Skunk Creek
Watercourse Master Plan

Biological Report: Relative Habitat Evaluation
Skunk Creek Watercourse Master Plan
Maricopa County, Arizona

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

LOGAN SIMPSON DESIGN INC.

City of Phoenix

ASL
Consulting Engineers

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I. INTRODUCTION

The consulting firm of Logan Simpson Design Inc. (LSD) is under contract with the Flood Control District of Maricopa County (District) to conduct a habitat evaluation of the study area and prepare a biological report for the Skunk Creek Watercourse Master Plan (SCWMP). A watercourse master plan is a comprehensive flood control plan based on hydraulic analysis, future land use development, and environmental considerations. This habitat evaluation is being prepared to develop appropriate environmental documentation in order to assist in the Master Plan process. The purpose of this habitat evaluation and report is to identify current vegetative conditions in the study area and to assess the potential existence of suitable habitat for federally listed Threatened and Endangered species (T&E) and Wildlife of Special Concern in Arizona (WSCA), as described by the Arizona Game and Fish Department (AGFD).

The relative habitat evaluation was prepared in coordination with the AGFD, Arizona State University (ASU), and the Flood Control District of Maricopa County (District). The U.S. Fish and Wildlife Service's list of Endangered and Threatened species for Maricopa County was evaluated. The AGFD's list of Wildlife of Special Concern in Arizona (WSCA) for the project area was also reviewed. A field reconnaissance survey of the study area was conducted in February and March 2000.

The study area is located in Maricopa County, Arizona (Figure 1). Ownership within the study area is both private and State Trust Land with a small area under Federal ownership. The SCWMP was divided into two different phases which focus on separate study areas. Phase I includes Skunk Creek and Unnamed Wash between Carefree Highway and the Central Arizona Project (CAP) canal (Figure 2). Phase II of the study includes the eleven mile section of Skunk Creek north of the Carefree Highway. The study area boundaries are 500 feet from the 100-year floodplain.

Existing data sources were utilized and includes the North Phoenix Wash Vegetation Study (Arizona State University 1998) and the North Phoenix Wildlife Inventory (Arizona State University 1999).

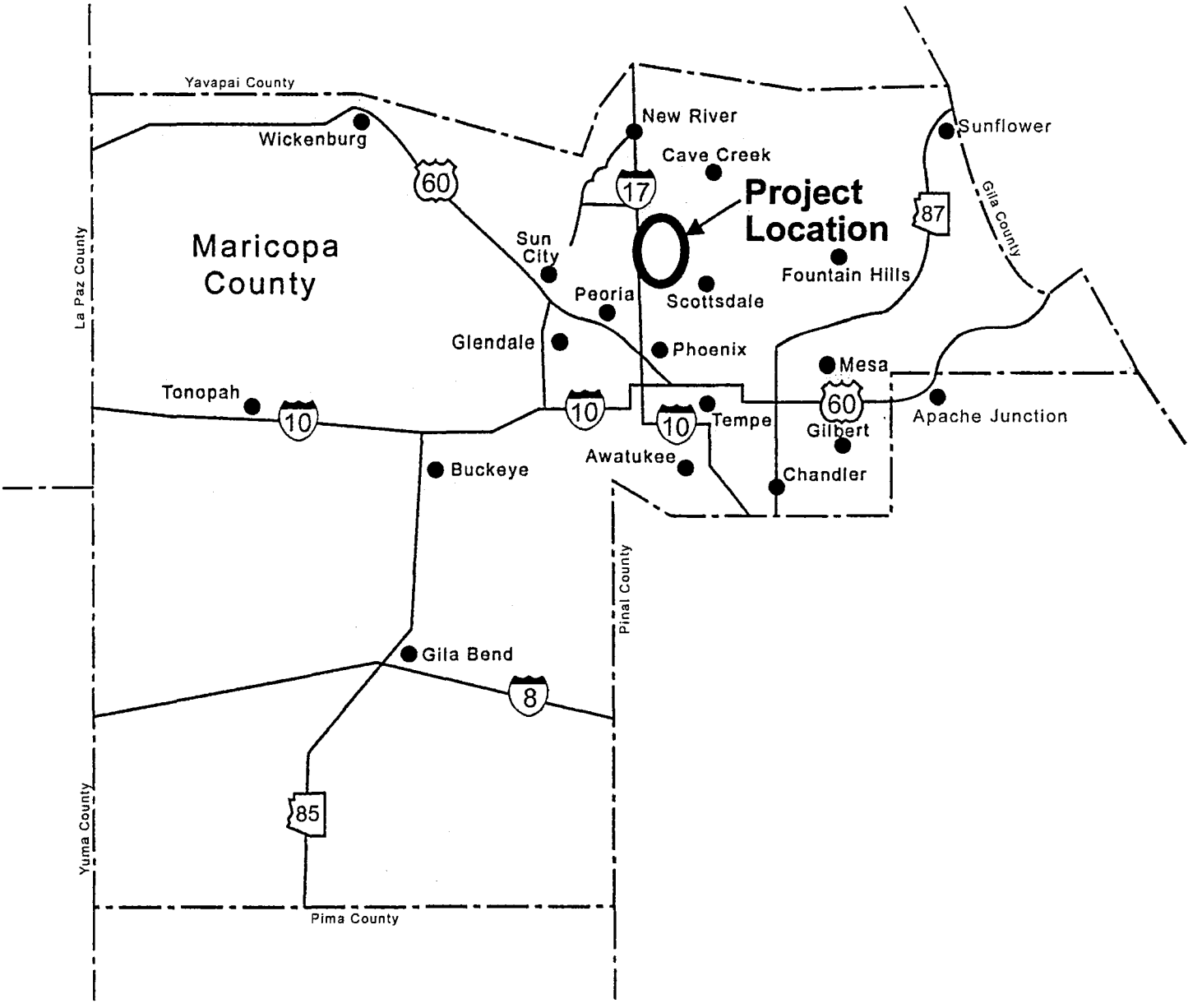
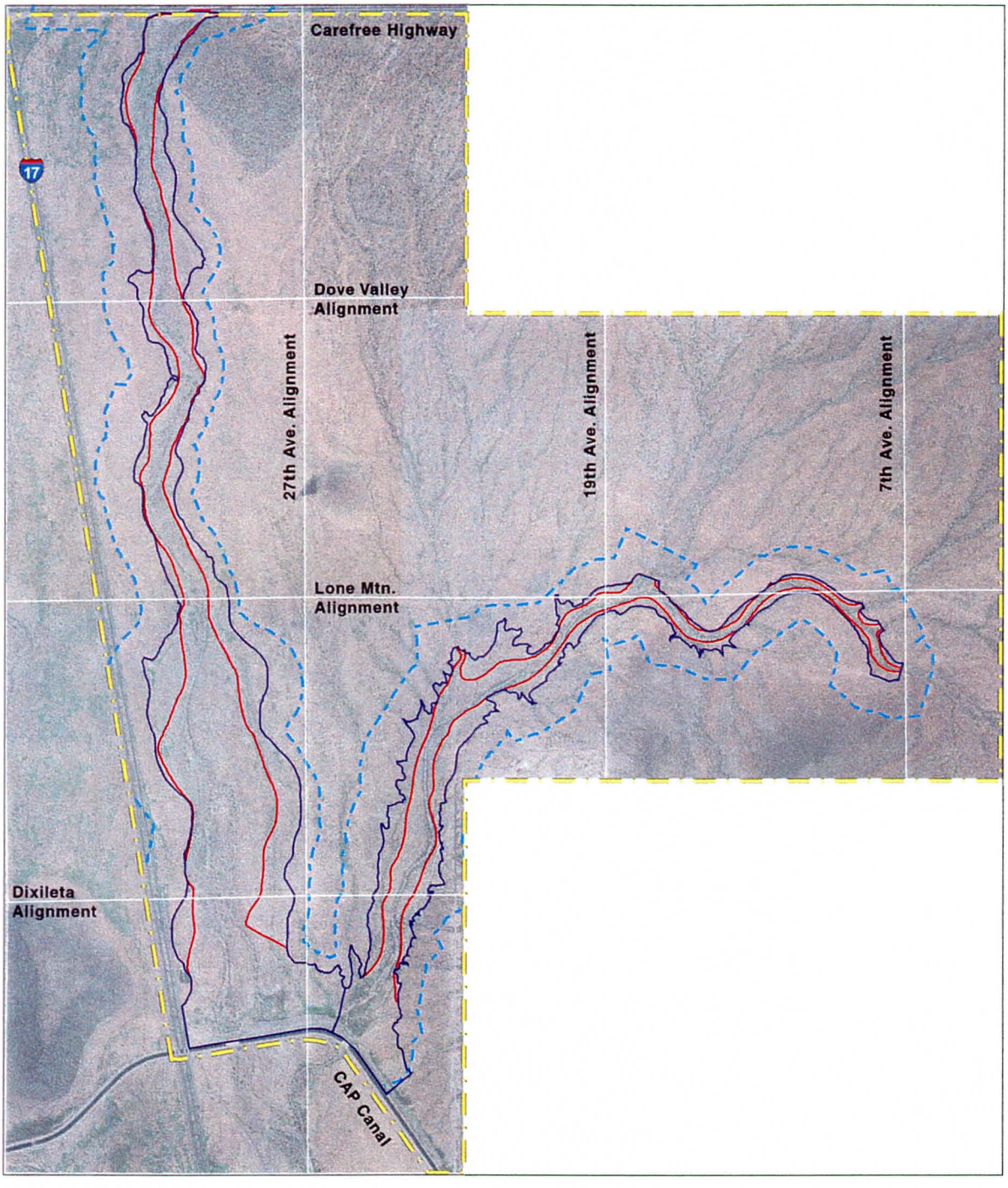


