

CHAPTER 2 STUDY AREA / AFFECTED ENVIRONMENT

STUDY AREA

The study area for the OCIFS is defined as the entire Onion Creek Watershed. Figure 2-1 contains a map showing the watershed, divided into major tributary sub-watersheds. Although the study area is the entire Onion Creek Watershed, the primary study focus was limited to six specific areas of interest within the Onion and Williamson Creek Watersheds, as depicted in Figure 2-2. Identifying these specific areas of interest from a flood damage reduction perspective allowed more efficiency in identifying areas for which feasible flood damage reduction projects exist, which may be either structural or non-structural in nature. These areas were given titles for identification purposes, which are shown in Table 2-1. One of the areas of interest, Middle Williamson Creek, was further subdivided into four sub-areas.

Table 2-1 Onion Creek Interim Feasibility Study Areas of Interest	
Listed from Downstream to Upstream:	
1.	Timber Creek
2.	Onion Creek Forest – Yarrabee Bend
3.	Bluff Springs Road/Perkins Valley
4.	Onion Creek Subdivision
5.	Bear/Onion Confluence
6.	Middle Williamson Creek
a.	Heartwood
b.	Radam/Salem Walk
c.	Broken Bow/Buckskin Pass
d.	Westgate Boulevard/Bayton Loop (includes Sunset Valley and Cherry Creek)

ONION CREEK WATERSHED

The Onion Creek watershed encompasses approximately 343 square miles and is located primarily in southern Travis and northern Hays Counties with a minor portion of the upper portion of the basin extending into eastern Blanco County. The longest stream length, from the headwaters to its confluence with the Colorado River, is approximately 78 river miles. The elevation of Onion Creek is around 1300 mean sea level (msl) at its headwaters and 386 msl at its confluence with the Colorado River. Existing impervious cover is estimated at 6.6 percent. Projected impervious cover at full build out is estimated to be 18.1 percent. Major tributaries on Onion Creek include Cottonmouth, Williamson, Marble, South Boggy, Slaughter, Rinard, Bear and Little Bear Creeks.

The upper part of Onion Creek in Hays County is a relatively rural setting with ranching activities. However, it is expected that most future urban development within the watershed will occur in the upper reaches. The lower part of the watershed is receiving even heavier pressure from municipal and residential development. There are still farming activities in large blocks of land; however, they are being platted for residential and commercial development at a rapid pace. The opening of the Austin-Bergstrom International Airport in May 1999 has brought rapid expansion to the extreme downstream portions of Onion Creek. In addition to residential and

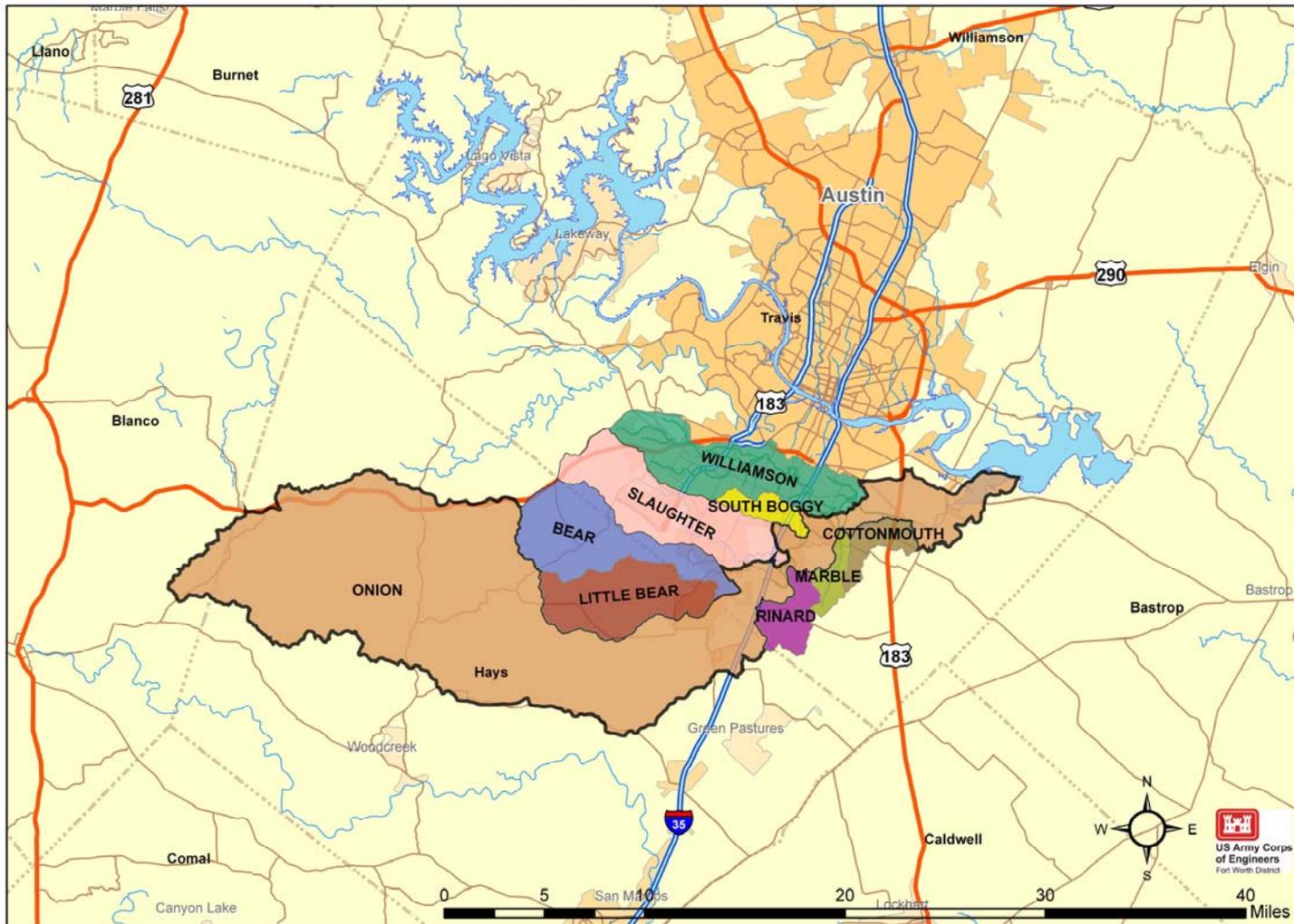
urban development, there are many sand and gravel operations within Onion Creek. Some are located in the upper watershed west of I-35, but some are located near the lower part of the watershed near the airport.

WILLIAMSON CREEK WATERSHED

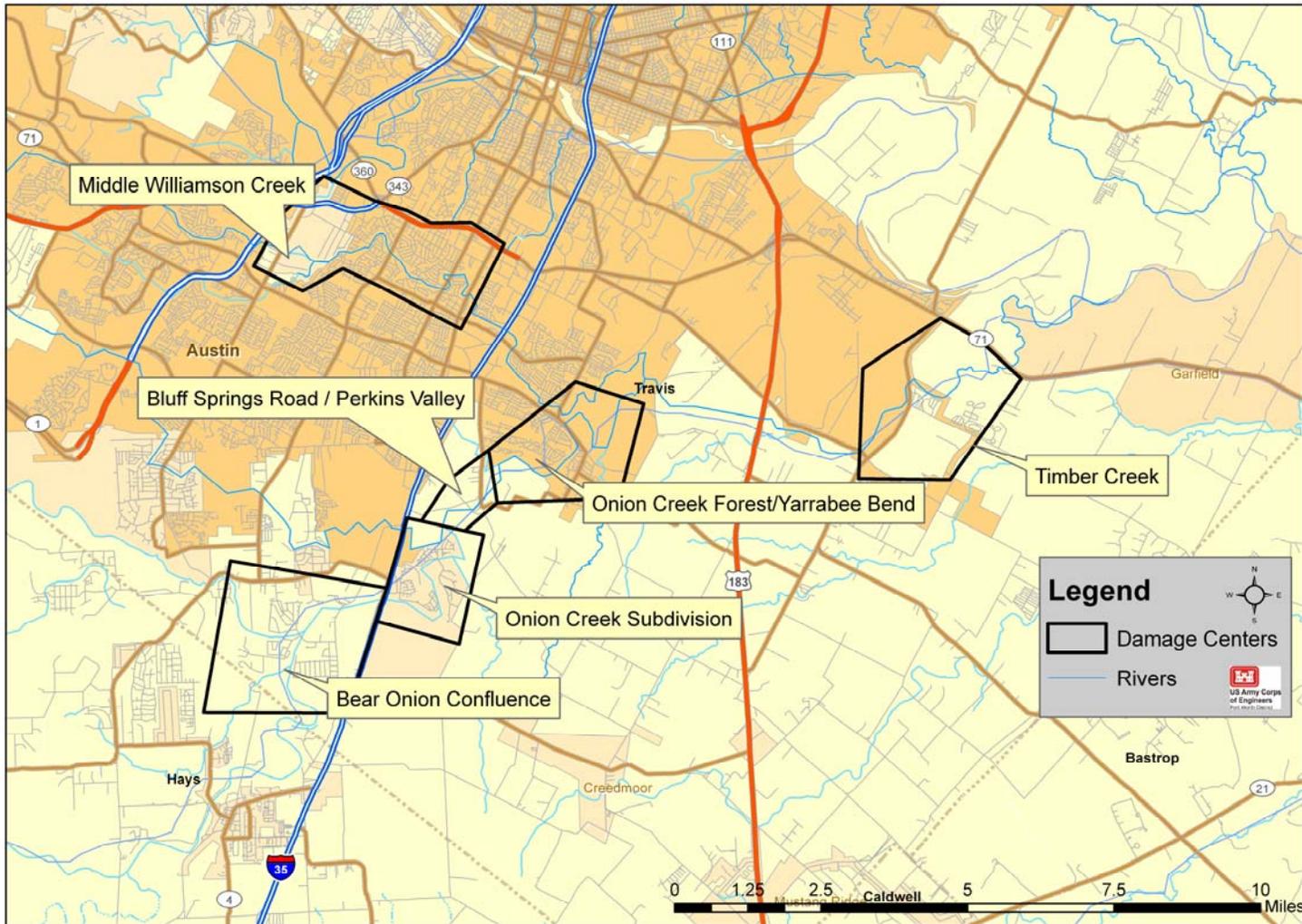
The Williamson Creek Watershed encompasses approximately 31 square miles, has a river-length of approximately 17.5 miles (from Onion Creek to the headwaters) and lies entirely within Travis County. The impervious cover for the creek has been estimated at 21 percent with future impervious cover estimated at 31 percent (Raymond Chan & Associates, 1997). Williamson Creek is a major tributary to Onion Creek. Major tributaries to Williamson Creek include St. Elmo, Pleasant Hill, Sunset Valley, Cherry Creek, Kincheon Branch, Motorola, and Scenic Brook. Williamson Creek originates southwest of the City of Austin near the Balcones Escarpment and flows about 17.5 miles before its confluence with Onion Creek near Austin-Bergstrom International Airport. Development of the middle portions of the watershed began in the 1950's. Since a portion of the watershed lies over the recharge zone of the Edwards Aquifer, the creek flows intermittently, however, there are perennial pools starting in the lower Bayton Loop area to the confluence with Onion Creek.

