

To: Dr. Bill Shaw, Chairman

From: Julia Fonseca, Environmental Planning Manager

Re: How Effectively Have County Acquisitions Addressed SDCP and MSCP goals?
Draft Analysis for Review

Problem Statement:

This technical memorandum is prepared at your request, at the February 24, 2009, meeting of the Science Technical Advisory Team (STAT). It attempts to quantify the relative contributions of various types of County open space lands to species habitats and landscape features deemed important by the STAT.

The Sonoran Desert Conservation Plan (SDCP) established a framework for landscape conservation in Pima County. Beginning in 1999, Pima County began to set aside lands for biological purposes. Spatially explicit, science-based goals for conservation of biodiversity were used to guide Pima County's 2004 open space bonds. The bond funds have been augmented with acquisition of floodprone land by Pima County Regional Flood Control District, grant funds, donations and set-asides of lands from the private sector.

Ten years have passed since the first SDCP-driven land acquisitions began. To date, ~62,000 deeded acres have been acquired or otherwise committed to long-term conservation (Figure 1), along with ~124,000 acres of grazing leases on state lands (Figure 2). These MSCP conservation commitments are joined with other SDCP conservation lands such as Tucson Mountain Park to create a total over of 229,000 acres of County-managed conservation lands (Figure 3). At this point, it is appropriate to review the configuration of conserved lands and assess its effectiveness in terms of accomplishing the SDCP goal of long-term conservation of biodiversity. This assessment is relevant to the Pima County Multiple-Species Conservation Plan (MSCP) as well as preparations for future open space bonds.

Purpose:

We will analyze the conservation effectiveness of lands that have been set aside for long-term protection under the SDCP. The objectives of the analysis are to:

1. Quantify and describe the contributions of Pima County's acquisition and management to the conservation of species covered in the MSCP.
2. Quantify and describe the contributions of Pima County's acquisition and management to the conservation of special elements identified in the SDCP.
3. Provide repeatable methods for understanding the benefits of potential future acquisitions and management in addressing deficits in mitigating species take for the MSCP, and conserving special elements for the SDCP.

Methods:

We analyzed effectiveness using typical conservation biology approaches incorporating both fine- and coarse-filter data (in the sense of Noss et al., 1997). Species habitats were the fine-filter: they were represented by two methods, Priority Conservation Areas (PCAs) and habitat models. The coarse filter approach uses conservation of landscape features as a metric. Those features deemed important by the Science Technical Advisory Team are known locally as the special elements of the SDCP. Configuration of the reserved lands was also examined.

Habitat models were developed in the Sonoran Desert Conservation Plan (SCDP) based on representations of factors thought to shape the distribution of potentially suitable habitat at the landscape level. Suitability was usually represented in GIS raster datasets as high, medium or low potentially suitable habitat. The models take advantage of more information about the variation of physical or biological characteristics than is available to any one expert. For this analysis, we used medium and high suitability habitat, where those distinctions existed. For species having only one habitat class, we used the entire habitat suitability class.

PCAs were defined by experts to prioritize land acquisitions for each taxon. PCAs are based on local experts' knowledge of the differences between habitat conditions, threats and species population distributions from place to place. All PCAs are polygons enclosing an area of significance; many are bubbles which enclose a smaller area of potentially suitable habitat. For this analysis, we used all PCAs:

