



WHITE

TANKS

F R S # 3

General Environmental Report

Prepared by:

URS

Submitted August 2001



Flood Control District of Maricopa County

Project No. E1-15448007.00

Contract No. FCD 98-11 PCN 4700430

**GENERAL ENVIRONMENTAL REPORT
WHITE TANKS FRS #3
MODIFICATIONS DESIGN PROJECT**

**Prepared for
Flood Control District of Maricopa County
Contract # FDC98-11
PCN 4700430**

Property of
Flood Control District of Maricopa County
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URS**

August 2001

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LIST OF ACRONYMS

ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AFB	Air Force Base
AGFD	Arizona Game and Fish Department
APS	Arizona Public Service Company
ARS	Arizona Revised Statutes
ASLD	Arizona State Land Department
ASM	Arizona State Museum
BLM	Bureau of Land Management
CAP	Central Arizona Project
District	Flood Control District of Maricopa County
FRS #3	Flood Retarding Structure Number Three
FWS	U.S. Fish and Wildlife Service
I-10	Interstate 10
kV	kilovolt
MAG	Maricopa Association of Governments
MCDOT	Maricopa County Department of Transportation
MWD	Maricopa Water District
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act

NRCS Natural Resources Conservation Service

SMS Scenery Management System

USACE U.S. Army Corps of Engineers

VMS Visual Management System

1.0 INTRODUCTION

The Flood Control District of Maricopa County (the District) Flood Retarding Structure Number Three (FRS #3) is a detention dam in west-central Arizona constructed in 1954 to provide flood protection to agricultural land and human life and property in the downstream floodplain. In 1997, the Arizona Department of Water Resources (ADWR) classified FRS #3 as posing a significant safety hazard and designated it a high priority for rehabilitation. The goal of the District is to regenerate FRS #3 to meet State of Arizona dam safety requirements, as well as provide flood control and recreation opportunities for the community. This report provides a general environmental review of the White Tank Mountains watershed, particularly the area within a 5-mile radius centered around the dam, defined as the study area.

FRS #3 is located in west-central Arizona just east of the White Tank Mountains. The dam is situated approximately 10 miles west of the Agua Fria River, 12 miles north of the Gila River, and 15 miles east of the Hassayampa River. Trilby Wash is about 7 miles to the north of the study area.

Based on the available data, this report describes the study area environments that may be affected by potential modifications to FRS #3 that have been proposed to meet dam safety requirements. This report addresses land jurisdiction and ownership, land use, utilities, and transportation; visual resources; biological resources; cultural resources; and socioeconomics.

This report also identifies potential project linkage opportunities and concurrent environmental projects that occur within close proximity to the FRS #3. This is by no means a complete list; however, it does provide a regional perspective of potentially relevant projects.

1.1 HISTORICAL BACKGROUND

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service) constructed FRS #3 in 1954 under a pilot watershed project known as

the White Tanks Watershed Protection Project for the District. Legislative authorities for the project were Public Laws 74-46 and 83-156.

Originally, the NRCS project was to consist of four primary detention structures designed to reduce damage to down-slope inhabitants and farmland caused by flash flooding from the southern White Tank Mountains and Trilby Wash watersheds. Due to the existence of military installations and national defense assets in the Trilby Wash watershed, the U.S. Army Corps of Engineers (USACE) undertook the Trilby Wash project to protect those federal properties from flooding. The USACE's McMicken Dam on the Trilby Wash provided coincidental protection to farmland in that watershed and eliminated the need for two (FRS #1 and FRS #2) of the four primary detention structures originally designed by NRCS. Based on this information, NRCS reevaluated and consequently redesigned the District project. FRS #3 and FRS #4 were deemed necessary and were constructed to provide protection to inhabitants and farmland in the southern portion of the White Tank Mountains watershed area.

2.0 ALTERNATIVES

Three conceptual alternatives were developed to include the passive, active, and mixed recreational-use options. Alternative 1 is a passive-use alternative and consists of a single basin and flow diversion to McMicken Dam from Waterfall Wash. Alternative 2 is an active-use alternative and consists of two basins and flow diversion to McMicken Dam and Northern Avenue. Alternative 3 is a mixed-use alternative and consists of two basins and flow diversion to Northern Avenue. The general idea behind each alternative is described in more detail below.

2.1 ALTERNATIVE 1 – PASSIVE-USE ALTERNATIVE

Alternative 1 would entail developing the site for minimal passive recreational uses. The conceptual plans for this alternative involve developing approximately 565 acres to include a native multi-use trail, scenic overlooks, and restored wildlife habitat. The only hardscape features would include a parking lot, lights, and signage located at the parking/entry area of the site. The site would be revegetated to a native desert condition with a blend of general seed mixes that follow the water distribution patterns of the site.

2.2 ALTERNATIVE 2 – ACTIVE-USE ALTERNATIVE

Alternative 2 would entail developing the site for active recreation and partnering opportunities. The conceptual plans for this alternative involve developing approximately 839 acres to include extensive sports complexes (e.g., baseball/softball fields, soccer fields, swimming pool, equestrian center), a multi-use trail system, and a golf course. Additionally, there would be areas of passive-use Sonoran Desert landscape integrated into the design. Similar to Alternative 1, the site would be revegetated to a native desert condition with a blend of general seed mixes that follow the water distribution patterns of the site.

2.3 ALTERNATIVE 3 – MIXED-USE ALTERNATIVE

Alternative 3 would entail a mixed-use development of the site while emphasizing environmental restoration. The conceptual plans for this alternative involve developing approximately 774 acres to include an environmental education center, observation facilities, improved wildlife habitat, hiking trails, concrete circulation path, native multi-use trails, scenic overlooks, adult and junior soccer fields, softball and little league fields, basketball courts, sand volleyball, playgrounds, turf, and horseback riding trails. A wetlands feature would be included in this alternative.

3.0 AFFECTED ENVIRONMENT

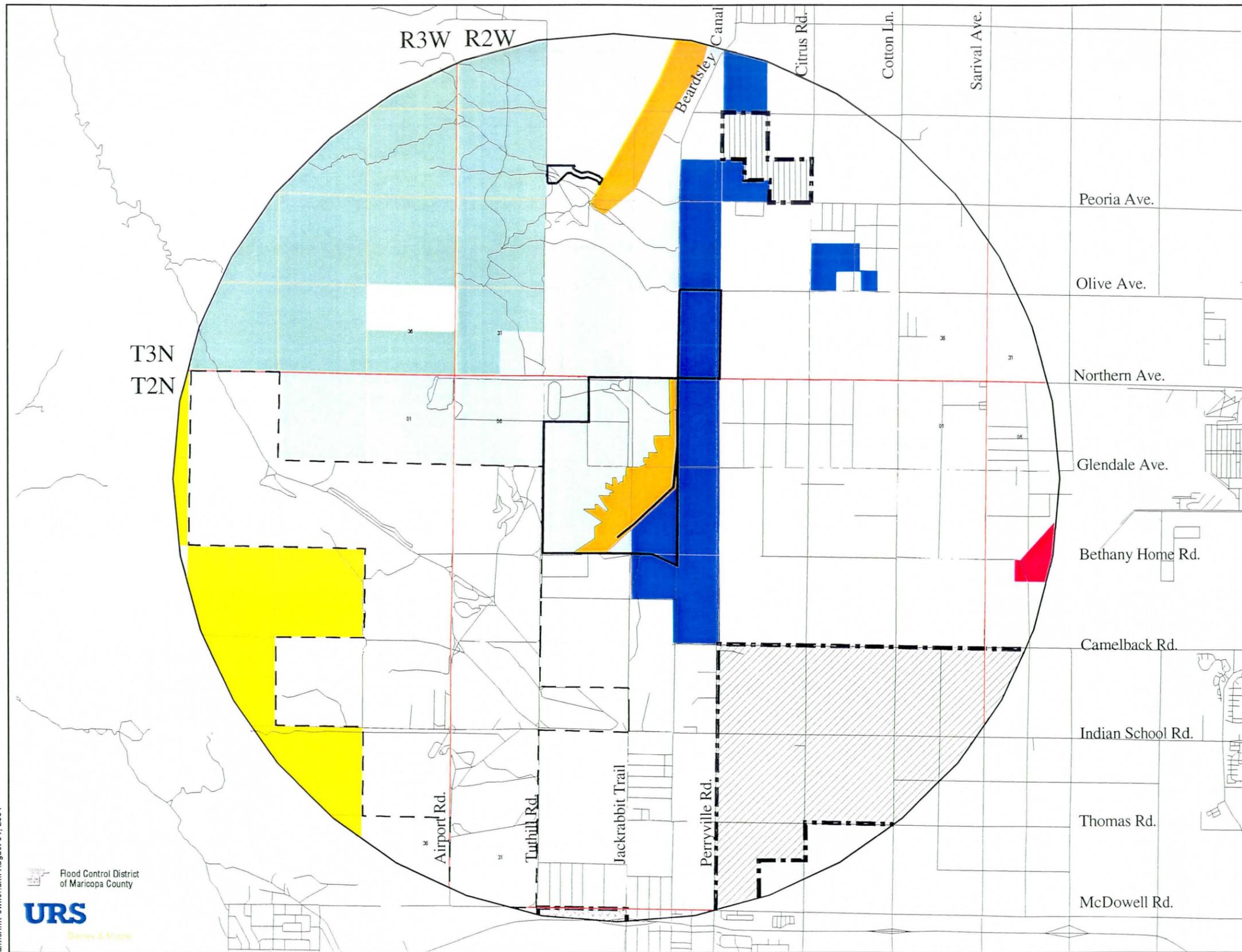
3.1 LAND JURISDICTION AND OWNERSHIP

Land jurisdiction pertains to the limits of administrative or jurisdictional control maintained by major landholders within the study area. Seven categories of land jurisdiction and ownership are identified and delineated, primarily from the May 1997 Arizona Land Resources Information System data. Maricopa County manages the majority of the land within the study area. Smaller parcels fall under the responsibility of State of Arizona, Bureau of Land Management (BLM), Maricopa Water District, military, and the District. Figure 1 graphically portrays the land jurisdiction and ownership identified in the study area.

3.1.1 State of Arizona

The Arizona State Land Department (ASLD) administers lands to generate revenues for state-funded programs and infrastructure such as schools, medical and emergency services, and highways. Arizona State Trust lands are under the jurisdiction of the ASLD and represent lands held in trust to generate revenues for Arizona schools. In 1863, the federal government granted the State Trust lands to Arizona when it was established as a territory. Additional lands were conveyed to Arizona under the Enabling Act of 1910. The mission of the ASLD includes managing and providing support for resource conservation programs for the well-being of the public and the state's natural environment. The Federal Enabling Act and State Constitution mandate that fair market value must be obtained from all Trust Land transactions including sales and commercial leasing.

The ASLD administers approximately 5,300 acres within the study area, the majority of which are concentrated around the eastern and southern boundaries of the White Tank Mountains Regional Park (refer to Figure 1).

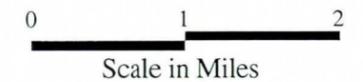


Legend

- Study Boundary
- Surface Ownership**
- Private
- State Trust
- Bureau of Land Management
- Military Reservation
- Regional Parks
- Flood Control District of Maricopa County
- Maricopa Water District
- Jurisdiction**
- City Boundaries
- - - Buckeye Annexation
- Maricopa County
- ▨ City of Buckeye
- ▧ City of Goodyear
- ▩ City of Surprise

Sources:

Arizona Land Resources Information Systems (ALRIS), 1997.
 Maricopa Association of Governments, 1998.
 Bureau of Land Management, 1999.



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 amls/fmt-owner.aml August 01, 2001



Dames & Moore Job No. 15448-007-058

Surface Ownership and Jurisdiction

Figure 1

3.1.2 Bureau of Land Management

The BLM receives its management authority from the Federal Land Policy and Management Act of 1976, which allows principles of multiple use and sustained yield in accordance with developed land use plans. While any number of encumbrances or agreements may exist on these lands, including lease agreements and management responsibility agreements or policies, this study does not identify specific parcels affected by these encumbrances or agreements. There are about 2,340 acres of BLM-administered lands in the study area. The Phoenix District Office manages these lands under the North-Central portion of the 1987 Phoenix Resource Management Plan.

3.1.3 Flood Control District of Maricopa County

FRS #3 is approximately 7,700 feet long and 27 feet high. The dam is currently owned and operated by the District; however, due to its height and reservoir capacity, the dam falls under the jurisdiction of ADWR. McMicken Dam, located in the northern portion of the study area, is also owned and operated by the District.

3.1.4 Maricopa Water District

The Maricopa Water District (MWD) has jurisdiction over the majority of the lands along the Beardsley Canal. MWD was formally organized in 1925 as a political subdivision, municipal corporation, and irrigation and water conservation district under Arizona State statutes. MWD takes Central Arizona Project (CAP) water and transports it for others to use. MWD also holds the certified water rights to the surface and subflows of the Agua Fria River and its tributaries. MWD is administered by a five-member Board of Directors and provides water and power to a service area of approximately 60 square miles. A combination of agriculture and urbanized land uses occur within this service area.

The MWD has jurisdiction over approximately 2,560 acres within the study area. Their land mostly parallels the east bank of the Beardsley Canal for a 5-mile extent from north of Peoria Avenue traversing southward to Camelback Road. They also have jurisdiction over the majority of the land on the downstream side of FRS #3 (refer to Figure 1).

3.1.5 Maricopa County

The study area is entirely within Maricopa County, Arizona. Maricopa County retains primary jurisdiction over the unincorporated lands within the study area. The cities of Buckeye, Goodyear, and Sunrise maintain jurisdiction over the incorporated and annexed portions within the study area.

Approximately 7,000 of the 26,337 acres of the White Tank Mountains Regional Park fall within the study area. The Maricopa County Parks and Recreation Department manages the entire park, which is the largest in the county system. Most of the park consists of the White Tank Mountains, which is a freestanding range separating the Phoenix Basin in the Salt River Valley from the Hassayampa Plain. The primary activities within the regional park include camping, picnicking, hiking, bicycling, and horseback riding. The park boasts an extensive trail system with more than 22 miles that potentially could be linked with surrounding recreational activities.

3.1.6 Military

Luke Air Force Base

Luke Air Force Base (AFB) extends into the eastern edge of the study area along Bethany Home Road (refer to Figure 1). The base's mission is to train and produce the world's finest F-16 pilots and technicians for the United States and allied armed forces. Land adjacent to Luke AFB is exposed to noise and potential accidents from aircraft operations in support of this mission.

The Air Force has had a longstanding management program in place to address these issues. The objectives of the program are as follows:

- safeguard public health, safety, and welfare and reduce noise and accident exposure
- encourage the implementation of land use controls to avoid inappropriate use of adjacent land that could lead to conflict between flight operations and surrounding land owners
- provide information to the community about aircraft noise and accident potential
- protect Luke Air Force Base's operational capabilities

Chapter 24, Article 7 of the Arizona Revised Statutes addresses planning, zoning, and compatibility with military airports. With objectives similar to those of the Air Force program, an area of about 280 square miles surrounding the Luke AFB main runway is designated as "territory in the vicinity of Luke AFB." This is an area much larger than is actually affected by aircraft accident potential or noise from the base (Luke AFB 1995). Arizona Revised Statute 28-8481 directs political subdivisions within this territory to adopt land use plans and adopt and enforce zoning regulations to ensure development compatible with the high noise and accident potential resulting from aircraft operations that may have an adverse effect on public health and safety. Approximately 115 acres of the White Tanks FRS #3 study area fall within this designated territory.