A 1997 Watershed Erosion Assessment report for Williamson Creek identified complete development within the middle third of the creek, with the lower and upper portions of the watershed continuing to transform to a fully developed condition. Commercial development is slated for the lower watershed according to the erosion assessment and mostly single-family development is anticipated for the upper portion of the watershed. The Edwards Aquifer Recharge Zone Ordinances that manage development in the upper portions of the watershed will limit impervious cover and potentially direct most development to be single family in nature. The watershed ordinances require water quality and detention ponds to manage the quality and quantity of runoff from frequent events and provide stormwater detention for large rainfall events (Raymond Chan and Associates, 1997). Therefore, with the implementation of these measures it is anticipated that runoff rates from the upper watershed during frequent storm events will be maintained at their current levels.

Onion Creek Watershed Location Map Figure 2.1



Designated Areas of Interest Figure 2.2



LAND USE

Land use within the lower reaches is a relatively flat terrain which is suitable for farming, while most of the upstream areas are associated with the Texas Hill Country, where ranching is prevalent. Urban pressures of the Austin metropolitan area are dramatically changing the landscape. The northernmost tributary, Williamson Creek, is almost entirely urbanized, while much of the upland reaches of the main stem of Onion Creek remain undisturbed. A land use/land cover classification was performed for the entire Colorado River basin. There are five major classifications for land use. These include: agricultural, barren land, forest land, rangeland, and urban. Table 2-2 shows a breakdown of land use for each creek. The land use for Onion was for the mainstem only and did not include major tributaries.

Table 2-2 Land Use Classification	
CLASSIFICATION	% of Area
WILLIAMSON CREEK	
Agricultural Lands	10
Barren Land	10
Forest Land	26
Rangeland	8
Urban	46
ONION CREEK	
Agricultural Lands	21
Barren Land	1
Forest Land	53
Rangeland	21
Urban	4

PHYSIOGRAPHY

Onion Creek travels through three major physiographic provinces, the Edwards Plateau to the west, the Rolling Prairie in the middle, and the Blackland Prairie to the east. The Edwards Plateau, also known as the Hill Country, is highly dissected by the Colorado River and its tributaries. Slopes generally range from 5 to 15 percent with slopes greater than 15 percent occurring adjacent to the Colorado River and many larger tributaries. The western half of Onion Creek is located in the Edwards Plateau. Although the Rolling Prairie is usually included in the Blackland Prairie, local geologic preference is to separate the two because of contrasting slope and different subsurface conditions. The Balcones Fault Zone forms the boundary between the Edwards Plateau and the Blackland Prairie, and the Rolling Prairie is considered to be the area generally occupied by the Balcones Fault Zone. The Balcones Fault Zone trends northeast/ southwest along the edge of the Hill Country, and divides Austin such that the northwestern one-third of the city lies with the Edwards Plateau and the southeastern two-thirds lies within the Rolling and Blackland Prairies. The Balcones Fault Zone, also referred to as the Balcones Escarpment, is comprised of a series of normal faults, generally upthrown to the west, that form a belt of faulted strata about five miles wide. The major part of the City of Austin is within this zone of moderately dissected slopes commonly less than 5 percent except in a few local areas. Onion Creek crosses the Balcones Fault Zone west of the town of Buda, and travels through the Rolling Prairie as it flows north towards the City of Austin. The Blackland Prairie is a slightly to moderately dissected area east of the Balcones Fault Zone. Slopes range from 2 to 5 percent with a few broad areas where slopes are less than 2 percent. Onion Creek enters into the Blackland Prairie as it crosses under Interstate 35 (I-35) and flows northeast toward the Colorado River.

GEOLOGY

Geologic units exposed in the Austin and Onion Creek area include Cretaceous-age limestones, dolomites, claystones, siltstones, tuffaceous claystones (altered pyroclastics) and basalts. Soils consist of residual soils, Quaternary age terrace deposits of gravels, sands, silts, and clays, and Recent Alluvium in the floodplain of the Colorado River and major tributaries such as Onion Creek. Cretaceous units generally strike northeast and dip gently southeastward except in the Balcones fault zone where magnitude and direction of dips are irregular. The total thickness of these units is about 2,500 feet. Most Cretaceous units are fossiliferous; common fossil varieties include several species of oysters, clams, and snails. Tertiary strata overlie Cretaceous units in the southeastern sections of the Austin area and are encountered southeast of Onion Creek after it crosses I-35. Alluvial deposits locally overlie Cretaceous and Tertiary bedrock units in the vicinity of the Colorado River and its tributaries. Where exposed, these units range from a few feet to about 30 feet in thickness. However, boreholes indicate that thicknesses greater than 50 feet occur in many areas.

HYDROLOGY

As mentioned above, the Onion Creek has a drainage basin of 343 square miles. The average channel slope of Onion Creek from Hays County to the Colorado River is approximately 11.5 feet-per-mile. Williamson Creek has a drainage basin of 31 square miles. The average channel slope is approximately 25 feet-per-mile. Both the Onion and Williamson Creeks experience extensive flooding, which is discussed in detail in Chapter 3 and Appendix G of this document.

CLIMATOLOGY

The climate in the study area is generally mild with hot summers, with averages ranging from 90° F in the summer and 61° F in the winter. High temperatures at or above 100 °F are common in the summer. The annual mean rainfall is approximately 33 inches and is typically distributed throughout the year. The maximum monthly and 24-hour rainfall in the Austin area is 20.78 inches in September 1921, and 19.03 inches September 9, 1921, respectively. The annual maximum and minimum rainfalls are 64.68 inches and 11.42 inches, respectively.

POPULATION AND INCOME

The city of Austin, located in Travis County, has been the capital of Texas since it became a state in 1846. The city spans an area of approximately 272 square miles and had a population of approximately 681,000 in April 2002. This metropolitan area is a major manufacturing, trade, distribution, and finance center. The principal manufacturing activities in Austin are electronics and industrial machinery. Other major employers are schools, utilities, and various government services. Regional statistics on population and income changes for the city, county and state are presented in Table 2-3.

Table 2-3 Regional Demographics Statistics					
Population					
	1990	2000	Percent Increase	Projected 2010	Percent Increase
Austin	465,622	680,000	46%	N/A	N/A
Travis County	576,407	812,280	41%	1,065,624	31%
Texas	16,986,000	20,851,820	23%	24,178,507	16%
Per Capita Income					
	1990	2000	Change	-	-
Austin	\$18,553	\$31,794	71%	-	-
Travis County	\$19,628	\$35,095	79%	-	-
Texas	\$17,446	\$28,035	61%	-	-
Source: BEA regional accounts data, U.S. Census Bureau, and Texas A&M Real Estate Center					

The Travis County unemployment rate for March 2002 was estimated at 5.4 percent, compared to the state unemployment rate of 5.6 percent. The unemployment rate is reflected in the area's per capita income. Per capita income is considered the most comprehensive measure of economic activity available, since it maintains a close and generally constant relationship with the gross national product. The average per capita income for Travis County in the first half of 2002 was approximately \$35,000, compared with the state average of approximately \$27,000.

AIR QUALITY

As documented in the *Final Programmatic Impact Statement for Flood Damage Reduction and Ecosystem Restoration, Lower Colorado River Basin, Colorado River Texas August 2005*, the Environmental Protection Agency (EPA) rejected the 1-hour ozone standard and the more stringent 8-hour standard has become the applicable ozone standard. The city of Austin has signed an Early Action Compact with the EPA. This action commits the city to implement emission reduction strategies designed to result in sufficient reductions to meet and maintain the 8-hour standard by 2007. The 8-hours standard requires that the average of the annual fourth highest daily eight-hour maximum over a three-year period is not to be at or above 85 parts per billion. The city of Austin is still classified as near non-attainment for Ozone only. The city is in attainment for all other criteria pollutants.

BIOLOGICAL RESOURCES

Riparian Vegetation

Onion Creek Watershed

The Onion Creek watershed provides an important diversity of habitats, which support a variety of wildlife. The watershed flows primarily over the Blackland Prairie and the Edwards Plateau ecoregions developing in Blanco County and continues through Travis and Hays Counties where it empties into the Colorado River.

The Edwards Plateau is a deeply dissected, rapidly drained stony plain having broad, flat to undulating divides. The original vegetation was grassland or open savannah-type plains with tree or brushy species found along rocky slopes and stream bottoms. Tall grasses such as various bluestems, Indiangrass, and switchgrass are still common along rocky outcrops and protected areas having good soil moisture. These tall grasses have been replaced on shallow xeric sites by mid grasses and short grasses such as sideoats grama, buffalograss, and Texas grama.

The western part of the Edwards Plateau comprises semiarid mixed vegetation. The climax grasses consist of various bluestems, sideoats, hairy grama, common curlymesquite, buffalograss, fall witchgrass and *Tridens* and *Elymus*. Common forbs are Engelmann daisy, orange zexmania, bush sunflower, western ragweed, and sneezeweed. On ranges that have been overgrazed, bitterweed, broadleaf milkweed, smallhead sneezeweed, broomweeds, prairie coneflower, mealycup sage, tasajillo, and prickly pear are common. Woody species common to the Edwards Plateau ecoregion include live oak, sand shin oak, post oak, mesquite, and juniper. The eastern and southern edges of the western portion of the plateau support dense stands of juniper; whereas, redberry juniper increases to the north and west of the plateau.

The Blackland Prairies ecoregion intermingles with the post-oak savannah in the southeast and has divisions known as the San Antonio and Fayette Prairies. This rolling and well-dissected prairie represents the southern extensions of the true prairie that occurs from Texas to Canada.

The Blackland Prairie is a tallgrass prairie that was once dominated by various bluestems, Indiangrass, tall dropseed, and *Silveus* dropseed. Minor species such as sideoats grama, hairy grama, Mead's sedge, Texas wintergrass, and buffalograss have increased with grazing pressure. Common forbs are asters, prairie bluet, prairie-clover, and late coneflower. Common legumes include snoutbeans and vetch. Mesquite, huisache, oak, and elm are common invaders on poor-condition rangelands and on abandoned cropland. Oak, elm, cottonwood, and native pecan are common along drainages.

Williamson Creek Watershed

Vegetation in the Williamson Creek watershed is highly variable. Vegetation on the hills, bluffs, and level uplands, which have a limestone base, consist of mixed timber and shinnery. In deeper soils, Ashe juniper, live oak, cedars, elm, and hackberry are prominent. Riparian areas along Williamson Creek and some of the smaller tributaries consist of Ashe juniper, cedar elm, American elm, black willow, bald cypress, cottonwood, pecan, and sycamore.

Disturbance due to urban and rural development has resulted in fragmentation of virtually all the natural habitat types. Natural patterns or mosaics of habitats have been altered to create unnatural situations. For example, soils that would support tall grass prairie are now dominated by shorter grasses and forbs with tall grasses persisting only on the pristine sites.

Riparian Woodland

The riparian woodland cover type is predominately composed of mature pecan, oaks, ash, and elms within the riparian corridors, or areas that are periodically flooded on public and private lands. These riparian ecosystems have been created by the interaction of streams, floodplains, and the adjacent terrestrial habitat. These hardwood forests, particularly old-growth hardwoods (greater than 100 years old), contribute to the biodiversity and provide important food and shelter for wildlife. Periodic flooding enhances the diversity of habitat types within these areas. The disturbance of the bottomland forest by flooding is a natural and important part of the proper functioning of these areas. Bottomlands help to contain floodwaters and lessen the impact of flooding when rivers overflow. In addition, these bottomland forests help maintain water quality by trapping sediments, wastes, and pollutants from stormwater runoff.

Trees found in the areas of interest include bald cypress, pecan, sycamore, oaks, elm, Ashe juniper, cottonwood, and hackberry. According to reports by the Texas Department of Parks and Wildlife (Fentress, 1986), at least 189 species of trees and shrubs, 42 woody vines, 75 grasses and 802 herbaceous plants are known to occur in the bottomland hardwood ecosystems in Texas. Even though central Texas (i.e. Onion Creek) bottomland hardwood ecosystems are not quite as diverse as the east Texas woodlands described by Fentress (1986), they are complex and dynamic habitats with large diverse communities. These plant communities provide habitat for a diversity of animal species.

