DRAFT

Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for Incidental Take of Golden-cheeked Warbler (*Dendroica chrysoparia*), Tooth Cave Pseudoscorpion (*Tartarocreagris texana*), Kretschmarr Cave Mold Beetle (*Texamaurops reddelli*), Bone Cave Harvestman (*Texella reyesi*), Tooth Cave Spider (*Neoleptoneta myopica*), and Tooth Cave Ground Beetle (*Rhadine persephone*) During the Construction and Operation of a Residential, Commercial, and/or Retail Development on Portions of the Approximately 70-acre GDF Realty, et al., Property, Austin, Travis County, Texas

U.S. FISH AND WILDLIFE SERVICE
10711 Burnet Road, Suite 200
Austin, Texas 78758

November 20, 2007

COVER SHEET

Title for Proposed Action: Issuance of an Endangered Species Act Section 10(a)(1)(B) permit for incidental take of the endangered golden-cheeked warbler (*Dendroica chrysoparia*), Tooth Cave pseudoscorpion (*Tartarocreagris texana*), Kretschmarr Cave mold beetle (*Texamaurops reddelli*), Bone Cave harvestman (*Texella reyesi*), Tooth Cave spider (*Neoleptoneta myopica*), and Tooth Cave ground beetle (*Rhadine persephone*) during the construction and operation of a residential, commercial, and/or retail development with associated streets and utilities on portions of the approximately 70-acre property in Austin, Travis County, Texas.

Unit of the U.S. Fish and Wildlife Service Proposing the Action: Regional Director, Region 2, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

Legal Mandate for Proposed Action: Endangered Species Act of 1973 (16 U.S.C. 1531 et. seq.), as amended, section 10(a)(1)(B), as implemented by 50 CFR 17.22.

Applicants: GDF Realty Investments, Inc., Parke Properties I, L.P., and Parke Properties II, L.P.

Permit Number: TE-171255

Duration: 30 years

Mitigation/Funding Plan: To ensure adequate funding is provided, a preserve operation, maintenance, and management budget with the receiving Managing Partner shall be drafted and agreed to by the Preserve Manager and the Applicants. Documentation of this agreement must be provided to the Service prior to issuance of the permit. The funds as agreed upon by the Preserve Manager and Applicants shall be delivered upon finalizing the transfer of the on-site and, if necessary, off-site mitigation lands, all of which must be completed prior to any vegetation clearing or construction activities. Documentation of the transfer of the mitigation lands and delivery of the agreed upon funds for operation and management must be provided to the Service within 30 days of its completion to ensure compliance with the permit. In the event these funds are not transferred, the Service may revoke the permit.

Document Author: U.S. Fish and Wildlife Service, Austin Office, 10711 Burnet Road, Suite 200, Austin, Texas 78758.

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1.0 INTRODUCTION

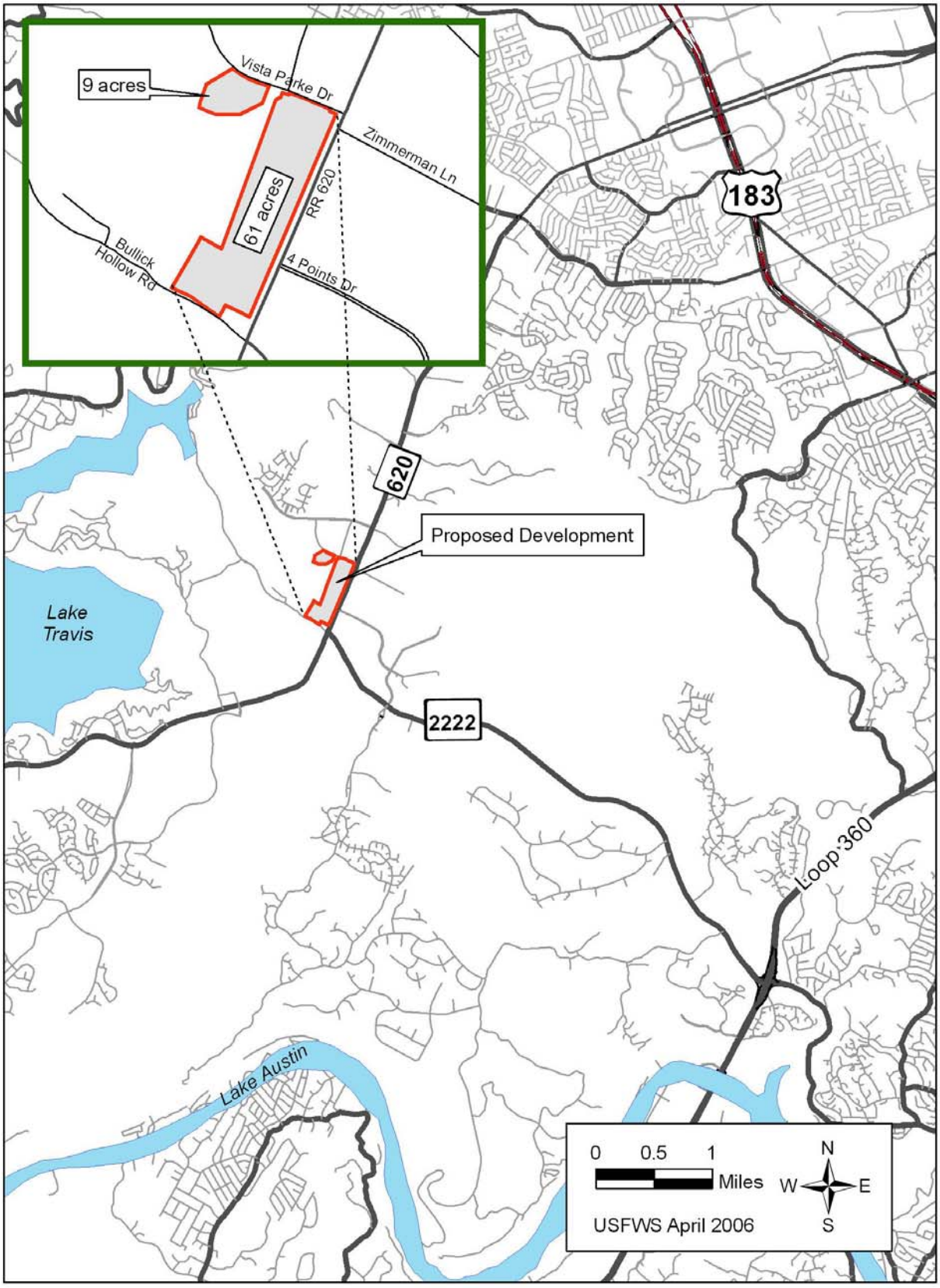
GDF Realty Investments, Inc., Parke Properties I, L.P., and Parke Properties II, L.P. (Landowners or Applicants) own approximately 70 acres (28.3 hectares), a portion of which is proposed for residential, commercial, and/or retail development. These 70 acres are divided into two separate tracts and are located near the northwest corner of Ranch Road (RR) 620 and Ranch Road 2222, on the northwest side of Austin, Travis County, Texas (Figure 1). The tract adjacent to RR 620 is approximately 61 acres (24.7 hectares), while the nearby, but not contiguous 9-acre (3.6-hectare) tract is located adjacent to Vista Parke Drive. Six federally listed endangered species have been documented as occurring on portions of the 70-acre property: one bird, the golden-cheeked warbler (*Dendroica chrysoparia*), and five invertebrates: Tooth Cave spider (*Neoleptoneta myopica*), Bone Cave harvestman (*Texella reyesi*), Tooth Cave pseudoscorpion (*Tartarocreagris texana*), Kretschmarr Cave mold beetle (*Texamaurops reddelli*), and Tooth Cave ground beetle (*Rhadine persephone*) herein referred to as "affected species" or "covered species." The black-capped vireo (*Vireo atricapilla*) formerly nested on this property (DLS Associates 1988) but has not been reported on the property since 1990 (DLS Associates 1990).

In accordance with the Endangered Species Act of 1973, as amended (Act), and 50 CFR 17.22, the Applicants submitted seven section 10(a)(1)(B) incidental take applications (PRT-838754, PRT-841088, PRT-841090, PRT-841093, PRT-841117, PRT-841120, and PRT-841125) dated December 30, 1997. These applications covered approximately 216 contiguous acres (87.4 hectares) of land known as the Hart Triangle property (former entire tract), Travis County, Texas. The applications requested take coverage of the affected species associated with construction, operation, and occupation of residential and commercial development along with streets, utilities, and other improvements and facilities. However, the Applicants prepared seven habitat conservation plans (HCP) that in the opinion of the Service, would not have avoided, minimized, and mitigated for the potential impacts to the affected species to the maximum extent practicable as required by the Act. Because of this and other inadequacies in the applications, the U.S. Fish and Wildlife Service (Service) denied all seven applications.

The Applicants then filed suit against the Service claiming it had "taken" their property under the Fifth Amendment. The plaintiffs and the Service agreed to enter mediation beginning in October 1999. In an effort to show that an incidental take permit could be issued for development of this property, the Service prepared a draft Environmental Assessment/Habitat Conservation Plan (EA/HCP) for development of portions of the 216-acre Hart Triangle property. This draft EA/HCP was noticed in the *Federal Register* on June 02, 2000, but was never accepted by the Applicants, and therefore never finalized. The permit (TE-027690) was never issued, and this suit continues to the present.

Since the June 2000 *Federal Register* notice, approximately 146 acres (59.1 hectares) of the former 216-acre Hart Triangle property have been foreclosed on, sold, and/or transferred to Travis County and are managed as part of the Balcones Canyonlands Preserve (BCP). The remaining 70 acres are under consideration in this Draft EA/HCP.

Figure 1: Project Location Map



This draft EA/HCP describes the impacts that would likely result to the affected species (the take) if the property is developed under the Preferred Alternative; what steps the Permittees or their successors would take to avoid, minimize, and mitigate for such impacts; the funding that would be made available to implement those steps; and the alternative actions that were considered.

The Service will process an incidental take permit application for GDF Realty Investments, Inc., Parke Properties I, L.P., and Parke Properties II, L.P., under the permit number TE-XXXXXXX. The Service is committed to continuing to work with the Landowners on an acceptable development plan as detailed herein.

2.0 PURPOSE AND NEED FOR ACTION

The purpose of this EA/HCP is to avoid, minimize, and mitigate for the adverse impacts to the federally listed golden-cheeked warbler, Tooth Cave pseudoscorpion, Kretschmarr Cave mold beetle, Bone Cave harvestman, Tooth Cave spider, and Tooth Cave ground beetle, and thereby contribute to the species' long-term protection while allowing otherwise lawful commercial, retail, and/or residential development to proceed. The proposed development necessitates an evaluation of the environmental impacts for issuance of a section 10(a)(1)(B) permit for the Preferred Alternative and the no action alternative. The permit would authorize incidental take of the aforementioned affected species associated with development on portions of the property. This EA/HCP will establish the conditions under which the Applicants could meet the requirements for issuance of a section 10(a)(1)(B) permit under the Act. The need for the permit is so that otherwise lawful development may proceed.

3.0 DESCRIPTION OF AFFECTED ENVIRONMENT

The property is located within the City of Austin in the Four Points area, which is being encroached upon by urban development. The high-tech industry that has in recent years been evolving and growing in the greater Austin area attracts new residents to fill these high-tech jobs every day. With these prospective homeowners come new housing developments, improvements in infrastructure, and an increased tax base to Travis County and the City of Austin. The property is currently undeveloped, but with the increasing demands for housing and employment, the area is attractive for suburban residential and commercial/retail development.

3.1 VEGETATION

Vegetation on upland areas consists primarily of an open to semi-open Ashe juniper (*Juniperus ashei*)/live oak (*Quercus fusiformis*) woodland/grassland mosaic. In general, Ashe juniper and live oak trees on the uplands range in height from 4 to 18 feet (1.2 to 5.5 meters). Small clusters of shin oak (*Quercus sinuata* var. *breviloba*) are also present.

The majority of the property is on a plateau that lies on the western edge of the Jollyville Plateau, a relatively flat plateau incised by steep-sided canyons. The main western canyon, the head of which occurs on the property, is a tributary of Bullick Hollow and supports a dense deciduous/Ashe juniper woodland, with most trees ranging in height from 10 to 18 feet (3 to 5.5

meters). Generally, the density of deciduous trees is highest along the upper slopes and in the drainages. Vegetation on the ridge-tops and upper slopes is dominated by semi-open Ashe juniper/live oak woodland. Vegetation in the canyon bottoms consists of dense deciduous/Ashe juniper woodland. Various deciduous tree species are present in moderate to high densities with Texas oak (*Quercus buckleyi*) as the most common deciduous species. Other deciduous tree species include Arizona black walnut (*Juglans major*), Carolina buckthorn (*Rhamnus caroliniana*), hackberry (*Celtis sp.*), Texas ash (*Fraxinus texensis*), cedar elm (*Ulmus crassifolia*), and pecan (*Carya illinoensis*). Ashe juniper trees in this area range in height from 8 to 14 feet (2.4 to 4.3 meters).

Rare Plants: Three species of plants that may need special conservation attention are the canyon mock-orange (*Philadelphus ernestii*), Texabama croton (*Croton alabamensis texensis*), and bracted twistflower (*Streptanthus bracteatus*). These plants are not known to occur on the property; however, no surveys have been conducted to determine their presence or absence. The nearest known occurrence of canyon mock-orange is about 3 miles (1.9 kilometers) to the east in the Bull Creek watershed. Canyon mock-orange typically grows on large boulders or steep rock faces within canyons. The canyon mock-orange would be expected on steep slopes or rock outcrops outside of the area proposed for development. In Travis County, Texabama croton is known from only a small number of scattered localities, most of which are in the Post Oak Ridge area roughly 12 miles (7.5 kilometers) northwest of the property. An isolated population is known from the northeast side of Lake Travis about 2.7 miles (1.7 kilometers) to the north. Natural controls on the distribution of this plant are poorly understood. The bracted twistflower grows on thin clay soils over limestone, in or near, dense, brushy areas. All Travis County localities of this species occur in the Balcones fault zone above permanent water and are usually on ridgetops or upper slopes. As this property is relatively flat and not close to permanent water, it is not expected to occur on the property. The closest locations of the bracted twistflower are North Cat Mountain, Cat Mountain, and Mt. Bonnell. The largest populations are threatened by housing developments.

3.2 WILDLIFE

No known general wildlife survey has been conducted on the property. However, it is expected wildlife on the property would be typical of oak/juniper woodlands/grasslands in central Texas. Common mammals would include fox squirrel (*Sciurus niger*), white-tailed deer (*Odocoileus virginiana*), armadillo (*Dasypus novemcinctus*), Texas mouse (*Peromyscus attwateri*), white-ankled mouse (*Peromyscus pectoralis*), and raccoon (*Procyon lotor*). Common permanent resident bird species include scrub jay (*Aphelocoma coerulescens*), tufted titmouse (*Parus bicolor*), Carolina chickadee (*Parus carolinensis*), Bewick's wren (*Thryomanes bewickii*), northern cardinal (*Cardinalis cardinalis*), brown-headed cowbird (*Molothrus ater*), and rufous-crowned sparrow (*Aimophila ruficeps*). Common reptiles and amphibians in the area include Gulf Coast toad (*Bufo valliceps*), cliff frog (*Syrrhophus marnocki*), white-throated slimy salamander (*Plethodon albagula*), ground skink (*Scincella lateralis*), and western diamondback rattlesnake (*Crotalus atrox*).

Jollyville Plateau Salamander: The Service received a petition to list the Jollyville Plateau salamander (*Eurycea tonkawae*) as endangered under the Act. This initiated a 90-day finding to

determine the validity of the petition. On February 13, 2007, the Service announced in the *Federal Register* (Vol. 72, No. 29) a finding that the petition presented substantial scientific or commercial information and that listing the Jollyville Plateau salamander may be warranted. Because of this, a 12-month review of its status is being conducted to determine if listing the species is warranted. This species is currently not federally listed.

