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50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Seven Bexar County, Texas, Invertebrate Species; Final Rule

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AI47

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Seven Bexar County, TX, Invertebrate Species

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), designate critical habitat for seven endangered invertebrate species found in Bexar County, Texas, pursuant to the Endangered Species Act of 1973, as amended (Act). The critical habitat designation totals approximately 431 hectares (1,063 acres) in 22 units. Section 7 of the Act requires Federal agencies to ensure, in consultation with the Service, that actions they authorize, fund, or carry out are not likely to result in the destruction or adverse modification of critical habitat. Section 4 of the Act requires us to consider economic and other impacts when specifying any particular area as critical habitat. We solicited data and comments from the public on all aspects of the proposed rule, including data on economic and other impacts of the designation. As a result of comments and information received, we are not designating critical habitat as originally proposed for two species that occur entirely on State-owned lands that are subject to a conservation plan.

DATES: This rule becomes effective on May 8, 2003.

ADDRESSES: Comments and materials received, as well as supporting documentation used in the preparation of this final rule, are available for public inspection, by appointment, during normal business hours at the Austin Ecological Services Field Office, U.S. Fish and Wildlife Service, 10711 Burnet Road, Suite 200, Austin, Texas 78758.

FOR FURTHER INFORMATION CONTACT: Robert Pine, Supervisor, U.S. Fish and Wildlife Service, Austin Ecological Services Field Office, at the above address (telephone 512/490–0057; facsimile 512/490–0974).

SUPPLEMENTARY INFORMATION:

Background

The seven species for which we are designating critical habitat in this rulemaking inhabit caves or other features known as karst. 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.

As a result of climatic changes beginning two million years ago and lasting until ten thousand years ago, invertebrate species colonized caves and other subterranean voids (Barr 1968; Mitchell and Reddell 1971; Elliott and Reddell 1989). Species that dwell exclusively in caves and other subterranean voids are referred to as ''troglobites.'' Through faulting and canyon downcutting, the karst terrain colonized by these species along the Balcones Fault Zone (a zone approximately 25 kilometers (km) in width, extending from the northeast corner of Bexar County to the western edge of the County) became increasingly dissected, creating ''islands'' of karst and barriers to dispersal. These ''islands'' isolated troglobitic populations from each other, probably resulting in further speciation.

The following nine Bexar County, Texas, troglobitic invertebrate species were listed as endangered on December 26, 2000 (65 FR 81419): spider (no common name) (*Cicurina venii*), Robber Baron Cave harvestman (*Texella cokendolpheri*), vesper cave spider (*Cicurina vespera*), Government Canyon cave spider (*Neoleptoneta microps*), Madla's cave spider (*Cicurina madla*), Robber Baron cave spider (*Cicurina baronia*), beetle (no common name) (*Rhadine exilis*), beetle (no common name) (*Rhadine infernalis*), and Helotes mold beetle (*Batrisodes venyivi*). These are karst dwelling species of local distribution in north and northwest Bexar County. They spend their entire lives underground.

Since publication of the listing final rule, the common names for the following six arachnid species have been changed as a result of a meeting of the Committee on Common Names of Arachnids of the American Arachnological Society in 2000. Accordingly, we are changing the common names of the species currently in the list of Endangered and Threatened Wildlife (50 CFR 17.11) as Robber Baron Cave harvestman, Robber Baron cave spider, Madla's cave spider, vesper cave spider, Government Canyon cave spider, and one with no common name (*Cicurina venii*) to Cokendolpher cave harvestman, Robber Baron Cave meshweaver, Madla Cave meshweaver, Government Canyon Bat Cave meshweaver, Government Canyon Bat Cave spider, and Braken Bat Cave meshweaver, respectively.

Individuals of the listed species are small, ranging in length from 1 millimeter (0.039 inch (in)) to 1 centimeter (0.39 in). They are eyeless, or essentially eyeless, and most lack pigment. Low quantities of food in caves have caused adaptations in these species, including low metabolism, long legs for efficient movement, and loss of eyes, possibly as an energy-saving trade-off (Howarth 1983). Survival may be possible from months to years with little or no food (Howarth 1983). Adult *Cicurina* spiders have survived in captivity without food for about 4 months (James Cokendolpher, Museum of Texas Tech University, pers. comm. 2002).

Although little is known about the life history of listed Texas troglobitic invertebrates, they are believed to live for longer than 1 year. This belief is based, in part, on the amount of time some juveniles have been kept in captivity without maturing (Veni and Associates 1999; James Reddell, Texas Memorial Museum, pers. comm. 2000). For example, James Cokendolpher (Museum of Texas Tech University, pers. comm. 2002) maintained a juvenile troglobitic *Cicurina* spider from May 1999 through April 2002. Reproductive rates of troglobites are typically low (Poulson and White 1969; Howarth 1983). According to surveys conducted by Culver (1986), Elliott (1994a), and Hopper (2000), population sizes of troglobitic invertebrates are typically small, with most species known from only a few specimens (Culver *et al.* 2000).

As described below, the primary habitat requirements of these species include: (1) Subterranean spaces in karst with stable temperatures, high humidities (near saturation), and suitable substrates (for example, spaces between and underneath rocks suitable for foraging and sheltering); and (2) a healthy surface community of native plants and animals that provide nutrient input and, in the case of native plants, act to buffer the karst ecosystem from adverse effects (for example, invasions of nonnative species, contaminants, and fluctuations in temperature and humidity). These karst invertebrates require stable temperatures and constant, high humidity (Barr 1968; Mitchell 1971a) because they are vulnerable to desiccation in drier habitats (Howarth 1983) or cannot detect or cope with more extreme 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, the listed species may retreat into small interstitial spaces (human-inaccessible) connected to a cave, where the physical environment provides the required humidity and temperature levels (Howarth 1983). These species may spend the majority of their time in such retreats, only leaving them to forage in the larger cave passages (Howarth 1987).

Since sunlight is absent or present in extremely low levels in caves, most karst ecosystems depend on nutrients derived from the surface either directly (organic material brought in by animals, washed in, or deposited through root masses) or indirectly through feces, eggs, and carcasses of trogloxenes (species that regularly inhabit caves for refuge, but return to the surface to feed) and troglophiles (species that may complete their life cycle in the cave, but may also be found on the surface) (Barr 1968; Poulson and White 1969; Howarth 1983; Culver 1986). Primary sources of nutrients include leaf litter, cave crickets, small mammals, and other vertebrates that defecate or die in the cave.

As described in our final rule to list the nine species (65 FR 81419), the continuing expansion of the human population in karst terrain constitutes the primary threat to the species through: (1) Destruction or deterioration of habitat by construction; (2) filling of caves and karst features and loss of permeable cover; (3) contamination from septic effluent, sewer leaks, runoff, pesticides, and other sources; (4) exotic species, especially nonnative fire ants (*Solenopsis invicta*); and (5) vandalism.

Karst in Bexar County

The northern portion of Bexar County is located on the Edwards Plateau, a broad, flat expanse of Cretaceous carbonate rock that ranges in elevation from 335.5 meters (m) (1,100 feet (ft)) to 579.5 m (1,900 ft) (Veni 1988; Soil Conservation Service 1962). This portion of the Plateau is dissected by numerous small streams and is drained by Cibolo Creek and Balcones Creek. To the southeast of the Plateau lies the Balcones Fault Zone, a 25-km-wide fault zone that extends from the northeast corner of the County to the western County line. The many streams and karst features of this zone recharge the Edwards Aquifer.

The principal, cave-containing rock units of the Edwards Plateau are the upper Glen Rose Formation, Edwards Limestone, Austin Chalk, and Pecan Gap Chalk (Veni 1988). The Edwards Limestone accounts for one-third of the cavernous rock in Bexar County and contains 60 percent of the caves, making it the most cavernous unit in the County. The Austin Chalk outcrop is second to the Edwards in total number of caves. In Bexar County, the outcrop of the upper member of the Glen Rose Formation accounts for approximately one-third of the cavernous rock, but only 12.5 percent of Bexar County caves (Veni 1988). In Bexar County, the Pecan Gap Chalk, while generally not cavernous, has a greater than expected density of caves and passages (Veni 1988).

