

# Ranching & Agriculture E.I.S. Issue Paper

Sonoran Desert Conservation Plan

2002

Pima County, Arizona  
Board of Supervisors  
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# MEMORANDUM

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Date: July 31, 2002

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

From: C.H. Huckelberry  
County Administrator *CH*

Re: **Ranching and Agriculture Issue Paper**

## I. Background

The technical teams and members of the expert community have completed data collection and prioritized natural and cultural resources for the Sonoran Desert Conservation Plan. This fall the Steering Committee will recommend the approach they would like to see Pima County take in applying for a Section 10 permit. To facilitate development of the Environmental Impact Statement (EIS) which must accompany the Section 10 multi-species conservation proposal, a series of issue papers will be forwarded to the Board and interested members of the community during the next weeks. In Pima County, ranching is an extensive, but low-intensity, land use. By virtue of its extensiveness, ranching is uniquely able to preserve the integrity of vast tracts of connected and unfragmented open space and wildlife habitat. Pima County ranks third of all Arizona counties in extent of open range grazing lands with 1.4 million acres, which translates roughly to an average of one animal per 70-80 acres. The attached study reviews the effect of five alternative permit strategies on the County's ability to preserve unfragmented landscapes through conserving ranchlands.

## II. Priority Conservation Areas

Pima County assembled a Ranch Conservation Technical Advisory Team in 1999 to assist in developing the ranch conservation element of the Sonoran Desert Conservation Plan. The Ranch Team has sponsored meetings and workshops, and provided technical advice to County staff and the Steering Committee. A brief summary of the major reports the Team has helped produce for this process follows.

*Ranching in Pima County: A Conservation Objective of the Sonoran Desert Conservation Plan*, a report describing the local history and current practice of ranching, was published in November 1999. It looks back as far as the 1600s when cattle were first introduced in Pima County by Spanish explorers; it covers the history of local ranches, which began to be established approximately 150 years ago; it outlines federal and state public land laws, and it tells about the practical aspects of the industry and ranching life, too. The report places Ranch Conservation in the context of the overall Sonoran Desert Conservation Plan, such as (1) defining the metropolitan urban boundary; (2) preserving western heritage and cultural resources; (3) maintaining a traditional industry and diversifying the local economy; and (4) preserving unfragmented natural open space, wildlife habitat and water reserves.

*Our Common Ground: Ranch Lands in Pima County*, published in October 1999, presents the Ranch Conservation Element of the Sonoran Desert Conservation Plan. Information is organized by eight watershed planning units, including a description of the ranching resource base, an assessment of threats to continued ranching, and current management.

*Preserving Ranch Lands in Pima County* (October 1999) provided additional expert writings on ecological and economic sustainability in ranching, as a companion to the *Ranch Conservation Element*.

In May 2001, the *Pima County Purchase of Development Rights Program* report was published. Drafted by county staff and the Ranch Conservation Technical Advisory Team, this document outlines the feasibility and funding of such a program, making recommendations and includes a draft ordinance outline.

In 2001, Pima County and the Arizona Open Land Trust organized a series of workshops on conservation tools. The reports that resulted are *Adaptive Management* (February 2001), *Conservation Easements* (August 2001), *Preserving Family Lands: Tax and Estate Tax Planning* (October 2001), and *Mitigation Land Banking* (March 2002).

On a watershed basis, the potential for ranchland conservation can be viewed as follows:

Highest Extent of Ranch lands

1. Altar Valley
2. Empire-Cienega Valley
3. Upper Santa Cruz Valley
4. San Pedro Valley
5. Avra Valley
6. Tortolita Fan
7. Western Pima County
8. Middle Santa Cruz Valley

Highest Productivity or Grazing Capacity

1. Empire-Cienega Valley
2. Altar Valley
3. Upper Santa Cruz Valley
4. San Pedro Valley
5. Middle Santa Cruz Valley
6. Tortolita Fan
7. Avra Valley
8. Western Pima County

Highest Threats to Ranch lands

1. Middle Santa Cruz Valley
2. Tortolita Fan
3. Upper Santa Cruz Valley
4. Avra Valley\*
5. Empire-Cienega Valley
6. Altar Valley
7. Western Pima County
8. San Pedro Valley

Highest Ranch Conservation Potential

1. Altar Valley
2. Empire-Cienega
3. Upper Santa Cruz Valley
3. San Pedro Valley
4. Western Pima County
5. Avra Valley
6. Tortolita Fan
7. Middle Santa Cruz

The results of these various analyses consistently identify the Altar Valley, Empire-Cienega Valley, Upper Santa Cruz Valley, and San Pedro Valley as the subareas where ranching comprises a significant land use, and where their capacity and stability suggest the best potential for sustainable ranch use. It is therefore concluded that ranch lands in these valleys and in the Avra Valley Ironwood National Monument area have the best potential to define the urban boundary, where developed lands at the urban edge give way to natural open space. Ranching in the Middle Santa Cruz Valley is the most threatened, least sustainable, and least likely to continue, while ranching on the Tortolita Fan is only marginally better.

### **III. Alternatives**

The first sections of the *Ranching and Agricultural EIS Issue Paper* present background information to define resources and to explain the results of years of research to locate, characterize, evaluate and comparatively analyze ranch and agricultural resources in eastern Pima County. Having established the best information available, the study examines each of the four alternatives developed in the cost model along with a brief assessment of the effect of the no action alternative on such resources. The conclusions drawn for purposes of this discussion paper are of a general and comparative nature. When specific recommendations are forwarded by the Steering Committee or interested members of the community, the merits of each specific proposal can be weighed.

In all alternatives to ensure comparability, it is assumed that conservation of a total of only 20,400 acres will be required for Section 10 compliance under the Endangered Species Act. It is further acknowledged that a combination of these alternatives might be recommended by members of the Sonoran Desert Conservation Plan Steering Committee to ensure that different landscape and habitat elements receive some level of conservation. Another important issue will be the availability of ranch lands for sale as well as which ranchers may voluntarily seek to sell their development rights. Consequently, no specific parcels are addressed in any of the alternatives, and because ranching is considered a compatible ongoing land use for the Sonoran Desert Conservation Plan, none of the alternatives are likely to cause a loss of ranchlands. Instead, each alternative is evaluated in terms of total acreage devoted to ranching and crops, number of parcels, number of grazing leases, and potential there is to conserve ranchlands within each alternative as defined. In the following sections, each alternative, plus a no action alternative, is briefly described and possible impacts to ranching and agriculture are discussed.

#### **A. No Action**

Under the No Action Alternative, a Section 10 permit would not be obtained from the U.S. Fish & Wildlife Service. Actions with a federal nexus that might constitute a "take" of a listed endangered species would require consultation with the U.S. Fish & Wildlife Service. Work toward the conservation of ranches will continue as outlined above; however, ranch lands will remain under threat of conversion to real estate development. Similarly, agricultural crop lands will continue to convert to real estate development, perhaps at a higher rate than ranch lands, as land values increase.

#### **B. Ranch Conservation**

Under the Ranch Alternative, Pima County would establish a reserve of 20,400 acres of high resource value ranch land. In this alternative, up to 12 percent of private ranchlands could be conserved throughout Pima County potentially affecting approximately 170,000 acres, 95 grazing leases, and nearly 1400 parcels of private ranchlands. Done correctly, this alternative is the most likely to provide the greatest benefit to ranch conservation and the ranching community.

Only ranches from willing sellers would be purchased, and such purchases could help prevent the conversion of ranch land to sprawl. More County involvement with the ownership of working ranches would serve to strengthen its commitment to ranch conservation, and could provide additional tools to promote the preservation of ranches (for example, the new ranch lands could provide more opportunities for research, public education, "grass banking," etc.)

Impact to agricultural lands is likely to be minimal. There are 5,913 acres of agricultural lands in unincorporated Pima County in the Conservation Lands System. These 72 parcels are located primarily in the pecan groves near Green Valley, along the Santa Cruz River at the very north and south boundaries of the County, along Sopori Wash and in several locations along Brawley Wash. This alternative might include purchasing and retiring some portion of these agricultural lands, but only with a willing seller and would be only a small fraction of eastern Pima County's 27,000 acres of agriculture. It is also likely under this alternative that agricultural lands would be purchased only as adjunct to a ranch purchase.

#### C. Mountain & Natural Resource Park Expansion & Ranch Conservation

Under this alternative, Pima County would expand natural resource parks and county-owned ranch lands by a total of 20,400 acres. For the purpose of comparing impacts of different alternative, both a one-mile and five-mile buffer around five major natural resource parks (Tucson Mountain Park, Colossal Cave Mountain Park, Cienega Creek Natural Preserve, Tortolita Mountain Park and Catalina State Park) was used to determine what private vacant lands in incorporated Pima County, and within the Conservation Land System, might be available for purchase.

Within the one-mile buffer, there are 1,005 acres of private ranch lands (in 17 parcels). Within the five-mile buffer, there are 17,166 acres (in 415 parcels). If ranch lands adjoining existing mountain parks and purchased for park expansion were retired from ranching, that would represent a negative impact. However, there are prior examples of the County continuing to operate or lease out ranching opportunities especially where grazing leases are in effect, so there is equally the potential for park additions to continue to operate as working ranches and benefit the goal of ranch conservation. Up to 100 percent of existing ranch lands in this alternative could be conserved. Moreover, there are 12 current grazing leases partially within the one-mile buffer, and 21 current grazing leases partially affected by the 5-mile expansion area.

There would be minimal or no impact to agricultural in this alternative. The one-mile buffer contains no agricultural lands and the five-mile buffer only 19 acres in one parcel.

#### D. Northwest Side Conservation Lands

Under this alternative, Pima County would create a 20,400-acre reserve in northwest Tucson, composed of high conservation values lands, some of which would be highly fragmented parcels in pygmy-owl Recovery Area 3. In this area, there are only 1,018 acres of private ranch lands in 22 parcels.

If these lands were purchased, it is possible that ranching could continue as long as it is managed to be compatible with pygmy-owl recovery and other Section 10 stipulations. Up to 100 percent of these existing ranch lands could be conserved. However, this area has been identified as a lower priority for future ranch conservation efforts because it is already highly fragmented due to urbanization and the conversion of the ranching land base to other uses and because of the lower natural suitability for ranching due to its lower elevation than other subareas in Pima County. There are no grazing leases directly affected by this alternative.

There would be no impact to agricultural crop lands with this alternative because there are no such lands in the area under consideration.

#### E. Riparian Conservation & Restoration Lands

Under this alternative, Pima County would create a 20,400-acre reserve comprised of 50 percent rural and ranch riparian lands, and 50 percent riparian lands closer to urbanized areas. Of the lands that might be available to accomplish this alternative, 24,443 acres are ranch lands (in 580 parcels). It is possible that ranching could continue on lands purchased for this purpose, perhaps with appropriate management to make sure it is compatible with fragile or sensitive riparian species.

Some ranchers in Pima County have already faced endangered species management challenges in riparian areas, and workable solutions have been found. Up to 83 percent of private ranch lands located in riparian areas could be conserved under this alternative, and there are 80 current grazing leases that are partially within this alternative. As noted above, Pima County would seek to maintain existing ranching operations on these private lands and public or state grazing leases. However, to the extent that private ranchlands are sold for other uses or development, there would be an impact to ranching.

There are 1,125 acres of agriculture (in 35 parcels) in this area under consideration. Purchasing agricultural land for conversion to restored riparian habitat would have a negative impact on agriculture, unless additional agricultural land is brought into production elsewhere (as in the case, for instance, if the land was obtained by trading other agricultural land for it).

#### IV. Conclusion

The table below illustrates relative effects to ranch conservation from the various alternatives. This assumes a total of 20,400 acres are required as mitigation lands located within the Conservation Land System in unincorporated Pima County. The greatest extent of ranch lands is addressed in Alternative B, Ranch Conservation, followed by Alternative E, Riparian Conservation. Alternatives C and D, which affect far fewer acres of ranch land, allow for up to 100 percent of these ranch lands to be conserved. The No Action Alternative does not allow for any active ranch conservation efforts, and threats to the ranching land base will continue as these lands are converted to real estate development.

**Comparison of Ranch & Agricultural Lands Affected by Alternatives**

<u>Cost Model Alternative:</u>	<u>Private Ranches:</u>	<u>Crop Lands:</u>	<u>Grazing Leases:</u>	<u>Effects:</u>
<b>A. No Action</b>	169,947 acres 1,399 parcels	5,913 acres 72 parcels	1,352,739 acres 95 leases	No ranch conservation actions due to Section 10 permit; threats continue.
<b>B. Ranch Conservation</b>	169,947 acres 1,399 parcels	5,913 acres 72 parcels	1,352,739 acres 95 leases	Up to 12% of private ranch/ag. lands conserved throughout Pima County.
<b>C. Mt. Preserve -1 mile</b>	1,005 acres 17 parcels	0 acres 0 parcels	31,176 acres 12 leases	Up to 100% of private ranch lands within 1 mile of mountains conserved.
<b>C. Mt. Preserve -5 mile</b>	17,166 acres 415 parcels	19 acres 1 parcel	121,956 acres 21 leases	Up to 100% of private ranch lands within 5 mile of mountains conserved
<b>D. Northwest Area</b>	1,018 acres 22 parcels	0 acres 0 parcels	0 acres 0 leases	Up to 100% of private ranch lands conserved.
<b>E. Riparian Conservation</b>	24,443 acres 580 parcels	1,125 acres 35 parcels	110,403 acres 80 leases	Up to 83% of private ranch lands conserved.

While the conclusions drawn for purposes of this discussion paper are of a general and comparative nature, the study supports a ranking of the alternatives from most beneficial to least beneficial to ranch conservation goals as follows:

<b>Rank</b>	<b>Alternative</b>
1	Ranch Conservation
2	Riparian Conservation
3	Mountain Park Expansion
4	High Conservation Value Land in Northwest Tucson
5	No Action

This relative ranking compares to that of the cultural resources analysis, with the exception being that Mountain Park Expansion could be more beneficial than Riparian Protection.

The final recommendation for land to be included in the Section 10 permit will likely include a combination of lands from the ranch, mountain park, riparian and northwest areas. When a specific recommendation is forwarded by the Steering Committee or by interested members of the community, the merits of each specific proposal will be reviewed and published in light of considerations in the attached issue paper, and additional information that might be provided as part of future discussions.

Attachment



**Section 10 Endangered Species Act Permit:**

**Impacts to Ranching and Agriculture  
A Discussion Paper for the Sonoran Desert Conservation Plan  
- Draft July 2002 -**

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## **Sonoran Desert Conservation Plan: Ranching & Agriculture**

### **Issue Summary**

In Pima County, ranching is an extensive, but low-intensity, land use. By virtue of its extensiveness, ranching is uniquely able to preserve the integrity of vast tracts of connected and unfragmented open space and wildlife habitat. Pima County ranks third of all Arizona counties in extent of open range grazing lands, and grazing capacity in eastern Pima County accommodates fewer than 20,000 head of livestock on 1.4 million acres, an average of one animal per 70-80 acres.