The Jollyville Plateau salamander is restricted to springs and spring runs in the Northern Segment of the Edwards Aquifer in northern Travis and southern Williamson counties. This species occurs in areas with abundant cover, such as rocks and dead leaves, and low to moderately low flow volumes. The major threat to this species is degradation of water quality and quantity from development. There are no springs on the property, but the property lies on the contributing zone of springs in the Cypress Creek and Bull Creek watersheds. No surveys have been conducted to determine if the Jollyville Plateau salamander occurs on the property. A spring in Kretschmarr Salamander Cave, approximately half a mile from the property, supports the Jollyville Plateau salamander (Chippindale et al. 2000). The Jollyville Plateau salamander has also been found at other springs and spring runs throughout the Cypress and Bull Creek watersheds to the north and east of the property. The vast majority of the property is relatively flat, and is not know to contain any springs with salamanders. It is expected the species has a greater potential to occur downstream of the property.

3.3 LISTED, PROPOSED, AND CANDIDATE SPECIES

Eight endangered species occur within the general project region: the black-capped vireo, the golden-cheeked warbler, and six cave-dwelling invertebrates - the Tooth Cave pseudoscorpion, Tooth Cave spider, Tooth Cave ground beetle, Kretschmarr Cave mold beetle, Bee Creek Cave harvestman (*Texella reddelli*), and Bone Cave harvestman. Of these, the golden-cheeked warbler and five of the karst invertebrates are known to occur on property. The black-capped vireo formerly nested on the property (DLS Associates 1988), but has not been reported on the property since 1990 (DLS Associates 1990). The Bee Creek Cave harvestman is not known to occur on the property. Neither of these two species will be discussed further.

3.3.1 Golden-cheeked warbler

Surveys to determine the status of the golden-cheeked warbler were conducted on portions of the former 216-acre Hart Triangle property in 1992 by the Texas Department of Transportation (TxDOT), in 1993 by DLS Associates, and in 1993, 1994 and 1998 by SWCA, Inc. These surveys identified a population of warblers generally restricted to the canyons. On December 19, 2003, Travis County purchased approximately 140 acres of the Hart Triangle property. They also own an additional 6 acres (2 hectares) that was transferred to them by the Texas System of Natural Laboratories. This approximately 6 acres was originally donated to the Texas System of Natural Laboratories by Dr. Purcell in 1990 and surrounds many of the cave entrances on the original 216 acre Hart Triangle property. Approximately 0.6 acres of this are encompassed within the boundaries of the 70-acre subject property. In spring 2004, Travis County conducted surveys on the 146 acres. These surveys identified two territories that overlapped onto the property under consideration in this draft EA/HCP, (BCCP 2005). Each territory contains a breeding pair of golden-cheeked warblers and their fledglings.

The golden-cheeked warbler was placed on the Federal Endangered Species list on May 4, 1990, with an emergency rule (55 FR 18844). At the same time the emergency rule was published, a proposed rule to list the species through the normal process was also published (55 FR 18846). The final rule listing the golden-cheeked warbler as endangered under the Act was published on December 27, 1990 (55 FR 53153). This species was added to Texas Parks and Wildlife Department's list of endangered species on February 19, 1991 (Executive Order No. 91-001). In addition, the golden-cheeked warbler has a Service recovery priority of 2C, which indicates a species with a high degree of threat that is in conflict with construction or development projects or other forms of economic activity and has a high potential for recovery (Service 1992).

Golden-cheeked warblers generally begin to arrive in their breeding grounds in early March, and nest from about mid-March through the end of June (Ladd and Gass 1999). Golden-cheeked warblers typically inhabit dense forests and woodlands primarily consisting of Ashe juniper and a variety of other, mostly deciduous, tree species. Their breeding habitat consists of mature Ashe juniper-oak woodlands. Golden-cheeked warblers are obligate users of Ashe juniper bark for nesting material, and their breeding range is consequently restricted to the range of that species. Since young Ashe juniper trees do not produce the loose strands of bark which the warblers use for nesting material, only woodlands which contain a component of mature Ashe junipers are considered to be golden-cheeked warbler habitat (Greene and Porter 2004). According to Ladd and Gass (1999), nesting habitat for the golden-cheeked warbler is found where there are tall, averaging 18 feet (5.5 meters), dense stands of mature Ashe juniper mixed with a variety of other trees, such as oak, sycamore, hackberry, and pecan. This type of habitat is commonly found on slopes and in canyons (Ladd and Gass 1999). The species will also use drier upland sites adjacent to preferred nesting habitat, especially late in the nesting season.

Golden-cheeked warblers feed almost entirely on insects, especially caterpillars, spiders, beetles, and other invertebrates found in the foliage of the tree canopy. Oaks are especially important as foraging trees during the breeding season. Relatively moist conditions, such as those found in canyon bottoms along draws, creeks, and cool, wooded slopes, enhance the production of insects eaten by this species (Service 1992).

Golden-cheeked warblers nest on the Edwards Plateau, Lampasas Cut-Plain, and Llano Uplift regions of central Texas (Ladd and Gass 1999) in a band west and north of the Balcones Fault. Texas is the only state in the country where this bird nests and, except for two fall migration records from Florida and the Farallon Islands off California, has never been found anywhere else in the U.S. (Pulich 1976). They are known to occur in 33 counties, but the largest blocks of habitat are found primarily in Travis County. Large blocks also occur in Real and Uvalde Counties, but these are at the drier, far western edge of their range.

Golden-cheeked warblers winter in the pine-oak highlands of southern Mexico and Central America from southern Chiapas (Mexico), Guatemala, Honduras, and Nicaragua, and then migrate overland through the mountains of the Sierra Madre Oriental of Mexico, passing through the states of Chiapas, Veracruz, Queretaro, Coahuila, Nuevo Leon and Tamaulipas until they reach their Texas breeding grounds (Service 1992).

Threats to the Golden-cheeked Warbler

In general, the most serious threats facing the golden-cheeked warbler, given its highly restricted breeding range, are habitat loss and fragmentation (Pulich 1976, Wahl et al. 1990, Service 1992, Ladd and Gass 1999). Secondary factors, such as declining oak regeneration and brown-headed cowbird brood parasitism, have also contributed to this species' decline (Wahl et al. 1990, Service 1992, Ladd and Gass 1999). Each of these threats is discussed in detail below.

Loss of Habitat

Loss of habitat is the most important threat to the golden-cheeked warbler. On-going and imminent habitat destruction from urbanization and clearing associated with agricultural practices were justification for the emergency listing of the golden-cheeked warbler in 1990 (55 FR 18844). In addition, the data of Wahl et al. (1990) indicate a high rate of habitat loss during the 1980s. Historically, the main reason for steady loss of habitat was the clearing of juniper to improve pasture conditions for cattle grazing (Pulich 1976). Other reasons for loss of juniper woodlands included cutting of junipers for fence posts, wood furniture, and cedar oil. However, most recent losses of nesting habitat have occurred in counties such as Travis, Williamson, and Bexar, in which rapid suburban development has spread into oak-juniper woodlands. Wahl et al. (1990), for example, found that the majority of recent habitat losses had taken place in 12 counties undergoing significant urban expansion or recreational lake and second home development.

In the northern part of the warbler's range, habitat loss of 15 percent occurred over the eight-year interval from 1981 to 1989, an average annual loss of 1.9 percent (Wahl et al. 1990). Little information is available on loss of warbler habitat since examination of the issue for the status report in the late 1980s (Wahl et al. 1990). Approximately 5,206 acres (2,107 hectares) of warbler habitat were burned in wildfires at Fort Hood in 1996 (Tolle 1998). Despite this loss, Fort Hood currently has about 52,935 acres of suitable habitat for the golden-cheeked warbler and is estimated to support a population of more than 6,000 territorial males (Service 2005). Recent estimates of warbler habitat loss for Travis County are not available; however, development pressure has been intense along the Balcones Fault from San Antonio to Georgetown north of Austin.

Habitat Fragmentation

Habitat loss frequently fragments remaining patches of habitat. The increased isolation of remaining habitat patches can prevent interaction between fragmented groups and render them effectively separate. Fragmentation of habitat has been shown to influence habitat quality for woodland songbirds in the following ways: (1) small patch size and thus small population size make extant populations more susceptible to random extinction or effects of inbreeding; (2) increased distance between patches reduces gene flow between populations and makes recolonization of vacant patches more difficult; and, (3) increased proportion of habitat edge in small patches may alter patterns of insect abundance, vegetation structure, and songbird foraging activity (due to changes in the microclimate) (Brett 1989, Klein 1989, Parker 1989, Reville et al. 1990, Saunders et al. 1991) or heighten rates of nest parasitism and nest predation to a point at which the surviving songbird populations cannot maintain themselves (Lovejoy et al. 1986, Wilcove et al. 1986).

As patches of habitat become smaller and more isolated and habitat edges increase, local golden-cheeked warbler populations may also become subject to the adverse effects of habitat fragmentation, particularly due to their dependence on mature forest habitat for foraging and nesting. For birds, selection of nesting habitat is especially important, because nest location often affects reproductive success (Martin 1992, 1998) and, thus, population viability. As a result, reproductive success of the golden-cheeked warbler population in highly fragmented habitat may be hindered due to the potential decrease in preferred nesting locations. Coldren (1998) determined territory selection from habitat edges by golden-cheeked warblers as related to reproductive success and suggested 492 feet (150 meters) as the point at which golden-cheeked warbler territories are affected by edge habitat. In addition, habitat fragmentation has the potential for increased rates of inbreeding resulting in reduced fertility and the inability of returning juveniles to locate suitable habitat and mating opportunities (Service 1992).

Another effect of habitat fragmentation on golden-cheeked warbler populations includes predation by opportunistic and adaptable animals, such as raccoons, foxes (*Urocyon cinereoargenteus*), skunks (*Mephitis mephitis*), opossums (*Didelphis marsupialis*), fox squirrels (*Sciurus niger*), rat snakes (*Elaphe obsolete*), crows (*Corvus brachyrhynchos*), blue jays (*Cyanocitta cristata*), grackles (*Quiscalus quiscala*) and feral cats (*Felis domesticus*), which adapt well to fragmented and urban habitats. Most of these species have the potential to impact golden-cheeked warbler populations by eating eggs, young birds, and even adults. Avian predators (e.g., crow, blue jay, and grackle) are more abundant in golden-cheeked warbler habitat within 328 feet (100 meters) from edges (Arnold et al. 1996). which may affect golden-cheeked warbler use and/or reproductive success (Coldren 1998, Fink 1996). In particular, proximity to urban areas may compound the problem of fragmentation by exposing edge habitats to high densities of blue jays. Urban sprawl has resulted in an increase in the blue jay population, which feeds on eggs and nestlings and may have contributed to the warbler's extirpation from suburban areas where suitable habitat is found (Engels 1995). Loss of habitat due to urbanization has reduced the golden-cheeked warbler population, causing the species to disappear from areas where it formerly resided (Biological Advisory Team 1990). Red-imported fire ants (*Solenopsis invicta*) are also known to prey upon the chicks of arboreal nesting birds and are more prolific in disturbed, fragmented areas. Red-imported fire ants (fire ants) have the ability to cause the golden-cheeked warbler to abandon its nest by stinging the brood patch of the female while she is sitting on the eggs. They can also directly prey upon bird hatchlings. In addition, red-imported fire ants out-compete native species of ants and reduce the native insect supply for the warblers (Damude 1992).

Declining Oak Regeneration

Long-term changes in the abundance of oaks in warbler habitat can reduce suitability of habitat for the species because most foraging for insects occurs on the oak trees. Pure stands of Ashe juniper usually do not support golden-cheeked warblers. The proportion of oaks in warbler habitat can change over a period of years, and is most affected by oak wilt and over-browsing by white-tailed deer.

Oak wilt fungal infections can reduce the oak component in golden-cheeked warbler habitat, resulting in a long-term decrease in habitat quality (BCP 2005a). Oak wilt is caused by a fungus

(*Ceratocystis fagacearum*) that spreads via root-to-root contact and by beetles of the Nitidulidae family, which feed on fungal mats produced on dying Texas red oak (*Quercus texana*) stems. Nitidulid beetles are also attracted to fresh wounds on healthy red oaks, and thus serve as a vector for the disease. Oak wilt quickly kills individuals of Texas red oak, which is an important component of the Ashe juniper-oak woodland primarily found on rocky slopes of mesas across the Edwards Plateau ecoregion (Nesvacil et al. 2004).

Such local spread of the infection can radiate from sites of initial infection at rates of up to 100 feet (31 meters)/year (BCP 2005b). Some infected patches already cover 198 acres (80 hectares) and contain hundreds of dead or dying oaks (Appel and Maggio 1984). The effects of this disease on golden-cheeked warblers are most pronounced where Texas red and live oaks are major components of warbler habitat and where the importance of other deciduous canopy species is low.

Browsing by white-tailed deer on oak seedlings can also cause long-term changes in the oak component of warbler habitat by reducing or eliminating the number of oak saplings available to replace normal die-off of mature oaks (BCP 2005b). White-tailed deer populations are often high in and near suburban areas, where hunting pressure is low and irrigated landscapes provide an abundant source of food. White-tailed deer are the largest native herbivore in central Texas and are considered a keystone species (i.e., a species that exerts a strong influence on populations of other species, plant and animal, in a given habitat type) (Waller and Alverson 1997). White-tailed deer populations can have significant impacts on oak regeneration and warbler habitat (BCP 2005b).

Brood Parasitism by Brown-headed Cowbirds

The brown-headed cowbird is an obligate brood parasite, relying solely upon other avian "host" species for the incubation and care of cowbird young (Gill 1995). They lay their eggs in other species nests and leave them for the foster parents to raise. The cowbird nestlings are larger and more aggressive than the warbler nestlings and out-compete them for food, so that the foster parents spend most of their efforts feeding the cowbird chick rather than their own offspring. Sometimes the cowbird chicks actively eject the warbler nestlings from the nest.

Historically, the primary habitat of the brown-headed cowbird consisted of open prairies and plains of short grasses found in Canada and the United States west of the Mississippi River (Mayfield 1965). Cowbirds on the prairies followed the nomadic bison, feeding on insects and seeds. The significance of this relationship is that the nomadic lifestyle made it impossible for the brown-headed cowbird to build a nest, lay and incubate eggs, and care for young before the bison moved to another location. As human habitation spread westward from the Atlantic coast, vast tracts of primordial forests were cleared, creating open fields and pastures, which could then be used by the cowbird. Soon thereafter, cowbirds became associated with less nomadic domestic livestock, such as cattle and horses. This association made excess feeds and grains readily available for cowbird consumption. As a result, these birds are now consistently found near feedlots, silos, and residential feeding stations (Brittingham and Temple 1983, Terborgh 1992), in addition to pastures, parks, and fields.

Despite becoming more stationary during the breeding season due to the association with domestic livestock and the available food sources, brown-headed cowbirds have maintained their parasitic nature of using host nests. As the number and range of the cowbirds have increased and expanded, many species previously not adapted to brood parasitism, such as the golden-cheeked warbler, have been exploited as host species (Brittingham and Temple 1983).

Intensifying the impact of brown-headed cowbirds on golden-cheeked warbler populations are current livestock practices, which tend to concentrate cowbirds in a given area through the cowbird's reproductive season, greatly increasing the rate and length of exposure of golden-cheeked warbler nests to brood parasitism events (Service 1992). Other agricultural practices have also led to increased cowbird populations, such as leaving waste grains in harvested fields and in feedlots at which flocks of cowbirds congregate to feed, thus decreasing winter mortality (Brittingham and Temple 1983).

3.3.2 Karst Invertebrates

Five listed karst invertebrate species occur on the property: Tooth Cave pseudoscorpion, Tooth Cave spider, Tooth Cave ground beetle, Kretschmarr Cave mold beetle, and Bone Cave harvestman. Three of these species, the Tooth Cave pseudoscorpion, Tooth Cave spider, and Kretschmarr Cave mold beetle, are known to exist only on the Jollyville Plateau (Service 1994), a small but ecologically rich and unique region of karst[1] totaling about five miles (3.1 kilometers) in diameter centered on the Four Points area. Within this area, the Tooth Cave pseudoscorpion has been confirmed within three caves, while the Tooth Cave spider and Kretschmarr Cave mold beetle have been confirmed in four and six caves, respectively. The Tooth Cave ground beetle and Bone Cave harvestman have been confirmed in 46 and 156 caves in Travis and Williamson counties (per Berkhouse 2005, and Service files). The caves of the Jollyville Plateau are the oldest in the Austin area and support very rich and unique biotas (Veni and Associates 1992). The numerous collapsed sinkholes in this area indicate it is more cavernous than is apparent from the surface and that subsurface connections between caves exist, many of which are humanly impassable but may be inhabited by the endangered karst fauna (Veni and Associates 1992).

