PIMA COUNTY	RH	1.24
PIMA COUNTY	CB-1	43.89
PIMA COUNTY	CB-2	54.44
PIMA COUNTY	CI-1	390.52
PIMA COUNTY	CMH-1	20.32
PIMA COUNTY	CR-1	881.44
PIMA COUNTY	GR-1	4,536.68
PIMA COUNTY	IR	2,149.40
PIMA COUNTY	RH	117,398.73
PIMA COUNTY	SH	307.31
PIMA COUNTY	SP	5,332.78
PIMA COUNTY	SR	1,533.70
PIMA COUNTY	SR-2	584.49
PIMA COUNTY	TH	60.04
TOTAL		133,294.98

There are several rezoning cases that are either being reviewed currently or have been left open from as far back as the early 1960s. Some of these have conditional zoning while others do not. **Table 4** lists the cases related to residential rezonings, showing that a total of 7,697 lots are proposed - subject to zoning changes - on a total of 2,285 acres (at maximum allowable density for each zone district).

Table 4

CASE #	CURRENT ZONE	TO	FROM	ACRES	PROP. # OF LOTS	CONDITIONAL	T-R-S	BASEMAP #
Co9-96-017	SR-2	SR-2	SR	3.99	2	YES	15-16-17	90, 131
Co9-70-043	CR-5	CR-5	GR	23.00	143	YES	15-16-11	179, 180
	CR-1	CR-1	GR-1	180.00	217	YES	15-16-11	179, 180
Co9-71-197	SR	SR	GR	912.00	275	YES	15-16-11	179, 180
	CR-1	CR-1	GR	35.00	42	YES	15-16-15	131
Co9-71-086	SR	SR	GR	120.00	36	YES	15-16-20	131
	CR-1	CR-1	GR	280.00	338	YES	15-16-20	131
Co9-96-017	SR-2	SR-2	SR	4.00	2	YES	15-16-17	90, 131
<u>Rocking K</u> Co23-96-002	SP	SP	RH, SR, GR-1	5087.00	5,672	YES	15-16-15, 16, 21, 22, 27, 28	130-132, 179, 180, 181, 226
Co9-95-053	SR-2	SR-2	RH	482.80	292	YES	16-16-16	184
<u>Vail Valley</u> Co23-97-001	SP	SP	RH, CR-3	60.00	5,500	YES	16-16-03, 04, 08-10, 15, 16	184
Co9-96-038	GR-1	GR-1	RH	37.90	45	YES	16-16-15	184
Co9-98-022	SR	SR	RH	52.10	15	YES	15-16-23, 25, 26	180, 181
	CR-1	CR-1	RH	444.30	537	YES	15-16-23, 25, 26	180, 181
Co9-99-024	CR-2	CR-2	GR-1	132.00	359	YES	16-16-03	133
	CR-3	CR-3	GR-1	232.00	1,263	YES	16-16-03	133
Co9-98-052	SR	SR	RH	56.50	17	YES	15-16-36	181, 182
	SR-2	SR-2	RH	101.76	61	YES	15-16-36	181, 182
Co9-99-003	SH	SH	TH, CI-I	139.60	168	YES	16-16-15	183
TOTAL				8383.95	14,984			

D. Topography

The Cienega-Rincon watershed sub-area topography has a combination of low-lying areas and mountain ranges. The Rincon mountains are in the northern part of the watershed; the Empirita mountains are in the center, about seven miles south of I-10; and, the Santa Rita mountains are in the southwest. Public preserves within the watershed, such as the Empire Cienega Resource Conservation area, and parts of the Coronado National Forest and Saguaro National Park - East account for approximately 158,255 acres (49.8 percent) of the total land.

The low-lying areas vary in altitude ranging between 800 and 1,350 meters above the mean sea level (MSL). The mountain ranges vary in altitude between 1,400 and 2,600 meters above MSL.

The Cienega-Rincon watershed originates in the Rincon Mountains, south of the Saguaro National Park - East and stretches all the way south to the Santa Cruz County line. **Table 5**, lists some of the prominent peaks of these mountain ranges that lie within the Altar Valley watershed.

There are several canyons and passes that act as a link between the various mountain ranges and the low-lying areas. Almost all the washes connect directly with the Cienega Creek. There are others that connect with the Agua Verde and Rincon Creeks. Cienega Creek dissects the lower half of the watershed into two parts, along a north-south axis.

Table 5

MOUNTAINS	PEAKS	ALTITUDE (METERS)*	LOCATION
RINCON	Fox Mountain	1,820	T14S, R18E
	Helens Dome	2,550	T14S, R18E
	Man Head	2,550	T14S, R18E
	Mica Mountain	2,600	T14S, R18E
	Reef Rock	2,500	T14S, R18E
	Rincon	2,585	T15S, R18E
	Spud Rock	2,625	T14S, R18E
	Tanque Verde	2,150	T14S, R17E
SANTA RITA	Castle Dome	2,202	T19S, R15E
	Mount Fagan	1,886	T18S, R16E
	Granite Mountain	1,800	T19S, R15E
	Harts Butte	1,850	T18S, R15E
	Weigles Butte	1,900	T18S, R15E

Source: USGS 30 x 60 minute quadrangle (1:100,000 - metric scale), 1994.

* Highest point of any given peak (within watershed)

Table 6, lists several of the more prominent canyons and passes which connect the peaks and ridges of the mountain ranges to the low-lying areas. Some of these canyons and passes range in altitude between 1,000 and 1,500 meters, while there are those that range between 1,000 and 2,300 meters. There are several smaller canyons throughout the watershed that connect to either the Cienega or the Agua Verde creeks.

Table 6

CANYON	AVG. ALTITUDE	LOCATION	PROXIMITY
Anderson	1,300	T17S, R18E	S. of I-10/Pima-Cochise border
Apache	1,200 - 1,500	T18S, R18E	W. of Whetstone Mountains
Barrel	1,400 - 1,500	T18S, R16E	E. of Santa Rita Experimental Range
Box	900 - 1,600	T15S, R16E	SW corner of Saguaro Nat. Mon.
Chimenea	1,600 - 2,300	T14S, R17E	Middle of Saguaro Nat. Monument
Davidson	1,000 - 1,200	T17S, R16-17E	N. of Empire Mountains
Distillery	1,200 - 2,000	T16S, R18E	E. of Colossal Cave County Park
Empire Gulch	1,300 - 1,500	T19S, R16-17E	S. of Empire Mountains
Fish	1,500 - 1,700	T19S, R15-16E	Between Santa Rita Mt. & Hwy. 83
Fresno	1,200 - 1,500	T18S, R18E	SW of Empire Mountains
Gardner	1,400 - 1,600	T19-20S, R16-17E	E. of Santa Rita Mt/Pima-Santa Cruz border
Los Posos Gulch	1,300 - 1,500	T19S, R16-17E	S. of Empire Mountains
Madrona	1,000 - 2,200	T14S, R17E	Middle of Saguaro Nat. Monument
Mattie	1,300 - 1,500	T18-19S, R17-18E	SW of Empire Mountains
Mud Spring	1,300 - 1,500	T19S, R17-18E	SW of Empire Mountains
North	1,300 - 1,500	T18S, R16-17E	S. of Empire Mt./E. of Hwy. 83
Oak Tree	1,300 - 1,500	T19S, R16-17E	S. of Empire Mt./E. of Hwy. 83
Ophir Gulch	1,450 - 1,600	T19S, R16E	NE of Santa Rita Mt./W. of Hwy. 83
Posta Quemada	1,100 - 2,300	T15S, R17-18E	E. of Colossal Cave County Park
Shaw	1,100 - 2,300	T15S, R17-18E	E. of Colossal Cave County Park
Sycamore	1,000 - 1,500	T17-18S, R15-16E	S. of Corona de Tucson
Spring Water	1,350 - 1,500	T19S, R17-18E	SW of Empire Mountains
Wakefield	1,150 - 1,500	T17-18S, R18E	S. of I-10/Pima-Cochise border
Wood	1,200 - 1,500	T18S, R18E	SW of Empire Mountains

E. Hydrology

In Pima County, the water problems evident today stem from historic issues of: serious overdraft of an aquifer due to continued groundwater mining; the failure to understand the interconnection between surface and ground water; and "the continued strategies within the community to defer reconciliation of water use with water availability."⁷ These in turn have given rise to "the loss of 85 to 95% of quality riparian habitat during the last century,..."⁸

It is evident that "the jurisdictions throughout the region face the realistic prospect that a level of restoration will be a condition of the Section 10 permit issued under the Endangered Species Act."⁹

The perennial streams in the Cienega-Rincon watershed are Apache Spring, Cienega Creek, Davidson Canyon, Empire Gulch, Mattie Canyon, Posta Quemada, Scholefield Spring and Wakefield Canyon.