Ranching has been found to be compatible with the goals of the Sonoran Desert Conservation Plan. Therefore, conserving operating ranches, maintaining the economic viability of ranching, and providing creative, voluntary conservation options, such as conservation easements and purchase of development rights, will provide the greatest level of landscape and watershed conservation. The benefits of ranching to the community and conservation goals are many:

- As a land use, ranching is uniquely capable of protecting Pima County's vast natural open space and wildlife habitat because it is an extensive rather than intensive use of the land.
- Unlike all other land uses, ranching because of its extensiveness, brings together private, state and federal lands into unified, large management units making grazing management, open space protection, and wildlife management easier.
- Historically, ranching has been and continues to be the single greatest determinant of the metropolitan urban boundary that defines the metropolitan and rural interface, thereby maintaining a more compact urban form.
- Specialized funds of knowledge about the natural landscape and the culture embodied and held in the ranching community contribute significantly to ranchers' ongoing stewardship of the land and enrich our community.
- Ranch lands preserve fragile, non-renewable archaeological and historical sites and our cultural landscape – our visual, social, cultural, and historical character.
- Ranching and agriculture provide rural industry and help to diversify our local economy.
- Ranching uses far less water than subdivisions and is critical to conserving water resources, both surface water and groundwater, on a watershed basis.

Despite its benefits, the economic sustainability of ranching is threatened by the growing disparity in land values for agricultural versus suburban/commercial purposes. As landscapes become more urban, increasing difficulties with ranching combine with growing expectations of lucrative land sales. When land is no longer valued for its productivity but is instead valued only as a commodity for development, there is no longer any motivation for good stewardship. Ranch land fragmentation is currently greatest within a 25-mile radius of the Tucson urban core.

In May 2002, Pima County released a cost model for a Section 10 Endangered Species Act permit for the unincorporated area of eastern Pima County. The cost model described future impacts and assessed costs for unincorporated Pima County's compliance with the Endangered Species Act. Four alternatives relative to the cost of implementing the Section 10 permit were presented: ranch conservation; mountain park expansion and ranch conservation; high conservation value land on the northwest side; and riparian protection and restoration. This paper describes work to date on developing ranch conservation as an element of the Sonoran Desert Conservation Plan, and shows the range of future impacts to ranching and agriculture in unincorporated Pima County as a result of each cost model alternative, including a no action alternative.

## **I. The Issue & Introduction**

We have referred to ranch lands as “our common ground” both in a literal sense and figurative sense. Comprised of both private ranch holdings, as well as public lands - “common ground,” ranch lands provide us our remaining natural and cultural landscape, our sweeping open spaces, our recreational areas, our refuge from the city, and home to sensitive biological systems and traditional rural communities. Unfortunately, these ranch lands are seriously threatened by the conversion of productive, expansive natural lands to subdivided real estate development, which fragments the landscape and destroys the connectivity and the integrity of these open spaces. As a community committed to conservation, we must also find “common ground” in finding creative and effective solutions to the conservation of these ranch lands.

Much of this open space historically and currently supports cattle ranching, an extensive rather than intensive use of the landscape, which respects the natural form of the land and has served to protect our common ground from the much greater impacts of intensive development. Comprised of a mosaic of land ownership, most ranches in Pima County are family-owned operations that include a relatively small amount of deeded private lands, often the original family homestead claims, and grazing leases on lands owned by federal and state land management agencies. This mixed composition of ranch land dates back to the first Spanish Colonial land grants, continues today, and typically accommodates multiple uses, such as natural area preserves, recreation, ranching, hunting, mining, and timber harvesting. **At present, some 1.4 million acres in eastern Pima County are used for ranching, and ranch lands comprise nearly 70 percent of the Pima County Conservation Land System.**

While population in the Tucson area grows and sprawls, the natural open space and ranch lands that support these multiple uses are diminishing as rural properties and private ranch lands are sold. With rising land prices, development pressure, changing livestock markets, and increasing political uncertainty over access to grazing lands, many ranching families are faced with the difficult choice of either continuing to ranch with the possibility of risking their financial well-being, or selling their private land holdings for development. As author, anthropologist, and Chair of the Ranch Conservation Technical Advisory Team, Dr. Thomas E. Sheridan has noted, “Some human impacts can be reversed, but subdivisions are more or less forever.”

Alternatively, if we seek to maintain a more compact urban form, it must be recognized that ranching, with its extensive land base, has been the single greatest determinant of a definable urban boundary in eastern Pima County. To prevent unwanted urban sprawl and unregulated development, it is most important that Pima County encourage and retain economically viable and sustainable ranching operations.

We have also maintained that ranching as an ongoing land use is compatible with the goals of the Sonoran Desert Conservation Plan. With sound management practices and careful land stewardship, sustainable ranching is helping to restore natural ecosystems, increase biodiversity, and conserve water resources, while providing a “working landscape” for people living in rural communities.

Ranch conservation is recognized therefore by the Sonoran Desert Conservation Plan as a key solution to preserving what remains of Pima County’s vast natural and cultural landscape.

## II. Ranching as a Land Use

Raising cattle for meat or dairy products is a major industry in Arizona and provides a livelihood for many people. However, current trends in numbers of cattle produced in Pima County and statewide indicate some decline in production based on 1992 and 1997 statistics. This may be, in part, due to recent drought conditions that have caused ranchers to reduce their herds, but it largely reflects the statewide shift to a more urban economy and a loss of rangeland as population growth and urban development have accelerated in recent years.

Still, the cattle industry remains a significant factor throughout Arizona and especially in the rural areas of the state that encompass private, federal, state, and tribal lands. Though widely dispersed, they are found in all parts of the state, and there are few areas so arid that no cattle graze on them. If lands are not grazed, it is usually due to some legal or jurisdictional barrier, like a national park designation, or urban development, and encroachment of suburban areas.

In 1992, there were nearly 930,000 head of cattle located throughout Arizona and about 51,000 head in Pima County. In 1997, the last year of the federal agricultural census, there were nearly 822,300 cattle in Arizona and about 39,000 total cattle in Pima County and on the Tohono O'odham Nation, a significant decline from the earlier census due in part to drought as well as conversion of ranch lands to real estate.

Cattle ranching in the arid Southwest and in Pima County is a land-extensive industry, and the raw statistics provided by the USDA on the numbers of cattle and total acreage used for grazing in Pima County suggest that an average of about 80 acres are needed for each cow to graze, or eight head of cattle per square mile. Approximately, 19,000 cattle graze 1.4 million acres of eastern Pima County ranch lands, although this number may be much lower due to recent severe drought conditions.

As has been noted in this report and elsewhere, ranch lands in Pima County are a mosaic of private, State Trust and federal lands. This patchwork of ownership was not designed, but is simply a consequence of the history of land ownership designations beginning with the 1854 Gadsden Purchase, various homesteading laws in effect between 1862 and 1934, the establishment of National Forests, and the Arizona State Enabling Act.

Currently, ranch land ownership throughout Pima County breaks down approximately as shown in Table 1.

**Table 1. Pima County Ranching Land Base**

<u>Ownership</u>	<u>Acres in Ranching/Ag. Use</u>	<u>Percent of Total</u>
State Trust Lands	817,541 acres	51%
Private Ranch Lands	209,146	13
Forest Service	254,370	16
BLM	<u>324,153</u>	<u>20</u>
TOTAL	1,605,210 acres	100%

### **III. Threats to Ranch Conservation**

The transition of ranchlands to real estate began in the period following World War II with the start of phenomenal population growth in Arizona, particularly in the Phoenix and Tucson areas. In 1972, the Arizona *Daily Star* noted that Arizona's population grew almost 74 percent from 1950 to 1960, and another 36 percent during the 1960s. Nearly 75 percent lived in the Phoenix or Tucson metropolitan areas. Between 1970 -1997, the *Daily Star* reported in 1998 that the state population increased by an additional 257 percent, and again nearly 77 percent of the population live in the Phoenix and Tucson areas.

This population boom began the transformation of the state's economy from a rural extractive base derived from cattle, cotton, and copper to an urban commercial economy. With the effective marketing of Arizona's climate and cheap land, people flooded to Arizona beginning in the 1950s with new hopes and new capital, and the real estate market and development exploded. Land now became valued, not for its natural productivity that might support ranching or farming, but for its higher value potential for development for residential or commercial uses.

Furthermore, because land tends to be "cheaper at the edge," developers have sought to buy former ranchlands at the outer limits of the built metropolitan area and have created new subdivisions and even new communities, following real and created market demand for "new" rather than "used" housing. Thematic development has focused on different kinds of living experiences such as retirement communities, golf resorts, exclusive gated access communities, equestrian facilities, and "ranchettes." Ironically even new communities, touted to espouse the "new urbanism" ethic, have also been built on the edge to take advantage of "raw" and cheaper land. Rather than attempt reinvestment and redevelopment of the urban core, the development industry has taken the lower risk, lower cost strategy of suburban and exurban investment, uniform product development, and long-term land speculation. Consequently, the Tucson metropolitan area has experienced rapid expansion of its suburban areas pushing its urban limits ever outward.

While ranches and their grazing leases have been effective in determining the urban edge, not only are the private ranch lands subject to conversion, but State grazing leases can also be terminated for sale for development, especially at the urban edge where development pressure is greatest.

Finally, in addition to the potential loss of these lands as natural open space, another implication of the uncertainty of grazing leases is more subtle. With long-term tenure of the land unlikely, there is no incentive for continued good stewardship when it is certain that the land will be graded for development. This change in view from land being valued for its productivity to land valued as a commodity marks the transition of ranching to real estate and allows the urban form to expand one ranch at a time, defining a new urban boundary.

### **IV. Compatibility with Sonoran Desert Conservation Plan Goals**

As noted elsewhere, the principal goal of the Pima County Sonoran Desert Conservation Plan is to protect and conserve the natural environment using long-range planning to ensure that our natural and urban environments not only coexist but develop an interdependent relationship, where one enhances the other. The Conservation Plan will guide already approved public bond investment, conservation, and preservation actions, and it will help to establish federal program and funding priorities and establish preference for our region's expenditure of State funds to preserve and protect State Trust lands threatened by urbanization.

### A. Defining the Metropolitan Urban Boundary

Earlier reports have described the uneven distribution of State Trust lands throughout Arizona and the high and disproportionate amount of State Trust lands in eastern Pima County. When combined with private land ownership, some 64 percent of eastern Pima County could be developed, given the mandate of the Arizona State Land Department to derive maximum revenue from its lands through sale or lease for its beneficiaries. This amounts to 2494 square miles or nearly 1.6 million acres. If this entire area were to be developed, the Tucson urban area would be nearly 16 times greater in size than it currently is! Sprawl will have found its natural limit with no additional land to develop, and the several natural reserves that today encircle the urban area would be left as mere islands of natural open space.

Ranch conservation is one important mechanism to help define the urban boundary, preserve natural open space and habitat values, and allow the sustainable use of the land for grazing to continue. Because the greatest majority of ranchlands are State Trust grazing leases, the 109 allotments or grazing lease areas essentially show where operating ranches have remained viable. In addition to the existing land reserves such as Saguaro National Park, Coronado National Forest, and Tucson Mountain Park among others, operating ranches and their public land grazing leases currently define the urban/suburban boundary.

### B. Preserving Western Heritage and Culture

While perhaps less measurable than loss of lands, the funds of knowledge embodied in the ranching community continue to be eroded as ranchlands are sold for development and children of ranching families seek other means of livelihood. For ranching and farming families, there is a knowledge and intimacy with the land that grows out of first-hand experiences. Moreover, they have the benefit of a wealth of wisdom passed on from previous generations who lived on the same land and knew how to conduct the business of cattle growing and caring for the land. This fund of knowledge simply cannot be learned and understood as well as someone raised in that culture and on the land.

Agriculturalists, in particular, have very specialized knowledge on which all members of our larger society are dependent. Even if new places of food production are being created and affecting our global market, it is a significant risk to become entirely dependent on these sources and lose this knowledge.

Both the knowledge of how to produce food and the capacity for agricultural production are critical to the very existence of any society. Sustaining that knowledge of the land and allowing ranchers to continue to practice their livelihood and manage the land to improve its natural productivity and health will result in better long-term stewardship.

### C. Ranching and Cultural Resources

Ranch conservation can also be considered a cultural resource conservation objective because it preserves traditional lifestyles and cultural landscapes that contribute to the visual, social, and cultural and historical character of our greater community. Ranch conservation will also help to preserve specific historic properties associated with ranching, such as historic ranch buildings, as well as entire ranching landscapes, shaped by the natural land form, that encompass buildings,

fences, corrals, camps, pastures, watering sites, roads, and other features placed on the natural landscape. Moreover, because ranching preserves the natural landscape and environment, archaeological sites, prehistoric settlement systems, and traditional cultural places valued by Native American groups and others are also preserved.

Areas where the greatest protections have been achieved for cultural resources include existing reserves like Saguaro National Park where development is precluded, or in ranching areas where development is limited and where preservation of the natural landscape is essential to the ranching operation. In these areas, not only are individual sites preserved, but the entire cultural landscape is preserved to provide meaning and context.

#### D. Maintaining a Traditional Industry & Diversifying the Local Economy

Despite price uncertainties on both the input and output sides, yield variability, and operating expenses that approach more than 70 percent of gross sales, ranchers and farmers in Pima County contributed \$46,861,000 to the state and local economy in 1997, up some 21 percent from 1992. Most ranches and farms are small to moderate sized operations, and many produce only supplementary income for their owners, with an average net cash return of \$29,746. The net return in 1997 to the 419 Pima County farms and ranches was nearly \$12,500,000.

In Pima County, the USDA reports that 1185 direct farm workers were hired in 1997 by some of the owners of the 419 farms and ranches in Pima County. When these workers and the owners of the farms are considered, there were at least 1600 people directly employed, at least part-time, in farm production. If a multiplier of 1.9 is applied, the employment estimate for Pima County may be roughly about 3050 jobs. Hired positions alone accounted for a payroll of nearly \$9.4 million. As for income in Pima County's economy, it was earlier noted that the net return to farmers and ranchers after expenses was about \$12.5 million.

The economic benefits of tourism in rural areas that includes both "eco-tourism" and "agricultural tourism" are considerable. In 1991, total tourist and visitor expenditures state-wide were almost \$6.8 billion dollars with \$680,000,000 spent in southern Arizona counties. While this accounted for the full range of visitors, about \$2.6 billion was spent on eco-tourism and outdoor recreation activities, with \$774 million spent on hunting, fishing, and wildlife associated recreation. Agricultural tourism is another growing tourist industry where "pick your own" orchards, pumpkin fields, and vegetable fields can attract as many as 10,000 to 30,000 visitors per farm during the produce season. Moreover, some ranches are beginning to offer ranch-living and round-up tour packages, attracting many tourists seeking an authentic experience of working and living on a real western ranch. While no numbers are available yet to define the impacts of these activities, eco-tourism and agricultural tourism are growing as opportunities to supplement income from other rural industries such as ranching.

#### E. Conserving Water Resources

Ranch conservation is critical to conserving water resources, especially ground water. Simply put, ranches use far less ground water than subdivisions, which can rapidly exceed the area's safe yield or the amount of water an aquifer will yield without depletion.

