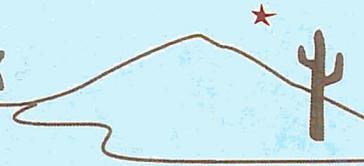


Skunk Creek

Watercourse Master Plan



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



LOGAN SIMPSON
DESIGN INC.



City of Phoenix

ASL

Consulting Engineers

TABLE OF CONTENTS

I. INTRODUCTION.....	1
II. EXISTING VEGETATIVE COMMUNITIES.....	4
1. Unnamed Wash South of Carefree Highway.....	4
2. Skunk Creek South of Carefree Highway.....	6
III. HABITAT QUALITY AND HABITAT TYPES.....	7
1. Habitat Value.....	8
2. Habitat Types.....	9
3. Habitat Values and Habitat Types Within Unnamed Wash Study Area.....	11
4. Habitat Values and Habitat Types Within Skunk Creek Study Area.....	12
5. Summary of Habitat Types and Values.....	12
IV. SENSITIVE SPECIES.....	13
1. Federally Listed Threatened and Endangered Species.....	13
2. Wildlife of Special Concern.....	17
3. Summary of Sensitive Species.....	18
V. RECOMMENDATIONS.....	19
VI. LITERATURE REVIEWED.....	21
VII. COORDINATION.....	23
VIII. APPENDIX.....	24

LIST OF FIGURES

Figure 1.	County Map	2
Figure 2.	Study Area Map	3
Figure 3.	Wash Vegetation Along Unnamed Wash	5
Figure 4.	Embankment Unnamed Wash.....	5
Figure 5.	Cattle Grazing Damage Along Unnamed Wash	5
Figure 6.	Skunk Creek Wash Vegetation	6
Figure 7.	Large Embankment of Skunk Creek.....	6
Figure 8.	Hazardous Materials Source	7
Figure 9.	Type 1 Habitat	9
Figure 10.	Type 1 Habitat	9
Figure 11.	Embankment Along Skunk Creek	10
Figure 12.	Type 3 Habitat Creosote -Bursage Flats	10
Figure 13.	Type 4 Habitat Hillsides and Slopes	11
Figure 14.	Type 5 Habitat Disturbed.....	11
Figure 15.	Semi-riparian Area at Bronco Tank.....	12
Figure 16.	Western Diamondback Rattlesnake	18

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).

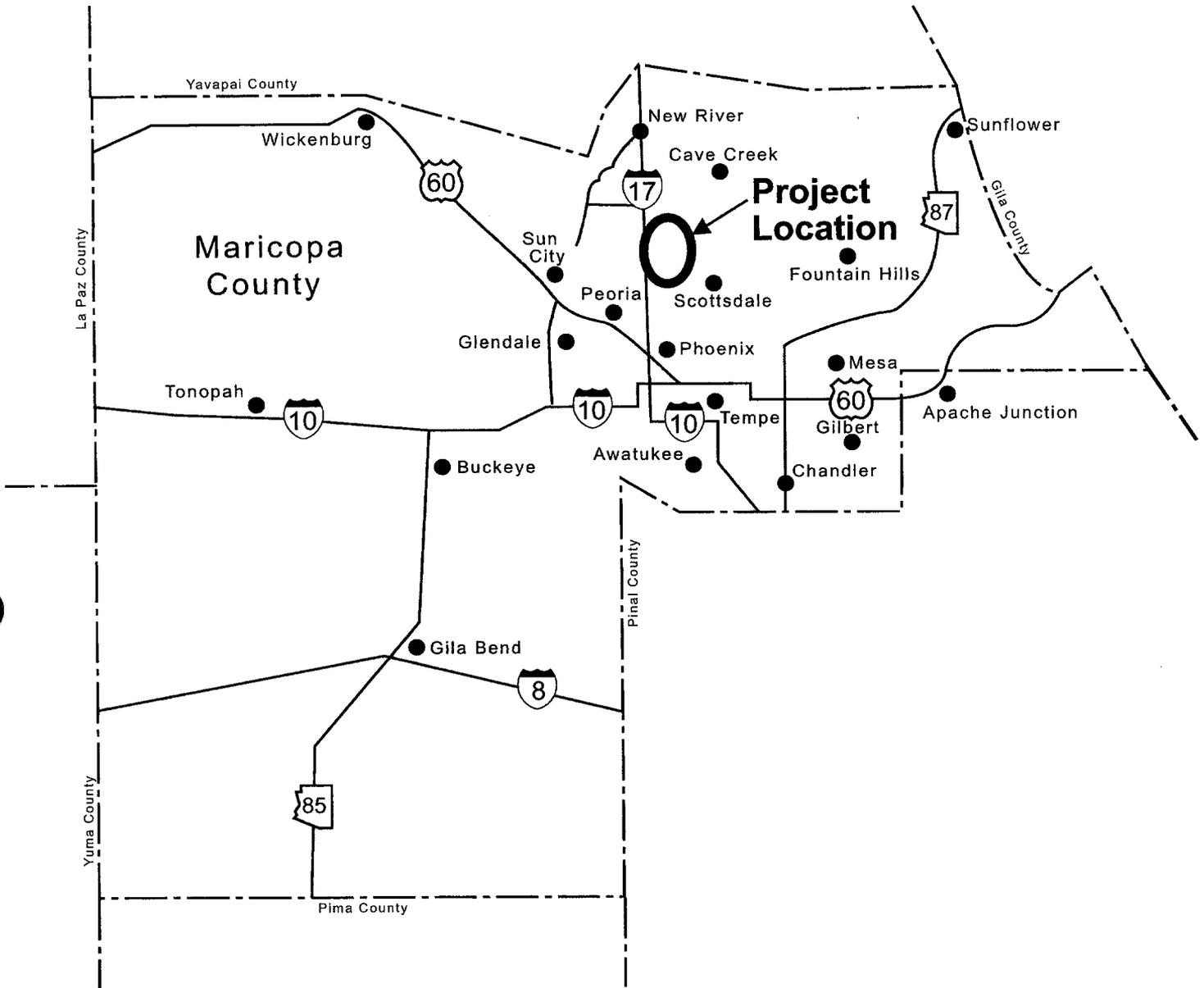
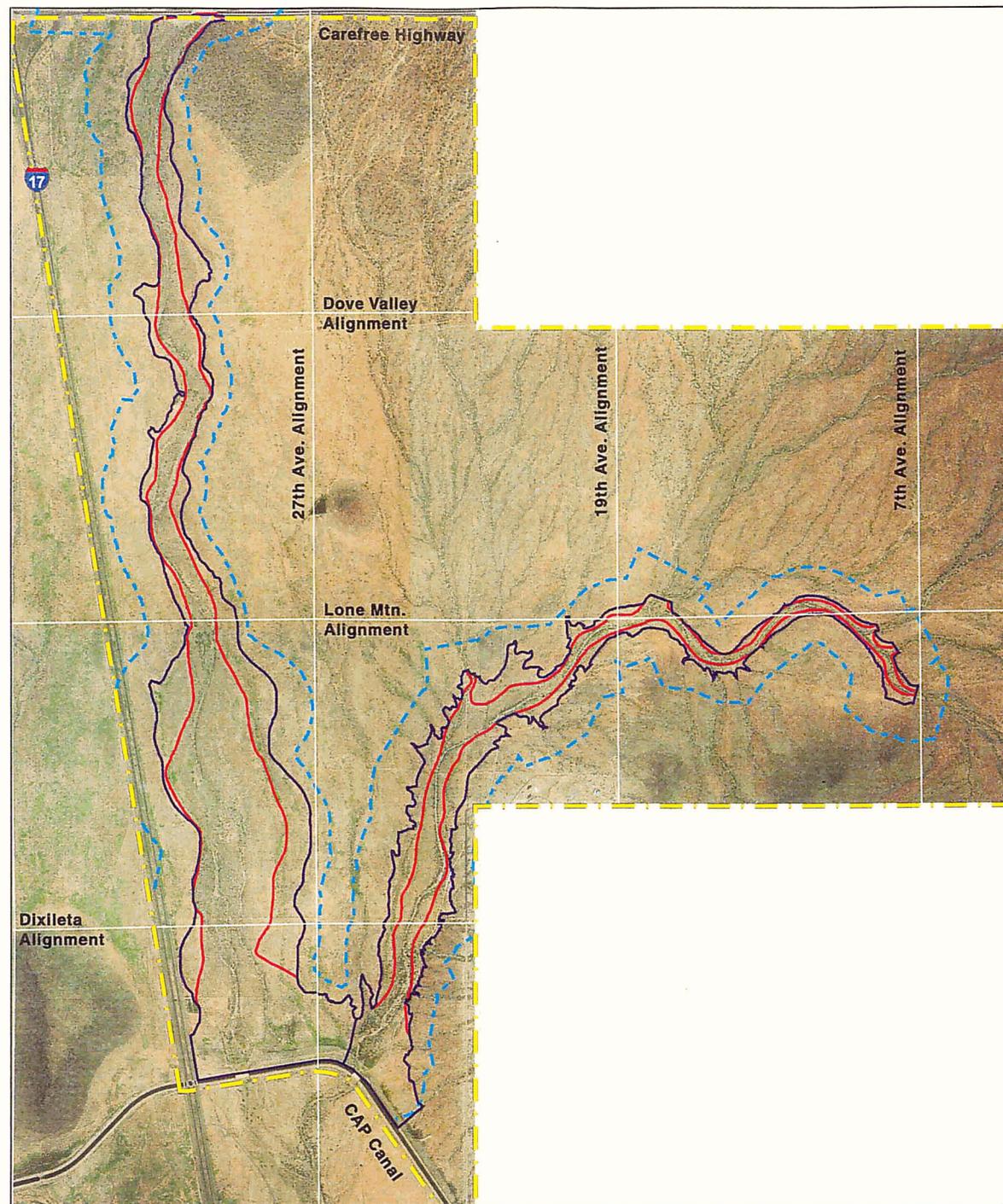


Figure 1. County Location Map





Key

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

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 than the plants along the banks and in the main channel.

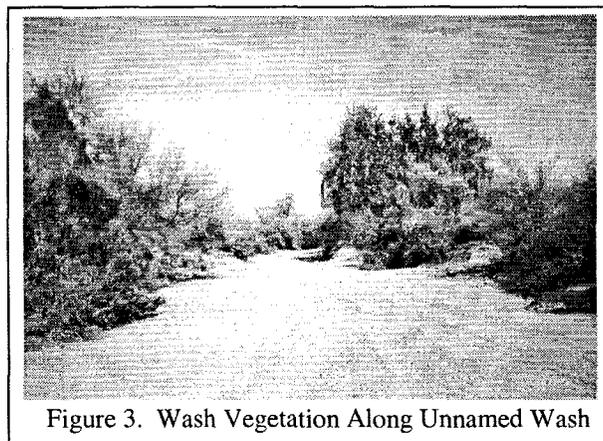


Figure 3. Wash Vegetation Along Unnamed Wash

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.

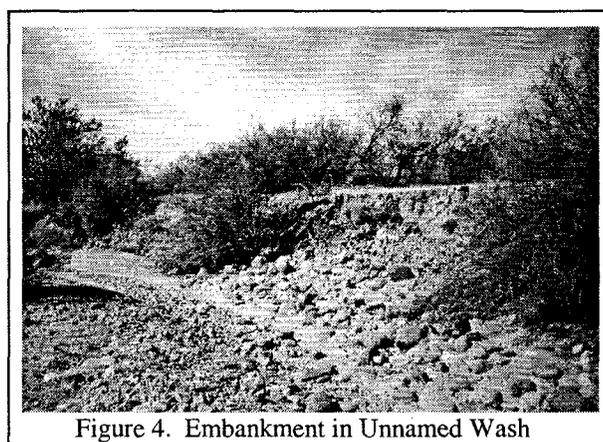


Figure 4. Embankment in Unnamed Wash

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).

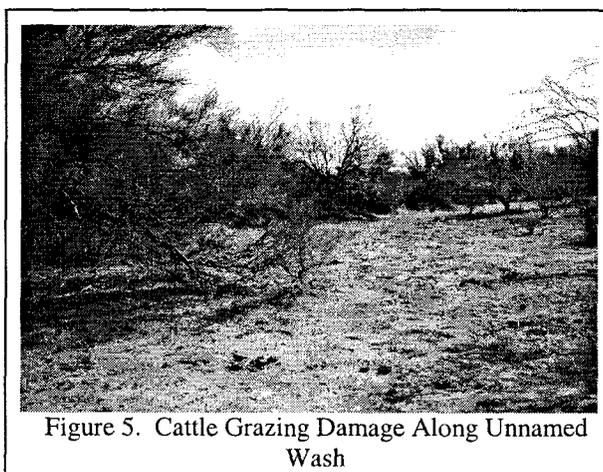


Figure 5. Cattle Grazing Damage Along Unnamed Wash

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.).

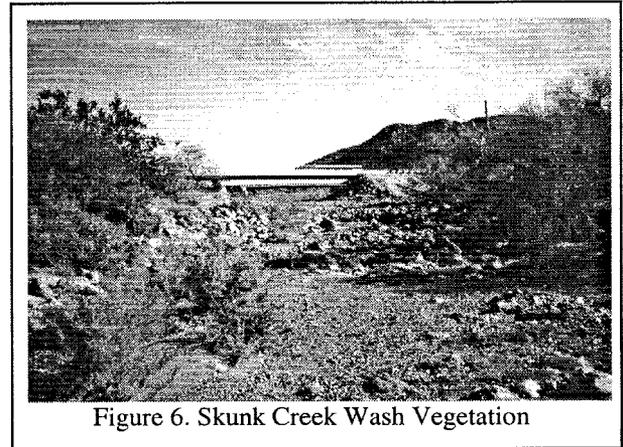


Figure 6. Skunk Creek Wash Vegetation

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 (*Carnegiea gigantea*) offer potential nesting locations for raptors, and other bird species, as well as provide cover for reptiles and mammals.

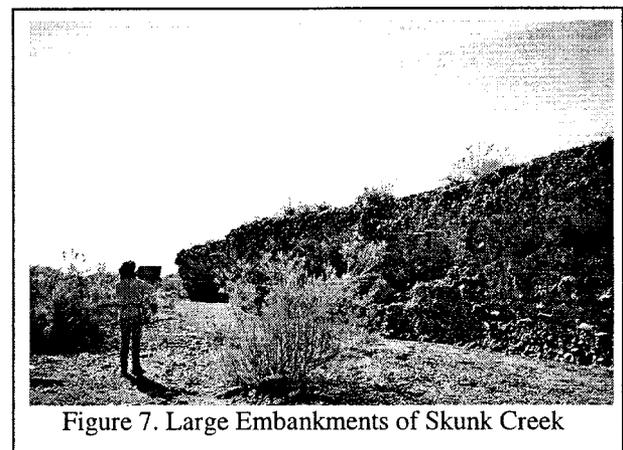


Figure 7. Large Embankments of Skunk Creek

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



Figure 8. Potential Hazardous Materials Concern

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.

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).

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*).

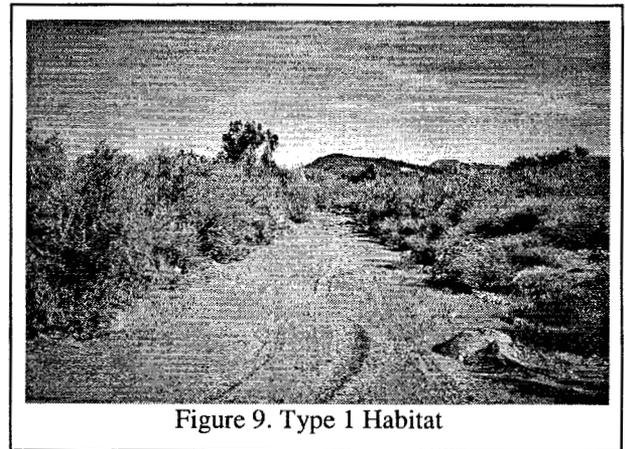


Figure 9. Type 1 Habitat

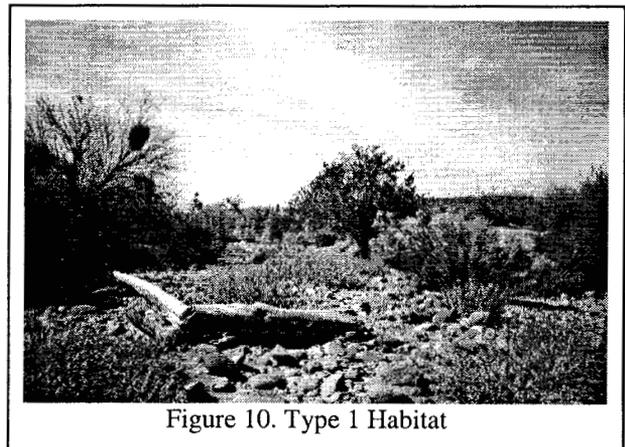


Figure 10. Type 1 Habitat

b. Type 2 Habitat. Wash Vegetation.

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,

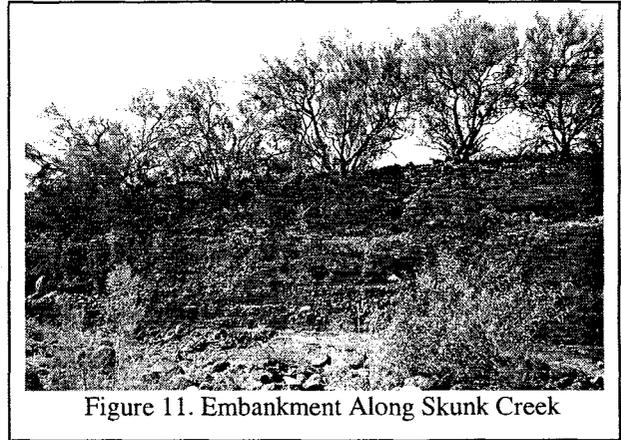


Figure 11. Embankment Along Skunk Creek

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.

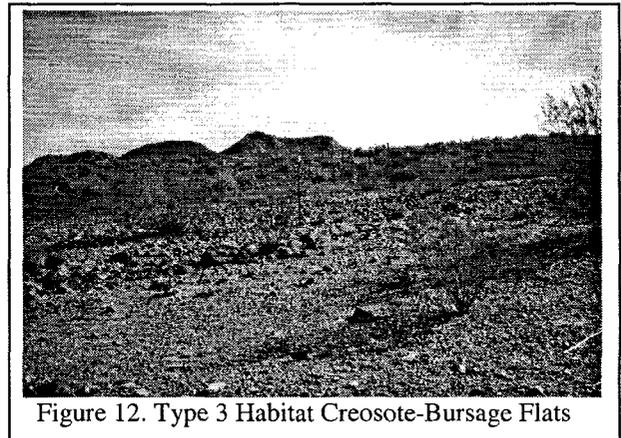


Figure 12. Type 3 Habitat Creosote-Bursage Flats

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.

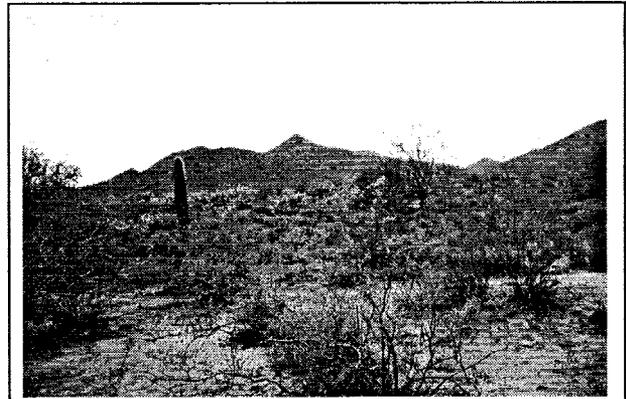


Figure 13. Type 4 Habitat. Hillsides and Slopes

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.

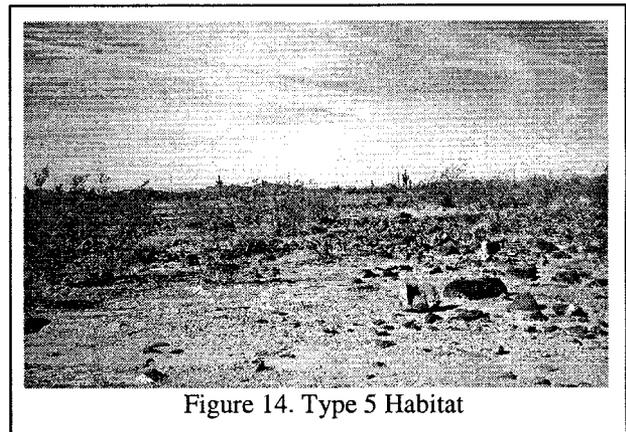


Figure 14. Type 5 Habitat

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

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.

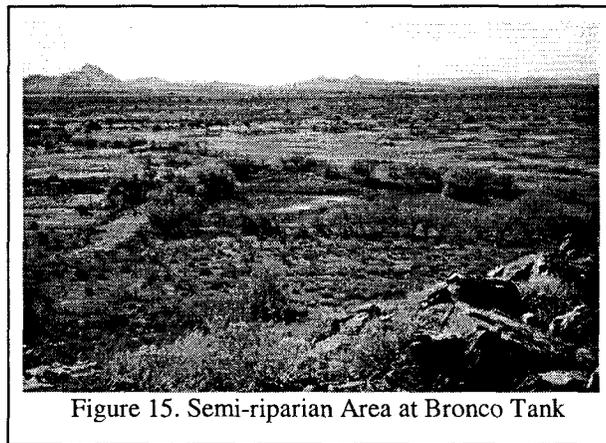


Figure 15. Semi-riparian Area at Bronco Tank

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 feet 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 yerbabuena*)

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 or 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 agassizii*)

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 yerbabuena*), Lowland leopard frog (*Rana yavapaiensis*), and the Sonoran desert tortoise (*Gopherus agassizii*).

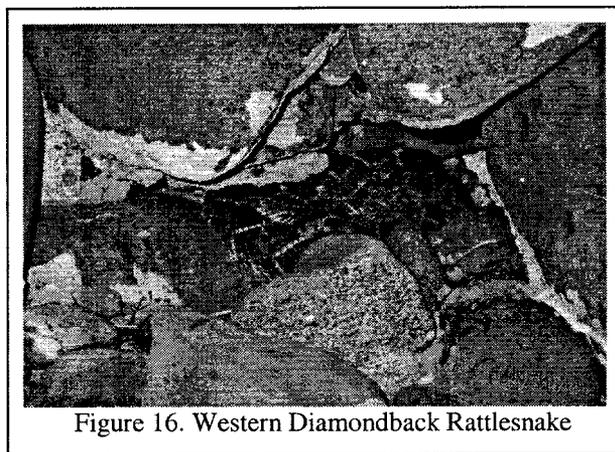


Figure 16. Western Diamondback Rattlesnake

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. *Gopherus 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

VIII. APPENDIX

Field Survey Methodology

Sample Data Sheet

Coordination Letters

Species Lists

Habitat Types

Habitat Values

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.

Observed Plant Species List

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

Observed Wildlife Species List

Mammals

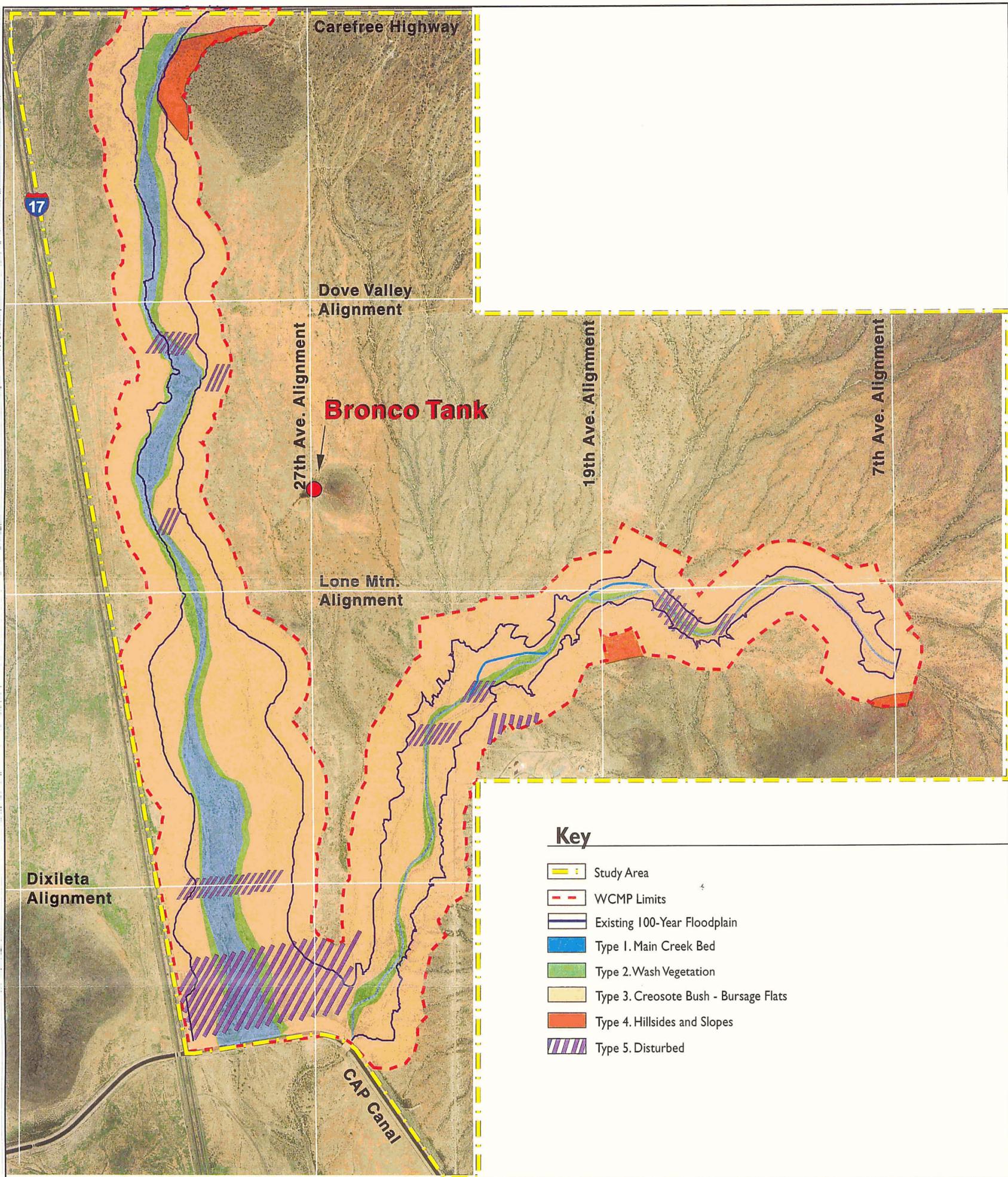
<i>Ammospermophilus harrissii</i>	Harris' antelope squirrel
<i>Canis latrans</i>	Coyote
<i>Lepus californicus</i>	Black-tailed jackrabbit
<i>Lynx rufus</i>	Bobcat
<i>Neotoma</i> sp.	Woodrat
<i>Sylvilagus auduboni</i>	Desert cottontail
<i>Tayassu tajacu</i>	Javalina
<i>Urocyon cinereoargenteus</i>	Gray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

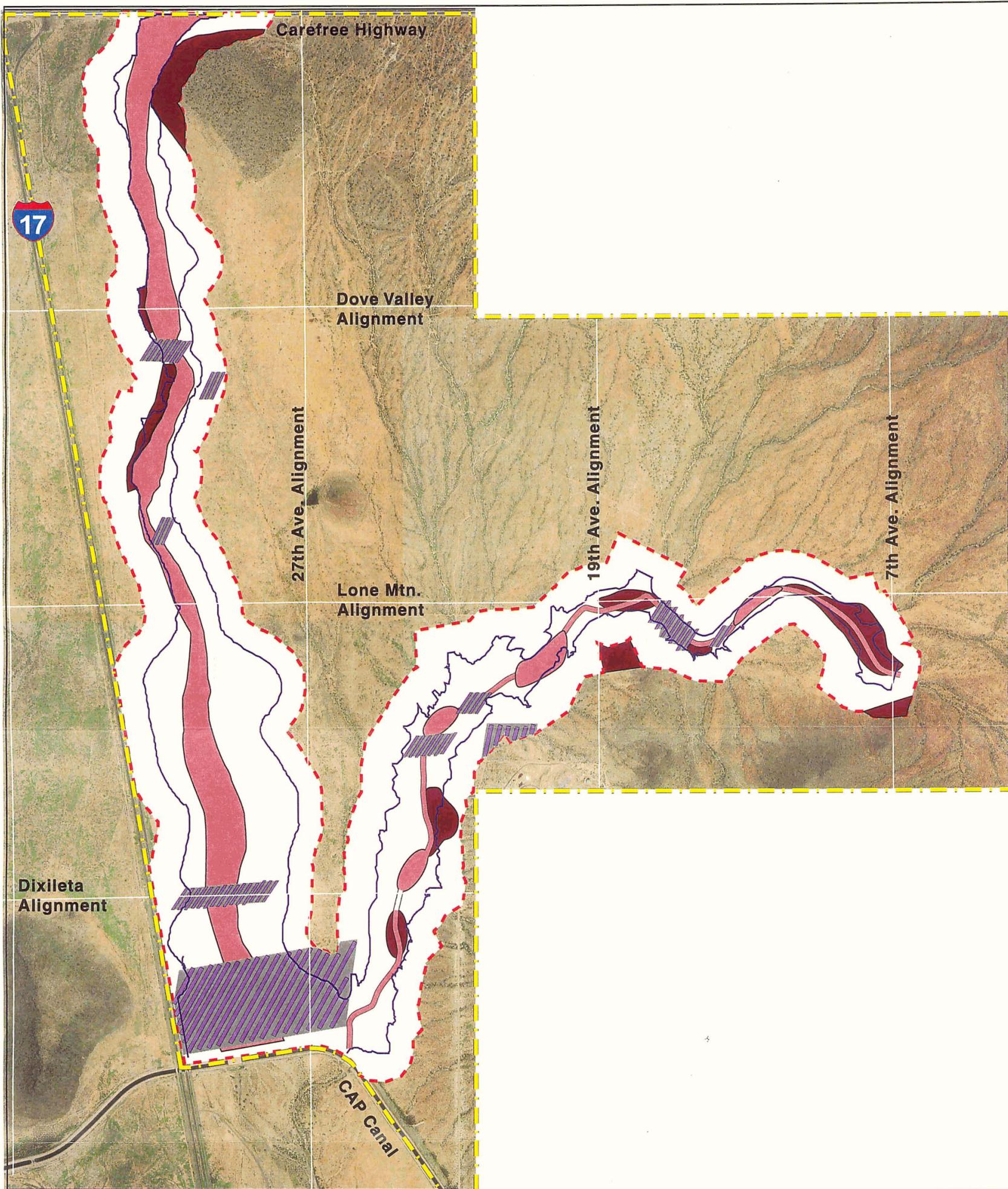
Birds

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

Reptiles

<i>Cnemidophorus tigris</i>	Western whiptail lizard
<i>Crotalus atrox</i>	Western diamondback
<i>Uta stansburiana</i>	Side blotched lizard





Key

- | | |
|---------------------|-----------|
| WCMP Limits | Low |
| 100-Year Floodplain | Medium |
| | High |
| | Disturbed |

Skunk Creek Watercourse Master Plan (Phase II)
Maricopa County, Arizona

**BIOLOGICAL REPORT:
HABITAT EVALUATION**

Skunk Creek

Watercourse Master Plan



Prepared for:



Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009

Prepared by:



Logan Simpson Design Inc.
51 W. Third Street, Suite 450
Tempe, Arizona 85281

JULY 2001

Skunk Creek Watercourse Master Plan (Phase II)
Maricopa County, Arizona

Skunk Creek
Watercourse Master Plan



Prepared for:



Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009

Prepared by:



Logan Simpson Design Inc.
51 W. Third Street, Suite 450
Tempe, Arizona 85281

JULY 2001

Table of Contents

I.	INTRODUCTION.....	1
II.	STUDY AREA.....	1
III.	EXISTING VEGETATIVE COMMUNITIES.....	5
IV.	HABITAT TYPES AND VALUES.....	5
V.	SENSITIVE SPECIES.....	12
VI.	RECOMMENDATIONS.....	16
VII.	LITERATURE REVIEWED	19
VIII.	COORDINATION	21

LIST OF FIGURES

Figure 1.	State Location Map.....	2
Figure 2.	Phase I Study Area.....	3
Figure 3.	Phase II Study Area.....	4
Figure 4.	Features and Landforms Associated with Skunk Creek.....	7

LIST OF APPENDICES

- Appendix A.** Habitat Types
- Appendix B.** Habitat Values
- Appendix C.** Plant and Animal Species Observed
- Appendix D.** Definitions of Habitat Classifications Used in Analysis of Potential Sensitive Species Occurrence
- Appendix E.** Coordination Letter from Arizona Game and Fish Department
- Appendix F.** Field Survey Methods

I. INTRODUCTION

The Flood Control District of Maricopa County (FCDMC) in cooperation with the City of Phoenix is developing a watercourse master plan for Skunk Creek. A watercourse master plan is a comprehensive flood control plan that recommends and evaluates strategies and actions to manage flooding while enhancing the quality of life for the affected community. The consulting firm of Logan Simpson Design Inc. (LSD) is under contract with the FCDMC to conduct a field evaluation of wildlife habitat for the Skunk Creek Watercourse Master Plan (SCWMP) study area and prepare a summary report.

The purpose of this report is to provide biological documentation that may assist in the development of the master plan process by: (1) Identifying current vegetative conditions in the study area; (2) Identifying habitat types and assigning qualitative values to habitat for wildlife overall; (3) Identifying any suitable habitat for sensitive species; and (4) Recommending actions to prevent loss of wildlife and habitat, as well as actions necessary to comply with existing wildlife regulations.

This report was prepared with the cooperation of Arizona Game and Fish Department (AGFD), Arizona State University (ASU), and the FCDMC. Previous studies of the area that provided useful background information include ASU's *North Phoenix Wash Vegetation Study*, and *North Phoenix Wildlife Inventory*. The field evaluation of the study area was conducted in January 2001.

II. STUDY AREA

The SCWMP is located north of Phoenix in northern Maricopa County, Arizona (Figure 1). Skunk Creek is a 29-mile long ephemeral wash that begins north of Phoenix in the New River Mountains, at an elevation of approximately 2,600 feet above mean sea level (MSL). The creek flows in a south and southwesterly direction from the New River Mountains to its confluence with the New River at approximately 1,180 feet above MSL near 83rd Avenue and Thunderbird Road in Peoria.

The SCWMP was divided into two phases that focus on separate segments of Skunk Creek. Phase I included Skunk Creek and an unnamed wash from Carefree Highway south to the Central Arizona Project canal (Figure 2). A habitat evaluation and report for Phase I of the SCWMP was completed by LSD in March 2000. The Phase II study limits consist of the nine-mile section of Skunk Creek north of the Carefree Highway and east of Interstate 17, extending 500 feet outside the Federal Emergency Management Agency (FEMA) 100-year floodplain (Figure 3). This report documents the habitat evaluation for Phase II of the SCWMP.

Within the Phase II study area, Skunk Creek travels in a south-southwesterly direction, dropping in elevation from approximately 2,200 feet at the northern limit of the study area, to approximately 1,745 feet

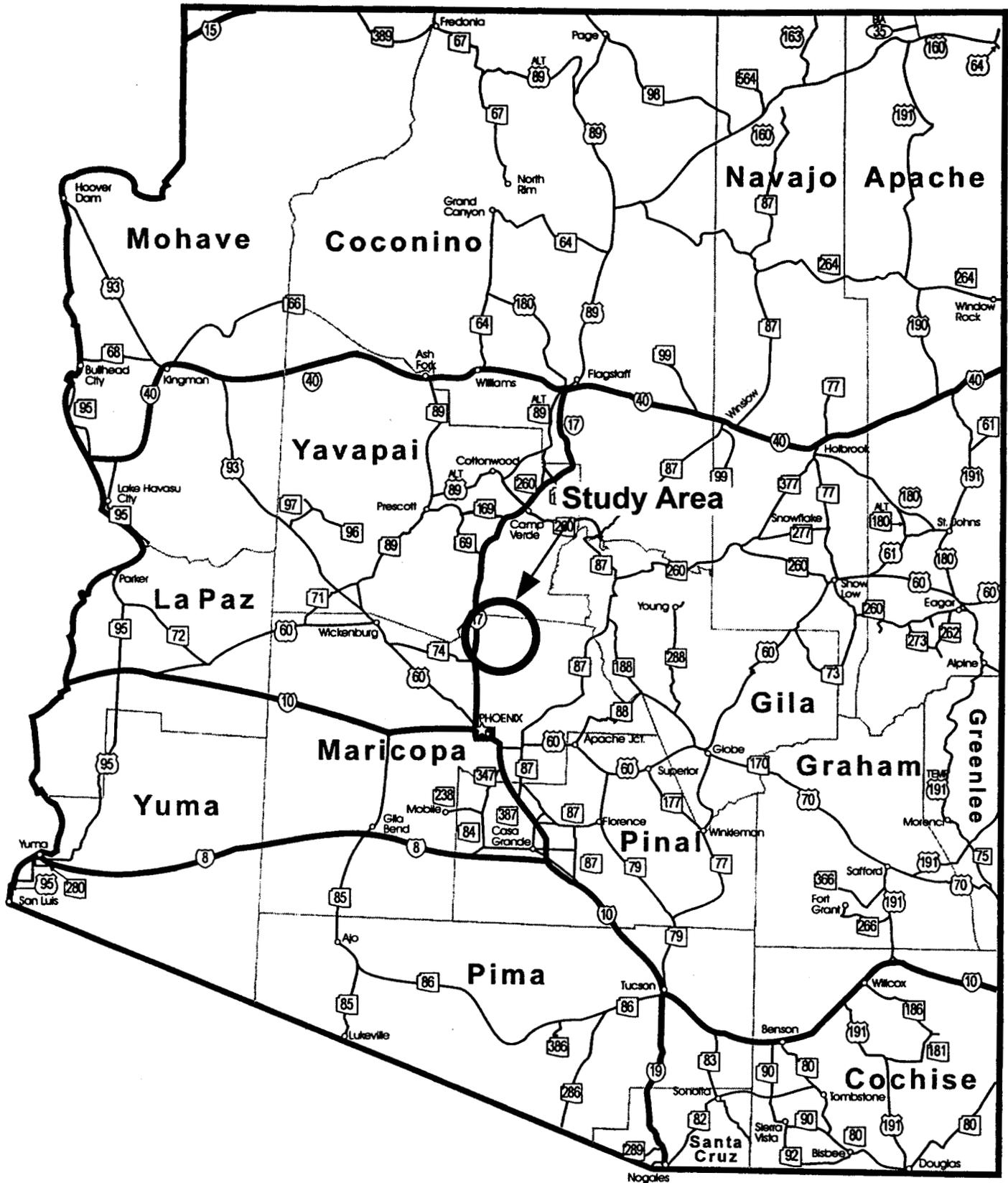
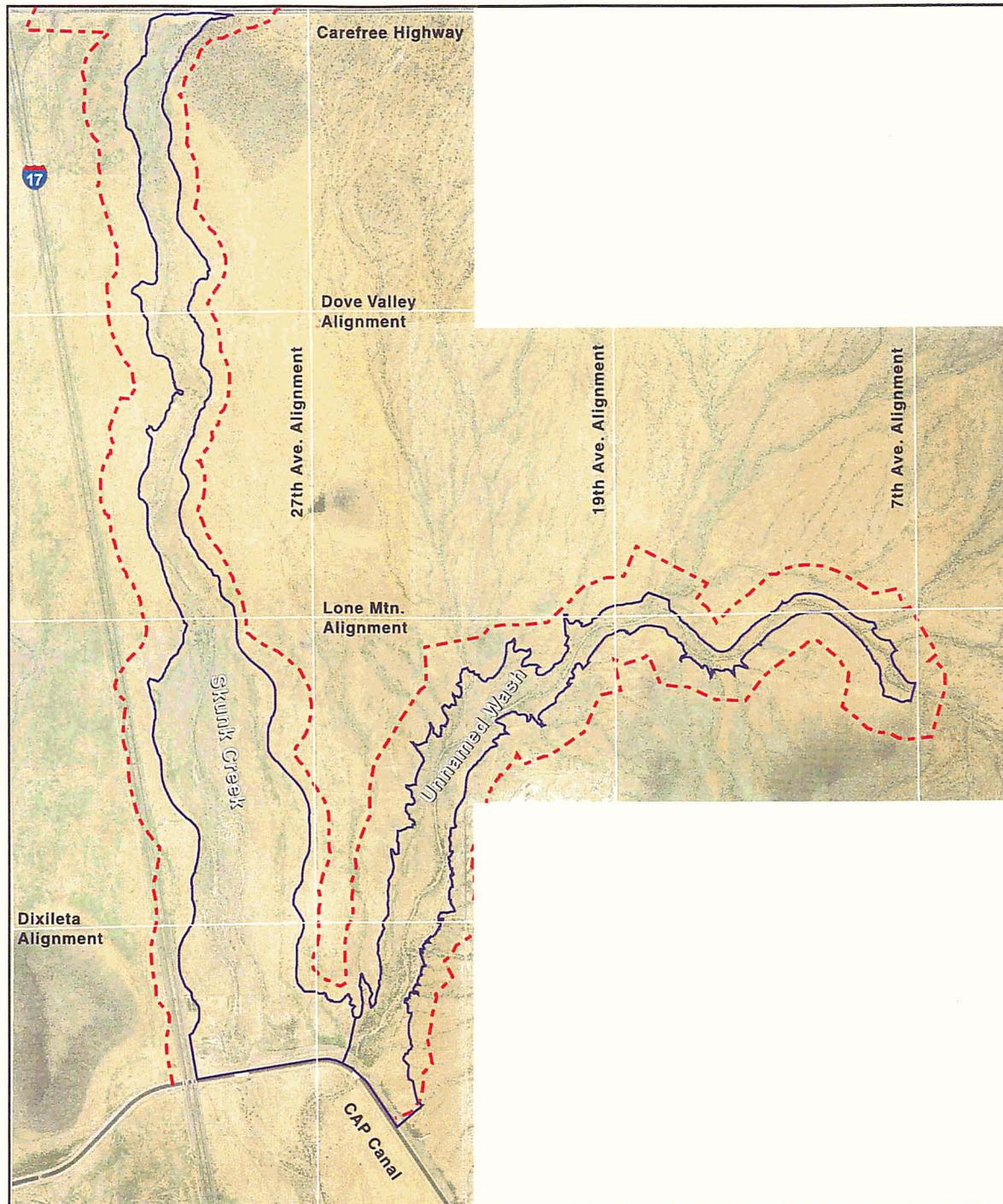


Figure 1. State Location Map



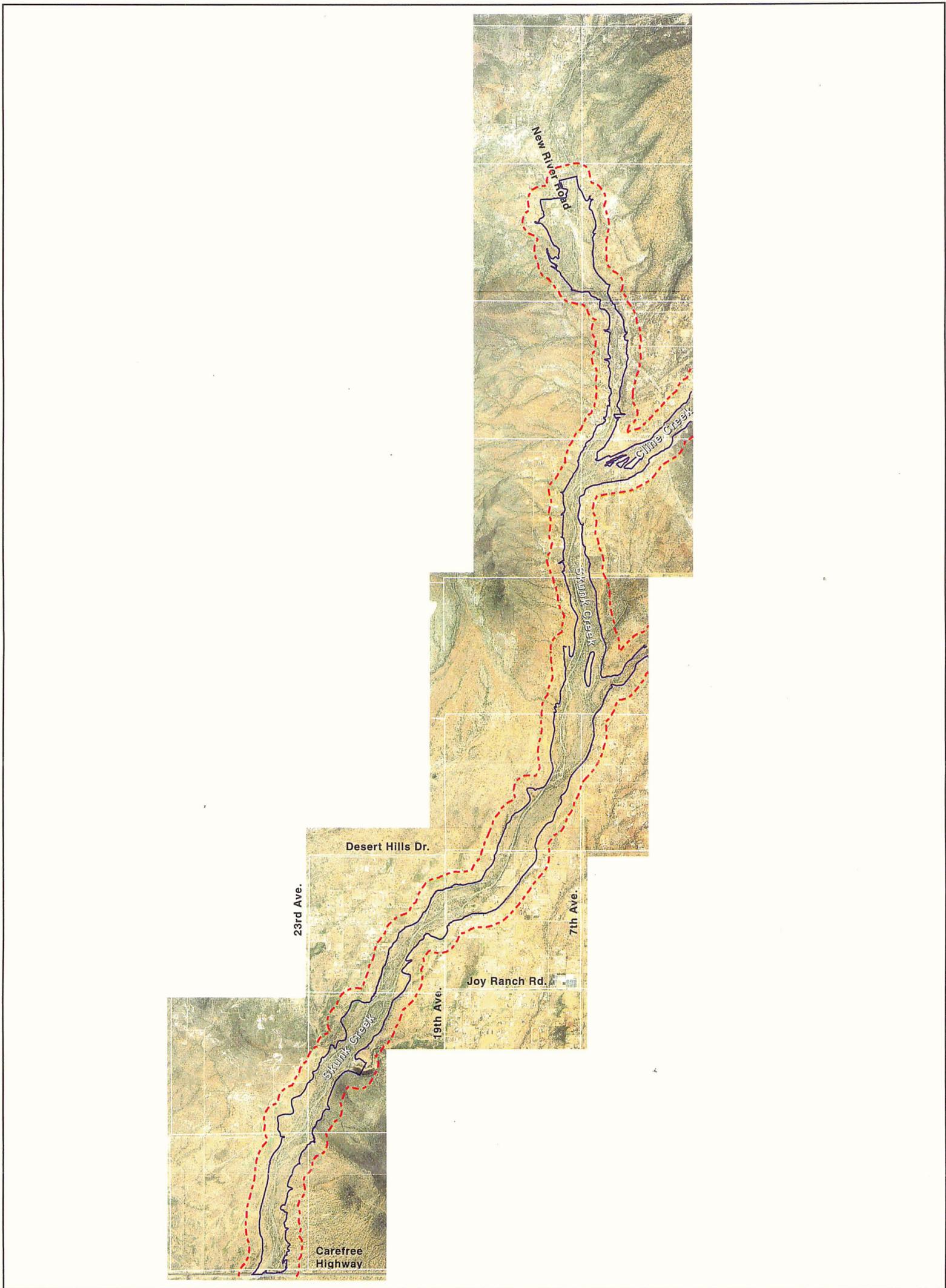


Key

-  Existing 100-Year Floodplain
-  WCMP Limits

Figure 2. Phase I Study Area





Key

- Existing 100-Year Floodplain
- WCMP Limits



Figure 3. Phase II Study Area



at the southern limit. Topography within the study limits varies from rolling hills and steep slopes in some areas, to gentle bajada slopes and flats in others. In the northern portion, Skunk Creek is most often constrained to one channel that is typically narrow and cut deeper into the earth with higher, steeper banks than in the southern portion. In the southern portion, Skunk Creek is typically wider with more gently sloping banks, and often splits into several smaller channels. Substrate in the creek bed is variable from medium to large cobble in some reaches, and fine to coarse sand or small cobble in others.