Veni (1994) delineated six karst areas within Bexar County. The regions were named after places within their boundaries. These karst fauna regions are bounded by geological or geographical features that may represent obstructions to the movement (on a geologic time scale) of troglobites, which has resulted in the present-day distribution of endemic (restricted to a given region) karst invertebrates in the Bexar County area.

These areas have been delineated by Veni (1994) into five zones that reflect the likelihood of finding a karst feature that will provide habitat for the endangered Bexar County invertebrates based on geology, distribution of known caves, distribution of cave fauna, and primary factors that determine the presence, size, shape, and extent of caves with respect to cave development. These five zones are defined as:

Zone 1: Areas known to contain one or more of the nine endangered karst invertebrates;

Zone 2: Areas having a high probability of suitable habitat for the invertebrates;

Zone 3: Areas that probably do not contain the invertebrates;

Zone 4: Areas that require further research but are generally equivalent to zone 3, although they may include sections that could be classified as zone 2 or zone 5; and

Zone 5: Areas that do not contain the invertebrates.

Under contract with the Service, Veni (2002) re-evaluated and, where applicable, redrew the boundaries of each karst zone originally delineated in Veni (1994). Revisions were based on current geologic mapping, further studies of cave and karst development, and the most current information available on the distribution of listed and nonlisted cave-adapted species (Veni 2002).

Endangered Karst Invertebrate Distribution

As of December 2002, 475 caves were known to occur in Bexar County, some of which have been biologically surveyed for listed species (Veni 2002). At least 97 of the 475 caves were sealed or destroyed before they could be biologically surveyed (Veni 2002). Not all of the remaining caves in Bexar County have been adequately surveyed for invertebrates. It is likely that some of these caves will be found to contain one or more of the listed species. When the species were listed as endangered in December 2000, the Service knew of 57 occupied caves. When critical habitat was proposed in Bexar County in August 2002, we knew of 69 occupied caves. We now know of 74 caves containing one or more of the listed species in Bexar County (Table 1). The following species status descriptions are based on information available to us as of December 23, 2002.

Braken Bat Cave Meshweaver

The Braken Bat Cave meshweaver, *Cicurina venii* (Araneae: Dictynidae), was first collected on November 22, 1980, by G. Veni and described by Gertsch (1992). Braken Bat Cave remains the only location known to contain this species (Table 1).

Cokendolpher Cave Harvestman

The Cokendolpher cave harvestman, *Texella cokendolpheri* (Opilionida: Phalangodidae), was collected in 1982 and described by Ubick and Briggs (1992). This species, along with the Robber Baron Cave meshweaver, is only known from Robber Baron Cave (Table 1).

Government Canyon Bat Cave Meshweaver

The Government Canyon Bat Cave meshweaver, *Cicurina vespera* (Araneae: Dictynidae), was first collected on August 11, 1965, by J. Reddell and J. Fish (Reddell 1993), and described by Gertsch (1992). The species is currently known from Government Canyon Bat Cave in Government Canyon State Natural Area and an unnamed cave referred to as ''5 miles northeast of Helotes.'' However, the specimen collected from the latter cave has been tentatively identified as a new species (Cokendolpher, in press).

Government Canyon Bat Cave Spider

The Government Canyon Bat Cave spider, *Neoleptoneta microps* (Araneae: Leptonetidae), was first collected on August 11, 1965, by J. Reddell and J. Fish (Reddell 1993). The species was originally described by Gertsch (1974)

as *Leptoneta microps* and later reassigned to *Neoleptoneta* following Brignoli (1977) and Platnick (1986). The species is known from 2 caves in Government Canyon State Natural Area (Table 1).

Madla Cave Meshweaver

The Madla Cave meshweaver, *Cicurina madla* (Araneae: Dictynidae), was first collected on October 4, 1963, by J. Reddell and D. McKenzie (Reddell 1993) and described by Gertsch (1992). The Madla Cave meshweaver has been found in eight caves (Table 1).

The Service is aware of 11 additional caves from which immature, eyeless troglobitic *Cicurina* spiders have been collected (SWCA 2000). Eight of these are in caves that have other listed species and are either included in critical habitat areas or areas that are not included in the designation due to the provision of adequate special management. The remaining three are in caves where authorization for take of *C. madla* was granted to La Cantera under a section 10(a)(1)(B) permit. These three caves have been, or will be, heavily impacted and are, therefore, not expected to contribute to the species recovery.

Robber Baron Cave Meshweaver

The Robber Baron Cave meshweaver, *Cicurina baronia* (Araneae: Dictynidae), was first collected in Robber Baron Cave February 28, 1969, by R. Bartholomew (Reddell 1993) and described by Gertsch (1992). The Robber Baron Cave meshweaver (a spider) is only known from Robber Baron Cave (Table 1).

Beetle (No Common Name) *Rhadine exilis*

The beetle *Rhadine exilis* (Coleoptera: Carabidae) was first collected in 1959. The species was described by Barr and Lawrence (1960) as *Agonum exile* and later assigned to the genus *Rhadine* (Barr 1974). The species is currently known to have been found in 47 caves (Table 1).

Beetle (No Common Name) *Rhadine infernalis*

Rhadine infernalis (Coleoptera: Carabidae) was first collected in 1959. The species was initially described by Barr and Lawrence (1960) as *Agonum infernale,* but later assigned to the genus *Rhadine* (Barr 1974). Scientists have recognized three subspecies (*Rhadine infernalis ewersi, Rhadine infernalis infernalis, Rhadine infernalis* new subspecies) (Barr 1974; Barr and Lawrence 1960; Reddell 1998), all of which are included as protected under the Federal listing of the full species as endangered. A total of 35 caves are known to contain *Rhadine infernalis* (Table 1).

Rhadine infernalis ewersi is known from 3 caves. *Rhadine infernalis infernalis* is known from 19 caves. The unnamed new subspecies (*Rhadine infernalis* new subspecies) was known from 6 caves at the time of the proposed rule designating critical habitat. During the public comment period, we received confirmation that *R. infernalis* collected from Obvious Little Cave has been identified as *R. infernalis* new subspecies. An additional 5 caves were identified in the proposed rule as containing *Rhadine infernalis* that have not yet been identified at the subspecies level. During the public comment period, we received survey information confirming the presence of *R. infernalis* in Continental Cave (Table 1). According to Veni (2002), specimens from these caves are probably *R. infernalis infernalis,* but have either not yet been fully identified or not reported.

Helotes Mold Beetle

The Helotes mold beetle, *Batrisodes venyivi* (Coleoptera: Pselaphidae), was first collected in 1984 and described by Chandler (1992). The species is currently known from six caves (Table 1). The location of one of the caves, referred to as ''unnamed cave ½ mile north of Helotes,'' is unknown. The original record for this cave is from Barr's (1974) description of *Rhadine exilis.* Because the number of caves in the general area is large, the location of this cave cannot be positively identified (George Veni, George Veni & Associates, pers. comm. 2002). However, this cave may not be a separate location after all, but may be an existing cave listed by the collector under the alternative name ''5 miles NE of Helotes.'' The cave referred to as ''5 miles NE of Helotes,'' also has an unknown location.