Figure 1. County Location Map



Key

- Existing 100 - Year Floodplain
- Existing 100 - Year Floodway
- WCMP Limits
- Study Area

NORTH TRUE

Figure 2. Study Area Map.

II. EXISTING VEGETATIVE COMMUNITIES

The study area is located in the Arizona Uplands subdivision within the Sonoran Desertscrub biome, as mapped by Brown and Lowe (1980). This subdivision is also known as the Paloverde-Cacti Desert, which is generally found in the upper elevations in central and south-central Arizona (Shreve 1951). The sloping terrain and lush vegetation supports a diverse group of animal and plant species diversity. Generally, vegetation in the Arizona Uplands is dominated by species of leguminous trees, shrubs, perennial succulents, and combinations of other trees. Species may include, foothill paloverde (*Cercidium floridum*), desert ironwood (*Olneya tesota*) and large tree-like cacti such as, teddy bear cholla (*Opuntia bigelovii*) and saguaro (*Carnegiea gigantea*).

The Arizona Upland associations on rolling slopes between washes grade gradually from north to south, and from higher to lower elevations into the creosote bush biological associations. Although the washes are typically xeric (dry) throughout the year, they are capable of carrying large volumes of water during the monsoon period. The average annual precipitation for this subdivision lies between 5 and 10 inches. The substrate consists of hyperthermic arid soils that contain developed layers, low in organic matter and moisture. The mean annual temperature is 72° F or higher for these soils.

For this habitat evaluation, the study area is divided into two sections: Unnamed Wash south of Carefree Highway and Skunk Creek South of Carefree Highway. A list of the predominant plant species and a list of animal species observed in the study area are included in the Appendix. The existing vegetative communities are described below.

1. Unnamed Wash South of Carefree Highway

Unnamed Wash is a tributary of Skunk Creek, located east of the creek and north of the CAP canal. Elevation along the watercourse descends from approximately 1,620 to 1,520 feet above MSL through gently sloping terrain. The main creek bed varies in width and composition from wide and sandy to narrow and rocky.

Wash vegetation changes from dominant species of desert hackberry (*Celtis pallida*), graythorn (*Zizyphus obtusifolia*), and desert wolfberry (*Lycium andersonii*) (Figure 3) to intermittent patches of large paloverde (*Cercidium* sp.) and ironwood (*Olneya tesota*). At sites where secondary washes converge into the main channel, vegetation species diversity, density, and structural variety of cover increases. At the confluences, infiltration rates may be greater and, therefore, the plants growing there receive more water that the plants along the banks and in the main channel.


Figure 3. Wash Vegetation Along Unnamed Wash

The main creek bed along the northern two-thirds of the watercourse is devoid of lush vegetative layers, probably due to scouring from seasonal flooding. The lower, flatter portions of Unnamed Wash support shrubby vegetation, which disperses within the main creek bed.

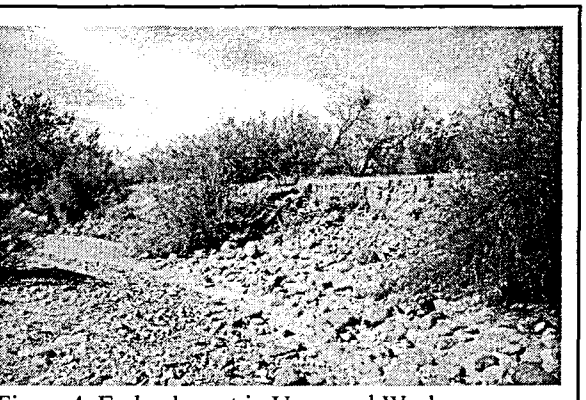


Figure 4. Embankment in Unnamed Wash

Small embankments are located at east facing bends and are sparsely vegetated (Figure 4) . Opposite banks are dominated with a higher volume of trees, shrubs, and grasses. Embankments are valuable to wildlife because they provide cover, nesting and burrowing structures for reptiles, small mammals and birds. The surrounding areas consist of creosote-bursage flats that transition into adjacent hillsides and slopes.

Due to cattle grazing, natural fire, and off-road vehicle use, the natural landscape has been altered in the southern portion of the wash. Damage has occurred along wash banks, particularly at sites where the roads bisect the wash. Cattle grazing operations have changed the vegetative composition creating bare ground and damage to small trees and shrubs (Figure 5).

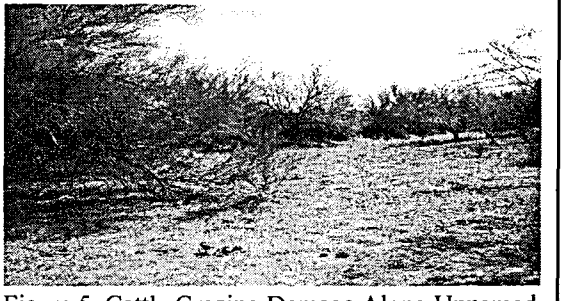


Figure 5. Cattle Grazing Damage Along Unnamed Wash

The result of disturbance, probably fire related, has introduced large populations of bursage species particularly in the lower portions of the wash. This is also the case with Skunk Creek, but to a greater degree.

