

DRAFT II

Pima County Multi-Species CONSERVATION PLAN



PIMA COUNTY BOARD OF SUPERVISORS
Sharon Bronson, Chair, District 3 • Ann Day, District 1 • Ramón Valadez, District 2 • Raymond J. Carroll, District 4 • Richard Elías, District 5

COUNTY ADMINISTRATOR
C.H. Huckelberry

MEMORANDUM

Date: February 3, 2005

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

From: C.H. Huckelberry
County Administrator

Re: **Draft Multiple Species Conservation Plan and Accomplishment of Working Landscape Reserves Through Open Space Purchases**

Introduction

The conflict between competing interests on the question of growth, while festering for a long period of time, matured in 1998. The Board chose a path of balance by advancing the Sonoran Desert Conservation Plan. I have attached the second draft of the Pima County Multiple Species Conservation Plan for your information. County staff will post the draft on the website, distribute it to interested community and committee members, and conduct a public process so that during 2005 the document can be finalized and submitted to the United States Fish and Wildlife Service as part of our application for a federal endangered species permit.

Background

The Multiple Species Conservation Plan will complete the land use planning process the Board undertook in 1998, which has involved extensive public and professional participation resulting in these milestones:

- adoption of the Sonoran Desert Conservation Concept Plan in 1998;
- acceptance of the Preliminary Sonoran Desert Conservation Plan in 2000;
- adoption of the conservation plan elements, particularly the Conservation Lands System, into the Pima County Comprehensive Land Use Plan in 2001;
- adoption of conservation visions to guide future actions; and
- funding of the Sonoran Desert Conservation Plan through the 2004 open space bond initiative.

County Approach with the Sonoran Desert Conservation Plan

While the federal permit is important, Pima County has taken the unique approach of encompassing a community conservation ethic in our local plan. This is a testament to the engaged and informed members of this community. Our approach also moves beyond the traditional preservation strategy of setting aside relatively small and isolated parks or refuges. Instead, the local plan includes larger working landscapes in addition to parks, preserves and riparian restoration areas.

Involving ranchers in conservation management will result in the protection of a vastly larger landscape. This is particularly important in our desert environment. Almost one-third of the world is arid or semi-arid and much of this is rangeland. Our efforts to have working landscapes contribute to conservation strategies are part of an important balancing approach that is being considered in semi-arid and arid lands around the world.

By including working landscapes, we can aspire to conserve the range of native species in the Sonoran Desert. The federal agency approach requires the identification of specific species for coverage, but we know that it is more cost effective and conservation oriented to take a broader perspective. The Sonoran Desert Conservation Plan is structured so that the covered species reflect the natural system, and at the same time it is inclusive of those plants and animals that are listed as imperiled by the federal government.

There is much to be proud of in our corner of the natural world: biodiversity is high given our location at a crossroads of major bioregions; we have some of the highest levels of mammal diversity in North America; we are rich in birds and reptiles; more than 2,000 native plant species are found across the Sonoran Desert, with more than 1,600 in Pima County; and soil diversity is rich due to our climatic zones and different rock types.

Opportunity to Improve on the Traditional Federal Approach

Lately there has been discussion about whether the federal Endangered Species Act has been effective in recovering imperiled wildlife. During the last three decades 518 animals and 746 plants have been listed as threatened or endangered and nearly 300 species are currently candidates for listing, while only 15 have been taken off the list due to recovery.

Though it takes a long time for recovery of imperiled populations, federal spending priorities have not been aligned with the recovery priorities established by scientists and spending has been narrowly focused: the number of federal listings approaches 1300, but in recently reported years the top 7 to 10 most expensive species have garnered half of the federal funding. Stated another way, one-half of the federal funding for endangered species goes to less than 1 percent of those species on the list.

This contributes to the low number of recoveries, but there is another lesson in this data as well: the federal approach to funding conservation can be improved upon by thinking in broader terms and in scientific terms, as we have with the Sonoran Desert Conservation Plan, and by engaging in a strategy of prevention through the conservation of large landscapes, rather than by delaying action until species are on the brink of extinction, and then responding with a small landscape, or refuge strategy, which has been the traditional federal approach.

Draft Multi-Species Conservation Plan

I believe that the Sonoran Desert Conservation Plan has the potential to provide better protection to species than many past efforts at the federal level simply because it is more comprehensive. However, it is important to obtain a federal permit so that we have long-term regulatory assurances for the community under federal law.

Pima County joins a handful of jurisdictions and hundreds of smaller landowners and developers who have sought the federal permit in exchange for conservation commitments, as allowed under Section 10 of the Endangered Species Act.

Currently there are 478 approved habitat conservation plans in the United States. Under Section 10(a)(B) of the Endangered Species Act, if the Secretary of the Interior finds with respect to an application that certain conditions are met, the Secretary shall issue the permit. Conditions include:

- that the taking of endangered species is incidental to an otherwise lawful activity;
- that the applicant (Pima County) will minimize and mitigate impacts;
- that there is adequate funding;
- that taking will not appreciably reduce likelihood of survival/recovery; and
- that other measures/assurances are met.

The attached draft Pima County Multiple Species Conservation Plan, when finalized through upcoming community process, adopted by the Board, and submitted to the United States Fish and Wildlife Service, will be judged according to these conditions. Considerations for the County include the following.

- Regarding take issues: Recent annexations by the City of Tucson, Marana and Sahuarita have reduced Pima County's immediate liability for take of endangered species. Beyond that, it is difficult to predict the future of the listing of the pygmy-owl. The wise course for reducing economic uncertainty due to any current or future listings, however, is to finalize the federal permit.

- Regarding the scope of the permit: Pima County has the option to submit a permit application that proposes to offset impacts of development and other activities but does not express all the aspirations of the Sonoran Desert Conservation Plan. A phased approach over time is also an option.

- Regarding funding: In terms of funding, with the passage of the 2004 open space bond initiative, Pima County has adequate funding for the first phase of the federal permit and in fact is projected to exceed our conservation obligation under the permit, since impacts are projected to be on the order of 6,000 acres and through our bond program and acquisitions since 1999 the estimated number of acres protected will exceed 70,000.

- Regarding survival and recovery: The draft plan has a detailed take analysis for proposed covered species which will be discussed and finalized by the Science Technical Advisory Team.

These and other issues will be discussed in public meetings and through written comments during the next months. The hope is that by sending out this unfinished draft we will involve interested community members in creating the final product, so that the application made to the United States Fish and Wildlife Service best reflects the goals of the community.

Building on Past Conservation Actions

In addition to partnering with agencies like the Bureau of Land Management on projects such as the 1987 establishment of the Las Cienegas National Conservation Area and the more recent Ironwood Forest National Monument, Pima County has a long history of conserving important ranch lands, mountain parks and riparian areas. The list includes Tucson Mountain Park, which dates back to 1929, Tortolita Mountain Park, Colossal Cave Mountain Park, Cienega Creek Natural Preserve, Pantano Restoration, Bingham Cienega Natural Preserve, the Posta Quemada Ranch, the Empirita Ranch, Canoa Ranch, the A7/Bellota Ranch as well as Carpenter Ranch. In each important watershed of Eastern Pima County, an anchor for reserve design has been created and we continue to build on this framework of our biological reserve.

These past actions are significant in conserving the natural, cultural, and historic resources of Pima County. These actions have been relatively continuous over the last three decades, with the majority of funding for the actions coming from voter-approved bond issues. In total, over $265 million in general obligation bonds for open space or floodprone land acquisition have been authorized by voters since 1974. These were authorized at elections held in 1974, 1984, 1986, 1997 and 2004. These acquisitions led to the present natural open space park system of over 60,000 acres consisting of the following natural open space parks and reserves, shown by size in the table below.

Existing Pima County Parks and Reserves

Park/Reserve	Acres
A-7 Ranch	6,889
Arivaca Open Space	124
Arthur Pack Regional Park	503
Bingham Cienega Natural Preserve	303
Buckalew Ranch	498
Canoa Ranch	4,801
Carpenter Ranch	200
Cienega Creek Natural Preserve	4,201
Colossal Cave Mountain Park	2,295
La Milagrosa/Agua Caliente	24
Lords Ranch	639
Los Morteros	223
Oracle Ridge Open Space	1,214
Pima County Parklands Foundation	316
Southeast Regional Park	3,004
Sweetwater Preserve	695
Tortolita Mountain Park	3,124
Tucson Mountain Park	19,544
Walden Ranch	470
West Branch of the Santa Cruz	74
36th Street Corridor	78
Other Pima County Open Space and Flood Control District Parcels	13,000
Total	**62,219**

The Emerging Reserve Framework

To some, the acquisitions that have occurred since the bond passed in 2004 appear random. However, as the maps which follow show, acquisitions to date represent lands at the best locations for reserve design at the lowest cost to the taxpayers. It is important that the cost-effectiveness of open space acquisitions be carefully considered given limited resources available for such. Hence, acquisitions that conserve larger areas of natural landscape at a lower price are preferred over more costly, smaller acquisitions. The emerging reserves identified below represent large landscape acquisitions at lower unit cost, or cost in dollars per acre. I will continue to support large landscape, lower cost acquisitions over those that require significant resources and accomplish much lower total resource protection.

- Conceptual Cerro Colorado Reserve: Pima County's acquisition of Canoa Ranch and the option on the Rancho Seco/Rancho Lucia create anchors which promote the successful conservation of the upper Arivaca and Santa Cruz area, as seen in the attached maps.

  In 2001, Pima County purchased over 4,800 acres of the historic Canoa Ranch. An option to purchase 9,754 acres of the Ranch Seco/Santa Lucia, including a conservation easement on 478 acres around the two ranch headquarters for $18.5 million, will go before the Conservation Acquisition Commission for approval on February 10, 2005, and then to the Board of Supervisors on February 22, 2005.

- Conceptual Northern Altar Valley Reserve: The acquisition of the Buckalew and King 98 ranches contributes significantly to defining urban form and conserving the Altar Valley watershed, which is among the most important for conservation purposes in Eastern Pima County.

  Pima County acquired almost 500 acres of the Buckalew property in 2002. On January 11, 2004, the Conservation Acquisition Commission approved the purchase of the 1,034 acre King 98 Ranch for $2.1 million. This acquisition will go to the Board of Supervisors for approval on February 22, 2005. Acquisition of the Old Hayhook ranch is also pending.

- Conceptual Cienega Valley Reserve: The important riparian holdings in the Cienega Creek watershed are enhanced by the McKenzie and Simonson exchange, and the proposed Davidson Canyon conservation lands so that, combined with non-County conservation areas such as Las Cienegas National Conservation Area and the surrounding Coronado National Forest lands, the outline of an impressive riparian and grassland reserve emerges, as seen in the attached maps.

  Pima County began preserving lands which are now known as the Cienega Creek Natural Preserve in 1986. Acquisition of the lands known as Colossal Cave Mountain Park began in 1989. In October 2004, Pima County acquired the 155 acre Baker property for $226,000, which links Colossal Cave Mountain Park to the Cienega Preserve. Adjoining the Cienega Preserve along Davidson Canyon is Pima County's most recent proposed acquisition, the 1,700 acre Bar V Ranch. This acquisition has been approved by the Conservation Acquisition Commission for $8.68 million and will go before the Board of Supervisors for approval on February 8. Another significant purchase in this area is the 470 acre Walden property east of the Cienega Preserve, which was acquired in July 2004 for $1.4 million. Through a land exchange, Pima County may

also be able to preserve the 1,700 acre McKenzie property, which lies east of the Cienega Preserve, between Colossal Cave Mountain Park and the Walden property. A federal land exchange involving several properties throughout Pima County could preserve a large private holding known as the Empirita/Simonson property, located east of the Bar V Ranch along the Pima/Cochise County border.

- Conceptual San Pedro Valley Reserve: In the northeast corner of Pima County, the Board acquired 6,829 acres of private land within the A-7 Ranch. Grazing leases bring the total acreage of conserved land to over 41, 100 acres.

- Ironwood Forest National Monument: Pima County initiated the process that created the 129,000 acre Ironwood Forest National Monument in June 2000. Since then, Pima County acquired a 640 acre in-holding within the National Monument, known as Lords Ranch.

The Conservation Acquisition Commission has worked steadily since their formation in 2004 and they have launched the Sonoran Desert Conservation Plan on a successful path toward implementation.

Next Steps

The draft Multiple Species Conservation Plan consolidates and refines more than half a decade of studies and analyses by the expert community, members of staff, and Recon Consulting. Finalizing the document through public process will take place through a series of community meetings that will begin in March. A multi-jurisdictional planning fair is also being organized for March, which will increase public awareness. The Science Technical Advisory Team, Science Commission, Implementation Team, and Conservation Acquisition Commission will also contribute substantially to completing the plan during 2005.

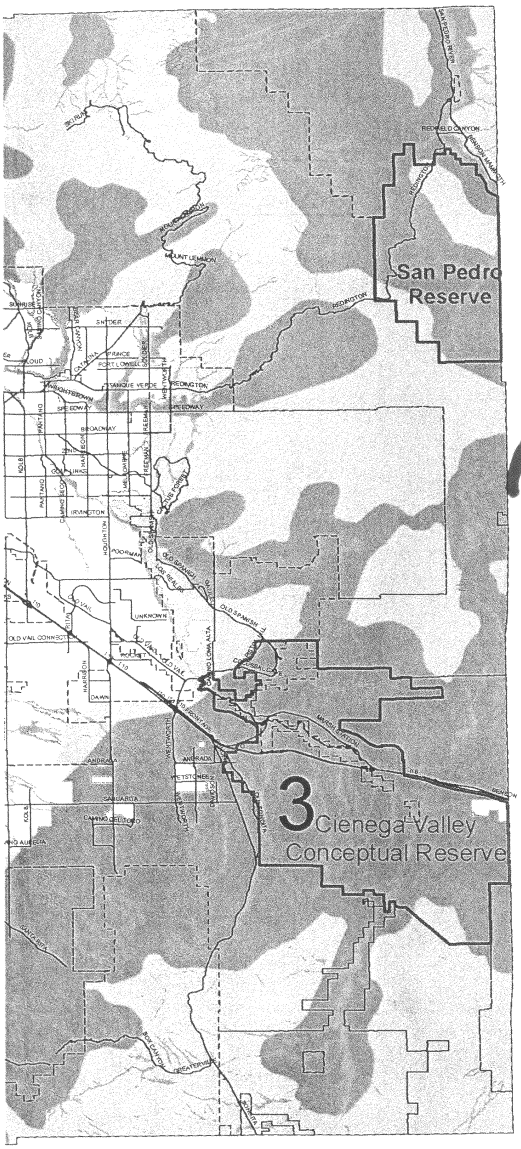
Conclusion

A new study published by the National Wildlife Federation entitled Endangered by Sprawl emphasizes the need for local governments to step up and participate in conservation efforts that are integrated with the best principles of urban planning. The specific recommendations of the report reflect policies that the Board has adopted and implemented since we began this effort in 1998. These include actions such as inventorying natural resources and species; working toward regional cooperation; developing a plan to protect green infrastructure; establishing urban form and natural resource reserve boundaries; protecting sensitive habitats; funding conservation; and combining urban planning with conservation planning. We have the opportunity now to complete the federal permit process in a way that contributes to the implementation of the Sonoran Desert Conservation Plan and provides economic stability by making the future regulatory process more streamlined and predictable.

CHH/jj

Attachments
CLS, Corridors and Conceptual Reserves Map
Cerro Colorado Reserve and Conceptual Cienega Valley Reserve Maps
Draft Pima County Multiple-Species Conservation Plan

CLS, Corridors & Conceptual Reserves



Conceptual Reserves

Major Streets

Jurisdictions

Conservation Lands System

Agriculture

Multiple Use

Biological Core

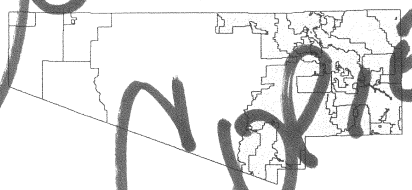
Important Riparian Areas

Areas Outside CLS

1 - Corridors

3 11"x17" Color Copies

Pima County Index Map



Index Map Scale 1:1,500,000

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DRAFT
PIMA COUNTY MULTIPLE SPECIES CONSERVATION PLAN
PIMA COUNTY, ARIZONA

Draft

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TABLE OF CONTENTS

Chapter 1: Introduction **1-1**

1.1 Purpose and Need for Document 1-1

1.2 Background 1-4

1.2.1 Sonoran Desert Conservation Plan (SDCP) 1-4

1.2.2 Pima County Comprehensive Land Use Plan 1-4

1.3 Pima County Multiple Species Conservation Plan (PCMSCP): Required Elements 1-5

1.4 HCP Alternatives 1-6

1.4.1 Alternatives Eliminated from Further Consideration 1-6

1.4.2 Steering Committee Recommendations 1-6

1.4.3 Alternatives Evaluated in Economic Analysis 1-7

1.4.4 Alternatives Analyzed by Environmental Impact Statement (EIS) 1-8

Chapter 2: Pima County Multiple Species Conservation Plan Impacts **2-1**

2.1 Delineation of PCMSCP Boundary 2-1

2.1.1 Planning Study Area 2-1

2.1.2 Permit Area 2-1

2.1.3 Participants 2-3

2.2. Collection and Synthesis of Biological Data 2-5

2.2.1 Methodology 2-5

2.2.2 Environmental Setting 2-6

2.2.2.1 Land Use 2-6

2.2.2.2 Population 2-6

2.2.2.3 Land Cover Data Assessment and Compilation 2-8

2.2.3 Biological Resources 2-10

2.2.3.1 Priority Vulnerable Species 2-10

2.2.4 Special Plant Communities and Other Special Elements 2-14

2.2.4.1 Biological Threats and Stressors 2-15

2.2.4.2 Primary Threats and Stressors 2-17

2.2.4.3 Significance of Historic Depletion of Water within Eastern Pima County 2-18

2.2.4.4 Landscape Conservation Management Status 2-19

2.2.4.5 Potentially Problematic Species 2-24

2.2.5 Ecosystem Basis of PCMSCP 2-27

2.2.5.1 Habitat Analysis and Species Distribution 2-27

2.2.5.2 Reserve Design Process 2-34

2.2.6 Proposed Covered Species 2-35

2.3 Activities Proposed for Coverage by PCMSCP 2-42

2.3.1 Criteria for Inclusion 2-42

Draft

TABLE OF CONTENTS (cont.)

2.3.2 Covered Activities 2-42
2.3.2.1 Development 2-43
2.3.2.2. Pima County Public Works 2-43
2.3.2.3 Pima County Regional Flood Control District (PCRFCD) 2-43
2.3.2.4 Ranching and Working Landscapes 2-44
2.3.2.5 Monitoring and Adaptive Management Actions 2-44
2.3.3 Federal Actions 2-44
2.4 Anticipated Incidental Take Levels of PCMSCP 2-45
2.4.1 Methods of Calculation of Incidental Take 2-45
2.4.1.1 Acres of Medium and High Potential Habitat 2-45
2.4.1.2 Acres of Priority Conservation Areas 2-45
2.4.1.3 Expected Level of Incidental Take and Related Impacts 2-46
2.4.1.4 Authorized Level of Incidental Take 2-46
2.5 Effects of PCMSCP 2-47
2.5.1 Direct Effects of PCMSCP on CLS 2-47
2.5.2 Direct Effects of PCMSCP on Covered Species 2-59
2.5.2.1 Proposed Covered Species 2-63
2.5.2.2 Species Proposed as Provisionally Covered 2-65
2.5.2.3 Species Not Proposed for Coverage 2-67
2.5.3 Indirect Effects of PCMSCP 2-67
2.5.4 Cumulative Effects of Other Activities on Covered Species 2-69
2.5.5 ESA Section 7 (a) (2) Standards and Jeopardy Analysis Framework 2-70
2.5.6 Effects on Critical Habitat 2-71
2.5.6.1 Cactus Ferruginous Pygmy-Owl 2-71
2.5.6.2 Southwestern Willow Flycatcher 2-71
2.5.6.3 Desert Pupfish 2-71
2.5.6.4 Gila Chup 2-71
2.5.6.5 Mexican Spotted Owl 2-72

Chapter 3: Mitigation Programs and Standards 3-1

3.1 Introduction: Conservation Land System as Foundation for PCMSCP Mitigation 3-1
3.2 Design and Development Guidelines for CLS 3-3

Draft

TABLE OF CONTENTS (cont.)

3.2.1 CLS Land-Use Designations 3-3
3.2.1.1 Important Riparian Areas 3-3
3.2.1.2 Biological Core Management Areas 3-3
3.2.1.3 Scientific Research Areas 3-3
3.2.1.4 Multiple Use Management Areas 3-5
3.2.1.5 Special Species Management Areas 3-5
3.2.1.6 Agriculture Inholdings within Conservation Lands System 3-5
3.2.1.7 Critical Landscape Connections 3-5
3.2.1.8 Other Mapped Riparian Areas 3-6
3.2.2 Urban Development Guidelines for Lands within Conservation Lands System 3-6
3.2.2.1 Conservation Guidelines for Important Riparian Areas 3-7
3.2.2.2 Conservation Guidelines for Biological Core Management Areas 3-7
3.2.2.3 Conservation Guidelines for Scientific Research Areas 3-7
3.2.2.4 Conservation Guidelines for Multiple Use Management Areas 3-7
3.2.2.5 Conservation Guidelines for Special Species Management Areas 3-7
3.2.2.6 Conservation Guidelines for Agriculture Inholdings within Conservation Lands System 3-8
3.2.2.7 Conservation Guidelines for Critical Landscape Connections 3-8
3.2.2.8 Conservation Guidelines for Other Riparian Areas 3-8
3.2.3 Design Criteria 3-8
3.2.3.1 Site Design Criteria 3-8
3.2.3.2 Design Criteria for Linkages and Corridors 3-11
3.2.3.3 Procedure to Demonstrate Compliance with CLS Guidelines and Design Criteria 3-12
3.2.3.4 Exemptions and Variances from CLS Guidelines and Design Criteria 3-12
3.3 CLS Acquisitions and Conservation Easements 3-14
3.4 Pima County Regional Flood Control District Riparian Habitat Programs 3-16
3.4.1 Regulatory Program 3-16
3.4.2 Acquisition Program 3-18
3.4.3 Land Management Program 3-19
3.4.4 Rehabilitation and Enhancement Program 3-20
3.4.5 Monitoring Program 3-22
3.5 Species-Specific Mitigation 3-23
3.6 Invasive Species Mitigation 3-25
3.7 Regulatory Standards and Relationship to Recovery 3-26
3.7.1 Recovery: Mandate vs. Enhancement 3-26
3.7.2 Recovery Plans and Goals 3-27
3.7.3 Recovery by Cooperation with Private Landowners: Safe Harbor Agreements 3-27

Draft

TABLE OF CONTENTS (cont.)

3.8 Mitigation Compliance 3-28
3.8.1 Assured Funding for Mitigation 3-28
3.8.2 Mitigation Monitoring and Reporting 3-29
3.8.3 Mitigation Enforcement 3-29
3.9 Benefit of HCP to Covered Species 3-30
Chapter 4: Monitoring and Adaptive Management 4-1
4.1 Vision of Desired Future Condition 4-1
4.1.1 ESA 4-2
4.1.2 SDCP 4-2
4.1.3 CLUP 4-2
4.1.4 SDCP and CLUP Subgoals 4-2
4.2 Role of Science Commission 4-6
4.2.1 Purpose 4-6
4.2.2 Composition 4-6
4.2.3 Responsibilities 4-6
4.3 Role of Government Working Group 4-8
4.3.1 Purpose 4-8
4.3.2 Composition 4-8
4.3.3 Responsibilities pertaining to MSCP 4-8
4.4 Management Plan: Collaborative Multi-Agency Effort 4-10
4.4.1 Working Model of Organizational Framework for PCMSCP 4-10
4.4.2 Interagency Collaborative Management Strategies 4-10
4.4.3 Management Goals and Specific Objectives 4-12
4.4.3.1 Land Area Goals and Objectives 4-12
4.4.3.2 Ecosystem Function Goals for Riparian Areas 4-12
4.4.3.3 Covered Species Goals and Objectives 4-14
4.4.4 Hierarchy of Space and Time Priorities 4-14
4.4.4.1 Special Priorities 4-14
4.4.4.2 Temporal Priorities 4-16
4.5 Monitoring Program 4-17
4.5.1 Compliance Monitoring 4-18
4.5.1.1 Compliance Monitoring Report 4-18
4.5.1.2 Quantification of Compliance Monitoring 4-19
4.5.1.3 Compliance Database 4-19
4.5.2 Effectiveness Monitoring 4-19
4.5.2.1 Effectiveness Monitoring Report 4-20
4.5.2.2 Countrywide Biological Monitoring Program 4-20
4.5.2.3 Site Specific Monitoring Programs 4-21

Draft

TABLE OF CONTENTS (cont.)

4.6 Database Management & Information Sharing 4-22
4.7 Assured Funding for Monitoring & Management 4-23

Chapter 5: Changed Circumstances, Unforeseen Circumstances, No Surprises, and Other Federal Commitments 5-1

5.1 In General 5-1
5.2 Methodology for Developing Criteria for Changed versus Unforeseen Circumstances 5-3
5.3 Procedure for Determining Occurrence of Unforeseen Circumstances 5-4
5.3.1 Notice to Applicants and Participants 5-4
5.3.2 Response through Adaptive Management Plan 5-4
5.3.3 Submission of Information by Others 5-4
5.3.4 County Review 5-5
5.3.5 Findings 5-5
5.4 Changed Circumstances 5-6
5.4.1 Response to Occurrence of Changed Circumstances—Adaptive Management 5-6
5.4.2 New or Proposed Listings of Uncovered Species 5-7
5.4.3 Significant Population Increases of Listed but Uncovered Species 5-8
5.4.4 Examples of Changed Circumstances 5-9
5.5 Unforeseen Circumstances 5-21
5.5.1 Response to Occurrence of Unforeseen Circumstances—No Surprises 5-21
5.5.2 Response to Occurrence of Unforeseen Circumstances—Adaptive Management 5-22
5.5.3 Examples of Unforeseen Circumstances 5-22
5.6 Additional Federal Commitments 5-26
5.6.1 Augmentation, not Replacement or Substitution, of Federal Budgets 5-26
5.6.2 Section 7 Consultations and Conferences 5-26
5.6.3 Consideration of PCMSCP in Section 4 Findings 5-26

Chapter 6: Implementation 6-1

6.1 Implementation Strategy 6-1
6.2 Conservation of Land 6-2
6.2.1 Purchase of Land and Interest in Real Property 6-2
6.2.2 Conservation Easements 6-2
6.2.3 Easement Components 6-3
6.2.4 Valuation and Payment 6-3
6.2.5 Administration of Conservation Easement Program 6-4
6.2.6 Resource Review Team 6-4
6.2.7 Amendments 6-4
6.3 Participants and Coordination Agreements 6-5
6.3.1 Pima County 6-5
6.3.2 U.S. Fish and Wildlife Service 6-5
6.3.3 Other Participants 6-5

draft

TABLE OF CONTENTS (cont.)

6.3.4 Other Federal Agencies 6-5
6.3.4.1 Bureau of Land Management 6-5
6.3.4.2 Bureau of Reclamation 6-6
6.3.4.3 National Park Service 6-6
6.3.4.4 National Resource Conservation Service 6-6
6.3.4.6 U.S. Army Corps of Engineers 6-6
6.3.4.7 U.S. Department of Defense 6-6
6.3.4.8 U.S. Environmental Protection Agency 6-6
6.3.4.9 U.S. Forest Service: Coronado National Forest 6-6
6.3.4.10 U.S. Geologic Survey 6-6
6.3.5 Native American Tribes 6-6
6.3.5.1 Pascua-Yaqui Nation 6-6
6.3.5.2 Tohono O'Odham Nation 6-6
6.3.6 State Agencies 6-7
6.3.6.1 Arizona Department of Transportation 6-7
6.3.6.2 Arizona Game and Fish Department 6-7
6.3.6.3 Arizona State Lands Department 6-7
6.3.7 Local Jurisdictions 6-7
6.3.7.1 City of South Tucson 6-7
6.3.7.2 City of Tucson 6-7
6.3.7.3 Town of Marana 6-7
6.3.7.4. Town of Oro Valley 6-7
6.3.7.5 Town of Sahuarita 6-7
6.4 Additional Implementation Elements 6-8
6.4.1 Migratory Birds and Eagles 6-8
6.4.2 Unlisted Species 6-8
6.4.3 Plants in HCP and Permit 6-8
6.5 Funding Mechanisms and Commitments 6-10
6.5.1 Existing Assured Funding Mechanisms 6-10
6.5.1.1 General Fund Line-Item 6-10
6.5.1.2 Open Space Bonds 6-10
6.5.1.3 Flood Prone Land Acquisition Program (FLAP) 6-11
6.5.2 Potential Funding Mechanisms 6-11
6.5.2.1 Sales Tax 6-11
6.5.2.2 Mitigation Fees 6-11
6.5.2.3 Impact Fees 6-11
6.5.2.4 Arizona Game & Fish Department's Heritage Fund 6-11
6.5.2.5 Arizona Preserve Initiative 6-12
6.5.2.6 Public Lotteries 6-12

Draft

TABLE OF CONTENTS (cont.)

6.5.2.7 Federal Line-Item Appropriations 6-12
6.5.2.8 Other Federal Funding and Grants 6-12
6.5.3 Partnering with Private Sector and Non-Profit Organizations 6-13
6.5.4 Partnering with Other Jurisdictions and Agencies 6-13
6.6 Phasing 6-14
6.7 Annual Reporting 6-15
6.8 Amendments 6-17
Chapter 7: References Cited 7-1
Chapter 8: Preparers and Contributors 8-1
8.1 Preparers: RECON Team Members 8-1
8.2 Contributors 8-1
8.2.1 Science Technical Advisory Team (STAT) Members Appointed by Pima County Board of Supervisors 8-1
8.2.2 Pima County Staff 8-2
8.2.3 Other Consultants

draft

FIGURES

2.1: Pima County Reserve System Boundaries 2-2
2.2: Section 10 Permit Area 2-4
2.3: Biologically Preferred Reserve Configuration Alternative 2-7
2.4: Composite Land Cover 2-9
2.5: Pima County Watershed Subunits 2-16
2.6: Land Conservation Status 2-23
2.7: Summary of High Potential Habitat for All Vulnerable Species 2-33
2.8: Initial Assessment of Areas of High Biological Value 2-36
2.9: Pima County Reserve System Boundaries 2-37
2.10: Reserve Design Rules and Principles 2-38
2.11: Reserve System Boundary 2-39
2.12: Conservation Lands System and Existing Development 2-53
2.13: Development Projections at 10 Years 2-54
2.14: Development Projections at 20 Years 2-55
2.15: Development Projections at Buildout 2-56
2.16: CLS in Permit Area at Buildout 2-58
3.1: CLS Land-Use Categories 3-4
3.2: Proposed Riparian Classification of Eastern Pima County 3-17
4.1: Conceptual Framework for Regional Management Coordination 4-11

TABLES

2.1: Priority Vulnerable Species of Pima County 2-11
2.2: Special Elements 2-14
2.3: Conservation Status Classifications 2-20
2.4: Potentially Problematic Species by Representative Ecosystems 2-28

TABLE OF CONTENTS (cont.)

TABLES (cont.)

2.5:	Environmental Variables in Species Environmental Matrix	2-30
2.6:	Species Proposed for Coverage under PCMSCP	2-40
2.7:	Distribution of CLS in Unincorporated Pima County by Ownership	2-48
2.8:	Distribution of CLS within Pima County Jurisdictions by Ownership	2-49
2.9:	Projected Acres of Future Development in Pima County Planning Study Area including State and Federal Lands	2-57
2.10:	Potential Conservation and New Development under CLS Conservation Guidelines within Permit Area	2-57
2.11:	Projected Acres of Future Development in Pima County Permit Area excluding State and Federal Lands	2-59
2.12:	STAT Conservation Goals for PVS	2-60
2.13:	Decision Process for Species Coverage for Pima County MSCP	2-62
2.14:	Species Proposed for Coverage under Terms of PCMSCP based on Conservation of PCA within CLS in Permit Area	2-64
2.15:	Invertebrates Locations within Permit Area and Planning Study Area	2-65
2.16:	Species Proposed for Provisional Coverage under Terms of PCMSCP based on Conservation of PCA within CLS in Permit Area	2-66
2-17:	Species Not Proposed for Coverage under Terms of PCMSCP based on Conservation of PCA within CLS in Permit Area	2-68
2-18:	Snail Species Occurring in Planning Study Area but Not within Permit Area	2-69
3.1:	Proposed Program for Assembling the CLS Lands under Conservation Management for PCMSCP	3-2
3.2:	Projected Implementation of PCMSCP during First 10 Yeats	3-2
3.3:	PCMSCP Mitigation Lands Acquired by Pima County 1999-2004	3-14
3.4:	Acres of FLAP Acquisitions for Section 10 Riparian Habitat Mitigation Credit	3-18
3.5:	Riparian Areas Protected and Managed consistently with PCMSCP Riparian Goals	3-18
3.6:	Representative Restoration, Rehabilitation, and Enhancement Projects in support of PCMSCP Riparian Goals	3-20
4.1:	STAT Habitat Conservation Goals for Covered Species	4-15
4.2:	Temporal Mitigation Priorities for PCMSCP	4-16
5.1:	Examples of Changed Circumstances	5-10
5.2:	Examples of Unforeseen Circumstances	5-23
6.1:	Federal and State Status of Plants in PCMSCP	6-9

ATTACHMENTS

A:	Working Agreements with Federal, State, and Local Agencies
B:	STAT Scope of Work
C:	Priority Vulnerable Species: Analysis and Review of Species Proposed for Coverage by HSCP
D:	Projected Covered Activities: Pima County Public Works
E:	Distribution of Special Elements within CLS
F:	Habitat Protection Priorities in Eastern Pima County

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Chapter 1
Introduction

This document represents the culmination of many years of planning and studies in the development of the biological element of the Sonoran Desert Conservation Plan (SDCP). That work effort has been lead by Pima County staff and guided by the Science Technical Advisory Team (STAT). The overriding biological goal of the SDCP as established by the STAT is:

> To ensure the long-term survival of the full spectrum of plants and animals that are indigenous to Pima County through maintaining or improving the habitat conditions and ecosystem functions necessary for their survival.

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Towards that end, an ecosystem-based Conservation Lands System (CLS) has been developed to serve as the basis for the regional-scale conservation of biological resources in Pima County as summarized by this Pima County Multiple Species Conservation Plan (PCMSCP).

While the PCMSCP represents a culmination of past efforts, it is also a reflection of current knowledge and commitment of intent and resources to a desired future condition in the coming decades. Therefore, it is in the spirit of a dynamic strategy, rather than a static reporting, that this information is presented.

In addition to the STAT members and Pima County staff, numerous persons have contributed their scientific knowledge and expertise. Contributors to the science of the PCMSCP are listed in Chapter 8.

1.1 Purpose and Need for Document

This PCMSCP serves as the basis for the U.S. Fish and Wildlife Service (USFWS) decision regarding issuance of an Incidental Take Permit under Section 10(a)(1)(B) of the Endangered Species Act (ESA). Section 9 of the ESA prohibits the "take" of threatened and endangered species. This includes "the attempt or action to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" such species. However, Section 10(a)(1)(B) authorizes exceptions for take that may occur incidentally to otherwise lawful activities with the provision of a Habitat Conservation Plan (HCP). The HCP must

thoroughly describe the anticipated effects of anticipated take on affected species and the measures proposed to avoid, minimize, and mitigate resulting impacts.

The general purposes of the ESA Section 10(a)(1)(B) and the HCP requirement can be summarized as follows:

- To permit non-Federal projects to take Federally listed species while ensuring their long-term survival and enhancement;
- To promote the long-term conservation of Federally listed species;
- To reduce conflicts between endangered species and economic activities; and
- To develop "creative partnerships" between the public and private sectors.

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For Pima County, the HCP addresses the needs of more than one single species, hence the multi-species designation, i.e., multiple species conservation plan (MSCP). The Pima County MSCP:

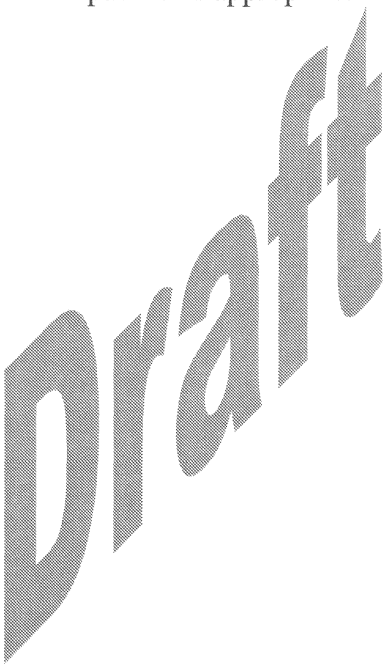
- Provides a summary of biological technical studies conducted in developing a regional landscape conservation plan for Pima County. Throughout this document there are references to scientific and planning reports that have been prepared as the information base for the SDCP. The number of these reports total over 200 and are listed in Chapter 7. The intent of this document is to concisely summarize the relevant background information from these reports rather than to repeat it.

- Serves as the document of record for conservation, mitigation, management, and monitoring commitments. Once the Section 10(a)(1)(B) permit has been approved and the plan implementation is underway, the permit is the document that becomes a legal record of the permit requirement details, including funding and implementation agreements.

- Establishes a phased approach to implementing the PCMSCP with appropriate interim milestones for meeting mitigation requirements associated with projected impacts; and provides a means for accruing mitigation credit for future phases in the event that actual tracked impacts are less than projected impacts.

- Provides a programmatic framework for developing other incidental take permits for non-Pima County jurisdictions and facilitating Section 7 consultations for Federal land management partners. The PCMSCP identifies the criteria for determining

impacts to species covered by the Section 10(a)(1)(B) permit. In this way, it functions to give direction and guidance for other incorporated jurisdictions within Pima County in their pursuit of their individual permits. Similarly, it can be utilized by Federal agencies proposing actions that require consultations with the USFWS. In both cases, the information base herein gives direction in reaching consistent evaluations of biological impacts and appropriate mitigation.



1.2 Background

The PCMSCP has been developed in a broad context, as part of the SDCP and in concert with the Pima County Comprehensive Land Use Plan. In addition to providing Pima County with incidental take protection under the ESA for covered species and permitted activities identified in the plan, the PCMSCP also provides the framework for ESA compliance for other Federal and non-Federal participants throughout Pima County.

1.2.1 Sonoran Desert Conservation Plan (SDCP)

The 1997 listing of the cactus ferruginous pygmy-owl (pygmy-owl) as a Federally endangered species, followed by the 1999 designation of this species' critical habitat galvanized the community dialogue regarding growth in Pima County. The Pima County Board of Supervisors (BOS) initiated the SDCP planning process in 1998 with a broader purpose than simply allowing continued community growth and expansion without significant adverse regulatory consequences from enforcement of the ESA relative to the pygmy-owl. This broader purpose was to develop a regional plan to address the long-term conservation needs of the full range of natural and cultural resources—a plan that can serve as the cornerstone of conservation as well as economic expansion (Pima County 2000). The development of the SDCP has been an iterative planning process whereby concepts are developed using science-based principles, shaped by public review and discussion, and further developed into a plan that reflects community values. Over 200 separate documents have been prepared as part of this planning and public outreach effort.

1.2.2 Pima County Comprehensive Land Use Plan

In 2000 the BOS initiated an update of the 1992 Comprehensive Plan, reflecting the land use concepts, policies, and principles of conservation identified in the draft Preliminary SDCP. This major plan amendment, the Pima County Comprehensive Land Use Plan (CLUP) Update (Pima County 2001 and 2002), was completed and its adoption established the initial implementation of the biological goals expressed by this PCMSCP and the CLS. (See further discussion in Section 3.1, Conservation Lands System).

1.3 Pima County Multiple Species Conservation Plan (PCMSCP): Required Elements

The PCMSCP is the document that institutionalizes the biological resources aspects of the SDCP and the CLUP. By so doing, it provides the legal and logistical framework for implementing those actions that will allow for "smart growth" and economic health while maintaining appropriate levels of ecological conservation.

In accordance with the USFWS Habitat Conservation Plan (HCP) Handbook (Dept. of Interior, 1996) the required elements of the HCP are as follows:

- Identification of impacts likely to result from the proposed taking of the species for which permit coverage is requested;
- Measures the applicant will undertake to monitor, minimize, and mitigate such impacts; the funding that will be made available to undertake such measures; and the procedures to deal with unforeseen circumstances;
- Alternative actions that the applicant has considered that would not result in take and the reasons why such alternatives are not being utilized; and
- Additional measures USFWS or National Marine Fisheries Service may require as necessary or appropriate for purposes of the plan.

In the update addendum to the HCP Handbook (Dept. of Interior, 2000), a "5-point policy" focuses on the integration of five components of the Habitat Conservation Planning program, namely:

- Biological goals
- Adaptive management
- Monitoring
- Permit duration
- Public participation

Each of these handbook and addendum components is discussed in detail in sections that follow.

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1.4 HCP Alternatives

As required in Section 10(a)(1)(B), Pima County has considered a full range of alternative actions to the incidental take proposed in this HCP. These alternative approaches have been the focus of discussions among the STAT, Steering Committee, other advisory committees, and numerous public forums.

1.4.1 Alternatives Eliminated from Further Consideration

A number of alternatives were discussed but not considered in further detail, because they either were not within the control of the participants, were otherwise considered infeasible, or on their face, did not meet Pima County or the USFWS's purpose and need for an incidental take permit. These alternatives included:

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- A Sonoran desert ecosystem permit including adjacent counties and, potentially, northern Mexico;
- A single species permit for the cactus ferruginous pygmy-owl; and
- A permit for the comprehensive list of species that were initially identified as vulnerable by the STAT.

Two sets of alternative approaches to an HCP for Pima County emerged from the public processes to develop the SDCP and HCP. These provide the basis for the PCMSCP as well as the alternatives analysis in the EIS.

1.4.2 Steering Committee Recommendations

In their final report, approved by the BOS in June 2003, the SDCP Steering Committee considered a number of issues associated with the scope and coverage of the Section 10(a)(1)(B) permit applications (Pima County 2003). These issues related to the duration of the permit, entities and projects to be covered by the HCP, and species to be covered by the permit.

The Steering Committee specifically recommended that:

- Pima County apply for a permit with a term ranging from 20 to 50 years. The decision on the specific duration of the permit should be made after other details of the application are completed.

- The Section 10(a)(1)(B) permit application cover all relevant Pima County projects and permits, and willing entities within Pima County.

- The PCMSCP utilize the ecosystem approach that resulted in a CLS map that protects the habitat of 55 priority vulnerable species (PVS).

- The EIS for the PCMSCP clearly describe and analyze five alternatives:

    - The 55 priority vulnerable species and the conservation measures enacted for their protection,

    - The listed species plus those that would be adequately addressed by the conservation measures enacted for the species,

    - A combination between the listed species and 55 PVS,

    - The species within the 55 PVS that are currently listed as threatened and endangered or are candidates for listing, and

    - The No Action Alternative, as required by law.

- This analysis should include an economic analysis of all five alternatives and other important topics that would include, but not be limited to, reserve requirements and regulatory requirements.

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1.4.3 Alternatives Evaluated in Economic Analysis

Pima County undertook an economic analysis of potential costs and benefits of obtaining a Section 10(a)(1)(B) permit (ESI and SWCA 2003). The scope of this study specified the range of alternatives in three scenarios, which measured the impact of:

- Not acquiring the permit while not allowing zoning to change over time (Scenario 1),

- Acquiring the permit while not allowing zoning to change over time (Scenario 2), and
- Acquiring the permit while allowing zoning to change over time (Scenario 3).

Each of these future scenarios was analyzed in the context of population and economic growth projections that quantified future land demand and the suitability of land for different development types. In this way future development footprints were predicted for 10 years, 20 years, and maximum future development. The predicted urban growth patterns were used as a basis for estimating the amount and cost of developable land, and the amount and cost of lands that may be needed to offset or mitigate impacts resulting from development. For example, the specific mitigation and conservation goals and commitments identified for the first 10 years of implementation of the PCMSCP (Section 3.1 and Table 3.2) are based on the land consumption projections (i.e., impacts) for that same time period.

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Furthermore, the economic analysis compared the reserve system incorporated in the CLS (an ecosystem approach based on 55 vulnerable species) with a reserve system designed to protect listed species (Pima County 2002b). The analysis also evaluated a range of mitigation ratios for land acquisition that might be used to accomplish assembly of these two reserve systems with the assumption of the three scenarios during the three time horizons.

1.4.4 Alternatives Analyzed by Environmental Impact Statement (EIS)

The alternatives analyzed in detail by the EIS include the following:

- Alternative 1. The No Action Alternative. Under this alternative, Pima County would not proceed with the application for a regionally applied Section 10(a)(1)(B) permit. Every individual project or action would be evaluated for its permit needs.

- Alternative 2. The Proposed PCMSCP with Partnership and Participation by Other Jurisdictions. The key features of this alternative are that it is a regional scale, ecosystem-based plan, that includes permit coverage for the 55 PVS, implementation of the adopted CLS, and strong participation from other jurisdictions within Pima County including but not limited to Federal agencies, State Land and other Arizona Departments, the City of Tucson, and the towns of Marana, Sahuarita, and Oro Valley.

This alternative would be implemented in 10-year phases. The population growth and land development projections and assumptions of Scenario 3 of the economic study are the basis for analysis of the environmental effects of this alternative.

- Alternative 3. Proposed PCMSCP without Partnership and Participation by Other Jurisdictions. This alternative is similar to the proposed PCMSCP as described above. It assumes continued partnerships with those Federal agencies that have signed cooperative working agreements and who are included as signatories to the Permit and Implementation Agreement. The key difference is that it does not include or rely upon the partnership and participation by other jurisdictions within Pima County. Rather, it provides a means for Pima County to obtain a stand-alone Section 10 permit for only the covered activities under its authority.

- Alternative 4. PCMSCP for Only Federally Listed Species. This Alternative differs from the proposed PCMSCP in that the incidental take permit would cover only a limited set of species that are currently listed as threatened or endangered by the USFWS. Like Alternative 3, it does not include or rely upon the partnership and participation by other jurisdictions within Pima County.

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Chapter 2

Pima County Multiple Species Conservation Plan Impacts

2.1 Delineation of PCMSCP Boundary

2.1.1 Planning Study Area

The Planning Study Area for the PCMSCP includes the 9,184 square miles (5,877,760 acres) of Pima County. Elevations range from 1,200 feet in the Lower Colorado Desert of western Pima County to over 9,000 feet at the peak of Mount Lemmon in the Catalina Mountains (Figure 2.1). Geographically, the Planning Study Area is representative of the Basin and Range Province, with mountainous "sky islands" separated by the desert floors of broad valleys.

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The San Xavier, Pascua Yaqui, and Tohono O'odham Nation reservations account together for 42 percent of Pima County's land ownership. The state of Arizona owns 15 percent, the U.S. Forest Service and Bureau of Land Management 12 percent, National Parks and other public lands 17 percent, and individual or corporate ownership accounts for 14 percent (Pima County, 2003).

In addition to the reservations, jurisdictions within Pima County include the cities of Tucson and South Tucson, and the towns of Oro Valley, Marana, and Sahuarita.

All of these areas were included in the study area of the PCMSCP, regardless of jurisdiction. The best available biological information for the study area was sought, compiled, and analyzed with the intent of providing a full context of the plan area for analysis.

2.1.2 Permit Area

The Permit Area, for which a Section 10(a)(1)(B) permit is being sought, is a subset of the Pima County and includes only the lands under the Pima County BOS legal authority

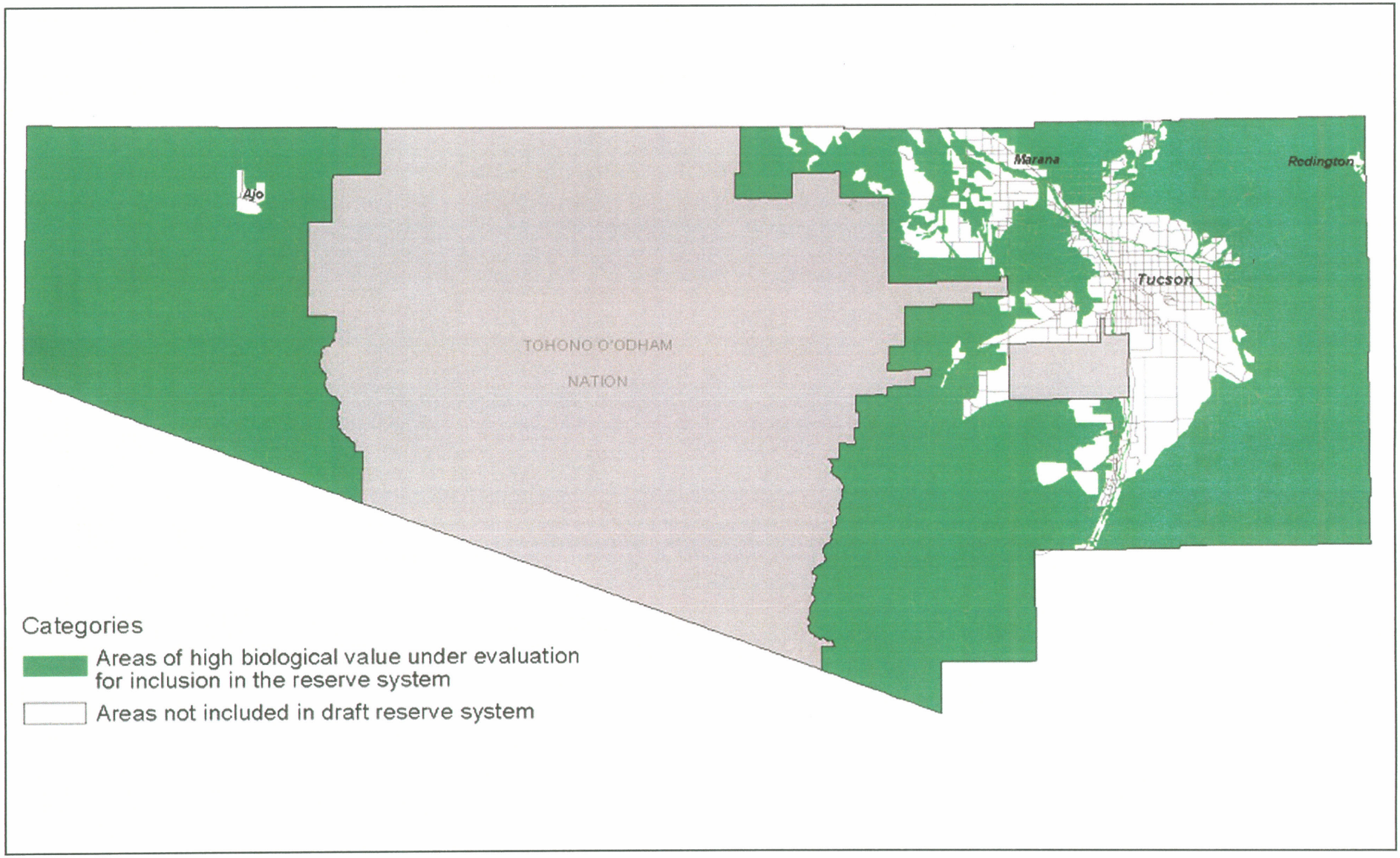


FIGURE 2.1
Pima County Reserve System Boundaries

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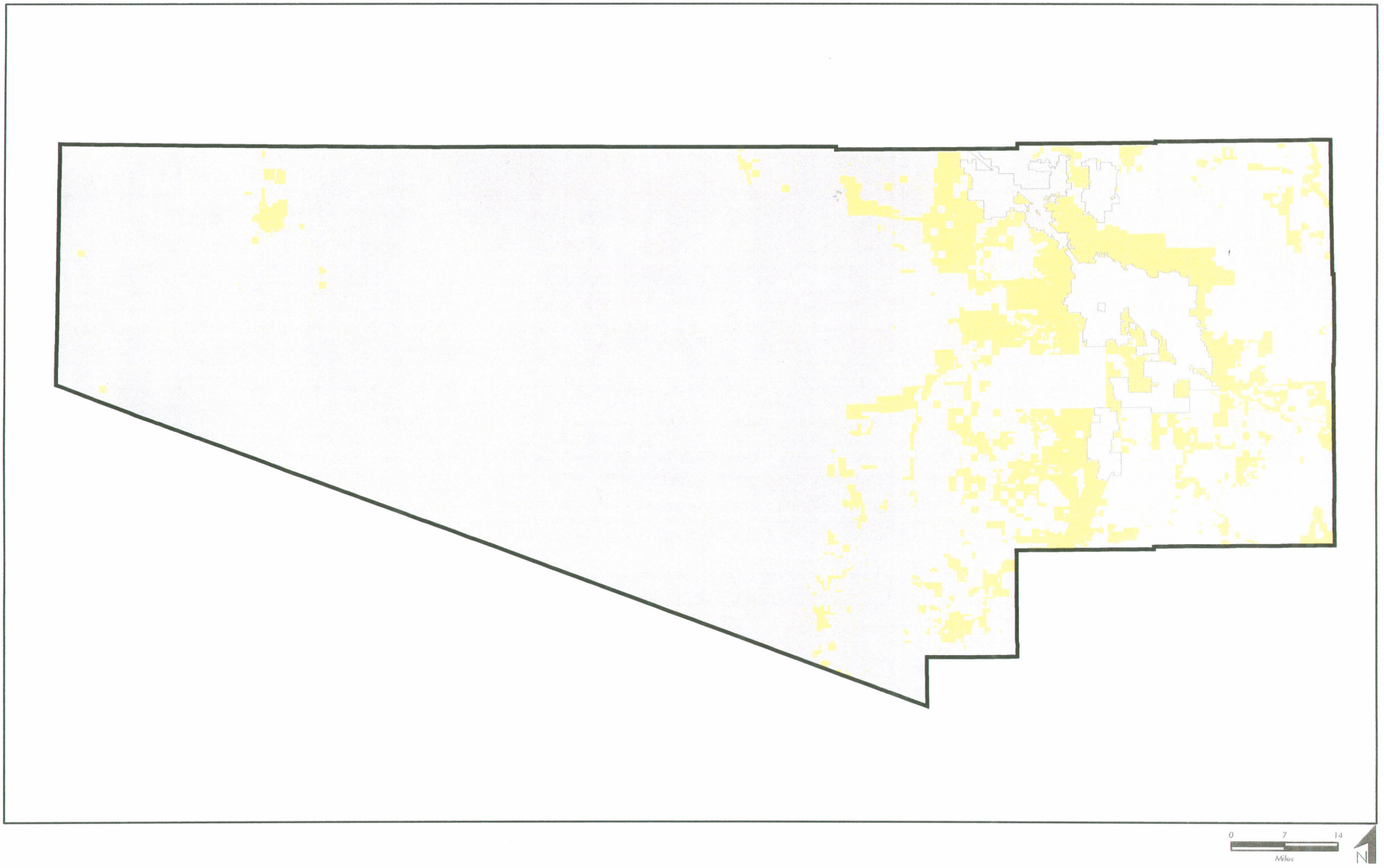
—a total of approximately 610,000 acres of unincorporated and county-owned lands (Figure 2.2). Excluded from the Permit Area are State of Arizona lands and lands incorporated under separate jurisdictions. Federal lands are not specifically included under the permit, however Federal land management agencies (i.e., Bureau of Land Management [BLM], U.S. Forest Service [USFS], National Park Service [NPS], and USFWS) are active partners in the conservation plan efforts, as identified by the Working Agreements entered into with Pima County (Appendix A).

2.1.3 Participants

Pima County has made broad participation by many agencies, organizations, and interested citizens a top priority for its conservation planning effort. Public participation has included public scoping meetings and comment periods, a citizens' Steering Committee of over 80 members meeting since March of 1999, over 400 public meetings, a series of educational sessions and workshops (also known as "SDCP Bootcamp"), meetings of 12 advisory and technical teams, and numerous informal meetings held with a variety of interest groups and concerned citizens. More than 150 scientists have contributed their expertise. Nationally recognized peer reviewers have provided insights and suggestions that have been incorporated.

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Local jurisdictions and state and Federal agencies have participated in meetings, on committees and as members of the STAT and Government Working Group (See Sections 4.2 and 4.3), and their concerns have been made part of the reserve design and conservation planning process. Entities with whom Pima County has formal Working Agreements and/or Cooperative Agreements are discussed in Section 6.2.



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FIGURE 2.2
Section 10 Permit Area

2.2 Collection and Synthesis of Biological Data

The Pima County BOS appointed a team of scientists to oversee the development of the biological resources component of the SDCP (see list of STAT members in Chapter 8). In May 1999, this multi-agency, multi-disciplinary team met for the first time to begin discussions about the biological underpinnings for a regional conservation plan. Since that time they and Pima County staff, along with consultants and other biologists and natural resource managers, have identified the plant and wildlife species of greatest concern, identified mapping and data gathering needs, participated in geographic information system (GIS) decision-making workshops, produced the CLS map, and identified monitoring and management needs for long-term viability of the proposed conserved lands. The result of this process, detailed in an extensive series of technical documents (see References Cited), forms the basis for the proposed PCMSCP. This process is described briefly below.

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2.2.1 Methodology

The collection and synthesis of biological data has been ongoing in Pima County for many years, with formal records dating back to the 1800s and extending into present time to reflect agency, academic, and private sector efforts. This information provides a broad historical context for examining existing conditions.

The focused efforts of scientists working on the SDCP began with the formation of the STAT. The STAT developed the initial goals and objective statement for the process (Pima County 1999a), developed a scope of work for the plan (Appendix B), and has continued to provide guidance and direction to the multidisciplinary team developing the plan. The STAT has performed the critical role of formal and informal peer review, which is fully incorporated into the plan development process.

The overall concept for development of the plan, established early in the process, was to make extensive use of GIS technology. This was recognized as the only feasible approach to assemble all of the extensive existing data (both digital and non-digital), identify critical gaps in the existing data (and potential remedies to the gaps), and to provide a means for analyzing the information on biological and physical resources over the 6-million-acre study area. The GIS data and analytical results were used by the STAT and multidisciplinary team to develop a sophisticated approach to achieving the goal of conservation of the full range of diversity of biological resources in Pima County, as well

as providing the basis for this application of a Permit under Section 10(a)(1)(B) of the ESA.