In various studies in Sonoita and elsewhere, it was found that a typical a cow consumes about 15 gallons of water on a hot, dry day. In contrast, a single person conservatively consumes about 10

times as much water as cattle or wildlife, and average use for one person is about 150 gallons of water per day. Moreover, density must also be considered. If eight head of livestock are typical for 640 acres of open range, only a total of 120 gallons of water are used each day. If, however, that land is hypothetically subdivided to one house per four acres resulting in 160 housing units, and assuming 2.5 people per household, water consumption increases significantly to at least 60,000 gallons per day, or 500 times as much.

The various studies are clear in their conclusions. People on average consume about 10 times more water per capita than cattle. In comparison to developed areas on the same amount of acreage, cattle ranches using open range have a much lower rate of water consumption.

#### F. Preserving Unfragmented Natural Open Space and Wildlife Habitat

Ranch conservation preserves the natural landscape to provide unfragmented open space and habitat critical for maintaining sustainable and diverse ecosystems and wildlife corridors.

It has also been noted that ranching defines the current urban boundary of the Tucson metropolitan area and how that urban boundary could expand one ranch at a time. When a new urban boundary is formed, it is the next ranch and its allotments that become vulnerable to sale, creating yet another cycle of converting rangelands to real estate. As the entire agricultural industry becomes less viable due to this conversion of land use, more marginal ranch holdings may be converted to wildcat subdivisions further fragmenting the landscape. Unfortunately, many of these relatively small, deeded parcels are also some of the most biologically sensitive and productive lands.

If the goals of the Sonoran Desert Conservation Plan are to conserve our natural environment and to allow our diverse ecosystems to persist and thrive, it is imperative to protect natural open space from further fragmentation. At the present time, eastern Pima County still has the opportunity to achieve these goals because rangelands outside the urban boundary form adjacent, continuous, and extensive tracts of natural open space that retain some of the most critical and productive wildlife habitat. These open spaces provide connectivity across valleys, provide a variety of habitats from riparian bottomlands, to bajadas and foothill and mountain environments, and they remain largely intact.

Historically, ranching has proved uniquely capable of protecting these vast open spaces. Because of southern Arizona's aridity, large land areas are required to support sustainable ranching operations. Out of a combination of economic and ecological interests in the land, which creates the incentive to restore and maintain the land's natural productivity, most ranchers have become good stewards, managing the land for its long-term health rather than short-term gain.

#### V. Pima County's Ranch Conservation Technical Advisory Team

Pima County convened a Ranch Conservation Technical Advisory Team about four years ago to provide assistance in developing the ranch conservation element of the Sonoran Desert Conservation Plan. The Ranch Team has sponsored meetings and workshops, and provided technical advice to County staff the SDCP's Steering Committee. A brief summary of the major reports it has helped produce for this process follows.

*Ranching in Pima County: A Conservation Objective of the Sonoran Desert Conservation Plan*, a report describing the local history and current practice of ranching, was published in November 1999. It looks back as far as the 1600s when cattle were first introduced in Pima County by Spanish explorers; it covers the history of local ranches, which began to be established approximately 150 years ago; it outlines federal and state public land laws, and it tells about the practical aspects of the industry and ranching life, too. The report places Ranch Conservation in the context of the overall Sonoran Desert Conservation Plan, such as 1) defining the metropolitan urban boundary; 2) preserving western heritage and cultural resources; 3) maintaining a traditional industry and diversifying the local economy; and 4) preserving unfragmented natural open space, wildlife habitat and water reserves.

*Our Common Ground: Ranch Lands in Pima County*, published in October 1999, presents the Ranch Conservation Element of the Sonoran Desert Conservation Plan. Information is organized by eight watershed planning units, including a description of the ranching resource base, an assessment of threats to continued ranching, and current management (with recommendations to fill gaps to support Ranch Conservation).

*Preserving Ranch Lands in Pima County* (October 1999) provided additional expert writings on ecological and economic sustainability in ranching, as a companion to the *Ranch Conservation Element*.

In May 2001, the *Pima County Purchase of Development Rights Program* report was published. Drafted by county staff and the Ranch Conservation Technical Advisory Team, this document outlines the feasibility and funding of such a program, making recommendations and includes a draft ordinance outline.

In 2001, Pima County and the Arizona Open Land Trust organized a series of workshops on conservation tools (helpful to Ranch Conservation and other elements of the Sonoran Desert Conservation Plan). The reports that resulted are *Adaptive Management* (February 2001), *Conservation Easements* (August 2001), *Preserving Family Lands: Tax and Estate Tax Planning* (October 2001), and *Mitigation Land Banking* (March 2002).

## **VI. Regional Summary of the Ranch Conservation Element:**

As one of the six elements of the Sonoran Desert Conservation Plan adopted by the Pima County Board of Supervisors, the value of ranch conservation was acknowledged as an important conservation element in its own right. Moreover, by including ranch lands as a productive “working landscape” worthy of conservation, Pima County formalized its commitment to ranching as an important land use and “to keep ranchers ranching.” Implicit in this acknowledgment is the understanding that working ranches and the state and public lands leased for ranching are critical to achieving multiple community and conservation goals.

While livestock ranching has deep historical roots in Pima County dating to the first Spanish explorers and missionaries who brought domestic cattle, horses, sheep, and goats to the Southwest missions in the 16<sup>th</sup> and 17<sup>th</sup> centuries, ranching has continued since that time as an assumed but largely “invisible” land use because it is a land-extensive industry and because an increasingly urban and growing population of newcomers in the Tucson metropolitan area simply have no first-hand knowledge of this traditional and deeply rooted local industry.

Unlike cultivated croplands, which most urban dwellers will recognize as agricultural lands, ranch lands are comprised of great expanses of natural open space and have no very obvious or frequent signatures to identify its use as grazing lands, except for the occasional cow, fence, or “open range” road sign. Consequently, there has been little attention focused to date on defining ranch lands and ranching as a land use in the rural areas of Pima County. Planning documents are generally written from an urban and development potential perspective where there are two gross categories of land use – “urban” with development and density classifications, and “ex-urban” or development reserve.

Ranching as a rural land use itself has never before been objectively defined and quantified to accurately characterize it for land use and conservation planning purposes in Pima County. To understand the potential for ranch conservation in the context of the Sonoran Desert Conservation Plan, this section attempts to answer four basic descriptive questions on a landscape or watershed level critical to accurately describing and quantifying this land use in Pima County:

1. What is the extent of ranch lands and ranching?
2. What is the capacity or productivity of ranch lands?
3. What are the threats to ranch lands?
4. What is the potential for ranch conservation in Pima County?

#### A. Extent and Contiguity of Pima County Ranch & Agricultural Lands

Today, approximately 50 percent of Pima County (excluding tribal lands) is dedicated to agricultural use, and about 60 percent of eastern Pima County is today used for ranching and other agricultural uses. When ownership is analyzed by valley, considerable differences in ownership that affects management and tenure can be noted.

To calculate these acreages, data were obtained from State, BLM, and Forest Service grazing lease information, and data for private lands in agricultural use and as ranches were derived from the Pima County Assessor’ Office. Under state statute ARS 42-12151, private lands maybe classified as agricultural property for property valuation and tax assessment purposes if certain criteria are met. In this article, “agricultural land” means land that is one or more of the following:

- Cropland in the aggregate of at least twenty gross acres.
- An aggregate ten or more gross acres of permanent crops.
- Grazing land with a minimum carrying capacity of forty animal units and containing an economically feasible number of animal units.
- Land devoted to high density use for producing commodities.
- Land devoted to use in processing cotton necessary for marketing.
- Land devoted to use in processing wine grapes for marketing.

Allowing further definition of agricultural lands is the distinction made between farmland or cropland and grazing land or ranch property. Properties in Pima County have been classified as one or the other, providing the data used in this analysis on these two different kinds of agricultural land uses.

Table 2 provides details of land ownership by watershed or valley system.

**Table 2. Ranch and Agricultural Land Ownership by Pima County Subarea**

	<u>Private</u>	<u>State</u>	<u>BLM</u>	<u>Forest</u>	<u>TOTAL Acres</u>
1. San Pedro Valley	18,667	66,975	0	73,032	158,674
2. Empire-Cienega	31,398	124,184	34,461	53,715	243,758
3. Upper Santa Cruz	57,102	203,305	6,844	41,034	308,285
4. Middle Santa Cruz	3,095	17,918	0	34,000	55,013
5. Tortolita Fan	18,606	42,306	1,183	22,700	84,795
6a. Altar Valley	63,542	314,459	21,431	29,889	429,321
6b. Avra Valley	16,716	47,674	85,388	0	149,778
7. Tohono O'odham	-	-	-	-	-
8. West Pima County	20?	720	174,846	0	175,586
	209,146	817,541	324,153	254,370	1,605,210

To examine further the extent of ranch lands in Pima County and to provide a basis for comparative assessment of the Sonoran Desert Conservation Plan watershed subareas, multiple variables were considered. Data for each variable were gathered and then quantified that either directly affect or reflect the extent of ranching and agriculture as a land use. Summary statistics were compiled for the region and for each subarea, and then a comparative assessment was conducted that ranked each subarea by variable. Finally a composite score and rank were calculated for each subarea that indicates those subareas with the highest extent of agricultural land use.

The variables considered include:

- % State Trust and Federal lands
- % ranch and agricultural use of the entire valley
- Number of ranches operating in each valley
- % area of the valley in grasslands
- Number of water sources (springs, stock tanks)
- Maximum livestock capacity by number
- Total acres in cultivation

Important to this analysis is the observation that the higher the percentage of ownership of State Trust and public lands, the higher the likelihood of extensive ranching use and the higher the likelihood of the continuation of ranching use. There is a greater “inertia” for federal lands to remain in ranch use, especially those lands designated as preserves, while state lands and certainly private lands are more easily converted to other uses. While this is an important variable, it was not weighted more heavily than other variables because other factors can equally affect sustainable agricultural land use. For example, the Western Pima County subarea has the very highest percentage of federal and State Trust lands; however, most of these lands are designated as natural preserves that exclude grazing, and much of the western desert areas have a very low capacity for grazing.

The number of ranches and the percent of ranching land use in the valley reflect well the current extent of ranching as a land use. The highest percentage of ranching as a land use occurs in the San Pedro Valley at 91 percent, and the highest number of ranches occurs in the Altar Valley with 31+ ranches.

Variables which determine suitability and hence the extent of lands used in ranching reflect the land's carrying capacity or the amount of livestock that the land can sustain. Included in this assessment were the percent of the area in grasslands, the number of water sources, and the maximum number of livestock allowed in the valley by lease or permit. When these variables are considered, the Empire-Cienega Valley has the highest percentage of grassland environment, and the Altar Valley has the greatest number of water sources and the highest capacity by number.

### B. Agricultural Croplands in Pima County

While this factor is considered together with the suite of variables used to determine the extent of agricultural and ranching land use, it is considered here separately because of its historic importance, its significant economic contribution to the entire agricultural industry in Pima County, its rapid conversion to real estate development, and its value for water rights.

First home to prehistoric agriculturalists who constructed sophisticated canal irrigation systems along the floodplains of the perennial reaches of its major streams, eastern Pima County has been continuously occupied by peoples who farmed to meet their subsistence needs and for commercial sale and trade of agricultural products. The Santa Cruz River valley has historically been the focus of this agricultural production and continues to be today.

While estimates of prehistoric and early historic agriculture have not been calculated, the total acreage estimated to have been in production during much of the 20<sup>th</sup> century is about 60,000 to as many as 88,000 acres, most of it focused along the Santa Cruz River near Green Valley, at San Xavier del Bac, near the confluence of the Rillito and Santa Cruz rivers, and in the Post Farms area near Marana. With the ability to pump ground water for irrigation, large areas of the lower Avra Valley along Brawley Wash were also developed into croplands.

From this estimated high of nearly 88,000 acres in cultivation, eastern Pima County now has about 27,000 acres of agricultural lands remaining in production, a difference of some 61,000 acres. Of these croplands taken out of production, the City of Tucson began an active program of buying agricultural lands and their water rights to ensure a future adequate water supply for the metropolitan area. Many of these so-called City of Tucson "farms" were purchased in the lower Avra Valley, and a few large parcels also occur in the northern Altar Valley. Assessor records indicate that the City may own as many as 47,000 acres of former croplands, most of this now just vacant land. The balance of agricultural lands taken out of production are likely to have been converted to development such as happened in the Green Valley area.

The current estimate of about 27,000 acres of agricultural lands in cultivation is derived from the Pima County Tax Assessor's Office that classifies agricultural uses. Most of these agricultural lands are cultivated for crops, with only a small amount of acreage devoted to irrigated pasture. Also of note is the fact that most of the remaining croplands are classified as "prime agricultural land" by the US Department of Agriculture. Prime farmland as defined by the USDA is the land that is best suited to food, feed, forage, fiber and oilseed crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

The majority of these remaining cultivated farmlands occurs near the confluence of the Santa Cruz River and Brawley Wash in the Tortolita Fan with 13,821 acres and in the Avra Valley with 3579 acres, where cotton, grains, and other food crops are grown. The Upper Santa Cruz Valley has 7359 acres in production, most of it in pecan orchards.

As shown in Table 3, the rural, upland valleys have the greatest extent and greatest contiguity of unfragmented ranch lands, with the Altar Valley ranked first overall, followed by the Empire-Cienega Valley, the Upper Santa Cruz Valley, and the San Pedro Valley.

**Table 3. Ranked Comparison of Highest Extent of Ranch & Agricultural Land Use**

Pima County Valley/	Ownership		Ranches: Number		Ranch Use % Ranch Use		Vegetation % Area in		Waters: Springs		Capacity: Max. AUs		Croplands Acres in		Rank Ranch
	%				%		%								
<b>1. San Pedro Valley</b> 174,315 ac (272 Sq.Mi.)	85%	2	11	5	91%	1	46%	4	368	4	1917	4	2131	4	<b>4</b>
<b>2. Empire-Cienega</b> 318,535 ac (498 Sq.Mi.)	79%	4	28	2	77%	2	70%	1	642	2	4250	3	60	7	<b>2</b>
<b>3. Upper Santa Cruz</b> 449,684 ac (703 Sq.Mi.)	65%	6	25	3	74%	3	63%	3	551	3	4315	2	7359	2	<b>3</b>
<b>4. Middle Santa Cruz</b> 361,851 ac (565 Sq.Mi.)	46%	8	5	7	15%	8	18%	5	92	5	666	7	222	6	<b>8</b>
<b>5. Tortolita Fan</b> 203,546 ac (318 Sq.Mi.)	50%	7	9	6	42%	6	11%	6	76	6	679	6	13,821	1	<b>6</b>
<b>6a. Altar Valley</b> 713,807 ac (1115 Sq.Mi.)	80%	3	31	1	70%	4	65%	2	864	1	6640	1	556	5	<b>1</b>
<b>6b. Avra Valley</b> 221,404 ac (346 Sq.Mi.)	69%	5	13	4	68%	5	3%	7	76	6	834	5	3579	3	<b>5</b>
<b>8. Western Pima County</b>	99%	1	5	7	26%	7	0%	8	35	7	604	8	0	8	<b>7</b>

C. Regional Summary of Livestock Capacity

The question of livestock capacity and productivity examines indirectly the current and potential sustainability of ranching as a land use by evaluating both environmental factors that affect grazing capacity like vegetation, rainfall, elevation and land form, and the actual numbers of livestock currently allowed by permit to graze in the different watershed subareas. No attempt was made to define or quantify areas within each watershed for their livestock capacity value, but it is clear that areas of low forage, rough topography, scarcity of water, and existing development are factors that limit livestock capacity and productivity.