3.2 LAND USE, UTILITIES, AND TRANSPORTATION

3.2.1 Issues and Concerns

Potential land use issues and concerns focus on indirect impacts on planned residences adjacent to the White Tanks FRS #3, including the potential for increased dust, noise, and light resulting from the development of new recreation uses.

3.2.2 Existing Land Use

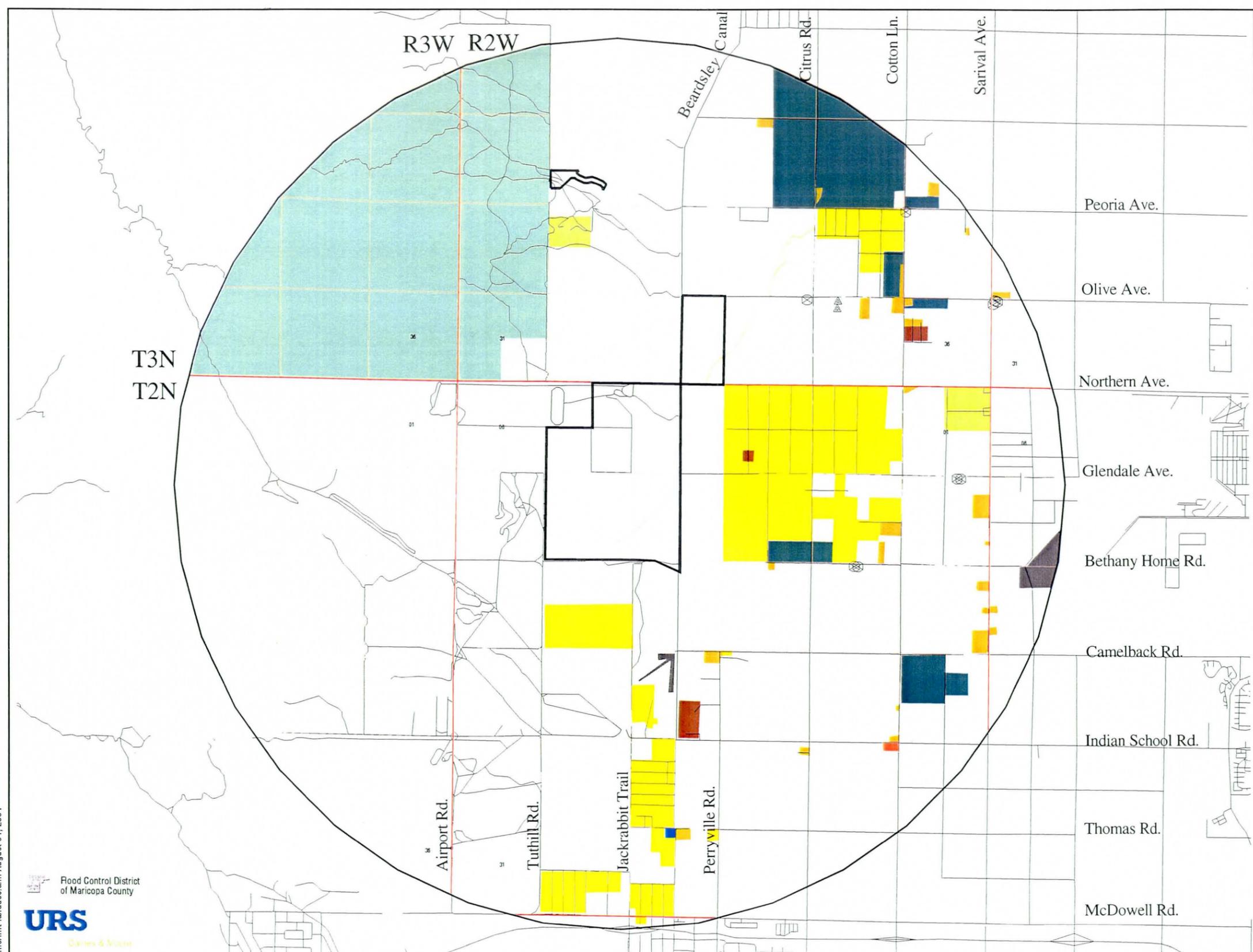
The general character of the study area is a combination of rural incorporated and unincorporated communities. The primary existing land uses within the study area include mixed-use areas; agriculture; livestock grazing; rural residential; and lands designated for recreation, protection, or conservation. Existing land use inventory results are displayed on Figure 2 and described in the subsections that follow.

Agriculture

Agricultural lands dominate the entire eastern half of the study area. These lands were classified into four categories: irrigated farmland, orchards, feedlots/horse farms, and farm complexes/agricultural outstructures. Irrigated farmland primarily is used for the production of alfalfa, cotton, small grain, and grapes. This cropland also is used as a secondary feed source for livestock following crop harvesting. Orchards are irrigated croplands used primarily to grow citrus. Two feed lots and two horse farms were identified in the study area. Agricultural use areas that include farmyards with associated barns, outbuildings, machinery, and single farmhouses were delineated as agricultural outstructures and farm complexes (refer to Figure 2).

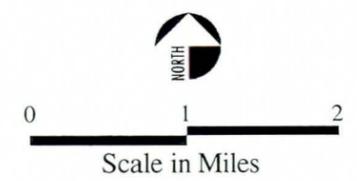
Light Industrial

A few scattered industrial land uses were identified within the study area including two warehouses, a test track, and the former Caterpillar Proving Grounds.



- Legend**
- Study Boundary
 - Residential Low Density
 - Residential Medium Density
 - Retail/Service
 - Mixed Use
 - Light Industrial
 - Public/Quasi-Public
 - Airstrip/Airport
 - Irrigated Farmland
 - Orchard
 - Feedlot/Horse Farm
 - Farm Complex/Agriculture Outstructure
 - Vacant
 - Canal/Dam
 - Secondary Roads
 - Regional Park
 - Recreational Facility
 - School
 - Pima Substation
 - Agriculture Outstructure
 - Single Family Dwelling Unit

Sources:
 Town of Goodyear, 1999.
 Maricopa County, 2000.
 Rupp Aerial Photography, Inc. 1998.
 Landiscor Aerial Information, 1998.



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Existing Land Use
 Figure 2

Commercial

Commercial and business land uses include retail, service, and office complexes. A few commercial and business properties were identified along McDowell Road in the southern portion of the study area adjacent to the Interstate 10 (I-10) corridor. These commercial properties include a restaurant/bar, two manufactured home dealerships, and a convenience store (refer to Figure 2).

Residential

Two classifications of residential land use are represented within the study area. The low-density classification represents housing areas with 1 to 2 dwelling units per acre and the medium-density classification represents housing areas with 2.1 to 15 dwelling units per acre.

Low-density residential housing areas are located throughout the study area with the primary concentration located east of the Beardsley Canal. These areas can be generally characterized as subdivisions or farm complexes.

Medium-density residential housing areas include manufactured home developments as well as some single-family residential subdivisions. One medium-density residential area was identified on the southwest corner of Thomas Road and Perryville Road (refer to Figure 2).

Mixed Use

A mixed-use category was used for areas that have a combination of residential, commercial, and light industrial uses in varying proportions. One mixed-use area, located on the southwest corner of Indian School Road and Cotton Lane, was identified within the study area.

Public/Quasi Public

The public and quasi-public land use category includes schools, correctional facilities, and other lands uses generally associated with public use. Public and quasi-public land uses within the study area include a post office, elementary school, and correctional facility.

The Scott L. Libby Elementary School (early childhood to grade 5), located south of Thomas Road and west of Perryville Road, is located within the Litchfield Elementary School District. It is the only school located within the study area and school enrollment during the 1998-1999 school year was 230 students (Arizona Department of Education 1999).

The Waddell U.S. Post Office is located on the northwest corner of Glendale Avenue and Cotton Lane and services the entire community within the study area.

The Arizona State Department of Prison Operations operates the Arizona State Prison – Complex in Perryville. This 2,600 male and female inmate capacity facility is located between Thomas Road and McDowell Road along Citrus Road.

Airstrip/Airport

Non-military airstrips and airports were inventoried to identify existing or planned airports, airstrips, airfields, and associated facilities. One airstrip is located within the White Tanks FRS #3 study area. The privately owned airstrip is located on the southeast corner of Perryville Road and Jackrabbit Road. The dirt airstrip is used by light aircraft such as crop dusters.

Recreation and Parks Areas

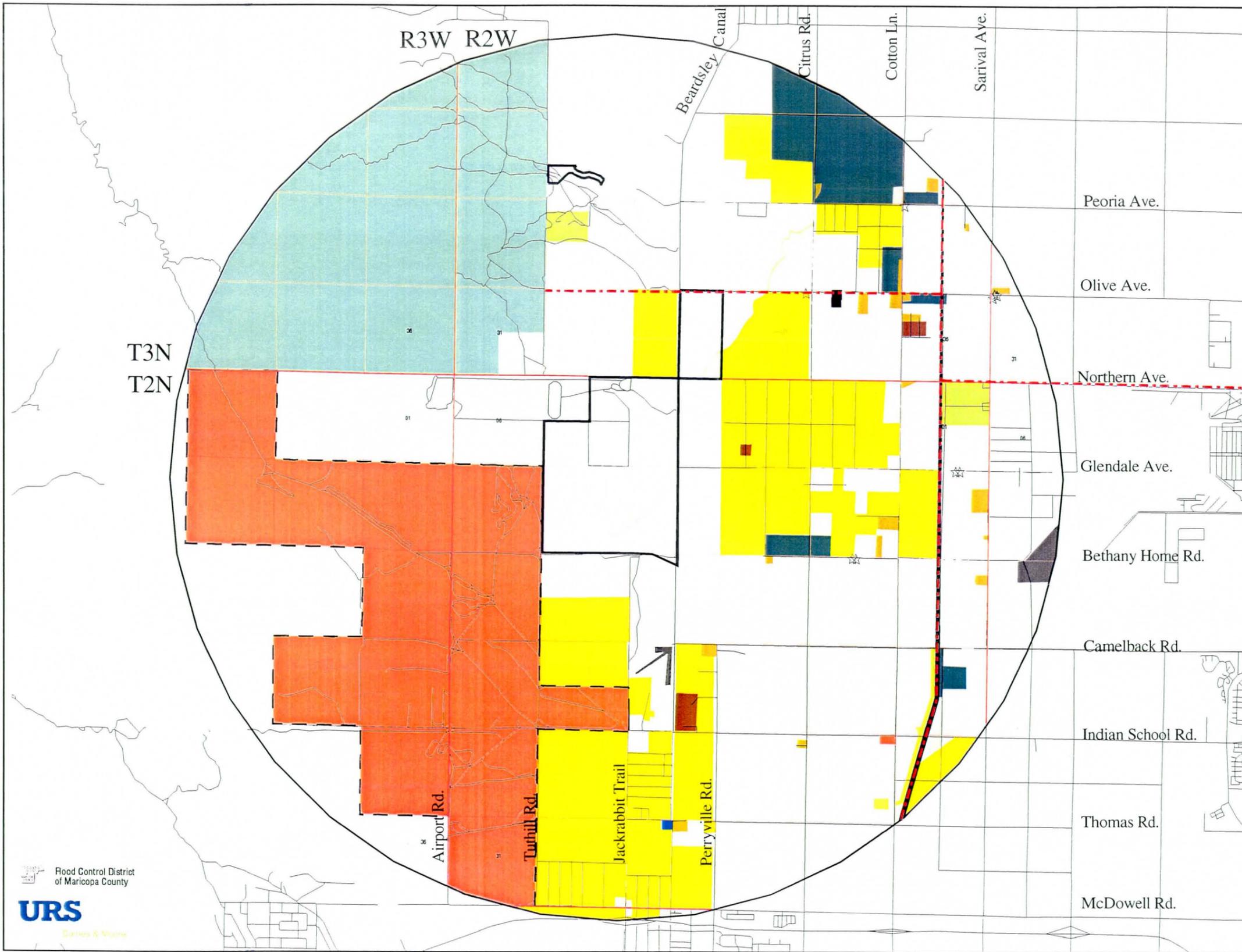
Three parks/recreation facilities were identified within the study area: (1) White Tank Mountain Regional Park, located northwest of the Northern Avenue and Tuthill Road interchange in the

northwestern portion of the study area; (2) White Tanks Riding Stables, located along Olive Avenue just east of the White Tank Mountains Regional Park entrance; and (3) Wildlife World Zoo, located south of Northern Avenue and west of Sarival Road. The White Tank Mountain Regional Park totals 26,337 acres, making it the largest park in the Maricopa County system. The park attracts more than 25,000 visitors annually and is managed by the Maricopa County Parks and Recreation Department. Horseback riding is permissible in the park. The privately owned equestrian park, White Tanks Riding Stables, is located on Olive Road adjacent to the main entrance to the park. The Wildlife World Zoo is a privately owned and operated animal park located in the eastern portion of the study area. This facility is open seven days a week to the public.

3.2.3 Future Land Use

Information regarding future land use in the study area was obtained from general or comprehensive plans adopted by county and municipal agencies, agency consultations, and a field reconnaissance. Plans reviewed include the Maricopa County White Tank Grand Avenue Plan, Goodyear General Plan, and Buckeye Annexation Conceptual Plan. Future land uses identified within the study area are shown on Figure 3.

To help accommodate the demands of rapid growth, the Maricopa County Department of Planning and Development updated and combined their Agua Fria White Tank Area Policy and Development Guide and Grand Avenue Land Use Plan into the White Tank Grand Avenue Area Plan. This plan was drafted in 1999 and is pending approval from the Maricopa County Board of Supervisors. The objective of this revised plan is to accommodate growth in a manner that is consistent with protecting public health, safety, convenience, and general welfare of the area. Table 1 illustrates current residential development plans within the study area.

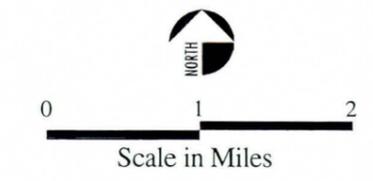


Legend

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- Residential Low Density
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- Orchard
- Feedlot/Horse Farm
- Farm Complex/Agriculture Outstructure
- Vacant
- Canal/Dam
- Secondary Roads
- Recreational Facilities
- Regional Park
- State Highway 303
- School
- ☆ Agriculture Outstructure
- Single Family Dwelling Unit
- Buckeye Annexation
- - - Maricopa County Bicycle Trail

Sources:

- Town of Buckeye, 2000.
- Town of Goodyear, 1999.
- Maricopa County, 2000.



Future Land Use
Figure 3

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**TABLE 1
FUTURE UNINCORPORATED RESIDENTIAL DEVELOPMENTS**

Name of Development	Type of Development	Number of Housing Units	General Location of Development
Cooley and Clearwater Farms	Single-family, 1-acre lot subdivision	26 +	Southwest corner of Cotton Lane and Maryland Avenue.
Crystal Springs Estates -- White Tank Mountain Ranch	Single family, 1-acre residence with horse privileges	600 +	Northwest corner of Citrus Road and Northern Avenue
Pasqualetti Mountain Ranch	Single-family, 1-acre lot subdivision	600 +	Southwest corner of Jackrabbit Road and Indian School Road
Perryville Limited	Single-family, 1-acre lot subdivision	80 +	Southwest corner of Camelback Road and Perryville Road
Sonoran Ridge Estates	Single-family, 1-acre lot subdivision	264 +	Southeast corner of Jackrabbit Road and Olive Avenue

Data Source: Maricopa County Department of Planning and Development

Municipalities with comprehensive plans or current planning guidance for lands within the study area include the towns of Goodyear and Buckeye. The General Land Use Plan for the Town of Goodyear was updated in 1998. This plan describes the existing natural characteristics, land uses, and zoning of the area. The General Plan provides a blueprint for development, revitalization, and growth within the town's corporate limits and acts as a guide for decision making in Goodyear. Future developments within the study area predominately will focus on providing employment opportunities such as industrial parks. The Town of Goodyear has set aside approximately 1,000 acres to serve as a Special Study Area. The Board of Supervisors currently is deciding what type of public/quasi-public land use will be best suited for this area, which is located south of Camelback Road between Cotton Lane and Perryville Road (Town of Goodyear 1998).