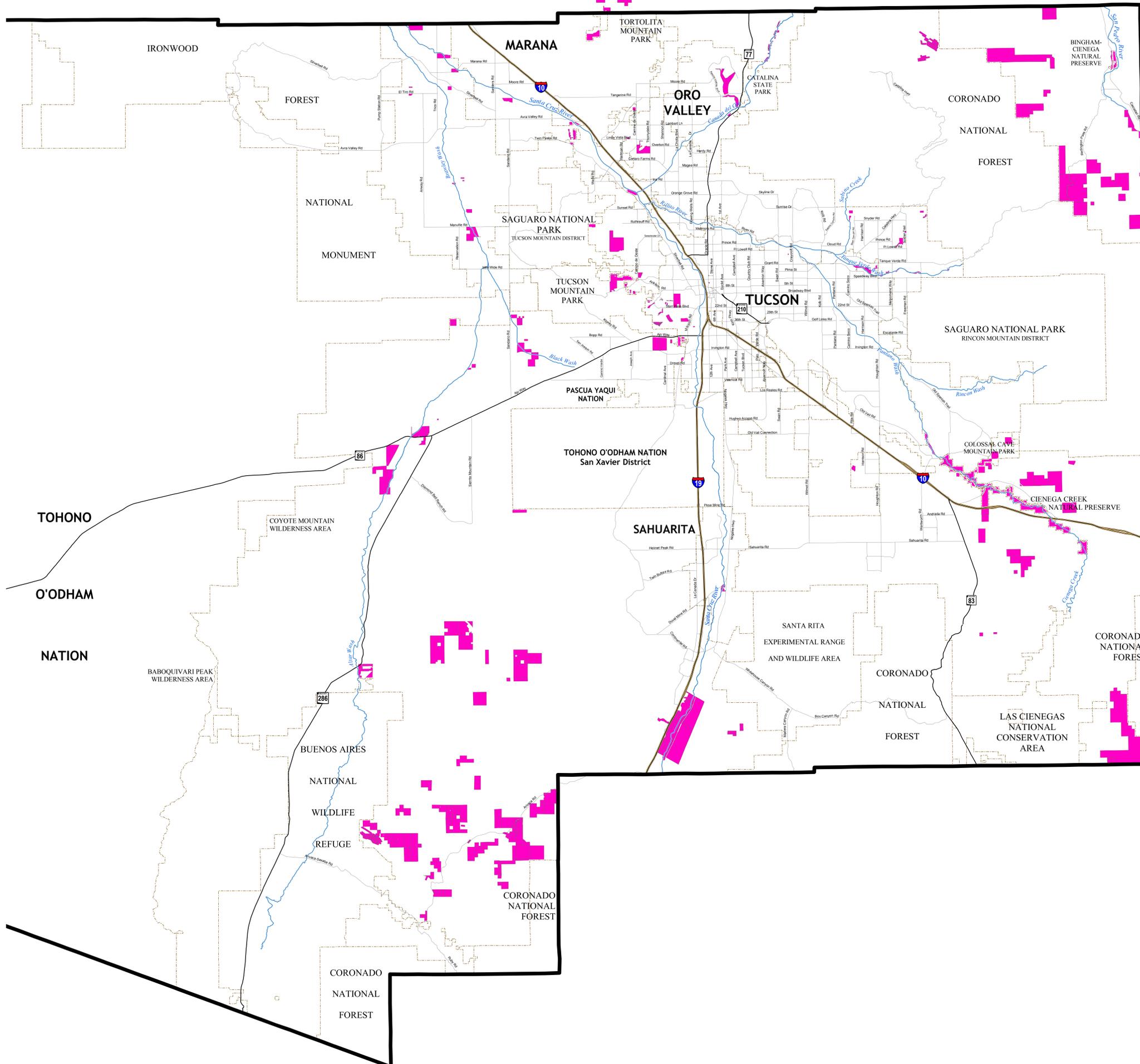
- PCA 1 Must be included in a reserve system
- PCA 2 Recommended for inclusion in a reserve system
- PCA 3 Areas thought to be important for connectivity
- PCA 4 Areas important for habitat restoration

Most SDCP models and PCAs were developed in 2001-2003. We reviewed the new models for the Tucson shovel-nosed snake and ground snake developed by Dr. Phillip Rosen to see whether the models could be applied. Because of our much larger planning area, the necessary soil textural data are not uniformly available, and thus the extant snake models could not be updated for this effort. We solicited expert assistance for updating the burrowing owl PCA, but there was not sufficient interest. We did confer and revise the PCA4 for the box turtle based on input from Drs. Cecil Schwalbe and Philip Rosen, and Mrs. David Hall and Marty Tuegel.