The intermittent springs in the watershed are Agua Verde Creek; Barrel, Box, Chimenea and Chimney canyons; Cienega Creek; Davidson, Distillery, Gardner, Madrona, Mattie and Mud Spring canyons; Rincon Creek; and, Sycamore and Wakefield canyons.¹⁰

There are areas in the watershed "suspected" of having shallow ground water. These are along Davidson Canyon and Agua Verde, Cienega and Rincon Creeks.¹¹ There are several wells with depth to water measuring less than 50 feet, all over the watershed (ADWR Well 55-Registry and GWSI databases, as mentioned in the above-referenced report).¹²

The decline of the Cienega Creek (and the ^{Draft} Pantano Wash) resulted when "arroyo-cutting along Cienega Creek began in the 1880s resulting in a channel incised 10 to 25 feet into the former floodplain. The incision led to a lowering of the water table,..."¹³ By 1936, Soil Conservation Service maps show that erosion had widened and deepened the arroyo to dimensions similar to the present,...."¹⁴, a far-reaching effect that occurred very early in the last century. "A large amount of natural flood storage capacity was lost when the floodplain was narrowed by incision, resulting in flashier storm discharges and higher flood peaks."¹⁵

F. Soils

For soil information, please contact Department of Environmental Quality (DEQ)

G. Environmental Characteristics

1. Vegetation

The watershed is documented to have the following flora based on the Gap Analysis Program (GAP). The Gap Analysis Program is "a national endeavor to catalog the range of vertebrates or their habitat (based on vegetation) in every state and compare them to land ownership."¹⁶

The vegetation types include Chihuahuan Desertscrub (Creosotebush - Tarbush), Chihuahuan Desertscrub (Mixed Scrub), Sonoran Desert Scrub (Paloverde - Mixed Cacti), Sonoran Desert Scrub (Creosotebush - Bursage), Sonoran Riparian and Oasis Forest (Cottonwood - Willow), Madrean Evergreen Forest (Encinal), Madrean Evergreen Forest (Oak - Pine), Madrean Montane Conifer Forest (Douglas-Fir - Mixed Conifer); Mogollon Chaparral Scrubland (Mixed Evergreen Sclerophyll); Mogollon Chaparral Scrubland (Manzanita); and, Scrub Grassland (Sacaton - Grass).¹⁷ Some vegetation types are unclassified in the GAP/EROS maps.

2. Wildlife

Please refer to the report on Biological Resource Base and Water Resources and the Sonoran Desert Conservation Plan, July 1999.

H. Viewsheds

The Cienega Rincon watershed has two distinct characteristics. The northern half continues to develop (mostly regulated subdivisions), while the southern half has a more sparsely developed, wild-cat lot-splitting approach, except for Corona de Tucson (which has a mixture of regulated as well as unregulated development).

The Rincon, Santa Rita, Empire, Whetstone and Huachuca Mountains offer a wide variety of panoramic views.

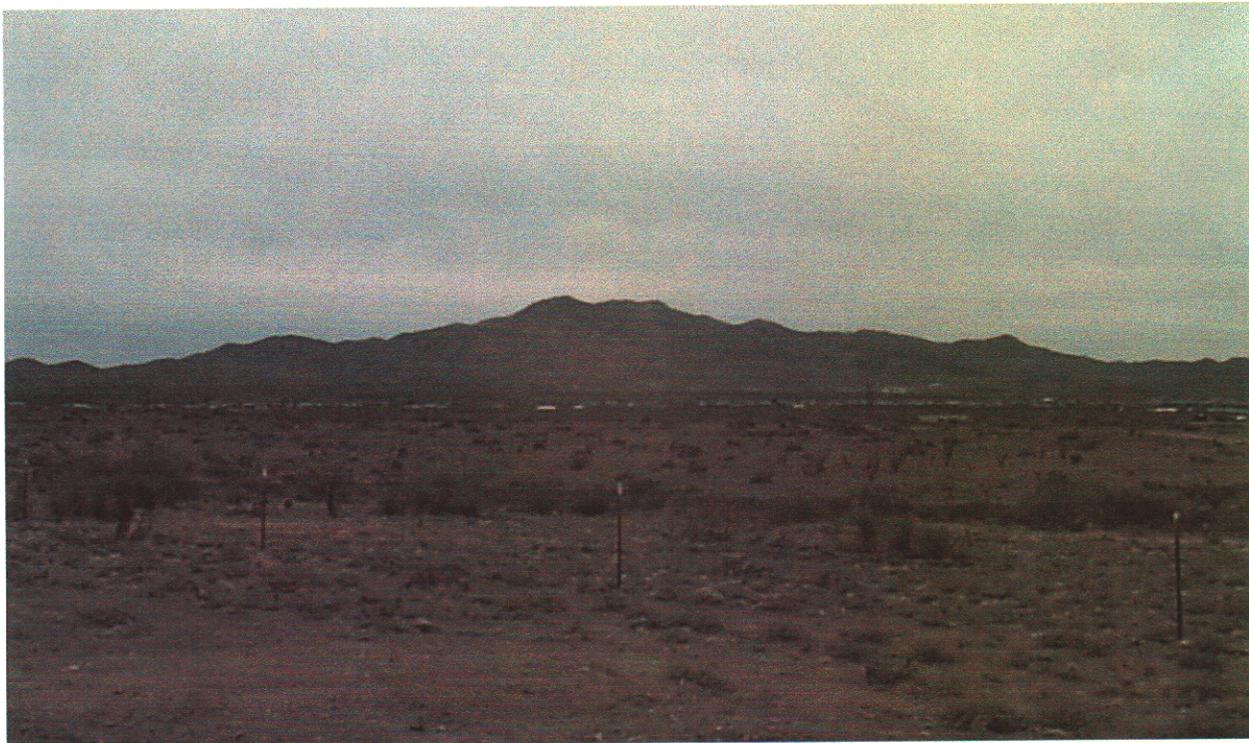


Plate I (above): Corona de Tucson, Mount Fagan and Harts Butte (looking southwest from the intersection of I-10 and State Highway 83).

