

**SCIENCE TECHNICAL ADVISORY TEAM
SUBCOMMITTEE MEETING NOTES OF APRIL 22, 2005**

Attendees: David Scalero, Christie McVie, Priscilla Titus, Paul Fromer, Scott Richardson, David Hogan, Courtney Conway, Mark Ogonowski and Bob Steidl

Meeting Goal

Determine what actions can be done to insure adequate coverage of the burrowing owl and cactus ferruginous pygmy-owl species under Pima County's Multi-Species Conservation Plan (MSCP).

Burrowing Owl

Courtney Conway provided a brief overview on the needs of the burrowing owl. In the natural setting, this owl is associated with prairie dogs in open grassland communities. The owl uses the tunnels provided by the prairie dogs for shelter and nesting purposes. Since the prairie dog no longer occurs in Pima County (there are historical records), burrowing owls have been using round-tailed ground squirrel holes. Although the owl cannot dig its own hole, it is able to modify the small holes dug by the squirrel. This is evident by the distribution of owls at Davis Monthan Air Force Base, which has a large number of round-tailed ground squirrel colonies on site.

Burrowing owl needs:

1. Burrows: use of round-tailed ground squirrel holes; owls will expand on holes that are already dug
2. Open habitat: sparse vegetation around burrows so they can see predators/prey
3. Abundant food

MSCP Actions:

1. **Identify existing owl populations on a map:** Where they are now
2. **Manage flood prone lands and recovering agricultural lands for the benefit of the owl:**
 - a. Agricultural lands that are kept as open fields are good for owl habitat
 - b. Management of channels to provide for/maintain owl burrows
 - c. Construct artificial burrows as needed to allow owls to move into while the natural elements (squirrels and soil piping) are being restored; artificial burrows will require routine maintenance (biannual) to keep integrity for owl use.
3. **Maintenance/reintroduction of colonial mammal populations where possible:** The owls can expand their territory with a healthy, colonial element intact.
 - a. Round-tailed ground squirrels - owls are already using colonies of this squirrel in places like Davis Monthan Air Force Base.
 - b. Prairie dogs - burrowing owls are normally associated with this species in the

nature, however prairie dogs no longer occur in Pima County. If reasonable, prairie dogs could be reintroduced into the area. This would require interested owners of large tracts of land to maintain a healthy population.

4. **Relocations of owls from developed areas**
 - a. This should be used as a last measure.
 - b. Owls have the ability to expand into areas on their own, even into human populated areas, given that adequate needs are present.

Cactus Ferruginous Pygmy-owl

Primary threat to this species is development.

MSCP Actions:

1. Protection of known sites
 - a. Conservation Land System helps protect locations in Altar Valley, Organ Pipe Cactus National Monument and Ajo
 - b. Focus efforts on protecting Northwest Tucson, Tortollita Fan and Avra Valley
2. Managing corridors of unoccupied habitat: Maintain nesting structure.
3. Insure protection in perpetuity of Special Species Management Areas (80% open space): Ordinance vs. Guidance.
4. Prioritize acquisitions of known locations (locations where owls have occurred, not just current locations): Restore degraded lands, as needed, and eliminate edge effects.
5. Support reintroduction efforts in the Northwest Tucson area.

Pima County Multi-Species Conservation Plan
 Table X. Species Evaluation for Coverage under the PCMSCP

Common Name Scientific Name STATUS	CONSERVATION GOAL CONSERVATION ACHIEVED WITHIN CLS IN PERMIT AREA	GENERAL BASIS FOR ANALYSIS OF SPECIES COVERAGE	POTENTIALLY IMPACTED / DEVELOPED WITHIN PERMIT AREA @ BUILDOUT	PROPOSED or NOT PROPOSED FOR COVERAGE
Western Burrowing owl <i>Athene cunicularia hypugaea</i> G4 TU S4	CONSERVATION ACHIEVED WITHIN CLS IN PLANNING STUDY AREA 75% 74% 63%	(e.g., Acres of PCA's, H/M Habitat, or # Known Locations in Permit Area) PCA acres	(e.g., Acres of PCA's, H/M Habitat, or # Known Locations) ≈19,000 PCA acres	(Yes / No) Yes
DETAILED RATIONALE FOR INCLUDING / NOT INCLUDING UNDER PERMIT:	High potential for federal listing during the life of the Permit. Does not meet STAT conservation goals within either the Permit Area or the Planning Study Area. However, the goal for the Permit Area is nearly met (-1%).			
SPECIAL CONDITIONS:	Tailor special conditions in the context of riparian species, in order to avoid conflict with those higher-water habitat needs. (Burrowing owls are associated with grasslands and open desert scrub but are also found along the Santa Cruz River where there is sufficient friable soil for burrows.) Prioritize acquisition of lands with grassland plant community and/or secondarily, the acquisition of agricultural lands.			
MANAGEMENT / MONITORING DIRECTIVES:	Pima County could actively manage for this species on their conservation acquisition lands and PCRFCFCD lands (e.g., add a biological monitoring component to watercourse maintenance activities; manage vegetation for foraging habitat through fire or grazing; continue collaboration with AZG&F to install artificial burrows) Monitor sites where artificial burrows have been installed and/or new colonies have established (i.e., Santa Cruz River, Ajo Detention Basin, Avra Valley, Davis-Monthan AFB.) Collaborate with federal partners (FWS, NPS, USFS, BOR, DOD, NRCS), and other conservation groups such as the Tucson Audubon Society. If there is collaboration with the Town of Marana and City of Tucson HCP's and management strategies, this species could foreseeably be well protected in all Permit Areas.			

Pima County Multi-Species Conservation Plan
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Common Name Scientific Name	CONSERVATION GOAL CONSERVATION ACHIEVED WITHIN CJS IN PERMIT AREA	GENERAL BASIS FOR ANALYSIS OF SPECIES COVERAGE	POTENTIALLY IMPACTED / DEVELOPED WITHIN PERMIT AREA @ BUILDOUT	PROPOSED or NOT PROPOSED FOR COVERAGE
<p>Cactus ferruginous pygmy-owl <i>Glaucidium brasilianum cactorum</i> C5 T3 S1 LE</p>	<p>75% 85% 93%</p>	<p>PCA's (e.g., Acres of PCA's, H/M Habitat, or # Known Locations in Permit Area)</p>	<p>≈26,000 acres (e.g., Acres of PCA's, H/M Habitat, or # Known Locations)</p>	<p>Yes (Yes / No)</p>
<p>DETAILED RATIONALE FOR INCLUDING / NOT INCLUDING UNDER PERMIT:</p>	<p>STAT conservation goal is exceeded for both the Permit Area and the Planning Study Area. Most known locations are within the current built environment area.</p>			
<p>SPECIAL CONDITIONS:</p>	<p>Strictly enforce the conservation %'s identified by the CJS (i.e., not use simply as guidelines.)</p> <p>Utilize best available science as reflected by recommendations of ESA Recovery Team.</p> <p>Prioritize acquisition of lands with riparian and palo verde/saguaro plant communities.</p> <p>In Altar Valley: Need to recognize the potential for impacts outside of but adjacent to PCA's. Impacts there may not be adequately addressed, because the potential development of existing private land @ Diamond Bell Subdivision is not captured by the Buildout Footprint.</p>			
<p>MANAGEMENT / MONITORING DIRECTIVES:</p>	<p>Collaborate with federal partners (FWWS, NPS, USFS, BOR, DOD, NRCs), and other conservation groups such as the Tucson Audubon Society.</p>			

To: C.H. Huckelberry, County Administrator

From: Science and Technical Advisory Team (STAT)

Date: 11 May 2005

Subject: Conservation Lands System Guidelines

At the May 3, 2005 Board of Supervisors Meeting, the Board requested that STAT review modifications and clarifications to the CLS Definitions and Guidelines proposed as part of an amendment to the Pima County Comprehensive Plan. We welcome the opportunity to address these issues.