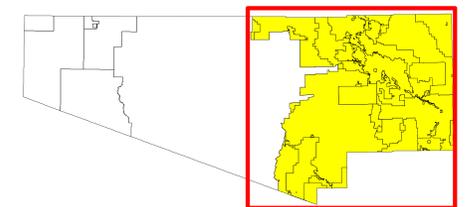
Pima County Geographic Information Services prepared a GIS layer representing County acquisitions held in fee simple or through conservation easements. These include recent and foreseeable purchases and donations, including Tumamoc Hill and Marley Ranch (Phase 1) plus others likely to be acquired by summer 2009 (Figure 1). They created a separate projection of state grazing leases projected to be held by Pima County by June 2009 (Figure 2). A third GIS layer represented all County-managed conservation lands, including state and federal grazing leases, natural resources parks which predate the

MSCP COMMITTED LANDS

 MSCP Committed Lands (~61,750 acres)



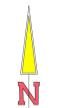
Pima County Index Map



Index Map Scale 1:1,500,000

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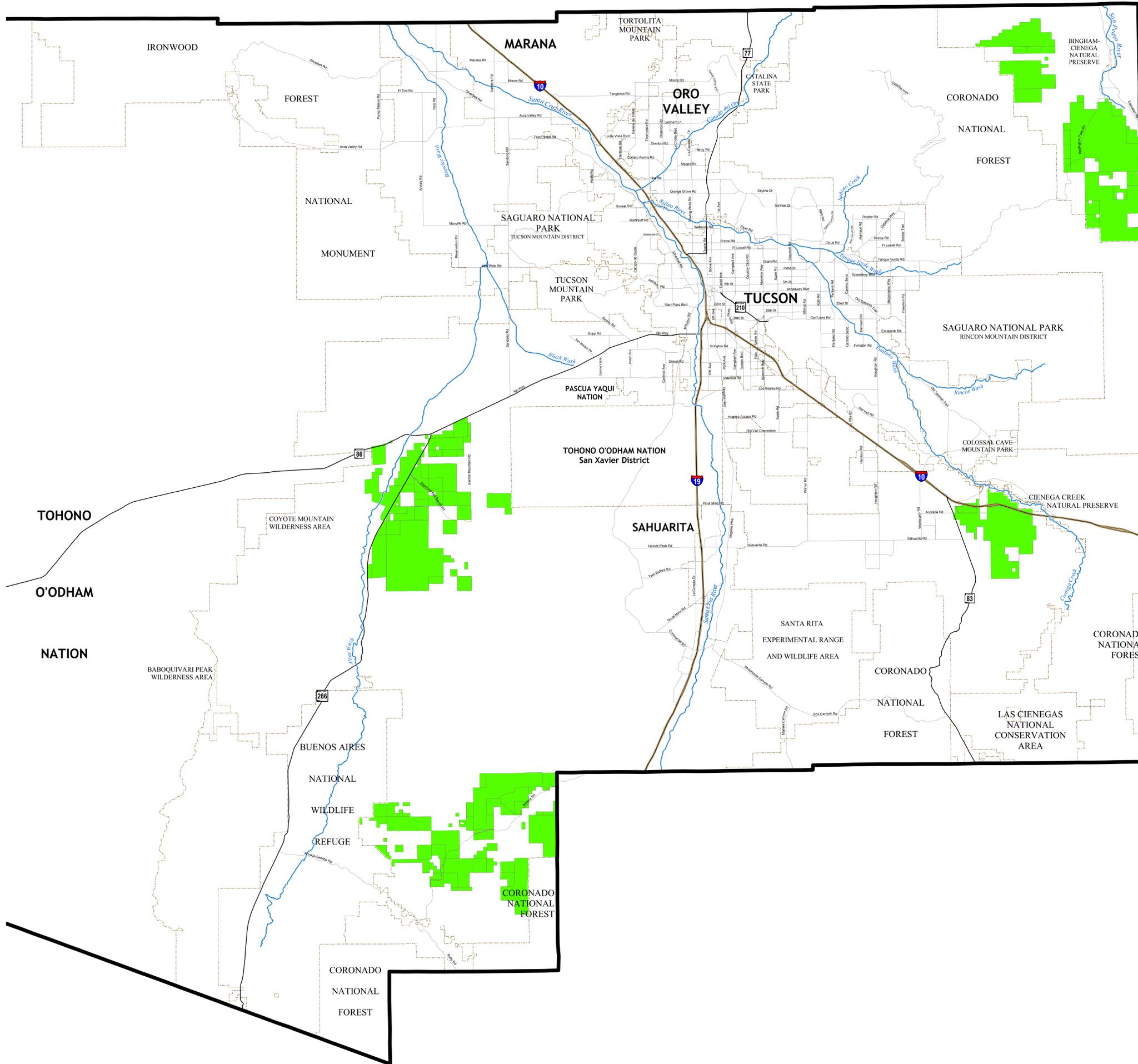