Bottomland hardwoods in Texas also support at least 116 species of fish, 31 species of amphibians, 54 species of reptiles, 273 species of birds and 45 species of mammals (Fentress, 1986). Over 50 percent of all the neotropical songbirds are associated with bottomland hardwood forests (Fentress, 1986). The Onion Creek bottomlands support a large diversity of insects, fish, amphibians, reptiles, birds, and mammals. Signs of armadillos, raccoons, and opossums were fairly numerous throughout the areas of interest. Leopard frogs and cricket frogs were abundant, as were snakes, butterflies, bees, and other flying insects. These areas provide some habitat for white tail deer. Some species that can be found in Onion and Williamson Creeks are listed in Appendix B, Addendum B-4.

As noted riparian woodlands are quickly becoming the most scarce habitat. Overall, the riparian habitat along the areas of interest is fairly fragmented and impacted by suburban and rural development and agricultural uses along the streambank. In addition, invasive exotic species such as Chinese tallow, legustrum, and chinaberry are commonly occurring species within this vegetation type. This makes this resource one of the most desired in terms of restoration potential. Dense pockets of properly functioning riparian habitat do exist within the areas of interest and the degree of fragmentation varies among sites. Riparian woodlands are significant on a national, institution and public recognition scale. As described above, these resources are becoming scarcer on a national, regional, and local level. Planning on watershed level scales for protection and restoration is required to restore riparian woodlands. Riparian woodlands are integral to the over health of the aquatic ecosystem. Corps regulations require riparian woodlands to be mitigated in-kind.

As a subset of the riparian woodland classification, the city of Austin further classifies portions of the riparian woodlands as *“Priority Woodlands”* and *“Other Significant Woodlands”*. In the entire Onion and Williamson Creek as a whole, approximately 3,864 and 2348 acres of Priority Woodlands exist, respectively. In addition Onion Creek has 4010 of Other Priority Woodlands and Williamson contains 1768. It should be noted that this GIS layer is somewhat outdated and some areas designated as Priority and Other Priority Woodlands are actually businesses, parking lots, and residential development.

Priority Woodlands are riparian and upland woodlands which are undisturbed, complex, biological habitats composed of a tall, diverse canopy of mature native tree species, as well as many types of shrubs, vines, and grasses. They most closely represent the natural and traditional character of our area's environment. Priority Woodlands are the old-growth forest of the Austin are and are especially valuable as wildlife habitat. These woodlands typically support numerous protected sized trees (over 19" in diameter) and can be dominated by several community assemblages depending on the site's vegetational region, The Blackland Prairie or the Edward's Plateau. The Blackland Prairie tends to support a Sugarberry-Elm community in most areas or Post Oak-Cedar Elm on high river terraces. The Edward's Plateau may support a Plateau Live Oak, Ashe Juniper Oak, or Texas Oak community structure. The Bald Cypress-Sycamore community is common along perennial riparian areas, where Walnut and Ash are also important species."

Other Significant Woodlands are riparian and upland woodlands which include community types similar to the Priority Woodlands but which are more disturbed by man's activities. Other Significant Woodlands may be second growth woodlands or manicured woodlands such as parks where most of the understory is removed. These woodlands may have been cleared for agriculture at one time but are now in an advanced stage of restoration. Other Significant Woodlands are also important ecological and aesthetic areas for preservation.

Parkland

This cover type is located in park settings or residential or commercial landscapes. It is mainly comprised of large mature trees with lawn consisting of Bermuda grass or Saint Augustine grass. The habitat value of these areas is limited from the lack of understory, but is still utilized by and important to nesting birds and bats. Typical trees species include live oak, cedar elm, American elm, green ash, pecan, walnut, and others.

Shrubland/Transitional Woodlands

This cover type is located in disturbed areas and considered to be in an early secondary successional stage. They are not as common in the project area as the other cover types but are interspersed within the woodlands and grasslands. They are composed of scattered mesquites, willows, young oaks and elms, cedars, tall grasses, and various forbs.

Grassland

The grasslands are generally located in parks, fallow farm fields, pastures, or in the floodway zone along the stream system. There are two types of grasslands in the study areas, short grasslands and tall grasslands. The short grass areas, that are routinely mowed, are comprised of short native and introduced grasses and forbs, and sometimes scattered trees. The tall grass fallow fields also contain a combination of native and introduced grass and forb species, but the composition is different than those in the short grass areas. The vegetation found on these sites is characteristic of disturbed or old-field bottomland pastures. These old-field sites can be expected to continue to succeed to scrub/shrub and eventually bottomland hardwood forests. In field reconnaissance visits, several sites noted on aerial photographs as being part of open field, are now covered by stands of juniper and cedar elm saplings. Common grasses identified in the grassland areas include Johnson grass, Canada wildrye, perennial rye, western wheatgrass, rescue grass, Dallas grass, Texas wintergrass, buffalo grass, Bermuda grass, oats, purple threeawn, and Japanese brome. Common herbaceous species found include ragweed, beggar's tick, bull nettle, blue mealy sage, Carolina snail seed, horsemint, spotted bee balm, silver leaf nightshade, prairie coneflower, white prickly poppy, Indian blanket, and annual sunflower.

Residential

These areas are predominately residential housing developments consisting of houses, maintained yards of landscaped Bermuda or Saint Augustine grasses and large trees consisting primarily of pecan, elms and hackberry. The residential areas currently provide little habitat, except for nesting birds. However, if the houses were removed, the area could be restored to riparian habitat. These areas are located within the 100-year floodplain, which makes them a prime area for ecosystem restoration since they have been heavily degraded by development.

Wildlife Resources

Onion Creek Watershed

Since Onion Creek occurs on the dividing line between two distinct ecoregions, numerous plants and animals occur here which are on the edge of their known range. The Onion Creek watershed provides an important diversity of habitats that support wildlife. The watershed contains a significant high quality riparian resource, which has the capability of supporting both upland and lowland species. Numerous species of songbirds such as mockingbirds, robins, blue jays, various sparrows, and cedar waxwings are present along the vegetated portions of the creek. Waterfowl, such as migratory ducks and geese, and game birds, including quail, dove, and wild turkey can be found within the watershed. The watershed also contains a number of springs and seeps that provide habitat for sunfish, bass, catfish, crappie, various minnows, carp, and other fish. Appendix B, Addendum B-4 provides information on additional species that can be found in Onion Creek.

Mammals such as rabbits, raccoons, squirrels, opossums, and skunks frequent the area. Whitetail deer, bobcat, coyote, fox and armadillos are found in less populated portions of the watershed. Numerous species of toads, frogs, turtles, and snakes are also abundant throughout the watershed. Natural crevices occur in the limestone bluffs and provide excellent habitat for karst troglodytic species such as the bone cave harvestman, tooth cave pseudoscorpion, tooth cave spider, tooth cave ground beetle, Kretschmarr cave mold beetle, and the cave cricket. These karst invertebrates may also be accompanied by bats including the cave myotis (*Myotis velifer*), big brown bat (*Eptesicus fuscus*), and free-tailed bat (*Nyctinomops macrotis*). Karsts

habitat throughout the watershed is severely threatened due to human encroachment. Threats from human encroachment include filling in or causing the collapse of caves, alteration of drainage patterns, alteration of surface plant and animal communities, contamination by pollutants, and other detrimental impacts caused by human visitation (TPWD, 1995).

Considerable residential development along portions of Onion Creek has impacted previously identified areas of valuable wildlife habitat. More recent habitat disturbance has resulted in a wildlife population composed of species more tolerant to human presence such as the raccoon and opossum and the species less tolerant such as the white-tailed deer, gray fox, and bobcat are continually being pushed outwards.

One major problem identified with the area is the rapid loss of high value riparian habitat due to accelerated commercial and residential development, primarily in Travis County. In 1987, according to the U.S. Fish and Wildlife Planning Report, the average Habitat Suitability Index (HSI) was 0.83 in undeveloped areas directly along the creek channel on a scale of 0.0 to 1.0, with 1.0 representing the highest quality. As the watershed becomes more urbanized it will continue to experience increased flooding, decreased water quality and a decline in species richness and numbers of individuals within populations of birds, mammals, reptiles and amphibians through the fragmentation of riparian habitat.

Gravel pits located along the river corridor have exposed banks that slump following rainfall events, preventing the regrowth of vegetation on their banks. They have directly impacted vegetation by removal of the riparian vegetation. In addition, the aquatic habitat could be affected by slumping which would cause changes in flow velocity, channel depth, and substrate materials. Furthermore, runoff from these pits could enter the system and deteriorate water quality by increasing turbidity with suspended solids which would reduce light penetration, thus affecting plant growth. Studies reveal that macroinvertebrate communities on Onion Creek respond dramatically to water quality variations. Additionally, changes in diatom communities are related distinctly to watershed changes due to levels of development as indicated by a land use breakdown study on Onion Creek (*Bioassessment Strategies for Nonpoint Source Polluted Creeks Project*, June 1993-1996).

Williamson Creek Watershed

Williamson Creek supports a wide variety of fish, wading birds, songbirds, waterfowl, shorebirds, mammals, reptiles, and amphibians. Mammals that may be found near the creek include beaver, nutria, raccoon, and mink. Amphibians possibly occurring in the stream may include small mouth salamander, Texas salamander, slimy salamander, Texas cliff frog, cricket frog, spotted chorus frog, Strecker's chorus frog, bullfrog, and Rio Grande, southern leopard frog, red-spotted toad, Gulf Coast toad, and Woodhouse's toad. Numerous turtles occur in the creek and deep intermittent pools. These may include, but are not necessarily limited to, the snapping turtle, yellow mud turtle, stinkpot, red-eared slider, and spring softshell turtles. Common snakes in the area may include the eastern hog-nosed snake, red-bellied water snake, checkered garter snake, western ribbon snake, and the western cottonmouth.

Disturbance due to urban and rural development is found throughout virtually all natural habitat types. As a result of prior and on-going agricultural and urban activities, riparian habitat capable of supporting a high density of wildlife species is quickly becoming scarce. Numerous springs and seeps provide intermittent segments of shallow flowing water, which support several species of fish, including sunfish, bass, crappie, minnows, and others.

The portion of the creek over the Edwards Aquifer is inundated only during high water levels and does not support a permanent fishery resource. Several species of songbirds such as mockingbirds, robins, cardinals, and blue jays are present along vegetated portions of the creek, as are mammals such as raccoons, squirrels, opossums, and skunks. As with the Onion Creek watershed, natural crevices occur in the limestone bluffs and provide excellent habitat for karst troglobitic species such as the bone cave harvestman, tooth cave pseudoscorpion, tooth cave spider, tooth cave ground beetle, Kretschmarr cave mold beetle, and the cave cricket. These karst invertebrates may also be accompanied by bats listed above or in Appendix B, Addendum B-4. Karst habitat throughout the watershed is severely threatened due to human

encroachment. Threats from human encroachment include filling in or collapse of caves, alteration of drainage patterns, alteration of surface plant and animal communities, contamination by pollutants, and detrimental impacts caused by human visitation (TPWD, 1995).

Threatened and Endangered Species

There are 17 Federally-listed endangered, one Federally-listed threatened, two Federal candidate, one state-listed endangered, and six state-listed threatened species that are known to occur within Travis and Hays Counties. A complete list of threatened and endangered species and rare and unusual species can be found in Appendix B, Addendum B-1.