The Town of Buckeye just recently has annexed nearly 9,000 acres of desert land at the base of the White Tank Mountains that once served as the Caterpillar Proving Grounds. The property runs from McDowell Road to Northern Avenue along the eastern side of the White Tanks and is located entirely within the study area. Caterpillar and DMB Associates, Inc. plan to develop this area into a major master-planned community, which would include apartments, single-family homes, schools, offices, shops, golf courses, hiking trails, and possibly a resort. The Town of

Buckeye has completed a Conceptual Plan for this area, the majority of which is zoned for single-family residential land use.

3.2.4 Public Utilities and Ground Transportation

Public utilities and ground transportation within and immediately adjacent to the White Tanks study area are described in this subsection.

Utilities inventoried include electrical transmission lines and canals. Transmission lines include lattice tower and wood-pole electrical transmission lines having a capacity of 69 kilovolts (kV) or greater. Primary canals used for residential and agricultural water distribution also were identified.

Ground transportation features are considered to be significant roads and highways, such as interstate freeways, federal highways, state highways, county and other major roads, and railroads.

Public Utilities

Transmission Lines

Arizona Public Service Company (APS) operates and maintains two high-voltage transmission lines identified within the project study area. The first 69kV transmission line originates at the Pima Substation, located on the northeast corner of Thomas Road and Estrella Parkway, traveling south along Cotton Lane. The second 69kV transmission line parallels Cactus Lane, traveling between the Waddell Substation, located on the northeast corner of Cactus Road and Cotton Lane, and the Dysart Substation, located outside the study area along Cactus Road.

Canals

The Beardsley Canal, owned and operated by the MWD, extends nearly 33 miles from Lake Pleasant to the most southern portion of the MWD's service area, near Indian School Road paralleling Perryville Road through the study area. The canal provides water and power to agricultural producers and rural inhabitants.

Ground Transportation

Railroads

One primary railroad was identified within the study area and is operated by the Atchison Topeka and Santa Fe Railroad. This line traverses from north of the study area to Indian School Road, generally paralleling Cotton Lane. An east branch diverges from this line and travels east paralleling Olive Road beyond the study area.

Highways and Roads

The road transportation network within the study area was developed in typical grid format. There are numerous arterial and connector roads that provide access to FRS #3. These connectors provide links with I-10, south of the study area, and Loop 303.

Loop 303—Loop 303 traverses south between Sarival Avenue and Cotton Lane serving as a connection route between Grand Avenue and I-10. The Maricopa County Department of Transportation (MCDOT) currently is constructing Loop 303 as a four-lane signalized arterial on the eastern 200 feet of Arizona Department of Transportation (ADOT)-owned right-of-way. The road eventually may revert to ADOT if and when it is upgraded to a freeway.

3.3 VISUAL RESOURCES

The District including the White Tanks FRS #3 lands and the majority of the surrounding properties have no formal guidelines for managing visual resources. The exception to this is the BLM land located along the northern side of the White Tanks FRS#3. The BLM does support management of visual resources on their lands through established guidelines. The visual resource studies completed for this project were based upon methods established by the Forest Service Visual Management System (VMS), 1974 and Scenery Management System (SMS), 1996; as well as the BLM Visual Resource Management Inventory and Contrast Rating System, 1986.

The visual resource inventory for the White Tanks FRS #3 Project was approached from a local-scale perspective so that variations in visual resource character could be distinguished within the study area. Data for the visual resource inventory were gathered primarily from field observations. However, aerial photography and land use maps also were used to determine the extent and pattern of visual resource components. Visual resource data were compared to the land use and biological resource data collected to ensure that a comprehensive inventory of relevant components was documented; for example, for identification of the visual resources where vegetation and/or land use patterns was a defining component of that visual resource.

3.3.1 Issues and Concerns

The following issues and concerns were identified for the White Tanks FRS #3 Project with regard to visual resources. These issues became the baseline for the inventory and assessment of potential visual resource impacts and/or benefits resulting from this project:

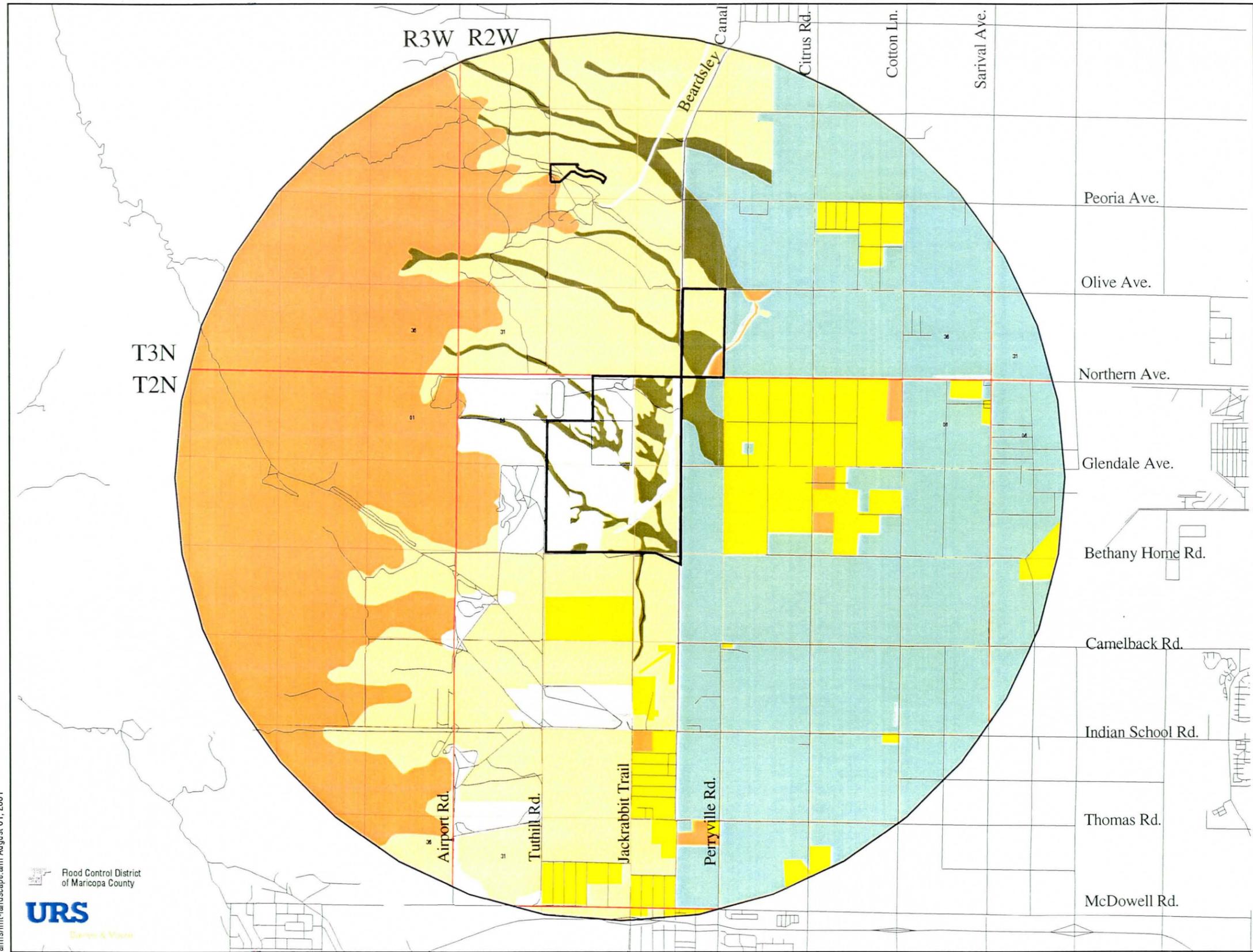
- Preservation of natural Sonoran desert landscapes exhibiting unique or special features (e.g., vegetation, washes)

- Preservation of views toward adjacent landscapes (i.e., White Tank Mountains) from within the study area and into the study area (e.g., from major roads, residences, parks)
- Restoration of degraded landscapes resulting from past construction activities and intensive site uses (e.g., proving grounds, off-highway vehicle use), while maintaining consistency with existing and planned land uses, including adjacent areas

Landscape Setting

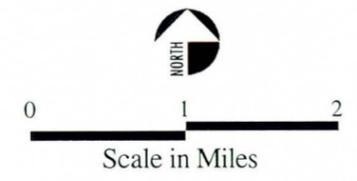
The study area is located immediately west of the metropolitan Phoenix area along the eastern side of the White Tank Mountains. The study area is located within the Basin and Range physiographic province as defined by Nevin A. Fennemen in *Physiography of the Western United States* (1931). This province is distinguished by isolated roughly parallel north-south trending mountain ranges, separated by relatively flat desert basins. The flat desert basins allow for expansive views of the adjacent mountain ranges. The Basin and Range physiographic province is broken into two landscape character types, the Sonoran Desert and Salton Trough. The Sonoran Desert landscape character type is relevant to this study area and consists of broad, flat desert plains and small mountain ranges. The majority of the mountains are 2,000 feet or less in height and have distinct ridgelines and steep v-shaped ravines. There is relatively little vegetative cover due to the steep dissected slopes and rocky soil. The plains areas are relatively flat with sparse vegetative cover except where there are major drainages. The predominant vegetation type is creosote bush-bursage, with areas of saguaro, organ pipe, and cholla cactus, as well as ironwood, mesquite, and paloverde trees adding to the distinctiveness of these areas.

The area expresses limited landscape variability due to the location within open desert basin and its alteration in response to its function as a flood control feature. The inventory and assessment of the visual environment for the study area defined the visual variability including the character of form, line, color, and texture of the existing physical elements and are identified in this discussion by scenic quality rating units and/or image types. Landscape characteristic types are illustrated on Figure 4.



- Legend**
- Study Boundary
 - Landscape Types**
 - Mountains
 - Creosote Plains
 - Desert Wash
 - Agriculture
 - Disturbed Area
 - Developed (residential, commercial, government facility)
 - Industrial

Sources:
LandisCor Aerial Information, 1997.



x: whitetanks
gis
amis/fmt-landscape.arml August 01, 2001



Dames & Moore Job No. 15448-007-058

Landscape Characteristic Types
Figure 4

Scenic Quality Rating Units

A scenic quality rating unit is a subset of the broadly defined landscape character types as previously discussed. A scenic quality rating unit is defined based on various elements that contribute to the uniqueness or diversity of the unit, such as landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications (disturbance). There are three classifications of scenic quality, as follows:

- Class A—lands of outstanding or distinctive diversity or visual interest
- Class B—lands of common or average diversity or visual interest
- Class C—lands of minimal diversity or visual interest

The scenic quality of the study area is defined primarily by the vegetation and drainage patterns. There are six distinct scenic quality rating units identified in the study area as summarized below.

White Tank Mountains

The White Tank Mountains are a scenic quality Class A landscape consisting of steep rocky slopes and a distinctive ridgeline. Vegetation is sparse on the slopes. However, the foothills are covered with a moderate to dense cover of upland Sonoran vegetation including saguaro cactus, cholla cactus, prickly-pear cactus, palo verde trees, and brittlebush. The green to dark green colors of the vegetation on the foothills contrast sharply with the dark and light colors of the exposed mountain slopes adding to the visual interest of this landscape. There are numerous small dissections and drainages cutting across the mountain slopes, which are accented by the rock outcroppings and exposed soil. Emphasis on the visual aspects of the White Tank Mountains should be considered in the final design.

The White Tank Mountains Regional Park is located within the north end of the mountains and foothills. There are numerous trails throughout this area as well as developed day-use picnic areas. There also are one main road and several parking lots within the park.

Outside the park, there are several features visible within the central and southern portions of the mountains. These features include several antennae (radio, cellular, etc.), numerous roads, and areas of disturbance from past mining and other industrial uses.

Desert Washes

The scenic quality Class B desert washes are characterized by dry, sandy drainages cutting across areas of relatively flat desertscrub areas. These drainages range from a few feet to more than 100 feet in width. A distinguishing feature of this landscape unit is the amount and variety of vegetation along the edges of the wash. The vegetation ranges from new growth to mature areas consisting of paloverde trees, ironwood trees, creosote shrubs, desert broom, and brittlebush, among other vegetation types. The green vegetation contrasts sharply with the light tan colors of the wash and adjacent soils. The washes are used occasionally by equestrian trail riders and hikers. Emphasis on maintaining natural appearing washes and drainages should be considered in the final design.

Embankment (Dam)

The scenic quality Class B embankment (dam) is a unique manmade feature within this landscape. The sharp uniform edges of the embankment provide a sharp contrast to surrounding desert washes and plains landscapes. The embankment is approximately 25 feet above the surrounding areas and has a road along the crest. The dam is the only feature displaying vertical relief within the area, which offers unique viewing opportunities of the surrounding landscapes including the White Tank Mountains. There currently is minimal vegetation on the embankment, with the exception of some grasses and desertscrub vegetation. There is opportunity to work this

feature into future designs by softening the edges and revegetation, while preserving the viewing opportunities.

Creosote Plains

The scenic quality Class C creosote plains landscape unit is characterized by relatively flat terrain with a moderate to dense cover of creosote shrubs. The creosote vegetation provides gray and green color to a relatively uniform tan color of the surrounding soil. Occasional saguaro, paloverde, brittlebush, and barrel cactus can be found mixed in with the creosote, adding visual interest to the landscape.

Borrow Area

The scenic quality Class C basin landscape unit is a relatively smooth depressed area created during the construction/remediation of the embankment (dam). This area is predominantly dry; however, there is standing water during times of peak rainfall, which adds visual interest to the landscape. There is minimal vegetation in this landscape, consisting mainly of grasses mixed with dispersed brittlebush and sage.

Disturbed Area

The scenic quality Class C disturbed area has numerous manmade “scars” visible throughout the landscape unit. The disturbances consist of trenches, pits, roads, and other features that have been cut into the landscape, likely a result of operation of the adjacent proving grounds. Vegetation in these areas consists of a moderate to dense cover of creosote shrubs and occasional saguaro, paloverde, brittlebush, and barrel cactus. The exposed soil and rock of disturbed areas contrast sharply with the adjacent vegetation and soils. This landscape unit offers the opportunity

for reclamation to its original character or is suited for additional modifications to meet required future design features.

Image Types

Image types reflect the human-influenced landscapes within the study area, and include residences, commercial/agricultural/light industrial uses, transportation corridors, and recreation areas. Image character types are determined based on an evaluation of existing and future land uses within the study area. Each image type's character is defined by architectural styles, building patterns, density, landscape design elements, disturbance, and circulation. Image types are not classified or ranked; however, residential areas and parks typically are considered to be of the highest concern with regards to visual change in the landscape.

Developed Residential

The developed residential image type consists primarily of low-density detached residences and structures within a rural landscape setting. Patterns of development are loosely ordered with numerous incongruous visual elements. The setting is diverse with a variety of building types, uses, and other elements including stables, corrals, and agricultural machinery. There is a relatively dense coverage of native and non-native vegetation throughout the residential image type. Circulation is based on a square-grid pattern. The rural setting for the residential areas provides visual interest in a surrounding area rapidly increasing in population and density.