2.2.2 Environmental Setting

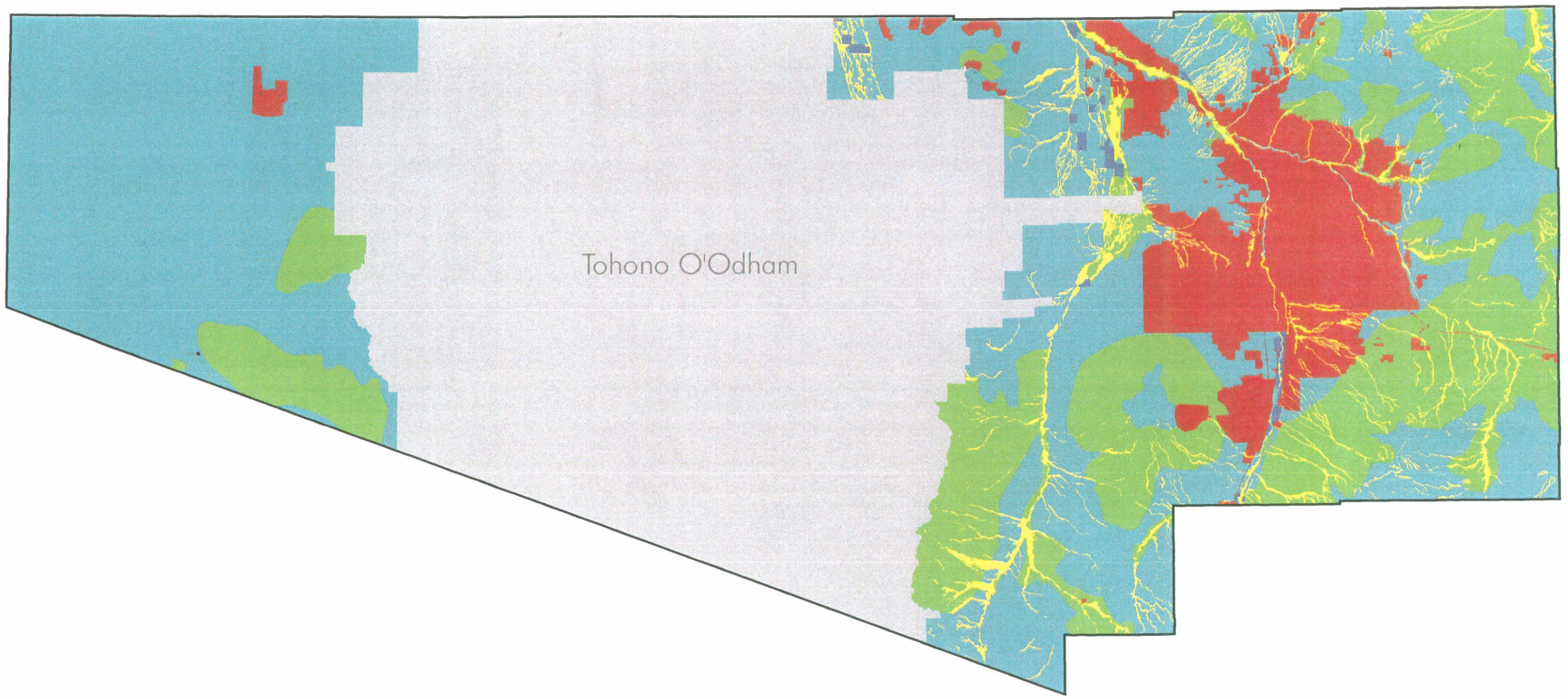
2.2.2.1 Land Use

A major plan amendment to Pima County's CLUP was completed in 2002 (Pima County 2001 and 2002). This updated plan incorporated the land conservation concepts, policies and principles reflected by the CLS and identified by preliminary drafts of the SDCP (Figure 2.3). The seven elements of the CLUP (i.e., Growth Area, Land Use, Circulation, Water Resources, Open Space, Cost of Development, and Environmental Planning) demonstrate a compatibility of natural and built environment planning that recognizes the physical interdependence of the conservation land system and the urban land system. By incorporating the CLS goals and guidelines, the CLUP established the initial implementation of the biological goals expressed by the PCMSCP. The primary mechanisms to achieve this are expressed by 1) Growth Areas focused on lands outside of the CLS, 2) down-planning in environmentally sensitive areas, 3) policies related to Water Resources, conservation and ecological restoration, 4) policies related to Natural Resource Protection and specifically, in support of the Conservation Lands System, and 5) the extent of Resource Conservation Areas.

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2.2.2.2 Population

Pima County's population has grown from less than 25,000 in 1910 (City of Tucson 2003) to the current estimate of approximately 889,000 and is expected to exceed 1.2 million in 20 years. Using water availability estimates as a constraint to growth, Pima County's population at buildout (i.e., the point at which water availability will cease to support additional population) has been projected at approximately 1.9 million people (ESI Corp and SWCA 2003). The amount of land needed to accommodate the population increase expected to take place outside the current built environment in eastern Pima County is projected to be just over 195,000 acres. The land absorption projection for the first 10-year phase of the PCMSCP is 6,348 acres. The footprint of this projected population and land absorption is discussed further under the analysis described in Section 2.4, and in Chapter 3., Mitigation Programs and Standards.



AGRICULTURE INHOLDINGS WITHIN CONSERVATION LANDS SYSTEM
BIOLOGICAL CORE MANAGEMENT AREAS
IMPORTANT RIPARIAN AREAS
MULTIPLE USE MANAGEMENT AREAS
AREAS OUTSIDE CONSERVATION LANDS SYSTEM

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Miles

N

FIGURE 2.3
Biologically Preferred Reserve Configuration Alternative

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2.2.2.3 Land Cover Data Assessment and Compilation

Vegetation and land cover data are essential for assessing conservation needs and developing potential reserve designs, since it is these data that describe habitat needs and are significant determinants of species distributions. Recognizing the importance of vegetation and land cover mapping to the development of a regional multi-species conservation plan, the STAT identified the need to assess and improve existing data for Pima County. A June 1999 report, "An Evaluation of Previous Vegetation Mapping Efforts for the Sonoran Desert Conservation Plan" was submitted to STAT (Pima County 1999b), which examined the suitability of previous mapping efforts for use in the SDCP. This paper examined four data sources: Arizona Gap Analysis Program, Pima County Wildlife Habitat Inventory Phase 2 (WHIP2), Pima Association of Governments 208 studies, and Pima County Riparian Habitat Mapping. The report recommended that the accuracy of vegetation delineation and classification could be improved for upland communities by combining multiple sources of vegetation data, but that special effort including extensive fieldwork were necessary for improving riparian mapping. The December 1999 report, "An Evaluation of Previous Riparian Vegetation Mapping Efforts for the Sonoran Desert Conservation Plan" assessed the same data sources (Pima County 1999c), plus Arizona Game and Fish Department's (AGFD) Vegetation and National Wetland Inventory Maps, focusing specifically on riparian vegetation communities. Deficiencies in existing data and recommendations for additional work were described.

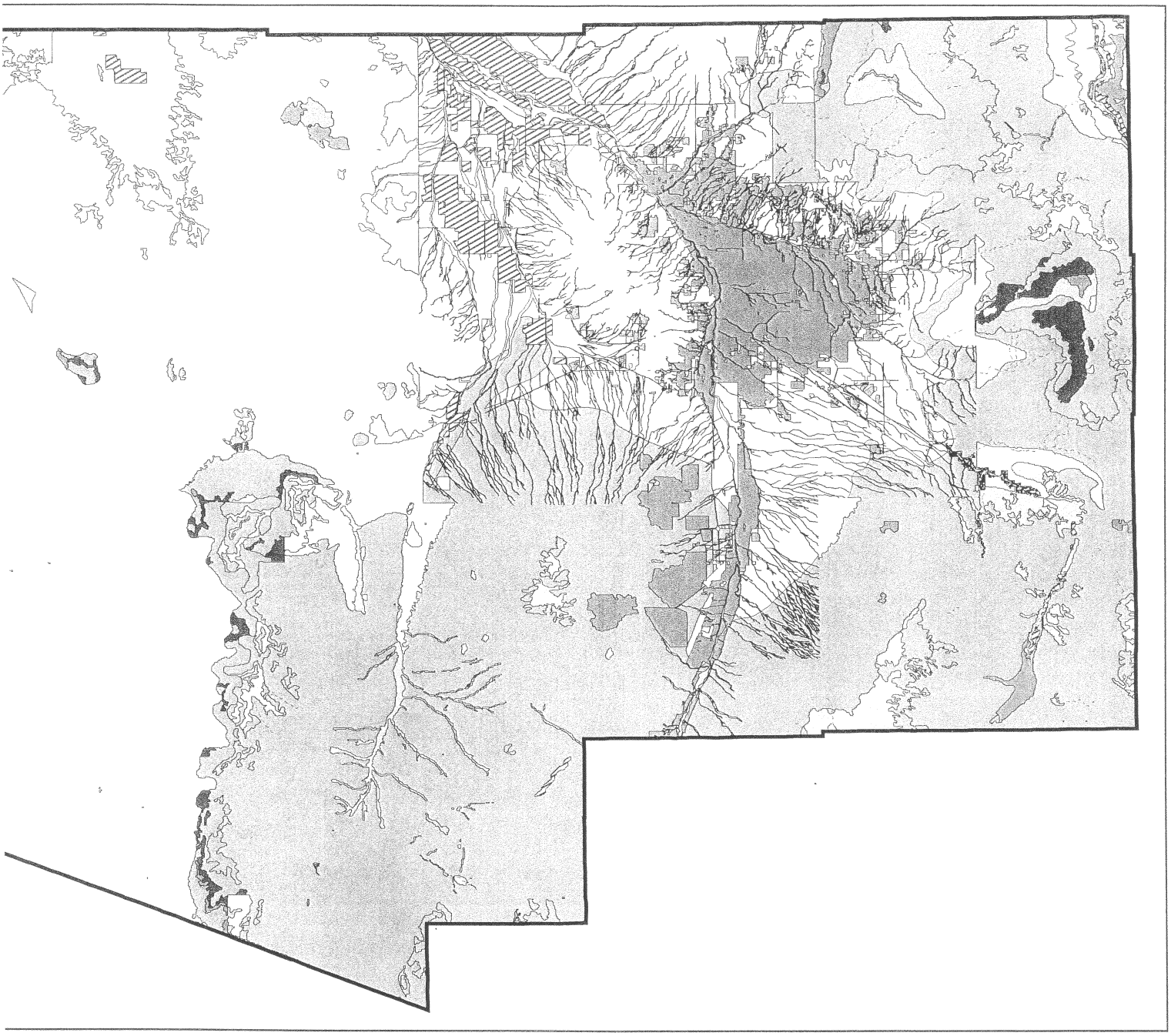
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From these studies, STAT developed a scope of work that outlined two separate tasks to be conducted:

- Produce new mapping for riparian areas based on existing data plus field work, and
- Compile an overall land cover map based on existing data, including an assessment and recommendations for improvement.

The primary goals for this work were to produce the best possible land cover data layer from available resources, adopt and apply a standard classification system, develop a system for compiling this data layer that would facilitate the incorporation of new data and assumptions, evaluate the results, and prioritize map improvements necessary for achieving the goals of the SDCP (RECON 2000a). Vegetation mapping was standardized to the classification system developed by Brown, Lowe, and Pase (Brown et al. 1979, 1980, 1982) using their codes.

Both mapping tasks have been completed, supporting metadata documented, and the revised riparian mapping has been incorporated into the Composite Land Cover Mapping (Figure 2.4).



Manzanita
Mixed Evergreen Sclerophyll
Sacatan-Scrub
Mixed Grass-Scrub
Shrub-Scrub Disclimax
Creosotebush-Tarbush
Mixed Scrub
Creosote-Bursage
Paloverde-Mixed Cacti
Saltbush

223.21 Cottonwood-Willow
223.22 Mixed Broadleaf
224.52 Mesquite
224.53 Cottonwood-Willow
234.71 Mixed Scrub
243.53 Cordgrass
244.71 Cattail
244.75 Saltgrass

Other Land Cover Types
999.0 Unclassified
999.1 Agriculture
999.2 Urban
999.3 Water
Streams
999.4 Bare Ground

FIGURE 2.4
Composite Land Cover

2.2.3 Biological Resources

2.2.3.1 Priority Vulnerable Species

Under the direction of the STAT, a list of the most vulnerable plant and wildlife species was developed (RECON 2000b). This began with an initial list of over one hundred species recognized by the Federal government as imperiled, species extirpated from Pima County, and additional species that are in decline or jeopardy. That list was then analyzed and certain species were screened out based on one or more of the following criteria:

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- Species for which conservation can be accomplished as a result of protection afforded to other species, habitat types, or plant communities by the Sonoran Desert Conservation Plan;

- Species of which insignificant or non-viable numbers occur in the planning area and for which conservation is best accomplished elsewhere (accidentals, range peripherals, etc.);

- Species that are not known to occur in the study area, nor are likely to occur in the study area within the planning horizon, or species that are too broadly distributed to help differentiate among a range of plan alternatives;

- Species known only from or predominantly within Pima County on lands managed by the U.S. Forest Service, the U.S. Fish and Wildlife Service, and/or the National Park Service, and species known only from or predominantly within Pima County on the Tohono O'odham Nation reservation. (Species in this category are already being managed by Federal agencies with commitments to protect them and are therefore out of PCMSCP's jurisdiction.)

This review resulted in a short list of 55 species that were identified by the STAT as Priority Vulnerable Species (PVS) of Pima County warranting further analysis and consideration for conservation and possible coverage by a Section 10(a)(1)(B) permit (Table 2.1). This list has subsequently been revised to 54 species for which specific locational information is available.

Detailed species accounts were compiled for each of these species (RECON 2000c). Sources of information used in assembling these accounts included AGFD Species Abstracts, Heritage Data Management System records, species accounts in various

Table 2.1
Priority Vulnerable Species of Pima County

Common Name	*Scientific Name*
Mammals (9 species)	
Mexican long-tongued bat	*Choeronycteris mexicana*
Allen's big-eared bat	*Idionycteris phyllotis*
western red bat	*Lasiurus blossevillii*
southern yellow bat	*Lasiurus xanthinus*
lesser long-nosed bat	*Leptonycteris curasoae yerbabuena*
California leaf-nosed bat	*Macrotus californicus*
Merriam's mouse	*Peromyscus merriami*
pale Townsend's big-eared bat	*Plecotus townsendii pallescens*
Arizona shrew	*Sorex arizonae*
Birds (8 species)	
rufous-winged sparrow	*Aimophila carpalis*
burrowing owl	*Athene cunicularia hypugaea*
Swainson's hawk	*Buteo swainsoni*
western yellow-billed cuckoo	*Coccyzus americanus occidentalis*
southwestern willow flycatcher	*Empidonax traillii extimus*
cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*
Abert's towhee	*Pipilo aberti*
Bell's vireo	*Vireo bellii*
Reptiles (7 species)	
Tucson shovel-nosed snake	*Chionactis occipitalis klauberi*
Organ Pipe shovel-nosed snake	*Chionactis palarostris organica*
giant spotted whiptail	*Cnemidophorus burti stictogrammus*
red-backed whiptail	*Cnemidophorus burti xanthonotus*
ground snake	*Sonora semiannulata*
desert box turtle	*Terrapene ornata luteola*
Mexican garter snake	*Thamnophis eques megalops*
Amphibians (2 species)	
Chiricahua leopard frog	*Rana chiricahuensis*
lowland leopard frog	*Rana yavapaiensis*

Table 2.1
Priority Vulnerable Species of Pima County (continued)

Common Name	*Scientific Name*
Fish (6 species)	
longfin dace	*Agosia chrysogaster*
desert sucker	*Catostomus clarki*
Sonora sucker	*Catostomus insignis*
desert pupfish	*Cyprinodon macularius macularius*
Gila chub	*Gila intermedia*
Gila topminnow	*Poeciliopsis occidentalis occidentalis*
Invertebrates (17 species):	
Arkenstone cave pseudoscorpion	*Albiorix anopthalmus*
talus snail species	*Sonorella ambigua ambigua*
talus snail species	*Sonorella baboquivarienis baboquivarienis*
talus snail species	*Sonorella baboquivarienis berryi*
talus snail species	*Sonorella baboquivarienis depressa*
San Xavier talus snail	*Sonorella eremita*
talus snail species	*Sonorella imperatrix*
talus snail species	*Sonorella imperialis*
talus snail species	*Sonorella magdalensis*
talus snail species	*Sonorella meadi*
talus snail species	*Sonorella pupela*
talus snail species	*Sonorella rinconensis*
talus snail species	*Sonorella sabinoenis buehmanensis*
talus snail species	*Sonorella sabinoensis tucsonica*
talus snail species	*Sonorella sitiens sitiens*
talus snail species	*Sonorella tortillita*
Kitt Peak talus snail	*Sonorella xanthenes*
Plants (7 Species):	
Pima pineapple cactus	*Coryphantha scheeri var. robustispina*
Gentry indigo bush	*Dalea tentaculoides*
Nichol Turk's head cactus	*Echinocactus horizonthalonius* var. *nicholii*
Acuna cactus	*Echinomastus erectocentrus* var. *acunensis*
needle-spined pineapple cactus	*Echinomastus erectocentrus* var.
Huachuca water umbel	*Lilaeopsis schaffneriana* var. *recurva*
Tumamoc globeberry	*Tumamoca macdougalii*

formats, local and regional field guides, primary literature, notes from conversations with species experts, and cumulative experience of the STAT and their consultants. Organized by taxonomic group, the list of PVS includes:

Mammals

Of the nine mammals in the study area, seven are bats. A number of the bat species depend on, or occur along, riparian corridors. Riparian losses have had a negative impact on the Merriam's mouse, listed in Table 2.1, and water is thought to be important to the Arizona shrew.

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Birds

Six of the eight birds included among the PVS have an association with riparian areas. These areas have been seriously altered from baseline conditions and continue to decline.

Reptiles

Desert box turtles and Mexican garter snakes are found in riparian areas, as are giant spotted whiptail lizards. Mixed riparian scrub (xeroriparian) and mesquite bosque are identified as important to the Tucson shovel-nosed snake.

Fish & Amphibians

The two frog and all six fish species are dependent on aquatic environments.

Invertebrates

Sixteen species of talus snails are included on the list of PVS. Although the state of taxonomic understanding is evolving, the actual number of species or subspecies is still somewhat uncertain.

Plants

Riparian or aquatic ecosystems are important for the Gentry indigo bush (*Dalea tentaculoides*) and the Huachuca water umbel (*Lilaeopsis schaffneriana* var. *recurva*).

The majority of these PVS are associated with aquatic and riparian-based ecosystems. This list of species also points out the importance of other landscape elements or features that are also threatened in Pima County. Grasslands, desert scrub, caves, adits, and talus slopes serve as unique habitat niches that support vulnerable species. These and other landscape elements also have an important function in providing landscape-scale connectivity between otherwise isolated conservation areas.

2.2.4 Special Plant Communities and Other Special Elements

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Protecting indigenous species requires more than individual species' habitat conservation. Maintaining the full spectrum of native biodiversity requires the inclusion of vegetation communities as well as particular species of concern when assembling a viable reserve system. Planning with a focus on species is referred to as a "fine filter" approach, while planning with a focus on plant communities and larger landscape ecological processes has been called the "coarse filter" approach (Noss and Cooperrider, 1994). Because these different strategies serve as an effective check and balance on one another, STAT directed that aspects of both be incorporated into the design of the CLS. In this way the number of species represented is maximized and the variability of ecological conditions and functions is captured (Marshall et al. 2000).

Special Elements are the landscape features that have been used in the PCMSCP reserve design. A number of categories of special element conservation targets were considered and used to constrain or influence the extent and boundaries of the CLS (Table 2.2).

Table 2.2
Special Elements

Special Elements	Acres in Pima County
Cattail	500
Cottonwood-willow	3,000
Interior southwest riparian deciduous forest	6,000
Intermittent streams (20-foot buffers)	1,000
Mixed conifer	2,000
Perennial streams (20-foot buffers)	300
Sacaton	7,000
Saltbush	12,000
Springs (50-foot buffers)	50
Talus slopes	600
Unincised floodplains	2,500
Grassland	365,000

Table 2.2
Special Elements
(continued)

Special Elements	Acres in Pima County
Ironwood	195,000
Limestone	40,000
Mesquite	23,000
Oak-grass ecotone	105,000
Sonoran riparian scrub	150,000
Watershed	80,000

Many of the Special Element conservation targets are plant community types. Others represent specific habitat types important for individual species, such as talus slopes for talus snails, or caves, adits and bridges for certain bats. All but the low elevation valley floors were used to guide or constrain the reserve design (Pima County 2002a). These areas are adequately represented by the combination of grasslands, riparian corridors, and desert scrub.

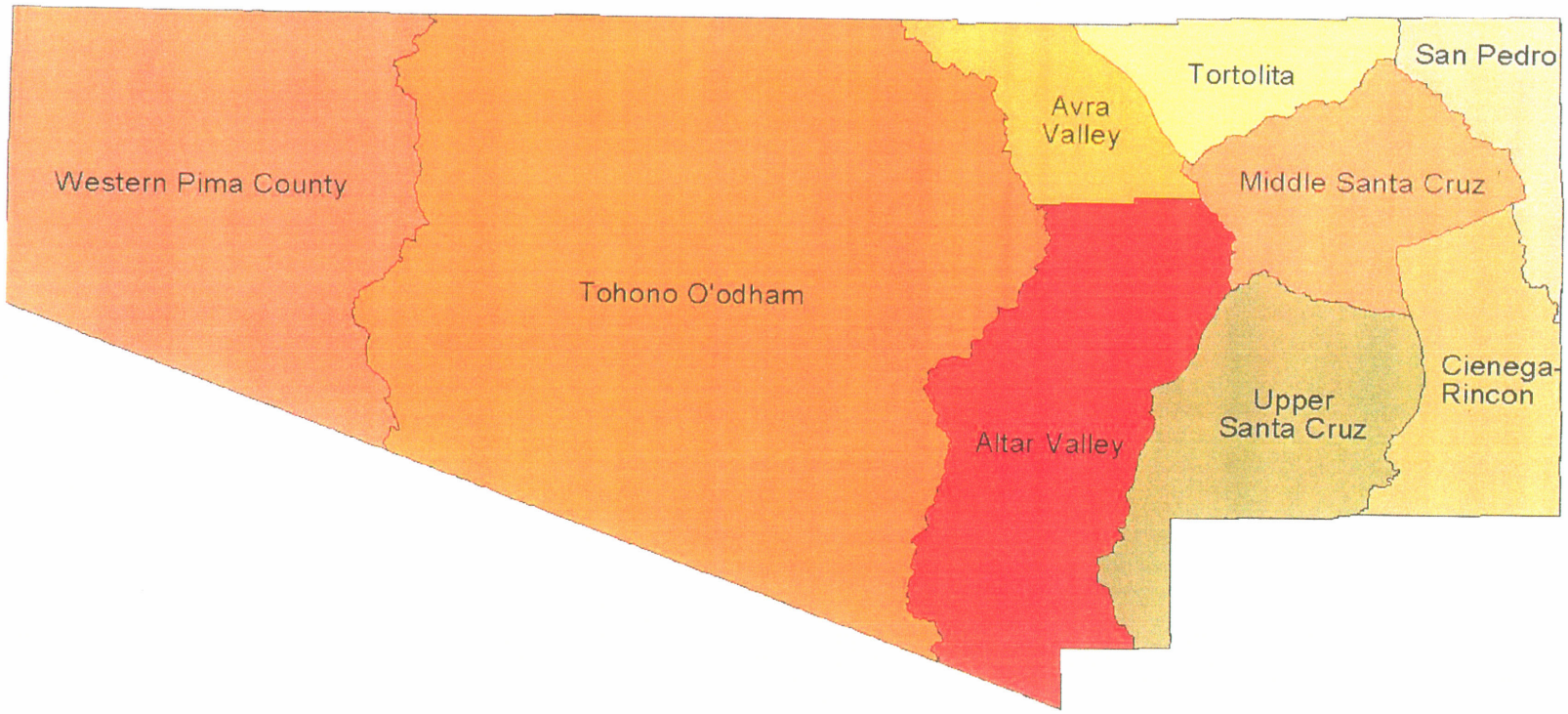
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2.2.4.1 Biological Threats and Stressors

At the same time the existing information regarding species, habitat distribution, and land cover data were being compiled, a countywide biological resources stress assessment was undertaken. The purpose of this evaluation was to establish the baseline knowledge of existing and potential threats and stressors to plants, wildlife species, and overall ecological health. Emphasis was placed on identifying the specific components of past, existing, and proposed land and water uses posing the greatest threats over the next 30 years to the PVS, special habitats, and plant communities that were identified by the STAT. The Biological Stress Assessment was developed in concert with the development of detailed Species Accounts in order to incorporate information on specific stressors to species to the extent possible. Each of the Pima County's nine watershed sub-areas was evaluated separately (Figure 2.5). The work effort was summarized in the report, "Biological Stress Assessment: an Overview Discussion of Issues and Concerns" (RECON 2000d).

The role and value of the Biological Stress Assessment is several fold in that it:

- Identifies species and landscape elements of greatest concern,
- Provides a science-based first step in identifying issues to evaluate under National Environmental Policy Act (NEPA) process,



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FIGURE 2.5
Pima County Watershed Subunits

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- Provides a mechanism to rank land areas by intensity of threat (least to most critical) and compare that to current conservation status,
- Highlights data gaps (GIS and otherwise), and
- Points to avenues for future analysis.

The stress assessment made a first cut in identifying issues to be evaluated under NEPA review. In the context of an HCP, some land uses will be considered as "otherwise lawful activities" that would be allowed and permitted under the terms and conditions of a Federal Section 10(a)(1)(B) Incidental Take permit. Stressors to biological resources stem from events, activities, changes over time, and other factors that affect individual plant and wildlife species as well as the biological and hydrological systems that support them.

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Stressors to wildlife include those factors that either directly or indirectly affect its ability to find or provide for its basic needs of food, water, and cover.

Stressors to plants include reduction in water availability, removal of and damage to plants, competition with invasive species, and loss of pollinator species.

Each of these sources of stress has the potential to affect biological resources in numerous ways—some positively, some negatively. Furthermore, many of these sources of stress are directly linked to specific land and water use activities.

2.2.4.2 Primary Threats and Stressors

The biologically rich landscape elements or areas most threatened in Pima County, and throughout the arid west, are riparian forests, wetlands, perennial streams, and areas of shallow groundwater. This has been documented and discussed for decades. The spread of introduced, non-native aquatic species is on the forefront of biodiversity discussions. The negative impact of non-natives on native populations has been greatly exacerbated by habitat modifications such as the damming of streams and the creation of ponds and lakes.

Other examples of threatened or stressed habitats in Pima County include cave habitats and limestone dependent plant communities, mine adits used by bats, grasslands and other undeveloped, low elevation valley lands, saguaro and ironwood plant communities,

and remaining xeroriparian areas that provide key connections to and extensions from existing preserves.

2.2.4.3 Significance of Historic Depletion of Water within Eastern Pima County

One of the most profound stressors to biological resources in Pima County has been the depletion of surface water flows and the drop in groundwater levels. These have resulted from a combination of factors.

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In the late 1800s the Tucson basin was relatively undeveloped. Watercourses that are now dry most of the year had perennial flows. Numerous springs flowed as well. The small community of Tucson depended almost entirely on surface flows from the Santa Cruz River or from springs that bubbled to the surface at the base of Sentinel Peak (now called "A" Mountain), Black Mountain near San Xavier Mission, and several other spots (J. Gelt et al. ND). There was enough water to support the few thousand residents, including the irrigation of crops. Windmills, frequently inactive, powered well pumps in areas of shallow groundwater. The technological development of pumps powered by wood-burning steam engines in the 1890s enabled wells to be drilled to much greater depths and produce far greater flows. From then on, groundwater pumping increased steadily and exponentially, proportionately to population growth and water demands. The depth to groundwater increased dramatically. By the 1940s the water table had dropped so low that the Santa Cruz River flowed only during flood events.

Extended droughts in California and Texas in the 1880s, coupled with the arrival of the railroad, brought huge numbers of livestock to the area. Severe weather patterns, overgrazing, and drought resulted in a landscape vulnerable to the heavy rains that fell in 1890. Erosion, down cutting of watercourses, and long-term range damage resulted (Tellman et al. 1997). These climatic and human developments worked together to eliminate many former wetlands and perennial watercourses.

The resulting loss of aquatic, semi-aquatic, and riparian ecosystems, and the corresponding loss of species that depend on these habitat types, presents a significant threat to biodiversity in Pima County for this reason: a high percent of endangered, threatened, or otherwise sensitive species in Pima County are associated with aquatic and riparian habitat types. This loss presents a significant dilemma given the resource protection and mitigation mandates of the ESA. As a practical matter, the permitting requirements and time delays associated with impacts to watercourse areas are by themselves a significant constraint to public works and private development (Pima County 1999d).

2.2.4.4 Landscape Conservation Management Status

Land ownership/management categories were assessed for level of threat to biodiversity by determining the conservation management status of each category. Conservation status is adapted from the system devised for the Natural Heritage Database System and utilized in the National Gap Analysis Program. This classification system uses a scale of 1 through 4 to represent the degree of management commitment to biodiversity maintenance (Table 2.3). The purpose of identifying land conservation status as part of an HCP reserve design process is to reveal the real potential for landscape modification and management that may or may not be consistent with conservation goals for a given area.

- Conservation Status 1 lands have the greatest level of protection (represented by the national parks and wildlife refuges);
- Conservation Status 2 lands include, state parks, BLM, national monuments, and some Pima County mountain parks;
- An example of Conservation Status 3 lands are U.S. Forest Service lands, which are managed for multiple uses; and
- Conservation Status 4 lands have the lowest level of protection (represented by urbanized and mined areas).

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Additional categories to further define Conservation Status level 4 have been developed. For example private or public lands, including Unreserved State Trust lands, with no management agreements to maintain native species were assigned a Conservation Status 4b.

All lands within Pima County were assigned a Conservation Status 1, 2, 3, or 4. Additional subcategories, which further define level 4, were added to reflect the existing potential for modification for uses that are not consistent with conservation goals.

The Land Conservation Status, as it was assigned to different management categories and land use areas, summarizes the patterns of existing biodiversity protection and shows opportunities for establishing future protection within the CLS (Figure 2.6). For a given land area, the Land Conservation Status provides a snapshot of the real potential for landscape modification and management that may not be consistent with conservation goals. Based on the distribution of general levels of potential threats and stressors, certain general conclusions emerge:

Table 2.3
Conservation Status Classifications

Gap Status	Status Description	Examples
1a	Primarily public lands with permanent protection from conversion of natural cover and a mandated management plan to maintain a natural state within which disturbance events are allowed or mimicked through management.	Some USFWS Wildlife Refuges; some Pima County Natural Preserves; some USFS RNAs; most USFS, BLM, and NPS Wilderness Areas.
1b	Primarily public lands with permanent protection from conversion of natural land cover and a mandated management plan to maintain a natural state within which disturbance events are allowed or mimicked through management, but may contain uses that detract from quality of land such as visitor centers, high levels of traffic through land, heavily used trails, and campgrounds. A maximum of 5 percent of the land is allowed to be managed in an unnatural state.	Some USFWS Wildlife Refuges; some USFS RNAs; some USFW Wilderness Areas; TNC deeded lands; some NPS National Parks.
2	Primarily public lands with permanent protection from conversion of natural land cover and mandated management plan in operation, but receives uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance. Over 5 percent of the land is managed in an unnatural state.	Some BOR lands; State Parks; some Pima County Mountain Park lands; NPS National Monument; some BLM National Conservation Areas.
3a	Primarily pubic lands managed to maintain biodiversity, but not subject to permanent protection; and/or managed to maintain biodiversity and subject to permanent protection without a management plan.	Some TNC Nature Preserves; most Pima County parks.

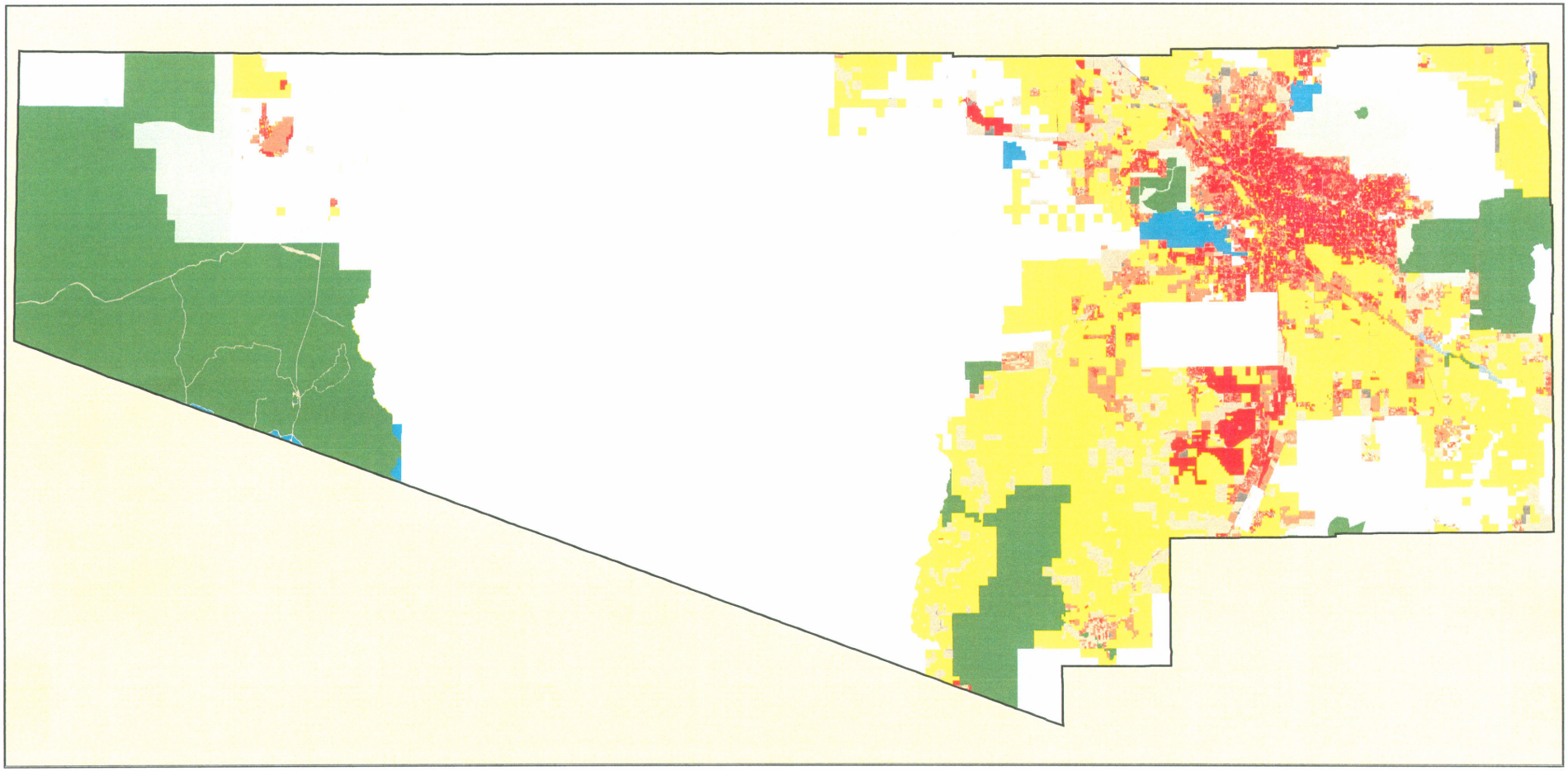
Table 2.3
Conservation Status Classifications
(continued)

Gap Status	Status Description	Examples
3b	Primarily public lands with permanent protection from conversion of natural land cover for the majority of the area, and subject to extractive uses of either broad, low-intensity type (logging), or localized intensive type (mining, bombing, residential). Management also confers protection to federally endangered and threatened species throughout the area.	Most USFS unreserved land; U of A Experimental Range land.
4a	Private or public lands without existing easements or irrevocable management agreements to maintain native species and natural communities; but without existing development or land uses which limit the lands' value for conservation purposes, and without entitlements or existing plans for changes in land use intensity.	Vacant state and private lands used for grazing.
4b	Private or public lands without existing easements or irrevocable management agreements to maintain native species and natural communities, with no existing development but with existing uses which limit the lands value for conservation purposes.	Vacant state and private lands used for grazing.
4c	Private or public lands without existing easements or irrevocable management agreements to maintain native species and natural communities, with no existing development, but with existing land use designations for increased intensity of land uses.	Vacant private lands with anticipated future land uses.
4d	Private or public lands with entitlements to increased intensity of land uses.	Vacant private lands with approved or planned development projects, recreation-oriented parks, agriculture.
4e	Native American lands	Tohono O'odham Nation reservation; Pascua Yaqui Reservation
4f	Private or pubic lands with existing development or other uses that minimize value for conservation purposes.	Existing residential, commercial, industrial, transportation, etc.

Table 2.3
Conservation Status Classifications
(continued)

Notes:

USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
BLM	Bureau of Land Management
NPS	National Park Service
TNC	The Nature Conservancy
BOR	Bureau of Reclamation
NCA	National Conservation Area (BLM)
U of A	University of Arizona
RNS	Research Natural Areas



Level of Threat

Low

High

Conservation Status

Most Protected

Least Protected

1a	(Public lands with permanent protection)
1b	(Public lands with permanent protection, but may contain uses that detract from quality of biological resources)
2	(Public lands with permanent protection, but includes uses that degrade quality of biological resources)
3a	(Public lands managed to maintain biodiversity, but not subject to permanent protection)
3b	(Public lands with permanent protection, but subject to extractive uses)
4a	(Unprotected private or public lands without existing land uses which limit the value for conservation)
4b	(Unprotected private or public lands with no existing development, but with existing land uses which limit the value for conservation)
4c	(Unprotected private or public lands with existing land use designations for increased intensity of land uses)
4e	(Unprotected private or public lands with entitlements to increased intensity of land uses)
4f	(Native American lands)
4x	(Private or public lands with existing development)

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FIGURE 2.6

Land Conservation Status

- Eastern Pima County has a well-defined set of core conservation areas, primarily centered on higher elevations areas.

- Because of the existing level of threats and stressors, coupled with the limited opportunities for increasing the amount of conservation lands within the Tucson metropolitan area, conservation planning should focus on the protection of key resources (e.g., riparian and aquatic habitats, endangered species habitats) and the provision of corridors and connections between more appropriate and feasible conservation areas.

Pima County's conservation planning should focus on augmenting the existing reserve core areas to provide for coverage of additional conservation targets, increasing the coverage of underrepresented conservation targets, and protecting landscape connections between important conservation areas.

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- Landscape fragmentation and habitat degradation resulting from urbanization, roads and highways, and other linear infrastructure elements represent a significant threat to biodiversity throughout Pima County.

- The opportunities for developing a biologically meaningful CLS are substantial. Almost half of Pima County (exclusive of the Tohono O'odham Nation lands) is represented by a Land Conservation Status 4a or 3b, which although not currently managed for conservation, are *not* committed to more intensive uses.

2.2.4.5 Potentially Problematic Species

The number of species and the relative sizes of populations of species in Pima County have changed during historical times. Some native species have increased, some have decreased, and several species native to other areas have become established. Some of the non-native species have had adverse impacts on native species. Because these non-native species have the potential to adversely affect native species in Pima County, their role was an important consideration in the development of the SDCP (RECON & SWCA, 2000).

Non-native species (also referred to as exotic species), invasive native species, pets, and livestock are considered here as "potentially" problematic, because they do not always or necessarily pose direct threats to PVS. In many cases, management strategies can offset potential impacts. Invasive plants often compete with desirable native plant species, resulting in an altered ecosystem less capable of supporting native wildlife and more

easily degraded by natural events (e.g., tamarisk can outcompete native riparian species for water and nutrients; the spread of invasive grasses can render a palo-verde/saguaro plant community susceptible to long-term damage from wildfires). Non-native wildlife species prey aggressively upon native wildlife (e.g., bullfrogs are predators of Mexican garter snakes and leopard frogs, cowbirds are nest parasites of some riparian nesting birds).

Criteria for Identifying Potentially Problematic Species

Pima County's potentially problematic species were generally identified as a non-native species or an invasive native species that:

- presents a high level of threat to the survival and recovery of PVS or biotic communities of concern (i.e., Special Elements);
- is established in Pima County or likely to become established;
- is at least moderate management feasibility, at least in certain circumstances.

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Representative Potentially Problematic Species

Based on the above criteria, some of the most significant potentially problematic species are described as follows:

Bullfrog (*Rana catesbeiana*): significant predator of aquatic and riparian small animal species, known to be established at numerous locations in Pima County, some of which may afford an opportunity for effective control.

Green sunfish (*Lepomis cyanellus*): important predator of aquatic species, known to be established at several locations in Pima County, potentially controllable with intensive program of repeated poisoning and other methods.

Western mosquitofish (*Gambusia affinis*): potentially important predator/competitor with Gila topminnow at some locations. May also disrupt aquatic ecosystems and harm other fish species. Potentially controllable, but also important for public health as mosquito control.

Red shiner (*Cyprinella lutrensis*): an important predator of aquatic species, known to be established at several locations in Pima County, potentially controllable with intensive

program of repeated poisoning and other methods.

Crayfish: significant predator of native fish, frogs, and Mexican garter snakes (*Thamnophis eques megalops*). Damages Huachuca water umbel (*Lilaeopsis schaffneriana* var. recurva). Established in many bodies of water.

Fivestamen tamarisk (*Tamarix ramosissima*): potentially capable of crowding out other riparian plants and drying up springs, small streams, and other water sources. Not as problematic in healthy river and stream corridors, but it takes over in systems that have been damaged by human activities such as damming. Potentially controllable at springs and other very limited water locations, not likely to be controllable along rivers and streams with hydrologic alteration. Important nest substrate for southwestern willow flycatcher (which is not known to nest in Pima County); 95 percent of southwestern willow flycatcher nests located in 2003 by AGFD were in Tamarisk.

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Imported fire ant (*Solenopsis invicta*): Not yet established in Pima County, but likely to become established in riparian and urban areas. Potentially disruptive in riparian areas, may out-compete native ants, prey on native insects, and disrupt food chain, and may prey on birds and small mammals. Also may impact cave-dwelling species. Hazardous to people; potentially controllable.

Africanized bee: Well-established in Pima County, effects unknown but may have very significant competition effect on native pollinators and consequential effect on native plants as well as health and life hazard for some wildlife, domestic animals, and people. Potentially controllable, but with difficulty in some situations.

Non-native grasses Red Brome (*Bromus rubens*), Lehmann lovegrass (*Eragrostis lehmanniana*), Buffelgrass (*Pennisetum ciliare*), Bermuda Grass (*Cynodon dactilon*), and Cheat Grass (*Bromus secalinus*): Well-established in Pima County, serious fire hazard for many species of native plants and animals, also may compete with native plants and result in change of food and cover availability for native animals. Potentially controllable in some situations, but control is likely to be very difficult.

Asian mustard (*Brassica tournefortii Gouan*): Important competitor of sand dune plants and other plants that require sandy, open soil. Known to be established in natural habitats in western Pima County as well as roadsides. Potentially controllable with intensive hand labor at limited sites.

Giant reed (*Arundo donax*): Potentially capable of crowding out other riparian plants.

Due to high water use, may be especially problematic at springs, but may also be especially controllable at springs.

Cattle and other livestock: potentially damaging by excessive herbivory and soil impacts when not properly managed. Historically have caused or contributed to great damage, but better management appears to be reducing ecosystem stresses. Carefully managed grazing may be neutral or beneficial with some native species' management goals.

Rio Grande leopard frog (*Rana berlandieri*): Not yet documented in Pima County but potentially serious predator/competitor with native leopard frogs.

Feral pig *(Sus scrofa):* Occurring in the San Pedro Valley in Pima County, feral pigs dig, root and consume plants and ground-nesting birds' eggs. Potentially controllable by trapping and shooting.

People (*Homo sapiens*): Last but not least, the impacts of people can be problematic to the conservation of species and ecosystems. Land use and activities can be managed and directed to eliminate, reduce, and mitigate many of the impacts we impose.

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Table 2.4 lists potentially problematic species and the PVS they may affect, sorted by aquatic, riparian, and terrestrial ecosystem types.

2.2.5 Ecosystem Basis of PCMSCP

2.2.5.1 Habitat Analysis and Species Distributions

As part of the scientific basis for determining a reserve design for the PCMSCP, the STAT, consultant team, and species experts compiled information on species' requirements and conducted habitat analysis and mapping for the PVS. This effort is summarized in the report, "Priority Vulnerable Species: Analysis and Review of Species Proposed for Coverage by the Multiple Species Conservation Plan" in May 2001. Details for each species, including status, recovery goals, HCP goals, taxonomy, life history traits, distribution, demographics, habitat requirements, current and potential threats, management needs, and habitat model results, can be found in Appendix C of this document. The discussion below presents a summary overview of the habitat analysis, modeling process, and species distribution results.

Table 2.4
Potentially Problematic Species by Representative Ecosystems

Ecosystems & Landscape Elements	Potentially Problematic Species	Affected Priority Vulnerable Species
Springs	Tamarisk, giant reed, Bermuda grass, fountain grass, bullfrog, green sunfish, western mosquitofish, tiger salamander, crayfish, Africanized bees, cattle, horses, burros, tiger salamander, nonnative snails, and introduced fire ants	Desert pupfish, Gila topminnow, bat species, Arizona shrew, Chiricahua leopard frog, lowland leopard frog, Merriam's mouse, and Huachuca water umbel
Riparian Systems	Bullfrog, green sunfish, bluegill, western mosquito fish, red shiner, bluegill, black bullhead, yellow bullhead, rainbow trout, several species of snails and clams, spiny softshell turtle, tamarisk, giant reed, Bermuda grass, cattle (horses and burros appear to be less of a problem than at springs), feral pigs, bullfrogs, cowbirds, fire ants, and Africanized bees	Chiricahua leopard frog, lowland leopard frog, Mexican garter snake, longfin dace, desert sucker, Sonora sucker, desert pupfish, Gila chub, Gila topminnow, Huachuca Water Umbel, bat species, Merriam's mouse, Arizona shrew, Abert's towhee, Bell's vireo, western yellow-billed cuckoo, southwestern willow flycatcher, and cactus ferruginous pygmy-owl (historically)
Caves and other Carbonate Terrains	People, introduced fire ants, and Africanized bees. People may affect these delicate ecosystems by limestone mining, groundwater depletion, direct development, recreational caving and mine exploring, plant collecting (especially commercial collecting of rare plants), and collecting and observing snails. Fire ants are considered a potential problem as predators on and competitors with native cave-dwelling species. They consume insects that may be food for bats, and may have other ecosystem effects that are currently unknown. Africanized bees that develop nests in caves and rock crevices may keep out or	Arkenstone cave pseudoscorpion, talus snails, Nichol Turk's head cactus, and needle-spined pineapple cactus, Mexican long-tongued bat, Allen's big-eared bat, lesser long-nosed bat, California leaf-nosed bat, and pale Townsend's big-eared bat. (Although not exclusively dependent on carbonate terrains, many bats are dependent on caves and mines for roosts.)

Table 2.4
Potentially Problematic Species by Representative Ecosystems (continued)

Ecosystems & Landscape Elements	Potentially Problematic Species	Affected Priority Vulnerable Species
	drive away bats, affect pollination ecology of plants and compete with native bee species.	
Grasslands	Domestic and feral ungulates (cattle, horses, burros), buffel grass, Lehmann's lovegrass, red brome, cheat grass, African daisy, filaree, sweet resin bush, and Africanized bees	Lesser-long-nosed bat, rufous-winged sparrow, burrowing owl, Swainson's hawk, Tucson shovel-nosed snake, Organ Pipe shovel-nosed snake, ground snake, desert box turtle, talus snails, Pima pineapple cactus, Acuña cactus, needle-spined pineapple cactus, Nichol Turk's-head cactus, Tumamoc globeberry
Desert scrubshrub	Cattle, horses, burros, buffel grass, Lehmann's lovegrass, red brome, cheat grass, African daisy, filaree, sweet resin bush, Africanized bees	Cactus ferruginous pygmy-owl, lesser-long-nosed bat, California leaf-nosed bat, rufous-winged sparrow, burrowing owl, Tucson shovel-nosed snake, Organ Pipe shovel-nosed snake, ground snake, giant spotted whiptail, talus snails, Pima pineapple cactus, Acuña cactus, needle-spined pineapple cactus, and Tumamoc globeberry
Sky Islands	People, cattle, horses, burros, buffel grass, Lehmann's lovegrass, red brome, cheat grass, African daisy, filaree, sweet resin bush, and Africanized bees	Lesser long-nosed bat, Mexican long-tongued bat, Allen's big-eared bat, pale Townsend's big-eared bat, Arizona shrew, and several species of talus snails

Habitat Modeling and Mapping

Initial data collection efforts included the compilation and analysis of species information regarding descriptions, habitats, known locations, generalized habitat maps, and early species potential distribution maps based on GIS models. This process is documented and described in detail in the reports "Priority Vulnerable Species Data Compilation" (RECON 2000e) and "Priority Vulnerable Species: Habitat Data Analysis" (RECON 2000f). These initial efforts provided a foundation for further analyses and determined the focus for additional work on species habitat, distribution, and modeling.

The next goal was to improve the spatial representation and quality of species data, habitat models, and potential distribution maps. A rigorous and iterative process was implemented to refine and improve the species distribution information through a habitat modeling procedure (see Appendix C).

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A general overview of the species habitat modeling and mapping effort is as follows. The first step was to compile species information regarding habitat requirements. This information was then incorporated into a species environmental matrix. The species environmental matrix is a Microsoft Excel database that contains habitat variables and the attributes for each variable. For example, vegetation is a habitat variable, the type of vegetation (sacaton scrub, Sonoran desert scrub, etc.) is an attribute for that variable. Table 2.5 lists the 14 of the primary variables contained in the species' environmental matrix.

Table 2.5
Environmental Variables in Species Environmental Matrix

Category	Environmental Variable	Number of Attributes
Landcover	Vegetation and Landcover	29
	Urban	9
	Mesoriparian	9
	Xeroriparian	13
Hydrology	Perennial and Intermittent Streams	8
	Shallow Groundwater	1
	Springs	2
Topography	Elevation	13
	Slope	9
	Aspect	8
	Landform	15
Geology	Carbonates—Cave and Mine Potential	3
	Geology	1
	Soils	10

The second step in the habitat modeling process was to assess each habitat value for the variables and attributes. For each species, every attribute was given a score that indicated the suitability of a species utilizing that particular environmental variable as it relates to habitat requirement. Scores, ranging from zero to three were assigned to represent the following categories:

- 0–unsuitable habitat
- mask – unsuitable barrier
- 1 – low value potential habitat
- 2 – medium value potential habitat
- 3 – high value potential habitat

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The "mask" category indicates that an unsuitable barrier or environmental condition exists that would effectively deter a species from utilizing the area where the mask is present. For example, Merriam's mouse is not found in high elevation, therefore, the elevation attributes ranging from 1,601 to 2,600 meters were assessed as a mask, meaning that it is extremely unlikely for Merriam's mouse to occur in these high elevation areas. For habitat suitability scores, the hydrology variable for the western red bat provides a good example. The western red bat is riparian dependent, so areas such as intermittent and perennial streams were assessed as 3, a high value potential habitat. Areas around shallow groundwater were assessed as 2, a medium value potential habitat, and areas around springs, where this bat is not typically found, were scored as 1, low value potential habitats. The team of experts assessed the variables and attributes for each species in the environmental matrix.

The third step in the habitat modeling process was to incorporate the species' environmental matrix into GIS. In GIS, each variable is represented by a data layer with attributes or a grid. ESRI ArcView Spatial Analyst software was used. Grids were established for each species for variables, so each species had a unique grid for each variable. Environmental data with suitability scores were reclassified into each grid. Some variables were more relevant to species than others. For example, while the western red bat is associated with riparian habitat, it is not necessarily associated with caves, so the carbonate data layer was not considered in the GIS model for this species. On the other hand, the Mexican long-tongued bat is associated with caves, and therefore the carbonate data layer was considered in the GIS model for this species. In all, there were approximately 500 grid layers used in the species habitat modeling process.

The fourth step in the habitat modeling process was to combine the data layers. The grid data layers were combined in an overlay process enabling the GIS model to consider all relevant data variables and attributes for each species. The result of this modeling process was a map that showed levels of potential suitable habitat for each species.

The fifth step in the habitat modeling process was a quality review check. Known location data for each species (based on Arizona Department of Agriculture June 1999, SWCA 2000, and AGFD HDMS 2000) were incorporated into the potential habitat map to serve as a preliminary model accuracy check. For approximately one third of species, more than 10 data locations were available; however, for most species only a few locations were known. Approximately one third of the species had no known location data. While initial model results gave some indication of potential habitat, most maps were not very definitive. Due to this, a rigorous, iterative process of model review and refinement was begun.

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GIS is an important tool for identifying species' potential habitat distribution for conservation planning, especially when data may be limited. The habitat modeling procedure is able to predict areas where species are very likely to occur, despite limitations in data and field surveys. While GIS is a powerful tool, it is limited by the data used for the models. The key to making the habitat modeling process successful, with the most accurate potential habitat maps, was the interactive and iterative process between GIS analysts and species experts that improved model accuracy and results.

The interactive and iterative process utilized by STAT, GIS analysts, and expert reviewers was a dynamic procedure. After completion of the modeling, the expert team scrutinized the species' potential distribution maps. The team of experts then identified and filled data gaps, continually updated the species environmental matrix, refined model parameters, and made final map adjustments to improve model accuracy. This dynamic process was completed seven times to maximize model efficiency and potential distribution map accuracy. The team of experts was able to provide first hand field knowledge of species' likelihood of occurrence throughout Pima County.

The result of the habitat analysis and modeling procedure was a potential distribution map for each PVS that identified areas of high, medium, low, and unsuitable potential habitat. Maps for each individual species can be found in Appendix C. The potential species distribution models produced a range of potential habitat classes that were combined by GIS analysts in a logical manner to reflect the high, medium, low, and unsuitable habitat categories. Figure 2.7 is a synoptic presentation of the distribution of the potential habitat for all of the species combined.

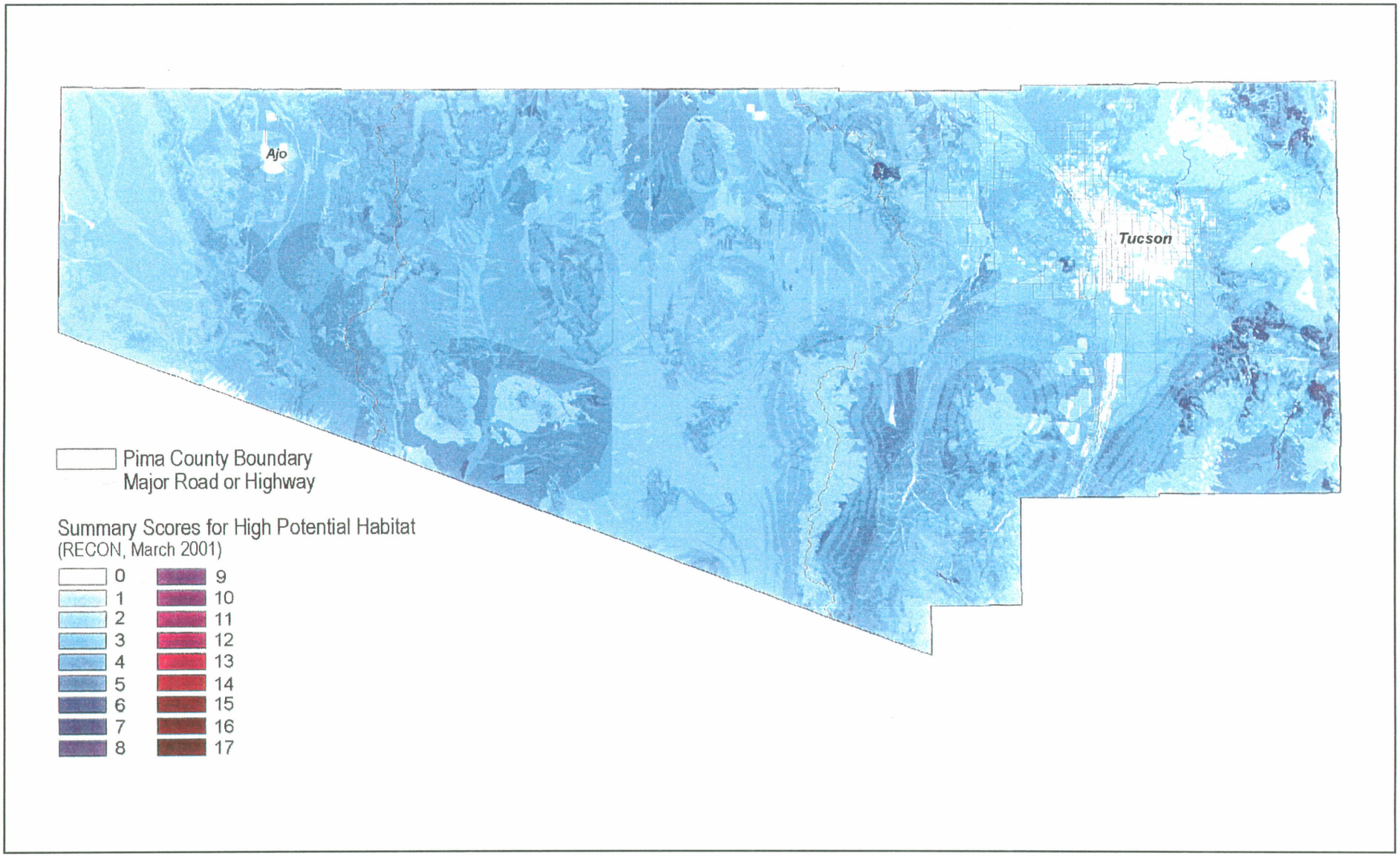


FIGURE 2.7
Summary of High Potential Habitat All Vulnerable Species

RECON

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Priority Conservation Areas

In addition, the reviewers were asked to identify Priority Conservation Areas (PCAs), based upon their knowledge or experience, that were of significance for conservation of each of the PVS (RECON 2001). This was a means to present important specific knowledge that did not emerge from the species distribution modeling process.

For each species, PCAs were identified in six tiers:

1. Areas that contained populations that must be included in the reserve system,
2. Areas that would be of value to the reserve system,
3. Areas that represent critical landscape linkages,
4. Areas that are cotangential for restoration or enhancement,
5. Areas that need not be in the reserve system, and
6. Areas that should not be in the reserve based on extent of fragmentation isolation, or degradation.

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2.2.5.2 Reserve Design Process

The foundation for the reserve design process was the multitude of layers of information relating to both natural and built environments in Pima County. The process of designing the reserve system for Pima County evolved with the incorporation of input from the iterative review process. The reserve design approach developed by STAT and RECON was founded on the principles of conservation biology applied to the particular species and the habitats of concern in Pima County (RECON 2000c, RECON 2002). GIS has been an important tool in building reserve designs, primarily because of its ability to manage large amounts of spatial data. Overlays were developed to present and understand complex spatial patterns on the landscape, whether the issues are biology, land use, or an intersection of the two. Overlay analysis provided the basis for building the component layers and ultimately the reserve design.

The biologically preferred alternative reserve system was developed based on biological value as assessed by the STAT in cooperation with many experts in the community. The major components of the biological value were vulnerable species habitat, other special habitats identified by STAT, expert-defined priority conservation areas, and USFWS critical habitat for endangered species. Also considered in subsequent analyses was

existing urban density, which facilitated identification and removal of areas of lower biological value from the initial reserve system.

The biological value mapping was founded upon data layers representing species' richness, a representation of the biological diversity of Pima County. The initial assessment was based on the distribution of high potential habitat for the 41 vulnerable species with mapped information (Figure 2.8). The distribution of high potential habitat was assembled from the GIS modeling of environmental variables for each species as discussed in the previous section. Areas of higher species' richness—places where three or more species have overlapping high potential habitat—are shown in graduated shades of blue.

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These areas of higher species richness provided the starting point for drawing the initial reserve system boundaries (Figure 2.9). The initial reserve system boundaries were delineated on the basis of a complex set of rules developed by STAT, guided by principles of reserve design (Appendix B).

Using the reserve design rules and the principles of reserve design in an iterative process (Figure 2.10), STAT and the consultant team, with assistance from Pima County staff, developed a "biologically preferred alternative" reserve configuration (Figure 2.11). This configuration represents a reserve system with the potential to meet the goals of conservation of the full range of biological resources in Pima County as well as meeting the requirements of Section 10(a)(1)(B) of the ESA for most, if not all, of the PVS. This reserve system configuration was adopted by the Pima County BOS in the Comprehensive Plan Update (2000) as the Conservation Land System (CLS) described in Section 3.1 below.