To examine more fully the livestock capacity of ranch lands in Pima County and to provide a basis for comparative assessment of the Sonoran Desert Conservation Plan watershed subareas, multiple variables were considered in addition to the obvious permitted numbers of livestock. Data for each variable were gathered and then quantified that either directly affect or reflect livestock capacity. Summary statistics were compiled for the region and for each subarea, and then a comparative assessment was conducted that ranked each subarea by variable. Finally a composite score and rank were calculated for each subarea that indicates those subareas with the highest capacity, productivity, and potential for sustainability.

The variables considered include:

- % area of the valley in grasslands
- Average estimated rainfall for entire valley
- Maximum number of animal units allowed by permit

- Average number of animal units allowed per square mile by permit
- Number of water sources (springs, stock tanks)
- % Ranch use of entire valley

Of course, the most direct reflection of the livestock capacity of any given subarea is the number of animal units allowed by permit that is approved by the BLM, State Land Department or the Forest Service. This may be considered both by the total maximum number of animals allowed and by the average number of animals that can be grazed per square mile per year. This carrying capacity, determined by calculating forage production, is the number of animals that can be grazed while ensuring a sustainable forage supply, protection of the soil, and maintaining vegetative cover. Table 4 shows the results of this analysis.

**Table 4. Ranked Comparison of Highest Livestock Grazing Capacity by Pima County Subarea**

<b>Pima County Valley/ Subarea</b> (Area in Acres/Size)	<b>Vegetation</b> % Area in	<b>Rainfall:</b> Avg. of	<b>Livestock:</b> Max. AUs	<b>Capacity:</b> Avg. AUs	<b>Waters:</b> Springs	<b>Ranch Use</b> %RanchLand	<b>Overall</b> Rank
<b>1. San Pedro Valley</b> 174,315 ac (272 Sq.Mi.)	46% 4	15-25 1	1917 4	8 4	368 4	91% 1	<b>4</b>
<b>2. Empire-Cienega</b> 318,535 ac (498 Sq.Mi.)	70% 1	15-23 2	4250 3	11 1	642 2	77% 2	<b>1</b>
<b>3. Upper Santa Cruz</b> 449,684 ac (703 Sq.Mi.)	63% 3	13-23 3	4315 2	9 3	551 3	74% 3	<b>3</b>
<b>4. Middle Santa Cruz</b> 361,851 ac (565 Sq.Mi.)	18% 5	11-19 4	666 7	8 4	92 5	15% 8	<b>5</b>
<b>5. Tortolita Fan</b> 203,546 ac (318 Sq.Mi.)	11% 6	9-17 5	679 6	5 5	76 6	42% 6	<b>6</b>
<b>6a. Altar Valley</b> 713,807 ac (1115 Sq.Mi.)	65% 2	11-19 4	6640 1	10 2	864 1	70% 4	<b>2</b>
<b>6b. Avra Valley</b> 221,404 ac (346 Sq.Mi.)	03% 7	9-11 6	834 5	4 6	76 6	68% 5	<b>7</b>
<b>8. Western Pima County</b>	00% 8	5-11 7	604 8	2 7	35 7	26% 7	<b>8</b>

For some grazing regimes, the inventory and monitoring of plants occurs every year, and in other more stable production areas the capacity does not change very often. This capacity rating means that the amount of livestock on a ranch cannot exceed its animal unit rating; however, as noted elsewhere most ranchers do not use the land to its maximum capacity in order to retain forage reserves and to facilitate upward trends in range health.

Because capacity is so dependent on forage and rainfall, it is not surprising that the Pima County valleys vary significantly as to capacity from only 1-2 head of livestock per square mile in the lowest elevation valleys to as many as 16 or more in the most stable grasslands environments.

Overall, Pima County is currently supporting a maximum of fewer than 20,000 head of livestock, not including tribal lands. USDA statistics from 1997 put the county-wide total at 39,000 head. As might be expected and consistent with the rankings for grasslands and rainfall, the valleys with the highest capacity and productivity by both maximum number and highest average per square mile include the Altar Valley, the Empire-Cienega Valley, and the Upper Santa Cruz Valley.

As with the question of the extent of ranch lands, it is the rural, upland valleys that have the greatest livestock capacity, productivity, and potential for sustainability with the Empire-Cienega Valley ranked first overall, followed by the Altar Valley, the Upper Santa Cruz Valley, and the San Pedro Valley.

#### D. Regional Summary of the Threats to the Ranching Land Base

As has been noted elsewhere, the greatest threats to the ranching land base are factors directly and indirectly related to significant population growth and development in the greater Tucson metropolitan area and the patterns that this growth takes. Much of the suburban growth to accommodate the huge influx of population in the period from about 1960 to the 1990s has been in the form of regulated or platted subdivisions. To date, there are more than 4700 platted subdivisions in eastern Pima County, and this kind of regulated development accounts for more than 160,000 acres of urban and suburban land use, much of this in the incorporated cities and towns.

In addition to regulated development, lot-splitting or wild-cat development is unfortunately becoming more prevalent in the areas outside the metropolitan area. This kind of development fragments the natural landscape, further contributes to sprawl, often devalues property, and can create significant hardships for its residents. This kind of development is generally defined as the proliferation of new residential parcels without the benefit of subdivision regulation, which ensures certain standards for public health and safety are met. In 1997, a total of 3729 new residential dwelling units received permits in unincorporated Pima County and fully 41 percent of the new units were not part of platted subdivisions.

Many of these lot split building sites occur in areas formerly used for agricultural uses that are in reasonable driving proximity to the metropolitan core and in areas where land values are increasing. With the increase in agricultural land values more than doubling since 1992 according to USDA statistics, land once valued for its natural productivity is now being valued for its potential for development. While the USDA also notes that agricultural productivity has increased, attesting to the better management of the land by ranchers and farmers alike, this healthy increase in the value of agricultural products sold is far out-stripped by the increase in land values. When this differential in land values becomes sufficiently attractive, ranch lands are sold and converted for real estate development.

As a consequence of these factors threatening the land base for ranching, a set of seven variables was selected and quantified to attempt to address where this conversion was most likely to occur and which subareas were more vulnerable. These variables include:

- area of the valley privately owned
- Proximity to the urban boundary
- Average cash value per acre
- % area of the valley with Rural Homestead (RH) zoning
- Fragmentation and number of subdivided parcels
- ASLD and BLM lands for disposal
- % private land not used in ranching

In assessing threats to ranch lands in each of the County subareas, seven variables were considered that reflect this characteristic, and a composite score and overall rank were calculated to compare the subareas. Again, as might be expected, it is private lands and public and State Trust grazing lands in the urban core and in the urbanizing areas within 25 miles of the urban core that appear to be most vulnerable to sale and subdivision.

**Table 5. Ranked Comparison of Highest Threats to Ranching Land Use**

Pima County Valley or Subarea	Ownership % Private	Proximity Urban*	Land Value: CashValue/A	Zoning % RH	Fragment Subdivide	SLUPs: ASLD acres	Private % Land	Rank Overall
<b>1. San Pedro Valley</b> 174,315 ac (272 Sq.Mi.)	15% 7	3.0 5	\$ 782 7	100% 8	598 8	0 8	28% 8	<b>8</b>
<b>2. Empire-Cienega Valley</b> 318,535 ac (498 Sq.Mi.)	21% 5	2.5 4	\$ 1500 5	88% 5	5704 6	7817 4	52% 7	<b>5</b>
<b>3. Upper Santa Cruz</b> 449,684 ac (703 Sq.Mi.)	35% 3	2.0 3	\$ 4000 3	92% 6	28,127 3	49,075 1	64% 5	<b>3</b>
<b>4. Middle Santa Cruz</b> 361,851 ac (565 Sq.Mi.)	54% 1	1.0 1	\$68,000 1	0% 1	217,093 1	17,919 2	98% 2	<b>1</b>
<b>5. Tortolita Fan</b> 203,546 ac (318 Sq.Mi.)	50% 2	1.5 2	\$25,000 2	83% 3	48,863 2	11,101 3	82% 3	<b>2</b>
<b>6a. Altar Valley</b> 713,807ac (1115Sq.Mi.)	20% 6	2.5 4	\$ 1300 6	94% 7	22,037 4	1981 5	56% 6	<b>6</b>
<b>6b. Avra Valley</b> 221,404 ac (346 Sq.Mi.)	31% 4	2.0 3	\$ 2000 4	84% 4	7900 5	645 6	76% 4	<b>4</b>
<b>8. Western Pima Co.</b>	1% 8	4.0 6	\$ 222 8	65% 2	3184 7	640 7	99% 1	<b>7</b>

\* Urban Boundary Proximity: 1= urban area; 2=accessible; 3= not easily accessible; 4=distant from urban area

Ranked, the lands with the highest threats include the Middle Santa Cruz Valley, the Tortolita Fan, the Upper Santa Cruz Valley, the Avra Valley, the Empire-Cienega Valley, the Altar Valley, Western Pima County, and the San Pedro Valley.

The Middle Santa Cruz Valley, ranked first in overall susceptibility to development, is shown to rank highest in five categories – highest percentage of private lands at 54 percent, closest to the urban core, highest average land value per acre at \$68,000, least RH zoning, highest number of subdivided parcels, and second highest in two categories – highest acreage of disposable lands, and highest percentage of private lands not used in ranching.

The Tortolita Fan, ranked second overall in development potential, also ranks second in percentage of private land, proximity to the urban core, land values, and numbers of subdivided parcels, and third highest in two categories – lowest RH zoning and highest percentage area of private lands not used in ranching.

The Upper Santa Cruz Valley, ranked third overall in development potential, with the highest acreage of disposable lands, and ranks third in four variables – percentage of private lands, proximity to the urban core, land values, and number of subdivided parcels.

The Avra Valley, ranked fourth overall in development potential, ranks third in proximity to the urban boundary and fourth highest in four categories – percentage of private lands, land values, lowest RH zoning, and percentage of private land not used in ranching.

The remaining four subareas exhibited lower overall threats to the conversion of the ranching land base to other uses, with the exception of those portions of these subarea that fall into the 25 mile radius of the urban core.

E. Conservation Potential of the Ranching Land Base

To conclude this assessment of the characteristics of Pima County ranch lands and to provide the best available information regarding the potential for ranch land conservation, it was critical to assess not only the extent, capacity and threats, but also those variables that contribute to sustainable ranching. In this assessment, some of the same variables used in earlier evaluations will be used to characterize conservation potential and sustainability, such as livestock carrying capacity, as well as others that address the integrity and connectivity of the landscape and the stability of ranching use. These variables include:

- % State and BLM ownership
- % private lands used in ranching
- Acres of State and Federal land grazing leases
- Number of ranches
- Livestock carrying capacity by number
- Acres of Federal lands grazed
- Acres of roadlessness

In assessing the potential for the conservation of Pima County ranch lands in each of the County subareas, seven variables were considered that reflect this characteristic, and a composite score and overall rank were calculated to compare the subareas.

The composite score for the potential for ranch conservation reveals again that it is the rural upland valleys that have the highest potential for ranch conservation, which exhibit the greatest amount of public lands, highest acreages of federal grazing leases, highest livestock capacity, the highest number of ranches, and the greatest integrity of natural open space. These are also the subareas that exhibit the fewest overall threats from ranch land conversion, with the exception of fragmenting areas of private land and State and BLM lands for commercial sale or use within the 25 radius of the urban core that appear to be most vulnerable to sale and subdivision. Table 6 shows the results of this analysis.

**Table 6. Ranked Comparison of Ranch Land Conservation Potential by Pima County Subarea**

Pima County Valley or Subarea	Ownership % Public	Ranch Use % Private	Stability: Ac. Leases	Ranches: Number	Capacity: Max. AUs	Preserves Grazed	Roadless: Areas/Ac	Cons. Potential
<b>1. San Pedro Valley</b> 174,315 ac (272 Sq.Mi.)	85% <b>2</b>	74% <b>1</b>	158,674 <b>5</b>	11 <b>5</b>	1917 <b>4</b>	73,032 <b>4</b>	54,899 <b>6</b>	<b>3</b>
<b>2. Empire-Cienega Valley</b> 318,535 ac (498 Sq.Mi.)	79% <b>4</b>	42% <b>3</b>	212,360 <b>3</b>	28 <b>2</b>	4250 <b>3</b>	88,176 <b>2</b>	94,798 <b>3</b>	<b>2</b>
<b>3. Upper Santa Cruz</b> 449,684 ac (703 Sq.Mi.)	65% <b>6</b>	36% <b>4</b>	251,183 <b>2</b>	25 <b>3</b>	4315 <b>2</b>	47,878 <b>6</b>	88,595 <b>4</b>	<b>3</b>
<b>4. Middle Santa Cruz</b> 361,851 ac (565 Sq.Mi.)	46% <b>8</b>	2% <b>7</b>	51,918 <b>8</b>	5 <b>7</b>	666 <b>7</b>	34,000 <b>7</b>	61,026 <b>5</b>	<b>7</b>
<b>5. Tortolita Fan</b> 203,546 ac (318 Sq.Mi.)	50% <b>7</b>	5% <b>6</b>	66,189 <b>7</b>	9 <b>6</b>	679 <b>6</b>	23,883 <b>8</b>	48,709 <b>7</b>	<b>6</b>
<b>6a. Altar Valley</b> 713,807 ac (1115 Sq.Mi.)	80% <b>3</b>	44% <b>2</b>	365,779 <b>1</b>	31 <b>1</b>	6640 <b>1</b>	51,320 <b>5</b>	276,233 <b>2</b>	<b>1</b>
<b>6b. Avra Valley</b> 221,404 ac (346 Sq.Mi.)	69% <b>5</b>	24% <b>5</b>	133,062 <b>6</b>	13 <b>4</b>	834 <b>5</b>	85,388 <b>3</b>	27,791 <b>8</b>	<b>5</b>
<b>8. Western Pima Co.</b>	99% <b>1</b>	<1% <b>8</b>	174,918 <b>4</b>	5 <b>7</b>	604 <b>8</b>	174,846 <b>1</b>	400,434 <b>1</b>	<b>4</b>

The Altar Valley, ranked first in overall potential for ranch conservation, is shown to rank highest in three categories – highest stability of grazing lease acres, highest number of ranches, and highest livestock capacity, and second highest in percentage of private lands in ranch use and in integrity of natural open space. The Altar ranked third in State and public land ownership. Its vulnerability is the high amount of State Trust grazing lease lands that could be sold or leased in the future for commercial purposes and the low amount of Federal lands leased for grazing.