TABLE 1.—CAVES KNOWN AS OF DECEMBER 23, 2002, TO CONTAIN ONE OR MORE OF THE NINE BEXAR COUNTY, TEXAS, KARST INVERTEBRATES FEDERALLY LISTED AS ENDANGERED

Species (# of caves)	Cave name
Braken Bat Cave meshweaver (*C. venii*) (1)	Braken Bat Cave.
Cokendolpher cave harvestman (*Texella cokendolpheri*) (1)	Robber Baron Cave.
Government Canyon Bat Cave meshweaver (*C. vespera*) (1)	Government Canyon Bat Cave.
Government Canyon Bat Cave spider (*Neoleptoneta microps*) (2)	Government Canyon Bat Cave, Surprise Sink.
Madla Cave meshweaver (*Cicurina madla*) (8)	Christmas Cave, Madla's Cave, Madla's Drop Cave, Helotes Blowhole, Headquarters Cave, Hills and Dales Pit, Robber's Cave, Lost Pothole.
Robber Baron Cave meshweaver (*C. baronia*) (1)	Robber Baron Cave
Beetle (no common name) (*Rhadine exilis*) (47)	40 mm Cave, B–52 Cave, Backhole, Black Cat Cave, Boneyard Pit, Bunny Hole, Cross the Creek Cave, Dos Viboras Cave, Eagles Nest Cave, Hairy Tooth Cave, Headquarters Cave, Hilger Hole, Hold Me Back Cave, Hornet's Last Laugh Pit, Isocow Cave, Kick Start Cave, MARS Pit, MARS Shaft, Pain in the Glass Cave, Platypus Pit, Poor Boy Baculum Cave, Ragin' Cajun Cave, Root Canal Cave, Root Toupee Cave, Springtail Crevice, Strange Little Cave, Up the Creek Cave.
	Christmas Cave, Helotes Blowhole, Helotes Hilltop Cave, Logan's Cave, unnamed cave ½ mile N. of Helotes.
	Creek Bank Cave, Government Canyon Bat Cave, Lithic Ridge Cave, Pig Cave, San Antonio Ranch Pit, Tight Cave.
	Hills and Dales Pit, John Wagner Ranch Cave No. 3, Kamikazi Cricket Cave, La Cantera Cave No. 1, La Cantera Cave No. 2, Mastodon Pit, Robber's Cave, Three Fingers Cave, Young Cave No. 1.
Beetle (no common name) *R. infernalis* (6) (subspecies not indicated—probably *R. infernalis infernalis* but individual specimens are either not fully identified or reported (Veni 2002)).	Canyon Ranch Pit, Continental Cave, Fat Man's Nightmare Cave, Pig Cave, San Antonio Ranch Pit, Scenic Overlook Cave.

TABLE 1.—CAVES KNOWN AS OF DECEMBER 23, 2002, TO CONTAIN ONE OR MORE OF THE NINE BEXAR COUNTY, TEXAS, KARST INVERTEBRATES FEDERALLY LISTED AS ENDANGERED—Continued

Species (# of caves)	Cave name
R. infernalis ewersi (3)	Flying Buzzworm Cave, Headquarters Cave, Low Priority Cave.
R. infernalis new subspecies (7)	Caracol Creek Coon Cave, Game Pasture Cave No. 1, Isopit, King Toad Cave, Obvious Little Cave, Stevens Ranch Trash Hole Cave, Wurzbach Bat Cave.
R. infernalis infernalis (19)	Bone Pile Cave, Dancing Rattler Cave, Government Canyon Bat Cave, Hackberry Sink, Lithic Ridge Cave, Surprise Sink, Christmas Cave, Helotes Blowhole, Logan's Cave, Madla's Cave, Madla's Drop Cave, Crownridge Canyon Cave, Genesis Cave, John Wagner Ranch Cave No. 3, Kamikazi Cricket Cave, Mattke Cave, Robber's Cave, Scorpion Cave, Three Fingers Cave.
Helotes mold beetle (*Batrisodes venyivi*) (6)	San Antonio Ranch Pit, Scenic Overlook Cave, Christmas Cave, unnamed cave ½ mile N of Helotes, Helotes Hilltop Cave, unnamed cave 5 miles NE of Helotes.

Animal Community

Cave Crickets

Cave crickets are a critical source of nutrient input for karst ecosystems (Barr 1968; Reddell 1993). Cave crickets in the genus *Ceuthophilus* 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. Cave crickets lay their eggs in the cave, providing food for a variety of karst species (Mitchell 1971b). Some karst species also feed on cave cricket feces (Barr 1968; Poulson *et al.* 1995) and on adults and nymphs directly (Cokendolpher, in press; Elliott 1994a). Cave crickets are scavengers or detritivores, feeding on dead insects, carrion, and some fruits, but not on foliage (Elliott 1994a).

Elliott (2000) studied the community ecology of three caves in protected areas of varying size in northwest Travis and Williamson Counties, Texas, from 1993 to 1999. The three caves are in areas protected as mitigation for two listed species found in Lakeline Cave during the development of Lakeline Mall. Lakeline Cave is located on a 0.9 hectares (ha) (2.3 acres (ac)) protected area and is surrounded by parking lots and a shopping center. Temples of Thor Cave and Testudo Tube are within much larger tracts of undeveloped land, being located on 42.5 ha (105 ac), and 10.5 ha (26 ac) of protected areas, respectively. During the monitoring study (1993–1999), the number of cave crickets drastically declined in Lakeline Cave, while they increased slightly or decreased moderately in the other two caves. Elliott (2000) concluded that drought, fire ants, and a decrease in racoon visitation caused the decline of the cave crickets. These results are consistent with reports of declines and extinctions of several invertebrates and small mammals (resulting from lower survivorship, higher emigration, and/or lower immigration) from habitat patches ranging in size from 2 to 7 ha (5 to 17 ac) (Mader 1984; Tscharntke 1992; Keith *et al.* 1993; Lindenmayer and Possingham 1995; Hill *et al.* 1996).

Elliott (1994a) evaluated cave cricket foraging within 50 m (164 ft) of cave entrances at his study sites and found crickets to the end of the 50 m sampling distance. On a few occasions he observed cave crickets beyond his sampling sites, and on one occasion he set a trap 60 m (197 ft) from the entrance and found one large adult. Elliott (1994a) concluded that the ''largest adults probably are capable of traveling far beyond 60 m from the entrance,'' but he did not have the data necessary to establish how far they go. During recent cave cricket surveys conducted for an ongoing project in central Texas, an adult cave cricket was found foraging 95 m (311 ft) from the study cave (Steve Taylor, Illinois Natural History Survey, pers. comm. 2002).

As trogloxenes, cave cricket populations are dependent on the patchy distribution of karst voids. Therefore, cave cricket populations may have a metapopulation (subpopulations that interact via the dispersal of individuals from one subpopulation to others) or a source-sink population structure, and it may be important to protect multiple karst features that support cave crickets in a karst ecosystem (Helf *et al.* 1995). Metapopulation dynamics require movement among patches, and persistence requires interacting patches that undergo local extinctions and establishment of new subpopulations in areas previously devoid of individuals (Hanski 1999). ''Source'' populations are those that occur ''in a high-quality habitat in which birth rate generally exceeds the death rate and the excess individuals leave as emigrants.'' ''Sink'' populations are those that occur ''in a low-quality habitat in which the birth rate is generally lower than the death rate and population density is maintained by immigrants from source populations (Meffe *et al.* 1997). Because cave crickets are a key source of nutrient input for karst ecosystems, conserving adequate areas between karst patches in a manner that allows for movement of individuals among cave cricket populations is likely an important factor in long-term maintenance for karst ecosystems.

Subsurface karst areas may also be important to allow movement among cave cricket populations through the subsurface environment associated with continuous limestone blocks. For example, Caccone and Sbordoni (1987) studied nine species of North American cave crickets (genera *Eukadenoecus* and *Hadenoecus*) from sites in North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, Kentucky, and Alabama. Seven of the species were obligate cave-dwelling species that emerged at night to feed. Through genetic analyses of the cave-dwelling species, they found that species or groups of populations inhabiting areas where the limestone is continuous and highly fissured are genetically less differentiated than are populations occurring in regions where the limestone distribution is more fragmented, indicating more exchange of individuals in areas of continuous karst.

Helf *et al.* (1995) suggested that populations of an eastern species of cave cricket (*Hadenoecus subterraneus*) may be at risk because they do not recover quickly after events such as drought, floods, and temperature extremes that preclude or diminish foraging opportunities. These cave cricket populations may have source-sink population dynamics, with some

karst features acting as sources and the majority of karst features acting as sinks, but Helf *et al.* (1995) recommends that ''even sink populations should be protected because their emigrants can ''rescue'' source populations that experience local decimation.'' These studies suggest that it is important to protect the geological features that connect caves and maintain habitat corridors among caves.