2.2.6 Proposed Covered Species

Table 2.6 lists the PVS provisionally proposed for coverage in the PCMSCP. The species are listed in order of their Federal status: threatened or endangered (nine species); proposed (one species); candidate (two species); and other PVS. This list is provisional based on the analyses in sections 2.4 Anticipated Incidental Take, and 2.5 Effects of the PCMSCP of this document and Chapter 4 Environmental Consequences of the EIS. Modifications of the list of covered species may be made after technical review of these analyses.

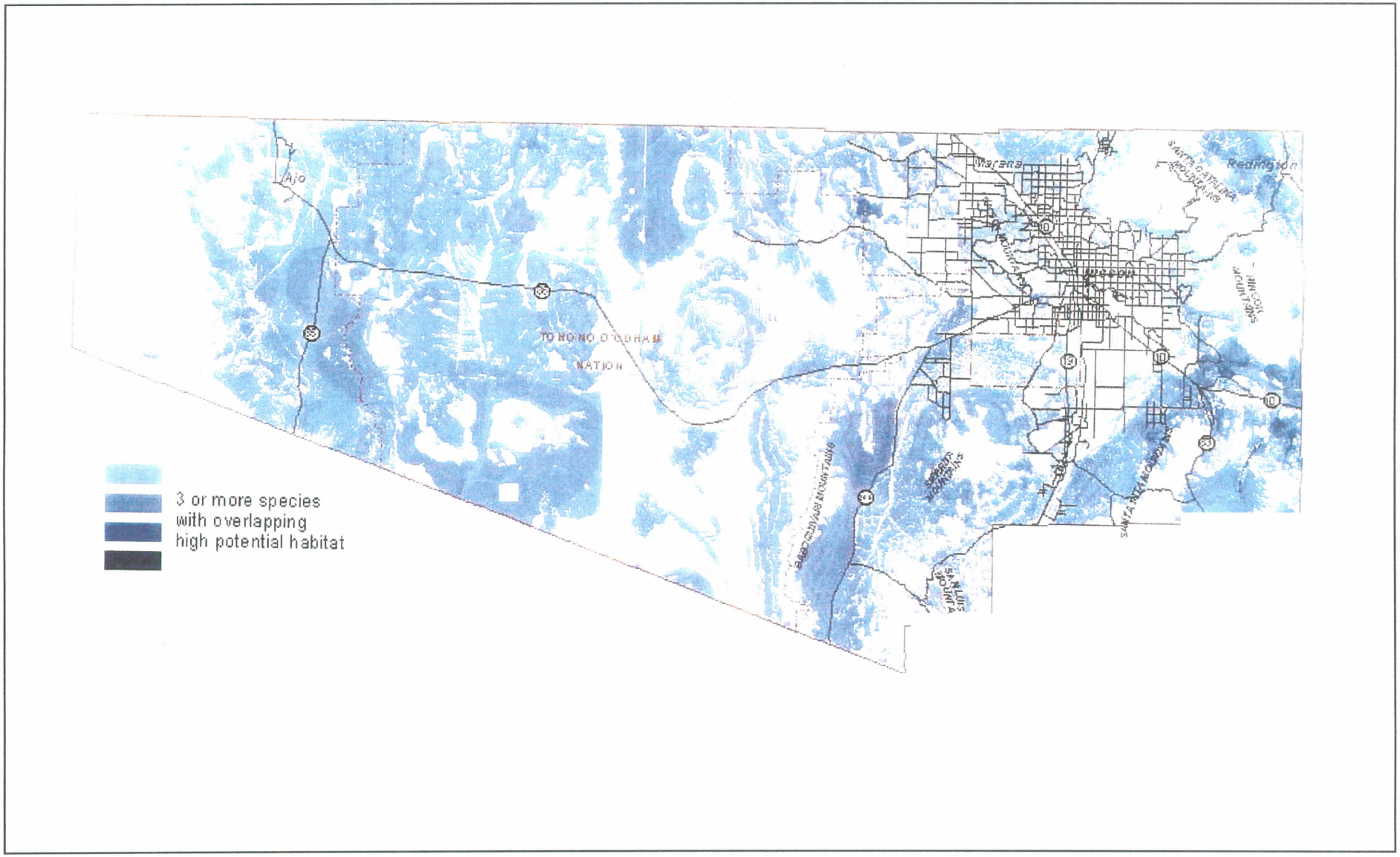


FIGURE 2.8
Initial Assessment of Areas of High Biological Value

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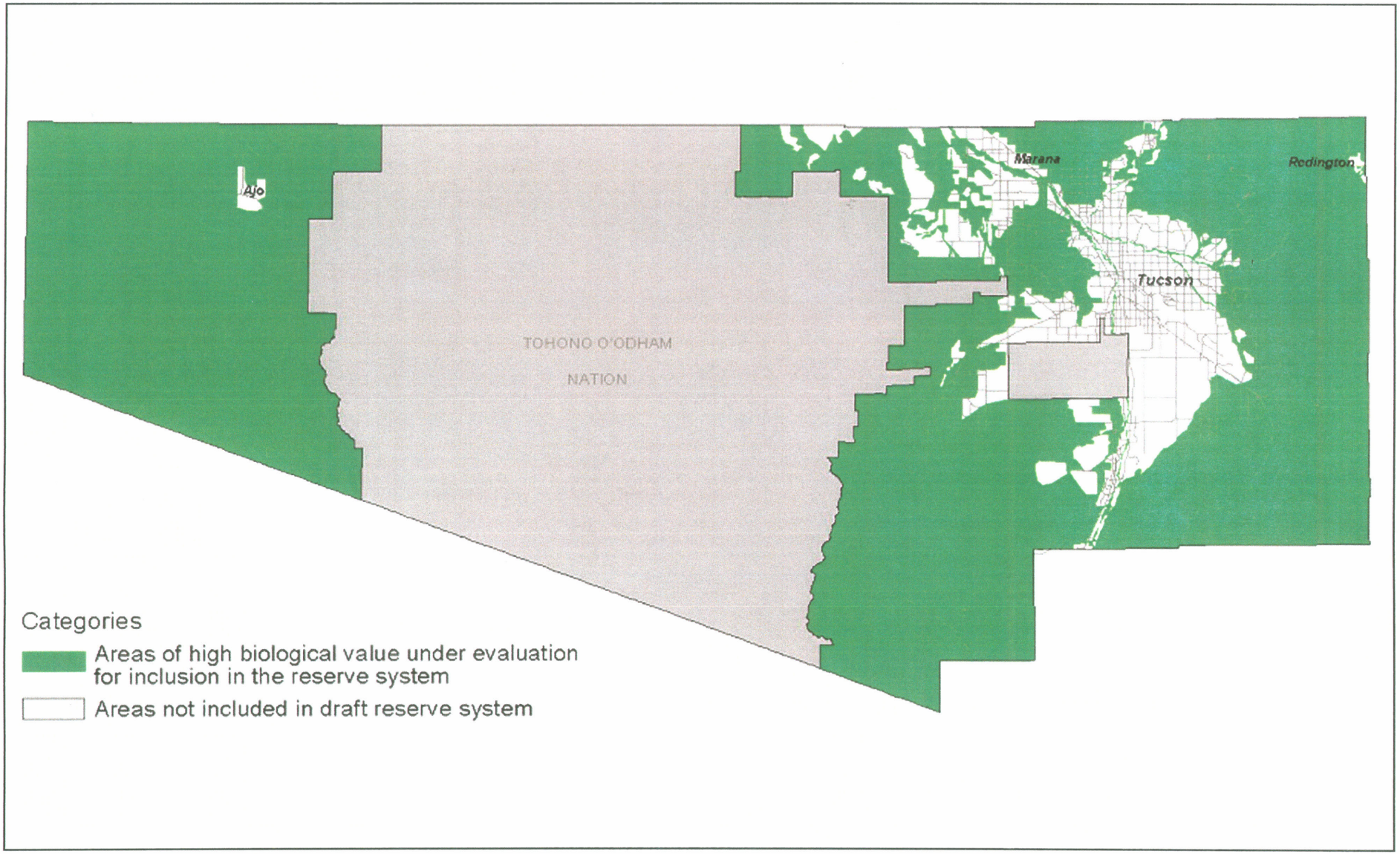


FIGURE 2.9
Pima County Reserve System Boundaries

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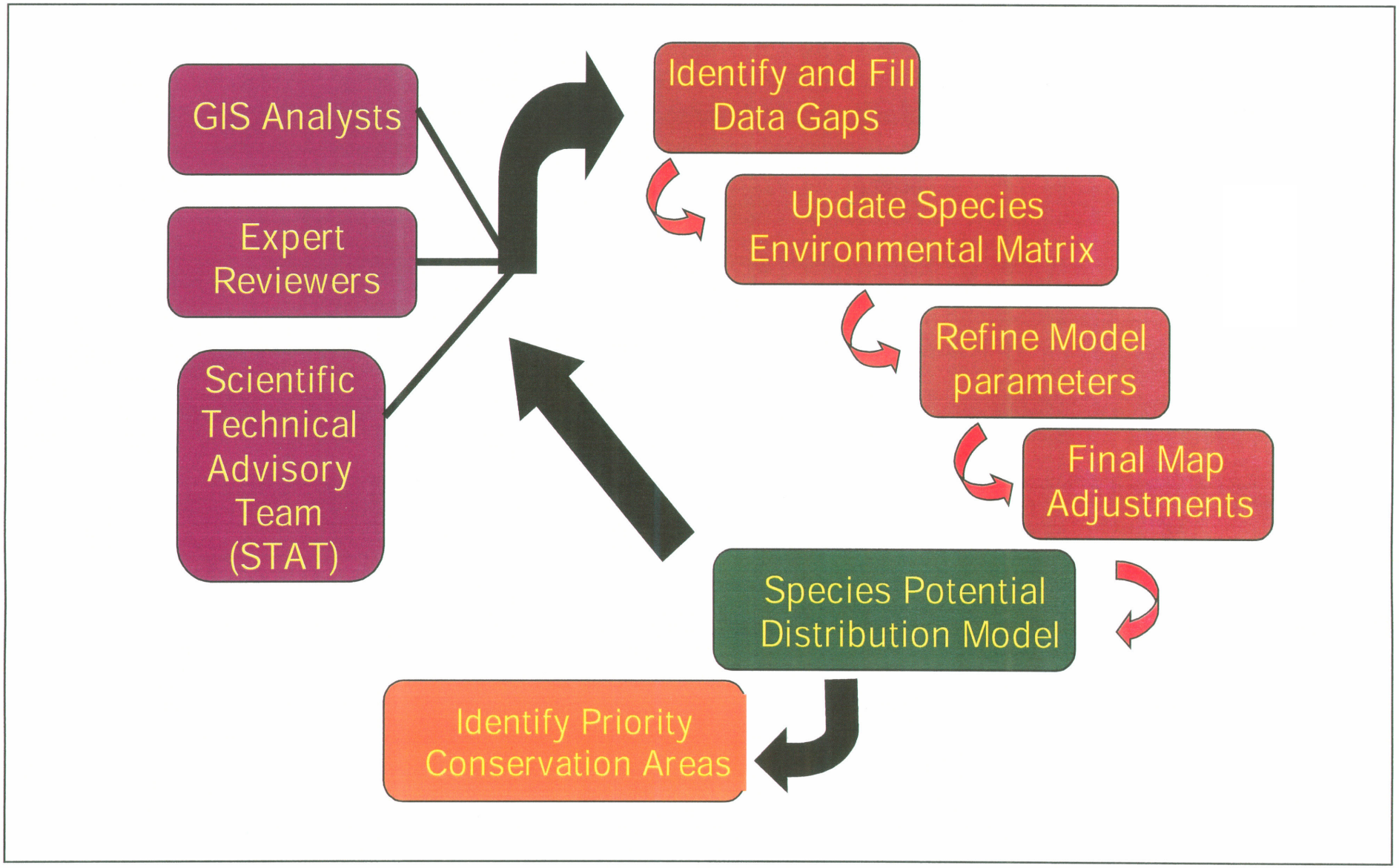


FIGURE 2.10
Reserve Design Rules and Principles

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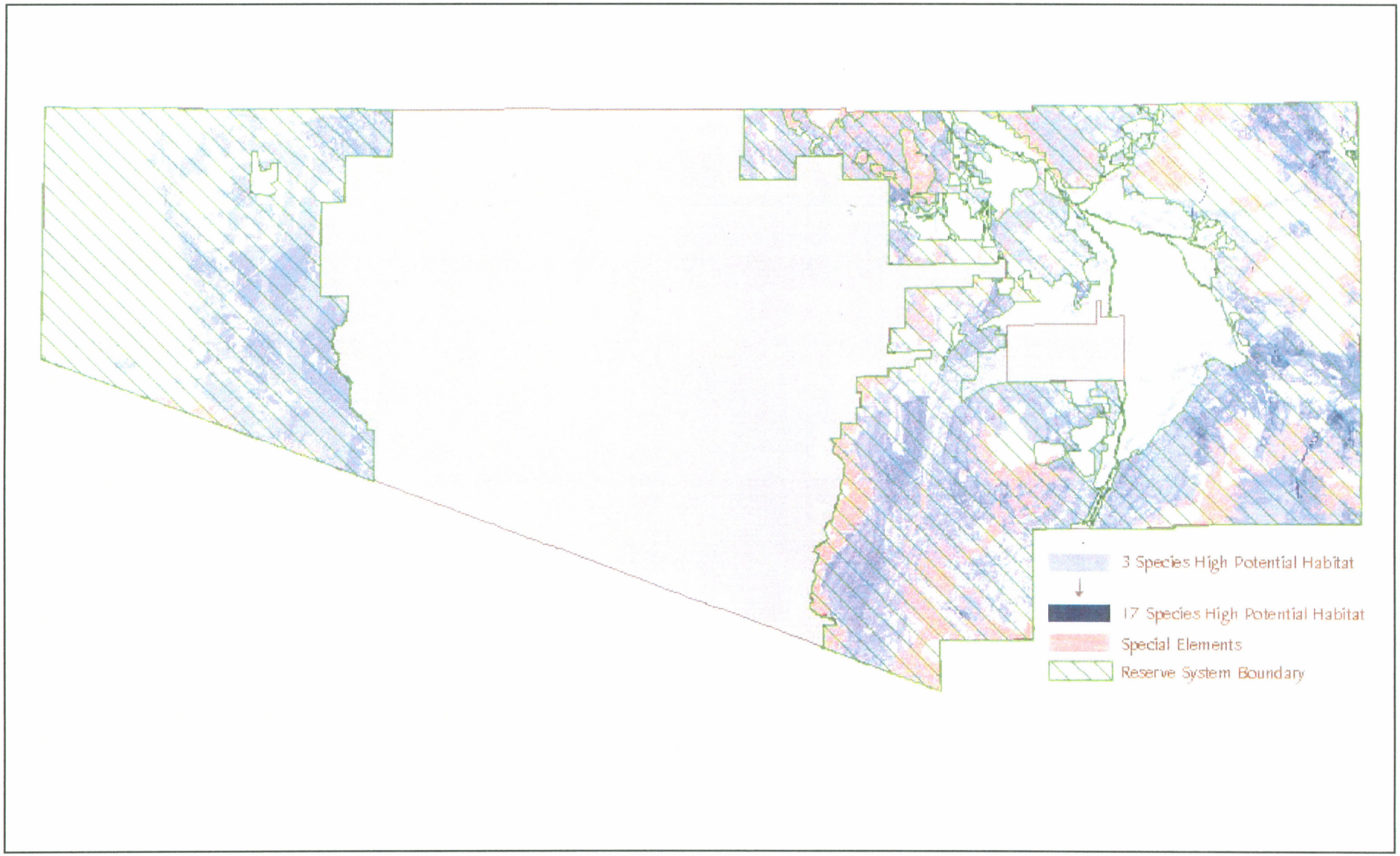


FIGURE 2.11
Reserve System Boundary

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Table 2.6
Species Proposed for Coverage under PCMSCP

Common Name	*Scientific name*	Status
Threatened and Endangered Species		
Birds (2)		
cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	E
southwestern willow flycatcher	*Empidonax traillii extimus*	E
Mammals (1)		
lesser long-nosed bat	*Leptonycteris curasoae yerbabuena*	E
Fish (2)		
desert pupfish	*Cyprinodon macularius*	E
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	E
Frogs (1)		
Chiricahua leopard frog	*Rana chiricahuensis*	T
Plants (3)		
Huachuca water umbel	*Lilaeopsis schaffneriana recurva*	E
Nichol Turk's head cactus	*Echinocactus horizonthalonius var. nicholii*	E
Pima pineapple cactus	*Coryphantha scheeri var. robustispina*	E
Proposed Species		
Fish (1)		
Gila chub	*Gila intermedia*	PE
Candidate Species		
Birds (1)		
yellow-billed cuckoo	*Coccyzus americanus*	C
Plants (1)		
Acuna cactus	*Echinomastus erectocentrus var. acunensis*	C
Other Priority Vulnerable Species		
Mammals (8)		
Arizona shrew	*Sorex arizonae*	
Merriam's mouse	*Peromyscus merriami*	
Mexican long-tongued bat	*Choeronycteris mexicana*	
Allen's big-eared bat	*Idionycteris phyllotis*	
western red bat	*Lasiurus blossevillii*	
southern yellow bat	*Lasiurus xanthinus*	
California leaf-nosed bat	*Macrotus californicus*	
pale Townsend's big-eared bat	*Plecotus townsendii pallescens*	
Birds (4)		
rufous-winged sparrow	*Aimophila carpalis*	
Abert's towhee	*Pipilo aberti*	
burrowing owl	*Athene cunicularia hypugaea*	
Swainson's hawk	*Buteo swainsoni*	

Table 2.6
Species Proposed for Coverage under PCMSCP (continued)

Common Name	*Scientific name*	Status
Reptiles (7)		
desert box turtle	*Terrapene ornata luteola*	
giant spotted whiptail	*Cnemidophorus burti stictogrammus*	
red-backed whiptail	*Cnemidophorus burti xanthonotus*	
ground snake	*Sonora semiannulata*	
Mexican garter snake	*Thamnophis eques megalops*	
Organ Pipe shovel-nosed snake	*Chionactis palarostris organica*	
Tucson shovel-nosed snake	*Chionactis occipitalis klauberi*	
Frogs (1)		
lowland leopard frog	*Rana yavapaiensis*	
Fish (3)		
longfin dace	*Agosia chrysogaster*	
desert sucker	*Catostomus clarki*	
Sonora sucker	*Catostomus insignis*	
Invertebrates (17)		
Arkenstone cave pseudoscorpion	*Albiorix anopthalmus*	
talus snail species	*Sonorella ambigua ambigua*	
talus snail species	*Sonorella baboquivarienis baboquivarienis*	
talus snail species	*Sonorella baboquivarienis berryi*	
talus snail species	*Sonorella baboquivarienis depressa*	
San Xavier talus snail	*Sonorella eremita*	
talus snail species	*Sonorella imperatrix*	
talus snail species	*Sonorella imperialis*	
talus snail species	*Sonorella magdalensis*	
talus snail species	*Sonorella meadi*	
talus snail species	*Sonorella pupela*	
talus snail species	*Sonorella rinconensis*	
talus snail species	*Sonorella sabinoenis buehmanensis*	
talus snail species	*Sonorella sabinoensis tucsonica*	
talus snail species	*Sonorella sitiens sitiens*	
talus snail species	*Sonorella tortillita*	
Kitt Peak talus snail	*Sonorella xanthenes*	
Plants (3)		
Gentry indigo bush	*Dalea tentaculoides*	
needle-spined pineapple cactus	*Echinomastus erectocentrus var. erectocentrus*	
Tumamoc globeberry	*Tumamoca macdougalii*	

2.3 Activities Proposed for Coverage by PCMSCP

Section 10(a)(1)(B) authorizes exceptions for take that may occur incidentally to otherwise lawful activities with the provision of a Habitat Conservation Plan (HCP).

Activities proposed for coverage under the Incidental Take Permit include takes that may occur incidentally to otherwise lawful activities on non-Federal lands within the Permit Area, such as Pima County's issuance of land use related discretionary permits, including those for development; roadway construction, extension of wastewater treatment facilities, installation of utilities, and implementation of capital improvement projects, and maintenance and operation of county facilities.

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2.3.1 Criteria for Inclusion

Activities to be covered by the incidental take provisions of the PCMSCP are those within the Planning Study Area:

- That are likely to result in incidental take,
- That are reasonably certain to occur over the life of the permit, and
- For which Pima County has some form of control.

2.3.2 Covered Activities

The specific categories of activity anticipated in the permit are described below. These include land disturbance activities on approximately 6,000 acres in the first 10 years of the permit, 15,000 acres in the second 10 years of the permit, and 53,000 acres in Years 21 through buildout of lands in eastern Pima County, for a total of approximately 74,000 acres of development on non-Federal lands in the Permit Area. Most importantly, from the perspective of the PCMSCP, these activities are anticipated to occur on approximately 3,800 acres of the CLS in the first 10 years of the permit, 9,200 acres in the second 10 years of the permit, and 32,000 acres in Years 21 through buildout of lands in eastern Pima County, for a total of approximately 45,000 acres of development on non-Federal, unincorporated Pima County lands in the Permit Area.

2.3.2.1 Development

All non-Federal land development permitted by Pima County in accordance with the Pima County Code, the Comprehensive Plan (2001), and other applicable regulations will be covered in the PCMSCP. Development includes all activities and projects for which Pima County has discretionary authority to issue permits, both inside and outside of the CLS.

2.3.2.2 Pima County Public Works

Public work activities, including on-going projects, maintenance of county rights-of-way, easements, and properties, and projects identified by the 2005-2010 Capitol Improvement Plan (CIP) for the county departments of Facilities Management, Transportation, Parks and Recreation, Wastewater Management and Solid Waste Management are activities proposed for coverage during the first 10-year phase of the permit. This coverage also includes cultural resource and historic preservation and open space acquisitions identified by the 1997 and 2004 Bond Programs. These approved CIP projects are summarized in Appendix D. Future CIP projects for subsequent years will be submitted and reviewed at the time of requests for subsequent permit phase renewals.

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2.3.2.3 Pima County Regional Flood Control District

The Pima County Regional Flood Control District (PCRFCD), a separate legal entity from Pima County, collects tax revenue for the purpose of funding the construction, inspection, maintenance and repair of public structures along watercourses. Structures receiving maintenance include constructed channels, grade-control structures, retention/detention basins and their inlets and outlets, dry wells, energy dissipaters, and bank protection. Maintenance activities include repairing existing constructed features, removing sediment build-up, clearing vegetation and debris, mowing grass, installing culverts and fences, regrading channels, and maintaining drainageway access roads. The new structures are also built as part of maintenance activities. These structures are funded and installed separately from those installed under the Pima County or PCRFCD's Capital Improvements Program (CIP). New construction funded outside the CIP is typically smaller in scale and requires no right-of-way acquisition. Appendix D includes a description of representative PCRFCD permitted activities.

2.3.2.4 Ranching and Working Landscapes

Ranching activities (e.g., grading, building, development, conditional use, etc.) requiring a discretionary permit from Pima County are covered under the permit as are raising and grazing of livestock as allowed by the Pima County Zoning Code. Grazing on state or Federal lands is not subject to jurisdiction of Pima County and is not covered under the permit.

Ranching and 'working landscapes' on lands owned by Pima County are allowed under the permit when such lands are managed in accordance with USFWS approved management plans and/or Conservation Easement requirements.

2.3.2.5 Monitoring and Adaptive Management Actions

Activities proposed for the purposes of ensuring the compliance with the permit, such as surveys, scientific studies, ecosystem restoration, and other activities associated with monitoring and management described in Chapter 6 are covered under the permit.

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2.3.3 Federal Actions

Activities on Federal lands or Federal actions reviewed under Section 7 in Planning Study Area of this HCP are not covered directly by the PCMSCP. However, Federal land managers and applicants for Federal actions will benefit from: 1) the reduced likelihood of the need to list additional species within the Planning Study Area (and the resultant need for additional Section 7 consultations for the newly listed species) because of the comprehensive nature of conservation measures included in the PCMSCP; 2) the streamlining of the existing Section 7 process for Federal land managers and Federal actions that are consistent with the provisions of the PCMSCP; and 3) the opportunity to make use of the conservation benefits incorporated in terms and conditions of the PCMSCP, including participation in the Adaptive Management Program.

2.4 Anticipated Incidental Take Levels of PCMSCP

Under the ESA Section 10(a)(1)(B), a conservation plan must detail the impacts likely to result from the proposed taking of the species covered by the proposed Incidental Take Permit. The impacts are to be determined based on the a) identification of the Permit Area boundary, b) biological relationships of the species to be covered, c) activities likely to result in incidental take, and d) quantification of the anticipated incidental take.

2.4.1 Methods of Calculation of Incidental Take

The goals and objectives of the PCMSCP go beyond the requirements of Section 10(a)(1)(B) in their breadth, primarily due to the landscape level approach to conservation of biological resources throughout Pima County. This approach focused on the use of biological data developed at the county scale: including models of high and medium potential habitat for each covered species and Priority Conservation Areas (PCAs) identified for each covered species.

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2.4.1.1 Acres of Medium and High Potential Habitat

The foundation layers of information developed for the PCMSCP were maps (models) of the areas of Pima County with a high or medium potential for occurrence for each of the proposed covered species based on their known or estimated biological and physical habitat associations. Incidental take of covered species was estimated by calculating the number of acres of medium and high potential habitat that would be lost (i.e., cleared and developed) and gained (provided by mitigation or otherwise conserved) for each of the covered species.

2.4.1.2 Acres of Priority Conservation Areas

Estimated losses to the various components of the PCAs for each species with defined habitats were also calculated. These losses provide a complimentary assessment of the potential effects of implementation of the PCMSCP on the proposed covered species.

2.4.1.3 Expected Level of Incidental Take and Related Impacts

The level of incidental take would be expected to stay within the thresholds expressed by the STAT as conservation goals for each of the species covered by the permit. These conservation thresholds are expressed as percentages of the medium and high potential habitat PCAs, or known locations, that should be conserved and are shown in Table 4.2 in Section 4.

2.4.1.4 Authorized Level of Incidental Take

The level of incidental take authorized by the permit, as expressed in loss of acres of high and medium potential habitat or PCAs, shall not exceed that identified in the species conservation goals identified by Table 4.2. Additional limitations on take are further defined for certain species for which even a relatively small area of take could foreseeably jeopardize the species. (See further discussion under Section 2.5.2.)

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2.5 Effects of PCMSCP

2.5.1 Direct Effects of PCMSCP on CLS

In order to evaluate the potential effects of the implementation of the PCMSCP, it is necessary to:

- Delineate the lands within the PCMSCP Permit Area that will be managed under the terms of the permit,
- Estimate the potential for loss of lands within the CLS,
- Estimate the potential for loss of non-CLS lands within the Permit Area,
- Assess the effects of potential habitat losses of the PVS proposed for coverage, and
- Evaluate the relationship of conserved lands in the CLS to surrounding lands.

The CLS is the core of the implementation strategy for the PCMSCP. It represents the biologically preferred reserve design developed by the STAT for Pima County that occurs within the Permit Area (not including tribal lands within Pima County). The CLS categorizes the proposed conserved lands into Important Riparian Areas, Biological Core Management Areas, Scientific Research Areas, Multiple Use Management Areas, Special Species Management Areas, Agriculture In-Holdings within the CLS, and Other Riparian Areas mapped and regulated by Pima County. It also identifies six Critical Landscape Connections, which are broadly defined areas of regional significance with constraints to connectivity of the CLS (see Chapter 3.1 for definitions).

More than 84 percent of the CLS lands are on lands managed by Federal and State of Arizona agencies (Table 2.7). The Federal agencies, including the BLM, Department of Defense (DOD), USFS, NPS, and U.S. Fish and Wildlife Service (USFWS) are the largest land managers with over 58 percent of the CLS lands. State managed lands, including State Trust Lands, State Parks, and the University of Arizona, cover 26 percent of the CLS. Privately owned lands represent approximately 14 percent and the cities and county combined own the remaining 3 percent of non-tribal lands in the County.

Approximately 16 percent (470,000 acres) of the lands in the CLS are on incorporated and unincorporated lands exclusive of Federal and state ownership (Table 2.8). Pima County's portion of the CLS, including unincorporated lands and Pima County Parks and

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Table 2.7
Distribution of CLS in Unincorporated Pima County by Ownership (acres)

	Cities	Pima County	Federal	Misc. Roads & Highways	Private	State of Arizona	Total
Inside CLS							
Biological Core	10,642	10,011	332,483	1,809	151,348	393,499	899,791
Multiple Use	13,238	30,434	1,317,745	5,909	210,503	334,070	1,911,900
Important Riparian Areas	1,296	3,263	608	897	21,448	3,957	31,469
Agriculture	2,916	-	51	229	7,699	3,325	14,219
CLS Total	28,092	43,708	1,650,888	8,844	390,998	734,851	2,857,380
Outside CLS	18,688	6,681	21,909	35,195	254,665	71,225	408,362
Total*	46,779	50,388	1,672,796	44,040	645,664	806,075	3,265,742
Percent within CLS	60	87	99	20	61	91	87
Percent of CLS	1	2	58	0	14	26	100

*Exclusive of Native American Lands

Table 2.8
Distribution of CLS within Pima County Jurisdictions by Ownership (acres)

Inside CLS	Ownership	Unincorporated Pima County	Tucson	Marana	Oro Valley	Sahuarita	South Tucson	Not Assigned	Total
Biological Core	City	10,495	89	57	1				10,642
	Pima County	9,756	93	160				1	10,011
	Federal	332,443		3	7			31	332,483
	Misc Rds/Hwys	1,673	50	53	33				1,809
	Private	149,621	226	1,201	300			1	151,348
	State	391,866	802	826				5	393,499
Total		895,853	1,261	2,299	340			38	899,791
Multiple Use	City	11,776	954	97	366	46			13,238
	Pima County	29,681	311	109	216	117			30,434
	Federal	1,316,490		1,177	20	1		56	1,317,745
	Misc Rds/Hwys	4,030	184	805	680	210			5,909
	Private	178,673	3,494	15,442	8,571	4,323		1	210,503
	State	307,465	2,718	23,044	34	796		14	334,070
Total		1,848,115	7,661	40,674	9,887	5,492		71	1,911,900
Important Riparian Areas	City	56	889	315	37				1,296
	Pima County	1,528	447	1,088	183	17			3,263
	Federal	587		21					608
	Misc Rds/Hwys	557	145	150	43	3			897
	Private	14,123	1,851	3,762	1,328	384			21,448
	State	2,412	777	672		94			3,956
Total		19,263	4,109	6,008	1,590	498			31,469
Agriculture	City	2,848				68			2,916
	Pima County								-
	Federal	50				1			51
	Misc Rds/Hwys	64		2		163			229
	Private	4,158		309		3,233			7,699
	State	3,106				219			3,325
Total		10,226		310		3,683			14,219

Table 2.8
Distribution of CLS within Pima County Jurisdiction by Ownership (acres)
(continued)

Inside CLS	Ownership	Unincorporated Pima County	Tucson	Marana	Oro Valley	Sahuarita	South Tucson	Not Assigned	Total
CLS Total	City	25,174	1,932	468	404	114	-		28,092
	Pima County	40,965	852	1,357	398	133	-	1	43,707
	Federal	1,649,571	-	1,201	27	2	-	87	1,650,887
	Misc Rds/Hwys	6,323	379	1,009	756	376	-	-	8,844
	Private	346,575	5,570	20,714	10,198	7,939	-	2	390,998
	State	704,849	4,297	24,542	34	1,109	-	19	734,850
Inside CLS Total		2,773,457	13,030	49,291	11,817	9,673	-	109	2,857,378
Outside CLS	City	5,777	12,172	654	75	10	1		18,688
	Pima County	4,929	1,363	284	80	20	4		6,681
	Federal	15,049	6,811	35	3	10			21,909
	Misc Rds/Hwys	15,010	16,480	1,550	1,190	764	202		35,195
	Private	164,063	60,123	14,590	8,073	7,371	439	6	254,665
	State	29,922	33,474	6,674		1,149	6		71,225
Outside CLS Total		234,751	130,423	23,785	9,421	9,324	652	6	408,362
Total		3,008,208	143,453	73,077	21,239	18,997	652	115	3,265,742

Preserves and other county-owned lands, covers 420,000 acres. The remaining 50,000 acres lay within the cities and towns of Tucson, Marana, Oro Valley, and Sahuarita.

The direct effects of the PCMSCP include the clearing and development of lands, which would potentially affect components of the CLS and areas predicted as medium and high potential habitat for covered species. Initial projections for new development as predicted by Pima County's economic analysis (ESI and SWCA 2003) were made for the first and second 10-year periods after plan implementation, and for Years 21 through buildout (defined as the point when water availability ceases to support additional population) (Figures 2.12 through 2.15). These projections are for eastern Pima County and include incorporated and unincorporated lands, as well as Arizona State Trust Lands. Table 2.9 shows the acres of projected future development for the Planning Study Area, both within and outside of the CLS.

Within the Permit Area (Figure 2.16), the acreages of future development can be compared with the constraints that are implicit in the CLS. These constraints, which are specified by the minimum percentage of conservation established for the CLS components, effectively reduce the maximum allowable development area (Table 2.10). For example, within Biological Core Management Areas the CLS guidelines call for an 80 percent conservation level. This constrains development on the153,000 acres of Biological Core within the Permit Area to a maximum of 20 percent (31,000 acres) that may be subjected to habitat loss by development or other land use activities. It should be noted that the 80 percent minimum conservation of Biological Core Management Area is not simply applied comprehensively across the Permit Area, but must rather be accomplished within a given core area. In this way, each core area will retain 80 percent of its land area in a configuration that provides for the long-term persistence of the covered species within it.

Even with the application of conservation constraints, the amount of potential future development within the Permit Area (166,000 acres at buildout) is significantly less than the amount of land available for development after conservation guidelines are applied to the CLS lands. This ensures that the PCMSCP can be accomplished while still allowing for future growth and development opportunities.

Table 2.11 reflects how the projected acres of new development in eastern Pima County intersect with the CLS components over time. If development proceeds as projected above, these numbers represent the amount of land that would be subject to new development and, therefore, would be potential direct effects of the permit.

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The estimated projected new development of lands within the CLS in the Permit Area would constitute an overall loss of approximately 45,000 acres, which represents approximately 13 percent of the CLS on Pima County lands, or just over 1 percent of the countywide CLS. The actual amount of land affected by direct effects will be

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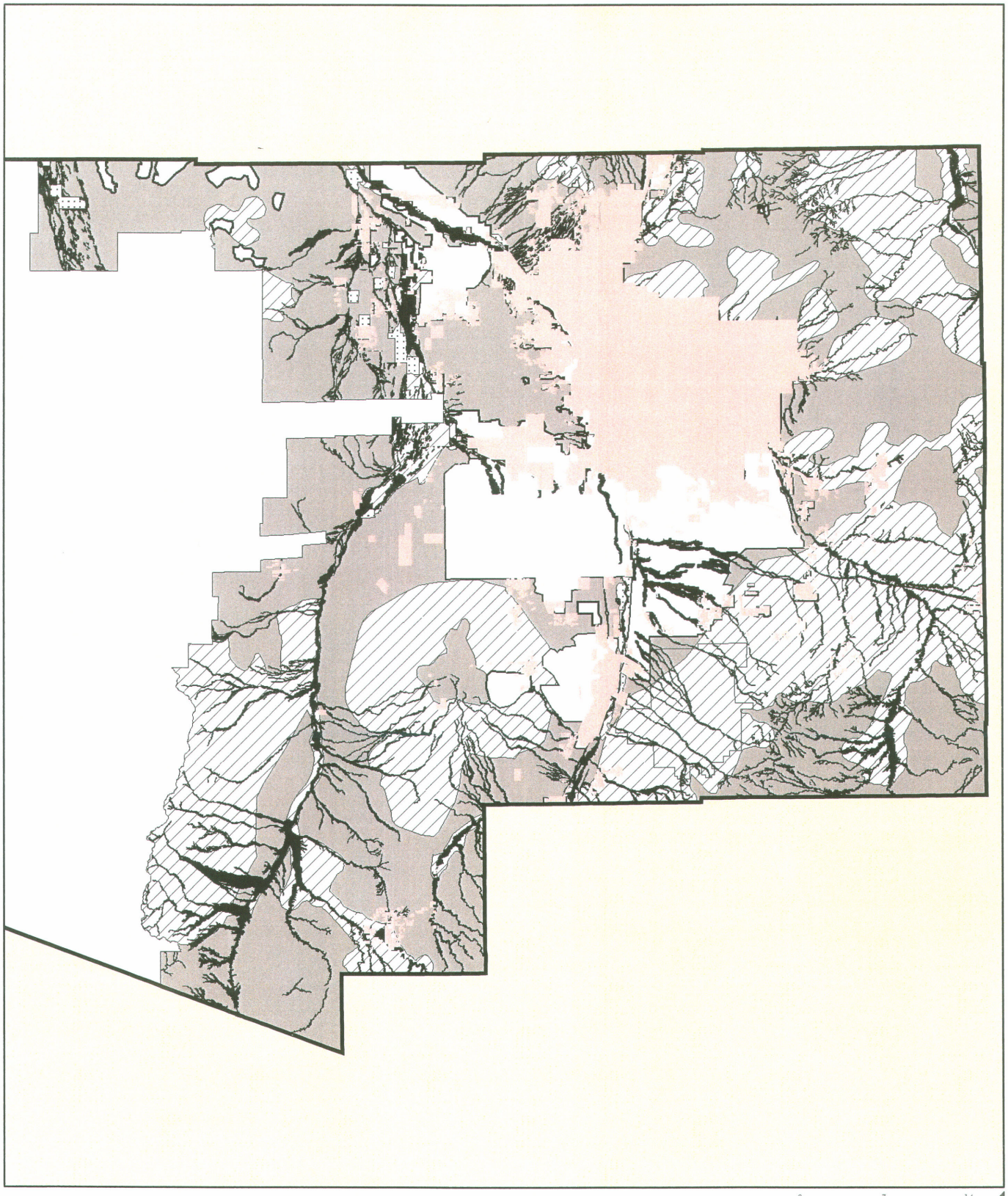


FIGURE 2.12

Conservation Land System and Existing Development

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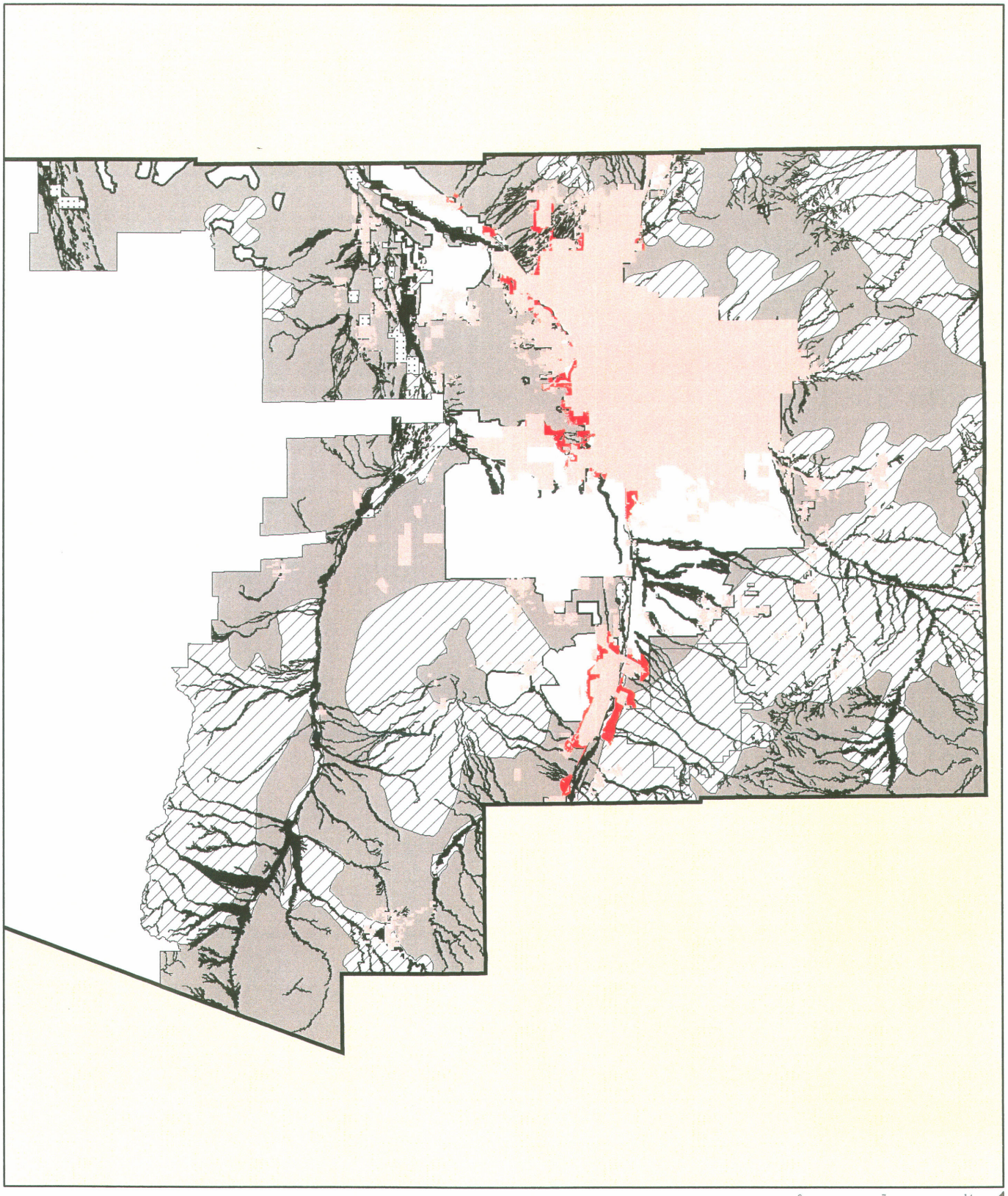


FIGURE 2.13

Development Projections at 10 Years

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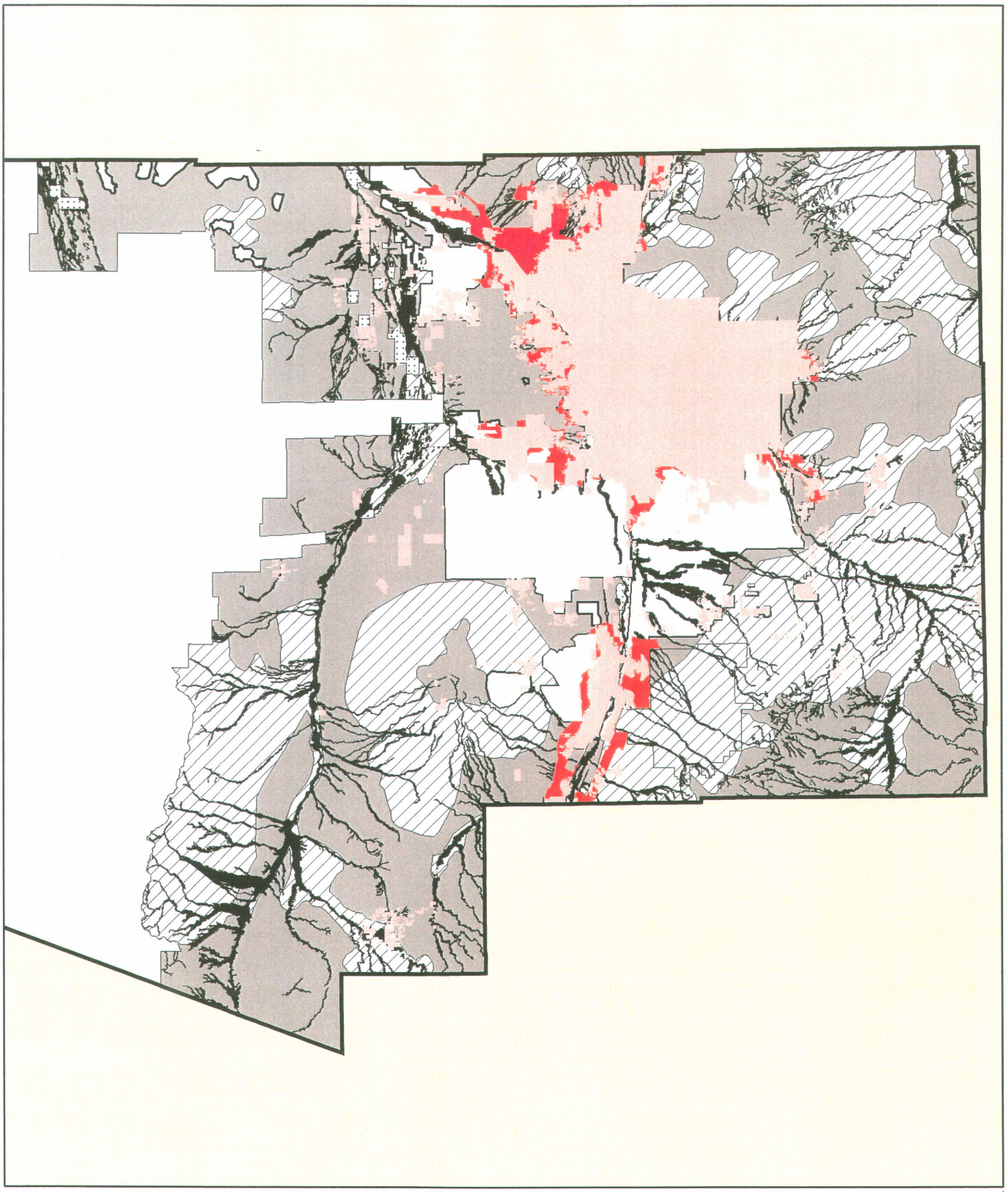


FIGURE 2.14
Development Projections at 20 Years

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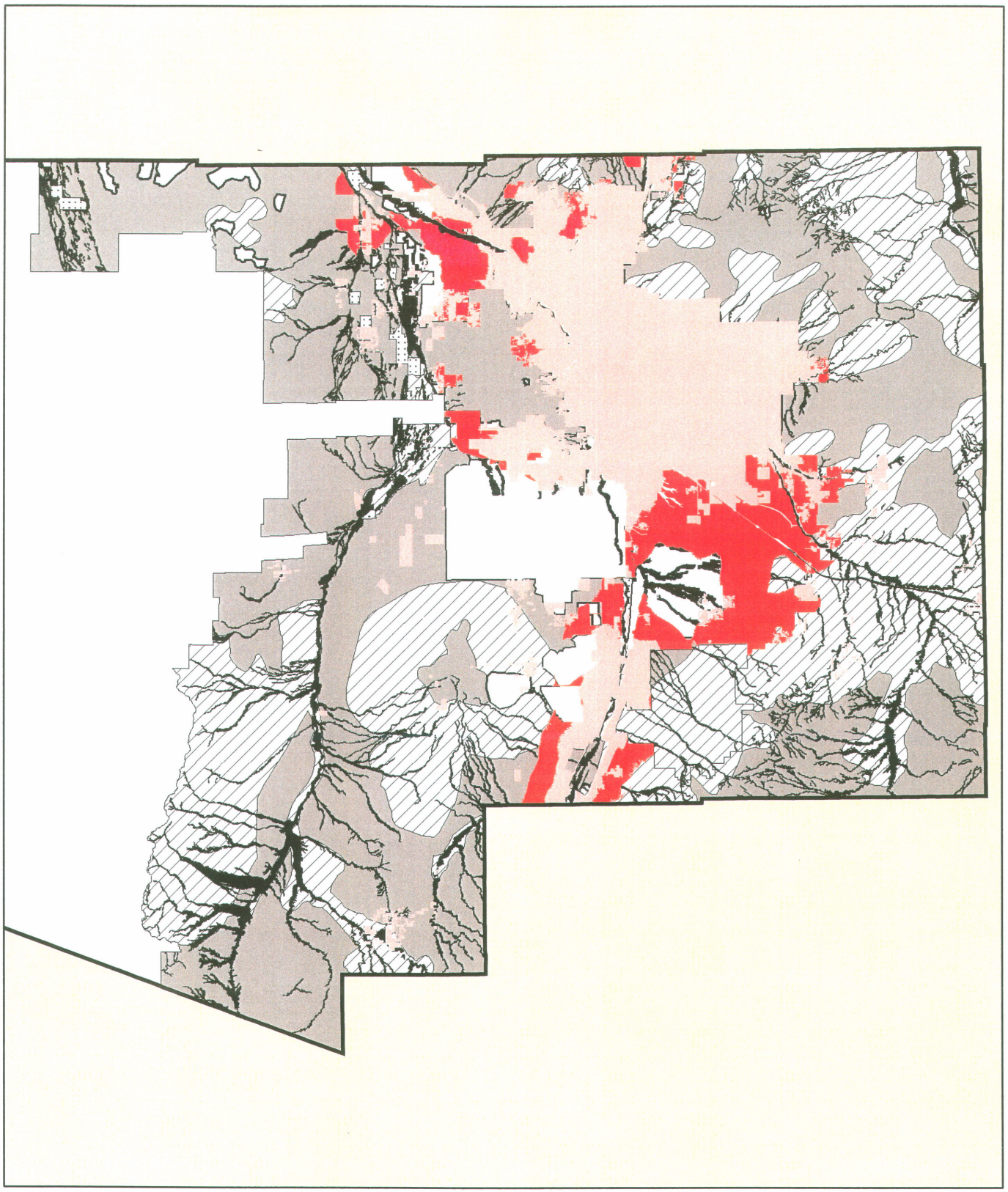


FIGURE 2.15

Development Projections at Buildout

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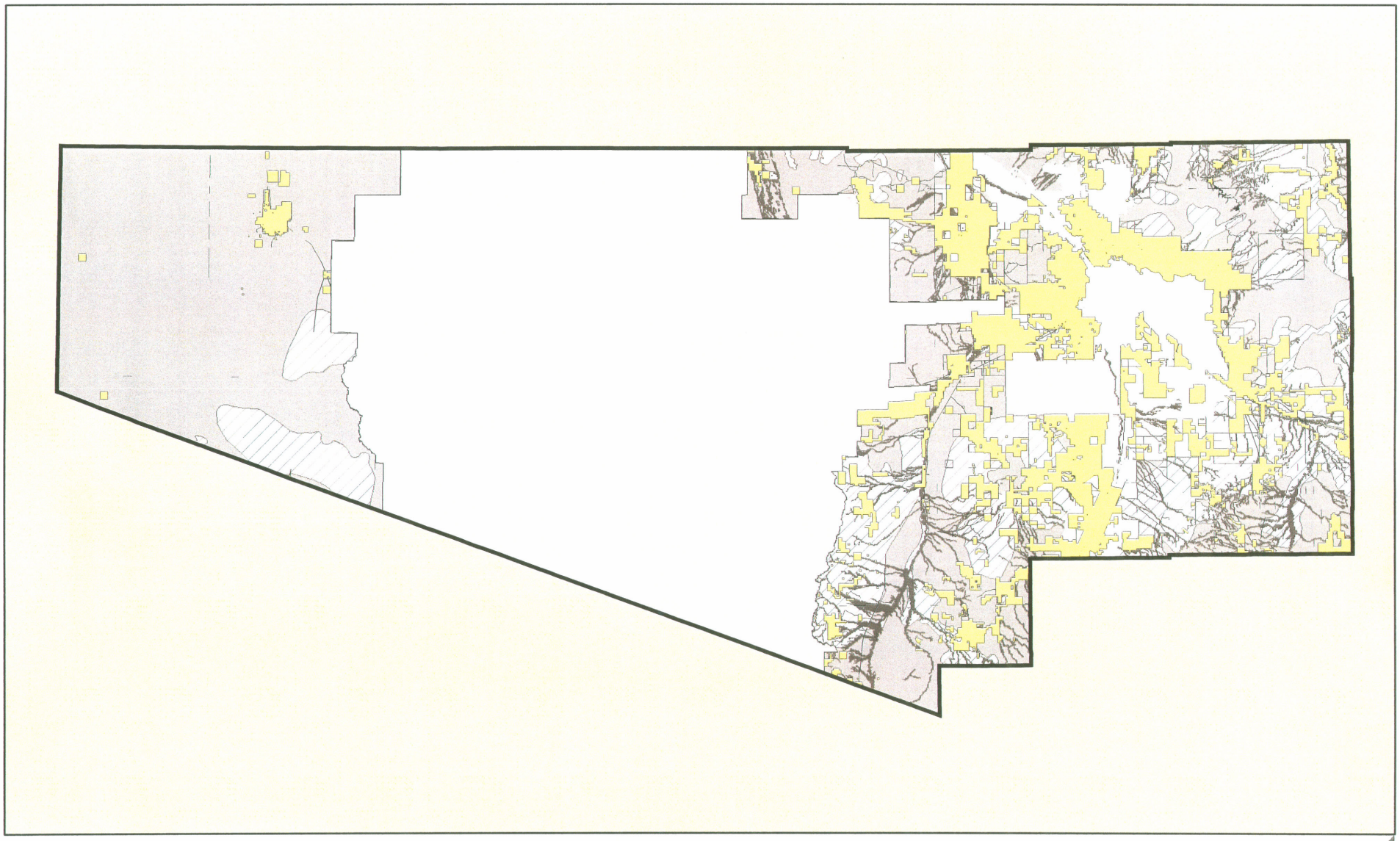
Table 2.9
Projected Acres of Future Development in Pima County Planning Study Area including State and Federal Lands*

Inside CLS	Existing Built	0 to 10 years	10 to 20 years	20 years to Buildout	Un-developed at Buildout	Total
Biological Core	21,235	1,277	5,289	32,390	839,703	899,893
Multiple Use	59,785	5,177	19,561	37,524	1,790,669	1,912,717
Important Riparian Areas	21,056	902	3,706	5,513	604	31,781
Agriculture	1,758	330	720	741	10,671	14,219
CLS Total	103,834	7,686	29,276	76,168	2,641,647	2,858,610
Outside CLS	225,819	5,885	14,077	65,856	168,493	480,131
Total*	329,653	13,570	43,353	142,024	2,810,140	3,338,741
Percent within CLS	31	57	68	54	94	86
Percent of CLS	4	0	1	3	92	100

*Excluding all but 73,000 acres of Native American lands dispersed in Eastern Pima County.

Table 2.10
Potential Conservation and New Development under CLS Conservation Guidelines within Permit Area

Inside CLS	Existing Undeveloped	CLS Conservation Guidelines	Potential Conservation	Potential New Development
Biological Core	152,819	80%	122,255	30,564
Multiple Use	184,196	75%	138,147	46,049
Important Riparian Areas	3,661	95%	3,478	183
Agriculture	6,735	0%	-	6,735
CLS Total	347,411		263,880	83,531
Outside CLS	82,240			82,240
Total*	429,651		263,880	165,770



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FIGURE 2.16
CLS in the Permit Area at Buildout

Table 2.11
Projected Acres of Future Development in Pima County Permit Area excluding State and Federal Lands

Inside CLS	Existing Built	0 to 10 years	10 to 20 years	20 years to Buildout	Un-developed at Buildout	Total
Biological Core	18,725	724	1,455	11,406	139,235	171,544
Multiple Use	39,964	2,829	6,563	18,184	156,621	224,160
Important Riparian Areas	12,602	227	1,019	2,415	-	16,263
Agriculture	335	84	171	6	6,474	7,070
CLS Total	71,626	3,863	9,208	32,010	302,330	419,037
Outside CLS	107,540	2,485	5,511	20,617	53,626	189,780
Total*	179,166	6,348	14,719	52,627	355,956	608,817
Percent within CLS	40	61	63	61	85	69
Percent of CLS	17	1	2	8	72	100

substantially lessened as a result of conservation and mitigation measures outlined in this PCMSCP. Therefore, the net impact of the PCMSCP is significantly less than what would be incurred without the permit and its requirements. The mitigation for the direct effects of permitting the above projections for land development is discussed in Sections 3 and 4. Although it is assumed that the mitigation required for the projected development during the first decade will be provided at the onset of the permit, the USFWS will require Pima County to revisit the growth projections for subsequent decades and adjust the up-front mitigation required at the end of Years 10 and 20, prior to permit renewal for those phases.

2.5.2 Direct Effects of PCMSCP on PVS

Overall, the CLS provides substantial coverage for the majority of the PVS whose modeled habitat contributed to its design. However, early in the development of the CLS, the STAT proposed conservation criteria expressed as a percentage goal for each of the PVS to be considered for their inclusion under the Incidental Take Permit (Table 2.12). Subsequently, the STAT developed a decision process for assessing the appropriateness for coverage based on these goals (Table 2.13). The decision process focuses primarily on the conservation of PCAs within the CLS for each species. The decision process segregates the species based on proportion of habitat within PCAs, modeled potential habitat, or location data.

Table 2.12
STAT Conservation Goals for PVS

Common Name	Scientific Name	STAT Conservation Goal
Abert's towhee	*Pipilo aberti*	75%
Acuna cactus	*Echinomastus erectocentrus var. acunensis*	95%
Allen's big-eared bat	*Idionycteris phyllotis*	75%
Arizona Shrew	*Sorex arizonae*	95%
Arkenstone cave pseudoscorpion	*Albiorix anopthalmus*	100%
Bell's vireo	*Vireo bellii*	75%
burrowing owl	*Athene cunicularia hypugaea*	75%
cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	75%
California leaf-nosed bat	*Macrotus californicus*	75%
Chiricahua leopard frog	*Rana chiricahuensis*	95%
desert box turtle	*Terrapene ornata luteola*	75%
desert pupfish	*Cyprinodon macularius macularius*	100%
desert sucker	*Catostomus clarki*	95%
Gentry indigo bush	*Dalea tentaculoides*	100%
giant spotted whiptail	*Cnemidophorus burti stictogrammus*	75%
Gila chub	*Gila intermedia*	100%
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	95%
ground snake	*Sonora semiannulata*	75%
Huachuca water umbel	*Lilaeopsis schaffneriana var. recurva*	75%
Kitt Peak talus snail	*Sonorella xanthenes*	100%
lesser long-nosed bat	*Leptonycteris curasoae yerbabuena*	95%
longfin dace	*Agosia chrysogaster*	75%
lowland leopard frog	*Rana yavapaiensis*	75%
Merriam's mouse	*Peromyscus merriami*	75%
Mexican garter snake	*Thamnophis eques megalops*	75%
Mexican long-tongued bat	*Choeronycteris mexicana*	100%
needle-spined pineapple cactus	*Echinomastus erectocentrus var. erectocentrus erectocentrus*	95%
Nichol Turk's head cactus	*Echinocactus horizonthalonius var. nicholii*	90%
organ pipe shovel-nosed snake	*Chionactis palarostris organica*	95%
pale Townsend's big-eared bat	*Plecotus townsendii pallescens*	75%
Pima pineapple cactus	*Coryphantha scheeri var. robustispina*	90%
red-backed whiptail	*Cnemidophorus burti xanthonotus*	90%
rufous-winged sparrow	*Aimophila carpalis*	75%
San Xavier talus snail	*Sonorella eremita*	100%
Sonora sucker	*Catostomus insignis*	95%
southern yellow bat	*Lasiurus xanthinus*	75%
southwestern willow flycatcher	*Empidonax traillii extimus*	75%
Swainson's hawk	*Buteo swainsoni*	75%
talus snail species	*Sonorella ambigua ambigua*	100%
talus snail species	*Sonorella baboquivarienis baboquivarienis*	100%
talus snail species	*Sonorella baboquivarienis berryi*	100%
talus snail species	*Sonorella baboquivarienis depressa*	100%
talus snail species	*Sonorella imperialis*	100%
talus snail species	*Sonorella imperatrix*	100%

Table 2.12
STAT Conservation Goals for PVS
(continued)

Common Name	Scientific Name	STAT Conservation Goal
talus snail species	*Sonorella magdalensis*	100%
talus snail species	*Sonorella meadi*	100%
talus snail species	*Sonorella pupela*	100%
talus snail species	*Sonorella rinconensis*	100%
talus snail species	*Sonorella sabinoenis buehmanensis*	100%
talus snail species	*Sonorella sabinoensis tucsonica*	100%
talus snail species	*Sonorella sitiens sitiens*	100%
talus snail species	*Sonorella tortillita*	100%
Tucson shovel-nosed snake	*Chionactis occipitalis klauberi*	75%
Tumamoc globeberry	*Tumamoca macdougalii*	75%
western red bat	*Lasiurus blossevillii*	75%
western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	75%

Table 2.13
Decision Process for Species Coverage for Pima County MSCP

Step	Decision	If	Go to Step
1	PCA identified	yes	2
		no	7
2	Proportion of PCA in CLS in Permit Area at projected buildout meets STAT goal	yes	14
		no	3
3	Proportion of PCA in CLS in Permit Area at 20 years meets STAT goal	yes	Provisionally covered
		no	4
4	Proportion of PCA in CLS in Permit Area at 10 years meets STAT goal	yes	Provisionally covered
		no	5
5	Proportion of PCA in CLS in Permit Area currently meets STAT goal	yes	Provisionally covered
		no	Not covered
6	Proportion of PCA countywide in CLS at buildout meets STAT Goal	yes	14
		no	Not covered
7	Species with broad distribution in Pima County	yes	8
		no	13
8	Proportion of high/medium habitat in CLS in Permit Area at projected buildout meets STAT goal	yes	14
		no	9
9	Proportion of high/medium habitat in CLS in Permit Area at 20 years meets STAT goal	yes	Provisionally covered
		no	10
10	Proportion of high/medium habitat in CLS in Permit Area at 10 years meets STAT goal	yes	Provisionally covered
		no	
11	Proportion of high/medium habitat in CLS in Permit Area currently meets STAT goal	yes	Provisionally covered
		no	Not covered
12	Proportion of high/medium habitat countywide in CLS at buildout meets STAT Goal	yes	14
		no	Not Covered
13	Entire limited distribution within Permit Area in public ownership, conservation easement, controlled by land use regulations	yes	15
		no	Not covered
14	Projected conserved areas within Permit Area in public ownership, conservation easement, controlled by land use regulations	yes	15
		no	Not covered
15	Projected conserved areas within Permit Area in areas covered by monitoring/management plan	yes	covered
		no	Provisionally covered

The species are segregated as covered, provisionally covered, and not covered based upon meeting the STAT goals.