Commercial/Agricultural/Light Industrial

The commercial image types are primarily limited to agricultural operations such as dairies, feed lots, and chemical/seed distribution centers. However, there are light industrial uses as well, including sand and gravel operations and proving grounds. The agricultural operations are

characterized by numerous buildings, fences, silos, and machinery. Landscaping is minimal and usually located on the perimeter of the operations. The proving grounds operations center consists of office buildings as well as storage and maintenance facilities. The proving grounds also consist of several acres of disturbed land previously described in the scenic quality section.

Transportation Corridors

Transportation corridors include areas that have been altered by the location of major roadways. Due to the somewhat dispersed development in the area, the roadways are not developed into any type of parkways, nor do they have any type of roadside landscaping. Therefore, they are not unique in terms of scenic resources and rely on adjacent landscapes to provide visual interest (e.g., White Tank Mountains and washes).

Views and Viewer Sensitivity

The landscapes within the study area are open and expansive, permitting extensive views and vistas of adjacent landscapes. Additionally, adjacent areas including the White Tank Mountains Regional Park, residences, and roads have views into the project site. Viewer sensitivity reflects the degree of public concern for change in the scenic quality of the landscape viewed from different locations. The type of viewer and the distance viewed from are considered when determining viewer sensitivity.

Visual sensitivity levels are categorized as high, moderate, and low. Views from residential and recreational areas as well as scenic roads are typically high sensitivity. Views from major arterial roads and commercial areas are typically moderate sensitivity. Views from agricultural or industrial areas are typically low sensitivity. High and moderate sensitivity views were the focus of this study.

Distance from the viewer is defined as foreground (0 to 0.5 mile), middleground (0.5 mile to 3 miles), and background (3 to 5 miles). Typically, the degree of discernible detail decreases with increasing distance.

There are several views into and out of the site, which take advantage of elevated terrain along the dam. Onsite foreground views of the washes and associated vegetation, as well as the embankment, are distinctive. The majority of other onsite foreground views are of desert scrub and disturbed landscapes are indistinctive. The change in elevation resulting from the dam allows for offsite panoramic middleground views to the west/northwest of the White Tank Mountains and foothills leading up to the mountains. The White Tank Mountains display several unique features, such as sharp peaks, steep slopes with areas of rock outcrops, as well as unique Sonoran Desert vegetation along the foothills. Additionally, there are panoramic foreground to middleground views to the east/southeast/south of the agricultural lands and distant background views of the Sierra Estrella Mountains to the south. The agricultural lands consist of a patchwork of colors ranging from shades of green to brown/tan. Views of the Caterpillar Proving Grounds to the west show several areas where the landscape has been “scarred” as a result of equipment testing.

These views of undisturbed landscapes, especially the White Tank Mountains, should be taken advantage of when considering future design concepts and modifications within the study area. Likewise, views where there is extensive “scarring” should be avoided or screened when possible, unless efforts are taken to mitigate the disturbance.

3.4 BIOLOGICAL RESOURCES

The existing White Tanks FRS #3 was visited on 15 November and 16 December 1999. The levee and the area immediately adjacent to it were examined by vehicle, and the remainder of the site was examined on foot. The vegetation resources of the site were assessed, and records were kept of any wildlife species observed on site. Lists of potentially occurring plants, mammals,

birds, and herpetofauna were generated from the existing literature on the distribution and habitat requirements of Arizona flora and fauna (Tables 2 through 5).

The White Tanks FRS #3 study area covers 2.75 square miles in Sections 4, 5, 8, and 9 of Township 2 North, Range 2 West (Figure 5) at the base of the White Tank Mountains. A smaller study area, containing the levee and the area immediately northwest of it, also is shown on Figure 5. The following description applies both to the small and large study areas.

The area is generally flat, with a 1 to 2 percent slope draining to the southeast. A number of xeroriparian washes dissect the area. The vegetation of the entire area falls into the Lower Colorado River Valley subdivision of Sonoran desert scrub (Turner and Brown 1994). Interfluvial flats are dominated by creosote bush (*Larrea tridentata*), and triangle-leaf bursage (*Ambrosia deltoidea*) and jimmyweed (*Happlopappus* spp.) are also common. Blue paloverde (*Cercidium floridum*) is the dominant tree species along the xeroriparian washes, and velvet mesquite (*Prosopis velutina*), ironwood (*Olneya tesota*), and catclaw acacia (*Acacia greggii*) also are present. Barrel cactus (*Ferocactus wislizenii*), hedgehog cactus (*Echinocereus englemannii*), ocotillo (*Fouquieria splendens*), and saguaro (*Carnegiea gigantea*) are scattered throughout the study area. A bosque (Photo 1) extends from the northwest corner of Section 9 southeast to the existing levee. Canopy cover ranges up to 40 percent, and is composed primarily of blue paloverde with some mesquite and occasional ironwoods.

Most of the study area is highly disturbed. In Sections 5 and 8, earth has been moved to create numerous trenches and berms, and this area shows signs of heavy vehicle use. Except along xeroriparian washes (Photo 2), large areas in Sections 5 and 8 have very sparse perennial vegetation (Photo 3). The levee and the area immediately northwest of it in Section 9 are also highly disturbed, with drainage basins excavated adjacent to the levee.

The portion of the study area in Section 4 and in NWNW Section 5 is the least disturbed (Photo 4). The creosote flats show signs only of limited vehicle use and horse travel. Many of the saguaros, barrel cacti, and hedgehog cacti on the site are present in Section 4.

**TABLE 2
PLANT SPECIES THAT POTENTIALLY OCCUR IN THE STUDY AREA**

Common Name	Scientific Name	Environment Type Likely Present In		
		Creosote Bush Flats	Upland Desert Scrub	Xero-riparian Washes
Bermuda grass*	<i>Cynodon dactylon</i>			✓
Arabian grass*	<i>Schismus arabicus</i>	✓	✓	✓
Mediterranean grass*	<i>Schismus barbatus</i>	✓	✓	✓
Buckwheat	<i>Eriogonum</i> spp.	✓	✓	✓
Wingscale	<i>Atriplex canescens</i>	✓		
Quail brush	<i>Atriplex lentiformes</i>	✓		
All scale	<i>Atriplex polycarpa</i>	✓		
Russian thistle*	<i>Salsola iberica</i>	✓		✓
Palmer's amaranth	<i>Amaranthus almeri</i>			✓
Yellow tansy mustard	<i>Descurainia pinnata</i>	✓	✓	✓
London rocket*	<i>Sisymbrium irio</i>	✓	✓	✓
Catclaw acacia	<i>Acacia greggii</i>			✓
Velvet mesquite	<i>Prosopis velutina</i>			✓
Foothill paloverde	<i>Cercidium microphyllum</i>		✓	✓
Blue paloverde	<i>Cercidium floridum</i>			✓
White ratany	<i>Krameria grayi</i>	✓	✓	✓
Filaree*	<i>Erodium cicutarium</i>	✓	✓	✓
Creosote bush	<i>Larrea tridentata</i>	✓	✓	✓
Corona de Cristo	<i>Castela emoryi</i>	✓		✓
Ditaxis	<i>Argythamnia neomexicana</i>		✓	✓
Graythorn	<i>Zizyphus obtusifolia</i>		✓	✓
Alkali pink, globe mallow	<i>Sphaeralcea</i> spp.	✓	✓	✓
Tamarisk, salt cedar*	<i>Tamarix pentandra</i>			✓
Saguaro	<i>Carnegiea gigantea</i>		✓	
Cholla cactus	<i>Opuntia</i> spp.	✓	✓	✓
Ocotillo	<i>Fouquieria splendens</i>	✓	✓	✓
Wolfberry	<i>Lycium</i> spp.	✓	✓	✓
Desert willow	<i>Chilopsis linearis</i>			✓
Common ragweed	<i>Ambrosia artemisiifolia</i>	✓	✓	✓
Triangle-leaf bursage	<i>Ambrosia deltoidea</i>	✓	✓	✓
White bursage	<i>Ambrosia dumosa</i>	✓	✓	✓
Desert broom	<i>Baccharis sarothroides</i>			✓
Brittle bush	<i>Encelia farinosa</i>	✓	✓	✓
Alkali goldenbush	<i>Haplopappus acradenius</i>	✓		✓
Jimmy weed	<i>Haplopappus</i> spp.	✓	✓	✓

Sources: Kearney and Peebles 1960; Lehr 1978; Turner and Brown 1994

*Not native to Arizona

TABLE 3
MAMMAL SPECIES THAT POTENTIALLY OCCUR IN THE STUDY AREA AND
THEIR HABITAT ASSOCIATIONS¹

Common Name	Scientific Name ²	Creosote Bush Flats	Upland Desert Scrub	Xero-riparian washes
Desert shrew	<i>Notiosorex crawfordi</i>	✓	✓	✓
California-leaf nosed bat	<i>Macrotus californicus</i>	✓	✓	✓
Lesser long-nosed bat	<i>Leptonycteris curasoae</i>	✓	✓	✓
Cave myotis	<i>Myotis velifer</i>	✓	✓	✓
California myotis	<i>Myotis californicus</i>	✓	✓	✓
Western pipistrelle	<i>Pipistrellus hesperus</i>	✓	✓	✓
Big brown bat	<i>Eptesicus fuscus</i>	✓	✓	✓
Southern yellow bat	<i>Lasiurus ega</i>	✓	✓	✓
Townsend's big-eared bat	<i>Plecotus townsendii</i>	✓	✓	✓
Pallid bat	<i>Antrozous pallidus</i>	✓	✓	✓
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	✓	✓	✓
Pocketed free-tailed bat	<i>Tadarida femorosacca</i>	✓	✓	✓
Big free-tailed bat	<i>Tadarida macrotis</i>	✓	✓	✓
Western mastiff bat	<i>Eumops perotis</i>	✓	✓	✓
Desert cottontail	<i>Sylvilagus audubonii</i>	✓	✓	✓
Black-tailed jackrabbit	<i>Lepus californicus</i>	✓	✓	✓
Harris' antelope squirrel	<i>Ammospermophilus harrisi</i>	✓	✓	✓
Round-tailed ground squirrel	<i>Spermophilus tereticaudus</i>	✓	✓	✓
Botta's pocket gopher	<i>Thomomys bottae</i>	✓	✓	✓
Little pocket mouse	<i>Perognathus longimembris</i>	✓	✓	✓
Arizona pocket mouse	<i>Perognathus amplus</i>	✓	✓	✓
Desert pocket mouse	<i>Chaetodipus penicillatus</i>	✓		
Bailey's pocket mouse	<i>Chaetodipus baileyi</i>		✓	
Merriam's kangaroo rat	<i>Dipodomys merriami</i>	✓	✓	✓
Desert kangaroo rat	<i>Dipodomys deserti</i>	✓		✓
Western harvest mouse	<i>Reithrodontomys megalotis</i>	✓	✓	✓
Cactus mouse	<i>Peromyscus eremicus</i>	✓	✓	✓
Southern grasshopper mouse	<i>Onychomys torridus</i>	✓	✓	✓
Arizona cotton rat	<i>Sigmodon arizonae</i>			✓
White-throated wood rat	<i>Neotoma albigula</i>		✓	✓
Desert wood rat	<i>Neotoma lepida</i>	✓	✓	✓
Coyote	<i>Canis latrans</i>	✓	✓	✓
Kit fox	<i>Vulpes macrotis</i>	✓		✓
Gray fox	<i>Urocyon cinereoargenteus</i>	✓	✓	✓
Badger	<i>Taxidea taxus</i>	✓	✓	✓
Mule deer	<i>Odocoileus hemionus</i>	✓	✓	✓

Source: Hoffmeister 1986

²Source: Jones et al. 1992

**TABLE 4
BIRD SPECIES THAT POTENTIALLY OCCUR IN THE STUDY AREA AND
THEIR HABITAT ASSOCIATIONS**

Common Name	Scientific Name	Creosote Bush Flats	Upland Desert Scrub	Xero-riparian Washes
Turkey vulture	<i>Cathartes aura</i>	S, M	S, M	S, M
Northern harrier	<i>Circus cyaneus</i>	W, M		W, M
Sharp-shinned hawk	<i>Accipiter striatus</i>		W, M	W, M
Cooper's hawk	<i>Accipiter cooperii</i>		R	R
Harris' hawk	<i>Parabuteo unicinctus</i>	R	R	R
Swainson's hawk	<i>Buteo swainsoni</i>	M	M	M
Red-tailed hawk	<i>Buteo jamaicensis</i>	R	R	R
Ferruginous hawk	<i>Buteo regalis</i>	W, M	W, M	W, M
American kestrel	<i>Falco sparverius</i>	R	R	R
Prairie falcon	<i>Falco mexicanus</i>	R	R	R
Gambel's quail	<i>Callipepla gambelii</i>	R	R	R
White-winged dove	<i>Zenaida asiatica</i>	S, M	S, M	S, M
Mourning dove	<i>Zenaida macroura</i>	R	R	R
Greater roadrunner	<i>Geococcyx californianus</i>	R	R	R
Western screech owl	<i>Otus kennicottii</i>		R	R
Great-horned owl	<i>Bubo virginianus</i>		R	R
Elf owl	<i>Micrathene whitneyi</i>		S	S
Burrowing owl	<i>Athene cunicularia</i>	R		
Lesser nighthawk	<i>Chordeiles acutipennis</i>	S	S	S
Common poorwill	<i>Phalaenoptilus nuttallii</i>	S	S	S
Costa's hummingbird	<i>Calypte costae</i>		W, Sp	W, Sp
Gila woodpecker	<i>Melanerpes uropygialis</i>		R	R
Ladder-backed woodpecker	<i>Picoides scalaris</i>		R	R
Gilded flicker	<i>Colaptes chrysoides</i>		R	R
Say's phoebe	<i>Sayornis saya</i>	S, W	S, W	S, W
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>			S
Brown-crested flycatcher	<i>Myiarchus tyrannulus</i>			S
Western kingbird	<i>Tyrannus verticalis</i>		S, M	S, M
Horned lark	<i>Eremophila alpestris</i>	R		
Common raven	<i>Corvus corax</i>	R	R	R
Verdin	<i>Auriparus flaviceps</i>		R	R
Cactus wren	<i>Campylorhynchus brunneicapillus</i>	R	R	R
Black-tailed gnatcatcher	<i>Poliptila melanura</i>		R	R
Northern mockingbird	<i>Mimus polyglottos</i>	R	R	R
Curve-billed thrasher	<i>Toxostoma curvirostre</i>		R	R
Phainopepla	<i>Phainopepla nitens</i>		R	R
Loggerhead shrike	<i>Lanius ludovicianus</i>	R	R	
European starling	<i>Sturnis vulgaris</i>		R	
Bell's vireo	<i>Vireo bellii</i>			S
Warbling vireo	<i>Vireo gilvus</i>		M	M
Orange-crowned warbler	<i>Vermivora celata</i>			M, W
Lucy's warbler	<i>Vermivora luciae</i>			S
Yellow warbler	<i>Dendroica petechia</i>			S, M
Yellow-rumped warbler	<i>Dendroica coronata</i>			M, W
Northern cardinal	<i>Cardinalis cardinalis</i>		R	R
Abert's towhee	<i>Pipilo aberti</i>			R

TABLE 4
BIRD SPECIES THAT POTENTIALLY OCCUR IN THE STUDY AREA AND
THEIR HABITAT ASSOCIATIONS

Common Name	Scientific Name	Creosote Bush Flats	Upland Desert Scrub	Xero-riparian Washes
Brewer's sparrow	<i>Spizella breweri</i>	W, M	W, M	W, M
Black-throated sparrow	<i>Amphispiza bilineata</i>	R	R	R
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	W, M	W, M	W, M
Western meadowlark	<i>Sturnella neglecta</i>	R	R	R
Brown-headed cowbird	<i>Molothrus ater</i>			R
House finch	<i>Carpodacus mexicanus</i>		R	R