Within the Phase II study area, the creek bed is relatively undisturbed by human activities, except for a few road crossings and evidence of excavation in one area. However, significant residential and commercial development is evident along the creek in the northern portion of the study area, and construction activities for new housing developments are currently underway in the southern portion. Land ownership within the study area is mostly private, with some Arizona State Trust Lands.

III. EXISTING VEGETATIVE COMMUNITIES

The study area is located within the Arizona Upland subdivision of the Sonoran Desertscrub Biotic Community. This subdivision typically occurs on slopes, broken ground, and multi-dissected sloping plains, and receives the most rainfall of any desertscrub community in North America, averaging between 5 and 10 inches annually.

Generally, vegetation in the Arizona Uplands is dominated by species of leguminous trees, low shrubs, and cacti. Dominant tree species are foothills paloverde (*Cercidium microphyllum*), desert ironwood (*Olneya tesota*), and velvet mesquite (*Prosopis velutina*). Common shrubs include triangle-leaf bursage (*Ambrosia deltoidea*), brittle bush (*Encelia farinosa*) and creosote bush (*Larrea tridentata*); and typical cacti species include buckhorn cholla (*Opuntia acanthocarpa*), Engelmann's prickly pear (*Opuntia engelmannii*), and saguaro (*Carnegiea gigantea*). Substrates generally consist of hyperthermic arid soils with developed layers and low organic matter content. A list of plant and animal species observed in the study area is included in Appendix C.

IV. HABITAT TYPES AND VALUES

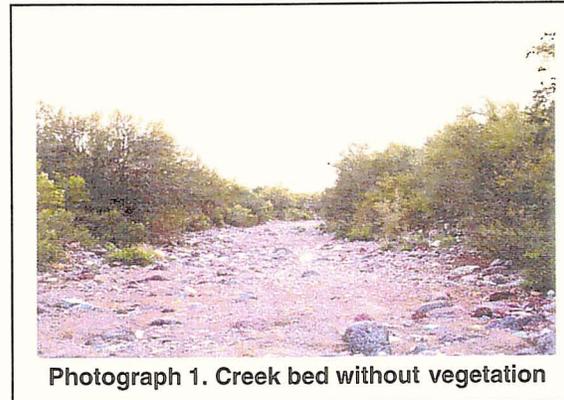
The study area was evaluated in terms of habitat types and habitat values. Habitat types are based on vegetative associations with features of Skunk Creek and other landforms in the study area, or significant human-related disturbance. Habitat value is related to habitat type and refers to the overall suitability of the landscape for wildlife.

1. Habitat Types

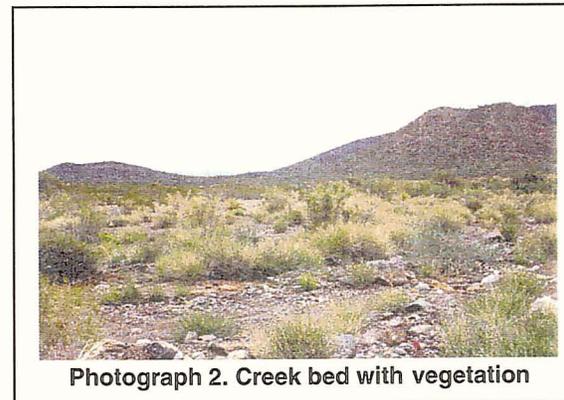
Five basic habitat types were used to categorize habitat, and were based on vegetative associations with features of Skunk Creek and other landforms in the study area (Figure 4), or human influence. These definitions are similar to those employed by ASU in the *North Phoenix Wash Vegetation Study* (1998).

Habitat Type 1. Creek Bed

This habitat type is contained within the channel of Skunk Creek and is characterized by a sandy or rocky substrate. In the creek bed, scouring by floods inhibits the establishment of slower growing shrubs and trees; however, during periods of little to no water flow, or in areas where scouring is less severe, fast growing shrubs and forbs may become established. At the time of the field survey, vegetation in the creek bed was generally sparse or absent in many reaches (Photograph 1), although patches of vegetation did exist in some areas, particularly in the southern portion. These patches were dominated by shrub species such as cheese weed (*Hymenoclea salsola*), burro bush (*Hymenoclea monogyra*), desert broom (*Baccharis sarothroides*), canyon ragweed (*Ambrosia ambrosoides*), and Chuckwalla's delight (*Bebbia juncea*) (Photograph 2).



Photograph 1. Creek bed without vegetation

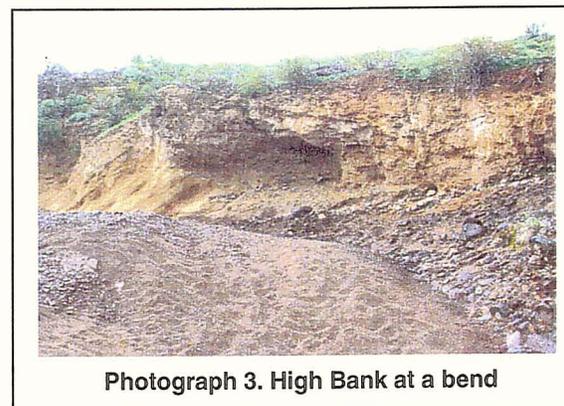


Photograph 2. Creek bed with vegetation

Habitat Type 2. Banks

In desert scrub communities, vegetation along the banks of washes is often more lush than on the floodplain further away from the wash channel, due to increased soil moisture content near the wash. However, this bank vegetation can vary in density, diversity, and structural complexity depending on bank morphology and hydrology of the area.

The banks of Skunk Creek are typically either high with a steep slope, or low with a gentle slope. High banks generally occur where water velocity is greatest, such as on the outside of a bend (Photograph 3), or in reaches where elevation drops rapidly, resulting in a narrow channel that is cut deeper into the earth. Vegetation is



Photograph 3. High Bank at a bend

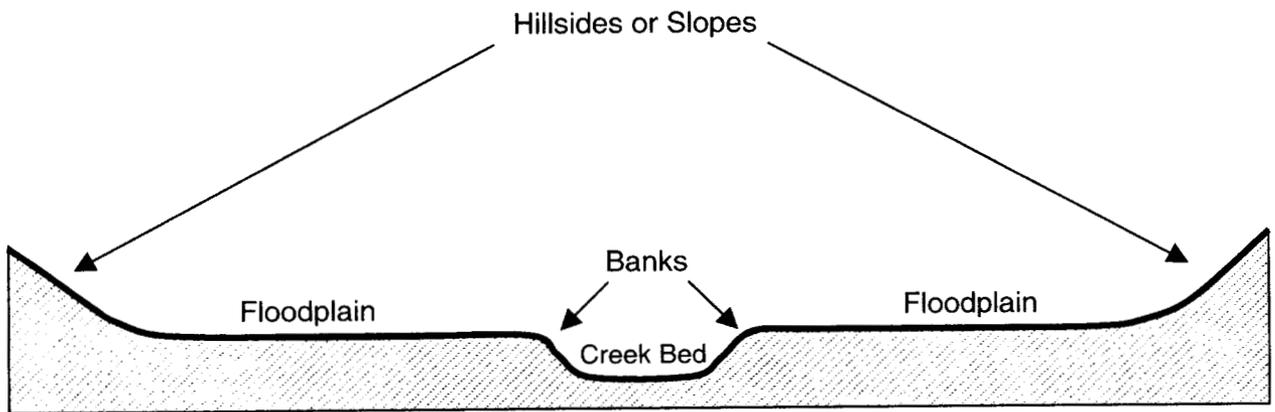


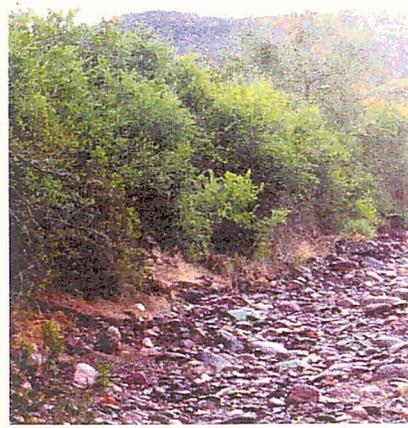
Figure 4. Features and Land Forms Associated with Skunk Creek

typically absent on the higher embankments because of the frequent scouring and almost vertical slopes, whereas the gentler slope of lower banks tend to support more vegetation.

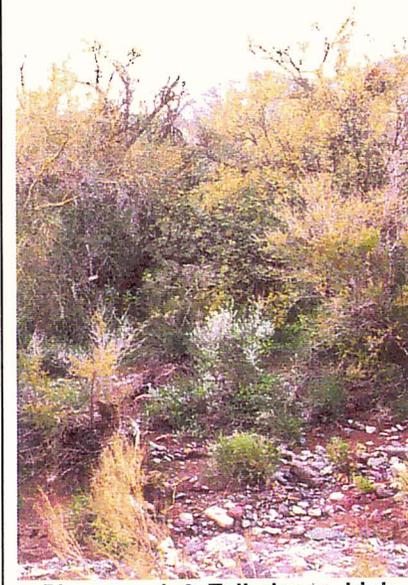
Vegetation on low, gently sloping banks may include short, sparse, low diversity assemblages dominated by species such as triangle-leaf bursage, creosote bush, and brittle bush (Photograph 4). Falling in a middle category is vegetation that is even-height and dense, but consists of few species, and is typically dominated by large shrubs such as desert broom, wolfberry (*Lycium spp.*), or desert hackberry (*Celtis pallida*) (Photograph 5). By contrast, some low banks exhibit vegetation that is relatively tall, dense, diverse, and structurally complex, consisting of a paloverde, ironwood, or mesquite overstory, a midstory of wolfberry, desert hackberry, or cat-claw acacia (*Acacia greggii*), and an understory of canyon ragweed, triangle leaf bursage, brittle bush, or cheese weed, with saguaro occurring nearby (Photograph 6).



Photograph 4. Short, sparse, low diversity bank vegetation



Photograph 5. Even-height, dense, low diversity bank vegetation



Photograph 6. Tall, dense, high diversity and structurally complex bank vegetation

Habitat Type 3. Floodplain

Areas immediately adjacent to the channel typically do not support vegetation as dense or diverse as that along the banks. In some portions of the study area, the floodplain is characterized by flats with low soil moisture that only support low, sparse vegetation dominated by creosote bush and triangle-leaf bursage (Photograph 4, background). In other areas with higher soil moisture, the floodplain exhibits taller, denser, and more diverse vegetation consisting of palo verde, ironwood, saguaro, mesquite, various cholla species, hedgehog cactus (*Echinocereus engelmannii*), brittle bush, and triangle leaf bursage (Photograph 7).



Photograph 7. Floodplain

Habitat Type 4. Hillsides and Slopes

Vegetation on hillsides and slopes within the study area may be similar to that of the floodplain, but generally lacks the density and structural composition of bank vegetation (Photograph 8). Dominant species on hillsides and slopes include triangle-leaf bursage, brittle bush, palo verde, creosote bush, saguaro and various species of cholla. Cacti, especially saguaro and cholla, are typically more abundant on hillsides and slopes than on the floodplain and banks. In addition, the rocky substrate of hillsides and slopes contrasts with the more alluvial substrate of the floodplain.



Photograph 8. Adjacent Hillside

Habitat Type 5. Human-Related Disturbance

Although most of the creek bed within the study area is relatively undisturbed by human activities, approximately 12 road crossings were observed during the field evaluation, and one area appears to have been excavated by heavy equipment. Larger areas of disturbance are mainly due to residences that abut portions of the creek. In these areas, native vegetation has been cleared for houses, driveways, yards, and horse enclosures (Photograph 9).



Photograph 9. Human-related Disturbance

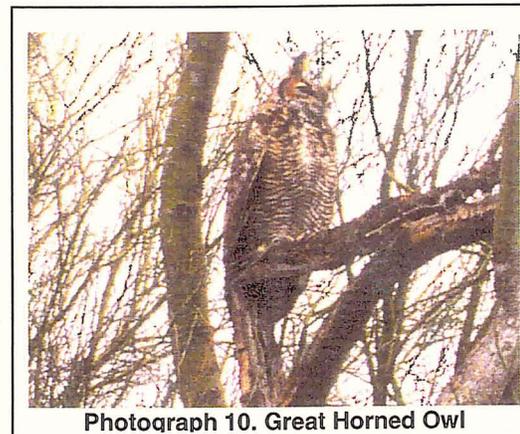
Although most of the human-related disturbance observed in the study area was due to development, evidence of livestock grazing and off-road vehicle use was also observed. However, livestock did not appear to be over-utilizing the area to the point of habitat degradation, and off-road vehicle use was localized (particularly near unimproved road crossings and just south and west of the New River Road Bridge).

2. Habitat Values

Habitat value reflects the suitability of the landscape for overall wildlife. Vegetation characteristics, the presence of landforms such as embankments or adjacent hillsides, and level of disturbance were considered in determining habitat values. Below is a brief summary of the habitat values, followed by a more detailed discussion of the criteria used to assign habitat values.

- **High Value:** Includes at least one of the following characteristics: the presence of large trees, diverse and structurally complex vegetation (tall trees, shrubs, and a ground layer), presence of adjacent hillsides, slopes, or high banks, and abundance of observed wildlife. Typically, the degree of human-related disturbance is little to none.
- **Medium Value:** Characterized by bank or floodplain vegetation that is dense, but less diverse or structurally complex when compared to high quality habitat; may function as a wildlife movement corridor. The degree of human-related disturbance is not significant.
- **Low Value:** Typically characterized by short, sparse, low diversity vegetation on the floodplain away from the channel, or areas where human-related disturbance is significant.

High value habitat includes vegetation that is diverse and structurally complex with tall trees (Photograph 6). This vegetation provides nesting sites, roosts, perches, cover, and foraging opportunities for many bird species, as well as cover and a variety of food sources for a range of wildlife species. These tall trees are especially important for raptors. As an example, five Great Horned Owls were observed day-roosting in larger paloverde trees along the creek during the field evaluation (Photograph 10).



Photograph 10. Great Horned Owl

Landforms such as high banks (photograph 3) or adjacent hillsides and slopes (photograph 8) also provide high value to wildlife. The high banks serve as shelter for small mammals and reptiles in the form of under-

cuts or pockets that result from scouring by flooding events. Hillsides and slopes provide rocky areas that are also important shelter sites for insects, mammals, and reptiles, and generally support a greater number of cacti, especially saguaro and cholla. Cacti provide nesting opportunities for birds, as well as fruits that are eaten by a variety of wildlife species. When hillsides and slopes abut dense wash vegetation, these areas become important for a variety of species that frequently use both habitat types, such as javelina, Gambel's quail, great horned owl, elf owl, western diamondback, and coyote.

Medium value habitats may include dense, even-height, low diversity vegetation (photograph 5) that typically occurs along the banks. This type does provide important food sources and cover for small birds, mammals, and reptiles, as well as nesting and roosting sites for smaller birds; however, these areas generally do not support as many animal species as the more structurally complex vegetation.

Areas that lack foraging opportunities, shelter, or breeding sites, but can function as movement corridors, such as the creek bed (photograph 1) are also of medium value. In the Sonoran Desert, ephemeral watercourse channels often serve as "natural highways" for wildlife, particularly Sonoran desert tortoises and larger mammal species such as javelina, mule deer, bobcats, and coyotes, which use watercourse channels as movement corridors in their foraging routines, or for dispersal.

Low value habitat includes open areas characterized by sparse, short, or monotypic vegetation (Photograph 4). Although some animals are specialized for such environments (e.g. kangaroo rats or whiptail lizards), these areas are of low value to many wildlife species because key components such as nesting or breeding sites, shelter, or a variety of food sources are lacking.

Disturbance can be an inherent ecosystem function (such as flooding, drought, and fire), or human-related (such as development, heavy livestock grazing, and off-road vehicle misuse). Human-related disturbances are most often longer-lived than disturbances inherent to the ecosystem, and recovery (succession) from human-related disturbance (such as development) generally takes longer. Areas that are significantly disturbed by human-related activities are of low value to most wildlife species (Photograph 9). Although it is important to note that some species are associated with such disturbance, in arid ecosystems, habitat value for wildlife overall generally decreases as the level of human-related disturbance increases.

3. Summary of Habitat Types and Values within the Study Area

The creek bed was assigned a habitat value of medium due to its importance as a movement corridor, unless the channel showed signs of significant human-related disturbance that would cause wildlife to avoid the area, such as road crossings.

Banks could be low, medium, or high value depending on bank morphology, or density, diversity, and structural complexity of vegetation. Areas where creosote bush-bursage was prevalent along banks were assigned a value of low. Bank vegetation consisting of dense, but even-height growths of large shrubs or small trees was given a value of medium. Structurally complex bank vegetation that is diverse and relatively dense was assigned a high value.

Creosote bush-bursage dominated floodplain was given a low value, whereas areas of the floodplain exhibiting tall, dense, more diverse vegetation were given a value of medium. Hillsides or slopes that were immediately adjacent to the creek were also given a high value. Areas significantly disturbed by human activities were given a low value.

V. SENSITIVE SPECIES

1. Federally Listed Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) list of federally Threatened, Endangered, Proposed, and Candidate species occurring in Maricopa County was reviewed. The following is a brief summary of each species that includes its status, habitat requirements, and an analysis of potential occurrence within the study area. The results of the analysis for these species are based on the following classifications: *No Suitable Habitat Present*, *Suitable Habitat Present*, or *Suitable Occupied Habitat Present*. Definitions of these classifications can be found in Appendix D.

Arizona Agave (*Agave arizonica*)

Status: Endangered

Habitat: Native to a small area in central Arizona (New River Mountains and Sierra Anches) usually found on steep, rocky slopes from 3,600-5,800 feet above MSL in transitions between Oak-juniper Woodlands to Mountain Mahogany-oak Scrub.

Analysis: *No Suitable Habitat.*

Arizona Cliffrose (*Purshia subintegra*)

Status: Endangered

Habitat: Associated with white soils of Tertiary limestone lakebed deposits from 2,500-4,000 feet above MSL.

Analysis: *No Suitable Habitat.*

Arizona Hedgehog Cactus (*Echinocereus triglochidiatus arizonicus*)

Status: Endangered

Habitat: Rugged, steep granite and dacite rock formations from 3,400-5,700 feet above MSL.

Analysis: *No Suitable Habitat.*

Bald Eagle (*Haliaeetus leucocephalus*)

Status: Threatened

Habitat: Areas near large, permanent water sources such as rivers or reservoirs with tall trees or cliffs that serve as perches with unimpeded views. In Arizona, Bald Eagles have been observed at elevations from 460-7,930 feet above MSL.

Analysis: *No Suitable Habitat.*

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

Status: Endangered

Habitat: Mature cottonwood/willow woodlands, mesquite bosques, xeroriparian Sonoran Desertscrub, or wooded drainages within semi-desert grassland below 4,000 feet above MSL.

Analysis: *Suitable Habitat Present.* The study area contains xeroriparian Sonoran Desertscrub, and historical records indicate that Pygmy-owls occurred as far north as New River.

Desert Pupfish (*Cyprinodon macularius*)

Status: Endangered

Habitat: Shallow clear-water springs, small streams, and marshes of the lower Gila River basin having soft substrates below 4,920 feet above MSL.

Analysis: *No Suitable Habitat.* There are no permanent sources of water within the study area.

Gila Topminnow (*Poeciliopsis occidentalis occidentalis*)

Status: Endangered

Habitat: Small streams, springs, and cienegas within the Gila River drainage below 4,500 feet above MSL.

Analysis: *No Suitable Habitat.* There are no permanent sources of water within the study area.

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

Status: Endangered

Habitat: Desertscrub, grasslands, and oak communities below 3,500 feet above MSL from April to July and up to 5,500 feet from July to late September. Usually found in association with columnar cacti and/or agave. Maternity and day roosts are typically caves or abandoned mine tunnels.

Analysis: *Suitable Habitat Present.* There are two late-summer records of two individuals in the Phoenix area, and the study area contains columnar cacti (saguaro). However, occurrences are unlikely because the study area is located outside the bats normal range.

Mexican Spotted Owl (*Strix occidentalis lucida*)

Status: Threatened

Habitat: Statewide in old growth, mixed-conifer or pine-oak forests on steep slopes from 3,700 to 10,000 feet above MSL, but can also be found in canyons or ravines with little vegetation.

Analysis: *No Suitable Habitat.*

Razorback Sucker (*Xyrauchen texanus*)

Status: Endangered

Habitat: Medium to large rivers and reservoirs of the Colorado River basin below 6,000 feet above MSL.

Analysis: *No Suitable Habitat.* There are no permanent sources of water within the study area.

Sonoran Pronghorn (*Antilocapra americana sonoriensis*)

Status: Endangered

Habitat: This subspecies of pronghorn occupies broad, intermountain alluvial valleys south of the Gila River that contain creosote-bursage and paloverde-cacti mix from 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: Statewide in dense riparian vegetation near a semi-permanent source of water or saturated soil from near MSL to 8,530 feet above MSL.

Analysis: *No Suitable Habitat.*

Yuma Clapper Rail (*Rallus longirostris yumanensis*)

Status: Endangered

Habitat: Dense, emergent vegetation in marsh-type habitats in lower Colorado drainage below 1,300 feet above MSL.

Analysis: *No Suitable Habitat.*

2. Other Special Status Species

A list of special status species documented as occurring in or near the study area was obtained from the Arizona Game and Fish Department (AGFD). This list includes AGFD Wildlife species of Special Concern in Arizona (WSCA), as well as plants that are Highly Safeguarded under the Arizona Native Plant Law. A copy of this list is included in Appendix E.

The following is a brief analysis of each species that includes its status, habitat requirements, and an analysis of occurrence or potential occurrence within the study area. The results of the analysis for these species are based on the following classifications: *No Suitable Habitat Present*, *Suitable Habitat Present*, or *Suitable Occupied Habitat Present*. Definitions of these classifications can be found in Appendix D.

Lowland Leopard Frog (*Rana yavapaiensis*)

Status: WSCA

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

Analysis: *No Suitable Habitat.* There are no permanent sources of water within the study area

Hohokam Agave (*Agave murpheyi*)

Status: Arizona Native Plant Law, Highly Safeguarded

Habitat: Well-drained soil on benches or terraces on gentle bajada slopes above major drainages from 1,300 - 2,400 feet above MSL. Typically associated with prehistoric habitations and/or agricultural sites suggesting tending.

Analysis: *Suitable Habitat Present (marginal).*

Sonoran Desert Tortoise (*Gopherus agassizii*)

Status: WSCA

Habitat: The Sonoran population occurs south and east of the Colorado River, inhabiting the bajadas and rocky slopes of Sonoran desertscrub from 520 feet to 5,330 feet above MSL.

Analysis: *Suitable Habitat Present.* The Sonoran desert tortoise has been documented as occurring in the vicinity, and the hillsides, slopes, and high banks of Skunk Creek provide suitable habitat for the tortoise.

VI. RECOMMENDATIONS

Based on the field reconnaissance surveys and coordination with AGFD, FCDMC, ASU, and USFWS, the following are recommended:

1. Flood Control Alternatives

(a) A non structural alternative is preferred over a full-structural alternative with respect to wildlife and habitat preservation because a non structural alternative would likely result in the least disturbance to habitat. A non structural alternative would include acquiring property, implementing buffer zones, or developing land-use ordinances that prohibit further encroachment into the study area.

(b) Since encroachment into the FEMA100-year floodplain has already occurred, some flood control structures would likely need to be implemented. However, it is recommended that only those structures necessary to restore existing grades or protect existing residents be implemented, and that a non structural alternative should be implemented throughout the remainder of the study area. Such a "partial-structural" alternative would meet the goal of protecting existing residents, while allowing a greater portion of Skunk Creek to be sustained in its natural state when compared to a full-structural alternative. Ideally, further encroachment should not be allowed within the study area (i.e. 500 feet outside of the 100-year floodplain), since this would preserve the greatest amount of habitat along Skunk Creek. Minimally, encroachment should not be allowed within the 100-year floodplain, which would at least preserve most high value habitat along the banks, and maintain the channel as a movement corridor.

(c) Preserve as much high value habitat within the study area by preferentially placing flood control structures in areas of low or medium habitat value whenever practicable. Regardless of the flood control structure or its location, the structure should be designed to allow or accommodate native vegetation substrates. The types, quantity, and structure of vegetation and substrate should maximize habitat value and minimize maintenance while allowing the flood control aspects of the structure to function properly and safely. If channelization of the creek bed is necessary, allow the creek to follow its natural flow path using a non-concrete alternative, such as cobble banks anchored by wire mesh with free cobble over the top, and bank slopes of no more than 30 degrees. If flood control structures such as dikes or berms are necessary, earthen berms constructed on the floodplain should be preferred. These berms could be vegetated with native species to mitigate for vegetation lost during construction of the berms, as well as prevent future erosion of the berms.

(d) Flood control structures should maintain the continuity of the channel as a movement corridor; therefore, dams other structures constituting a barrier to wildlife movement should not be constructed in the channel. Furthermore, roads crossing Skunk Creek should be either at-grade with the creek bed, or elevated sufficiently above the creek bed to allow bridges or culverts that are tall enough and wide enough to allow movement of animals as large as mule deer to pass through. Bridges are preferable to box culverts, and pipe culverts are not recommended. The inside height of a bridge or box culvert should ideally be 14 feet, but no less than 8 feet, as should be the inside widths between bridge pilings or culvert walls. The floor of the bridge or culvert should be a native substrate.

2. Sensitive Species

(a) Prior to the implementation of any structural flood management solutions, surveys following appropriate protocols may be required in suitable habitat for species federally listed under the Endangered Species Act. The study area contains suitable habitat for the Cactus Ferruginous Pygmy-owl and Lesser Long-nosed Bat; therefore, a formal Biological Evaluation would need to be prepared if suitable habitat would be affected, and informal consultation with the USFWS would be necessary to determine if surveys for these species are required.

Because the study area is considered outside the normal range of the Lesser Long-nosed Bat, the USFWS would likely not require surveys for this species. Surveys for the Cactus Ferruginous Pygmy-owl (CFPO) would likely be required before construction activities begin. The USFWS has identified three survey zones based on potential CFPO presence within suitable habitat, and the study area is located within Zone 3, which includes areas within the historic range of the CFPO with a low potential of occupancy. Therefore, the USFWS may require up to two years of CFPO surveys (consisting of three spring surveys and two fall surveys for each year) before construction begins; however, the duration and number of CFPO surveys

required is dependent on the expected level or risk of "take", which is decided on a case by case basis. Depending on the determination of the Biological Evaluation and results of the surveys, formal Section 7 consultation with USFWS may also be required.

(b) Suitable habitat exists in the study area for the Sonoran Desert Tortoise, a WSCA species, and Desert Tortoises are known to occur in the area; therefore, surveys are recommended prior to construction activities. Tortoises found during the survey could be relocated prior to construction in order to prevent loss of individuals.

(c) Marginally suitable habitat exists in the study area for the Hohokam agave, a plant that is Highly Safeguarded under the Arizona Native Plant Law. The Arizona Native Plant Law also affords some protection to many of the native plants occurring within the study area, and some of these plants will likely be impacted by the project. The Arizona Department of Agriculture should be contacted in order to determine actions necessary to comply with the Arizona Native Plant Law. Actions would likely include conducting a native plant survey, and notifying the Arizona Department of Agriculture at least 60 days prior to construction so that permitted commercial salvagers would be allowed the opportunity to remove and salvage these plants.

(d) The Migratory Bird Treaty Act (MBTA) protects more than 800 species of migratory birds, or almost every common wild bird found in the United States. Of the 26 bird species observed during the field evaluation, 24 are protected under the MBTA. The MBTA prohibits "take" of migratory birds, which is in part defined as "to pursue, hunt, take, capture, kill, attempt to take, capture, or kill...any migratory bird, any part, nest, or eggs of any such bird", but does not include habitat alteration. Unlike the Endangered Species Act, existing MBTA permit regulations do not authorize "incidental take" (take that results from, but is not the purpose of, the activity in question).

Most of the bird species observed during the field evaluation would likely nest along Skunk Creek. In addition, migrants that winter south of the U.S.-Mexican Border, but migrate to the U.S. in the spring to breed (e.g. Bell's Vireo and Lucy's Warbler) could also nest along Skunk Creek. Construction of flood control structures would likely result in removal of vegetation, and if birds protected under the MBTA were nesting in this vegetation, removal would likely result in incidental take by destroying nests and/or eggs, killing nestlings or fledglings, or causing nest abandonment. According to the USFWS, there are three options available to comply with the MBTA: 1) Prohibit clearing of any vegetation where protected birds are nesting, 2) Limit construction to the non-breeding season, or 3) Conduct a nest search of vegetation that would be cleared, and allow permitted wildlife rehabilitators to collect nests, eggs, or young that are found.

Prohibiting vegetation removal is likely not practicable, and limiting construction to the non-breeding season would also be difficult, since breeding seasons for species vary, and some birds (e.g. Mourning Dove) nest year-round. However, limiting vegetation removal to the non-breeding season for a majority of birds would have the least potential for take of birds protected under the MBTA. Therefore, it is recommended that: 1) Removal of vegetation should be prohibited during the breeding season of most birds (March through August); 2) Prior to vegetation removal (regardless of season), a nest search of the vegetation should be conducted to determine if nests are present; and 3) A permitted wildlife rehabilitator should be contacted to collect any nests, eggs, nestlings, or fledglings found.

VII. LITERATURE REVIEWED

- Allan, J. D. 1995. Stream Ecology, Structure and Function of Running Waters. Chapman and Hall, London, England.
- Arizona Game and Fish Department. 1996. *Gopherus Agassizii*. Herp Diversity Review. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.
- Arizona Game and Fish Department and U.S. Fish and Wildlife Service. 2000. Cactus Ferruginous Pygmy-owl Survey Protocol.
- _____. 1996. *Rana yavapaiensis*. Herp Diversity Review. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.
- _____. 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.
- _____. 1998. *Glaucidium brasilianum 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.
- Arizona State University. 1998. North Phoenix Wash Vegetation Study. Prepared for the City of Phoenix by the College of Architecture and Environmental Design, School of Planning and Landscape Architecture.
- Arizona State University. 1999. North Phoenix Wildlife Inventory. Prepared for the City of Phoenix by the College of Architecture and Environmental Design, School of Planning and Landscape Architecture.
- Brown, D.E., Editor. 1994. *Biotic Communities: Southwestern United States and Northwestern Mexico*. University of Utah Press, Salt Lake City, Utah.
- Logan Simpson Design, Inc. 2000. Biological Report: Relative Habitat Evaluation, Skunk Creek Watercourse Master Plan, Maricopa County, Arizona.
- Maricopa County Flood Control District. 2001. Upper Cave Creek/Apache Wash Watercourse Master Plan Technical Summary, Maricopa County, Arizona.
- Reed, Dale F., Woodard, Thomas N., and Pojar, Thomas M. 1975. Behavioral Response of Mule Deer to a Highway Underpass. *Journal of Wildlife Management*. 39(2):361-367.
- U.S. Fish and Wildlife Service. 1995. Lesser Long-nosed Bat Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 45 pp
- _____. 1999. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Cactus Ferruginous Pygmy-owl (*Glaucidium brasilianum cactorum*). *Federal Register* 64 (132):37419-37440.