2. Skunk Creek South of Carefree Highway

Skunk Creek in Phase I of this study is located on the east side of Interstate 17, south of Carefree Highway and north of the CAP canal. The watercourse moves south through a broad, gently sloping plain, elevation ranging from 1,660 to 1,525 feet above MSL. Wash vegetation is dominated by a mixture of shrubs and scattered tall trees (Figure 6). Creosote bush-bursage flats occupy the area adjacent to the channel. The hillsides and slopes consist of saguaros (*Carnegiea gigantea*), paloverde (*Cercidium* sp.), and cholla (*Opuntia* sp.).

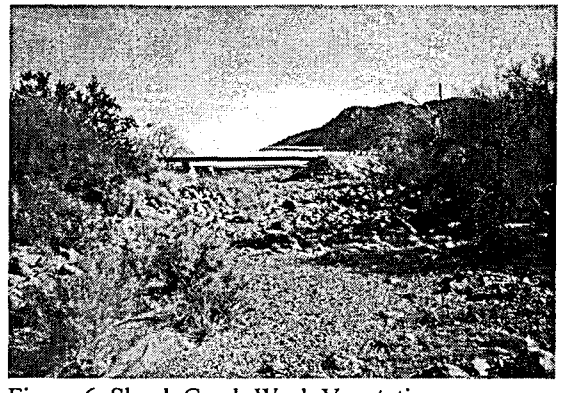


Figure 6. Skunk Creek Wash Vegetation

Characteristics of the main creek bed vary from upper to lower elevations, from wide and rocky to intermittently narrow, sandy, and braided. The sandy substrate contains less vegetation while patches of desert broom (*Baccharis sarothroides*), big-leaf bursage (*Ambrosia ambrosioides*), and sweetbush (*Bebbia juncea*) survive in areas where the substrate is somewhat rocky.

Three tall, steep embankments are present along Skunk Creek, each east-facing, and containing little vegetation. These particular embankments are larger and support more wildlife species than Unnamed Wash (Figure 7).

The tall paloverde (*Cercidium* sp.), ironwood (*Olneya tesota*), and saguaros (*Carnegia gigantea*) offer potential nesting locations for raptors, and other bird species, as well as provide cover for reptiles and mammals.

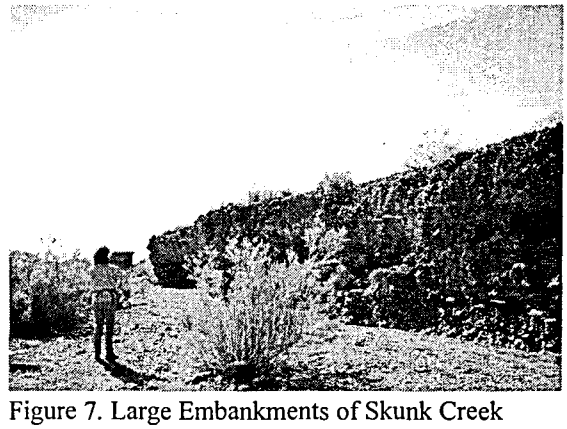


Figure 7. Large Embankments of Skunk Creek

Creosote-bursage flats are present in all areas surrounding the main channel including the cacti dominated hillsides and slopes, characteristic of the Arizona Upland Subdivision. A natural residual concentration of closely packed pebbles, boulders, and rock fragments, called desert pavement, is visible on the western landscape near Interstate 17.

Three significant disturbed areas along Skunk Creek were observed during the field reconnaissance survey. Cattle grazing has depleted ground vegetation and has damaged smaller trees and shrubs in the lower portion of the creek. Erosion damage is also evident in portions of the main creek bed. A potential area of hazardous materials concern was observed on the eastern side of the creek in the creosote bush-bursage flats approximately 1.5 miles south of Carefree Highway (Figure 8). One permanent water source, Bronco Tank, is located west of Bronco Butte. Because it is the only permanent water source within the study area, it is probably overused by cattle and wildlife. Consequently, the surrounding area is devoid of vegetation.

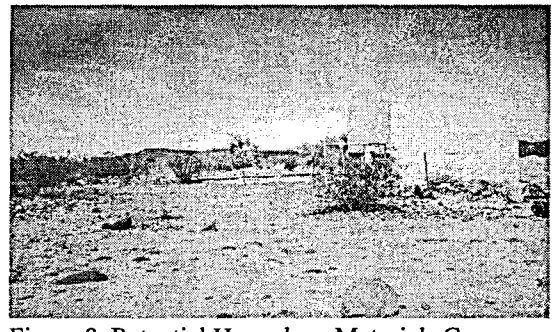


Figure 8. Potential Hazardous Materials Concern

III. HABITAT VALUES AND HABITAT TYPES

The study area was evaluated in terms of relative habitat values and types. Habitat value refers to the suitability of the landscape for wildlife. Habitat type categorizes the landscape in terms of vegetative associations with landforms.

1. Habitat Value

Relative habitat values were determined for the study area and were assigned as high, medium, and low. These values reflect the overall suitability of the landscape for a diversity of wildlife species. The presence of land forms such as embankments are also considered. The criteria used to assign habitat value is as follows:

- High: Includes at least one of the following characteristics: the presence of large trees, defined vegetative structure and diversity (tall trees, shrubs, and a ground layer), variety of vertical cover, abundance of wildlife observed, presence of adjacent hillsides and slopes, tall embankments, and absence of noise. Typically, the degree of disturbance is little to none.

- Medium: Characterized by a lower diversity, density, and size of vegetation compared to high quality habitat; may function as a wildlife corridor; the degree of disturbance from human (i.e., noise, land use, etc.) And non-human (i.e., grazing, wildfire, etc.) is not significant. Medium habitat may include the presence of monotypic (desert hackberry, graythorn, or desert wolfberry) or mixed vegetation (structural layers of shrubs and small trees).

- Low: Typically characterized by monotypic vegetation, sparsely vegetated, and contains structural diversity; may be damaged from erosion; may be significantly disturbed.

Habitat values may change frequently due to human impact and environmental factors. These factors may include, road developments, wildfire, amount of rainfall in any particular year, terrain, and the structural dynamics of the secondary washes.

It is important to note that in this study, habitat value assigned within each watercourse is not intended to make habitat value comparisons between Skunk Creek and Unnamed Wash. For example, Unnamed Wash provides important travel corridors for wildlife, even though less observations are made of nesting and

burrowing animals. This could be due to the lack of abundant habitat structures such as, embankments and abundance of tall trees. The construction of the CAP canal creates a corridor barrier for wildlife movement along the watercourses.

2. Habitat Types

For the purposes of this study, habitat types are defined, using definitions similar to those employed by Arizona State University resources in the North Phoenix Wash Vegetation Study (1998). Five basic habitat types were used to categorize the existing habitat within the study area. These habitat types are described below.

a. Type 1 Habitat. Main Creek Bed (Figure 9).