- Appropriate development levels for Multiple-Use Lands. Our goal in creating this CLS category was to surround and connect the Biological Core and Important Riparian Areas with land uses that are capable of supporting considerable biodiversity and, importantly, create a landscape that is permeable to wildlife and plant pollination and dispersal processes so that Biological Core and Important Riparian Areas are less likely to be genetically isolated. We believe land uses in which at least 65% of the land is not developed can provide this permeability, especially if the configuration of those undeveloped areas is designed to maximize its potential for conserving biodiversity.
- Application of Conservation Guidelines. For all CLS categories, the amount of conservation to be achieved should be applied to the **entire** area of each site within the CLS that is under review, not simply the individual parts of a site that have highest biological values.
- Mitigation. In some circumstances, exceptions to the CLS conservation guidelines for on-site habitat set asides may be appropriate. In such cases, mitigation (including restoration and enhancement activities) is a legitimate tool to achieve the overall desired level of conservation. However, mitigation (such as acquisition of off-site lands with high biological values) must provide benefits that clearly equal or exceed the conservation benefits otherwise achievable through retaining all conservation (set-asides) on-site; and, it must be demonstrated that the exception to the conservation guideline for on-site conservation does not significantly compromise the goal of ensuring that CLS lands remain as biologically connected and permeable landscapes.

Finally, we wish to clarify the conditions which would warrant adjustments or exceptions to the CLS. Specifically, we wish to address the assertion that some properties that may

seem to have low or no biological value were "mistakenly" included in the CLS. The CLS is a regional-scale plan for conserving biodiversity that is based on many factors including biodiversity (species and communities), regional connectivity, size and arrangement of protected areas, proximity to existing protected areas, etc. There are undoubtedly individual parcels or parts of parcels in the CLS that, when analyzed out of context, may appear to be degraded or biologically impoverished. However, for the CLS to be effective in realizing SDCP conservation goals, these sites must be subject to the same conservation standards as other sites within the CLS.

Over time, it may be appropriate to amend or revise the CLS based on new knowledge **provided that the new information is comprehensive and regional in scope.** Amendments or exceptions based on individual parcel analyses are not appropriate. Over time, such amendments or exceptions would likely result in a cumulative erosion of the effectiveness of the CLS as a conservation tool.

TO: C. H. Huckelberry, County Administrator

FROM: Science Technical Advisory Team (STAT)

DATE: 11 May 2005

SUBJECT: Pima Pineapple Cactus Conservation

Over the last several months, STAT has been evaluating the Conservation Land System (CLS), its associated conservation guidelines, and the pattern of projected urban development to determine whether our goals for conservation of certain individual species will be met.

As part of our evaluation of the Pima pineapple cactus, we recently adopted revised Priority Conservation Areas based on a compilation of known locations. We also learned that recent surveys for the plants in ~~southern Pima County~~, Cochise County and northern Sonora have not produced significant findings of new locations. Conservation through acquisition of Habitat Protection Priorities under the auspices of the May 2004 Open Space Bond also appears to miss those areas that are crucial for long-term conservation of this cactus. This new information, coupled with the documented and projected losses of this taxon, and knowledge of relatively few areas where the cactus is secure, indicates that successful conservation of Pima pineapple cactus is more daunting than previously anticipated.

By design, the CLS is a landscape-level biodiversity conservation plan. Consequently, there has always been the possibility that the CLS would not in and of itself address the Science Team's goals for all species. The evidence now suggests that additional measures are needed to ensure conservation of the Pima pineapple cactus.

STAT recommends a range of conservation measures be used to attain the level of conservation originally envisioned for this Priority Vulnerable Species. Broadly speaking, STAT recommends that substantial tracts of lands with high value habitat in the Altar Valley and Santa Rita piedmont be protected and conserved from urban development, invasive non-native grasses, cactus poaching, and off-road vehicular use (See Map XX). Those lands associated with the bajada of the northern Sierrita Mountains, which form a connective bridge between cacti in the Altar Valley and the Santa Rita piedmont, should be subject to conservation measures that emphasizes on-site conservation to retain Pima pineapple cacti and other ~~on-site retention of all~~ native cacti (which help support native pollinators) as well as physical site conditions such as hydrology and soils. Maintaining these features within the 'bridge areas' is necessary to maintain the transfer of genetic material between known populations.

Connectivity

Specific measures that can help conserve the Pima pineapple cactus are presented below:

1. Expand the proposed Special Species Management Area (SSMA) to include Pima pineapple cactus PCAs. Require 80% conservation levels for rezoning projects within those SMA's.

1. Where possible within these SSMA's, require on-site conservation of Pima pineapple cactus. Where on-site conservation is not possible, require off-site conservation in conservation banks established within the boundaries of the SSMA. Ensure that on-site conservation results in habitat that is a configuration and size that contributes toward the long-term conservation of the Pima pineapple cactus. Small, isolated areas of habitat that are surrounded by urban development will not contribute toward its conservation.

- ~~1.2.~~ Immediately establish additional ~~mitigation~~-conservation banks within the boundaries of the ~~Priority Conservation Areas~~ SSMA, targeting areas of known populations, such as the low to mid-elevation areas of northern Altar Valley and in the vicinity of the Santa Rita Experimental Range (see map). Mitigation banks could be established by local governments, tribal entities, or by private entities such as builder/developer coalitions.
- ~~2.3.~~ Revise Pima County's native plant preservation ordinance to conserve native plant habitat, and implement mitigation requirements. Specifically, the requirements for the northern Sierrita Mountains portion of the SSMA ~~PCA~~ would establish a preference for on-site conservation of cactus habitat, and maximize opportunities for land acquisition. Outside the northern Sierrita Mountains PCA, the preference would be to mitigate off-site through the acquisition of credits in established conservation ~~fund~~ ~~off-site mitigation~~ banks.
- ~~3.~~ Expand the proposed Special Species Management Area (SSMA) to include Pima pineapple cactus PCAs. Require 80% conservation levels for rezoning projects within those SMA's.
- ~~4.~~ Collaborate with developers to explore the benefits of more careful salvage, transplant and monitoring of any individual specimens taken from the 20% allowable developed area.
- ~~5.4.~~ Secure long-term protection of lands in the Santa Rita Experimental Range.
- ~~6.5.~~ Acquire land or land interests in the SSMA's ~~PCAs~~ using 1997 or 2004 bond funds, whether in the Altar Valley, Sierrita piedmont, or Santa Rita piedmont.
- ~~7.6.~~ Support and conduct surveys for PPC in the southern Sierrita piedmont.
- ~~8.7.~~ Evaluate the conservation value of federally owned lands in the range of the species.
- ~~9.8.~~ Conserve, manage, and monitor populations of Pima pineapple cactus located on County lands.