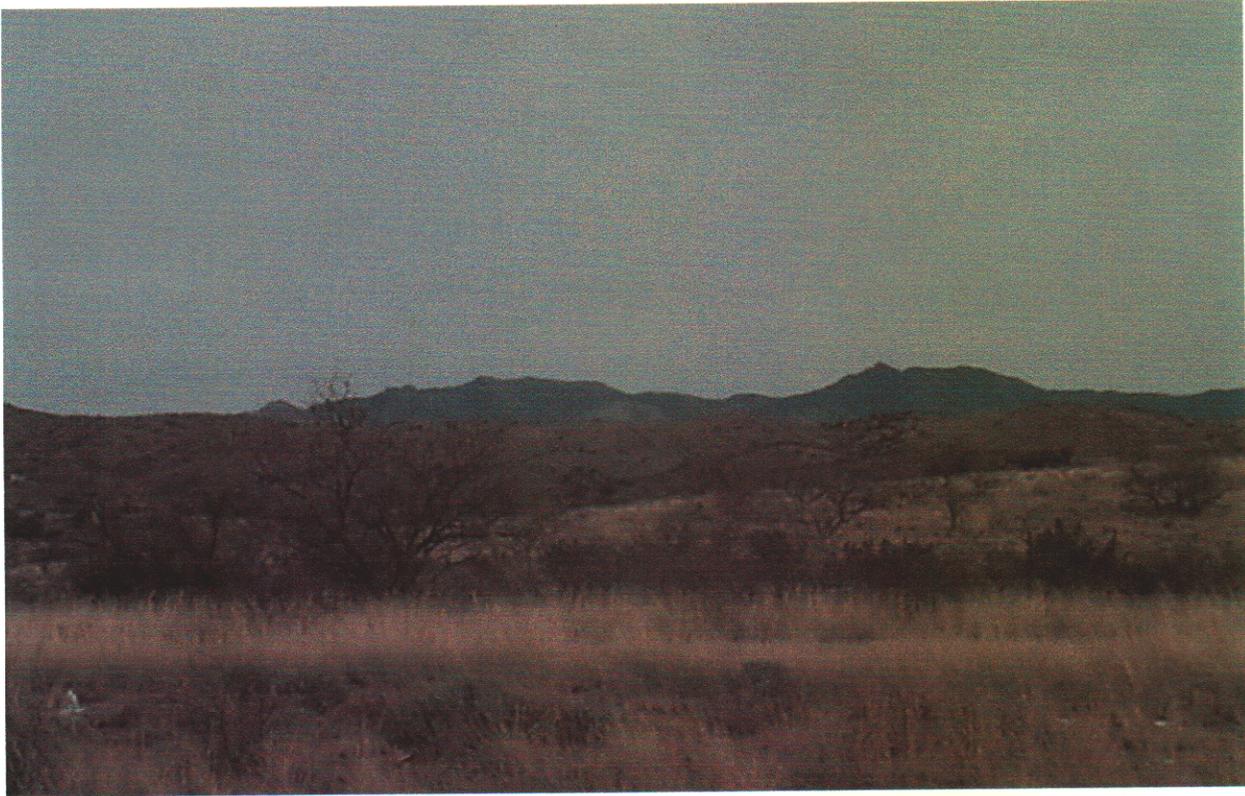
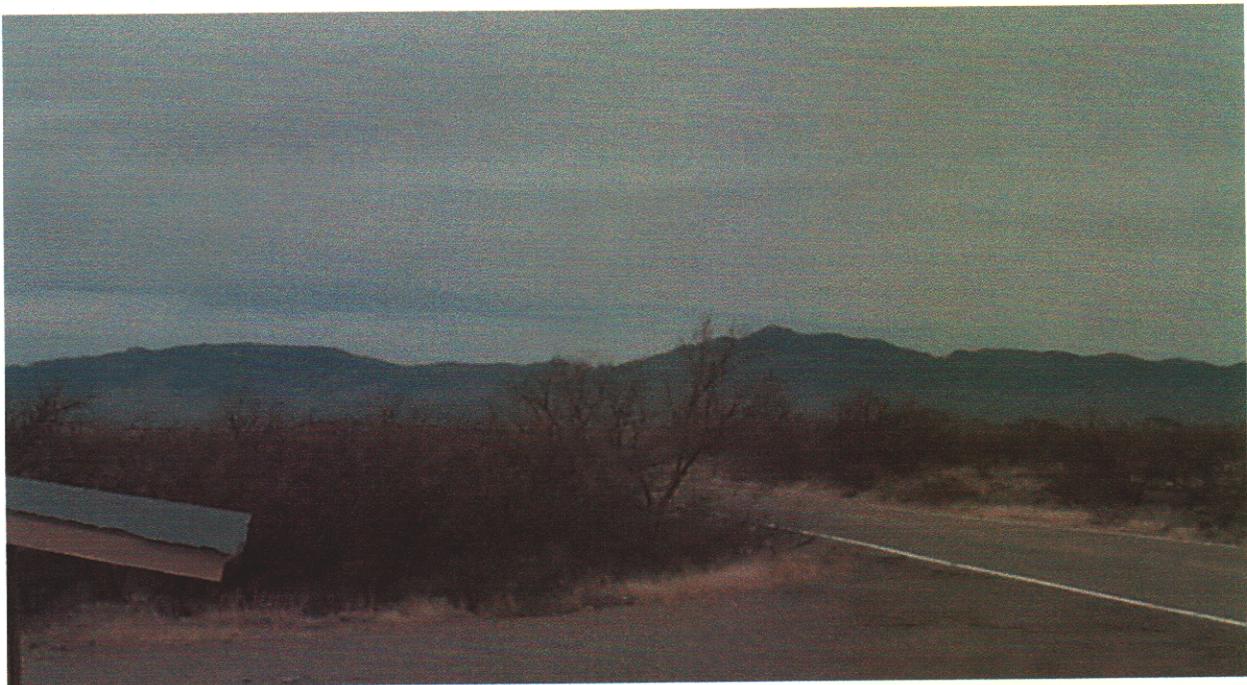


Plate II (above): Cienega Valley and the Whetstone Mountains (looking east from approximately 13 miles south of the intersection of I-10 and State Highway 83).

Plate III (below): Cienega Valley and the Santa Catalina Mountains (looking north from approximately 13 miles south of the intersection of I-10 and State Highway 83).



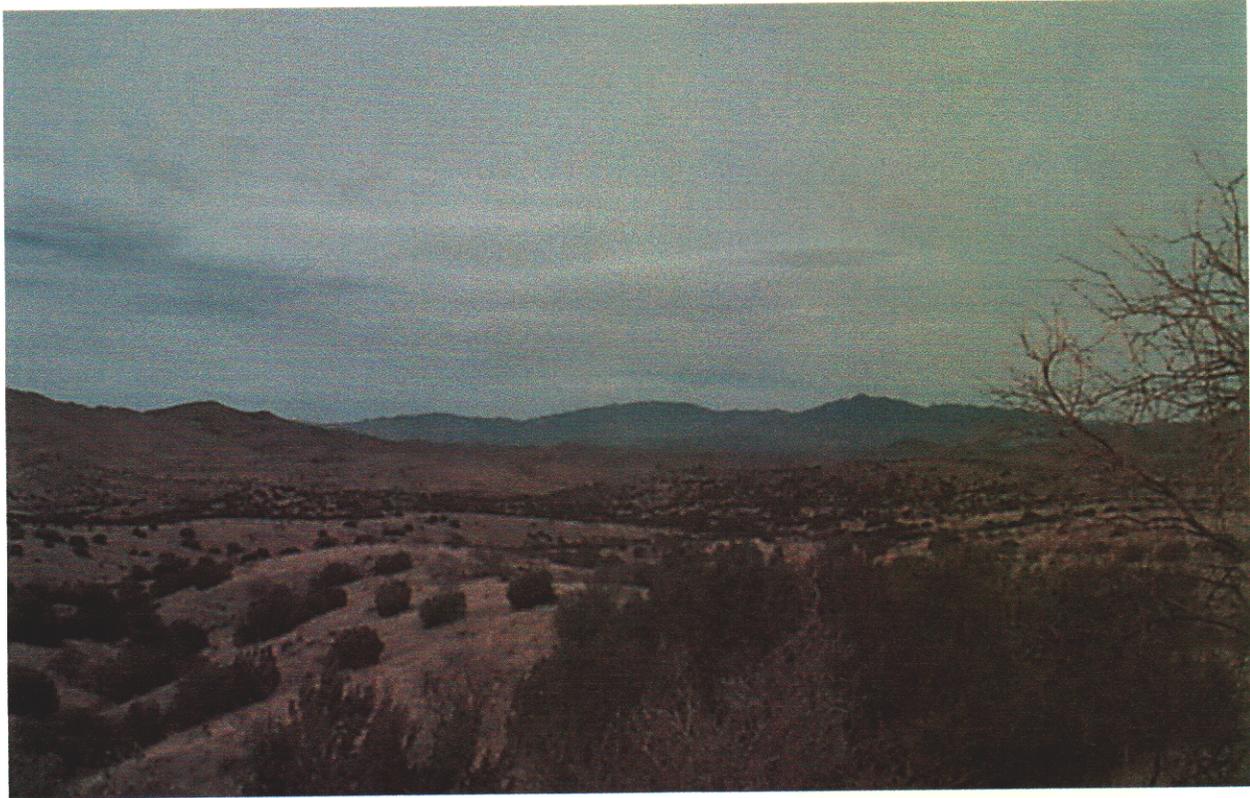


Plate IV (above): Rolling hills and the Cienega Valley with the Santa Rita Mountains as the backdrop (looking southwest from 14 miles south of the intersection of I-10 and State Highway 83).

Plate V (below): Weigles Butte, Santa Rita Mountains (looking west from 14 miles south of the intersection of I-10 and State Highway 83).





Plate VI (above): Proximity of Barrel Canyon, Santa Rita Mountains (looking west from 11 miles north of the Town of Sonoita).

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Plate VII (below): Proximity of Barrell Canyon (looking west from 11 miles north of the Town of Sonoita).





Plate VIII (above): Cienega Valley vegetation (looking south from 10 miles north of the Town of Sonoita).

Plate IX (below): Corona de Tucson (at the intersection of I-10 and State Highway 83).



I. Infrastructure

The Cienega-Rincon watershed has high levels of infrastructure demands in high-density developments north of I-10. In the future, with the completion of some large residential developments, the population and housing will swell.

1. Roads and Access

Interstate 10 roughly bisects (horizontally) the watershed, connecting metro Tucson to Cochise County. The Sonoita-Mountain View Hwy (State Hwy 83) links Interstate 10 to Sonoita and Santa Cruz County. According to the Pima County Major Streets and Scenic Routes Plan, all state highways including Interstate 10 and Sonoita Highway are designated both “scenic” and “major” routes with special zoning regulations for abutting properties. Other roads designated both scenic and major are Old Spanish Trail, Colossal Cave Road, portions of Camino Loma Alta, Sahuarita Road, and Marsh Station Road. Many more roads in the area are designated as major streets although not scenic routes.

2. Water

The western part of this watershed overlaps the Arizona Department of Water Resources Tucson Active Management Area. The watershed is served by private wells and by these water companies with their general service areas: Tucson Water Company (southeastern edge of metro Tucson), Spanish Trail Water Company (T15S,R16E - south of Saguaro National Park), Saguaro Water Co. (T15S, R16E, Sections 23,26), Rincon Creek Water Co. (T15S, R16E, Sections 13,14), Del Lago Water Co. (T16S, R16E, Section 9, 10, 14, 15 & T17S, R16E, Sections 4, 9, 10), Santa Rita Bel Aire (T17S, R15E, several mile range surrounding Section 23), and So. Az Livestock Water Company (T16S, R15E, Section 14).