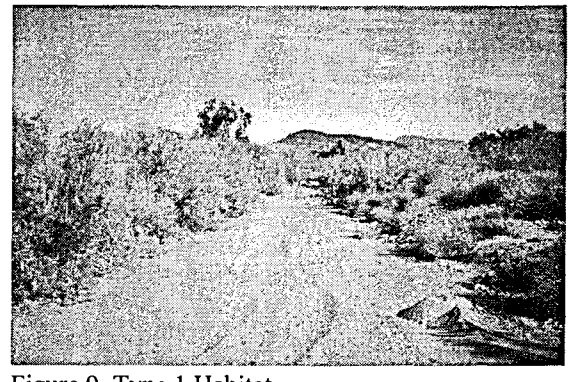


Figure 9. Type 1 Habitat

This type is characterized by a sandy, rocky channel with prominent sand bars. The main creek bed in Skunk Creek is predominantly fine sands and gravels with intermittent patches of boulders, resulting from scouring effects of flooding events. In some segments, large patches of vegetation including big-leaf bursage (*Ambrosia ambrosioides*), desert broom (*Baccharis sarothroides*), salt cedar (*Tamarix* sp.), old man's beard (*Clematis drummondii)*, and sweetbush (*Bebbia juncea*) are present (Figure 10). In the narrow main creek bed of Unnamed Wash, vegetation is relatively sparse, except for the area near the CAP canal, which is dominated with desert broom (*Baccharis sarothroides*), sweetbush (*Bebbia juncea*), and a few small blue paloverde (*Cercidium microphyllum*).

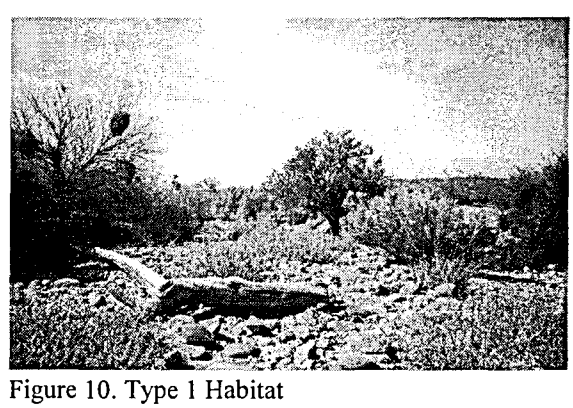


Figure 10. Type 1 Habitat

b. Type 2 Habitat. Wash Vegetation.


Figure 11. Embankment Along Skunk Creek

Eroded embankments located along the east side of Skunk Creek provide burrowing, nesting, and general cover for a variety of species (Figure 11). Vegetation is scarce, but opposite banks which are less steep, provide conditions for lush, dense vegetation composed of desert broom (*Baccharis sarothroides*), big-leaf bursage (*Ambrosia ambrosioides*), a few paloverde (*Cercidium* sp.), and tobosa grass (*Hilaria mutica*). Patches of large trees are present along the bank which provide nesting, perching, and cover for birds and mammals. Common shrubs found along the watercourse include salt cedar (*Tamarix* sp.), desert broom (*Baccharis sarothroides*), and big-leaf bursage (*Ambrosia ambrosioides*).

The embankments along Unnamed Wash are smaller than those along Skunk Creek, but do exhibit similar qualities. Typical shrubs found along the watercourse includes big-leaf bursage (*Ambrosia ambrosioides*), graythorn (*Zizyphus obtusifolia*), and desert wolfberry (*Lycium andersonii*). The north end of Unnamed Wash is dominated with desert hackberry.

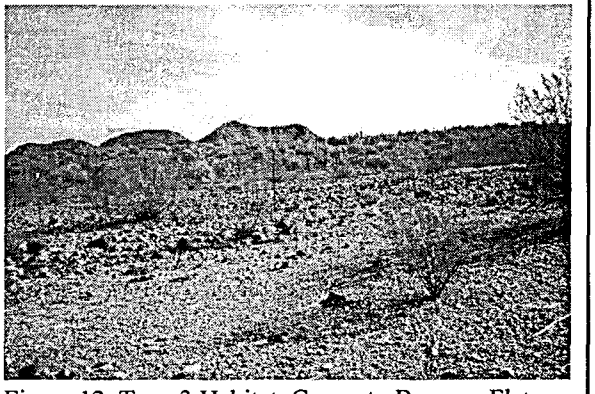


Figure 12. Type 3 Habitat Creosote-Bursage Flats

c. Type 3 Habitat. Creosote-Bursage Flats (Figure 12)

These dominant species tolerate hot arid conditions of the desert flats. Species include creosote bush (*Larrea tridentata*) and triangle-leaf bursage (*Ambrosia deltoidea*).The creosote-bursage community is present throughout the study area adjacent to the two watercourses. The creosote bush continues to hold a position on the slopes and hillsides nearby.

d. Type 4 Habitat. Hillsides and Slopes (Figure 13)

Vegetation characteristics prominent on hillsides and slopes within the study area include foothill palo verde (*Cercidium microphyllum*), blue palo verde (*Cercidium floridum*), creosote (*Larrea tridentata*), saguaro (*Carnegiea gigantea*), and cholla (*Opuntia* sp.). This vegetation type is common for the Arizona Upland subdivision.

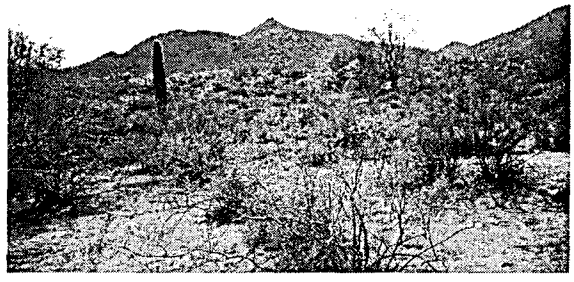


Figure 13. Type 4 Habitat. Hillsides and Slopes

e. Type 5 Habitat. Disturbed (Figure 14).

Large portions of the Skunk Creek study area have been burned and is now dominated with creosote-bursage species. Disturbed areas include cattle-grazing and off-road vehicle use. Noise disturbance is present on the east side of Unnamed Wash due to an adjacent shooting range, the mining operation, and Interstate 17 traffic noise. Interstate traffic was observed to contribute more to the noise disturbance on a continual basis than the mining operation.

Figure 14. Type 5 Habitat

3. Habitat Values and Habitat Types Within the Unnamed Wash Study Area

In Unnamed Wash, numerous secondary washes drain down from the surrounding hillsides and slopes into the main watercourse. At Skunk Creek, there are fewer secondary washes. Overall, the habitat value was medium to high, the plant size and diversity was not as large as Skunk Creek. Several large ironwood and paloverde trees are present along Unnamed Wash. Embankments offer high value to burrowing and hibernating animals. The creosote-bursage flats have low value to wildlife independently, but secondary washes and surrounding hillsides and slopes provide travel corridors and foraging habitat. The highly disturbed areas are determined to be low value to wildlife. Medium habitat value areas provide wildlife with basic needs, but are not typically preferred.

4. Habitat Values and Habitat Types Within the Skunk Creek Study Area

A high diversity of species is associated with a broad variety of habitats found on Skunk Creek. The land forms, such as tall embankments, hillsides and slopes, provide high value to wildlife. Wash vegetation ranges from shrubby to multi-layered structures of grasses, shrubs, and tall trees. The creosote-bursage flats offer low value to wildlife, because key components such as water and little shelter, important to habitat are missing. In some areas, wash vegetation is thick and shrubby, invading the main creek bed and surrounding areas. Patches of large ironwood and paloverde are present, in limited segments of the wash. These areas provide the best nesting habitat for birds, especially raptors.

Habitat was assigned a medium value to areas of Skunk Creek that fall in between the areas of high and low value; vegetation structure is present, but abundance of larger, taller trees is missing. The areas of low value are associated with creosote- bursage flats and highly disturbed areas.