Cc: Dr. Bill Shaw, Chair, STAT
Members of the STAT
Who else???

Table 1
Detailed Analysis of Projected Impacts to Pima Pineapple Cactus PCAs in Permit Area

		CLS Category					Total		Grand
		Biologica	Multiple		Agricultur	Inside	Outside	Total	
		l Core	Use	Riparian	e	CLS	CLS		
PCA 1	Existing Built	3,270	1,923	723	178	6,094	6,335	12,428	
	0-10 years	712	667	36	8	1,423	75	1,498	
	10-20 years	559	321	95		975	115	1,089	
	20 years-Buildout	6,709	473	212		7,394	1,571	8,965	
	New Impacts	7,980	1,461	343	8	9,792	1,761	11,552	
	Not Impacted	9,554	18,930	5,796	552	34,832	2,110	36,942	
	Total - Existing Built								48,494
PCA 1 Total		20,804	22,314	6,861	738	50,717	10,205	60,922	
PCA 2	Existing Built		67	473	0	539	12,461	13,000	
	0-10 years					-	350	350	
	10-20 years			7		7	2,881	2,888	
	20 years-Buildout	3	862	708		1,572	13,556	15,129	
	New Impacts	3	862	715	-	1,579	16,788	18,367	
	Not Impacted	1	168	570		739	10,151	10,889	
	Total - Existing Built								29,256
PCA 2 Total		4	1,096	1,758	0	2,857	39,399	42,256	
PCA 1 &	Existing Built	3,270	1,990	1,195	178	6,633	18,795	25,428	
	0-10 years	712	667	36	8	1,423	425	1,848	
	10-20 years	559	321	101	-	981	2,995	3,977	
	20 years-Buildout	6,712	1,335	920	-	8,966	15,128	24,094	
	New Impacts	7,983	2,322	1,057	8	11,371	18,548	29,919	
	Not Impacted	9,554	19,098	6,366	552	35,570	12,261	47,831	
	Total - Existing Built								77,750
PCA 1 & 2 Total		20,807	23,410	8,619	738	53,574	49,604	103,178	

PCA Remaining in Permit Area			
	10 years	20 years	Buildout
PCA 1	97%	95%	76%
PCA 2	99%	89%	37%
PCA 1 &	98%	93%	62%

Table 2
Detailed Analysis of Projected Impacts to Pima Pineapple Cactus PCAs in Pima County

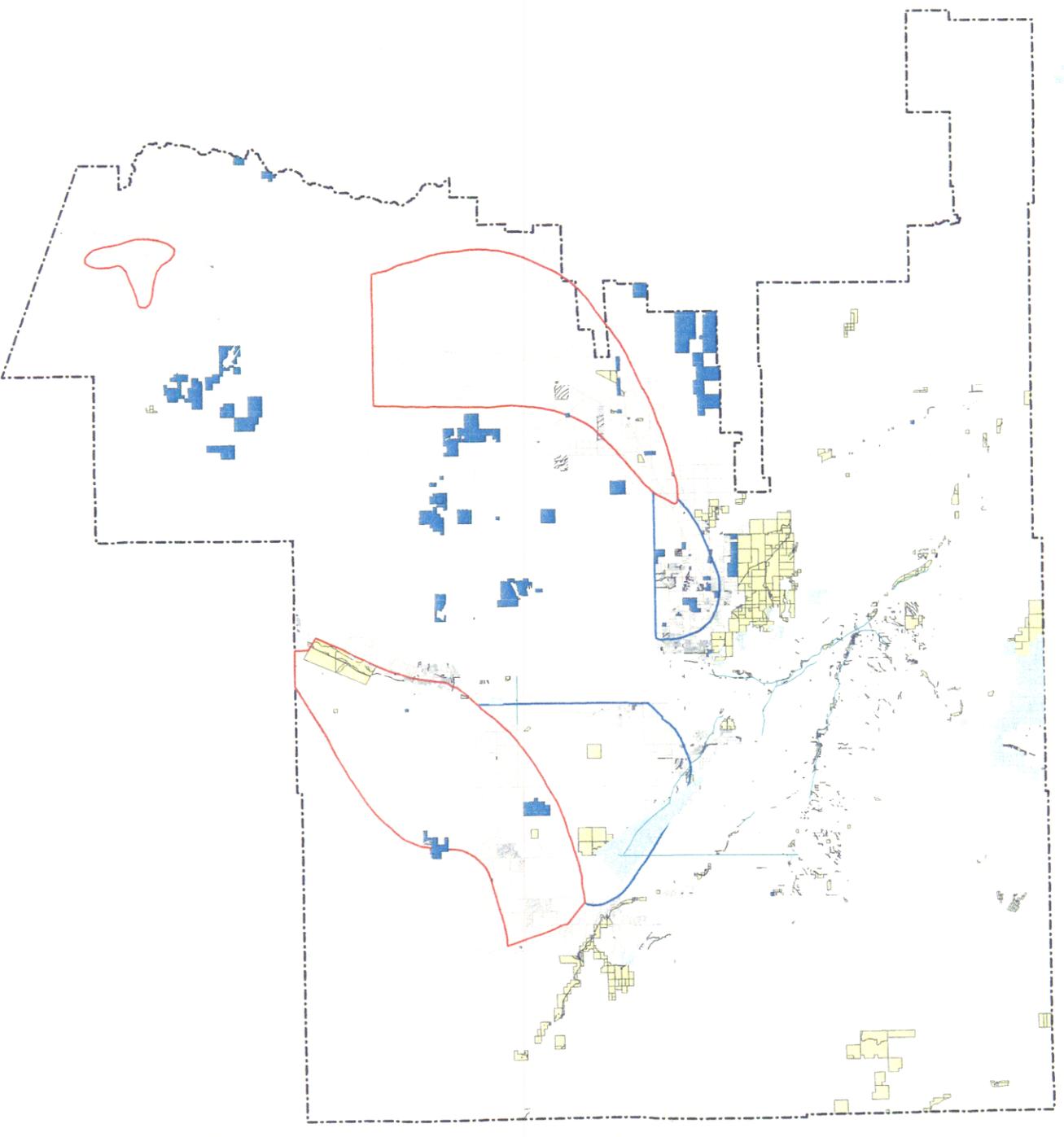
		CLS Category				Total		
		Biological	Multiple	Riparian	Agriculture	Inside	Outside	Grand
		Core	Use			CLS	CLS	Total
PCA 1	Existing Built	3,783	2,373	1,017	711	7,884	7,690	7,690
	0-10 years	1,207	863	159	197	2,425	826	826
	10-20 years	3,700	1,385	539	157	5,781	1,844	1,844
	20 years-Buildout	25,950	3,468	953		30,370	4,036	4,036
	New Impacts	30,856	5,715	1,651	354	38,576	6,706	6,706
	Not Impacted	93,192	92,344	16,309	797	202,642	8,768	8,768
	Total - Existing Built							
PCA 1 Total		158,688	106,147	20,628	2,216	287,679	29,870	29,870
PCA 2	Existing Built		68	765	161	994	21,009	21,009
	0-10 years					-	697	697
	10-20 years			7		7	3,924	3,924
	20 years-Buildout	77	3,071	1,362		4,510	37,789	37,789
	New Impacts	77	3,071	1,369	-	4,517	42,410	42,410
	Not Impacted	46	336	2,318	734	3,433	28,851	28,851
	Total - Existing Built							
PCA 2 Total		199	6,545	5,821	895	13,461	134,680	134,680
PCA 1 & 2	Existing Built	3,783	2,440	1,783	872	8,878	28,699	28,699
	0-10 years	1,207	863	159	197	2,425	1,523	1,523
	10-20 years	3,700	1,385	546	157	5,788	5,768	5,768
	20 years-Buildout	26,027	6,539	2,315	-	34,880	41,825	41,825
	New Impacts	30,933	8,786	3,020	354	43,093	49,116	49,116
	Not Impacted	93,238	92,679	18,627	1,531	206,076	37,618	37,618
	Total - Existing Built							
PCA 1 & 2 Total		158,886	112,693	26,449	3,111	301,139	164,550	164,550