- Covered species are those that meet the STAT goals for conservation of the PCA, modeled high and medium potential habitat, or known locations within the CLS in the Permit Area at projected buildout assuming that these areas will be monitored and managed under the PCMSCP.

- Species are identified as provisionally covered if they do not meet the STAT goals for conservation within PCA, modeled high and medium potential habitat, or known locations within the CLS in the Permit Area at projected buildout, but do within the Planning Study Area. Coverage for provisionally covered species will be provisional, based on demonstration that ongoing land disturbing activities do not exceed the STAT conservation goal within the Permit Area.

- Species not meeting the STAT goals either within the Permit Area or the Planning Study Area are not proposed for coverage in the PCMSCP.

2.5.2.1 Proposed Covered Species

A total of 27 species meet STAT conservation goals within the Permit Area. Twenty species meet the STAT goals for conservation of identified PCAs within the Permit area (Table 2.14). Conservation of modeled high and medium potential habitat for Allen's big-eared bat (*Idionycteris phyllotis*) achieves the STAT conservation goal of 75 percent. Approximately 209,012 acres of the existing 259,689 of modeled habitat (80 percent) will remain within the CLS at buildout within the Permit Area and 93 percent will remain in the Planning Study Area.

Seven of the 15 invertebrate species included among the PVS occur within the Permit Area, based upon the available location data (Table 2.15). Four of these species (Arkenstone cave pseudoscorpion [*Albiorix anopthalmus*] and the talus snails [*Sonorella eremite*, *S. imperialis*, and *S. rinconensis*]) are identified only from locations within the permit area. These locations are also within the CLS and outside of the areas projected to be impacted at buildout. Two other talus snails (*S. ambigua ambigua* and *S. magdalensis*) are known from locations in Pima County both within and outside of the Permit Area. The locations within the Permit Area are in the CLS and outside of the areas projected to be impacted at buildout.

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Table 2.14
Species Proposed for Coverage under Terms of PCMSCP based on Conservation of PCA within CLS in Permit Area

		Permit Area					Planning Study Area			
Common Name	STAT Conservation Goal	Total Existing Acres	Total Existing Acres in CLS	Total Acres in CLS at Buildout	CLS Conservation	Permit Area as % of Total	Total Existing Acres	Total Existing Acres in CLS	Total Acres in CLS at Buildout	CLS Conservation
Abert's towhee	75%	22,827	21,605	20,974	92%	42%	60,146	56,402	54,349	90%
Bell's vireo	75%	19,284	34,214	18,572	96%	38%	51,025	65,941	50,168	98%
cactus ferruginous pygmy-owl	75%	180,075	169,793	153,772	85%	17%	1,119,362	1,084,729	1,045,899	93%
Chiricahua leopard frog	95%	50,498	50,498	50,476	100%	13%	397,934	397,934	397,912	100%
desert box turtle	75%	24,735	22,142	20,974	85%	10%	265,449	256,096	253,550	96%
desert sucker	95%	1,337	1,337	1,337	100%	15%	8,655	8,655	8,655	100%
Gentry indigo bush	100%	22,720	22,720	22,720	100%	17%	132,722	132,722	132,722	100%
giant spotted whiptail	75%	30,054	25,061	24,337	81%	45%	82,877	71,405	66,789	81%
Gila chub	100%	2,449	2,449	2,449	100%	13%	19,062	19,061	19,061	100%
Huachuca water umbel	75%	7,087	6,384	5,976	84%	30%	28,643	25,301	23,773	83%
longfin dace	75%	6,215	6,160	6,010	97%	34%	18,655	18,592	18,415	99%
lowland leopard frog	75%	113,321	107,719	95,194	84%	26%	477,535	460,052	439,636	92%
Merriam's mouse	75%	20,405	19,543	17,146	84%	22%	102,928	98,614	92,592	90%
organ pipe shovel-nosed snake	95%	300	300	300	100%	0%	170,040	170,040	170,040	100%
pale Townsend's big-eared bat	75%	79,332	78,098	73,952	93%	28%	297,193	294,189	284,066	96%
rufous-winged sparrow	75%	167,410	154,811	127,704	76%	22%	841,016	816,477	753,741	90%
Sonora sucker	95%	1,413	1,413	1,413	100%	1%	178,642	178,642	178,642	100%
Swainson's hawk	75%	180,377	170,032	153,292	85%	21%	907,560	887,825	844,979	93%
western red bat	75%	92,558	88,685	88,503	96%	18%	507,167	501,960	502,557	99%
western yellow-billed cuckoo	75%	18,905	18,782	17,579	93%	44%	45,881	45,336	42,665	93%

Table 2.15
Invertebrates Locations within the Permit Area and Planning Study Area

Scientific Name	Impacted at Build-out	Not Impacted at Buildout					
		Bio-logical Core	Multiple Use	IRA	Within Permit Area	Outside Permit Area	Total
Albiorix anopthalmus		1			1		1
Sonorella ambigua ambigua				1	1	3	4
Sonorella eremita			1		1		1
Sonorella imperialis		1			1		1
Sonorella rinconensis		1			1		1
Sonorella baboquivarienis depressa	1	1			2	1	3
Sonorella magdalensis			2		2	2	4
Total	1	4	3	1	9	16	25

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2.5.2.2 Species Proposed as Provisionally Covered

A total of 10 species are proposed for provisional coverage in the PCMSCP. Six species do not met STAT goals for conservation of PCAs within the Permit Area, but do meet these goals in the Planning Study Area as a whole (Table 2.16). These species are proposed for provisional coverage under the PCMSCP. These species could be covered by the PCMSCP if the STAT goal can be achieved through adequate management and monitoring.

The modeled high and medium potential habitat remaining at buildout for the southern yellow bat (*Lasiurus xanthinus)* and Tumamoc globeberry (*Tumamoca macdougalii)* do not meet STAT goals within the Permit Area, but do meet them in the Planning Study Area.

Two species that did not have either modeled habitat or identified PCAs, desert pupfish (*Cyprinodon macularius macularius)* and Arizona shrew (*Sorex arizonae)* are nonetheless proposed for provisional coverage. The desert pupfish would benefit from potential habitat restoration and reintroduction programs for other native fish species. The likely potential habitat for the Arizona shrew, the Santa Rita Mountains, is within the CLS that is not projected to be disturbed at buildout.

Table 2.16
Species Proposed for Provisional Coverage under Terms of PCMSCP based on Conservation of PCA within CLS in Permit Area

		Permit Area					Planning Study Area			
Common Name	STAT Conserva-tion Goal	Total Existing Acres	Total Existing Acres in CLS	Total Acres in CLS at Buildout	CLS Conser-vation	Permit Area as % of Total	Total Existing Acres	Total Existing Acres in CLS	Total Acres in CLS at Buildout	CLS Conser-vation
California leaf-nosed bat	75%	37,982	31,330	27,522	72%	7%	528,610	519,153	514,458	97%
red-backed whiptail	90%	17,922	14,811	14,811	83%	5%	370,633	359,879	359,883	97%
Nichol Turk's head cactus	90%	2,109	1,698	1,698	81%	22%	9,861	9,438	9,438	96%
Pima pineapple cactus	90%	7,792	7,281	5,070	65%	11%	79,552	78,636	73,879	93%
Tucson shovel-nosed snake	75%	85,166	60,722	39,077	46%	33%	333,537	286,460	254,919	76%
Sonorella ambigua ambigua	100%	4,740	4,436	4,436	94%	4%	109,841	109,468	109,468	100%

2.5.2.3 Species Not Proposed for Coverage

A total of 18 of the PVS are not proposed for coverage in the PCMSCP at this time. Seven species do not meet STAT goals for conservation of PCAs within the Permit Area or within the Planning Study Area as a whole (Table 2.17).

Two species that do not have known distributions within the Permit Area, Acuna cactus (*Echinomastus erectocentrus* var. *acunensis*) and Gila topminnow (*Poeciliopsis occidentalis occidentalis*), are not proposed for coverage. The distribution of species are within the CLS that projected to remain at buildout in the Planning Study Area.

One of two known locations known to occur within the permit area of the talus snail (*Sonorella baboquivarienis depressa*) is within the area projected to be developed by buildout, therefore this species does not meet STAT criteria for coverage. If this location is afforded protection and management in the future, this species could be added to the permit.

The remaining 8 snail species on the PVS list occur within the Planning Study Area, but not within the Permit Area, based on the known location data (Table 2.18).

The only known location for *Sonorella baboquivarienis berryi* is within the Tohono O'odum Nation. Two of the three locations of *Sonorella sitiens sitiens* are also within the Tohono O'odum Nation and the third is within the CLS, outside of the areas projected to be effected by future development.

The only known location of *Sonorella tortillita* is within the area identified as existing built environment within the City of Tucson.

The remaining five species, *Sonorella baboquivarienis baboquivarienis, Sonorella imperatrix, Sonorella meadi, Sonorella sabinoenis buehmanensis,* and *Sonorella sabinoensis tucsonica* occur in the CLS outside of the areas projected to affected by future development.

2.5.3 Indirect Effects of PCMSCP

Indirect effects resulting from the implementation of the PCMSCP are most likely to manifest themselves by certain levels of habitat fragmentation, particularly within the urbanizing areas. This is because the development of Pima County and private lands will

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Table 2.17
Species Not Proposed for Coverage under Terms of PCMSCP based on Conservation of PCA within CLS in Permit Area

		Permit Area					Planning Study Area			
Common Name	STAT Conserva-tion Goal	Total Existing Acres	Total Existing Acres in CLS	Total Acres in CLS at Buildout	CLS Conser-vation	Permit Area as % of Total	Total Existing Acres	Total Existing Acres in CLS	Total Acres in CLS at Buildout	CLS Conser-vation
needle-spined pineapple cactus	95%	11,718	11,261	8,910	76%	30%	41,80	41,302	39,448	94%
Mexican garter snake	75%	24,079	21,915	16,134	67%	40%	81,23	68,877	59,700	73%
lesser long-nosed bat	95%	250,120	231,380	209,156	84%	18%	1,530,03	1,446,022	1,395,704	91%
Mexican long-tongued bat	100%	122,423	118,107	108,635	89%	43%	301,61	295,336	285,864	95%
burrowing owl	75%	74,742	60,098	55,542	74%	73%	163,01	117,022	102,745	63%
southwestern willow flycatcher	75%	4,270	2,530	2,530	59%	72%	13,11	5,963	5,963	45%
ground snake	75%	10,552	7,317	6,131	58%	81%	40,10	18,428	13,009	32%

Table 2.18
Snail Species Occurring in Planning Study Area but Not within Permit Area

Scientific Name	Within Built	Biological Core	Multiple Use	Tohono	Total
Sonorella baboquivarienis baboquivarienis			1		1
Sonorella baboquivarienis berryi				1	1
Sonorella imperatrix		1			1
Sonorella meadi			1		1
Sonorella sabinoenis buehmanensis		1			1
Sonorella sabinoensis tucsonica			1		1
Sonorella sitiens sitiens			1	2	3
Sonorella tortillita	1				1
Total	2	4	7	3	16

continue to be lawful activities under the permit. However, the potential for habitat fragmentation on a landscape scale will be far less than it would be without the permit, due to the scale and connectivity of conservation areas identified and protected by the CLS. Indirect effects to PVS and conserved lands within CLS will also result from nearby allowed development. The indirect effects of associated lights, traffic and roads, noise, water use, air pollution, human activities, pets, and non-native species can be as detrimental as the direct effects of habitat loss, if not minimized and mitigated. These indirect effects will be addressed by development standards for projects and activities within or adjacent to CLS lands.

2.5.4 Cumulative Effects of Other Activities on Covered Species

Cumulative effects caused by other projects and activities not covered by the permit will be minimized by the efforts being undertaken by the Town of Marana and the City of Tucson in pursuit of their individual HCPs and Section 10(a)(1)(B) Permits. The total land area covered by the combination of permit areas under these two jurisdictions will constitute the major portion of land area in Pima County, with the exclusion of the Tohono O'odham Nation, Arizona State Trust Lands, and Federal lands. The cumulative effect of the PCMSCP and other HCPs will dramatically increase conservation efforts throughout Pima County and result in long-term gains in habitat protection for native plant and wildlife species.

The Federal signatories to the PCMSCP, who will be assisting in the implementation of conservation actions, will also minimize cumulative negative effects. The Coordination Agreements between Pima County and the cooperating agencies will establish the

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PCMSCP goals and management framework as a guiding context for Federal land management activities. One example of this is the ongoing efforts by the U.S. Army Corps of Engineers (USACE), Pima County, the City of Tucson, and the Town of Marana in planning for the large-scale, long-term riparian ecosystem restoration along the Santa Cruz and Rillito rivers. The USACE involvement in these projects is directly tied to their support of the goals of the SDCP and more specifically the PCMSCP.

The City of Tucson recently released its long-range water resource plan, the Draft Water Plan 2000-2050. It was developed to address a wide range of potential future situations and determine a number of possible pathways that could lead to them. The different pathways have been assigned 'Critical Decision' points, and customers of Tucson Water will be asked which alternative pathway they will direct Tucson Water to follow. Tucson Water has developed a list of water programs and projects that will be implemented at the time of each Critical Decision. The draft plan proposes in 2014 the critical decision as to whether Tucson Water should continue to allow excess effluent to flow down the Santa Cruz River or maximize the use of effluent as a water supply. Customers will be asked to decide whether to capture this additional effluent and use it to augment the groundwater supplies or continue to discharge it into the Santa Cruz where it is allowed to flow downstream and eventually recharge to be come groundwater in areas north of the city – areas that Tucson Water cannot legally access for water recovery.

This Draft Water Plan has potentially significant implications for the Riparian Element of the SDCP, which calls for the utilization of a conservation pool of effluent water for the enhancement and restoration of riparian habitat. If effluent flows are no longer available for this use, the cumulative impacts could be significant. The water plan is currently under review and is being evaluated to better understand and describe those cumulative impacts.

2.5.5 ESA Section 7(a)(2) Standards and Jeopardy Analysis Framework

Section 7(a)(2) of the ESA requires Federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat. The Coordination Agreements will commit any future Section 7(a)(2) consultations to be made in support of the PCMSCP. The USFWS will also conduct an intra-service section & consultation on their action of issuing the Section 10(a)(1)(B) permit supported by this PCMSCP. The USFWS analysis must consider these same jeopardy and adverse modification standards.

2.5.6 Effects on Critical Habitat

2.5.6.1 Cactus Ferruginous Pygmy-Owl

Critical habitat for the pygmy-owl has been proposed and a Draft Recovery Plan has been prepared. The STAT has incorporated the best available scientific information on the habitat and recovery needs of this species into the development of the CLS. Therefore the PCMSCP supports the proposed pygmy-owl critical habitat Draft Recovery Plan strategies.

2.5.6.2 Southwestern Willow Flycatcher

Previously designated critical habitat for southwestern willow flycatcher occurs along the San Pedro River in northeastern Pima County. The Critical Habitat designation was vacated, and the USFWS is in the process of developing a new proposal. Conservation efforts along the San Pedro will continue to include land acquisition and the pursuit of conservation easements, partnering with the Nature Conservancy at Bingham Cienega and other conservation strategies to protect habitat for this species. The STAT incorporated the best available scientific information on the habitat and recovery needs of the southwestern willow flycatcher into the development of the CLS. Therefore the PCMSCP supports conservation of this species.

2.5.6.3 Desert Pupfish

Critical habitat for desert pupfish (*Cyprinodon macularius*) includes Quitobaquito Springs in Organ Pipe Cactus National Park. Conservation for this species is achieved by the NPS.

2.5.6.4 Gila Chub

Critical habitat for this species has been proposed in several sections of watercourses in Pima County: Sabino Canyon (USFS, Coronado National Forest), Cienega Creek (Pima County owned lands), Cienega Creek (BLM and Arizona State Land), and Mattie Canyon and Empire Gulch (BLM). Conservation in these areas is achieved by Federal agencies and in the case of the county-owned portion of Cienega Creek by the Cienega Creek Management Plan. Areas on Arizona State lands would be subject to PCMSCP conservation requirements, if they were sold to private entities and were still within Pima County's jurisdiction.

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2.5.6.5 Mexican Spotted Owl

There is currently a proposal to redesignate critical habitat for Mexican spotted owl. In Pima County the proposed designation is primarily within the Coronado National Forest, in the Santa Catalina, and Rincon and Santa Rita mountains. Conservation of these areas is achieved by the USFS. The proposed designation does not cover any state or private lands.

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Chapter 3

Mitigation Programs and Standards

3.1 Introduction: Conservation Land System as Foundation for PCMSCP Mitigation

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The overarching strategy to address mitigation for incidental take in Pima County is the establishment of the Conservation Land System (CLS) as adopted by the Pima County BOS. The CLS and its guidelines provide a template for achieving habitat conservation within Pima County that will achieve the goals and objectives of the PCMSCP. Proposed covered activities and future land development through buildout are projected to result in the permanent loss of 45,000 (approx.) acres of CLS lands. The PCMSCP provides Pima County the mechanism to acquire, protect, manage, and monitor up to 264,000 acres (approx.) within the CLS to mitigate the effects of development through projected buildout (see Table 3.1). This total assumes that:

- The permit terms are implemented through buildout in eastern Pima County,
- Impacts within the CLS (45,000 acres, approx.) will be mitigated within the CLS (152,000 acres, approx.), and
- Impacts outside the CLS (29,000 acres approx.) also will be mitigated within the CLS (112,000 acres approx.).

Pima County will apply additional special conditions to all projects to ensure that certain PVS are adequately conserved under the PCMSCP.

Table 3.1
Proposed Program for Assembling CLS Lands under Conservation Management for PCMSCP

	Permit Area (acres)	CLS Conservation Goal (%)	CLS Conservation Goal (acres)	Total Projected New Development at Buildout (acres)	CLS/ Bond Mitigation Ratios*	CLS Mitigation Acres
CLS						
Biological Core	152,819	80	122,255	13,584	4:1	54,336
Multiple Use	184,196	75	138,147	27,576	3:1	82,727
Important Riparian Areas	3,661	95	3,478	3,661	4:1	14,643
Agriculture in CLS	6,735	0	0	261		
Total CLS	347,411		263,880	45,081		151,706
Outside CLS	28,614			28,614	3.92:1	112,174
Total	376,025			73,695		263,880

*assuming that impacts of new development within the CLS are mitigated within the CLS in accordance with the conservation goal and that conservation for impacts outside the CLS are mitigated through acquisitions within the CLS through the bond and other funding sources

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Within this long-term mitigation framework, the implementation of the PCMSCP can be phased to provide for appropriate interim milestones. The conservation goals for the first 10 years of implementation of the program based on the land consumption projections are shown in Table 3.2.

Table 3.2
Projected Implementation of PCMSCP During First 10 Years

	Total Projected New Development at Year 10 (acres)	CLS/ Bond Mitigation Ratios*	CLS Mitigation Acres
CLS			
Biological Core	724	4:1	2,896
Multiple Use	2,829	3:1	8,487
Important Riparian Areas	227	4:1	908
Agriculture in CLS	84		
Total CLS	3,863		12,291
Outside CLS	2,485	3.92:1	9,741
Total	6,348		22,032

3.2 Design and Development Guidelines for CLS

3.2.1 CLS Land-Use Designations

The purpose of the PCMSCP is to ensure the long-term survival of the full spectrum of plants, animals, and biological communities that are indigenous to Pima County. The CLS identifies those areas in Pima County that are essential for accomplishing this goal, and places them into land categories that are defined below and shown on Figure 3.1.

3.2.1.1 Important Riparian Areas

These are areas defined by mesoriparian and xeroriparian vegetation, high (relative to adjacent uplands) water availability, denser vegetation, and high biological productivity. In addition to the inherent biological value of these water-related communities, important riparian areas and the adjacent uplands provide a framework for linkages and landscape connections. These riparian areas are extremely important elements in this Conservation Lands System, and every effort should be made to protect, restore, and enhance the structure and functions of these areas, including hydrological, geomorphic, and biological functions.

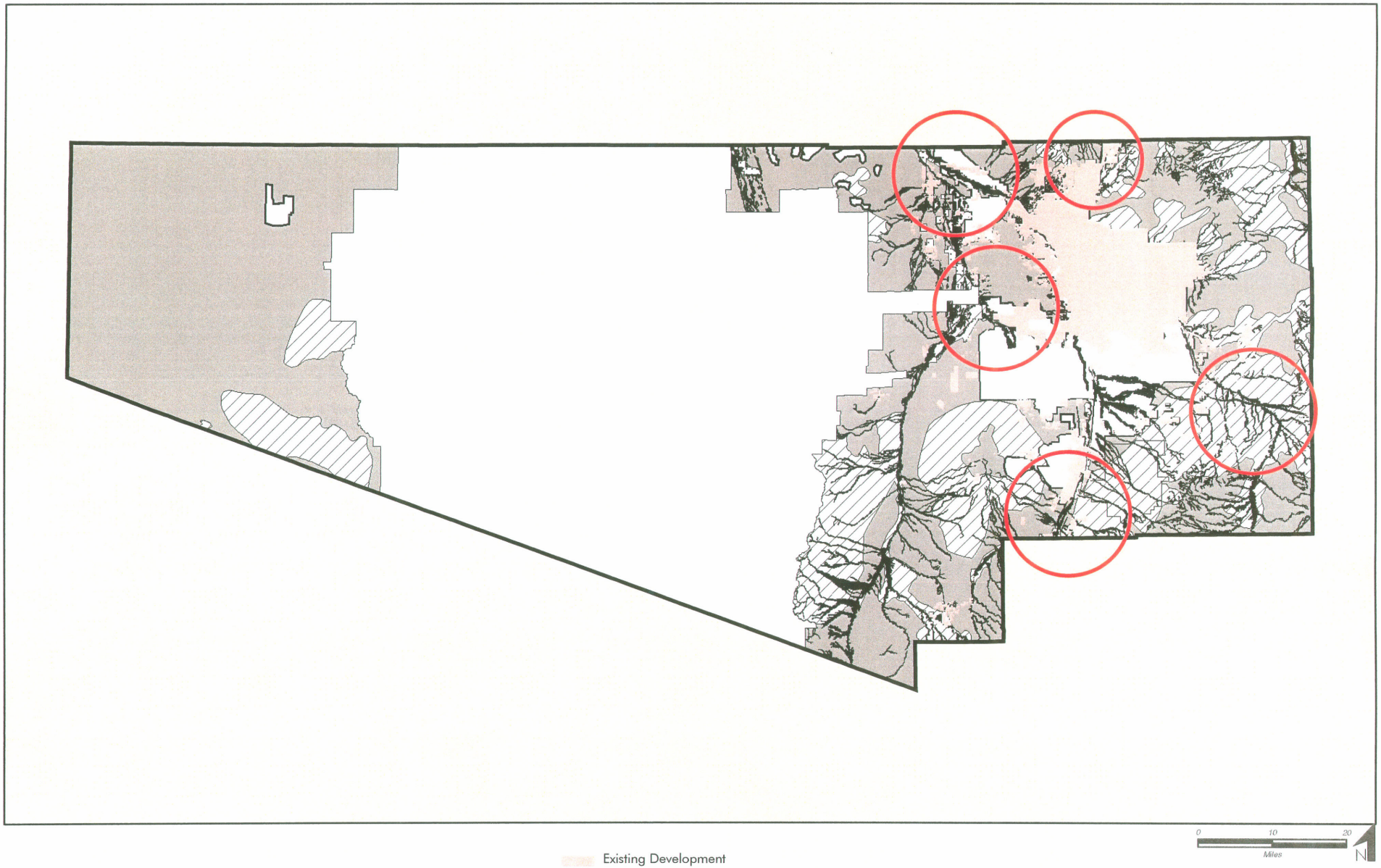
3.2.1.2 Biological Core Management Areas

These are areas of very high biological importance distinguished by high potential habitat for five or more PVS and special elements (e.g., caves, perennial streams, cottonwood-willow forests). Land use and management within these areas will focus on conservation, restoration, and enhancement of natural communities, with provision for other land uses that are consistent with improvement of conditions for native species, soils, and native vegetation.

3.2.1.3 Scientific Research Areas

These areas are currently managed for scientific research: the Santa Rita Experimental Range and the University of Arizona Desert Laboratory (at Tumamoc Hill). Land use and management within these areas focus on balancing conservation, restoration, and enhancement of natural communities in support of scientific research on the environment and natural resources (e.g., monitoring ecological change, measuring effects of experimental grazing methods).

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FIGURE 3.1
CLS Land-Use Categories

3.2.1.4 Multiple Use Management Areas

These areas are generally defined by the occurrence of high potential habitat for three or more PVS and special elements (e.g., caves, perennial streams, cottonwood-willow forests). Land use and management goals within these areas will focus on balancing conservation, restoration, and enhancement of natural communities with other uses compatible with the maintenance of biological values. Land uses appropriate for these areas must be consistent with maintaining open space, natural vegetation, and wildlife habitat values.

3.2.1.5 Special Species Management Areas

These are areas defined as crucial for the conservation of plant or wildlife species of special concern to Pima County. Land use and management within these areas will focus on conservation, restoration, and enhancement of habitat for these species.

3.2.1.6 Agriculture Inholdings within Conservation Lands System

These are areas identified as having existing or abandoned agricultural uses. Agriculture provides greater permeability than higher intensity land uses for many wildlife species. Changes in land uses in these areas may impact the conservation effectiveness of adjacent or nearby CLS lands.

3.2.1.7 Critical Landscape Connections

These are broadly defined areas that contain potential connectivity corridors for biological resources but also may have now, or in the future, barriers that tend to isolate major conservation areas. Specifically, these regional-scale areas are located:

1) across the I-10/Santa Cruz River corridors in the northwest;
2) between the Catalina and Tortolita Mountains;
3) across the I-10 corridor along Cienega Creek in the east;
4) across the I-19 and Santa Cruz River corridors in southern Pima County;
5) across the Garcia strip extension of the Tohono O'odham Nation; and
6) across the CAP canal in Avra Valley.

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Habitat loss and fragmentation by roads, other infrastructure, and housing and commercial development pose major challenges to wildlife movement in these areas, and high priority should be given to the identification, preservation, and reconnection of habitat linkages.

3.2.1.8 Other Mapped Riparian Areas

These are riparian areas that are mapped and regulated by the Pima County Regional Flood Control District for purposes of protecting a limited resource, preserving areas of groundwater recharge, promoting improved quality of surface water, reducing erosion, and providing biological connectivity to adjacent uplands. These mapped riparian areas also significantly contribute to those biological, hydrological, and geomorphological functions that sustain the health of Important Riparian Areas; every effort should be made to protect, restore, and enhance the structure and functions of these mapped riparian areas.

3.2.2 Urban Development Guidelines for Lands within Conservation Lands System

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The Environmental Element of the CLUP was adopted by the BOS on December 18, 2001. Under state law, the Environmental Element requires analysis, planning, and strategies to address anticipated effects of land-use changes associated with proposed development on natural and cultural resources. The SDCP provides a strategy for natural and cultural resource protection by identifying conservation goals and defining the CLS. The following guidelines and procedures ensure that the SDCP conservation goals are given proper consideration in evaluating development proposals. Nothing in these guidelines shall alter, modify, decrease, or limit existing and legal land uses, zoning, permitted activities, or management of lands within the CLS.

The CLS is designed to protect biodiversity and provide land-use guidelines consistently with the conservation goals of the SDCP. New applications for land-use changes within the CLS will be evaluated to ensure that the guidelines presented below are met. In the case of land parcels that include more than one of the CLS categories, the guidelines should be met for each CLS subsection of that parcel (i.e., if a parcel consists of some land that is Multiple Use and some that is Important Riparian, each subsection should comply with the guidelines for the respective CLS category). In some cases, more than one category is indicated for a given land unit (for example, Special Species Management Areas may overlap Biological Core or Multiple Use Management Areas). In these situations, the guidelines for the most protective CLS category for that area should take precedence.

3.2.2.1 Conservation Guidelines for Important Riparian Areas

Land-use changes should retain at least 95 percent of the riparian area's land cover in a natural or undisturbed condition.

3.2.2.2 Conservation Guidelines for Biological Core Management Areas

Land-use changes within Biological Core Management Areas should retain at least 80 percent of the land in natural vegetation and in a configuration that achieves actual conservation of the native species that may occupy that landscape.

3.2.2.3 Conservation Guidelines for Scientific Research Areas

Scientific Research Areas should continue to be managed for the purpose of scientific research on the environment and natural resources. Scientific research activities should minimize any long-lasting impacts that may affect adjacent or nearby CLS lands. Any land-use changes subject to Pima County jurisdiction should achieve the conservation goals of the underlying CLS category.

3.2.2.4 Conservation Guidelines for Multiple Use Management Areas

Land-use changes within Multiple Use Management Areas should retain at least 75 percent of the land in natural vegetation and in a configuration that achieves actual conservation of the native species that may occupy that landscape.

3.2.2.5 Conservation Guidelines for Special Species Management Areas

Land-use changes within Special Species Management Areas should retain at least 80 percent of the land in natural vegetation and in a configuration that achieves actual conservation of these species that may occupy that landscape.

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3.2.2.6 Conservation Guidelines for Agriculture Inholdings within the Conservation Lands System

Land-use changes within these areas should emphasize the restoration of natural vegetation communities. Development within these areas should be configured in a manner that does not compromise the conservation values of adjacent and nearby CLS lands.

3.2.2.7 Conservation Guidelines for Critical Landscape Connections

Land-use changes in these general areas should protect existing biological linkages and attempt to remove barriers and restore fragmented corridors of natural habitat.

3.2.2.8 Conservation Guidelines for Other Riparian Areas

The riparian areas mapped and regulated by the Pima County Regional Flood Control District, regardless of their location within or outside the CLS boundaries, should be retained in a natural or undisturbed condition, in accordance with the Floodplain Protection and Erosion Hazard Ordinance.

3.2.3 Design Criteria

3.2.3.1 Site Design Criteria

Pima County will ensure that direct and indirect impacts of new development on the CLS will be minimized using specific land planning and design principles and preserve management provisions. The determination of the specific measures necessary to contain impacts from a new development project, and thereby avoid, reduce, or mitigate edge effects on the preserve to less than significant levels, will be determined through the applicable project and environmental review process.

Pima County will require on-site conservation by projects subject to BOS discretionary actions (e.g., rezoning, subdivision plats, development plans, conditional use permits, etc.) that occur within the CLS. The BOS may approve rezonings to allow increased land use intensities if the resulting project configuration would be better than what would be achieved under existing zoning. Project applicants must demonstrate that proposed site planning and design contribute toward the conservation of the covered species and special elements and result in a viable reserve

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design. Pima County will achieve on-site conservation by complying with ordinances and CLS guidelines that define the required percentage of conservation.

Impacts to priority conservation areas within the CLS will be avoided as a first priority. Where complete avoidance cannot be attained, Pima County staff will work with the project proponent to design the project to minimize impacts to Priority Conservation Areas (PCAs) through on-site conservation and other appropriate means.

Site design objectives are generally summarized as the avoidance and/or minimization of impacts to biological resources and ecosystem functions within the CLS from new development, and retention of core areas and functional linkages. Potential impacts from new development on biological resources and ecosystem functions within the CLS that should be considered in the design of any project include:

- Direct effects:
  - Habitat loss
  - Fragmentation
  - Deterioration of ecosystem functions
- Indirect effects:
  - Increased access to adjacent conservation lands
  - Introduction and spread of non-native predators
  - Introduction and spread of non-native and invasive species that compete with native species
  - Alterations to surface water
  - Depletion of shallow groundwater
  - Increased noise levels
  - Increased night light levels
  - Degradation of air quality due to vehicle emissions and dust generation

Development activities usually have profound and permanent impacts on native vegetation and wildlife, both during and after construction. Therefore, there shall be only limited, compatible development within the CLS, particularly within linkages. Development, where practicable, shall be directed outside the CLS or within disturbed or lower value habitats.

New, higher intensity uses, commercial and industrial uses, and landfills generally are not compatible within the CLS. Lower intensity uses, such as low-density residential (one dwelling

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unit per one or more acres), utility corridors, and limited water facilities, may be compatible with certain restrictions. Residential development can promote habitat loss and fragmentation; degrade soil, air, water, and visual quality; introduce non-native species; alter the composition of wildlife communities; and increase predation by domestic animals. Commercial development may have fewer indirect impacts than residential development, although lighting impacts can be greater.

Low-density residential development represents a particular challenge. Pima County should provide incentives to cluster development away from core biological areas and sensitive resources. Careful planning of access, building pads, utilities, fencing, brush management, and landscaping can further minimize impacts.

Existing and planned regional public facilities identified in existing general plans, such as roads, landfills, and other infrastructure, are expected to be incorporated into the CLS in a manner that will allow for ecosystem function. Heavily used roads, rail lines, and aqueducts can isolate wildlife populations, increase mortality, restrict wildlife movement, interrupt breeding cycles, and affect runoff, among other impacts. The design of new roadways and improvements to existing roadways will be in accordance with Pima County's Environmentally Sensitive Roadway Ordinance. Bridges or structures providing wildlife under-crossings should be used instead of culverts for all riparian crossings and regional wildlife corridors, and fencing should be placed to direct wildlife toward these crossings. If culverts must be used, they should be sized with a maximum 2:1 length-to-width ratio wherever possible (e.g., 30 feet wide by 15 feet high). Future and currently unplanned regional facilities will avoid CLS areas, except as needed for public health and safety. Any project thus constructed cannot compromise overall levels of conservation in the CLS or adversely affect preservation and species goals or must mitigate accordingly. The following design criteria will be employed to evaluate the potential effects of proposed activities within the CLS:

- The most biologically valuable land areas are conserved, and proposed new development is sited in the least sensitive habitat areas;
- The structural diversity of conserved habitat areas is maximized by the conservation of unique habitats and habitat features (e.g., soil types, rock outcrops, drainage patterns, vegetation);
- The conserved areas are configured in a way that maximizes the ratio of surface area to the perimeter of conserved habitats and thereby minimizes edge effects;
- The conserved areas are configured in a way that maximizes connectivity with adjacent watercourses and other habitat areas;

- The developed areas are designed and configured in a way that minimizes indirect effects on adjacent conserved areas. This will include employing physical and regulatory measures to limit human access, lighting, and noise; to control invasive species, dust, and free-roaming pets; and to restrict plantings to native species of local origin;

- The biological integrity of linkages between Biological Core Management Areas is preserved;

- Impacts to narrow endemic species are minimized and impacts to PCAs for these species are avoided; and

- The conservation goals for covered species and special elements are achieved.

3.2.3.2 Design Criteria for Linkages and Corridors

The following criteria will be employed in the process of designing and evaluating linkages and corridors within the CLS:

- Habitat linkages will be maintained.

- Existing movement corridors within linkages will be identified and maintained.

- Corridors with good vegetative and/or topographic cover will be protected.

- Regional linkages that accommodate travel for a wide range of wildlife species, especially those linkages that support resident populations of wildlife, will be selected.

- The width of a linkage will be based on the biological information for the target species, the quality of the habitat within and adjacent to the corridor, topography, and adjacent land uses. Where there is limited topographic relief, the corridor must be well vegetated and adequately buffered from adjacent development.

- If a corridor is relatively long, it must be wide enough for animals to hide in during the day. Generally, wide linkages are better than narrow ones. If narrow corridors are unavoidable, they should be relatively short. If the minimum width of a corridor is 400 feet, the length should be no longer than 500 feet. A width of greater than 1,000 feet is recommended for large mammals and birds. Corridors for bobcats, deer, and other large animals should reach rim to rim along drainages, especially if the topography is steep.

- Visual continuity (i.e., long lines-of-sight) will be provided within movement corridors. This makes it more likely that the animals will keep moving through the corridor. Developments along the rim of a canyon used as a corridor should be set back from the canyon rim and screened to minimize their visual impact.

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- Corridors with low levels of human disturbance, especially at night, will be selected. This includes maintaining low noise levels and limiting artificial lighting.
- Barriers, such as roads, will be minimized. Roads that cross corridors should have 10-foot high fencing that channels wildlife to underpasses.
- Strict adherence to regulations banning off-road vehicle use will be enforced and monitored.

3.2.3.3 Procedure to Demonstrate Compliance with CLS Guidelines and Design Criteria

Applications for land-use changes requiring approval by the BOS shall include information that provides: 1) mapped and descriptive documentation of the natural resources of the area applicable to the site; and 2) mapped and descriptive explanations as to what extent natural resource disturbance will occur, if at all, and how actual conservation will occur as part of the development; and 3) measures to eradicate and/or manage invasive species within the area.

"Actual conservation" means a demonstration of in-place conservation or mitigation where natural biological resources are protected from loss or where disturbed areas are restored to the level of biological resources surrounding the disturbed area.

Actual conservation also means that development (at both the project-specific and cumulative regional scale) should be configured in a manner that maximizes landscape continuity and perpetuates the presence of native species that occupy that landscape, while minimizing the impact to site-specific sensitive resources. Those lands that are reserved from development because of their natural resources will be conserved and managed, in perpetuity, for the benefit of the natural resources. Residents, or associations of residents, of a development may not serve as the sole administrator or enforcement entity of those requirements established for the conservation and management of natural resources.

Conservation actions are to be encouraged, and protection of biological resources is considered an essential component of land-use planning.

3.2.3.4 Exemptions and Variances from CLS Guidelines and Design Criteria

Requests for exemptions and/or variances from the above guidelines and design criteria may only be granted by the BOS, and only in those cases in which an applicant demonstrates that an

alternative strategy is consistent with the goals of the PCMSCP and will result in a superior level of conservation. Exceptions may be made on a case-by-case basis for purposes of public safety. Submittal requirements for considering requests for exemptions and/or variances shall include mapped and descriptive site-specific information.

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3.3. CLS Acquisitions and Conservation Easements

Pima County will protect approximately 53,333 acres of land during the first 10-year phase, through acquisition of fee title or conservation easements using the 2004 bond money and other sources. Additionally, Pima County has acquired 17,221 acres since initiating the HCP planning process in 1999 (listed in Table 3.3), bringing the total to 70,554 acres of conservation lands contributing to mitigation requirements. Pima County establishes rules for prioritizing continuing acquisitions through the Pima County Conservation Acquisition Commission in order to ensure conservation of covered species and special elements and establishment of a viable preserve design. Acquisitions will focus on the "Habitat Protection Priorities" map. Acquisitions will mitigate projects that occur outside of the CLS and those projects inside the CLS that are no longer subject to Board of Supervisor (BOS) discretion. Without BOS discretion, the CLS guidelines and ordinances would not apply.

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Table 3.3
PCMSCP Mitigation Lands Acquired by Pima County 1999-2004

Property	Year Acquired	Acres
L & F International	1999	294
Holsclaw	1999	10
Perper/Rollins	2000	773
Lefkovitz/Lakia	2001	115
Baxter	1999	33
Joshua Tree II	2000	40
Orach	2001	3
Bradley	1999	40
Akers/Dailey	1999	158
Alpher	2000	147
Canoa Ranch	2001	4,700
Carpenter Ranch	1999	200
Ruddick	2000	13
Walden Ranch	2004	400
Buckelew	2002	500
Lords Ranch	2003	640
Arivaca Open Space	2003	124
Oracle Ridge	2004	1,214
Sweetwater	2004	695
Jacobs	2004	78
A-7 Ranch	2004	6,889
Baker	2004	155
TOTAL		17,221

Pima County will ensure the protection of mitigation lands in perpetuity through the recordation of conservation easements on both acquired lands and lands set aside through the CLS. Pima County will also provide a template conservation easement for these lands and for ranch conservation lands and other working landscapes.

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3.4 Pima County Regional Flood Control District Riparian Habitat Programs

The Pima County's Regional Flood Control District (PCRFCD) has developed an array of programs designed to avoid, minimize, and mitigate impacts to watercourses under its jurisdiction. This is accomplished by application of the Floodplain and Erosion Hazard Management Ordinance, acquiring floodprone lands, managing acquired lands, and participating in numerous riparian restoration planning efforts.

3.4.1 Regulatory Program

Pima County's Floodplain & Erosion Hazard Management Ordinance (Title 16 of the Pima County Code) regulates floodplains of watercourses with flows of 100 cubic feet per second (cfs) or more. It limits encroachments into and/or modifications of floodway and floodplains, establishes erosion hazard setbacks, and provides a framework for riparian habitat protection. The ordinance regulates activities requiring floodplain use permits, including single lot development, subdivision plats, and development plans.

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The ordinance defines alteration of regulated riparian habitat as disturbance resulting from grading, clearing, thinning, planting of non-native species, or other modifications that reduce vegetative volume or diminish the value of the habitat condition. The goal of the regulatory program under this ordinance is to avoid and minimize losses of riparian areas in unincorporated Pima County.

Pima County has completed detailed mapping and classification of riparian habitat to support development of the SDCP and PCMSCP. These maps delineate hydromesoriparian and xeroriparian vegetation and were adopted by Pima County Public Works Department in 2002 for general planning purposes. The updated maps are being presented for review at public meetings with expectations of their formal adoption by the BOS in 2005 (Figure 3.2.) When adopted, the maps will provide the quantitative basis for tracking riparian impacts and for determining mitigation. The location and acreage of impacted and mitigated riparian areas occurring under the regulatory program will be reported annually to USFWS.

The existing ordinance is currently under revision to expand riparian protection and thereby better serve the biological goals of the PCRFCD by improving maintenance of riparian habitat conditions and ecosystem functions necessary for the survival of covered species. Specifically this will occur by:

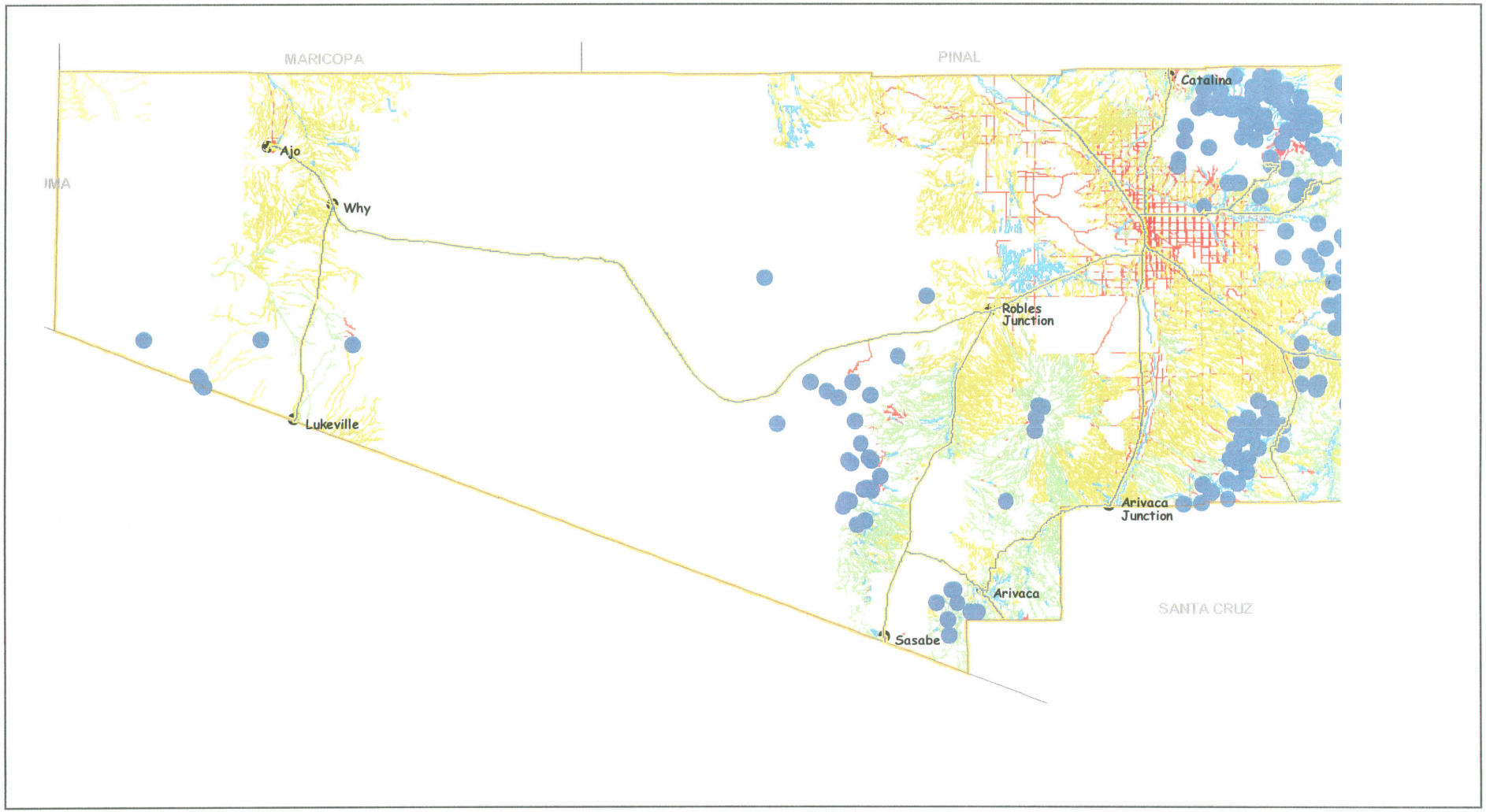


FIGURE 3.2
Proposed Riparian Classification of Eastern Pima County

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1. Linking the ordinance to the CLS, adopting the maps, applying the 95 percent conservation standard to all mapped riparian areas, and thereby increasing the areal extent of riparian habitat regulated by the ordinance to over 210,000 acres;

2. Requiring a mitigation plan for 1/3 acre (14,000 sq. ft.) or more of proposed disturbance to areas classified as Xeroriparian A, B, and C;

3. Requiring a mitigation plan for any amount of proposed disturbance to riparian habitat delineated as Hydromesoriparian or Important Riparian Areas;

4. Requiring BOS approval and mitigation for any proposed disturbance of more than one acre of alteration to hydromesoriparian or xeroriparian areas occurring within Important Riparian Areas;

5. Requiring clear demonstration that no reasonably practicable alternative to proposed impacts exists, and that the proposed impact on vegetation will be the minimum necessary; and

6. Regularly reviewing the efficacy of the ordinance in achieving the purposes of the PCMSCP.

PCRFCD will also continue to use its land use authority under Title 48 of the Arizona Revised Statutes to review proposed rezonings and comprehensive land use plan amendments for impacts to habitat and ecosystem functions. This review, which occurs prior to the submittal of subdivision plats and development plans, offers the greatest degree of flexibility to affect project design in ways that avoid or reduce damage to riparian areas.

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3.4.2 Acquisition Program

Since the onset of the PCMSCP planning process in 1999, Pima County and PCRFCD have utilized acquisition and subsequent management to offset direct and indirect losses of riparian areas that occur in association with their land use decisions. Acquisitions of newly acquired riparian areas for which Pima County seeks mitigation credit are listed in Table 3.3. There are approximately X_acres of lands classified as Important Riparian Areas within these reserves. In addition, these areas contain other riparian habitat in the CLS categories Multiple Use, Biological Core. These areas were acquired with 1997 and 2004 bonds.

In addition, PCRFCD will continue its Floodprone Lands Acquisition Program (FLAP) using its tax levy to acquire floodprone lands and related water rights. Certain recent acquisitions are deemed appropriate by PCRFCD for mitigation credits under the PCMSCP (Table 3.3). Where possible, future acquisitions will include purchases of land or water rights to reduce water demands and fragmentation of hydromesoriparian areas due to future development. Acquisitions will also enable restoration and improved land management, and reduce the need for future flood

and erosion hazard structures. Additional funding may be provided by the 2004 Flood Control Bonds to purchase land in the Conservation Land System, including appurtenant water rights.

Floodprone parcels have been purchased along the Tanque Verde, Cienega, and Agua Verde creeks, the Cañada del Oro, Pantano, Pegler and Black washes, and along the Rillito and Santa Cruz rivers. During FY 2002/03, the District purchased 37 parcels of land totaling approximately 1,286 acres of land at a cost of $3,255,633.

Table 3.4
Acres of FLAP Acquisitions for Section 10 Riparian Habitat Mitigation Credit

Property	Parcel Code	IRA Acres	Total CLS Acres
Canoa Ranch?			
		Total Acres of Credit:	

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3.4.3 Land Management Program

PCRFCD will commit to protect riparian areas under their authority or control. Absent this commitment, many of the lands acquired by the District or County could be traded, sold, or used for other purposes. This commitment will minimize future direct and indirect riparian impacts. PCRFCD assures protection in perpetuity and land management consistently with the biological goals of the PCMSCP for the land areas listed in Table 3.4. These properties are a subset of lands owned by Pima County and PCRFCD that are within the CLS, and were not purchased with Federal funds, or used as cost-share or mitigation credit under other Federal programs.

Table 3.5
Riparian Areas Protected and Managed consistently with PCMSCP Riparian Goals

Property	Parcel Information	Total acres
Cienega Creek Natural Preserve		
Bingham Cienega Natural Preserve		
La Cebadilla		
Portion of Aqua Caliente Wash		
Portion of Tanque Verde Wash		
Isabella Lee property on Aqua Caliente and Tanque Verde Washes		
Parcels along Pantano River		
Santa Cruz River at Canoa		
Other Parcels along Santa Cruz River		
Portion of Bear Canyon/Wash		
Total Acres Protected and Managed		

Pima County RFCD will manage these areas by updating existing management plans and developing new management plans consistent with PCMSCP goals. PCRFCD will continue to use a portion of its tax levy, supplemented with other funds as available, to manage riparian and other floodprone lands under its authority or to contract with other agencies and organizations to perform these functions. Pima County Natural Resources, Parks and Recreation Department, will use general funds, supplemented with District and other funds as available, to manage lands under its authority.

Consistent with the intent to conserve Important Riparian Areas, PCRFCD will identify additional lands that will be brought under its protection and management in the future with full notification to USFWS.

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3.4.4 Rehabilitation and Enhancement Program

The goals of the SDCP, to protect riparian areas as well as maintain the full complement of indigenous native plants and animals, cannot be achieved through protection and mitigation activities alone. This is because past land and water use decisions have resulted in the degradation or elimination of a significant amount of riparian resources throughout Pima County. Low elevation valley-floor streams in eastern Pima County, particularly within the Tucson basin, have been disproportionately affected by loss of water, loss of native species, and other problems. The biggest benefit to the urban area will result from repairing the degraded riparian environments of major drainage systems and by enhancing protection of the remaining riparian fragments along their tributaries.

Towards this end, Pima County has initiated a range of actions and has participated in numerous agreements that will have long-term positive effects on riparian habitat and watercourse functions. These activities are intended to improve baseline conditions and reduce the need for future listings, consistent with the goals of the SDCP. Some of these projects are made possible by an Intergovernmental Agreement between Pima County and the City of Tucson, which permanently secures up to 10,000 acre-feet of treated effluent water per year for riparianprojects. Pima County has initiated participation and funding by the U.S. Army Corps of Engineers (USACE) to plan and implement several large-scale ecological restoration projects that will greatly increase the areal extent of riparian habitat. Representative riparian restoration, rehabilitation, and enhancement projects are summarized in Table 3.6.

Table 3.6
Representative Restoration, Rehabilitation, and Enhancement Projects in support of PCMSCP Riparian Goals

Project	Description	Acres
Kino Wetlands at Ajo Detention Basin (Constructed by USACE under Section 1135 Water Resources Development Act with cost sharing by PCFCD and PCWWM	Creation of a 7-acre lake and 20 acres of ponds; 38 acres of mesquite bosques, grasslands, upland scrub, and riparian habitat	65
Paseo de las Iglesias (Feasibility Study by USACE in collaboration with Pima County)	Riparian restoration plan for approximately 12 miles of the Santa Cruz River between the San Xavier District and 22nd Street; 718 acres of mesquite woodland, 356 acres of xeroriparian scrub, 18 acres of cottonwood/ willow, and 6 acres of emergent vegetation and riparian grasses	1,098
Tres Rios del Norte (Feasibility Study by USACE in collaboration with Pima County, City of Tucson and Town of Marana)	Riparian restoration plan for approximately 18 miles of the Santa Cruz River between Prince and Sanders roads that currently has perennial flow of treated effluent from 2 water treatment facilities; 1,819 acres of mesquite woodland, 847 acres of xeroriparian scrub, 358 acres of cottonwood/willow, and 163 acres of river bottom emergent/wetland vegetation	3,187
El Rio Antiguo (Feasibility Study by USACE in collaboration with Pima County)	Riparian restoration plan for approximately 4.8 miles of the Rillito River between Campbell Avenue and Craycroft Road; creation of 102 acres of mesquite woodland, 35 acres of desert wash habitat , 96 acres of cottonwood/willow, and 3.5 acres of cienega and riparian grasses; enhancement of 48 acres of existing riparian habitat.	285
Rillito Riparian (Ecosystem Restoration Study by USACE in collaboration with Pima County)	Riparian restoration plan for approximately 14 acres of mixed deciduous riparian vegetation, 42 acres of xeroriparian vegetation, and 5 acres of riparian scrub-shrub vegetation	61
Cortaro Mesquite Bosque (Construction scheduled to begin in 2005)	Creation of a mesquite bosque woodland along the west side of the Santa Cruz River with 6.5 acres of xeroriparian scrub and grasses, 3.5 acres of deciduous riparian vegetation and 60 acres of mesquite and understory riparian vegetation	70

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Table 3.6
Representative Restoration, Rehabilitation, and Enhancement Projects in support of PCMSCP Riparian Goals (cont.)

Project	Description	Acres
La Canoa Spring at Canoa Ranch (Feasibility for restoration being studied by USACE in collaboration with Pima County)	Potential for recreation of a seep at the historic Canoa spring site, enhance vegetation along historic irrigation ditch, rehabilitate a ponded area, and revegetate previously cultivated areas along the Santa Cruz River	
Cienega Bottomlands at Empirita Ranch (RFCD and Bureau of Land Management)	Fencing to exclude livestock from bottomland, removal of unneeded fencing, soil, water and vegetation monitoring, roadway assessment, livestock watering improvements.	
Canada del Oro Floodplain Rehabilitation	Remove houses and other structures from floodplain, manage non-native plants, install fencing to control land abuse, designate trail and trailheads for non-motorized use	158

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3.4.5 Monitoring Program

PCFCD will continue to monitor groundwater and surface-water resources at Cienega Creek and Bingham Cienega Natural Preserves, and other resources as required for site management purposes. In addition, PCRFCD operates and maintains a network of sensors used to collect hydro- meteorological data. This network provides information to PCRFCD and other agencies about precipitation, stormwater runoff, and weather conditions affecting watersheds within Pima County. Currently the system consists of a fully automated network of 80 precipitation sensors, 30 stream stage sensors, and 4 weather stations operating in eastern Pima County and adjoining counties. PCRFCD will conduct periodic analyses of the system sensors and of the USGS gaging system data as needed for the PCMSCP monitoring program.

3.5 Species-Specific Mitigation

The following additional special directives, in addition to monitoring species populations in certain areas and/or at certain time intervals, will apply to all projects to ensure that certain vulnerable species are adequately conserved under the PCMSCP:

- **Merriam's mouse**: Avoid impacts to mesoriparian areas. If impacts cannot be avoided mitigate them within the same drainage when possible, to ensure no net loss of habitat function and value. Reestablish mesquite bosques where conditions are appropriate. Manage against feral cats and house mice.

- **Pygmy-owl**: Implement a biological resource overlay zone in the Tortolita Fan area to require on-site conservation or mitigation fees that will contribute toward a regional mitigation strategy for the pygmy-owl. Fund a pygmy-owl augmentation program and habitat management and monitoring efforts. Manage non-native competitors for nest cavities and predators.

- **Burrowing owl:** Implement aburrowing owl strategy, which establishes burrowing owl management areas and passive exclusion of burrowing owls on lands to be developed.

- **Western yellow-billed cuckoo:** Avoid impacts to hydro- and mesoriparian areas. If impacts cannot be avoided, mitigate them within the same drainage, when possible, to ensure no net loss of habitat function and value. Acquire and protect water rights to maintain and restore habitat. Restore riparian vegetation where conditions are suitable. Manage against cowbird parasitism and human disturbance.

- **Southwestern willow flycatcher:** Avoid impacts to hydro- and mesoriparian areas. If impacts cannot be avoided, mitigate them within the same drainage, when possible, to ensure no net loss of habitat function and value. Acquire and protect water rights to maintain and restore habitat. Restore riparian vegetation where conditions are suitable. Manage against cowbird parasitism and human disturbance.

- **Chiricahua and lowland leopard frogs:** Avoid impacts to hydro- and mesoriparian areas. If impacts cannot be avoided, mitigate them within the same drainage, when possible, to ensure no net loss of habitat function and value. Acquire and protect water rights to maintain and restore habitat. Participate in reestablishment of frog populations in CLS. Manage against non-native species.

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- **Tucson shovel nosed snake:** (Develop a conservation strategy in collaboration with USFWS.)

- **Ground snake:** (Develop a conservation strategy in collaboration with USFWS.)