5. Summary of Habitat Types and Values

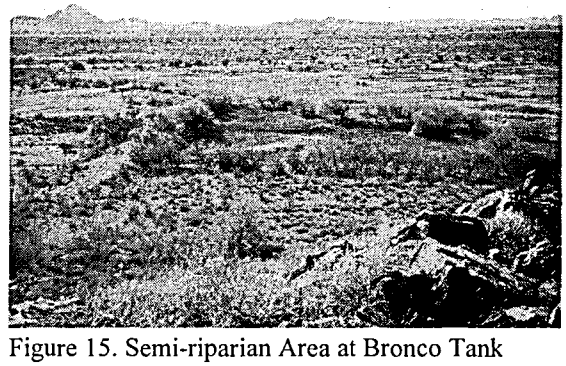


Figure 15. Semi-riparian Area at Bronco Tank

The Skunk Creek segment of the study area supports more vegetation per acre and has the greatest potential for nesting and/or burrowing animals. Wash vegetation is valuable habitat along both watercourses. Each watercourse provides unique qualities to wildlife potential. Both areas have distinctly different roles in maintaining wildlife abundance and diversity. Unnamed Wash serves as an important travel corridor, as well as provide cover for numerous species, whereas, Skunk Creek provides key elements for providing settlement. Bronco Tank provides semi-riparian habitat and is used throughout the year (Figure 15). Even though the tank provides water to wildlife year round, the landscape is disturbed from heavy use.

IV. SENSITIVE SPECIES

1. Federally Listed Threatened and Endangered Species

A list of federally listed Threatened and Endangered Species for Maricopa County was obtained from the U.S. Fish and Wildlife Service. A copy of this list is included in the Appendix. The following is a discussion of each species, its status, habitat requirements, and occurrence or potential occurrence within the study area. The results of the analyses for these species are based on the USDA Forest Service (USFS) classifications *No Suitable Habitat*, *Suitable Habitat Present*, or *Suitable Habitat Occupied.*

Arizona Agave (*Agave arizonica*)

Status: Endangered

Habitat: The Arizona agave is native to a small area in central Arizona (New River Mountains and Sierra Anches) usually found on steep, rocky slopes between 3,600 - 5,800 feet above MSL between Oak-Juniper Woodlands and Mountain Mahogany-Oak Scrub.

Analysis: *No Suitable Habitat.*

Arizona Cliffrose (*Purshia subintegra*)

Status: Endangered

Habitat: This species is associated with white soils of Tertiary limestone lakebed deposits at elevational ranges between 2,500 - 4,000 feet above MSL.

Analysis: *No Suitable Habitat.*

Arizona Hedgehog Cactus (*Echinocereus triglochidiatus arizonicus*)

Status: Endangered

Habitat: The Arizona hedgehog cactus is usually found between Interior Chaparral and Madrean Evergreen Woodlands in rugged canyons and boulder-pile ridges, in narrow cracks between boulders, and in the understory of shrubs. This plant is found at elevations between 3,400 - 5,300 feet above MSL.

Analysis: *No Suitable Habitat.*

Bald Eagle (*Haliaeetus leucocephalus*)

Status: Threatened

Habitat: Bald Eagles are found in areas with large trees or cliffs that are near water (reservoirs, rivers and streams), and contain an abundance of prey. In Arizona, Bald Eagles have been observed at elevations between 460 - 7,930 fee above MSL.

Analysis: *Suitable Habitat Present* (migration, forage). Bald Eagles could forage within the study area. Their food preference includes fish, but is followed by small mammals.

Bonytail Chub (*Gila elegans*)

Status: Endangered

Habitat: The bonytail chub occupies main stream portions of mid-sized to large rivers and streams, usually over mud or rocks. A small population exists on Lake Mohave with possible individuals down river to the Parker Dam.

Analysis: *No Suitable Habitat.*

Cactus Ferruginous Pygmy-Owl (*Glaucidium brasilianum cactorum*)

Status: Endangered

Habitat: These owls are typically found in mature cottonwood/willow woodlands, mesquite bosques and Sonoran desertscrub, at elevations below 4,000 feet above MSL.

Analysis: *Suitable Habitat Present* (*marginal*). Historical records indicate that Pygmy-owls occupied Sonoran desertscrub as far north as New River. However, the study area is lacking an abundance of saguaros and ironwoods for nesting. Recent information suggests that the Pygmy-owl habitat includes desert washes with mature blue paloverde, mesquite, and ironwood.

Desert Pupfish (*Cyprinodon macularius*)

Status: Endangered

Habitat: The pupfish's historical range, found at elevations below 4,920 feet above MSL, and included the lower Gila River basin. No natural populations exist in Arizona, however, reintroduced populations occupy shallow waters of springs, small streams, and marshes. The fish is associated with areas of soft substrates and clear water.

Analysis: *No Suitable Habitat.*

Gila Topminnow (*Poeciliopsis occidentalis*)

Status: Endangered

Habitat: The topminnow occupies small streams, springs, and cienegas/vegetated shallows below 4,500 feet in elevation above MSL. It is associated with dense aquatic vegetation.

Analysis: *No Suitable Habitat.*

Lesser Long-nosed Bat (*Leptonycteris curasoae yerbabuenae*)

Status: Endangered

Habitat: The Lesser long-nosed bat occupies desertscrub and grasslands to oak communities. It normally feeds on flower nectar, pollen, and sometimes fruit from agave and columnar cacti. The bat is found at elevations below 3,500 feet from April to July and up to 5,500 feet from July to late September. These bats roost in the day, in caves and abandoned tunnels. This species is not present in Arizona in the winter.

Analysis: *Suitable Habitat Present.* There are two late-summer records of two individuals in the Phoenix area. However, occurrences are unlikely because the study area is located outside the bats normal range. Arizona State University conducted a bat survey in 1999. Six unidentified bats were observed at Bronco tank.

Mexican Spotted Owl (*Strix occidentalis lucida*)

Status: Threatened

Habitat: These owls are usually found at higher elevations between 4,100 to 9,000 feet above MSL. This species occupies dense forested areas with multi-layered foliage structure. They generally rest in canyons and dense forests, preferring sites that include cool microclimates.

Analysis: *No Suitable Habitat.*

Razorback Sucker (*Xyrauchen texanus*)

Status: Endangered

Habitat: This fish occupies rivers, lakes, and slower moving water, found below 6,000 feet above MSL. In some areas, they prefer depths of three feet of more over sand or gravel substrates. Do to lack of recruitment, these populations remain small.

Analysis: *No Suitable Habitat.*

Sonoran Pronghorn Antelope (*Antilocapra americana sonoriensis*)

Status: Endangered

Habitat: This subspecies of antelope occupies broad, intermountain alluvial valleys with creosote-bursage and paloverde-mixed cacti, at elevations between 400 - 1,600 feet above MSL.

Analysis: *No Suitable Habitat.* This subspecies has never been documented north of the Gila River.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Status: Endangered

Habitat: This species is found in riparian areas along rivers and streams, associated with cottonwood/willow and tamarisk vegetative communities. They occupy areas between 90 - 8,240 feet above MSL.

Analysis: *No Suitable Habitat.* This subspecies prefers dense canopy cover, a large volume of foliage, and surface water for nesting.