VIII. COORDINATION

Arizona Game and Fish Department

Sabra Schwartz, HDMS Coordinator, Phoenix Office

Arizona State University

Joseph Ewan, Assistant Professor, Herberger Center, Main Campus

Dr. William Miller, Professor, East Campus

Maricopa County Flood Control District

Theresa Hoff, Environmental Planner/Biologist

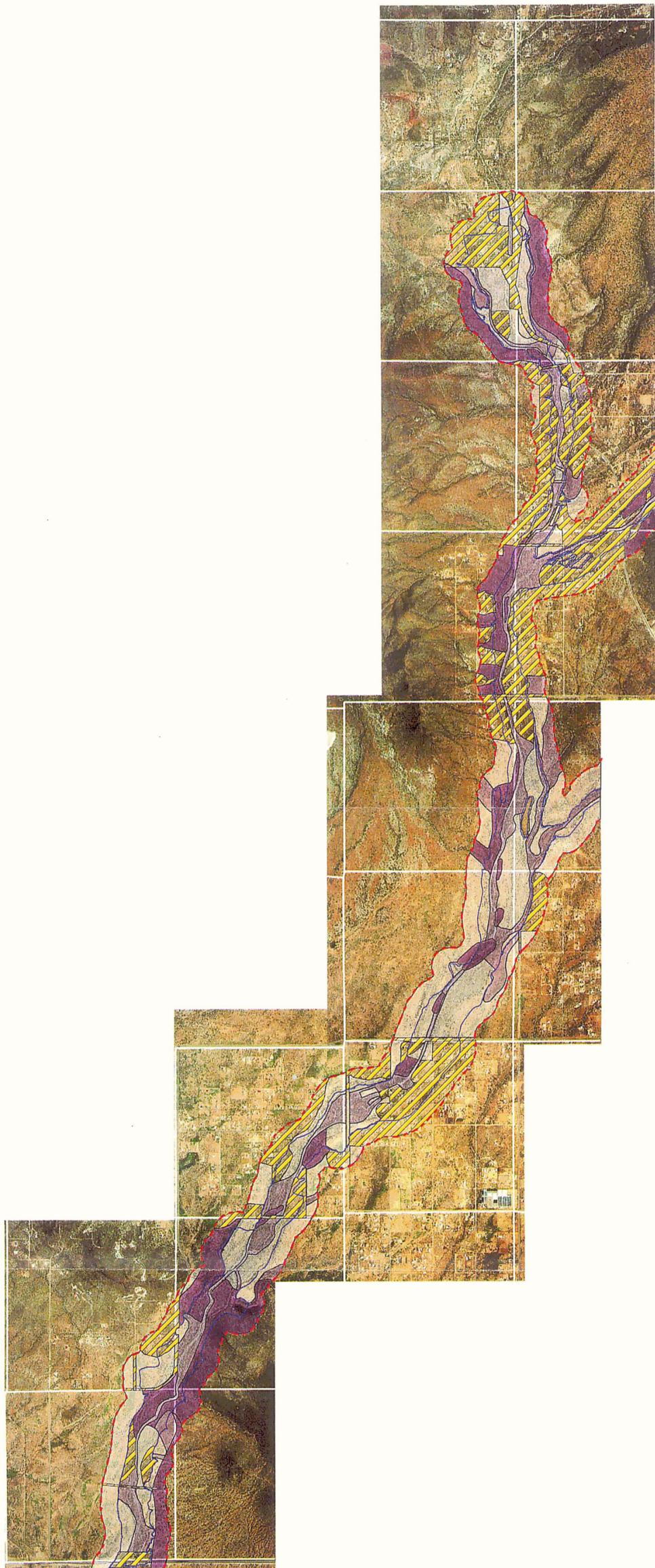
U.S. Fish and Wildlife Service

Robert Romero, Law Enforcement Division, Mesa Office

APPENDIX A.
Habitat Types

Key

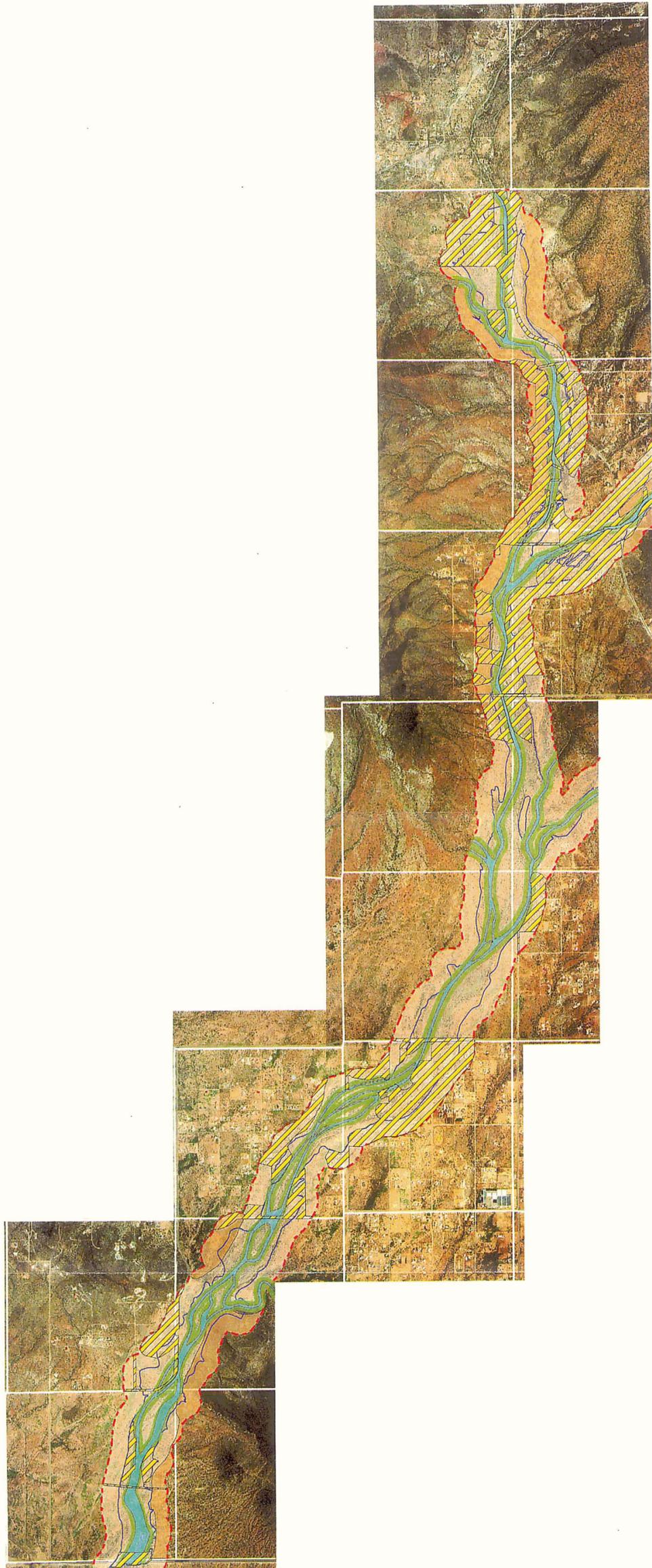
-  WCMP Limits
-  100-Year Floodplain
-  High
-  Medium
-  Low
-  Human-related Disturbances



APPENDIX B.
Habitat Values

Key

-  WCMP Limits
-  100-Year Floodplain
-  Creek Bed
-  Banks
-  Floodplain
-  Hillsides & Slopes
-  Human-related Disturbances



APPENDIX C.
Plant and Animal Species Observed

Plants

<u>Common Name</u>	<u>Scientific Name</u>
Catclaw Acacia	<i>Acacia greggii</i>
Canyon Ragweed	<i>Ambrosia ambrosoides</i>
Triangle-leaf bursage	<i>Ambrosia deltoidea</i>
White Bursage	<i>Ambrosia dumosa</i>
Fiddleneck	<i>Amsinckia spp.</i>
Seepwillow	<i>Baccharis salicifolia</i>
Desert Broom	<i>Baccharis sarothroides</i>
Chuckwalla's Delight	<i>Bebbia juncea</i>
Saguaro	<i>Carnegiea gigantea</i>
Desert Hackberry	<i>Celtis pallida</i>
Foothills Palo Verde	<i>Cercidium microphyllum</i>
Blue Palo Verde	<i>Cercidium floridum</i>
Hedgehog Cactus	<i>Echinocereus engelmannii</i>
Brittle Bush	<i>Encelia farinosa</i>
Compass Barrel Cactus	<i>Ferocactus spp.</i>
Ocotillo	<i>Foqueria splendiscens</i>
Burro Bush	<i>Hymenoclea monogyra</i>
Cheese Weed	<i>Hymenoclea salsola</i>
Juniper	<i>Juniperus spp.</i>
Creosote Bush	<i>Larrea tridentata</i>
Wolfberry	<i>Lycium spp.</i>
Four O'clock	<i>Mirabilis bigelovii</i>
Ironwood	<i>Olneya tesota</i>
Buckhorn Cholla	<i>Opuntia acanthocarpa</i>
Teddy Bear Cholla	<i>Opuntia bigelovii</i>
Engelmann's Prickly Pear	<i>Opuntia engelmannii</i>
Chain-fruit Cholla	<i>Opuntia fulgida</i>
Christmas Cholla	<i>Opuntia leptocaulis</i>
Pencil Cholla	<i>Opuntia arbuscula</i>
Velvet Mesquite	<i>Prosopis velutina</i>
Gooding's Willow	<i>Salix goodingii</i>
Jojoba	<i>Simmondsia chinensis</i>
Tamarisk, Salt Cedar	<i>Tamarix spp.</i>
Goldeneye	<i>Viguiera spp.</i>
Grey Thorn	<i>Ziziphus obtusifolia</i>

Mammals (tracks or scat)

<u>Common Name</u>	<u>Scientific Name</u>
Coyote	<i>Canis latrans</i>
Bobcat	<i>Felis rufus</i>
Black-tailed Jackrabbit	<i>Lepus californicus</i>
Mule Deer	<i>Odocoileus hemionus</i>
Desert Cottontail	<i>Sylvilagus audubonii</i>
Collared Peccary (Javelina)	<i>Tayassu tajacu</i>
Various Rodentia	

Birds

<u>Common Name</u>	<u>Scientific Name</u>
Cooper's Hawk	<i>Accipiter cooperii</i>
Black-throated Sparrow	<i>Amphispiza quinquestriata</i>
Verdin	<i>Auriparus flaviceps</i>
Great Horned Owl	<i>Bubo virginianus</i>
Gambel's Quail	<i>Callipepla gambelii</i>
Anna's Hummingbird	<i>Calypte anna</i>
Costa's Hummingbird	<i>Calypte costae</i>
Cactus Wren	<i>Campylorhynchus brunneicapillus</i>
Northern Cardinal	<i>Cardinalis cardinalis</i>
Lesser Goldfinch	<i>Carduelis tristis</i>
House Finch	<i>Carpodacus mexicanus</i>
Northern Flicker	<i>Colaptes auratus</i>
Inca Dove	<i>Columbina inca</i>
Common Raven	<i>Corvus corax</i>
Gila Woodpecker	<i>Melanerpes uropygialis</i>
House Sparrow	<i>Passer domesticus</i>
Phainopepla	<i>Phainopepla nitens</i>
Abert's Towhee	<i>Pipilo aberti</i>
Rufous-sided Towhee	<i>Pipilo erythrophthalmus</i>
Black-tailed Gnatcatcher	<i>Polioptila nigriceps</i>
Rock Wren	<i>Salpinctes obsoletus</i>
Bendire's Thrasher	<i>Toxostoma bendirei</i>
Curve-billed Thrasher	<i>Toxostoma curvirostre</i>
American Robin	<i>Turdus migratorius</i>
Mourning Dove	<i>Zenaida macroura</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>

APPENDIX D.

Definitions of Habitat Classifications Used in
Analysis of Potential Sensitive Species Occurrence

Suitable Habitat: The type of environment where a species normally occurs that includes characteristics important to that species' survival. These characteristics can be physical (e.g. elevation, temperature, soil type), biological (e.g. vegetation type, food sources), or both. Suitable habitat is not in itself a specific characteristic, but rather a sum of characteristics.

No Suitable Habitat Present: The study area does not contain the type of environment where the species is known to normally occur; therefore, the species would most likely not occur in the study area.

Suitable Habitat Present: The study area contains the type of environment where the species is known to normally occur; therefore, the species could occur in the study area.

Suitable Occupied Habitat Present: The study area contains the type of environment where the species is known to normally occur, and the species has been documented in the study area.

APPENDIX E.
Coordination Letter From
Arizona Game and Fish Department



GAME & FISH DEPARTMENT

2221 West Greenway Road, Phoenix, Arizona 85023-4399 (602) 942-3000
www.gf.state.az.us

Governor
Jane Dee Hull

Commissioners:
Chairman, William Berlet, Tucson
W. Hays Gilstrap, Phoenix
Dennis D. Manning, Alpine
Michael M. Oolighilly, Flagstaff
Joe Carter, Safford

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.

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>STATUS</u>
lowland leopard frog	<i>Rana yavapaiensis</i>	WC,S
Hohokam agave	<i>Agave murpheyi</i>	S,HS
Sonoran desert tortoise	<i>Gopherus agassizii</i>	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).

Ms. Theresa M. Hoff

February 16, 2000

2

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

APPENDIX F.
Field Survey Methods

The study area was surveyed using 1"=400' scale aerial photographs showing the approximate 500-foot project boundary beyond the 100-year floodplain. Photographs and notes were taken at 1000-foot intervals along the entire length of the study area, and in between those intervals when warranted. The descriptive notes taken at these points included predominant plant species, vegetation structure, attributes such as unusual landforms (e.g. embankments, sandy channel, hillsides and slopes), comments on potential T&E/WSCA species habitat, debris, disturbance, noise such as nearby road traffic, wildlife observed, along with a description of any other notable features of the local environment. Field photographs and notes were compared to the aerial photographs, maps and other resources given to LSD on the area. Habitat Type and Habitat Value were then delineated on aerial photographs that included an overlay of the study area limits.

**THE UPPER SKUNK CREEK
WATERCOURSE MASTER PLAN
ARCHEOLOGICAL ASSESSMENT
OF NORTHERN
MARICOPA COUNTRY, ARIZONA**

James B. Rodgers



Contract Archeological Series 999-5

Scientific Archeological Services



THE UPPER SKUNK CREEK
WATERCOURSE MASTER PLAN
ARCHEOLOGICAL ASSESSMENT
OF NORTHERN
MARICOPA COUNTY, ARIZONA

Maricopa County Flood Control District Contract No. 97-41

Work Assignment No. 9

Prepared and Submitted by:

James B. Rodgers
Scientific Archeological Services
2542 W. Monterey Way
Phoenix, Arizona 85017

Prepared for and Submitted to:

Ms. Theresa M. Hoff
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009

June 21, 1999

Contract Archeological Series 999-5

ABSTRACT

In advance of performing certain geotechnical activities for its Upper Skunk Creek Watercourse Master Plan study, the Flood Control District of Maricopa County has contracted Scientific Archeological Services to prepare an assessment of all cultural resources presently known to exist in both the USCWMP project area and its immediately surrounding locality, which is termed the Upper Skunk Creek Locale. The project area itself consists of a narrow corridor that, averaging only about 2,400 feet wide, begins at the Hayden-Rhodes Aqueduct section of the Central Arizona Project Canal and then extends nearly 15 miles northward along, primarily, Skunk Creek and, secondarily, one of its short and unnamed eastern tributaries. Overall, this area encompasses about 3,884 acres and occupies at least a small part of 30 legal sections and five contiguous townships that are located in northern Phoenix and Maricopa County, Arizona.

No actual fieldwork was performed during this assessment, of course. Instead, the two principal activities of this project have involved extensive literature searches and different site record checks. Together, they result in several significant findings. In particular, slightly more than 35 percent of the USCWMP project area has previously been surveyed by professional archeologists. Also, the Upper Skunk Creek Locale does not appear to contain either the quantity, the variability, or the large size of sites that presently characterize more distant locales situated along Cave Creek to the east and New River to the west.

In addition to numerous loci of isolated artifacts, however, 22 archival sites are documented from the project locale, and 10 of them occur in the project area itself. Five of the latter consist entirely of undesignated dirt roads that were in use during 1894-1933 but have since likely been destroyed and, thus, are probably not significant resources. The other five project sites may be eligible for nomination to the Arizona Register of Historic Places, however, and they have been formally designated as AZ T:4:2 ASU, AZ T:4:5 ASU, AZ T:4:119 ASM, AZ T:4:120 ASM, and AZ T:4:121 ASM. All five are prehistoric Hohokam sites. Three of them are rather small campsites; the other two are single surface habitations of cobble masonry that date to the Sedentary period (A.D. 1000-1200) and were probably used in conjunction with local farming.

Several project recommendations are offered later for careful agency consideration. In general, though, archeology is definitely not expected to be a major deterrent to any of the proposed geotechnical investigations. However, absolutely no field disturbing activities of that subsequent geotechnical research should be undertaken without having first conducted an intensive archeological survey of all project areas of expected disturbance. All activities of that professional survey should be done in compliance with the Arizona Antiquities Act and the Arizona State Historic Preservation Act.

TABLE OF CONTENTS

	<u>Page</u>
Abstract	ii
Introduction	1
Project Objective and Goals	4
Environmental Setting	5
Skunk Creek Region	5
Upper Skunk Creek Locale	8
USCWMP Project Area	12
Project Methodologies	15
Archival Research Phase	16
Laboratory Analysis Phase	18
Archival Research Results	18
Culture Histories	18
Prior Research Projects	21
Local Resources	25
Designates sites	26
Undesignated sites	30
Summary Evaluation and Recommendations	32
References Cited	35

LIST OF FIGURES

<u>No.</u>		<u>Page</u>
1	General location of the centerline of the USCWMP project area and the boundary of the Upper Skunk Creek Locale.....	2
2	Detailed location of the northern part of the USCWMP project area and adjacent parts of the Upper Skunk Creek Locale.....	9
3	Detailed location of the central part of the USCWMP project area and adjacent parts of the Upper Skunk Creek Locale.....	10
4	Detailed location of the southern part of the USCWMP project area and adjacent parts of the Upper Skunk Creek Locale.....	11

LIST OF TABLES

<u>No.</u>		<u>Page</u>
1	Legal location parts of the USCWMP project area.....	14
2	Prior cultural resource studies of the Upper Skunk Creek Locale.....	22
3	Characteristics of all designated sites of the Upper Skunk Creek archeological research locale	27
4	Characteristics of all undesignated sites of the Upper Skunk Creek archeological research locale	31

INTRODUCTION

This report is intended to document the nature, location, methodologies, results, and recommendations of an archeological contract project recently negotiated between Scientific Archeological Services (SAS) and the Flood Control District of Maricopa County (FCDMC or Flood Control District). As a typical assessment study, defined below, this project involved two primary types of archival research only: a literature search and a site records check, with no intensive field survey having yet been undertaken of any part of the concerned project area. Accordingly, the successful completion of this assessment has been achieved without having to obtain any field permits or other archeological repository agreements from any agency of either the State of Arizona (State) or the federal government.

Further, this particular archeological assessment study itself is a requirement of no State or federal agency, and no geotechnical activity of the overall Upper Skunk Creek Watercourse Master Plan study is currently expected to require a Clean Water Act 404 Permit from the U.S. Army Corps of Engineers (USACE or Corps). Instead, the impetus of this archeological investigation is strictly the informal cultural resource management policy of the Flood Control District. The overriding concern of that policy is the professional treatment of all significant prehistoric and historic resources that, otherwise, could eventually be adversely affected, directly or indirectly, by authorized undertakings of the Maricopa County government.

As defined and differentiated elsewhere by SAS (Rodgers 1991:15), an archeological assessment is considered a project specific type of planning or management study that is usually undertaken in order to obtain and evaluate various data pertaining to the nature and location of previous research areas and, even more importantly, the different prehistoric and historic archeological resources previously recorded therein. Archeological assessments closely resemble more general types of "overview" projects, therefore, but they differ from them largely on the basis of their greater specificity in both project area and project scope. Significantly, archeological assessment studies have proven to be valuable preservation tools, for they have often produced critical information upon which final management decisions can be made for eliminating the unnecessary and usually costly activities that are normally associated with either subsurface site testing or full-scale site data recovery.

As elaborated in the project scope of work (Flood Control District of Maricopa County 1999a: Exhibit A), the Upper Skunk Creek Watercourse master Plan itself is to be a document that develops and identifies alternative plans for providing 100-year flood protection along upper Skunk Creek from the town of New River southward to its intersection with the Central Arizona Project (CAP) Canal in northern Maricopa County, Arizona (Figure 1). The necessary USCWMP study will be a joint effort of the FCDMC and the city of Phoenix, Arizona, and one of its primary requirements will be to determine a) the potential lateral migration of the upper

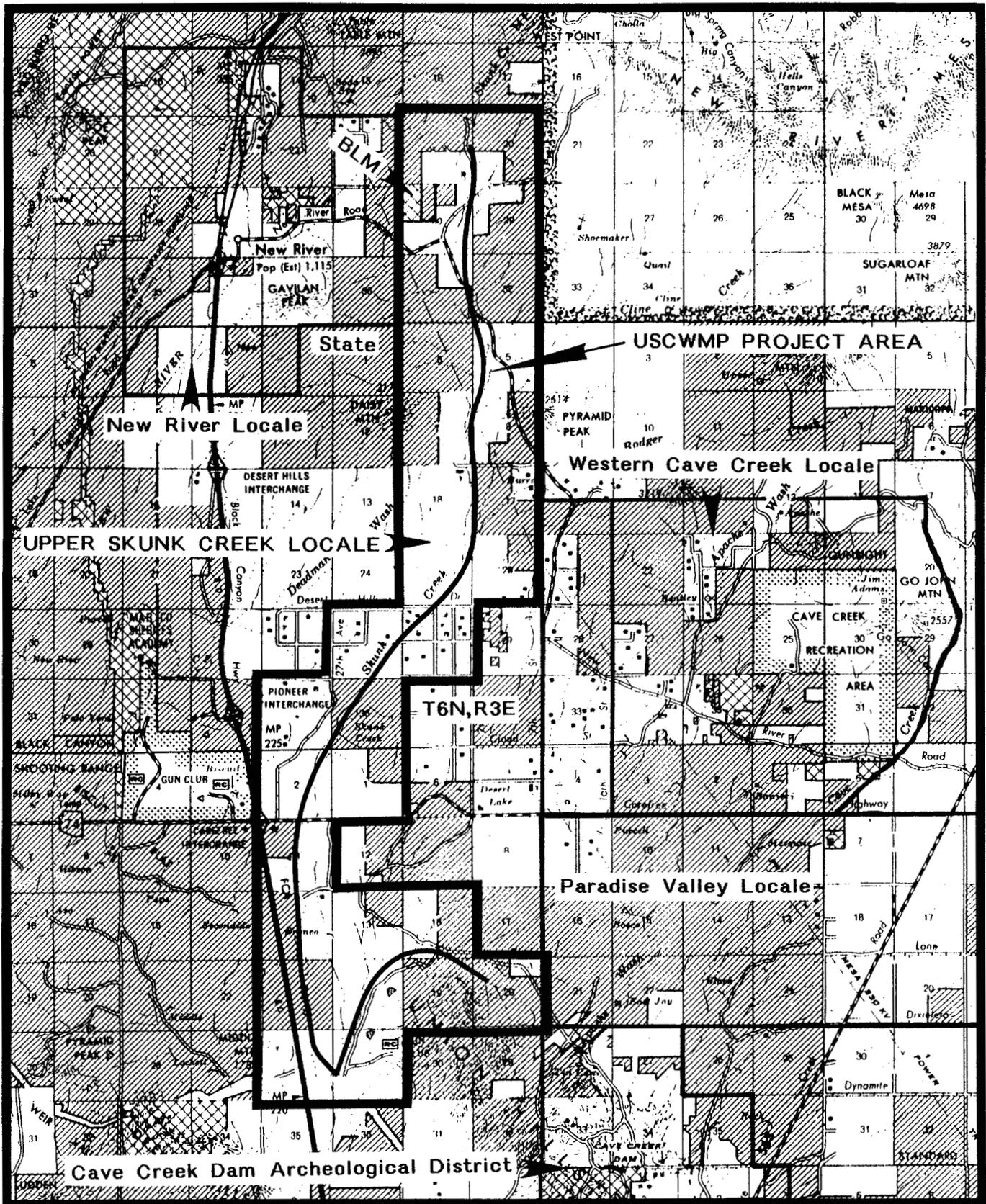


Figure 1. General location of the centerline of the USCWMP project area and the boundary of the Upper Skunk Creek Locale. (based on Sheet 2 of the 1993 land ownership map of the Arizona State Land Department)

part of Skunk Creek, and b) the opportunities for and the benefits of implementing a non-structural solution to the periodic flooding of this drainage. While such will eventually require certain geotechnical excavations to be undertaken by a professional hydrological and geomorphological firm, which has not yet been identified by the FCDMC, no specific locations presently exist for any of those excavations.

The resulting USCWMP archeological assessment project officially began April 23, 1999, and the Flood Control District has remained its sole sponsor. Two of the key project personnel of this agency have variously assisted SAS during its entire course. Mr. Douglas A. Williams, FCDMC senior water resource planner, is also the USCWMP project manager, and has provided SAS with much project support and information. Ms. Theresa M. Hoff, FCDMC environmental services planner, actually administered this project for the FCDMC, however, and her involvement has included several major tasks: 1) the expeditious negotiation of the project contract, 2) the regular maintenance of communication between the FCDMC and SAS, 3) the provision of different project resource materials, and 4) the review and acceptance of this final assessment report.

Four primary types of project resource material were provided to SAS, but all of them are large-scale maps that were prepared at the Flood Control District by Mr. Jim Smith, analyst for the GIS (Geographic Information System) Branch of the FCDMC. The first is a detailed index map of the 15 contiguous aerial photographs that overlap the entire USCWMP project area. The second includes a copy of each of the 15 aerial photographs (FCDMC 1999b) themselves. These are all large-scale (1" = 200'), colored photographs that are numbered consecutively (Sheet 1-15), indicate the exact longitude and latitude location of certain aerial ground markers and, much more importantly, they all illustrate the precise boundary of the three contiguous areas that comprise the concerned USCWMP project area: 1) the upper Skunk Creek floodway, 2) the upper Skunk Creek floodplain, and 3) an adjacent 500-foot-wide buffer zone.

The third resource material is also a detailed (1" = 800') aerial photograph (FCDMC 1999c), but this one indicates the designation and accurate location of 339 parcels of private and public property that occurs in or next to the actual USCWMP project area. It is subsequently referred to as the USCWMP Land Ownership Map. It is accompanied by a corresponding USCWMP Land Ownership List (FCDMC 1999d), which provides the name and address of each project parcel owner. The fourth and last material is most valuable and, hereafter, is referred to as the USCWMP Composite Map (FCDMC 1999e). It consists of a large-scale (1" = 2000'), oversize, composite map of the five 7.5' quadrangle areas that include at least a very small part of the USCWMP project area, as just defined above. These five quad areas have been mapped and designated by the U.S. Geological Survey (USGS), between 1957 and 1965, as Daisy Mountain (1964), New River SE (1964), Biscuit Flat (1965), Union Hills (1964), and Hedgpeth Hills (1957), Arizona. Respectively, they have also been designated by the Arizona State Museum (ASM) as AZ T:4 NE, AZ T:4 SE, AZ T:4 SW, AZ T:8 NE, and AZ T:8 NW.

As its principal investigator, the author administered all aspects of this project for SAS. In addition, he actually conducted or directly supervised all of the necessary archival research activities. As usual, a variety of fiscal and laboratory support activities were ably accomplished by Carol A. Rodgers, SAS laboratory director, and Michelle L. Howe, SAS project clerk and laboratory technician.

Other competent assistance was variously provided throughout this project by other professionals unaffiliated with either SAS or the Flood Control District. Specifically, the desired ASM site survey records check was begun May 7, 1999, with all of it having been fully completed by May 24, 1999. It was conscientiously performed on campus at the University of Arizona in Tucson, Arizona, by both Sharon F. Urban, ASM public archaeologist, and Regina Chapin-Pyritz, ASM assistant public archeologist. Later, on May 28, 1999, Arthur W. Vokes, assistant curator for the ASM archeological collections, reported his results of having examined all of the project sites for any post-survey archeological work that may have taken place there.

PROJECT OBJECTIVE AND GOALS

Scientific Archeological Services defines an objective as a primary goal to be achieved by accomplishing several secondary objectives, or goals per se. Accordingly, the main objective of this archeological assessment project has been the production and evaluation of various archival information that the FCDMC can use in making certain final recommendations relating to its USCWMP study. This overall project objective could have required SAS to achieve any or all of the following six project goals:

1. Represent the Flood Control District during all interagency meetings held in conjunction with this assessment project.
2. Define the nature and area of potential adverse effect of the proposed undertaking.
3. Attempt to identify all cultural resource projects previously undertaken and completed inside and immediately outside of the USCWMP project area.
4. Attempt to locate and evaluate all prehistoric and historic sites previously found to exist in or immediately next to this same area.
5. Provide realistic compliance recommendations concerning the potential need for having to survey particular parts of the project area.
6. Document all relevant information pertaining to the nature, location, methodologies, results, and recommendations of this archeological assessment project.

ENVIRONMENTAL SETTING

Primarily, there are only two interrelated reasons for providing the following section. First, SAS has a responsibility to provide a comprehensive environmental description of the concerned archeological project area. Second, the resulting description will hopefully serve well as an archival foundation, at least, for better understanding and, hopefully, appreciating the variable use that the upper reach of Skunk Creek has received during both the prehistoric and historic past. In order to realize both goals, therefore, much SAS data are incorporated here, as they appropriately pertain to three arbitrary areas of successively increasing specificity: 1) the general Skunk Creek region, 2) the Upper Skunk Creek Locale, and 3) the actual USCWMP project area. Once again, none of the eventual geotechnical test trenches of this area have yet been defined so, of course, none of them can be included in the following discussion.

Skunk Creek Region

Figure 1 was based on a western part of the "General Highway Map of Maricopa County, Arizona." That map was originally prepared by the Maricopa County Highway Department, presently the Maricopa County Department of Transportation (MCDOT), and it has since been updated, on January 7, 1993, by the Arizona State Land Department (ASLD). Figure 1 itself should therefore have been important for several major reasons. First, it has indicated that a rather complex ownership pattern, elaborated later, exists within the USCWMP project area itself. Second, Figure 1 has illustrated the fact that this project area is immediately associated with four large localities of previous archeological research.

For purposes of later discussions and interpretations, only the first of these four locales occurs west of Skunk Creek. As modified here, this New River Locale (Rodgers 1995) now includes SAS's former Gavilan Peak Locale (Rodgers 1994a) and extends a total of 4.0 miles eastward from undeveloped 51st Avenue and 5.0 miles northward from partially developed Circle Mountain Road. The other three areas are contiguous localities situated east of Skunk Creek. The Western Cave Creek Locale (Rodgers 1996) extends 4.5 miles northward from Carefree Highway and a maximum of nearly 5.0 miles eastward from 16th Street to the Cave Creek drainage, or Cave Creek Wash. The Paradise Valley Locale (Rodgers 1998a) is a true rectangular area that is bounded by Carefree Highway, Scottsdale Road, Dixileta Drive, and 7th Street. The Cave Creek Dam Archeological District (Rodgers 1978) is the fourth and last locality. This irregular area extends 5.0 miles southward from Dixileta Drive to Deer Valley Road and a maximum of 3.5 miles eastward from 7th Street.

Third, and most importantly, Figure 1 has introduced the general geography of the upper Skunk Creek region. Accordingly, this region is situated within the northern Salt River Valley and

a northern part of Maricopa County, Arizona. Further, the smaller southern part of this region basically occurs south of Carefree Highway and is located across a northern part of the city of Phoenix. Regionally speaking, two other relevant communities occur also. First, the unincorporated community of New River, Arizona, occurs only about 8.5 miles north of the intersection of Skunk Creek and Carefree Highway; the city of Cave Creek, Arizona, occurs 10.2 miles east-northeast of this same intersection. The two exclusive county parks of this region are the Ben Avery Shooting Range and Recreation Area and the Adobe Dam Recreation Area. The first one occupies 1,443 acres and is located only about 0.82 miles west of the Skunk Creek-Carefree Highway intersection. The second one includes roughly 1,500 acres and occurs both north and south of the undeveloped intersection of 43rd Avenue and Deer Valley Road.

Vehicular access through this region is provided mainly by only two major roadways. Interstate 17 is the much larger of the two and is the principal route between the town of New River and downtown Phoenix, which occurs about 25 miles south of its intersection with Carefree Highway. Carefree Highway itself is a main east-west thoroughfare that leads 10 miles eastward from Interstate 17 to Cave Creek Road, which then continues only 2.5 miles northeastward to downtown Cave Creek, Arizona, and 6.25 miles westward from this intersection to Lake Pleasant Road, which then continues about 5.25 miles northwestward to Lake Pleasant. The two major waterworks of this region are the Hayden-Rhodes Aqueduct section of the Central Arizona Project (CAP) Canal and Adobe Dam. The former crosses Interstate 17 between the undeveloped alignments of Dynamite Boulevard and Dixileta Drive. The latter is a flood control structure that was constructed in 1981. Hydrologically, it separates the lower and upper reaches of Skunk Creek. Being situated along the southeastern edge of the Adobe Dam Recreation Area, the approximate center of this dam coincides with the intersection of Skunk Creek and Deer Valley Road.

Environmentally, the upper Skunk Creek region exists within both the Phoenix Basin (Péwé 1987) and the southern, or Sonoran, section of the Basin and Range Physiographic Province (Fenneman 1946). It therefore enjoys a warm, arid climate that is especially suitable for fall, winter, and spring recreation. As elaborated by Sellers and Hill (1974:143), it is characterized by high diurnal temperatures, low precipitation, and a low relative humidity. Due to the size and topographic variability of this region, its precipitation rate and temperatures are somewhat variable (Camp 1986). Generally speaking, however, the average annual precipitation here ranges from 6 inches to 12 inches but is usually between 7 inches and 10 inches, and its average annual air temperature ranges from 66° to 73° F., but it most commonly averages between 70° and 73° F. Such factors combine to form a regional frost-free growing season that varies from about 270 days to 300 days.

The indigenous plants of this particular region typically belong exclusively to the Arizona Upland subdivision of the Sonoran Desertscrub land (Brown 1973). The regional geology has been

examined, studied and actually mapped by not only Wilson et al. (1957) but, most recently, by Kamilli and Richard (1998), too, and its numerous soils have been thoroughly discussed, classified and mapped by the Natural Resources Conservation Service (NRCS) (Camp 1986). Based on the SAS archival interpretation of these different data, as well as some prior SAS fieldwork and certain terms of the American Geological Institute (1974), the upper Skunk Creek region is believed to be composed of no fewer than six major environmental zones.

From lowest to highest, these zones include: 1) the Skunk Creek drainageway, 2) the Skunk Creek floodplain, 3) an expansive fan terrace, 4) shallow drainages and larger arroyos entrenched across this terrace, 5) low isolated hillocks and higher hills, and 6) one low mountain. The single mountain here is Daisy Mountain, which rises from about 2,000 feet to 3,176 feet above sea level. Hills are more numerous and, always being less than 1,000 feet high, are often unnamed but do include those of Adobe Mountain, Deem Hills, Gavilan Peak, Middle Mountain, Pyramid Peak, and Union Hills. Two particular parts of the Skunk Creek fan terrace zone have been specifically designated as Biscuit Flat and Little Deer Valley. Paradise Valley and Apache Peak occur farther east. The former is drained southward by Cave Creek Wash and Apache Wash, one of its major western tributaries. Apache Peak is situated just west of Apache Wash and just northwest of Maricopa County's Cave Creek Recreation Area.

The paleohydrology of Skunk Creek has previously been investigated by Earl (1983), who has already suggested that it may once have been a seasonal drainage. Presently, however, Skunk Creek is only an ephemeral stream that constitutes the principal drainage of this region, of course, and is one of the largest eastern tributaries of New River, which is a large eastern tributary of the Agua Fria River. Both New River and Skunk Creek originate in the New River Mountains, which occur northeast of the town of New River, and, interestingly, branches of both drainages occur at one point (Sec 9 in T7N,R3E), in fact, where they are less than 0.3 miles apart. Skunk Creek itself flows generally southwestward and is roughly 30 miles long and drains an alluvial basin of approximately 110 square miles.

Regionally speaking, Cline Creek and Rodger Creek are the only two specifically named tributaries of Skunk Creek and both originate east of it. The former is the longer and more northern one. It rises along the steep southern hillslopes of New River Mesa, which is a southeastern part of New River Mountains, and it then flows 7.3 miles southwestward, before merging with Skunk Creek at a point located just southwest of Pyramid Peak. The Rodger Creek-Skunk Creek confluence occurs only about 2.0 miles farther south. Rodger Creek itself is 7.9 miles long. It begins along the southern slopes of Elephant Mountain, which occurs 3.2 miles south of New River Mesa, and then flows generally westward, past the northern slopes of Apache Peak, and then southwestward to Skunk Creek.

UPPER SKUNK CREEK LOCALE

Figure 1 has indicated the complete boundary of the area known synonymously as either the Upper Skunk Creek Locale or, more simply, the USCWMP project locale. This is strictly an arbitrary archeological locality that immediately surrounds the USCWMP project area itself and was chosen by SAS as the specific area of its present archival research concern. More specifically, this locale extends out 0.38-0.82 miles north, 0.23-1.18 miles east, 0.39-0.52 miles south, and 0.22-1.30 miles west from the maximum boundary of the USCWMP project area. As such, the final boundary of this project locale was simply selected by SAS to include the maximum boundary of all the different legal sections that contain even a very small part of the actual USCWMP project area.

Figure 1 has also illustrated the location of the three major ownership patterns that exist across this USCWMP project locale, and that map totally agrees with all relevant ownership data that has more recently been produced, on April 19, 1999, by the Arizona Land Resource Information System (ALRIS) Division (1999) of the Arizona State Land Department. Accordingly, most of this area consists of either incorporated private land that is situated in the city of Phoenix or unincorporated private land situated in northern Maricopa County. Five separate tracts of Arizona State Trust land also occur here, however, and they belong to the ASLD. The third and final pattern consists of one relatively small parcel of land belonging to the U.S. Bureau of Land Management (BLM). Not indicated in Figure 1 is the fact that several small, southern parts of this project locale are also owned by both the U.S. Bureau of Reclamation and the United States of America. None of this locale is owned by the U.S. National Forest Service, however.

A much more detailed view of the northern, central, and southern sections of this locality is provided in Figures 2, 3, and 4. Collectively, these are three contiguous, large-scale (1" = 2000') maps that are variously composed of five quadrangle areas that have previously been mapped and designated by the U.S. Geological Survey (USGS), between 1957 and 1965, as Daisy Mountain (1964), New River SE (1964), Biscuit Flat (1965), Union Hills (1964), and Hedgpeth Hills (1957), Arizona. These same five quad areas have also been designated by the Arizona State Museum (ASM) as, respectively, AZ T:4 NE, AZ T:4 SE, AZ T:4 SW, AZ T:8 NE, and AZ T:8 NW.

Accordingly, therefore, this USCWMP archeological assessment locale is irregular in plan and a far northeastern part of it immediately borders a southwestern part of the U.S. Tonto National Forest. Geographically, this locale extends a maximum of 14 miles northward from the largely undeveloped alignment of Dynamite Boulevard to undeveloped Photo View Road and a maximum of 4.0 miles eastward from locally undeveloped 35th Avenue to only partially developed 7th Street. Overall, it encompasses the approximate 30 square miles that, in reference to the Gila and Salt River Baseline and Meridian (G&SRB&M), occupy the following 30 legal sections

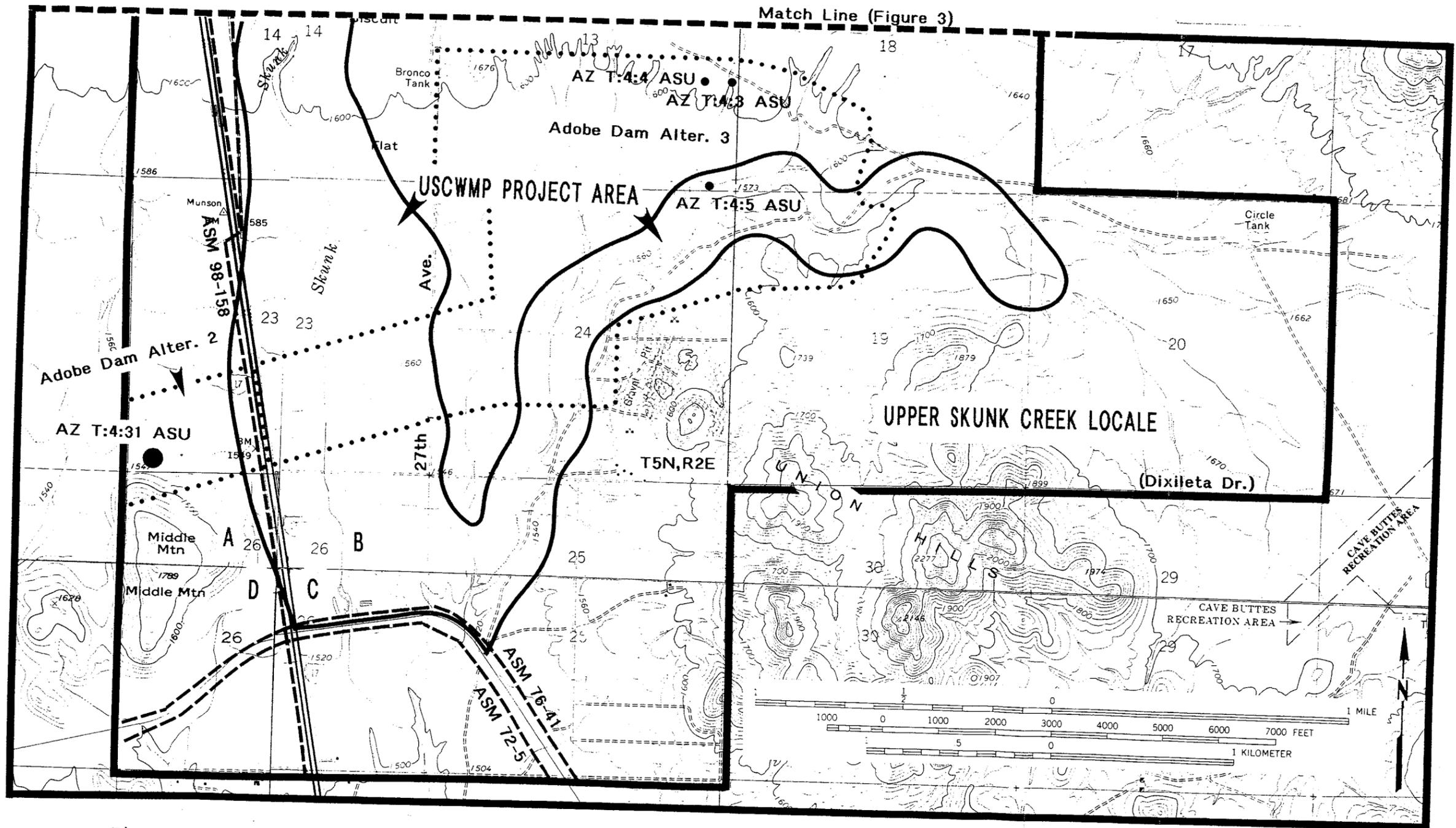


Figure 4. Detailed location of the southern part of the USCWMP project area and adjacent parts and archival project areas of the Upper Skunk Creek Locale. (based on the USGS 7.5' quadrangle maps of the 1965 Bicut Flat [A], 1964 New River SE [B], 1964 Union Hills [C], and 1957 Hedgpeth Hills [D], Arizona.