The property lies near the western edge of the Jollyville Plateau. At least 16 potential karst features have been documented on the property (Reddell 1999a, 1999b; Warton and Associates 1999), and two of these features (Tooth and Root Cave, the entrances of which are now owned by Travis County) are known to contain endangered invertebrates (Reddell 1999b). Tooth Cave is one of the most biologically important caves on the Jollyville Plateau (Veni and Associates 1992), has the most diverse fauna of any Texas cave, and contains all five endangered karst invertebrate species (Service 1994, Reddell 1999b). Elliott et al. (2005), stated that Tooth Cave has one of the highest levels of biodiversity in America west of the Mississippi River. Other caves with federally listed species occur on the adjacent BCP land and are close to this property.

[1] The term "karst" refers to a type of terrain that is formed by the slow dissolution of calcium carbonate from limestone bedrock by mildly acidic groundwater. This process creates numerous cave openings, cracks, fissures, fractures, and sinkholes, and the bedrock resembles a honeycomb (Veni and Associates 1988, 1995, 2002).

Various portions of the property have been surveyed for karst features by George Veni and Associates, William Elliott, James Reddell, and Mike Warton and Associates. Surveys began in 1964 for Tooth Cave and several other caves were discovered and surveyed in the 1980s. However; the entire tract was not thoroughly surveyed and most karst features were not excavated until 1999 (Reddell 1984, Veni and Associates 1988, Reddell 1989, Elliott and Reddell 1989, Reddell 1991, Service 1994, Elliott 1997, Reddell 1997, Warton and Associates 1997a, 1997b, 1999; Reddell 1999a, 1999b; Veni and Associates 2006).

The Kretschmarr Cave mold beetle, Tooth Cave spider, and Tooth Cave pseudoscorpion each occur in Tooth Cave. The Tooth Cave ground beetle and Bone Cave Harvestman are found in Tooth and Root caves. Other karst features on the property may contain listed species, but have not been fully explored because they are not humanly accessible or would require blasting to enter (Reddell 1999a, 1999b). Table 1 summarizes the survey information for each of the documented karst features. Other caves containing listed species are immediately adjacent to the property on BCP land owned by Travis County: Kretschmarr, Gallifer, and Two Trunks caves. Kretschmarr Cave is between the two tracts of the property adjacent to Vista Park Drive. Gallifer Cave and Two Trunks are approximately 260 and 110 feet (79 and 36 meters) west of the property.

Habitat

Nutrient availability and moisture are critical limiting factors for karst fauna occupying terrestrial cave environments (Barr 1968). Adaptations to the high relative humidity and low nutrient availability typical of caves are common among troglobites (terrestrial species restricted to a subsurface environment such as a cave) (Howarth 1983, Mitchell 1971a, Barr 1968). Troglobites require constant, high humidity (Barr 1968, Mitchell 1971a) because they are vulnerable to desiccation in drier habitats (Howarth 1983). They require stable temperatures because they cannot cope with more extreme

Table 1. Karst Features Evaluated within or adjacent to the Subject Property

Karst Feature Name	Endangered Species/Presence of Other Fauna	Biological Survey Dates
*Gallifer Cave	Tooth Cave ground beetle Bone Cave harvestman Tooth Cave spider	August 28, 1988 September 17, 1994
*Kretschmarr Cave	Tooth Cave ground beetle Kretschmarr Cave mold beetle	January 20, March 2, & September 13, 1963 May 21, 1966 June 23, 1968 February 21, 1988
*Two Trunks Cave	Tooth Cave ground beetle	June 19, 1997
[2]Root Cave	Tooth Cave ground beetle Bone Cave harvestman	July 12, 1984 April 1, 1989
[3]Tooth Cave	Kretschmarr Cave mold beetle Tooth Cave ground beetle Bone Cave harvestman Tooth Cave pseudoscorpion Tooth Cave spider	Feb. 25, March 2, August 5, & Oct. 1963 March 5, 1964 March 30 & Oct. 8, 1965 May 14, 1966 June 9, 1967 March 8, 1968 August 19, 1970 April 7, 1984 April 6, 1986 February 21, 1988 September 2, 1990 May 24, June 6, 1992 July 9, 1997
Joint Sink	Endangered Species Not Found but Other Fauna Important to the Karst Ecosystem (e.g., Cave Crickets) Present	December 1999
Mixed Emotions Cave	“	October 25, 1999
Mold Hole	“	June 8, 1966
Red Berry Cave	“	October 25, 1999
Encinal Cave	“	December 1988
S.D. Sink	Does Not Appear to Provide Habitat for Endangered Species but Additional Information Needed to Determine if Trogloxenes or Other Fauna Important to Karst Ecosystems are Present	“
Persimmon Sink	“	“
Small Soil Sink	”	”
Small Pit	“	“
Dual Sink	Unknown	Unknown
PFK #3	Unknown	Unknown
Powerline Sink	Determined Not to Provide Habitat for Troglobitic Fauna	December 1999
Soil Sink	“	“
Weed Sink	“	“

[2] Root Cave is separate but related to North Root Cave; in this report following Veni 2006, both are referred to as Root Cave.
[3] Tooth Cave is also known as Russell Cave.

*Cave known to contain endangered species that is adjacent to the subject property and could benefit from, or be impacted by, the Preferred Alternative. Reddell 1999a, 1999b; Warton and Associates 1999, Veni 2006.

temperatures (Mitchell 1971a). Temperatures in caves typically remain at the average annual surface temperature, with little variation (Howarth 1983, Dunlap 1995). Relative humidity is typically near 100 percent in caves that support troglobitic invertebrates (Elliott and Reddell 1989). During temperature extremes, troglobites may retreat into small (human-inaccessible) interstitial spaces connected to a cave, where the physical environment provides the required humidity and temperature levels (Howarth 1983) and may spend the majority of their time in such retreats, only leaving them to forage in larger cave passages (Howarth 1987).

Nearly all food energy in caves must be imported from the exterior (Holsinger 1988) either by organic material washed in, deposited through root masses, or brought in by animals through feces, eggs, and carcasses. Two types of animals that frequent caves are trogloxenes[4] and troglophiles[5] (Barr 1968, Poulson and White 1969, Howarth 1983, Culver 1986). In deeper cave reaches, nutrients enter through water containing dissolved organic matter percolating through the karst vertically through fissures and solution features (Howarth 1983, Holsinger 1988, Elliott and Reddell 1989).

Cave Crickets

Cave crickets, *Ceuthophilus* sp., are a critical source of nutrient input for karst ecosystems (Barr 1968, Reddell 1993) and occur in most caves in Texas (Reddell 1966). Being sensitive to temperature extremes and drying, cave crickets forage on the surface at night and roost in the cave during the day. They are opportunistic scavengers or omnivores; their diet includes items such as dead insects, carrion, and fruit (Elliott 1994, Taylor et al. 2005). They deposit their eggs and feces in the cave, providing food for a variety of karst species (Mitchell 1971b, Barr 1968, Poulson et al. 1995). Additionally, adults and nymphs are directly preyed upon by some karst invertebrates (Cokendolpher 2004, Elliott 1994).

Previous research indicated that cave crickets (*Ceuthophilus secretus, C. cunicularis* and *C. new species)* mostly feed within 16.4 to 32.8 feet (5 to 10 meters) of a cave, with most foraging within a distance of 50 m (164 feet) from cave openings (Elliott 1994). However, during a study of a central Texas cave, Taylor et al. (2005) found that one of these species of cave crickets (*C. secretus*) foraged up to 345 feet (105 meters) from the cave entrance. Cave crickets may use small, unnoticeable passages from the cave to the surface in addition to the main cave entrance to enter and exit the cave. Due to their contribution to the karst ecosystem, cave crickets and their foraging ranges surrounding the underground extent of a cave are important to the conservation of karst invertebrates.

Vegetation Community

Surface vegetation supports the karst habitat in several important ways: by providing plant material into the karst with storm water; providing habitat and food sources for the animal communities that contribute nutrients to the karst ecosystem (such as cave crickets, small

[4] Trogloxenes - species that regularly inhabit caves for refuge, but return to the surface to feed.
[5] Troglophiles - species that may complete their life cycle in the cave, but may also be found on the surface.

mammals, and other animals), and sending roots into subsurface areas. Tree roots have been found to provide a major energy source in shallow lava tubes and limestone caves in Hawaii (Howarth 1981). Jackson et al. (1999) investigated rooting depth in 21 caves on the Edwards Plateau to assess the belowground vegetation community structure and the functional importance of roots. They observed roots penetrating up to 82 feet (25 meters) into the interior of 20 of the caves, with roots of six tree species common to the plateau penetrating to below 16.4 feet (5 meters). Surface vegetation also acts as a buffer for the subsurface environment against changes in the temperature and moisture regime and serves to filter pollutants before they enter the karst system (Biological Advisory Team 1990, Veni and Associates 1988). In some cases, healthy native plant communities also help control certain exotic species (such as red-imported fire ants) (Porter et al. 1988) that may compete with or prey upon species (such as cave crickets) that are important nutrient contributors (Elliott 1994, Helf 2005).

Buffer Areas

To maintain the native woodland and grassland communities, a buffer area is needed to shield the core habitat from impacts associated with edge effects or disturbance from adjacent urban development (Lovejoy et al. 1986, Yahner 1988). In this context, the term "edge effects" refers to the adverse changes to natural communities (primarily from increases in invasive species and pollutants, and changes in microclimates) from nearby areas that have been modified for human development. The length and width of the edge, as well as the contrast between the vegetation communities, all contribute to edge effects (Smith 1990, Harris 1984). Edge effects include increases in solar radiation, changes in soil moisture due to elevated levels of evapotranspiration, wind buffeting (Ranny et al. 1981), changes in nutrient and hydrological cycles (Saunders et al. 1991), and changes in rate of leaf litter decomposition (Didham 1998).

The changes caused by edge effects can occur rapidly. For example, vegetation 6.6 feet (2 meters) from a newly created edge can be altered within days (Lovejoy et al. 1986) and the change may allow invasive plant species to gain a foothold where the native vegetation had previously prevented their spread (Saunders et al. 1991, Kotanen et al. 1998, Suarez et al. 1998, Meiners and Steward 1999). When plant species composition is altered by edge effects, changes also occur to the surface animal communities (Lovejoy and Oren 1981, Harris 1984, Mader 1984, Thompson 1985, Lovejoy et al. 1986, Yahner 1988, Fajer et al. 1989, Kindvall 1992, Tscharntke 1992, Keith et al. 1993, Hanski 1995, Lindenmayer and Possingham 1995, Bowers et al. 1996, Hill et al. 1996, Kozlov 1996, Kuussaari et al. 1996, Turner 1996, Mankin and Warner 1997, Burke and Nol 1998, Didham 1998, Suarez et al. 1998, Crist and Ahern l999, Kindvall 1999). Edges can act as a barrier to dispersal of birds, mammals, and invertebrates (Yahner 1988, Hansson 1998, Mader et al. 1990, Saunders et al. 1991). In general, animal communities need buffers of 164 to 328 feet (50 to 100 meters) or greater to ameliorate edge effects (Lovejoy et al. 1986, Wilcove et al. 1986, Laurance 1991, Laurance and Yensen 1991, Kapos et al. 1993, Andren 1995, Reed et al. 1996, Burke and Nol 1998, Didham 1998, Suarez et al. 1998). Changes in plant and animal species composition as a result of edge effects may unnaturally change the nutrient cycling processes required to support cave and karst ecosystem dynamics.

Threats to Karst Invertebrates

Destruction of Caves

Filling cave entrances or collapsing cave ceilings threaten karst invertebrates directly by killing individuals and destroying habitat. Destruction of karst features also reduces or may totally block the input of nutrients and moisture. Based on the degree of filling, larger trogloxenes such as raccoons may no longer be able to access the cave to provide nutrient input. Even if smaller trogloxenes such as cave crickets are still able to access a partially filled cave, the habitat quality may have been degraded by making it more difficult for them to exit the cave to forage (Helf et al. 1995).

The drainage into karst features may be altered during construction by altering topography, adding curbs, berms, drainage ditches, or storm drains that alter drainage patterns, or by increasing impervious cover (the surface area covered by buildings, roads, parking lots, or other construction that impedes normal rainwater infiltration into the soil) over the area that would normally drain or seep into the cave (the drainage basin). These alterations can lead to either an increase or a decrease in the total amount of water flow into a cave, or they may change the rate or periodicity of water flow into the cave. Delineation of drainage basins must be based on a detailed and appropriate hydrologic investigation by a geohydrologist who is experienced both with karst systems and the geology of central Texas.

Since the honeycombed karst limestone has little capacity for water purification, caves are susceptible to pollution from contaminated water entering the ground. Urban run-off, pesticides and fertilizers, hazardous materials, pipeline and storage tank leaks, power transformer and industrial accidents, and leakage from septic systems, landfills and sewer lines can pollute the karst ecosystem. Karst systems can also be contaminated or clogged by sedimentation caused by soil erosion that accompanies development and clearing of vegetation. Primary routes of contaminant entry into karst ecosystems include the introduction of water-borne pollutants into the surface and subsurface drainage basin of a karst ecosystem, gas or airborne contaminants into the voids, and disposal of household garbage, construction debris, motor oil and other materials directly into cave entrances. Such items may either be toxic or the excess organic waste may alter the nutrient balance of the cave and increase levels of competing species from the surface (Culver 1986). The surface and subsurface drainage basins that supply water to the ecosystem have the greatest potential to carry contaminants into the karst. However, the potential for contaminants to travel through karst systems outside these basins may be extensive in some cases. For example, a 1986 Texas Railroad Commission report stated a petroleum spill from the Shell Rancho pipeline resulted in toxic fumes migrating approximately two miles through karst (Railroad Commission of Texas 1986).

Red-imported Fire Ant

The red-imported fire ant is an aggressive predator introduced to the U.S. from Brazil. Red-imported fire ants started colonizing karst areas of central Texas in the late 1980s (Elliot 1993, 1994, Service 1994) causing devastating and long-lasting impacts on arthropod biodiversity (Porter and Savignano 1990). Red-imported fire ants will consume a wide variety of plants and animals and have led to 40 percent reduction in arthropod species in some instances (Vinson and Sorensen 1986).

Red-imported fire ants have been observed building nests both within, and near, cave entrances, as well as foraging in caves, especially during the summer. Shallow caves inhabited by karst

invertebrates are especially vulnerable to invasion by red-imported fire ants and other exotic species. In addition to preying on cave invertebrate species, including cave crickets, fire ants may compete with cave crickets for food (Elliott 1994, Helf *in litt.* 2002). Helf (*in litt.* 2002) states that competition for food between red-imported fire ants and cave crickets may be a more important interaction than predation. The presence of red-imported fire ants in, and around, karst areas could have a drastic detrimental effect on the karst ecosystem through loss of both surface and subsurface species that are critical links in the food chain.

The invasion of red-imported fire ants is known to be aided by disturbances that clear vegetation and disrupt the native ant community (Porter et al. 1988). Morrison and Porter (2003) found that red-imported fire ants may pose the most serious threat to rare species, since they would have the hardest time recovering from a serious loss of individuals. They believe species identities in addition to numbers should be considered when determining the overall impact of fire ant invasions.

Controlling red-imported fire ants once they have invaded a cave and its vicinity is difficult. Porter et al. (1991) states that control of red-imported fire ants in areas greater than 12 acres (5 hectares) may be more effective than in smaller areas, since multiple queen red-imported fire ant colonies reproduce primarily by branching off from the main colony. Chemical control methods have some effectiveness, but the effect of these agents on non-target species such as cave crickets is a concern. While carefully controlled chemical treatment may be appropriate in certain circumstances, this method is not currently advisable. At present, the Service recommends boiling water treatment for control of red-imported fire ant colonies near caves inhabited by endangered karst invertebrates. This method is labor intensive and only moderately effective. Regardless of the type of control used, it will likely be needed indefinitely or until a long term method of red-imported fire ant control is developed.

Recreation

People visiting caves can also damage the cave environment (Culver 1986). Even the most conservation-minded visitors can inadvertently kill individuals of listed invertebrate species or disrupt or destroy habitat by compacting substrate or disturbing cover objects in the process of moving through restrictive passageways (Crawford & Senger 1988). Less conservation-minded visitors may leave used batteries, spent carbide (a headlamp fuel), and cigarette butts, all of which are toxic and may kill the listed species or their prey species. Human vandalism may include littering with beer cans, broken glass, food wrappers, graffiti, or other material (Howarth 1983). Excess organic matter that is not a natural part of the system may lead to a change in community composition, including the introduction of new species that are detrimental to the cave (Howarth 1983).