The Empire-Cienega Valley, ranked second overall in conservation potential, and also ranks second in percentage of number of ranches and federal lands used for ranching purposes, and third highest in four categories – percentage area of private lands used in ranching, stability of grazing lease acres, livestock capacity, and integrity of open space.

The Upper Santa Cruz Valley, ranked third overall in conservation potential, and ranks second overall in stability of acreage of public lands leased for grazing and livestock capacity, and ranks third in number of ranches, and fourth in percentage of private lands used in ranching and integrity of open space.

The San Pedro Valley, also ranked third overall in conservation potential, and ranked first in percentage of private land in ranching use, second in highest State and public land ownership, and fourth in livestock capacity and federal lands used in grazing.

The remaining four subareas exhibited lower overall potential for ranch conservation due to lower natural suitability for ranching in the lower elevation subareas and because of urbanization and the conversion of the ranching land base to other uses.

#### F. Summary of Findings

Central to the debate over ranching versus real estate development in Pima County is the sheer magnitude of the land area that could be converted from ranch lands and open space to development. If current growth continues and low-density development trends persist, the Tucson metropolitan area could expand significantly, resulting in the loss of open space that is critical to our community's quality of life, the integrity of our natural environment, and the conservation of our natural and cultural values.

Sprawling development has numerous costs – loss of open space, loss of natural habitat, dirty air, traffic congestion, greatly increased infrastructure costs, and urban disinvestment. But growth in itself is not the problem; instead it is really the solution. The problem is where and how growth occurs, and the solution is putting the best quality development in the right places, while conserving the integrity of our remaining open space, much of it ranch lands.

Given the realities of continued growth and the need to preserve ranch lands for a variety of conservation purposes consistent with the Sonoran Desert Conservation Plan, the foregoing analysis of ranching as a land use in the various subareas was conducted in an attempt to assess which subareas have the greatest extent, productivity, and conservation potential for ranch lands, and which are experiencing the greatest threats from development pressure.

**Table 7. Comparison of Pima County Subareas & Ranch Conservation Potential**

<u>Highest Extent of Ranch lands</u>	<u>Highest Productivity or Grazing Capacity</u>
1. Altar Valley	1. Empire-Cienega Valley
2. Empire-Cienega Valley	2. Altar Valley
3. Upper Santa Cruz Valley	3. Upper Santa Cruz Valley
4. San Pedro Valley	4. San Pedro Valley
5. Avra Valley	5. Middle Santa Cruz Valley
6. Tortolita Fan	6. Tortolita Fan
7. Western Pima County	7. Avra Valley
8. Middle Santa Cruz Valley	8. Western Pima County

<u>Highest Threats to Ranch lands</u>	<u>Highest Ranch Conservation Potential</u>
1. Middle Santa Cruz Valley	1. Altar Valley
2. Tortolita Fan	2. Empire-Cienega
3. Upper Santa Cruz Valley	3. Upper Santa Cruz Valley
4. Avra Valley*	3. San Pedro Valley
5. Empire-Cienega Valley	4. Western Pima County
6. Altar Valley	5. Avra Valley*
7. Western Pima County	6. Tortolita Fan
8. San Pedro Valley	7. Middle Santa Cruz

\*The Ironwood National Monument continues ranching and grazing under BLM management within the Monument boundaries.

The results of these various analyses consistently identify the Altar Valley, Empire-Cienega Valley, Upper Santa Cruz Valley, and San Pedro Valley as the subareas where ranching comprises a significant land use, and where their capacity and stability suggest the best potential for sustainable ranch use. It is therefore concluded that ranch lands in these valleys and in the Avra Valley Ironwood National Monument area have the best potential to define the urban boundary, where developed lands at the urban edge give way to natural open space. Ranching in the Middle Santa Cruz Valley is the most threatened, least sustainable, and least likely to continue, while ranching on the Tortolita Fan is only marginally better.

## VII. SDCP Proposed Conservation Actions

Assuming it is the community's desire to maintain the integrity and connectivity of these private and public ranch lands and to conserve natural open space, then active measures will be necessary to prevent their fragmentation. These include options for landowners, as well as options for local government, that will assist community-based conservation planning. In addition, these measures must guarantee to ranchers and rural property owners that their property rights will be preserved and honored and their financial status will not be compromised as a consequence of conservation planning.

There are numerous voluntary options that ranchers can use to preserve their private land and meet their personal, financial, and future ownership goals, and most of these options assume the rancher wants to retain ownership or at least wants to continue in ranching. Consequently, these conservation tools tend to focus on donating or selling conservation easements, limiting development, selectively developing, diversifying the ranching operation, estate planning, and tax planning, among other options. It is beyond the scope of this report to enumerate and describe all of these conservation tools; however, because it is largely rising property values that create the vulnerability for land conversion near the urban core, it is clear that some kind of acquisition program from willing sellers will be of primary utility.

Two kinds of acquisition strategies might be pursued – acquisition in fee simple and acquisition of development rights. Both have been successfully employed in southern Arizona. For example, both the Empirita Ranch and Posta Quemada Ranch are examples of properties purchased by Pima County for their flood control and riparian area values along Cienega Creek while maintaining their upland grazing leases and open space values through cooperative arrangements with local ranchers. Voter support for bond funding for open space acquisition has been amply demonstrated, and it will likely continue to be one mechanism to preserve parcels of critical importance for their open space, natural, and cultural values.

Another mechanism is acquisition of development rights, which can increase the “buying power” of local governments or land trusts with limited funding to conserve open space and agricultural lands while allowing approved uses such as grazing to continue. In Santa Cruz County, the Nature Conservancy recently concluded a highly significant conservation effort through their purchase of the San Rafael Ranch and selling a small portion of the ranch and a conservation easement to Arizona State Parks.

The conservation easement is essentially a deed restriction that stipulates the ranch can never be sold for development, and it was these development rights that Arizona State Parks purchased using Arizona Heritage Fund monies. The larger portion of the ranch, minus its development rights, was then sold to a rancher willing to operate the ranch according to the terms of the conservation easement.

It is possible that any ranch conservation and habitat conservation program adopted by Pima County could utilize both of these acquisition strategies as appropriate to ensure the long term integrity and viability of its ranch lands, natural resource and habitat values, cultural resource values, and open space. In addition to these conservation goals, certainly cost and land values will be primary considerations in order to conserve the greatest amount of land with the highest environmental and cultural values at the lowest cost. While conservation planning efforts have not yet recommended specific lands for habitat, ranch, riparian, or mountain preserve conservation, it is likely that acquisition will be one of the tools employed.

#### A. Policies for County-owned Ranches

Whenever possible and appropriate, it is expected that County-owned ranches will continue to be working ranches. The County will use range management practices to achieve a sustainable landscape, and will be a contributing member of the larger ranching community by sharing information, providing “grass banking” services, and providing education to the public about the role of ranching.

#### B. Guidelines for a Comprehensive Pima County Ranch Conservation Strategy

The Ranch Conservation Technical Advisory Team discussed at their March 22, 2001, meeting what guidelines they might recommend for the County’s efforts to achieve ranch conservation and practice adaptive management to achieve the goals of the Sonoran Desert Conservation Plan. What follows are their suggestions.

Here are some starting points. If there is a presumption of incompatibility and exclusion, then management prescriptions will be considered adversarial. Instead, ranching as an ongoing land use is considered compatible with the goals of the Sonoran Desert Conservation Plan.

- Create partnerships for mutual landscape goals – maintain flexibility, inclusiveness.
- Work in partnership through process of establishing landscape goals, incentives for participation, research, monitoring, data analysis, and management recommendations to achieve mutual goals.
- More than 70 percent of Pima County ranchers are already cooperators with the Natural Resources Conservation Service (NRCS).
- Ranchers must have significant role in research, monitoring, and management decisions.
- Private property rights must be acknowledged and honored.

Some guidelines:

1. Rancher/property owner participation and cooperation must be voluntary.
2. Utilize existing ranch management plans that ranchers have developed in cooperation with NRCS.
3. Manage for improved ecological health at the landscape or watershed level.
4. Framework and funding source must be established for research and monitoring.
5. Conduct research, monitoring, before management decisions are made.
6. Maintain flexibility and streamline regulatory process (e.g. fire, erosion control, etc.) for cooperators.
7. Create means to establish long-term grazing leases.
8. Bring Arizona State Land Department (ASLD) into process so that State benefits for conservation (economically, public good will, etc.).
9. Recognize that ranchers already have stewardship roles and knowledge to bring to process.
10. Utilize existing groups (e.g. Altar Valley Conservation Alliance) to help establish habitat and species goals, and for research, monitoring, management decisions in collaboration with other stakeholders (U.S. Fish & Wildlife Service, Arizona Game & Fish Department, range managers, species experts, etc.).
11. NRCS is already monitoring for improvements to general ecological health; research is needed on how sensitive species are responding to management.
12. Collaboration will create a better social framework to lessen antagonisms.
13. Role of County Ranch Division should be to facilitate coordination/collaboration in adaptive management process.
14. Establish dedicated funding mechanism/endowment to assist in monitoring and for investment in improving ecological health of the land.
15. Land parcels purchased for “mitigation banking” should be preserved wholly, not partially; otherwise there is only incentive for development of balance of parcel.

### C. Voluntary Incentive Programs for Private Ranches

The Ranch Conservation Technical Advisory Team also developed a list of potential incentives for ranchers to be involved:

1. Develop “endowment” for Adaptive Management Program (AMP) for investment in improving natural resource base.
2. Allow ranchers to apply for AMP grants/funds for conservation actions (Clark County, Nevada, had \$550/acre development impact fee).
3. Compensation/payment for systematic monitoring services and reporting.
4. Certainty of relief from Endangered Species Act liability if rancher is cooperating.

5. Long-term grazing leases in exchange for land stewardship and monitoring.
6. Tax relief for rural property owners who do not meet livestock capacity for agricultural status.
7. Assistance in defining ways to “improve the bottom line.”
8. Establishment of “grass banks” to be used by cooperating ranchers.
9. Compensation for assisting with species recovery and reintroduction.
10. Increased law enforcement and patrols to assist cooperating ranchers.
11. Integration of natural resource goals with ranchers’ goals (fire, erosion, mesquite control).
12. Compensation to rancher for lowering livestock numbers to meet certain biological goals.
13. Create system of grazing lease exchanges to better accommodate biological goals and grazing.

### VIII. Impacts to Ranch Conservation under the Alternatives

The May 2002 cost model described future impacts and assessed costs for unincorporated Pima County’s compliance with the Endangered Species Act. Four alternatives relative to the cost of implementing the Section 10 permit were presented: ranch conservation; mountain park expansion and ranch conservation; high conservation value land on the northwest side; and riparian protection and restoration. In all alternatives to ensure comparability, it is assumed that conservation of a total of only 20,400 acres will be required for Section 10 compliance under the Endangered Species Act. It is further acknowledged that a combination of these alternatives might be recommended by members of the Sonoran Desert Conservation Plan Steering Committee to ensure that different landscape and habitat elements receive some level of conservation. Another important issue will be the availability of ranch lands for sale as well as which ranchers may voluntarily seek to sell their development rights. Consequently, no specific parcels are addressed in any of the alternatives, and because ranching is considered a compatible ongoing land use for the Sonoran Desert Conservation Plan, none of the alternatives are likely to cause a loss of ranchlands. Instead, each alternative is evaluated in terms of total acreage devoted to ranching and crops, number of parcels, number of grazing leases, and potential there is to conserve ranchlands within each alternative as defined.

In the following sections, each alternative, plus a no action alternative, is briefly described and possible impacts to ranching and agriculture are discussed.

#### A. No Action

Under the No Action Alternative, a section 10 permit would not be obtained from the U.S. Fish & Wildlife Service. Actions that might constitute a “take” of a listed endangered species would require consultation with the U.S. Fish & Wildlife Service. Work toward the conservation of ranches will continue as outlined above; however, ranch lands will remain under threat of conversion to real estate development. Similarly, agricultural crop lands will continue to convert to real estate development, perhaps at a higher rate than ranch lands, as land values increase.

#### B. Ranch Conservation

Under the Ranch Alternative, Pima County would establish a reserve of 20,400 acres of high resource value ranch land. In this alternative, up to 12 percent of private ranchlands could be conserved throughout Pima County potentially affecting approximately 170,000 acres, 95 grazing leases, and nearly 1400 parcels of private ranchlands.

Done correctly, this alternative is the most likely to provide the greatest benefit to ranch conservation and the ranching community. Only ranches from willing sellers would be purchased, and such purchases could help prevent the conversion of ranch land to sprawl. More County involvement with the ownership of working ranches would serve to strengthen its commitment to ranch conservation, and could provide additional tools to promote the preservation of ranches (for example, the new ranch lands could provide more opportunities for research, public education, “grass banking,” etc.)

Impact to agricultural lands is likely to be minimal. There are 5,913 acres of agricultural lands in unincorporated Pima County in the Conservation Lands System. These 72 parcels (shown in green on map 2) are located primarily in the pecan groves near Green Valley, along the Santa Cruz River at the very north and south boundaries of the County, along Sopori Wash and in several locations along Brawley Wash. This alternative might include purchasing and retiring some portion of these agricultural lands, but only with a willing seller and would be only a small fraction of eastern Pima County’s 27,000 acres of agriculture. It is also likely under this alternative that agricultural lands would be purchased only as adjunct to a ranch purchase.

#### C. Mountain & Natural Resource Park Expansion & Ranch Conservation

Under this alternative, Pima County would expand natural resource parks and county-owned ranch lands by a total of 20,400 acres. For the purpose of comparing impacts of different alternative, both a one-mile and five-mile buffer around five major natural resource parks (Tucson Mountain Park, Colossal Cave Mountain Park, Cienega Creek Natural Preserve, Tortolita Mountain Park and Catalina State Park) was used to determine what private vacant lands in incorporated Pima County, and within the Conservation Land System, might be available for purchase. See maps 4, 5 and 6.

Within the one-mile buffer, there are 1,005 acres of private ranch lands (in 17 parcels). Within the five-mile buffer, there are 17,166 acres (in 415 parcels). If ranch lands adjoining existing mountain parks and purchased for park expansion were retired from ranching, that would represent a negative impact. However, there are prior examples of the County continuing to operate or lease out ranching opportunities especially where grazing leases are in effect, so there is equally the potential for park additions to continue to operate as working ranches and benefit the goal of ranch conservation. Up to 100 percent of existing ranch lands in this alternative could be conserved. Moreover, there are 12 current grazing leases partially within the one-mile buffer, and 21 current grazing leases partially affected by the 5-mile expansion area.

There would be minimal or no impact to agricultural in this alternative. The one-mile buffer contains no agricultural lands and the five-mile buffer only 19 acres in one parcel (map 5).

#### D. Northwest Side Conservation Lands

Under this alternative, Pima County would create a 20,400-acre reserve in northwest Tucson, composed of high conservation values lands, some of which would be highly fragmented parcels in pygmy-owl Recovery Area 3. In this area, there are only 1,018 acres of private ranch lands in 22 parcels. If these lands were purchased, it is possible that ranching could continue as long as it is managed to be compatible with pygmy-owl recovery and other Section 10 stipulations. Up to 100 percent of these existing ranch lands could be conserved. However, this area has been

identified as a lower priority for future ranch conservation efforts because it is already highly fragmented due to urbanization and the conversion of the ranching land base to other uses and because of the lower natural suitability for ranching due to its lower elevation than other subareas in Pima County. There are no grazing leases directly affected by this alternative.