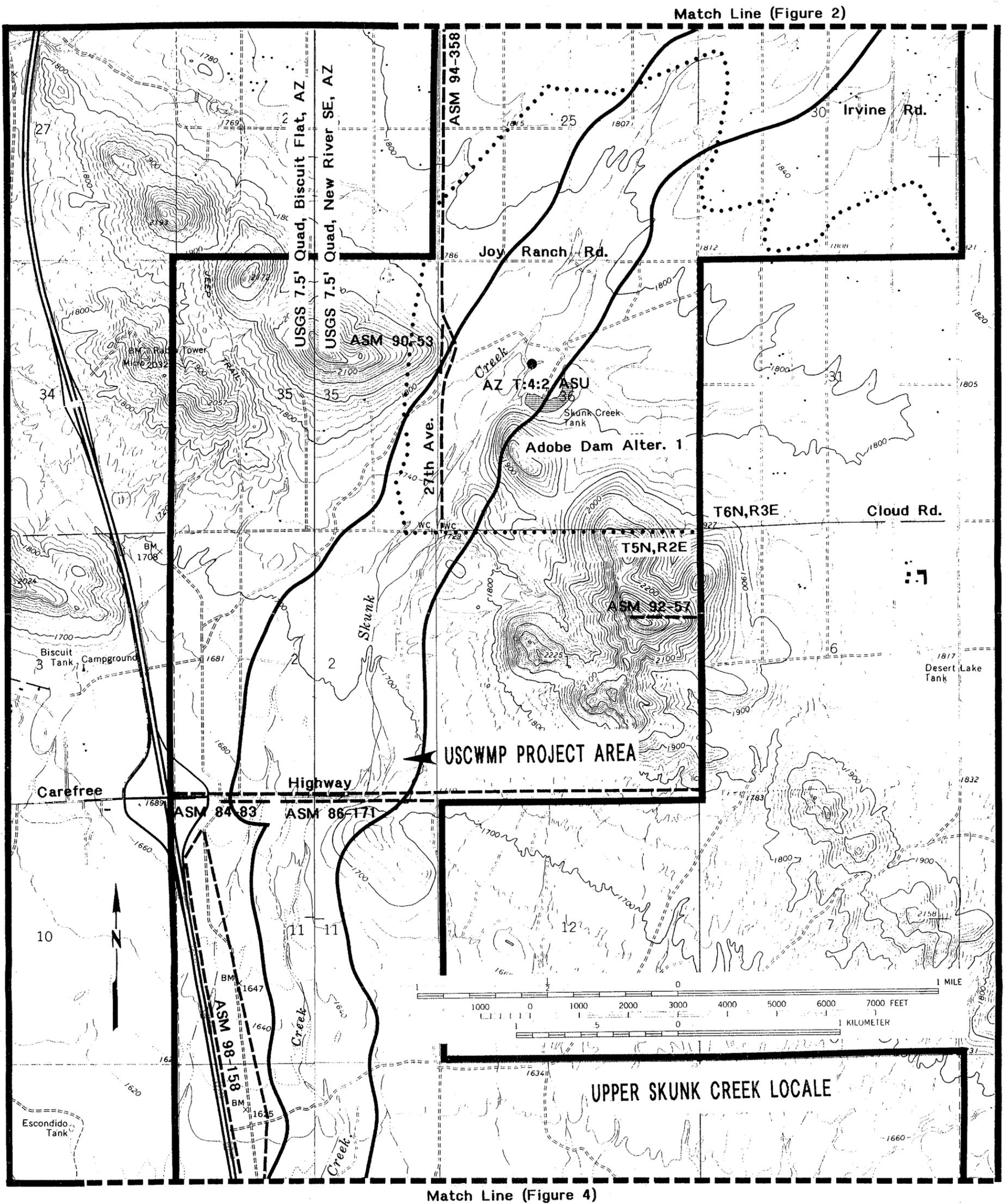
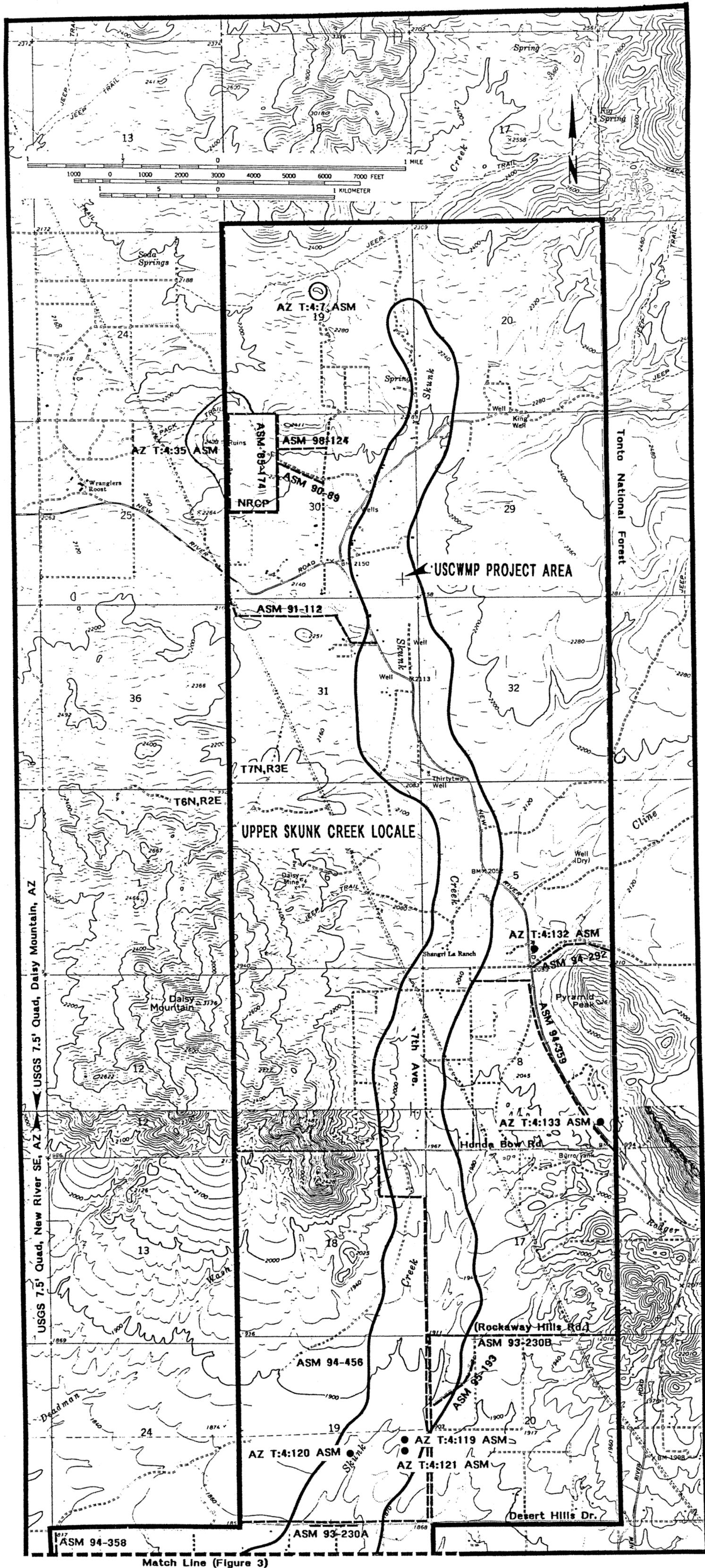


Figure 3. Detailed location of the central part of the USCWMP project area and adjacent parts and archival project areas of the Upper Skunk Creek Locale. (based on the USGS 7.5' quadrangle maps of New River SE [1964] and Biscuit Flat [1965], Arizona.)



Match Line (Figure 3)

Figure 2. Detailed location of the northern part of the USCWP project area and adjacent parts and archival project areas of the Upper Skunk Creek Locale. (based on the 1964 USGS 7.5' quadrangle maps of Daisy Mountain and New River SE, Arizona.)

(Sec): 1) Sec 1, 2, 11, 13, 14, and 23-26 of Township 5 North and Range 2 East (T5N,R2E), 2) Sec 18-20 of T5N,R3E, 3) Sec 25, 35, and 36 of T6N,R2E, 4) Sec 5-8, 17-20, and 30 of T6N,R3E, and 5) Sec 19, 20, and 29-32 of T7N,R3E.

At least a small part of all six environmental zones of the upper Skunk Creek region also occurs within this archeological project locale. Skunk Creek and its adjacent floodplain basically bisect this area and is surrounded by an eastern part of Biscuit Flat, a central part of Little Deer Valley, and other undesignated parts of the more encompassing fan terrace zone. Such areas are composed chiefly of deep deposits of Quaternary silt, sand, and gravel that date primarily to the middle Pleistocene and Holocene, or Recent, epochs. The two largest tributary drainages of the local terrace include the lowest reaches of both Cline Creek and Rodger Creek. The low mountain zone is locally represented only by a large eastern part of Daisy Mountain, and the sixth zone is represented by several yet unnamed hills, a small western and northern part of Union Hills, a small northwestern part of Pyramid Peak, and nearly all of Middle Mountain. These conspicuous landforms contain a variety of igneous (basalt, andesite, rhyolite, etc.) and metamorphic (e.g., granite, gneiss, etc.) rock that was formed predominantly during the Quaternary and much earlier Proterozoic periods.

USCWMP Project Area

This third and final research area is the most critical, for it will eventually include the actual transects from which certain necessary subsurface geotechnical data will subsequently be obtained. Both the full physical extent and the complete boundary of this area have therefore already been delimited in Figures 2, 3, and 4. Accordingly, this is essentially a long but relatively narrow corridor that occupies a total of 3,883.8 acres. Importantly, however, this acreage is composed of two contiguous alluvial alignments.

The first and much larger alignment encompasses 3,463.80 acres and, except for one small, western linear strip of it, occurs entirely east of Interstate 17. This area begins at the intersection of Skunk Creek and the CAP Hayden-Rhodes Aqueduct. It then extends generally northward along Skunk Creek and, after a total distance of about 14.84 drainage miles, ends at a point located east of the town of New River, 0.43 miles south of undeveloped Photo View Road, and 1.26 miles west of the Tonto National Forest. This Skunk Creek alignment averages only about 2,400 feet wide, although its width does range from a minimum of about 1,000 feet to a maximum of about 3,600 feet. It is a true linear route, therefore, that descends gently southward and southwestward from approximately 2,245 feet to 1,520 feet above sea level. New River Road formerly provided northwest-southeast access across this area between the towns of New River and Cave Creek. The Prescott-Mesa 230 KV Power Transmission Line generally parallels this roadway and is located about 0.60 miles west of it.

The second and much shorter part of this USCWMP project area coincides with a lowermost reach of an unnamed tributary of Skunk Creek that originates just west of Apache Wash and just southwest of a large unnamed hill situated west of Paradise Valley. This "Unnamed Tributary" then flows 3.35 miles westward, immediately bypassing the northern edge of Union Hills, and continues 2.23 miles southward, where it finally enters Skunk Creek at a point located only about 0.38 miles south of the CAP canal. This second part of the project area actually begins at this CAP Hayden-Rhodes Aqueduct, however, and it then continues upstream for a total distance of about 3.30 miles. Being quite consistently only about 1,100 feet wide, this resulting project area encompasses only about 420 acres, and it descends in elevation from about 1,640 feet to 1,520 feet above sea level.

As a whole, this smaller southern part of the combined USCWMP project area occurs in northern Phoenix, while its northern part is situated only in northern Maricopa County. Further, this total project area is located within at least a small part of the 30 legal sections and 5 townships that are detailed in Table 1. All of the legal ownership information presented there is based on data provided by both ALRIS (1999) and the GIS Branch of the FCDMC (1999b, 1999c). Most of the resulting project acreage is either incorporated or unincorporated private land, therefore. South of Honda Bow Road alone, for example, this area includes 180 parcels of such land. Much Arizona State Trust land of the ASLD occurs here, too, however. Finally, nine parcels of federal land also occur immediately north of the CAP canal. Six of them belong to the United States of America; the three last ones are owned by the U.S. Bureau of Reclamation. Thus, no lands of either the BLM or the U.S. Forest Service actually occur within this smaller USCWMP project area itself.

Given the narrow, alluvial nature of the planned development, it is somewhat surprising but a small part, at least, of all six of the environmental zones of both the upper Skunk Creek region and the Upper Skunk Creek Locale actually occurs within the USCWMP project area itself. Also, all but one of the six zones occur within both the longer Skunk Creek and the much shorter Unnamed Tributary parts of this project area. The exception is the low mountain zone, which is limited to a very small eastern part of Daisy Mountain that is situated just southwest of the intersection of Skunk Creek and New River Road. It is characterized by steep slopes (25-60%) and soils of the Schenco-Rock outcrop complex.

Skunk Creek is the principal drainageway of both project areas. Local examples of more secondary drainages extend across the extensive fan terrace east and west of it and, from north to south, are represented best by terminal reaches of Cline Creek, Rodger Creek, and the Unnamed Tributary. Hereafter, all such drainage routes are defined more fully as being composed of three hydrologic components: an actual drainage channel, an adjacent floodway of periodic flooding, and a 100-year floodplain. The FCDMC has already included the specific boundaries of all three components on not only the USCWMP Composite Map, as previously defined, but also on

Table 1.

Legal Location Parts of the USCWMP Project Area

<u>Township</u>	<u>Section</u>	<u>Subdivision</u>	<u>Ownership*</u>
T7N,R3E	19	SE4NE4 and E2E2SE4	Priv, State
	20	SW4SW4NW4 & W2SW4	Priv
	29	W2NW4	Priv
	30	E2NE4 & SE4	Priv
	31	NE4 & SE4	Priv, State
	32	W2NW4 & W2SW4	State
T6N,R2E	25	NE4, SE4 & E2SW4	Priv
	35	SE4	Priv
	36	NW4, W2NE4, & SW4	State
T6N,R3E	5	NW4 & SW4	Priv
	6	NE2NE4NE4 & SE4SE4SE4	State
	7	E2NE4 & SE4	Priv
	8	NW4 & W2W2SW4	Priv
	17	W2NW4 & SW4	State
	18	E2NE4 & SE4	Priv
	19	NE4, SE4 & E2SW4	Priv
	20	W2NW4	Priv
	30	NW4, W2NE4 & N2NW4SW4	Priv
T5N,R2E	1	W2NW4NW4	Priv
	2	NE4, E2NW4, SE4, & SW4	Priv
	11	NW4, NE4, E2SW4, & SE4	Priv, State
	13	S2SE4SE4	Priv
	14	E2NW4, W2NE4, E2SW4, & SE4	Priv, State
	23	E2NW4, NE4, E2SW4, & SE4	State
	24	S2NW4, NE4, SW4, & W2SW4SE4	Priv
	25	NW4 & N2NW4SW4	Priv, US
26	E2E2NW4, NE4, & N2N2SE4	Priv, Rec, US	
T5N,R3E	18	S2SW4 & S2SE4	Priv, State
	19	N2NW4 & NE4	State
	20	W2W2NW4	State

* Private (Priv), State Trust (State),
U.S. Bureau of Reclamation (Rec), United States of America (US)

each of the 15 contiguous aerial photographs that comprise the USCWMP Project Base Map.

The adjacent floodplains of Skunk Creek, the Unnamed Tributary, and Cline Creek all have a nearly level (0-3%) surface. Those of the first two drainageways are dominated by soils of the Antho-Carrizo-Maripo complex; that of Cline Creek is dominated by alluvium of the Anthony-Arizo complex. Other floodplain soils here include Valencia sandy loams, Arizo cobbly sandy loam, Estrella loams, Gilman loams, and other ones of the Brios-Carrizo complex. In contrast, Rodger Creek cuts into the surrounding fan terrace and exclusively contains soils of the Pinamt-Tremant complex. This fan terrace zone is most variable and, having slopes ranging from nearly level to moderately steep, no fewer than 15 different soils have already been differentiated here. However, the most common ones include: Carefree cobbly clay loam, Tremant gravelly sandy loam, Ebon very gravelly loam, and others belong to the Carefree-Beardsley, Eba-Pinaleno, Suncity-Cipriano, and Gunsight-Cipriano, complexes. Hills constitute the sixth and last project zone and include only one large and one small unnamed example and a small northwestern part of Union Hills. Respectively, the gentle, moderate, and steep slopes there typically contain Vaiva very gravelly loam or coarse loams and exposed rock of the Gachado-Lomitas-Rock outcrop and Quilotosa-Vaiva-Rock outcrop complexes.

Although no project related fieldwork has yet been undertaken within either of the two parts of the USCWMP project area, archival research suggests the provisional existence there of three general plant communities. Specifically, the different drainage channels are expected to contain occasionally dense growths of desert trees (e.g., mesquite, paloverde, ironwood), catclaw, tomatillo, and tamarisk shrubs. In contrast, the adjacent floodplains and most of the fan terrace zone should be dominated by mainly bursage and creosote bushes, but also a modicum of cacti. The third and final plant community should characterize the steeper slopes of both Daisy Mountain and the different named and unnamed hills. A typical paloverde-mixed cacti association is expected to predominate there, and its numerous cacti will likely be represented by, among many others, scattered saguaro, barrel, and buckhorn, pencil, Christmas, and chain-fruit cholla.

PROJECT METHODOLOGIES

The six explicit project goals of this assessment project were all achieved by accomplishing numerous minor tasks and several major activities that were undertaken during the four concurrent or immediately successive phases of project administration, archival research, laboratory analysis, and report writing. All relevant aspects of those activities have already been elaborated by the project director in his project journal (SAS Form 220). Without a doubt, however, the most significant activities of this project have been those of the archival research and laboratory analysis phases. Thus, the most critical procedures of both phases are elaborated shortly.

Presently, however, it is important to realize that most of the research activities of the current assessment will eventually comprise one of the two principal components of an archeological inventory that will have to be performed prior to initiating any land disturbing geotechnical activities in the USCWMP project area. In general, therefore, all tasks and activities of this assessment were performed according to the professional standards and the procedural and reporting guidelines that have already been developed and formally disseminated by not only certain federal agencies (National Park Service 1977, Advisory Council on Historic Preservation 1986), but the national archeological community (McGimsey and Davis 1977) and especially the Arizona Board of Regents (1991) and the Arizona State Museum (1994). In addition, SAS considered certain draft recommendations recently made by the Arizona State Museum (1999) and the Arizona State Historic Preservation Office (1999) for implementing both the Arizona Antiquities Act of 1927 and the State Historic Preservation Act of 1982.

Further, all archeological sites were to meet the minimal characteristics of a site, as previously established by the Arizona State Museum (Fish 1994), and the archeological significance of all such resources was to be evaluated according to their individual potential for being nominated to either the National Register of Historic Places (National Register) or the Arizona Register of Historic Places (Arizona Register). The eligibility criteria for both Registers are essentially the same and were originally established, in 36 CFR 60, by the National Park Service (1976). Also, SAS continues to define isolated artifact loci as non-site manifestations that, most commonly, are represented by either a single prehistoric or historic specimen or a sparse, spatially distinct loci of such specimens that are known or strongly believed to predate 1949, the beginning of contemporary or modern times. They are variously referenced by other researchers as isolated finds, isolated occurrences, or simply isolates.

In actuality, however, all noncontemporary cultural resources of Arizona can date to either of three general time periods, or chronological eras: the prehistoric, the protohistoric, and the historic. For greater understanding later, regional prehistoric resources generally predate circa 1450, protohistoric resources date between 1450 and 1534, and historic resources typically span the approximate interval from 1534 to 1949. Further, Arizona's historic era is commonly divided into three general periods: Spanish (1534-1821), Mexican (1821-1848), and Anglo-American (1848-1949), or simply American. While the Spanish period is sometimes subdivided into earlier Spanish Exploration (1534-1690) and later Spanish Colonial (1690-1821) times, the Anglo-American period has commonly been subdivided into the Pre-Territorial (1848-1863), Territorial (1863-1912), and Statehood (1912-1949) phases.

Archival Research Phase

Scientific Archeological Services conducted two principal types of archival research during this USCWMP assessment project:

a comprehensive literature search and a thorough site records check. The explicit purpose of the literature search was to obtain and examine all relevant information that has been published concerning the natural environment, ownership, and archeology of both the USCWMP project area and its surrounding archeological locale. Several site record checks were actually completed during this project. The principal purpose of all of them was to locate and evaluate various sources of unpublished data (e.g., maps, site files, correspondences, records, photographs, etc.) concerning a) all previous cultural resource investigations of the defined project locale and, even more importantly, b) the different prehistoric and historic resources resulting from those investigations.

Scientific Archeological Services essentially began this archival research phase on April 20, 1999. Shortly thereafter, on May 7, 1999, a formal request was made by SAS for the Arizona State Museum to perform a comprehensive site survey file examination of all relevant ASM files, maps, records, photographs, etc. pertaining to all of its sites and previous projects occurring within the USCWMP project locale. Sharon F. Urban, ASM public archeologist, and Regina Chapin-Pyritz, ASM assistant public archeologist, had completed all aspects of this first site file check by May 24, 1999. Their area of investigation actually overlapped that of the requested area by 8.0 square miles, however, for it included the 38-square-mile area that is bordered by the following legal areas: Sec 19, 20, and 29-32 of T7N,R3E, Sec 5-8, 17-20, and 30 of T6N,R3E, Sec 25, 35, and 36 of T6N,R2E, Sec 1-3, 10, 11, 13-15, 22-27, and 34-36 of T5N,R2E, and Sec 18-20 of T5N,R3E. On May 28, 1999, SAS also requested all ASM information pertaining to any of the project sites at which any post-survey research (e.g., monitoring, testing, full-scale data excavation, etc.) had been performed and reported. All such information was quickly supplied to the author by Arthur W. Vokes, assistant curator for the ASM archeological collections.

Other record checks and numerous literature searches were performed throughout this project. All of them were completed at the following eight research facilities of the greater metropolitan Phoenix-Tempe area: 1) Scientific Archeological Services, 2) the Flood Control District of Maricopa County, 3) the Arizona Room of the Phoenix Central Library, 4) the Heard Museum Library and Archives, 5) the Public Records Room of the Arizona State Office of the U.S. Bureau of Land Management, 6) the Hayden Library at Arizona State University (ASU), 7) the Public Records Room of the Arizona State Land Department, and 8) the reference library at the State Historic Preservation Office. Admittedly, additional research could also have been performed at other local research institutions but was not, due to a rather short project schedule. For future consideration, such facilities include the Department of Anthropology at ASU, the Phoenix District Office of the BLM, the Arizona Department of Transportation (ADOT), the U.S. Tonto National Forest Service, the Museum of Northern Arizona, and the Pueblo Grande Museum (PG or PGM) in Phoenix.

Laboratory Analysis Phase

No artifact analyses were expected to be undertaken during this assessment, of course, for this project has included absolutely no fieldwork. Consequently, the majority of the time expended during this laboratory phase was spent analyzing and interpreting the vast array of data that have been generated by the different literature searches and site record checks. In addition, the most accurate data available were all carefully used to plot the general location, at least, of all archival sites occurring within both the USCWMP project area and its surrounding locale. Such plotting was performed on both the USCWMP Composite Map and all appropriate sheets of the USCWMP Project Base Map, which are later to be considered by the project geomorphologist. The remainder of this phase was used to finalize certain archeological materials of this project for their eventual curation by the Arizona State Museum. The SAS procedures for accomplishing such curatorial processing are the same as those officially formulated by the Arizona State Museum (Young 1988).

ARCHIVAL RESEARCH RESULTS

Much pertinent archeological data have been produced during this particular assessment project, and the explicit purpose of the following section is to document all of that information, as it relates to two principal topics of archeological concern: 1) the general cultural variability of the northern Salt River Valley and, especially, 2) the archeology of the Upper Skunk Creek Watercourse Master Plan study area. The second of these two topics will be considered by discussing both the prior cultural resource projects and the nature, designation, and location of all resulting prehistoric and historic resources of the entire USCWMP archeological assessment locale.

Culture Histories

The northern Salt River Valley was extensively utilized during both the prehistoric and historic past but, unfortunately, no single, comprehensive synthesis presently exists concerning the marked cultural variability of this panregional area. More localized overviews do exist, however, as the result of a tremendous amount of contract archeological research that has recently been completed from six major research locales that surround the upper Skunk Creek region itself. They are heavily relied upon here for the following discussion.

Four of the concerned localities have already been introduced, in the Environmental Setting section, and at least partially located, in Figure 1. Accordingly, valuable archeological resource syntheses have previously been provided for the New River Locale (Rodgers 1994a, 1995), the Western Cave Creek Locale (Rodgers 1996), the Paradise Valley Locale (Rodgers 1998a, 1998b, 1998c,

1993), and the Cave Creek Dam Archeological District (Smith 1974; Rodgers 1974, 1977, 1978; Henderson and Rodgers 1979).

The archeology of the two other localities has recently been summarized and evaluated as the result of two separate master plan studies of the FCDMC. The earlier study was completed by SAS (Rodgers 1994b), in 1994, and its area of investigation was originally termed the Skunk Creek Locale. To eliminate any possible confusion between that and the present USCWMP project, this former area is formally redesignated here as the Lower Skunk Creek Locale. As such, it is an irregular area that, being situated entirely south of the center of Adobe Dam, extends a maximum of 6.5 miles eastward from 83rd Avenue and a maximum of 4.0 miles northward from Greenway Road. It thus includes the entire boundary of the Skunk Creek Archeological District, but only the more significant southern part of the Adobe Dam Recreation Area (Bruder 1983a, 1983b), which generally coincides with the Adobe Dam Alternative Site No. 4 reservoir area (Dittert 1976a).

The second FCDMC study was only recently completed, in 1998, by Stantech Consulting, Inc. (SCI) of Phoenix. As reported by Giacobbe and Larkin (1998), its explicit research area was to have been that of the Middle New River Watercourse Master Plan. Hereafter, it is more informally referred to as simply the Middle New River locale, which consists of a large rectangular area that basically extends 9.0 miles northward from Thunderbird Road and 4.0 miles westward from 67th Avenue. This sixth and final locale both overlaps a southwestern part of the Lower Skunk Creek Locale, therefore, and its northern part includes a large area of numerous site excavations that Soil Systems, Inc. (SSI) (Doyel and Elson 1985) previously completed along the middle New River drainage.

Based largely upon the archeology of the above six locales, the vast archeological record of the combined New River-Skunk Creek-Cave Creek region may someday prove to have begun more than 11,500 years ago. If so, however, no sites of any Paleo-Indian or later Archaic cultures, or cultural traditions, have yet been reported from this particular part of the northern Salt River Valley. The Paleo-Indian and Archaic traditions constitute the two most popular stages of preceramic development in the United States and, in Arizona, they are presently known best from much more southeastern parts of this state.

Dating generally from 10,000 B.C. to 8000 B.C., the Paleo-Indian stage includes both the Clovis (ca. 9500-9000 B.C.) and sequent Folsom (ca. 8800-8200 B.C.) cultures. This early developmental stage is characterized by numerous Indian groups who very skillfully made and used large, lanceolate-shaped projectile points to hunt large game animals, including several species of extinct megafauna. To date, the only Paleo-Indian remains of this panregion reportedly occur near the town of New River, Arizona. They include the known, albeit professionally undocumented, occurrence of an isolated Clovis point and a series of three controversial lithic collections, which have been speculated by Peru (1984) to represent a) the Paleo-Indian preparation of certain hunting implements, b)

the butchering of game, and c) the processing of both cordage and animal hides.

Archeologically speaking, the Archaic actually designates a continental-wide phenomenon that is characterized by a much more diverse subsistence economy that was based on the hunting of smaller game animals, much plant food collecting, and, eventually, incipient agriculture. Currently, such activities in Arizona may be represented best by those of the Cochise Indians. The Cochise culture has recently been reevaluated by Huckell (1984). It was originally defined by Sayles and Antevs (1941), however, with its cultural history then having been divided into the three phases that Whalen (1971) suggests most likely date 7500-3500 B.C. (Sulphur Spring), 3500-1500 B.C. (Chiricahua), and 1500-200 B.C. (San Pedro). While no unequivocal Archaic sites have yet been fully documented from the New River-Cave Creek region, Kenny (n.d.) has speculated the intrasite coexistence of certain Archaic and Hohokam remains at a site in New River, Arizona.

The Hohokam Indians constitute the apogee of prehistoric culture in south-central and all southern Arizona (Haury 1945, 1976; Gumerman and Haury 1979; McGuire and Schiffer 1982; Gumerman 1991) and, therefore, an exhaustive discussion of this complex culture is obviously beyond the scope of this report. Characteristically, though, the Hohokam Indians were agriculturalists who employed intricate systems of canal irrigation, floodwater farming, and sheetwash farming. Importantly, they heavily supplemented their different cultivated foods (e.g., corn, squash, beans, etc.) with those obtained by hunting, gathering, and collecting a wide variety of indigenous plants and animals. Both inhumation and cremation were common human burial practices, and, whenever possible to do so, much rock art was produced. Hohokam habitations varied greatly through time and included subsurface pithouses, semisubterranean, masonry-footed, and adobe-walled structures, and large compounds built of adobe and rock. Several types of interfamily settlements have thus been recognized, but all of them commonly exhibit a preoccupation with making various craft products of especially pottery, stone, bone, and shell.

The Hohokam cultural sequence may have lasted more than 1,700 years but is presently undergoing much professional debate (Dean 1991). Traditionally, though, it has been divided into four periods: Pioneer, Colonial, Sedentary, and Classic; and a series of nine corresponding phases. The earliest period is the most controversial one but may have included the Vahki (A.D. 300-500), Estrella (A.D. 500-600), Sweetwater (A.D. 600-700), and Snaketown (A.D. 70-800) phases. The Colonial period is much better known and includes the Gila Butte (A.D. 800-900) and Santa Cruz (A.D. 900-1000) phases. The Sedentary period coincides with the Sacaton phase of A.D. 1000-1200. The final Classic period, at least in the northern Salt River Valley, consists of only the Soho (A.D. 1200-1300) and Civano (A.D. 1300-1450) phases.

Quite unfortunately, much less is currently known about the protohistoric era of the New River-Skunk Creek region. In brief

overview, though, this second era most often relates to a rather limited array of habitation and subsistence activities that are believed to have been undertaken by either of two Native American groups: the Pima and the Yavapai. The Pima, currently known by themselves as the Akimel O'odham ("river people"), are generally considered to be descendants of the Hohokam and, primarily, were sedentary agriculturalists who inhabited riverine reaches of especially the Santa Cruz, Gila, and Salt rivers (Russell 1975; Ezell 1983). In marked contrast, the Yavapai people were mainly hunters and gatherers who practiced a nomadic lifestyle that was based principally upon the ripening of a vast array of different indigenous foodstuffs (Gifford 1936; Khera and Mariella 1983). While their ancestry remains an issue of some heated professional debate, they most likely originated from either Yuman immigrants of western Arizona or the Southern Sinagua Indians of the Verde River valley in central Arizona.

Cultural activities of the third and final historic era are much more diverse, for they are most commonly associated, directly or indirectly, with the Anglo-American growth and development of not only the town of New River but, much more critically, that of the cities of both Cave Creek and Phoenix. Others exist, such as the politics, education, and economy of all such residential community growth, but some of the more significant research interests of the particular developments of these three communities include those of: desert habitation, ranching, stock raising, mining, canal construction and irrigation, and vehicular transportation (Carlson 1988). While none of them are believed to have begun prior to late Territorial times, all of them were occurring during the sequent Statehood (1912-1949) phase, and essentially all of them are continuing today.

Prior Research Projects

The archeology of the Upper Skunk Creek Locale itself is known as the result of no fewer than 28 previous cultural resource studies. For convenience sake, all of those projects are listed in Table 2, and a terse summary of each one is provided below. Table 2 should be self-explanatory, but the reader should be alerted to the fact that the different information presented there, as well as here in the following discussion itself, generally pertains to only those parts of the archival projects that occur within the defined boundary of the Upper Skunk Creek Locale. Also, because of the large quantity and often overlapping area of those projects, only the centerline or areal boundary of the most significant projects have previously been included in Figures 2, 3, and 4.

The first five of these 28 projects were actually cadastral surveys that were completed as the result of different individual contracts having been negotiated with the U. S. General Land Office (GLO). The two earliest GLO surveys were performed during January 27-March 2, 1894, when J. H. Martineau (1895a, 1895b) examined Township 5 North and Ranges 2 and 3 East. Later, Later, George F. Rigby and H. L. Baldwin (1920) surveyed T7N,R3E, between December

Table 2.

Prior Cultural Resource Studies
of the Upper Skunk Creek Locale

Cultural Resource Project	ASM Project No.	Contract Firm	Fieldwork Year	Local Isolates	Local Sites	Major Project Reference
GLO: T7N,R3E (G&SRB&M)	NA	NA	1916-1918	---	+	Rigby and Baldwin 1920
GLO: T6N,R2E (G&SRB&M)	NA	NA	1933	---	+	Kinsey 1935
GLO: T6N,R3E (G&SRB&M)	NA	NA	1922	---	---	Blout 1923
GLO: T5N,R2E (G&SRB&M)	NA	NA	1894	---	+	Martineau 1895a
GLO: T5N,R3E (G&SRB&M)	NA	NA	1894	---	---	Martinaeu 1895b
Maricopa County Reconnaissance	1964-004	ASM	1964-1965	---	+	Ayres 1965
Phoenix Flood Control Vicinity	1970-003	ASM	1970	---	+	Vivian 1970
CAP Granite-Reef Aqueduct	1972-005	ASM	1972	---	---	Kemrer et al. 1972
Adobe Dam Alternative No. 1	NA	ASU	1973	+	+	Treat and Dittert 1976a
Adobe Dam Alternative No. 2	NA	ASU	1973	+	+	Treat and Dittert 1976b
Adobe Dam Alternative No. 3	NA	ASU	1973	+	+	Treat and Dittert 1976c
CAP Granite-Reef Aqueduct	1976- 41	ASU	1976	---	---	Brown 1976
Pioneer Substation 69 KV Line Tap	1984- 83	ACS	1984	---	---	(letter report only)
New River Community Park	1985-174	SAS	1985	+	+	Rodgers 1985
Carefree Highway 12 KV Line	1986-171	ACS	1986	+	---	(letter report only)
Skunk Creek 12 KV Line	1990- 53	ACS	1990	+	---	(letter report only)
New River Park Communications	1990- 89	ACS	1990	+	---	Irwin 1990
Gavilan Peak Trespass	1991-112	ASLD	1991	+	---	Kenny 1991
Police Department Tower	1992- 57	ACS	1992	---	---	Allen 1992
Maricopa County Roadways	1993-230	MCDOT	1993	+	---	Kenny 1993
New River I	1994-292	SWCA	1994	+	+	Howell 1994
New River III	1994-358	SWCA	1994	+	---	Mitchell & Stubing 1994
New River II	1994-359	SWCA	1994	+	+	Stubing & Mitchell 1994
Desert Hills	1994-456	SWCA	1994	---	+	Neal 1994
Desert Hills Roadway	1995-193	SWCA	1995	---	---	Stubing & Mitchell 1995
Carefree Highway	1995-476	SSI	1995	---	---	Hansen 1996
New River Community Park Road	1998-124	D&M	1998	+	---	Wilson & Rogge 1998
Interstate-17 69 KV Realignment	1998-158	ACS	1998	+	---	Adams 1998

5, 1916 and May 24, 1918, and Sidney E. Blout (1923), U.S. Cadastral Engineer, surveyed T6N,R3E between August 15 and September 9, 1922. The last of these five GLO surveys was undertaken by B. J. Kinsey (1935). During December 5-8, 1933, he examined the entirety of T6N,R2E.

All 23 of the remaining archival projects of this locale have been professional archeological contract investigations and, with only two exceptions, all of them have been intensive field surveys, which are known or believed to have resulted in essentially a 100 percent surface coverage of their given project areas. Both of the two exceptions were reconnaissance, or incomplete, surveys that were completed by ASM staff members. The earlier one, ASM Project No. 1964-4, basically results as a site specific investigation that has been documented by Ayres (1965). The later one, ASM Project No. 1970-3, was a preliminary intersite study that Vivian (1970) undertook for the USACE and its proposed Phoenix Vicinity Flood Control Project.

Subsequently, and much more formally, the Corps finally designated the above project as its Gila River Basin, New River and Phoenix City Streams, Arizona Project. The ASU Anthropology Department investigated the archeological resources of this area, in 1973, and the resulting project report was assembled by Dittert (1976b). The three most critical chapters of it pertain to the fieldwork and results that were achieved at three alternative locations for the proposed Adobe Dam. Those locations are known as Adobe Dam Alternative Site No. 1 (Adobe Dam Alter. 1) (Treat and Dittert 1976a), Adobe Dam Alter. 2 (Treat and Dittert 1976b), and Adobe Dam Alter. 3 (Treat and Dittert 1976c). All three of these proposed reservoirs overlap at least very small eastern and western sections of Skunk Creek, of course. Adobe Dam Alter. 1 is situated less than one mile north of Carefree Highway. Adobe Dam Alter. 2 and 3 are actually contiguous reservoirs that are basically separated by Interstate 17. The former is situated north of Deem Hills and west of Middle Mountain; the latter is situated farther east, or just northeast of Middle Mountain. Collectively, these three project areas alone comprise roughly 928 acres, or about 23.89 percent of the entire USCWMP project area.

Two different institutional studies have also been made of the former Granite-Reef Aqueduct section of the CAP Canal, which is currently known as the CAP Hayden-Rhodes Aqueduct. The ASM investigated the preliminary alignment of this waterway in 1972, ASM Project No. 1972-5, and all of its results have been reported by Kemrer et al. (1972). The final alignment of this aqueduct was examined in 1976 by ASU, ASM Project No. 1976-41, and its similar results have been elaborated by Brown (1976a).

With only two single exceptions, ASM Project Nos. 1991-112 and 1993-230, all subsequent research within this locale has resulted from much contract work that has been undertaken entirely by private archeological firms. In 1985 Scientific Archeological Services surveyed the 80-acre parcel of the New River Community Park (NRCP). Coinciding with the W2NW4 of Sec 30 in T7N,R3E, this

park occurs about 2.4 miles east of Interstate 17 and only about 0.40 miles north of New River Road. The NRCP survey itself has been designated ASM Project No. 1985-174, and all aspects of it have been discussed by Rodgers (1985).

Interestingly, another 14 of the total 28 local projects have been linear in nature. Archaeological Consulting Services, Ltd. (ACS) of Tempe, Arizona, has completed six of them, and the purpose of all six has essentially been the compliance clearance for specific power utility lanes. The first five of these six projects were undertaken for Arizona Public Service (APS). In 1984 a short 0.36-mile-long section along the southern edge of Carefree Highway was examined, ASM Project No. 1984-83, prior to the installation of a 69 kV transmission line tap for APS's Pioneer Substation. In 1986 a much longer (2.6 miles) alignment, mainly along this same route, was surveyed, ASM Project No. 1986-171, before erecting the Carefree Highway 12 KV Transmission Line. In 1990 a short (0.15 miles) section of the Skunk Creek 12 kV line, ASM Project No. 1990-53, was examined north of Carefree Highway and immediately east of the 27th Avenue alignment. (No management report, as originally defined by the Arizona State Museum, currently exists for either of these three projects, although a brief letter report has been written for each one.) Later, in 1992, a short (0.20 miles) right-of-way (ROW) was surveyed in order to provide APS power to a city of Phoenix police transmitter station. That project has been designated ASM Project No. 1992-57, and its management report has been prepared by Allen (1992). Most recently and most significantly, ACS has intensively surveyed two APS ROWs that generally parallel each other along Interstate 17 between Carefree Highway and Dynamite Boulevard. All aspects of that Interstate-17 69 KV Realignment Project, ASM Project No. 1998-158, have been reported by Adams (1998). The six and final ACS survey was performed on behalf of US West Communications in 1990. Designated ASM Project No. 1990-89, it resulted in the examination of a 0.29-mile-long overhead power line that extends northwestward into New River Community Park (Irwin 1990).

The eight final linear project areas all coincide with sections of particular roadways. The first one is actually that of a trespass situation, known as the Gavilan Peak trespass, that, unfortunately, resulted in the preliminary construction of a bulldozer road across Arizona State Trust land prior to the archeological investigation of that unauthorized route. The eventual survey of this area was conducted for and by the ASLD, ASM Project No. 1991-112, and all of its results have been reported by Kenny (1991).

The seven other roadway surveys have all been undertaken at the request of MCDOT, and they have been completed by four different institutions. The first one, ASM Project No. 1993-230, was actually performed by MCDOT itself (Kenny 1993). It includes the field examination of both a short section (0.27 miles) of Desert Hills Drive (ASM Project No. 1993-230a) and a longer one (ASM Project No. 1993-230b) that extends the entire mile-long distance of Rockaway Hills Road between the partially developed

alignments of 7th Avenue and 7th Street. Two years later SSI intensively surveyed the entire local section of Carefree Highway, ASM No. 1995-476, and this project has been thoroughly discussed by Hansen (1996). In 1998 the NRCP road survey, ASM Project No. 1998-124 (Wilson and Rogge 1998), was begun and completed by Dames & Moore (D&M).

The four last roadway surveys have all been investigated by members of the Phoenix office of SWCA Environmental Consultants, Inc. (SWCA). The first one, ASM Project No. 1994-292, examined a 0.70-mile-long section of Circle Mountain Road, as it curves westward along the northern end of Pyramid Peak (Howell 1994). The second one, ASM Project No. 1994-359, considered a longer (1.20 miles) section of adjacent New River Road (Stubing and Mitchell 1994). The third survey, ASM Project No. 1994-358, occurred farther west, between Desert Hills Drive and Carefree Highway, and it resulted in the investigation of certain parts of 27th Avenue, Cloud Road, and 33rd Avenue (Mitchell and Stubing 1994). The fourth project, ASM Project No. 1995-193, intensively surveyed 7th Avenue and a short adjacent road that are located between Rockaway Hills Road and Desert Hills Drive (Stubing and Mitchell 1995).

The last of the concerned 28 archival projects of this Upper Skunk Creek Locale was completed by SWCA's Flagstaff office. It is also one of the largest of the local projects, even though it encompasses only the easternmost part (1,240 acres) of Anthem, a new residential development of the Del Webb Corporation that totals about 5,661 acres. The concerned local part of this Desert Hills project area, ASM Project No. 1994-456, extends 2.0 miles north of Desert Hills Drive and 1.0 mile west of 7th Avenue, as it overlaps about 380 acres of the USCWMP project area itself. Its environment and recent archeological survey results have all been detailed by Neal (1994).

Local Resources

As a result of the above 28 archival projects, 22 archeological sites are currently known to have once existed in the Upper Skunk Creek Locale and only 10 of them specifically occur in the more relevant USCWMP area itself. All 22 sites are discussed below but, importantly, they include two widely divergent types of sites: formal and informal. Twelve formal, or designated, sites exist, and all of them have been officially recorded by at least one professional archeological research facility. Further, all of them have been assigned a consecutive numerical designation that, given their relative location, includes an "AZ T:4:" prefix and an abbreviated suffix, indicating which research institution is presently responsible for housing its various data records. All available provenience data have already been used to relocate all of these particular sites in Figures 2, 3, and 4.

Prior to discussing the concerned sites, however, it should be informative to realize that the majority, or 14 of the 23 (60.8%), professional archeological surveys of this locale have produced at

least one and as many as 27 loci of isolated artifacts. Collectively, in fact, new fewer than 91 loci of isolated artifacts have been recorded by members of these 14 concerned projects. Most of the prehistoric loci have contained single pieces or sparse quantities of only undiagnostic artifacts, especially Hohokam plainware pottery and different pieces of stone debitage, or unused stone flakes resulting from various processes of stone tool manufacturing. Diagnostic isolates of the prehistoric era do also occur, however, and have included whole but usually broken fragments of, for example, decorated pottery, food grinding stones (e.g., manos, handstone, metates), projectile points, a host of stone tools (e.g., cores, hammerstones, knives, scrapers, etc.), and even a few pieces of shell jewelry. Similarly, historic isolates are of a diagnostic and undiagnostic nature, too. They most often include discarded tin cans and broken pieces of glass bottles and ceramic dinnerware.

DESIGNATED SITES

All 12 of the formally designated sites of the Upper Skunk Creek Locale date exclusively to the prehistoric past, and Table 3 summarizes certain critical characteristics of each one. Arizona T:4:2 ASU was originally recorded by ASU (Treat and Dittert 1976a) during its survey investigation of the proposed reservoir of Adobe Dam Alternative Site No. 1. Accordingly, this first archival site occurs within the actual USCWMP project area. Topographically, it occupies a low rise that is situated between Skunk Creek and one of its minor tributaries, just northwest of Skunk Creek Tank, and just north of a central part of the large unnamed hill located north of Carefree Highway. Overall, the resulting sparse artifact scatter measures about 65 m (213 ft) in diameter and has been interpreted to have been a temporary campsite, or limited activity locus, of the Hohokam. Its primary artifacts include Wingfield Plain, which designates one of the three major kinds of Hohokam plainware pottery, stone debitage, and several kinds of lithic tools: choppers, cores, knives, scrapers, scraper-planes, and a projectile point. The total lack of any decorated pottery and any diagnostic lithic artifacts prevented any accurate dating of this site.