3. Sanitary sewer

The public sanitary sewerage conveyance and treatment facilities in Pima County are owned and operated by the Wastewater Management Department (WWM). WWM is an enterprise fund and is not supported by the tax base.

Some developments have the need for sewers. The developer bears all responsibility to build such sewers to serve a development, and pays for the construction of all sewers, whether they are public or private, on-site or off-site. If the sewers are public, the developer builds and transfers ownership to WWM, subject to acceptance by WWM.

The cost to WWM for the operation, maintenance and replacement of conveyance lines is paid for by the monthly User Fees. These fees also pay for the treatment costs. The cost to WWM for treatment facility expansion and large line (trunk or interceptor) construction or augmentation are paid for by the one-time Sewer Connection Fees.

The Cienega-Rincon Watershed Sub-area includes some large trunk sewers near the westerly edge, as well as a number of existing developments.

There are some significant developments planned in this area, as follows:

- a. Civano (T15S, R15E, Section 1+)
- b. Rocking K (T15S, R16E, Section 9+)
- c. Vail Valley (T15S, R16E, Section 10+)
- d. An area east of Houghton Road and south of Valencia Road

Both the Rocking K and Vail Valley developments will be extending large trunk sewers past undeveloped land to their sites.

4. Natural Gas

Southwest Gas provides services to portions of the area including the Sahuarita and Houghton Roads area; otherwise private propane tanks are used.

5. Telephone and Electricity

U.S. West provides telephone service to the area. Tucson Electric Power Company serves this area except for the southeast corner and an area near Sahuarita and Houghton Roads which is served by Trico Electric Company.

6. Schools

The Vail Unified School District covers the northwestern majority of the watershed on both sides of 1-10 and south to the Coronado National Forest (Santa Rita Mountains). The Vail School District has a preschool, three elementary schools, and one middle school. There is no high school although one is proposed in the near future. Vail S.D. high school students now attend metro Tucson high schools and there is a Vail Charter High School on South Rita Road. The far southeastern portion of the watershed is served by the Empire School District which is a "transporting district" although the Arizona Department of Education lists the Empire Elementary school in Sonoita as the district's own school. Depending upon where middle or high school students live in the district, they would attend adjacent school districts.

7. Parks

Colossal Cave Park is owned by Pima County but leased and managed by a private company. Cienega Creek Natural Preserve is owned and managed by Pima County. Portions of Saguaro National Park and Coronado National Forest also lie within this watershed.

J. Open Space

The primary open spaces in the watershed are the reserves. Studies were done where "reserve boundaries were verified by land managers,"¹⁸

The reserves identified within the watershed are Cienega Creek Preservation Area, Colossal Cave Mountain Park, Empirita Ranch, Rincon Mountain Wilderness Area, and parts of Coronado National Forest, Empire Cienega Resource Conservation Area and Saguaro National Park - East.¹⁹

There are several reserves that lie in part or whole within the watershed, only the large ones of which are described in **Table 7**.

Table 7

NO	RESERVE	ACRES (APPROX).	LOCATION
1.	Cienega Creek Preservation Area	3,979	T16-17S, R16-17E
2.	Colossal Cave Mountain Park	2,238	T16S, R17E
3.	Coronado National Forest (partial)	48,000	T18-19S, R16E; T18-19S, R18E; T15S, R18E
4.	Empire Cienega Resource Cons. Area	64,000	T18-19S, R17-18E
5.	Saguaro National Park (partial)	24,000	T14-15S, R16-17E

The combined total of the reserves account for approximately 50 percent of the total land area in the watershed. With, perhaps, the exception of Empire Cienega Resource Conservation Area, the rest of the reserves are protected at Status 1a of the Gap Analysis Program.²⁰

K. Archaeological and Cultural Resources

Please refer to *Pima County's Cultural and Historic Resources* Report.

L. Real Estate Market Conditions

It is noted that "the Pima County property tax base has declined substantially during the last quarter century when viewed on a per capita basis. The general fiscal trends show a decline in the revenue base."²¹

There is a considerable amount of unregulated development in the watershed. There are also a number of mobile homes. In terms of contribution to the County's tax base, "since 1977-78, there has been a 38 percent drop in the primary property tax value and a 36 percent drop in secondary value. To compensate for this declining tax base, the tax rate is increased with regulated development subsidizing the cost of providing services to unregulated areas."²²

There are large areas of unplatted land (wild cat, lot-splitting) which contribute to the disparity in fiscal capacity when compared with platted land. The watershed has only part of one of the sixteen urbanizing areas in Pima County.²³ In terms of infrastructure and fiscal strength, the full cash value of unplatted land in eastern Pima County (non-urbanized areas) is \$3,560 per acre, in comparison with the value of \$159,011 per acre of platted land.²⁴ It can be said that "the basic reason for this disparity is that unregulated development offers little in the way of sewers and roads, and the major housing type in unregulated areas has a valuation method which assumes depreciation over time, but improvements are the bulwark of the tax base."²⁵

M. Capital Improvement Projects (by Departments)

Parks and Recreation

Agua Verde Creek (General Obligation Bond No. RW-12)	\$221,717
Cienega Creek (General Obligation Bond No. RW-14)*	\$1,400,000
Colossal Cave Mountain Park Improvements (General Obligation Bond No. P-06)	\$499,000
Vail Park Improvements (General Obligation Bond No. P-24)	<u>\$562,000</u>
Total:	\$2,682,717

Transportation

Vail Rd.: I-10 to Southern Pacific Railroad Crossing (Impact Fees)	\$4,469,000
Pistol Hill Rd.: Colossal Cave to Old Spanish Trail (HURF Bond No. DOT-38, County HURF)**	<u>\$1,672,984</u>
Total:	\$6,141,984

Facilities Management

Sheriff's New Substations (General Obligation Bond No. S-3)	\$980,000
---	------------------

Cultural Resources (County Administrator's Office)

Empirita Ranch Building Rehabilitation (General Obligation Bond No. CH-26)	\$200,000
Pantano Townsite (General Obligation No. CA-34)	<u>\$100,000</u>
Total:	\$300,000

* future project

** completed project

*** Sheriff's New Substations consists of construction of three substations, one of which will be located in the Cienega Rincon area (Vail).