Summary

The conservation of troglobitic species depends on a viable ecosystem that protects the cave entrance and footprint (the extent of the cave under the surface), the surface and subsurface drainage basins associated with the cave, interstitial spaces or conduits associated with the cave, and a viable surface animal and plant community for nutrient input. Because sunlight is either absent or present in extremely low levels in caves, karst ecosystems depend on nutrients derived from the surface. Primary sources of nutrients in cave ecosystems include leaf litter, cave

crickets, small mammals, and other vertebrates that defecate or die in the cave. The presence of surface vegetation communities is important for maintaining the humid conditions, stable temperatures, and natural airflow in cave and karst environments. Vegetation also plays an important role in water quality by absorbing or filtering suspended solids and pollutants. Since soil depth is shallow over the limestone plateau, water collects as sheet flow on the surface following rain and enters the subsurface environment through cave openings, fractures, and solutionally-enlarged bedding planes (i.e., a plane that divides two distinct bedrock layers). This direct, rapid transport of water through the karst allows for little or no purification (Veni and Associates 1988), and contaminants and sediments enter directly into the subsurface environment. As a result, the karst environment and karst invertebrates are vulnerable to the adverse effects of pollution from contaminated ground and surface water. Maintaining stable environmental conditions and protecting groundwater quality and quantity requires managing an adequate amount of healthy vegetation and protecting the surface and subsurface drainage basins. Therefore, the protection of the karst environment that the listed karst invertebrates depend upon requires that a cave and its associated interstitial spaces be protected from direct destruction, pollutants, and red-imported fire ants; maintained with its natural moisture input and temperatures; and provided with self-sustaining animal and vegetative resources to supply nutrients to the karst invertebrates.

3.4 WETLANDS

The U.S. Army Corps of Engineers (USACE) defines wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (USACE 1987). Generally, springs and seeps are present along the exposed contact between the Edwards Formation and the underlying, relatively impermeable Walnut Formation or along exposed marly layers within the Glen Rose Formation.

According to the National Wetland Inventory map, Jollyville Quadrangle (Service 1993), there are no potential wetlands on-site.

3.5 GEOLOGIC FEATURES AND SOILS

Surface geologic features on upland portions of the property consist of the basal unit of the Edwards Formation. This lower Cretaceous formation consists primarily of limestone and dolomite, the basal unit of which is typically conducive to the formation of karst features. Caves, sinkholes, and solutionally enlarged fractures are some of the karst features that capture and transmit water underground. Karst rapidly takes water into the subsurface, generally with little or no filtration, which makes their groundwater systems very sensitive to surface activities and conditions. The Edwards formation in this portion of the Jollyville Plateau contains a “soluble horizon” between the 1,030 foot (314 meters) and 1,050 foot (320 meters) contours, which is conducive to cave formations (Veni 2006). Below that, at about the 1,010 foot (308 meters) to 1,020 foot (311 meters) contour is a mineraloid horizon that is less permeable and tends to conduct water down slope to the northeast along the bedding planes where it emerges as springs in the Bull Creek watershed (Veni & Associates 1988).

A limited amount of the Walnut Formation crops out on the slopes of drainages and canyons. The Walnut Formation consists mainly of limestone, marl, and dolomite; this formation is typically not conducive to the formation of karst features. Surface geologic features of lower elevations of the property consist of the upper member of the Glen Rose Formation. This formation also consists of limestones, dolomites, and marls. The upper member of the Glen Rose also typically lacks karst features (Veni & Associates 1988).

The soils are generally thin and rocky. Three soil series occur on the property: (1) Brackett soils and rock outcrop, steep; (2) Tarrant soils, rolling; and, (3) Tarrant and Speck soils, 0 to 2 percent slopes. Brackett soils are typically shallow, gravelly, calcareous, and loamy. Brackett soils and rock outcrop, steep, occur on the slopes of drainages in Bullick Hollow and also along steep slopes of Lake Travis. Tarrant soils, rolling are the predominant soil series on the property. It occurs on the plateaus and ridge tops. These soils typically consist of shallow, stony clays. Tarrant and Speck soils, 0 to 2 percent slopes, develop under tall grass and trees and are composed of grayish-brown stony clays (Soil Conservation Service 1974).

3.6 LAND USE

Much of the property had been cleared and disturbed by cattle and goat grazing prior to current ownership. Since at least 1988, the land has remained essentially undisturbed and woody vegetation has regrown. Woody vegetation has been cleared along a power line right-of-way that runs between the two tracts in a north-south direction. The western border of the property is adjacent to BCP lands owned by Travis County. Vista Parke Drive, across which is a low-density research and development facility, forms the northern boundary of the two tracts. The southern boundary is adjacent to Bullick Hollow Road and a convenience store. The property is bound on the east by RR 620, a heavily traveled four-lane road. Across RR 620, is a considerable amount of development, including a shopping center and a large grocery store, with additional development slated for the area.

3.7 WATER RESOURCES

All surface run-off from the property flows into the tributary of Bullick Hollow drainage and subsequently into Lake Travis. There are no permanent water bodies on the property.

The property lies east of Lake Travis. Water will likely be supplied by the Lower Colorado River Authority and will ultimately come from Lake Travis and the Colorado River.

3.8 AIR QUALITY

Air quality on the site is currently good. Travis County and the City of Austin are currently full attainment areas for all air quality criteria pollutants of the Environmental Protection Agency and Texas Commission on Environmental Quality (TCEQ). Based on data from the nearest monitoring station, ozone levels are currently below the 8-Hour Ozone Standard (TCEQ 2006).

3.9 WATER QUALITY

Quality of surface water on the property is estimated to be good because of a well-developed vegetative cover. The property lies within the Lake Travis watershed.

3.10 CULTURAL RESOURCES

On November 17, 2006, the Service completed a search of the Texas Historical Commission's Archeological Sites Atlas (http://pedernales.thc.state.tx.us, restricted access). It appears two archeological surveys within this general area have been completed, one by the University of Texas in 1966, and the other by Espey-Huston and Associates in 1985. These surveys identified two small prehistoric lithic scatters and one middle-archaic to neo-Indian rock shelter. All of these sites appeared to be either immediately off-site, or located within the proposed preserve area. None of these sites had any potential for further research, and had no potential as a State Archeological Land Mark.

3.11 SOCIOECONOMIC ENVIRONMENT

The greater Austin area is rapidly and steadily growing. In 1999, the greater Austin metropolitan area grew at an annual rate of 3.5 percent. The current population for the area is 1.25 million people, up from 846,000 in 1990. The population of Travis County increased more than 29 percent since 1990, and the current population consists of 68.2 percent White, 9.3 percent Black or African American, 4.5 percent Asian, 0.9 percent American Indian or Alaska native persons, and 17.1 percent other (U.S. Census 2005).

Government, service, trade, manufacturing, finance-real estate, and construction are the primary employment sectors within the metropolitan area according to the Austin Chamber of Commerce. Primary employers are the University of Texas at Austin, Dell Computer Corporation, Motorola Inc., IBM Corporation, and Advanced Micro Devices.
Non-agricultural employment in the greater Austin area during the last decade has grown at an annual rate of approximately 5.3 percent. Unemployment figures have increased recently with the downturn in the high-tech sector in the greater Austin area. Residential real estate trends parallel growth and employment statistics in Travis County (U.S. Census 2005).

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, mandates that Federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs on minority or low-income populations. Existing development near the property consists of middle to upper middle-class homes and commercial/retail development. There are no minorities or low-income individuals on the property, nor would any minority or low-income individuals be displaced or disadvantaged by this development.

4.0 ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

This section presents details of the alternatives considered. Three alternatives are considered within this EA/HCP, the Preferred Alternative, historic significant development scenarios considered but rejected, and the no action alternative. An HCP (Section 6.0) has been included with the Preferred Alternative that specifies what steps the Applicant will take to minimize,

avoid, and mitigate for impacts to the affected species, to the maximum extent practicable. The expected environmental consequences of each alternative are presented in Section 5.0 of this EA/HCP.

4.1 PREFERRED ALTERNATIVE (Proposed Action)

The proposed action on the 70-acre property includes a development envelope of approximately 40.2 acres, an on-site preserve (mitigation) of approximately 7 acres (Figure 2), and sale of approximately 22.7 acres[6] to Travis County or other similar entity to be protected and managed as part of the BCP. Because the 22.7 acres would be purchased as preserve land, none of it would be available to satisfy any mitigation needs of the Preferred Alternative. When we assessed impacts, the Service assumed the 22.7 acre acquisition area, the 7 acres of on-site mitigation, and the area previously donated and now owned by Travis County would be preserved and no incidental take coverage would be authorized in these areas.

The southern boundary of the 22.7-acre acquisition identified in Figure 2 generally corresponds with the 1,048-foot contour line and Bullick Hollow Road. According to Veni (2006), the 1,048 contour line is below the floor of Tooth Cave and therefore any contaminants from development occurring below this contour line should not enter the Cave.

As both the golden-cheeked warbler and the five karst invertebrate species are either known to occur or depend upon the habitat on the on-site mitigation lands, every acre of on-site mitigation land (not including the 22.7-acre acquisition) is considered to benefit all affected species.

The Preferred Alternative includes the issuance of a permit under section 10(a)(1)(B) of the Act to authorize incidental take of the affected species during the construction and operation of a residential, commercial, and/or retail development with attendant roads and utilities on portions of the 70-acre property. The type of development (with exceptions identified in Section 6.0) chosen would be at the Permittees' discretion. The development envelope was analyzed by the Service with the assumption that non-preserve lands (i.e. development envelope) would be fully developed and no habitat value on those lands would remain. The proposed development envelopes, 22.7-acre acquisition, on-site mitigation lands, and existing BCP preserve land are identified on Figure 2.

The Preferred Alternative includes measures to avoid, minimize, and mitigate for potential impacts to the federally listed golden-cheeked warbler and the five federally listed karst invertebrates that are either known to occur or depend upon habitat found on the property to the maximum extent practicable. These are identified in Section 6.0 (HCP) and are included as part of this alternative. As identified in Section 6.0, the Permittees will provide (by conveyance of fee simple title or conservation easement) the on-site mitigation land as identified in Figure 2.

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[6] In addition to the 22.7-acre acquisition, Travis County currently owns approximately 0.6 acres surrounding Tooth and Root caves, which is located in the acquisition area. The proposed 22.7-acre acquisition would be added to the 0.6 acres for a total of 23.3 acres as indicated on Figure 2. The remainder (5.7 acres) of the previously donated area totaling 6.3 acres is part of the former 216 acre Hart Triangle property and is not located within the 70 acres considered in this EA/HCP. See Section 6.0 for more discussion about the 6.3 acre donation.

These areas will be combined with the Travis County 22.7-acre acquisition, and will be preserved and managed as part of the BCP in perpetuity.

Figure 2: GDF Development Envelope, 22.7-Acre Acquisition, Mitigation Lands, and Existing Preserve.

The Preferred Alternative would allow development to occur over three karst features that are in the development envelope: Persimmon sink, Red Berry Cave, and Mixed Emotions Cave. These caves are not known to contain federally listed species and are not believed to be directly related to any cave with federally listed species, but may still be important to the overall karst ecosystem. This alternative would also not fully protect the remaining cave cricket foraging area for Tooth Cave, Root Cave, and Kretschmarr Cave (see Section 5.1). A thorough analysis of karst species impacts are discussed in Section 5.1.

4.2 PAST DEVELOPMENT ALTERNATIVES CONSIDERED

This alternative considers past significant Endangered Species Act compliance events that have occurred over the past ten years. Specifically this includes the seven December 1997 section 10(a)(1)(B) incidental take permit applications and associated EA/HCPs submitted by the Applicants, and the June 2000 draft EA/HCP prepared by the Service. Both of these significant events covered the former 216-acre Hart Triangle property, 70 acres of which are currently under consideration in this EA/HCP. Several other negotiations have occurred over the years, but are not discussed in detail here. Additional details regarding these negotiations are included in the Service's administrative files.

In December 1997 the Applicants applied for seven section 10(a)(1)(B) incidental take permits (PRT-838754, PRT-841088, PRT-841090, PRT-841093, PRT-841117, PRT-841120, and PRT-841125). These permits would have allowed for take of the affected species associated with construction, operation, and occupation of residential and commercial development along with streets, utilities, and other improvements and facilities. However, the Applicants did prepare seven habitat conservation plans (HCP) that in the opinion of the Service would not have avoided, minimized, and mitigated the potential impacts to the affected species to the maximum extent practicable as required by the Act. Because of this and other inadequacies in the applications, the U.S. Fish and Wildlife Service (Service) denied all seven applications.

The Applicants then filed suit against the Service claiming it had "taken" their property under the 5th Amendment. The plaintiffs and the Service agreed to enter mediation beginning in October 1999. In an effort to show that an incidental take permit could be issued for development of this property, the Service prepared a draft EA/HCP for development of portions of the 216-acre Hart Triangle property. This draft EA/HCP was noticed in the *Federal Register* on June 02, 2000, but was never accepted by the Applicants, and therefore never finalized. The permit (TE-027690) was never issued.

A complete analysis of the direct, indirect, and cumulative impacts associated with the 1997 and 2000 draft EA/HCPs can be located within the Service's administrative files and are therefore not included within this document.

4.3 NO ACTION ALTERNATIVE

This alternative assumes that the proposed development does not occur, and that no application for an incidental take permit is processed. This alternative would provide uncertain and possibly severely reduced economic value for the current landowners. The Applicants could sell the

property to Travis County for the BCP, but it is unknown when or if the County will have the resources to purchase the entire property. The property could also be sold to other developers as mitigation land, but no such prospective buyers are currently known. Choosing this alternative would not result in take of endangered species, since no development would occur. No type of monitoring or management would be done as proposed in the HCP, and the site would continue to be subject to unauthorized uses and vandalism. Also, red-imported fire ants would continue to be a threat without active management.

5.0 ENVIRONMENTAL CONSEQUENCES

5.1 PREFERRED ALTERNATIVE

5.1.1 Direct Impacts

As defined in Council on Environmental Quality (CEQ) regulations (40 CFR § 1508.8), "direct effects" are effects that are caused by the action and occur at the same time and place. Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.

Direct impacts to all relevant resources were assessed based on the Permittees' adherence to the avoidance and minimization measures prescribed in the HCP (Section 6.0).

5.1.1.1 Vegetation

Approximately 40.2 acres of land are proposed for development under the Preferred Alternative. Development would chiefly occur on plateau areas where vegetation consists primarily of Ashe juniper/deciduous woodland. Natural vegetation in the development areas would be removed and replaced with structures, impervious cover, and landscape plants, which would consist of native vegetation. As much as possible, existing native vegetation would be maintained in the development areas. As these vegetation types are common and wide-spread throughout central Texas, no significant vegetative resources are expected to be impacted.

5.1.1.2 Wildlife

Wildlife within those areas planned for development would largely be displaced to adjacent areas during the construction process. Following construction, landscape vegetation and preserved trees would provide habitat for those species tolerant of suburban development. With the Preferred Alternative, approximately 42 percent (includes the 22.7-acre acquisition) of the property would remain undisturbed and become part of the BCP. These areas, along with the adjacent BCP lands would continue to provide thousands of acres of habitat for the wildlife species that currently occur there. Therefore, no significant impacts to wildlife species are expected.

Since the Jollyville Plateau salamander is not known to occur on the property, direct impacts to it are unlikely. Any impacts would likely be indirect.

5.1.1.3 Listed, Proposed, and Candidate Species

Based upon past surveys, six federally listed species are known to occur within the 70 acre property: the golden-cheeked warbler, the Tooth Cave spider, the Bone Cave harvestman, Tooth Cave pseudoscorpion, Tooth Cave ground beetle, and Kretschmarr Cave mold beetle. Potential direct impacts to these species are discussed below.

As part of the Preferred Alternative, an HCP has been included that describes the measures the Permittee will take to avoid, mitigate for, and minimize the potential impacts to the covered species and their habitats, described below. This will assure that the Preferred Alternative does not reduce the potential for survival and recovery of the golden-cheeked warbler or the five federally listed karst invertebrates, as mandated by requirements at 50 CFR Part 17.22(b)(1)(iii). The HCP is detailed in Section 6.0 of this document.