According to the U.S. Fish and Wildlife Service (USFWS) Planning Aid Letter dated October 11, 2002, not all of these species are found in the immediate vicinity. Table 2-4 represents species that are likely to occur in the proposed project area. A short description of each species and their habitat is provided below.

Table 2-4 Federally Listed T&E Species That Could Occur in the Study Area		
Common Name	Scientific Name	Federal Status
Barton Springs Salamander	<i>Eurycea sosorum</i>	Endangered
Black-capped Vireo	<i>Vireo atricapilla</i>	Endangered
Golden-cheeked Warbler	<i>Dendroica chrysoparia</i>	Endangered
Whooping Crane	<i>Grus americana</i>	Endangered
Austin Blind Salamander	<i>Eurycea waterlooensis</i>	Candidate

Barton Springs Salamander

The Barton Springs salamander (*Eurycea sosorum*) has only been documented at four spring outlets (collectively known as Barton Springs) within the City of Austin's Zilker Park in Travis County, Texas. Habitat for the Barton Springs Salamander occurs in stenothermal (that is having a narrow temperature range) spring flows with substrates that are free of sediment and have various mixtures of gravel, cobble, aquatic plants, and leaf litter.

The primary threats or reasons for listing the Barton Springs salamander were "the degradation of quality and quantity of water that feeds Barton Springs" as a result of urban expansion over the watershed. The species' restricted range makes it vulnerable to both acute and chronic groundwater contamination. The salamander is also vulnerable to catastrophic hazardous material spills, increased water withdrawals from the Edwards Aquifer, and impacts to surface habitat.

Black-capped Vireo

The black-capped vireo (*Vireo atricapilla*) breeds throughout the Edwards Plateau region. Its preferred habitat consists of scattered trees and numerous dense clumps of shrubs growing to ground level, interspersed with open areas of bare ground, rock, grasses, or forbs. Foliage that extends to ground level is the most important requirement for nesting. Most nests are located between 0.4 and 1.24 meters above ground level and are well screened by foliage. Plant species commonly used as nest substrate are evergreen sumac and shin oak. Other species include junipers, Mexican persimmon, live oak, wafer ash, silktassel, elbow brush, Texas kidneywood, yaupon, and deciduous holly. Black-capped vireo territories can be located on steep slopes, such as heads of ravines or along the sides of arroyos. On such areas, the shallow soils slow succession, and the microclimates provided by rugged terrain perpetuate clumping of vegetation, thus sustaining an area suitable for the vireo. On level terrain, vireo habitat tends to change through succession, from prairie grass to oak-juniper woodlands. Black-capped vireo habitat in level areas, was maintained by wildfires that kept the vegetation in an early successional stage. Total cover has been known to range from 17 to 88%. Threats to the black-capped vireo include habitat loss due to urbanization, browsing by

herbivores, brush clearing, and natural succession; brown-headed cowbird brood parasitism, and human disturbance (FWS 1995).

Golden-cheeked Warbler

The Golden-cheeked Warbler (*Dendroica chrysoparia*) is found in juniper-oak woodlands in the Edwards Plateau. It is dependent on Ashe juniper for long fine bark strips, only available in mature trees, used in nest construction and foraging sites. Various oaks also provide foraging sites. Other predominant woody species used include live oak, Spanish oak, scaly bark oak, cedar elm, Mexican persimmon, hackberry, Texas ash, bald cypress, Arizona walnut, big-tooth maple, Lacey oak, and sycamore. The threat to the golden-cheeked warbler is from habitat loss and fragmentation due to urban encroachment and clearing of oak-juniper woodlands (FWS 1995).

Whooping Crane

Whooping cranes (*Grus Americana*) occur only in North America. They currently exist in the wild at 3 locations and in captivity at 7 sites. The December 2003, total wild population was estimated at 315. This includes: 194 individuals in the only self-sustaining Aransas-Wood Buffalo National Park Population that nests in Wood Buffalo National Park and adjacent areas in Canada and winters in coastal marshes in Texas; 85 captive-raised individuals released in an effort to establish a non-migratory Florida Population in central Florida, and 36 individuals introduced starting in 2001 in the eastern U.S. that migrate between Wisconsin and Florida. The last remaining bird in the reintroduced Rocky Mountain Population died in the spring of 2002. The captive population contained 119 birds in December 2003, with annual production from the Calgary Zoo, International Crane Foundation, Patuxent Wildlife Research Center, and the San Antonio Zoo. The total population, wild and captive, in December 2003 was 434.

The whooping crane breeds, migrates, winters and forages in a variety of habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, agricultural fields. Historic population declines resulted from habitat destruction, shooting, and displacement by activities of man. Current threats include limited genetics of the population, loss and degradation of migration stopover habitat, construction of additional power lines, and degradation of coastal habitat and threat of chemical spills in Texas.

The whooping crane is a potential migrant of the area and has been spotted in Travis County. However, it is unlikely that the whooping crane would be affected by the project.

Austin Blind Salamander

The Austin Blind Salamander (*Eurycea waterlooensis*) is not currently a listed threatened or endangered species; however, it is listed as a candidate species by the USFWS. The salamander is a small aquatic salamander that is known from three springs in Travis County. The species is believed to spend most of its life cycle underground, living in the Edwards Aquifer. Primary threats include degradation of water quality and quantity due to urbanization (67 Federal Register 40660).

AQUATIC RESOURCES

Aquatic Habitat

Onion Creek

Onion Creek originates just inside the Blanco County line and flows east through Hays County and Travis County until its confluence with the Colorado River in Travis County. From its headwaters until it

reaches the Edwards Aquifer Recharge Zone, Onion Creek is predominately perennial in nature due to multiple small dams that hold water.

Onion Creek is predominately an intermittent creek while it transverses the Edwards Aquifer west of Interstate Highway 35 (IH-35). During this segment of the creek, Onion Creek is dry most of the year except during times of floods and therefore has minimal aquatic resources present throughout the year. This section of creek has multiple recharge features that contribute water to the Edwards Aquifer and to Barton Springs.

Finally, downstream of IH-35 the creek turns into mostly a perennial creek with minimal habitat for fish and reptiles until it gets close to its confluence with the Colorado River downstream of the Timber Creek damage center. This segment contains most of the project area. The creek has limited aquatic vegetation; however, during site visits several species were identified in specific locations including water willow, smart weed, and American pond weed. The creek, as well as the deep pools seen during site visits, provides habitat for catfish, bass, sunfish, frogs, and water snakes. Most of the creek habitat is the Onion Creek Greenbelt, which follows the creek on one or both sides throughout the Onion Creek Forest/Yarrabee Bend Damage Center.

Onion Creek has undergone several changes from its historical conditions. According to the Onion Creek Watershed Erosion Assessment, which assessed Onion Creek through Travis County, Onion creek is attempting to re-establish geomorphic stability.

The city of Austin performs creek assessments for each of their watershed master planning program. These assessments result in an Environmental Integrity Index being prepared for each watershed. The Onion Creek Watershed is rated fair with an overall score of 77 on a 100 scale. The degraded elements were water chemistry with a score of 64. Water quality is above average, but ammonia is high. Habitat was another degraded element with a score of 61 with sediment deposition as a degrading factor. The aquatic life was rated as good with a score of 70, and it was noted that benthic macroinvertebrate and diatom communities were good. The presence of pollution-intolerant diatom species indicates that there is an overall healthy community.

Williamson Creek

Much of Williamson Creek lies within the recharge zone of the Barton Springs segment of the Edwards Aquifer. The creeks crossing the Edwards Aquifer recharge zone tend to go dry during the summer months because much of the flow is infiltrated into the aquifer through recharge features in the streambeds. This creek section is intermittent, but retains water throughout the lower portions of the stream near the confluence with Williamson Creek. This area serves as a migration area for fish that are spawning and rearing. Fish and aquatic insects are quick to populate the damage center when stream flows are present. These fish and insects either move upstream for perennial water sources or move downstream to deep pools that may hold water throughout the year. Frogs and toads are fairly common throughout this area.

As mentioned above, the city of Austin performs creek assessments as part of their watershed master planning program. These assessments result in an Environmental Integrity Index being prepared for each watershed. The Williamson Creek Watershed is rated good with an overall score of 69 on a 100 scale. The degraded elements were water chemistry with a score of 63. Habitat was another degraded element with a score of 66 with sediment deposition and the lack of buffer zone as contributing factors to degradation. The aquatic life was rated as good with a score of 70, and it was noted that benthic macroinvertebrate community is poor, but the diatom community is good. The poor benthic community is more than likely as a result of dry creek beds.

Ground Water

Recharge to the Edwards Aquifer occurs primarily as infiltration of stream flows conveyed in the creeks as they cross the outcrop of the Edwards limestone. Secondary recharge to the aquifer occurs from rainfall

infiltrating directly into the outcropped limestone and subsurface inflows from adjacent formations. Figure C shows the Barton Springs Segment of the Edwards Aquifer.

Approximately 85 percent of the Barton Springs Segment of the Edwards Aquifer recharge occurs through the streambeds of six creeks (Slade, 1986). Their recharge contributions and maximum recharge rates are estimated and displayed in Table 2-5.

WATERSHED	PERCENT OF TOTAL RECHARGE	MAXIMUM RECHARGE RATE (CFS)
Barton Creek	28	30-70
Williamson Creek	6	13
Slaughter Creek	12	52
Bear Creek	10	33
Little Bear Creek	10	30
Onion Creek	34	120

Based on 65 years of flow measurement documented by the USGS (Slade, 1986), the mean discharge at Barton Springs is about 50 cfs. The minimum and maximum recorded discharge rates are 10 and 166 cfs. The water quality of the contributing creeks is a significant determining factor in the water quality of Barton Springs as their flow constitutes most of the recharge to the springs (Slade, 1986).

Water Quality

Onion Creek is listed on the 2004 Texas Commission on Environmental Quality's (TCEQ) Draft Water Quality Inventory and 303(d) List as an impaired water body from the confluence with the Colorado River in Travis County to the most upstream crossing of FM 165 in Blanco County for depressed dissolved oxygen. This segment is classified as a category 5c, which means that additional data and information will be collected before a Total Maximum Daily Load (TMDL) or review of the water quality standard is scheduled. Dissolved oxygen (DO) measures the amount of oxygen available to fish and other aquatic organisms. Fish will become stressed if the DO falls below 2 mg/L for an extended period of time. The state standard is 5 mg/l for most water bodies. In addition to Onion Creek, Slaughter Creek (a tributary of Onion), is listed for an impaired macrobenthos community from its confluence with Onion creek to above US 290 west of Austin. It is also listed as a category 5c. Williamson Creek is not listed on the state 303 (d) list.

HAZARDOUS, TOXIC AND RADIOACTIVE WASTES (HTRW)

An environmental site assessment (ESA) for the Onion Creek Interim Feasibility Study was performed to investigate the project site and its general vicinity for the presence, or suspected presence, of Hazardous, Toxic, and Radioactive Waste (HTRW) materials under existing conditions. This assessment was undertaken to facilitate early identification and appropriate consideration of HTRW problems during the reconnaissance, feasibility, pre-construction engineering and design, land acquisition, construction, and operations, maintenance, repair, replacement, and rehabilitation phases of the project.

In November 2000, an environmental site reconnaissance was conducted by the U.S. Army Corps of Engineers, Fort Worth District. This reconnaissance consisted of site walkovers of the footprint area, interviews with property/facility owners, and photographs documenting the project site. Field observations found household debris, small dumping grounds containing household garbage, and a 55-gallon rusted drum lodged into a creek bank. No evidence of HTRW issues were believed to exist as a result of the site reconnaissance.