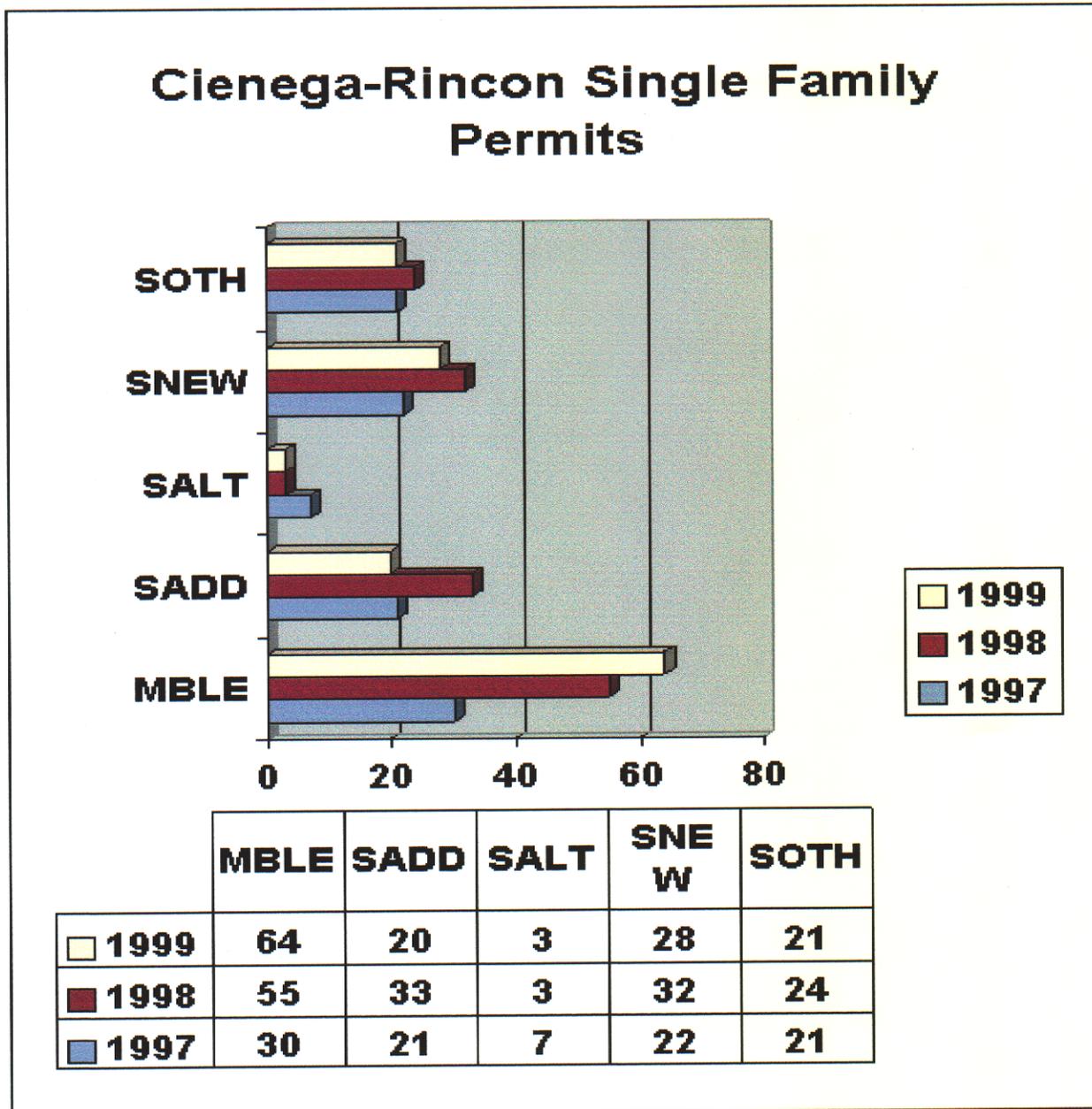
N. Permits

Permits issued for residential and commercial activities, between 1997 and 1999, are shown in **Graph 1** and **Graph 2** respectively.

Graph 1 shows that, between 1997 and 1999, the total permitting activities were an all-time high in 1998, with a total of 147 permits issued. The number of mobile home permits have been on a decline, by over 50 percent, between 1997 and 1999. This may be an indication that there has also been a slight decline in wildcat lot-splitting activities in the area.

New home permits increased between 1997 and 1998 but dropped by approximately 30 percent between 1998 and 1999. The number of permits issued does not reflect the fact that upon completion of Rocking K and Vail Valley, the watershed will have increased considerably in the number of dwelling units (over 11,000 units).

Graph 1

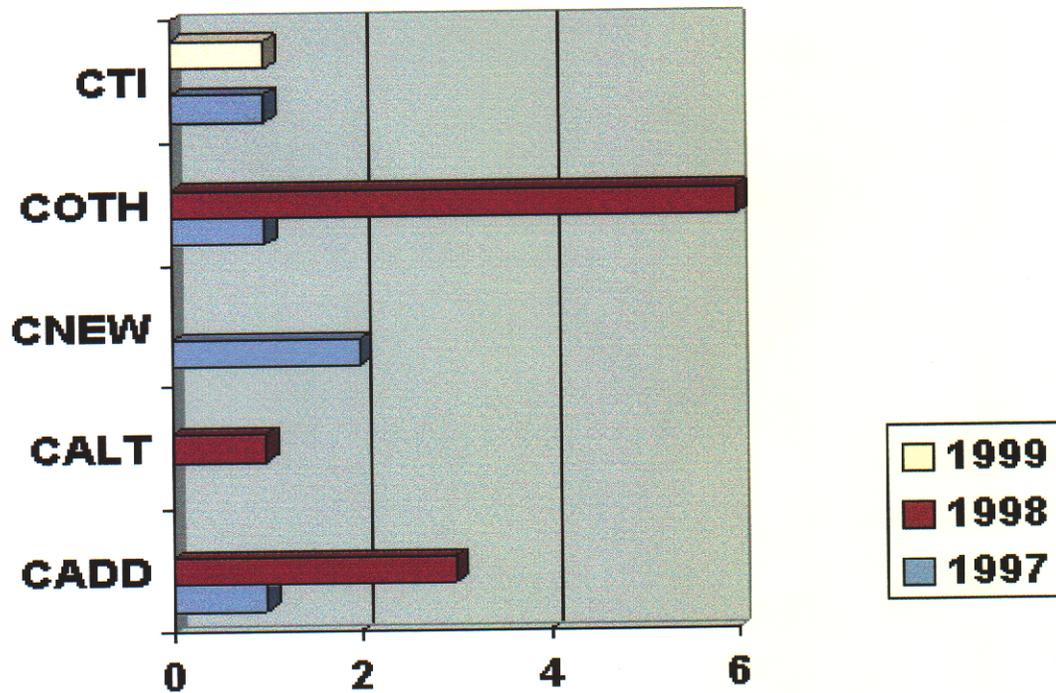


SOTH = SINGLE FAMILY (OTHER); SNEW = NEW SINGLE FAMILY; SALT = SINGLE FAMILY ALTERATIONS; SADD = SINGLE FAMILY ADDITIONS; MBLE = MOBILE HOMES

Graph 2 reveals the same trend as that of **Graph 1** in terms of the decline in activities from 1998 to 1999. The total number of permits decreased from 18 in 1998 to five in 1999, and there were no new commercial development permits issued in 1998 and 1999.

Graph 2

Cienega-Rincon Commercial Permits



	CADD	CALT	CNEW	COTH	CTI
1999					1
1998	3	1		6	
1997	1		2	1	1

CADD = COMMERCIAL ADDITIONS; CALT = COMMERCIAL ALTERATIONS; CNEW = NEW COMMERCIAL; COTH=COMMERCIAL (OTHER); CTI=COMMERCIAL TENANT IMPROVEMENT

APPENDICES

Maps:

1. Map of Existing Land Use
2. Map of Existing Zoning on Vacant Land
3. Map of Planned Land Use on Vacant Land
4. Map of Committed Land
5. Map of Approved and Proposed Subdivisions on Vacant Land
6. Map of Wastewater Infrastructure by Watershed Area

Draft

REFERENCES

Pima County/Pima Association of Governments. *GIS Coverages of Perennial and Intermittent Streams, and Areas of Shallow Groundwater, Sonoran Desert Conservation Plan.*

Pima County. *Land Stewardship in Pima County, Sonoran Desert Conservation Plan.*

Pima County. *Sonoran Desert Conservation Plan.*

Pima County. *Sonoran Desert Conservation Plan, Focus on Riparian Areas.*

Pima County. *Water Resources and the Sonoran Desert Conservation Plan.*

USGS. Tucson, ARIZONA. *30 X 60 Minute Quadrangle.*

Draft

END NOTES

1. Pima County, Land Stewardship in Pima County, Sonoran Desert Conservation Plan, February 2000, Table 6, p. 14.
2. Pima County, Sonoran Desert Conservation Plan, October 1998, p. 5.
3. Ibid, p. 6.
4. Ibid.
5. Ibid.
6. Ibid.
7. Pima County, Water Resources and the Sonoran Desert Conservation Plan, July 1999, p. ii.
8. Ibid, p. 3.
9. Ibid.
10. Pima Association of Governments for Pima County, GIS Coverages of Perennial and Intermittent Streams, and Areas of Shallow Groundwater, Sonoran Desert Conservation Plan, January 2000, Figure 1, p. 13, 14 & 15.
11. Ibid, Figure 4, p. 25.
12. Ibid.
13. Pima County, Water Resources and the Sonoran Desert Conservation Plan, July 1999, p. 35
14. Ibid.
15. Ibid.
16. Pima County, Land Stewardship in Pima County, Sonoran Desert Conservation Plan, February 2000, p. 1.
17. Ibid, Figure 2, p. 8.
18. Ibid, p. 4.
19. Ibid, Figure 1, p. 5.
20. Ibid, p. 1.
21. Pima County, "Impact of Unregulated Development on the Pima County Tax Base, Service Demand and Future Infrastructure Liability", Fiscal Impact of Land Use, February 2000.

Draft

22. Pima County, "Impact of Unregulated Development at the Community and Watershed Level", *Fiscal Impact of Land Use*, March 2000.
23. Ibid.
24. Ibid.
25. Ibid.