Arizona T:4:3, 4, and 5 ASU occur farther south and were all recorded during ASU's investigation of the reservoir surrounding the third alternative location for Adobe Dam. All three sites have thus been reported exclusively by Treat and Dittert (1976c). As such, AZ T:4:5 ASU is located in the USCWPM project part of the Unnamed Tributary; AZ T:4:3 ASU and AZ T:4:4 ASU are located farther north in only the project locale. All three sites are believed to have been campsites associated with the seasonal exploitation of different indigenous plant resources. Further, all three are mainly ceramic scatters of Wingfield Plain pottery, with a total of only three lithic artifacts having been recorded at AZ T:4:4 ASU and AZ T:4:5 ASU and none at AZ T:4:3 ASU. This third site is the largest, presumably, but measures only about 35 m long and 10 m wide (114.8-32.8 ft). It also has the greatest quantity of pottery, which consists of 109 pieces of Wingfield Plain and 2 pieces of a decorated type known Santa Cruz Red-on-buff. These last

Table 3.

Characteristics of All Designated Sites
of the Upper Skunk Creek Archeological Research Locale

	<u>Legal</u>	<u>Location</u>	<u>Project</u> <u>Location*1</u>	<u>Owner*2</u>	<u>Site Type</u>	<u>Date</u>	<u>Major Site Reference</u>
AZ T:4:	2 ASU	SW4SE4NW4 of Sec 36 in T6N,R2E	PA	ASLD	Campsite	?	Treat and Dittert 1976a
AZ T:4:	3 ASU	NE4NE4SE4 of Sec 13 in T5N,R2E	L	Priv	Campsite	A.D. 900-1000	Treat and Dittert 1976c
AZ T:4:	4 ASU	NE4NE4SE4 of Sec 13 in T5N,R2E	L	Priv	Campsite	?	Treat and Dittert 1976c
AZ T:4:	5 ASU	SE4SE4SE4 of Sec 13 in T5N,R2E	PA	Priv	Campsite	?	Treat and Dittert 1976c
AZ T:4:	7 ASM	NE4SE4NW4 & NW4SW4NE4 of Sec 19 in T7N,R3E	L	ASLD	Fort, petroglyphs	?	Ayres 1965; Vivian 1970
AZ T:4:	31 ASU	SW4SW4SW4 of Sec 23 in T5N,R2E	L	ASLD	Campsite	?	Treat and Dittert 1976b
AZ T:4:	35 ASM	W2NW4 of Sec 30 in T7N,R3E & NE4NE4 of Sec 25 in T7N,R2E	L	BLM- ASLD	Fort, quarry, terraces	A.D. 1100-1250	Rodgers 1985
AZ T:4:119	ASM	NW4NE4SE4 of Sec 19 in T6N,R3E	PA	Priv	Field house	A.D. 1000-1200	Neal 1994
AZ T:4:120	ASM	W2NW4SE4 of Sec 19 in T6N,R3E	PA	Priv	Campsite ?	A.D. 1000-1200	Neal 1994
AZ T:4:121	ASM	W2NE4SE4 of Sec 19 in T6N,R3E	PA	Priv	Field house, terraces	A.D. 1000-1200	Neal 1994
AZ T:4:132	ASM	W2SW4SE4 of Sec 5 in T6N,R3E	L	Priv	Campsite ?	?	Howell 1994
AZ T:4:133	ASM	NESESE4 of Sec 8 in T6N,R3E	L	ASLD	Campsite ?	?	Stubing and Michell 1994

*1 Upper Skunk Creek Locale (L), USCWMP project area (PA)

*2 Private (Priv), Arizona State Land Department (ASLD), U.S. Bureau of Land Management (BLM)

two sherds tentatively date AZ T:4:3 to the Santa Cruz phase of possibly A.D. 900-1000. Neither AZ T:4:4 ASU nor AZ T:4:5 ASU has yet been dated.

Very few facts presently exists concerning AZ T:4:7 ASM, which was originally recorded by Ayres (1965) and, supposedly, later reevaluated by Vivian (1970). In fact, SAS provisionally maintains that this fifth archival site is actually that of AZ T:4:35 ASM, discussed shortly, but the confirmed plotted location of AZ T:4:7 ASM itself is suppose to coincide with a low hill situated in both the E2SE4NW4 and the W2SW4NE4 of Sec 19 in T7N,R3E. This archival location places AZ T:4:7 ASM well northwest of the USCWMP project area but still inside the project locality. Archeologically, this site has been interpreted as a small, prehistoric hilltop village, or fortification, that includes some petroglyphs but is characterized by 13 contiguous rooms that have 2.7-foot-wide walls standing 6.5 feet high. Surface pottery here is limited to a very sparse scatter of undefined plainware pottery, and no food grinding tools were observed. Somewhat justifiably, therefore, no cultural and no chronological placement of AZ T:4:7 ASM has ever been attempted by either of the ASM researchers.

Arizona T:4:31 ASU occurs much farther south and was first recorded during the ASU survey of the reservoir surrounding Adobe Dam Alternative Site No. 2. More specifically, it is located just north of Middle Mountain, which places it west of Interstate 17 and the USCWMP project area, and just east of the western boundary of this project locale. Treat and Dittert (1976b) describe AZ T:4:31 ASU as a sparse lithic scatter measuring about 135 m (442 ft) in diameter. The stone artifacts here occurred mainly along the site periphery, leaving a more central area of possible prehistoric activity, and include: choppers, cores, scraper-planes, utilized flakes, several manos, and much debitage. Lacking any pottery and any diagnostic lithic tools, it was considered impossible to assign this site to either a particular cultural group or even a general chronological period.

Arizona T:4:35 ASM was earlier recorded by Prescott College, as AZ T:4:3 PC, the Pueblo Grande Museum, as AZ T:4:2 PG, and the U.S. Bureau of Land Management, as AZ020-1426 BLM. Its most thorough investigation has resulted from the SAS survey (Rodgers 1985) of New River Community Park, however. The resulting New River Community Park Site overlaps this park boundary and occupies lands of both the ASLD and the BLM. Without a doubt, it is the largest and most important site of the entire Upper Skunk Creek Locale. Geographically, it is located along the western boundary of this locale and, fortunately, one-half mile west of the USCWMP project area itself.

Physically, AZ T:4:35 ASM extends about 1,000 m (3,281 ft) north-south and 800 m (2,624 ft) east-west, and it occupies roughly 140 acres that cross major parts of three local environmental zones. Archeologically, this is a multicomponent prehistoric site that is composed of no fewer than 20 separate features, or intra-component activity areas. The largest and northeastern component of

this site consists of a rather small part of a vast lithic quarry that has previously been investigated by Peru (1984) and may likely date to some unknown part of the Archaic period. However, both of the other two components have been assigned to the Hohokam and are provisionally dated to the transition of the Sedentary and Classic periods, possibly during A.D. 1100-1250. The northwestern component is the more conspicuous one, for it includes several field houses situated along the base and a small hilltop fortification perched atop a 75-meter-high low hill. The third and southeastern component includes both a large resource exploitation area, represented by different artifact scatters, and a rather large system of farming terraces, represented by various rock alignments known chiefly as check dams and linear borders, or contour terraces.

The next three sites are all known as the result of SWCA's Desert Hills survey at the Anthem residential community. All three are located in the USCWMP project area and just northwest of the intersection of 7th Avenue and Desert Hills Drive. As elaborated by Neal (1994), all three are rather small Hohokam sites dating to the Sedentary period of, perhaps, A.D. 1000-1200. The first site, AZ T:4:120 ASM, occurs immediately west of Skunk Creek and measures a maximum of 35 m (114.8 ft) in diameter. It appears to have simply been a campsite at which stone tools were made and plant foods were ground. The other two sites are located immediately east of Skunk Creek and, being situated less than 150 m (492 ft) apart, probably functioned together. Measuring less than 50 m (164 ft) in diameter, AZ T:4:119 ASM consists of a sherd and lithic scatter that surrounds a temporary surface habitation, or "field house," that is constructed of dry-laid cobble masonry. Arizona T:4:121 ASM is only slightly larger (40 m x 58 m or 131.2 x 190 ft) but includes a masonry field house, a mixed artifact concentration, and five possible field terraces. Wingfield Plain is the predominant pottery at all three sites but, interestingly, the lithic assemblages there are rather limited to only debitage and a few cores and manos.

The last two archival sites are AZ T:4:132 ASM and AZ T:4:133 ASM, and both are also known exclusively through the previous survey work of SWCA. Arizona T:4:132 ASM is located just east of the USCWMP project area, at a point situated just north of Circle Mountain Road, just north of Cline Creek, and immediately east of New River Road. As found and recorded by Howell (1994), this is a possible campsite measuring 110 m long and 50 m (360.9 by 164 ft) wide. Artifactually, it is represented by two spatially distinct and sparsely concentrated artifact scatters composed of Wingfield Plain pottery, stone debitage, and one metate fragment. The general dating of this Hohokam site is precluded by the total absence of any diagnostic artifacts.

Arizona T:4:133 ASM occurs farther south but is also situated only within the project locality, and not within the project area itself. More precisely, essentially all of it is located east of New River Road, just northwest of the 7th Street-Honda Bow Road intersection, just north of Rodger Creek, and just west of a low unnamed hill. Stubing and Mitchell (1994) have recorded AZ T:4:133 ASM as a rather large artifact scatter that surrounds a smaller but

denser artifact concentration, but no functional interpretation of it has yet ever been attempted. Overall, this possible campsite averages about 135 m (442.9 ft) in diameter, but no datable artifacts were observed here. Instead, its entire artifact collection is limited to one roughly finished projectile point, hundreds of pieces of stone debitage, and thousands of Wingfield Plain sherds.

UNDESIGNATED SITES

In marked contrast with those just described, very little factual information presently exists concerning the last 10 resources of this assessment project. Specifically, none of these informal, or undesignated, sites have yet been found and officially recorded by any professional archeological research team. Instead, all of them are known exclusively from previous GLO survey work. Thus, their current physical existence is unknown, which precludes their locations having previously been included in Figure 2, 3, and 4. However, summary attributes of all these resources are provided in Table 4.

No cultural resources are indicated by Martineau (1895b) as occurring in any USCWMP project part of T5N,R3E. Thus, all 10 of these informal sites are located in either of the four remaining townships of the Upper Skunk Creek Locale. Overall, they represent extremely little typological variability, for all of them are dirt roads. The only one of them that has been specifically named is the "Phoenix to Prescott Road," which must predate 1894. According to Martineau (1895a), it extends 4.3 miles generally southward through the following five legal parts of T5N,R2E: the SW4SW4 of Sec 2, the W2W2 of Sec 11, the W2 of Sec 14, the W2 of Sec 23, and the N2 of Sec 26. All but a small southern part of this road crosses only the project locale, rather than the USCWMP project area itself, and, unfortunately, its entirety has most likely been totally destroyed by the subsequent construction of Interstate 17.

Undesignated dirt roads therefore remain the most common type of informal sites of this entire locale. In fact, different parts of at least nine such roads could prove to still exist here. Seven of them predate 1933 (Kinsey 1935). They cross either this locale or the actual USCWMP project area in the following sectional subdivisions: all but the NE4 of Sec 25, the SE4 of Sec 35, and the NW4NE4 of Sec 36 in T6N,R2E. Interestingly, two possible segments of them parallel Skunk Creek, cross both the project locale and project area, and, as of 1981 at least, are actually indicated on the USGS quadrangle map of New River SE, Arizona, as being unimproved roads. The eighth road may once have been an old mining road that was used prior to 1922 (Blout 1923). It begins along the eastern bank of Skunk Creek, curves slightly southeastward around Pyramid Peak, winds along Rodger Creek, and finally ends at the "Chas. Beverly House," "Corral," and "Old Smelter" there. Project portions of this road occur in the SE4SE4 of Sec 7, the S2SW4 of Sec 8, and the N2NE4 of Sec 17 in T6N,R3E. The ninth and last undesignated road appears to have possibly been an original alignment of New River Road that has to have been used prior to

Table 4.

Characteristics of All Undesignated Sites
of the Upper Skunk Creek Archeological Research Locale

	<u>Legal Location</u>	<u>Project Location*</u>	<u>Date</u>	<u>Major Reference</u>
Township 5 North and Range 2 East:				
Phoenix to Prescott Road:	SW4SW4 of Sec 2	L, PA	pre-1894	Martineau 1895a
	W2W2 of Sec 11	L	"	" "
	W2W2 of Sec 14	L	"	" "
	E2W2 of Sec 23	L, PA	"	" "
	N2 of Sec 26	L	"	" "
Township 6 North and Range 2 East:				
Unnamed dirt roads (3)	NW4, SW4, & SE4 of Sec 25	L, PA	pre-1933	Kinsey 1935
Unnamed dirt road (1)	SE4 of Sec 35		"	" "
Unnamed dirt roads (3)	NW4 & NE4 of Sec 36	L, PA	"	" "
Township 6 North and Range 3 East:				
Unamed dirt road (1)	SE4SE4 of Sec 7	PA	pre-1922	Blout 1923
	S2SW4 of Sec 8	L, PA	"	" "
	N2NE4 of Sec 17	L	"	" "
Township 7 North and Range 3 East:				
Unnamed dirt road (1)	SW4SW4SW4 of Sec 19, Sec 30	L L, PA	pre-1918	Rigby and Baldwin 1920
	NE4 of Sec 31	PA	"	" " " "
	W2W2 of Sec 32	PA	"	" " " "

* Upper Skunk Creek Locale (L), USCWMP project area (PA)

1918 (Rigby and Baldwin 1920). This alignment is 2.5 miles long and crosses local and project specific parts of T7N,R3E: the SW4SW4SW4 of Sec 19, all of Sec 30, the NE4 of Sec 31, and the W2W2 of Sec 32. The two exclusive parts of this road that may also be specifically indicated on the 1964 USGS quadrangle map of Daisy Mountain, Arizona, occur immediately northeast of the low hill situated in the northwest corner of New River Community Park. More specifically, they are located in the SE4SE4SE4 of Sec 19 and the NW4NW4 of Sec 30 (T7N,R3E).

SUMMARY EVALUATION AND RECOMMENDATIONS

This archeological assessment will hopefully constitute a significant component of the overall Upper Skunk Creek Watercourse Master Plan. In particular, this project has undertaken and completed numerous minor tasks and major activities that have been directly associated with several literature searches and different site record checks. Its various results should therefore be important from at least five relevant perspectives.

First, a substantive environmental description has been provided for not only the USCWMP project area itself, but also for the immediately surrounding Upper Skunk Creek archeological research locale. From a comparative perspective, at least, that description should have been especially valuable for two reasons. Primarily, it has indicated that the concerned project area is represented by at least a small part of all six environmental zones that comprise both the project locale and its surrounding upper Skunk Creek region. In fact, the most significant differences between these two areas is that the project locale has more upper elevations of the several hills and single low mountain zone, whereas, understandably, the project area is better characterized by the actual channel, floodplain, and adjacent fan terraces occurring along Skunk Creek and its Unnamed Tributary. Secondly, this description has revealed that, as a whole, Skunk Creek is definitely not as large or as permanent of drainage as is either New River to the west or Cave Creek Wash to the east.

Second, a terse cultural history has been presented for the entire region occupied by the numerous desert tributaries of New River, Skunk Creek, Apache Creek, and Cave Creek. Accordingly, the Hohokam Indians dominate the prehistory of this interregional area and were especially active during the late Colonial, Sedentary, and early Classic periods of circa A.D. 900-1300. Interestingly, no definite protohistoric sites have yet been documented here. Historic sites are much more numerous, however, and include a variety of activities that began during the later part of the 1863-1912 Territorial phase and continued through the following Statehood phase of 1912-1949.

Third, a brief synthesis has been provided of the different cultural resource investigations that have previously been

undertaken across the Upper Skunk Creek Locale. Twenty-eight such studies have been individually considered, and this is a tremendous quantity, especially given the rather limited amount of modern development here. Collectively, these archival projects have been performed by professional members of different cadastral teams, 1 county agency, 3 State agencies, and 5 private archeological contract firms. Only seven of the 23 professional archeological surveys were of an areal nature; all 16 of the remaining ones have had much more linear project areas, which usually coincided with either large-scale waterworks, power utility lines, or county roadways. Nevertheless, the combined acreage of these same 23 projects totals about 1,419.09 acres, and it overlaps approximately 36.54 percent of the entire USCWMP project area. Most of this prior survey acreage, or 1,206.09 acres of it, occurs along Skunk Creek and represents 34.82 percent of the USCWMP project area there. The remaining 213 acres occur along the Unnamed Tributary, and they constitute 50.71 percent of this second project alignment.

Fourth, much effort was expended to locate, plot, and variously evaluate all archival resources of this project. In addition to numerous loci of isolated artifacts, these resources include a total of 12 formally designated sites and 10 informal, or undesignated, sites. Except for the two large multicomponent sites of AZ T:4:7 ASM and AZ T:4:35 ASM, which are restricted exclusively to the project locale, the sites of both project areas are remarkably similar to one another and all share the six following principal characteristics.

1. All of them are more numerous than the few sites previously recorded nearby along Apache Wash.

2. None of them are either as large or as plentiful as the sites known to exist farther east along Cave Creek Wash and much farther west along New River.

3. All 12 of the formally designated sites belong to the prehistoric era, and all of them are known or believed to be eligible for nomination to the Arizona Register of Historic Places. That is, all of them have yielded or have the potential to yield important information pertaining to the prehistory of the upper Skunk Creek region of northern Maricopa County, Arizona.

4. With only one possible exception, all 12 of these sites result from a rather limited variety of Hohokam activities that, generally speaking, were undertaken during the Santa Cruz and Sacaton phases of A.D. 900-1200. Quite consistently, too, they evince a primary concern with only temporary habitation, the exploitation of certain indigenous foodstuffs, and the practice of at least a modicum of desert agriculture.

5. All 10 of the undesignated sites are undeveloped dirt roads that must have been in use during 1894-1933. All of them have probably since been destroyed by subsequent use, therefore, and, if so, none of them would probably qualify for nomination to the Arizona Register.

6. None of the designated or undesignated sites of the USCWMP project area are known to contain any features, such as shrines or human burials, that might be considered sensitive to any Native American group.

Fifth, the integrated results of this assessment project should prove valuable for at least careful consideration during all subsequent decisions concerning the nature and location of all proposed geotechnical activity within the USCWMP project area itself. To help avoid future site impacts, for example, three recommendations are proffered. First, the quantity and size of the geotechnical test trenches, as well as the transect areas surrounding them, should only be those that are sufficient for accomplishing the explicit purposes of such subsurface excavation. Second, the placement of such trenches and transects within areas of previous archeological surveys should greatly reduce the unexpected occurrence of sites there. Third, two major environmental situations repeatedly occur among the different project sites and, thus, whenever possible, both might profitably be avoided when locating the various geotechnical trenches and transects. The first pattern occurs immediately east and west of Skunk Creek and is characterized by low topographic rises situated between two drainages. The second pattern generally occurs farther upslope and always occurs in direct association with the lower elevations of either a low hill or low mountain.

Finally, SAS recommends that absolutely no ground disturbing activities of any geotechnical work should subsequently be conducted for the USCWMP Project without having first had a professional archeological inventory performed, reported, and reviewed by appropriate representatives of all concerned project agencies. The primary and secondary activities of that inventory should be an intensive (100%) field survey and a limited amount of additional archival research. The former should be performed of all areas to be disturbed during the geotechnical investigation, including all vehicle access routes that are not previously established or existing roads, and, of course, all project transects and all test trenches within them. Given the nature of the present USCWMP assessment project, future archival work should be undertaken only to augment the current archival results or to answer specific research questions raised by the intensive field survey. Needless to say, all tasks and activities of that inventory project should comply with all specified provisions of all necessary project permits, the 1927 Arizona Antiquities Act, and the 1982 State Historic Preservation Act.

REFERENCES CITED

Adams, Kim

- 1998 Archaeological Assessment of Arizona Public Service Company's Proposed Interstate-17 69 KV Realignment, Maricopa County, Arizona. Ms., Archaeological Consulting Services, Ltd., Tempe.

Advisory Council on Historic Preservation

- 1986 Protection of Historic and Cultural Properties: Final Amendment (36 CFR 800). Federal Register 51 (169): 31115-31125, September 2.

Allen, Wilma

- 1992 An Archaeological Survey of Arizona Public Service Company Overhead Powerline Right-of-Way to Serve a City of Phoenix Police Transmitter Station, Maricopa County. Ms., Archaeological Consulting Services, Ltd., Tempe.

American Geological Institute

- 1974 Dictionary of Geological Terms. Anchor Press/Doubleday, Garden City, New York.

Arizona Board of Regents

- 1991 Arizona State Museum: Rules Implementing A.R.S. § 15-1631 and 41-841, Et seq., the Arizona Antiquities Act. In State of Arizona Administrative Rules and Regulations, Title 12, Chapter VIII. Arizona State Museum, Tucson.

Arizona State Historic Preservation Office

- 1999 Draft Guidelines for the State Historic Preservation Act. Ms., State Historic Preservation Office, Phoenix.

Arizona Land Resource Information System Division

- 1999 "Arizona Surface Management Responsibility: Arizona State Land Department and U.S. Bureau of Land Management." Medium-scale (1:100,000) map, Arizona State Land Department, Phoenix.

Arizona State Museum

- 1993 The Arizona State Museum Archaeological Site Recording Manual. Arizona State Museum, Tucson.
- 1994 The Arizona State Museum Procedures Manual For State Land Permits, Records Management/Repository Agreements, and Site Files Access. Arizona State Museum, Tucson.
- 1999 Draft recommended changes to the Arizona Board of Regents' Chapter VIII Rules for Implementing the Arizona Antiquities Act (A.R.S. § 15-1631 and 41-841 Et. Seq.). Ms., Arizona State Museum, Tucson.

Ayres, James E.

- 1965 A Summary of Archaeological Sites in Maricopa County. Ms. on file, Arizona State Museum in Tucson.

Blout, Sidney E.

- 1923 Township No. 6 North, Range No. 3 East, Gila and Salt River Meridian. General Land Office map examined and approved by the Surveyor General's Office in Phoenix, Arizona, on November 2.

Brown, David E.

- 1973 "The Natural Vegetative Communities of Arizona" (1:500,000). Arizona Game and Fish Department, Phoenix.

Brown, Patricia E.

- 1976 An Archaeological Survey of the Reach 10 Realignment of the Granite Reef Aqueduct, Central Arizona Project. Ms., Office of Cultural Resource Management, Arizona State University, Tempe.

Bruder, J. Simon

- 1983a Archaeological Investigations in the Adobe Dam Project Area. Research Paper 27, Museum of Northern Arizona, Flagstaff.

- 1983b Archaeological Investigations at the Hedgpeth Hills Petroglyph Site. Research Paper 28, Museum of Northern Arizona, Flagstaff.

Camp, Philip D.

- 1986 Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona. Soil Conservation Service, Phoenix.

Carlson, Frances C.

- 1988 Cave Creek and Carefree, Arizona: A History of the Desert Foothills. Encanto Press, Scottsdale.

Dean, Jeffrey S.

- 1991 Thoughts on Hohokam Chronology. In Exploring the Hohokam: Prehistoric Desert Peoples of the American Southwest, edited by G. J. Gumerman, pp. 61-149. University of New Mexico Press, Albuquerque.

Dittert, Alfred E., Jr.

- 1976a Adobe Dam, Alternative Site No. 4. In An Archaeological Survey in the Gila River Basin, New River and Phoenix City Streams, Arizona Project Area, assembled by A.E. Dittert, Jr., pp. 36-47. Anthropology Department, Arizona State University, Tempe.

- 1976b An Archaeological Survey in the Gila River Basin, New River and Phoenix City Streams, Arizona Project Area. Anthropology Department, Arizona State University, Tempe.

Doyel, David E. and Mark D. Elson (eds)

- 1985 Hohokam Settlement and Economic Systems in the Central New River Drainage, Arizona. Soil Systems Publications in Archaeology (1 & 2), Phoenix.

Earl, Richard A.

- 1983 Paleohydrology of Skunk Creek. In *Archaeological Investigations in the Adobe Dam Project Area*, by J. Simon Bruder, pp. 165-231. Research Paper 27, Museum of Northern Arizona, Flagstaff.

Ezell, Paul H.

- 1983 History of the Pima. In *Handbook of North American Indians: Southwest 10*, edited by Alfonso Ortiz, pp. 149-160. Smithsonian Institution, Washington, D.C.

Fenneman, Nevin M.

- 1946 "Physical Divisions of the United States." Small-scale (1:7,000,000) map, U.S. Geological Survey, Washington, D.C.

Fish, Paul R.

- 1994 Revised Site Definition Policy. Ms., Arizona State Museum, Tucson.

Flood Control District of Maricopa County

- 1999a Scope of Work: Upper Skunk Creek Watercourse Master Plan. Ms., Contracting Branch of the Administration Division of Maricopa County, Phoenix.

- 1999b USCWMP Project Base Map. Series of 15 large-scale (1:2400) aerial photographs that overlap the project area, prepared by the Geographic Information System (GIS) Branch of the FCDMC, Phoenix.

- 1999c USCWMP Land Ownership Map. Large-scale (1:9600) aerial photograph showing project parcel ownership, prepared by the Geographic Information System (GIS) Branch of the FCDMC, Phoenix.

- 1999d USCWMP Land Ownership List. Unpublished list of the name and address of the different project parcel owners, prepared by the Geographic Information System (GIS) Branch of the FCDMC, Phoenix.

- 1999e USCWMP Composite Map. Large-scale (1:24,000) map of the five USGS quadrangle areas that overlap the project area, prepared by the Geographic Information System (GIS) Branch of the FCDMC, Phoenix.

Giacobbe, John A. and Robert A. Larkin

- 1998 Middle New River Watercourse Master Plan; Cultural Resources Overview. Stantech Consulting, Inc., Phoenix.

Gifford, Edward W.

- 1936 Northeastern and Western Yavapai. University of California Publications in American Archaeology and Ethnology 34(4):247-354. Berkeley.

- Gumerman, George J. (ed)
1991 *Exploring the Hohokam: Prehistoric Desert Peoples of the American Southwest*. University of New Mexico Press, Albuquerque.
- Gumerman, George J. and Emil W. Haury
1979 *The Prehistory: Hohokam*. In *Handbook of North American Indians: Southwest 9*, edited by Alfonso Ortiz, pp. 75-90. Smithsonian Institution, Washington, D.C.
- Hansen, Eric
1996 *A Cultural Resources Survey of Carefree Highway Between Interstate 17 and Scottsdale Road, North-Central Phoenix, Maricopa County, Arizona*. Technical Report No. 95-27, Soil Systems, Inc., Phoenix.
- Haury, Emil W.
1945 *The Excavation of Los Muertos and Neighboring Ruins in the Salt River Valley, Southern Arizona*. Peabody Museum of American Archaeology and Ethnology 24 (1).
1976 *The Hohokam: Desert Farmers and Craftsmen*. University of Arizona Press, Tucson.
- Henderson, T. Kathleen and James B. Rodgers
1979 *Archaeological Investigations in the Cave Creek Area, Maricopa County, South-Central Arizona*. Anthropological Research Paper 17, Arizona State University.
- Howell, Todd L.
1994 *An Archaeological Survey Along New River Road and Circle Mountain Road, Maricopa County, Arizona*. Archeological Report No. 94-182, SWCA, Inc., Phoenix.
- Huckell, Bruce B.
1984 *The Paleo-Indian and Archaic Occupations of the Tucson Basin: An Overview*. *Kiva* 49 (3-4): 133-145.
- Irwin, Donald C.
1990 *An Archaeological Assessment of the US West New River Community Park Communications Line*. Ms., Archaeological Consulting Services, Ltd., Tempe.
- Kamilli, Robert J. and Stephen M. Richard (eds)
1998 "Geologic Highway Map of Arizona." Small-scale (1:1,000,000) map, Arizona Geological Society and Arizona Geological Survey, Tucson.
- Kemrer, Sandra, Sandra Schultz, and William Dodge
1972 *An Archaeological Survey of the Granite-Reef Aqueduct*. Archaeological Series 12, Arizona State Museum, Tucson.

Kenny, Brian W.

n.d. The New River Stricklin Site, AZ T:4:1 (ASU): An Early Transitional Site in the Hohokam Northern Periphery. Ms., U.S. Bureau of Land Management District Office, Phoenix.

1991 Archaeological Survey and Cultural Resource Evaluation of a Trespass Fence Installation near New River, Maricopa County, Arizona. Ms., Arizona State Land Department, Phoenix.

1993 A Cultural Resources Survey of Seven (7) Proposed Transportation-Related Construction Locations in the New River-Cave Creek Region of Maricopa County, South-Central Arizona. Ms., Maricopa County Department of Transportation, Phoenix.

Khera, Sigrid and Patricia S. Mariella

1983 Yavapai. In *Handbook of North American Indians: Southwest 10*, edited by Alfonso Ortiz, pp. 38-54. Smithsonian Institution, Washington, D.C.

Kinsey, B.J.

1935 Township No. 6 North, Range No. 2 East, Gila and Salt River Meridian. General Land Office map examined and approved by the U.S. Supervisor of Surveys in Denver, Colorado, on May 31.

Martineau, J. H.

1895a Township No. 5 North, Range No. 2 East, Gila and Salt River Meridian. General Land Office map examined and approved by the Surveyor General's Office in Tucson, Arizona, on January 28.

1895b Township No. 5 North, Range No. 3 East, Gila and Salt River Meridian. General Land Office map examined and approved by the Surveyor General's Office in Tucson, Arizona, on January 28.

McGimsey, Charles R., III and Hester A. Davis (eds)

1977 *The Management of Archeological Resources: The Airlie House Report*. Special publication of the Society for American Archaeology.

McGuire, Randall H. and Michael B. Schiffer (eds)

1982 *Hohokam and Patayan: Prehistory of Southwestern Arizona*. Academic Press, New York.

Mitchell, Douglas R. and Michael Stubing

1994 An Archaeological Survey of 158 Acres Along Cloud Road, 27th Avenue, and 33rd Avenue Between Desert Hills Road and Carefree Highway, Maricopa County, Arizona. Archaeological Report No. 94-227, SWCA, Inc., Phoenix.

National Park Service

1976 National Register of Historic Places: Nominations by State and Federal Agencies (36 CFR 60). Federal Register 41(6): 1590-1597, January 9.

1977 Recovery of Scientific, Prehistoric, and Archaeological Data: Methods, Standards, and Reporting Requirements: Proposed Guidelines (36 CFR 66). Federal Register 42 (19): 5374-5383, January 28.

Neal, Lynn A.

1994 An Archaeological Survey of the Proposed Villages at Desert Hills on 5,661 Acres in Maricopa County, Arizona. Archaeological Report No. 94-154, SWCA, Inc., Flagstaff.

Peru, Donald V.

1984 New River: A Lithic Industry of Maricopa County, Arizona. Occasional Paper 1, Arizona Archaeological Society, Phoenix.

Péwé, Troy L.

1987 Terraces of the Lower Salt River Valley in Relation to the Late Cenozoic History of the Phoenix Basin, Arizona. In Guidebook to the Geology of Central Arizona, edited by D. M. Burt and T. L. Péwé, pp. 1-45. Arizona Bureau of Geology and Mineral Technology Special Paper 2, Tucson.

Rigby, George F. and H. L. Baldwin

1920 Township No. 4 North, Range No. 3 East, Gila and Salt River Meridian. General Land Office map examined and approved by the Surveyor General's Office in Phoenix, Arizona, on May 14.

Rodgers, James B.

1974 An Archaeological Survey of the Cave Buttes Dam Alternative Site and Reservoir, Arizona. Anthropological Research Paper 8, Arizona State University, Tempe.

1977 Archaeological Investigations of the Granite Reef Aqueduct, Cave Creek Archaeological District, Arizona. Anthropological Research Paper 12, Arizona State University, Tempe.

1978 The Fort Mountain Archaeological Complex, Cave Buttes, Arizona. In Limited Activity and Occupation Sites: A Collection of Conference Papers, compiled by A.E. Ward, pp. 147-163. Contributions to Anthropological Studies 1, Center for Anthropological Studies, Albuquerque.

1985 An Intensive Archeological Survey of New River Community Park, Maricopa County, Arizona. MS, Scientific Archeological Services, Phoenix.

Rodgers, James B. (cont)

- 1991 Technical Proposal for Conducting Various On-Call Archeological Consulting Services for Maricopa County during Fiscal Year 1991-92. Ms., Scientific Archeological Services, Phoenix, Arizona.
- 1993a The Terravita Archeological Inventory Project of Northern Scottsdale, Arizona. Contract Archeological Series 993-10, Scientific Archeological Services, Phoenix.
- 1994a The Bragg Archeological Mitigation Project near the Town of New River in Northern Maricopa County, Arizona. Contract Archeological Series 992-6, Scientific Archeological Services, Phoenix.
- 1994b The Skunk Creek Master Plan Archeological Inventory Project of Northern Glendale, Arizona. Contract Archeological Series 994-5, Scientific Archeological Services, Phoenix.
- 1995 An Archeological Inventory for the New River Floodplain Mitigation Project of Northern Maricopa County, Arizona. Contract Archeological Series 995-5, Scientific Archeological Services, Phoenix.
- 1996 The Cave Creek Recreation Area Archeological Mitigation Project of Southwestern Cave Creek, Arizona. Contract Archeological Series 991-5, Scientific Archeological Services, Phoenix.
- 1998a An Archeological Inventory Along Apache Wash, Paradise Wash, and Desert Hills Wash in Northern Phoenix, Arizona. Contract Archeological Series 998-6, Scientific Archeological Services, Phoenix.
- 1998b The Cave Creek Sanitary Landfill Archeological Mitigation Project of Northern Phoenix, Arizona. Contract Archeological Series 993-5B, Scientific Archeological Services, Phoenix.
- 1998c An Archeological Inventory in the Southern Part of the Upper Cave Creek Watercourse Master Plan Study Area of Phoenix and Cave Creek, Arizona. Contract Archeological Series 998-3, Scientific Archeological Services, Phoenix.

Russell, Frank

- 1975 The Pima Indians. The University of Arizona Press, Tucson.

Sayles, E. B. and Ernst Antevs

- 1941 The Cochise Culture. Medallion Papers 29, Gila Pueblo. Globe.

Sellers, William D. and Richard H. Hill (eds)

- 1974 Arizona Climate. University of Arizona Press, Tucson.

Stubing, Michael and Douglas R. Mitchell

1994 An Archaeological Survey Along Seventh Avenue, Between Desert Hills Drive and Rockaway Hills Road. Ms., SWCA, Inc., Phoenix.

1995 Archaeological Survey Along New River Road Between Circle Mountain Road and Honda Bow Road, Maricopa County, Arizona. Archaeological Report No. 94-223, SWCA, Inc., Phoenix.

Treat, Raymond and Alfred E. Dittert, Jr.

1976a Adobe Dam, Alternative Site No. 1. In An Archaeological Survey in the Gila River Basin, New River and Phoenix City Streams, Arizona Project Area, assembled by A.E. Dittert, Jr., pp. 19-25. Anthropology Department, Arizona State University, Tempe.

1976b Adobe Dam, Alternative Site No. 2. In An Archaeological Survey in the Gila River Basin, New River and Phoenix City Streams, Arizona Project Area, assembled by A.E. Dittert, Jr., pp. 25-31. Anthropology Department, Arizona State University, Tempe.

1976c Adobe Dam, Alternative Site No. 3. In An Archaeological Survey in the Gila River Basin, New River and Phoenix City Streams, Arizona Project Area, assembled by A.E. Dittert, Jr., pp. 31-36. Anthropology Department, Arizona State University, Tempe.

Vivian, R. Gwinn

1970 Archaeological Investigation of the Corps of Engineers' Phoenix Vicinity Flood Control Project Area. Archaeological Series 1, Arizona State Museum, Tucson.

Whalen, Norman M.

1971 Cochise Culture Sites in the Central San Pedro Drainage, Arizona. Ph.D. dissertation, Department of Anthropology, University of Arizona, Tucson.

Wilson, Meredith A. and A. E. Rogge

1998 Archaeological Survey of New River Community Park Road, Maricopa County, Arizona. Ms., Dames & Moore, Phoenix.

Wilson, Eldred D., Richard T. Moore, and H. Wesley Peirce

1957 "Geologic Map of Maricopa County, Arizona." Medium-scale (1:375,000) map, Arizona Bureau of Mines, University of Arizona, Tucson.

Young, Holly

1988 Requirements for Processing of Archaeological Project Collections. Arizona State Museum, Tucson.

AN ARCHEOLOGICAL INVENTORY IN THE
UPPER SKUNK CREEK WATERCOURSE MASTER
PLAN STUDY AREA OF NORTHERN
MARICOPA COUNTY, ARIZONA

State of Arizona Antiquities Act Permit No. 1999-11BL

Prepared by:

James B. Rodgers
Scientific Archeological Services
2542 W. Monterey Way
Phoenix, Arizona 85017-5104

Prepared for and Submitted to:

Ms. Theresa M. Hoff
Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009

November 5, 1999

Contract Archeological Series 999-12

ABSTRACT

Scientific Archeological Services has just completed an archeological inventory of six geotechnical transects, at which subsequent test excavations are proposed in order to obtain certain geomorphological data needed to complete the Upper Skunk Creek Watercourse Master Plan. This entire inventory project has been sponsored by the Flood Control District of Maricopa County, and neither it nor any of the future excavations are known or expected to require any federal involvement. All six transects of this project do occur on State Trust lands, however, and, thus, none of them will be excavated without first having obtained official authorization to do so from the Arizona State Land Department.

Five of the six transects are situated along upper Skunk Creek (Transect SC 1, SC 2, SC 3, SC 4, and SC 5); the sixth one (Transect UT 1) occurs farther east along an unnamed drainage. Including three short sections of attached access roads, all six transects total only about 28.83 acres and are located in Phoenix and northern Maricopa County, Arizona. According to the three USGS quadrangle maps of Daisy Mountain, Biscuit Flat, and New River SE, Arizona, they are all located in the following legal sections: Sec 23 of T5N,R2E, the N2NW4 of Sec 19 in T5N,R3E, the NW4 of Sec 36 in T6N,R2E, and the NE4SE4SE4 of Sec 31 in T7N,R3E (G&SRB&M).

The results of this inventory are based on two major kinds of archeological research activity. First, previous archival research has included both literature searches and different site record checks. They reveal the existence of no archival sites in or immediately next to any of the project transects. Second, an intensive, or essentially complete (100%), field survey was performed at all six transects, as well as along three specific access roads. It was accomplished by walking a series of 26 linear swaths that were never wider than 20 m (65.6 ft) but did vary from 152.4 m to 670.5 m (500-2,200 ft) long. It results in the fact of having encountered absolutely no prehistoric or historic sites and not even one locus of isolated artifacts.

MANAGEMENT SUMMARY

The archeological results of both former archival research and the present intensive survey activities are consistent in indicating clearly that none of the proposed geotechnical excavation work should have any effect upon any cultural resources. All appropriate State agency authorization is therefore recommended for the FCDMC to continue all of its planned geomorphological testing along upper Skunk Creek and one of its unnamed eastern tributaries without having to undertake any additional archeological research there. If archeological monitoring of such testing is preferred, however, certain activities of that subsequent archeological project are also elaborated herein.

TABLE OF CONTENTS

	<u>Page</u>
Abstract	ii
Management Summary	ii
Introduction	1
Project Objective and Goals	4
Environmental Setting	5
Skunk Creek Region	5
Upper Skunk Creek Locale	8
USCWMP Project Area	9
Project Transects	13
Transect SC 1	15
Transect SC 2	19
Transect SC 3	21
Transect SC 4	23
Transect SC 5	24
Transect UT 1	26
Project Methodologies	28
Archival Research Phase	29
Fieldwork Phase	30
Laboratory Analysis Phase	32
Archival Research Results	32
Culture Histories	34
Local Resource Variability	36
Transect Resources	37
Field Survey Results	39
Project Evaluation and Recommendations	41
References Cites	44

LIST OF FIGURES

<u>No.</u>		<u>Page</u>
1	General location of the six geotechnical transects of the USCWMP archeological inventory project, as they occur in the Upper Skunk Creek archeological research locale.	2
2	Detailed location of project Transect SC 1, SC 2, and UT 1 in the far southern part of both the general USCWMP project area and the Upper Skunk Creek Locale...	10
3	Detailed location of project Transect SC 3 and SC 4 in a south-central part of both the general USCWMP project area and the Upper Skunk Creek Locale.....	11
4	Detailed location of project Transect SC 5 in a northern part of both the general USCWMP project area and the Upper Skunk Creek Locale.....	12
5	Detailed map of project Transect SC 1.....	18
6	Detailed map of project Transect SC 2.....	20
7	Detailed map of project Transect SC 3 and SC 4.....	22
8	Detailed map of project Transect SC 5.....	25
9	Detailed map of project Transect UT 1.....	27

LIST OF TABLES

<u>No.</u>		<u>Page</u>
1	Summary description of the six USCWMP transects.....	14
2	General floral variability of the six geotechnical transects of the USCWMP project area.....	16

INTRODUCTION

The present document is intended to be a technical management report that has been specifically designed to discuss the nature, methodologies, results, and recommendations of a recent archeological inventory of six separate geotechnical study units, or linear transects, all of which occur within the Upper Skunk Creek Watercourse Master Plan (USCWMP) study area. This USCWMP inventory project has been performed solely by Scientific Archeological Services (SAS), and its numerous investigative activities have been funded entirely by the Flood Control District of Maricopa County (Flood Control District or FCDMC).

For clarity sake, SAS considers an archeological inventory to be a listing, description, and evaluation of all prehistoric and historic resources that could be impacted by a governmental undertaking. SAS also continues to define a governmental undertaking as any project or activity that could alter the character, condition, or integrity of a significant prehistoric or historic property.

The Upper Skunk Creek Watercourse Master Plan itself has previously been defined in the project scope of work (Flood Control District of Maricopa County 1999). Accordingly, it is to a comprehensive document that develops and identifies alternative plans for providing protection from 100-year floods occurring along upper Skunk Creek from the town of New River, Arizona, southward to its intersection with the Central Arizona Project (CAP) Canal in northern Phoenix and Maricopa County, Arizona (Figure 1). Parenthetically, a 100-year flood is one that has only a one percent chance of occurring each year.