There would be no impact to agricultural crop lands with this alternative because there are no such lands in the area under consideration.

#### E. Riparian Conservation & Restoration Lands

Under this alternative, Pima County would create a 20,400-acre reserve comprised of 50 percent rural and ranch riparian lands, and 50 percent riparian lands closer to urbanized areas. Of the lands that might be available to accomplish this alternative, 24,443 acres are ranch lands (in 580 parcels). It is possible that ranching could continue on lands purchased for this purpose, perhaps with appropriate management to make sure it is compatible with fragile or sensitive riparian species. Some ranchers in Pima County have already faced endangered species management challenges in riparian areas, and workable solutions have been found. Up to 83 percent of private ranch lands located in riparian areas could be conserved under this alternative, and there are 80 current grazing leases that are partially within this alternative. As noted above, Pima County would seek to maintain existing ranching operations on these private lands and public or state grazing leases. However, to the extent that private ranchlands are sold for other uses or development, there would be an impact to ranching.

There are 1,125 acres of agriculture (in 35 parcels) in this area under consideration. Purchasing agricultural land for conversion to restored riparian habitat would have a negative impact on agriculture, unless additional agricultural land is brought into production elsewhere (as in the case, for instance, if the land was obtained by trading other agricultural land for it).

### IX. Conclusion

Ranch conservation is an important element of the Sonoran Desert Conservation Plan, and Pima County has worked diligently to develop some strategies for achieving it. Mitigation alternatives for achieving a Section 10 Endangered Species Act permit must take into account possible impacts – both positive and negative – on ranch conservation efforts.

With proper planning and involvement of the ranching community, it will be possible to help accomplish ranch conservation during this process. Table 8 illustrates relative effects to ranch conservation from the various alternatives. This assumes a total of 20,400 acres are required as mitigation lands located within the Conservation Land System in unincorporated Pima County. As noted above and in the following table, the greatest extent of ranch lands is addressed in Alternative B, Ranch Conservation, followed by Alternative E, Riparian Conservation. Alternatives C and D, which affect far fewer acres of ranch land, allow for up to 100 percent of these ranch lands to be conserved. The No Action Alternative does not allow for any active ranch conservation efforts, and threats to the ranching land base will continue as these lands are converted to real estate development.

**Table 8. Comparison of Ranch & Agricultural Lands Affected by Alternatives**

<u>Cost Model Alternative:</u>	<u>Private Ranches:</u>	<u>Crop Lands:</u>	<u>Grazing Leases:</u>	<u>Effects:</u>
<b>A. No Action</b>	169,947 acres 1,399 parcels	5,913 acres 72 parcels	1,352,739 acres 95 leases	No ranch conservation actions due to Section 10 permit; threats continue.
<b>B. Ranch Conservation</b>	169,947 acres 1,399 parcels	5,913 acres 72 parcels	1,352,739 acres 95 leases	Up to 12% of private ranch/ag. lands conserved throughout Pima County.
<b>C. Mt. Preserve -1 mile</b>	1,005 acres 17 parcels	0 acres 0 parcels	31,176 acres 12 leases	Up to 100% of private ranch lands within 1 mile of mountains conserved.
<b>C. Mt. Preserve -5 mile</b>	17,166 acres 415 parcels	19 acres 1 parcel	121,956 acres 21 leases	Up to 100% of private ranch lands within 5 mile of mountains conserved
<b>D. Northwest Area</b>	1,018 acres 22 parcels	0 acres 0 parcels	0 acres 0 leases	Up to 100% of private ranch lands conserved.
<b>E. Riparian Conservation</b>	24,443 acres 580 parcels	1,125 acres 35 parcels	110,403 acres 80 leases	Up to 83% of private ranch lands conserved.

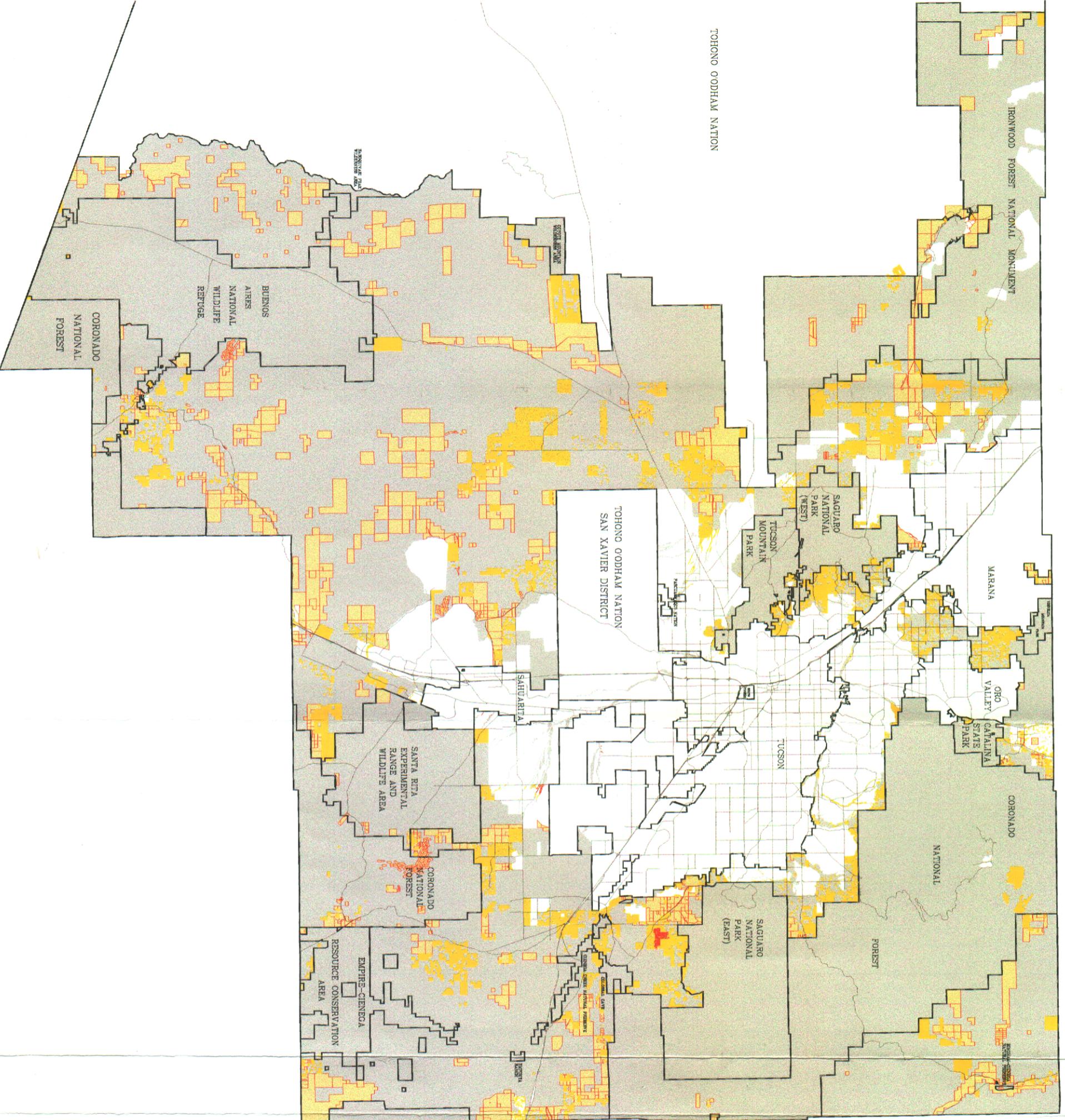
The alternatives with the greatest potential to conserve ranch lands are ranked as follows:

1. Alternative B - Ranch Conservation
2. Alternative E - Riparian Conservation
3. Alternative C - Mountain Preserves - 5mile buffer
4. Alternative C - Mountain Preserves - 1 mile buffer
5. Alternative D - Northwest Area
6. Alternative A - No Action



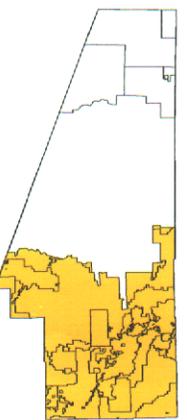
# Private Ranch Lands and Private Vacant Parcels in Unincorporated E. Pima County

-  Administrative Boundaries
-  Major Streets
-  Conservation Lands System (CLS)  
in Unincorporated Eastern Pima County
-  Private Vacant Parcels
-  Private Ranch Lands



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Pima County Index Map



Index Map Scale 1:1,500,000

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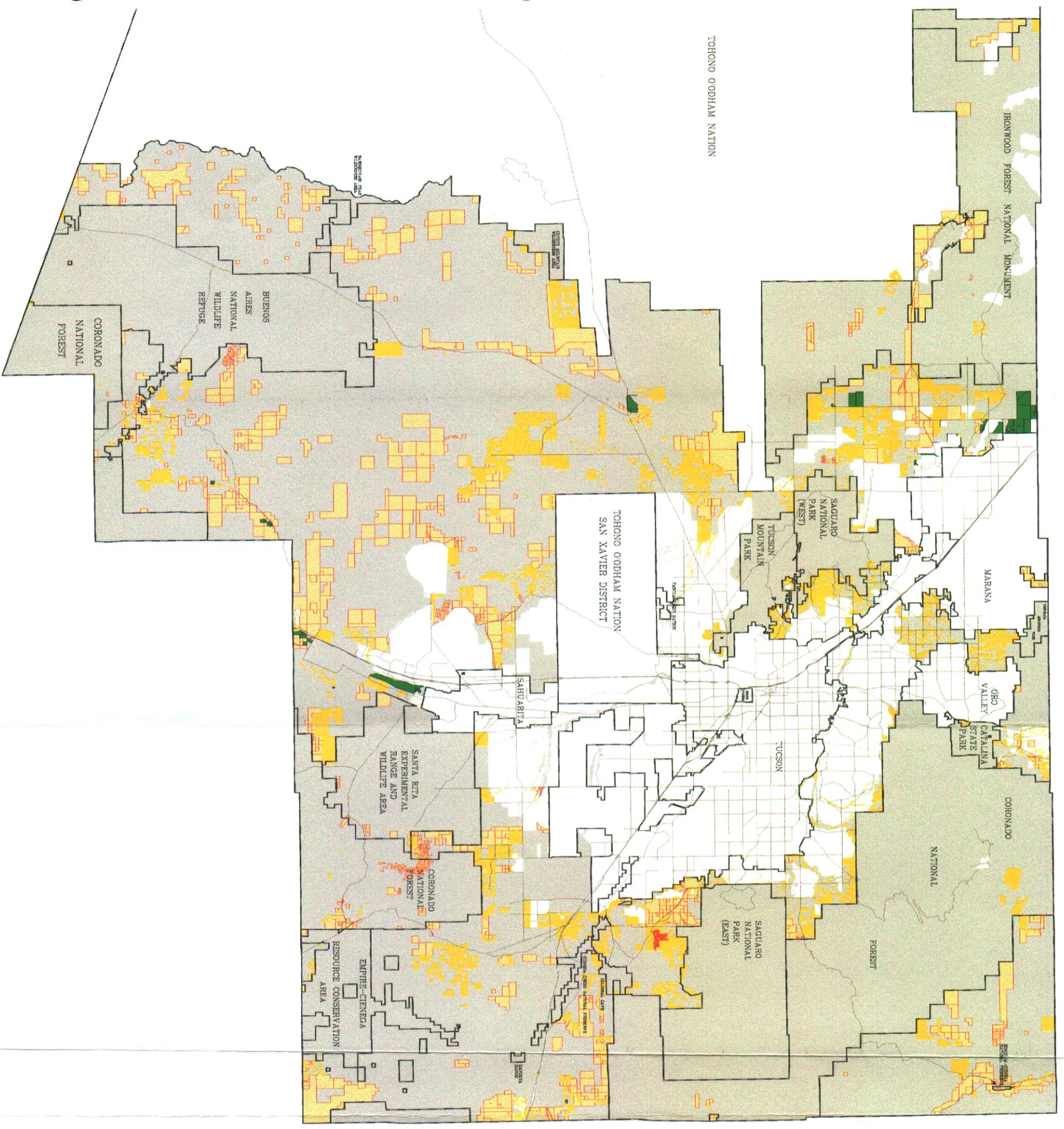


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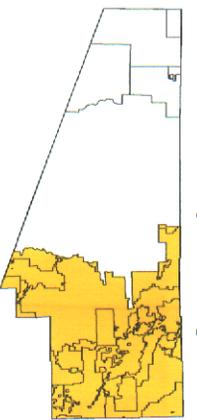
# Agricultural and Ranch Lands with Private Vacant Parcels in Unincorporated E. Pima County

-  Administrative Boundaries
-  Major Streets
-  Agricultural Lands
-  Private Vacant Parcels
-  Conservation Lands System (CLS) in Unincorporated Eastern Pima County
-  Private Ranch Lands