PCA Remaining in Pima County			
	10 years	20 years	Buildout
PCA 1	95%	83%	57%
PCA 2	99%	94%	40%
PCA 1 & 2	98%	92%	43%

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Pima pineapple cactus (<i>Coryphantha scheeri</i> var <i>robustispina</i>) C4 TW/ LE	90% 65%** 93%	PCAs	≈30,000 acres	YES**
DETAILED RATIONALE FOR INCLUDING / NOT INCLUDING UNDER PERMIT:	Does not meet STAT conservation goals within the Permit Area (~35%), but meets/exceeds goals within the Planning Study Area. **Acquisition of additional acres of PCA would be necessary in order to meet STAT conservation goal and to warrant coverage of this species.			
SPECIAL CONDITIONS:	<p>Significant portions of the PCA's were annexed by the City of Tucson. PCA boundaries have recently been updated by STAT. This is a sparsely distributed species, found mostly along relatively flat areas of Sonoran desertscrub that are areas typically favored for development. More information is needed on the size and distribution of populations. Land disposal in Santa Cruz basin (as defined by 2004 bond priority map) would allow development of about 600 acres of habitat known to have 28 cacti in Swan Southlands in Year 2000. (The approx. 600 acres is currently County-owned as PPC Mitigation Bank: high PPC mortality in this area has been observed since 2002, presumably due to drought. The remainder of the Swan Southlands Specific Plan area under private ownership (approx. 2560 acres) supports 135 PPC. In addition, a proposed land exchange with BLM along Sahuarita road would release additional habitat to development. County is also issuing permits to develop on private lands in Black Wash area, where there is suitable habitat. Acquisition of +/- 22,000 acres would achieve 90% goal. Strengthen the NPPD during the first phase of the MS/CP to minimize losses related to development; add an option for purchasing credits in a mitigation bank to offset impacts to PPC that are not preserved in place.</p>			
MANAGEMENT / MONITORING DIRECTIVES:	<p>If there is collaboration with the City of Tucson's HCP and management strategies, this species could foreseeably be well-protected in both Permit Areas. Conservation easements on private lands and the establishment of mitigation banks, as has been done by the Altar Valley Alliance, would contribute greatly to long-term conservation. Strategies currently being implemented by Pima County are adequate for the initial 10-year Permit Phase. Pima County has taken positive steps to protect cacti, at Canoa Ranch and at Southeast Regional Park (i.e., A portion of this was fenced and set aside for the cactus, containing 102 individuals in 1998.) Pima County is considering acquiring Madera Highlands, known to have cacti, and Helvetia townsife, which has known specimens nearby. Establish a Special Species Management Area requiring survey and set asides in the CLS for this species. Strengthen the NPPD during the first phase of the MS/CP to minimize losses related to development; add an option for purchasing credits in a mitigation bank to offset impacts to PPC that are not preserved in place. Address loss of seedbank resources due to development. A management and monitoring plan needs to be developed.</p>			

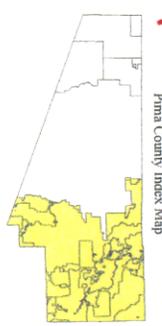
Pima Pineapple Cactus with Pima County/FCD Owned lands and Permit Area



Pima Pineapple Cactus

- Priority 1 - Total Acres - 275,946
- Priority 2 - Total Acres - 101,230
- Pima County/FCD owned or Permit
- BLM disposable lands
- PC/FCD owned lands
- Open Space Bond projects
- Cultural, River Park, Sewer bonds

Updated PCAs

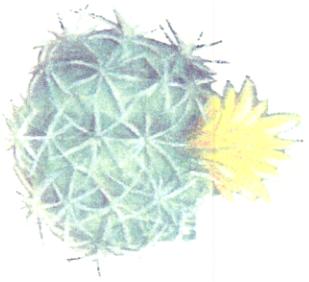


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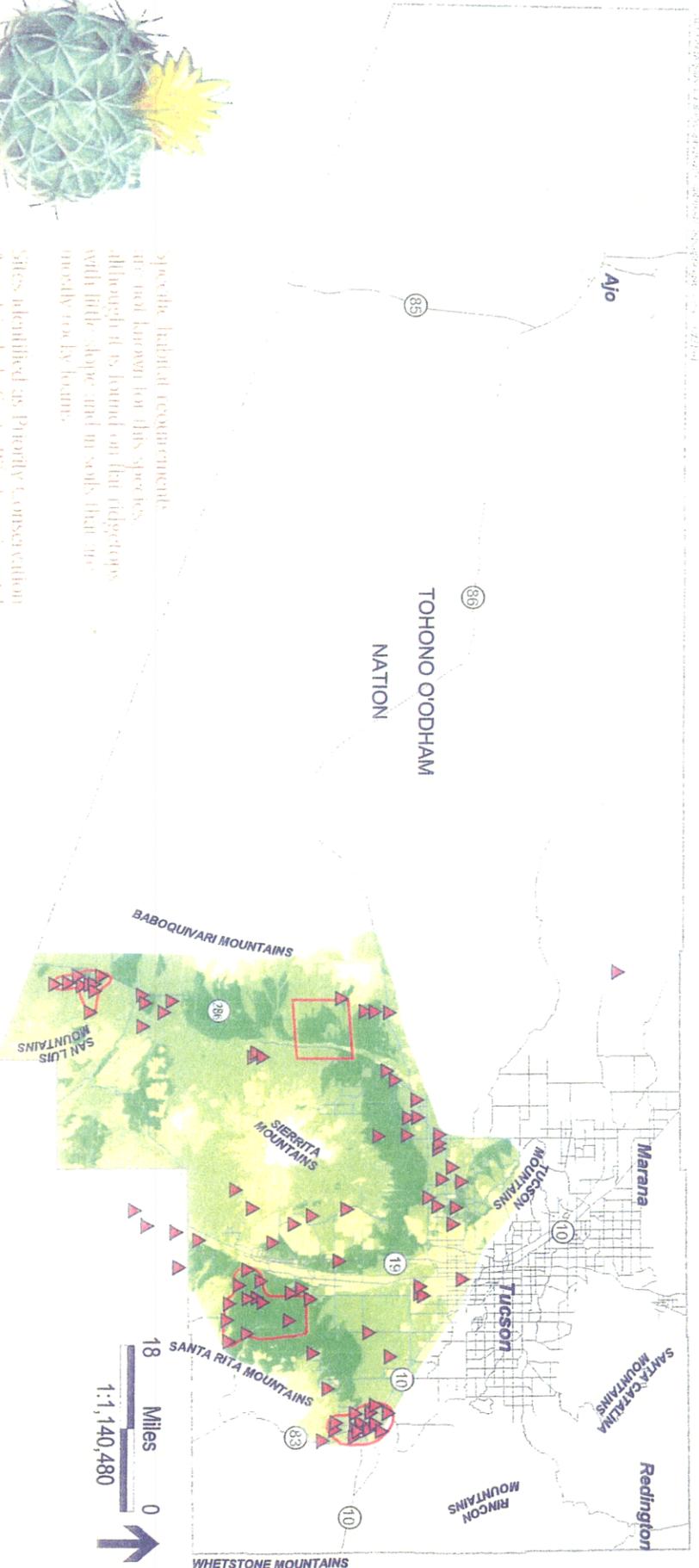
2011 North Stone Avenue - 8th Floor
Tucson, Arizona 85724-1307 - 5129
http://www.azdot.com/pima/2214