In May 2001, the Corps contracted with Environmental Data Resources (EDR) of Southport, Connecticut to conduct the environmental regulatory database search on the City of Austin and its general

vicinity according to the requirements of the American Society for Testing and Materials (ASTM) Standard Test Methods "Standard Practice for Environmental Site Assessments", E-1527-00. The State records review consisted of reviewing the Texas Commission on Environmental Quality (TCEQ) databases for underground storage tank facilities, leaking underground storage tank facilities, and landfill closures which may be present within a one-half mile radius from the project site. The Federal Records Review consisted of reviewing the U.S. Environmental Protection Agency (EPA), Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Information System, Resource Conservation and Recovery Act (RCRA) and Emergency Notification System listings, also reviewed and summarized up to a one-half mile radius from the referenced site locations. Records of relevant geological and hydrological information available from the U. S. Department of Agriculture (USDA), Soil Conservation Service, and U. S. Geological Service (USGS) were also reviewed.

Based on the ESA report findings, field observations, and the recommended study conditions; there are HTRW issues to consider during future investigations, design, construction, and operation portions of the project. Most importantly, since the project is located in an urbanized drainage way, any soil disposed of as a result of the project will need to be appropriately tested. One individual property, identified in the ESA Inc. report as an auto repair shop, was identified as having a "low" probability of causing an HTRW issue for the project. The property is located within the 100-year floodplain, but has already been purchased by Travis County.

CULTURAL RESOURCES

The Onion Creek watershed has been shown to be inhabited fairly often throughout time. In 2001, studies completed by a Corps contractor identified 45 recorded archeological sites in the six areas of interest. In addition, historic map and aerial photograph research was undertaken to identify potential unrecorded historic archeological sites and architectural properties. A windshield survey on public streets was performed to confirm the extent of development, assess the current condition of known archeological sites/architectural properties and potential historic sites, and determine the presence/absence of architectural properties. Finally, where possible, known and potential sites/architectural properties were visited and assessed for the potential for Holocene depositional contexts that could contain buried archeological deposits. The Corps concluded, in consultation with the Texas State Historic Preservation Officer (SHPO) that detailed cultural resources survey should be conducted within the project-specific footprints, once they had been identified.

None of the previously recorded sites identified in the 2001 study is located within the six project areas. As per the Corps agreement in 2002 with the SHPO, pedestrian surveys were undertaken within the footprint of each of the project areas. In 2006, an archaeologist from the Corps excavated shovel test pits in the Timber Creek and Yarrabee Bend locations. The Bear/Onion Confluence was determined to be too steep to bear likely cultural deposits. The Williamson Creek project area will require deeper excavation during construction than the other project areas due to necessary modifications needed along the creek banks. For this reason, the Corps has determined deep backhoe trenching will be required in the Williamson Creek project areas to adequately locate any cultural materials that may be impacted by the construction. This deep trenching will occur during the Preconstruction & Design Phase of the study, after the project has acquired the proper easements to the properties. The backhoe trenching will be completed prior to any construction activities and any Historic Properties unearthed by those investigations will be appropriately mitigated in consultation with the SHPO before construction is allowed to begin. Cultural surveys were not conducted in the Bluff Springs/Perkins Valley or Onion Creek Subdivision because these areas were not carried further into detailed design.

No cultural resources were observed at Timber Creek, Yarrabee Bend or at the Bear/Onion Confluence project areas. The Corps has determined that no Historic Properties will be affected by the planned construction in those locations. In addition, no standing structures within these three areas are eligible for listing on the National Register of Historic Places. Consultation is underway with the SHPO for concurrence with this determination.

OTHER SOCIAL CONCERNS

Socioeconomics

In order to evaluate impacts to the human environments as a result of a proposed project, it is necessary to know the existing demographics of the area. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, requires that the Government address impacts of proposed projects to these populations. There are existing low income and minority populations in the Timber Creek Area of Interest. Discussions with local residents during site visits made this apparent. Residents said that they could not afford alternate housing because of land costs and therefore had to continue to reside in the floodplain. Environmental Justice is not considered an issue in the other five damage areas.

Traffic

Traffic within the proposed project areas generally consists of traffic associated with high density residential developments. Higher levels of traffic and traffic congestion are generally experienced during the morning and evening commute. Traffic levels off during the afternoon and at night. Several major thoroughfares intersect the study area as shown on Figure 2-2.

Noise

Noise is described as unwanted sound, which is measured and perceived by its characteristic amplitude and frequency. Amplitude is a measure of the strength of the sound and is directly measured in terms of changes in the pressure of a sound wave. Frequency, commonly perceived as pitch, is the number of times per second the sound causes air molecules to oscillate. Sound is represented on a logarithmic scale in decibel (dB) units. The threshold of human hearing is approximately 0 dB, and the threshold of pain is around 120 dB.

Frequency of measured sound is adjusted to correspond to the frequency sensitivity of the human ear if measuring community response to noise. Sound levels that have been adjusted are referred to as A-weighted sound levels and are represented as dBA units. Noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (DNL).

DNL is the community noise metric recommended by the EPA and has been adopted by most federal agencies (Federal Interagency Committee on Noise 1992). A DNL of 65 dB is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities that do cause noise. Areas exposed to DNL above 65 dB are generally not considered suitable. A DNL of 55 dB was identified by EPA as a level below which there is effectively no adverse impact (USEPA 1972).

The primary noise sensitive receptors near the project area are residential neighborhoods, churches, and public use areas (golf courses, greenbelts, and parks). In addition, there is additional increase in noise levels associated with air traffic from aircraft approaching or departing Austin-Bergstrom International Airport. Austin City Code Chapter 9-2 sets Noise and Amplified Sound restrictions. This code restricts the operation of "a machine that separates, gathers, grades, loads, or unloads sand, rock, or gravel within 600 feet of a residence, church, hospital, hotel, or motel between 7:00 p.m. and 6:00 a.m." In addition, the code states that a permit must be obtain before using sound equipment at an outdoor music venue. The code states "A person may use sound equipment at an outdoor music venue that produces sound as measured at any point along the property line of the permitted venue not greater than 85 decibels between 10:00 a.m. and: 1) 10:30 p.m. on Sunday through Wednesday; 2) 11:00 p.m. on Thursday; or 3) 12:00 midnight on Friday or Saturday." According to city staff, the city of Sunset Valley Ordinance 980707 prohibits unreasonable noise between the hours of 10:30 p.m. and 7:00 a.m. the following morning. However, the city usually allows construction activities, but restricts construction in residential areas to the hours of 8:00 a.m. to 7:00 p.m. According to Travis County, there are no existing noise ordinances that restrict construction.

Lighting

The primary light sensitive receptors near the project area are residential neighborhoods, churches, and public use areas (golf courses, greenbelts, and parks). Wildlife are particularly susceptible to lighting. However, wildlife within urban environments are typically more adjusted to increased levels of lighting. The Timber Creek damage area is adjacent to the airport and hence suffers from increased levels of light disturbance.

RECREATION

The Onion Creek Watershed areas of interest as described earlier in this report are located in Travis County and within the extra-territorial-jurisdictional boundary of the city of Austin, Texas. The Timber Creek area is part of Travis County, and has not been incorporated into the city of Austin at this time; however, as growth continues this may be a future event. The Onion Creek Forest/Yarrabee Bend areas are within the city of Austin. The Williamson Creek areas are predominantly within the city of Austin, but a small portion is within the city of Sunset Valley. The Bear/Onion Creek Confluence is located within Travis County.

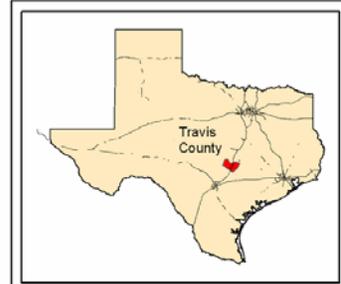
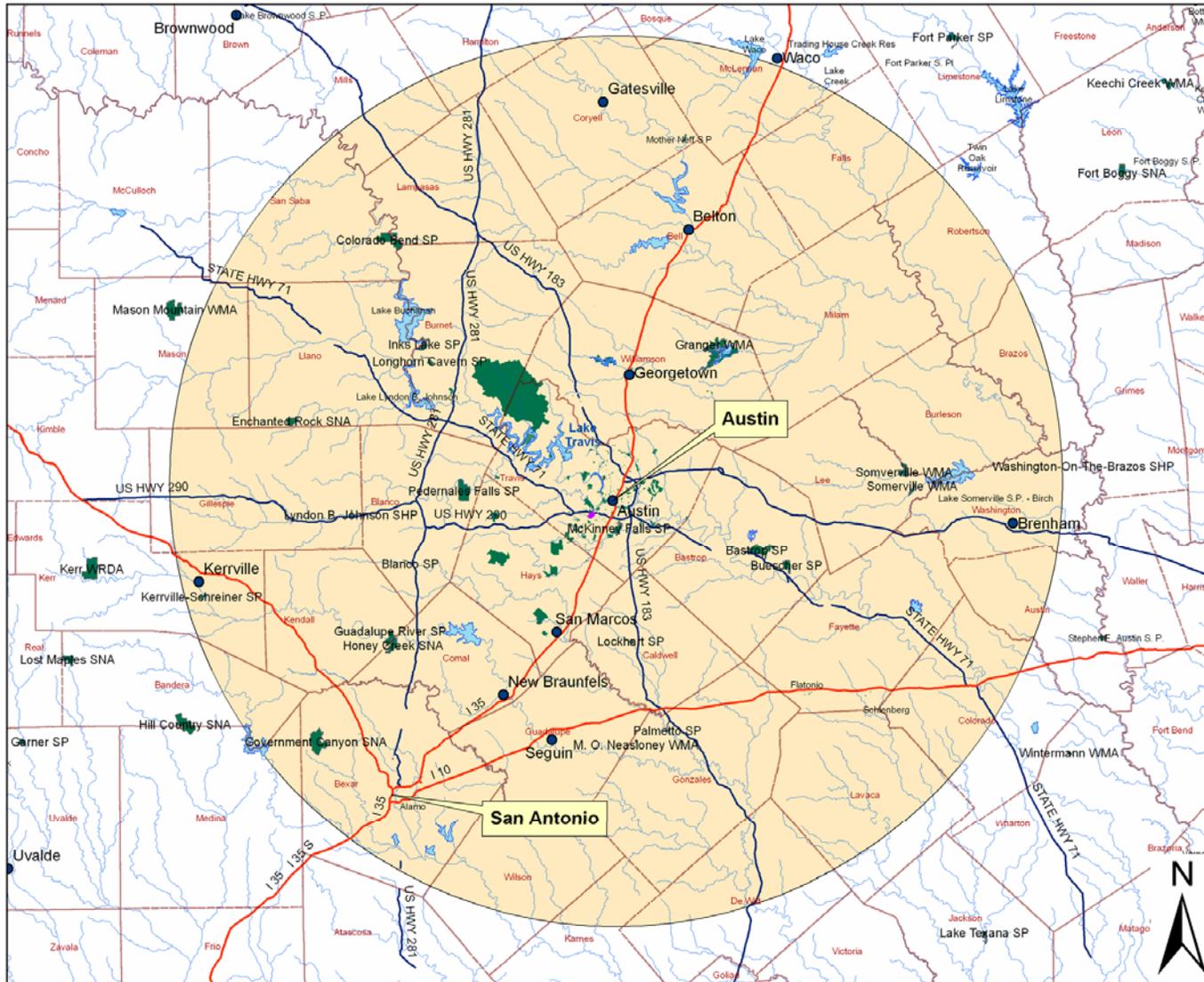
Regional Recreational Resources

Within the 100-mile service range, (the maximum travel recreation distance identified by Texas Parks and Wildlife for day use), there are several state parks and wildlife management areas as shown on Figure 2-3 (See *Appendix F* for larger view of all figures) and Table 2-6. Travis County is a major part of the Hill Country of Texas, which is the “recreation mecca” of the state, because of its numerous lakes, streams and rivers, state and local parks, and unique geological and ecological features. Austin is also the home of the state capital and the University of Texas. Over the past two decades this area has experienced extensive population growth, which is expected to double within the next couple of decades.