Other Surface Animals

Many central Texas caves with endangered invertebrate species are frequented by mammals and several species of reptiles and amphibians (Reddell 1967). Although there are no studies establishing the role of mammals in central Texas cave ecology, the presence of a large amount of animal materials (such as scat, nesting materials, and dead bodies) indicates they are probably important. An important source of nutrients for the cave species may be the fungus, microbes, and/or other troglophiles and troglobites that grow or feed on feces (Elliott 1994b; Gounot 1994).

For predatory troglobites (such as the listed Bexar County invertebrates), invertebrates that accidently occur in the caves may also be an important nutrient source (Hopper 2000). Documented accidental species include snails, earthworms, terrestrial isopods (commonly known as pillbugs or potato bugs), scorpions, spiders, mites, collembola (primitive wingless insects that are commonly known as springtails), thysanura (commonly known as bristletails and silverfish), harvestmen (commonly known as daddy-long-legs), ants, leafhoppers, thrips, beetles, weevils, moths, and flies (Reddell 1965; 1966; 1999).

Vegetation Community

Surface vegetation is an important element of the karst habitat for several reasons, including its role in providing nutrients from: (1) Direct flow of plant material into the karst with water; (2) habitat and food sources provided for the animal communities that contribute nutrients to the karst ecosystem (such as cave crickets, small mammals, and other vertebrates); and possibly, (3) roots that extend into subsurface areas. Surface vegetation also acts as a buffer for the subsurface environment against drastic changes in the temperature and moisture regime and serves to filter pollutants before they enter the karst system (Biological Advisory Team 1990; Veni 1988). In some cases, healthy native plant communities also help control certain exotic species (such as fire ants) (Porter *et al.* 1988) that may compete with or prey upon the listed species and other species (such as cave crickets) that are important nutrient contributors (Elliott 1994a; Helf, *in litt.* 2002).

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 vegetational community structure and the functional importance of roots. They observed roots penetrating up to 25 m (82 ft) into the interior of 20 of the caves, with roots of 6 tree species common to the plateau penetrating to below 5 m (16.4 ft).

Along with providing directly and indirectly nutrients to the karst ecosystem, a healthy vegetative community may also help control the spread of exotic species. The red imported fire ant (*Solenopsis invicta*) is an aggressive predator, which has had a devastating and long-lasting impact on native ant populations and other arthropod communities (Vinson and Sorenson 1986; Porter and Savignano 1990) and is a threat to the karst invertebrates (Elliott 1994b; USFWS 1994). 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 listed karst invertebrates are especially vulnerable to invasion by 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 1994a; Helf *in litt.* 2002). Helf (*in litt.* 2002) states that competition for food between fire ants and cave crickets (*Ceuthophilus secretus*) may be a more important interaction than predation. The presence of 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 fire ants is known to be aided by ''any disturbance that clears a site of heavy vegetation and disrupts the native ant community'' (Porter *et al.* 1988). Porter *et al.* (1991) state that control of fire ants in areas greater than 5 ha (12 ac) may be more effective than in smaller areas since multiple queen fire ant colonies reproduce primarily by ''budding,'' where queens and workers branch off from the main colony and form new sister colonies. Maintaining large, undisturbed areas of native vegetation may also help sustain the native ant communities (Porter *et al.* 1988; 1991).

Listed species, and their associated prey items, have adapted to native vegetation, with its associated nutrients, surface foliage, and subsurface roots. Before 1860, Bexar County native vegetation consisted of an approximate equal mix of areas with woody and grassland plants (Del Weniger 1988). In more recent times, exotic species have often replaced native plants. The effects on listed invertebrates of replacement of native with exotic vegetation have not been reported.

Woodland-Grassland Community

Because of the various roles played by surface vegetation in maintaining the cave and karst ecosystem, including the listed karst invertebrate species that are part of the ecosystem, we examined the best available scientific information to estimate the surface vegetation needed to support ecosystem processes. The woodland-grassland mosaic community typical of the Edwards Plateau is a patchy environment composed of many different plant species. Van Auken *et al.* (1980) studied the woody vegetation of the Edwards and Glen Rose formations in the southern Edwards Plateau in Bexar, Bandera, and Medina counties. They encountered a total of 24 species of plants on the Edwards or Glen Rose geologic formations, two of the principal, cave-containing rock units of the Edwards Plateau.

To maintain natural vegetation communities over the long term, enough individuals of each plant species must be present for successful reproduction. The number of reproductive individuals necessary to maintain a viable or self-reproducing plant population is influenced by needs for satisfactory germination (Menges 1995), genetic variation (Bazzaz 1983; Menges 1995; Young 1995), and pollination (Groom 1998; Jennersten 1995; Bigger 1999). Pavlik (1996) stated that long-lived, self-fertilizing, woody plants with high fecundity would be expected to have minimum viable population sizes in the range of 50–250 reproductive individuals. Fifty reproductive individuals is a reasonable minimum figure for one of the dominant species of the community (*Juniperous ashei*) based on reproductive profiles (Van Auken *et al.* 1979; Van Auken *et al.* 1980; Van Auken *et al.* 1981). This figure would likely be an underestimate for other woody species present in central Texas woodlands, however, because these other species are more sensitive to environmental changes and do not meet several of the life-history criteria needed for the lowest minimal viable population size. Although these species may require population sizes at

the higher end of range (that is, nearer 250 individuals) suggested by Pavlik (1996) to be viable, we do not have the data to support that contention. Therefore, on the basis of our review of information available to us, and after soliciting input from a botanist with expertise in the Edwards Plateau (Dr. Kathryn Kennedy, Center for Plant Conservation, pers. comm. 2002), we consider a minimum viable population size for individual plant species composing a typical oak/juniper woodland found in central Texas to be 80 individuals per species. This estimate is based on a habitat type that, as a whole, is fairly mature, and on knowledge that the species are relatively long-lived and reproductively successful.

On the basis of an analysis of recorded densities, corrected for nonreproductive individuals, we then calculated the area needed to support 80 mature reproductive individuals per species for the 24 species reported by Van Auken *et al.* (1980). Based on our calculations, the four highest area requirements to maintain at least 80 mature individuals were for species that occur at lower densities. These included 80 ha (198 ac) for *Condalia hookeri,* and approximately 32 ha (79 ac) for each of *Ptelea trifoliata, Ungnadia speciosa,* and *Bumelia lanuginosa.* Our calculations indicate that the area needed to maintain the 7 species with the highest average dominance values (*Juniperus ashei, Quercus fusiformis, Quercus texana, Acacia greggii, Rhus virens, Berberis trifoliata,* and *Ulmus crassifolia*) is approximately 13 ha (33 ac). This number would maintain 80 reproductive individuals for 15 of the 24 species. Nine of the species are rarer in the community and all have importance values of less than 1.0. The area needed to maintain these nine species ranges from approximately 20 to 80 ha (49 to 198 ac), with 7 of them in the 26 ha to 32 ha (65 to 79 ac) range.

Most literature found for Central Texas native grasslands was descriptive and not quantitative in its treatment of species composition and dispersion. No literature was located that provided grassland species area curves or quantitative species density tables for the Central Texas area. Two papers by Lynch (1962, 1971) examined species on an 8-acre tract over time, with 123 species, but a high species turnover. High species turnover can be indicative of a habitat area which is too small; however, pre- and post-drought conditions may also have affected this situation. Robertson *et al.* (1997), in a slightly more mesic grassland habitat, found that a 4 ha (10 ac) site captured most of the species diversity (100 species) present even in much larger patches, although it does not address population sizes and persistence in isolation, and an increase to a 6 ha (14 ac) tract increased species representation to 140. One paper on a grassland in a more westerly and drier location in Central Texas recorded 157 taxa in a 16 ha (40 ac) exclosure studied between 1948 and the mid-1970's (Smeins and Merrill 1976).

Primary recruitment of new individuals of grass species in grasslands is from seedling establishment. Many grass species use wind to disperse their seeds and dispersal distances may be small. The process of expansion through rhizomes (underground stems) is slow and clonal, which reduces genetic variability. Seed dispersal, soil texture, and suitable soil moisture profiles at critical times are important factors for maintaining viability (Coffin *et al.* 1993).