Specific habitat requirements are not known for this species, although it is found on flat ridgetops with little slope and in soils that are mostly rocky loams.

Sites identified as Priority Conservation Area 1 include Santa Rita Experimental Range and areas in Altar Valley.



Pima Pineapple Cactus (*Coryphantha scheeri* var. *robustispina*) Modeled Potential Habitat and Priority Conservation Areas

- Pima County Boundary
- Major Road or Highway
- Modeled Potential Habitat (RECON, November 2001)
 - No Potential
 - Low Potential
 - Medium Potential
 - High Potential
- Priority Conservation Areas (Expert Review Team, November 2001)
 - 1 Areas with populations which must be within the reserve system (excluding the Tohono O'odham Nation)
- Known Locations
 - Present and Historic

Figure 46

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needle-spined pineapple cactus <i>(Echinomastus erectocentrus var. erectocentrus)</i> G3	95% 76%** 94%	(e.g., Acres of PCA's, H/M Habitat, or # Known Locations in Permit Area) PCAs	≈2,800 acres (e.g., Acres of PCA's, H/M Habitat, or # Known Locations)	(Yes / No) Yes**
DETAILED RATIONALE FOR INCLUDING / NOT INCLUDING UNDER PERMIT:	There is too much development in the PCA relative to the STAT goals for this species.			
SPECIAL CONDITIONS:	Primary Conservation Areas are found in the Cienega Creek watershed areas and the area south of I-10 @ Sonoita Highway exit. Much of this is on State Trust Lands. **Acquisition of an additional 2,222 acres of PCA lands would bring the conservation %, within the CLS in the Permit Area, up to the 95% level recommended by STAT. Strengthen the NPP0 during the first phase of the MSCP to minimize losses related to development.			
MANAGEMENT / MONITORING DIRECTIVES:	Management and monitoring directives are needed.			

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<p>Nichol's turk's head cactus (Echinocactus horizontalis var. nicholii) G4 T2 LE</p>	<p>90% 81%** 96%</p>	<p>(e.g., Acres of PCA's, H/M Habitat, or # Known Locations in Permit Area) PCAs</p>	<p>≈400 acres</p>	<p>YES</p>
<p>DETAILED RATIONALE FOR INCLUDING / NOT INCLUDING UNDER PERMIT:</p>	<p>Does not meet STAT conservation goals within the Permit Area (~9%), but meets/exceeds goals within the Planning Study Area.</p>			
<p>SPECIAL CONDITIONS:</p>	<p>90% of the range of this cactus is in Pima County, occurring only on limestone derived soils. Of the known/recorded occurrences, 4 are on BLM lands in the Silver Bell and Waterman Mountains, 2 are on State Lands and 6 are on private lands.</p> <p>**Acquisition of an additional 200 acres of PCA lands would bring the conservation % up to the 90% level recommended by STAT. Acquisition of 400 acres would achieve 100% conservation of the PCA.</p> <p>Much of the range of this species is within the Ironwood Forest National Monument.</p> <p>Collecting by hobbyists is a major threat. Other threats include ATV and mining.</p>			
<p>MANAGEMENT / MONITORING DIRECTIVES:</p>	<p>IAW Recovery Plan (USFWS 1986).</p> <p>Given that much of this species habitat is within federally managed lands, IGA/MOU's with management commitments could adequately serve to protect this species.</p> <p>Collaborate with TNC and AZ Dept. of Agriculture on their monitoring and research programs.</p>			

Item XI

SUMMARY OUTLINE FOR:

Pima County SDCP Riparian and Aquatic HCP Elements
(Plants, Fish, Amphibians and Reptiles)

- I)** Commitment to Programmatic Infrastructure. Focus on field personnel FTE's devoted to program, field managers, and director as top manager.
- II)** General tasks (aquatic-riparian species) under Pima County SDCP Program.
- A)** Monitoring, and research support:
 - B)** Coordination with key agencies, especially City of Tucson, AGFD, BLM, State Parks, NPS, U.S. Forest Service, National Wildlife Refuges, USFWS Ecological Services, and private and NGO partners.
 - C)** Establish or assist with nurseries and captive propagation for restoration project uses. Maintain attention to genetic and area-of-origin issues.
 - D)** Actions and methods for MSHCP conservation:
 - 1) Protect existing aquatic and riparian habitat (Top Priority):**
 - (a)** Land purchase, easements and management rights purchase, water rights purchase, regulatory ordinances.
 - 2) Non-native species control:**
 - 3) Create / restore suitable aquatic and riparian habitat**
 - 4) Establish species by introduction in vacant and created sites**
- III)** Site-specific examples to guide MSCP:
- A)** Cienega Creek: top quality habitat protected, exotic threats eliminated
 - B)** A7 (Redington Pass) and other Ranch areas: active, pond-based conservation.
 - C)** Ajo Detention Basin: combine flood control and native aquatics
 - D)** Agua Caliente and other major altered springs: pursue public support
 - E)** Paseo de las Iglesias and other projects in major drainage corridors: work toward project implementation and advocate surface water.
 - F)** Arthur Pack Park (golf course): replace exotic fish and frogs with natives; initiate landscaping changes to favor natives.
 - G)** Neighborhoods and urban/suburban public spaces: integrate conservation into neighborhood quality; integrate neighborhood environments into conservation concept.
- IV)** Species-specific targets for monitoring. Achieve a combination of the following targets suitable to preserve all or all possible Priority Vulnerable Species in eastern Pima County, and to represent a reasonable combination of met targets that demonstrate healthy, viable aquatic and riparian species assemblages. Use standard of "reasonable stability and abundance" (*def.* "Not rare; occurring in expected abundances; in context of demographics and genetics, can be expected and/or projected to persist in perpetuity").