Water supply is a major concern for the region and more pressure is being placed on the local governments to conserve, protect and develop water supplies, as well as to restrict development in floodplains. Simultaneously the public is also demanding more recreation opportunities, including gaining improved access to the local river systems for rafting, kayaking, canoeing and fishing. The Texas Parks and Wildlife Department has shifted its focus to acquiring large, contiguous tracts (5,000 acres or more) for wildlife habitat and use by the public. Maintenance of existing state parks, however, is limited because of lack of funding to support operations and maintenance of these parks, and some parks are being released to local conservation groups and governments.

Lakes within the 100-mile radius from Austin include the Lower Colorado River's Highland Lakes - Lake Buchanan, Inks Lake, Lake Lyndon B. Johnson, Lake Travis and Lake Austin. Town Lake is immediately downstream of Lake Austin. Other lakes within the area are U. S. Army Corp of Engineers (Corps) reservoirs – Waco Lake, Belton Lake, Stillhouse Hollow Lake, Lake Georgetown, Granger Lake, Somerville Lake and Canyon Lake. Smaller lakes include, but are not limited to Walter E. Long Lake, Fayette County Lake, Medina Lake, Mitchell Lake, East Lake and others. Development of marinas, resorts, RV and other campgrounds and lake front residential areas has been a common use of lands bordering these lakes.

Figure 2-3: Regional Recreation Resources – 100 Mile Radius from Austin



Legend

- Major Cities
- Interstates
- State Highways
- Lakes
- ▭ Counties
- 100 Mile Radius
- texas_parks polygon

This map was developed strictly for planning purposes for the Onion Creek Phase II Study to show proposed recreations zones on lands being considered for non-structural flood damage and ecosystem restoration in the Onion Creek - Timber Creek Area.

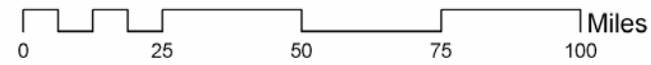


Table 2-6 Regional Recreation Resources – 100 Mile Radius from Austin	
<p>Texas State Parks Bastrop SP Blanco SP Buescher SP Colorado Bend SP Inks Lake SP Kerrville-Schreiner SP Lake Somerville SP – Birch Lockhart SP Longhorn Cavern SP McKinney Falls SP Mother Neff SP Palmetto SP Pedernales Falls SP</p>	<p>Texas State Natural Areas Enchanted Rock SNA Government Canyon SNA Guadalupe River Honey Creek SNA</p> <hr/> <p>Wildlife Management Areas (WMA) Balcones National Wildlife Refuge Granger WMA M. O. Neasloney WMA Somerville WMA</p>

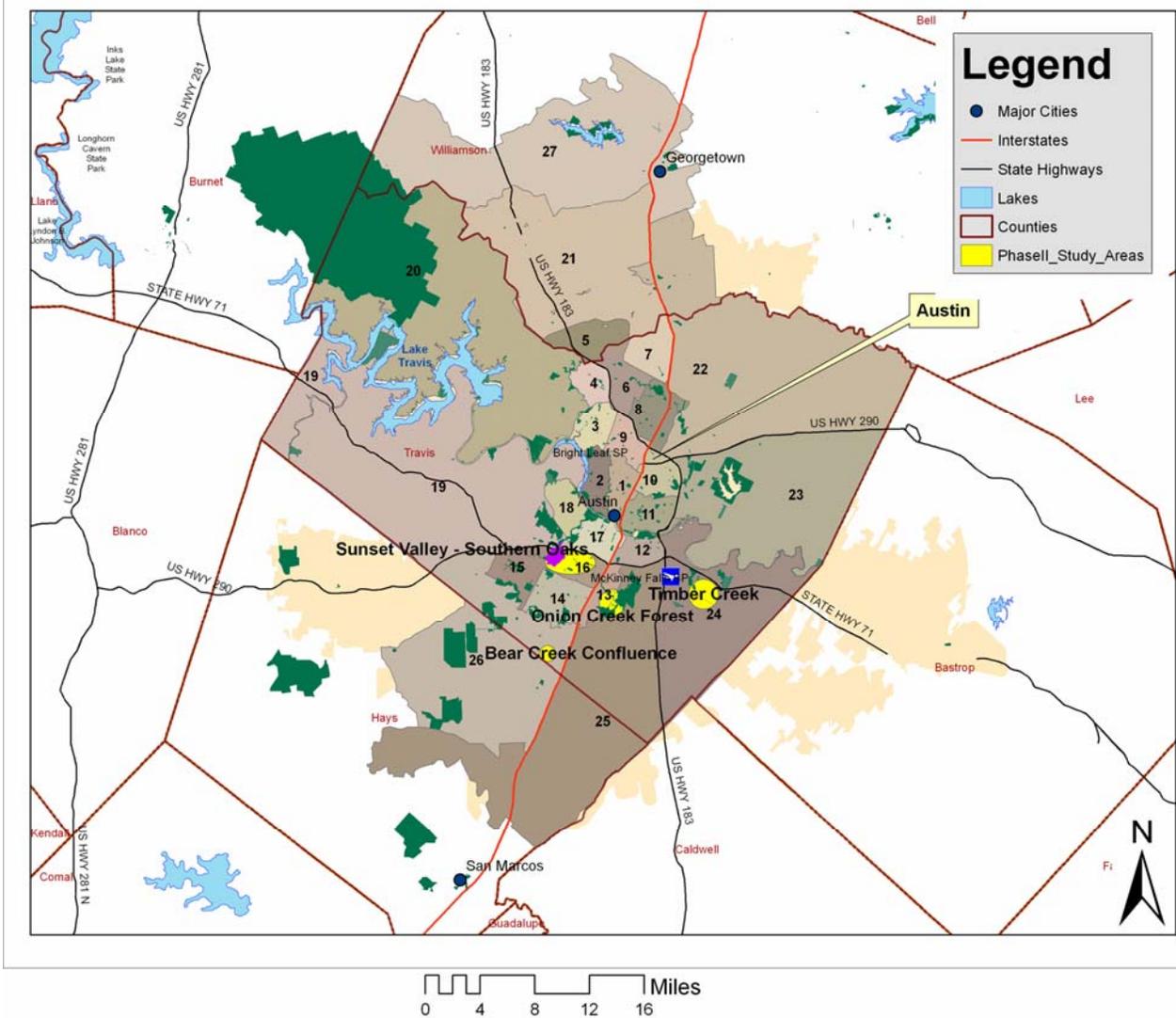
Many of the lakes and state parks are experiencing restricted access and early closings due to daily carrying-capacity limitations during the peak recreation season. Appendix D of the *Onion Creek Information Report* provides a more thorough description of regional recreation and recreation trends identified for state owned properties, as evaluated by the Texas Parks and Wildlife Department.

Local Recreational Resources

Local recreation facilities are considered to be those within the extra-territorial-jurisdictional boundary of the city of Austin, which extend five miles from the city’s existing boundary. There are over 223 parks and/or recreation facilities within the extra-jurisdictional boundary. Each facility is defined into a major category – such as Neighborhood Park, Metro Park, School, Special, District, Greenbelt, Senior, Golf Course etc. The city has subdivided the area encompassed by the extra-jurisdictional boundary into 27 planning regions, which are then divided into neighborhoods. Park and recreation planning is performed at the neighborhood and planning region levels. Some lands shown in Figure 2-4 are under the jurisdiction of the city of Sunset Valley and Travis County. Planning regions of interest to this project include 13, 16, 17, 23, 24, and 25.

As described in the *Onion Creek Information Paper*, data supporting supply and demand for recreation is outdated and is no longer easily accessible for all areas. Texas Parks and Wildlife Department only evaluates state land resource needs, not local demand. To acquire up-to-date demand data, the local sponsor and the Corps conducted the Onion Creek Recreation Survey, which would be used by local government to update their five-year master plans and by the Corps to identify recreation demand. The methodology used for this survey and a description of results are described in Appendix F.

Figure 2-4: City of Austin Planning Regions



City of Austin Master Planning Efforts

There are 187 parks within Austin’s Parks and Recreation system (Figure 2-5), not including the Balcones Canyonlands Preserves lands on the western edge of the City. These 187 parks yield a total area of 14,361 acres and the Balcones area adds an additional 8,847 acres for residents to enjoy in the immediate vicinity. To facilitate planning efforts, the Parks and Recreation Department maintains a Geographic Information System to identify areas of significant natural resources within the city, including riparian areas, floodplains, aquifer recharge zones, springs, and endangered species habitat.

The Parks and Recreation Department defines the City’s parks by various types, based upon size, location and planned use. The numbers of the various park types are listed in Table 2-7. The park system contains two waterfront swimming areas and 30 miles of designated Hike and Bike Trails, with additional trails planned. The Balcones Canyonlands Preserves (BCP) lands are dedicated as preserves, as opposed to parkland, and are set aside to provide habitat for several endangered species. Some trail-based recreation is permitted in the BCP area.

Table 2-7 City of Austin's Park Types		
Park Types	Number W/ City	Acreage
Neighborhood Parks	77	799
School Playgrounds	22	157
District Parks	12	768
Metropolitan Parks	9	7,571
Greenbelts	23	3,394
Golf Courses	5	839
Special Parks	29	225
Nature Preserves	10	608
Balcones Canyonlands Preserve	15	8,847
Total		23,208
Source: <i>Long Range Plan for Land and Facilities</i> , Prepared by: The City of Austin Parks and Recreation Department, 1998.		

Neighborhood Parks

Neighborhood parks are the most plentiful and provide basic recreational opportunities near the residential areas. These parks are the smallest in size (5-30 acres) and include features such as, playgrounds, basketball and tennis courts, open play areas and picnic tables. Landscaping of these areas, as well as other parks, has been shifting toward naturalized, low maintenance landscaping utilizing native wildflowers and other native plants.