As described above, we have reviewed the available information concerning grasslands and grassland species in Central Texas. The information is of a relatively general nature, and we did not find specific information addressing the role that grasslands or grass species might play in contributing, directly or indirectly, to karst ecosystems. While grassland communities and species may be important to maintaining the karst community, we lack adequate information to credibly estimate surface habitat patch size requirements for grass species in relation to karst ecosystems.

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. 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. This direct, rapid transport of water through the karst allows for little or no purification (Veni 1988), allowing contaminants and sediments to enter directly into the subsurface environment. As a result, karst features and karst dependent 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 a healthy vegetation community to avoid threats from surface and subsurface drainage to the karst environment needed by the karst dependent species. This includes not only the cave entrances accessible to humans, but also sinks, depressions, fractures, and fissures, which may serve as subsurface conduits into caves and other subsurface spaces used by the invertebrates.

Buffer Areas

To maintain a viable vegetative community, including woodland and grassland species, 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, edge effects refer 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 changes caused by edge effects can occur rapidly. For example, vegetation 2 m (6.6 ft) from a newly created edge can be altered within days (Lovejoy *et al.* 1986). Edges may allow invasive plant species to gain a foothold where the native vegetation had previously prevented their spread (Saunders *et al.* 1990; Kotanen *et al.* 1998; Suarez *et al.* 1998; Meiners and Steward 1999). When plant species composition is altered as a result of an edge effect, changes also occur in 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 1999; Kindvall 1999). 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. To minimize edge effects, the core area must have a sufficient buffer area.

One recommendation for protecting forested areas from edge effects that are in proximity to clear-cut areas is use of the ''three tree height'' approach (Harris 1984) for estimating the width of the buffer area needed. We used this general rule to estimate the width of buffer areas needed to protect the habitat core areas. The average height of native mature trees in the Edwards woodland association in Texas ranges from 3 to 9

m (10 to 30 ft) (Van Auken *et al.* 1979). Applying the ''three tree height'' general rule, and using the average value of 6.6 m for tree height, we estimated that a buffer width of at least 20 m (66 ft) is needed around a core habitat area to protect the vegetative community from edge effects. Based on this rule, 7 acres is necessary to protect a 33-acre core area. We recognize that the ''three tree height'' approach described by Harris (1984) was based on the distance that effects of storm events (''wind-throw'') from a surrounding clear-cut ''edge'' will penetrate into an old-growth forest stand. Since the effects of edge on woodland/grass land mosaic communities have not been well studied, the ''three tree height'' recommendation is considered to be the best available peer-reviewed science to protect woodland areas from edge effects (Dr. Kathryn Kennedy, Center for Plant Conservation, pers. comm. 2003). The Texas Parks and Wildlife Department is also in general agreement about the need for some type of buffer as a means of addressing edge effects, but currently has not specific recommendations on appropriate size for such a buffer (John Herron, Texas Parks and Wildlife Department, pers. comm. 2003).

Animal communities also should be buffered from impacts associated with edge effects or disturbance from adjacent urban development. Edges can act as a barrier to dispersal of birds and mammals (Yahner 1988; Hansson 1998). Invertebrate species are affected by edges. Mader *et al.* (1990) found that carabid beetles and lycosid spiders avoided crossing unpaved roads that were even smaller than 3 m (9 ft) wide. Saunders *et al.* (1990) suggested that as little as 100 m (328 ft) of agricultural fields may be a complete barrier to dispersal for invertebrates and some species of birds. In general, for animal communities, species need buffers of 50 to 100 m (164 to 328 ft) 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).

Nonnative fire ants are known to be harmful to many species of invertebrates and vertebrates. In coastal southern California, Suarez *et al.* (1998) found that densities of the exotic Argentine ant (*Linepithema humile*), which has similar life history and ecological requirements to the red imported fire ant (Dr. Richard Patrock, University of Texas at Austin, pers. comm. 2003), are greatest near disturbed areas. Native ant communities tended to be more abundant in native vegetation and less abundant in disturbed areas. Based on the association of the Argentine ant and distance to the nearest edge in urban areas, core areas may only be effective at maintaining natural populations of native ants when there is a buffer area of at least 200 m (656 ft) (Suarez *et al.* 1998).

Information on the area needed to maintain populations of animal species, including cave crickets, found in Central Texas is lacking. As discussed above, animal communities should be buffered by areas of 50 to 100 m (164 to 328 ft) or greater to ameliorate edge effects, and by areas of 200 m (656 ft) to buffer against the effects of fire ants. From this data, we determined that a buffer of 100 m (328 ft), in addition to the 50 m (164 ft) cave cricket foraging area, would, at a minimum, protect the cave cricket foraging area from the effects of edge and nonnative species invasions.

Fragmentation

Haskell (2000) examined the effect of habitat fragmentation by unpaved roads through otherwise contiguous forest in the southern Appalachian Mountains and found reduced soil macroinvertebrate species abundance up to 100 m (328 ft) from the road and declines in faunal richness up to 15 m (50 ft) from the road. Haskell (2000) pointed out that ''these changes may have additional consequences for the functioning of the forest ecosystem and the biological diversity found within this system. The macroinvertebrate fauna of the leaf litter plays a pivotal role in the ability of the soil to process energy and nutrients.'' Haskell further points out that these changes may in turn affect the distribution and abundance of other organisms, particularly plants. Changes in abundance in litter dwelling macroinvertebrates may also affect ground-foraging vertebrate fauna (Haskell 2000).

Invertebrate biomass per unit area has been found to be less in small fragmented habitats, which may result in reduced food available for cave crickets. Burke and Nol (1998), working in southern Ontario, Canada, found a greater biomass of leaf litter invertebrates in large (≥20 ha (49 ac)) than in smaller forested areas. Zanette *et al.* (2000) in New South Wales, Australia, reported that the biomass of ground dwelling invertebrates was 1.6 times greater in large (> 400 ha (988 ac)) than in smaller (~55 ha (136 ac)) forested areas.

Dispersal

The ability of individuals to move between preferred habitat patches is essential for colonization and population viability (Eber and Brandl 1996; Fahrig and Merriam 1994; Hill *et al.* 1996; Kattan *et al.* 1994; Kindvall 1999; Kozlov 1996; Kuussaari *et al.* 1996; Turner 1996). Patch shapes allowing connection with the highest number of neighboring patches increase the likelihood that a neighboring patch will be occupied (Fahrig and Merriam 1994; Kindvall 1999; Kuussaari *et al.* 1996; Tiebout and Anderson 1997). If movement among populations is restricted and a population is isolated, the habitat patch size must be large enough to ensure that the population can survive (Fahrig and Merriam 1994).

It is likely that many cave systems are connected throughout the subsurface geologic formation even though this may not be readily apparent from surface observations. The extent to which listed species use interstitial spaces and passages is not known. Troglobitic species may retreat into these small interstitial spaces where the physical environment is more stable (Howarth 1983) and may spend the majority of their time in such retreats, only leaving them during temporary forays into the larger cave passages to forage (Howarth 1987). During several karst invertebrate surveys conducted in Bexar County caves, Service biologists have observed that troglobites, including listed species, were not found when temperature and humidity in the cave was low. Upon returning to the same cave once environmental conditions returned to optimal, the listed species and other troglobites were observed.

Small voids (inaccessible to humans) and interstitial spaces can also provide subsurface corridors for movement of listed species and cave crickets between and among caves and karst features. Cores drilled around and between occupied caves have led to discovery of additional void space that was hydrologically, but not physically connected to the humanly-accessible portion of an occupied cave. Listed species were found in this void space.

Summary

The conservation of the endangered karst invertebrates depends on a self-sustaining karst ecosystem; surface and subsurface drainage basins to maintain adequate levels of moisture; and a viable surface animal and plant community for nutrient input and protection of the subsurface from adverse impacts. The area needed to conserve such an

ecosystem includes a core area buffered from the impacts associated with fragmentation, isolation, edge effects, and other factors that may threaten ecosystem stability. Depending on the size and shape of these core habitat areas or patches, in order to remain viable, they may also require connections to other habitat patches.