GENERAL POINTS FOR STAT RE:

Pima County SDCP Riparian and Aquatic HCP Elements

(Plants, Fish, Amphibians and Reptiles)

12 May 2005

- (1) Does the STAT want the county to express advocacy for aquatic restoration and urban ecology ("reconciliation ecology") in the HCP?
- (2) Does the STAT like the idea of a programmatic commitment by the county to have people in a county department dedicated to reserve planning and management, adaptive management of parks and reserves, and supervision of county-employed field biotechnicians plus consultants?
- (3) To what extent does the county want to commit to leadership in developing active habitat and species management concepts, and pursuing their implementation with other agencies?
 - a. Many key actions cannot be carried out by county without outside approvals, which cannot be guaranteed. Thus:
 - b. Include defined and specific commitments to advocacy as part of HCP?
- (4) What are the appropriate targets for monitoring:
 - a. Compliance and regulation.
 - b. Understanding what's happening.
 - c. Guiding adaptive management (active management)
 - d. Guiding habitat acquisition and protection ("passive" [?] management)?
- (5) What kinds of targets should be set for monitoring, which might trigger evaluations of compliance:
 - a. Site occupancy rates
 - b. Abundance trends
 - c. Functional (causal) interpretations of population health or threats
 - d. Elimination of harmful exotics in target areas (specific ones, as well as in general)
 - e. Elimination of other threats?
 - f. Success at being allowed to utilize natives such as the topminnow?

DRAFT DETAILED OUTLINE FOR:

Pima County SDCP Riparian and Aquatic HCP Elements

(Plants, Fish, Amphibians and Reptiles)

Philip C. Rosen and J. Eric Wallace
University of Arizona

12 May 2005

I) Establishment of Programmatic and Administrative Structure.

- A) Establish program to carry out MSHCP goals and tasks set out below:**
- 1) Two fieldwork-oriented positions mostly for riparian/aquatic parts of program (birds and mammals not included), totaling:
 - (a) ≥ 1.2 FTE actual field contact.
 - (b) ≤ 0.8 FTE data management, quality assurance, reality check interactions with management.
 - 2) Two management-oriented FTE positions (total < 0.4 FTE in field) partly dedicated to aquatic/riparian aspects of ecological management:
 - (a) Floodplain acquisition, water rights, easements, physical parameters.
 - (b) Ecological planning, analysis and synthesis, and coordination with other field agencies and non-county landscape areas.
 - 3) Director (concerned with all SDCP biological issues) providing guidance to managers, developing ecological restoration programs, parks, and reserves, and providing vision for landscape, interfacing with county government, state, federal and private entities.
- II) General tasks (aquatic-riparian species) under Pima County SDCP Program.**
- A) Monitoring, and research support:**
- 1) Monitor county-owned and -managed areas for:
 - (a) Harmful non-native species or evidence of bio-vandalism involving non-native species or native species.
 - (b) Habitat conditions, fluctuations, and impacts (both natural and anthropogenic) likely to favor harmful non-native species or affect native species in ways requiring management.
 - (c) Presence/absence of riparian and aquatic Priority Vulnerable Species.
 - (d) Quantitative relative abundance of targeted Priority Vulnerable Species (in targeted areas) and of closely related or ecologically similar and representative species using readily repeatable, highly efficient methods.
 - 2) Support and/or endorse research to:

- (a) Design and help test monitoring methods.
 - (b) Understand and manage non-native species and inter-related habitat alteration problems.
 - (c) Understand and educate for public concerns, perceptions, and needs.
 - (d) Observe population structure, ecology, and demography that will provide advanced warning and indication of the function of negative impacts affecting Priority Vulnerable Species.
 - (e) Investigate ways to actively manage (resolve or mitigate) negative impacts using feasible management.
- 3) Cooperate closely in monitoring with other key agencies including:**
- (a) Federal land management agencies (NPS, USFS, USFWS, BLM, and Bureau of Reclamation) to dovetail efforts on adjoining lands at scales appropriate for target species.
 - (b) AGFD for permitting, design, database, and analysis, and instruction and data sharing for field procedures.
 - (c) University of Arizona.
 - (d) Private and NGO groups on non-public lands.
- B) Coordination will occur with the following in particular:**
- (a) City of Tucson for aquatic and riparian ecological restoration.
 - (b) AGFD for wildlife management authority (translocation, captive propagation) and expertise.
 - (c) AGFD, BLM, State Parks, NPS, U.S. Forest Service, and National Wildlife Refuges to ensure efficient pursuit of shared goals for aquatic management issues and joint monitoring where needed.
 - (d) USFWS Ecological Services for compliance and information sharing.
 - (e) Participating private and NGO partners, including development of incentive-based systems for active cooperators.
- C) Propagation:**
- 1) Establish one or more native plant nurseries and/or collaborate with private nurseries to ensure availability of native plants of local and genetically known provenance for riparian and aquatic uses, including in back yards, parks, golf courses, and major drainage-way restoration projects. Species would include Huachuca water umbel and many other locally native aquatic algae and higher plants, as well as native velvet mesquite and many other riparian forbs, shrubs, vines and trees.
 - 2) Establish a salvage program for native plants and their seeds in areas to be bladed for urban and suburban development.
 - 3) Collaborate with AGFD and Arizona-Sonora Desert Museum and private entities, including organizations with extensive grounds and

individuals with yards, to propagate and protect native aquatic species, including plants (as above) and animals, especially Gila Topminnow, Gila Chub, Desert Pupfish (and/or other pupfishes under careful supervision to avoid hybridization), Lowland Leopard Frog, Sonoran Mud Turtle, Desert Box Turtle, Giant Spotted Whiptail, and Mexican Garter Snake.

- 4) Utilize captive-propagated individuals for translocations to stock new or restored habitat areas.
- 5) Maintain genetically known populations to preserve known or presumed genetic diversity (i.e., from different wild source populations).

D) Actions and methods for MSHCP conservation:

1) Protect existing aquatic and riparian habitat (Top Priority):

- (a) Land purchase.
- (b) Easements and management rights purchase.
- (c) Water rights purchase.
- (d) Ordinances regulating habitat destruction, corridors, and environmentally friendly (proactive) development.
- (e) Promote appropriate use and enjoyment of preserve environments. Non-native species control:
 - (a) Identify key existing threats.
 - (b) Monitor to detect new threats quickly, especially in key places.
 - (c) Work with other agencies on removal plans and field actions.
 - (d) Plan landscape and habitat design to minimize habitat and dispersal potential for non-natives.
 - (e) Remove non-native species using landscape-level plans.
- (f) Identify non-native threats that are emerging or may likely emerge, including potentially invasive plants and exotic wildlife and plant diseases, before they become locally detectable problems.
 - (g) Follow field methods that minimize disease spread.
 - (h) Develop and publicize alternatives to non-native species using indigenous species or species with minimal invasion potential.
 - (i) Develop and publicize guidelines for habitat conditions suitable for native species and unsuitable for non-natives.
 - (j) Work toward ordinances supporting use of native species in landscaped settings.
 - (k) Work toward ordinances restricting use of non-natives in landscaped setting.
 - (l) Utilize native species and appropriate habitat conditions in restoration projects and other projects where aquatic and riparian species can thrive.
- 3) Create and restore suitable aquatic and riparian habitat wherever feasible:
 - (a) With other agencies, assist and help plan non-native species removals in created and restored habitat areas.
 - (b) Assist AGFD in planning for use of non-natives in sport fishing to minimize invasive species hazards and use native species for sport.