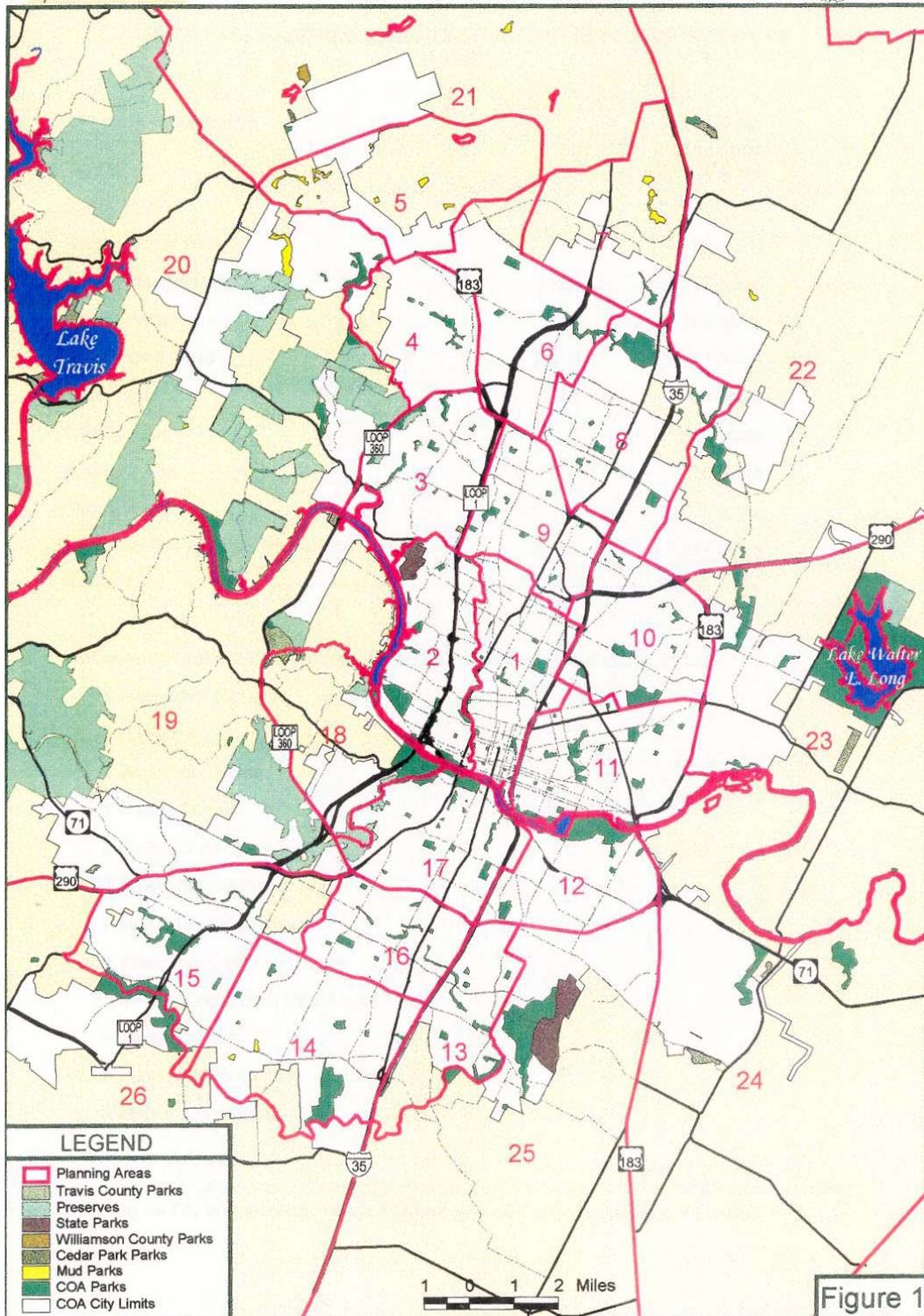
School Parks

School parks are typically located on elementary school properties and they are partially owned by the City. The top priority use for these is as school facilities, and designed to meet the student population, rather than the larger neighborhood's needs.

District Parks

District parks are larger and more developed than neighborhood parks; they are designed to serve neighborhoods within a 2-mile radius, and include features found in neighborhood parks, as well as major indoor and outdoor recreational facilities. They typically range from 30 – 200 acres in size and are located close to public transportation. Outdoor facilities often include regulation sport courts and playfields, group or reservation picnic facilities, a junior Olympic or Olympic size swimming pool and bathhouse, trails and interpretive signage.

**Figure 2-5
City of Austin
Parks and Preserves**



Source: *Long Range Plan for Land and Facilities*, Prepared by
The City of Austin Parks and Recreation Department, 1998

Metropolitan Parks

Metropolitan parks are the largest of the park types and typically provide natural resource-based outdoor recreation. These are typically located along waterways, and designed to serve the citywide population and tourist markets. Metropolitan parks are usually over 200 acres in size, and typically include trails, open playfields, picnic facilities, swimming pools or swimming areas. Some are designed for special interest activities such as archery ranges, radio controlled airplane fields, horseback riding, mountain biking, camping areas, and water-based recreation. Hiking, bird watching and nature interpretation are popular uses of these parks.

Greenbelts and Greenways

Greenbelts and greenways are linear parks following rivers, creeks, scenic ravines, and occasionally abandoned railroad corridors. The ideal design of these parks includes alternative transportation linkages to neighborhoods, parks, schools and business districts. Service areas of greenbelts and greenway parks vary considerably with some being used mostly by nearby neighborhoods, while others have citywide appeal. The term "greenways" imply a linear corridor with multiple functions, such as wildlife corridor, flood control, water quality preservation, alternative transportation, utility corridors and linkage systems to other parks, schools and civic areas.

These parks typically have parking areas associated with them, and provide walking, jogging, and biking opportunities. Other facilities desirable within these parks include interpretive and directional signage, drinking fountains, composting toilets, picnic tables, trash receptacles and wider, improved trails. Often separate trails for bicyclists and pedestrians are created.

Existing Facilities near Areas of Interest

Tables 2-8 through 2-13 display the existing recreational facilities within a 5-mile radius of the areas of interest.

Table 2-8 Parks within 5 Miles of Timber Creek		
Park Name	Acres	Amenities
Golf Course		
Bergstrom	266	18 hole, to be closed and converted into industrial park
Greenway or Nature Park		
Onion Creek Preserve		No amenities listed
Neighborhood Park		
Austin's Colony	9	No amenities listed
Richard Moya	Not listed	Travis County – picnic tables, pavilion, covered basketball, parking, restrooms
Metro Park		
Southwest Metro Park	Not listed	Proposed by Travis County
Special		
Montopolis Practice Fields	6	2 baseball, restroom, parking
State Park		
McKinney Falls	744.4	Thomas F. McKinney horse trainer's cabin, homestead ruins, camping, hiking, mountain biking, road biking, picnicking, fishing and wildlife observation. Swimming is now allowed in Onion Creek (condition varies with water quality)

Table 2-9 Parks within 5 miles of Onion Creek Forest/Yarrabee Bend		
Park Name	Acres	Amenities
District Parks		
Dove Springs	73	2 baseball, 1 softball, 1 basketball, 1 volleyball, 1 tennis court, 1.32 trail miles, playground, 10 tables with shelters and grills, restroom, parking
Garrison	39	3 baseball, 1 softball, 0.7 trail miles, playground, 28 tables with shelters, 9 BBQ, restroom, parking
Mable Davis	50	1 softball field, 2 basketball courts, 0.25 trail miles, playground, 4 tables with shelters, 2 grills, parking
Golf Courses		
Jimmy Clay	204	18 holes, restroom, parking
Roy Kizer	271	18 holes, restroom, parking
Greenway or Nature Park		
Blunn Creek	13	1 multipurpose field, 0.81 trail miles
Blunn Creek Preserve	39	1 trail mile
Longview	20	1 multipurpose field, 2 basketball, 0.39 trail miles, playground, 3 tables and shelters, 1 BBQ, restroom, parking
Marble Creek	11	1 softball, 2 basketball, 0.25 trail miles, playground, picnic table and shelter, 2 BBQ, swimming, parking
South Boggy Creek	147	No amenities listed
Stephenson Preserve	20	1.02 trail miles
Williamson Creek Central	61	no amenities listed
Williamson Creek East	96	greenway, no amenities listed
Neighborhood Park		
Battlebend	5	2 basketball, playground, picnic table and 2 BBQ
Dittmar		2 multipurpose fields, 6 basketball and 1 volleyball court, 0.33 trail miles, playground, 4 tables, 6 BBQ grills, restroom, parking
Franklin	5	1 multi-purpose field, 2 basketball and 1 volleyball court, 0.33 trail miles, playground, 3 picnic tables with shelters, 1 BBQ grill. 1 multipurpose field, 2 basketball courts, 0.31 trail miles, playground, 4 tables with shelters, 4 grills, restroom, parking
Gillis	7	0.73 trail miles, no other amenities.
Montropolis	8	2 multipurpose, 1 basketball, playground, 6 tables & shelters, 2 BBQ, restroom, swimming, parking, recreation
Piney Bend	4	playground, 2 tables
Ponciana	5	No amenities listed
South Austin	15	1 multipurpose field, 2 basketball, 2 tennis courts, playground, 8 tables, 6 grills, restroom

Table 2-9 Continued		
Parks within 5 miles of Onion Creek Forest/Yarrabee Bend		
Metro Park		
Onion Creek Sports Complex	121	Soccer fields, restroom, parking, concessions
Onion Creek Forest	388	no amenities
Onion Creek Metro	388	No amenities listed
Mary Moore Searight	344	1 soccer, playground 5.78 miles, 18 tables and shelters, 10 BBQ grills, restroom, parking
School		
Houston	7	1 multipurpose field, 4 basketball courts, playground, parking area
Odom	4	playground, 2 tables with shelters
Williams	3	1 multipurpose field, 4 basketball courts, 0.25 trail miles, playground, 2 tables, 2 grills, parking
Special Park		
South Austin Senior Center	5	3 tables, recreation programs
State Park		
McKinney Falls	744.4	Thomas F. McKinney horse trainer's cabin, homestead ruins, camping, hiking, mountain biking, road biking, picnicking, fishing and wildlife observation. Swimming is now allowed in Onion Creek (condition varies with water quality)

Table 2-10 Parks within 5 miles of Bluff Springs Area		
Park Name	Acres	Amenities
District Park		
Garrison	39	3 baseball, 1 softball, 0.7 trail miles, playground, 28 tables with shelters, 9 BBQ, restroom, parking
Dove Springs	73	2 baseball, 1 softball, 1 basketball, 1 volleyball, 1 tennis court, 1.32 trail miles, playground, 10 tables with shelters and grills, restroom, parking
Mable Davis	50	1 softball, 2 basketball, 0.25 trail miles, playground, 4 picnic tables with shelters, parking
Golf		
Jimmy Clay	204	18 holes, restroom, parking
Roy Kizer	271	18 holes, restroom, parking
Greenway and Nature Parks		
Blowing Sink	168	No amenities
Blunn Creek Preserve	39	1 trail mile
Onion Creek Forest	388	No amenities
Slaughter Creek	316	No amenities
Stephenson Preserve	147	1.02 trail miles
South Boggy Creek	4	No amenities
Williamson Creek Central	61	No amenities
Williamson Creek East	67	No amenities
Metro Park		
Mary Moore Searight	344	1 soccer field, 2 basketball, 2 volleyball, 2 tennis courts, 18 disc golf, 5.78 trail miles, playground, 18 picnic tables with shelters, 10 BBQ grills, restroom, parking.
Circle C Ranch Metro Park	535	7 soccer fields, 2 basketball and 2 volleyball courts, 18 hole disc golf, 5.36 miles of trail, playground, 6 picnic tables, restroom, parking
Houston	7	1 multipurpose field, 4 basketball courts, playground, parking area
Onion Creek Sports Complex		Soccer complex, restroom, parking

Table 2-10 Continued Parks within 5 miles of Bluff Springs Area		
Neighborhood Park		
Armadillo	2	No amenities
Battlebend	5	Playground, 2 basketball, 3 picnic tables, 2 BBQ
Cherry Creek	1	4 picnic tables, playground
Dittmar	16	2 multipurpose, 6 basketball, 1 volleyball, 0.33 trail miles, playground, 4 picnic tables, 6 BBQ, restroom, swimming, parking area, recreation
Davis Hill	9	No amenities
Franklin	5	1 multi-purpose field, 2 basketball ad 1 volleyball court, 0.33 trail miles, playground, 3 picnic tables with shelters, 1 BBQ grill
Grand Meadow	7	No amenities
Joslin	5	4 basketball, 1 volleyball, 2 tennis courts, 0.23 trail mile, 2 picnic tables
Longview	20	1 multipurpose fields, 2 basketball courts, 0.39 trail miles, playground, 3 picnic tables, 1 picnic shelter, 1BBQ, restroom, parking area
Kendra Page	16	1 volleyball, 0.2 trail miles, playground, 2 picnic table, 2 BBQ grills, restroom
Ponciana	5	No amenities
School		
Cunningham	4	2 multipurpose, 4 basketball, 0.25 trail mile, playground, 1 picnic table, parking
Odom	4	2 multi-purpose, 2 basketball, playground, 2 picnic tables with shelters
Piney Bend	4	Playground, 2 tables
St. Elmo	5	1 Baseball, 1 multipurpose, 2 basketball, 0.25 trail miles, playground, restroom
Special Parks		
South Austin Senior Activity Center	5	3 picnic tables, rec programs