Draft

EXISTING LAND USE

Cienega-Rincon Watershed

16-MAR-2000

Legend

Existing Land Use

VACANT	INDUSTRIAL
RURAL	INSTITUTIONAL
0.2 TO 0.4 RAC	MISC. GOVERNMENT
0.4 TO 0.75 RAC	TRANSPORT FACIL
0.75 TO 1.25 RAC	UTILITIES/TELECOMMUNICATIONS
1.25 RAC TO 3.0 RAC	PARK
3.0 TO 6.0 RAC	GOLF COURSE
6.0 TO 10.0 RAC	AGRICULTURE
10.0 TO 15.0 RAC	DEDICATED OPEN SPACE
15.0 TO 25.0 RAC	OTHER
GREATER THAN 25 RAC	MILITARY/ST. POLICE
LODGING	VACANT-STATE
RESORT	VACANT-JURISDICTION
OFFICE	PARTIALLY DEVELOPED
COMMERCIAL	NO DATA
PVT STREETS	

Basemap Features

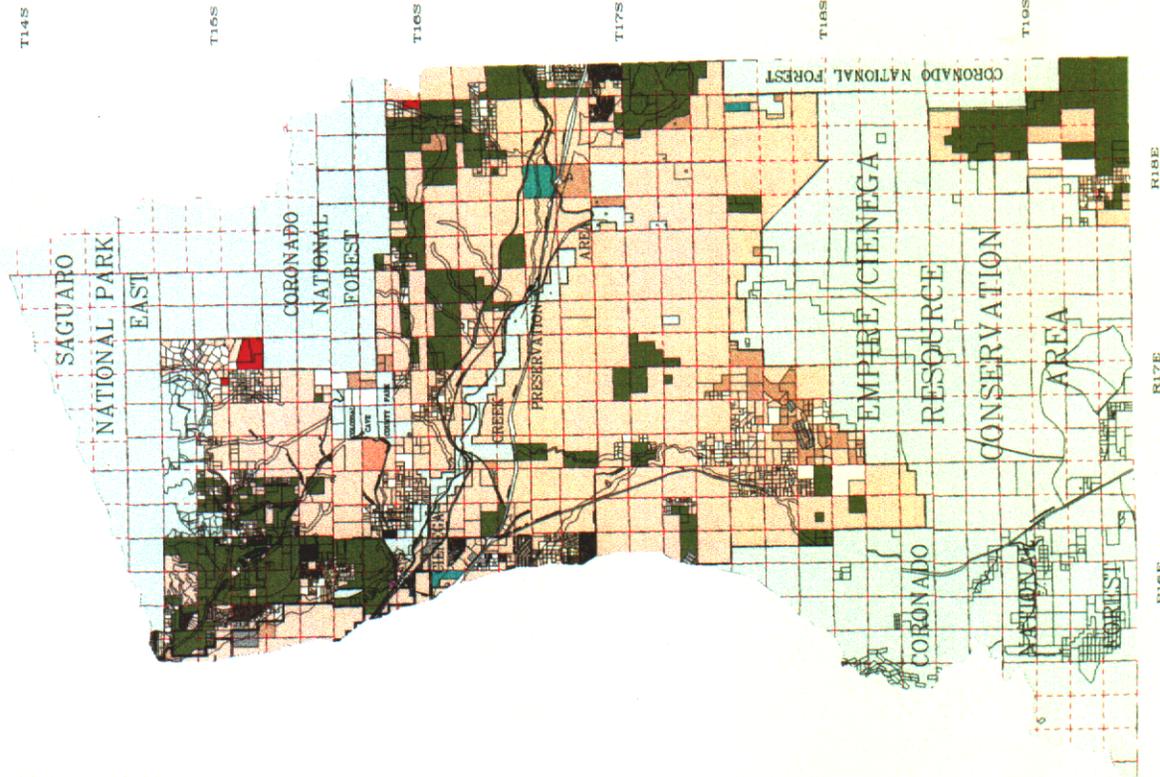
Public Preserve	Public Preserve Boundary
Tribal Lands	City and Town Limits
	Sections



This map is prepared for use in the Pecos National Forest
 and its vicinity, including the Pecos County Development
 Bureau, Dept. of Transportation and the
 Pecos County Assessor's Office.



Map of Cienega-Rincon Watershed
 Prepared by the Pecos County Assessor's Office
 2000



EXISTING ZONING ON VACANT LAND

Unincorporated Pima County Cienega-Rincon Watershed

15-MAR-2000

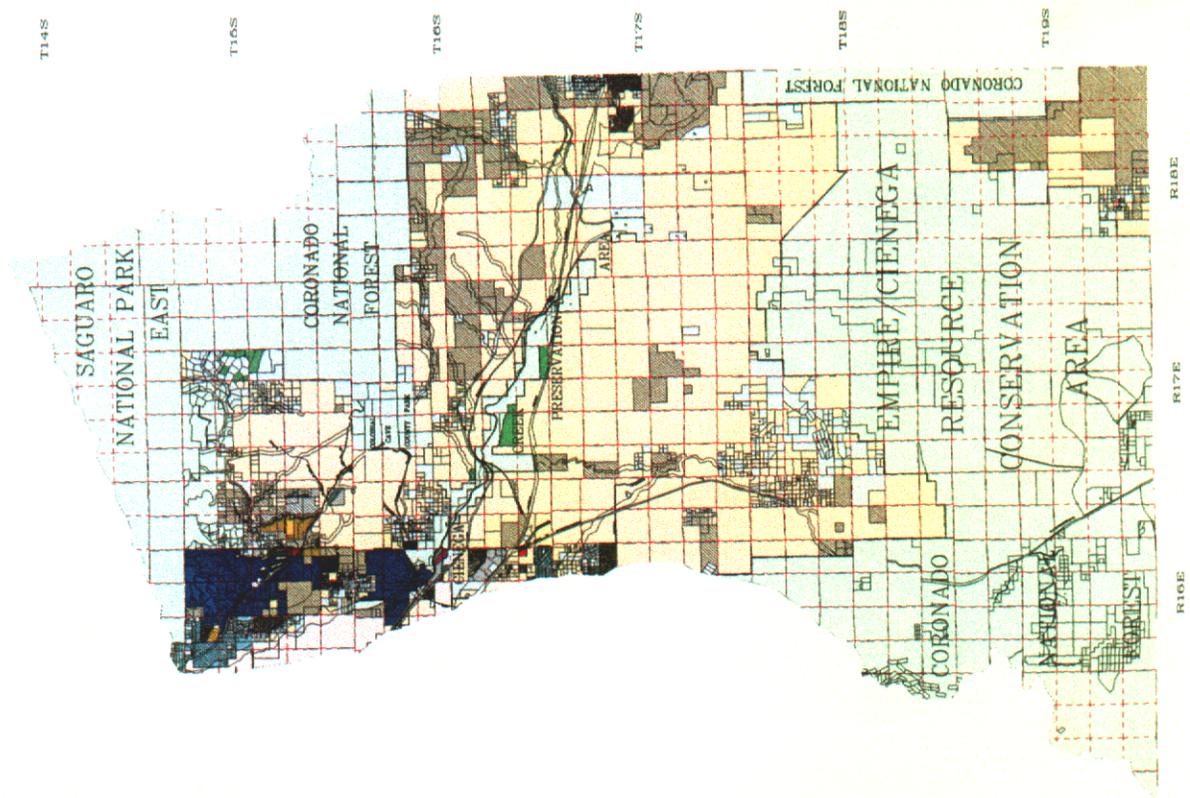
Legend

- Zoning Districts**
- IR Institutional Reserve
 - RH Rural Homestead
 - GR-1 Rural Residential
 - SR Suburban Ranch
 - SR-2 Suburban Ranch Estate
 - SH Suburban Homestead
 - CR-1 Single Residence
 - CR-2 Single Residence
 - CR-3 Single Residence
 - CR-4 Mixed Dwelling Type
 - CR-5 Multiple Residence
 - TR Transitional
 - CMH-1 Mobile Home 1
 - Cond Zoning Boundary
 - CMH-2 Mobile Home-2
 - TH Trailer HomeSite
 - MU Multiple Use
 - MR Major Resort
 - RVC-Rural Village Center
 - CB-1 Local Business
 - CB-2 General Business
 - CPI Campus Park Industrial
 - CI-1 Light Industrial/Warehouse
 - CI-2 General Industrial
 - CI-3 Heavy Industrial
 - SP Specific Plan
 - GC Golf Course

Basemap Features

- Built or Committed Land
- Cities and Towns
- Sections
- Public Preserve Boundary
- Public Preserves
- Tribal Lands
- Ranching or Grazing Land

Note: Vacant land shown by zoning district color



This map is prepared in honor of the late, Dr. Robert B. ...
Arizona Dept. of Transportation and So.
Pima County Assessor's Office.