Assessment of Take

The development envelope has been evaluated for the federally listed threatened or endangered species discussed under Section 3.3 above. Other than evidence of use of the permit area by the covered species, including the golden-cheeked warbler and the five federally listed karst species, there is no evidence of any other threatened or endangered species. Past survey efforts have provided valuable information in determining the extent of golden-cheeked warbler and karst species occupation within the permit area. However, it does not provide a precise mechanism for predicting the number of individuals that may actually be "taken" by the proposed action. The effectiveness of these surveys in counting the number of birds and/or karst species in an area can be somewhat limited. For example, male golden-cheeked warblers are much more easily observed than female warblers or fledglings during surveys due to the males' territorial behavior and frequent vocalization, and karst species because of their cryptic nature are inherently difficult to find. Moreover, occupation of a given area by the covered species can vary from year to year depending on a wide variety of factors. In addition, the impacts to covered species may not be fully realized in a single season and may be spread over several or even many years. During this period, utilization of the site by covered species may vary for reasons unrelated to the proposed project. For these reasons, it is not possible to predict a precise number of golden-cheeked warblers or karst invertebrates that may, over time, be taken or preserved as a result of the Preferred Alternative. It is more accurate and appropriate to state that, over time an area that has been observed to support these species may or may not be rendered unsuitable. Therefore, in this document take is not characterized by a precise bird or karst invertebrate count, but by the loss or potential loss of areas known or likely to be occupied, the relative quality of which is in part determined by the levels of prior observed utilization as well as the assessment of habitat quality.

Take, as defined in section 3 of the Act, is to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any of these activities. Harm has been further defined to include significant habitat modification or degradation where it actually kills or

injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. As described in the Service's 1996 HCP handbook, take can be measured in terms of the number of individuals affected or by the area of habitat affected, where it is generally assumed that all individuals occupying that habitat are taken. Since the precise number of golden-cheeked warblers and karst invertebrates to be taken by the proposed action is not measurable, this proposed permit would estimate take in terms of the area of endangered species habitat affected by the proposed project, to the extent that the effects constitute take.

Golden-cheeked Warbler

To the best of its ability, and with the limitations described above, the Service has attempted to estimate the number of golden-cheeked warbler territories that would be taken by the Preferred Alternative. Earlier surveys (1990s) indicated relatively limited distribution of golden-cheeked warblers on the former 216-acre Hart Triangle property (TxDOT 1992, DLS 1993, SWCA 1993, 1994 and 1998). Generally, these surveys identified this population as being restricted to the canyons. In 2003, Travis County purchased much of this property and completed an extensive survey for the golden-cheeked warbler the following spring (2004). This survey identified several additional territories (a breeding pair of golden-cheeked warblers occupies a territory) on areas that had not been considered habitat in past negotiations, including portions of three territories that occur within the permit area (Balcones Canyonlands Conservation Plan [BCCP] 2005). Based upon this more recent information, it is anticipated that the Preferred Alternative would result in direct impacts to 7.8 acres of known occupied warbler habitat. This would adversely impact portions of two known golden-cheeked warbler territories by removing habitat. This would result in take of two breeding pairs in the form of harm and harassment.

Karst Invertebrates

Because of the reasons described above, and since the proposed preserve (mitigation area and 22.7-acre acquisition area) was designed to avoid/minimize impacts to karst species, it is not possible to estimate the number of individuals of the five federally listed karst species covered in the HCP that would be taken by the Preferred Alternative. To the best of its ability, and with the limitations described above, the Service has attempted to estimate the potential for direct impacts to karst features known to be occupied by one or more of the five covered karst species. The development envelope is known to surround two caves (Tooth Cave and Root Cave) that contain listed species. Other caves known to contain listed species are located in proximity. Direct impacts to all on- and off-site caves and their federally listed karst species are expected to be minimal since all caves with listed species, their surface and subsurface drainage basins, the cave footprints, and the majority or all (depending on the cave) of the remaining cave cricket foraging area (see Table 2) will be protected under the Preferred Alternative. It is expected that direct impacts to federally listed karst invertebrates would occur only if an unknown void is encountered during construction and that void is occupied by listed species and/or is connected to a known feature with listed species. However, the property has been extensively surveyed for karst features, and the likelihood of encountering an extensive void is small. The probability of this occurring and any resulting impacts will be minimized by the conditions in the permit (Section 6.0 of the EA/HCP). Additionally, as described in Section 6.0, mitigation will be provided up front in the event an unknown void is encountered. Any direct impacts would therefore be unknown, and unquantifiable, but would be covered by the proposed permit.

However, direct impacts to known caves with listed species (Tooth, Root, Two Trunks, Kretschmarr, and Gallifer) would not be covered by this permit.

5.1.1.4 Wetlands

According to the Service's National Wetland Inventory map (Jollyville quadrangle, 1993), there are no potential wetlands within the proposed permit area. Therefore, no direct impacts to wetlands are expected.

5.1.1.5 Geologic Features and Soils

Areas proposed for the preserve and development envelope are underlain by the basal unit of the Edwards Formation. Since the topography is relatively flat and soil is very thin and rocky, surface soil alterations in the development envelope, such as grading are expected to be minimal, and will comply with all applicable construction codes for erosion and sedimentation. Construction is likely to require some drilling or excavation of the limestone rock to install building piers and utilities. This will be minimized as described in Section 6.0. Dynamite or other blasting techniques will not be used.

5.1.1.6 Land Use

Approximately 40.2 acres would be converted from open space to residential, commercial, and/or retail development. The proposed action is comparable and compatible with current land use in the area. A low density research and development facility is located immediately to the north of the permit area across Vista Parke Drive. Additionally, directly across RR 620 to the east is a large grocery store and strip mall, which is covered by an existing 10(a)(1)(B) permit and additional commercial development, including a hotel, is planned.

5.1.1.7 Water Resources

The property lies east of Lake Travis. Water is likely to be supplied by the Lower Colorado River Authority and will ultimately come from Lake Travis and the Colorado River. The project will slightly increase the demand for water in this area. There are no water resources on the property and none will be directly affected.

5.1.1.8 Air Quality

Development of the property will increase exhaust emissions somewhat by increasing the number of gas-powered vehicles on the property. A reduction in the number of trees on the property may slightly reduce air filtering capabilities. A temporary increase in dust levels is expected during the construction process. These emissions are not expected to be significant.

5.1.1.9 Water Quality

It is expected that some water quality degradation will occur from urbanization and development. Impacts to surface water quality will be minimized by following all applicable local and State storm water quality regulations.

5.1.1.10 Cultural Resources

All known cultural resources are either located off-site or within the identified preserve area. Therefore, no direct impacts are expected.

5.1.1.11 Socioeconomic Environment

The proposed development, construction, and occupation of the property would include construction of residential, commercial, and/or retail development with attendant roads and utilities on portions of the property. Proposed land uses may vary depending upon market conditions at the time of development. However, it is expected that development of this property would provide additional residential, commercial, and/or retail space and would result in an increased demand for temporary and permanent employment. The presence of additional workers and increased employment would result in a slight increase in retail sales due to purchases of food, fuel, and other merchandise. The project would increase the tax base for the City of Austin and Travis County. A portion of these taxes would contribute to the acquisition and management of the BCP.

The project would not disproportionately adversely affect, separate, or isolate any distinct neighborhoods, ethnic groups, or other specific groups. It can thus be concluded that the requirements of Executive Order 12898 on Environmental Justice are satisfied.

5.1.2 Indirect Impacts

As defined in CEQ regulations (40 CFR § 1508.8), “indirect effects” are effects caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in these regulations are synonymous.

5.1.2.1 Vegetation

Indirect impacts to vegetation off-site and on the proposed preserve (mitigation and 22.7 acre acquisition) are expected as a result of the Preferred Alternative due to detrimental edge effects. These effects may include, but are not limited to, invasion by exotic species, drying, and locally increased air temperatures. Due to the management proposed under the HCP and the considerable amount of protected (existing and proposed) vegetation in the immediate area, no significant impacts are expected.

5.1.2.2 Wildlife

Wildlife within those areas planned for development would largely be displaced to adjacent areas during the construction process. Those species dependent on the existing habitat proposed for development will likely decrease in the local area. Following construction, landscape vegetation and preserved trees would provide habitat for those species tolerant of suburban development, possibly resulting in increased populations in the surrounding area. Indirect effects of development may result in slightly negative or positive impacts to the populations of some species in the area. For example, snake and other native herpetofaunal species and invertebrates may decrease, due to human presence and increase in edge effects. Populations of deer, blue jays, starlings, and brown headed cowbirds may increase due to potential increases in availability of food for them in proposed development areas and their greater tolerance for human disturbance.

Because development on the property can influence the quality and quantity of water that emerges in springs in the Cypress and Bull creek watersheds, there is a potential for negative effects on the Jollyville Plateau salamander that occupies those springs. These impacts would be minimized by following all water quality regulations. The HCP does not contain measures to specifically minimize and mitigate for impacts to the Jollyville Plateau salamander, nor is this species proposed to be included on the permit. In the event this species becomes listed in the future, and the Applicants believe their development will impact this species, they would need to seek additional authorization.

5.1.2.3 Listed, Proposed, and Candidate Species

Indirect impacts to all federally listed species will be minimized and mitigated to the maximum extent practicable by the mitigation plan described in Section 6.0 and would be covered by the proposed permit.

Some negative indirect impacts are expected to affect golden-cheeked warblers that inhabit land adjacent to proposed development. Habitat adjacent to the proposed development envelope will be subject to the indirect effects of urbanization. These indirect impacts may include a reduction in overall nesting, foraging, and breeding habitat. Encroachment of noise and activity within proximity of golden-cheeked warbler habitat, introduction or increase of predator species (e.g., scrub jays [*Aphelocoma coerulescens*], and cats), and increase of species that may compete with the golden-cheeked warbler for shelter, forage, and nesting resources (such as brown-headed cowbirds) are also potential indirect impacts of this development. These indirect impacts are considered in the Assessment of Take Section 5.1.1.3 and are further described in Section 3.3.1.

Indirect impacts are expected to affect the five karst species as a result of site clearing, construction, and development activities. Section 3.3.2 describes many of the anticipated indirect impacts that will likely occur as a result of the Preferred Alternative. Mitigative measures to off-set these impacts are identified in Section 6.2 of the HCP. Indirect impacts to karst species include, but are not limited to, contaminants/pollution entering caves with listed species, loss of cave cricket foraging areas, loss of surface vegetation, and loss of other karst features that do not contain listed species. These are discussed in greater detail in Section 3.3.2.

<u>Contaminants/Pollution</u>

Per discussions on hydrology and preserve design in Veni (2006), the Preferred Alternative is not expected to impact the surface and subsurface drainage basins for all caves with federally listed species on or adjacent to the property, thereby substantially avoiding the potential for pollution from the development's runoff to enter caves with listed species. It is however possible that <5% of the surface drainage input could come from the power line right-of-way to the south of Kretschmarr Cave (Veni 2006). The development envelope borders this area on the eastern side of the preserve owned by Travis County. To ensure surface runoff from the proposed development does not enter this cave, specific conditions addressing this issue would be included in the proposed permit (see Section 6.2 of the HCP).

Cave Cricket Foraging Areas

Cave crickets provide essential nutrients to karst invertebrates. According to Taylor et al. (2005), cave crickets (*Ceuthophilus secretus)* have been found foraging up to 345 feet from a cave entrance. This and a closely related cave cricket (*Ceuthophilus cunicularis)* are the two species that occupy the caves on and adjacent to the permit area (BCCP 2007).

The Preferred Alternative would result in the loss of some of the cave cricket foraging areas for caves occupied by the karst species. Table 2 identifies the percentage of remaining cave cricket foraging area that would be lost under the Preferred Alternative, the percent that is impacted by existing development, and the anticipated remaining foraging area. The 345-foot radius foraging area was calculated from the center of each cave entrance and was based upon the Service's current understanding of where the cave is located in relation to the proposed development (Figure 2). The Preferred Alternative would result in impacts to 38 percent, 0 percent and 1 percent of the remaining cave cricket foraging areas for Root Cave, Kretschmarr Cave and Tooth Cave, respectively.

Buffers and Edge Effects

The Preferred Alternative would result in the removal of natural vegetation that buffers the surface and subsurface environment near caves occupied by karst species. These buffers protect against edge effects, microclimate changes (drying of the cave environment), and invasion by exotic plant or animal species (example, red-imported fire ants) (Porter et al. 1988). The Preferred Alternative includes a development envelope that results in the loss of natural vegetation on 40.2 acres (Figure 2). As the development envelope increases in size and encroaches closer to a cave's entrance, it is expected to result in greater loss of natural vegetation and increased indirect impacts from smaller buffer areas and greater edge effects.

Table 2. Estimated Impacts to Cave Cricket Foraging Area* for the Preferred Alternative

Cave	Percent of total foraging area currently impacted by off-site development	Percent of total foraging area impacted by proposed development	Percent of total foraging area remaining
Root Cave	0	38	62
Kretschmarr Cave	35	0	65
Tooth Cave	6	1	93

* Area is based on the 345 foot radius per Taylor et al. 2005.

Other Karst Features

Some karst features that are not known to contain federally listed species will be destroyed or heavily impacted as a result of the Preferred Alternative. These features are not believed to be directly related to any cave with federally listed species (Veni 2006), but may still be important to the overall karst ecosystem because they may provide habitat for essential species. The Preferred Alternative would allow destruction of three of these karst features: Persimmon sink, Red Berry Cave, and Mixed Emotions Cave. Even though it is not believed to be directly related to Kretschmarr Cave, Encinal Cave may be important in maintaining a healthy cave cricket population to Kretschmarr Cave (Veni 2006). The entrance to Encinal Cave would be included within the area to be preserved under the Preferred Alternative.

5.1.2.4 Wetlands

The increase in impervious cover could contribute to a reduction in water quantity or, if development run-off is directed into the canyon, degradation of water quality for one off-site impounded wetland. Because all storm water quality regulations would be followed, the effects under any of the options are not anticipated to be significant.

5.1.2.5 Geologic Features and Soils

No indirect impacts to geologic features or soils are expected as a result of the Preferred Alternative.

5.1.2.6 Land Use

No significant indirect impacts to existing or proposed land uses are expected to occur as a result of the Preferred Alternative. Most of the properties adjacent to, or in the vicinity of, the proposed development are currently developed or are protected by the BCP. For the properties that are developed, or are planned for development, the Preferred Alternative will not change or

impact the use of those properties. The proposed development is fully compatible and comparable to current human land use in the area.

5.1.2.7 Water Resources

No indirect impacts to water resources are expected as a result of the proposed development. The Lower Colorado River Authority is likely to provide water to the development, and they are ultimately responsible for ensuring adequate water supplies are available to their customers.

5.1.2.8 Air Quality

Development of the property is expected to result in an increase in the number of motorized vehicles in the area, which may result in a decrease in air quality. A reduction in the number of trees on the property may slightly reduce local air filtering capabilities. None of these are expected to be significant.

5.1.2.9 Water Quality

Although each development option will comply with all applicable regulations, it is expected that minor water quality degradation will occur from the anticipated level of impervious cover and run-off from the development, and therefore, slight degradation to spring and stream flows off-site.

5.1.2.10 Cultural Resources

Since no construction is proposed outside of this development, no indirect impacts to cultural resources are expected.

5.1.2.11 Socioeconomic Environment

The Preferred Alternative will result in an increase in the overall population and jobs in the area. This Alternative may also result in an increase in supportive businesses such as stores and restaurants. There may be an increase in the need for schools, road repairs, and other public services in the area, along with an increased tax base.

5.1.3 Cumulative Impacts

As defined in CEQ regulations (40 CFR §1508.7), "cumulative impact" is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time.

5.1.3.1 Vegetation

Because the Preferred Alternative would result in disturbance of up to 40.2 acres of vegetation, predominantly Ashe juniper/oak woodlands, it would cumulatively contribute to the loss of these vegetation types in Travis County. These vegetation communities are relatively common and widespread throughout Travis County, much of which is protected by the BCP and other land protection programs. The proposed preserve (mitigation land and 22.7 acre acquisition) is contiguous with thousands of acres of existing preserve land and will further contribute to the perpetual protection of the native plant communities both on and off the property. Therefore, no significant cumulative impacts are expected.