Sources: American Ornithologists Union 1998; Monson and Phillips 1981; National Geographic Society 1999; Witzeman et al. 1997

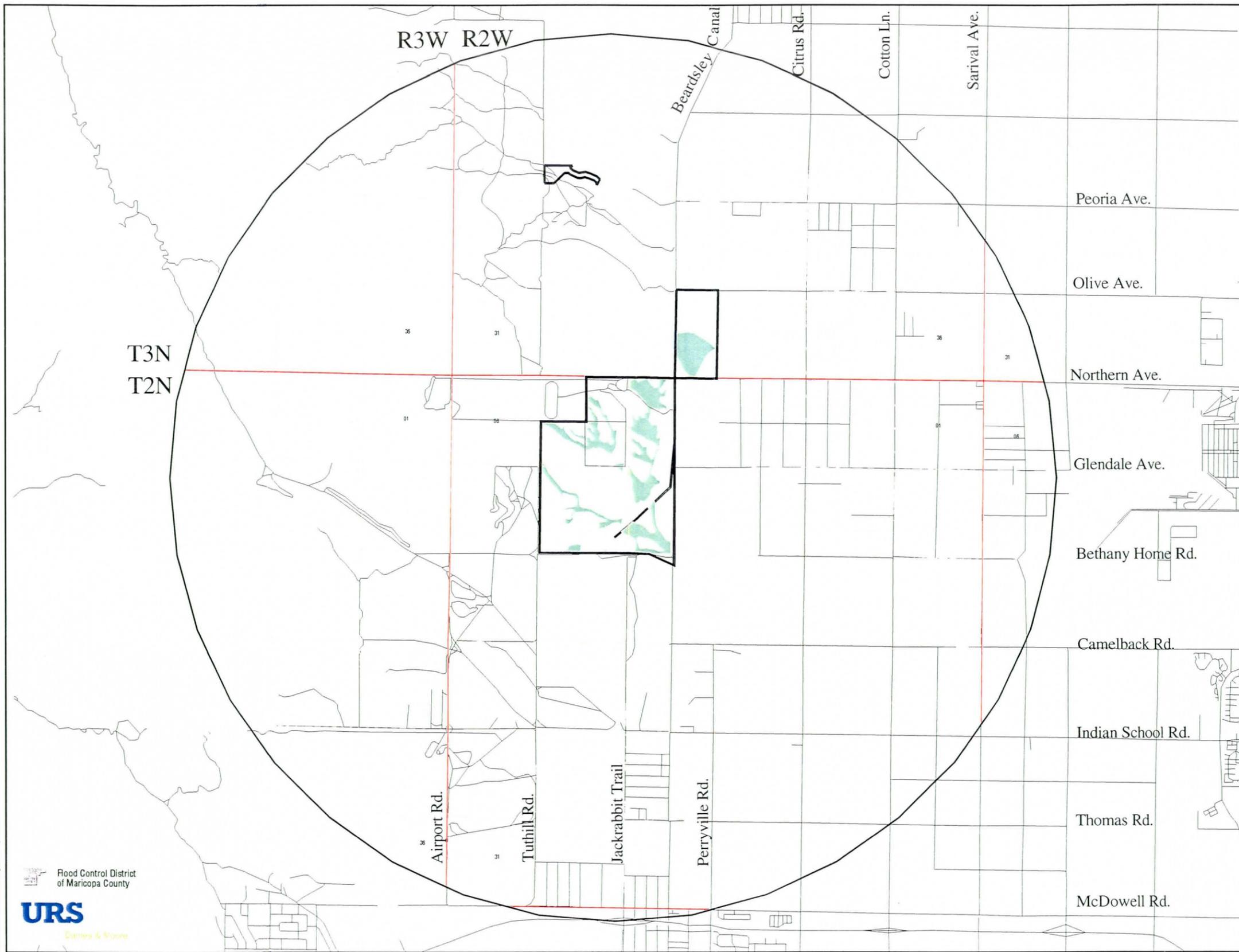
Key to season birds expected:

Sp = Spring S = Summer W = Winter F = Fall M = Migration R = Resident

TABLE 5
REPTILE AND AMPHIBIAN SPECIES THAT POTENTIALLY OCCUR IN THE
STUDY AREA AND THEIR HABITAT ASSOCIATIONS.

Common Name	Scientific Name	Creosote Bush Flats	Upland Desert Scrub	Xeroriparian Washes
TOADS				
Couch spadefoot	<i>Scaphiopus couchi</i>	✓	✓	✓
Western spadefoot	<i>Scaphiopus hammondi</i>	✓	✓	✓
Sonoran desert toad	<i>Bufo alvarius</i>	✓	✓	✓
Woodhouse toad	<i>Bufo woodhousei</i>			✓
Red-spotted toad	<i>Bufo punctatus</i>		✓	✓
Great plains toad	<i>Bufo cognatus</i>	✓	✓	✓
TURTLES				
Desert tortoise	<i>Gopherus agassizii</i>	✓	✓	✓
LIZARDS				
Western banded gecko	<i>Coleonyx variegatus</i>	✓	✓	✓
Desert iguana	<i>Dipsosaurus dorsalis</i>	✓		✓
Common chuckwalla	<i>Sauromalus obesus</i>		✓	
Zebratail lizard	<i>Callisaurus draconoides</i>	✓		✓
Common collared lizard	<i>Crotaphytus collaris</i>		✓	✓
Long-nosed leopard lizard	<i>Gambelia wislizenii</i>	✓	✓	✓
Desert spiny lizard	<i>Sceloporus magister</i>	✓	✓	✓
Side-blotched lizard	<i>Uta stansburiana</i>	✓	✓	✓
Long-tailed brush lizard	<i>Urosaurus graciosus</i>	✓	✓	✓
Tree lizard	<i>Urosaurus ornatus</i>			✓
Desert horned lizard	<i>Phrynosoma platyrhinos</i>	✓	✓	✓
Western whiptail	<i>Cnemidophorus tigris</i>	✓	✓	✓
Gila monster	<i>Heloderma suspectum</i>	✓	✓	✓
SNAKES				
Spotted leaf-nosed snake	<i>Phyllorhynchus decurtatus</i>	✓	✓	✓
Coachwhip	<i>Masticophis flagellum</i>	✓	✓	✓
Sonoran whipsnake	<i>Masticophis bilineatus</i>		✓	✓
Western patch-nosed snake	<i>Salvadora hexalepis</i>	✓	✓	✓
Glossy snake	<i>Arizona elegans</i>	✓	✓	✓
Gopher snake	<i>Pituophis melanoleucus</i>	✓	✓	✓
Common kingsnake	<i>Lampropeltis getulus</i>	✓	✓	✓
Long-nosed snake	<i>Rhinocheilus lecontei</i>	✓	✓	✓
Ground snake	<i>Sonora semiannulata</i>			✓
Western shovel-nosed snake	<i>Chionactis occipitalis</i>	✓	✓	✓
Night snake	<i>Hypsiglena torquata</i>	✓	✓	✓
Arizona coral snake	<i>Micruroides euryxanthus</i>	✓	✓	✓
Western diamondback rattlesnake	<i>Crotalus atrox</i>	✓	✓	✓
Sidewinder	<i>Crotalus cerastes</i>	✓		✓
Mohave rattlesnake	<i>Crotalus scutulatus</i>	✓	✓	✓

Source: Stebbins 1985



Legend

-  Study Boundary
- Biology**
-  Suitable Habitat for Cactus Ferruginous Pygmy-Owl



x: whitetanks
 ois
 am/s/fmt-bio.aml August 01, 2001



Dames & Moore Job No. 15448-007-058

Biological Resources
 Figure 5



PHOTOGRAPH 1 – Bosque in the White Tanks FRS #3 study area, NW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 9, Township 2 North, Range 2 West.



PHOTOGRAPH 2 – Xeroriparian wash in the White Tanks FRS #3 study area, center of Section 8, Township 2 North, Range 2 West.

3.4.1 Species of Special Concern

A list of threatened, endangered, or otherwise sensitive plants and animals known from Maricopa County was compiled from information obtained through publications and web sites from the U.S. Fish and Wildlife Service (FWS), Arizona Game and Fish Department (AGFD), and Arizona Department of Agriculture (Table 6). Contacts with the FWS and AGFD also provided information on sensitive species that have the potential to occur in the study area (Appendix A). The FWS provided a list of federally threatened and endangered species for Maricopa County and recommended protecting any riparian areas in the study area. AGFD reported the lowland leopard frog and Sonoran desert tortoise as documented to occur in the study area. Of the species listed in Table 6, the California leaf-nosed bat, lesser long-nosed bat, southern yellow bat, peregrine falcon, cactus ferruginous pygmy-owl, and crested saguaro also could occur in the study area.

California Leaf-nosed Bat

Foraging habitat (Sonoran desertscrub) for the California leaf-nosed bat is present in the study area. However, the species is threatened by vandalism and disturbance at roost sites and by a general limit to the number of roost sites this bat can use during the winter (AGFD 1996) rather than by a lack of foraging habitat. California leaf-nosed bats roost in mine shafts or caves, which are not present in the study area.

Lesser Long-nosed Bat

Lesser long-nosed bats are present in Arizona only in the summer and feed on the nectar and pollen of agaves and columnar cacti. Although saguaro cacti are present in the study area, low saguaro density and the lack of agaves make the site an unlikely foraging area for lesser long-nosed bats.



PHOTOGRAPH 3 – Highly disturbed creosote flats in the White Tanks FRS #3 study area, NE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 8, Township 2 North, Range 2 West.



PHOTOGRAPH 4 – Creosote flats in the White Tanks FRS #3 study area, SW $\frac{1}{4}$ of Section 4, Township 2 North, Range 2 West.

**TABLE 6
SPECIAL STATUS WILDLIFE AND PLANT SPECIES KNOWN FROM MARICOPA
COUNTY**

Common Name	Scientific Name	Habitat	Federal Status	State Status	Habitat Present in Study Area
MAMMALS					
California leaf-nosed bat	<i>Macrotus californicus</i>	Primarily cave and mine dwellers, mostly in Sonoran desertscrub		SC	Yes
Lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuena</i>	Desertscrub with agave and columnar cacti present as food plants	E	SC	Yes
Red bat	<i>Lasiurus borealis</i>	Over ponds, along waterways, among oaks, sycamores, walnuts, cottonwoods, and pine-fir forest		SC	No
Southern yellow bat	<i>Lasiurus ega</i>	Associated with Washington fan palms		SC	Yes
Spotted bat	<i>Euderma maculatum</i>	Uneven cliffs within a mile of a riparian situation		SC	No
Jaguar	<i>Panthera onca</i>	Low mountains, chaparral, open forest		SC	No
Chihuahuan pronghorn	<i>Antilocapra americana mexicana</i>	Plains and meadows of shortgrass from the deserts of the south to the high plateaus of the north		SC	No
Sonoran pronghorn	<i>Antilocapra americana sonoriensis</i>	Broad, intermountain alluvial valleys with creosote-bursage and paloverde-mixed cacti	E	SC	No
BIRDS					
Least bittern	<i>Ixobrychus exilis</i>	Cattail marshes		SC	No
Great egret	<i>Ardea alba</i>	Ponds, streams, and marshes		SC	No
Snowy egret	<i>Egretta thula</i>	Ponds, streams, and marshes		SC	No
Black-bellied whistling duck	<i>Dendrocygna autumnalis</i>	Ponds		SC	No
Mississippi kite	<i>Ictinia mississippiensis</i>	Riparian areas		SC	No
Bald eagle	<i>Haliaeetus leucocephalus</i>	Large trees or cliffs near water (reservoirs, rivers and streams) with abundant prey	T	SC	No
Gray hawk	<i>Asturina nitida</i>	Riparian areas in Sonoran zones		SC	No
Common black-hawk	<i>Buteogallus anthracinus</i>	Riparian areas in Sonoran zones		SC	No
Peregrine falcon	<i>Falco peregrinus</i>	Cliffs near Salt River reservoir, generally distributed, tops of tall urban buildings		SC	Yes
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	Fresh water and brackish marshes	E	SC	No
Snowy plover	<i>Charadrius alexandrinus</i>	Ponds		SC	No
Western yellow-billed cuckoo	<i>Coccyzus americanus</i>	Riparian areas of lower Sonoran zone		SC	No
Cactus ferruginous pygmy-owl	<i>Glaucidium brasilianum cactorum</i>	Mature cottonwood/willow, mesquite bosques, and Sonoran desertscrub	E	SC	Yes

**TABLE 6
SPECIAL STATUS WILDLIFE AND PLANT SPECIES KNOWN FROM MARICOPA
COUNTY**

Common Name	Scientific Name	Habitat	Federal Status	State Status	Habitat Present in Study Area
Mexican spotted owl	<i>Strix occidentalis lucida</i>	Nests in canyons and dense forests with multi-layered foliage structure	T	SC	No
Belted kingfisher	<i>Ceryle alcyon</i>	Ponds, streams, and canals		SC	No
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Cottonwood/willow and tamarisk vegetation communities along rivers and streams	E	SC	No
REPTILES AND AMPHIBIANS					
Great Plains narrow-mouthed toad	<i>Gastrophryne olivacea</i>	Seasonally or permanently wet areas of dense grass within semidesert grassland and oak woodland		SC	No
Lowland leopard frog	<i>Rana yavapaiensis</i>	Restricted to permanent waters: pools of foothill streams, overflow ponds		SC	No
Desert tortoise	<i>Gopherus agassizii</i>	Riverbanks, washes, dunes, and rocky slopes		SC	Yes
Arizona skink	<i>Eumeces gilberti arizonensis</i>	Pinyon-juniper woodland and yellow pine forest		SC	No
Mexican garter snake	<i>Thamnophis eques megalops</i>	Permanent marshes and streams at middle elevations		SC	No
FISH					
Bonytail chub	<i>Gila elegans</i>	Eddies and pools, not in swift currents	E	SC	No
Gila chub	<i>Gila intermedia</i>	Small and medium tributaries of Gila River	C	SC	No
Roundtail chub	<i>Gila robusta</i>	Many streams across central Arizona		SC	No
Razorback sucker	<i>Xyrauchen texanus</i>	Riverine and lacustrine areas, generally not in fast-moving water and may use backwaters	E	SC	No
Desert pupfish	<i>Cyprinodon macularius macularius</i>	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	E	SC	No
Gila topminnow	<i>Poeciliopsis occidentalis occidentalis</i>	Concentrates in shallow water, especially where aquatic vegetation or debris is present	E	SC	No
PLANTS					
Arizona agave	<i>Agave arizonica</i>	Transition zone between oak-juniper woodland and mountain mahogany oak scrub	E	HS	No
Tonto Basin agave	<i>Agave delamateri</i>	Benches and edges of slopes overlooking drainages		HS	No
Hohokam agave	<i>Agave murpheyi</i>	In Maricopa County, found in Paradise Valley		HS	No
Arizona cliffrose	<i>Purshia subintegra</i>	Characteristic white soils or tertiary limestone lakebed deposits	E	HS	No
Crested or Fan-top saguaro	<i>Carnegiea gigantea</i>	Rocky hillsides and outwash slopes		HS	Yes
Arizona hedgehog cactus	<i>Echinocereus triglochidiatus arizonicus</i>	Ecotone between interior chaparral and madrean evergreen woodland	E	HS	No

**TABLE 6
SPECIAL STATUS WILDLIFE AND PLANT SPECIES KNOWN FROM MARICOPA COUNTY**

Common Name	Scientific Name	Habitat	Federal Status	State Status	Habitat Present in Study Area
Acuna cactus	<i>Echinomastus erectocentrus acunensis</i>	Limestone hills and flatlands in western lower Sonoran desert	C	HS	No
Lemmon fleabane	<i>Erigeron lemmoni</i>	Cliff areas within Fish Creek Canyon in Maricopa County	C	HS	No

Sources: Arizona Department of Agriculture 1999; AGFD 1996, 1998; FWS 1999a, 1999b, 1999c; Hoffmeister 1986; Monson and Phillips 1981; Stebbins 1985; Witzeman et al. 1997

Key to Table:

Federal Status: E = Endangered T = Threatened C = Candidate

State Status: SC = Special Concern HS = Highly Safeguarded

Southern Yellow Bat

Southern yellow bats, whose preferred habitat is the Washington fan palm, may be present in the study area because of a palm nursery located less than 2 miles from the site. As with the California leaf-nosed bat, the southern yellow bat is limited by a lack of roost and nest sites and would be using study area as a foraging area only.