Table 2-11 Parks within 5 miles of Onion Creek Subdivision		
Park Name	Acres	Amenities
District Park		
Garrison	39	3 baseball, 1 softball, 0.7 trail miles, playground, 28 tables with shelters, 9 BBQ, restroom, parking
Dove Springs	73	2 baseball, 1 softball, 1 basketball, 1 volleyball, 1 tennis court, 1.32 trail miles, playground, 10 tables with shelters and grills, restroom, parking
Golf		
Jimmy Clay	204	18 holes, restroom, parking
Roy Kizer	271	18 holes, restroom, parking
Greenway and Nature Parks		
Onion Creek Forest	388	No amenities
Slaughter Creek	316	No amenities
Stephenson Preserve	147	1.02 trail miles
South Boggy Creek	4	No amenities
Williamson Creek Central	61	No amenities
Williamson Creek East	67	No amenities
Metro Park		
Mary Moore Searight	344	1 soccer field, 2 basketball, 2 volleyball, 2 tennis courts, 18 disc golf, 5.78 trail miles, playground, 18 picnic tables with shelters, 10 BBQ grills, restroom, parking.
Circle C Ranch Metro Park	535	7 soccer fields, 2 basketball and 2 volleyball courts, 18 hole disc golf, 5.36 miles of trail, playground, 6 picnic tables, restroom, parking
Houston	7	1 multipurpose field, 4 basketball courts, playground, parking area
Onion Creek Sports Complex		Soccer complex, restroom, parking

Table 2-11 Continued Parks within 5 miles of Onion Creek Subdivision		
Neighborhood Park		
Armadillo	2	No amenities
Cherry Creek	1	4 picnic tables, playground
Dittmar	16	2 multipurpose, 6 basketball, 1 volleyball, 0.33 trail miles, playground, 4 picnic tables, 6 BBQ, restroom, swimming, parking area, recreation
Davis Hill	9	No amenities
Franklin	5	1 multi-purpose field, 2 basketball ad 1 volleyball court, 0.33 trail miles, playground, 3 picnic tables with shelters, 1 BBQ grill
Grand Meadow	7	No amenities
Longview	20	1 multipurpose fields, 2 basketball courts, 0.39 trail miles, playground, 3 picnic tables, 1 picnic shelter, 1BBQ, restroom, parking area
Kendra Page	16	1 volleyball, 0.2 trail miles, playground, 2 picnic table, 2 BBQ grills, restroom
Ponciana	5	No amenities
Southland Oaks	18	No amenities
School		
Cunningham	4	2 multipurpose, 4 basketball, 0.25 trail mile, playground, 1 picnic table, parking
Odom	4	2 multi-purpose, 2 basketball, playground, 2 picnic tables with shelters
Piney Bend	4	Playground, 2 tables
Hays County		
Buda Open Space		

Table 2-12 Parks within 5 Miles of Bear/Onion Confluence Site		
Park Name	Acres	Amenities
Metro		
Circle C Ranch	535	7 soccer fields, 2 basketball and 2 volleyball courts, 18 hole disc golf, 5.36 miles of trail, playground, 6 picnic tables, restroom, parking
Slaughter Creek	316	no amenities
Mary Moore Searight	344 acres	1 soccer field, 2 basketball, 2 volleyball, 2 tennis courts, 18 disc golf, 5.78 trail miles, playground, 18 picnic tables with shelters, 10 BBQ grills, restroom, parking.
Onion Creek Forest	388	no amenities
Special		
LBJ Wildflower Center		Private ownership, educational botanic garden/event planning
Hays County		
Fee easements	Not listed	Amenities not listed.
Buda Open Space and Park	Not listed	Amenities not listed

Table 2-13 Williamson Creek Area - Parks within Vicinity (5 mile radius)		
Park Type	Acres	Amenities
District Parks		
		nature area, no amenities
Dick Nichols	133	1 multi-purpose field, 2 basketball, 3 volleyball and 2 tennis courts, 1.25 trail miles, playground, 17 picnic tables with shelters, 10 BBQ grills, restroom, swimming, parking
Dove Springs	73	2 baseball, 1 softball, 1 basketball, 1 volleyball, 1 tennis court, 1.32 trail miles, playground, 10 tables with shelters and grills, restroom, parking
Garrison	39	3 baseball, 1 softball, 0.7 trail miles, playground, 28 tables with shelters, 9 BBQ, restroom, parking
Mable Davis	50	1 softball field, 2 basketball courts, 0.25 trail miles, playground, 4 tables with shelters, 2 grills, parking
Golf Courses		
Lion's Municipal Golf	146	
Roy Kizer	271	18 holes, restroom, parking
Jimmy Clay	204	18 holes, restroom, parking
Greenway and Nature Parks		
Barton Creek Park	823	7 miles of trail, restroom, swimming, parking
Barton Creek Wilderness Park	1028	no amenities listed
Bee Creek	96	no amenities
Blunn Creek Preserve	39	1 trail mile
Boggy Creek	4	no amenities
Karst Preserve	9	no amenities
Latta Branch	99	1.45 trail miles, picnic shelter
Onion Creek Forest	388	no amenities
Shoal Creek	82	4.62 trail miles, 10 tables with shelters, parking
Slaughter Creek	316	no amenities
Stephenson Preserve	147	1.02 trail miles
West Boldin Creek	18	0.94 trail miles
Williamson Creek East	96	no amenities
Williamson Creek Central		no amenities
Williamson Creek West	67	greenway, no amenities

Table 2-13 Continued		
Williamson Creek Area - Parks within Vicinity (5 mile radius)		
Neighborhood Parks		
Big Stacy	4 acres	restroom, parking
Convict Hill Quarry	3 acres	no amenities listed
Davis Hill	9 acres	no amenities
Dittmar	16	2 multipurpose fields, 6 basketball and 1 volleyball court, 0.33 trail miles, playground, 4 tables, 6 BBQ grills, restroom, parking
Duncan	6	6 tables
Eilers (Deep Eddy)	11	0.25 trail miles, playground, 16 picnic tables, 3 BBQ grills, parking, fishing pier
Gillis	7	1 multipurpose field, 2 basketball courts, 0.31 trail miles, playground, 4 tables with shelters, 4 grills, restroom, parking
Franklin	5	1 multi-purpose field, 2 basketball and 1 volleyball court, 0.33 trail miles, playground, 3 picnic tables with shelters, 1 BBQ grill.
Gaines Creek Park	38	0.73 trail miles, no other amenities.
Johnson Creek	18	1.38 trail miles
Johnson Creek Haskell House	2	1 multipurpose field, 2 basketball courts, playground, 2 tables, restroom
Joslin Park	5	2 multipurpose fields, 4 basketball, 1 volleyball and 2 tennis courts, 9.23 trail miles
Little Stacy	6	1 multipurpose field, 1 basketball court, 1 volleyball court, 2 tennis courts, playground, 5 picnic tables with shelters, 4 BBQ grills
Longview	20	0.39 trail miles, playground, 3 picnic tables with shelters, 1 BBQ, restroom, parking area
Oakhill Park	13	Neighborhood Park, no amenities listed
Palm	4	2 multipurpose fields, 2 tennis courts, 1 picnic table with shelter, restroom
Piney Bend	4	playground, 2 tables
Ponciana	5	No amenities
Silk Oak	5	playground and 8 tables, 2 BBQ grills
South Austin	15	1 multipurpose field, 2 basketball, 2 tennis courts, playground, 8 tables, 6 grills, restroom
West Austin	3	1 multipurpose field, 1 basketball, 1 tennis court, playground, 6 tables with shelters, restroom, parking, theatre
Zilker	4	1 multipurpose field, 2 basketball and 2 tennis courts, 0.27 trail miles, playground, 3 tables, 2 BBQ grills, restroom

Table 2-13 Continued		
Williamson Creek Area - Parks within Vicinity (5 mile radius)		
Metro Parks		
Circle C Ranch	535	7 soccer fields, 2 basketball and 2 volleyball courts, 18 hole disc golf, 5.36 miles of trail, playground, 6 picnic tables, restroom, parking
Mary Moore Searight	344 acres	1 soccer field, 2 basketball, 2 volleyball, 2 tennis courts, 18 disc golf, 5.78 trail miles, playground, 18 picnic tables with shelters, 10 BBQ grills, restroom, parking.
Proposed Yarrabee Bend Park (see this report)		In planning
Onion Creek Forest	388	No amenities
Onion Creek Sports Complex –		Soccer complex, restroom, parking
Red Bud Isle	14	0.52 trail miles, 5 tables, parking, boat ramp, fishing pier
Town Lake – Festival Beach	74 acres	3 baseball, 2 softball, 2 basketball, playground, picnic shelter, restroom, parking area, recreation programming, fishing pier
Town Lake – Lakeshore	14 acres	picnic shelter, restroom, parking area, fishing pier
Town Lake – Norwood Tract	11 acres	parking area
Town Lake – Shoal Beach	16 acres	picnic shelter, restroom, parking, fishing pier.
Town Lake - Waller Beach	28 acres	playground, parking, boat ramp
Town Lake Auditorium Shores	81 acres	1 multipurpose field, 10.1 trail miles, picnic shelter, restroom, parking, arts center, theatre Town Lake Butler Shores – 29 acres, 3 baseball, 2 softball, restroom, parking, theatre, administration facility
Town Lake Lamar Beach	64 acres	baseball fields, 1 softball field, 2 soccer field, restroom, parking, boat ramp,
Zilker	382 acres	10 soccer fields, 4 volleyball courts, 18 hole disc golf, 1.75 trail miles, playground, 321 picnic tables with shelters, 24 grills, restroom, parking, botanical garden, fishing pier
Houston	7 acres	1 multipurpose field, 4 basketball courts, playground, parking area
Odom	4 acres	playground, 2 tables with shelters
St Elmo	5 acres	1 baseball, 2 basketball, 0.25 trail miles, playground, restroom
Williams	3 acres	1 multipurpose field, 4 basketball courts, 0.25 trail miles, playground, 2 tables, 2 grills, parking

Table 2-13 Continued		
Williamson Creek Area - Parks within Vicinity (5 mile radius)		
Special Parks		
Lady Bird Johnson Wildflower Center		Private ownership, educational botanic garden/event planning
South Austin Senior Citizen Center	5 acres	3 tables, recreation programs
Brush Square O. Henry Museum	2 acres	Museum
Austin Recreation Center	7 acres	4 tennis courts, restroom, parking recreation programs
Old Bakery	.3 ac	no amenities
Republic Square	2 acres	picnic shelters
Town Lake Central Maintenance		Complex Maintenance and Admin Facility
Wooldridge Square	2 acres	7 tables, theatre
State Parks		
McKinney Falls	744.4	Thomas F. McKinney horse trainer's cabin, homestead ruins, camping, hiking, mountain biking, road biking, picnicking, fishing and wildlife observation. Swimming is now allowed in Onion Creek (condition varies with water quality)