Yuma Clapper Rail (*Rallus longirostris yumanesis*)

Status: Endangered

Habitat: This rail is associated with dense emergent riparian vegetation, with wet substrate and dense herbaceous or woody vegetation. They tend to occupy fresh and brackish water marshes at elevations below 4,500 feet above MSL.

Analysis: *No Suitable Habitat.* These birds prefer more humid microhabitats, often associated with standing water and a closed canopy.

2. Wildlife of Special Concern

A list of WSCA documented as occurring in the study area was obtained from AGFD. A copy of this list is included in the Appendix.

The following is a discussion of each species, its status, habitat requirements, and occurrence or potential occurrence within the study area. This list also includes federally listed Threatened and Endangered Species. The results of the analyses for these species are based on the USDA Forest Service (USFS) classification *No Suitable Habitat, Suitable Habitat Present,* or *Suitable Habitat Occupied.*

Lowland Leopard Frog (*Rana yavapaiensis*)

Status: WSCA

Habitat: This species occupies the Virgin River drainage in the northwestern part of the state, Colorado River near Yuma, west, central, and southeastern Arizona, south of the Mogollon Rim. Frequents the desert, grassland, oak and oak-pine woodland, permanent pools of foothill streams, rivers and permanent stock tanks. Found from 800 feet to 5,500 feet above MSL in elevation.

Analysis: *Suitable Habitat Present* (marginal). This species generally stays close to permanent water, creeks, rivers, ponds or stock tanks. Bronco tank is located within the study area, however, there are no known records of the species here.

Hohokam Agave (*Agave murpheyi*)

Status: WSCA

Habitat: This species of agave is found on benches or terraces on gentle bajada slopes above major drainages associated with prehistoric habitations and/or agricultural sites suggesting tending. Also found near rock piles which discourage rodents and help accumulate nutrients and water. The Hohokam agave is found at elevations ranging from 1,300 - 2,400 feet above MSL. This agave requires well drained soil, susceptible to root-rot.

Analysis: *Suitable Habitat Present (marginal).*

Sonoran Desert Tortoise (*Gopherus agassizzii*)

Status: WSCA

Habitat: The Sonoran population occupies a range south and east of the Colorado River, inhabiting the bajadas and rocky slopes of the Sonoran desertscrub in elevations as low as 520 feet up to 5,330 feet above MSL.

Analysis: *Suitable Habitat Present.* The Sonoran desert tortoise has been documented as occurring in the Cave Creek area just east of the study area The hillside and slope areas provide marginal habitat for the tortoise, however, no sign was found during the field survey.

3. Summary/Recommendations of Sensitive Species

Within the study area, suitable habitat exists for the Bald Eagle (*Haliaeetus leucocephalus*), Cactus Ferruginous Pygmy-Owl (*Glaucidium brasilianum cactorum*), Hohokam agave (*Agave murpheyi*), Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), Lowland leopard frog (*Rana yavapaiensis*), and the Sonoran desert tortoise (*Gopherus agassizzii*).

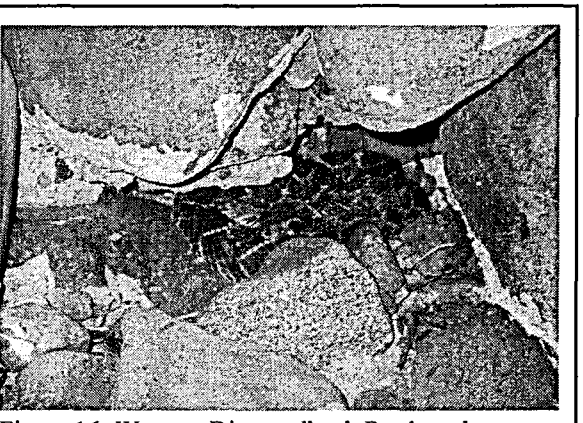


Figure 16. Western Diamondback Rattlesnake

During a reconnaissance survey in March 2000, a female bobcat (*Lynx rufus*) was observed pursuing birds in a large ironwood tree, located along the bank of Unnamed Wash. A Western diamondback rattlesnake was observed in one of the "pot holes" or crevices along an embankment in Skunk Creek (Figure 16) and

a breeding pair of Great-Horned Owls was observed flying and perching all along the Skunk Creek. Other species observations made during an additional field reconnaissance survey in March included a kingsnake preying on two Western diamondback rattlesnakes.

Prior to the implementation of structural or non-structural activities that would alter the stream channel, specific species surveys following appropriate survey protocol are recommended for areas of suitable or potentially suitable habitat for sensitive species. The U.S. Fish and Wildlife Service has identified three survey zones based on the potential of an Cactus Ferruginous Pygmy-Owl being present within suitable habitat. Zone 3 is within the historic range of the species, and includes the study area.

V. RECOMMENDATIONS

Based on the field reconnaissance surveys, coordination with the District, AGFD, and Arizona State University, the following are recommendations:

- Preserve as much wash vegetation as possible, especially in areas where large ironwoods and paloverdes are present. This vegetation provides corridors and connections to the surrounding hillsides and slopes. The large trees provide nesting potential and are used as safe refuges for a wide variety of species.

- At Unnamed Wash, prevent the fragmentation of the secondary washes that converge into the main watercourse and maximize the use of those wash systems for the conveyance of storm water.

- Preserve and maintain segments of the watercourses that provide embankments. These areas provide habitat for cavity nesting animals, therefore, they should remain undisturbed, if possible. Reptiles, mammals and birds such as the great-horned owl, rattlesnakes, rock squirrels, and some swallows and bats utilize crevices in the embankments.

- Maintain Bronco Tank and the adjacent vegetation; this is the only source of water for wildlife in the study area year round.

- Unnamed Wash has high value to wildlife as a travel corridor. Preserving the area, by maintaining the structural diversity of vegetation is recommended. Vegetative diversity increases the potential for higher species diversity.

- If fragmentation of Skunk Creek is necessary, preserve the segments with large trees (ironwoods and paloverdes) and tall embankments. These areas should be maintained as natural areas for the ecological health of the environment.

IV. LITERATURE REVIEWED

Arizona Game and Fish Department. 1996. *Goperus Agaszii.* Herp Diversity Review. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1996. *Rana yavapaiensis.* Herp Diversity Review. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix. Berger, B. 1999. Personal communication. AGFD surveys conducted along the Salt River.

Arizona Game and Fish Department. 1995. *Poeciliopsis occidentalis occidentalis.* Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1995. *Cyprinodon macularius macularius.* Unpublished abstract compile and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1995. *Gila elegans.* Unpublished abstract compile and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1997. *Echinocereus triglochidiatus arizonicus.* Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1997. *Agave arizonica.* Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1997. *Purshia subintegra.* Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1997. *Empidonax traillii extimus.* Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1997. *Rallus longirostris yumanensis*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1997. *Haliaeetus leucocephalus*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1997. *Abutilon parishii*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1998. *Glaucidium brailianum cactorum*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1998. *Strix occidentalis lucida*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1998. *Leptonycteris curasoae yerbabuena*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

____. 1999. *Antilocapra americana sonoriensis*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

Brown, D.E., Editor. *Biotic Communities: Southwestern United States and Northwestern Mexico*. University of Utah Press. Salt Lake City, Utah. 1994.

Hendricks, David M. 1985. *Arizona Soils*. University of Arizona, Tucson.

Shreve, F. 1951. *Vegetation and Flora of the Sonoran Desert*. Volume I. Vegetation 192pp. Carnegie Institution of Washington Publications 591.