- **Mexican garter snake**: Avoid impacts to hydro- and mesoriparian areas. If impacts cannot be avoided, mitigate them within the same drainage to ensure no net loss of habitat function and value. Acquire and protect water rights to maintain and restore habitat. Participate in reestablishment of garter snake populations in CLS. Manage against non-native species.

- **Desert pupfish, Gila topminnow, Gila chub, longfin dace, desert sucker, and Sonora sucker**: Avoid impacts to hydroriparian areas. If impacts cannot be avoided, mitigate them within the same drainage, when possible, to ensure no net loss of habitat function and value. Acquire and protect water rights to maintain and restore habitat. Participate in reestablishment of native fish populations in CLS. Manage against non-native species.

- **Talus snails:** Avoid impacts to occupied talus snail habitat. Manage against adverse recreation impacts.

- **Pima and needle-spined pineapple cacti:** Collaborate with the City of Tucson to establish pineapple cactus habitat reserves that mitigate for the amount of habitat anticipated to be impacted and provide for full genetic representation.

- **Nichol Turk's head cactus:** Avoid all impacts to occupied habitat.

- **Huachuca water umbel:** Avoid impacts to hydroriparian areas. If impacts cannot be avoided, mitigate them within the same drainage, when possible, to ensure no net loss of habitat function and value. Acquire and protect water rights to maintain and restore habitat. Participate in reestablishment of water umbel populations in CLS. Reduce competition with non-native species.

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3.6 Invasive Species Mitigation

To mitigate for the potential introduction and spread of invasive species and edge effects within and adjacent to developed lands, the Government Working Group will develop a comprehensive strategy to monitor and manage problem species. Guidance provided by the strategy and mitigative actions will be implemented during project and environmental review processes.

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3.7 Regulatory Standards and Relationship to Recovery

Section 10(a)(2)(B) of the ESA identifies Permit Issuance Criteria that must be met before the USFWS may issue an Incidental Take Permit. Included are criterion that:

- The taking will be incidental;
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
- The applicant will ensure that adequate funding for the HCP and procedures to deal with unforeseen circumstances will be provided;
- The applicant will ensure that other measures that USFWS may require as being necessary or appropriate will be provided;
- The USFWS has received such other assurances as may be required that the HCP will be implemented; and
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.

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According to the ESA, this last statutory criterion is important because it establishes a standard for any covered species and any listed species affected by the PCMSCP. The wording of this criterion is also used in the definition of "jeopardy" under the ESA Section 7 regulations (50 CFR Part 402.02), which defines the phrase "jeopardize the continued existence of" as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."

3.7.1 Recovery: Mandate vs. Enhancement

While Section 10 does not mandate recovery, the USFWS will not permit activities that preclude recovery of covered and/or listed species. The ESA does not explicitly require the PCMSCP to recover species or contribute to the objectives identified by adopted Recovery Plans, but the USFWS must consider the extent to which the PCMSCP is likely to enhance the habitat of the covered species or increase the long-term survivability of the species or their ecosystem. Therefore, the PCMSCP has been developed to produce a net positive effect on all covered species, whether listed or not.

3.7.2 Recovery Plans and Goals

Some of the PCMSCP covered species have a Recovery Plan (draft or final) promulgated by the USFWS:

- Lesser long-nosed bat
- Cactus ferruginous pygmy-owl
- Southwestern willow flycatcher
- Desert pupfish
- Gila topminnow
- Nichol Turk's head cactus

The Recovery Plans for these species have been used as the basis for identifying minimization and mitigation measures, as summarized above, for information on appropriate management strategies, and for identifying monitoring needs and protocols. In the absence of other information approved by the USFWS, Pima County will assume that the Recovery Plans will continue to constitute the "best available science" for a species.

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3.7.3 Recovery by Cooperation with Private Landowners: Safe Harbor Agreements

This program provides assurances to non-Federal partners who participate in conservation and recovery efforts on their private property. Safe Harbor Agreements will be authorized under the PCMSCP to allow landowners to restore habitat and allow the return of covered and/or listed species to their property without the ESA land use restrictions that would otherwise pose concern.

3.8 Mitigation Compliance

Pima County will ensure that mitigation is occurring in the anticipated proportion to take. Strategies to achieve this include but are not limited to the following:

1. Pima County will require a site analysis of lands proposed for development that delineates and provides the acreage for certain vegetation communities and Special Elements (EIS Table 4.6).

2. Pima County will conduct a site assessment of parcels to be purchased as mitigation. The determination of acreage of vegetation communities developed and conserved will serve as the basis for the annual reporting on compliance. This site analysis will also provide sufficient information for the development of a management plan.

3. Pima County will require a more rigorous site analysis of lands in the CLS that are proposed for development. This site analysis will provide sufficient information for configuration of the development in a manner that conserves vulnerable species and special elements and contributes to a viable preserve design.

4. Pima County will establish thresholds for take based on the amount of conservation that is projected to be achieved during the life of the permit. Based on the EIS analysis, 13,392 acres of development are anticipated within the first 10-year phase of the permit; 57,137 acres of development are anticipated by the end of the second 10-year phase; and a total of 204,657 acres of development are anticipated by the end of the third phase (buildout).

   Phase 1, the first 10-year permit period. It is estimated that past acquisitions and those funded by the May 2004 bond will result in the conservation of approximately 70,554 acres of land. At the mitigation levels proposed this will mitigate for the losses associated with the development of approximately 36,939 acres of developed land, which is 23,547 acres greater than the 13,392 acres of land development projected for Phase 1. Any surplus in mitigation lands will be credited towards subsequent Phases.

5. Permit renewal for subsequent phases will be dependent on Pima County's demonstration of mitigation compliance, assured continued funding, and acquisition of additional mitigation lands.

3.8.1 Assured Funding for Mitigation

Pima County ensures that adequate funding is now and will continue to be available to implement the PCMSCP program. The 2004 bond money will be used to initiate the first 10-year phase acquisitions. Additional funding sources will be identified by Pima County prior to

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permit issuance (and prior to subsequent permit renewal phases) for administration of the program, land management, and monitoring.

3.8.2 Mitigation Monitoring and Reporting

1. Pima County will track acres of land that are developed and conserved on a continual basis. The documentation of acreage developed outside the CLS may be tabular in form. The documentation of acreage inside the CLS will be tabular, digital, and spatial in form. The digital/spatial form will provide a visual demonstration of how the conserved land "fits" within the context of existing conserved lands and within the landscape to achieve conservation goals.

2. Pima County will submit an annual report to the USFWS by January 30th of each year containing an accounting, by project and cumulatively, of habitat acreage lost and conserved during the previous calendar year. The accounting will specify acres conserved and developed by vegetation type. The report will also describe how habitat preservation is proceeding in rough step with development and how preserve assembly is consistent with the biological goals and preserve design criteria.

3. Annual meetings. Pima County will meet at least once per year with the USFWS to review the status and accomplishments of the permit and to present and review the annual report.

4. Public meetings: Pima County will hold at least one public meeting per year to provide to the public the status and accomplishments of the permit.

5. Audit: Once every three or more years, as needed, the USFWS may conduct an audit of development approvals and mitigation imposed; all lands acquired; and all monies received, invested, and expended on acquisition, management, and monitoring activities.

3.8.3 Mitigation Enforcement

Pima County will enforce compliance with mitigation programs, by adhering to and enforcing CLS development guidelines and design criteria, ordinances, building permit requirements, and other regulations. Violations will be addressed promptly and considered zoning code violations, with corrective actions required. Fines, other penalties, and stop-work orders may be invoked as needed.

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3.9 Benefit of HCP to Covered Species

The CLS has been designed and the PCMSCP has been developed to produce a net positive effect on all covered species, in spite of the authorized incidental take that may occur over the life of the Incidental Take Permit. Pima County's intent has been to seek flexibility by including planning for listed as well as unlisted species, to take an ecosystem and landscape-level approach to biological conservation, and thereby reduce future conflicts and possibly preclude the need for future listing of species.

Specifically the PCMSCP will benefit covered species in the following ways:

- The taking will be incidental to otherwise lawful permitted activities (i.e., permitted activities will be in compliance with all local, state, and Federal laws and regulations). Pima County does not consider "take" of covered species a legitimate purpose of any permitted activities.

- Pima County will, to the maximum extent practicable, minimize and mitigate the impacts of any incidental take. Minimization of take will be achieved on a landscape-scale by implementing the ecosystem-based CLS, which provides conservation of and connectivity between biologically rich areas. The CLS further minimizes take by establishing maximum allowable land disturbance (percentages described under Section 3.X). The mitigation levels described under Section 3.X will mitigate the impacts of incidental take to the maximum extent practicable.

- Pima County, by putting into effect the funding measures described in Sections 3.6.1 and 6.4, ensures that adequate funding for the PCMSCP is provided and that procedures to respond appropriately to unforeseen circumstances are provided, per Section 5.

- Pima County ensures that other measures that the USFWS may require as being necessary or appropriate, such as Coordination Agreements with cooperating agencies, are or will be provided.

Other benefits to covered species are expressed in the high percentages of conservation achieved in the long-term by the CLS and by the provision of a priori mitigation for the projected growth.

Chapter 4
Monitoring and Adaptive Management

The overall conservation strategy of the PCMSCP is primarily goal oriented as opposed to mitigation oriented, although mitigation will play an important part in achieving the goal. Simply stated, the goal of the PCMSCP is the assembly and management of a portion of the landscape of Pima County sufficient to ensure the continued existence of the full diversity of species and ecological systems. This goal can be expressed as the desired future condition (DFC), which in the case of the PCMSCP, must be viewed from several perspectives as discussed below.

Assembly of a system of conserved lands, the CLS, is the first step in achieving the DFCs for the PCMSCP. Critical to the ultimate success of the PCMSCP in achieving the conservation goals embodied in the several DFCs will be the implementation of a program to monitor and manage the conserved lands. The PCMSCP will develop and implement an Adaptive Management Plan (AMP) as the framework for a countywide comprehensive approach to managing conserved lands. The AMP will be guided by the DFCs, overseen by the Science Conservation Commission, and implemented by the entities represented in the Government Working Group. The AMP will have three components: the management plan, the monitoring program, and database management and sharing. The roles of each of these components of the AMP are discussed in detail below.

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4.1 Vision of Desired Future Condition

The desired future conditions (DFCs) of the PCMSCP permit area is one in which Pima County's biological resource conservation goals are met over the course of the permit period and in the context of the commitments and requirements of the ESA, the SDCP, and the comprehensive land use plan (CLUP). Desired future conditions can be defined for the key participants for habitat characteristics of species proposed for coverage in the PCMSCP, and for ecological restoration actions, and management. The DFCs provide an overall set of goals upon which the implementation and management elements of the PCMSCP can be developed, and ultimately, be measured.

4.1.1 ESA

The USFWS DFC for permitted actions is that they not "appreciably reduce the likelihood of the survival and recovery of the species in the wild." Further, impacts to biological resources that may occur because of the permit-covered activities will be minimized, mitigated, and monitored.

The HCP Handbook Addendum has established Monitoring and Adaptive Management as the primary tools used to demonstrate that these fundamental requirements are met, by measuring the extent to which conservation commitments are fulfilled and biological uncertainties about the covered species is reduced.

4.1.2 SDCP

The overarching DFC established by STAT is the long-term survival of the full spectrum of indigenous plants and animals through maintaining or improving the habitat conditions and ecosystem functions necessary for their survival. The CLS is the foundation for achieving that DFC. The initial vision for prioritizing lands conservation within the CLS is expressed by the Habitat Protection Priorities in Eastern Pima County (Appendix F) as adopted by the Pima County Board of Supervisors.

4.1.3 CLUP

The DFC expressed by the 2001–2002 Comprehensive Land Use Plan (CLUP) Update establishes parameters for the physically interdependent and compatible urban and conservation lands systems, with the CLS defining the form for current and future urban landscapes. The Natural Resource Protection of the CLUP sets the policies for protecting natural resources according to their value, as defined by the CLS (see conservation standards under Section 3.1).

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4.1.4 SDCP and CLUP Subgoals

The SDCP and the CLUP each have specific subgoals, or directives, that Pima County has committed to in order to achieve the DFC by avoiding, minimizing, mitigating, and monitoring impacts to biological resources that may occur as a result of the permit-covered activities. These have been formulated, and in some cases implemented, in direct response to the evaluation of biological threats and stressors and establish the context for future management actions and monitoring criteria. SDCP and CLUP subgoals that more specifically express the MSCP DFCs are summarized as follows.

a. Habitat Protection Desired Future Conditions

- Future growth and associated infrastructure expansion is focused in areas in closest proximity to existing urbanizing areas, not in areas of highest biological richness
- Intensity of future land uses allowed in certain biologically sensitive areas is significantly lowered by downplanning (the CLUP 'downplans' over 45,000 acres near major washes,

within CFPO habitat, adjacent to Saguaro National Park, in Rincon Valley, and in other sensitive areas). Although downplanning does establish the desired future condition, it does not change existing zoning which could be altered by BOS amendments to the CLUP. Only a subsequent downzoning could result in or facilitate on-the-ground habitat protection.

- Future losses and fragmentation are avoided or minimized by a publicly supported land acquisition and conservation program. Open Space Acquisition funds and other private/public partnerships enable the acquisition of lands adjacent to the existing reserve system and ranches purchased from willing sellers, thereby implementing the Ranch Conservation and Mountain Park Expansion Elements of the SDCP.

- Twenty-six percent of the CLS is prioritized for conservation by the adoption of *Habitat Protection Priorities in Eastern Pima County*. This includes approximately 525,000 acres of Biological Core, Important Riparian Areas, Special Species Management Areas, and Special Landscape Elements (Appendix F).

- Pima County continues to nominate and pursue acquisition of biologically sensitive lands for reclassification by the Arizona State Land Department under the Arizona Preserves Initiative.

- The expansion goals of the SDCP Mountain Parks Element are implemented for Tortolita and other County Mountain Parks by the above and other strategies.

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b. Ecological Restoration Desired Future Conditions

- The Riparian Restoration Element of the SDCP is implemented in partnership with the U.S. Army Corps of Engineers (USACE), USFWS, AGFD, and other state and federal agencies and local jurisdictions. This program and its policies addresses ecological restoration from a comprehensive integrated regional perspective and are initiated by restoration studies of segments of the Santa Cruz and Rillito Rivers and the Ajo Regional Detention Basin.

- Recovery of natural functions within riverine systems is achieved over time. This contributes to the goal of precluding the need for future T&E species listings and leads to recovery or improved conditions for riparian and aquatic-dependent species, which constitute approximately two thirds of the species covered by the MSCP.

- Restoration and impact mitigation requirements for private lands are strengthened by amendments to ordinances such as the Floodplain Protection Ordinance.

- Opportunities for restoring conservation lands are pursued for upland ecosystems as well and are initiated as part of the management strategy for existing reserve areas and newly acquired lands such as the Empire-Cienega Ranch and Canoa Ranch.

c. Management Desired Future Conditions

Pima County prepares and implements Management Plans for each of their conservation reserve areas, including existing and future parks and open space lands. Elements in support of the MSCP include:

- Invasive species
- Recreation Use
- Resource protection and restoration
- Enforcement and staffing
- Fire
- Grazing
- Mining & Extraction
- Monitoring high priority species
- Monitoring for ecological health

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d. Non-native and Invasive Species Management

In order to attain the goals set forth by compliance with the ESA, the SDCP, and the comprehensive land use plan (CLUP), Pima County will lead the effort to develop a comprehensive strategy with the government working group to manage invasive species that pose threats to native species, habitats, and properties. The following efforts could be included in the strategy.

Invasive Species Ordinance. The formulation and adoption of a Pima County Invasive Species Ordinance would address many of the PCMSCP elements. The ordinance would require the removal of targeted invasive species during land and infrastructure development (excepting special cases for which removal is deemed inappropriate due to potential impacts to PVS or specialized habitats), and would require monitoring and removal of such species in perpetuity. Methods to remove and control invasive and exotic plants would be included in development plans. In order to be effective, the ordinance would be operative countywide and across all zoning classifications including private and County-owned lands. Municipalities would be automatically included in the area encompassed by the ordinance, but could choose to opt out of the county-wide ordinance by adopting their own ordinances as long as they meet the specified

goals and desired future conditions (DFCs). The goal of the ordinance is to help eradicate and discourage establishment of invasive species within Pima County, in order to protect the health and safety of citizens, improve the quality of life, restore and maintain natural areas, and to ensure the long-term survival of the full spectrum of indigenous plants and animals within the CLS lands.

Approved Native Plant List

The development of a native plant policy and approved plant list for use in all reviewed development projects would ensure the continued viability and diversity of indigenous plant and animal communities, and promote the use of plants naturally adapted to local conditions. The list also could include information regarding non-native plants prohibited for use within CLS lands.

Non-Native Species Repository

At present, Pima County Code primarily addresses the disposition of unwanted birds, cats, and dogs. Wildlife rehabilitators typically accept only native species. The development or funding of a repository for unwanted animals including fish, amphibians, ducks, rabbits, and others could prevent or discourage releases into natural habitats.

Educational Outreach

Pima County could lead efforts to develop and distribute educational materials for the public regarding the release of unwanted pets in natural locations. A wide variety of non-native animals including chickens, ducks, reptiles, amphibians, fish and others are released by ill-informed people who believe that releasing the animals is more humane than destroying them. Furthermore, most of the public is uninformed regarding the dangers posed to native wildlife resulting from the release of native animals raised in captivity, which are not adapted to life in the wild and often carry and distribute diseases to wild populations and are. Additionally, there is widespread unawareness regarding the adverse effects to native plant and animal communities resulting from the conversion of desert communities to areas landscaped by non-native plants. An effort that builds on the pride of living in the Sonoran Desert could enlist the cooperation of the residents of Pima County and reduce problems associated with released animals.

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4.2 Role of Science Commission

4.2.1 Purpose

The purpose of the Science Conservation Commission (SCC) is to provide an overarching view of conservation in Pima County- one that integrates and balances the various elements using science as a basis for decisions and recommendations. This Commission will oversee the implementation of the MSCP and will monitor the progress of the SDCP.

4.2.2 Composition

The SCC is comprised of representatives of each the Technical Advisory Teams (i.e., Science, Ranching, Cultural Resources and Recreation Technical Advisory Teams) that have been working on parallel tracks to develop elements of the SDCP. (See Chapter 8 for appointed members.) The SCC will be permanently staffed and funded by Pima County.

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4.2.3 Responsibilities

The SCC will inform and advise the Board of Supervisors on matters pertaining to the MSCP, and will have a directing and oversight role in efforts including but not limited to the following:

- Review MSCP Permit Application and annual status reports.

- Track the progress towards meeting goals and reaching desired future conditions (DFCs). Recommend changes to management strategies as needed.

- Oversee the implementation of Adaptive Management and Monitoring components of the MSCP. Identify and prioritize research and monitoring needs.

- Identify long-term program and structure elements needed in order to incrementally achieve the MSCP commitments. These may be in addition to those included in the MSCP and/or developed at a more detailed level.

- Prepare "State of the Conservation Lands System" Report. The SCC will oversee the preparation of an annual report that describes and monitors the health of the environment in

terms of key indicators (2002. Pima County. State of the Environment Reporting. November). This will be the primary document in support of USFWS-required status reports for the MSCP permit continuance. It will address topics such as baseline conditions, land acquisitions, ecosystem function, change in land cover, invasive species, riparian conditions, ground and surface water conditions, ranch resources, fire management and abiotic resources (air, soil, visual, precipitation, weather, climate trends). (See further discussion under Section 4.4 and 4.5.)

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4.3 Role of Government Working Group

4.3.1 Purpose

The purpose of the Government Working Group (GWG) is to function as a collaborative interagency partnership with Pima County to support and benefit from a successful implementation of the MSCP and Adaptive Management and Monitoring Plan.

4.3.2 Composition

The Government Working Group (GWG) is a consortium of land managers, resource managers and regulatory representatives of state and federal government agencies and local jurisdictions. (See list of participants in Section 8.) Representatives of many of these entities have been meeting together under the auspices of the Tucson Basin Managers for many years. The GWG will provide additional focus, structure and funding to implement management actions.

4.3.3 Responsibilities pertaining to MSCP

The GWG will work cooperatively with Pima County and other GWG members with common purposes for natural resource conservation and a focus on management and monitoring efforts pertaining to the MSCP. This working relationship will include formal Working Agreements (see Section 6.2) and a continuing dialogue addressing, but not limited to the following:

- Consistency of management plans (existing and proposed) with regional conservation goals;
- Developing consistent protocols for gathering, sharing and updating information on T&E, invasive species, and other species of concern within various reserve areas;
- Developing mutually beneficial, workable solutions to existing or potential regulatory conflicts;
- Actions needed to raise Conservation Status of lands,
- Actions needed to achieve management compatibility between/along reserve boundaries;
- Increasing knowledge of management issues and effective prescriptions;
- Increasing knowledge of ecosystem health and biological resources, particularly relating to covered species and their habitat types;

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- Increasing knowledge of primary threats and stressors to biological resources, particularly the establishment and effects of invasive species and effective techniques for their management;
- Ways to contribute and share monitoring knowledge, expertise, protocols, data, on-going efforts, particularly for covered species;
- Adaptations to management and monitoring strategies that are deemed necessary for improved conservation of biological resources;
- Opportunities for intergovernmental training;
- Opportunities for cross-training of staff to expand their management and monitoring capabilities;
- Existing intergovernmental efforts, local or otherwise that can be supported and/or emulated;
- Opportunities for cooperative and coordinated efforts; staffing needs and opportunities for shared responsibilities;
- Cost-sharing and cost-saving strategies;
- Funding needs and mechanisms; opportunities to leverage funding from federal or other sources with local support; and
- Opportunities to increase the effectiveness of the reserve system either by land acquisitions, easements, exchanges or other means.

The Government Working Group will generate information and recommendations, both as a whole and by the parties represented, regarding research, surveys, incremental achievement of goals, State of the Conservation Lands System, and circumstances requiring adaptations to the overall implementation plan. These will be submitted to the SCC for their consideration and use.

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4.4 Management Plan: Collaborative Multi-Agency Effort

One of the key lessons learned from regional scale conservation planning elsewhere in the U.S. is the importance of cooperation and coordination among federal, state, and local governmental agencies as well as other land managing participants (Fromer 2002). Ultimately, the success of the program will hinge upon the development of a adaptive management framework that focuses on the application of the best scientific and management principles in a neutral political context (RECON 2001).

The general principles of the adaptive management program to be implemented for the PCMSCP alan will begin with this framework as a starting point and evolve and develop under the direction of the Science Conservation Committee and with the cooperation of the Government working Group.

4.4.1 Working Model of Organizational Framework for PCMSCP

Figure 4.1 presents the conceptual framework for organizing the regional effort to manage lands consistent with the PCMSCP conservation goals and commitments.

4.4.2 Interagency Collaborative Management Strategies

Numerous vehicles will be used to facilitate collaborative land management. First are the Cooperative Agreements that the Board of Supervisors has entered into since 1998 with federal land and resource management agencies and other entities to formally establish a common purpose with regard to natural resource conservation. (See List, Appendix A.) Through these Cooperative Agreements many of the PCMSCP conservation objectives have been initiated and/or completed. A number of actions involving federal lands have resulted from close cooperation with federal agencies. Examples of these actions include: establishment of Ironwood Forest National Monument, establishment of Las Cienegas National Conservation Area, wetland and riparian restoration of 120 acres at the Ajo Detention Basin, and initiation of riparian restoration plans for thirty miles of regionally significant watercourses, the Santa Cruz and Rillito Rivers.

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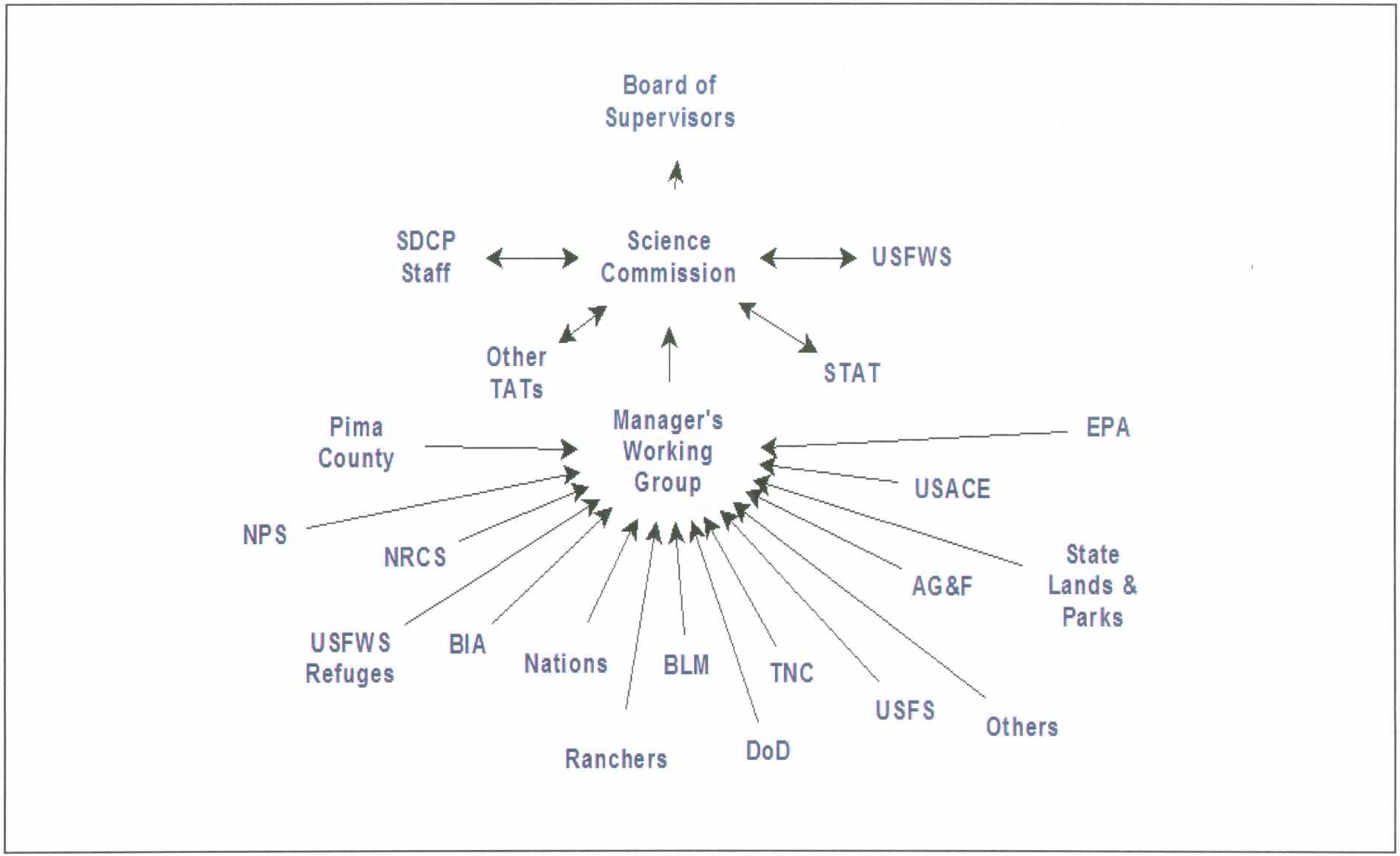


FIGURE 4.1
Conceptual Framework for Regional Management Coordination

RECON

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Second are the Coordination Agreements that are an integral part of Pima County's MSCP Implementing Agreement with the USFWS. These Coordination Agreements provide additional specificity to the above Cooperative Agreements and serve as the basis for clarifying intent and responsibilities relative to land management, species protection, monitoring efforts, public education and other actions to be taken in support of the MSCP. (See additional detail in Section 6.2, Coordination Agreements.)

Third are the policy changes and ordinances associated with the built environment that cooperating jurisdictions can adopt to assist in meeting conservation goals. Since the inception of the SDCP planning process Pima County has initiated and/or passed a series of Zoning Code Change "Managers' Working Group" to "Government Working Group" changes to increase protection of biological resources (e.g., Conservation Subdivision Option, Hillside Development Zone & Buffer Overlay, Riparian Habitat Mitigation Standards, Environmentally Sensitive Resource Ordinance). Cooperating local entities will work together to adopt and enforce similar and consistent resource protective ordinances and policies for other jurisdictions.

Other Interagency Collaborative Management Strategies will be conceived and implemented during the course of ongoing dialogue with the Government Working Group, the SCC.

4.4.3 Management Goals and Specific Objectives

4.4.3.1 Land Area Goals and Objectives

The land area based goals and objectives for the PCSMCP are summarized under the discussion of the CLS Management Areas, Sections 2.2.7, and 3.1. They establish specific percentage standards for conserved land within Important Riparian Areas (95 percent), Biological Core and Special Species Management Areas: (80 percent), Multiple Use Management Areas (75 percent), and clarify conservation intent for the other CLS components. The CLS goals and objectives incorporate considerations given to Special Landscape Elements discussed under Section 2.2.3.2.

4.4.3.2 Ecosystem Function Goals for Riparian Areas

STAT adopted specific ecosystem function goals for the management and conservation of Riparian Areas:

- To the extent possible, maintain or restore the connection between interdependent components of river systems: channel, overbank floodplain, distributary flow zones, riparian vegetation and connected shallow groundwater.

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- Maintain or restore natural flooding and sediment balance;

- Preserve or re-establish connection between channels and their floodplains, and channels and their distributary flow zones;

- Maintain or re-establish hydrologic connections between riparian and aquatic ecosystems and shallow groundwater zones

- Manage uplands as appropriate to protect the functioning of riparian and aquatic ecosystems within the watershed;

- Manage point-source and non-point source pollution to maintain water quality at a level needed to support SDCP biological goals;

STAT also established guidelines for protecting existing self-sustaining riparian and aquatic ecosystems over the creation of new or enhanced areas of riparian and aquatic life that depend on continuing inputs of water, energy and materials.

- Protect systems that are self-sustaining over those that need continual inputs. STAT prioritizes substitution of renewable water supplies for groundwater and surface water diversions in areas where high-quality aquatic and riparian ecosystems still exist and where diversion of water is a primary stressor of those systems.

- Restore or enhance native riparian and aquatic ecosystems by releasing water to restore local aquifer conditions. Where ground water pumping is limited and favorable hydrogeologic conditions exist, reclaimed water and secondary effluent can be released into an area in a manner that restores local aquifer conditions. Where hydrogeologic conditions are suitable, restoring localized shallow groundwater systems and floodplain dynamics will have a greater likelihood of success in creating a sustainable system than construction of artificial wetlands and container plantings or seedings of riparian vegetation.

- If plantings are to be used: a) revegetation is favored in areas where perpetual irrigation will not be needed; Ideally, these projects will be designed to avoid disturbance of existing vegetation and minimize the need for perpetual irrigation and maintenance. Placement in areas where hydrologic conditions are suitable can provide the necessary water. b) conflicts with other social objectives should be minimized; Revegetation sites should be chosen to minimize future conflicts with aesthetic, recreation, or public safety considerations. c) native species appropriate to the site must be used; Using native species that are adapted to the

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specific soil, aspect and elevation of the site will assist in establishment and d) sites which augment existing high-quality riparian habitats are favored.

- Insure sufficient instream flows to achieve and protect natural functions of riparian and aquatic ecosystems.

4.4.3.3 Covered Species Goals and Objectives

Goals and objectives for covered species have been established by the STAT with primary consideration given to the attributes of rarity and endemism. For each of the PVS, the STAT established conservation goal ranging between 75 percent and 100 percent of the modeled high and medium potential habitat within the Study Area (Table 4.1). Other goals for the management and monitoring of covered species are described in species accounts in the PVS report.

The proportions of various elements within the CLS (e.g., species habitat, species known locations, PCAs, special elements, and various land cover types) are detailed in Appendix E.

4.4.4 Hierarchy of Space and Time Priorities

4.4.4.1 Spatial Priorities

Spatial priorities for conservation have been identified generally by the CLS and incorporated into the comprehensive land use plan (CLUP). Approximately 26 percent of the CLS has been more narrowly prioritized for conservation by the adoption of *Habitat Protection Priorities in Eastern Pima County*. This includes approximately 525,000 acres of Biological Core, Important Riparian Areas, Special Species Management Areas and Special Landscape Elements (see Appendix F) Pima County's Open Space Acquisition Master Plan identified specific properties for conservation, some of which have been acquired using funds approved by voters in the 1997 bond election. Open space conservation priorities are now being reevaluated in the context of the SDCP *Habitat Protection Priorities* by the Conservation Bond Advisory Committee, whose recommendations will be considered by the Board of Supervisors for inclusion in a bond election scheduled for May 2004.

A high priority will be placed on protecting and managing the biologically rich lands that are most threatened by on-going or near-future development. However, this will be balanced by a long-term strategy for protecting less immediately threatened lands, further from the urban core, particularly when warranted by opportunistic and cost-saving considerations.

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Table 4.1
STAT Habitat Conservation Goals for Covered Species

Common Name	% Goal for CLS
Abert's towhee	75
Acuna cactus	95
Allen's big-eared bat	75
Arizona shrew	95
Bell's vireo	75
Burrowing owl	75
Cactus ferruginous pygmy-owl	75
California leaf-nosed bat	75
Chiricahua leopard frog	95
Desert box turtle	75
Desert pupfish	100
Desert sucker	95
Gentry indigobush	100
Giant spotted whiptail	75
Gila chub	100
Gila topminnow	95
Ground snake	75
Huachuca water umbel	75
Lesser long-nosed bat	95
Longfin dace	75
Lowland leopard frog	75
Merriam's mouse	75
Mexican garter snake	75
Mexican long-tongued bat	100
Needle-spined pineapple cactus	95
Nichol Turk's head cactus	90
Organ Pipe shovel-nosed snake	95
Pale Townsend's big-eared bat	75
Pima pineapple cactus	90
Red-backed whiptail	90
Rufous-winged sparrow	75
Sonoran sucker	95
Southwestern willow flycatcher	75
Swainson's hawk	75
Tucson shovel-nosed snake	75
Tumamoc Globeberry	75
Western red bat	75
Western yellow bat (12/01 model)	75
Western yellow-billed cuckoo	75

4.4.4.2 Temporal Priorities

Temporal priorities will be phased, relative to growth and land absorption. Initial projections for new development, as predicted by the County's growth model (ESI and SWCA 2003) are made for the first and second 10-year periods and for years 21 through buildout (defined as the point when water availability ceases to support additional population). This information projects a maximum additional area of 196,341 acres being developed outside the existing built environment of Eastern Pima County. The area projected for development within the first ten years is between 11,159 and 13,564 acres.

Using these initial 10-year increments as a basis for setting phased priorities, the initial management, monitoring and land acquisition strategies will focus on minimizing and mitigating impacts resulting from the projected development of land. Assuming a worst case scenario of mitigating for lands that become developed within the CLS at a ratio of 4:1, and assuming mitigation would be required "up-front" (i.e., before impacts are accrued) mitigation for years 1, 11, and 21 would be as shown in Table 4.2.

The analysis of take versus conservation shall include development that occurs within covered species habitat both inside and outside the CLS. Pima County will mitigate proposed take occurring outside of the CLS by acquisition of real properties or conservation easements utilizing open space bond funds.

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Table 4.2
Temporal Mitigation Priorities for PCMSCP

Acres of mitigation land required at	Year 1: Onset of permit	Year 11	Year 21
1:1	7,193	34,931	109,784
2:1	14,385	69,863	219,569
3:1	21,578	104,794	329,353
4:1	28,770	139,725	439,137

Although it is assumed that the mitigation required for the projected development during the first decade will be provided at the onset of the permit, additional development of CLS lands beyond the projected 28,770 acres would not be covered by the permit without the provision of additional mitigation. Correspondingly, the USFWS will require Pima County to revisit the growth projections for subsequent decades and adjust the up-front mitigation required at years 11 and 21.

4.5 Monitoring Program

Monitoring is an essential component of the PCMSCP (and AMP) that provides the basis for both assessing and assuring the ultimate success of the plan. Specifically the monitoring program must provide information to (1) evaluate compliance with the terms and conditions of the PCMSCP (Compliance Monitoring); (2) assess the achievement of the biological goals and objectives of the PCMSCP (Effectiveness Monitoring); and (3) provide direction for the adaptive management program (an adjunct to Effectiveness Monitoring). In addition, the monitoring program will provide measures to identify the occurrence of changed circumstances or unforeseen circumstances, which will require responses as delineated in Chapter 6 of this PCMSCP. Monitoring shall assess effects, compliance, and effectiveness with the entire Plan Area, not just within the CLS.

The general guidance in Section 10 requires Pima County to incorporate measures in the PCMSCP to "monitor" the impacts of the taking resulting from activities covered in the plan [50 CFR 17.22(b)(1)(iii)(B) and 50 CFR 222.22(b)(5)(iii)]. These monitoring measures should provide detail and specificity commensurate with the scope and scale of the permit and sufficient to detect anticipated effects.

The general elements of the monitoring program should include:

- Periodic accountings of take,
    - Surveys to determine species status in affected and mitigation areas,
    - Progress reports on fulfillment of mitigation requirements,
    - Established target milestones,
    - Requirements through the life of the permit, and
    - Adaptive management actions including measures to control invasive species that compete with species covered by the HCP.
- The steps in developing an HCP monitoring program:
    - Develop objectives for the monitoring program,
    - Describe the subject of the monitoring program
    - Describe the variables to measured and how the data will be collected
    - Detail the frequency, timing, and duration of the sampling of the variables, and
    - Describe how the data are to be analyzed and who will conduct the analyses.

The biological monitoring program should be sufficient to determine trends in species populations or other biologically important variables in the plan area but should be as economical as possible. The monitoring programs can be conducted by entities other than the permittee as long as (1) this is specified in the HCP, (2) funding is provided, and (3) the entities are qualified.

The monitoring program PCMSCP will build upon the countywide GIS data base developed for the PCMSCP and comprehensive land use plan (CLUP) processes. This database will be updated and improved through the implementation of the PCMSCP and provide comprehensive information that will be used in both compliance monitoring and effectiveness monitoring.

4.5.1 Compliance Monitoring

The annual compliance monitoring report (as part of the State of the Environment Report) will provide information verifying that the permittees are carrying out the terms and conditions of the PCMSCP, the Implementation Agreement (IA), and associated agreements. The SCC will be the primary entity responsible for monitoring compliance with the PCMSCP, with Pima County taking primary responsibility for achieving compliance. Other signatories to the PCMSCP will provide compliance monitoring information to the SCC with respect to their obligations under the PCMSCP to be included in the annual report. The report will outline the status of implementation of the terms and conditions of the PCMSCP, including: financial responsibilities and obligations; management responsibilities; and other requirements of the PCMSCP, IA and agreements. The results of the monitoring report will be presented in an annual public meeting of the Science Conservation Commission.

4.5.1.1 Compliance Monitoring Report

The Compliance Monitoring Report will provide clear and distinct evaluation criteria, defined thresholds, and pre-established review questions. The report will function as a formal annual or periodic review with the USFWS. The report will be prepared and reviewed under the direction of the Science Conservation Commission. The report will be prepared by a trained review team, and incorporate field visits to various sites, as necessary and appropriate. This team will be available for briefing to the STAT, SCC, BOS, and USFWS. To the extent possible, the annual report should provide links to the decision making process with:

- Clear and detailed contingency action steps or plans if terms are not being met.
- Prescribe changes to improve monitoring program to provide needed information
- Prescribe changes to improve management strategies

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- Update and/or revise evaluation criteria and review questions for the following year(s).

4.5.1.2 Quantification of Compliance Monitoring

The annual report will quantify for the Administrative Record:

- Annual acquisitions
- Take of covered species
- Impacts to habitat and vegetation communities
- Annual financial status of the plan
- Status of CLS lands and Critical Landscape Connections (including the amount and configuration of lands conserved and lands developed depicted on maps)

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4.5.1.3 Compliance Database

The results of the annual compliance report will be incorporated into on-going database management and provide a means for agencies and public to access monitoring data.

4.5.2 Effectiveness Monitoring

The purpose of effectiveness monitoring is to evaluate the effects of activities authorized by the incidental take provisions of the PCMSCP, particularly with respect to covered species. The monitoring effort for the PCMSCP will also monitor the effects of permitted activities on a broader range of biological resources, in keeping with the broader goals and objectives of the SDCP. The effectiveness monitoring program will provide (1) measures of the progress toward meeting the defined biological goals and objectives of the PCMSCP and (2) information critical to the implementation of adaptive management activities.

The monitoring program will be structured initially in two tiers: countywide monitoring and site specific monitoring. The countywide monitoring program will focus on integrating and coordinating monitoring activities on a countywide scale, building on existing monitoring activities. Site specific monitoring incorporated in the PCMSCP will overlap with site specific monitoring goals and objectives of participating land managers

4.5.2.1 Effectiveness Monitoring Report

The Effectiveness Monitoring Report will provide an evaluation, in both quantitative and qualitative terms, of the effects of activities covered by the permit in the context of conservation activities implemented during each year and on a cumulative basis for the term of the permit. Initially this evaluation will focus on three general aspects of the implementation of the PCMSCP:

- status and trends of populations of covered species (as measured directly or inferred from other appropriate indicators)
- progress and status of assembly of the CLS, and
- response to expected changes in biological circumstances and causative agents.

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4.5.2.2 Countywide Biological Monitoring Program

Within two years of issuance of the PCMSCP, the SCC will prepare a countywide Adaptive Management Plan (AMP), including a comprehensive monitoring plan. The AMP will be developed in consultation with the STAT, USFWS, and AGFD. The AMP will coordinate with management and monitoring efforts of Pima County, the cities of Tucson, Marana, Oro Valley, Sahuarita, South Tucson, USFS, BLM, NPS, DOD, the Nations, and other land managers. The plan will be developed in consultation with the best available scientific expertise. The plan will build upon the GIS data sets developed as part of the PCMSCP and focus on developing cost effective methods for evaluating the assembly of the CLS and monitoring of the effectiveness of management activities in achieving the desired future conditions (DFCs).

The AMP will include monitoring of the status and or trends of selected Covered Species, indicator species including invasives, habitats, vegetation communities, or other indicator parameters that enable evaluation of the status of the Covered Species and their habitats. The focus will be on the development of the most cost effective means of assessing the general status of the complete suite of biological resources within the plan area, while providing an adequate assessment of the status and trend of the Covered Species.

The AMP will provide guidelines for coordination and integration of monitoring activities throughout Pima County. The monitoring plan will include:

- Methodologies and protocols

- Timing, including frequency, duration, and scheduling
- Locations
- Personnel and equipment needs
- Documentation methods
- Methods of analysis
- Information expected
- Criteria and thresholds for modification of methods
- Criteria and thresholds for modification of management

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4.5.2.3 Site Specific Monitoring Programs

In addition to countywide monitoring focused on the assembly and management of the CLS, more site specific monitoring will be undertaken for key ecological systems and for discrete management units. For example, riparian and aquatic systems play an important role for a large proportion of the covered species of the PCMSCP. These systems are localized and fine-grained on the landscape and are not as easily monitored on a large scale as many other of the vegetation communities that provide habitat for other species. Therefore, the development of a cost effective monitoring program focusing on key areas of riparian and aquatic habitats will be of highest priority. Other priorities for site specific monitoring will come from the list of expected changed conditions identified and discussed in Chapter 5.

The monitoring for discrete management units (e.g., Saguaro NP, Ironwood NM, Colossal Cave Park, Tucson Mountain Park, etc.) will be added with input from the land managers.

4.6 Database Management & Information Sharing

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The availability and dissemination of high quality information is essential for effective implementation of the PCMSCP. Decisions affecting covered species, as well as other aspects of the implementation of the PCMSCP, IA, and particularly the Adaptive Management Plan are critically dependent upon the quality of information.

Pima County will serve as the central data repository of all scientific data for the PCMSCP for the term of the permit. The County will cooperate with the SCC to facilitate collection, maintenance, management, analysis, and distribution of the data collected for the purposes of compliance, effectiveness monitoring, and management actions under the Adaptive Management Plan. The SCC will conduct periodic review of the data reliability and validity, with assistance from the STAT and other qualified reviewers. The database will be updated at least annually with data pertinent to the compliance and monitoring activities. Pima County will ensure data security, compliance with Federal and State standards, and provision of guidance with respect to standards for data submitted by participants.

4.7 Assured Funding for Monitoring & Management

Pima County is in the process of developing the assured programs and mechanisms to fund the development and implementation of a more detailed monitoring plan, overarching conservation land management guidelines, and detailed management plans for the County-owned or managed lands that contribute to the conservation goals of the PCMSCP. The assured funding program will also cover the costs associated with implementing the prescribed monitoring and management efforts, which will be the responsibility of Pima County.

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Chapter 5

Changed Circumstances, Unforeseen Circumstances, No Surprises, and Other Federal Commitments

Section 10 regulations [50 CFR 17.22(b)(2)(iii)] require that an HCP specify the procedures to be used for dealing with changed and unforeseen circumstances that may arise during the implementation of the HCP. In addition, the Habitat Conservation Plan Assurances ("No Surprises") Rule [50 CFR 17.2, 17.22(b)(5) and (6); 63 FR 8859] defines "changed circumstances," "unforeseen circumstances," and describes the obligation of the permittees and the USFWS.

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5.1 In General

Pima County has made every effort to anticipate the minimization, monitoring, and mitigation measures (conservation measures) necessary to conserve the covered species and the habitats that support those species and, to that end, have relied upon the best scientific and commercial information available. In addition, the AMP and the flexible provisions regarding the expenditure of mitigation funds provided by Pima County are intended to meet and address future exigencies and emergency situations. Thus, the PCMSCP is intended to reduce the potential for adverse changed or unforeseen circumstances on the covered species and their habitats to a level of insignificance. Notwithstanding the provisions of the PCMSCP, if adverse changes or unforeseen circumstances result in, or threaten, a substantial change in the population of any covered species or the overall quality of any habitat of that species, as determined pursuant to the procedure outlined hereinafter, Pima County and USFWS shall cooperate to resolve the adverse impacts in accordance with this section.

The terms "changed circumstances" and "unforeseen circumstances" as defined in this PCMSCP are intended to have the same meaning as defined in the Habitat Conservation Plan Assurances ("No Surprises") Rule:

Changed Circumstances: Changed circumstances means changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the Services, and that can be planned for (e.g., the

listing of new species, or a fire or other natural catastrophic event in areas prone to such events). If additional conservation and mitigation measures are deemed necessary to respond to changes in circumstances that were provided for in the HCP, the permittee(s) will be expected to implement the measures specified in the HCP, but only those measures and no others.

Unforeseen Circumstances: Unforeseen circumstances means changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers or the Services at the time of the conservation plan's negotiation and development, and that result in a substantial and adverse change in the status of a covered species (e.g., the eruption of Mount St. Helens was not reasonably foreseeable). The USFWS will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources, even upon a finding of unforeseen circumstances, unless the permittee(s) consent. Upon a finding of unforeseen circumstances, the USFWS will be limited to modifications within conserved habitat areas and the HCPs operating conservation program. Additional conservation and mitigation measures will not involve the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources.

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5.2 Methodology for Developing Criteria for Changed versus Unforeseen Circumstances

The USFWS will determine changed versus unforeseen circumstances based on the likelihood of the change or event occurring during the 50-year PCMSCP permit period. These criteria may be refined during the first year of the permit based upon the collection and analysis of available data on the frequency, geographic scope, and magnitude of events identified below. Data will be from the ecosystems covered by the PCMSCP or appropriate, scientifically comparable surrogate areas.

The data on natural catastrophic events will be analyzed to describe and predict, within appropriate confidence limits, the probability of occurrence of those events during the term of the permit. To the extent that appropriate data are available, the likelihood of occurrence of invasion by exotic species or species-specific disease or any other circumstance that significantly threaten covered species or their habitats will also be analyzed.

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5.3 Procedure for Determining Occurrence of Unforeseen Circumstances

Prior to making a determination regarding the occurrence of any unforeseen circumstance, the USFWS shall comply with the following procedure:

5.3.1 Notice to Applicants and Participants

The USFWS shall provide written notice to Pima County together with a detailed statement of the facts regarding the unforeseen circumstance involved, the anticipated impact thereof on the covered species and its habitat, and all information and data that supports the allegation. In addition, the notice shall include any proposed conservation measure(s) that is/are likely to effectively address the unforeseen circumstance, an estimate of the cost of implementing such conservation measure(s), and the likely effects upon a) Pima County and its permittees and b) the existing plans and policies of any involved Federal or state agencies.

5.3.2 Response through Adaptive Management Plan

Pima County, in consultation with the USFWS, may choose to perform an expedited AMP analysis of the covered species or its habitat affected by the alleged unforeseen circumstance and to modify or redirect existing conservation measures to mitigate the effects of the unforeseen circumstance, within the scope of existing funded conservation actions. To the extent that these modified or redirected conservation measures do not affect conservation of other species, habitats, or key areas, this may be deemed an adequate response to the unforeseen circumstance. If the proposed modifications or redirected conservation actions could affect the conservation of other covered species or its habitat, the procedure outlined below will be followed.

5.3.3 Submission of Information by Others

Pima County and/or other entities shall have a meaningful opportunity to submit information to the USFWS and shall submit such information to the USFWS within 60 days of the written notice as provided above. Upon the written request of any applicant or participant, the time for submission of said information may be extended by the USFWS, which will not be unreasonably denied.

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5.3.4 County Review

Within 30 days after the close of the period for submission of additional information, Pima County shall assess: a) the alleged unforeseen circumstances; b) the proposed additional conservation measure(s); c) its effects upon the species and its habitat and the economy and lifestyles of Pima County and permittees; and d) possible alternatives to the proposed additional conservation measures which would result in the least adverse impacts upon the economy and lifestyles of Pima County and permittees, while at the same time leading to the survival and recovery of the affected species.

5.3.5 Findings

The USFWS shall have the burden of demonstrating that an unforeseen circumstance has occurred, that such unforeseen circumstance is having or is likely to have a significant adverse impact on the covered species or its habitat, and that the proposed conservation measure(s) are appropriate. The findings of the USFWS must be clearly documented and be based upon the best scientific and commercial data available regarding the status and habitat requirements of the species. In addition, based on the results of an expedited AMP analysis of the changed or unforeseen circumstance and the information provided by the applicants and participants, the USFWS shall provide the justification and approval for any reallocation of funds or resources necessary to respond to the unforeseen circumstance within the existing commitments of Pima County under the PCMSCP.

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5.4 Changed Circumstances

For the purposes of this PCMSCP, "changed circumstances" include:

- Listing of a new species not covered by this PCMSCP.
- Future designation of Critical Habitat for covered species.
- Delisting of a covered species.
- Vandalism or other intentional, destructive illegal human activities.
- Natural catastrophic events such as fire, drought, severe wind or water erosion, floods, and landslides of a magnitude and geographic scope expected to occur during the term of the permit. The magnitude of natural catastrophic events should be evaluated on the basis of historical records of the frequency and severity of such events, as well as the increased frequency that could be attributed to urbanization. For floods along a given watercourse, this would include a flood in excess of a 100-year event.
- Invasion by new, native and/or exotic species or species-specific disease or any other circumstance that significantly threatens populations of covered species or their habitats throughout a substantial portion of their distribution in the Plan Area.

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5.4.1 Response to Occurrence of Changed Circumstances—Adaptive Management

While Pima County believes that the initial measures to be funded by the PCMSCP will be effective to conserve both habitats and the covered species, it is anticipated that conditions within the Permit Area, the status of habitats, and the overall conditions of individual species over time will change (changed circumstances). In addition, it is quite likely that additional and different conservation measures, not contained within the PCMSCP, will be suggested and be proven effective during the term of the PCMSCP. Finally, measures currently funded by the PCMSCP may prove to be ineffective in the conservation of either species or the habitats in which they dwell. Therefore, Pima County, with the cooperation of USFWS and AGFD, are proposing an AMP to gauge the effectiveness of existing conservation measures, and to propose additional or alternative conservation measures as the need arises and to deal with changed circumstances.

In order to mitigate the impact of changed circumstances that may occur at any time during the plan term (including the first year during which thresholds are being developed) and require immediate response, Pima County and the appropriate state and Federal agencies will conduct an expedited analysis for the purposes of the development of appropriate management responses for the species, habitats, or key areas impacted by any changed circumstance. This expedited analysis will be a function of the AMP.

The analysis will begin as soon as the requisite personnel from Pima County and the Federal and state agencies can be made available. If specific AMP management analysis has been performed previously for such species, habitat, key areas, or circumstances, then that analysis will be reviewed in light of the changed circumstances. If management protocols for the species, habitats, key areas, or circumstances have not been previously developed as part of the AMP, then their development will be made a priority.

If multiple changed circumstances occur sufficiently close to each other in time such that the response will be significantly delayed due to lack of immediately available personnel or other resources, Pima County will meet and confer with the USFWS, and other applicable agencies in order to prioritize the analyses that need to be done. The purpose of the prioritizing will be to first consider those species, habitats, key areas, or circumstances that are most at risk of further impacts.

The outcome of the analysis will be the development of appropriate measures to minimize to the extent practicable the occurrence of adverse effects resulting from the changed circumstances. The measures will then be implemented. Ongoing management activities may continue until new measures resulting from the analyses are developed. However, as the agencies deem necessary, in consultation with Pima County, measures will be promptly implemented to minimize adverse effects prior to completion of the analysis to the extent feasible.

5.4.2 New or Proposed Listings of Uncovered Species

The new listing of a species not covered by this PCMSCP may constitute a changed circumstance. The USFWS shall immediately notify the County upon becoming aware that a species which is associated with the habitats found in the Plan Area and which is not a covered species (an "uncovered species") may be or has been proposed for listing.

Upon receipt of notice of the potential listing of an uncovered species, Pima County may, but is not required to, enter into negotiations with the USFWS regarding necessary modifications, if any, to the PCMSCP. An amendment to the Federal permit is then

required to cover the uncovered species. If Pima County elects to pursue amendment of the applicable permit, the USFWS will provide technical assistance to Pima County in identifying any modifications to the PCMSCP that may be necessary to amend the applicable Federal permit.

In determining whether any further conservation or mitigation measures are required in order to amend the affected permit to authorize incidental take of such uncovered species, the USFWS shall take into account the conservation and mitigation measures already provided in the PCMSCP and cooperate with Pima County to minimize the adverse effects of the listing of such uncovered species on the covered activities consistent with Section 10(a)(1)(B) of the ESA, as required by the IA.

Once a species is proposed or petitioned and is found to be warranted, the USFWS shall use its best efforts to identify any necessary measures to avoid the likelihood of jeopardy to or take of the uncovered species ("no take/no jeopardy" measures).

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5.4.3 Significant Population Increases of Listed but Uncovered Species

Increases of populations or geographic distribution of listed species not covered by the PCMSCP, for example jaguars or wolves, also may constitute a changed circumstance, to the extent that the likelihood of take from otherwise lawful activities covered by the plan is no longer negligible. The USFWS shall immediately notify Pima County upon becoming aware that activities covered by this plan are affected by the prohibition of take of a species which is associated with the habitats found in the Plan Area and which is not a covered species (an "uncovered species").

Upon receipt of notice of the potential taking of a listed but uncovered species, Pima County may, but is not required to, enter into negotiations with the USFWS regarding necessary modifications, if any, to the PCMSCP required to amend the applicable Federal permit to cover the uncovered species. If Pima County elects to pursue amendment of the applicable permit, the USFWS will provide technical assistance to Pima County in identifying any modifications to the PCMSCP that may be necessary to amend the applicable Federal permit.

In determining whether any further conservation or mitigation measures are required in order to amend the affected permit to authorize incidental take of such listed but uncovered species, the USFWS shall take into account the conservation and mitigation

measures already provided in the PCMSCP and cooperate with Pima County to minimize the adverse effects of the additional conservation measures of such listed but uncovered species on the covered activities consistent with Section 10 of ESA, as required by the IA.

5.4.4 Examples of Changed Circumstances

The STAT developed a preliminary list of examples of conditions or occurrences that could be defined as changed circumstances as defined above and as illustrated in Table 5.1. This list is not meant to be exhaustive, or inclusive, but to provide general guidance in future evaluations and determinations of changed circumstances during the term of the PCMSCP.

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Table 5.1
Examples of Changed Circumstances

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
High	Utilization of CAP water introduces new non-native aquatic species	Harm could be great to native aquatic vertebrates, as well as infrastructure. New species could include zebra mussel, New Zealand mudsnail, salvinia.	Federally funded monitoring at Cienega Creek; fish barriers installed along Santa Cruz River; Bureau of Reclamation (BOR) grant program; local land-use restrictions on use of raw CAP in floodplains
High	Non-native aquatic species (NNAS) enter Cienega Creek or other aquatic sites from non-CAP sources	Bullfrogs: negative effect on PVS aquatics vertebrates. Crayfish: negative effect on PVS aquatic vertebrates and Huachuca water umbel. Mosquitofish would have adverse effects upon Gila topminnow and would be difficult to remove. Sunfish could affect topminnow and chub. Effects greater if the fish get into Upper Cienega watershed as opposed to lower Cienega.	Eradicate selected pond habitats (e.g., SLD claypit); eradicate non-natives; SHA for natives; support crayfish restrictions on commerce; public education
High	West Nile Virus will take hold in southern Arizona.	Likely to cause increased PVS bird mortality and place restrictive constraints on riparian restoration element.	Proactive vector management with multi-jurisdiction/multi-agency involvement; intensive public education program
High	Urbanization causes further desiccation of other groundwater-dependent riparian systems.	Less aquatic habitat, more strand vegetation. Mesquite bosques and broadleaved deciduous trees will be more stressed, and fewer recruitment events will occur. Habitat quality and quantity for PVS aquatic species will decline. Habitat quality and quantity for PVS species associated with riparian forest will decline.	Buy water rights; prevent rezonings that increase water use; multi-jurisdiction efforts to increase water conservation and public education; substitution of reclaimed water for groundwater for landscape irrigation; reduced groundwater pumping in central well-field and other areas, particularly those areas with remnant riparian and aquatic vegetation.
High	Cactus poaching of Nichol	Significant numbers of individual cacti may be	Minimize public access especially vehicular public

Table 5.1
Examples of Changed Circumstances (continued)

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
	Turk's head	removed from reserves or mitigation banks established for them.	access to the area
High	Regional, decadal-scale drought continues to affect all reserve components. Reduced aquatic habitat, and more strand vegetation. Mesquite bosques and broadleaved deciduous trees will be more stressed, and fewer recruitment events will occur. Periodic desiccation of Bingham Cienega and Agua Caliente ponds. More shrubs, less grass in rangeland areas. Secondary diseases in woodlands and forests.	Declines in habitat quality and extent for species that are dependent on riparian forest structure and aquatic habitat. Periodic elimination of non-native or native fish, potentially other PVS aquatic vertebrates. Decline in the percent of vegetative cover systematically affects regional biodiversity levels Increased erosion and flashier stormflow episodes—may positively or negatively impact PVS fish depending on how they occur.	More emphasis on conserving vegetation in floodplains and sustainability of restoration efforts; restocking native fish; preventing woodcutting and agricultural clearing; conservation of upland soil resources and better livestock management on contributing uplands through cooperative efforts.
High	More cats and feral dogs in urbanizing areas and riparian areas.	Feral dogs and cats adversely affect native wildlife species directly (by killing) and indirectly (by scaring off).	Monitor presence and increases; establish a program under which feral cats and dogs are removed from Conservation Lands. Include such actions in all Conservation Easements and/or Management Plans developed for Conserved Lands.