5.1.3.2 Wildlife

The Preferred Alternative would contribute to a cumulative reduction of habitat for some wildlife species intolerant of human impacts when added to impacts resulting from other development, road construction, and other types of land use projects in Travis County. Wildlife species associated with urban and suburban settings would likely increase, while species intolerant of development would locally decrease. Wildlife associated with the vegetation communities described above is relatively common and widespread throughout Travis County. Much of the land on which this wildlife occurs is protected by the BCP or other land protection programs. The proposed preserve (mitigation land and 22.7 acre acquisition) is contiguous with thousands of acres of existing preserve land and will further contribute to the perpetual protection of land that these species will use. Therefore, no significant cumulative impacts are expected.

Development on the property would contribute to cumulative impacts to the quality and quantity of water that emerges in springs in the Bull Creek and Lake Travis watersheds. This additional degradation in water quality may have a negative effect on the Jollyville Plateau salamander, which exists in the Bull Creek and Lake Travis watersheds. The HCP does not contain measures to minimize or mitigate for impacts to the Jollyville Plateau salamander, nor is this species proposed to be included on the permit. In the event this species becomes listed in the future, and the Applicants believe their development will impact the species, they would need to seek additional authorization.

5.1.3.3 Listed, Proposed, and Candidate Species

The Preferred Alternative would reduce the amount of suitable golden-cheeked warbler habitat in Travis County. This would contribute to the overall take of the golden-cheeked warbler and its habitat in Recovery Region 5 when added to other section 10(a)(1)(B) incidental take permits and Biological Opinions that have been or would be issued by the Service. To date, 111 individual incidental take permits and eleven section 7 Consultations/Biological Opinions for the golden-cheeked warbler have been issued in Travis County. These permits cover about 16,258 acres (6,579 hectares) (note: this is the permit area, not the actual acres of impacted habitat), only part of which was golden-cheeked warbler habitat. Most of the permitted area is included within the 633,000-acre (256,171-hectare) area in Travis County covered by the Balcones Canyonlands Conservation Plan regional 10(a)(1)(B) permit.

There is currently one active incidental take permit application for take of the golden-cheeked warbler being considered by the Service in Travis County. This application or pre-application

consultation covers approximately 164 acres, only a portion of which is proposed for development. Every incidental take permit is required to provide mitigation of impacts to the maximum extent practicable. The golden-cheeked warbler habitat expected to be impacted by the Preferred Alternative, added to approximately 16,258 acres (see note above) already permitted in Travis County constitutes approximately 6.7 percent of the estimated 240,747 acres (97,428 hectares) of golden-cheeked warbler habitat in Recovery Region 5 (derived from Service 1992). The most recent estimate of potential habitat within the breeding range identifies 1,869,511 acres (756,581 hectares) of potential golden-cheeked warbler habitat (DeBoer and Diamond 2006). The golden-cheeked warbler habitat expected to be impacted by the Preferred Alternative, added to approximately 16,258 acres already permitted in Travis County constitutes less than one percent of the estimated habitat within its breeding range.

The level of impacts resulting from projects for which permits are currently being considered is dependent upon the amount of take resulting from the actual number of these permits issued by the Service. Cumulatively, the anticipated take from future permits could have the potential to reduce the probability of survival and recovery of the golden-cheeked warbler over time, and thus each application, including this one, is being evaluated with respect to its impact on the populations of golden-cheeked warblers in Recovery Region 5. The recovery strategy for the golden-cheeked warbler calls for the preservation of sufficient breeding habitat to ensure the continued existence of at least one self-sustaining, viable population of golden-cheeked warblers in each of eight recovery regions (Service 1992). Currently, 27,751 acres (11,229 hectares) of golden-cheeked warbler habitat have been preserved in the BCP with a goal of acquiring a total of 30,428 acres (12,314 hectares) (BCCP 2007). Those acres, plus the 45,000 acres (18,211 hectares) to be included in the still incomplete Balcones Canyonlands National Wildlife Refuge, are considered adequate to sustain a viable population of golden-cheeked warblers (RECON 1996). This property is located within the Cypress Creek macrosite of the BCP. Currently, approximately 7,747 acres (3,135 hectares) have been acquired and preserved in this macrosite. Approximately 362 acres (147 hectares) remain to be acquired to meet the minimum acreage goal (BCCP 2007). The 22.7 acre off-site mitigation for golden-cheeked warbler, the 7 acres of on-site mitigation and the proposed 22.7 acre Travis County acquisition under the Preferred Alternative, will help contribute towards this goal. A sufficient number of acres still remain within this macrosite to complete the final goal.

Cumulative impacts to listed karst invertebrates would be expected as a result of the Preferred Alternative (see discussions throughout EA/HCP). Some of the area around the karst features with listed species is currently developed and it is not feasible to achieve total protection of each cave with listed species. This may be most significant for the cave cricket foraging area delineated by Taylor et al. 2005 (see Section 3.3 and 5.1.2.3 for information on cave cricket foraging area). Table 2 identifies the percentage of cave cricket foraging area that is currently impacted by existing development (RR 620 and Vista Parke Road), the foraging area that would be impacted by the Preferred Alternative and the remaining cave cricket foraging area that will be preserved around each cave with listed species. It is not expected any other significant reasonably foreseeable future actions will occur within the area, as the property is, or will be, within the proposed development, surrounded by existing development, or protected by preserve land.

All of the proposed preserve land is connected to existing preserve lands, which should help compensate for areas where the entire cave cricket foraging area is not preserved. Ultimately though, the proposed preserve was configured to protect most of the remaining habitat and nearly all of the available cave cricket foraging area around Tooth Cave, the most diverse (and largest number of different endangered species) of all caves on the property, while still allowing for a reasonable level of development to occur. The design, management, and configuration of the preserve are based on the best scientific information available. Protecting these karst ecosystems and providing a complete connection to the adjacent BCP land would represent a major recovery action for the five listed species that either occur or depend on habitat on the property.

5.1.3.4 Wetlands

No direct impacts to wetlands are expected. Therefore, no significant cumulative impacts are expected.

5.1.3.5 Geologic Features and Soils

Cumulative impacts to geologic features and soils are expected to be insignificant.

5.1.3.6 Land Use

The Preferred Alternative would contribute to the on-going conversion of undeveloped land to developed land in the Austin area. However, the Preferred Alternative would also preserve much of the property. This would add to the lands already acquired and managed under the BCP.

5.1.3.7 Water Resources

Together with other development occurring in the area, the Preferred Alternative will add somewhat to the overall demand for water resources. Ultimately, the Lower Colorado River Authority must ensure adequate water supplies. Therefore, no noticeable cumulative impact is expected.

5.1.3.8 Air Quality

The Preferred Alternative will contribute somewhat to degradation of air quality in the Austin area primarily through an increase in automobile emissions. The degree of the impact will depend upon air quality requirements for construction activities and automobiles. Continued development of the area could result in cumulative impacts on air quality at some time in the future.

5.1.3.9 Water Quality

The increase in run-off and infiltration containing pollutants will add to that produced by other existing or planned development in the area, resulting in some reduction in water quality in the Bullick Hollow and Bull Creek watersheds over time.

5.1.3.10 Cultural Resources

Since there are no known direct or indirect impacts to cultural resources, no cumulative impacts are expected.

5.1.3.11 Socioeconomic Environment

The Preferred Alternative will contribute to an increase in population, property values, and traffic in western Travis County which will over time become more urbanized with each new development. No cumulative adverse socioeconomic conditions are expected.

5.2 PAST DEVELOPMENT ALTERNATIVES CONSIDERED

This alternative considers past significant Endangered Species Act compliance events that have occurred over the past ten years. Specifically this includes the seven December 1997 section 10(a)(1)(B) incidental take permit applications and associated EA/HCPs submitted by the Applicants, and the June 2000 draft EA/HCP prepared by the Service. Both of these significant events covered the former 216-acre Hart Triangle property, 70 acres of which are currently under consideration in this EA/HCP. As with the Preferred Alternative, the 1997 and 2000 EA/HCPs proposed the construction and operation of a residential, commercial, and/or retail development. Several other negotiations have occurred over the years, but are not discussed in detail here. Additional details regarding these negotiations are included in the Service's administrative files.

A complete analysis of the direct, indirect, and cumulative impacts associated with the 1997 and 2000 draft EA/HCPs can be located within the Service's administrative files and are therefore not included within this document.

5.3 NO ACTION ALTERNATIVE

Under this alternative, the Applicants would not develop the property and there would be no impacts to the golden-cheeked warbler or karst invertebrates. It is possible the 22.7-acre acquisition would continue regardless. Abandonment of Preferred Alternative would result in the loss of significant monies invested by the landowners in the property, and may be economically impractical for them. Moreover, the property would have no active management for endangered species and no provision of land or money would go toward the long-term conservation of golden-cheeked warblers and karst invertebrates in Travis County.

6.0 HABITAT CONSERVATION PLAN

This section contains the specific conservation plans for the Preferred Alternative. The Preferred Alternative consists of commercial, residential, and or retail development with attendant roads and utilities on portions of the approximately 70-acre property (Figure 2). This HCP is provided to describe the measures the Applicant will take to minimize and mitigate for any potential impacts to the covered species as a result of the Preferred Alternative. As mandated by requirements of 50 CFR Part 17.22(b)(l)(iii), all of the Preferred Alternative Options are

intended to ensure that the proposed development does not reduce the potential for survival and recovery of the following covered species: the golden-cheeked warbler, Tooth Cave ground beetle, Bone Cave harvestman, Tooth Cave pseudoscorpion, Tooth Cave spider, and Kretschmarr Cave mold beetle in the wild. This HCP does not include any provisions for other listed or non-listed species, and therefore none would be included on the permit.

As described in Section 4.1, the proposed action in the Preferred Alternative includes the purchase of approximately 22.7 acres (Figure 2) by Travis County for inclusion in the BCP. In the event the Preferred Alternative does not occur, this acquisition may still proceed. Since these 22.7 acres are proposed for sale to Travis County, it does not count as mitigation for the proposed development, but does compliment the proposed mitigation lands, and helps ensure the goals and objectives of this HCP are met. When we assessed impacts on the 70 acre Hart Triangle property, the Service assumed the 22.7 acre acquisition area, the 7 acres of on-site mitigation, and the 0.6 acre previously donated (around Tooth Cave and Root Cave) and now owned by Travis County would be preserved and no incidental take coverage would be authorized in these areas. Please note, the January 1990 donation of approximately 6.3 acres to the Texas System of Natural Laboratories includes 0.6 acres around Tooth Cave and Root Cave that are located on the 70 acre property considered in this EA/HCP. The remaining 5.7 acres, is not within the boundaries of the 70 acre parcel but rather on the former 216 acre Hart Triangle property. In the on-site mitigation discussion below, we do give credit for the entire 6.3 acre donation.

6.1 BIOLOGICAL GOALS AND OBJECTIVES

The goals of this HCP are:

(1) to ensure that the proposed development does not reduce the potential for survival and recovery of the five covered federally listed karst invertebrates and the golden-cheeked warbler.

(2) to avoid impacts to the three rarest federally listed karst invertebrates (Tooth Cave pseudoscorpion, Kretschmarr Cave Mold Beetle, and Tooth Cave spider) and minimize impacts to the Bone Cave harvestman, Tooth Cave Ground Beetle, and golden-cheeked warbler to the maximum extent practicable.

The following objectives will help ensure the goals of this HCP are achieved:

- maintain the essential internal habitat in the caves, including a stable and mild temperature, high relative humidity, appropriate water input;
- maintain appropriate nutrient input to caves and associated karst habitat, including cave crickets; plant detritus; root masses; and feces, eggs, and/or dead bodies of animals foraging on the surface and bringing nutrients into the cave;
- protect the karst ecosystems and listed species from damage or harm that could be caused by things such as vandalism, over-visitation, and contamination of the caves and associated karst habitat;
- maintain or improve the condition and viability of the surface native plant community; and, undertake any other activities found to be necessary for long-term conservation of the covered species and the ecosystems upon which they depend.

- fire ant control

6.2 PROPOSED TERMS OF THE HABITAT CONSERVATION PLAN

The Permittees or their successors will minimize and mitigate to the maximum extent practicable the impacts of the Preferred Alternative on the golden-cheeked warbler, Tooth Cave ground beetle, Bone Cave harvestman, Tooth Cave pseudoscorpion, Tooth Cave spider, and Kretschmarr Cave mold beetle. The following are conditions that would be included in the permit, if issued. These conditions help identify how the Permittee will minimize and mitigate for impacts to the maximum extent practicable, and how they will ensure the biological goals and objective of this HCP are met. Figure 2 identifies the proposed mitigation land, the 22.7-acre Travis County acquisition, and the development envelope. Collectively, the proposed mitigation land and 22.7-acre acquisition may be referred to in this EA/HCP as the "preserve." Compliance with these measures will be documented in the annual report described below. Funding assurances for this HCP are identified in Section 8.0.

The mitigation lands, the 22.7-acre acquisition, and other measures intended to avoid or minimize impacts to known localities of the listed karst species are based on geologic, biologic, and hydrogeologic studies on the property, other studies conducted within the Austin area, and an extensive literature review. The shape and size of the preserve (mitigation land and 22.7-acre acquisition) were designed based on hydrogeologic investigations and an assessment of the surface area necessary to sustain the karst ecosystems. The configuration of the preserve was also designed to minimize detrimental edge effects from adjacent development and maximize connectivity for normal dispersal of essential species. The known extent of underground passage of each cave with listed species (both on-site and off-site caves) is included within the preserve as well as the surface and subsurface drainage areas. It is believed the preserve, with additional management actions, includes sufficient area to maintain the native plant communities, considering the connection to the adjacent BCP land maintained by Travis County.

<u>On-Site Mitigation</u>

1. Prior to any clearing or construction activities, the Permittees or their successors shall ensure approximately 7 acres of on-site preserve are preserved in perpetuity as identified on Figure 2 of the EA/HCP. The development/mitigation lines identified in this figure are approximate and minor adjustments may be necessary to accommodate the requirements identified throughout the EA/HCP. This preservation shall be accomplished by the Permittees imposing a restrictive covenant on the preserve area prior to the permit being issued which requires the property to remain undeveloped and which requires that upon issuance of a site plan by the City of Austin the Permittees or their successors will convey the property in fee simple to a BCP Managing Partner (Travis County, City of Austin, or Lower Colorado River Authority). This transaction shall be filed by the Permittees or their successors at their cost in the Official Public Records of Travis County, Texas, and a copy of the recorded instrument shall be provided to the Service within 30 days of recordation. The Permittees or their successors will also ensure the mitigation/development line is surveyed and staked prior to the transfer to the conservation entity, and that funds will be available to complete this. The funds

necessary to complete the survey and transfer are in addition to the other funding requirements described below. This mitigation land shall be maintained and managed in perpetuity as a preserve for the covered species by the receiving conservation entity. A copy of a binding management agreement with the conservation entity will be provided to the Service before vegetative clearing or construction begins.

2. In addition to the seven acres described above, the Service recognizes and gives credit to the Permittee for the January 1990 donation of approximately 6.3 acres to the Texas System of Natural Laboratories that includes the 0.6 acres around Tooth Cave and Root Cave that are located on the 70 acre property considered in this EA/HCP. This 6.3 acres is acreage which surrounds the entrances to all caves with listed species on the former 216-acre Hart Triangle property (see this EA/HCP for discussion on Hart Triangle property). These 6.3 acres have since been transferred to Travis County and are being managed as part of the BCP. The 6.3 acres provide a direct benefit to all federally listed species affected by the proposed permit and are the most critical acreage for preservation, as it contains the entrances to all of the caves with listed species on and adjacent to the 70 acre tract under consideration in this HCP. Permittees have told the Service that with the 1990 donation, they retained an interest in the 6.3 acres and could exercise those interests in the event no credit was given. The Service has been unable to verify this. Regardless, the Service is willing to recognize and give credit for this donation. However, in order to receive this credit, Permittees shall, within 30 days of issuance of the permit, transfer to Travis County by quit claim deed all right, title, and interest in the 6.3 acres.