VII. COORDINATION

The following persons were contacted in relation to this project:

Arizona Game and Fish Department

Main Office (Phoenix):	Sabra Schwartz, HDMS Coordinator

Arizona State University

Main Campus (Tempe)	Joseph Ewan, Assistant Professor
	Herberger Center
East Campus (Mesa)	Dr. William Miller, Professor

Flood Control District

Maricopa County	Theresa Hoff, Environmental Planner/Biologist

Field Survey Methodology

The studied area was surveyed using 1"=600' scale aerial photographs showing the approximate 600-foot project boundary beyond the 100-year floodplain. Points for data collection were chosen essentially at random, at approximately 600-foot spacings. The data collected at these points followed a standard data sheet, including the assessment of Habitat Type, Habitat Quality, Predominant Plant Species (3 species), Cactus Abundance and Species Present, along with a description of any notable features of the local environment.

Descriptive notes included such attributes as unusual landforms (e.g. embankments, sandy channel, hillsides and slopes), comments on potential T& E/WSCA species habitat, additional notable plant species, debris, noise (sand and gravel operations, and I-17), observed wildlife, and evidence of domestic livestock. Numerous photographs were taken and compared to the resources/maps given to LSD on the area.

VIII. APPENDIX

Field Survey Methodology

Sample Data Sheet

Coordination Letters

Species Lists

Field Survey Methodology

The studied area was surveyed using 1"=600' scale aerial photographs showing the approximate 600-foot project boundary beyond the 100-year floodplain. Points for data collection were chosen essentially at random, at approximately 600-foot spacings. The data collected at these points followed a standard data sheet, including the assessment of Habitat Type, Habitat Quality, Predominant Plant Species (3 species), Cactus Abundance and Species Present, along with a description of any notable features of the local environment.

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POINT #	PREDOM. PLANT			CACTI	HAB TYPE	HAB QUALITY	DESCRIPTION
	1	2	3				

HAB TYPE: DGS = Semidesert Mixed Grass-Mixed Scrub; PCS = Paloverde-Mixed Cacti-Mixed Scrub; CMS = Creosotebush-Mesquite Scrub; CBS = Creosotebush-Bursage Scrub; RS = Riparian Scrub; HSA = High Disturbance Area

HAB QLTY: H=High, M=Moderate, L=Low

THE STATE OF ARIZONA

GAME & FISH DEPARTMENT

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Director
Duane L. Shroufe

Deputy Director
Steve K. Ferrell

February 16, 2000

Ms. Theresa M. Hoff
Environmental Services Planner
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009-1501

Re: Special Status Species; Skunk Creek Watercourse Master Plan

Dear Ms. Hoff:

The Arizona Game and Fish Department (Department) has reviewed your letter, dated February 11, 1999, regarding special status species in the above-referenced area and the following information is provided.

The Department's Heritage Data Management System (HDMS) has been accessed and current records show that the special status species listed below has been documented as occurring in the project vicinity.

COMMON NAME	SCIENTIFIC NAME	STATUS
lowland leopard frog	*Rana yavapaiensis*	**WC,S**
Hohokam agave	*Agave murpheyi*	**S,HS**
Sonoran desert tortoise	*Gopherus agassizii*	**WC,S**

STATUS DEFINITIONS

WC - **Wildlife of Special Concern in Arizona.** Species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Department's listing of **Wildlife of Special Concern in Arizona** (WSCA, in prep.). Species included in WSCA are currently the same as those in **Threatened Native Wildlife in Arizona** (1988).

S - **Sensitive.** Species classified as "**sensitive**" by the Regional Forester when occurring on lands managed by the U.S.D.A. Forest Service.

HS - **Highly Safeguarded.** Those Arizona native plants whose prospects for survival in this state are in jeopardy or are in danger of extinction, or are likely to become so in the foreseeable future, as described by the Arizona Native Plant Law (1993).

At this time, the Department's comments are limited to the special status species information provided above. This correspondence does not represent the Department's evaluation of impacts to wildlife or wildlife habitat associated with activities occurring in the subject area. If you have any questions regarding the HDMS information provided in this letter, please contact me at (602) 789-3605.

Sincerely,

Bob Broscheid
Project Evaluation Program Coordinator
Habitat Branch

cc: Russ Haughey, Habitat Program Manager, Region VI, Mesa

Observed Plant Species List

Ambrosia deltoidea	Triangle-leaf bursage
Ambrosia ambrosioides	Big-leaf bursage, canyon ragweed, or giant-leaf bursage
Acacia greggi	Cat claw acacia
Baccharis sarothroides	Desert broom
Bebbia juncea	Sweetbush, chuckwalla's delight
Carnegiea gigantea	Saguaro
Celtis pallida	Desert hackberry
Clematis drummondii	Old man's beard
Cercidium sp.	Paloverde
Encelia farinosa	Brittlebush
Ephedra trifurca	Mormon tea
Ferocactus acanthodes	Barrel cactus
Larrea tridentata	Creosote
Lycium andersonii	Desert wolfberry
Olneya tesota	Ironwood
Prosopis sp.	Mesquite
Simmondsia chinensis	Jojoba
Zizyphus obtusifolia	Graythorn
Euphorbia sp.	Milkweed
Opuntia leptocaulis	Desert Christmas cholla
Datura wrightii	Sacred datura
Hilaria mutica	Tabosa grass
Opuntia acanthocarpa	Buckhorn cholla
Opuntia frulgida	Chain fruit cholla
Opuntia bigelovii	Teddy bear cholla
Sphaeralcea ambigua	Globe mallow
Tamarix sp.	Saltcedar