Table 5.1
Examples of Changed Circumstances (continued)

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
			An ordinance relating to free-roaming domestic pets would be a valuable tool. (Current leash laws pertain to dogs, but not cats.)
High	Establishment of feral pigs, sheep, or goats in additional conserved riparian areas.	Potentially catastrophic to riparian and aquatic PVS, and native bighorn sheep.	Monitor presence and increases; establish a program under which feral pigs, sheep, and goats are removed from Conservation Lands. Include such actions in all Conservation Easements and/or Management Plans developed for Conserved Lands.
High	New genetic information about Talus-snails; Tucson shovel-nosed snake; desert box turtle; ground snake subpopulations; red-backed whiptail subpopulations; and other PVS shows that they are a separate species.	No physical effect on PVS. Legal status may change, however.	Plan to add species information to coverage as needed; support research efforts that inform the Adaptive Management Program. Taxonomic changes of covered species will be addressed by minor amendment to the permit.

Table 5.1
Examples of Changed Circumstances (continued)

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
High	Elimination of natural, restored or created wetlands, cienega and cienega-like environments due to social conflict or public perception (airport restrictions; mosquito, other vector and aesthetic preference issues)	Failure to meet biological objectives of habitat restoration and species re-establishment. Destruction of existing wetlands may affect for one or more PVS species related to these habitats.	Don't rely on open-water or created wetlands restoration for satisfying permit conditions
Medium	African sumac, Arundo, and other existing non-native and/or invasive expand further into riparian areas.	Effects upon PVS are impossible to forecast. Arundo already invading Santa Cruz River.	Restrict commercial distribution; restrict use in new development; implement monitoring and control efforts in reserves.
Medium	Expansion in range of non-native grasses continues.	Potential direct negative effect on Pima pineapple cactus. Increased spread of non-native grasses in uplands will encourage wildfires that will severely damage or eliminate local stands of palo verde and saguaro. General effects to watershed and hydrology, insect faunal composition. Direct negative impact to nesting, breeding and roosting habitat of several PVS birds and bats, including pygmy-owl.	Expand monitoring and control efforts in reserves; expand educational outreach programs; involve all land managers in control efforts; support community volunteer efforts such as those of the "Weedwhackers"

Table 5.1
Examples of Changed Circumstances (continued)

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
Medium	Chytrid fungus may appear in Las Cienegas, where it has not been found.	The small population of Chiricahua leopard frog in las Cienegas could be eliminated	Researchers in the aquatic environment should follow protocols for minimizing disease transmission. Plan and implement monitoring for presence/absence of Chytrid fungus
Medium	Residential and commercial development in the Vail, Empirita, and Mescal areas continues to increase, along with reliance on groundwater pumping. Lower Cienega Creek will be gradually desiccated by pumping.	Shift to less aquatic habitat, more strand vegetation over time. Mesquite bosques and broadleaved deciduous trees will be more stressed, and fewer recruitment events will occur. Habitat quality and quantity for PVS aquatic species will decline. Habitat quality and quantity for PVS species associated with riparian forest will decline. Greater chance for NNAS invasion, as impacts to habitat facilitate invasion.	Coordinated and concerted effort to work with landowners and developers in minimizing high-water using elements; purchase riparian habitat and/or water rights; long-term potential for treating and reusing wastewater for landscape irrigation and support of natural systems.
Medium	Fires occurring inside and outside the reserve system. Not all reserves are affected at the same time, but several are.	Enhanced erosion and siltation potential. Lowland leopard frogs disappear from Santa Catalina Mountains and/or Rincons due to ash inflows to Montrose-Romero and Buehmann Canyons. Fire may open up the forested environments on mountains possibly harming some species, e.g. localized decline of PVS birds, as well as giant spotted whiptail. Loss of potential pygmy-owl habitat. Temporary loss of potential Yellow-billed Cuckoo	Coordinate fire management across jurisdictions. Continue to build upon a reserve network that spans different mountain ranges and watersheds.

Table 5.1
Examples of Changed Circumstances (continued)

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
		habitat. Fires may benefit other species, like reptiles that need warmth at ground level, and parkland or grassland birds. May be instrumental in improving watershed condition over the long term.	
Medium	Populations of Leopard frog and other aquatic PVS decline in other areas of southeast Arizona (not Pima County).	Viability of species' continued existence declines.	USFWS and AGFD complete Safe Harbor Agreements and allow land owners with suitable ponds and/or stream segments to "host" re-establishment of leopard frogs and other aquatic PVS, resulting in establishment of many new, small populations. Contribution to recovery could lead to downlisting.
Medium	Loss of a known population of covered species.	Rufous-winged sparrow populations on the southeast and south sides of Tucson are in peril today; Tucson shovel-nosed snake may be already gone from Pima County.	Pima County will participate in reestablishment of species on conserved lands, in coordination and collaboration with FWS and AG&FD.
Medium	Conversion of desert, riparian areas, or grasslands to agriculture in permit area or on adjacent tribal lands	Fragmentation of landscape, reducing viability of some PVS populations	Conservation easement program; Pima County will continue to offer support and assistance to Tribal governments in developing their own conservation programs that are consistent with the PCMSCP.
Medium	Increased off-road vehicle (ORV) use in existing and proposed reserves.	General habitat degradation with potential direct impact to several PVS	More enforcement needed; road restoration efforts; consideration for designated ORV areas to be established. Pima County is developing an ordinance

Table 5.1
Examples of Changed Circumstances (continued)

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
			to regulate ORV use on private property; existing laws ban ORVs from public washes and riverbeds.
Medium-Low	New species of landscaping plants are discovered to be invasive into wildland settings.	Effects upon PVS are impossible to forecast.	Develop protocols to restrict commercial distribution of landscaping species found to be invasive.
Medium-Low	Wasting disease affects deer population; predators (e.g., mountain lions) are also affected	Loss of top predator could effect the entire ecosystem	Support on-going monitoring efforts by AGFD and Federal land managers
Low	Arrival of fire ants into riparian areas.	Unknown	Coordinate with Arizona Department of Agriculture. Fire ants should be monitored for presence. Immediate response may prevent establishment.
Low	Due to TNC efforts and discontinued mining, Lower San Pedro River becomes better watered, with bigger pools and more beaver	Native dace and lowland leopard frog decline due to improved habitat conditions for NNAS. Riparian forest-dependent PVS species benefit.	Coordinate with TNC and other land managers to develop a balanced system for wider variety of species
Low	Gradual increase followed by gradual decrease of the extent and discharge rate of effluent-dominated reaches of the Santa	Increase in marsh and riparian scrub and forest, followed by reduced extent of cottonwood-willow and increase extent of burrobrush. Riparian forest-dependent PVS species benefit at first, then decline	Insure commitments for minimal water requirements of on-going riparian restoration design are met over long-term. Decrease in volume may be compensated by increase in alternative water sources (e.g., CAP

Table 5.1
Examples of Changed Circumstances (continued)

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
	Cruz River.	with habitat desiccation.	water)
Low	CAP recharge, farming, and restoration along Santa Cruz River near Martinez Hill increases riparian vegetation	Increased riparian and aquatic habitat for some non-aquatic PVS species outside plan area; potential for NNAS habitat	Insure adequate management and monitoring efforts are incorporated into all restoration and recharge implementation plans.
Low	Windthrow or disease affects saguaros in Tortolita piedmont.	Potential to lose a few pygmy-owl nest sites and foraging habitat for Lesser long-nosed bats	Determine appropriate level of revegetation strategy, if any
Low	A few severe freezes. Mesquite die back, incidence of bacterial necrosis in saguaros increases.	Minor effects to pygmy-owl nesting sites. Minor loss of foraging habitat for Lesser long-nosed bat.	Landscape-scale reserve design covers broad areas, not all of which would be effected equally at any given time. Built in resilience.
Low	Periodic rainy winters will result in dense growth of red brome, black mustard, fiddleneck, and other winter annuals	Spring and early summer fires will eliminate local populations of Pima Pineapple Cactus.	Support ongoing coordinated regional efforts to raise awareness, actively monitor and remove to fullest extent possible.
Low	Increased warming increases the length of the growing season. More annual growth in plants when sufficient water	Shifts in plant community composition and distribution that could indirectly affect PVS.	None.

Table 5.1
Examples of Changed Circumstances (continued)

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
	exists.		
Low	100-year floods will occur in several reserves. Riparian vegetation will be removed. Channel vegetation will quickly recover, but mature mesquite forest on terraces will be lost due to erosion over the term of the permit.	Localized decline of PVS birds, as well as giant spotted whiptail. Loss of potential pygmy-owl habitat. Temporary loss of potential Yellow-billed cuckoo habitat	Proposed reserve design should include riparian reserves in many different watersheds.
Low	Movement of mobile PVS species from reserves into areas outside of reserves.		Acceptable
Low	Limestone quarries established in various areas outside reserves.	Could affect needle-spined cactus, Nichol Turk's head cactus, and potential certain bat roosts	Include limestone areas in reserve system as much as possible.
Low	New Federal listings of covered species	No physical effect on PVS; legal status may change.	Update permit to indicate new status; no further action by Pima County is needed.

Table 5.1
Examples of Changed Circumstances (continued)

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
Low	New Federal listings of non-covered species	CLS and PCMSCP conservation strategies may or may not be adequate.	Pima County will evaluate conservation needs in consultation with FWS and determine if they wish to amend the permit to add the species. Additional minimization and mitigation measures may be required.
Low	Delistings of covered species	May or may not effect PCMSCP	Delisted species would be considered a covered, unlisted species and Pima County would continue to implement any associated species-specific conservations strategies. If the species becomes listed again in the future, it will automatically be added to the permit upon its listing.
Low	New designation of Critical Habitat for covered species	May or may not affect PCMSCP	Update permit to indicate new status; no further action by Pima County is needed.
Low	New planned and unplanned foot trails extended from new developments	More disturbances of roosting, nesting, resting, and other activities in urbanizing areas. Spread of nonindigenous species.	Incorporate requirements for monitoring, removal, and restoration of wildcat trails in all Conservation Easements and/or Management Plans for all Conservation Lands; Approved trails will have limited, designated access points.
Low	Runoff from paved surfaces increases, causing localized	Countervailing force that may somewhat mitigate the adverse effects of urbanization upon habitat of species	Adopt updates to Pima County's Floodplain Ordinance to protect riparian areas; ensure water

Table 5.1
Examples of Changed Circumstances (continued)

Priority	Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Minimization and Monitoring Strategies (on-going or proposed)
	increase in xeroriparian vegetation in smaller, urbanizing watersheds	such as Abert's towhee, Bell's vireo.	harvesting guidelines are followed in preparation of engineering and landscape plans for all development.
Low	New roads established through talus slopes.	Low potential for talus snails to be affected.	Conservation easements on private lands; careful control and monitoring on public lands.
Low	Clearing of pecan groves for urban development	Loss of habitat for Yellow-billed cuckoo resulting in decrease in numbers of this species in the County.	PCWWM will acquire and revegetate lands near Green Valley WWTF; developers will minimize destruction of pecans during development.
Low	Paving Oracle Control Road		Pima County will work with the USFS to enforce strict regulations to prevent ORV use of adjacent lands. (Section 7 Consultation between USFS and FHWA; measures to minimize and mitigate vegetative losses will be incorporated and implemented.)

5.5 Unforeseen Circumstances

For the purposes of this PCMSCP, "unforeseen circumstances" are any events not identified as a changed circumstance and specifically includes:

- Natural catastrophic events such as fire, drought, severe wind or water erosion, floods, and landslides (also landslides associated with earthquakes) of a magnitude exceeding that expected to occur during the term of the permit

- Invasion by exotic species or habitat or species-specific disease that threaten covered species or their habitats which cannot be effectively controlled by currently available methods or technologies or which cannot be effectively controlled without resulting in greater harm to other covered species than to the affected covered species

In making the determination that such an event constitutes an unforeseen circumstance, the USFWS will consider, but not be limited to, the level of knowledge about the affected species and the degree of specificity of the species' conservation program under the PCMSCP. Whether or not failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild will also be considered by the USFWS.

5.5.1 Response to Occurrence of Unforeseen Circumstances—No Surprises

After the conclusion of the process outlined above, if the USFWS determines that an unforeseen circumstance has occurred and that additional conservation measures are required to address such circumstances which are not contemplated or were not capable of implementation by the Adaptive Management Plan (AMP) and procedures of the PCMSCP, and provided that Pima County has fully complied with the terms of the PCMSCP, any proposed additional conservation measures shall fit, to the maximum extent possible, within the terms of the PCMSCP and its AMP. To the extant allowed by law, additional conservation measures shall not require the payment of additional compensation by the County or permittees. If additional expenditures are required, the USFWS or any other Federal agency shall take additional actions that might lead to the conservation or enhancement of a species that is being adversely affected by an unforeseen circumstance. The costs of these additional actions shall be borne by the USFWS or any other Federal agency. However, the USFWS agrees that, prior to undertaking or attempting to impose any action or conservation measure, it shall consider

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all practical alternatives to the proposed conservation measures, and adopt only those actions or conservation measures which would have the least effect upon the economy and lifestyle of Pima County and permittees, while at the same time addressing the unforeseen circumstance and the survival and recovery of the affected species and its habitat. The purpose of this provision is to recognize that Congress intended, even in the event of unforeseen, extraordinary, or changed circumstances, that additional mitigation requirements not be imposed upon a Section 10 permittee which has fully implemented the requirements undertaken by it pursuant to an approved habitat conservation plan.

5.5.2 Response to Occurrence of Unforeseen Circumstances—Adaptive Management

Pima County believes that the initial measures to be funded by the PCMSCP will be effective to conserve both habitats and the covered species for that period. However, over time, unforeseen circumstances may affect the status of habitats and the condition of individual species within the ecosystems in the Plan Area. Therefore, Pima County, with the cooperation of USFWS and AGFD, are proposing an AMP to gauge the effectiveness of existing conservation measures, and to propose alternative conservation measures as the need arises, to deal with unforeseen circumstances, within the budget and scope of the AMP. If existing or additional conservation measures within the budget and scope of the approved PCMSCP AMP do not adequately respond to unforeseen circumstances, the County will assist and coordinate with any additional conservation efforts undertaken by the USFWS.

5.5.3 Examples of Unforeseen Circumstances

The STAT also developed a preliminary list of examples of conditions or occurrences that could be defined as unforeseen circumstances as defined above and as illustrated in Table 5.2. This list is not meant to be exhaustive or inclusive, but to provide general guidance in future evaluations and determinations of unforeseen circumstances during the term of the PCMSCP.

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Table 5.2
Examples of Unforeseen Circumstances

Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Comments on Potential Responses by Pima County that may warrant Contingency Funds
Weapons of mass destruction affect the urbanized area, causing social breakdown; warfare along international border extends into biologically sensitive areas	Potential for large-scale destruction of PVS habitat types.	Support Federal efforts, with priority given to public health, safety, and welfare.
Massive internal or external population shifts overwhelm public services, causing the appearance of shantytowns in the urban or rural areas.	Increase in landscape fragmentation, decrease in connectivity, possible isolation of PVS populations, influx and spread of nonindigenous species.	Continue to conduct advance planning for future growth and development; maintain strong and adequate CLUP.
Construction of expanded international port-of-entry and highway improvements in Altar Valley.	Increase in roadkill, particularly along State Routes 286 and 86, increased risk of influx of non-native species; potential adverse effect upon pygmy-owl.	Support State and Federal agencies in efforts to minimize impacts and monitor conditions, especially for PVS.
Toxic or hazardous waste spill into Cienega Creek or the Santa Cruz River either from the railroad or from the Interstate Highway.	Potential adverse effect on PVS native fish and frogs, including kill-off; loss of vegetation within Important Riparian Area.	Develop County-level contingency plan that parallels and supports state and Federal response plans.
Copper or other mining begins in Davidson Canyon, Buehman Canyon, or other watersheds;	Potential contamination of streams with heavy metals, and watershed diversions or habitat losses. Potential effects upon PVS located in the direct impact areas or upon downstream aquatic PVS.	Support the USFS or other land management agency in their efforts to develop permit requirements to avoid or minimize potential adverse impacts.
Greatly reduced pumping along Santa Cruz River allows formation of new intermittent and perennial stream segments at Canoa, Tucson, and Marana.	Increase in riparian and aquatic vegetative communities likely to have a positive effect, particularly for native fish, frogs, and other PVS; potential for contamination of upstream conditions.	Maintain strong vector and disease control monitoring and response measures at County level; coordinate efforts with State and Federal agencies.
Massive poaching for subsistence.	Unlikely to directly impact PVS; indirect effects more likely.	Coordinate biological monitoring with AGFD and other state and Federal Agencies.

Table 5.2
Examples of Unforeseen Circumstances (continued)

Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Comments on Potential Responses by Pima County that may warrant Contingency Funds
Greatly increased reliance on mesquite as fuelwood.	Reduced canopy cover in mesquite savanna and mesquite forest would affect different PVS differently.	Controlled by local ordinances as well as state and Federal Agencies.
Ranchers decide to shift to planting and irrigating exotic grasses rather than using and managing semi-natural ecosystem.	Potential for exotic species to out-compete native species and provide less suitable habitat for PVS; potential for increased wildfire risk.	NRCS and the state and Federal agencies that grant grazing leases have a critical role in supporting the biological goals of the PCMSCP.
Paved road over Redington Pass.	Likely significant increase in vehicular traffic, ORV use, habitat destruction and fragmentation, roadkill, and spread of non-native species.	CLUP directs growth in areas other than the San Pedro Valley; long-range transportation plans exclude this action.
Arkenstone Cave dries up.	Pseudoscorpion and its food network possibly affected.	Pima County includes this in long-term monitoring of the cave conditions and evaluates possible contingency actions.
Establishment of new, non-native game animals (e.g., oryx, red or Sitka deer).	Unlikely to directly affect PVS; may have an indirect effect due to transmission of disease and/or due to competition for food sources and other habitat elements.	Participating state and Federal agencies consider all land use and management actions in the context of supporting the biological goals of the PCMSCP.
Desert tortoise populations in Sonoran Desert develop consistent pattern of decline, seen now in only about 2 or 3 major population sites.	Unlikely to affect PVS.	PCMSCP (and ESA) include amendment provisions to add species to permit.

Table 5.2
Examples of Unforeseen Circumstances (continued)

Circumstance/Scenario	Potential Impact on Covered Species and/or Effectiveness of PCMSCP	Comments on Potential Responses by Pima County that may warrant Contingency Funds
Natural establishment of Yuma clapper rail, mountain plover, or other currently listed species not currently considered PVS.	Unlikely to affect PVS.	PCMSCP (and ESA) include amendment provisions to add species to permit. Surveys and monitoring efforts would be warranted.
Natural colonization of Gila topminnow into the effluent-dominated Santa Cruz River.	New population of Gila topminnow established, possibly increasing long-term viability of metapopulation.	Species is proposed for coverage under the permit. New populations will be monitored under PCMSCP and under the proposed Tres Rios del Norte riparian ecosystem restoration plan for the effluent-dominated segment of the river. Pima County and USACE are formulating a safe harbor agreement.
Increased acid rain.	pH changes in ponds, lakes and mountain streams which lack limy substrates, potential loss of species and populations of aquatic and other PVS.	Water quality monitoring is incorporated into management of aquatic ecosystems.
Sustained cooling trend shortens the growing season over the permit period.	Gradual long-term shifts in vegetative composition; possible decrease or die-off in species sensitive to cold (e.g., Saguaro, Ironwood) and increase in extent of montane species (juniper, oaks, pine).	Regional climate monitoring information is brought into PCMSCP monitoring and management decision-making.

5.6 Additional Federal Commitments

5.6.1 Augmentation, not Replacement or Substitution, of Federal Budgets

Each Federal agency that is a participant in the PCMSCP process and signatory to the required IA will agree that it shall annually include in its agency budget requests dedicated and earmarked funding adequate to allow the agency to fully operate, manage, maintain, and monitor its lands pursuant to the terms of this PCMSCP. Furthermore, each Federal agency shall fulfill its obligations to protect the species and ecosystems consistent with statutory obligations imposed by Congress and to actively cooperate with and provide technical assistance to Pima County. Each Federal agency will agree that it shall not use funds allocated by the PCMSCP to be substituted for funds which it would otherwise receive from the Federal budget process, and instead will use PCMSCP funds to augment, and not replace, its appropriated funds. Nor will any Federal agency receiving funds from the PCMSCP move or redirect its own funds from categories currently established to implement conservation measures, plans, or policies to other budget categories. Finally, no state or regional office of any Federal agency will take into account any PCMSCP funds paid or expected to be paid in allocating available funds among its various offices and departments.

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5.6.2 Section 7 Consultations and Conferences

Except as may be specifically provided elsewhere in this PCMSCP, nothing in the PCMSCP is intended to apply to any activity on Federal lands or Federally funded projects that are governed by Section 7 of the ESA. All minimization measures that result from the authorization of incidental take pursuant to Section 7 and contained within any biological opinion or conference report shall be generally consistent with the minimization measures required by the PCMSCP. However, nothing in this PCMSCP is intended to limit the USFWS from requiring minimization in excess of that provided for in the PCMSCP, if the circumstances so warrant.

5.6.3 Consideration of PCMSCP in Section 4 Findings

The USFWS will specifically inform Pima County of any listing proposal under Section 4 of the ESA for species in the Plan Area in writing. To the extent permitted by law, the USFWS will consider actions undertaken by Pima County in making their determination.

Chapter 6
Implementation

6.1 Implementation Strategy

The overarching strategy to implement the PCMSCP is for Pima County to establish the CLS and manage it for the long-term conservation of Priority Vulnerable Species (PVS). Conservation will be achieved by securing land through acquisition of fee title and conservation easements, management and monitoring, and phasing the plan incrementally. Pima County will develop coordination agreements with local, state, and Federal entities to ensure conservation of the CLS throughout Pima County. Pima County will also ensure that monitoring and management are conducted and reports are prepared.

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6.2 Conservation of Land

The cornerstone of implementing the PCMSCP is bringing additional land into conservation status and raising the conservation level of existing conservation lands. The primary methods that Pima County will use to accomplish this include purchasing land and appurtenant water rights, establishing conservation easements, and tailoring management and monitoring to specific conservation objectives.

6.2.1 Purchase of Land and Interest in Real Property

Pima County will acquire properties in fee or conservation easements or other interests in real property and water rights where such acquisition meets PCMSCP conservation goals and objectives. Such acquisitions may be initiated by Pima County staff as appropriate assets become available or by property owners who have contacted Pima County. Acquisition of conservation easements and parcels funded by Pima County's 2004 Conservation Bond Program will be solely on a willing seller/willing buyer basis. The *Habitat Protection Priorities in Eastern Pima County* map, which identifies approximately 525,000 acres of biologically significant areas, will be used as a guide for land acquisitions, including easements. (See discussion under Section 4.4.4.) Written recommendations on *Habitat Protection Priorities* are given in the May 18, 2004 Bond Implementation Plan Ordinance (Bond Ordinance). Lands or interest in lands acquired as identified in the Bond Ordinance shall not change or alter game and wildlife management, which is exclusively reserved to the State through the Arizona Game and Fish Commission. No County action shall limit access for the recreational purposes of sportsmen lawfully engaged in activities related to the legal taking of fish and game.

All acquisition proposals will be presented to the Board of Supervisors for final approval.

6.2.2 Conservation Easements

A conservation easement shall be recorded on all County-owned land for which Pima County seeks Section 10 mitigation credit for the purpose of encumbering that land for conservation purposes. Conservation easements may also be recorded on privately owned lands for which Pima County seeks Section 10 mitigation credit, whether such easements are acquired by donation or acquisition. Participation by property owners is entirely voluntary. All conservation easements will be recorded and will consist of terms, conditions, and conveyance of rights and restrictions that run with the land in perpetuity. The USFWS will be named as a third party beneficiary of the conservation easements used for Section 10 mitigation credit, for compliance monitoring, and enforcement purposes.

Conservation easements may have varying levels of conservation requirements, which will directly correspond to the Section 10 mitigation credit given by USFWS. The least restrictive conservation easement level may include only the retention of natural land cover through Purchase of Development Rights (PDR), while more restrictive conservation easements may include additional restrictions or specific management activities supporting the conservation, enhancement, and restoration of biological resource values.

Pima County has developed a template for conservation easements, which is included in Appendix XX[1]. Additional, more detailed templates may be utilized for different purposes and circumstances (e.g., for dedicated natural open space within subdivisions, for Pima County-owned lands, and for 'working landscapes' of privately-owned ranchlands).

6.2.3 Easement Components

Conservation easements for PDR will consist of the recorded easement document, a legal description, and map of the surveyed property, and a Baseline Conditions Report. A template for the Baseline Conditions Report is provided in Appendix XX[2].

Annual reporting to ensure the compliance with terms of the easement will be a requirement of the conservation easement.

Additional documentation in the Baseline Conditions Report and/or a Management Plan may also be required, if the easement has conditions, in addition to PDR, that are related to management of specific biological resource values.

6.2.4 Valuation and Payment

The determination of the cost of purchasing development rights and other property rights will be conducted through a parcel-specific appraisal. Payment may be by lump-sum purchase, installment payments, exchange, or receipt of donation.

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1 Pima County to provide template(s) for Conservation Easements.

2 Pima County to provide template for Baseline Conditions Reports.

6.2.5 Administration of Conservation Easement Program

Pima County will establish a permanently staffed program for the administration of conservation easements. Staff will responsible for the acquisition of conservation easements, monitoring compliance with provisions, and reporting on their status. The Conservation Easement Program will include the recommendations from *Purchase of Development Rights Program* report, as approved by the Board of Supervisors.

Pima County will continue to fund actions to maintain, manage, and monitor County-owned conservation lands in order to assure viability of special elements, priority vulnerable species, and other resources located upon those lands. Private landowners shall be required to comply with the provisions of their conservation easements.

6.2.6 Resource Review Team

A multi-disciplinary resource team will be utilized to describe the baseline conditions of land proposed for conservation easements. The team will consist of Pima County staff and/or subcontractors with proven biological and land management expertise and an understanding of the PCMSCP goals and objectives. The Resource Review Team will also be responsible for the annual review of the management and monitoring report and field evaluation of the privately held land covered by the conservation easement to determine, if its condition continues to meet the stated conservation easement conditions. Pima County will arrange for the Resource Review Team to perform this function on County-owned parcels.

6.2.7 Amendments

Conservation easements may be amended in accordance with their terms and conditions.

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6.3 Participants and Coordination Agreements

6.3.1 Pima County

Pima County's role is that of the permittee, with central responsibility of ensuring that all requirements of the PCMSCP are met (i.e., that any taking will be incidental, all impacts will be minimized and mitigated to the maximum extent practicable, adequate funding will be provided; the taking will not appreciably reduce the likelihood of the survival and recovery of the species, and that other permit requirements are met).

6.3.2 U.S. Fish and Wildlife Service

The USFWS is responsible for ensuring NEPA compliance for the PCMSCP and makes the final determination of permit requirements and issuance. Local and regional USFWS staff will track and monitor permit compliance on an annual basis and may enforce permit restrictions when permit requirements are not met. USFWS may provide Federal funding for the implementation of various aspects of the PSMSCP such as land acquisitions, field surveys, ecosystem restoration, and management actions.

6.3.3 Other Participants

Other participants are signatories to the plan and in some cases third-party beneficiaries to the permit. Formal Coordination Agreements (attached as Appendix A) commit plan signatories to a long-term course of action and management towards fulfilling the biological goals set forth during the reserve planning process as reflected by the CLS map and as summarized in Section 3 of this document.

6.3.4 Other Federal Agencies

6.3.4.1 Bureau of Land Management

- Ironwood Forest National Monument
- Las Cienegas National Conservation Area
- Various other BLM lands throughout Pima County

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6.3.4.2 Bureau of Reclamation

6.3.4.3 National Park Service

- Organ Pipe Cactus National Park
- Saguaro National Park, East and West Units

6.3.4.4 National Resource Conservation Service

6.3.4.5 National Wildlife Refuges

- Buenos Aires National Wildlife Refuges
- Cabeza Prieta National Wildlife Refuges

6.3.4.6 U.S. Army Corps of Engineers

6.3.4.7 U.S. Department of Defense

- Barry M. Goldwater Air Force Range
- Davis-Monthan Air Force Base

6.3.4.8 U.S. Environmental Protection Agency

6.3.4.9 U.S. Forest Service: Coronado National Forest

6.3.4.10 U.S. Geologic Survey

6.3.5 Native American Tribes

6.3.5.1 Pascua-Yaqui Nation

6.3.5.2 Tohono O'Odham Nation

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6.3.6 State Agencies

6.3.6.1 Arizona Department of Transportation

6.3.6.2 Arizona Game and Fish Department

6.3.6.3 Arizona State Lands Department

6.3.7 Local Jurisdictions

6.3.7.1 City of South Tucson

6.3.7.2 City of Tucson

6.3.7.3 Town of Marana

6.3.7.4 Town of Oro Valley

6.3.7.5 Town of Sahuarita

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6.4 Additional Implementation Elements

6.4.1 Migratory Birds and Eagles

The PCMSCP also constitutes a Special Purpose Permit under 50 CFR 21.27 for the take of ESA listed birds in the amount and/or number and subject to the terms and conditions specified herein. Any such take will not be in violation of the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 U.S.C 703-712). Unlisted birds that are covered by the HCP are not covered by the Special Purpose Permit and may be taken only if such take is not in violation of the MBTA. This Special Purpose Permit will be valid for a period of three years from the effective date of the 10(a)(1)(B) Permit, provided that the permit also remains in effect for that period. The Special Purpose Permit will be renewed automatically, provided that Pima County continues to fulfill its obligations under the permit and its IA. Each automatic renewal will be valid for the maximum time period allowed by 50 CFR 21.27 or its successor at the time of renewal.

6.4.2 Unlisted Species

Assurances will be given for those species that are adequately covered by the HCP, pursuant to the 'No Surprises Policy' (63 FR 8859 February 23, 1998, revised 50 CFR 17). Implicit in this is that 1) the HCP must address the conservation of the species and its habitat (either individually or by habitat association), and 2) all Section 10 issuance criteria specified in the Act and its implementation regulations must be met. To conserve unlisted species, an HCP must not significantly contribute to the subsequent need to elevate that species to candidate or emergency listing status.

6.4.3 Plants in HCP and Permit

The Federal take prohibitions under the ESA for listed plants on non-Federal lands is limited, unless taking of those plants is in violation of State law or regulations. However, before the USFWS issues a permit, the effects of the permit on listed plants must be analyzed. This is because Section 7 of the ESA requires that any Federal action, in this case issuance of a Section 10 permit, must not jeopardize any listed species, including plants.

The USFWS encourages applicants to consider listed plants in HCPs. As part of the overall ecosystem basis of the PCMSCP, and consistent with the goals established by the STAT, seven PVS plants are proposed for coverage under this Section 10 Permit (Section 6.1). Three of these species are listed as endangered under the ESA and one is a candidate for listing. All of these

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plant species are protected under the Arizona Native Plant Law as highly safeguarded (no collection is allowed) or salvage restricted (collection is allowed only with permit.)

Table 6.1
Federal and State Status of Plants in PCMSCP

Species	*Scientific name*	Federal Status[1]	Arizona Status[2]
Huachuca water umbel	*Lilaeopsis schaffneriana recurva*	E	HS
Nichol Turk's head cactus	*Echinocactus horizonthalonius var. nicholii*	E	HS
Pima pineapple cactus	*Coryphantha scheeri var. robustispina*	E	HS
Acuna cactus	*Echinomastus erectocentrus var. acunensis*	C	HS
Gentry indigo bush	*Dalea tentaculoides*	sc	HS
Needle-spined pineapple cactus	*Echinomastus erectocentrus var. erectocentrus*	sc	SR
Tumamoc globeberry	*Tumamoca macdougalii*		SR

[1]E = endangered; C = candidate; sc = species of special concern.
[2]HS = highly safeguarded; SR = salvage restricted

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6.5 Funding Mechanisms and Commitments

Pima County commits to funding the implementation of the PCMSCP by securing and/or pursuing a variety of funding sources as described below. Funding for land acquisition will be shared between public and private sectors, with no more than 50 percent of the funding coming from affected private landowners and not less than 50 percent coming from publicly funded sources. The intent is that the assured funding be a segregated fund to be used solely for the acquisition and management of habitat and the purchase of development rights within the CLS, to carry out the following components and functions of the PCMSCP:

- New land acquisitions and other similar protections to build the CLS,
- Creation of mitigation banks,
- Protective management and monitoring of the Conservation Lands System,
- Contingency funding for private property compensation for takings pursuant to U.S. or Arizona constitutions,
- Contingency funding for changed and unforeseen circumstances,
- Periodic independent review, and
- Administration.

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6.5.1 Existing Assured Funding Mechanisms

6.5.1.1 General Fund Line-Item

Pima County will increase the amount of the designated open space line-item budget as the County budget permits.

6.5.1.2 Open Space Bonds

In May 2004 Pima County voters approved a bond initiative for the purpose of continuing the County's acquisition of lands and other rights within the CLS. This bond established a fund of over $100 million. The highest priority for the use of this fund is for the acquisition and protection of lands with high biological value necessary to achieve the goals of the PCMSCP as identified by the Habitat Protection Priorities map. The Pima County Conservation Acquisition

Commission has been established for the purpose of making recommendations to the Board of Supervisors which parcels to acquire with 2004 bond funds.

6.5.1.3 Flood Prone Land Acquisition Program (FLAP)

Pima County will continue this program to acquire flood prone lands, will accelerate and expand the flood control budget line-item as economic conditions allow and will pursue the authorization of a general obligation bond for flood prone land acquisition.

6.5.2 Potential Funding Mechanisms[1]

6.5.2.1 Sales Tax

Pima County will explore the feasibility of presenting to the voters a sales tax proposal as non-regressive as possible consistent with law. The intent is that this increase would be placed in the segregated fund and be used to obtain lands for the PCMSCP.

6.5.2.2 Mitigation Fees

Pima County will implement an equitable mitigation fee program with an option whereby property owners may achieve impact mitigation independent of the County fee program.

6.5.2.3 Impact Fees

Pima County will pursue and support State legislation granting Counties the statutory authority to impose open space impact fees.

6.5.2.4 Arizona Game & Fish Department's Heritage Fund

Pima County will pursue Heritage Fund grant requests and will request that the Arizona legislature abide by the will of the voters when establishing the Heritage Fund in 1990 (A.R.S. §5-22), and maintain the Heritage Fund as dedicated funding for the purposes for which it was established.

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1 Pima County to provide FWS with more detailed information on assured (vs. potential) funding sources.

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6.5.2.5 Arizona Preserve Initiative

Pima County will encourage legislators to assist Pima County in working with the State Land Department so that the Arizona Preserve Initiative can fund conservation efforts in this region. Use of the Arizona Preserve Initiative program allows State funds from Growing Smarter to pay one-half of the acquisition costs.

6.5.2.6 Public Lotteries

Pima County will pursue and support State legislation to establish county-by-county lotteries, the proceeds for which would be spent in the county in which the tickets are sold. Fifty percent of the proceeds would fund Arizona Preserve Initiative projects in the respective county. Other revenues generated by these games would go for the purchase of development rights.

6.5.2.7 Federal Line-Item Appropriations

Pima County will continue to encourage Congressional Representatives to pursuing line-item appropriations to support partnerships and efforts contributing to the goals of the PCMSCP.

6.5.2.8 Other Federal Funding and Grants

Pima County will pursue Federal funding from sources such as:

- Department of Interior
- Department of Agriculture
- Department of Defense
- The Land and Water Conservation Fund
- National Fish and Wildlife Foundation Challenge Grants
- Applicable Farm Bill funding
- National Oceanic and Atmospheric Administration (NOAA)
- Other Federal programs

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Although Federal funding cannot be used to implement mitigation requirements for the Section 10(a)(1)(B) permit, such funding can be pursued for the purpose of further enhancing the PCMSCP goals by providing additional levels of conservation and mitigation.

6.5.3 Partnering with Private Sector and Non-Profit Organizations

Pima County will pursue partnering opportunities in association with private landowners and non-profit organizations (such as The Nature Conservancy, Arizona-Sonora Desert Museum, Sky Islands Alliance, Tucson Audubon Society, Tucson Herpetological Society, Tucson Botanical Garden, the Sierra Club, Arizona Open Lands Trust, the Sonoran Institute, Ducks Unlimited, Trout Unlimited, American Rivers, and the National Wildlife Federation) with common goals for biological conservation. Such partnering efforts may include but are not limited to:

- Shared staffing and use of equipment;
- Matching or other shared funding of land acquisitions and/or conservation easements;
- Joint efforts in surveying, monitoring, and management responsibilities;
- Coordinated efforts in biological data management;
- Public information, outreach, and environmental education efforts and materials; and
- Coordination and use of local contributions, including land, trusts, volunteer support, and other in-kind services.

6.5.4 Partnering with Other Jurisdictions and Agencies

Pima County will also foster partnerships with other local jurisdictions within and adjacent to Pima County and will support their habitat conservation efforts, particularly those that are a subset of implementing the PCMSCP. Pima County will foster partnerships with the University of Arizona, Pima Community College, and public and private schools in order to maximize effectiveness of research and education efforts pertaining to the PCMSCP goals.

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6.6 Phasing

Phasing of the PCMSCP is established to respond to the long-term conservation needs identified by the CLS and the projected population growth and development of land as reflected by the Economic Analysis, with corresponding check points to monitor the plan's implementation and effectiveness.

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6.7 Annual Reporting

Pima County will prepare and submit an annual report for USFWS review of permit compliance. This will be in the form of the "State of the Conservation Lands System" report prepared by the SCC. This annual report will address topics such as baseline conditions, land acquisitions and acreages, ecosystem function, change in land cover, invasive species, riparian conditions, ground and surface water conditions, ranch resources, fire management, and abiotic resources (air, soil, visual, precipitation, weather, climate trends; see further discussion under Sections 4.4 and 4.5). Maps delineating the locations and configuration of areas where take has occurred and where conservation has been achieved will be included. Annual reports will also include brief summaries of joint or concurrent efforts by partnering entities. This annual report will be the primary document in support of USFWS-required status reports for the PCMSCP permit continuance.

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6.7.1 Phase I: Permit Years 1–10

During this phase the initial "down payment" on the CLS will be made by securing funding for, and acquiring or otherwise conserving lands at a level adequate to meet mitigation requirements for the projected growth of the first decade (see Section 4.4.4 Hierarchy of Space and Time Priorities). Pima County will place special emphasis on achievements within the first five years of the permit by pursuit of a bond election and other funding strategies discussed above. Lands and conservation easements acquired by Pima County during the course of their habitat conservation planning efforts (i.e., since 1998) will be credited towards meeting goals of the initial 10-year phase.

6.7.2 Phase II: Permit Years 11–20

During this phase, Pima County will continue to secure funding for, and acquire or otherwise conserve lands at a level adequate to meet mitigation requirements for the projected growth of the second decade. Lands and conservation easements acquired by Pima County during Phase I that have not already been used to meet Phase I impact mitigation requirements will be credited towards meeting goals of Phase II.

6.7.3 Phase III: Permit Years 21–Buildout

During this phase Pima County will continue to secure funding for, and acquire or otherwise conserve lands at a level adequate to meet mitigation requirements for the projected growth of the third decade or until buildout (i.e., population of 1.94 million). Lands and conservation

easements acquired by Pima County during Phase II will be credited towards meeting goals of Phase III.

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6.8 Amendments

Amendments to the PCMSCP may be sought, if there is unanimous agreement by all permit signatories. Amendments may be either major or minor, as determined by USFWS. Minor amendments will be handled administratively. Major amendments, which will require an amendment to the permit, will involve the full public review process. Procedurally, a permit amendment application is treated in the same way as the original permit application. However, documentation required by USFWS in support of a proposed amendment will vary depending on the nature of the amendment and the content of the original PCMSCP documents. If the circumstances necessitating the amendment have been addressed in the original documents (e.g., a previously unlisted species adequately addressed in the HCP is subsequently listed), then only amendment of the permit itself will be needed. If the amendment involves an action that was not addressed in the original documents, IA, or NEPA analysis, these documents may need to be revised or new versions prepared addressing the proposed amendment(s).

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- Purchase of Development Rights Program Discussion Paper; May 2003
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- Ranch Tradition and Conservation in the Altar Valley Area; August 1999
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- Resources of the Altar Valley. Includes information on: Historic Conditions, Survey and Assessment, Watershed Protection; March 2000
- Resources of the Avra Valley Subarea. Includes Information on Fiscal Resources (mining) and Proposals for the Ironwood Monument; April 2000
- Resources of the Catalina Foothills Subregion; March 2003
- Resources of the Cienega Rincon Subarea; May 2000
- Resources of the Middle San Pedro Subarea. Includes: Middle San Pedro River Subarea Concept Plan (TNC) and other resources; March 2000
- Resources of the Middle Santa Cruz Subarea; May 2000
- Resources of the Northwest Subregion; July 2003

draft

- Resources of the Rincon/Southeast Subregion; March 2003
- Resources of the Southwest Subregion; March 2003
- Resources of the Tortolita Subarea; May 2000
- Resources of the Tucson Mountains/Avra Valley Subregion; March 2003
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- Resources of the West Pima County Subarea; May 2000
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- Rezoning from SR, RH, and GR 1; May 2003
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- Water Usage along Selected Streams in Pima County; July 2000
- Wetland Plant Evaluations ****; January 2003
- Wildcat Subdivision Study; April 1998

draft

Chapter 8

Preparers and Contributors

8.1 Preparers: RECON Team Members

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- Ms. Shannon Turek
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8.2 Contributors

8.2.1 Science Technical Advisory Team (STAT) Members Appointed by Pima County Board of Supervisors

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- Dr. George Ruyle, University of Arizona
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8.2.3 Other Consultants

- Harris Environmental
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- SWCA

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ATTACHMENTS

ATTACHMENT D

1. Wastewater Management Department Capital Improvement Projects
2. Department of Transportation and Flood Control District: Projects in County 5-Year Plan
3. Natural Resources Parks and Recreation: Memo and Maps
4. Flood Control District Maintenance Activities
5. 2004 Bond Projects

WASTEWATER MANAGEMENT DEPARTMENT
CAPITAL IMPROVEMENT PROJECTS
Potential for Section 10

	ACRES	2004-2009	2010-2019
1997 Sewer Revenue Bond Projects			
Ina Rd WPCF Proc Chg & Exp to 37.5 mgd	220.00	No	Completed
Arivaca Junction WWTF Extension Sewer	48.46	Possible	Completed
Misc. Wastewater Reclamation Facility (Randolph)	1.80	No	Completed
Green Valley WWTF Upgrade and Expansion	60.00	No	Completed
Roger Road Odor Control	Completed	NA	NA
Kino Effluent Wetcland Recharge/Ajo Basin	Completed	NA	NA
Rillito/Swan Effluent Wetland Project - Transferred to FCD	Cancelled	NA	NA
Green Valley Effluent Reuse for Turf Irrigation	Cancelled	NA	NA
Santa Cruz Interceptor, Prince-Franklin (Phase II & III))	53.06	Possible	Completed
Santa Cruz Interceptor /Lincoln-Drexel	38.09	Possible	Completed
TV Int., Craycroft-Tucson Country Club	20.65	Possible	Completed
TV Int., Hidden Hills Wash to Arbor Circle	13.77	Possible	Completed
N. Rillito Interceptor	Completed	NA	NA
New Marana WWTF (0.5 mgd) Construction	240.00	No	Completed
Marana Interceptor	Cancelled	NA	NA
Harrison-Pantano WRF	Cancelled	NA	NA
System Development Fund Projects			
Green Valley CC Estates Trunk Reloc.@ DW #7	0.14	Possible	Completed
Thornydale Rd. Trunk Sewer Phases I& II	Completed	NA	NA
S. Rillito Int. RS, Glenn-Kleindale	0.00	No	Completed
Green Valley Sewer Protection	0.14	Possible	Completed
Santa Cruz River Relief Sewer (W.Branch Xing)	2.29	Possible	Completed
Carrillo School/El Paso Sewer Rehab	0.00	NA	NA
Old Nogales Hwy. Colonia	20.15	Possible	Possible
Marana Colonia Sewer/Redev. Honea Hgts.	16.90	No	Completed
Regional Facility Plan Update	NA	NA	NA
Sewer System Inventory & Inspection	NA	NA	NA
Avra Valley BNROD Expansion	150.00	No	No
Misc. Eng. Design Services	NA	NA	NA
Miscellaneous Sewer Relocations	NA	NA	NA
Tanuri Drive Relief Sewer	NA	No	Completed
Tangerine Rd. Sewer X-sing @ Big Wash	12.10	Possible	Completed
Sewer Replacement @ Alvernon and Hayne St.	NA	NA	NA
Pumping Systems SCADA	NA	NA	NA
Hidden Valley Easements	NA	NA	NA
Sewer System Condition Assessment (CCTV)	Completed	NA	NA
98 Acres Near Ina Road - Transferred to FCD	NA	NA	NA
Richey Yard Improvements	NA	NA	NA
Neural Network/SSO Early Warning	NA	NA	NA
Ina Warehouse	NA	NA	NA
Ina - DeNitrification	NA	NA	NA
Ina - Railing Renovation	NA	NA	NA
Ina - Roof Refurbishment	NA	NA	NA
Ina - Biosolids Bladder Liner	NA	NA	NA
Ina - Chlorine	NA	NA	NA
Roger - Admin Bldg.	NA	NA	NA
Roger - Security	NA	NA	NA
Roger - Rehabilitation	NA	NA	NA

Roger - Clarifier	NA	NA	NA
Roger - Chlorine Control	NA	NA	NA
Roger - Storm Sewer	NA	NA	NA
Roger Relocate Sample Prep Room	NA	NA	NA
Outlying - Building	Completed	NA	NA
ADOT Relocation: Speedway to Congress	Completed	NA	NA
ADOT Relocation: I-19-&_I-10	Completed	NA	NA
New Federal Prison	39.69	Possible	Completed
Corona de Tucson / Fairgrounds Improvements	25.00	Possible	Possible
Continental Ranch 2nd Force Main & Standby Pump	30.28	Possible	Completed
CIPP Pipe Bursting	Completed	NA	NA
Kinder-Morgan Pipeline	NA	NA	NA
PCDOT: 12th Ave. : Ago to Los Realest	Completed	NA	NA
PCDOT: River Road - 1st to Campbell	Completed	NA	NA
PCDOT: Sunrise Dr. - Swan to Craycroft	Completed	NA	NA
PCDOT: First Ave.: River Rd. to Orange Grove	Completed	NA	NA
PCDOT: Misc. Projects	Completed	NA	NA
2004 Sewer Revenue Bond Projects			
Roger Road WWTF Rehabilitation	130.00	No	No
Misc. Conveyance System Rehab. And Repair	NA	NA	NA
Santa Cruz Interceptor, Prince-Franklin (Phase II & III))	53.06	Possible	Completed
Roger Rd. WWTF to Ina Rd WPCF Plant Inter.	67.84	Possible	Possible
TV Int., Craycroft-Tucson Country Club	20.65	Possible	Completed
Marana Regional Airport Sewer Con.	60.50	Possible	Completed
Ina Road WPCF - Denitrification	220.00	No	No
Ina Rd. WPCF Central Plant & Electric Upgrade	220.00	No	No
Ina Rd. WPCF Laboratory & Office Bldg.	220.00	No	No
New Marana WWTF Expansion	240.00	No	No
Misc. Water Reclamation Projects	Unknown	No	Possible
Mt. Lemon Sewer System	160.00	No	Possible
Total Acres	**2,384.56**		
Possible Acres		**505.87**	**272.99**

Acreage

Conveyance easements assumed to be 100 feet in width.

Treatment facility areas calculated from MapGuide GIS data.

Cancelled - Project Cancelled

Completed - Project Completed

NA - Not Applicable

No - No Section 10 needs anticiptated

Possible - Section 10 needs could be possible

Unknown - Unable to quantify acreage at this time.A2

Pima County Department of Transportation Projects in County 5 Year Plan (Developed 8/5/04)

BOND NO.	PROJECT NO.	PROJECT NAME	CON START DATE	LENGTH FT.	402 AREA OF DISTURBANCE (acres)	CLS AREA OF DISTURBANCE (acres)	404 AREA OF DISTURBANCE (acres)
5 Year Plan (Current thru FY 08/09)							
DOT 45B	4LCRIR	La Cholla Blvd: River to Omar	Oct 03		53	-	1
	4TWETM	Ruthrauff/Wetmore: La Cholla to Fairview	Nov 03		35	-	-
	4TVMEM	Veterans Memorial Overpass	Feb 04		27	-	-
DOT 57-22	4ABCON	Abrego Dr & Continental Rd	Jul 04	2,350	7	-	0.25
DOT 57	4SVSWT	Silver Bell and Sweetwater-Traffic Signal	Jul 04	1,000	0.5	-	-
DOT 57	4DVIEW	Valencia Rd. @ Desert View H.S.	Jul 04	1,500	0.2	-	-
DOT 57	4DMRRA	Duval Mine Rd./Rio Altar	Aug 04	2,000	1.4	-	-
DOT 57	4RVTOC	River Rd. @ Pontatoc-Signal and Realign	Aug 04	1,800	3	-	-
		Massingale Dentention Basin	Aug 04	500	1	-	<0.1
	4CDSTC	Camino del Sol Multi-use Lane	Sept 04	5,200	2.4	-	<0.1
DOT 57	4CADRX	Cardinal/Drexel Traffic Signal	Sep 04	2,700	3	-	-
DOT 30	4CHTVH	Catalina Hwy: Tanque Verde to Houghton Rd	Sep 04	11,250	43	-	0.6
DOT 57	4KNSAN	Kinney Rd. @ Sandario - Drainage Work	Oct 04	400	0.6	0.3	<0.1
	4CATBL	Catalina Highway Bike Lane	Nov 04	12,950	12	3.0	<0.1
DOT 4	4TRRCA	River Road: Campbell Rd. to Alvernon Way	Jan 05	12,700	48	-	0.8
DOT 5	4AWRRF	Alvernon Way: River Rd to Ft. Lowell Rd	Jan 05	4,000	15	-	0.3
DOT 25	4ISNFC	I-19 S Frontage at Continental	Jan 05	800	3	-	-
DOT 57	4LCHOV	La Cholla/Overton Rd. Traffic Signal	Feb 05	2,400	5.5	4.0	X
DOT 57	4SHAOV	Shannon/Overton Traffic Signal	Feb 05	2,400	2.5	2.5	x

BOND NO.	PROJECT NO.	PROJECT NAME	CON START DATE	LENGTH FT.	402 AREA OF DISTURBANCE (acres)	CLS AREA OF DISTURBANCE (acres)	404 AREA OF DISTURBANCE (acres)
DOT 57	4TVDLP	Tanque Verde Rd./Tanque Verde loop Improv.	Feb 05	2,050	3	-	-
DOT 57	4GATES	Gates Pass Rock Removal	Mar 05	750	1.4	1.4	-
	4AHGLB	Aviation Parkway /Golf Links Rd Bike Path Conn.	Jun 05	3,000	1.5	-	-
DOT 43b	4TSTAR	S. 12th Ave; 44th Street Gateway	Jun 05	1,900	4	-	-
		Dodge Blvd; Fort Lowell to River Rd.	Jan 06	4,000	2.8	-	x
DOT 46	4CRRSD	Craycroft Rd: River Rd to Sunrise Dr	Jan 06	13,000	49	-	x
	4XHHRD	Hayhook Ranch Rd.	Feb 06	26,400	36	36	x
DOT 17	4VMCLT	Valencia Rd: Mark Rd to Camino de la Tierra	Mar 06	11,000	42	-	x
	4PICSN	Picture Rocks @ Sandario-Traffic Signal	Apr 06	2,400	1.2	-	X
	4PICAK	Picture Rocks @Van Ark-Widening	Apr 06	1,500	0.8	-	x
DOT 57-27	4CWIRX	RR Crossing: Contractors Way @ Illnois St	Apr 06	860	3	-	-
DOT 57-29	4CWMRX	RR Crossing: Contractors Way @ Michigan St.	Apr 06	715	3	-	-
DOT 57-26	4TBRYX	RR Crossing @ Twin Buttes Rd	Apr 06	500	1.9	0.23	<0.1
DOT 47	4SRCRK	Sunrise Dr: Craycroft Rd to Kolb Rd	Jan 07	10,000	38	-	x
DOT 12	4CCTST	Country Club Rd: 36th St to Irvington Rd	Feb 07	7,500	28	-	x
	4LCRRI	La Canada Dr: River Rd to Ina Rd	Jul 07	14,500	55	-	x
DOT 20	4LCITR	La Cholla Blvd: I-10 to Ruthrauff Rd	Jul 07	7,500	28	-	x
DOT 44	4OGCOR	Orange Grove Rd: Corona Dr to Oracle Rd	Jul 07	10,400	40	-	x
DOT 32	4KRSCS	Kolb Rd: Sabino Canyon to Sunrise Dr	Jan 08	10,600	40	-	x
BEYOND 08 /09							
	4VRISP	Colossal Cave Rd: Acacia to Pantano Wash	Beyond 08/09	4,400	13	-	x

BOND NO.	PROJECT NO.	PROJECT NAME	CON START DATE	LENGTH FT.	402 AREA OF DISTURBANCE (acres)	CLS AREA OF DISTURBANCE (acres)	404 AREA OF DISTURBANCE (acres)
	4MCAFW	Madera Canyon Rd: Culvert @ Florida Wash	Beyond 08/09	3,100	11	8.5	0.15
	4MCAMW	Madera Canyon Rd: Culvert @ Medium Wash	Beyond 08/09	1,650	6	4.5	0.13
	4TSBBB	Silverbell Rd at Blanco / Brawley Washes	Beyond 08/09	3,550	15	12	2.33
DOT 18b	4TCFIT	Cortaro Farms Rd: Camino De Oeste to Thornydale Rd.	Beyond 08/09	7,400	37	8.3	x
DOT 57-07	4SPPHA	Speedway Blvd: Painted Hills to Anklam Rd	Beyond 08/09	8,900	30	23	x
DOT 49	4VRMRI	Valencia Rd: Mission Rd to I-10	Beyond 08/09	9,300	7	-	x
DOT 36	4CSWPC	Camino Del Sol/West Pkwy.: Cont. to Duval Mine	Beyond 08/09	12,555	48	-	x
DOT 6	4MRLCO	Magee Rd: La Canada Dr to Oracle Rd	Beyond 08/09	6,500	25	-	x
DOT 28	4SBCSH	Speedway Blvd: Camino Seco to Houghton Rd	Beyond 08/09	10,550	40	4	x
DOT 34	4CSCRO	Camino Del Sol: Continental to Ocotillo Wash	Beyond 08/09	8,400	32	-	x
DOT 11	4DTBAW	Drexel Rd: Tucson Blvd to Alvernon Way	Beyond 08/09	8,000	30	-	x
DOT 7	4OGAFW	Orange Grove Rd: Culvert @ Geronimo Wash	Beyond 08/09	1,000	4	-	x
DOT 50	4KRAWB	Kinney Rd: Ajo Way to Bopp Road	Beyond 08/09	7,200	27	-	x
DOT 27	4TRVEN	River Rd: Culvert @ Ventana Canyon Wash	Beyond 08/09	1,100	5	-	1
DOT 23	4TTCLV	Thornydale: Cortaro Farms to Linda Vista Blvd	Beyond 08/09	8,920	3	9	x

BOND NO.	PROJECT NO.	PROJECT NAME	CON START DATE	LENGTH FT.	402 AREA OF DISTURBANCE (acres)	CLS AREA OF DISTURBANCE (acres)	404 AREA OF DISTURBANCE (acres)
DOT 26	4ISNBF	Abrego Dr at I-19 NB Frontage Rd	Beyond 08/09	1,500	6	-	x
DOT 53	4OTNHS	Old Tucson/Nogales Hwy: Summit Neighborhood	Beyond 08/09	6,400	24	-	x
DOT 37	4INFRC	I-19 NB Frontage: Canoa TI to Continental TI	Beyond 08/09	24,400	92	70	x
DOT 10	4LCILL	La Canada Dr: Ina Rd to Calle Concordia	Beyond 08/09	13,200	50	-	x
DOT 31	4TVCHH	Tanque Verde: Catalina Hwy to Houghton Rd	Beyond 08/09	9,000	34	-	x
DOT 40	4GRORP	Grant Rd: Oracle Rd to Park Ave	Beyond 08/09	6,700	25	-	x
DOT 24	4MBTLT	Mainsail Blvd: Twin Lakes Dr 27 Wash Vicinity	Beyond 08/09	1,100	4	-	x
	4TPSML	Twin Peaks Rd: Sidewinder Rd to Marana Town Limits	Beyond 08/09	7,100	24	10.5	x
DOT 56	4BBECC	Broadway Blvd: Euclid Ave to Country Club Rd	Beyond 08/09	10,200	38	-	x
DOT 48	4DMLCA	Duval Mine Rd: La Canada Dr to Abrego Dr.	Beyond 08/09	3,550	13	-	x
DOT 29	4HRSTV	Houghton Rd: Golf Links Rd to Speedway Blvd	Beyond 08/09	15,850	60	1.5	x
DOT 52	4PVIVM	Palo Verde Rd: I-10 to Veterans Memorial Overpass	Beyond 08/09	8,700	33	-	x
DOT 44	4OGTCD	Orange Grove Rd: Thornydale Rd to Corona Dr	Beyond 08/09	11,750	44	-	x
	4MCFTL	Magee Rd/Cortaro Farms Rd: Thornydale Rd to La Canada Dr.	Beyond 08/09	18,150	69	13.2	x
DOT 41	4TSITP	22nd St: I-10 to Park Avenue		7,160	27	-	x

BOND NO.	PROJECT NO.	PROJECT NAME	CON START DATE	LENGTH FT.	402 AREA OF DISTURBANCE (acres)	CLS AREA OF DISTURBANCE (acres)	404 AREA OF DISTURBANCE (acres)
	4FSAMU	Calle De Samuel Culvert		800	3	-	x
DOT 57-12	4DRMIS	Drexel Rd & Mission Rd		1,000.00	3.8	-	x
DOT 57-23	4FAROG	Fairview Rd & Roger Rd		1,100	4	-	x
DOT 19	4HLNCF	Hartman Lane North of Cortaro Farms Rd	Beyond 08/09	1,100.00	2.5	1.8	0.5
DOT 54	4MTLMS	Mount Lemmon Shuttle	Beyond 08/09	1,950	7.	-	x
DOT 57-14	4RCSMC	Rancho Catalina Subdivision Connect to Magee Rd		700	2.5	-	x
DOT 57-08	4RIVTF	River Rd: Tanuri Dr to Flagstaff Pl		4,515	17	-	x
	4FSULL	Sullinger Ave Storm Drain		2,900	11	-	x

Storm Water Permit 402 Area of Disturbance = (ROW) 150 ft. + 10%
CLS Area does not include areas that are riparian only
404 'x' means that a 404 is anticipated, but area not yet determined

M E M O R A N D U M

TO: Maeveen Behan

FROM: Darrin Brightman

DATE: June 22, 2004

SUBJECT: Section 10 – CIP Projects

Attached are maps for each of the following projects:

1997 Bond:

Picture Rocks District Park – Construction of a new district park.
Old Nogales Neighborhood Park – Construction of a new neighborhood park.
Sahuarita District Park – Construction of a new district park.

2004 Bond:

Curtis Road Park – Construction of a new neighborhood park. 2.1 acres of the site fall within the Multi-Use zone.

Dan Felix District Park – Improvements to an existing district park, including creation of an additional soccer field, parking areas, and development of a passive recreation/riparian restoration zone. 0.31 acres fall within the Riparian zone, and .23 acres within the Multi-Use zone. Please note that most of this is existing parking.

Feliz Paseos Universal Access Park – Construction of a new nature park. All 50 acres fall within the Multi-Use zone.