The USCWMP study project is an ongoing joint investigation by the Flood Control District and the city of Phoenix, and one of its principal requirements is twofold: 1) determine the potential lateral migration of the upper Skunk Creek and 2) evaluate the opportunities for and the benefits of implementing a non-structural solution to the periodic flooding of this drainage system. No action or activity of this overall project is expected to require the U.S. Army Corps of Engineers (Corps or USACOE) to issue the FCDMC a Clean Water Act Section 404 Permit. However, such study will obviously require the performance of certain geomorphological testing, and all such excavation work will definitely require a formal right-of-entry from the Arizona State Land Department (ASLD), for all six of the proposed geotechnical study units, as well as a few attached access roads, occur on Arizona State Trust land.

A preliminary total of 16 geotechnical trenches, or really geomorphological test pits, are planned to be excavated, and all of those necessary test excavations will eventually be performed by JE Fuller Hydrology & Geomorphology, Inc. (JE Fuller or JEF) of Tempe, Arizona. Further, these same 16 trenches will be variously situated within either of six linear transects that are elaborated later as Transect SC 1, SC 2, SC 3, SC 4, SC 5, and UT 1. The first five

trenches all occur along upper Skunk Creek (SC) itself. The sixth one is located along an unnamed eastern tributary of it, which is hereafter referred to as simply the Unnamed Tributary (UT).

All six geotechnical transects of this USCWMP inventory project also occur within an SAS archeological research locality known as the Upper Skunk Creek Locale. This is especially important for SAS has just recently completed a comprehensive archival research investigation of this entire locale. As reported by Rodgers (1999), that FCDMC archeological assessment investigation included several site record checks and numerous literature searches that were designed to obtain all available information pertaining to, among other things, the natural environment and both the prehistoric and historic resources of both the general USCWMP project area and the Upper Skunk Creek Locale, which immediately surrounds it. As already delimited here, in Figure 1, this same locale has an irregular plan that, measuring 14 miles long and a maximum of four miles wide, encompasses roughly 30 square miles.

The present USCWMP inventory project actually began October 14, 1999. On that date Mr. Douglas A. Williams, FCDMC senior water resource planner and USCWMP project manager, requested SAS to prepare a project cost proposal, which was accepted shortly thereafter. All subsequent activities of this archeological project have been completed according to explicit provisions of four relevant documents: 1) the previously cited USCWMP project scope of work, 2) a general or blanket Arizona Antiquities Act permit (No. ASM 1999-11BL), 3) an unnumbered non-collection repository agreement, which was signed by SAS and the Arizona State Museum (ASM) on December 17, 1998, and 4) a formal notice of intent (NOI) for SAS to undertake this study. Stipulations of all four governing documents reflect a host of requirements that are specified in different pieces of archeological legislation and corresponding procedural guidelines that are all mentioned shortly. The project NOI was submitted to the ASM on October 15, 1999, and, according to the standard operating procedure of SAS, a courtesy copy of it was then also sent to the ASLD.

Ms. Theresa M. Hoff, environmental services planner, administered this inventory project for the Flood Control District. As usual, her dedicated assistance is greatly appreciated by SAS, for it has involved several important tasks: 1) the expeditious negotiation of this particular work assignment, 2) the issuance of the project Notice to Proceed, which is dated October 18, 1999, 3) the maintenance of regular project communication with SAS, 4) the provision of an SAS copy of the USCWMP Composite Quadrangle Map, defined later, and 5) the review and agency acceptance of this final inventory report.

As its principal investigator, the author administered this project for SAS. He also performed some additional archival research and, on October 19 and 20, 1999, actually performed all of the required field survey activities himself. Various fiscal and laboratory analysis and support activities were also ably provided throughout this project by Carol A. Rodgers, SAS laboratory

director, and Ms. Michelle L. Howe, SAS project clerk and laboratory technician.

Much additional assistance was provided by several professionals who are totally unassociated with either the Flood Control District or SAS. Two staff members of JE Fuller were especially helpful. Mr. Jon E. Fuller, JEF principal, himself discussed several aspects of this project with the author and actually provided SAS with a series of project aerial photographs, which form the USCWMP Aerial Base Map. This aerial base map was extremely useful throughout this project. It is a colored, large-scale (1" = 400') aerial photograph that has all normal mapping data (e.g., north arrow, graphic and ratio scales, legend, etc.), and clearly indicates, among many other things, the location of every transect and geotechnical trench of this project, all major floral patterns, and the modern existence of all major and minor dirt roads. Mr. Michael Henze, JEF geomorphologist, was responsible for actually field marking the centerline of the six project transects, and he actually escorted the author to all six of them. Heidi MacDonald, administrative assistant in the ASM archeology division, conducted certain project specific responsibilities for the ASM, which is located on campus at the University of Arizona in Tucson, Arizona. Finally, Mr. Michael O'Hara, associate librarian and archivist, assisted SAS during an archival research investigation at the Museum of Northern Arizona (MNA) in Flagstaff, Arizona.

PROJECT OBJECTIVE AND GOALS

The Flood Control District plans to apply for a formal right-of-entry (ROE) from the Arizona State Land Department, in order to conduct the necessary geotechnical research, and an explicit prerequisite for eventually obtaining that ROE is expected to include the appropriate provision for having first undertaken a professional inventory of all land of the state of Arizona (State) that could be adversely effected by such a State undertaking. Thus, the legal impetus of this USCWMP archeological inventory project is, strictly speaking, the Arizona State Historic Pre-servation Act of 1982 (A.R.S. § 41-861 et seq.). As amended, this Act requires that, in cooperation with the Arizona State Historic Preservation Officer (SHPO), each State agency is to ensure that no significant resource property is inadvertently transferred, sold, altered, demolished, or substantially altered as the result of any activity undertaken across lands owned or controlled by the State, any agency or institution of this State, or any county or municipal corporations within this State. Less directly, the Arizona Antiquities Act of 1927 (A.R.S. § 41-841 et seq.) is very relevant, too, for, among other things, it authorizes only the Arizona State Museum to issue different archeological permits for investigating State lands, and it requires that the results of all such cultural resource surveys be promptly reported to the ASM.

Given the nature and legal jurisdiction of the proposed undertaking, a primary purpose of this USCWMP inventory has been to

assist the Flood Control District, the Arizona State Land Department, the State Historic Preservation Office, and the Arizona State Museum with their respective compliance responsibilities of the above two Acts. This overall project objective could therefore have required SAS to achieve any or all of the following eight project goals:

1. Represent the FCDMC during all interagency meetings held in conjunction with this particular inventory project.
2. Define the nature and area of potential adverse effect of the proposed State undertaking.
3. Identify all prehistoric and historic resources that could be affected by it.
4. Report the occurrence of all Indian burial remains and funerary objects encountered during the project survey.
5. Evaluate the potential archeological significance of all prehistoric and historic project resources.
6. Assess the nature of effects that the project undertaking might have upon all significant cultural resources.
7. Recommend realistic alternative measures for alleviating, or mitigating, all adverse effects of the proposed undertaking.
8. Document all relevant information pertaining to the nature, activities, results, and recommendations of this archeological study.

ENVIRONMENTAL SETTING

A complete graphic delineation and thorough textual description of the entire USCWMP project area has already been included by SAS in its USCWMP archeological assessment report (Rodgers 1999). The following discussion relies heavily upon that earlier one and, thus, its principal purpose is to provide a comprehensive view of not only the six separate project transects, but also the surrounding environment in which they occur. To achieve this goal, as well as for greater comparative comprehensiveness, various SAS field and archival data are presented as they relate to four arbitrary levels of successively increasing spatial specificity: 1) the general Skunk Creek region, 2) the Upper Skunk Creek archeological research locale, 3) the general USCWMP project area, and, of course, 4) the six actual geotechnical transects.

Skunk Creek Region

Figure 1 has appropriately indicated that it was based on Sheet 2 of the land ownership map that was updated by the ASLD on

January 7, 1993. That map should therefore have been important for three main reasons. First, it confirms the earlier statement that all six of the project transects occur on State Trust lands of the Arizona State Land Department. Second, Figure 1 has illustrated the fact that all six transects are situated within the Upper Skunk Creek Locale, which is itself immediately associated with four adjacent localities of much previous archeological, as well as environmental, research. For the purpose of later discussions, the New River Locale (Rodgers 1995), as modified in the USCWMP assessment report (Rodgers 1999:5), is the only one of the four that occurs west of Skunk Creek. The other three are contiguous locales situated east of this drainage. From north to south, they include the Western Cave Creek Locale (Rodgers 1996), the Paradise Valley Locale (Rodgers 1998a), and the Cave Creek Dam Archeological District (Rodgers 1978).

Third, and most importantly, Figure 1 has introduced the general geography of the upper Skunk Creek region. As such, this region is situated within the northern Salt River Valley and a northern part of Maricopa County, Arizona. The smaller southern part of this region basically occurs south of Cloud Road and is located across a northern part of the city of Phoenix, Arizona, but two other relevant communities occur also. First, the unincorporated community of New River, Arizona, occurs only about 8.5 miles north of the intersection of Skunk Creek and Carefree Highway, and the city of Cave Creek, Arizona, occurs 10.2 miles east-northeast of this same intersection. The two exclusive county parks of this region are the Ben Avery Shooting Range and Recreation Area and the Adobe Dam Recreation Area. The first one occupies 1,443 acres and is located only about 0.82 miles west of the Skunk Creek-Carefree Highway intersection. The second one includes roughly 1,500 acres and occurs both north and south of the undeveloped intersection of 43rd Avenue and Deer Valley Road.

Vehicular access through this region is provided mainly by only two major roadways. Interstate 17 is the much larger of the two, of course, and is the principal route between the town of New River and downtown Phoenix, which occurs about 25 miles south of its intersection with Carefree Highway. Carefree Highway itself is a main east-west thoroughfare that leads 10 miles eastward from Interstate 17 to Cave Creek Road, which then continues only 2.5 miles northeastward to downtown Cave Creek, Arizona, and 6.25 miles westward from this intersection to Lake Pleasant Road, which then continues about 5.25 miles northwestward to Lake Pleasant. The two major waterworks of this region are the Hayden-Rhodes Aqueduct section of the Central Arizona Project (CAP) Canal and Adobe Dam. The former crosses Interstate 17 between the undeveloped alignments of Dynamite Boulevard and Dixileta Drive. The latter is a flood control structure that was constructed in 1981. Hydrologically, it separates the lower and upper reaches of Skunk Creek.

Environmentally, the upper Skunk Creek region exists within both the Phoenix Basin (Péwé 1987) and the southern, or Sonoran, section of the Basin and Range Physiographic Province (Fenneman 1946). It therefore enjoys a warm, arid climate that is especially

suitable for fall, winter, and spring recreation. As elaborated by Sellers and Hill (1974:143), it is characterized by high diurnal temperatures, low precipitation, and low relative humidity. Due to the size and topographic variability of this region, its precipitation rate and temperatures are somewhat variable (Camp 1986). Generally speaking, though, the average annual precipitation here ranges from 6 inches to 12 inches but is usually between 7 inches and 10 inches, and its average annual air temperature ranges from 66° to 73° F., but it most commonly averages between 70° and 73° F. Such factors combine to form a regional frost-free growing season that varies from about 270 days to 300 days.

The indigenous plants of this particular region typically belong exclusively to the Arizona Upland subdivision of the Sonoran Desertscrub land (Brown 1973). The regional geology has been examined, studied and actually mapped by not only Wilson et al. (1957) but, most recently, by Kamilli and Richard (1998), too, and its numerous soils have been thoroughly discussed, classified and mapped by the Natural Resources Conservation Service (NRCS) (Camp 1986). Based on the SAS archival interpretation of these different data, as well as some prior SAS fieldwork and certain terms of the American Geological Institute (1974), the upper Skunk Creek region is believed to be composed of no fewer than six major environmental zones.

From lowest to highest, these zones include: 1) the Skunk Creek drainageway, 2) the Skunk Creek floodplain, 3) an expansive fan terrace, 4) shallow drainages and larger arroyos entrenched across this terrace, 5) low isolated hillocks and higher hills, and 6) one low mountain. The single mountain here is Daisy Mountain, which rises from about 2,000 feet to 3,176 feet above sea level. Hills are more numerous and, always being less than 1,000 feet high, are often unnamed but do include those of Adobe Mountain, Deem Hills, Gavilan Peak, Middle Mountain, Pyramid Peak, and Union Hills. Two particular parts of the Skunk Creek fan terrace zone have been specifically designated as Biscuit Flat and Little Deer Valley. Paradise Valley and Apache Peak occur farther east. The former is drained southward by Cave Creek Wash and Apache Wash, one of its major western tributaries. Apache Peak is situated just west of Apache Wash and just northwest of Maricopa County's Cave Creek Recreation Area.

The paleohydrology of Skunk Creek has previously been investigated by Earl (1983), who has suggested that it may once have been a seasonal drainage. Presently, however, Skunk Creek is only an ephemeral stream that constitutes the principal drainage of this region, of course, and is one of the largest eastern tributaries of New River, which is a large eastern tributary of the Agua Fria River. Both New River and Skunk Creek originate in the New River Mountains that occur northeast of the town of New River, and, interestingly, branches of both drainages occur at one point in Section 9 of Township 7 North and Range 3 East, in fact, where they are less than 0.3 miles apart. Skunk Creek itself flows generally southwestward and is roughly 30 miles long and drains an alluvial basin of approximately 110 square miles.

Upper Skunk Creek Locale

The complete spatial boundary of the Upper Skunk Creek Locale or, more simply, the USCWMP project locale has also been included in Figure 1. This area is strictly an arbitrary archeological locality that was chosen by SAS on the basis that it includes the maximum boundary of all the different legal sections that contain even a very small part of the actual USCWMP project area itself, which is defined shortly. More specifically, this particular locale extends 0.38-0.82 miles north, 0.23-1.18 miles east, 0.39-0.52 miles south, and 0.22-1.30 miles west from the maximum boundary of the USCWMP project area.

The most detailed view of the northern, central, and southern sections of both the Upper Skunk Creek Locale and the smaller USCWMP project area appears in three contiguous figures of the USCWMP archeological assessment report (Rodgers 1999: Figs. 2-4). Those three oversize figures are actually composite illustrations that were based on five large-scale (1:24,000) quadrangle maps that the U.S. Geological Survey (USGS) had previously mapped and designated, between 1957 and 1965, as Daisy Mountain (1964), New River SE (1964), Biscuit Flat (1965), Union Hills (1964), and Hedgpeth Hills (1957), Arizona. These same five quadrangle maps form the basis of the previously introduced USCWMP Composite Quadrangle Map. Less formally, those respectively mapped areas have also been designated by the Arizona State Museum as AZ T:4 NE, AZ T:4 SE, AZ T:4 SW, AZ T:8 NE, and AZ T:8 NW.

Overall, therefore, this USCWMP project locale is irregular in plan and a far northeastern part of it immediately borders a southwestern part of the U.S. Tonto National Forest. Geographically, it extends a maximum of 14 miles northward from the largely undeveloped alignment of Dynamite Boulevard to undeveloped Photo View Road and a maximum of 4.0 miles eastward from locally undeveloped 35th Avenue to only partially developed 7th Street. Spatially speaking, it encompasses the approximate 30 square miles that, in reference to the Gila and Salt River Baseline and Meridian (G&SRB&M), occupy the following 30 legal sections (Sec): 1) Sec 1, 2, 11, 13, 14, and 23-26 of Township 5 North and Range 2 East (T5N,R2E), 2) Sec 18-20 of T5N,R3E, 3) Sec 25, 35, and 36 of T6N,R2E, 4) Sec 5-8, 17-20, and 30 of T6N,R3E, and 5) Sec 19, 20, and 29-32 of T7N,R3E.

At least a small part of all six environmental zones of the upper Skunk Creek region also occurs within this archeological locale. Skunk Creek and its adjacent floodplain basically bisect this area and are surrounded by an eastern part of Biscuit Flat, a central part of Little Deer Valley, and other undesignated parts of the more encompassing fan terrace zone. Such areas are composed chiefly of deep deposits of Quaternary silt, sand, and gravel that date primarily to the middle Pleistocene and Holocene, or Recent, epochs. The two largest tributary drainages of the local terrace include the lowest reaches of both Cline Creek and Rodger Creek. The low mountain zone is locally represented only by a large eastern part of Daisy Mountain, and the sixth zone is represented

by several yet unnamed hills, a small western and northern part of Union Hills, a small northwestern part of Pyramid Peak, and nearly all of Middle Mountain. These conspicuous landforms contain a variety of igneous (basalt, andesite, rhyolite, etc.) and metamorphic (e.g., granite, gneiss, etc.) rock that was formed predominantly during the Quaternary and much earlier Proterozoic periods.

USCWMP Project Area

This third and smaller research area is even more critical, for it actually contains the six transect locations of proposed geomorphological test excavation. Once again, both the full physical extent and the complete boundary of this area have previously been delimited in Figures 2, 3, and 4 of the USCWMP archeological assessment report (Rodgers 1999). Thus, none of those cumbersome maps should need to be provided here. For later convenience, however, the far southern, a south-central, and a northern part of this general project area, as well as surrounding parts of the Upper Skunk Creek Locale, are included here in Figure 2, 3, and 4.

This general USCWMP project area is essentially a long but relatively narrow corridor that occupies a total of 3,883.8 acres. More importantly, all of this acreage is composed of two contiguous alluvial drainage alignments. The first, or Skunk Creek, alignment is the much larger one. It encompasses 3,463.80 acres and, except for one small, western linear strip of it, occurs entirely east of Interstate 17. This area begins at the intersection of Skunk Creek and the CAP Hayden-Rhodes Aqueduct. It then extends generally northward along Skunk Creek and, after a total distance of about 14.84 drainage miles, ends at a point located east of the town of New River, 0.43 miles south of undeveloped Photo View Road, and 1.26 miles west of the Tonto National Forest. This Skunk Creek alignment averages only about 2,400 feet wide, although its width does range from a minimum of about 1,000 feet to a maximum of about 3,600 feet. It is a true linear route, therefore, that descends gently southward and southwestward from approximately 2,245 feet to 1,520 feet above sea level. New River Road formerly provided northwest-southeast access across the entire local area occurring between the towns of New River and Cave Creek. The Prescott-Mesa 230 KV Power Transmission Line generally parallels this roadway and is located about 0.60 miles west of it.

The second and much shorter part of this project area coincides with a lowermost reach of an unnamed tributary of Skunk Creek that originates just west of Apache Wash and just southwest of a large unnamed hill situated west of Paradise Valley. This Unnamed Tributary then flows 3.35 miles westward, immediately bypassing the northern edge of Union Hills, and continues 2.23 miles southward, where it finally enters Skunk Creek at a point located only about 0.38 miles south of the CAP canal. This second part of the project area actually begins at this CAP Hayden-Rhodes Aqueduct, however, and it then continues upstream for a total distance of about 3.30 miles. Being quite consistently only about 1,100 feet wide, this resulting project alignment encompasses only about 420 acres, and

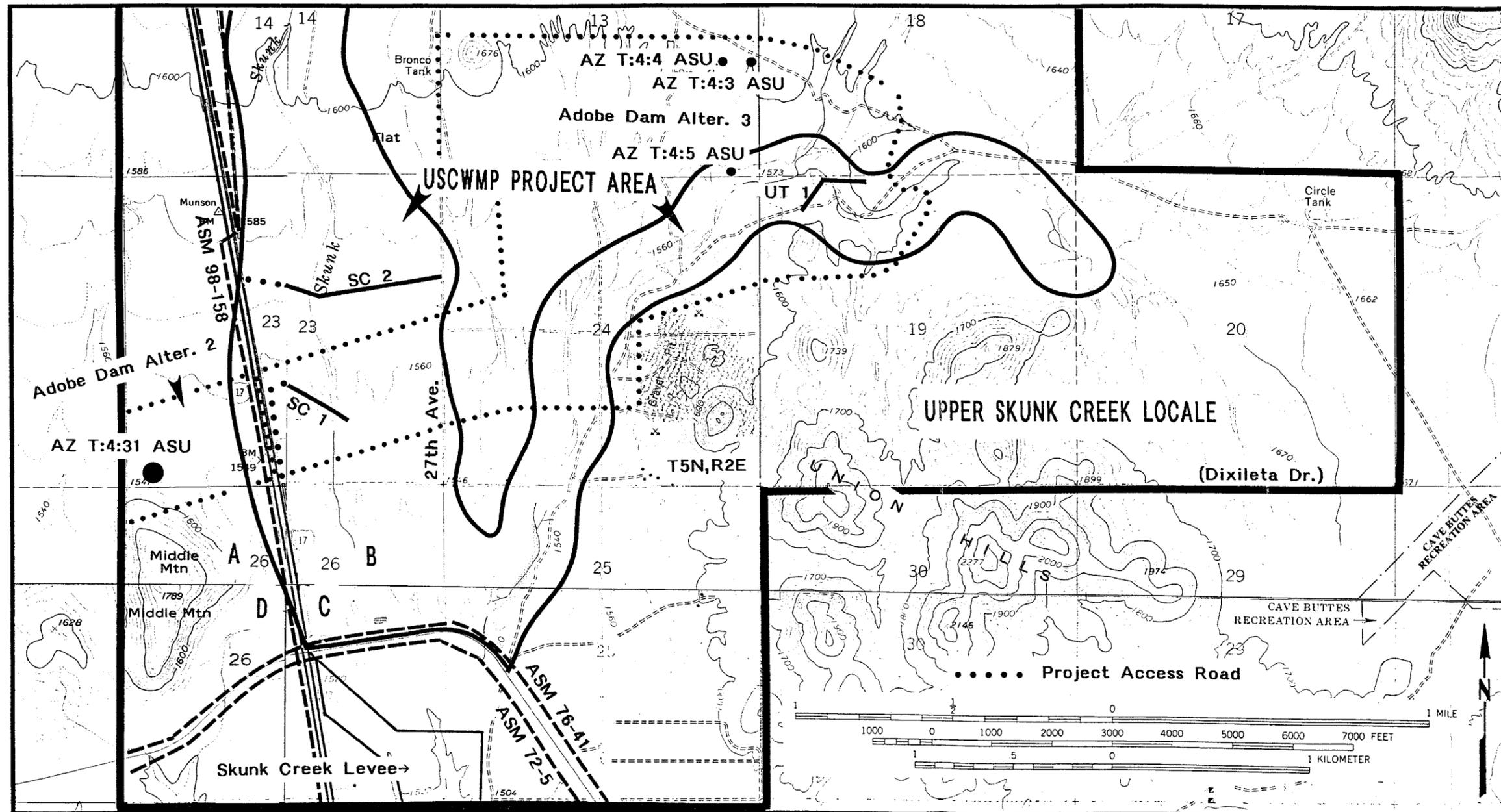


Figure 2. Detailed location of project Transect SC 1, SC 2, and UT 1 in the far southern part of both the general USCWMP project area and the Upper Skunk Creek Locale. (based on the USGS 7.5' quadrangle maps of Biscuit Flat [A], New River SE [B], Union Hills [C], and Hedgpeth Hills [D], Arizona.)

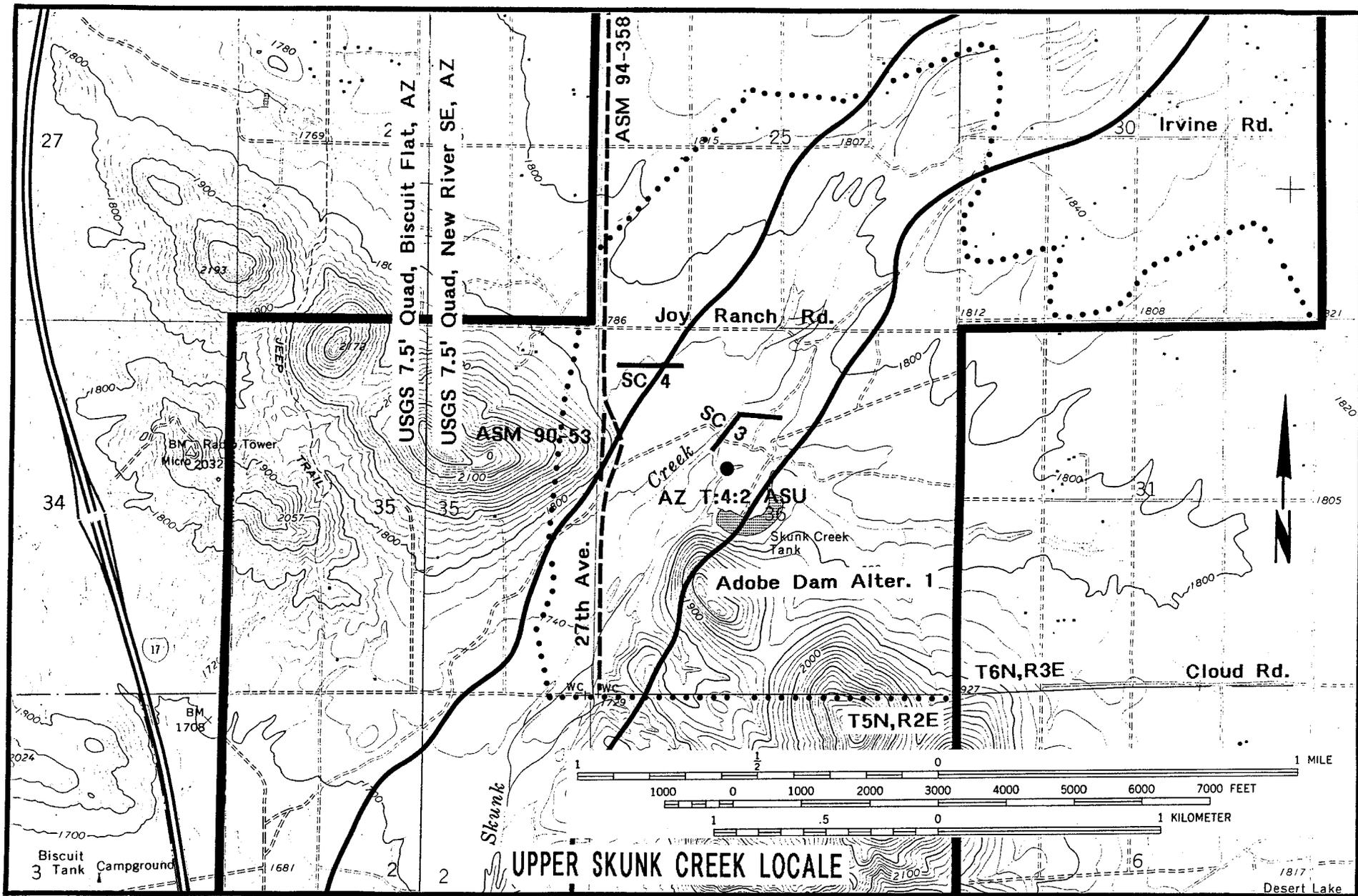


Figure 3. Detailed location of project Transect SC 3 and SC 4 in a south-central part of both the general USCWMP project area and the Upper Skunk Creek Locale. (based on the 1964 USGS 7.5' quadrangle maps of Biscuit Flat and New River SE, Arizona.)

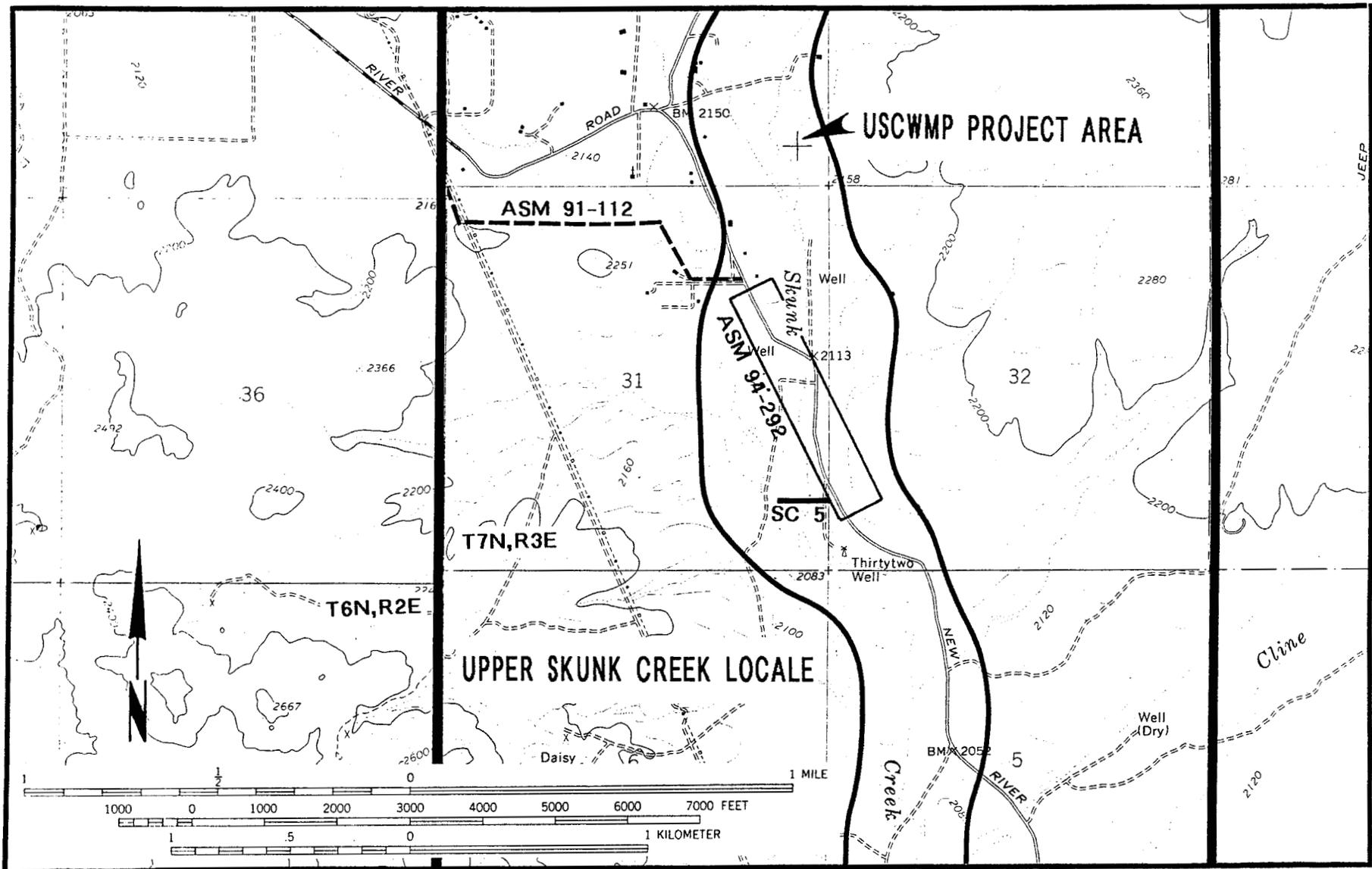


Figure 4. Detailed location of project Transect SC 5 in a northern part of both the general USCWP project area and the Upper Skunk Creek Locale. (based on the 1964 USGS 7.5' quadrangle map of Daisy Mountain, Arizona.)

it descends in elevation from about 1,640 feet to 1,520 feet above sea level.

Given the narrow, alluvial nature of the planned development, it is somewhat surprising but at least a small part of all six of the environmental zones of both the upper Skunk Creek region and the Upper Skunk Creek Locale actually occurs within this USCWMP project area. Also, all but one of the six zones occur within both the longer Skunk Creek and the much shorter Unnamed Tributary parts of this project area. The exception is the low mountain zone, which is limited to a very small eastern part of Daisy Mountain that is situated just southwest of the intersection of Skunk Creek and New River Road.

Skunk Creek is, of course, the principal drainageway of this general project area. Local examples of more secondary drainages extend across the extensive fan terrace east and west of it and, from north to south, are represented best by terminal reaches of Cline Creek, Rodger Creek, and the Unnamed Tributary. Hereafter, all such drainage routes are defined more fully as being composed of three hydrologic components: 1) an actual drainage channel, 2) an adjacent floodway of periodic flooding, and 3) a 100-year floodplain. The FCDMC has already included the specific boundaries of all three components on its the USCWMP Composite Quadrangle Map, as just recently defined.

Project Transects

Each of the six geotechnical transects of this USCWMP project is discussed separately below, as they generally occur, first, from south to north along Skunk Creek and, second, along the Unnamed Tributary. Once again, they have been individually designated (Transect SC 1 through SC 5 and Transect UT 1), and their detailed locations within both the general USCWMP project area and the surrounding Upper Skunk Creek Locale have previously been indicated here in Figure 2, 3 and 4. Including three short sections of necessary vehicle access roads, these six transects total 28.73 acres, and certain summary attributes of them are succinctly presented below in Table 1.

For even greater detail, every transect is also included on a separate map showing each transect in relation to its immediate vehicle access route and its associated environmental zones. These transect maps are based on the different sheets of the USCWMP Aerial Base Map, and three different kinds of dirt roads are indicated on them. "USGS road" simply designates a road that, due to its common or intensive use, has been specifically included by the USGS on either of the three project quadrangle maps. All "modern" roads are considered to be previously established dirt roads that do not occur on a particular quadrangle map and, thus, must postdate its publication. Lastly, a "project access road" is a route that was established during the present project in order to allow later vehicle access to a particular USCWMP project transect.

Table 1.

Summary Attributes of All Six USCWMP Inventory Transects

	SC 1	SC 2	SC 3	SC 4	SC 5	UT 1
Drainageway:*1	SC	SC	SC	SC	SC	UN
Land Ownership:	ASLD	ASLD	ASLD	ASLD	ASLD	ASLD
Transect Size:						
length (ft)	1,100	2,680	1,200	870	560	1,335
width	130	130	130	130	130	130
acres	3.28	8.0	3.58	2.60	1.67	3.98
Project Access Road:	+	+	-	-	-	+
length (ft)	1,815	600	---	---	---	750
width (ft)	65	130	---	---	---	65
acres	2.71	1.79	---	---	---	1.12
Total Acreage:	5.99	9.79	3.58	2.60	1.67	5.10
USGS 7.5' Quad Map:*2	BF, NRSE	BF, NRSE	NRSE	NRSE	DM	NRSE
Legal Location:	S2 Sec 23 T5N,R2E	N2 Sec 23 T5N,R2E	E2NW4 Sec 36 T6N,R2E	N2NW4NW4 Sec 36 T6N,R2E	NE4SE4SE4 Sec 31 T7N,R3E	N2N2NW4 Sec 19 T5N,R3E
Geotechnical Trenches:	----- LOB-1 ----- ROB-1 -----	CHL-1 LOB-1 LOB-2 ROB-1 -----	CHL-1 LOB-1 LOB-2 ----- -----	----- ----- ----- ROB-1 ROB-2	----- ----- ----- ROB-1 ROB-2	CHL-1 LOB-1 LOB-2 ROB-1 -----
Transect Disturbances:	-	-	+	-	+	+
Cultural Resources:	None	None	None	None	None	None

*1 Skunk Creek (SC), unnamed eastern tributary of Skunk Creek (UT)

*2 Biscuit Flat (BF), Daisy Mountain (DM), New River SE (NRSE), Arizona

Finally, every transect map also indicates the presently preferred field location of two major kinds of geotechnical test trenches: channel trenches and overbank trenches, with no trench of either kind ever being expected to be any longer than about 25 feet (7.62 m). All channel trenches will be excavated between the banks of drainage channels, of course, and, following the conventional practice of hydrologists, are always designated consecutively, starting with "CHL-1." At least two overbank trenches are planned for each project transect and are differentiated by composite designations that indicate their consecutive location either left or right of a channel, as one is facing downstream. Along south-flowing Skunk Creek, for example, an "LOB-1" trench would therefore designate the first left overbank trench of a transect occurring east of this drainage; an "ROB-3" designation would be that of the third right overbank trench located west of that channel.

In very brief overview, the six project transects were found to contain at least a small part of five pertinent environmental zones, and much consistency was actually observed in their natural resource variability. Plants were generally quite numerous and variable in these zones, and a summary list of them is included here in Table 2. Faunal populations were neither abundant nor markedly varied during the project survey, however, and, except for the ubiquitous lizard, no amphibians and no reptiles were encountered during it. Mammals were represented exclusively by a couple of black-tailed jack-rabbits (*Lepus californicus*) and only a slightly greater quantity of cottontail rabbits (*Sylvilagus audubonii*). Avifauna were most abundant but were still limited to an unidentified owl, a roadrunner (*Geococcyx californianus*), numerous mourning dove (*Zenaidura macroura*), and several coveys of Gambel's quail (*Lophortyx gambelii*).

In addition, the different drainage channels here always contain a variable mixture of normal stream deposits: small boulders, large cobbles, gravel, and sand, and the nearly level (0-3%) surface of their associated floodways are usually characterized by sandy and gravelly soils of the Antho-Carrizo-Mariposa complex. The floodplain zone also has a nearly level surface but generally contains finer soils that have been classified as Gilman loams. Although almost always covered by patinated boulders, cobbles, and gravel of igneous origin, the surfaces of the surrounding fan terrace zone are somewhat more variable. They have both nearly level and gently sloping (1-8%) surfaces, for example, and soils of not only Carefree cobbly clay loam and Tremant gravelly sandy loam, but also those of the Pinamt-Tremant complex. The fifth and last zone, the hillslope, is only minimally represented among the six project transects. Nevertheless, it has a gently sloping surface, too, and its surface soil has been identified as being that of Vaiva very gravelly loam.

TRANSECT SC 1

This first and southernmost transect occurs west of Union Hills, only 0.70 miles north of the Hayden-Rhodes Aqueduct of the CAP, and 0.57 miles northeast of the foothills of Middle Mountain

Table 2.

General Floral Variability of the Six Geotechnical
Transects of the USCWMP Project Area

Common Names	Scientific Names	Environmental Zones *				
		CH	FW	FP	FT	H
Trees:						
ironwood	<i>Olneya tesota</i>	R**	-	O	-	-
mesquite	<i>Prosopis juliflora</i>	D	C	C	R	R
paloverde, blue	<i>Cercidium floridum</i>	O	R	R	R	R
paloverde, yellow	<i>Cercidium microphyllum</i>	D	C	C	C	C
willow	<i>Salix</i> spp.	R	-	-	-	-
Cactus:						
barrel	<i>Ferocactus</i> spp.	O	O	C	O	O
buckhorn cholla	<i>Opuntia acanthocarpa</i>	O	C	C	O	O
chain-fruit cholla	<i>Opuntia fulgida</i>	-	-	O	O	O
Christmas cholla	<i>Opuntia leptocaulis</i>	-	O	C	O	O
hedgehog	<i>Echinocereus englemanni</i>	-	O	O	C	O
pencil cholla	<i>Opuntia arbuscula</i>	O	O	C	O	O
pincushion	<i>Mammillaria</i> spp.	-	R	R	O	R
prickly pear	<i>Opuntia</i> spp.	O	O	O	O	R
saguaro	<i>Cereus giganteus</i>	-	-	O	O	R
teddy-bear cholla	<i>Opuntia bigelovii</i>	-	O	C	O	R
Shrubs:						
bursage	<i>Franseria deltoidea</i>	O	C	C	D	C
burro brush	<i>Hymenoclea salsola</i>	C	C	O	-	-
catclaw	<i>Acacia greggii</i>	D	C	O	O	R
creosote	<i>Larrea tridentata</i>	O	C	C	D	C
crucifixion thorn	<i>Castela emoryi</i>	-	-	R	R	-
desert broom	<i>Baccharis sarothroides</i>	D	C	O	-	-
desert hackberry	<i>Celtis pallida</i>	C	C	O	-	-
Mormon tea	<i>Ephedra</i> spp.	R	O	O	-	-
sweet bush	<i>Bebbia juncea</i>	C	C	O	-	-
thornapple	<i>Datura meteloides</i>	C	C	O	-	-
tomatillo	<i>Lysium andersonii</i>	C	C	O	-	-

* drainage channel (CH), floodway (FW), floodplain (FP), fan terrace (FT), hillslope (H)

** dominant (D), common (C), occasional (O), rare (R)

in Phoenix, Arizona. Direct vehicle access to it is obtained only by driving a project specific access road, which is defined below. Figure 2 has already indicated that this transect itself occurs along the western edge of the 1964 USGS 7.5' quadrangle map of New River SE, Arizona, while its western access road occurs along the eastern edge of the 1965 USGS 7.5' quadrangle map of Biscuit Flat, Arizona. Together, these two areas occupy State land located in the S2 of Sec 23 in T5N,R2E (G&SRB&M).

Figure 5 is based on Sheet 2 of the USCWMP Aerial Base Map. It indicates that Transect SC 1 has a simple rectangular plan that, measuring 130 feet wide and 1,100 feet long (39.6-335.2 m), encompasses 3.28 acres and is oriented along an axis of true North 69° West. The approximate center of this transect is situated at about 1,555 feet above sea level.

Three environmental zones are represented at this transect. The Skunk Creek floodway extends southward through its eastern section, and its actual channel is dominated by yellow paloverde and mesquite trees, along with much catclaw. The flat and slightly convex surfaces of this floodway are dominated by soils of the Antho-Carrizo-Mariposa complex. The Skunk Creek floodplain borders the western edge of this floodway, and its surface contains some gravel but, otherwise, is characterized by much sheetwashed alluvium. The principal soils here are Gilman loams that chiefly support creosote bushes and, much less frequently, bursage and some immature mesquite trees. The adjacent fan terrace zone crosses the western part of this transect. Generally lacking all normal cobbles and gravel, its surface consists predominantly of Tremant gravelly sandy loams. Creosote is the primary floral species here, although some bursage exists, too, as do some widely separated examples of buckhorn cholla and hedgehog cactus.

Only two geotechnical trenches are expected to be excavated at Transect SC 1, and neither one of them is to be a channel trench. Instead, one is a left overbank trench, Trench SC 1-LOB-1; the other one is a right overbank trench, Trench SC 1-ROB-1. Trench SC 1-LOB-1 is rather centrally situated within the floodplain zone, while Trench SC 1-ROB-1 occurs farther west and well within the fan terrace zone.