Peregrine Falcon

Peregrine falcons potentially could use the study area as a foraging area. However, the presence of this falcon would be a rare event (Witzeman et al. 1997).

Cactus Ferruginous Pygmy-owl

Cactus ferruginous pygmy-owls inhabit Arizona uplands, mature cottonwood/willow areas, and mesquite bosques (Witzeman et al. 1997). They require a cavity, usually in a columnar cactus, for nesting. Although there are no records of pygmy-owls from this area and vegetation generally

is sparse, the study area does contain potential pygmy-owl habitat in the form of a bosque and stringers of trees along dry washes (refer to Figure 5).

Crested Saguaro

Crested or fan-top saguaros are a rare growth form caused by freezing or mechanical injury to the saguaro's apical meristem (Steenbergh and Lowe 1983). No crested saguaros were observed during visits to the study area, but the site was not inventoried.

Desert Tortoise

Desert tortoises occur in the general vicinity of the White Tanks FRS #3 site. They are more likely to be found in rocky foothills and washes, rather than the creosote flats that constitute the majority of the study area (AGFD 1996).

Lowland Leopard Frog

The AGFD reported the lowland leopard frog as occurring in the study area. The lowland leopard frog is unlikely to occur on the actual project site, however, because permanent water, which the lowland leopard frog requires (AGFD 1996), is absent.

3.5 CULTURAL RESOURCES

An intensive pedestrian archaeological survey was conducted between 17 November and 1 December 1999, and between 1 through 3 November 2000. All areas potentially encompassed by the three basin design alternatives were systematically examined by a crew of three to four archaeologists walking parallel transects spaced between 15 to 20 meters (50 to 65 feet) apart.

Archaeological or historical resources discovered during the survey were flagged and later revisited. Based on complexity and artifact density, each archaeological find was assessed individually and determined to be either an isolated occurrence or an archaeological or historical site. Each find was recorded as appropriate and extensive notes were taken of all aspects of the survey.

The survey encompassed a total of approximately 1,935 acres. About 1,294 acres are Arizona State Trust lands and the remaining 640 acres are privately owned (including lands managed by the District and other county entities). Due to inclement weather, the Waterfall Wash diversion area of Alternative 1 has not yet been surveyed. It is anticipated that cultural resources will be present, although the possibility of extensive deposits of cultural materials being present on the toe slope of the White Tank Mountains is expected to be slight.

Two archaeological sites and 22 isolated occurrences of cultural materials have been discovered thus far. Site AZ T:7:175 (ASM) is a large scatter of historic and modern artifacts. Five features are present on the site, including four large, concrete, cobble and pipe features and a small, partial rock ring. The concrete features are broken, and appear to represent the remains of cisterns or livestock watering structures. The artifacts primarily are contained within four loci, and seem to represent locations where trash was dumped by passersby; a dirt road extends through the site, and all four loci are within a few feet of the road. Identifiable marks on artifacts suggest the trash was deposited in the late 1930s or 1940s, although some more recent artifacts also are present. Recording of the site has effectively exhausted its information potential. Thus, it is recommended as not eligible for listing on the National Register of Historic Places (National Register).

Site AZ T:7:246 (ASM) is a medium-sized scatter of prehistoric sherds and flaked stone artifacts. Ceramics predominate; just a few pieces of flaked stone debitage were noted on the site surface. Sherds include several varieties of Hohokam plain ware, but a high number of red-on-buff sherds also were seen and recorded. Although further research is necessary, recognizable design motifs might indicate use by the Patayan during the Sacaton or Santa Cruz phases during the Sedentary

and Colonial periods. The site is recommended as being potentially eligible for listing on the National Register on the basis of its information potential.

The 22 isolated occurrences of cultural materials are a mix of historic trash and prehistoric materials. Isolated occurrences occasionally can yield significant information concerning past land use within a region, but generally reflect human activity that falls below the currently accepted threshold for identification as archaeological sites. None of the isolates recorded during the survey are regarded as significant, and thus are recommended as ineligible for National Register listing.

Additional cultural resource information can be found in *the Cultural Resources Inventory for the White Tanks FRS #3 Project, Maricopa County, Arizona* (2000).

3.6 SOCIOECONOMICS

The socioeconomic inventory includes a description of the demographic, economic, fiscal growth, and user benefit characteristics within the area that would be potentially affected by the rehabilitation of FRS #3. Information for this section was obtained from the Maricopa Association of Governments (MAG), Maricopa County, U.S. Census Bureau, and Arizona Department of Economic Security.

As previously stated, the White Tanks FRS #3 is located in Maricopa County, Arizona. Small-to-large farms constitute most of the study area. Some light manufacturing and goods and services industries, primarily along the I-10 corridor, also occur within the study area. The upgrading of Loop 303 will increase the potential for economic development along the corridor, which is located in the eastern portion of the study area. Increased recreation opportunities and/or use within and around the project study area also may have the potential to encourage economic development.

The land within the FRS #3 study area is currently sparsely populated. The majority of the communities that fall within the study are unincorporated. Table 7 shows actual and projected population estimates for the study area as compared to Maricopa County as a whole.

Area	Census 1985	Census 1990	Census 1995	Projection 2000	Projection 2005	Projection 2010
White Tanks Area	9,022	13,164	13,987	17,873	33,878	50,798
Maricopa County	1,837,954	2,122,101	2,504,254	2,693,024	2,981,794	3,270,564
Percent of Total County Population	0.5	0.5	0.5	0.5	1.0	1.5

Source: Holm 1999; U.S. Census Bureau 1990

The largest incorporated communities in the immediate vicinity of the watershed area are the towns of Goodyear (estimated 1999 population of 17,085) and Buckeye (estimated 1999 population of 5,860). The study area population is expected to increase significantly over the next two decades (MAG 1999).

The economy of the study area is closely linked to the larger Phoenix metropolitan area. One of the area's largest economic employers is Luke AFB, which is located directly east of the study area.

3.7 POTENTIALLY RELEVANT PROJECTS

The study area offers many opportunities for recreation. The White Tank Mountains, to the east, have a vast network of existing roads and trails open to the public. These roads are easily accessed by vehicle via Olive Avenue from the east through the communities of Litchfield Park and Sun City. Lake Pleasant, located approximately 26 miles north of the study area, has high recreational value since it is a premier boating and fishing destination in the region and easily accessible by vehicle.

Even though most of these regional recreation areas are accessible by automobiles, there is a lack of connection, in terms of a road network or recreation corridor, between them. There currently are several existing and proposed environmental and/or recreational projects within close proximity to the study area. It is vital to be cognizant of these projects as they provide possible linkage or partnership opportunities.

This section provides a brief description of several potentially relevant projects that occur within close proximity to FRS #3. Information for this section was obtained from county and local municipalities. These projects are graphically portrayed on Figure 6.

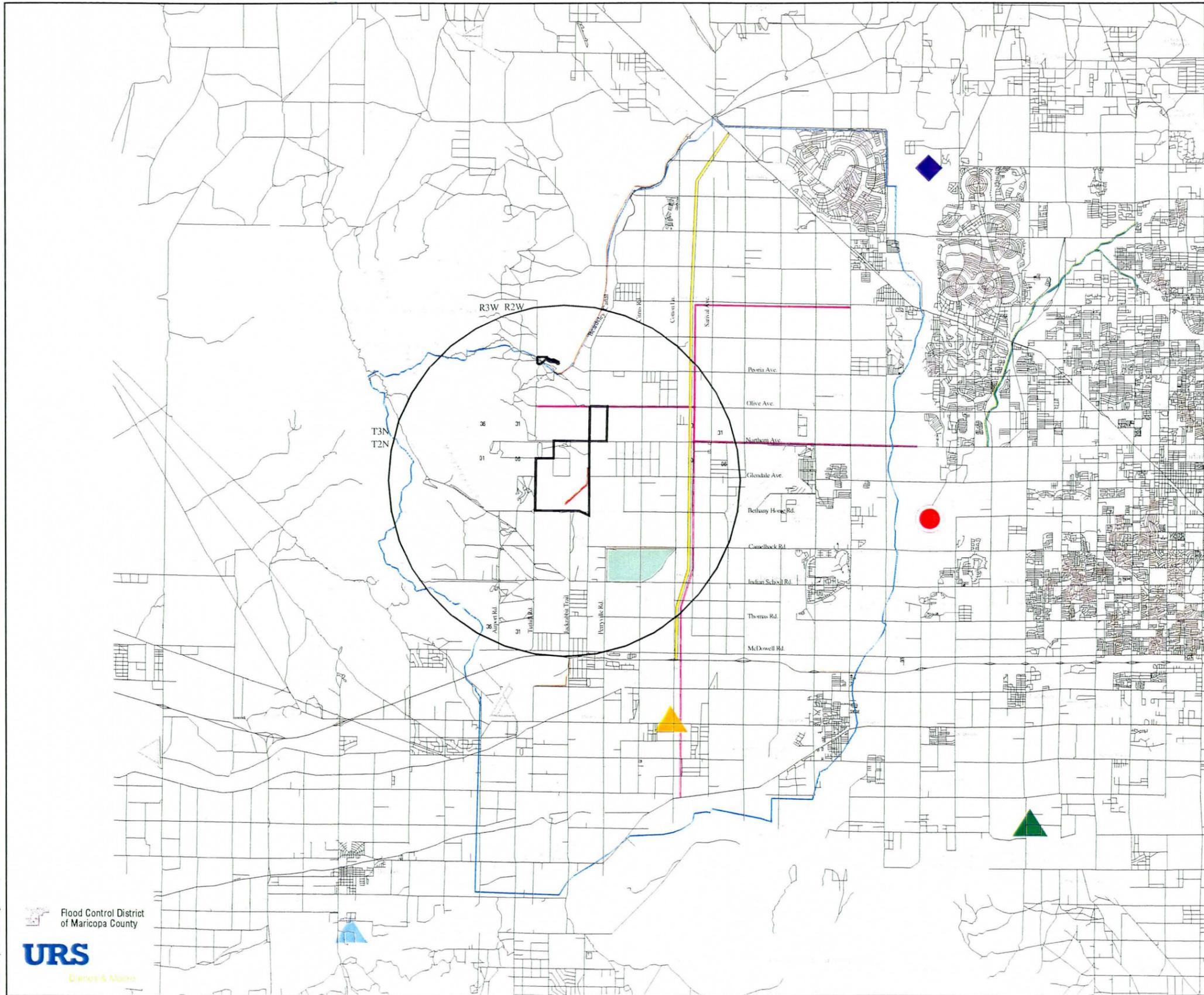
3.7.1 Drainage Master Plan for the White Tanks Area

The District currently is in the process of updating their 1994 drainage master plan for the White Tanks area. The study area for this project encompasses 220 square miles from the spine of the White Tank Mountains to the Agua Fria River, and from Sun City Grand on the north to the Gila River on the south. The impetus for updating this plan stems from concerns over public safety as the area shifts from primarily agricultural use to residential and commercial uses.

3.7.2 Tres Rios Constructed Wetlands Demonstration Project

In 1990, the Arizona Department of Environmental Quality (ADEQ) released the new Navigable Water Quality Standards, which significantly increased the water quality standards for discharge into Arizona waterways. Officials were forced to seek an alternative treatment process due to excessive costs needed to upgrade the 91st Avenue Wastewater Treatment Plant to comply with new standards to clean the Valley's wastewater.

The Tres Rios Demonstration Project tests the use of treated wastewater for riparian habitat restoration on a 12- acre site along the Gila River. The Phoenix Water Services Department operates the Tres Rios Demonstration Project, on behalf of the multi-city Sub-



Legend

- Study Boundary
- Projects**
- City of Peoria Trails and Rivers Master Plan
- Maricopa County Bicycle Network Plan
- Loop 303
- Loop 303/White Tanks Area Drainage Master Plan Update
- FCDMC Flood Retarding Structures
- ◆ Beardsley Wastewater Treatment Plant
- West Area Water Reclamation Facility
- ▲ Tres Rios Constructed Wetlands Demonstration Project
- ▲ Goodyear Groundwater Recharge
- ▲ Buckeye Town Lake
- ▭ Middle New River Watercourse Master Plan
- ▭ Special Use Area

Sources:

- Maricopa County, 2000.
- City of Peoria, 1999.
- City of Glendale, 2000.
- Flood control District of Maricopa County, 2000.
- Maricopa Association of Governments, 1999.
- City of Phoenix, 1999.



Scale in Miles



x: whitetanks
 ois
 amts/rrt-pot.aml August 01, 2001



Dames & Moore Job No. 15448-007-058

Potentially Relevant Projects
 Figure 6

Regional Operating Group, which includes the cities of Glendale, Mesa, Phoenix, Scottsdale, and Tempe. Other project participants involved in the joint effort include the U.S. Bureau of Reclamation, U.S. Environmental Protection Agency, USACE, and the District (Arizona Republic June 9, 1999 "Restoring A River").

The Corps of Engineers and the City of Phoenix have developed plans for a full scale Tres Rios Project. The Tres Rios Project will provide environmental restoration and flood control along the Salt, Gila River. Project limits are from the Salt River at 83rd Avenue to the confluence of the Agua Fria River. This federal project has been authorized by Congress and the Corps of Engineers is currently initiating design of the project.

3.7.3 West Area Water Reclamation Facility

Construction of the City of Glendale West Area Water Reclamation Facility began in February 1999 at the southeast corner of 115th Avenue and Bethany Home Road on land located near the confluence of the Agua Fria and New rivers.

The facility became operational in May 2000 and includes a raw sewage pump station and pipelines that will convey wastewater to the treatment plant and a 35-acre aquifer recharge facility for treated wastewater. The water reclamation facility is expected to treat 4.3 million gallons of wastewater per day, but has the capacity to treat up to 15 million grams per day (City of Glendale 1999). Wastewater solids will be sent directly to the 91st Avenue Wastewater Treatment Plant in Phoenix.

3.7.4 Middle New River Watercourse Master Plan

The District, in cooperation with the cities of Glendale and Peoria, are developing a Watercourse Master Plan for the middle reach of the New River. This project covers an area extending from New River Dam south 8.5 miles to Skunk Creek. Lands adjacent to New River continue to experience development pressures and this plan evaluates strategies for a comprehensive approach to managing undeveloped portions of the river corridor with existing development. The

plan calls for a non-structural channel extending 2.5 miles from Pinnacle Peak Road to New River Dam, and a structural channel extending 6 miles from Pinnacle Peak Road to Skunk Creek. The structural channel would consist of a natural bottom with rock-filled wire baskets (gabions) for stabilization of the channel side-slopes and recreation trails on the channel margins (Flood Control District of Maricopa County 2000).