Previous Federal Action

On January 16, 1992, we received a petition submitted by representatives of the Helotes Creek Association, the Balcones Canyonlands Conservation Coalition, the Texas Speleological Association, the Alamo Group of the Sierra Club, and the Texas Cave Management Association to add the nine invertebrates to the List of Threatened and Endangered Wildlife. On December 1, 1993, we announced in the **Federal Register** (58 FR 63328) a 90-day finding that the petition presented substantial information that listing may be warranted.

On November 15, 1994, we added eight of the nine invertebrates to the Animal Notice of Review as category 2 candidate species in the **Federal Register** (59 FR 58982). We intended to include *Rhadine exilis* in the notice of review, but an oversight occurred and it did not appear in the published notice. Category 2 candidates, a classification since discontinued, were those taxa for which we had data indicating that listing was possibly appropriate, but for which we lacked substantial data on biological vulnerability and threats to support proposed listing rules.

On December 30, 1998, we published a proposed rule to list the nine Bexar County karst invertebrates as endangered (63 FR 71855). Incorporating comments and new information received during the public comment period on the proposed rule, we published a final rule to list the nine Bexar County karst invertebrate species as endangered in the **Federal Register** on December 26, 2000 (65 FR 81419).

In the proposed rule for listing these species, we indicated that designation of critical habitat was not prudent for the nine invertebrates because the publication of precise species locations and maps and descriptions of critical habitat in the **Federal Register** would make the nine species more vulnerable to incidents of vandalism through increased recreational visits to their cave habitat and through purposeful destruction of the caves. We also indicated that designation of critical habitat was not prudent because it would not provide any additional benefits beyond those provided through listing the species as endangered.

Based on recent court decisions (for example, *Natural Resources Defense Council* v. *U.S. Department of the Interior* 113 F. 3d 1121 (9th Cir. 1997); *Conservation Council for Hawaii* v. *Babbitt,* 2 F. Supp. 2d 1280 (D. Hawaii 1998)) and the standards applied in those judicial opinions, we reexamined the question of whether critical habitat for the nine invertebrates would be prudent. After reexamining the available evidence for the nine invertebrates, we did not find specific evidence of collection or trade of these or any similarly situated species. Consequently, in our final rule listing the species, we found that ''by designating critical habitat in a manner that does not identify specific cave locations, the threat of vandalism by recreational visits to the cave or purposeful destruction by unknown parties should not be increased'' (65 FR 81419). Therefore, our final rule to list the species as endangered also included our determination that critical habitat designation was prudent as we did not find specific evidence of increased vandalism, and we found there may be some educational or informational benefit to designating critical habitat. Thus, we found that the benefits of designating critical habitat for the nine karst invertebrate species outweighed the benefits of not designating critical habitat.

The Final Listing Priority Guidance for FY 2000 (64 FR 57114) stated that we would undertake critical habitat determinations and designations during FY 2000 as allowed by our funding allocation for that year. As explained in detail in the Listing Priority Guidance, our listing budget was insufficient to allow us to immediately complete all of the listing actions required by the Act during FY 2000. We stated that we would propose designation of critical habitat in the future at such time when our available resources and priorities allowed.

On November 1, 2000, the Center for Biological Diversity (Center) filed a complaint against the Service alleging that the Service exceeded its 1-year deadline to publish a final rule to list and to designate critical habitat for the nine Bexar County cave invertebrates. Subsequent to the Service publishing the final rule to list these nine species as endangered on December 26, 2000, the Center agreed to dismiss its claim regarding the listing of the species. Under the terms of a settlement reached between the Center and the Service, the Service agreed to submit to the **Federal Register** for publication a proposed critical habitat determination on or by June 30, 2002, and a final determination on or by January 25, 2003. Sixty-day extensions on the deadlines to submit both the proposed and final critical habitat determinations to the **Federal Register** for publication were approved by the court, and the new deadlines became August 31, 2002, and March 26, 2003, for the proposed and final rules, respectively.

On February 28, 2002, we mailed letters to the Texas Parks and Wildlife Department and the Texas Natural Resource Conservation Commission informing them that we were in the process of designating critical habitat for the nine Bexar County karst invertebrates. We requested any additional available information on the listed species, including biology; life history; habitat requirements; distribution, including geologic controls to species distribution; current threats; and management activities, current or in the foreseeable future. The letters contained a current list of Bexar County caves known to contain listed species, a map showing the general distribution of these species within each Karst Fauna Region, and a list of the references pertaining to these species and their distribution as we know it. We requested their review and comments on our current information and asked their assistance in providing any additional available information.

We also mailed approximately 300 pre-proposal letters to interested parties and cave biologists on March 20, 2002, informing them that we were in the process of designating critical habitat for the 9 listed karst invertebrates. The letters contained a copy of the final rule to list these Bexar County invertebrate species as endangered, a map showing the general distribution of these species, a list of literature about these species and their habitats, and a brief summary with questions and answers on critical habitat. We requested comments on: (1) The reasons why any habitat should or should not be determined to be critical habitat as provided by section 4 of the Act, including whether the benefits of excluding areas will outweigh the benefits of including areas; (2) land use practices and current or planned activities in the subject areas and their possible impacts on possible critical habitat; (3) any foreseeable economic or other impacts resulting from the proposed designation of critical habitat, and particularly any impacts on small entities or families; and (4) economic and other benefits associated with designating critical habitat for the Bexar County karst invertebrates.

On August 27, 2002, we proposed that 25 units encompassing a total of approximately 3,857 ha (9,516 ac) in

Bexar County, Texas, be designated as critical habitat for the nine karst invertebrates (67 FR 55064). The comment period for the proposed rule was originally scheduled to close on November 25, 2002, but was extended until December 23, 2002 (67 FR 70203), to allow for a 30-day comment period on the draft economic analysis. Thus, we accepted comments on the proposed rule and the economic analysis until December 23, 2002.

Summary of Comments and Recommendations

In the August 27, 2002, proposed rule, we requested all interested parties to submit comments or information concerning the designation of critical habitat for the nine endangered Bexar County invertebrates (67 FR 55064). During the comment period, we held a public hearing in San Antonio on October 30, 2002. We published a newspaper notice inviting public comment and announcing the public hearing in the San Antonio Express-News. A transcript of the hearing is available for inspection (*see* **ADDRESSES** section). The comment period was originally scheduled to close on November 25, 2002.

On November 21, 2002, we announced the availability of the draft economic analysis and requested comments on it and the proposal during an extension of the comment period until December 23, 2002 (67 FR 70203). We contacted all appropriate State and Federal agencies, county governments, scientific organizations, and other interested parties and invited them to comment. We also provided notification of these documents through email, telephone calls, letters, and news releases faxed and/or mailed to affected elected officials, media outlets, local jurisdictions, and interest groups. For the notice of the proposed rule, we mailed over 1,500 letters to interested parties. Later we sent over 1,200 post cards notifying interested parties of the availability of the draft economic analysis and the extension of the comment period. The number of parties on the mailing list fell as we deleted out-of-date and duplicate addresses. We also published all of the associated documents on the Service's regional Internet site following their release.

We solicited 11 independent experts who are familiar with these species and the karst ecosystem to peer-review the proposed critical habitat designation. Only one of the peer reviewers submitted comments, generally in support of the proposed designation (see ''Peer Review'' section below). We also received a total of 42 written comments, and 3 oral comments at the public hearing. Of those comments indicating a preference, 10 supported the critical habitat designation and 13 indicated opposition to designation. Many commenters did not express opposition to the designation, but did express opposition to specific areas being included. We reviewed all comments received for substantive issues and new data regarding critical habitat and the draft economic analysis. Here, we address all comments on both documents received during the comment periods, as well as public hearing testimony. We have grouped similar comments and addressed them in the following summary.

Issue 1: Biological Justification and Methodology for Size of Critical Habitat Units

(1) *Comment:* The Service should designate smaller areas for critical habitat units, including: (1) Surface and subsurface drainage areas; (2) cave cricket foraging areas; and (3) dominant and subdominant woody species, rather than uncommon plant species. The Service focused its methodology on surface plant communities, but little information exists relating particular vegetation communities to the subsurface habitat of the listed species.