As already mentioned, no existing dirt road leads directly to Transect SC 1. Thus, a project access road had to be established here. Beginning just inside the unlocked gate located at the intersection of unpaved Dixileta Drive and the unmarked paved road along the immediate eastern edge of Interstate 17, this route continues 1,750 feet slightly northwestward, as it generally parallels the eastern right-of-way (ROW) that the Arizona Department of Transportation (ADOT) has along Interstate 17. It then turns true North 78° East and continues 65 feet down the center of a pre-existing shallow blade cut that continues across the fan terrace. Never measuring any more than 20 m wide, this resulting project access route adds an additional 2.61 acres to Transect SC 1 itself.

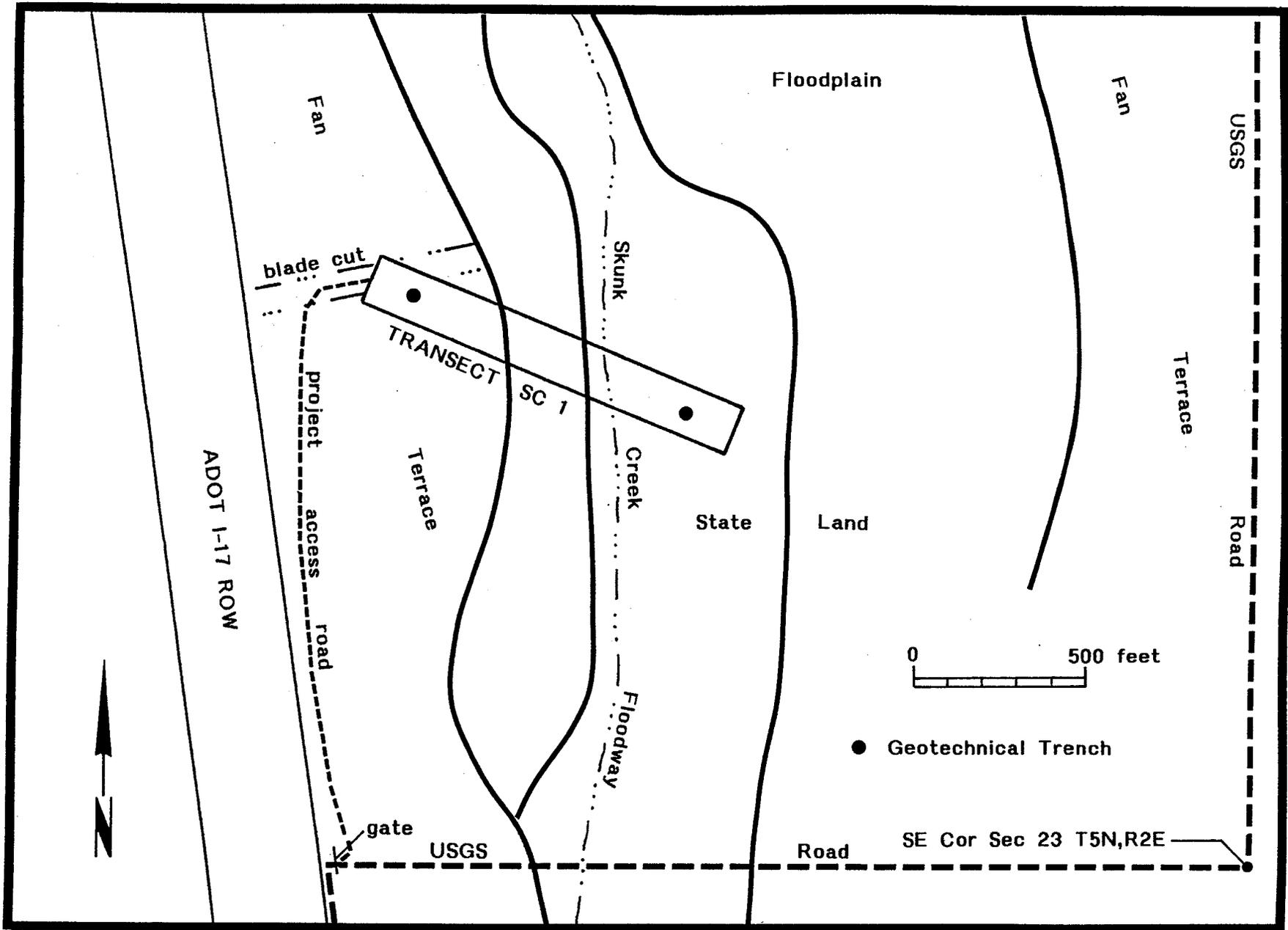


Figure 5. Detailed map of project Transect SC 1.

TRANSECT SC 2

This second transect occurs only about 0.38 miles north of Transect SC 1, but vehicle access between these two is precluded by a rather dense surface blanket of fan terrace cobbles and small boulders. Thus, all direct western vehicle traffic to Transect SC 2 is possible only via a USGS road and a second project access road, defined below. The concerned USGS road begins along the southern edge of Carefree Highway. It then extends about 2.50 miles southward, as it generally parallels and usually occurs less than 500 feet east of the barbed-wire-fence that marks the eastern edge of ADOT's ROW boundary of Interstate 17.

Figure 2 has already indicated that both the above USGS road and the project access road occur along the eastern edge of the 1965 USGS 7.5' quadrangle map of Biscuit Flat, Arizona, with Transect SC 2 per se occurring farther east along the western edge of the 1964 USGS 7.5' quadrangle map of New River SE, Arizona. Accordingly, this combined transect area is situated at about 1,575 feet above sea level, and all of it occurs on State land located in the N2S2NE4 and the NE4SE4NW4 of Sec 23 in T5N,R2E (G&SRB&M).

Transect SC 2 itself is the largest of the six project transects, encompassing 8.0 acres and measuring a total of 2,680 feet long and 130 feet wide. Figure 6 is based on Sheet 2 of the USCWMP Aerial Base Map, and it clearly illustrates that this transect is also a double jointed one. Its shortest western section is 480 feet long and is oriented true South 77° East, its central section is 1,300 feet long and is oriented true North 87° East, and its third or eastern section is 900 feet long and is oriented true North 81° East.

Three environmental zones also cross this second transect. The first and smallest one is the Skunk Creek floodway, which here is rather narrow and extends southward between the western and central sections. The surface of the steep banked channel here contains normal stream sediments supporting paloverde trees and rather widely separated mesquite trees, sweetbush, and occasionally dense clumps of thornapple and especially catclaw. The much wider Skunk Creek floodplain parallels both the eastern and western sides of this floodway, and its surface occasionally contains some gravel but is essentially composed of Gilman loams. Creosote bushes predominate here, but bursage is quite common and barrel cactus occur occasionally. The fan terrace zone parallels the eastern and western sides of the Skunk Creek floodplain and is consistently dominated by Carefree cobbly clay loam. Across the western terrace, this cobbly soil is associated with only much creosote, some bursage, and occasional examples of buckhorn cholla. The eastern terrace is also dominated by creosote and bursage but, in marked contrast, also contains variable quantities of buckhorn cholla, hedgehog and barrel cacti, isolated saguaro cactus, and, along its few minor drainages, yellow paloverde and mesquite trees.

Four geotechnical trenches are planned to be excavated at Transect SC 2. The single channel trench, or Trench SC 2-CHL-1, is

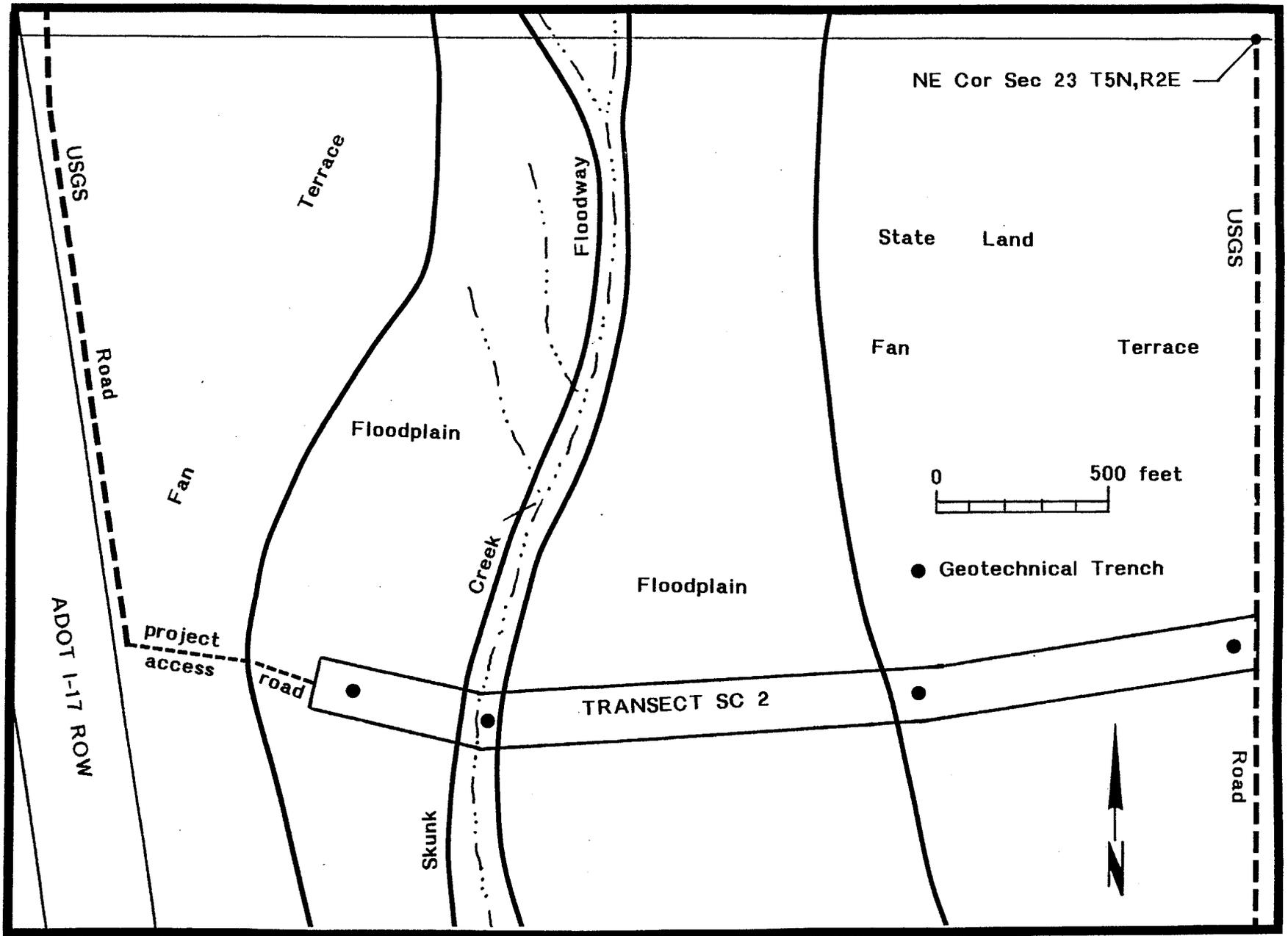


Figure 6. Detailed map of project Transect SC 2.

centrally situated within the Skunk Creek channel. The single right overbank trench, or Trench SC 2-ROB-1, occurs near the center of the western floodplain. Both of the two left overbank trenches occur farther east across the eastern fan terrace. Trench SC 2-LOB-1 is situated just inside the western edge of this terrace; the more western one, Trench SC 2-LOB-2, is located just west of the far eastern end of this transect.

Importantly, two main access roads actually lead to and through Transect SC 2, in fact. The western one has already been introduced, for it begins with the USGS road along the eastern edge of Interstate 17 and ends with the project access road. Being only about 600 feet long, this project access road is rather short and is consistently 130 feet wide, resulting in another 1.79 project acres here. The centerline of its western section begins along ADOT's eastern I-17 ROE boundary, at an angle-iron marker and cemented metal cap inscribed with "Arizona Highway Department/POT NB. 1098+00/19." It then extends 350 feet, true South 84° East and crosses the fan terrace zone. The eastern section of this road then continues 250 feet farther, along an axis of true South 70° East, and, crossing the western edge of the western floodplain zone, eventually ends at the western end of Transect SC 2. The main eastern access road here coincides with a second USGS road. It also begins along Carefree Highway, but it then extends due southward along the different section lines occurring between this highway and Dixileta Drive.

TRANSECT SC 3

This third project transect occurs 4.2 miles upstream from Transect SC 2, where it is situated just north of Skunk Creek Tank, 0.26 miles south of Joy Ranch Road, and 0.30 miles east of 27th Avenue. According to Figure 3, it occurs entirely within the boundary of the 1964 USGS 7.5' quadrangle map of New River SE, Arizona. Further, Transect SC 3 occupies a total of only about 3.58 acres of State land that is situated at about 1,840 feet above sea level. All of this acreage is located in the E2NW4 of Sec 36 in T6N,R2E (G&SRB&M).

Figure 7 is based on information provided on both Sheet 4 and Sheet 5 of the USCWMP Aerial Base Map. Transect SC 3 is fully shown on Sheet 4 of that base map, however, and indicates that this is a single jointed transect that is consistently 130 feet wide. Its longer southwestern arm is 700 feet long and is oriented true North 35° East. Its shorter northeastern one is only 500 feet long and is oriented essentially due east-west.

Figure 7 also reveals that only two environmental zones occur in Transect SC 3. First, the Skunk Creek floodway occupies most of the southern part of this transect area, while the adjacent floodplain occupies nearly all of the northern transect area. The actual Skunk Creek channel is about 55 feet wide here, and its rather steep eastern and western banks directly overlook surface fluvial deposits of mainly small boulders, smaller cobbles, and much loose sand. Both banks here are lined with a rather dense

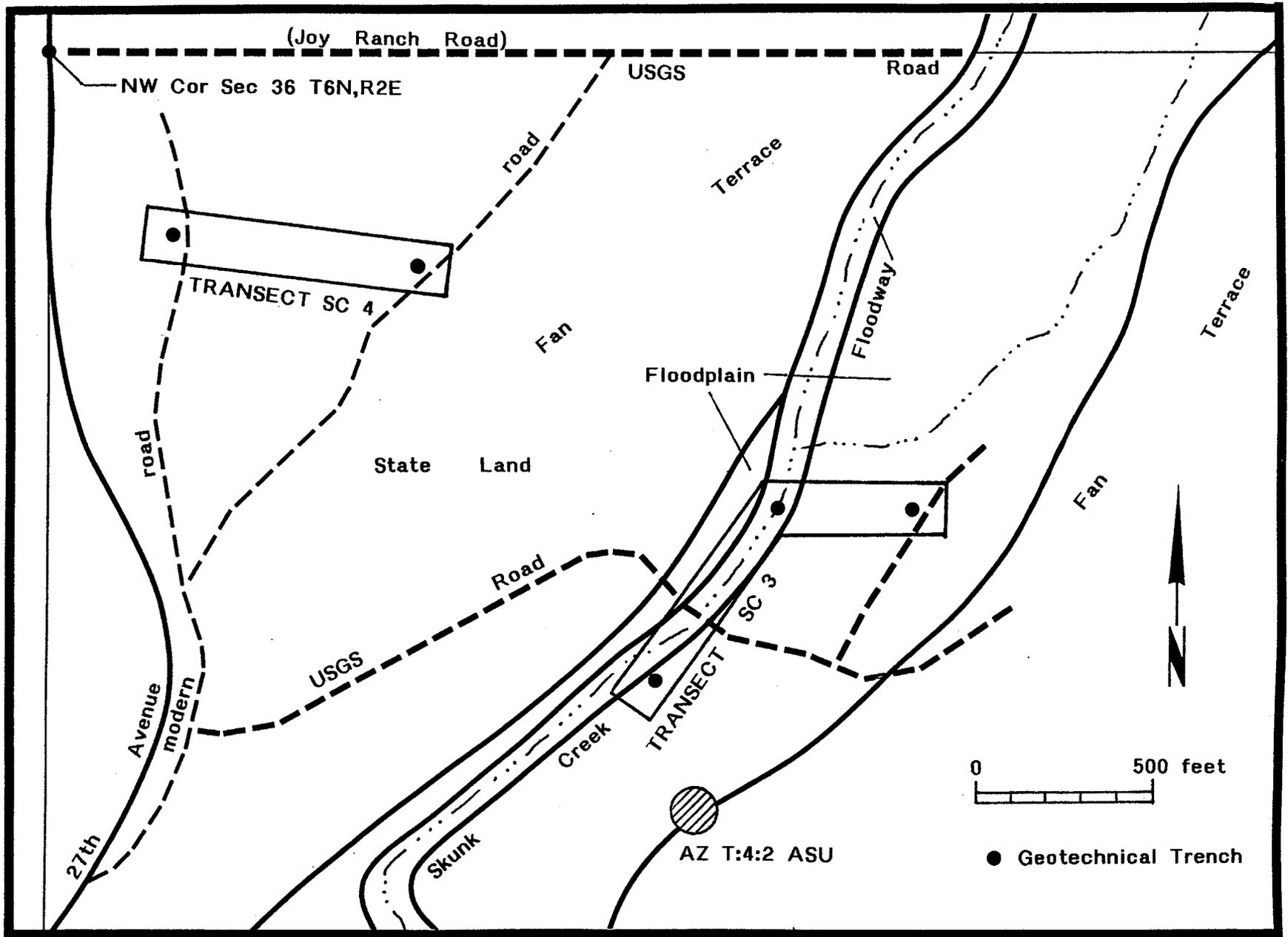


Figure 7. Detailed map of project Transect SC 3 and Transect SC 4.

floral community composed chiefly of yellow paloverde trees, intermittent mesquite trees, and much catclaw, desert broom, burro brush, and thornapple. The surface of the adjacent floodplain zone contains some gravel but is composed predominantly of Gilman loams. These soils support not only much creosote and bursage, but also some immature mesquite trees and widely scattered occurrences of buckhorn cholla, hedgehog cactus, and barrel cactus.

Three geotechnical trenches are proposed for geomorphological excavation here. The single channel trench, or Trench SC 3-CHL-1, is rather centrally situated within the Skunk Creek channel itself. Both of the two overbank trenches occur east of this floodway. The more western one, Trench SC 3-LOB-1, occurs along the western edge of the floodplain; the more eastern one, Trench SC 3-LOB-2, is located much farther east within this same zone.

Direct vehicle access to all three transect trenches should be easily obtained by using a well established USGS road. This road basically begins along the eastern edge of recently paved 27th Avenue. It then continues generally eastward, as it parallels the immediate north side of a rather long but low banked drainage ditch, extends through the southeastern part of this transect, and finally branches northward through its northeastern arm, where it immediately bypasses Trench SC 3-LOB-2. In contrast, the safest and most immediate access to Trenches SC 3-LOB-1 and SC 3-CHL-1 would result from leaving this USGS road, where it intersects the Skunk Creek channel, and then driving that alluvial stream bed only a short distance southward and northward, respectively.

TRANSECT 4

Situated only about 0.20 miles northwest of Transect SC 3, Transect 4 occurs less than 275 feet east of paved 27th Avenue and 450 feet south of unpaved Joy Ranch Road. The accurate location of this fourth project transect has previously been included in Figure 3. Accordingly, it also occurs entirely within the boundary of the 1964 USGS 7.5' quadrangle map of New River SE, Arizona. In reference to the G&SRB&M, Transect SC 4 is located solely on State land existing in the N2NW4NW4 of Sec 36 in T6N,R2E.

Transect SC 4 is fully indicated on Sheet 5 of the project Aerial Base Map, and the most detailed view of it has already been provided here in Figure 7. Accordingly, this transect is situated at about 1,820 feet above sea level. Further, it has a simple rectangular boundary that, measuring 130 feet wide and 870 feet long, encompasses only 2.60 acres. The primary axis of this transect is oriented true North 84° West.

This entire transect is situated entirely within the local fan terrace zone occurring west of Skunk Creek, and its entire surface is blanketed with small igneous boulders, cobbles and gravel. Two slight surface soil conditions exist here, however, and they result in a conspicuous difference in natural vegetation. Specifically, the much smaller but slightly more elevated western part of this transect is characterized by a convex surface of Beardsley cobbly

clay loam. Major vegetation here includes scattered paloverde trees, much creosote and bursage, and minor quantities of hedgehog cactus, and pencil, Christmas, and buckhorn cholla. Contrastingly, the adjacent eastern and slightly lower part of this transect has a slightly concave surface of chiefly Carefree cobbly clay loam. Its vegetation essentially forms a homogeneous community of small mesquite trees, although some examples of pencil cholla, buckhorn cholla, and barrel cactus do also occur.

Of course, no channel trench can be excavated at Transect SC 4. Two geotechnic trenches have been staked here, however, and both of them are of the right overbank type. The more eastern trench, designated Trench SC 4-ROB-1, occurs just west of the eastern end of this transect. Similarly, Trench SC 4-ROB-2 was staked just east of the western end of this transect. Figure 7 has also indicated that both trenches occur immediately adjacent to two modern roads that branch together south of Transect SC 4 and then continue 0.90 miles southward to 27th Avenue.

TRANSECT 5

This is the northernmost of the six project transects, and Figure 4 has previously indicated that it occurs entirely on the 1964 USGS 7.5' quadrangle map of Daisy Mountain, Arizona. It is thus situated east of the town of New River, Arizona, about 2.34 miles east of the top of Gavilan Peak, and just west of New River Road. More importantly, this transect occupies only State Trust land located in the NE4SE4SE4 of Sec 31 in T7N,R3E (G&SRB&M).

Figure 8 is based on Sheet 8 of the USCWMP Aerial Base Map. It indicates that Transect SC 5 is rectangular in plan and measures 130 feet wide and only 560 feet long. Thus, it is also the smallest of the six project transects, encompassing only 1.67 acres. Its principal axis is oriented true North 87° West and its eastern edge coincides with a fenced sectional boundary.

This transect is composed of a narrow floodway, or Skunk Creek drainageway, that is surrounded on the west by a floodplain and on the east by an expansive fan terrace. Normal fluvial deposits characterize the actual Skunk Creek channel here, while the floodway soils of flatter and slightly more convex surfaces are of both a gravelly loam and sandy loam. Paloverde trees essentially dominate this entire floodway, but mesquite trees, catclaw, and desert broom are all very common. The chief soils of both the floodplain and the fan terrace zone are currently believed to belong to the Pinamt-Tremant complex. The floodplain surface contains more of a gravelly sandy loam, however, whereas that of the fan terrace is mainly a cobbly gravelly loam. Accordingly, the vegetation of these two zones varies greatly. While that of the fan terrace is almost totally dominated by creosote and bursage, with some scattered examples of buckhorn cholla and prickly pear cactus, the floodplain is ratherly densely covered by a typical creosote-mixed cacti community. Creosote and bursage are thus most plentiful there but are variously associated with tomatillo, barrel cactus, and buckhorn, chain-fruit, Christmas, and pencil cholla.

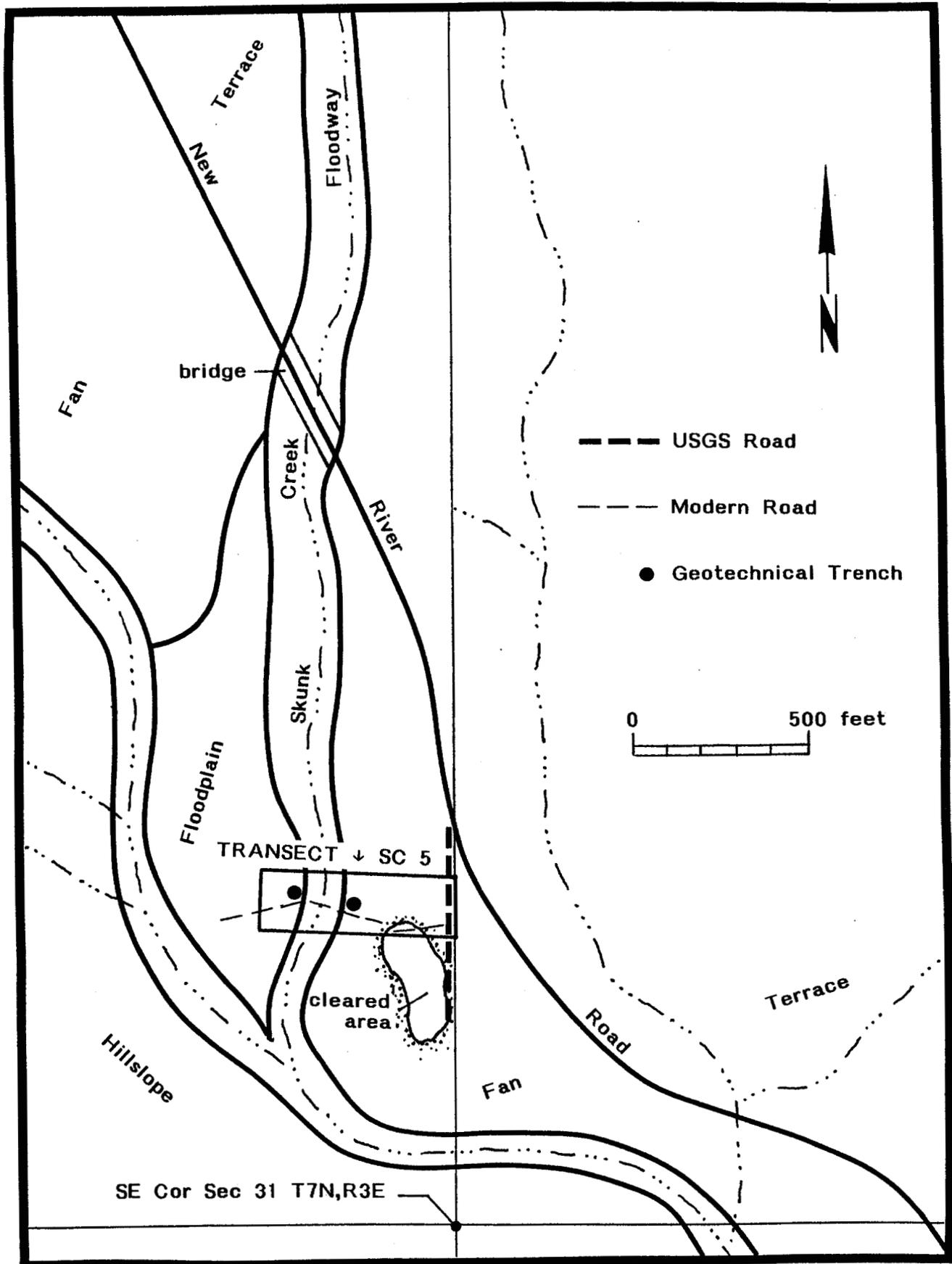


Figure 8. Detailed map of project Transect SC 5.

Geotechnical testing here will be done only at two overbank trenches, with no channel trench presently planned for excavation. The exclusive left overbank trench, or Trench SC 5-LOB-1, has been situated along the western periphery of the fan terrace zone. The exclusive right overbank trench, or Trench SC 5-ROB-1, has been similarly staked along the eastern periphery of the Skunk Creek floodplain. Direct vehicle access to both trenches is readily available from a well established modern road. This road begins along the western edge of New River Road, continues southward on State land along the sectional fence there, and finally extends due westward through the length of Transect SC 5.

TRANSECT UT 1

This sixth and last project transect is the only one situated along the unnamed eastern tributary of Skunk Creek. According to Figure 2, it occurs on the 1964 USGS 7.5' quadrangle map of New River SE, Arizona, and is situated about 1.50 miles east of Skunk Creek, about 0.50 miles northeast of a major sand and gravel operation, and just less than 0.50 miles north of the northern foothills of Union Hills. Geographically, Transect UT 1 is located immediately south of undeveloped Lone Mountain Road and about 700 feet east of undeveloped 19th Avenue. Figure 2 also indicates that it, as well as its project access road, occupies only State land occurring in the N2N2NW4 of Sec 19 in T5N,R3E (G&SRB&M).

A much more detailed view of Transect UT 1 is provided by Figure 9, which is based on Sheet 9 of the Aerial Base Map. Accordingly, this is a double jointed transect that results in three contiguous segments. The first and southwesternmost one begins along an established USGS road, is 425 feet long, and is oriented true North 26.5° East. The central one is only 310 feet long, for its northeastern end is terminated by private land, and is oriented true North 63° East. Measuring 600 feet, the third and easternmost segment is the longest one and is oriented true South 84° East. All three sections are 130 feet wide and, totaling a cumulative length of about 1,335 feet, result in a transect area of approximately 3.98 acres. An additional 1.12 acres of project access road accounts for the total transect acreage of 5.10 acres.

Four environmental zones occur across Transect UT 1. Importantly, the Unnamed Tributary here essentially flows sinuously westward and crosses the interface of the eastern and central segments. Its actual channel is rather narrow and has an especially steep eastern bank and normal channel sediments that support relatively dense growths of both paloverde and mesquite trees, desert hackberry, catclaw, and thornapple. The adjacent floodplain contains a sparse surface scatter of gravel and a variable mixture of creosote, bursage, and different cacti. The third zone constitutes a short part of a north-facing hillslope that occupies most of the southwestern segment. Vaiva very gravelly loam is its primary soil and, due to its extreme shallowness, supports only a sparse floral community of especially creosote bush, bursage, and small isolated stands of cholla. The fourth zone consists of a fan terrace that occurs immediately east of the local hillslope and

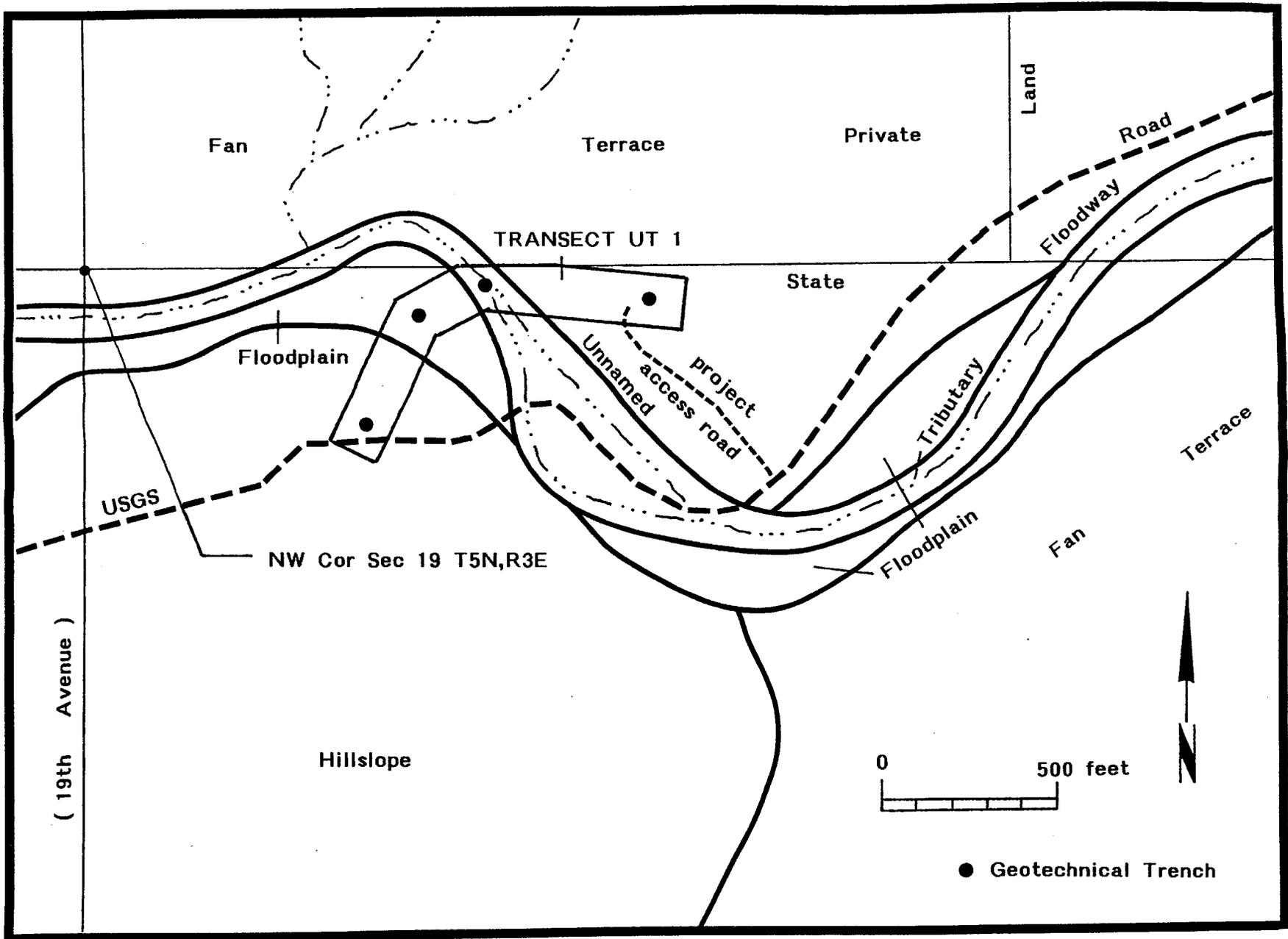


Figure 9. Detailed map of project Transect UT 1.

immediately north of the northern unnamed floodway. The surface of this terrace is heavily littered with small basalt boulders, cobbles and gravel, and its principal soil is Carefree cobbly clay loam. The main floral pattern here is composed largely of creosote bush, with less frequent species including bursage, buckhorn cholla, chain-fruit cholla, barrel cactus, and saguaro cactus.

Four geotechnical trenches are staked to be excavated here and include 1 channel trench (CHL-1), 1 right overbank trench (ROB-1), and 2 left overbank trenches (LOB-1 and LOB-2). Of course, Trench UT 1-CHL-1 occurs in the unnamed drainage channel itself. Trench UT 1-ROB-1 occurs across the fan terrace near the eastern end of this transect. Trench UT 1-LOB-1 is situated farther southwest across the floodplain, and Trench UT 1-LOB-2 has been intentionally placed to explore the more elevated hillslope zone.

Two routes will provide all necessary vehicle access to Transect UT 1. The first, or main, route coincides with a well established USGS road that enters the southwestern section of this transect, proceeds eastward across the hillslope, floodplain, and drainage floodway, and then continues farther northeastward across the fan terrace. As such, it should greatly facilitate all vehicle work at Trench UT 1-LOB-2, Trench UT 1-LOB-1, and Trench UT 1-CHL-1. The second route is more minor in nature, for it basically consists of a modern road that is so faint that it was specifically examined as a project access road. It leads directly northwestward from the USGS road and, 750 feet thereafter, ends at Trench UT 1-ROB-1.

PROJECT METHODOLOGIES

All eight of the explicit goals of this USCWMP archeological inventory project have since been essentially accomplished by completing several major activities and numerous minor tasks that were undertaken during five concurrent or immediately successive phases of project administration, archival research, fieldwork, laboratory analysis, and reporting. Relevant aspects of each phase, as well as their results, have already been documented by the project director in his Summary Project Journal (SAS Form 210). In addition, certain procedural aspects of the three most critical phases are elaborated shortly, for they have involved some additional archival research, an intensive field survey, and different laboratory analyses.

Generally speaking, though, SAS performed all of its project activities according to the professional standards and both the procedural and reporting guidelines formally developed by not only certain federal agencies (National Park Service 1977; the Advisory Council on Historic Preservation 1999), but especially the Arizona Board of Regents (1991) and the Arizona State Museum (1994, 1999; Fish 1994). In addition, SAS carefully considered certain inter-agency recommendations of the State (Fish et al. 1995; Hassell et al. 1995) as well as other informal standards of the ASLD (Rozen

1997) itself. Finally, the significance of all project resources were to be evaluated according to their individual potential for being nominated to the Arizona Register of Historic Places. Eligibility criteria for this Register are essentially the same as those formerly established and espoused by the National Park Service (1976).

Archival Research Phase

A comprehensive archival research investigation of the entire Upper Skunk Creek Locale, and thus the general USCWMP project area itself, has previously been completed by SAS (Rodgers 1999). The primary purpose of the few archival research activities of the present project, therefore, was only to augment the results of that particular archeological assessment project. Overall, however, all activities of both archival studies have been designed to obtain all relevant information concerning all prehistoric and historic sites that might be affected by any of the proposed geomorphological activities. Hence, they have rightfully involved both normal literature searches and different site record checks.

The explicit purpose of the literature searches has been to obtain and analyze all published data pertaining to the environment and archeology of both the defined USCWMP project area and especially the six defined geotechnical transects themselves. In contrast, the different site record checks were conducted in order to locate and evaluate various sources of unpublished data (e.g., maps, site files, photographs, records, etc.) concerning the different archeological sites previously found and recorded within this same project vicinity.

The numerous archival research activities of the combined SAS assessment-inventory project originally began May 7, 1999. On that day, SAS formally requested the Arizona State Museum to perform and informally report its results of a thorough examination of relevant maps, files, and certain other records pertaining to all former ASM sites and research projects known to have been previously undertaken within the defined Upper Skunk Creek Locale. All aspects of that research were completed by Sharon F. Urban, ASM public archeologist. Following specific SAS instructions, they were performed for the entire 30-square-mile area that has previously been defined for this locale and specifically delimited here in Figure 1.

No archival research was ever deemed necessary to be undertaken at the Land Records Room of the ASLD. On the other hand, though, additional site record checks or other literature searches were subsequently performed throughout the course of both the original assessment and the present inventory project. With one exception, all of them were completed at the following research facilities located in the greater metropolitan area of Phoenix and Tempe: 1) Scientific Archeological Services, 2) the Arizona Room of the Phoenix Central Library, 3) the Heard Museum Library and Archives, 4) the Public Records Room of the Arizona State Office of

the U.S. Bureau of Land Management, 5) the reference library at the State Historic Preservation Office, and 6) the Anthropology Department at Arizona State University (ASU). The single exception also includes the Museum of Northern Arizona (MNA) in Flagstaff, Arizona. All archival research there was greatly facilitated by the gracious and friendly assistance of Mr. Michael O'Hara, MNA associate librarian and archivist.

Fieldwork Phase

An intensive survey, as differentiated from an incomplete or reconnaissance survey, is the only type of field examination suitable for achieving the compliance goals of an archeological inventory. Even more explicitly, for example, McGimsey and Davis (1977:113), consider it to be "a comprehensive and extended physical examination of a study area for the purpose of obtaining reliable data on all cultural resources and associated environmental variables."

According to its standard operating procedures, SAS conscientiously strove to intensively survey essentially the entire (100%) surface of all six project transects and each of the three project access roads occurring at Transect SC 1, Transect SC 2, and Transect UT 1. As already mentioned, that survey was performed solely by the author, on October 21 and 22, 1999, but it was greatly facilitated by the competent assistance of Mr. Michael Henze, JEF geomorphologist. Michael's field assistance was especially valuable, for he led the author directly to all six of the project transects. He also established the centerline of all those transects, using the five following items: 1) the USCWMP Composite Quadrangle Map, 2) the USCWMP Aerial Base Map, 3) two different series of large-scale (1:9600 and 1:12,000) aerial photographs, 4) a Garmin GPS III global positioning system (GPS) unit, and 5) a computerized list of longi-latitudinal coordinates for every geotechnical trench at every project transect.

SAS completed its project survey only after having walked a total of 22 swaths, or linear transects, with each swath having been assigned its own consecutive alphanumeric designation. Eighteen of those swaths resulted from having examined at least two contiguous, parallel swaths at each of the six project transects. Further, the inner edge of all of those swaths coincided with the intermittently flagged centerline of each transect itself. The four remaining swaths resulted from having walked one swath down the center of the project access road at both Transect SC 1 and Transect UT 1 and another two parallel, contiguous swaths along the centerline of the project access road at Transect SC 2. Overall, none of these 22 swaths were ever any wider than 20 m (65.6 ft), but they did vary greatly in length from about 152.4 m to 670.5 m (500-2,200 ft).

As necessary, the accurate field location and plotting of all archeological resources were to have been rather easily accomplished through the regular SAS use of different field equipment

and other project resource materials: 1) a tripodded Brunton pocket transit, which was properly adjusted to read all bearings in relation to true north, 2) a 100-meter-long tape, 3) the USCWMP Composite Quadrangle map, and, most importantly, 4) the different sheets of the USCWMP Aerial Base Map. Once again, this aerial base map was essentially a large-scale (1:4,800), colored, aerial photograph that possessed all normal mapping data and clearly indicated, among many other things, the location of each project transect, every geotechnical trench of this project, all major floral patterns, and all major and minor dirt roads.

According to provisions of the SAS-ASM curatorial agreement, no project artifacts were to be collected or removed from the field. During his survey, however, the author was prepared and properly equipped to designate, measure, photograph, and record several categories of significant cultural resources. In decreasing size and order of potential importance, those resources could have included: 1) archeological sites per se, 2) intrasite components, 3) intracomponent features, and 4) isolated artifact loci.

To eliminate any possible confusion later, SAS considers an archeological site to include any geographic space utilized by man, and the different minimal artifact criteria for actually defining a site per se have already been defined by the ASM (Fish 1994). Further, all noncontemporary cultural resources of Arizona can be assigned to either of three general time periods, or chronological eras: the prehistoric, the protohistoric, and the historic. For greater understanding later, regional prehistoric resources generally predate circa 1450, protohistoric resources data between 1450 and 1534, and historic resources typically span the approximate interval from 1534 to 1949, the beginning of contemporary or modern times. Arizona's historic era is commonly divided into three general periods: Spanish (1534-1821), Mexican (1821-1848), and Anglo-American (1848-1949), or simply American. While the Spanish period is sometimes subdivided into earlier Spanish Exploration (1534-1690) and later Spanish Colonial (1690-1821) times, the Anglo-American period has commonly been subdivided into the Pre-Territorial (1848-1863), Territorial (1863-1912), and Statehood (1912-1949) phases.

An official ASM designation was to be assigned to every newly found prehistoric or historic site of this project, as well as to any previously recorded project site that had not yet received such a designation from the ASM. All appropriate ASM site records were to be filled out for all new sites, of course, with standard procedures for doing so having already been established by the Arizona State Museum (1993). While no extensive mapping was expected to occur, further site documentation was to be achieved by photographing all important environmental, prehistoric, and historic archeological features. All observed flora and fauna were to be listed using SAS Form 303, a Biotic Resource Variability Sheet.