3.7.5 Rivers Master Plan and Trails Master Plan

The City of Peoria also is working to enhance the recreational use, flood control function, and adjacent compatible development of the Agua Fria River, New River, and Skunk Creek through related elements of their Rivers Master Plan and Trails Master Plan (City of Peoria 2000).

3.7.6 West Valley Recreation Corridor

The West Valley Recreation corridor is a proposed joint plan between the cities of Avondale, Glendale, Peoria, Phoenix, and Maricopa County. The initial proposal would entail some form of environmental and/or riparian restoration of a 40-mile parkway and recreation corridor extending from the confluence of the Gila and Agua Fria rivers on the south, up the Agua Fria River to the north, and then along the New River to the northeast, connecting 17 existing recreational trails (Arizona Republic June 9, 1999).

3.7.7 Maricopa County Bicycle Network Plan

In 1999, MCDOT adopted the Bicycle Transportation System Plan. This plan provides a comprehensive transportation network of on- and off-road bicycle facilities throughout Maricopa County. One of its goals is to connect the outlying communities to the urban center and help facilitate bicycling as a reasonable, non-polluting alternative to the automobile. It also provides connections between valley communities and regional parks.

3.7.8 Goodyear Groundwater Recharge Project

The Town of Goodyear has a groundwater recharge project located in the northwest corner of Yuma Road and Estrella Parkway. According to the planning department, the Town of Goodyear is considering the designated Special Use Area (refer to Figure 6) as a possible site for another groundwater recharge facility location. The Board of Supervisors for the Town of Goodyear is scheduled to approve a designated use for the area this year. A potential exists to include future phases of the Goodyear groundwater recharge project into the White Tanks FRS #3 project.

4.0 ENVIRONMENTAL CONSEQUENCES

Environmental impacts, or modifications to the environment that are brought about by an outside action, can be beneficial or adverse. This section contains the scientific and analytical basis for the predicted environmental consequences of the three action alternatives outlined in the Final Design Report. Impacts can be described as direct (effects that are caused by the action or occur at the same time and place) or indirect (effects that are caused by the action and occur later in time or are farther removed in distance, but are still reasonably foreseeable). The following subsections address the direct and indirect impacts of the three action alternatives on the resources in the same order as they were discussed previously.

4.1 LAND USE, UTILITIES, AND TRANSPORTATION

Potential impacts were evaluated for existing and planned land uses based on the issues and concerns that emerged during the planning process. Impacts have been defined to include physical restrictions on an existing and planned land use or incompatibility with existing land use and transportation plans.

4.1.1 Alternative 1

Alternative 1 focuses on passive recreation. The plans associated with Alternative 1 (totaling approximately 565 acres) would include a native multi-use trail, scenic overlooks, and restored wildlife habitat. Implementation would create minimal disturbance on surrounding land use and existing transportation corridors. Access to White Tanks FRS #3 recreation facilities would occur from Northern Avenue. This plan is compatible with surrounding land uses.

4.1.2 Alternative 2

Approximately 839 acres of extensive sports complexes, a multi-use trail system, and a golf course are proposed recreation elements under Alternative 2. Access to recreation facilities would occur at two proposed major park entry features accessed from Northern Avenue and Bethany Home Road.

4.1.3 Alternative 3

Alternative 3 would provide a balanced set of uses (between active and passive recreation) and would meet demands that likely are to be associated with projected residential development north and west of the White Tanks FRS #3, including the desire for open space and recreational facilities. Plans include the development of 774 acres that would include an environmental education center, observation facilities, improved wildlife habitat, hiking trails (possible connectors to future developments), concrete circulation path, native multi-use trails, scenic overlooks, adult and junior soccer fields, softball and little league fields, basketball courts, sand volleyball, playgrounds, turf, and horseback riding trails.

Access to White Tanks FRS #3 facilities would occur from Northern Avenue, Olive Avenue, and Bethany Home Road. The development of multiple access points would improve access to the various recreation facilities of White Tanks FRS #3. There is expected to be a slight increase in traffic with the implementation of this alternative, however, this increase is anticipated to be negligible relative to total projected volumes in the area after total build out. This plan also is compatible with the surrounding land uses and open space.

4.1.4 Summary

The boundaries of all alternatives and access to facilities are contained within the land currently owned or to be acquired by the District, and no physical conflict with or restrictions on adjacent

land uses are anticipated. Existing land uses east of White Tanks FRS #3 would be buffered from the park by the Beardsley Canal. Planned land uses to the north and the southwest generally are compatible with recreation facilities, including residential and commercial uses, and additional recreation facilities.

Implementation of the more active alternatives would generate traffic in and out of FRS #3 over the long term, although changes in traffic volumes would become more certain as plans become more specific. Given the projected level of traffic increase in the area resulting from development and population growth, it is anticipated that FRS #3 would contribute a negligible increase to the total traffic. As development of FRS #3 becomes denser, particularly on the southwest and north, the county should evaluate the need for a traffic signal or other measures to address access issues related to event traffic. In addition, to address access issues that may arise, as plans become more specific, construction routes would be pre-approved by the District and shown on construction drawings.

4.2 VISUAL RESOURCES

The assessment of effects that the alternatives would have on visual resources were based on the anticipated change in the configuration of the landscape components, primarily landform and vegetation, that define the character of the project setting, as well as on-site or off-site views. The impacts considered existing and future conditions.

Effects on visual resources will occur through direct alteration of the landscape components such as earth grading, vegetation removal, and placing structures in the landscape. Effects also could occur indirectly through visible elements that are imposed on the surroundings within and adjacent to the study area, such as diffuse or direct light from light standards, non-harmonious placement of facilities, or use of materials that cause glare, high color contrast, or silhouetting against the sky.

There is potential for both positive and negative effects on visual resources within the study area, as well as on adjacent visual resources such as existing and future parks, roads, businesses, institutions, and residences.

There were three alternative conceptual plans used to evaluate potential effects on visual resources. The visual character is anticipated to change based on the specifics of each alternative conceptual plan. Regardless of the final plan selected, designs that incorporate vegetation enhancements for all disturbed areas and facilities, as well as consideration for construction materials, will minimize impacts on or improve the visual environment from both an on-site and off-site perspective. Facilities and vegetation screening may reduce desirable off-site views throughout the study area if not considered in the final design. Scheduling considerations for sporting events, lowering light standards, or shielding light sources may reduce impacts related to lighting requirements.

The following criteria were used to evaluate the effects each alternative would have on visual resources:

Landscape Character/Scenic Quality

- Preservation of existing Sonoran Desert landscape
- Enhancement of degraded landscapes
- Increased landscape complexity
- Promotion of desired landscape or “sense of place” and scenic integrity

Views and Visual Sensitivity

- Preservation of high-quality on-site views
- Preservation of high-quality off-site views
- Enhancement of on-site viewing opportunities
- Enhancement of off-site viewing opportunities

Other Variables

- Creation of visual “clutter”
- Increased visible lighting/glare

4.2.1 Alternative 1

Alternative 1 would focus on retaining and restoring the natural Sonoran Desert landscape by taking advantage of the existing intact landscape features (i.e., washes and drainages) and complimenting them with the design of the basin and berms. The hard lines of the existing embankment (dam) would be softened by adding berms along the edges, which would result in a more natural-appearing landscape and help define the basin. Additionally, this alternative would enhance degraded landscapes by restoring native vegetation and creating visual interest/complexity through variations in terrain (i.e., berms and basin). Accents to the landscape would be provided through the use of native vegetation, including mesquite trees, paloverde trees, ironwood trees, saguaro, and other native species. Visitors to this site would find opportunities to experience this landscape through a network of trails that would traverse the landscape. Overall, this alternative would create a unique “sense of place” for those who desire to experience a passive Sonoran Desert landscape (i.e., vegetation and wildlife).

This alternative would preserve on-site and off-site views, as well as enhance viewing opportunities throughout the site. This would be accomplished retaining viewing areas along the existing embankment (dam) and creating additional viewing areas throughout the network of trails. The viewing areas would be located along the trails where the terrain is the highest to offer panoramic views. The views would be oriented primarily toward the west/northwest to take advantage of the White Tank Mountains. Views from surrounding areas such as residences and roads would not be affected by the implementation of this alternative.

The passive nature of this alternative would not create visual “clutter” or increase visible lighting or glare, since there would be only a few hardscape features (parking lot, lights, signage, etc.) located at the parking/entry area of the site.

4.2.2 Alternative 2

This alternative would focus on developing the site into several active-use recreation areas. Additionally, there would be areas of passive-use natural Sonoran Desert landscape integrated into the design. The active-use recreation areas range from an 18-hole golf course, equestrian center, and district park/sports complex (e.g., baseball/softball fields, soccer fields, swimming pool) The passive-use areas, consisting of berms and basins, would help break up the intensity and dominance of the recreation facilities, while adding visual interest/complexity to the landscape. The recreation and natural Sonoran Desert areas would be accented through the use of native vegetation as presented in Alternative 1. Alternative 2 would enhance the existing degraded landscapes within the site. Visitors would be able to experience this landscape in a variety of ways, both active and passive, which would add to the uniqueness of the design. The dominance of the recreation activities would drive the visitor’s experience in this landscape setting, while the passive-use areas would add to the overall “sense of place” within the landscape setting.

This alternative would not preserve on-site and off-site views as well as the other alternatives, due to the intense development of the site. Although there would not be as many opportunities to take advantage of high-quality off-site views of the White Tank Mountains, there still would be several viewing areas along the northwest side of the site that would provide panoramic views. These views would be accessible through a network of trails and viewing platforms where the terrain is the highest similar to the other alternatives. Views from within the site and views from off-site areas (i.e., residences and roads) could be affected by design elements associated with the recreation facilities. This could include blockage of the views toward the White Tank Mountains resulting from the presence of buildings, parking areas, signage, and light standards. Night lighting could also affect existing and future adjacent residential areas.

The active developed nature of this alternative potentially could create visual “clutter” and increase visible lighting and glare. Mitigation measures such as the use of architectural design details and colors consistent with the desert environment would reduce impacts on views. Limiting the height of light standards and using shielding devices would decrease the visibility of light and glare from the site. Additionally, limiting use times for activities requiring lighting to reasonable evening hours would result in fewer impacts on off-site viewers.

4.2.3 Alternative 3

This alternative would combine features of Alternatives 1 and 2 to create a landscape reflecting the unique attributes of a natural, passive Sonoran Desert setting while providing limited opportunities for active-use recreation. The passive areas would include a series of berms and basins, accented with native vegetation to provide visual interest/complexity into the landscape, as well as an interpretive wetland. The active recreation areas would include soccer fields, baseball/softball fields, and playgrounds. The visitor’s “sense of place” would be defined by the type of activity in which they are participating. The natural passive areas would allow visitors to experience Sonoran Desert vegetation and wildlife independent of the active areas.

On-site and off-site viewing opportunities would be preserved and enhanced by the use and location of berms and trails along the northwest side of the site. The trails would lead to viewing platforms located on highest areas of the berms, which would allow for panoramic views of the White Tank Mountains. The recreation facilities may contribute to blockage of some on-site and off-site views of the White Tank Mountains. Additionally, some off-site views (residences and roads) may experience light and glare from light standards.

The mixed-use nature of this alternative would contribute minimal visual “clutter” and slightly increase off-site visible light and glare. The passive natural areas would surround the active-use recreation areas, creating a visual buffer, which would minimize the potential impacts on off-site views. Mitigation measures for the active-use areas as discussed in Alternative 2 would reduce potential impacts on both on-site and off-site views.

4.2.4 Summary

All three alternatives would enhance the visual appeal of the site as it exists today. This would be due primarily to increasing the visual interest/complexity of the landscape setting. All of the alternatives would improve previously degraded landscapes and allow for areas that would provide high-quality Sonoran Desert landscapes. These natural landscapes would include variable terrain, native vegetation, and washes/drainages consistent with the character of the area. The natural areas would provide preservation and enhancement of on-site and off-site views including panoramic views of the White Tank Mountains. Alternative 1 would deviate the least from the existing landscape character of the area and retain its unique "sense of place." Alternatives 2 and 3 would deviate slightly from the existing character of the area, with Alternative 2 having the greatest degree of change from the existing landscape character. However, Alternatives 2 and 3 still would have an identifiable "sense of place" and may be more consistent with future development plans for the area (i.e., more residential and commercial development patterns). Appropriate mitigation measures for Alternatives 2 and 3 would result in minimal impacts on both on-site and off-site views.

4.3 **BIOLOGICAL RESOURCES**

4.3.1 Cactus Ferruginous Pygmy-owl Surveys

Guidelines for survey protocol are under the direction of the U.S. Fish and Wildlife Service (FWS). A new guideline was issued in 2000, which designated three survey zones in Arizona with slightly different survey recommendations in each zone. Zone 1 includes areas within the current range of pygmy-owls where the chance of finding an owl is high. Zone 2 includes areas within the current range of the pygmy-owl where the chance of finding an owl is moderate. Zone 3 includes areas within the historical range of the pygmy-owl where the chance of detecting an owl is low.

FWS recommends surveying for pygmy-owls where projects will impact potential habitat for the owl. This habitat includes areas below 4,000 feet elevation within the following vegetation communities:

- Riparian vegetation—broadleaf, riparian gallery forests of cottonwoods, willows, mesquites, ash, or other trees growing along watercourses
- Sonoran desertscrub—characterized by braided wash systems and vegetation that is dense and well structured; key species include mesquite, foothill and blue palo verdes, ironwood, saguaro, organ pipe cactus, and various other shrubs and cacti
- Semidesert grasslands—containing wooded drainages with mesquite, hackberry, ash, and a limited number of saguaros

Three surveys per year for two consecutive years should be completed prior to the removal of potential pygmy-owl habitat. All surveys must be completed between January 1 and June 30, with at least one survey completed during the period between February 15 and April 15. Surveys also must be spaced at least 15 days apart. Surveys can be completed from one hour before sunrise to two hours after sunrise or from one hour before sunset to one hour after sunset. Surveys also can be completed within two days of a full moon at any time the moon is visible.

Surveys are completed at survey stations placed between 150 and 400 meters apart, depending on the location of surveys. Surveys completed in rural areas where noise levels are low can be placed 0.25 mile (400 meters) apart (0.5 mile apart if electronic listening devices are used). In urban areas survey stations should be placed no more than 150 meters apart. At each survey station, at least 15 minutes are spent listening and looking for pygmy-owls. The first two minutes are spent observing quietly. For 10 minutes, the surveyor alternately plays taped calls of a pygmy-owl for 30 seconds and observes for 90 seconds. The last three minutes at each survey station are spent observing quietly.

Surveys are valid from the date of completion for the second year until December 31 of that year. If potential habitat, that will be removed or disturbed for a project, is still present on January 1, an additional year of surveys should be completed.

These protocols established by FWS indicate that surveys are required only in areas within the current or historic range of the pygmy-owl. However, some federal agencies may require surveys prior to providing approvals or permits for study areas where suitable habitat is present *even when the study area in question is beyond the delineated survey zones* (personal communication, April 2000, Larry Flatau, USACE). The study area is near but outside of Survey Zone 3. It does contain pygmy-owl habitat components, and therefore, our conservative recommendation to the District is to undertake the surveys if the need for a permit from the USACE is anticipated. In support of this recommendation, Sallie McGuire of the US Army Corps of Engineers indicated to the District, during a discussion held in April 2001, that she would require a pygmy owl survey for big projects such as master plan communities, even if the area were outside of the designated zones. She also noted that if a federal agency sponsors the project, a survey will most likely be required. It is important to be aware that the *surveys require two years to complete and at least one of the surveys must be conducted between February 15 and April 15.*

4.3.2 Alternative 1

Alternative 1 emphasizes passive use of the site and rehabilitation through the planting of native species. It contains the most environmentally compatible elements of the three alternatives. It also has the fewest negative elements such as increased traffic and extensive landscape modifications.