Observed Wildlife Species List

Mammals

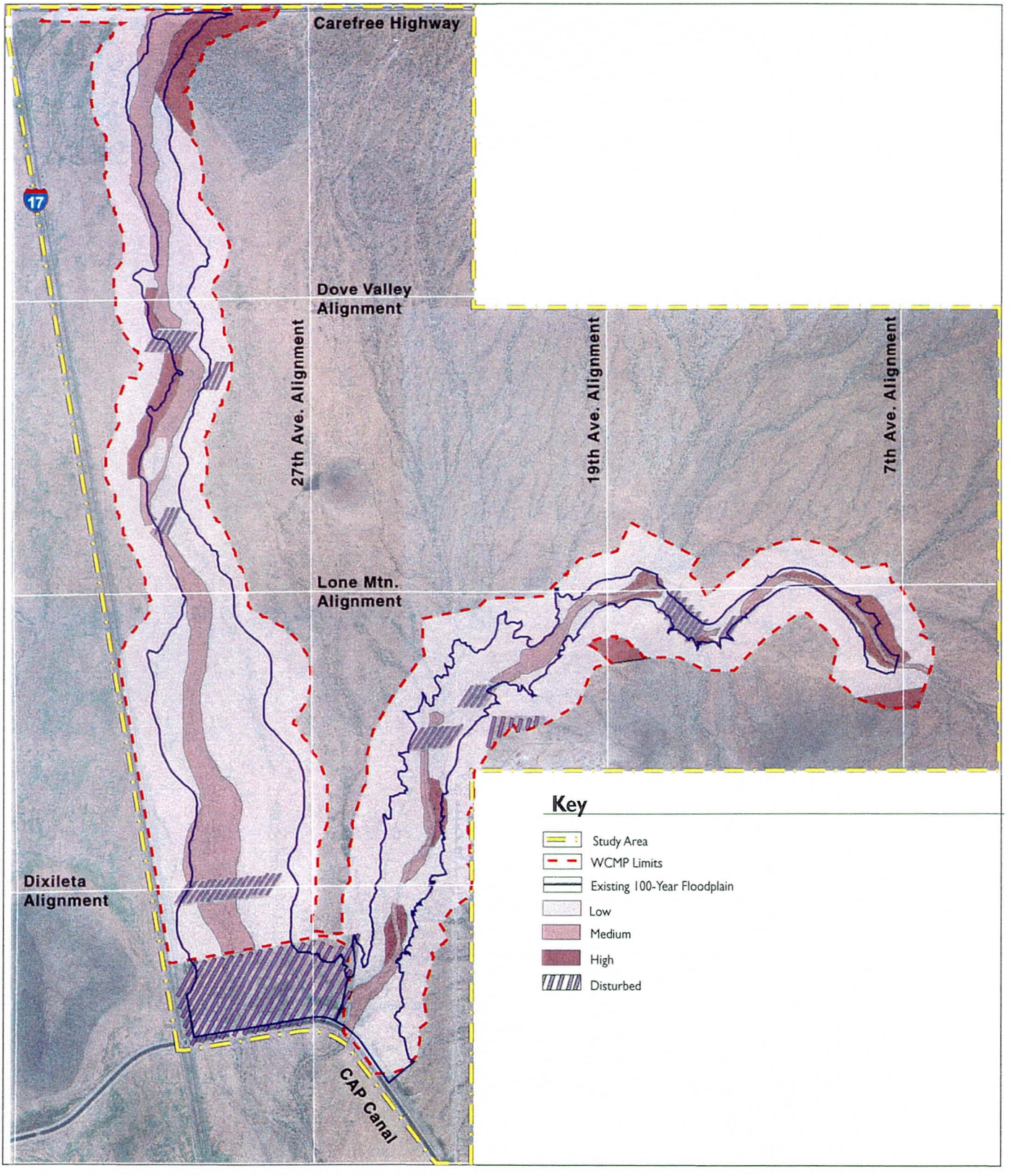
Ammospermophilus harrissii	Harris' antelope squirrel
Canis latrans	Coyote
Lepus californicus	Black-tailed jackrabbit
Lynx rufus	Bobcat
Neotoma sp.	Woodrat
Sylvilagus auduboni	Desert cottontail
Tayassu tajacu	Javalina
Urocyon cinereoargenteus	Gray fox

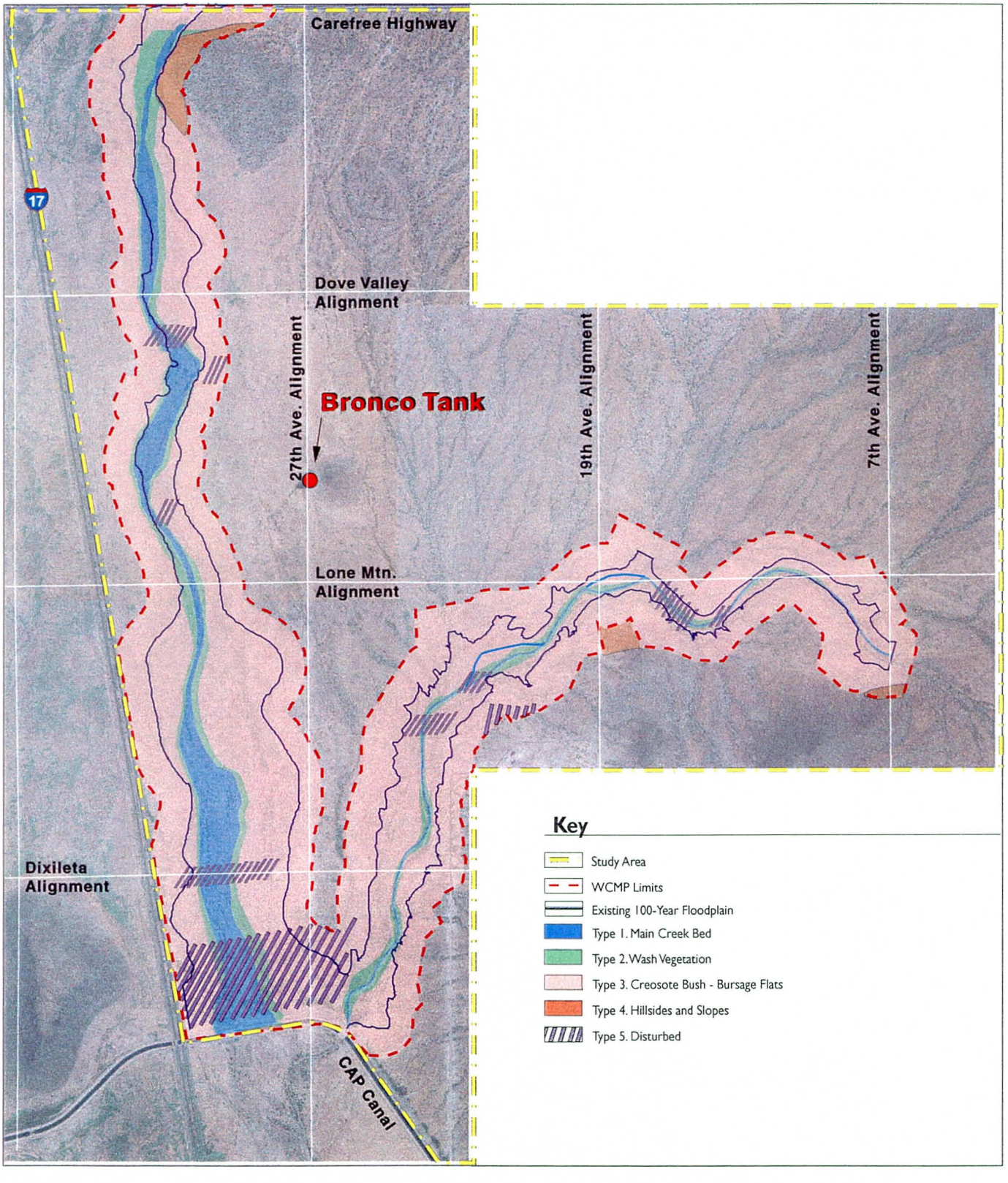
Birds

Amphispiza bilineata	Black-throated sparrow
Auriparus flaviceps	Verdin
Bubo virginianus	Great-horned owl
Buteo jamaicensis	Red-tailed hawk
Callipepla gambelii	Gambel's quail
Campylorhynhcus brunneicapillus	Cactus wren
Cathartes aura	Turkey vulture
Cardinalis cardinalis	Cardinal
Carduelis psaltria	Lesser goldfinch
Melanerpes uropygialis	Gila woodpecker
Parabuteo unicinctus	Harris' Hawk
Phainopepla nitens	Phainopepla
Polioptila melanura	Black-tailed gnatcatcher
Toxostoma curvirostre	Curved-billed thrasher
Zenaida macroura	Mourning dove

Reptiles

Cnemidophorus tigris	Western whiptail lizard
Crotalus atrox	Western diamondback
Uta stansburiana	Side blotched lizard


Carefree Highway
17
Dove Valley
Alignment
27th Ave. Alignment
19th Ave. Alignment
7th Ave. Alignment
Lone Mtn.
Alignment
Dixileta
Alignment
CAP Canal
Key
Study Area
WCMP Limits
Existing 100-Year Floodplain
Low
Medium
High
Disturbed



Habitat Types