Off-Site Mitigation

3. In addition to the on-site mitigation described above, and in addition to the remaining conditions described below, the Permittees or their successors shall provide additional off-site golden-cheeked warbler mitigation. The off-site mitigation shall be satisfied by (1) donating a 3.5 acre property and the right to access that property currently owned by the Permittees, and (2) the Permittees will pay $3,000 per acre for 19.2 acres (22.7-3.5 = 19.2 acres), or a total of $57,600 to the BCP (Travis County) to be used by Travis County to purchase additional golden-cheeked warbler habitat within or adjacent to the BCP in western Travis County. The 3.5 acre property is located approximately 1.5 miles to the northwest of the permit area and is within the BCP acquisition boundaries. This property (Travis County Appraisal District property ID number 170787) shall be transferred in fee-simple to one of the Managing Partners described above, and shall be managed as part of the BCP. The off-site mitigation requirements shall be completed prior to any vegetation clearing or construction activities in the permit area. The costs associated with this off-site mitigation requirement are in addition to all other costs associated with the permit.

4. As described in Section 5.1.1.3 of the EA/HCP, it is possible an unknown void containing federally listed species could be encountered during clearing or construction activities within the development envelope. Since this property has been extensively surveyed, the probability of encountering an extensive void is small, but not impossible. Additionally, the conditions identified below will further reduce the probability of this occurring.

However, in order to ensure incidental take coverage as a result of encountering one or more of these unknown voids, the Permittees or their successors shall provide a payment to the BCP (Travis County) an amount equal to what would be expected of a BCP applicant mitigating for impacts to karst geology (currently $750 per acre, increasing to $1,000 per acre in July 2008). This payment currently would be $30,150 ($750 X 40.2). These funds shall be used by Travis County to purchase karst invertebrate habitat within or adjacent to the BCP in western Travis County. This payment is in addition to all other conditions identified in the HCP and must occur prior to any vegetation clearing or construction activities.

On-Site and Off-site Mitigation Land Management

5. Perpetual operation and maintenance obligations for the on-site and off-site mitigation lands shall be funded by the Permittees or their successors by payment to the receiving conservation entity. For the purposes of this HCP, this entity may be referred to as the "Preserve Manager." This funding shall be an amount sufficient to fund management to a level equivalent to that required by the BCP land management plan. A preserve operation, maintenance, and management budget shall be drafted and agreed to by the Preserve Manager and the Permittees prior to issuance of the permit. The agreed upon funds shall be delivered to the Preserve Manager upon finalizing the transfer of the on-site and off-site mitigation lands.

6. Operation and maintenance shall include at a minimum, or as otherwise determined by the Preserve Manager or Service and agreed to by the Permittees, annual monitoring of the mitigation lands including golden-cheeked warbler presence/absence surveys, karst invertebrate surveys, and habitat conditions at time of species monitoring, patrols by law enforcement and other staff, deer and browse surveys, and any other measure consistent with the BCP land management plan that is deemed necessary for the management of the preserve. This responsibility shall be transferred to the Preserve Manager upon the transfer of the mitigation lands and must occur prior to any vegetation clearing or construction activities. Ultimately, appropriate perpetual management of the preserve will be determined by the Preserve Manager, and will be coordinated with the Service.

7. Motorized vehicles, mountain bikes, horseback riding, livestock, cats, dogs, dumping of material (including pool water), pesticides, herbicides, fertilizers, clearing of vegetation, construction, or anything else that is not consistent with the management of habitat for the golden-cheeked warbler and karst invertebrates shall be prohibited within the preserve.

8. With the exception of controlling exotic species, no fertilizers, herbicides, or pesticides will be used within the preserve unless approved by the Service and these products should not be used within 345 feet of any karst features known/believed to contain cave crickets.

9. The Preserve Manager shall develop a Red-Imported Fire Ant control and treatment program. Red-Imported Fire Ant control will be conducted at least twice per year, once

in the spring and once in the fall. Monitoring for Red-Imported Fire Ants will be conducted at least twice per year immediately preceding the required biannual red-imported fire ant control. Additional control shall be conducted should the monitoring indicate an abundance of Red-Imported Fire Ants. All Red-Imported Fire Ant control techniques shall be consistent with the Service's currently approved guidelines.

10. No new roads, new utilities, or other development including stormwater or wastewater treatment ponds, structures or other facilities shall be constructed within the preserve.

11. Access to the on-site and off-site preserve lands shall be limited to the Preserve Manager and the Service, except as otherwise authorized by the Preserve Manager or the Service. The Permittees or their successors shall ensure that unauthorized access to the on-site and off-site preserve land is prevented by fencing the boundary between all preserves and development areas, including any road frontage. The fence must be constructed to a standard to adequately prohibit unauthorized access. Gated access points will be provided only for the authorized entry. This fence shall be installed prior to commencement of vegetation clearing or construction. If necessary, signage shall be placed on the fence at 300-foot intervals to identify the area as a preserve and prohibit unauthorized entry. Such fencing shall not include gates should it border the back of residential development. Should it be necessary, the fence shall be upgraded to control access. All costs associated with this fence shall be borne by the Permittees and are in addition to those necessary for the operation and management of the preserve.

12. The Permittees or their successors shall not, without the prior written consent of the Service, which consent shall not be unreasonably withheld or delayed, voluntarily sell, convey, grant an easement upon, or otherwise encumber the 22.7-acre area to be acquired by Travis County or any on-site or off-site mitigation/preserve land in a manner that would materially impact the protected nature of the preserve, or the ability to operate or maintain the preserve, for the benefit of the golden-cheeked warbler and the five federally listed karst species. In the event that any portion of the preserve is condemned by a third party for a public purpose and such third party undertakes an action within such condemned area that has the effect of materially impacting the quality of golden-cheeked warbler or karst habitat, the Service recognizes that such material impact is not a result of any action of the Permittees or their successors, and the condemning party would be primarily responsible for any finding of harm or take as a result of the condemnation. The condemnation award shall be provided to the Service and may be used by the Service, or its designee, to contribute to replacement of the habitat lost as a portion of the preserve, while the condemning authority would be responsible under the then applicable law for compensating for its impacts to the habitat and getting any necessary authorization under the Act.

<u>Construction Practices in the Development Area</u>

13. Projects that have the potential to contaminate sub-surface karst and/or groundwater, including but not limited to gas stations, dry cleaners (on-site cleaning process), metal or chemical processing or manufacturing facilities, hazardous waste facilities, sewage

holding tanks, septic tanks, manufacturing, bacterial/viral/genetic laboratories and any other types of similar development shall not be constructed within the development area.

14. The Permittees or their successors shall minimize vegetation clearing to the maximum extent practicable. This shall include minimizing the disturbance of soil and subsurface geological features. The Permittees or their successors, or their subcontractors will not use explosives during any part of the development activities. Areas that are disturbed during construction, but are not occupied by impervious surfaces, shall be replanted with native oaks and other vegetation native to Travis County. Additionally, vegetation clearing by the Permittees, their successors, or assigns will be consistent with the current practices recommended by the Texas Forest Service to prevent the spread of oak wilt.

15. No new utility lines shall be placed in any preserve areas. Except as provided in the specific exceptions set out in balance of this paragraph, development of the property shall be accomplished so as to restrict excavation to no deeper than four feet from the surface, including but not limited to construction of foundations. No underground storage tanks will be installed and no underground parking facilities will be constructed. An exception to the four foot excavation restriction applies to building piers and utility lines and in these cases these shall occur in such a way that as little excavation as reasonably possible is done deeper than four feet from the surface. If piers are needed to support buildings, the piers shall be designed to cause the least amount of subsurface disturbances as reasonably possible, given safety and economic constraints. Likewise, trenching in conjunction with utility installation shall be done in a manner reasonably designed to avoid interference with karst features. If traditional, engineered foundations can be constructed at a reasonable cost by using fill instead of excavations deeper than 4 feet, the developer shall use fill instead of excavation to construct the foundations. Pipelines and other similar structures placed within the development envelope above the 1030 foot contour interval shall be double-walled, and shall be located within the existing road rights of way to the maximum extent practicable. Any pipelines that need to be installed deeper 4 feet from the surface shall also be doubled walled. Such pipelines shall be avoided where reasonably possible, but it is recognized that it may not be feasible to install all pipelines above that depth.

16. It is understood that the property is planned to become a commercial development. If the type of development changes, the Permittees or their successor should contact us because other permit conditions may be added in this case.

17. Within the development envelope, the use of herbicides and pesticides by the Permittees or their successors shall comply with all label guidelines for application, and shall not occur within 345 feet of any karst feature with federally listed species or around features that contain cave crickets that contribute nutrients to features with listed karst species.

18. Based on hydrogeologic investigations, the configuration of the karst preserve should protect the surface and subsurface drainage basins of all on-site and off-site caves known to contain listed species. However, to ensure the water quality entering the preserve is protected, and to protect the integrity of the surface plant and animal community within

the karst preserves, all drainage from developed areas will be channeled into curbed roadways or other confined drainages and diverted away from all on-site and off-site preserves. This storm-water shall be diverted off the tract, and below the 1,030 foot contour interval. Any water quality control structures shall be contained within the development area and as far from any on-site or off-site preserve as is reasonably possible.

19. Clearing activities within 300 feet (91.4 meters) of golden-cheeked warbler habitat, will be conducted only during the time of year when the golden-cheeked warbler is not present (August 1 through March 1), unless a breeding season survey performed by a Service-permitted biologist indicates that no golden-cheeked warblers are present within 300 feet of the desired activity. Clearing and construction activities within 300 feet of golden-cheeked warbler habitat may be conducted at any time when the warblers are not present. During the time of year when golden-cheeked warblers are present, construction may proceed as long as such construction follows permitted clearing, as referenced above, in a reasonably prompt and expeditious manner indicating a continuous activity.

20. Experience with adjacent property and roadways has demonstrated that construction undertaken in a manner to reduce excavation may still result in uncovering a karst feature. If and when such feature is discovered during construction, the karst feature shall immediately be covered with a tarp, sandbags or other waterproof material to minimize desiccation and temperature fluctuations due to exposure. Except during the surveys described below, all construction shall cease at a minimum distance of 50 feet of the karst opening and this distance may need to increase should site specific information suggest greater distances are needed to avoid de-stabilizing the area, causing a collapse, or causing any other unsafe conditions. Immediately upon uncovering a karst feature the Permittees or their successor shall notify the Service along with any State or local governmental entities that are required to be notified. The Service and/or its designees will have up to 5 business days to inspect, enter, and survey the karst feature to increase the Service's understanding of karst invertebrates and their distribution. This survey and the results of the survey shall not result in any delay in construction other than the 5 business days and the Service's work shall be done in a manner to minimize the disruption on construction consistent with the safety of all personnel. To ensure the safety of all personnel, all construction activities within 500 feet of the karst opening shall cease during the survey. Immediately following the survey, the Permittees or their successor shall ensure the karst opening is walled off using natural materials (rocks and pebbles grouted together using a brick- mortar) to prevent exposure to the outside elements. The wall shall be designed to resemble, as much as reasonably possible, the conditions within the feature prior to excavation and designed to be strong enough to prevent the fill from entering the void and still allow moisture, air, and any karst invertebrates to move through the area that had been uncovered. Where karst features are divided by the excavation, a small conduit(s) to maintain the natural connection shall be constructed, using PVC or natural materials, if reasonably possible. Upon appropriate closure of the karst opening, all construction activities on the property may resume.

21. Construction period management will meet, at minimum, the City of Austin and TCEQ code requirements and protocols for erosion and silt control; for storage, use, and spill containment; and countermeasures for construction-related chemical and petroleum products.

22. The proposed development, its landscaping, and the use of construction equipment will be limited to the Development envelope as delineated on Figure 2 of the EA/HCP. Contractors shall not use or impact any preserve/mitigation land. If any vegetation is unintentionally disturbed within the preserve/mitigation land, the Permittees or their successors will ensure that area is immediately replanted with similar native vegetation. Since it is not known if an unintentional disturbance will occur, or to what extent, it is possible funds necessary to replant vegetation would be omitted in the preserve operation and management budget described above. In the event this occurs, the Permittees or their successors will provide all necessary funds to ensure the area is restored. These funds may be in addition to those identified in the preserve operation and management budget.

Reporting

23. The Permittees or their successors shall submit an annual report to the Service by September 1 of each year the permit is in effect, or upon completion of the proposed development, whichever is sooner. All reports will include, but are not limited to, the status of clearing and construction, documentation of compliance with all terms and conditions of the permit, implementation of mitigation measures, and any management actions taken, and survey results when required. The Preserve Manager shall also document its management activities in an annual report. Upon expiration of the permit, or completion of the proposed development, the Preserve Manager will continue to provide annual reports on its management activities and survey results in perpetuity. All written annual reports will be submitted by September 1 of each year to the Service Field Office, 10711 Burnet Road, Suite 200, Austin, Texas 78758; and to the Service, P.O. Box 1306, Room 4102, Albuquerque, New Mexico 87103.

Additionally, the Service would include the following conditions on the permit:

24. The Permittees are authorized to "Take" (kill, harm, or harass) the golden-cheeked warbler, Tooth Cave ground beetle, Bone Cave harvestman, Tooth Cave pseudoscorpion, Tooth Cave spider, and Kretschmarr Cave mold beetle within the development envelope, incidental to activities necessary for the construction, operation, and maintenance of a residential, commercial, and/or retail development as described in the Permittees' application and EA/HCP.

25. The authorization granted by the permit is subject to full and complete compliance with, and implementation of, the terms and conditions of this HCP and all terms and conditions contained in the permit.

26. Upon locating a dead, injured, or sick golden-cheeked warbler, federally listed karst invertebrate, or any other endangered or threatened species, the Permittees are required to

contact the Service's Law Enforcement Office, in Georgetown, Texas, (512) 863-5972, for care and disposition instructions. Extreme care should be taken in handling sick or injured individuals to ensure effective and proper treatment. Care should also be taken in handling dead specimens to preserve biological material in the best possible state for analysis of cause of death. In conjunction with the care of sick or injured endangered/threatened species or preservation of biological materials from a dead specimen, the Permittees and their contractors/subcontractors have the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

27. Conditions of the permit shall be binding on, and for the benefit of, the Permittees and their successors and assigns. If the permit requires an amendment because of change of ownership, the Service will process that amendment without the requirement of the Permittee preparing any new documents or providing any mitigation over and above that required in the original permit.

28. If during the tenure of the permit, the project design and/or the extent of the habitat impact described in the HCP is altered such that there may be an increase in the anticipated take of the golden-cheeked warbler, Tooth Cave ground beetle, Bone Cave harvestman, Tooth Cave pseudoscorpion, Tooth Cave spider, and/or Kretschmarr Cave mold beetle, Permittees are required to contact the Service and obtain authorization and/or amendment of the Permit before commencing any construction or other activities that might result in take beyond that described in the EA/HCP.

29. The permit shall be recorded with the County Clerk, Travis County, Texas, prior to the beginning of clearing or construction activities on the Property. Verification of this transaction shall be provided to the Service within 30 days of its completion.

30. Upon prior written notification to the Permittees, the Service will be allowed access to the property, accompanied by representatives of the Permittees or their successors or assigns, to inspect the condition of the golden-cheeked warbler or karst invertebrate habitat and to ensure that the HCP is being implemented according to its terms for the benefit of the covered listed species. In the event that the Service finds that the HCP is not being implemented according to its terms, the Service has the option, as a last resort, of terminating and revoking the permit. Prior to revocation, the Service will exercise all possible measures to remedy the situation.

31. The current "No Surprises" policy of the Service provides that additional mitigation requirements for land, water, or financial obligations shall not be required of the Permittees or their successors beyond the level of mitigation provided for in the Permit and the HCP if fully and completely complied with and implemented. With respect to this permit, the HCP and supporting documents adequately addressed the federally listed golden-cheeked warbler, Tooth Cave ground beetle, Bone Cave harvestman, Tooth Cave pseudoscorpion, Tooth Cave spider, and Kretschmarr Cave mold beetle.

6.3 CHANGED AND UNFORSEEN CIRCUMSTANCES

The Service provides economic and regulatory assurances under the No Surprises policy (63 FR 8859, Section 1.7.1) to incidental take Permittees who incorporate provisions for changed or unforeseen circumstances in their HCP and fully and completely implement the terms and conditions of the HCP and incidental take permit. These assurances give Permittees certainty regarding the costs of mitigation and conservation of protected species.