- (c) After finding consensus, develop, implement, and/or assist in landscape plans to renovate stock pond systems for native species occupancy, including non-native species removals, adjustments of water quality and availability, and establishment of native species.

- (d) After finding consensus, advocate, help develop, and assist in plans to renovate golf course pond and wetland systems for native species occupancy, including non-native species removals, avoidance of recolonization, habitat redesign, and establishment of native species.

- (e) After finding consensus, develop, implement, and/or assist in plans to renovate city and county park pond systems for native species occupancy, including non-native species removals, habitat redesign, and introduction or re-establishment of native species.

- (f) Work with U.S. Army Corps of Engineers, City of Tucson, Town of Marana, Santa Cruz County, and Pinal County to restore function and ecology of major drainage-ways and their environs:

- (i) Advocate and pursue urban restoration plans that are under study or near implementation using reclaimed water for riparian vegetation and subsurface wetlands, which support wetland vegetation without having open surface water.

- (ii) Develop plans and advocate for surface water with biological and habitat characteristics for communities without mosquito infestations.

- (iii) Maintain natural floodplain surfaces and their function wherever possible using land purchases, land-use regulations, development designs, and flood control designs to achieve this.

- (iv) Recharge aquifers that may be accessible to riparian plants or may restore surface flow where feasible.

- (v) Advocate for and enhance water quality of sewage effluent for utilization by aquatic and riparian wildlife and vegetation.
- (vi) Encourage and participate in propagation and supply of aquatic and riparian species needed for restoration or in created habitat.

III) Site-specific examples as illustration of actions required under MSHCP:

A) Cienega Creek:

- 1) Work with AGFD, BLM, Arizona State Lands Department, and Cienega Creek and Empire Valley citizens coalition groups to

eliminate invasion threats of mosquito fish, green sunfish, bullhead catfish, and crayfish, as well as other harmful non-native species by:

- (a) Identifying by survey all in-basin sources of such species.
- (b) Removing these potentially harmful populations from public lands as permitted by AGFD, Arizona State Land Department, BLM and U.S. Forest Service.
- (c) Replacing these populations with populations of native species as feasible.
- (d) Pursue permission by private landowners to remove harmful species.
- (e) Purchase lands, management rights easements, or access agreements on private areas supporting harmful species.
- (f) Develop ordinances for county forbidding utilization of harmful species in this drainage basin.
- (g) Advocate ordinances at state (or federal) level prohibiting biological contamination of Cienega Creek by harboring proscribed species.

B) A7 Ranch (Redington Pass):

- 1) Remove harmful non-native species or restrict them to harmless positions in the landscape.
- 2) Advocate the replacement of harmful species with natives that may be suitable for sport-fishing and wildlife observation.
- 3) With AGFD, USFWS, and U.S. Forest Service, develop a management plan for native aquatic animals in the Redington Pass area, including for Gila Topminnow, Longfin Dace, Gila Chub, Lowland Leopard Frog, Sonoran Mud Turtle.
- 4) Implement this plan as permitted by AGFD and USFWS.

C) Altar Valley and Arivaca area ranches:

- 1) Proceed similarly except:
 - (a) Focus on development of plans with ranchers and other residents in addition.
 - (b) Utilize Chiricahua leopard frog instead of lowland Leopard frog in appropriate places.
 - (c) Avoid use of Gila Chub where transportation/translocation into Rio Conception basin (i.e., geographic range of Sonora Chub) is possible.

D) Canoa Ranch:

- 1) Manage aquatic environment to minimize potential for bullfrog population.
- 2) Utilize native fishes, especially Gila Topminnow, for mosquito control, here and for all other cases where fish are utilized, as permitted by AGFD and USFWS.

E) Canada del Oro in Catalina:

- 1) Protect and re-establish native vegetation species and natural vegetation structure (multi-layers, thickets, etc.).
- 2) Utilize existing facilities to protect and produce native animals such as Gila Topminnow, Gila Chub, Sonoran Mud Turtle, and Lowland Leopard Frogs.

F) Ajo Detention Basin:

- 1) Utilize native species for mosquito control, including aquatic insects, Gila Topminnow, and Desert Pupfish, as permitted by AGFD and USFWS.
- 2) Increase native plant diversity by introducing suitable riparian and aquatic species from genetically appropriate sources of propagation or seed harvest.
- 3) Establish populations of Lowland Leopard Frog, Sonoran Mud Turtle, and Mexican Garter Snake as feasible based on habitat and permitting.

G) Agua Caliente and other major altered springs:

- 1) Develop and advocate plans for natural habitat and native species, including Gila Topminnow, Desert Pupfish, Gila Chub, Longfin Dace, Lowland Leopard Frog, Sonoran Mud Turtle, Mexican Garter Snake, and rare plants such as Huachuca Water Umbel, Blue-eyed Grass, and many others.
- 2) Implement plans that are agreeable to landholders and the public, especially the local public for the project.
- 3) Propagate key species needed for such restoration efforts.

H) Paseo de las Iglesias and other projects in major drainage corridors:

- 1) Strongly support U.S. Army Corps of Engineers studies for restoration or creation of riparian environments using reclaimed water and stormwater harvest.
- 2) Provide species-level habitat input for these studies to specify design of vegetation structure and landscape (patch sizes, connectivity).
- 3) Advocate surface water features in appropriate major valley floor corridors, based on scientifically sound designs that also encompass flood control, non-native species management, and mosquito abatement priorities.
- 4) Pursue implementation of surface water features with clear public support.
- 5) As permitted by AGFD and USFWS, translocate the following species into suitable riparian communities with suitable, newly created riparian environments: Giant Spotted Whiptail, Clark's Spiny Lizard, Western Fence Lizard, Desert Box Turtle (large patches only), summer breeding amphibians, various ground-walking arthropods, and various plants including Tumamoc globeberry and others.
- 6) If and when surface water restoration and creation becomes feasible, and with appropriate permitting, translocate the following species to suitable, newly created aquatic environments: Gila Topminnow, Desert Pupfish, Gila Chub, Longfin Dace, Desert Sucker, Sonora Sucker, Lowland Leopard Frog, Great Plains Narrow-mouthed Toad,

Sonoran Mud Turtle, Mexican Garter Snake, and various plants including Huachuca Water Umbel.

I) Arthur Pack Park and/or similar golf courses:

- 1) Remove non-native fishes and African Clawed Frogs.
- 2) As permitted, introduce native fishes (especially Gila Topminnow, Gila Chub, and Desert Pupfish), Lowland Leopard Frog, and Sonoran Mud Turtle.

3) Gradually replace non-native tree and shrub plantings with native plantings designed to support riparian birds, lizards, and other animals.

4) Advocate design and implementation of native aquatic and riparian environmental types within golf course contexts.