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Pima County Index Map



Index Map Scale: 1:500,000

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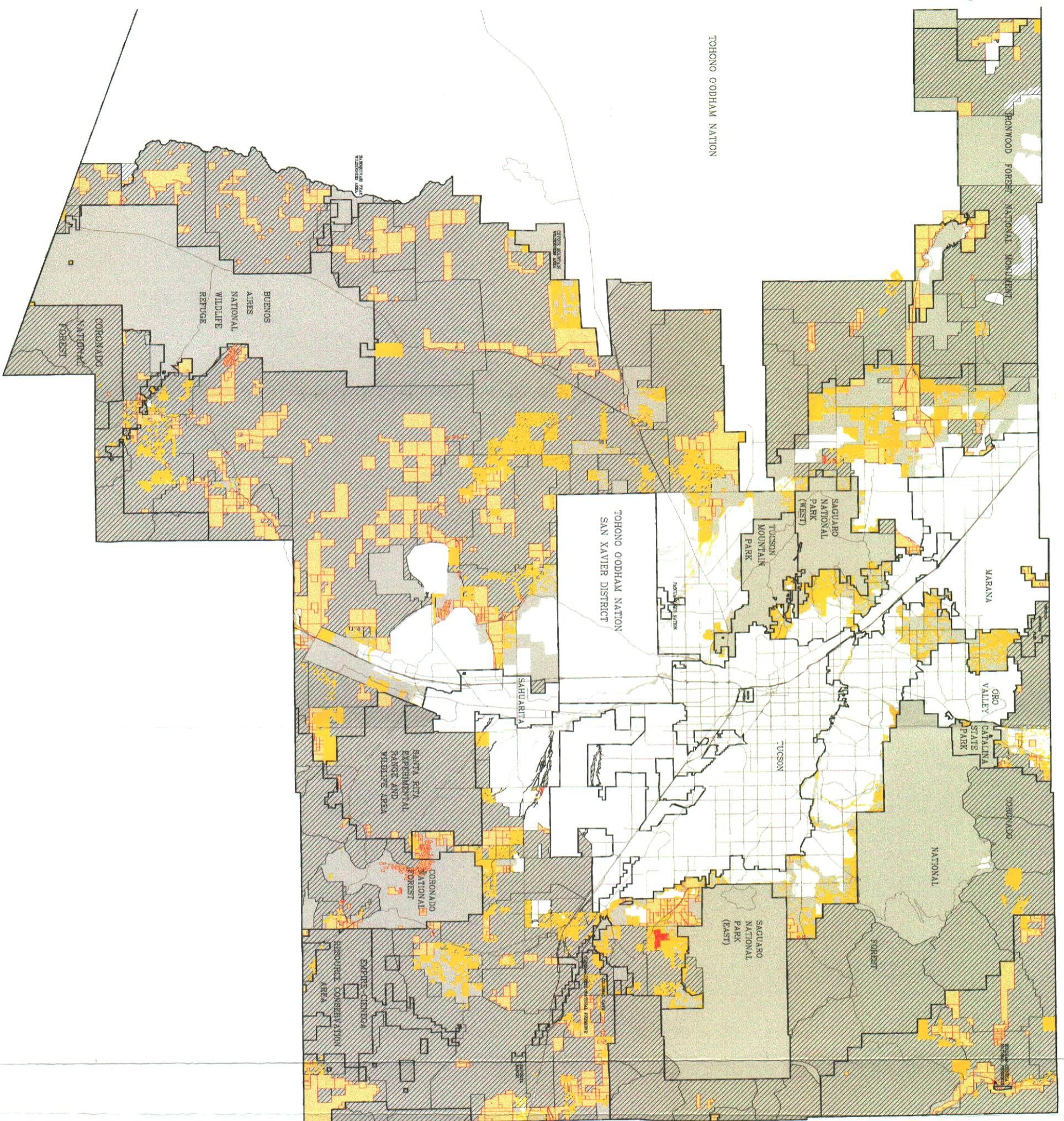


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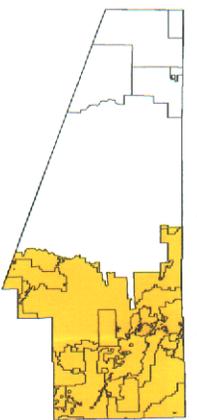
# Grazing Allotments & Ranch Lands with Private Vacant Parcels in Unincorporated E. Pima County

- Administrative Boundaries
- Major Streets
- Conservation Lands System (CLS) in Unincorporated Eastern Pima County
- Private Vacant Parcels
- Private Ranch Lands
- Grazing Allotments



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Pima County Index Map



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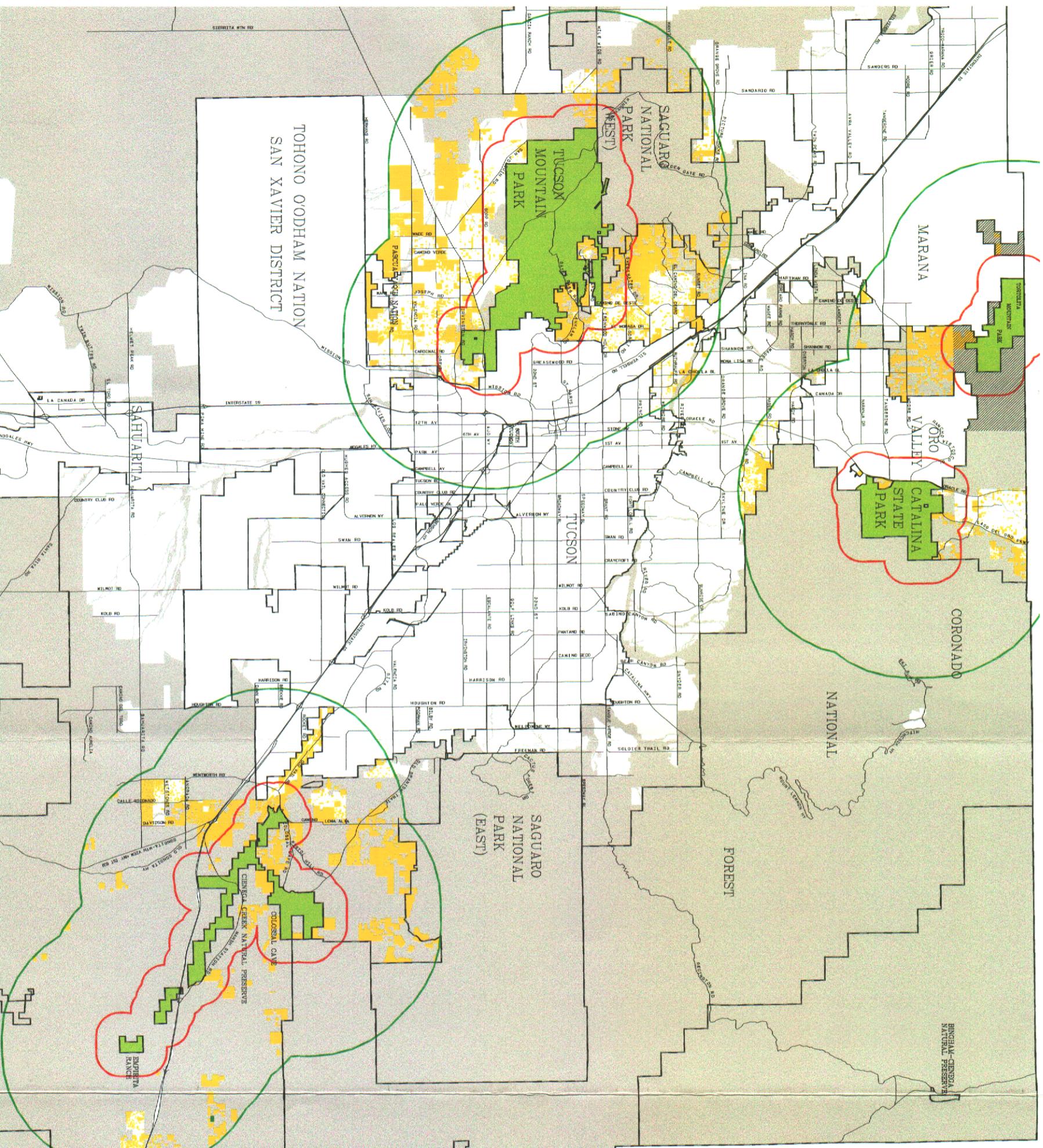


# Mountain Park Expansions,

## Agricultural Lands and

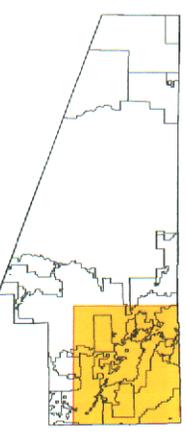
### Private Vacant Parcels

-  Administrative Boundaries
-  Major Streets
-  One Mile Buffer around Existing Mountain Park
-  Five Mile Buffer around Existing Mountain Park
-  Conservation Lands System (CLS) in Unincorporated Pima County
-  Agricultural Land
-  Private Vacant Parcels within Park Buffer Zones
-  Existing Mountain Park
-  Board of Supervisors Designated Park Expansion Area



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Pima County Index Map



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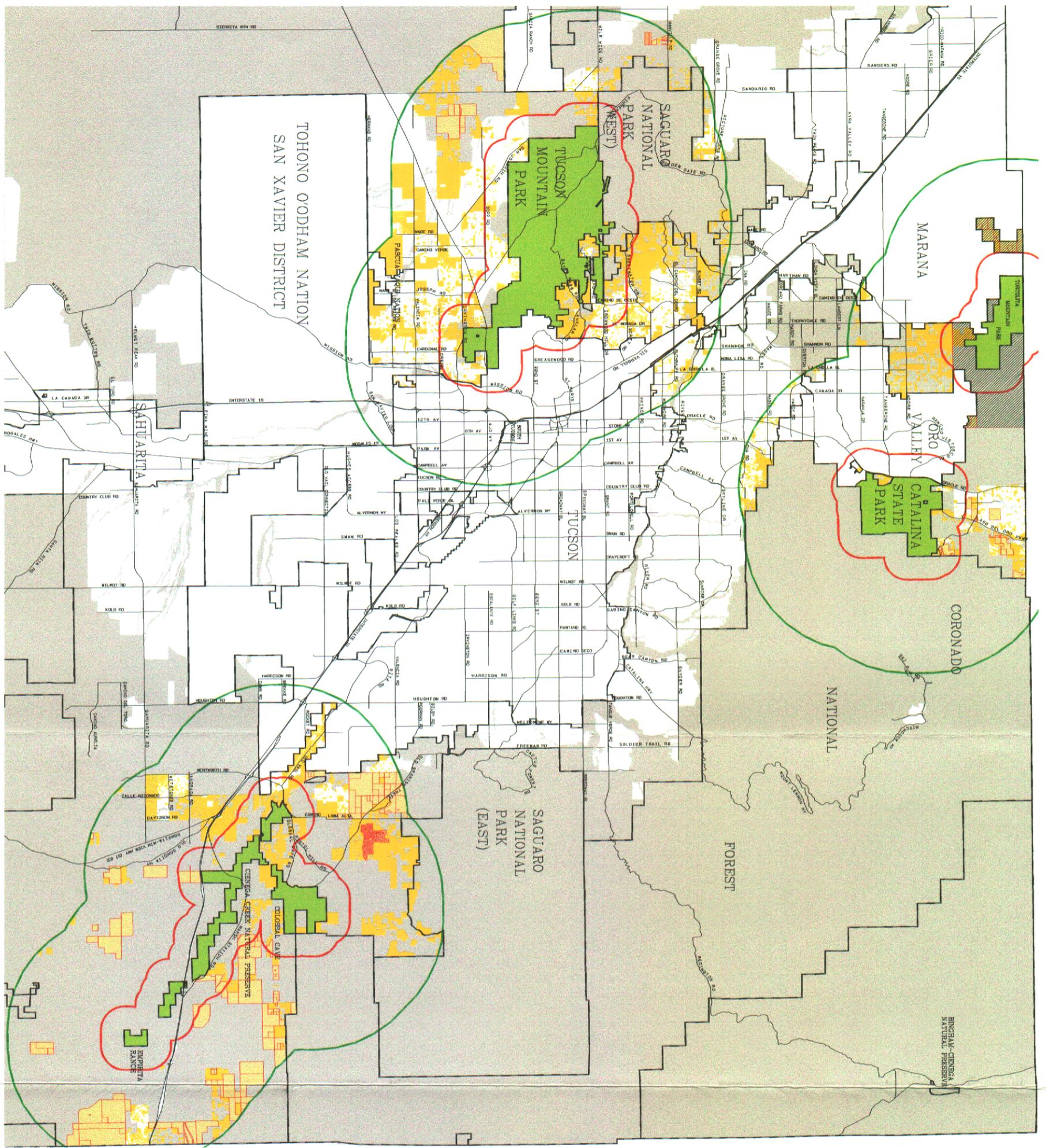
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 Tucson, AZ 85701-1507  
 Phone: 520-799-3429  
 Fax: 520-799-3429  
 Website: www.pima.gov



# Mountain Park Expansions,

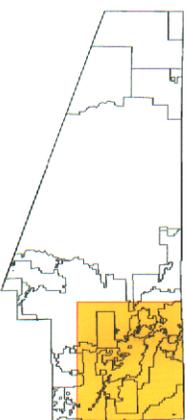
## Private Ranch Lands and Private Vacant Parcels

-  Administrative Boundaries
-  Major Streets
-  One Mile Buffer around Existing Mountain Park
-  Five Mile Buffer around Existing Mountain Park
-  Conservation Lands System (CLS) in Unincorporated Pima County
-  Existing Mountain Park
-  Private Vacant Parcels within Park Buffer Zones
-  Private Ranch Lands within Park Buffer Zones
-  Board of Supervisors Designated Park Expansion Area



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Pima County Index Map



Scale Map Scale 1:1,500,000

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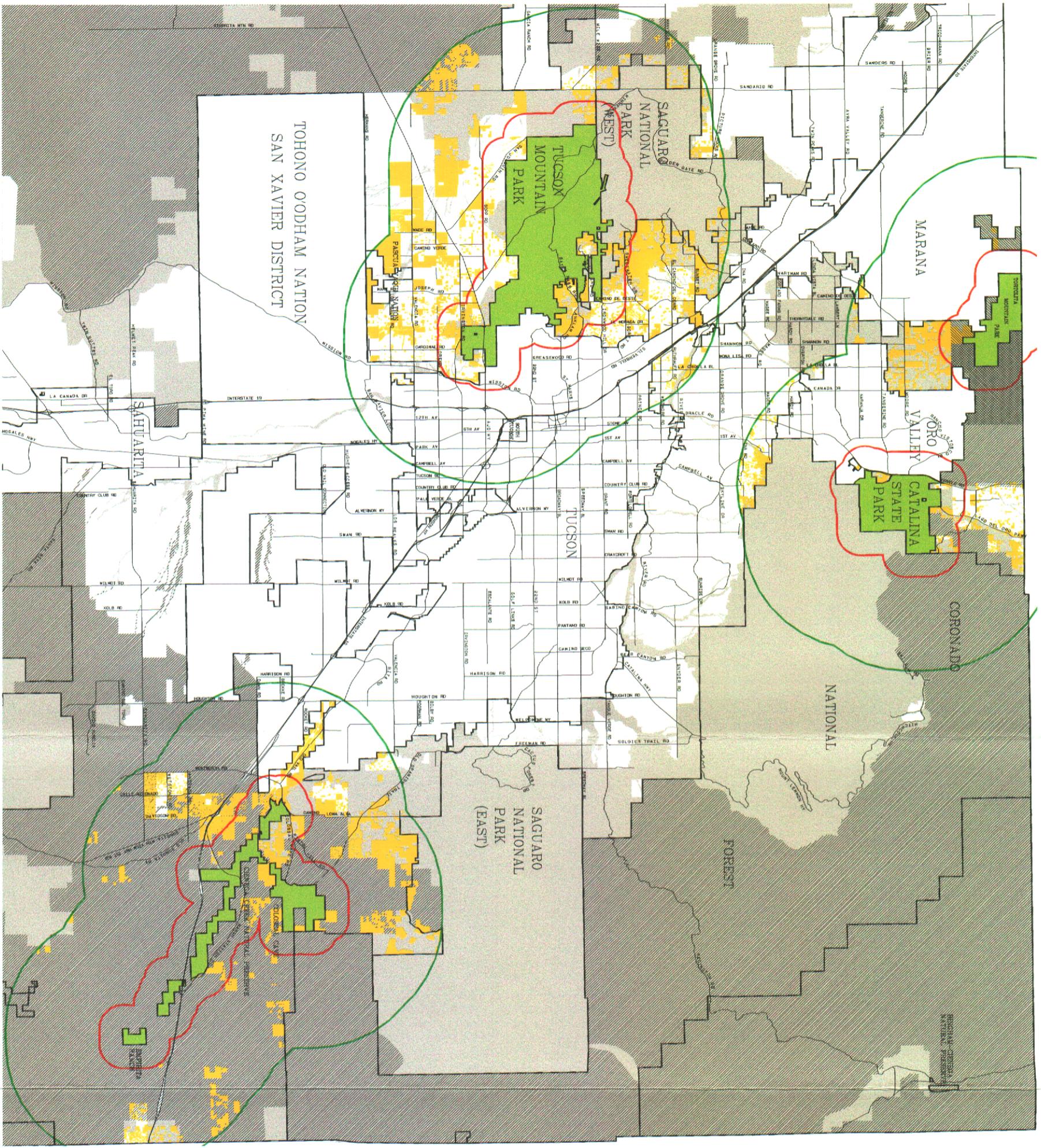
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# Mountain Park Expansions, Grazing Allotments and Private Vacant Parcels