Finally, SAS continues to consider an isolated artifact locus (IAL) as usually a non-site archeological manifestation most com-

monly represented by either a single prehistoric or historic specimen or a sparse and spatially distinct locus of such specimens that are known or believed to predate 1949. As such, an IAL of SAS is similar to, but yet significantly different from, other entities variously defined by other research institutions as, for example, isolated finds, isolated occurrences, isolated artifacts, or simply isolates. A large area, or associated group, of different isolated artifact loci is further considered to form a field of isolated artifacts, or simply an "isolate field."

Although the recording of isolated artifact loci is currently not specifically required by the state of Arizona, basic descriptive data from each IAL of this USCWMP inventory project was to have been obtained using SAS Form 315. This Isolated Artifactual Locus Data Sheet considers several kinds of administrative, provenience, environmental, and strictly archeological variables, or analytic observations. It also recognizes the existence of three mutually exclusive types of IALs: single, double, and multiple; depending upon the quantity of artifacts observed and recorded at each one. For greater ease in referencing, all IALs of this inventory were also to receive consecutive numerical designations, and their accurate locations were to have been included on the different transect maps.

Laboratory Analysis Phase

No major artifact analyses were expected to occur during this particular inventory project, due to the general non-collection restriction of it. Most of this laboratory phase was therefore spent analyzing and interpreting the numerous field and prior archival research data. All remaining time was used to finalize the different report illustrations and process all resulting project maps, records, correspondence, photographs, etc. for their eventual curation by the Arizona State Museum. The SAS procedures for accomplishing such curatorial processing are the same as those officially formulated by Young (1988).

ARCHIVAL RESEARCH RESULTS

A tremendous amount of archival research data were obtained and disseminated during the USCWMP archeological assessment project (Rodgers 1999) and, quite understandably, much of that information is now heavily relied upon here. In particular, however, the two primary responsibilities of that assessment project were to a) discuss the general cultural variability of the northern Salt River Valley and, especially, b) define and evaluate the prehistoric and historic archeological record of the entire Upper Skunk Creek Watercourse Master Plan study area.

A significant result of the USCWMP assessment project was the rather immediate realization that the northern Salt River Valley has been extensively utilized during both the prehistoric and

historic past and that, fortunately, much of the archeological information pertaining to this region has subsequently been synthesized as the result of much contract archeological research. In fact, such information results from six major research locales that are situated immediately adjacent to the Upper Skunk Creek Locale itself. Four of these localities have already been introduced, and all four have produced valuable archeological resource syntheses. They include the New River Locale (Rodgers 1994a, 1995), the Western Cave Creek Locale (Rodgers 1996), the Paradise Valley Locale (Rodgers 1998a, 1998b, 1998c, 1993), and the Cave Creek Dam Archeological District (Smith 1974; Rodgers 1974, 1977, 1978; Henderson and Rodgers 1979).

The archeology of the two other localities has recently been summarized and evaluated as the result of two separate master plan studies of the FCDMC. The earlier study was completed by SAS (Rodgers 1994b), in 1994, and its area of investigation was originally termed the Skunk Creek Locale. To eliminate any possible confusion between that one and the present USCWMP project, however, this former area is formally redesignated here as the Lower Skunk Creek Locale. As such, it is an irregular area that, being situated entirely south of the center of Adobe Dam, extends a maximum of 6.5 miles eastward from 83rd Avenue and a maximum of 4.0 miles northward from Greenway Road. It thus includes the entire boundary of the Skunk Creek Archeological District, but only the more significant southern part of the Adobe Dam Recreation Area (Bruder 1983a, 1983b).

The second FCDMC study was only recently completed, in 1998, by Stantech Consulting, Inc. (SCI) of Phoenix. As reported by Giacobbe and Larkin (1998), its explicit research area was to have been that of the Middle New River Watercourse Master Plan. Hereafter, this area is more informally referred to as simply the Middle New River locale, which consists of a large rectangular area that basically extends 9.0 miles northward from Thunderbird Road and 4.0 miles westward from 67th Avenue. This sixth and final locale both overlaps a southwestern part of the Lower Skunk Creek Locale, therefore, and its northern part includes a large area of numerous site excavations that Soil Systems, Inc. (SSI) (Doyel and Elson 1985) previously completed along the middle New River drainage.

The above six research locales obviously contain much archeological information that does not directly pertain to the concerned Upper Skunk Creek Locale. In a comparative sense, however, such data are valuable for substantiating the fact that the general USCWMP project area is situated not within but rather peripheral to two major regions of vast archeological resource significance and variability. The first of these regions coincides with that of the central New River drainage; the second one occurs along the entire central reach of Cave Creek Wash.

The primary purpose of the following section, therefore, is to summarize certain archival information only as it variously relates to three principal concerns of this particular archeological

inventory project: 1) the establishment of regional culture histories, 2) the description of all local archeological resource variation, and, even more specifically, 3) the evaluation of the nature, location, and potential significance of all archival resources known or believed to exist in or immediately next to the six defined USCWMP transects. Brief descriptions, at least, are also provided of the different archival projects that were most instrumental in the discovery or subsequent investigation of those very few concerned resources.

Culture Histories

Based largely upon the archeology of all seven of the above research localities, the vast archeological record of the combined New River-Skunk Creek-Cave Creek region may someday prove to have begun more than 11,500 years ago. If so, however, no sites of any Paleo-Indian or later Archaic cultures, or cultural traditions, have yet been reported from this particular part of the northern Salt River Valley. The Paleo-Indian and Archaic traditions constitute the two most popular stages of preceramic development in the United States and, in Arizona, they are presently known best from much more southeastern parts of this state.

Dating generally from 10,000 B.C. to 8000 B.C., the Paleo-Indian stage includes both the Clovis (ca. 9500-9000 B.C.) and sequent Folsom (ca. 8800-8200 B.C.) cultures. This early developmental stage is characterized by numerous Indian groups who very skillfully made and used large, lanceolate-shaped projectile points to hunt large game animals, including several species of extinct megafauna. To date, the only Paleo-Indian remains of this panregion reportedly occur near the town of New River, Arizona. They include the known, albeit professionally undocumented, occurrence of an isolated Clovis point and a series of three controversial lithic collections, which have been speculated by Peru (1984) to represent a) the Paleo-Indian preparation of certain hunting implements, b) the butchering of game, and c) the processing of both cordage and animal hides.

Archeologically speaking, the Archaic actually designates a continental-wide phenomenon that is characterized by a much more diverse subsistence economy that was based on the hunting of smaller game animals, much plant food collecting, and, eventually, incipient agriculture. Currently, such activities in Arizona may be represented best by those of the Cochise Indians. The Cochise culture has recently been reevaluated by Huckell (1984). It was originally defined by Sayles and Antevs (1941), however, with its cultural history then having been divided into the three phases that Whalen (1971) suggests most likely date 7500-3500 B.C. (Sulphur Spring), 3500-1500 B.C. (Chiricahua), and 1500-200 B.C. (San Pedro). While no unequivocal Archaic sites have yet been fully documented from the New River-Cave Creek region, Kenny (n.d.) has speculated the intrasite coexistence of certain Archaic and Hohokam remains at a site located in New River, Arizona.

The Hohokam Indians constitute the apogee of prehistoric culture in south-central and all southern Arizona (Haury 1945, 1976; Gumerman and Haury 1979; McGuire and Schiffer 1982; Gumerman 1991) and, therefore, an exhaustive discussion of this complex culture is obviously beyond the scope of this report. Characteristically, though, the Hohokam Indians were agriculturalists who employed intricate systems of canal irrigation, floodwater farming, and sheetwash farming. Importantly, they heavily supplemented their different cultivated foods (e.g., corn, squash, beans, etc.) with those obtained by hunting, gathering, and collecting a wide variety of indigenous plants and animals. Both inhumation and cremation were common human burial practices, and, whenever possible to do so, much rock art was produced. Hohokam habitations varied greatly through time and included subsurface pithouses, semisubterranean, masonry-footed, and adobe-walled structures, and large compounds built of adobe and rock. Several types of interfamily settlements have thus been recognized, but all of them commonly exhibit a preoccupation with making various craft products of especially pottery, stone, bone, and shell.

The Hohokam cultural sequence may have lasted more than 1,700 years but is presently undergoing much professional debate (Dean 1991). Traditionally, though, it has been divided into four periods: Pioneer, Colonial, Sedentary, and Classic; and a series of nine corresponding phases. The earliest period is the most controversial one but may have included the Vahki (A.D. 300-500), Estrella (A.D. 500-600), Sweetwater (A.D. 600-700), and Snaketown (A.D. 700-800) phases. The Colonial period is much better known and includes the Gila Butte (A.D. 800-900) and Santa Cruz (A.D. 900-1000) phases. The Sedentary period coincides with the Sacaton phase of A.D. 1000-1200. The final Classic period, at least in the northern Salt River Valley, consists of only the Soho (A.D. 1200-1300) and Civano (A.D. 1300-1450) phases.

Quite unfortunately, much less is currently known about the protohistoric era of the New River-Skunk Creek region. In brief overview, though, this second era most often relates to a rather limited array of habitation and subsistence activities that are believed to have been undertaken by either of two Native American groups: the Pima and the Yavapai. The Pima, currently known by themselves as the Akimel O'odham ("river people"), are generally considered to be descendants of the Hohokam and, primarily, were sedentary agriculturalists who inhabited riverine reaches of especially the Santa Cruz, Gila, and Salt rivers (Russell 1975; Ezell 1983). In marked contrast, the Yavapai people were mainly hunters and gatherers who practiced a nomadic lifestyle that was based principally upon the ripening of a vast array of different indigenous foodstuffs (Gifford 1936; Khera and Mariella 1983). While their ancestry remains an issue of some heated professional debate, they most likely originated from either Yuman immigrants of western Arizona or the Southern Sinagua Indians of the Verde River valley in central Arizona.

Cultural activities of the third and final historic era are much more diverse, for they are most commonly associated, directly

or indirectly, with the Anglo-American growth and development of not only the town of New River but, much more critically, that of the cities of both Cave Creek and Phoenix. Others exist, such as the politics, education, and economy associated with all such residential community growth, but some of the more significant research interests of the particular developments of these three communities include those of: desert habitation, ranching, stock raising, mining, canal construction and irrigation, and vehicular transportation. While none of them are believed to have begun prior to late Territorial times, all of them were occurring during the sequent Statehood phase, and essentially all of them are continuing today.

Local Resource Variability

The archeological variability of the Upper Skunk Creek Locale itself is known as the result of no fewer than 28 previous cultural resource studies. Every one of those investigations has already been thoroughly discussed and succinctly summarized by SAS in its USCWMP archeological assessment report (Rodgers 1999:21-32, Tables 2 and 3). In addition, that discussion has fully described the 12 formal and 10 informal sites that have resulted from those different investigations. No such elaboration should thus be necessary here.

Parenthetically, though, informal sites are those resources that have been located but not yet formally recorded. In contrast, all formal sites have been formally recorded and assigned a consecutive numerical designation that, given their relative location, includes an "AZ T:4:" prefix and an abbreviated suffix, indicating which research institution is responsible for housing their various data records. This "AZ T:4:" prefix reflects the fact that all of the formal sites of the concerned USCWMP project area occur only on the USGS 7.5' quadrangle map of either Biscuit Flat, Daisy Mountain, or New River SE, Arizona.

In brief overview, 5 of the 28 archival projects were actually cadastral surveys that were undertaken at different times according to different contracts having been negotiated separately with the U. S. General Land Office (GLO). As such, those GLO surveys began on January 27, 1894, and all of them had been completed by December 8, 1933. All 23 of the remaining archival projects of this locale have been professional archeological contract investigations and, with only two exceptions, all of them have been intensive field surveys, which are known or believed to have resulted in essentially a 100 percent surface coverage of their given project areas. Both of the two exceptions were reconnaissance, or incomplete, surveys that were completed by ASM staff members.

The majority, or 14, of the 23 (60.8%) professional archeological surveys of this locale have produced at least one and as many as 27 loci of isolated artifacts. Interestingly, though, only 10 of the 22 sites of the Upper Skunk Creek Locale actually occur in the smaller USCWMP project area. Five of them are informal, or undesig-

nated, sites that consist entirely of unnamed dirt roads that were plotted during the GLO surveys and, thus, had to be in use sometime between 1894 and 1933. Most of them are probably insignificant resources, therefore that, most likely, have since been destroyed by both reuse or subsequent development. On the other hand, all five formal sites of this general project area may be eligible for nomination to the Arizona Register of Historic Places. They have been formally designated by ASU as AZ T:4:2 ASU and AZ T:4:5 ASU and by the Arizona State Museum as AZ T:4:119 ASM, AZ T:4:120 ASM, and AZ T:4:121 ASM. All five are prehistoric Hohokam sites. Three of them are rather small campsites. The other two include only single surface habitations of cobble masonry that date to the Sedentary period (A.D. 1000-1200) and may have been used in conjunction with local farming.

Transect Resources

Based strictly upon archival research data alone, none of the six project transects was definitely known to occur in or immediately next to any previously recorded prehistoric or historic archeological site. However, 3 informal sites (two undesignated roads and the Phoenix-Prescott Road) and 5 formal sites (AZ T:4:2, 3, 4, 5, and 31 ASU) are known to occur within 0.50 miles of these six transects. All of them are considered here, therefore, as are 15 archival projects that have previously been completed in the general vicinity of these transects.

Figure 4 has already indicated the location of certain archival sites and previous project areas relative to that of Transect SC 1, Transect SC 2, and Transect UT 1. Accordingly, both Transect SC 1 and Transect UT 1 occur in one of the four alternative locations for Adobe Dam, which was then officially designated by the USACOE as Adobe Dam Alternative Site No. 3 (Adobe Dam Alter. 3). Adobe Dam Alternative Site No. 2 (Adobe Dam Alter. 2) and Adobe Dam Alter. 3 are separated by Interstate 17, and ASU intensively surveyed both of those then proposed reservoir sites in 1973. The first survey recorded site AZ T:4:31 ASU; the second one recorded sites AZ T:4:3, 4, and 5 ASU.

Occurring in Adobe Dam Alternative Site No. 2 and being situated just north of Middle Mountain, AZ T:4:31 ASU occurs just less than 0.40 miles west of USCWMP Transect SC 1. Unfortunately, however, very little information presently exists concerning this site. As defined by Treat and Dittert (1976a:29), though, it is a sparse lithic scatter measuring about 135 m in diameter. The stone artifacts here occurred mainly along the site periphery, leaving a more central area of possible prehistoric activity, and include: choppers, cores, scraper-planes, utilized flakes, several manos, and much debitage. Lacking any pottery and any diagnostic lithic tools, it was considered impossible to assign this site to either a particular cultural group or even a general chronological period.

AZ T:4:5 ASU occurs 0.20 miles generally west of Transect UT 1, and AZ T:4:3 ASU and AZ T:4:4 ASU occur just less than about

0.50 miles north of this same transect. Similarly, though, very little is known concerning either site. All three have been investigated exclusively by Treat and Dittert (1976b:34-36), all three are reported to have been campsites associated with the seasonal exploitation of different indigenous plant resources, and all three are mainly ceramic scatters of Wingfield Plain pottery, with a total of only three lithic artifacts having been recorded at AZ T:4:4 ASU and AZ T:4:5 ASU and none at AZ T:4:3 ASU. This third site is the largest, presumably, but it still measures only about 35 m long and 10 m wide. It also has the greatest quantity of pottery, which consists of 109 pieces of Wingfield Plain and 2 pieces of a decorated type known Santa Cruz Red-on-buff. These last two sherds tentatively date AZ T:4:3 ASU to the Santa Cruz phase of possibly A.D. 900-1000. Neither AZ T:4:4 ASU nor AZ T:4:5 ASU has yet been dated.

Five other archival projects are relevant in conjunction with these same three project transects. The first one consists of the GLO survey that J. H. Martineau (1895) completed of T5N,R2E during the brief period of January 26-February 20, 1894. It results in the professional map location of the "Road from Phoenix to Prescott," or simply the Prescott-Phoenix Road. As such, this informal site must predate 1894 and extends 4.3 miles generally southward through the following five legal parts of T5N,R2E: the SW4SW4 of Sec 2, the W2W2 of Sec 11, the W2 of Sec 14, the W2 of Sec 23, and the N2 of Sec 26. It should therefore occur just west of both USCWMP Transect SC 1 and Transect SC 2.

Neither one of the four final archival projects of this particular transect area ever resulted in the recording of any formal or informal sites. The first two of them consist of different institutional surveys of the CAP Hayden-Rhodes Aqueduct. The ASM investigated the preliminary alignment of this waterway in 1972, ASM Project No. 1972-5 (Kemrer et. al. 1972); its final alignment was later examined by ASU, ASM Project No. 1976-41, in 1976 (Brown 1976). Much later, in 1981, and immediately south of this aqueduct, the MNA surveyed the Skunk Creek Levee for the USACOE (Bruder 1982). Most recently, in 1998, Archaeological Consulting Services, Ltd. (ACS) of Tempe, Arizona, intensively surveyed two APS ROWs that generally parallel each other along Interstate 17 between Carefree Highway and Dynamite Boulevard. All aspects of that Interstate-17 69 KV Realignment Project, ASM Project No. 1998-158, have been reported by Adams (1998).

Farther north, both USCWMP Transect SC 3 and Transect SC 4 occur in the southern part of Adobe Dam Alternative Site No. 1 (Adobe Dam Alter. 1) (Figure 3). The entirety of that proposed reservoir was also intensively surveyed by ASU, in 1973, and AZ T:4:2 ASU was the single site that was then found there. This site supposedly occurs only about 300 feet southeast of the southwestern segment of Transect SC 3. As originally recorded and briefly discussed by Treat and Dittert (1976c), it occupies a low rise and consists of a sparse artifact scatter measuring about 65 m in diameter. It has been interpreted to have been a temporary Hohokam campsite, or limited activity locus, and its primary artifacts

include Wingfield Plain pottery, stone debitage, and several kinds of lithic tools: choppers, cores, knives, scrapers, scraper-planes, and a projectile point. Unfortunately, the total lack of any decorated pottery and any diagnostic lithic artifacts at this site prevented its accurate dating.

Much earlier, between December 5 and 8, 1933, B. J. Kinsey (1935) conducted his GLO survey of Township 6 North and Range 2 East. That survey resulted in the plotting of two perpendicular dirt roads that may cross in or near project Transect SC 4. The first or, apparently, main road extended southwestward along the western bank of Skunk Creek. The second one began along this route and then extended northwestward along the northern base of the unnamed northwestern extension of Union Hills.

Three other surveys have been completed near these same two project transects, but neither one of them ever encountered any prehistoric or historic sites. ACS undertook the first two surveys for Arizona Public Service. The earlier one, ASM Project No. 1990-53, involved the examination of a short (0.15 miles) section of the Skunk Creek 12 kV line occurring immediately east of 27th Avenue. (Regrettably, however, no management report, as originally defined by the ASM, has ever been written for this project.) The later one included the survey of a short (0.20 miles) ROW needed to provide APS power to a city of Phoenix police transmitter station. That project has been designated ASM Project No. 1992-57, and its management report has been prepared by Allen (1992). The third project, ASM Project No. 1994-358, was investigated by the Phoenix office of SWCA Environmental Consultants, Inc. (SWCA). It resulted in the intensive survey of 27th Avenue between Cloud Road and Joy Ranch Road (Mitchell and Stubing 1994).

Finally, the last three archival projects were all undertaken east of the town of New River, and neither one of them produced any prehistoric or historic sites occurring near project Transect 5. The earliest one was a GLO cadastral survey that U.S. Surveyor George F. Rigby (1920) made of T7N,R3E between December 5, 1916 and January 8, 1917. The other two were professional archeological surveys that were conducted along certain roadways. In 1991, the ASLD itself examined an unauthorized bulldozer road that extended across State Trust land, and all results of that trespass investigation, ASM Project No. 1991-112, have been reported by Kenny (1991). Later, the Maricopa County Department of Transportation (MCDOT) contracted SWCA (Howell 1994), ASM Project No. 1994-92, to intensively examine a 0.70-mile-long section of New River Road occurring immediately east of Transect SC 5 itself.

FIELD SURVEY RESULTS

A tremendous quantity of relevant information was collected during the fieldwork phase of this USCWMP inventory project. Geographical and environmental data were especially abundant and, among several other things, have already been used, in the environ-

mental section of this report, to elaborate the location and natural resource variability of not only the Upper Skunk Creek Locale, but also the general UCCWMP project area itself, and, of course, all six of the project geotechnical transects. Thus, the main purpose of this present section is to discuss the actual archeological field results of this inventory project.

Most importantly, the intensive survey of both the six transects and the three associated project access roads has produced three major kinds of results. First, and more significantly, absolutely no new, or previously unrecorded, prehistoric or historic archeological site, intrasite component, intracomponent feature, or even one isolated artifact locus was encountered during any field activity at either of the six USCWMP transects. Such negative evidence tends to reinforce the documented archival interpretation that a major difference exists in both the nature and relative density of archeological sites situated along upper parts of Skunk Creek versus those of nearby reaches of New River and Cave Creek Wash.

One rather straight alignment of small and medium-size boulders, measuring between 25 cm and 1.15 m, does occur just west of the northwestern end of Transect SC 1, however, but it is very easily interpreted as being nothing more than a modern alignment of rock that was unearthed while blading the southern edge of the adjacent drainage cut. Nevertheless, this alignment measures about 20.3 m long, is oriented true North 72° East, and simply consists of about 26 boulders that are commonly spaced 1.5-4.5 m apart. Further, there are no true prehistoric agricultural rock alignments (e.g., check dams, linear borders, contour terraces, grid borders, etc.) anywhere near this transect, but another alignment of similar boulders does occur farther east along the northern edge of the same blade cut. Quite understandably, many of the boulders in these two parallel alignments still contain uneroded caliche stains.

Second, SAS encountered absolutely no field evidence for the present project existence of either a) the two undesignated dirt roads near Transect SC 4, b) the historic Prescott-Phoenix Road near Transect SC 1 and SC 2, or c) sites AZ T:4:2 ASU, AZ T:4:3 ASU, AZ T:4:4 ASU, AZ T:4:5 ASU, and AZ T:4:31 ASU. While AZ T:4:2 ASU may still exist just southeast of Transect SC 3, the nonproject occurrence of AZ T:4:3, 4, 5, and 31 ASU is very easily justified, given the archival location of these sites well beyond the project boundaries of the six concerned geotechnical transects. Also, the local section of the Prescott-Phoenix Road has most probably been totally destroyed during the subsequent construction of Interstate 17. Interestingly, though, a few parallel north-south rock alignments do occur south of Carefree Highway, just east and west of the USGS road leading to Transect SC 2, but well north of the concerned boundary of this USCWMP inventory area. All of them quite possibly represent particular realignments of this historic road.

The third and final result of this USCWMP field survey pertains to the six different transects themselves. That is, all of them and all three project access roads there were found to be

generally characterized by undisturbed natural surfaces and rather sparse indigenous plant communities that generally provided excellent ground visibility. Accordingly, there exists only an extremely slight chance that any significant cultural resources were inadvertently overlooked at either Transect SC 1, SC 2, SC 3, SC 4, SC 5, or Transect UT 1.

On the other hand, some minimal land disturbances were recorded during the project survey. A few small and shallow but unfilled soil test pits were observed across the northeastern part of Transect SC 3, for example. Also, Transect SC 5 contains a small northern part of a rather large area that has been generally denuded by off-road vehicle use, several small to medium dumps of modern trash, and various abandoned appliances that are now continuing to be used for target practice. Finally, prior disturbance in the southwestern part of Transect UT 1 is limited to some modern trash dumping and slight vegetation denuding that is ongoing along the USGS road there.

PROJECT EVALUATION AND RECOMMENDATIONS

This USCWMP archeological inventory project has been very productive, and all of the different results of the present field survey are quite consistent with those of the USCWMP archeological assessment project. Specifically, the various literature searches and record checks of this latter project suggest that two major settlement patterns were extant across the general USCWMP project area. The first one appears to be that of the prehistoric Hohokam Indians who inhabited this area during mainly the Santa Cruz and Sacaton phases of ca. A.D. 900-1200. It is represented best by only a few, small and widely scattered habitation structures, which may have been associated with local agricultural fields, and even smaller campsites that likely result from the local exploitation of different natural resources. The second and much later pattern relates directly to historic transportation and dates largely to the Territorial and sequent Statehood phases of pre-1894 to post-1933. It consists entirely of several local roads that were variously connected to the main stagecoach route between Phoenix and Prescott. Quite understandably, therefore, no prehistoric or historic resources, as previously defined, were found during any field activities of the present project.

Based on all available field and archival research data, therefore, Scientific Archeological Services concludes this report with four pertinent and closely interrelated recommendations. First, SAS maintains that the proposed undertaking will have no effect upon any prehistoric or historic resource property. Second, the Flood Control District of Maricopa County is strongly encouraged to continue the ongoing compliance process by making available a review copy of this report for both the State Historic Preservation Office and, of course, the Arizona State Land Department. Third, it is highly recommended that officials from both agencies

provide all appropriate authorization for the FCDMC to obtain the necessary right-of-entry to undertake all USCWMP project geotechnical activities in northern Phoenix and northern Maricopa County, Arizona.

Although definitely not expected to occur, there is always at least an unforeseen possibility that certain subsurface archeological materials might exist at any one of the six USCWMP project transects. Finally, therefore, the FCDMC should be formally alerted to its compliance responsibility to:

- 1) report the occurrence of any prehistoric or historic archeological site or human burial materials that are older than 50 years and are discovered during any surface or subsurface testing activities;
- 2) take all reasonable steps to assure the protection of any and all archeological remains encountered during such testing activity.

Both of the above responsibilities are explicit requirements of both the Arizona Antiquities Act, specifically A.R.S. § 41-844, and the recommended regulations of the state of Arizona for implementing it, as stated by the Arizona Board of Regents (1991:33-43) and the Arizona State Museum (1999). Accordingly, those responsibilities might best be fulfilled by reporting the occurrence of all prehistoric and historic archeological materials to the ASM director and all human remains or associated funerary objects to the ASM repatriation coordinator at the University of Arizona in Tucson, Arizona. The verbal reporting of such materials is required within three working days of all pertinent discoveries, and it should be followed up immediately with a corresponding written report.

Additionally, the FCDMC might consult with the ASLD and, together, carefully consider the possible feasibility of authorizing all of the proposed geotechnical activities to be monitored by a professional archeological firm. Emphatically, however, SAS presently has no objective justification for recommending such action, for, once again, no archeological sites have ever been encountered at any of the six project transects and neither one of them exists in any area of significant archeological sensitivity. On much more of a subjective basis, though, such monitoring would be more consistent with the past cultural resource management policy of the Flood Control District, and it should definitely result in the professional recognition, recording, and reporting of any archeological materials found.

Simply stated, SAS considers archeological monitoring to be the observation of all field activities having the potential to adversely affect prehistoric or historic resources. If accepted by the FCDMC and the ASLD, the primary purpose of the USCWMP monitoring project would be to document whether or not any of the geotechnical testing activities had any effect upon any prehistoric or historic cultural resources of the six defined project transects,

including the three associated project access roads, of course. Further, all monitoring activities should be conducted in accordance with all provisions of any project specific permits that may be required by either the ASLD or the ASM. Among other possible ones, those activities might profitably include the following:

1. The physical on-site escorting of all vehicles and heavy equipment to each of the six proposed geotechnical transects.
2. The constant inspection of all backhoe activities associated with the excavation but not necessarily the backfilling of the different geotechnical trenches there.
3. The collection and analysis of all diagnostic and undiagnostic artifacts that may occur either along the final backhoe routes or within any of the actual test trenches.
4. The preparation of a brief final report that appropriately discusses the nature, activities, results, and recommendations of all activities undertaken during that USCWMP archeological monitoring project.

REFERENCES CITED

- Adams, Kim
1998 Archaeological Assessment of Arizona Public Service Company's Proposed Interstate-17 69 KV Realignment, Maricopa County, Arizona. Ms., Archaeological Consulting Services, Ltd., Tempe.
- Advisory Council on Historic Preservation
1999 Protection of Historic Properties; Recommended Approach for Consultation on Recovery of Significant Information from Archaeological Sites; Final Rule and Notice (36 CFR 800). Federal Register 51 (169): 27071-27087, May 18.
- Allen, Wilma
1992 An Archaeological Survey of Arizona Public Service Company Overhead Powerline Right-of-Way to Serve a City of Phoenix Police Transmitter Station, Maricopa County. Ms., Archaeological Consulting Services, Ltd., Tempe.
- American Geological Institute
1974 Dictionary of Geological Terms. Anchor Press/Doubleday, Garden City, New York.
- Arizona Board of Regents
1991 Arizona State Museum: Rules Implementing A.R.S. § 15-1631 and 41-841, Et. Seq., the Arizona Antiquities Act. In State of Arizona Administrative Rules and Regulations, Title 12, Chapter VIII. Arizona State Museum, Tucson.
- Arizona State Museum
1993 The Arizona State Museum Archaeological Site Recording Manual. Arizona State Museum, Tucson.
- 1994 The Arizona State Museum Procedures Manual For State Land Permits, Records Management/Repository Agreements, and Site Files Access. Arizona State Museum, Tucson.
- 1999 A.R.S. § 41-844 and § 41-865 Guidelines. Arizona State Museum, Tucson.
- Brown, David E.
1973 "The Natural Vegetative Communities of Arizona." Medium-scale (1:500,000) map, Arizona Game and Fish Department, Phoenix.
- Brown, Patricia E.
1976 An Archaeological Survey of the Reach 10 Realignment of the Granite Reef Aqueduct, Central Arizona Project. Ms., Office of Cultural Resource Management, Arizona State University, Tempe.
- Bruder, J. Simon
1982 An Archaeological Survey of the Proposed Skunk Creek Levee, Maricopa County, Arizona. Ms., Museum of Northern Arizona, Flagstaff.

Bruder, J. Simon (cont)

1983a Archaeological Investigations in the Adobe Dam Project Area. Research Paper 27, Museum of Northern Arizona, Flagstaff.

1983b Archaeological Investigations at the Hedgpeth Hills Petroglyph Site. Research Paper 28, Museum of Northern Arizona, Flagstaff.

Camp, Philip D.

1986 Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona. Soil Conservation Service, Phoenix.

Dean, Jeffrey S.

1991 Thoughts on Hohokam Chronology. In *Exploring the Hohokam, Prehistoric Desert Peoples of the American Southwest*, edited by G.J. Gumerman, pp. 61-149. University of New Mexico Press, Albuquerque.

Doyel, David E. and Mark D. Elson (eds)

1985 *Hohokam Settlement and Economic Systems in the Central New River Drainage, Arizona*. Soil Systems Publications in Archaeology (1 & 2), Phoenix.

Earl, Richard A.

1983 Paleohydrology of Skunk Creek. In *Archaeological Investigations in the Adobe Dam Project Area*, by J. Simon Bruder, pp. 165-231. Research Paper 27, Museum of Northern Arizona, Flagstaff.

Ezell, Paul H.

1983 History of the Pima. In *Handbook of North American Indians: Southwest 10*, edited by Alfonso Ortiz, pp. 149-160. Smithsonian Institution, Washington, D.C.

Fenneman, Nevin M.

1946 "Physical Divisions of the United States." Small-scale (1:7,000,000) map, U.S. Geological Survey, Washington, D.C.

Fish, Paul R.

1994 Revised Site Definition Policy. Ms., Arizona State Museum, Tucson.

Fish, Paul R., John Madsen, Kenneth C. Rozen, Carol Griffith, and Cathy Johnson

1995 Memorandum of Agreement Regarding Inventory and Treatment of Cultural Resources on State Trust Land Among Arizona State Land Department, Arizona State Historic Preservation Office, and Arizona State Museum (draft). Ms., Arizona State Museum, Tucson.

- Flood Control District of Maricopa County
1999 Scope of Work: Upper Skunk Creek Watercourse Master Plan. Ms., Contracting Branch of the Administration Division of Maricopa County, Phoenix.
- Giacobbe, John A. and Robert A. Larkin
1998 Middle New River Watercourse Master Plan; Cultural Resources Overview. Stantech Consulting, Inc., Phoenix.
- Gifford, Edward W.
1936 Northeastern and Western Yavapai. University of California Publications in American Archaeology and Ethnology 34(4):247-354. Berkeley.
- Gumerman, George J. (ed)
1991 Exploring The Hohokam: Prehistoric Desert Peoples of the American Southwest. University of New Mexico Press, Albuquerque.
- Gumerman, George J. and Emil W. Haury
1979 The Prehistory: Hohokam. In Handbook of North American Indians: Southwest 9, edited by A. Ortiz, pp. 75-90. Smithsonian Institution, Washington, D.C.
- Hassell, Eugene, Raymond H. Thompson, Kenneth E. Travous, and Joel D. Valdez
1995 Intergovernmental Agreement Among the Arizona State Land Department; the Arizona State Parks Board-Arizona State Historic Preservation Office; and the Board of Regents, the University of Arizona, and the Arizona State Museum; Regarding the Inventory and Treatment of Cultural Resources on State Trust Land. (final draft). Ms., Arizona State Museum, Tucson.
- Haury, Emil W.
1945 The Excavation of Los Muertos and Neighboring Ruins in the Salt River Valley, Southern Arizona. Peabody Museum of American Archaeology and Ethnology 24 (1).

1976 The Hohokam: Desert Farmers and Craftsmen. University of Arizona Press, Tucson.
- Henderson, T. Kathleen and James B. Rodgers
1979 Archaeological Investigations in the Cave Creek Area, Maricopa County, South-Central Arizona. Anthropological Research Paper 17, Arizona State University, Tempe.
- Howell, Todd L.
1994 An Archaeological Survey Along New River Road and Circle Mountain Road, Maricopa County, Arizona. Archeological Report No. 94-182, SWCA, Inc., Phoenix.

- Huckell, Bruce
1984 The Archaic Occupation of the Rosemont Area, Northern Santa Rita Mountains, Southeastern Arizona. Archaeological Series 147 (I), Arizona State Museum, University of Arizona, Tucson.
- Kamilli, Robert J. and Stephen M. Richard (eds)
1998 "Geologic Highway Map of Arizona." Small-scale (1:1,000,000) map, Arizona Geological Society and Arizona Geological Survey, Tucson.
- Kemrer, Sandra, Sandra Schultz, and William Dodge
1972 An Archaeological Survey of the Granite-Reef Aqueduct. Archaeological Series 12, Arizona State Museum, Tucson.
- Kenny, Brian W.
n.d. The New River Stricklin Site, AZ T:4:1 (ASU): An Early Transitional Site in the Hohokam Northern Periphery. Ms., U.S. Bureau of Land Management Phoenix District Office, Phoenix.

1991 Archaeological Survey and Cultural Resource Evaluation of a Trespass Fence Installation near New River, Maricopa County, Arizona. Ms., Arizona State Land Department, Phoenix.
- Khera, Sigrid and Patricia S. Mariella
1983 Yavapai. In Handbook of North American Indians: Southwest 10, edited by Alfonso Ortiz, pp. 38-54. Smithsonian Institution, Washington, D.C.
- Kinsey, B.J.
1935 Township No. 6 North, Range No. 2 East, Gila and Salt River Meridian. General Land Office map examined and approved by the U.S. Supervisor of Surveys in Denver, Colorado, on May 31.
- Martineau, J. H.
1895 Township No. 5 North, Range No. 3 East, Gila and Salt River Meridian. General Land Office map examined and approved by the Surveyor General's Office in Tucson, Arizona, on January 28.
- McGimsey, Charles R., III and Hester A. Davis (eds)
1977 The Management of Archeological Resources: The Airlie House Report. Special publication of the Society for American Archaeology.
- McGuire, Randall H. and Michael B. Schiffer (eds)
1982 Hohokam and Patayan: Prehistory of Southwestern Arizona. Academic Press, New York.

- Mitchell, Douglas R. and Michael Stubing
1994 An Archaeological Survey of 158 Acres Along Cloud Road, 27th Avenue, and 33rd Avenue Between Desert Hills Road and Carefree Highway, Maricopa County, Arizona. Archaeological Report No. 94-227, SWCA, Inc., Phoenix.
- National Park Service
1976 National Register of Historic Places: Nominations by State and Federal Agencies (36 CFR 60). Federal Register 41(6):1590-1597, January 9.
- 1977 Recovery of Scientific, Prehistoric and Archeological Data: Methods, Standards, and Reporting Requirements: Proposed Guidelines (36 CFR 66). Federal Register 42(19): 5374-5383, January 28.
- Peru, Donald V.
1984 New River: A Lithic Industry of Maricopa County, Arizona. Occasional Paper 1, Arizona Archaeological Society, Phoenix.
- Péwé, Troy L.
1987 Terraces of the Lower Salt River Valley in Relation to the Late Cenozoic History of the Phoenix Basin, Arizona. In Guidebook to the Geology of Central Arizona, edited by D. M. Burt and T. L. Péwé, pp. 1-45. Arizona Bureau of Geology and Mineral Technology Special Paper 2, Tucson.
- Rigby, George F. and H. L. Baldwin
1920 Township No. 4 North, Range No. 3 East, Gila and Salt River Meridian. General Land Office map examined and approved by the Surveyor General's Office in Phoenix, Arizona, on May 14.
- Rodgers, James B.
1974 An Archaeological Survey of the Cave Buttes Dam Alternative Site and Reservoir, Arizona. Anthropological Research Paper 8, Arizona State University, Tempe.
- 1977 Archaeological Investigations of the Granite Reef Aqueduct, Cave Creek Archaeological District, Arizona. Anthropological Research Paper 12, Arizona State University, Tempe.
- 1978 The Fort Mountain Archaeological Complex, Cave Buttes, Arizona. In Limited Activity and Occupation Sites: A Collection of Conference Papers, compiled by A.E. Ward, pp. 147-163. Contributions to Anthropological Studies 1, Center for Anthropological Studies, Albuquerque.
- 1993 The Terravita Archeological Inventory Project of Northern Scottsdale, Arizona. Contract Archeological Series 993-10, Scientific Archeological Services, Phoenix.

Rodgers, James B. (cont)

- 1994a The Bragg Archeological Mitigation Project near the Town of New River in Northern Maricopa County, Arizona. Contract Archeological Series 992-6, Scientific Archeological Services, Phoenix.
- 1994b The Skunk Creek Master Plan Archeological Inventory Project of Northern Glendale, Arizona. Contract Archeological Series 994-5, Scientific Archeological Services, Phoenix.
- 1995 An Archeological Inventory for the New River Floodplain Mitigation Project of Northern Maricopa County, Arizona. Contract Archeological Series 995-5, Scientific Archeological Services, Phoenix.
- 1996 The Cave Creek Recreation Area Archeological Mitigation Project of Southwestern Cave Creek, Arizona. Contract Archeological Series 991-5, Scientific Archeological Services, Phoenix.
- 1998a The Cave Creek Sanitary Landfill Archeological Mitigation Project of Northern Phoenix, Arizona. Contract Archeological Series 993-5B, Scientific Archeological Services, Phoenix.
- 1998b An Archeological Inventory Along Apache Wash, Paradise Wash, and Desert Hills Wash in Northern Phoenix, Arizona. Contract Archeological Series 998-6, Scientific Archeological Services, Phoenix.
- 1998c An Archeological Inventory in the Southern Part of the Upper Cave Creek Watercourse Master Plan Study Area of Phoenix and Cave Creek, Arizona. Contract Archeological Series 998-3, Scientific Archeological Services, Phoenix.
- 1999 The Upper Skunk Creek Watercourse Master Plan Archeological Assessment of Northern Maricopa County, Arizona. Contract Archeological Series 999-5, Scientific Archeological Services, Phoenix.

Rozen, Kenneth C.

- 1997 Standard Format and Content for Reports on Cultural Resource Surveys. Ms., Arizona State Land Department, Phoenix.

Russell, Frank

- 1975 The Pima Indians. The University of Arizona Press, Tucson.

Sayles, E. B. and Ernst Antevs

- 1941 The Cochise Culture. Medallion Papers 29, Gila Pueblo, Globe.

- Sellers, William D. and Richard H. Hill (eds)
1974 Arizona Climate. University of Arizona Press, Tucson.
- Smith, Landon D.
1974 Archaeological and Paleoenvironmental Investigations in the Cave Buttes Area North of Phoenix, Arizona. Unpublished Master's thesis, Department of Anthropology, Arizona State University. Tempe.
- Treat, Raymond and Alfred E. Dittert, Jr.
1976a Adobe Dam, Alternative Site No. 2. In An Archaeological Survey in the Gila River Basin, New River and Phoenix City Streams, Arizona Project Area, assembled by A.E. Dittert, Jr., pp. 25-31. Anthropology Department, Arizona State University, Tempe.
- 1976b Adobe Dam, Alternative Site No. 3. In An Archaeological Survey in the Gila River Basin, New River and Phoenix City Streams, Arizona Project Area, assembled by A.E. Dittert, Jr., pp. 31-36. Anthropology Department, Arizona State University, Tempe.
- 1976c Adobe Dam, Alternative Site No. 1. In An Archaeological Survey in the Gila River Basin, New River and Phoenix City Streams, Arizona Project Area, assembled by A.E. Dittert, Jr., pp. 19-25. Anthropology Department, Arizona State University, Tempe.
- Whalen, Norman M.
1971 Cochise Culture Sites in the Central San Pedro Drainage, Arizona. Unpublished Ph.D. dissertation, Department of Anthropology, University of Arizona, Tucson.
- Wilson, Eldred D., Richard T. Moore, and H. Wesley Peirce
1957 "Geologic Map of Maricopa County, Arizona." Medium-scale (1:375,000) map, Arizona Bureau of Mines, University of Arizona, Tucson.
- Young, Holly
1988 Requirements for Processing of Archaeological Project Collections. Arizona State Museum, Tucson.