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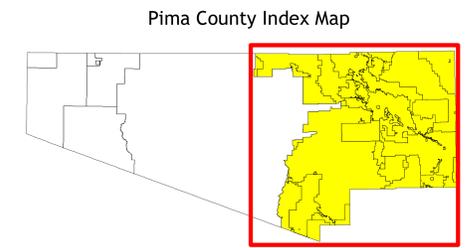


04/14/2009

PIMA COUNTY HELD STATE GRAZING LEASES



 Pima County Held State Grazing Leases (~123,700 acres)



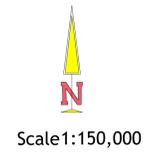
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SDCP, developer subdivision dedications, and BLM lands which are likely to be obtained under existing applications through the Recreation and Public Purposes Act (R&PPA) (Figure 3). Other private, state, federal and local reserves were not included in this layer.

Pima County Geographic Information Services staff the overlaid various classifications of County-preserved land with habitat models and PCAs. They compared the types of preserves as shown in the sample table below:

Current and potential conservation of species habitat in Pima County lands						
Conservation Target	MSCP mitigation to date: fee lands ²		MSCP Mitigation to date: State trust leases only		County-managed acreage conserved through SDCP ³	
	PCA acre	Model Acres	PCA acres	Model acres	PCA acres	Model acres
Species X						
Species Y						
Species Z						

² Including County owned MSCP committed lands owned by Pima County, not including state trust grazing leases., but including Tumamoc Hill and the Marley Phase 1 acquisition

³ Acres conserved by Pima County, including new and existing County preserves that are not part of the mitigation program, and existing R&PPA applications

In addition, Pima County GInSo used overlays of protected lands with special elements to calculate the sites, acres or linear miles of each special element conserved. Special elements include features such as perennial and intermittent streams, springs, caves, and talus deposits. All units are in acres, as springs and streams each have 300-foot buffers.

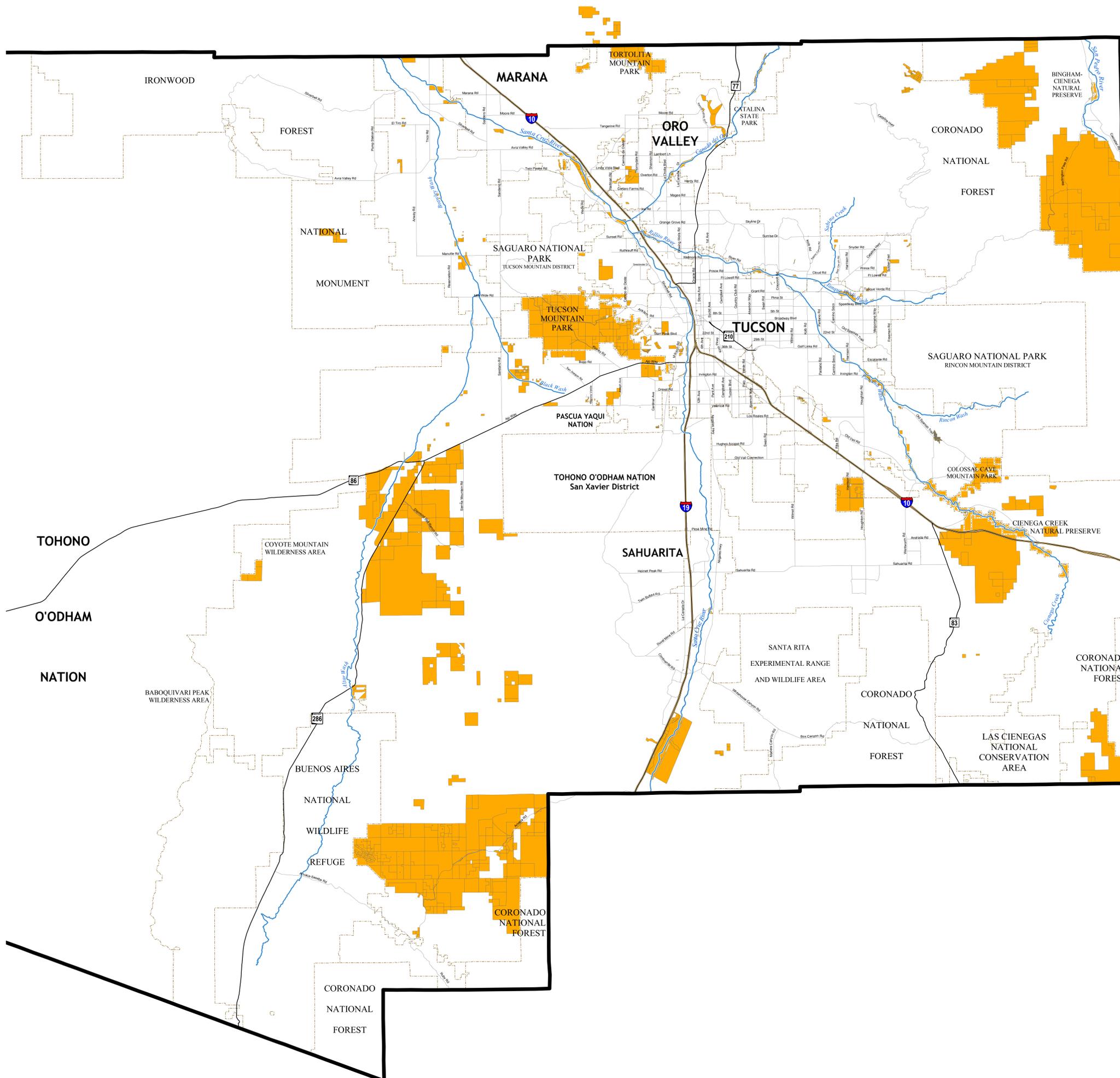
The contribution of state trust lands managed by Pima County to the MSCP was described based on the preceding analyses as well as reserve configuration. Reserve configuration was analyzed using the following metrics: average patch area , edge to area ratio (perimeter to area), average patch perimeter, and nearest neighbor distance (interpatch distance)