Brandi Fenton Memorial Park – Construction of a new district park in conjunction with River Road/Alvernon Way realignment. 8.63 acres fall within Multi-Use zone. Much of this area will be dedicated to habitat restoration.

George Mehl Family Foothills District Park – Improvements to an existing district park, including new sports field, an activity center, and infill planting. 14 acres fall within the Multi-Use zone, and 1.44 acres within the Riparian zone.

Rillito Regional Park – Improvements to an existing regional park, including new sports fields, an entry from River Road, additional parking, and a trailhead. Of 15 acres to be improved, 10 acres are within the Multi-Use zone.

I've also enclosed the relevant pages from the Vegetation Requirements, 2004-2011 publication, which include concept diagrams, master plans, and the like.

If you have any questions or require any additional information, please contact me at 877-6242 or via e-mail at darrin.brightman@parks.pima.gov!

cc: C. DiPilato
G. Hagen



Old Nogales Neighborhood Park
1800 East Summit Street
1997 Bond: 2003-2004 Construction

Designated Trail
Wash
Conservation Lands System - Riparian

0 600 1200 Feet

N

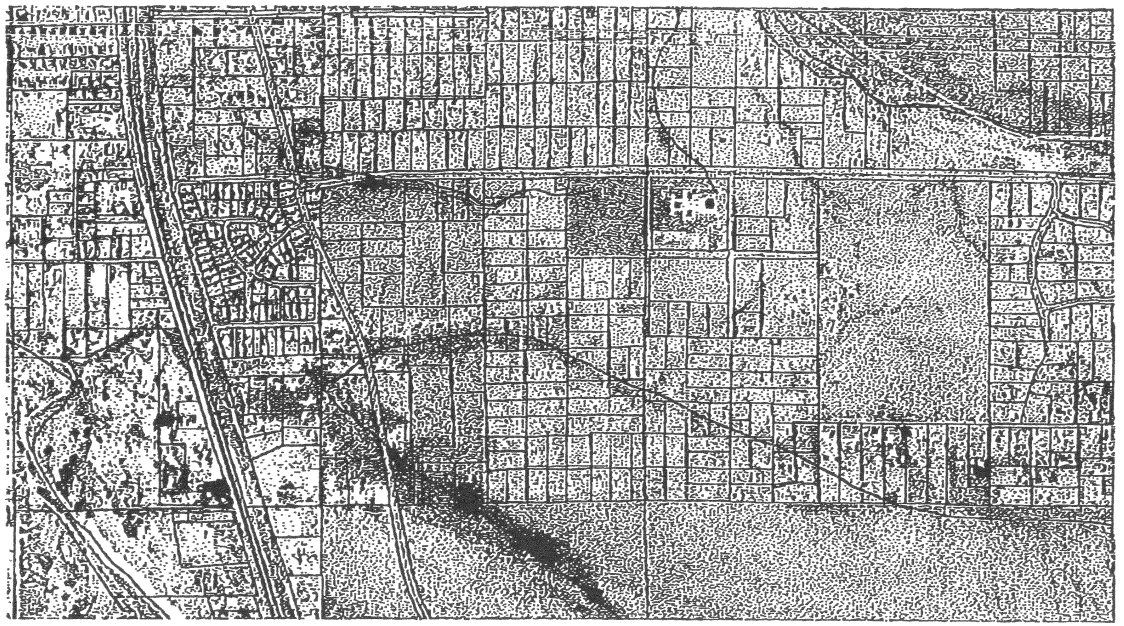
P-40 Old Nogales Neighborhood Park

1800 East Summit Street
Construction: 2003-2004

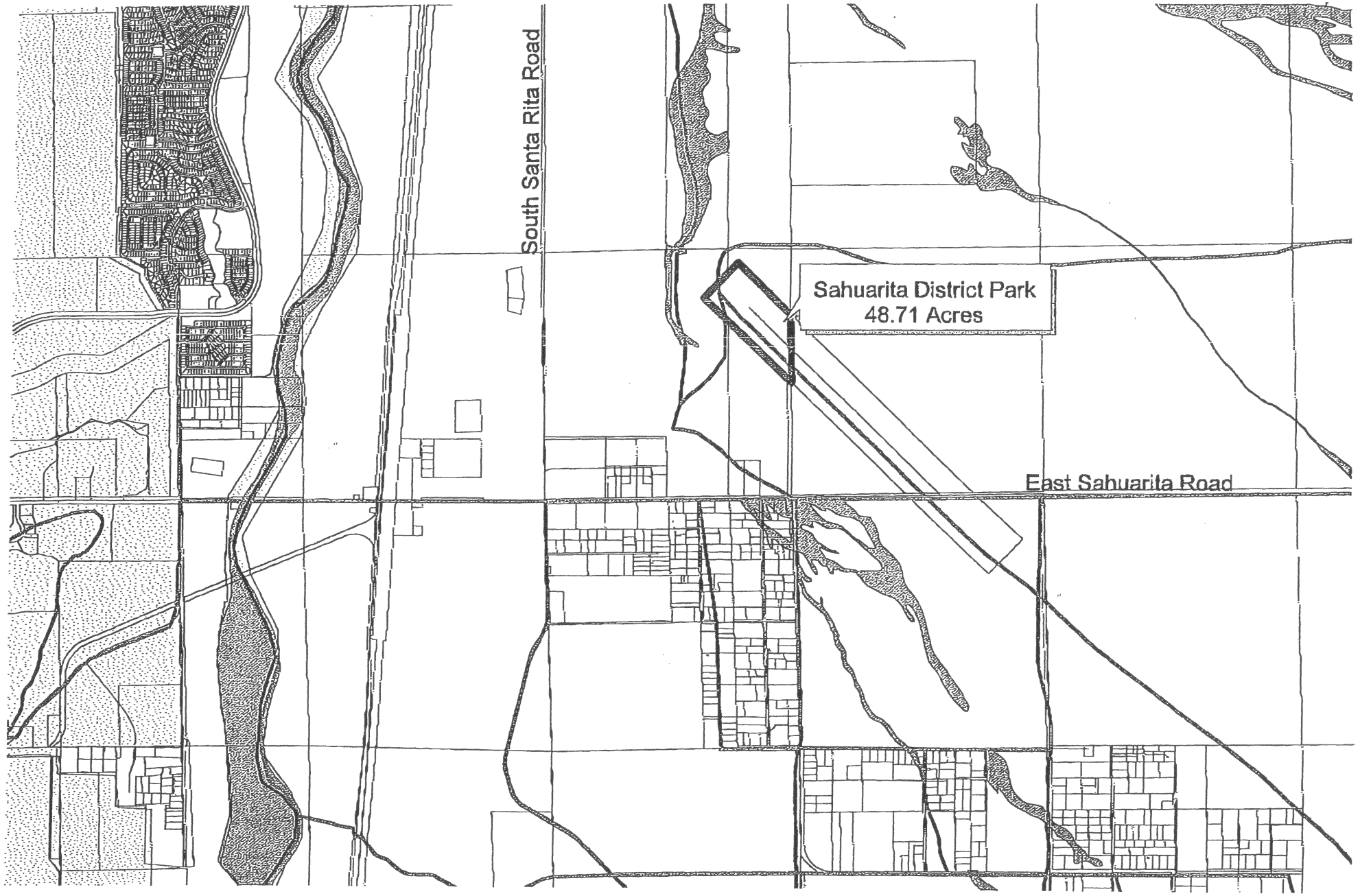
24" box plants:	33
15-gallon plants:	330
5-gallon plants:	0
1-gallon plants:	0
Odd-sized plants:	0
Total Plants:	**363**

Scope: The development of a new active-use neighborhood park.

Species	#
Cercidium floridum	30
Olneya tesota	3
Total 24" Box	**33**
Prosopis velutina	125
Leucophyllum candidum 'Thundercloud'	9
Baccharis centennial	64
Lantana montevidensis	93
Dasylirion wheeleri	6
Ferocactus wislizenii	30
Yucca elata	3
Total 15 gallon	**330**
Total Plants	**363**



Project Site



Sahuarita District Park
15500 South Sahuarita Park Road
1997 Bond: 2004-2005 Construction

Designated Trail
Wash
CLS - Riparian
CLS - Agriculture
CLS - Multi-Use

N

0 6001200 Feet

01/13/2005 18:10 FAX 5207408171 PIMA COUNTY ADMIN STRATO 006/028

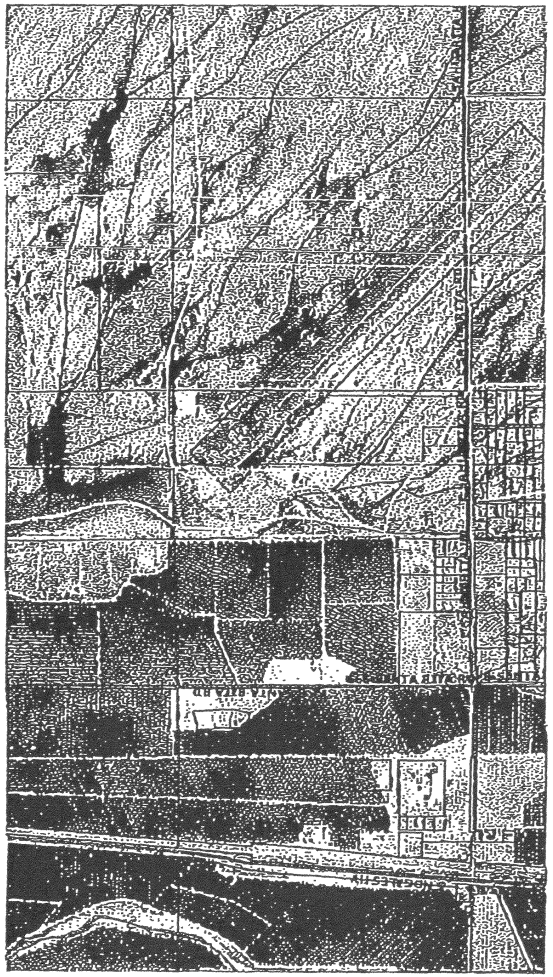
P-14 Sahuarita District Park

15500 South Sahuarita Park Road
Construction: 2004-2005

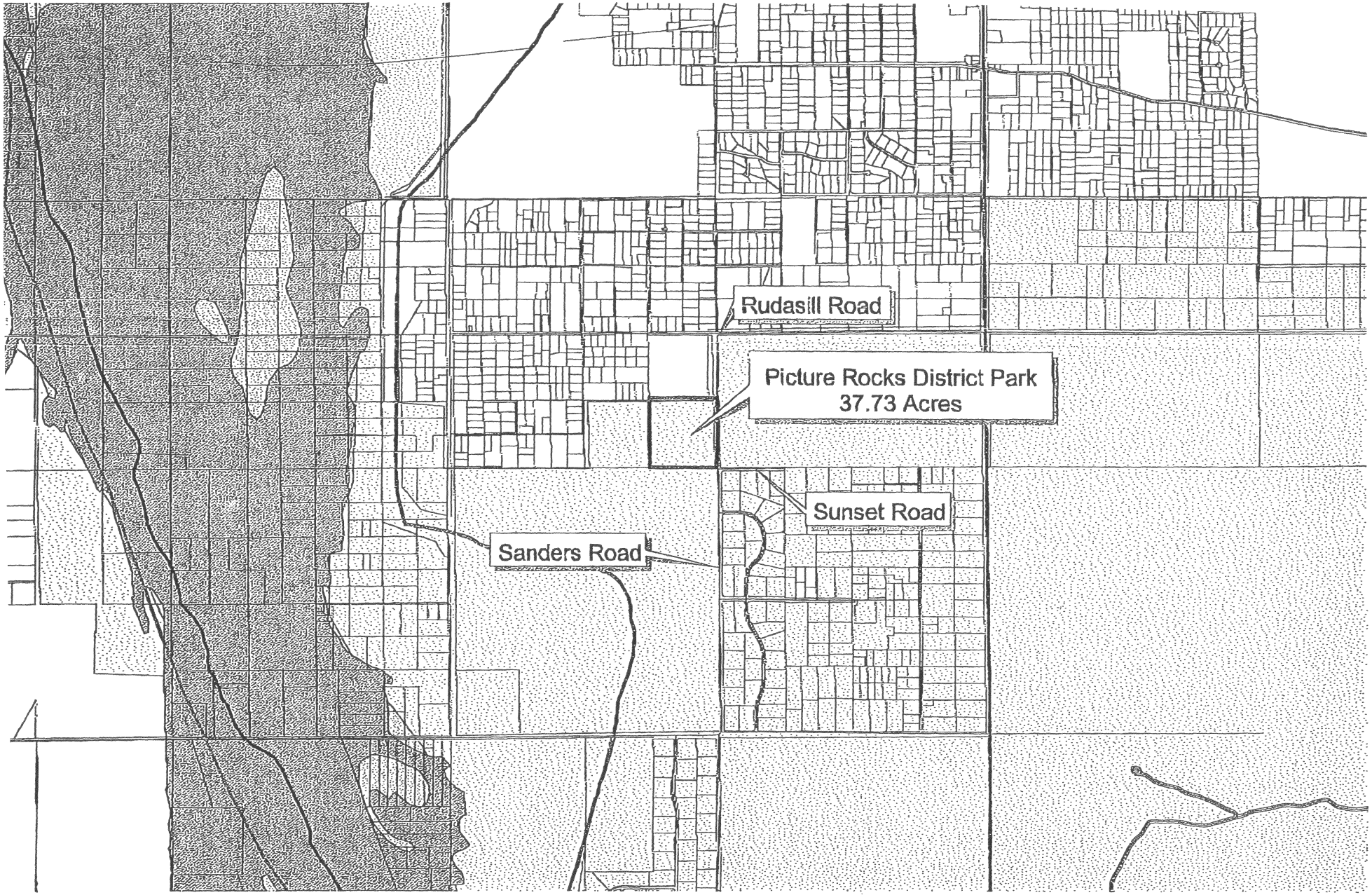
24" box plants:	0
15-gallon plants:	120
5-gallon plants:	303
1-gallon plants:	182
Odd-sized plants:	0
Total Plants:	**605**

Scope: Enhancements to an existing multi-use district park.

Species	#	
Prosopis velutina	69	
Cercidium floridum	38	
Acacia constricta	8	
Acacia greggii	5	
Total 15 gallon	**120**	
Dodonea viscosa	16	
Simmondsia chinensis	17	
Senna wislizenii	1	
Ziziphus obtusifolia	13	
Larrea tridentata	43	
Aristida purpurea	34	
Calliandra eriophylla	102	
Salvia mojavensis	38	
Nolina microcarpa	16	
Dasylirion wheeleri	17	
Fouquieria splendens	6	(6', 6 canes minimum)
Total 5 gallon	**303**	
Dalea greggii	9	
Baileya multiradiata	32	
Psilotrophe cooperi	141	
Total 1 gallon	**182**	
Total Plants	**605**	



Project Site



icture Rocks District Park
unset and Sanders Roads
997 Bond: 2004-2005 Construction

Designated Trail
Wash
CLS - Riparian
CLS - Bio Core
CLS - Agriculture
CLS - Multi-Use

N
0 1000 Feet

01/13/2005 18:11 FAX 5207408171 PIMA COUNTY ADMIN.STRATU 008/028

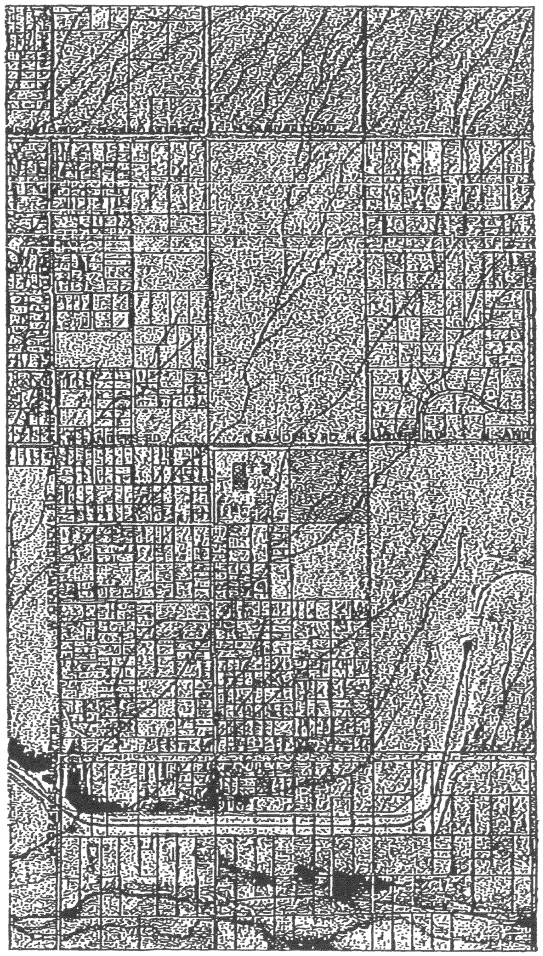
P-21 Picture Rocks District Park

Sunset and Sanders Roads
Construction: 2004-2005

24" box plants:	0
15-gallon plants:	139
5-gallon plants:	180
1-gallon plants:	115
Odd-sized plants:	19
Total Plants:	**453**

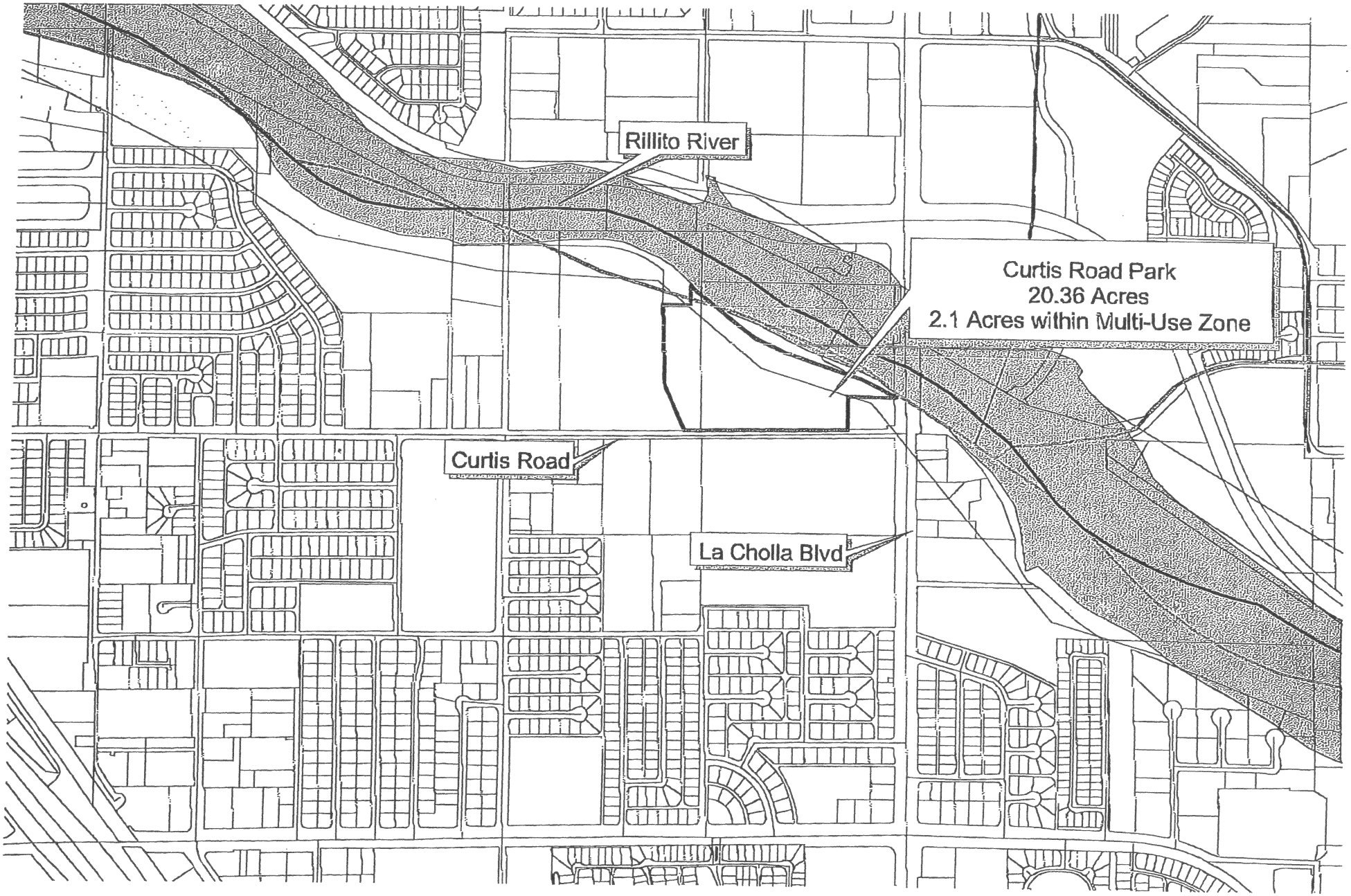
Scope: The development of a new active-use district park.

Species	#	
Acacia greggii	4	
Celtis pallida	13	
Cercidium floridum	63	
Chilopsis linearis	11	
Prosopis velutina	48	
Total 15 gallon	**139**	
Agave Palmeri Chrysantha	18	
Calliandra eriophylla	13	
Dalea pulchra	29	
Dodonea viscosa	13	
Encelia farnesia	32	
Fouquieria splendens	11	
Larrea tridentata	42	
Simmondsia chinensis	22	
Total 5 gallon	**180**	
Ambroisia deltoidea	42	
Dalea capitata 'Sierra Gold'	34	
Verbena goodingii	39	
Total 1 gallon	**115**	
Carnegiea gigantea	19	4' minimum
Total misc. sizes	**19**	
Total plants	**453**	



Project Site

01/13/2005 18:11 FAX 5207408171 PIMA COUNTY ADMIN.STRATO 009/028



Curtis Road Park
Curtis Road West of La Cholla Blvd
2004 Bond: Construction by 2011

Designated Trail
Wash
CLS - Riparian
CLS - Bio Core
CLS - Agriculture
CLS - Multi-Use

N

0 400 800 Feet

01/13/2005 18:11 FAX 5207408171 PIMA COUNTY ADMIN. STRATU 010/028

Curtis Road Park

(Flowing Wells East)
Curtis Road west of La Cholla Boulevard
Construction: Proposed 2004 Bond

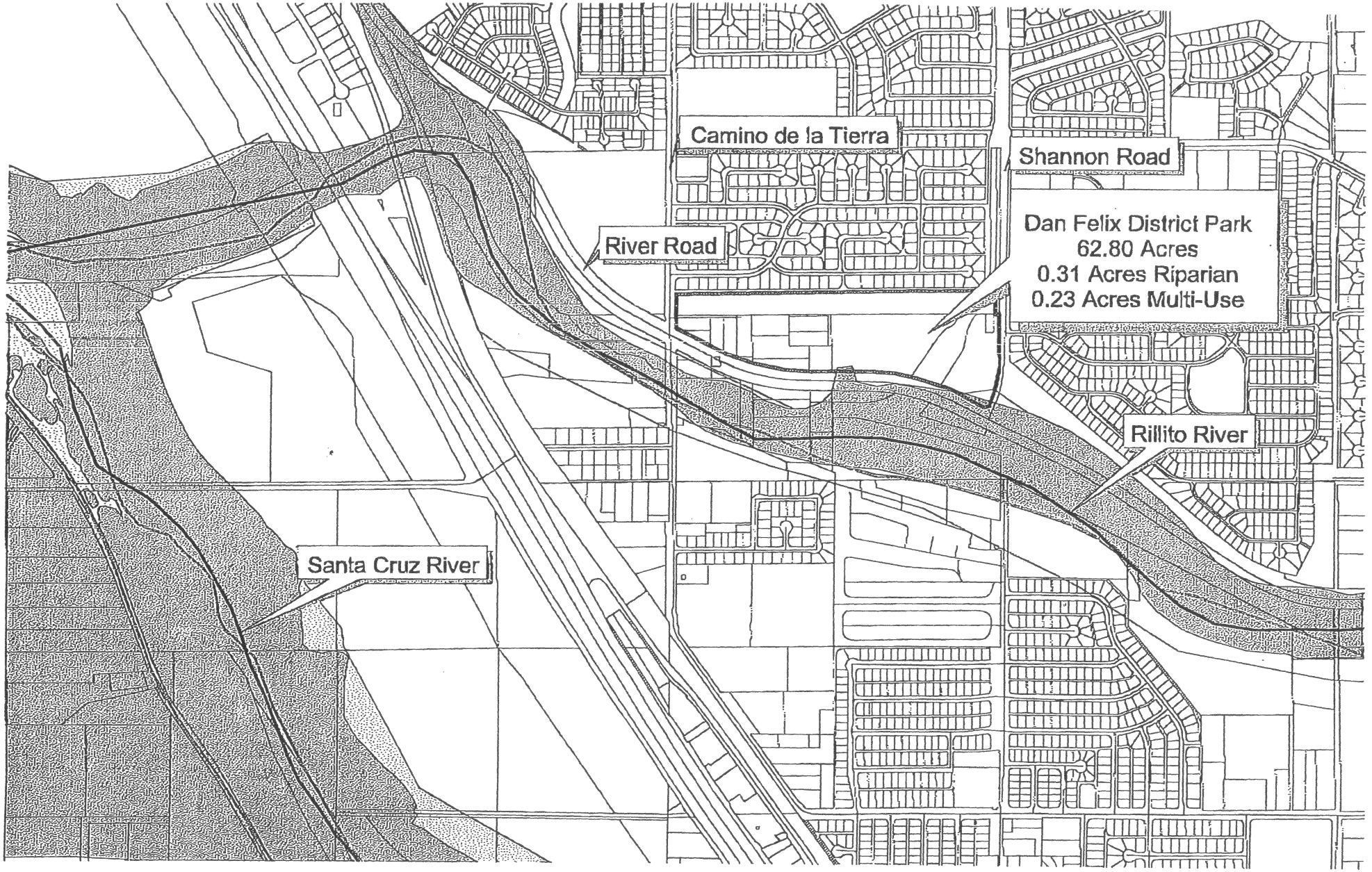
Dryland Species	
15-gallon plants:	201
5-gallon plants:	144
Xero/Meso/Hydroriparian Species	
15-gallon plants:	422
5-gallon plants:	373
Total Plants:	**1140**

Scope: This 20.36 acre site, adjacent to the Rillito River Park, includes features typical of active-use parks, such as two ball fields, a soccer field, playground, and turf free-play areas. Approximately 14.23 acres will be devoted to these uses, along with parking. These areas will receive planting at a density equal to 100% of the Land Park Average Density.

The remaining 6.13 acres present an opportunity for a riparian restoration and passive recreation facility, strongly tying the site to the Rillito River Park. Water harvesting will allow this area to be planted at 125% of the River Park Average Density.



UL/13/2005 10:12 FAX 520/4081/1 PIMA COUNTY ADMIN.CINAIU 002/011



Dan Felix District Park
5790 North Camino de la Tierra
2004 Bond: Construction by 2011

Designated Trail
Wash
CLS - Riparian
CLS - Bio Core
CLS - Agriculture
CLS - Multi-Use

N

0 500 1000 Feet

01/13/2005 18:12 FAX 5207408171 PIMA COUNTY ADMIN. SIRAIU 012/028

Dan Felix District Park

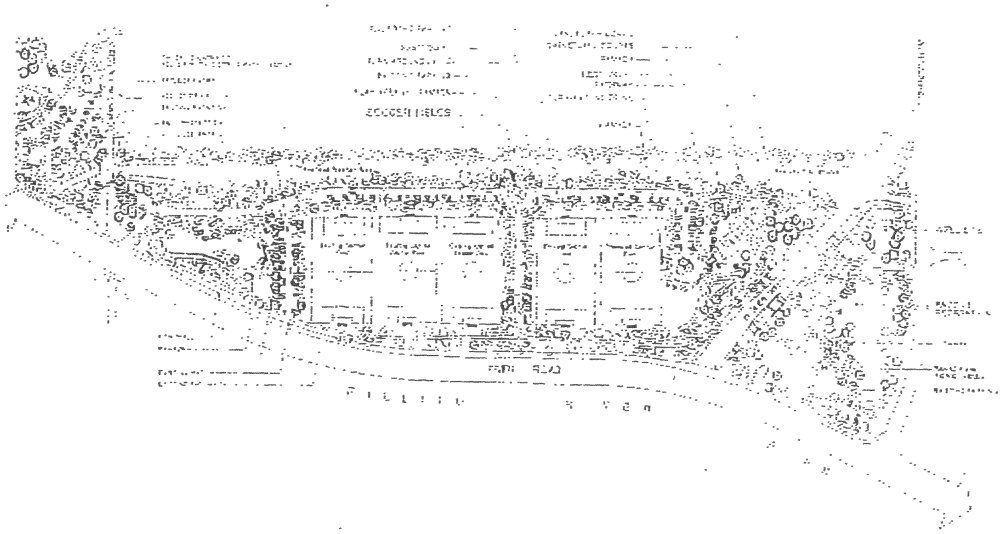
(formerly Pegler Wash District Park)
5790 North Camino de la Tierra
Construction: Proposed 2004 Bond

Dryland Species	
15-gallon plants:	201
5-gallon plants:	144
Xero/Meso/Hydroriparian Species	
15-gallon plants:	422
5-gallon plants:	373
Total Plants:	**1140**

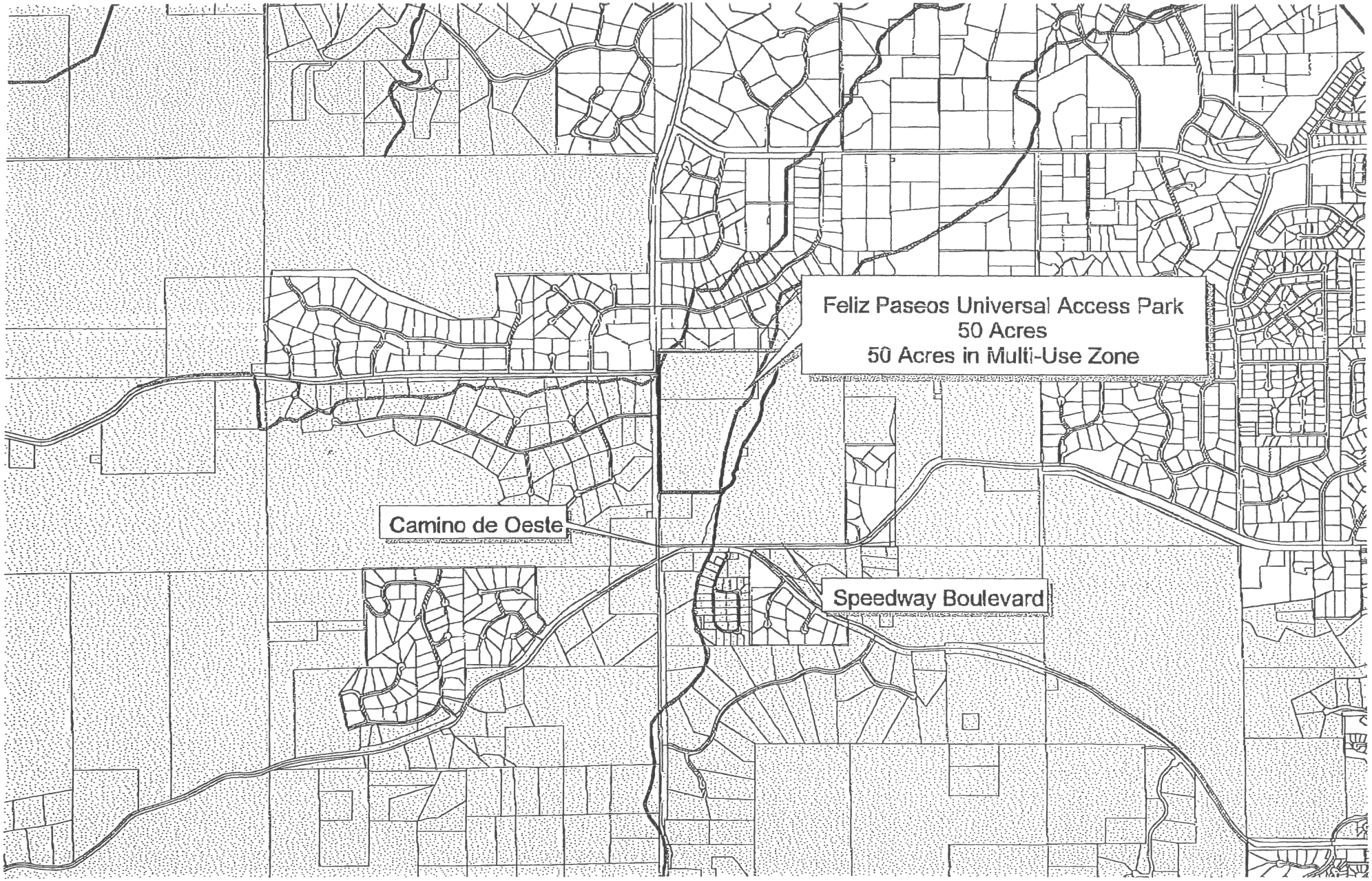
Scope: This 62.80 acre site currently hosts four soccer fields and parking. Pegler Wash passes through the eastern quarter of the site, and a substantial neighborhood drainageway occupies the northern 200 feet of the property.

Planned improvements include addition of basketball courts, a fifth soccer field, parking, and a turfed multi-use area. Active use facilities will occupy 3.26 acres of the site, and be planted at 100% of the Land Park Average Density.

The remaining 59.54 acres have been designated for riparian restoration/water harvesting and passive recreation. Of these, 40% will receive dryland species planted at 50% of River Park Average Density. 60% will receive X/M/H-riparian species, planted at 125% of RPA Density.



01/13/2005 18:12 FAX 520/4081/1 PIMA COUNTY ADMIN.STATIO 009/010



Feliz Paseos Universal Access Park
1600 North Camino de Oeste
2004 Bond: Construction by 2011

Designated Trail
Wash
CLS - Riparian
CLS - Bio Core
CLS - Agriculture
CLS - Multi-Use

N

0 800 1600 Feet

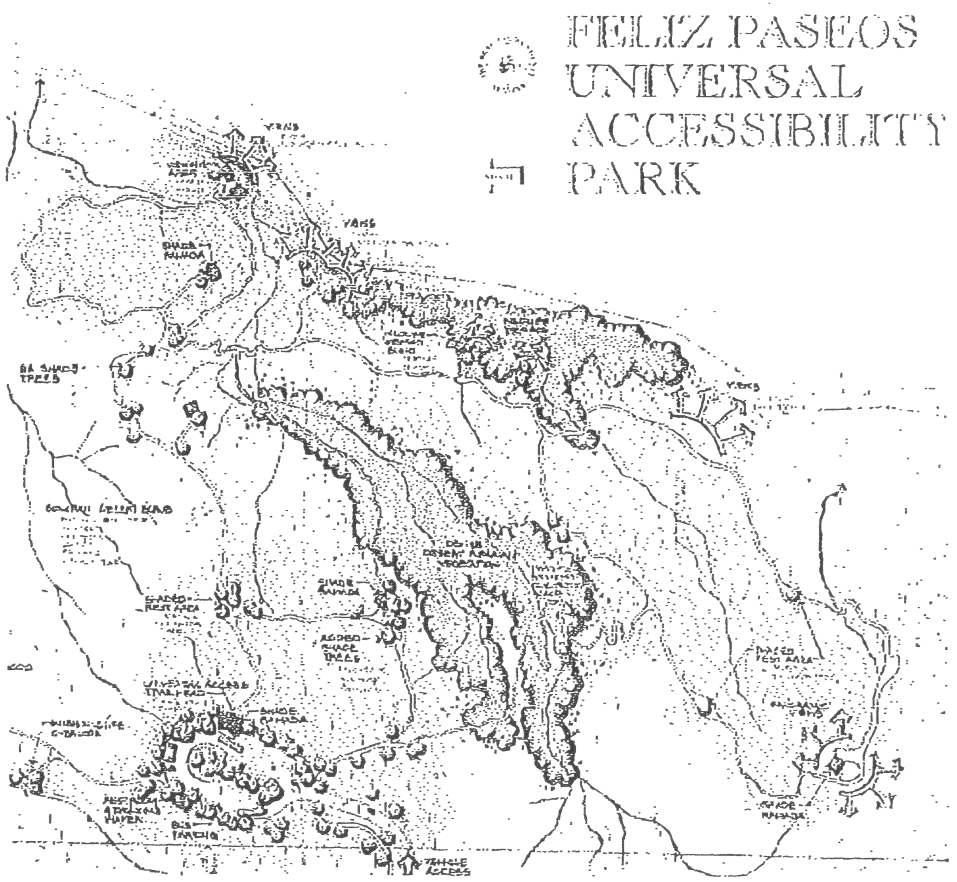
01/13/2005 18:12 FAX 6207408171 PIMA COUNTY ADMIN. SIMATO 014/028

Feliz Paseos Universal Access Park

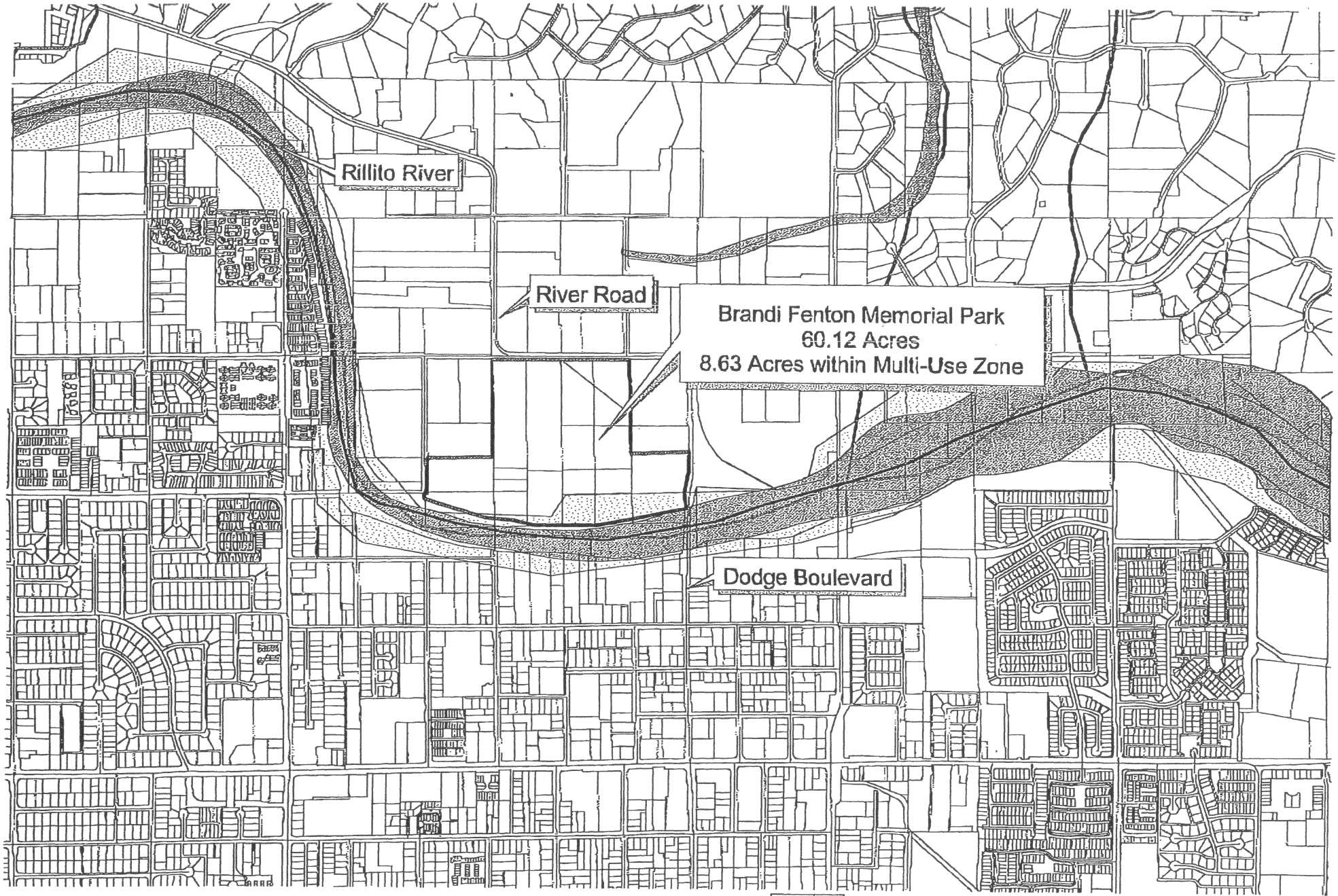
1600 North Camino de Oeste
Construction: Proposed 2004 Bond

Dryland Species	
15-gallon plants:	50
5-gallon plants:	30
Xero/Meso/Hydroriparian Species	
15-gallon plants:	15
5-gallon plants:	10
Total Plants:	**105**

Scope: This passive-recreation nature park site is already well-vegetated. The additional plants listed above will be used around parking facilities and to fill occasional planting gaps as needed.



01/13/2005 18:13 FAX 5207408171 PIMA COUNTY ADMIN.SIKAIU 015/028



Brandi Fenton Memorial Park
River Road at Dodge Boulevard
2004 Bond: Construction by 2011

Designated Trail
Wash
CLS - Riparian
CLS - Bio Core
CLS - Agriculture
CLS - Multi-Use

N

0 500 1000 Feet

PIMA COUNTY ADMINISTRATOR
07/07/2006 10:13 FAX 520 740 7171

Brandi Fenton Memorial Park

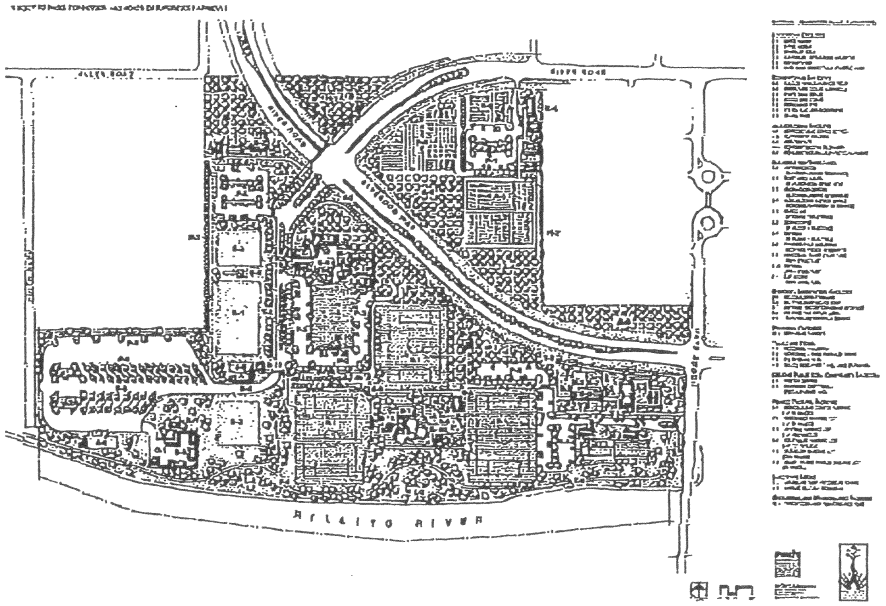
at Binghampton Historic District
River Road at Dodge Boulevard
Construction: Proposed 2004 Bond

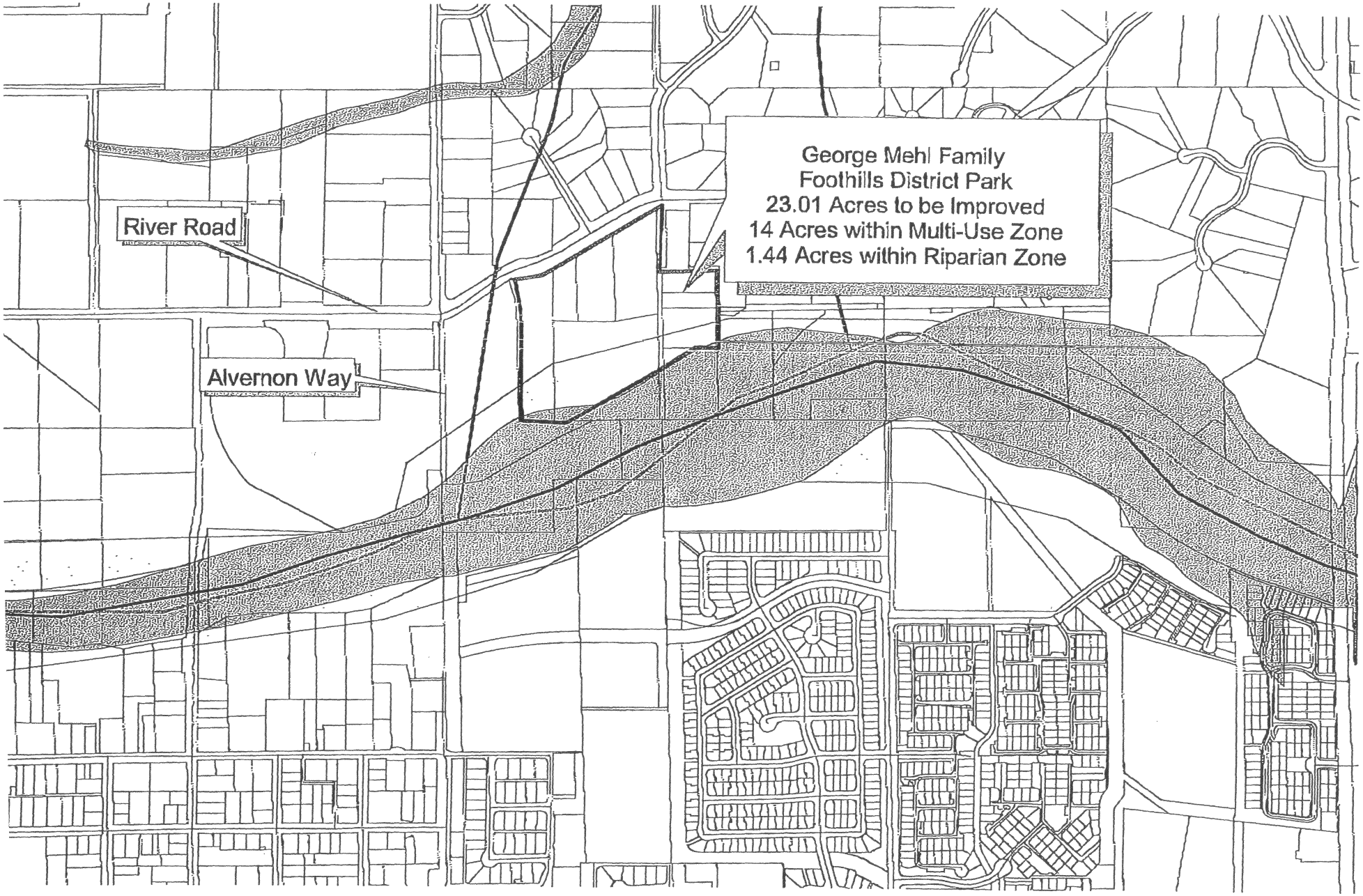
Dryland Species	
15-gallon Plants:	1646
5-gallon Plants:	349
Xero/Meso/Hydroriparian Species	0
Orchard Trees	54
Total Plants:	**2049**

Scope: This 60.12 acre site will be developed following construction of the Alvernon Way bridge. Adjacent to the Rillito River Park, the property will be developed as a mixed-use park, with interpretive facilities, historic buildings, agricultural demonstration areas, soccer fields, an equestrian staging area, and passive recreation facilities.

58.12 acres will receive planting at 200% of Land Park Average Density, and 2.00 acres of demonstration orchard will receive trees planted at 27 trees/acre (40 feet on center).

The revised master plan (right) indicates a quadrupling of orchard space (200+ trees); perhaps a similar aesthetic effect can be achieved with more drought-tolerant species. Use of native mesquite bosques (and the pods they produce) would offer an additional historic interpretation opportunity, while making use of the County's native plant nursery.





eorge Mehl Family
oothills District Park
)01 East River Road
)04 Bond: Construction by 2011

Designated Trail
Wash
CLS - Riparian
CLS - Bio Core
CLS - Agriculture
CLS - Multi-Use

N

0 400 800 Feet

01/13/2005 18:13 FAX 5207408171 PIMA COUNTY ADMIN STRATU 018/028

George Mehl Family Foothills District Park

4001 East River Road
Construction: Proposed 2004 Bond

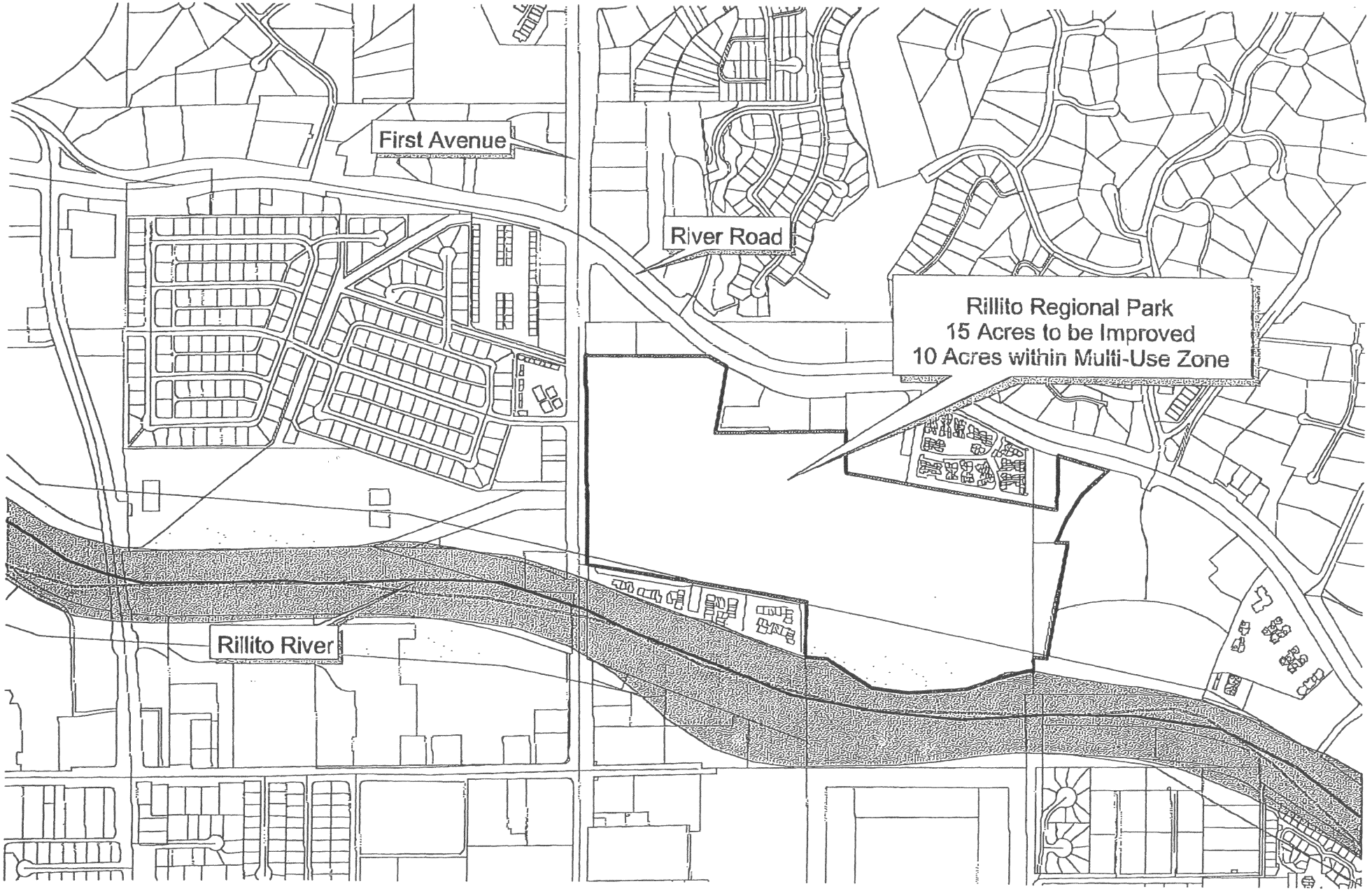
Dryland Species	
15-gallon plants:	217
5-gallon plants:	46
Xero/Meso/Hydroriparian Species	
15-gallon plants:	0
5-gallon plants:	0
Total Plants:	**263**

Scope: This active-use district park, adjacent to the Rillito River Park, is largely developed. Planned improvements may add one soccer and one softball field, an activity center, and parking.

Of 23.01 acres requiring additional planting, the 15.44 acres adjacent to the river park will receive infill planting at 50% of Land Park Average Density. The 7.57 acres adjacent to River Road will receive planting at 100% of LPAD.



01/13/2005 18:14 FAX 5207408171 PIMA COUNTY ADMIN STRATO 020/028



Rillito Regional Park
4502 North First Avenue
2004 Bond: Construction by 2011

Designated Trail
Wash
CLS - Riparian
CLS - Bio Core
CLS - Agriculture
CLS - Multi-Use

N
0 300 600 Feet

Rillito Regional Park

4502 North First Avenue
Construction: Proposed 2004 Bond

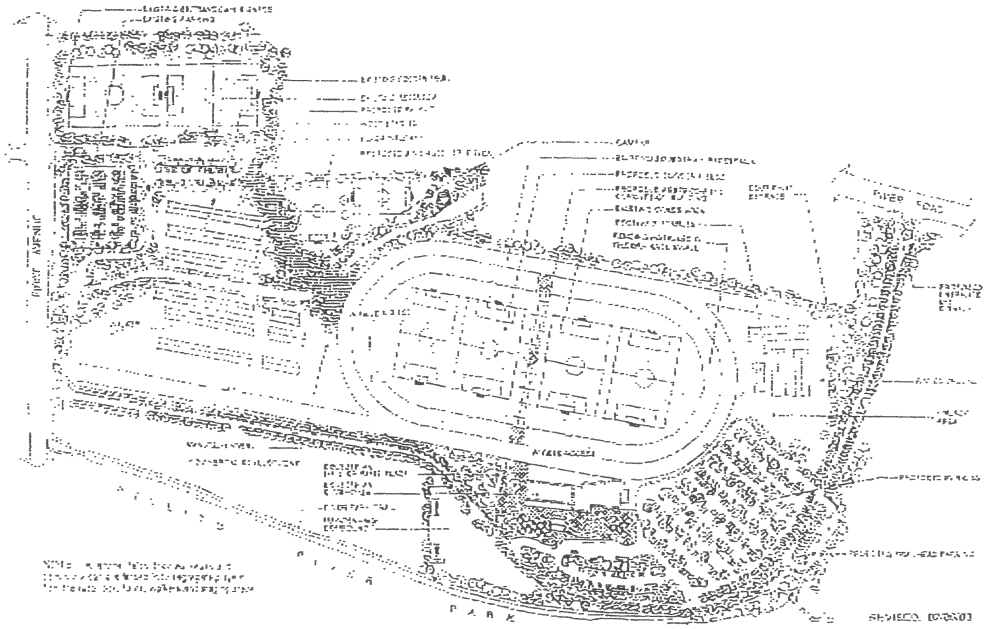
Dryland Species	
15-gallon plants:	315
5-gallon plants:	18
Xero/Meso/Hydroriparian Species	
15-gallon plants:	81
5-gallon plants:	71
Total Plants:	**485**

Scope: This active-use regional park, adjacent to the Rillito River Park, is already largely developed. Planned improvements include additional parking, additional soccer fields, a new entry from River Road, and a trailhead.

A wash passing through the site north of the racetrack and between the stables, then on toward First Avenue, offers a 1.76-acre riparian restoration/water harvesting opportunity. This area may receive planting at 100% of River Park Average Density.

12.05 acres of parking and plaza areas will receive planting at 50% of Land Park Average Density.

Entry drives and walkways totaling 4600 linear feet will receive double-allee treatment, with trees every 40 feet.



01/13/2005 16:14 FAX 520/4081/1 PIMA COUNTY ADMIN.STRAIG 図021/028

Pima County Flood Control District-funded maintenance activities to be covered by Section 10(a) permit application

The Pima County Flood Control District is a separate legal entity from Pima County, and collects tax revenue for the purpose of funding the construction, inspection, maintenance and repair of public structures along watercourses and District-owned lands. Structures receiving maintenance include constructed channels, grade-control structures, retention/detention basins and their inlets and outlets, dry wells, energy dissipators, and bank protection, roadway ditches, embankments, dip crossings and culverts.

Maintenance activities include repairing existing constructed features, removing sediment build-up, clearing vegetation and debris, mowing grass, mosquito abatement, installing culverts and fences, regrading channels and maintaining drainageway access roads. New structures are also built as part of maintenance activities. These structures are funded and installed separately from those installed under the Pima County or Pima County Flood Control District's Capital Improvements Program (CIP). New construction funded outside the CIP is typically smaller in scale and requires no right-of-way acquisition. In this document, the term "maintenance" includes non-CIP construction, as well as repair, consistent with current practice.

District funds are provided to Operations Division within Pima County Department of Transportation and Flood Control District for the purpose of maintenance. The District also funds maintenance through other, private contractors chosen through a bid process. In addition, maintenance is sometimes funded through other County Departments through a funds transfer.

The activities occur along primarily but not exclusively in unincorporated Pima County where land has been granted as an easement or fee simple rights-of-way to either the District or Pima County. Through intergovernmental agreements (IGAs) and plat dedications, the District also maintains certain watercourse bottoms, constructed channels and other structures within City of Tucson, and the towns of Oro Valley, Marana and Sahuarita. The District has agreements with the U. S. Army Corps of Engineers assuring that the flood-carrying capacity of the bank protected portions of the Rillito and several other streams will be maintained through periodic grading. In addition, the District sometimes maintains drainageways in privately-owned common areas or other privately-owned locations when there is a clear benefit to the public.

Maintenance and repair activities have and will continue to be undertaken in District-owned reserves, including the Bingham Cienega Natural Preserve and Cienega Creek Natural Preserve, to reduce erosion. These activities have included the construction of small berms and grade-control structures, fence repair, removal of wildcat dumps, and removal of non-native plants. Activities on District lands at Bingham Cienega also include burning vegetation to maintain fire-tolerant plant communities. The full gamut of activities should be covered in the permit, for the purpose of protecting natural resources.

The extent to which the District's maintenance responsibilities will increase over the 50-year period of the Section 10(a) permit is unclear. Because of the IGAs, easements, agreements, plat dedications and

other responsibilities already accepted by the District, a decrease seems unlikely. To the contrary, the maintenance burden can be expected to increase slowly as urbanization proceeds, even though measures will be taken to minimize floodplain encroachment. In addition, periodic flooding and erosion can be expected to damage or threaten to damage aging facilities and public infrastructures, requiring new construction or repair. Large, new restoration projects will also require maintenance.

The need for grading and removal of vegetation can be anticipated where development, including roadway crossings, occurs. This includes within watercourses which are considered Important Riparian Areas under the Sonoran Desert Conservation Plan, especially along the larger watercourses. Natural hydrological and ecological processes which operate during the decades between large, scouring floods can result in streambed aggradation and increased channel roughness. These natural processes can increase the potential for flooding to the point where properties which were once out of the regulatory floodplain may, over time, become subject to flooding or erosion. The Federal Emergency Management Agency may in some locations require this maintenance be performed as a condition of accepting a floodplain modification caused by a roadway or development. Even though the actual structures may occupy a small footprint, the drainageway modifications required in the future to assure drainageway capacity can be quite large.