Our Response: We believe it is well documented that surface flora and fauna communities are an essential energy source for fauna, including the nine endangered invertebrates, in the karst environment. The areas needed to support dominant, subdominant, and ''other woody species'' common to the Edwards Plateau were included in our proposal to incorporate key components of the native vegetative community that contribute directly to nutrient input, and which also support the animal community that is another source of nutrient input to karst areas. We do not have data from vegetation surveys conducted around occupied caves to determine the importance of rarer plant species. Therefore, in this final designation we have reduced the size of all of the critical habitat units based on the amount of area that we believe, based on the best available information, is needed to support at least 15 of 24 species of vegetation on the Edwards Plateau, including the seven species with the highest dominance values, but not the rarer plant species (see ''Criteria Used to Delineate Critical Habitat'' section below for further explanation).

(2) *Comment:* The Service should designate larger areas for the critical habitat units to: (1) Include all or most of Karst Zone 1; (2) all or portions of Karst Zone 2; (3) reduce fragmentation of habitat; (4) consider subsurface karst voids between known caves that may provide habitat for the species; (5) provide better protection against pollution; and (6) provide dispersal corridors for cave crickets.

Our Response: We agree that it is likely that all of these concerns have the potential to affect the conservation of the endangered karst invertebrates. Much of the biology and ecology of these karst-adapted listed species is not well understood. Critical habitat was delineated to encompass areas on which are found those components of the karst ecosystem for which sufficient information exists to determine that they are essential to the conservation of the listed species.

We recognize that areas outside of the boundaries of critical habitat may be important for the karst invertebrates for purposes such as providing habitat in interstitial karst voids (beyond the known caves), additional sources of nutrients, or dispersal corridors. However, we did not have sufficient data when we proposed critical habitat, nor were any data provided during the comment period, that would allow us to adequately assess the importance to occupied caves of other areas of Karst Zones 1 or 2, karst voids between known caves, larger buffers, or areas that are needed for dispersal corridors for cave crickets. For instance, members of the Technical Subcommittee of the Karst Invertebrate Recovery Team, who are experts on the species and the karst ecosystems, agree that it is likely the invertebrates spend considerable time, perhaps the majority of time, in the human-inaccessible karst voids (interstitial spaces) associated with the cave (Steve Taylor, Technical Subcommittee chair, pers. comm. 2002). However, the distance that these invertebrates go from the cave into the surrounding karst is unknown. Since protection of the surface and subsurface drainage areas associated with each occupied cave is important to buffer the cave from pollutants, these drainage areas were included, where possible, in the critical habitat designation. Additional scientific discovery may show that larger areas are needed for long-term conservation, and we will continue to incorporate such information into planning and implementing various conservation activities for these species. Given the best available information, we believe the specific areas designated in this rule contain one or more of the physical or biological features that are essential to the conservation of the species and meet the definition of critical habitat as provided in section 3 of the Act.

(3) *Comment:* The proposed rule did not show that designating critical habitat was essential to conservation of the species or requires special management.

Our Response: Section 3 of the Act defines critical habitat as ''(i) the specific areas within the geographical area occupied by the species, at the time it is listed * * *, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species * * * upon a determination * * * that such areas are essential for the conservation of the species.'' Regulations (50 CFR 424.12) direct us to ''focus on the principal biological or physical constituent elements within the defined area that are essential to the conservation of the species.'' Conservation is defined in the Act, section 3, as ''the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary.'' We believe the proposed rule demonstrated that the primary constituent elements we recognized are essential to the conservation of the species. The areas we are designating all contain one or more of such features.

The caves and the associated karst are essential to the conservation of the species because the invertebrates live, feed, and reproduce in the caves and the associated karst structures. The subsurface drainage area is essential to provide the environmental conditions in the cave that are requirements for the species. The surface drainage area helps maintain the environmental conditions and helps maintain an energy flow into the underground karst system. The surface vegetation is a direct source of energy through plant materials entering the karst system, and the surface vegetation also supports animals (such as cave crickets) that process the plant materials and then leave the resulting nutrients in the cave. Cave crickets are likely one of the most important sources of nutrients that support the endangered karst invertebrates. We believe this final rule documents that the areas designated meet the definition of critical habitat in that they contain one or more of the physical and biological features that are essential to the conservation of the endangered karst invertebrates. We also have carefully reviewed whether such areas may require special management considerations or protection, as called for under the definition of critical habitat in section 3(5)A)(i) of the Act. On the basis of our evaluation of certain areas already covered by conservation plans and thus already have special management considerations or protection, we did not include some areas in this final designation. (*See* ''Lands Covered Under Existing Conservation Plans'' section, below.)

(4) *Comment:* Because critical habitat must contain those physical or biological features essential to the conservation of the species, with the term ''conservation'' being considered synonymous with recovery, it appears that the same criteria used by the Service to delineate critical habitat must be incorporated into recovery plans for the Bexar County karst invertebrates. The commenter also hypothesized that the recovery of the Bexar County invertebrates will require establishment of a certain number of caves within adequate preserves that meet the parameters described in the proposed rule for critical habitat designation. Although a recovery plan has not yet been developed for these species, some of the areas proposed as critical habitat do not appear as if they will meet likely future recovery criteria for these species.

Our Response: We recognize that our designation of critical habitat may not include all the habitat areas that might eventually be determined to be necessary for the conservation of the listed karst invertebrates. For these reasons, critical habitat designations do not signal that habitat outside the designation is unimportant or may not be recommended for attention as part of a recovery plan. Similarly, critical habitat designations made on the basis of the best information available at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans, or other species conservation planning efforts, particularly if new information available to these planning efforts calls for a different outcome. We also note that as provided for under section 4(a)(3) of the Act, we can revise our designation of critical habitat in the future if it is appropriate to do so.

Designation of critical habitat does not establish recovery criteria; that is one of the purposes of a recovery plan. Pursuant to section 4(f)(1) of the Act, the Service develops and implements plans, referred to as recovery plans, for the conservation and survival of listed species. As defined in section 3 of the Act, ''conservation'' means ''the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary.'' A key purpose of a recovery plan is to recognize the threats to the listed species and propose methods for removing or minimizing the threats.

A Recovery Team, including stakeholders, currently is working with the Service to prepare a draft recovery plan for these species. While the Team has discussed recovery criteria, no draft plan has been developed. When a plan is developed, the public's review and comments will be solicited before a final plan is adopted by the Service. We cannot currently say how many or which areas will be identified in the recovery plan as being important for the conservation the species.

(5) *Comment:* The Service's recommendation for the size of the critical habitat units appears to be based on the study of a single cave (Lakeline Cave in Williamson County, Texas) that may not be representative of the other karst features.

Our Response: The recommended size for critical habitat units is not based on the results of the Lakeline Cave cricket study. The Service used the Lakeline study as one source of information that suggests small areas of native vegetation, surrounded by urban development, are not adequate to sustain the cave cricket population, which is believed to be a key to the ecology of karst invertebrates and a primary source of cave nutrients. Our designation is based on the use of the best scientific data available regarding the physical and biological features that are essential to the conservation of the species and the identification of specific areas where such features are found.

(6) *Comment:* The size of the area needed to support native plant communities is based on the need for the plants to support each other, not one karst ecosystem. Therefore, no reason exists that multiple cave/karst ecosystems cannot occur within the boundaries of one critical habitat unit, as long as the actual areas providing nutrients to each cave are encompassed.

Our Response: We agree that the approach taken in the proposed rule of providing adequate surface plant communities for the karst ecosystem does not necessarily require more surface area to support multiple caves in close proximity. In the final rule, we revised our methods for delineating critical habitat to include multiple caves within the same smaller surface area, where appropriate. For each cave, we overlaid the areas needed to include the surface and subsurface drainages, cave cricket foraging area, and the vegetative surface community (see ''Critical Habitat'' section).

(7) *Comment:* The Service should consider only designating the cave cricket foraging area plus a buffer area, or about 5.34 ac, as critical habitat around each cave.