Adjacent ranch parcels owned in fee or through conservation easement by Pima County were joined together and considered as a patch. A parcel that was not adjacent to another parcel counted as a separate patch (see Figure 4). The class of all ranch lands owned in fee or through conservation easement was compared to the class of ranch fee lands joined together with their associated state trust grazing leases (Figure 2). Patch metrics were calculated without regard to federal lands or reserves managed by other entities..

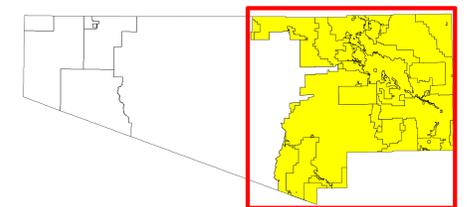
Results

COUNTY MANAGED CONSERVATION LANDS

 Pima County Managed Lands (~229,800 acres)



Pima County Index Map



Index Map Scale 1:1,500,000

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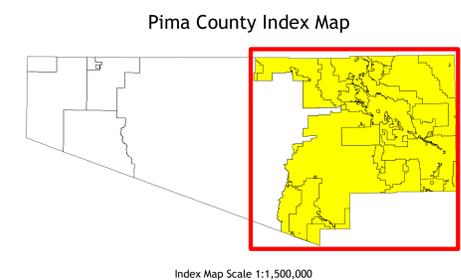
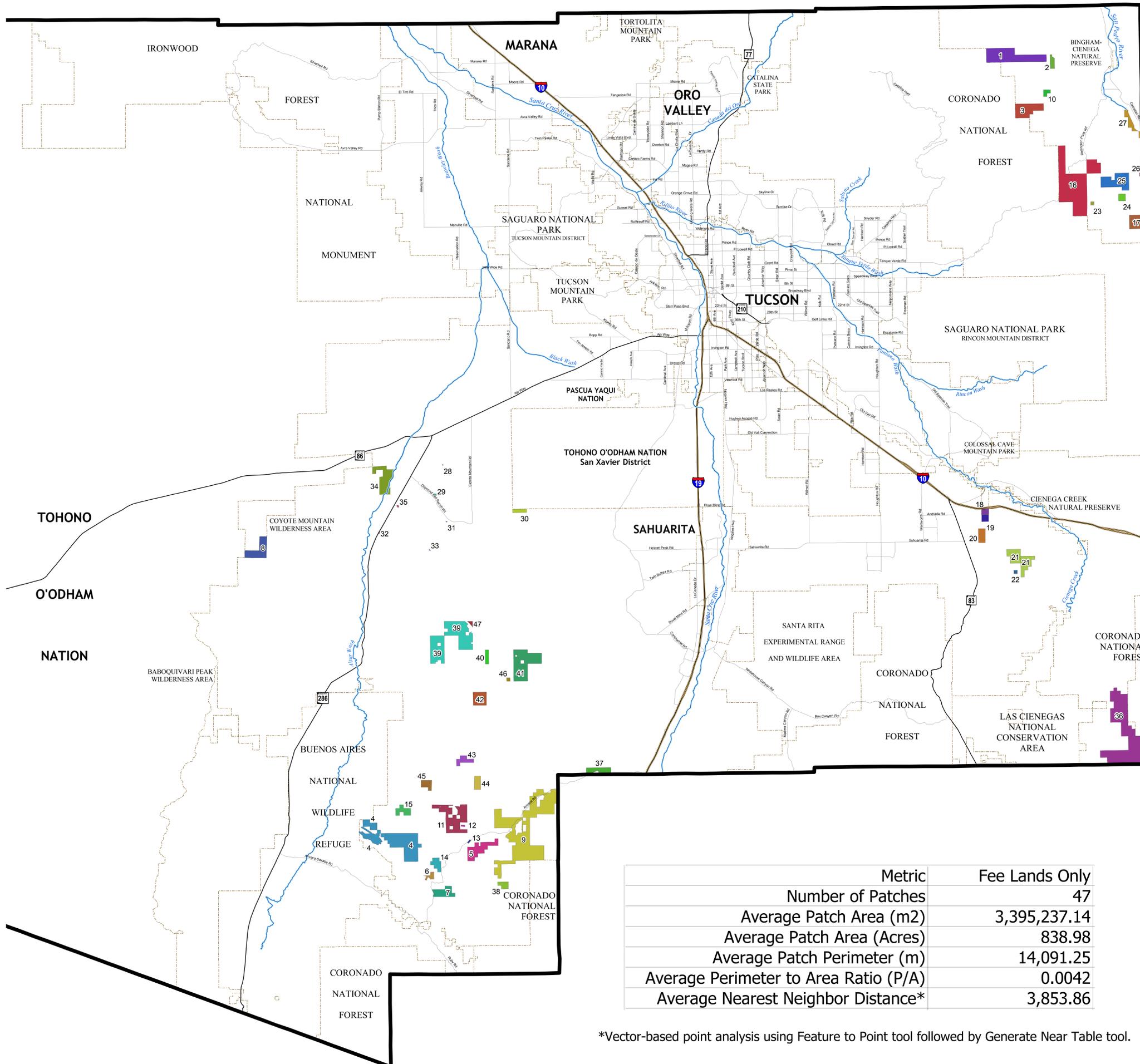
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04/20/2009

COUNTY RANCLAND "PATCHES" (FEE LANDS ONLY)

 Unique Ranchland "Patch" (various colors)



Metric	Fee Lands Only
Number of Patches	47
Average Patch Area (m2)	3,395,237.14
Average Patch Area (Acres)	838.98
Average Patch Perimeter (m)	14,091.25
Average Perimeter to Area Ratio (P/A)	0.0042
Average Nearest Neighbor Distance*	3,853.86

*Vector-based point analysis using Feature to Point tool followed by Generate Near Table tool.

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04/06/2009

Fee-owned mitigation lands are dispersed in 47 different patches, with an average patch area of around 800 acres. The ranch conservation element of the SDCP decreases the number of patches to 21 and the average patch area increases to 7500 acres. The perimeter to area ratio would be doubled if the County did not hold the associated grazing leases, and the nearest neighbor distance from patch to patch would more than double.

Tables 1, 2, and 3 list in acres the amount of each habitat, Priority Conservation Area (PCA) or special element that has been acquired. As explained above, the tables allow distinctions to be drawn between those mitigation acres under the proposed MSCP, and other lands which include leases and other County-owned lands for which no mitigation may be sought under the MSCP.