APPROVED AND PROPOSED

SUBDIVISIONS

ON VACANT LAND

Cienega-Rincon Watershed

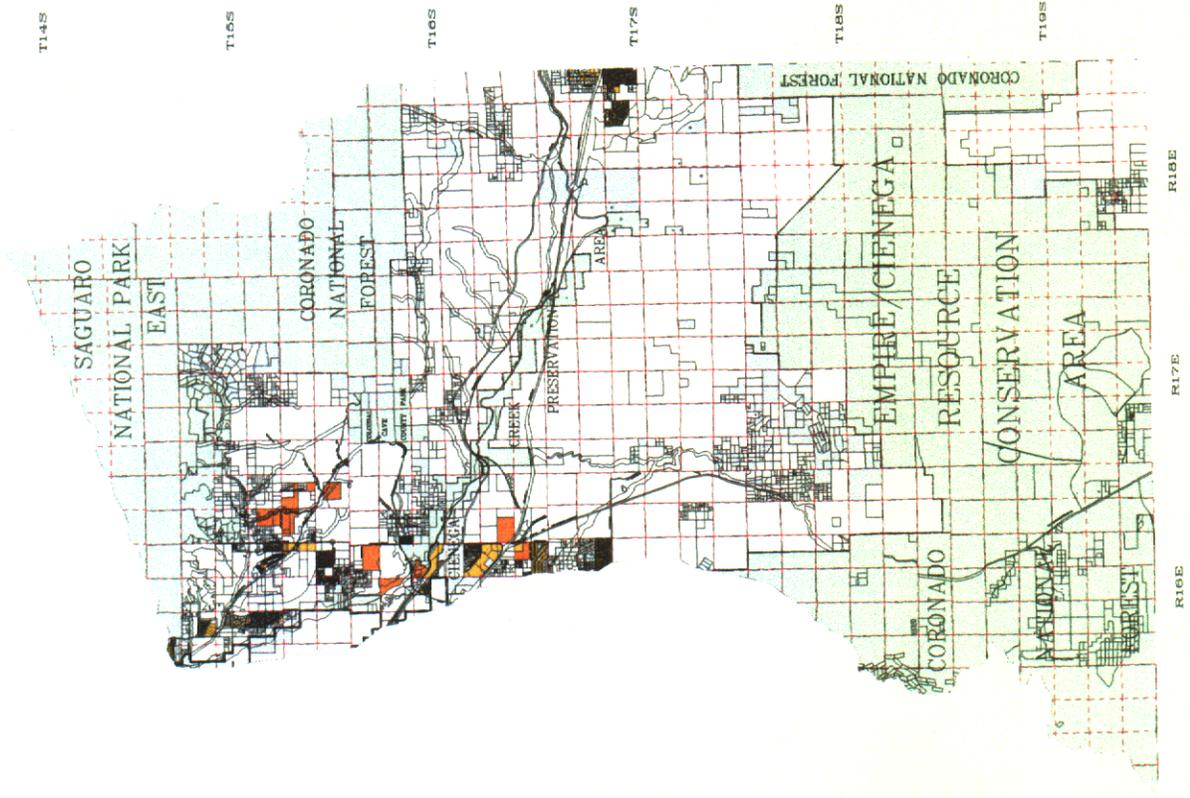
22-MAR-2000

Legend

- Approved Subdivisions or Development Plans
- Proposed Subdivisions or Development Plans

Basemap Features

- Built or Committed Land
- City and Town Limits
- Sections
- Public Preserve Boundary
- Public Preserves
- Tribal Lands



This map is prepared to show the location of the subdivisions and development plans within the Cienega-Rincon Watershed. It is not intended to be used for any other purpose. The County Board of Supervisors is not responsible for any errors or omissions in this map.



PIMA COUNTY BOARD OF SUPERVISORS
 PUBLIC WORKS DEPARTMENT
 100 N. GILBERT AVENUE
 TULSA, OKLAHOMA 74103

PLANNED LAND USE ON VACANT LAND

Unincorporated Pima County Cienega-Rincon Watershed

15-MAR-2000

Legend

Planned Land Use	
CC Activity Centers	Medium Intensity Rural
RCAC Regional Activity Center	Low Intensity Rural
MAC Metropolitan Activity Center	Resource Transition
MFC Multifunctional Corridor	Resource Productive
D Medium/High Intensity Urban	Industrial
D Medium Intensity Urban	Urban Industrial
F High Intensity Urban	Heavy Industrial
C1.2 Low Intensity Urban	Resource Conservation
3.0 Low Intensity Urban	Special Areas
1.2 Low Intensity Urban	Not in Plan Area
0.5 Low Intensity Urban	
0.3 Low Intensity Urban	
DR Development Reserve	
RA Rural Activity Centers	
RUAC Rural Activity Center	
RX Rural Crossroads	

Basemap Features

Built or Committed Land	Public Preserve Boundary
Cities and Towns	Public Preserves
Ranching or Grazing Land	Tribal Lands
Sections	

Note: Vacant land shown by plan designation color

T14S

T16S

T18S

T17S

T18S

T18S

SAGUARO
NATIONAL PARK
EAST

CORONADO
NATIONAL
FOREST

PRESERVA

CORONADO NATIONAL FOREST

EMPERE/CIENEGA
RESOURCE
CONSERVATION
AREA

CORONADO
NATIONAL
FOREST

R18E

R18E

R18E



This map is prepared in whole or in part under the authority of the Planning and Zoning Department, Pima County, Arizona. It is a public document and its use is subject to the provisions of the Pima County Assessor's Office.



PLANNING AND ZONING DEPARTMENT
PIMA COUNTY, ARIZONA
1000 N. GILBERT AVENUE, SUITE 200
TULSA, ARIZONA 85711
520.744.1888

COMMITTED LANDS

Unincorporated Pima County

Cienega-Rincon Watershed

17-MAR-2000

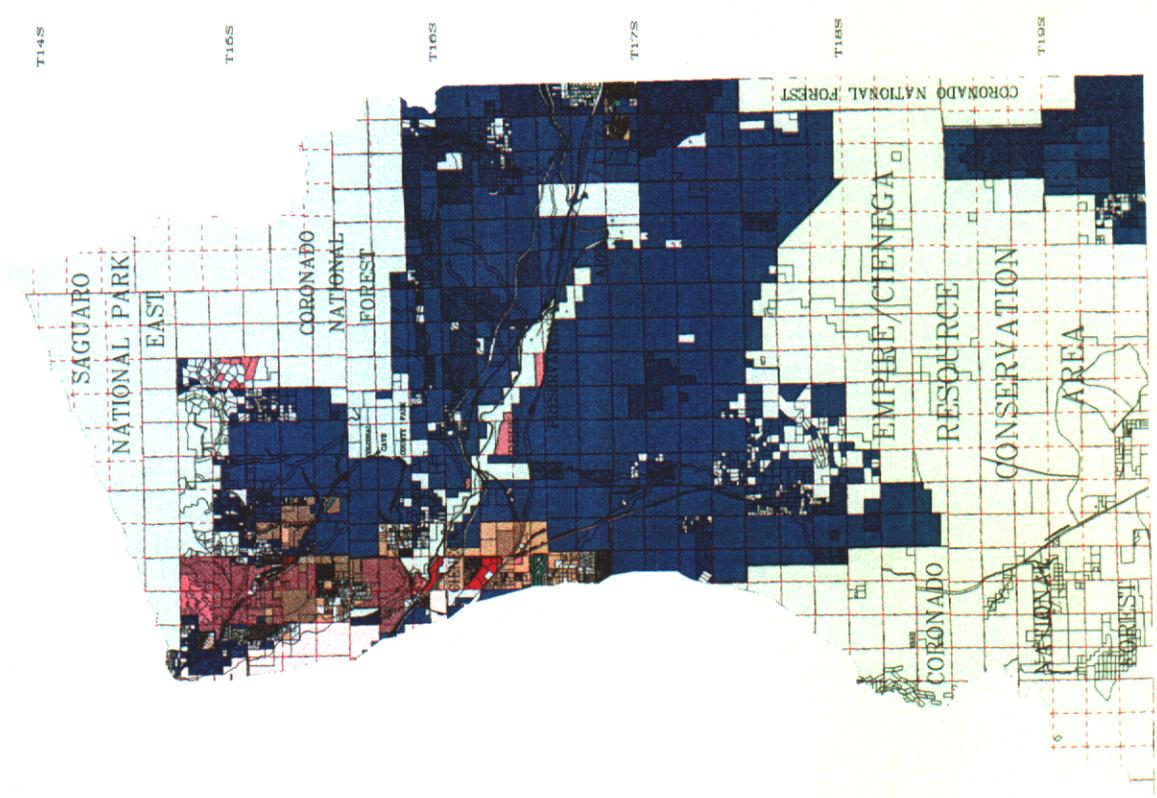
Legend

Land Status

- Built or Committed Land
- Categories of Vacant Land**
- Rural Zoning**
- Rural Zoning-Subdivision or Development Plan Applied For
- Rural Zoning-Approved Subdivision or Development Plan
- 0.3-1.0 RAC Equivalent Zoning
- 0.3-1.0 RAC-Subdivision or Development Plan Applied For
- 0.3-1.0 RAC-Approved Subdivision or Development Plan
- 1.0-3.0 RAC Equivalent Zoning
- 1.0-3.0 RAC-Subdivision or Development Plan Applied For
- 1.0-3.0 RAC-Approved Subdivision or Development Plan
- 3.0+ RAC Equivalent Zoning
- 3.0+ RAC-Subdivision or Development Plan Applied For
- 3.0+ RAC-Approved Subdivision or Development Plan