J) Neighborhoods and urban/suburban public spaces:

1) Support the use of native species of plants and animals in mesic plantings and back yard water features.

2) Work with City of Tucson, neighborhood organizations, Town of Marana, San Xavier District, and others to develop and fund voluntary efforts to develop, fund, monitor, and provide needed water (as appropriate) for such projects.

3) Advocate use of, and provide sources for genetically appropriate native species for such uses.

IV) Species-specific targets for monitoring.

A) Achieve a combination of the following targets suitable to preserve all or all possible Priority Vulnerable Species in eastern Pima County, and to represent a reasonable combination of met targets that demonstrate healthy, viable aquatic and riparian species assemblages:

- 1) Desert Pupfish: to be determined.
- 2) Gila Topminnow: protect existing populations; establish numerous new urban populations; and utilize this species for mosquito control for human health.
- 3) Gila Chub: protect and maintain all existing natural populations; establish this species in stock ponds and elsewhere to replace sunfish fisheries; establish several to many new urban populations.
- 4) Longfin Dace: maintain all existing natural populations; re-establish in Canada del Oro; utilize in new urban situations for native fisheries.
- 5) Native suckers (Sonora Sucker, Desert Sucker): assist or support management in San Pedro River and tributaries; establish in created or restored urban streams in major drainages and/or park or gold course sites.
- 6) Lowland Leopard Frog: protect habitat conditions for all existing natural populations; establish many new urban populations in back yards, in golf courses, and in restored corridor habitat; maintain several viable populations in springs, tinajas, and stock ponds in A7 Ranch/Redington Pass area and each additional county-managed ranch area at suitable elevation (generally regions $\leq 3,500$ feet).

7) Chiricahua Leopard Frog: protect habitat conditions for all existing natural populations; maintain several viable populations (see USFWS Recovery Plan for specific guidelines) in springs, tinajas, and stock ponds in ranches near Buenos Aires NWR and Arivaca and each additional county-managed ranch area at suitable elevation (generally > 3,500 feet).

8) Desert Box Turtle: protect and enhance habitat conditions for existing natural populations (mainly Cienega Creek and San Pedro River) as indicated by new research that may be done; establish new urban populations in areas where collecting will not eliminate them, if possible; support education and state regulations requiring use of native species (*Terrapene ornata*) and not eastern species (*T. carolina*) in pet trade in Tucson and Arizona; support and advocate establishing captive-breeding registry and education for back yard pets to encourage use of native subspecies (Desert Box Turtle, *T. ornata luteola*) and end trade in exotic *T. ornata*.

9) Sonoran Mud Turtle: protect all existing natural habitat; sustain presence in viable numbers and trends for this species at all remaining natural, sizable population sites; locate sites from which small numbers may be collected to stock new sites; establish several to many new population sites in golf courses and parks where capture and collection by the public are not likely problems; establish turtles in major riparian restoration areas if habitat prospects appear highly suitable.

10) Mexican Garter Snake: monitor and protect existing populations in Cienega Creek and achieve reasonable population size and stability; support bullfrog removal in existing population area; utilize captive-propagated garter snakes to establish new populations in suitable restoration areas to be determined.

11) Giant Spotted Whiptail: monitor key accessible populations (e.g., Sabino Canyon and others); sustain reasonable population size and stability as indicated by monitoring; establish genetically appropriate nursery area(s) in semi-captive setting(s) to allow propagation for translocation; establish species in many suitable sites in urban valley (e.g., Arroyo Chicho, riparian restoration sites, richly landscaped properties).

12) Huachuca Water Umbel: monitor accessible natural populations to ensure continued presence and reasonable abundance and stability; utilize widely in back yard ponds and other created or restored aquatic sites that are to use native species.

DRAFT TAXON-SPECIFIC LIST OF ACTIONS FOR:

Pima County SDCP Riparian and Aquatic HCP Elements

(Plants, Fish, Amphibians and Reptiles)

- ❖ Leopard Frogs:
 - Establish in stock ponds on ranches in metapopulations
 - Establish with known genetic sources in urban environments:
 - Back yard ponds, golf courses, park ponds
 - Restored stream segments and springs
 - Translocate Lowland Leopard Frog from urban propagation to Santa Catalina-Rincon mountains sites of extirpation. Sustain metapopulation by re-establishment translocations as needed.
 - Create sufficient valley bottom stream populations and connectivity to self-sustain valley-canyon core-satellite metapopulation dynamics.
 - Control bullfrogs by simultaneous removals across whole landscapes
 - Prevent spread of crayfish
 - Avoid creation of pond or lake environments where bullfrog and exotic fish colonization cannot be prevented.
 - Support research on causes of declines and management methods
- ❖ Natives Fishes:
 - Protect Cienega Creek from exotic fish and crayfish
 - Establish in stock ponds on ranches (Gila Topminnow, Gila Chub, pupfish)
 - Establish with known genetic sources in urban environments:
 - Back yard ponds (Gila Topminnow, pupfish, Gila Chub, others)
 - Golf courses, park ponds (all species)
 - Restored stream segments and springs (Longfin Dace, Gila Chub, Gila Topminnow, others)
 - Utilize Gila Topminnow for health-related mosquito control, supplemented in places with other fish, especially pupfish.
 - Keep Sabino and Bear canyons free of non-native fishes; augment Gila Chub population and attempt to re-establish Gila Topminnow and Longfin Dace.
 - Eliminate non-native fishes wherever possible. Replace exotic-based fisheries with native-based fisheries.
 - Participate in viable native fish plan (exotic fish eradication) for entire San Pedro.
- ❖ Mexican Garter Snake:
 - Eliminate bullfrogs and re-establish leopard frogs in Cienega Creek
 - Establish in restored or created valley bottom wetlands in Tucson Basin
 - Establish breeding program for re-establishment efforts in Tucson Basin wetlands and stock ponds.
 - Avoid creation of pond or lake environments where bullfrog and exotic fish colonization cannot be prevented.
- ❖ Sonoran Mud Turtle:
 - Prevent spread of crayfish/eliminate from Sabino and Bear Canyon
 - Develop management guidelines for mud turtles during stock pond maintenance
 - Utilize selected, closely managed/monitored ponds (stock ponds, sewage treatment, others) as sources of turtles for establishment at restoration areas, parks, and golf courses.
 - Provide flood refugia suitable for turtles (and topminnows, pupfishes) if they are established in major drainage restoration streams.
- ❖ Desert Box Turtle:
 - Protect and establish reserves on private and NPS land in Tanque Verde Valley.
 - Develop legal structure and education to eliminate gene pool contamination by exotic box turtles, especially Eastern Box Turtle.
 - Develop program for existing captive population.
 - Support research into requirements of box turtle populations in desert grassland.
- ❖ Giant Spotted Whiptail:
 - Develop semi-captive population to serve as stock for translocations.
 - Establish populations in newly suitable habitat (Arroyo Chico, landscaped areas, riparian restoration areas, Santa Cruz effluent reach).
- ❖ Huachuca Water Umbel:
 - Propagate for use in backyard ponds, golf course wetlands, spring and stream restoration.
 - Include as part of native aquatic plant toolkit including creating nursery supply of appropriate species from local sources with adequate genetic sources.