Since 2004, Pima County is making great strides in acquiring native grasslands, with over 20,000 acres projected for mitigation lands owned in fee at the end of this fiscal year, and a total of over 60,000 acres in county management (Table 1). Mitigation fee and leased lands also would include 10% of the known distribution of the mesquite woodlands special element. Over 800 acres of perennial streamsides are or will soon be in county management, of a total of 5124 acres. More than 2000 of the 16,000 acres of intermittent streamside will be in the County preserve network, making Pima County second only to the Coronado National Forest as a steward of this special element. County-managed lands, mainly Tucson Mountain Park, contain over 20% of the mapped talus deposits.

Tens of thousands of acres of priority conservation areas for individual species are projected to be acquired in fee, most notably for lowland leopard frog, Mexican long-tongued bat, lesser long-nosed bat, pale Townsend's bat, cactus ferruginous pygmy-owl, rufous-winged sparrow, red bat, and Swainson's hawk (Table 2). Leased lands include over 100,000 acres of lesser long-nosed bat PCA, and over 55,000 acres of pygmy-owl PCA. For Pima Pineapple Cactus, ~8700 acres of PCA has or will soon be acquired as committed lands, but this does not include the mitigation or leased acres, which would bring the total to 51,024 acres. A separate analysis of the Special Species Management Area for pygmy-owl finds that over 8000 acres will be conserved in fee mitigation lands by the end of the fiscal year, and a total of ~65,000 acres will be under County management.

In terms of habitat, the acreages acquired or in management are projected to be even higher than the more restricted PCAs (Table 3). Two species of concern, the Tumamoc globeberry and desert tortoise, lack designated PCAs, but each have tens of thousands of acres of land under County management. Over 30,000 acres of pygmy-owl habitat has been acquired in fee as mitigation under the MSDCP, for a total of ~120,000 acres in County management. Pima Pineapple Cactus habitat includes ~18,000 acres in fee, and almost 90,000 under County management. For these last two species, lands managed as mitigation banks under Section 7 of the Endangered Species Act are included only in the County management column.

Notably few acres have been acquired for the red-back whiptail lizard (Table 2). None of the 641 acres of red-back whiptail lizard PCA are located in committed or leased lands,

and no acres of habitat are projected to be acquired by the end of this fiscal year. The Draft 5 MSCP did not project take in the PCA of this species. The lack of acquisition or take call into question whether the County can meaningfully contribute to the conservation of this species. There are some 71 acres of lizard habitat which are under County management in reserves which predate the SDCP.

References:

Noss, R. F., O'Connell, and D. D. Murphy 1997. The Science of Conservation Planning. Island press, Washington, D. C.

Table 1. Special Elements Analysis (Acres)

<u>Element</u>	<u>Committed</u>	<u>Leases</u>	<u>Co. Managed</u>	<u>Total Element*</u>
cattail	0	0	0	29
cottonwood-willow	150	16	250	3,405
creosote-bursage	1,521	6,049	8,919	629,747
douglas fir-mix conifer	0	0	0	709
unincised floodplain	4,737	927	6,709	83,188
int.sw. deciduous riparian fo	143	68	211	6,872
intermittent stream	1,079	458	2,029	16,639
iwoodse	872	0	2,178	167,205
mesquite bosque	2,476	290	3,373	26,290
native grassland	20,765	33,996	61,909	393,103
oak-grassland ecotone	1,311	0	1,964	106,868
perennial stream	428	261	819	5,124
palo verde-saguaro	7,424	25,371	58,144	1,050,690
sacaton	403	140	543	10,145
saltbush	6	0	290	10,817
springs	59	3	68	1,575
riparian scrub	3,321	4,298	10,130	164,546
talus	3	0	905	1,925
taluscol	0	0	0	2,128
low elev valley floor	1,855	0	4,721	436,698

* Excluding Tribal Nations

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Table 2. Priority Conservation Area (Acres)