6.3.1 Changed Circumstances

Changed circumstances are defined as "circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the Service and that can be planned for..." (50 CFR 17.3). An HCP must identify provisions to help compensate for any negative impacts to covered species from changed circumstances to qualify for "No Surprises" assurances. If the Service determines that a changed circumstance has occurred, the Permittee must implement any provisions included in the HCP and/or incidental take permit that address such circumstances. If a changed circumstance has not been addressed by the HCP and/or incidental take permit, the Service will not require additional conservation or mitigation measures of the Permittee, provided that the terms of the HCP and incidental take permit are being properly implemented. Under these conditions, any additional conservation measures deemed necessary by the Service to compensate for a changed circumstance could be implemented at the expense of the Service.

Examples of changed circumstances that can reasonably be anticipated to occur sometime in the future include, but are not limited to:

(1) A wildfire or the potential threat of a wildfire occurs in the preserve or development envelope.

- Upon detection of fire, whether wild or deliberate, the Preserve Manager will notify the local fire department and the Service. Immediately following extinguishment, or as soon as warranted by safety considerations, the Preserve Manager will assess any impacts and implement appropriate corrective actions approved by the Service. Additionally, the Preserve Manager will coordinate annually with local fire department personnel to keep them informed of preserve access points, existing roads, fire threat conditions, and any other relevant information.

- A potential future threat of a wildfire occurring within the development and/or preserve could occur. As such, the Permittees or their successors may elect to construct a firebreak, but only within the development envelope described in Section 4.1 of the EA/HCP. In the event the Permittees or their successors elects not to construct a firebreak within the proposed development envelope, the subsequent residences, businesses, and/or homeowners association do not have the authority to construct such a firebreak within the preserve. If the Preserve Manager and the Service agree it is desirable to construct such firebreak, they will be responsible for determining the method and means of constructing such a firebreak.

(2) A new species becomes federally listed.

- The Service will work with the Permittees or their successors to identify measures necessary to avoid take of, jeopardy to, or adverse modification of the critical habitat of a species not covered under the proposed permit, in the event that species becomes listed under the Act and may be affected by covered activities. The Permittees or their successors will implement these measures until the permit is amended to include such species, or until the Service notifies the Permittees that such measures are no longer needed to avoid jeopardy to, take of, or adverse modification of the critical habitat of the non-covered species.

(3) Excessive predatory, parasitic, and other problem species occur within the preserve or development envelope.

The Preserve Manager, or Permittee as appropriate, shall implement the following, as necessary, to control the impacts of these plants/animals on federally listed species and their habitat.

- White-tailed Deer and Feral Hogs (*Sus scrofa*): Deer and feral hogs often occur in greater density adjacent to suburban areas than in undeveloped areas due to greater availability of food. High densities of deer and feral hogs are known to have a long-term adverse effect on the abundance and distribution of trees, seedlings, and saplings by increasing browsing pressure (deer) and uprooting vegetation (hogs). The subsequent decrease in the deciduous tree component of the wooded areas could lead to shifts in both plant and animal communities. If effects of excessive browsing pressure, a lack of oak seedling recruitment, and/or vegetation damage is found, Preserve Management will implement appropriate techniques to remedy these damages. Such techniques may include hunting, trapping, or other deer and hog number reduction programs.

- Predators: Some problem animals that prey on songbirds, their eggs, and young are domestic and feral cats, snakes, raccoons, opossums, skunks, and some predatory birds. If the Preserve Management begins to notice an increase in the number of raccoons, skunks, opossums, predatory birds, or other indicative signs such as an increase in the amount of scat observed and this increase is believed to be a threat to the sustainability of the golden-cheeked warbler, a program, approved by the Service, to reduce the number of predators may be implemented. Additionally, if the number of potential mammalian predators increases and is believed to be a threat to the karst ecosystems, a program, approved by the Service, to reduce the number of mammalian predators may be implemented.

- Red-imported fire ants: Red-imported fire ants are known to prey upon the chicks of arboreal nesting birds, karst invertebrates and their prey. An increase in the frequency of fire ant control will be required if either of the following conditions are met during any survey: (1) red-imported fire ant densities are greater than 40 mounds per acre or (2) there are greater than 40 mounds within 345 feet of the entrance to any karst feature that has listed species or cave crickets. Additionally, if red-imported fire ant mounds are ever observed within 33 feet of any karst feature on the karst preserve or if biological

investigations find any fire ants within any cave that has endangered invertebrates or cave crickets, all mounds within 33 feet of that cave entrance must be treated within 15 days. Preserve Management must follow the current Service approved fire ant control guidelines. Care should be taken to avoid misidentification of ant species and impacts to native ant species.

- Exotic plant and animal species: In addition to feral hogs and red-imported fire ants, other exotic plant and animal species are known to out-compete native plant and animal species. If monitoring indicates the presence of exotic species, a control program shall be implemented and coordinated with the Service.

- Ashe juniper: To increase surface biodiversity and maintain moisture levels in the caves with listed species, it may be beneficial to selectively remove immature second growth Ashe juniper within the cave cricket foraging area of each cave with federally listed species within the preserves. This management activity could also extend to other caves known to contain cave crickets. Ashe juniper to be removed should be multi-trunked and be less than 15 feet (4.6 meters) tall. Since the need for this management action may already exist, funds necessary to complete this should be included in the operation and management budget. This form of adaptive management is supported by Veni (2006) and should be coordinated with the Service.

- Cowbirds: Brown-headed cowbirds are well known for parasitism of songbird nests. If through monitoring, Preserve Management identifies excessive numbers of cowbirds, Management shall implement a cowbird trapping program within the preserve in coordination with the Service and Texas Parks and Wildlife Department (TPWD).

(5) Excessive unauthorized entry into the mitigation lands and/or karst features.

- If unauthorized entry to the karst features becomes a problem, entrances of caves containing listed species within the karst preserves may need to be gated. Prior to gating, the Preserve Manager shall consider and use other methods, such as fencing, described below. Additionally, existing cave gates may also need to be replaced, repaired, or removed over time.

- If unauthorized entry into the mitigation land becomes a problem, the Preserve Manager shall take additional actions to control this unauthorized access. This may include upgrading or repairing fencing, and erecting barriers.

- If detected, vandalism will be immediately reported to the Service and to Service Law Enforcement agents. The effects of vandalism will be documented and then corrected, with Service approval.

(6) Chemical Spill/Release

- In the event of a release of chemicals, gasoline, oil, or other hazardous materials, or a gas leak within or adjacent to the preserve, the Preserve Manager will immediately notify the

local fire department, the Service, and if appropriate and necessary, the TCEQ. As soon as warranted by safety considerations, the Preserve Manager will assess any damages and take appropriate corrective action in consultation with the Service.

(7) An unknown cave or subterranean void is encountered during construction

- If any caves or subterranean voids are encountered during construction, the Permittees or their successors will proceed according to Conditions 21 and 22 in Section 6.2.

(8) Additional Changed Circumstances Requiring Adaptive Management

Conditions that will warrant adjustments to the management program include, but are not limited to, the following:

- destruction or deterioration of surface vegetation or deleterious shifts in community composition regardless of cause;
- destruction or deterioration of subterranean habitat;
- a single drastic or consistent gradual decline in the number of observed listed species, cave crickets, or other native species that normally inhabit the caves;
- declines in measured relative humidity or increased variation in measured temperature or shifts from suitable temperatures and humidities;
- an inadequate number, either too low or too high, of native vertebrates known to frequent the caves such as mice, amphibians, raccoons, and snakes;
- a significant imbalance in the community structure of the native plant community;
- potentially harmful numbers of or an increase in non-native fauna within the karst preserves such as cockroaches (*Periplaneta americana Linnaeus*), Norwegian (*Rattus norvegicus*) or black (*Rattus rattus*) rats, or red-imported fire ants;
- new information on the biology of the listed species; and
- evidence of loss of structural integrity of one or more caves such as collapse or large breakdown in the cave interior or entrance.

Any circumstances detrimental to the listed species will trigger the need to consult with the Service for advice on adaptive management. The Preserve Manager will undertake corrective actions, in consultation with the Service, as necessary to meet the goals and management objectives of this HCP.

If any management and/or monitoring activity is determined not to be effective in benefiting or conserving a listed species and the ecosystems on which they depend, or the biological goals and objectives of this HCP are not being met, then adaptations to management and/or monitoring will be made by the Preserve Manager with the approval of the Service.

6.3.2 Unforeseen Circumstances

Unforeseen circumstances are “changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by the Permittees or the Service at the time of the conservation plan's negotiation and development, and that result

in a substantial and adverse change in the status of the covered species" (50 CFR 17.3). The No Surprises policy assures incidental take Permittees that the Service will not require additional mitigation or resources (other than those available under the original terms of the conservation plan) without the consent of the Permittee (63 FR 8859).

The "No Surprises" policy states that the Service may require additional conservation measures of an incidental take Permittee as a result of unforeseen circumstances "only if such measures are limited to modifications within conserved habitat areas, if any, or to the conservation plan's operating conservation program for the affected species, and maintain the original terms of the conservation plan to the maximum extent possible." The Service shall not require the commitment of additional land, water, or financial resources by the Permittee without the consent of the Permittee, or impose additional restrictions on the use of land, water, or other natural resource otherwise available for use by the Permittee under the original terms of the incidental take permit. No Surprises assurances apply only to the species adequately covered by the HCP, and only to those Permittees who are in full compliance with the terms of their HCP, incidental take permit, and other supporting documents. This EA/HCP adequately covers the golden-cheeked warbler, Tooth Cave ground beetle, Bone Cave harvestman, Tooth Cave pseudoscorpion, Tooth Cave spider, and Kretschmarr Cave mold beetle, and the Applicants are eligible for the assurances of the No Surprises policy pertaining to these species.

The Service determines whether unforeseen circumstances have occurred based on, but not limited to, the following considerations (63 FR 8871):

1. Size of the current range of the affected species;
2. Percentage of range of covered species adversely affected by the HCP;
3. Percentage of range of covered species conserved by the HCP;
4. Ecological significance of that portion of range affected by the HCP;
5. Level of knowledge about the affected species and the degree of specificity of the species' conservation program under the HCP; and,
6. Whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

A determination by the Service that unforeseen circumstances exist must be documented and based upon reliable technical information regarding the status and habitat requirements of the affected species. In the case of an unforeseen circumstance, the Service, any Federal, State, or local government agency, non-government organization, or private entity may take any actions necessary in order to conserve a species, as long as the actions are at the expense of that organization.

In the event of an unforeseen circumstance, the Service shall provide at least 30 days notice of a proposed finding of unforeseen circumstances to the Permittees or their successors and will work with the Permittees or their successors to develop an appropriate response to the new conditions. The Permittees or their successors shall have the opportunity to submit information to rebut the proposed finding, if it deems necessary. The Service may request that the Permittees or their successors alter the HCP described in this section to address the unforeseen circumstance, if the

requested alterations are limited to the conservation program and maintain the original terms of the HCP to the maximum extent possible.

7.0 AMENDMENT PROCEDURES

Amendments to this EA/HCP and/or the associated incidental take permit may be necessary during the term of the permit. These amendments may include relatively minor changes to the EA/HCP and/or incidental take permit, or major changes that substantially alter the covered activities, conservation program, or implementation of the EA/HCP. Amendments to the EA/HCP and associated incidental take permit may be made through an expedited administrative process or through a formal amendment procedure that would require additional notification through the *Federal Register* and NEPA analysis (Service and NMFS 1996), depending on the scope of the proposed changes. All amendments to the EA/HCP or incidental take permit will require the consent of both the Applicants and the Service.

7.1 Minor Amendments

Minor amendments are defined as those that have little or no impact on the amount of incidental take authorized by the permit, the degree of negative impacts to the golden-cheeked warbler or karst invertebrates from covered activities, or the effectiveness of the conservation program. Minor amendments include, but are not limited to:

1. Administrative changes addressing the implementation of the conservation program, such as avoidance and minimization measures and reporting requirements; and,
2. Similarly minor alterations to the EA/HCP and/or incidental take permit that could arise from changed or unforeseen circumstances or other circumstances.

Minor amendments may be incorporated into the EA/HCP and/or incidental take permit administratively provided that both the Permittees and the Service agree on the proposed changes, the proposed amendments are documented in written form, and the proposed amendments do not change the net effect of the proposed project on the covered species or the amount of incidental take requested. The following procedure will be used to process an administrative amendment to the EA/HCP and/or incidental take permit:

1. The Permittees will submit a draft of the proposed minor amendment to the Service;
2. The Service will review the draft amendment and provide comment on the proposal. The Service will consult with the Permittees, as needed, to reach consensus on the requested changes;
3. Upon reaching an agreement with the Service, the Permittees will prepare the final amendment language, including any applicable changes to other implementing documents, and forward the proposed changes to the Service;
4. The Service will administratively process the agreed-upon changes, and append the amendment to the EA/HCP and other related documents, as appropriate, and make any necessary changes to the incidental take permit.

<u>Amendments to Locally Approved Development Plans</u>

It is acknowledged that upon the written request of the Permittee, the local agency having land use regulatory jurisdiction is authorized in accordance with applicable law to approve amendments to development plans for the subject development area that do not encroach on any endangered species habitat that is not presently contemplated to be taken as a consequence of the development and that do not alter the conditions set forth in the HCP.

7.2 Major Amendments

Major amendments are those that would substantially alter the effects of the proposed project or the conservation program. Major amendments are likely to change the amount of take or impacts authorized by the incidental take permit, and/or have a significant impact on the structure, implementation, or effectiveness of the conservation plan. Major amendments may include, but are not limited to:

1. Changing the boundaries of the permit area, development envelope, and/or mitigation land such that there is an increase in take beyond that described in the HCP;
2. Reducing the amount of mitigation provided by the conservation plan;
3. Reducing the use of construction phase best management practices that avoid and minimize impacts; and,
4. Similar modifications to the EA/HCP and/or incidental take permit that could arise from changed or unforeseen circumstances or other circumstances.

Incorporating major amendments will require completion of a formal amendment procedure similar to the original permit application process. This procedure may include public review through the *Federal Register*, additional analysis to comply with NEPA requirements, and an intra-Service section 7 consultation (Service and NMFS 1996).

8.0 FUNDING

The Permittees or their successors shall fence the mitigation/preserve lands as described in Section 6.2 or shall provide sufficient funding to the Preserve Manager to ensure adequate fencing is completed as described in Section 6.2. Additionally, the Permittees or their successors shall ensure adequate funding is available to operate, manage and maintain the on-site mitigation/preserve land, and assure construction best management practices identified in Section 6.2 will be implemented prior to initiation of any vegetation clearing or construction activities. A preserve operation, maintenance, and management budget with the receiving conservation entity shall be drafted and agreed to by the Preserve Manager and the Permittees. Documentation of this must be provided to the Service prior to issuance of the permit. The funds as agreed upon by the Preserve Manager and Permittees shall be delivered upon finalizing the transfer of the on-site and off-site mitigation/preserve lands, all of which must be completed prior to any vegetation clearing or construction activities. Documentation of the transfer of the mitigation lands and delivery of the agreed upon funds for operation and management must be provided to the Service within 30 days of its completion to ensure compliance with the permit.

9.0 DURATION

This HCP is written in anticipation of issuance of a section 10(a)(1)(B) permit for a period of 30 years.

10.0 PUBLIC AND AGENCY COORDINATION

The Permittees have been actively pursuing public and agency acceptance of developing portions of the property for several years.

The following agencies, organizations, and individuals were consulted or coordinated with during the process of addressing endangered species concerns for the original seven Hart Triangle property incidental take permit applications, the draft June 02, 2000 EA/HCP, and this EA/HCP:

City of Austin - Austin, Texas
Travis County - Texas
George Veni and Associates - San Antonio, Texas
James Reddell, Texas Memorial Museum - Austin, Texas
Mike Warton and Associates - Austin, Texas
Frank Howarth – Bishop Museum, Honolulu, Hawaii
SWCA, Inc. - Austin, Texas
Service - Austin, Texas, and Albuquerque, New Mexico

This document was prepared by the Service based on all information gathered during the original review of the Permittees' applications dated December 30, 1997, development of the Service's June 02, 2000 EA/HCP, as well as current additional species and habitat information gathered, analyzed, and incorporated herein.

Public notification of the availability of the Draft EA/HCP will be published in the *Federal Register* initiating a 60-day public comment period. All concerned agencies, entities, and individuals who make a request will be provided a copy of this EA/HCP for review and comment. The public notice will include the caution that before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time.

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