Urbanization increases the frequency and magnitude of runoff events, particularly on small watersheds, such that natural washes may be de-stabilized over time. The District anticipates the occasional need to remove vegetation and sediment, or construct erosion protection or grade-control structures to protect public and private property in the future, even where the washes are left natural

When flood damage occurs, maintenance operations staff work diligently to ensure that any damage is repaired as soon as possible. These repairs occur outside the Capital Improvement Program and do not involve the acquisition of rights-of-way. The U. S. Army Corps of Engineers specifically exempts certain emergency repairs from the Section 404 (Clean Water Act) program, while others can be expected to go through the Section 404 process.

Quantifying the location and amount of future disturbances associated with maintenance is difficult. Based on past maintenance records, between 250 and 1000 acres of land is graded for maintenance each year, and a little fewer than 100,000 cubic yards is moved. Additional amounts are mowed, fenced or disturbed. Past records of maintenance do not suggest an linear increase or decrease. Rather, the amount of work fluctuates greatly year to year. Regional flood events similar to those experienced in 1983 and 1993 can be expected to increase the annual channel maintenance needs dramatically for the year of their occurrence.

Of particular concern to the Section 10(a) permit may be the need to maintain channels and detention/retention basins in the habitat occupied by the pygmy-owls within the Tortolita piedmont. Because of the density of development, vegetated drainageways provide important habitat. The density of housing, commercial development, roadways and other utilities ensures that there is a continuing need to grade drainageways and maintain detention basins in the area. Drainageway maintenance activities are also known to overlap with burrowing owl nest sites.

Question 1: Sonoran Desert Open Space and Habitat Protection; Preventing Urban Encroachment of Davis-Monthan Air Force Base

Community Open Space Parcels

1-1.1	Sweetwater Preserve	$ 13,000,000
2-1.2	Camino de Oeste	2,000,000
3-1.3	Dos Picos	1,000,000
4-1.4	Tortolita Mountain Park API	7,000,000
5-1.5	Tucson Mountain Park API	1,000,000
6-1.6	Catalina Conservation Easements	1,000,000
7-1.7	Canoa Ranch	3,000,000
8-1.8	Los Morteros	1,000,000
9-1.9	Carpenter Ranch	1,000,000
10-1.10	Tortolita East Biological Corridor API	10,000,000
11-1.11	Catalina State Park API	5,000,000
12-1.12	Colossal Cave Expansion	6,000,000
13-1.13	Painted Hills	4,500,000
14-1.14	South Corridor	2,100,000
	Bond Allocation for Community Open Space Parcels (Not Less Than)	37,300,000[1]

Jurisdictional Open Space

City of Tucson

15-1.15	Agua Caliente	5,000,000
16-1.16	36th Street Corridor	5,000,000
17-1.17	Habitat at 36th and Kino	1,000,000

Town of Oro Valley

18-1.18	Kelly Ranch	2,500,000

Town of Sahuarita

19-1.19	Santa Cruz River Open Space	1,500,000
	Bond Allocation for Jurisdictional Open Space (Not More Than)	15,000,000

Davis-Monthan Environs Open Space

20-1.20	Davis-Monthan Environs Open Space (Not More Than)	10,000,000

Habitat Protection Priorities

21-1.21	Southeastern Corridor Project Area (34%)	38,000,000
22-1.22	Santa Cruz Basin Project Area (20%)	22,000,000
23-1.23	Altar Valley Project Area (19%)	21,000,000
24-1.24	Avra Valley Project Area (4%)	5,000,000
25-1.25	Tortolita Mountains Project Area (10%)	11,000,000
26-1.26	Tucson Basin Project Area (5%)	6,000,000
27-1.27	San Pedro Project Area (8%)	9,000,000
	Bond Allocation for Habitat Protection Priorities (Not More Than)	112,000,000

Total Question 1 ..... $174,300,000

[1]The number of Community Open Space projects identified is in excess of the number that can be purchased with the $37,300,000 allocation of bond funds. This provides necessary flexibility during the property acquisiton process. Individual acquistion amounts for each Community Open Space project will not reasonably exceed cost estimates.

Question 2: Public Health and Community Facilities

Public Health Facilities

28-2.1	Kino Public Health Center	$ 25,000,000
29-2.2	Teresa Lee Health Clinic	2,000,000
30-2.3	New Psychiatric Hospital	12,000,000

Other Facilites

31-2.4	Animal Care Center	3,000,000
32-2.5	Roy Place Commercial Building Restoration	800,000
33-2.6	Green Valley Performing Arts Center - Phase 2	4,000,000
34-2.7	Mt. Lemmon Community Center	1,000,000
35-2.8	Amado Food Bank Kitchen	300,000

Neighborhood Reinvestment

36-2.9	Neighborhood Reinvestment – Countywide	20,000,000
37-2.10	Housing Reinvestment – Countywide	10,000,000

Ina Road Tire Relocation

38-2.11	Ina Road Tire Relocation	1,500,000

County Museums

39-2.12	Arizona Sonora Desert Museum – Auditorium	1,000,000
40-2.13	Arizona Sonora Desert Museum – Gray Water	200,000
41-2.14	Pima Air and Space Museum – Hanger	1,000,000

Total Question 2 ..... $ 81,800,000

Question 3: Public Safety and Justice Facilities

42-3.1	Regional Public Safety Communications System	$ 92,000,000
43-3.2	New Justice Court/Municipal Court Complex	76,000,000
44-3.3	Rehabilitation of Old Courthouse	4,500,000
45-3.4	Corrections Jail Security Project	3,000,000
46-3.5	Interagency Victim Advocacy Center	6,000,000
47-3.6	Juvenile Court Build-Out	2,000,000

Total Question 3 ..... $183,500,000

Question 4: Parks and Recreational Facilities

Cultural and Historic Resources

48-4.1	Empirita Ranch Buildings Rehabilitation	$ 400,000
49-4.2	Canoa Ranch Buildings Rehabilitation	2,700,000
50-4.3	Anza National Historical Trail	3,750,000
51-4.4	Fort Lowell Acquisition & San Pedro Chapel	3,000,000
52-4.5	Helvetia Townsite Acquisition	100,000
53-4.6	Steam Pump Ranch Rehabilitation	2,000,000
54-4.7	Binghampton Historic Buildings Rehabilitation	800,000
55-4.8	Marana Mound Community Site	2,000,000
56-4.9	Dakota Wash Site Acquisition	750,000
57-4.10	Coyote Mountain Sites Acquisition	800,000
58-4.11	Honey Bee Village Acquistion	1,000,000
59-4.12	Performing Arts Center Rehabilitation	682,000
60-4.13	Valencia Site Preservation	100,000
61-4.14	Los Morteros Preservation	100,000
62-4.15	Pantano Townsite Preservation	50,000

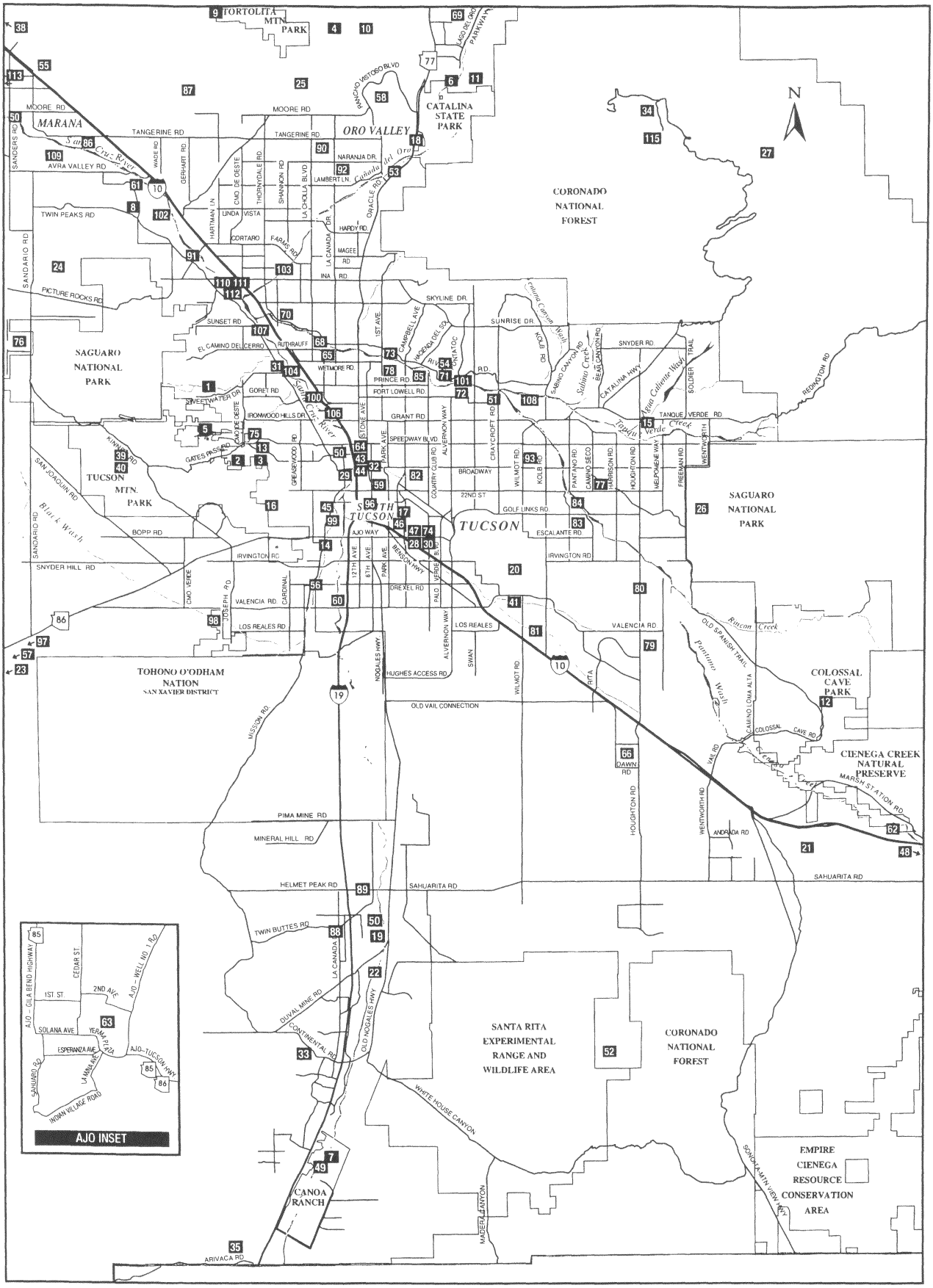
63-4.16	Ajo Curley School Historic Art Institute	500,000
64-4.17	Dunbar School	1,218,000
Parks and Recreation		
65-4.18	Flowing Wells Community Center	$ 3,500,000
66-4.19	Southeast Regional Park/Shooting Range	3,500,000
67-4.20	Sports Field Lighting of Existing Fields	3,000,000
68-4.21	Curtis Park – Flowing Wells East	2,250,000
69-4.22	Catalina Community Park	2,000,000
70-4.23	Dan Felix Memorial Park – Pegler Wash	1,750,000
71-4.24	Brandi Fenton Memorial River Bend Park	3,000,000
72-4.25	Mehl-Foothills Park	2,000,000
73-4.26	Rillito Race Track	2,250,000
74-4.27	Kino Public Sports Field Lighting	650,000
75-4.28	Feliz Paseos Universal Access Park	1,000,000
76-4.29	Picture Rocks Pool	2,000,000
77-4.30	Eastside Sports Complex and Senior Center	6,000,000
78-4.31	Northside Community Park	5,500,000
79-4.32	Southeast Community Park	6,000,000
80-4.33	Houghton Greenway	1,400,000
81-4.34	Julian Wash Linear Park	3,700,000
82-4.35	Arroyo Chico	1,000,000
83-4.36	Atturbury Wash Sanctuary Land Acquistion and Expansion	2,000,000
84-4.37	Pantano Linear Park, 22nd St south to Michael Perry Park	2,700,000
85-4.38	Rio Vista Natural Resource Park	1,500,000
86-4.39	Regional Heritage and Cultural Park	1,000,000
87-4.40	Tortolita Trail System	1,200,000
88-4.41	Anamax Park Multi-Use Ballfield	500,000
89-4.42	Bicycle Lane on Sahuarita Road	1,500,000
90-4.43	Naranja Town Site Park	3,000,000
Libraries		
91-4.44	Marana Continental Ranch New Library	4,500,000
92-4.45	Oro Valley Library Expansion	1,100,000
93-4.46	Wilmot Branch Library Replacement	7,000,000
Total Question 4		**$ 96,450,000**

Question 5: River Parks and Flood Control Improvements

Flood Control		
94-5.1	Floodprone and Riparian Land Acquistion	$ 5,000,000
95-5.2	Urban Drainage Infrastructure Program	8,281,000
96-5.3	City of South Tucson Projects	1,719,000
97-5.4	Tohono O'Odham Nation Drainage Improvements	1,500,000
98-5.5	Pascua Yaqui Tribe Black Wash Flood Control	1,000,000
River Parks		
99-5.6	Santa Cruz River, Ajo to 29th Street	14,000,000
100-5.7	Santa Cruz River, Grant to El Camino del Cerro	2,700,000
101-5.8	Rillito River Linear Park Completion	3,000,000
102-5.9	Santa Cruz River in Vicinity of Continental Ranch	4,000,000
103-5.10	Canada del Oro River Park, Thornydale to Magee	5,000,000
Total Question 5		**$ 46,200,000**

Question 6: Sewer System Revenue Bonds

Rehabilitation And Repair		
104-6.1	Roger Road WWTP Rehabilitation	$ 20,000,000
105-6.2	Miscellaneous Conveyance System Rehabilitation and Repair	15,000,000
Augmentation of Conveyance Capacity		
106-6.3	Santa Cruz Interceptor – Prince to Franklin	25,000,000
107-6.4	Roger Road WWTP to Ina Road WPCF Plant Interconnect	23,000,000
108-6.5	Tanque Verde Interceptor Craycroft to Tucson Country Club	5,000,000
109-6.6	Marana Regional Airport Sewer Connection	2,800,000
Enhanced Processing Regulatory Compliance		
110-6.7	Ina Road WPCF – Denitrification	17,000,000
111-6.8	Ina Road WPCF – Central Plant and Electrical Upgrade	12,000,000
112-6.9	Ina Road WPCF – Laboratory and Office Building	9,000,000
System Treatment Capacity		
113-6.10	New Marana WWTP Expansion	10,000,000
114-6.11	Miscellaneous Water Reclamation Facilities	4,000,000
115-6.12	Mt. Lemmon Sewer System	7,200,000
Total		**$150,000,000**
Grand Total		**$732,250,000**


TORTOLITA MTN. PARK
CATALINA STATE PARK
MARANA
ORO VALLEY
CORONADO NATIONAL FOREST
SAGUARO NATIONAL PARK
TUCSON MTN. PARK
SOUTH TUCSON
TUCSON
TOHONO O'ODHAM NATION
SAN XAVIER DISTRICT
COLOSSAL CAVE PARK
CIENEGA CREEK NATURAL PRESERVE
SANTA RITA EXPERIMENTAL RANGE AND WILDLIFE AREA
CANOA RANCH
EMPIRE CIENEGA RESOURCE CONSERVATION AREA
AJO INSET
N
MOORE RD
TANGERINE RD
AVRA VALLEY RD
TWIN PEAKS RD
PICTURE ROCKS RD
SUNSET RD
SKYLINE DR.
SUNRISE DR.
SNYDER RD
EL CAMINO DEL CERRO
RUTHRAUFF
WETMORE RD.
PRINCE RD.
FORT LOWELL RD
GRANT RD
SPEEDWAY BLVD
BROADWAY
22ND ST
GOLF LINKS RD
ESCALANTE RD
IRVINGTON RD
SNYDER HILL RD
BOPP RD
VALENCIA RD.
LOS REALES RD.
AJO WAY
DREXEL RD
OLD VAIL CONNECTION
HUGHES ACCESS RD
PIMA MINE RD.
MINERAL HILL RD.
HELMET PEAK RD
SAHUARITA RD
TWIN BUTTES RD
DUVAL MINE RD.
CONTINENTAL RD.
WHITE HOUSE CANYON
MADERA CANYON
ARIVACA RD.
SANDARIO RD
LA CANADA DR.
ORACLE RD.
CAMINO DE OESTE
THORNYDALE RD.
SHANNON RD.
LA CHOLLA BLVD
HARTMAN LN.
GERHART RD.
WADE RD.
SANDERS RD.
RANCHO VISTOSO BLVD
LAMBERT LN.
LINDA VISTA
CORTARO
HARDY RD.
MAGEE RD.
INA RD.
CAMPBELL AVE.
1ST AVE.
STONE AVE.
PARK AVE.
ALVERNON WAY
COUNTRY CLUB RD.
CRAYCROFT RD.
WILMOT RD.
KOLB RD.
PANTANO RD.
CAMINO SECO
HARRISON RD.
HOUGHTON RD.
MELPOMENE WAY
FREEMAN RD.
WENTWORTH RD.
SOLDIER TRAIL
REDINGTON RD.
CATALINA HWY
SABINO CANYON RD.
BEAR CANYON RD.
KINNEY RD.
SAN JOAQUIN RD.
GREASEWOOD RD.
GATES PASS RD.
IRONWOOD HILLS DR.
SWEETWATER DR.
GORET RD.
CAMINO DE OESTE
JOSEPH RD.
CARDINAL AVE.
CAMINO VERDE
12TH AVE.
61ST AVE.
PARK AVE.
SWAN RD.
ALVERNON WAY
NOGALES HWY
OLD NOGALES HWY
MISSION RD.
WILMOT RD.
RITA RD.
CAMINO LOMA ALTA
COLOSSAL CAVE RD.
VAIL RD.
MARSH STATION RD.
ANDRADA RD.
HOUGHTON RD.
DAWN RD.
OLD SPANISH TRAIL
Rincon Creek
Pantano Wash
Tanque Verde Creek
Agua Caliente Wash
Sabino Canyon Wash
Sabino Creek
Black Wash
Santa Cruz River
Canada del Oro
Rillito
SCHOOLHOUSE-MTN. VIEW RD.
AJO – GILA BEND HIGHWAY
AJO – WELL NO. 1 RD.
CEDAR ST.
1ST ST.
2ND AVE.
SOLANA AVE.
ESPERANZA AVE.
YEAM PLAZA
AJO–TUCSON HWY
LA MIRA AVE.
INDIAN VILLAGE ROAD

Question No. 1

Sonoran Desert Open Space and Habitat Protection; Preventing Urban Encroachment of Davis-Monthan Air Force Base

BENEFITS

COMMUNITY OPEN SPACE PARCELS

1 Sweetwater Preserve — $1,500,000

2 Tanque Verde — $2,500,000

3 Rocky Point — $1,500,000

4 Tortolita Mountain Park Addition — $7,000,000

5 Tucson Mountain Park Addition — $1,000,000

6 Arizona Conservation Easements — $1,000,000

7 Agua Caliente Ranch — $1,000,000

8 Los Morteros — $1,000,000

9 Carpenter Ranch — $1,000,000

10 Catalina East Passage/Canada Agua Preserve Initiative — $10,000,000

11 Catalina State Park Expansion/Arizona Preserve Initiative — $5,000,000

12 Colossal Cave Expansion — $6,000,000

13 Painted Hills — $1,500,000

14 South Corridor (Ajo/Mission) — $2,300,000

Total Allocation for Community Open Space Parcels (Not Less Than) — $37,800,000

URBAN OPEN SPACE REQUESTED BY JURISDICTIONS

City of Tucson

15 Agua Caliente — $5,000,000

16 36th Street Corridor — $5,000,000

17 Habitat at 36th and Kino — $1,500,000

Town of Oro Valley

18 Kelly Ranch — $2,500,000

Town of Sahuarita

19 Santa Cruz River Open Space — $1,500,000

Total Allocation for Urban Open Space Requested by Jurisdictions (Not More Than) — $15,000,000

Open Space acquired with previous County bonds:



Tortolita Mountain Park — acquired with 1986 and 1997 bond funds



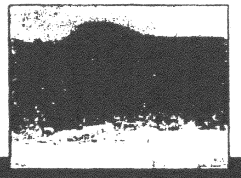
Colossal Cave Mountain Park — acquired with 1986 and 1997 bond funds



Canoa Ranch — acquired with 1997 bond funds



Agua Caliente Park — acquired with 1997 bond funds



Tucson Mountain Park — Purple Mtn. property acquired with 1997 bond funds



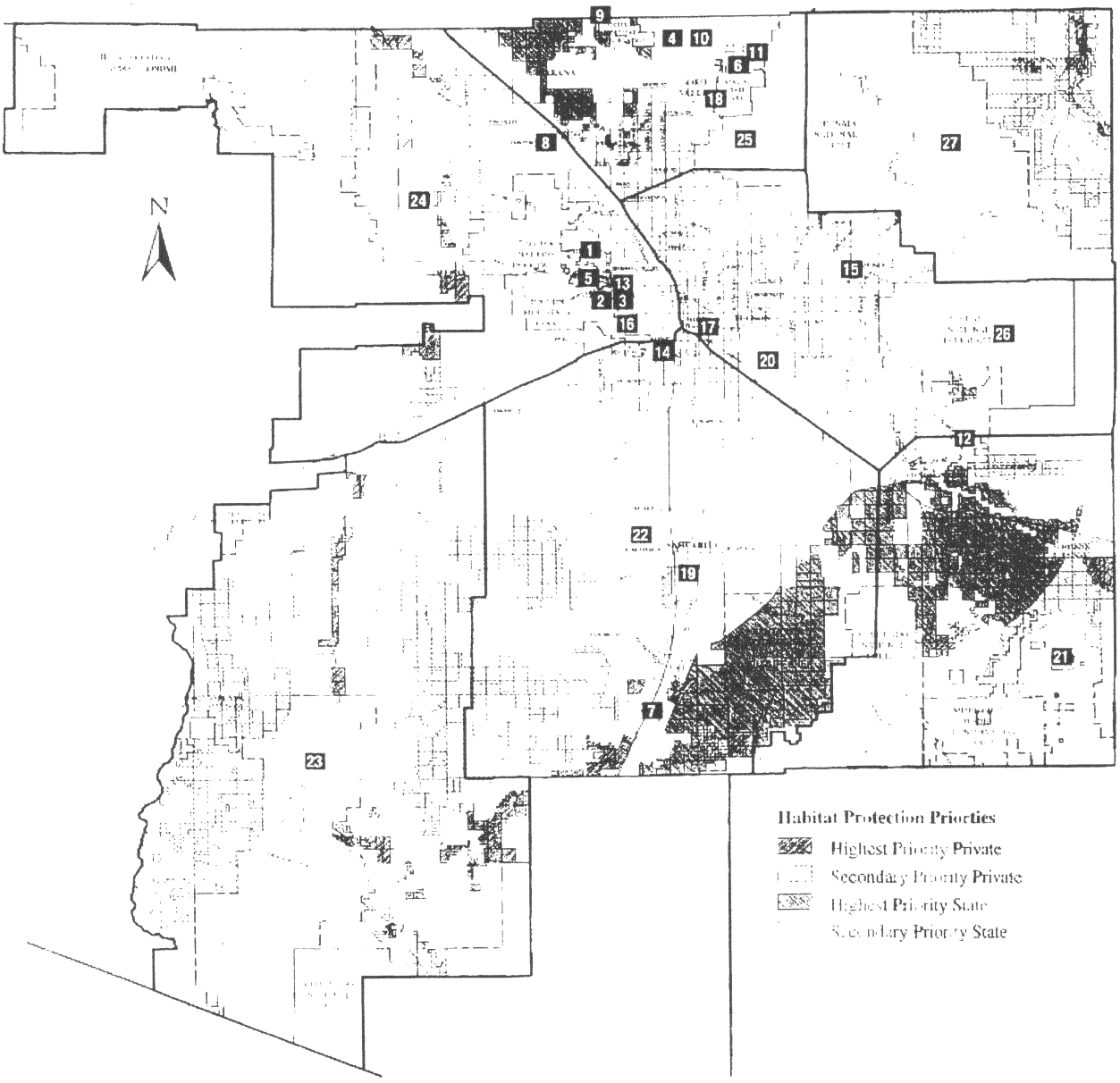
Tucson Mountain Park — Bob Thomas property acquired with 1997 bond funds

1986 1997

Pima County
BOND ELECTION

Question No. 1

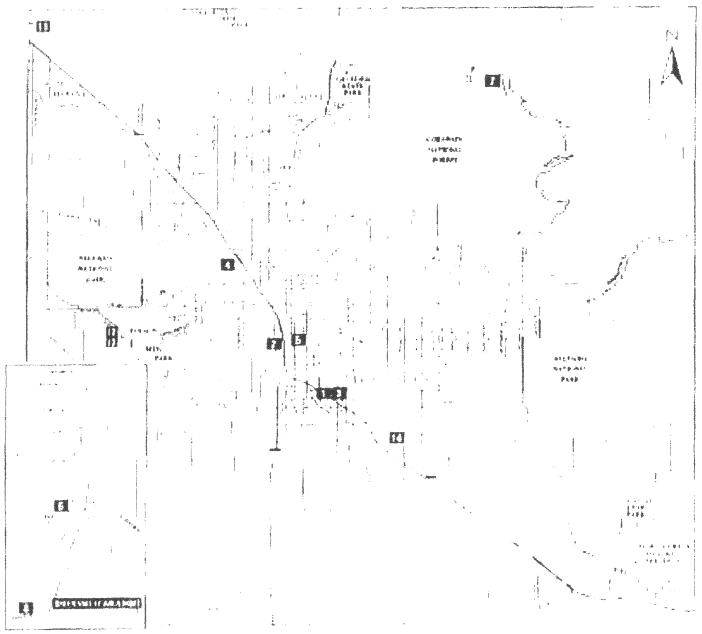
Sonoran Desert Open Space and Habitat Protection; Preventing Urban Encroachment of Davis-Monthan Air Force Base



For additional information and continuing updates, visit www.bondelection2004.pima.gov

Question No. 2:

Public Health and Community Facilities



PUBLIC HEALTH FACILITIES

1 Kino Public Health Center $25,000,000
...

2 Teresa Lee Health Clinic $2,000,000
...

3 New Psychiatric Hospital $17,000,000
...

OTHER FACILITIES

4 Animal Care Center $5,000,000
...

5 Ivy Place Commercial Building Restoration $800,000
...

6 Green Valley Performing Arts Center, Phase 2 ..... $4,000,000
...

7 Mt. Lemmon Community Center $2,000,000
...

8 Arnold Food Bank Kitchen $400,000
...

NEIGHBORHOOD REINVESTMENT

9 Neighborhood Reinvestment - Countywide $20,000,000
...

10 Housing Reinvestment - Countywide $10,000,000
...

INA ROAD FIRE RELOCATION

11 Ina Road Fire Relocation $1,500,000
...

COUNTY-OWNED MUSEUMS

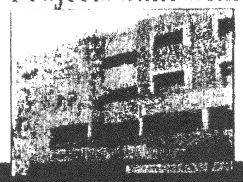
12 Arizona Sonora Desert Museum - Auditorium $1,000,000
...

13 Arizona Sonora Desert Museum - Gray Water $200,000
...

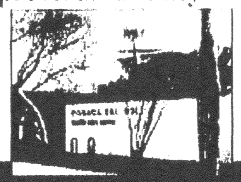
14 Pima Air and Space Museum - Hangar $1,000,000
...

TOTAL FOR QUESTION NO. 2 ..... $81,800,000

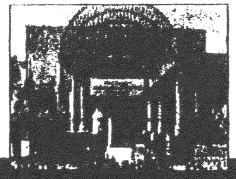
Projects built with previous County bonds:



Kino Community Hospital -- completed with 1974 Facilities bond funds



Posada del Sol Health Care Center complete for the 1974 Facilities bond funds



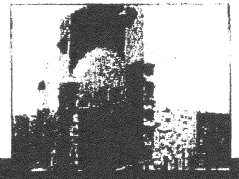
Green Valley Recreation Center -- completed with 1986 Facilities bond funds



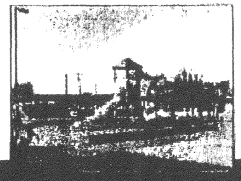
Ina Road Water Tank -- completed with 1997 Facilities bond funds



El Rio Health Center and Child Care Center -- completed with 1997 Facilities bond funds



El Pueblo Child Development Center and Early Learning Center -- completed with 1997 Facilities bond funds

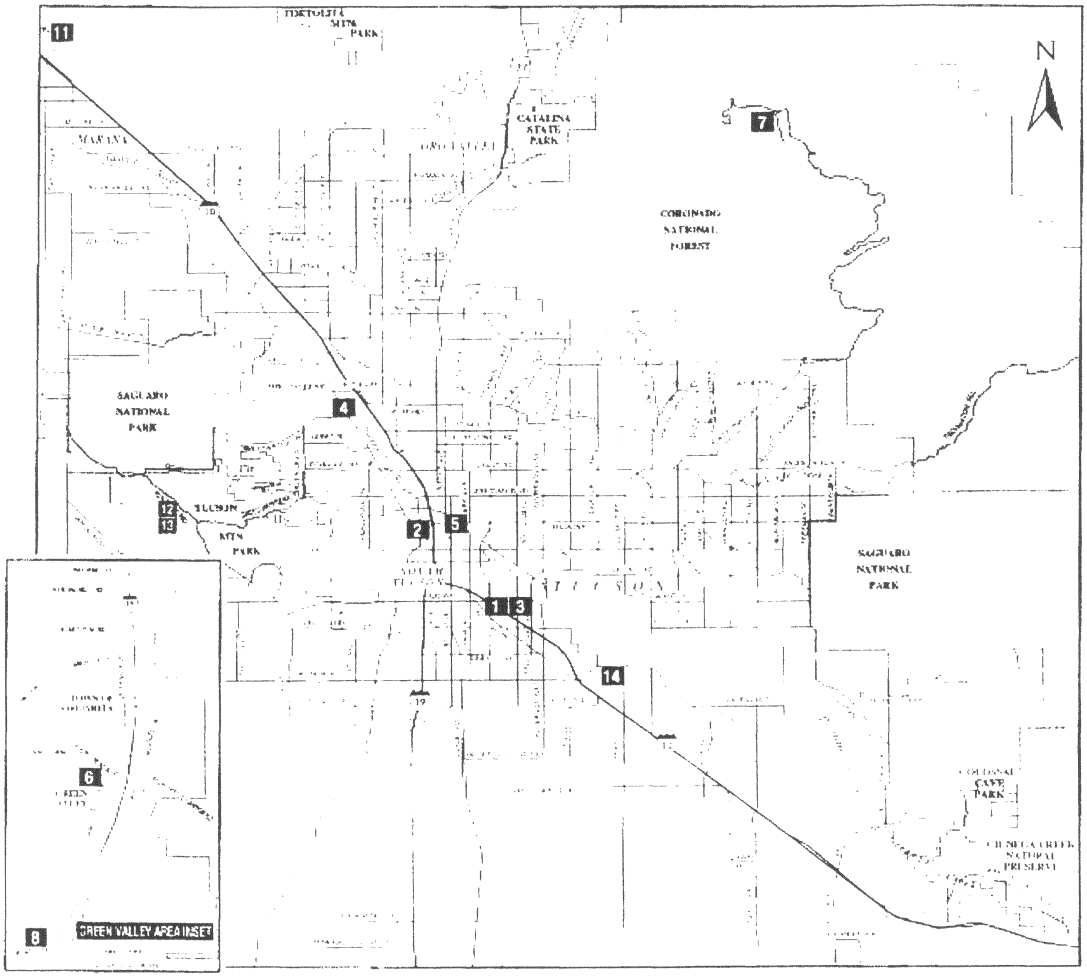


Tucson Northwest Clinical Improvements -- completed with 1997 Neighborhood Reinvestment bond funds

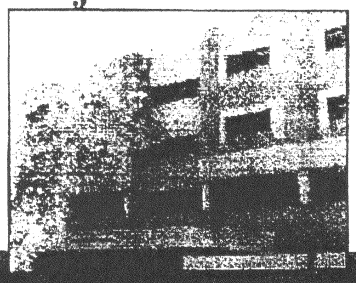
1974 1986 1997

Question No. 2:

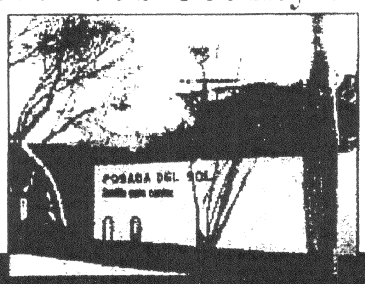
Public Health and Community Facilities



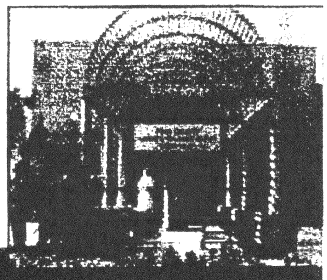
Projects built with previous County bonds:



Kino Community Hospital — completed with 1974 Facilities bond funds



Posada del Sol Health Care Center — completed with 1974 Facilities bond funds

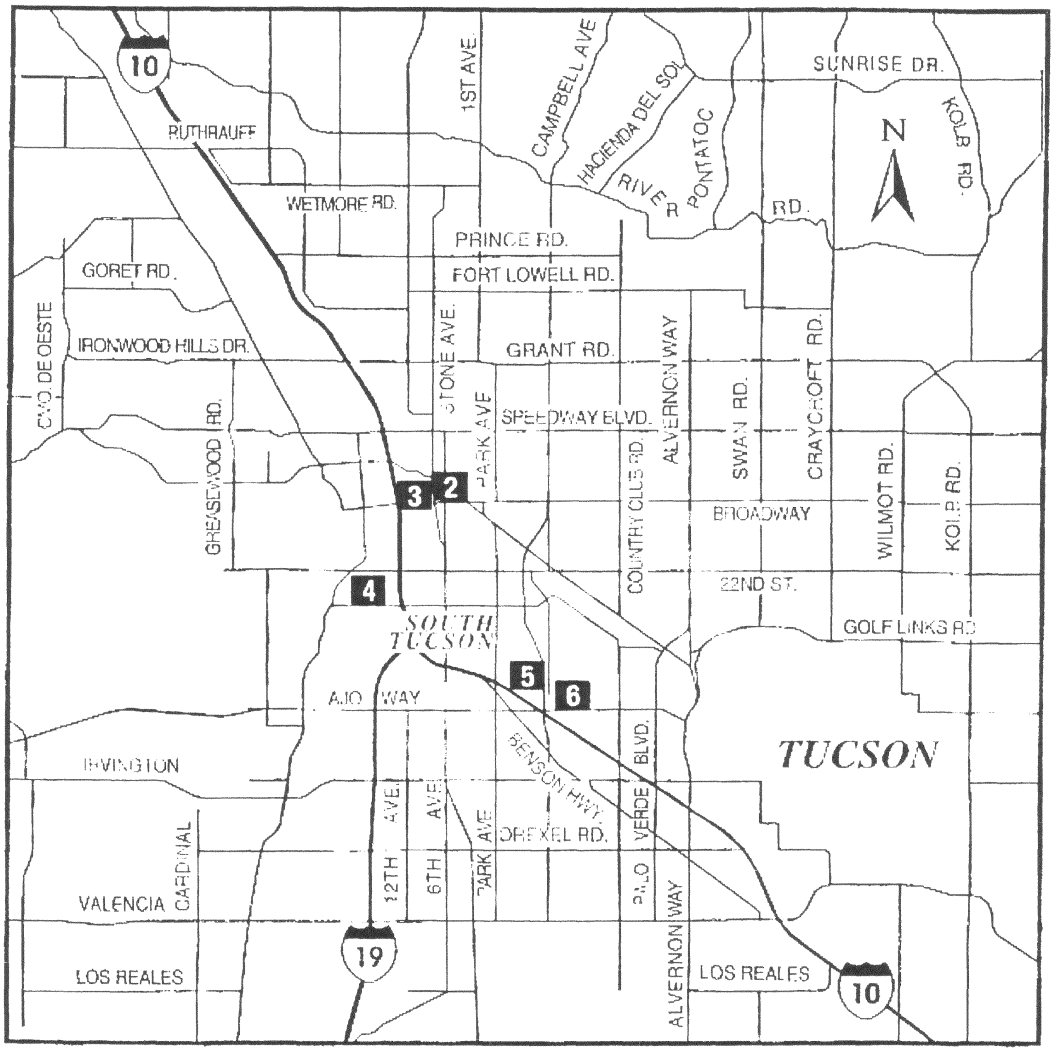


Green Valley Government Center — completed with 1986 Facilities bond fu

1974 1986

Question No. 3

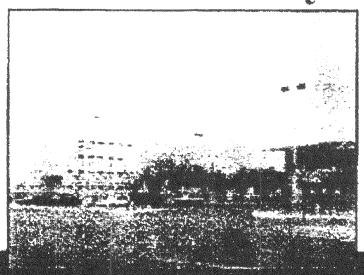
Public Safety and Justice Facility Projects



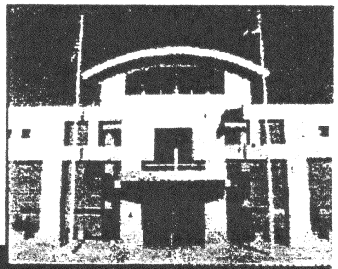
Projects built with previous County bonds:



New Main Jail — completed with 1979 Facilities bond funds



Medium Security at Main Jail Complex — completed with 1979 Facilities bond funds



Juvenile Court Center — completed wi 1986 and 1997 Facilities bond funds

1979

Question No. 4

Historic and Cultural Resource Projects

1 Empacho Ranch Building Rehabilitation ..... $[illegible]

2 Cuervo Ranch Buildings Rehabilitation $2,700,000

3 Jean Bautista de Anza National Historic Trail $1,750,000

4 Fort Orwell Acquisition & San Pedro Chapel $3,000,000

5 Heleota Ranch Acquisition ..... $[illegible]

6 Stream Pump Ranch Rehabilitation $2,000,000

7 Binghampton Historic Buildings Rehabilitation $800,000

8 Mesa Monte Community Site Acquisition $2,000,000

9 Dos Aguas Site Acquisition $750,000

10 Cuesta Mountain Site Acquisition $600,000

11 Honey Bee Village Site Acquisition $1,000,000

12 Performing Arts Center Rehabilitation $682,000

13 Valverde Site Preservation $300,000

14 Los Moderos Preservation $100,000

15 Pastime Township Preservation $50,000

16 Ajo Curtiss School Historic Art Institute $750,000

17 Dunbar Site $1,219,000

TOTAL FOR HISTORIC AND CULTURAL RESOURCE PROJECTS $19,950,000

Projects built with 1997 County preservation bonds:



Historic 1884 Robles Ranch House rehabilitated as Robles Junction community center



Historic 1873 Agua Caliente Ranch rehabilitated as Agua Caliente Park visitor center



Historic San Ignacio de la Canoa Ranch — acquisition, protection and rehabilitation



San Agustin, the 1860s "Headquarters of Texas" — acquired Mission Gardens



Colonial Center — Rehabilitated 1864 Cushing Construction Corporation center



Juan Bautista de Anza National Historic Trail — interpretive trail segments certified and signage established



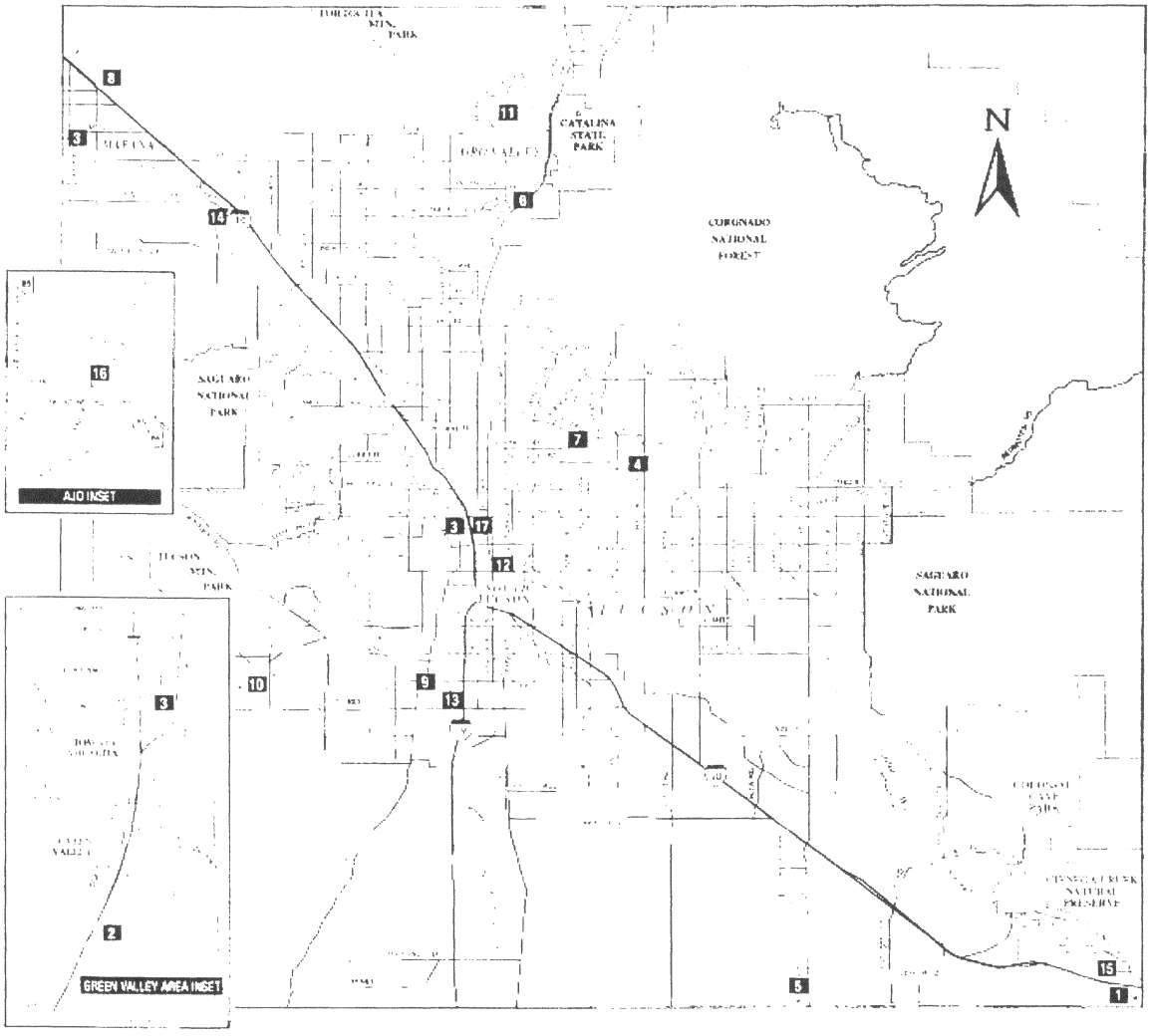
Los Moderos — our central Tohono O'odham Hohokam site acquired for preservation

1997

Pima County
Bond ELECTION

Proposition No. 4

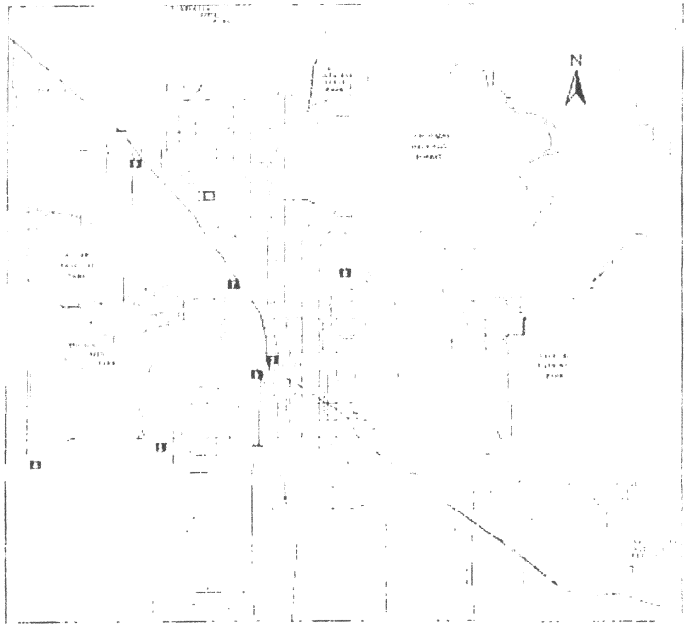
Historic and Cultural Resource Projects



For additional information and continuing updates, visit www.bondelection2004.pima.gov

Question No. 5:

River Parks and Flood Control Improvements



FLOOD CONTROL

1 Floodplain and Riparian Land Acquisition $5,000,000

Purchase of flood prone property from willing sellers, including relocation assistance to displaced residents, demolition of structures, and removal of debris. Property will be managed for flood control, open space, habitat, and recreation purposes.

2 Urban Drainage Infrastructure Program $8,281,000

Construction of flood control facilities, including detention basins, channels, storm drains, and improvements to existing facilities. Projects will be designed to minimize impacts on natural resources and to enhance recreational opportunities where feasible.

3 City of South Tucson Projects $1,210,000

Flood control facilities and improvements. Projects will be designed to protect property from flooding and to minimize impacts on natural resources. Recreational opportunities will be incorporated where feasible.

4 Lower Julian Wash Drainage Improvements $1,500,000

Construction of flood control facilities, including detention basins, channels, storm drains, and improvements to existing facilities. Projects will be designed to minimize impacts on natural resources and to enhance recreational opportunities where feasible.

5 Pascua Yaqui Tribe Wash Flood Control $1,000,000

Flood control facilities and improvements. Projects will be designed to protect property from flooding and to minimize impacts on natural resources. Recreational opportunities will be incorporated where feasible.

RIVER PARKS

6 Santa Cruz River, Valencia to 29th Street $1,000,000

Land acquisition, development and improvement of river park facilities, including trails, landscaping, lighting, and recreational facilities. Projects will be designed to minimize impacts on natural resources and to enhance recreational opportunities where feasible.

Santa Cruz River, Grant to Ft. Lowell or Cherry $2,700,000

Land acquisition, development and improvement of river park facilities, including trails, landscaping, lighting, and recreational facilities. Projects will be designed to minimize impacts on natural resources and to enhance recreational opportunities where feasible.

Rillito River Park Completion $3,000,000

Land acquisition, development and improvement of river park facilities, including trails, landscaping, lighting, and recreational facilities. Projects will be designed to minimize impacts on natural resources and to enhance recreational opportunities where feasible.

Santa Cruz River at Vicinity of Continental Ranch $1,000,000

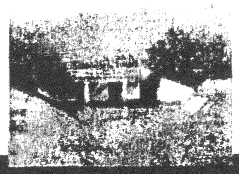
Land acquisition, development and improvement of river park facilities, including trails, landscaping, lighting, and recreational facilities. Projects will be designed to minimize impacts on natural resources and to enhance recreational opportunities where feasible.

Canada del Oro River Park, Thornydale to Magee $5,000,000

Land acquisition, development and improvement of river park facilities, including trails, landscaping, lighting, and recreational facilities. Projects will be designed to minimize impacts on natural resources and to enhance recreational opportunities where feasible.

TOTAL FOR QUESTION NO. 5 ..... $46,200,000

Projects built with previous County bonds:



Following the 1983 flood disasters, Pima County voters approved $64,800,000 in bonds in 1984 to construct, repair or replace roads, bridges, utility lines, channels, drainageways, dikes and levees; purchase land for these improvements; and purchase floodprone properties and relocate occupants.

1984







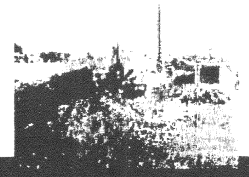


La Puntarenas Park on the Santa Cruz River, before and after projects purchased with 1984 Floodplain Land Acquisition bond funds.



Santa Cruz River, Speedway to Grant. Land acquisition and river park construction with 1986 bond funds.

1986

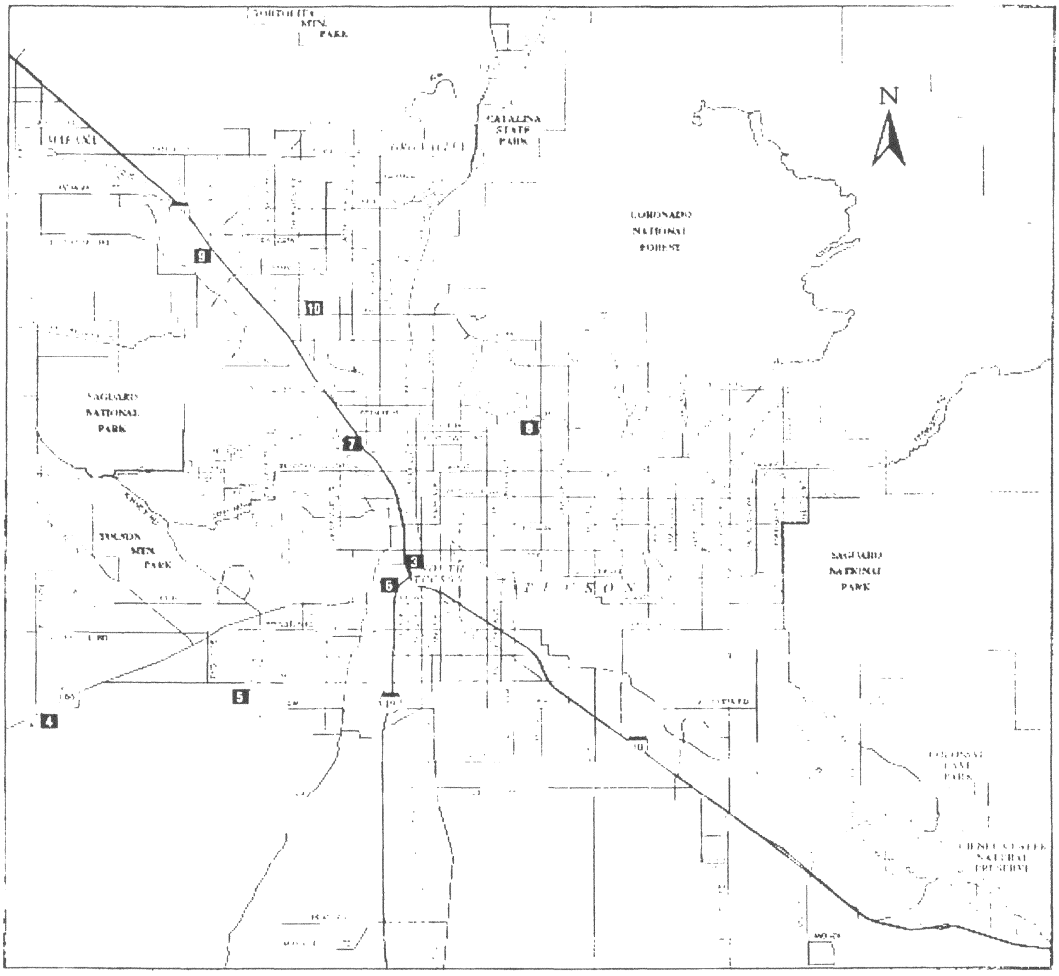


Enhancement and Upgrade of Private Property improvements constructed with 1997 bond funds.

1997

Question No. 5:

River Parks and Flood Control Improvements



Projects built with previous County bonds:

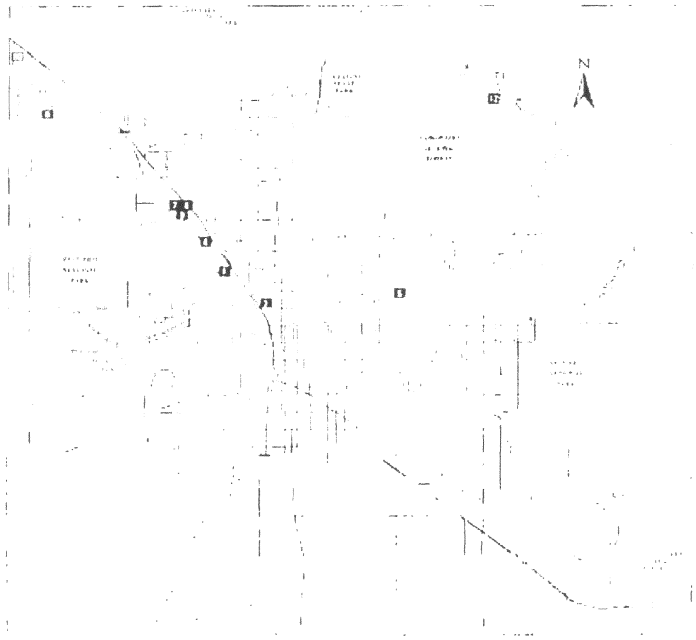


Following the 1983 flood disasters, Pima County voters approved $63,800,000 in bonds in 1984 to construct, repair or replace bridges, utility lines, channels, drainageways, dikes and levees; purchase land for these improvements; and purchase flood properties and relocate occupants.

1984

Question No. 6:

Sewer System Revenue Bonds



REHABILITATION AND REPAIR

1 Roger Road Wastewater Treatment Plant Rehabilitation $20,000,000

2 Miscellaneous Conveyance System Rehabilitation and Repair $5,000,000

AUGMENTATION OF CONVEYANCE CAPACITY

3 Santa Cruz Interceptor – Prince to Ina Rd. $25,000,000

4 Roger Road Wastewater Treatment Plant to Ina Road Water Pollution Control Facility Interconnect $24,000,000

5 Canada Verde Interceptor – Craycroft to Tucson Country Club $5,000,000

6 Marana Regional Airport Sewer Connection $2,500,000

ENHANCED PROCESSING/REGULATORY COMPLIANCE

7 Ina Road Water Pollution Control Facility – Denitrification $17,000,000

8 Ina Road Water Pollution Control Facility – Central Plant and Electrical Upgrade $12,000,000

9 Ina Road Water Pollution Control Facility – Laboratory and Office Building $9,000,000

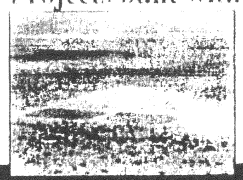
SYSTEM TREATMENT CAPACITY

10 New Marana Wastewater Treatment Plant Expansion $10,000,000

11 Miscellaneous Water Reclamation Facilities $4,000,000

12 Mt. Lemmon Sewer System $7,200,000

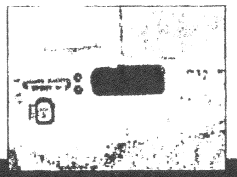
Projects built with previous County bonds:



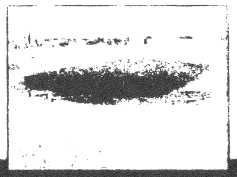
Casa de Tucson Wastewater Treatment Facility – construction with 1986 bond funds



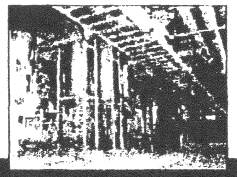
Roger Road Wastewater Treatment Facility – expansion with 1986 bond funds



Avra Valley Wastewater Treatment Facility – expansion with 1986 bond funds



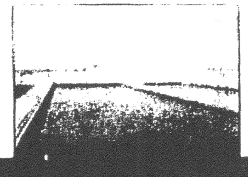
Marana Wastewater Treatment Facility – expansion with 1986 bond funds



Randolph Park Wastewater Reclamation Facility – restoration, expansion and modification with 1987 bond funds



Ina Road Water Pollution Control Facility – expansion with 1987 bond funds

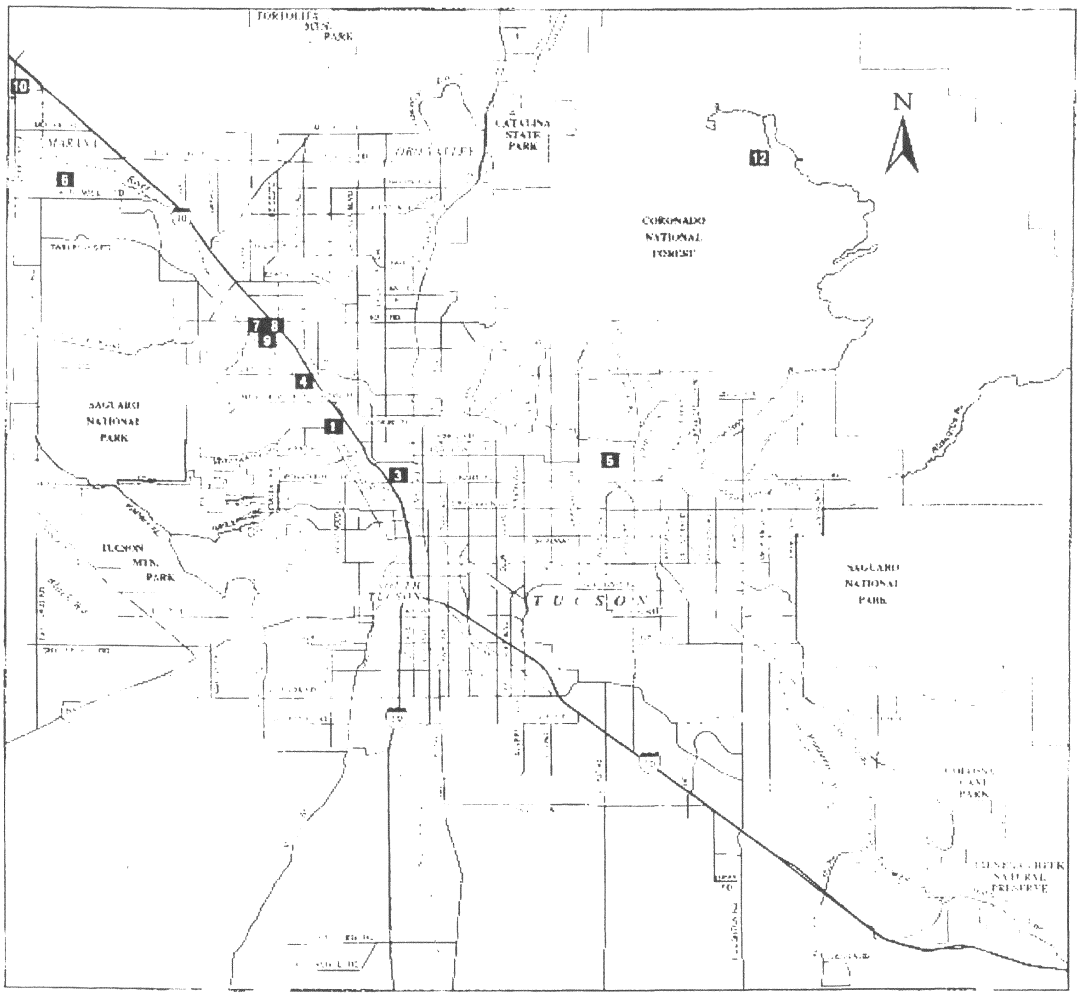


Green Valley Wastewater Treatment Facility – construction with 1987 bond funds

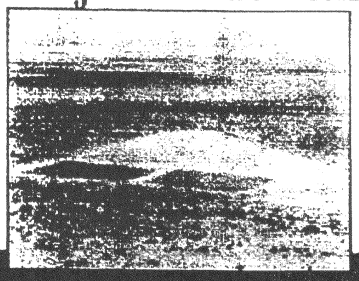
1986 1987

Question No. 6:

Sewer System Revenue Bonds



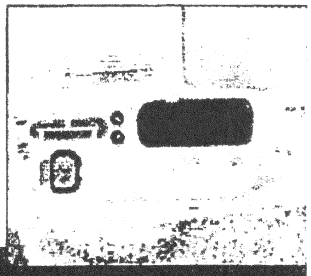
Projects built with previous County bonds:



Corona de Tucson Wastewater Treatment Facility – construction with 1986 bond funds



Roger Road Wastewater Treatment Facility – expansion with 1986 bond funds



Avra Valley Wastewater Treatment Facility – expansion with 1986 bond funds

1986