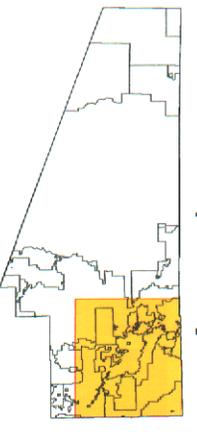
## Private Vacant Parcels

-  Administrative Boundaries
-  Major Streets
-  One Mile Buffer around Existing Mountain Park
-  Five Mile Buffer around Existing Mountain Park
-  Conservation Lands System (CLS) in Unincorporated Pima County
-  Existing Mountain Park
-  Private Vacant Parcels within Park Buffer Zones
-  Board of Supervisors Designated Park Expansion Area
-  Grazing Allotments



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Pima County Index Map



Index Map Scale: 1:1,500,000

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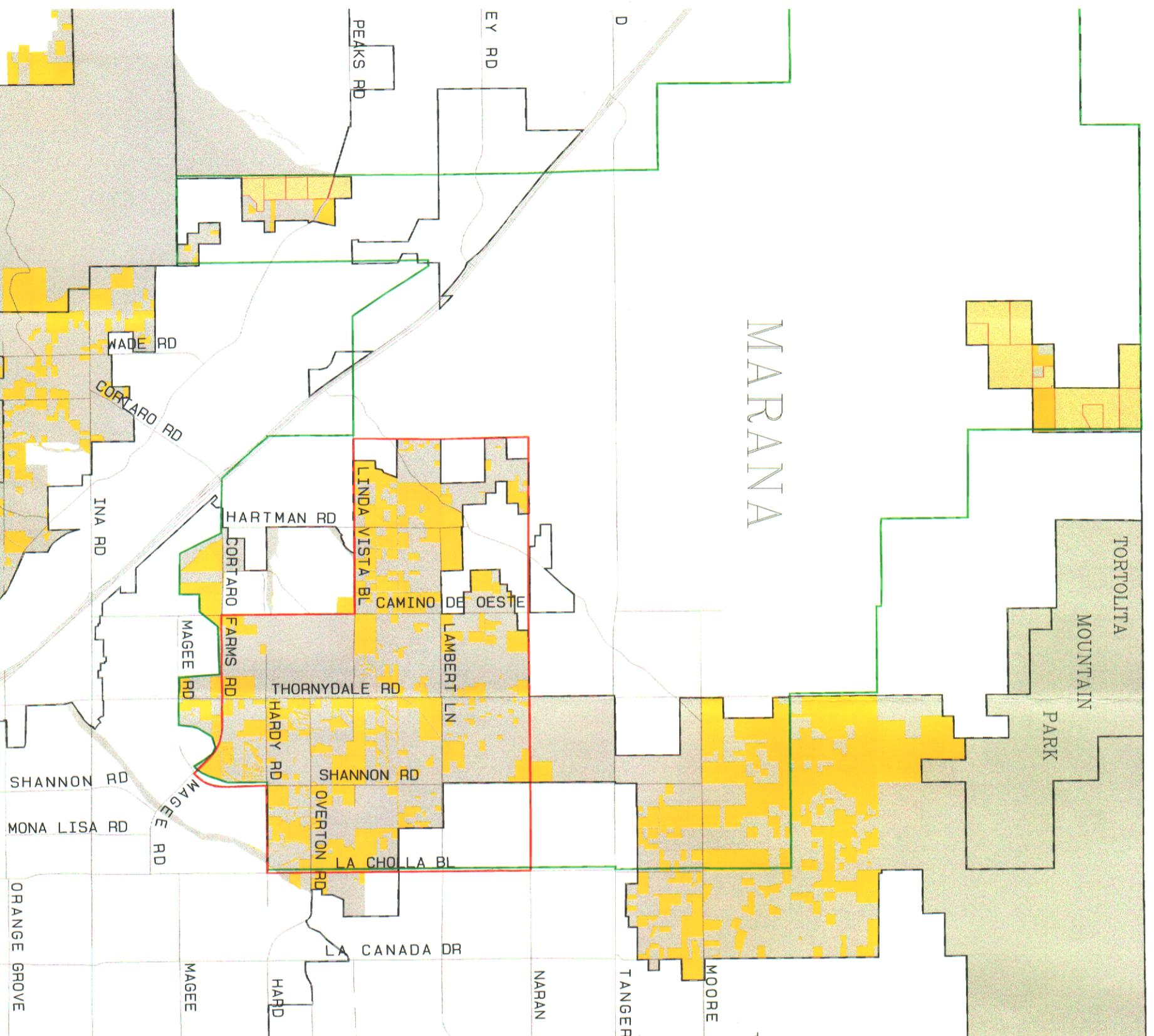


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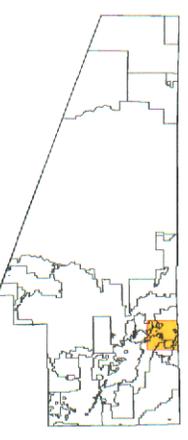
# Northwest Recovery Area 3, Private Ranch Lands and Private Vacant Parcels

- Administrative Boundaries
- Major Streets
- Recovery Area 3
- High Conservation Value Area
- Conservation Lands System (CLS) in Unincorporated Pima County
- Private Vacant Parcels
- Private Ranch Lands



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Pima County Index Map



Index Map Scale 1:1,500,000

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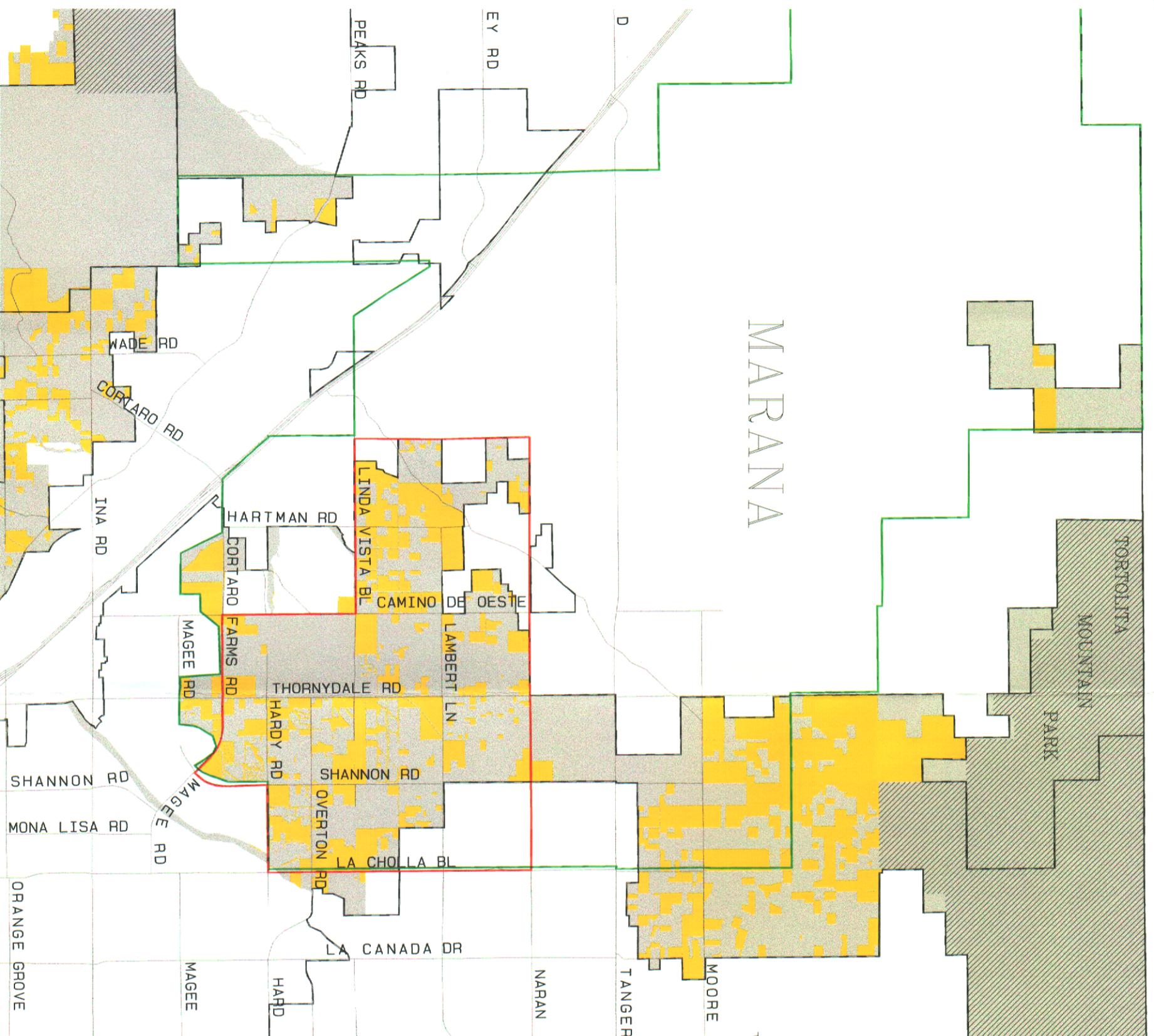


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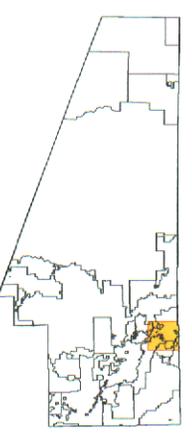
# Northwest Recovery Area 3, Grazing Allotments and Private Vacant Parcels

-  Administrative Boundaries
-  Major Streets
-  Recovery Area 3
-  High Conservation Value Area
-  Conservation Lands System (CLS) in Unincorporated Pima County
-  Private Vacant Parcels
-  Grazing Allotments



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Pima County Index Map



Index Map Scale 1:1,500,000

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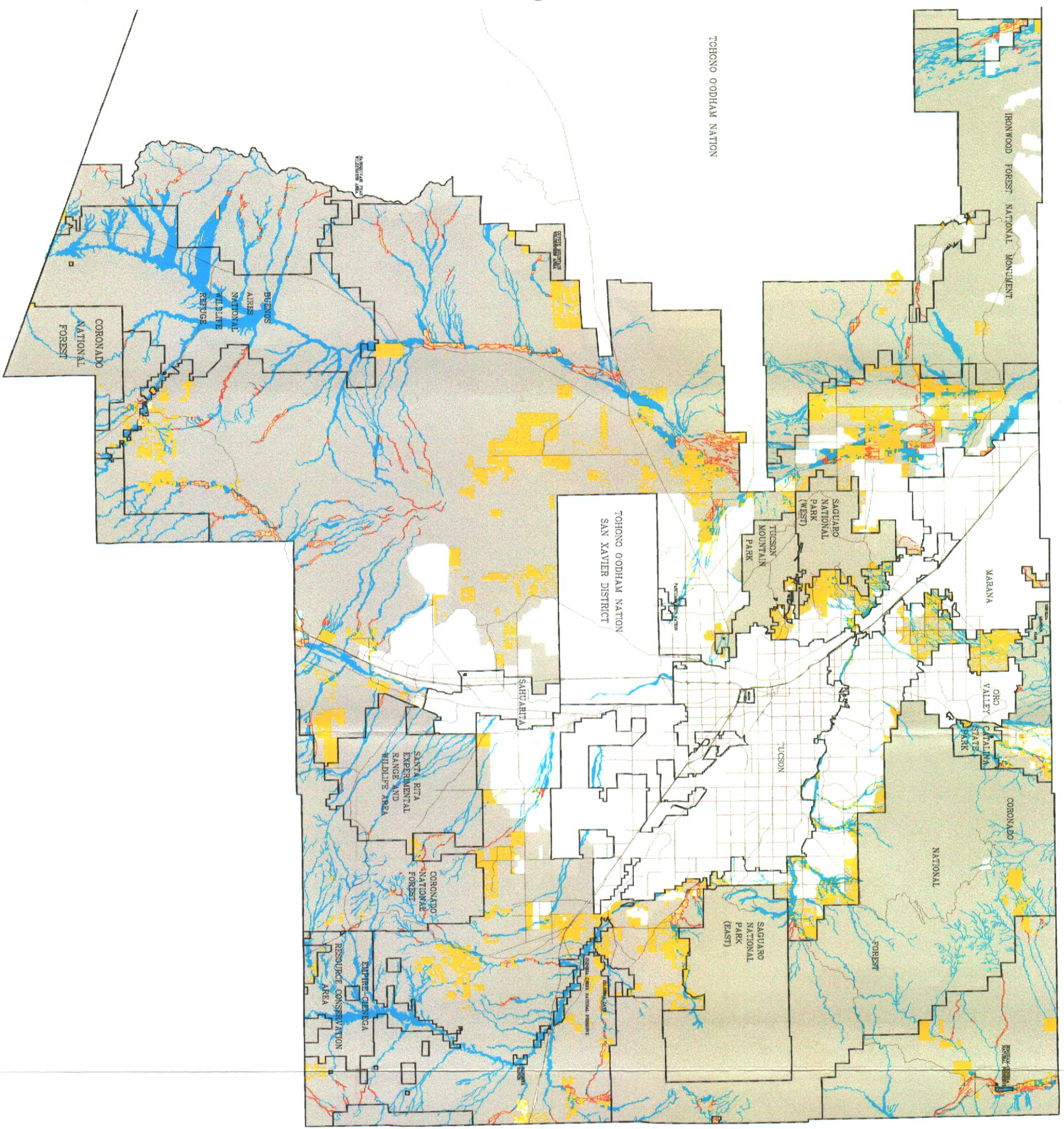


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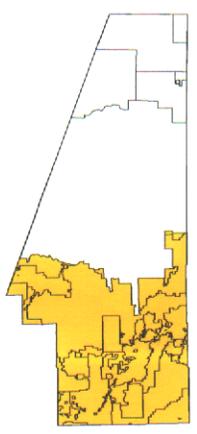
# Private Ranch Lands in Important Riparian Areas with Private Vacant Parcels

- Administrative Boundaries
- Major Streets
- Conservation Lands System (CLS) in Unincorporated Eastern Pima County
- Important Riparian Areas in Unincorporated Eastern Pima County
- Private Vacant Parcels
- Private Ranch Lands inside Important Riparian Areas



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Pima County Index Map



Index Map Scale: 1:1,200,000

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Scale 1: 144,000

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