Basemap Features

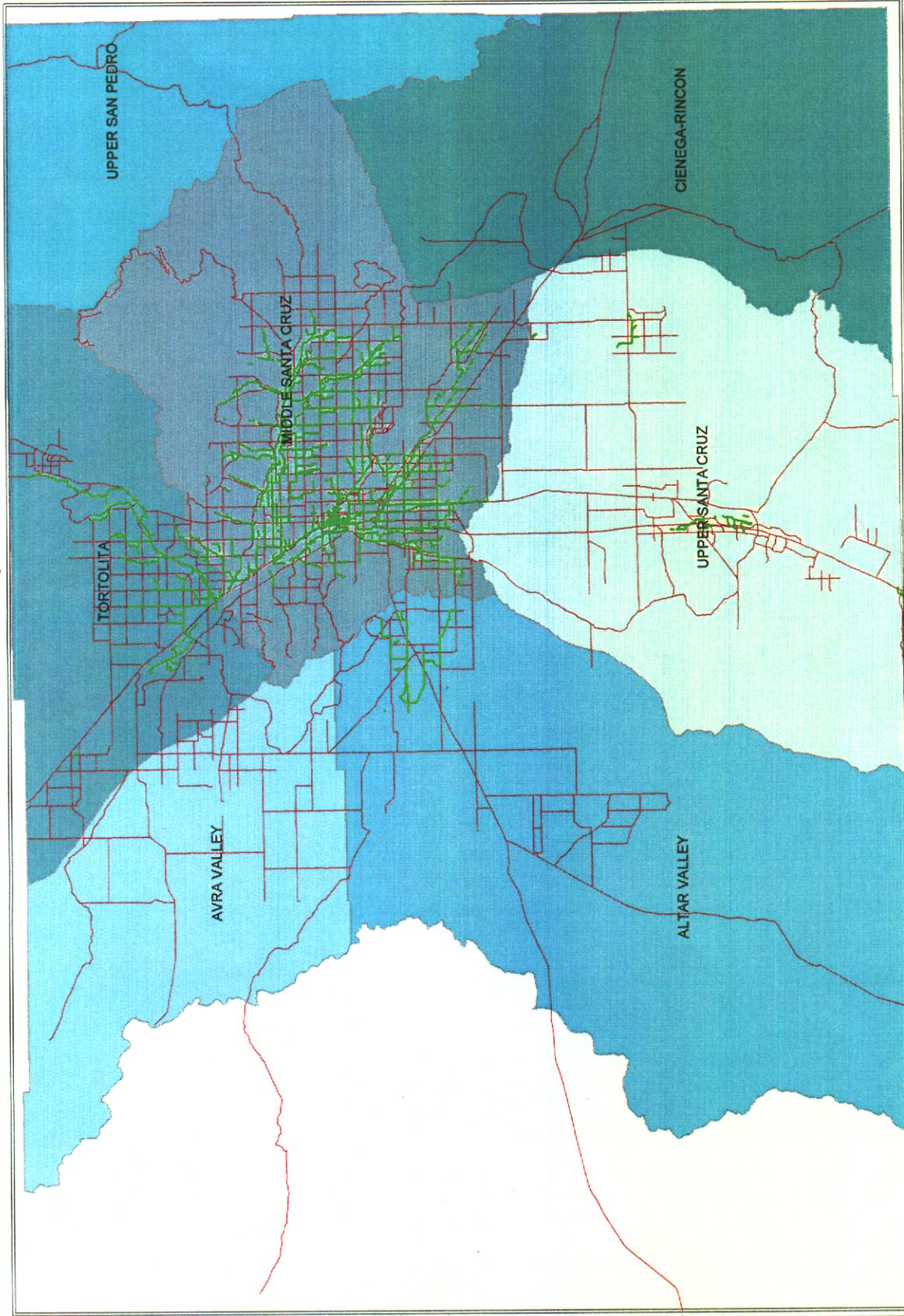
- Cities and Towns
- Public Preserve Boundary
- Tidal Lands
- Public Preserves
- Sections
- Ranching or Grazing Land



This map is prepared in order to show current zoning status, including the Pima County Development Code, and to provide information and for Pima County, Arizona 85701.



Wastewater Infrastructure By Watershed Area



Legend

- Major Wastewater Lines
- Major Roadways
- NAME
- ALTAR VALLEY
- AVRA VALLEY
- CIENEGA-RINCON
- MIDDLE SANTA CRUZ
- TORTOLITA
- UPPER SAN PEDRO
- UPPER SANTA CRUZ

Platted Subdivisions

SDCP PLANNING UNIT 2

- Planning Unit Boundary
- Major Washes
- Parcel Lines
- Platted Subdivisions
- BLM
- County Park
- Tribal Nations
- Military Reservations
- National Forest Lands
- National Parks And Monuments
- National Wildlife Refuge
- Private Lands
- State Lands
- State Park
- Ranch Use

STATISTICS FOR UNIT 2
 NUMBER OF PLATTED SUBDIVISIONS: 41
 NUMBER OF PARCELS: 5,704

Pinna County Index Map



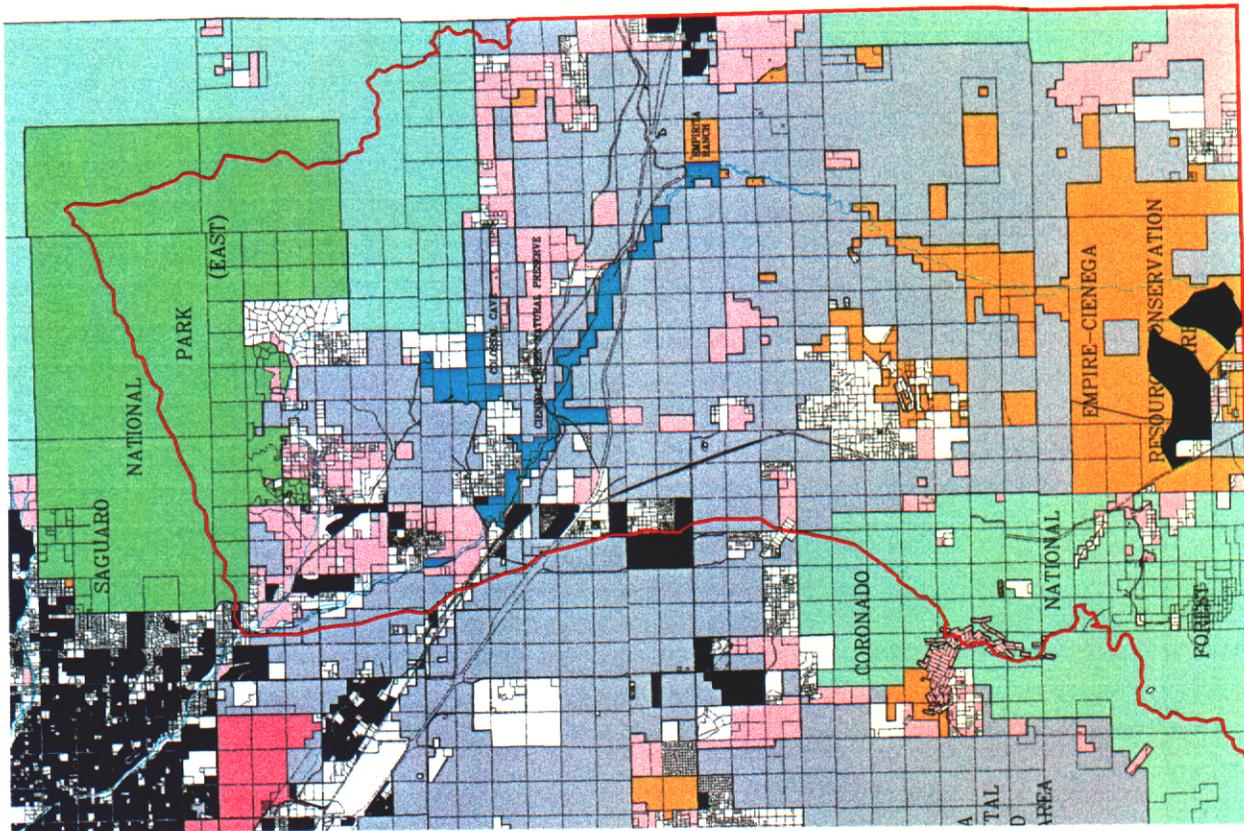
Scale Map Made 11/16/2008

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Scale 1:70,000



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 Tucson, AZ 85701
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 Website: www.pcta.com



Topology

SDCP PLANNING UNIT 2

-  Washes
-  Major Roads
-  Administrative Boundaries
-  Contour Lines

Pinna County Index Map



Scale 1:70,000

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