The area's attractiveness to wildlife can be enhanced by allowing emergent vegetation to develop in areas of the basin. This would require the basin to be designed with sloping sides and some fluctuation in water level. Created wetlands can be managed to avoid mosquito breeding while being extremely attractive to wildlife and outdoor enthusiasts.

4.3.3 Alternative 2

Extensive modification of the habitat would be required for building sports facilities and supporting infrastructure under Alternative 2. This will be a direct and permanent effect. The proposed golf course would prove an inviting source of food and water to wildlife. Their use may be considered undesirable by the patrons. The course also would introduce exotic plant competitors and require the use of chemical additives that would adversely impact natural areas. The higher level of development would increase the use of all areas, including the passive recreation features.

4.3.4 Alternative 3

Alternative three has the challenge of keeping passive recreation features in the presence of high-volume use and in a smaller area. This would require greater infrastructure in the passive areas such as walkways to control access and more extensive interpretative features. Planting of native species may be more intensive to counteract the pressure from greater use. It is important to keep access roads away from natural areas as they have significant direct and indirect effects on natural areas.

4.4 CULTURAL RESOURCES

The assessment of effects on cultural resources was based on the alternative conceptual plans that have been developed at this time. More detailed design of the footprints of specific recreation facilities would allow for a more precise evaluation of impacts, but specific designs

for recreational facilities will be initiated only after one of the alternative plans is chosen and approved.

Despite the results of previous research and archaeological survey in support of this project, it is recognized that additional archaeological resources with no indication of their presence on the ground surface might be present. Therefore, if any buried archaeological materials or human remains and funerary objects should be unexpectedly discovered during construction, they should be protected in place and immediately reported to the director of the Arizona State Museum in accordance with Arizona Revised Statute (ARS) 41-865.

The criteria defined by regulations for Protection of Historic Properties (36 CFR Part 800) were used to assess effects of the alternative plans on historic properties. Those regulations define effects as direct or indirect alterations of the characteristics of a historic property that make it eligible for inclusion in the National Register. Such effects that diminish a property's integrity of location, design, setting, materials, workmanship, feeling, or association are considered to be adverse. Examples of such adverse effects include physical destruction, changing important physical features, and introducing visual or audible elements within a property's setting that contribute to its historic significance.

The potential for indirect impacts on cultural resources was considered. Any cultural properties within the study area have been or will be affected by recent and ongoing urban development. Within that context, recreational development within the White Tanks FRS #3 area is unlikely to have any significant indirect effects on cultural resources.

4.4.1 Alternative 1

The areas encompassing the basin and the Waterfall Wash Diversion have been surveyed and no impacts on cultural resources are anticipated. Thus, no mitigation measures should be required unless buried archaeological resources or human remains or funerary objects are discovered during construction.

4.4.2 Alternative 2

A single historic archaeological site was discovered within the area proposed for development of Alternative 2, the multiple-basin, active-use alternative. The site, AZ T:7:175 (ASM) is recommended ineligible for listing on the National Register. Thus, no mitigation measures should be required unless buried archaeological resources or human remains or funerary objects are discovered during construction.

4.4.3 Alternative 3

A single prehistoric archaeological site was discovered within the Olive Basin area proposed for development as part of Alternative 3; the multiple-basin, mixed-use alternative. The site, AZ T:7:246 (ASM) is recommended as potentially eligible for National Register listing, and therefore, impacts on the site might be considered adverse. Certainly, construction of the basin would destroy the site if Alternative 3 were selected. Measures to mitigate potential adverse effects might include controlled collection and recording of artifacts found on the ground surface and archaeological test excavations to determine the potential for buried archaeological materials and features. Based on the results of the test excavations, full-scale excavations also might be warranted. Additionally, as is true of the first two alternatives, if buried archaeological resources or human remains or funerary objects are discovered during construction, additional mitigation measures might be necessary.

4.5 SOCIOECONOMICS

Development of FRS #3 would create changes in recreation opportunities for residents within existing and future developed areas within the 5-mile radius surrounding FRS #3. Among such changes would be the conversion of a flood detention basin into an area designed for the

recreational use and benefit of local residents and area visitors. Those living and working within the radius would most directly experience the benefits of these recreation opportunities.

Funding for implementation of all action alternatives would occur as available. The District, in conjunction with partnerships, would fund the proposed recreational development. With the action alternatives, local construction firms may be hired to complete the development within FRS #3, thus contributing to the local and county economies.

Positive short-term impacts on local services may occur from the increase in construction laborers. Construction firms may hire local skilled workers, which also would provide a positive impact on the local and regional economies. The increase in recreational opportunities also would create positive impacts on local businesses with the influx of visitors patronizing local businesses.

In suburban areas, property values tend to be enhanced on parcels adjacent to or near recreational open space. There also can be an increase in social amenity values from increased recreation activities. Aesthetic improvements will increase the social value of the area.

4.5.1 Alternative 1

Alternative 1 emphasizes passive recreation and would involve minimal changes to the existing operation and uses of FRS #3 in comparison to the other action alternatives. Costs associated with implementing Alternative 1 include recreation design elements such as a native multi-use trail and various scenic overlooks, as well as operation and maintenance. Specific costs for implementing Alternative 1 are uncertain due to a lack of recreation design specifics, but it is anticipated that costs would be the least when compared to the other action alternatives. Approximately 185 acres of the total 565 acres would need to be acquired from the ASLD.

4.5.2 Alternative 2

Alternative 2 focuses on active use recreation elements and would include the installation of a golf course, extensive sports complexes, and a multi-use trail system. If developed, the golf course and sports complexes would have the ability to generate revenue from user fees. Costs and revenues generated from recreational uses (e.g., user fees and special events) may positively impact the local economy. Local businesses also may experience an increase in revenue due to the infiltration of visitors to White Tanks FRS #3.

Due the development of extensive recreation facilities, the probable costs associated with the implementation of Alternative 2 are the highest amongst the three alternatives. Alternative 2 would require the acquisition of approximately 459 acres from the ASLD.

4.5.3 Alternative 3

A balance between active and passive recreation uses is proposed under Alternative 3. Proposed recreational facilities include an environmental education facility, scenic overlooks, multi-use trail system, basketball courts, soccer fields, and softball/baseball fields. Costs and revenues generated from recreational uses (e.g., user fees and special events) may positively impact the local economy. Local businesses also may experience an increase in revenue due to the infiltration of visitors to White Tanks FRS #3.

Implementation of Alternative 3 would require the acquisition of approximately 394 acres from the ASLD and MWD.

4.5.4 Summary

Overall, the recreational development of FRS #3 is expected to result in economic and social benefits for the local community. The cost associated with Alternative 2, the most developed alternative, would be higher than the other alternatives.

4.5.5 Environmental Justice

Title IV of the Civil Rights Act of 1964 and related statutes ensure that individuals are not excluded from participation in, denied the benefits of, or subjected to discrimination under any program or activity receiving federal assistance on the basis of race, color, national origin, age, sex, or disability. Executive Order 12898 on Environmental Justice directs that programs, policies, and activities not have a disproportionately high and adverse human health and environmental effect on minority and low-income populations. The proposed recreational development of FRS #3 would not result in significant social and economic impacts on the surrounding area. No minority or low-income residences or businesses would be relocated or directly impacted. Therefore, the project is not anticipated to have any disproportionately high and adverse effects on populations protected by Title IV of the Civil Rights Act. All recreationalists would benefit from the proposed development.

4.6 MITIGATION MEASURES

Mitigation measures have been suggested to address potential project-related issues and impacts. The project proponents should commit to undertake these measures to protect resources as standard practice for the entire project. Specific mitigation measures for each resource are shown in Table 8. In particular, there are several key mitigation commitments that should be implemented, as follows:

- *Habitat protection and enhancement* – This measure is designed to address concerns about the health of sensitive vegetation communities over time. Enhancement would occur throughout the park with a particular focus on the area designated for passive uses. The District would evaluate habitat and conduct surveys as required by the FWS for special status species with the potential to occur on site.
- *Pond design and development of a vector control management plan* – These measures are designed to address concerns regarding a potential increase in the mosquito population that

could occur near newly located ponds. To address this issue, ponds would be lined with a 90-degree angle wall that is tapered; this would prevent vegetation growth that could develop into mosquito habitat. To address mosquito populations that develop after flood events, a vector control management plan would be developed and implemented by the District in consultation with Maricopa County Vector Control Division.

- *Detailed design and implementation* – As facilities are designed in greater detail, if federal funds are used the lead federal agency will determine whether National Environmental Policy Act (NEPA) compliance is needed.

TABLE 8 RESOURCE-SPECIFIC MITIGATION MEASURES	
Resource	Mitigation Measures
	<p>Mitigation measures for potential impacts related to floodwater mosquitoes could include the following:</p> <ul style="list-style-type: none"> • Ensure that larvae are managed within 48 hours after a storm event, before they develop into adult mosquitoes (Olson 2000) • Develop an action plan for time periods immediately after storm events • Map areas that are prone to flooding • Provide for vector control in the operation and maintenance budget for FRS #3
Land Use	Construction access will be pre-approved by the District and shown on construction drawings
Visual Resources	As specific designs develop, select lighting fixtures and locations to minimize impacts on adjacent residences
Biological Resources	Salvage and or transplant large trees, such as ironwoods, paloverde, and mesquite within FRS #3 basin.
Cultural resources	<ul style="list-style-type: none"> • Prior to construction, instruct all supervisory personnel on the protection of cultural resources • Stop construction activities if previously unknown cultural resources are encountered, and notify the District. Additional mitigation measures may be necessary to protect any additional cultural resources
Recreation	Provide signage to educate trail users on minimizing conflicts between horses, bikes, and hikers.

5.0 REFERENCES CITED

- Agua Fria-New River Natural Resources Conservation District. 1996. White Tank Mountains Watershed Plan and Environmental Assessment. May.
- American Ornithologists' Union. 1998. Check-list of North American Birds. 7th edition. American ornithologists' Union, Washington, D.C. 829 pp.
- Arizona Department of Agriculture. 1999. Protected Native Plants by Categories website: <http://agriculture.state.az.us/psd/protplantlst.htm>. Arizona Department of Agriculture. Accessed July 26, 1999.
- Arizona Department of Education. 1999. www.de.state.az.us. Accessed Fall 1999.
- Arizona Game and Fish Department (AGFD). 1998. Heritage Data Management System, Special Status Species by County for Arizona. Accessed September 11, 1998.
- _____. 1996. Wildlife of Special Concern in Arizona (Public Review Draft). Arizona Game and Fish Department, Phoenix, Arizona. 23 pp.
- Arizona Republic June 9, 1999. "Restoring a River."
- City of Glendale. 1999. Planning and Zoning Department. Project Waters West Area Water Treatment Facility. www.ci.glendale.az.us. Accessed 20 December 1999.
- City of Peoria. 2000. <http://peoriaaz.com> accessed January 10, 2000
- DeSimon, D. 1999. Personal communication with Dino DeSimon, U.S. Department of Agriculture Natural Resources Conservation Service.
- Fenneman, N.A. 1931. Physiography of the Western United States.
- Flood Control District of Maricopa County 2000. Projects and Structures.
- Hoffmeister, D.F. 1986. Mammals of Arizona. University of Arizona Press, Tucson, Arizona. 602 pp.
- Holm, M. 1999. Maricopa County Planning and Development Department. Personal communication between Matt Holm, White Tanks/Grand Avenue Project Planner and Sarah Beloshapka, Dames & Moore. November 18.
- Jones, J.K. Jr., R.S. Hoffman, D.W. Rice, C. Jones, R.J. Baker and M.D. Engstrom. 1992. Revised checklist of North American mammals north of Mexico, 1991. Occas. Papers Mus., Texas Tech University, No. 146.
- Kearney, T.H. and R.H. Peebles. 1960. Arizona flora. University of California Press. 1085 pp.

- Kempton, R. 1999. Personal communication with Reed Kempton, Maricopa County Transportation Planner. November.
- Lehr, J.H. 1978. A catalogue of the flora of Arizona. Northland Press, Flagstaff, Arizona. 203 pp.
- Luke Air Force Base (AFB). 1995. Luke Air Force Base and Environs Aircraft Noise. December.
- Maricopa Association of Governments (MAG). 2000. Current projects. www.mag.maricopa.gov. Accessed January 17.
- Maricopa County Department of Transportation (MCDOT). 1999. Bicycle Transportation System Plan. May 19.
- Maricopa County Planning and Development Department. 1999. White Tank/Grand Avenue Area Plan. October 29.
- Monson G. and A.R. Phillips. 1981. Annotated checklist of the birds of Arizona. Second edition. University of Arizona Press. 240 pp.
- National Geographic Society. 1999. Field guide to the birds of North America. Third edition. National Geographic Society, Washington, D.C. 480 pp.
- Natural Resources Conservation Service (NRCS). 1996. Final Watershed Plan and Environmental Assessment for the White Tank Mountains Watershed. Prepared by the U.S. Department of Agriculture, Natural Resources Conservation Service. May.
- Olson, E. 2000. Personal communication between Einar Olson, Maricopa County Vector Control and Lesley Johnson, URS Dames & Moore. September 5.
- Stebbins, R.C. 1985. A field guide to western reptiles and amphibians. *Petersen Field Guides*. Houghton Mifflin Co., Boston. 336 pp.
- Steenbergh, W.F. and C.H. Lowe. 1983. Ecology of the Saguaro: III. *Scientific Monograph Series*, No. 17. U.S. Department of the Interior, National Park Service, Washington, D.C.
- Stevens, D. Personal communication with Donna Stevens, Town Planner, Town of Buckeye. December 7.
- Thelen, B. 2000. Personal communication with Brad Thelen, Park Ranger, White Mountain Regional Park. January 3.
- Town of Goodyear. 1998. Land Use Plan. May.
- Trasancos, D. 1999. Personal communication with Debbie Trasancos, Water Specialist, Maricopa Water District. December.
- Tres Rios constructed Wetlands Demonstration Project Home Page. (www.tresrios.net).

- Turner, R.M. and D.E. Brown. 1994. Sonoran Desertscrub. Pages 180-222 In *Biotic Communities: Southwestern United States and Northwestern Mexico*. D.E. Brown, editor.
- U.S. Census Bureau. 1990. Census data.
- U.S. Fish and Wildlife Service (FWS). 1999a. Endangered species web page: www.fws.gov/r9endspp/stat1-r2.html#lnkAZ. U.S. Fish and Wildlife Service. Accessed June 16, 1999.
- _____. 1999b. Endangered and threatened wildlife and plants; review of plant and animal taxa that are candidates or proposed for listing as endangered or threatened; annual notice of findings on recycled petitions; annual description of progress on listing actions; proposed rule. *Federal Register* 64(205):57534-57547.
- _____. 1999c. Endangered species list web page: <http://ifw2es.fws.gov/EndangeredSpecies/Lists/ListSpecies.cfm>. Arizona Ecological Services. Accessed December 9, 1999.
- Witzeman, J., S. Demaree, and E. Radke. 1997. Birds of Phoenix and Maricopa County, Arizona. Maricopa Audubon Society, Phoenix, Arizona. 153 pp.