<u>Species</u>	<u>Committed</u>	<u>Leases</u>	<u>Co. Managed</u>	<u>Total PCA*</u>
Allen's big-eared bat	58	0	58	50,112
Burrowing owl	2,399	0	3,961	216,161
Desert box turtle	4,563	80	6,173	304,340
Cal. leaf-nosed bat	9,339	10,332	30,932	542,813
Cuckoo, yellow-billed	7,624	4,116	11,992	56,990
Desert sucker	92	0	99	9,167
Desert tortoise	N/A	N/A	N/A	N/A
Flycatcher, Southwest w	307		314	14,364
Tumamoc globeberry	N/A	N/A	N/A	N/A
Gila Chub	3,335	490	3,931	32,225
Ground snake	701	0	1,021	39,600
Chiricahua leopard frog	9,318	13,185	28,560	403,425
Lowland leopard frog	23,051	48,011	78,000	575,361
Lesser long-nosed bat	47,328	107,385	175,801	1,532,720
Longfin dace	2,755	1,246	4,009	19,853
Mexican long-tongued b	28,618	47,898	82,092	561,907
Gila topminnow	4,160	1,277	5,439	21,877
Mesquite mouse	8,155	789	9,163	119,584
Mexican Gartersnake	9,808	1,856	13,274	140,702
Needle-spined.cactus	5,849	11,154	17,182	44,172
Pima Pineapple Cactus	8,735	38,542	51,024	581,823
Pale Townsend Bat	18,908	28,717	60,397	306,520
Desert pupfish	N/A	N/A	N/A	N/A
Cactus ferruginous pygn	26,064	55,642	101,030	1,264,330
Red-back whiptail lizard	0	0	641	370,461
Red bat	14,077	12,144	33,044	512,767
Sonoran sucker	43	0	138	10,492
Rufous-winged sparrow	24,642	44,992	78,806	893,606
Giant spotted whiptail liz	6,028	4,529	13,078	321,644
Swainson's hawk	35,425	53,274	98,534	923,310
Abert's towhee	9,416	1,504	12,211	78,081
Tucson shovel-nosed sn	1,131	0	1,316	87,788
Huachuca water umbel	3,512	685	5,230	35,608
Bell's vireo	7,228	2,102	10,414	63,672
Yellow bat, western	4,627	3,294	9,474	147,749

Table 3. Habitat Model Analysis (Acres)

<u>Species</u>	<u>Committed</u>	<u>Leases</u>	<u>Co. Managed</u>	<u>Total Habitat*</u>
Allen's big-eared bat	42,008	79,460	146,088	1,865,010
Burrowing owl	18,391	33,112	67,916	2,824,740
Desert box turtle	26,542	41,674	72,485	870,330
Cal. leaf-nosed bat	47,597	99,186	184,695	3,246,020
Cuckoo, yellow-billed	6,757	898	9,406	288,704
Desert sucker	83	51	152	1,044
Desert tortoise	29,740	53,952	113,078	1,240,280
Flycatcher, Southwest willow	3,945	458	5,437	121,412
Tumamoc globeberry	11,619	31,267	61,275	1,600,040
Gila Chub	83	51	152	1,044
Ground snake	46,110	73,769	130,785	3,000,970
Chiricahua leopard frog	10,386	11,711	25,952	1,251,330
Lowland leopard frog	23,202	45,543	78,343	806,327
Lesser long-nosed bat	55,170	105,279	201,737	3,347,920
Longfin dace	83	51	152	1,044
Mexican long-tongued bat	41,310	78,847	144,879	1,822,670
Gila topminnow	84	51	153	1,044
Mesquite mouse	41,510	97,892	168,045	2,057,700
Mexican Gartersnake	7,841	945	11,092	258,283
Needle-spined.cactus	20,044	46,160	68,624	450,766
Pima Pineapple Cactus	18,490	53,873	89,957	1,007,090
Pale Townsend Bat	48,438	88,031	170,165	3,390,270
Desert pupfish	84	51	153	1,044
Cactus ferruginous pygmy-owl	31,038	61,314	123,915	3,205,010
Red-back whiptail lizard	0	16	87	367,003
Red bat	48,133	78,495	142,592	2,434,600
Sonoran sucker	84	51	153	1,044
Rufous-winged sparrow	40,812	87,150	146,801	2,278,790
Giant spotted whiptail lizard	5,586	5,269	11,973	109,342
Swainson's hawk	49,923	95,675	170,358	3,315,150
Abert's towhee	10,995	4,889	18,890	489,680
Tucson shovel-nosed snake	12,101	13,277	33,383	1,215,110
Huachuca water umbel	2,128	394	2,948	34,493
Bell's vireo	11,027	7,093	22,265	489,680
Yellow bat, western	27,849	29,183	73,609	2,889,960

* Excluding Tribal Nations

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