Our Response: We agree that the immediate area around an occupied cave is very important for cave cricket foraging and other reasons, and that this area should be included in the critical habitat designation. However, there are additional physical and biological features that we have identified as essential to the conservation of the species, consistent with the definition of critical habitat in section 3 of the Act. The area recommended by the commenter would not adequately provide for the features and related primary constituent elements that we have identified as being essential to the conservation of these species (*see* ''Critical Habitat'' and ''Primary Constituent Elements'' sections, below).

(8) *Comment:* Based on the Testudo Tube Cave example in Williamson County, 31 acres (26-acre preserve plus a buffer area) may be an adequate area for critical habitat units.

Our Response: Testudo Tube Cave Preserve in Williamson County, Texas, is surrounded by several hundred acres of undeveloped land and is adjacent to an even larger preserved area of several thousand acres, resulting in an effective ''preserve'' size of much larger than 31 acres. We will be interested in long-term studies of the Testudo Tube Cave Preserve that may provide additional information about the adequacy of the size of the preserve. We note also that designating critical habitat does not establish a preserve (see ''Critical Habitat'' section).

(9) *Comment:* Boundaries of the critical habitat units are arbitrary and not properly defined. The boundaries should be based on biology and not roads and surface features.

Our Response: While the general size of the critical habitat unit boundaries are based on primary constituent elements needed by the species, in the proposed rule we did use roads and other surface features to make it easy for the public to identify the boundaries. In the changes to the boundaries in this final rule, we did not use surface features, but instead used specific coordinates to describe the boundaries. This allowed us to base boundaries mainly on biological, hydrological, and geological considerations, thereby delineating critical habitat areas more precisely.

(10) *Comment:* Critical habitat needs to be defined to include three new caves that have been discovered to contain listed species since the proposed rule was published.

Our Response: Of the three caves that were discovered to contain listed species since the proposed rule was published, two (Hackberry Sink and Dancing Rattler Cave) are located in Government Canyon State Natural Area. We have determined that the management for the caves and the species in the Natural Area provides adequate special management considerations for the primary constituent elements, and consequently units within the Natural Area that we proposed for designation are not included in this final rule. (See the ''Lands Covered Under Existing Conservation Plans'' section for further details.) One cave (Crownridge Canyon Cave) is in a new location, but was not included in this final determination because there would have been no opportunity for public comment had we included the area in critical habitat. Under our rulemaking procedures and the Administrative Procedure Act, we would first need to propose the area for designation and seek public review and comment on such a proposal before a designation would be possible. Because of the court-approved settlement agreement that set a deadline for finalizing this rule, we did not have enough time to republish a proposed rule that might have included the Crownridge Canyon Cave in the critical habitat designation. We note that the listed species in Crownridge Canyon Cave do occur in other caves within the critical habitat designation. Although we are not able to consider including Crownridge Canyon Cave in this designation of critical habitat, we believe the cave and the associated karst ecosystem to be important to the conservation of the species. Because the cave is known to be occupied, it will be covered by applicable provisions under sections 7 (requiring Federal agencies to consult under the ''jeopardy standard''), 9, and 10 of the Act.

(11) *Comment:* The Service ignored the potential for the species to occur in void spaces within the bedrock lying between caves.

Our Response: We agree that the species occur within, and use, subsurface voids in karst rock and areas between occupied caves, and we indicated this in the proposed rule for critical habitat. However, we do not have data to quantify such areas. Using the best available data, we designated critical habitat to incorporate the specific areas on which are found the primary constituent elements of a karst ecosystem in the vicinity of caves known to be occupied by the endangered species.

(12) *Comment:* How can a cave located within an area lacking a healthy surface plant community contain an intact subsurface environment?

Our Response: The surface vegetative community has been significantly altered by urbanization in some of the designated critical habitat units. Since the caves still contain the endangered species, we believe that the areas have maintained the primary constituent elements related to the karst subsurface environment and surface and subsurface drainages. We recognize that intensive management of the remaining surface habitat may be needed to compensate for lack of natural plant and animal communities on the surface.

Issue 2: Data Quality

(13) *Comment:* The available data used in the proposed rule is not adequate to support this critical habitat designation. There seems to be a particular lack of data on species biology, ecology, and distribution of the species and information on which to base the unit boundaries and areas.

Our Response: As per section 4(b)(2) of the Act, we are required to designate critical habitat ''on the basis of the best scientific data available,'' and we believe our designation meets that requirement. In general, the biology and ecology of the karst-adapted species are not well understood. Consequently, the criteria we used to delineate critical habitat, and the areas we delineated, were based on components of the karst ecosystem for which sufficient information exists to determine their importance to the listed species, and for which specific areas can be identified and mapped. The ''Information Sources'' and ''Criteria Used to Designate Critical Habitat'' sections below provide additional information regarding the basis for our designation.

(14) *Comment:* The number of Bexar County caves and those containing listed species should be updated to the latest available information. Will the Service designate critical habitat for new locations of the listed species that will be discovered subsequent to publication of the final rule for critical habitat designation?

Our Response: We fully agree that our knowledge of the caves in Bexar County that are known to provide habitat for endangered karst invertebrates should be as current as possible. This knowledge will help the Service evaluate the threats to the species, the status of the species, and plan for their conservation. We recognize that additional caves are likely to be found

in the future that have endangered karst invertebrates and may not be within the areas currently designated as critical habitat.

Section 4(a)(3) of the Act provides that subsequent to the designation of critical habitat, we ''may, from time-to-time thereafter as appropriate, revise such designation.'' Any new caves discovered to contain the listed species may be important to the conservation of the species, and we will consider them for potential future revisions of this designation, provided the available science at the time supports the designation. This would require the same procedures for public comment and full economic analysis as this final rule has followed. We note also that new areas found to be occupied by the endangered species and not included in this designation of critical habitat may be considered and included in the recovery plan being prepared for these species. Also, the species at those new locations will receive protection under sections 7 (pursuant to requirements for Federal agencies related to the ''jeopardy'' standard), 9, and 10 of the Act, regardless of whether the area is designated as critical habitat.

(15) *Comment:* Restricted access to private property limits the knowledge of other caves that may contain endangered karst invertebrates.

Our Response: The help of private property owners will be essential for the recovery of these endangered karst invertebrates. Any surveys for caves or cave invertebrates on private property are completely voluntary and at the discretion of the landowner. We appreciate the cooperation the Service has received from many landowners in Bexar County who allowed geologists and biologists access. We want to continue to build positive, voluntary relationships with private landowners for the conservation of listed species.

(16) *Comment:* Does critical habitat designation comply with the Federal Data Quality Act and Service Information Quality Guidelines?

Our Response: The U.S. Department of the Interior, of which the Fish and Wildlife Service is part, issued guidelines regarding data quality, in response to the passage of Public Law 106–554, referenced by the commenter. These guidelines, Information Quality Guidelines Pursuant to Section 515 of the Treasury and General Government Appropriations Act For Fiscal Year 2001, became effective October 1, 2002. The Service's rulemaking procedure, inclusive of this designation of critical habitat, includes a comprehensive public comment process and imposes a legal obligation on us to respond to comments on the proposed action. These procedural safeguards can ensure a thorough response to comments on quality of information. The thorough consideration required by this process generally meets the needs of the request for correction of information process, under the Federal Data Quality Act and Service Information Quality Guidelines. In the case of rulemakings and other public comment procedures, where we disseminate a study analysis or other information prior to the final rulemaking, requests for correction are considered prior to the final action. The commenter did not specifically identify how the draft economic analysis or proposed rule might not meet the criteria that the guidelines require. Regardless, we believe that this process used the best and most reliable scientific and commercial data available regarding the designation and meets the criteria of the data quality guidelines.

(17) *Comment:* The proposed rule states that of about 400 caves known in Bexar County, only 57 contain the listed species. Have the other 343 caves been surveyed?

Our Response: The final rule has been updated to reflect the best available information on the total number of caves known from Bexar County (475 caves as of December 2002). Seventy four caves are currently known to contain listed species. Not all of the known caves in Bexar County have been adequately surveyed for invertebrates. It is likely that some of these caves will be found to contain one or more of the listed species. We also expect more caves to be discovered as additional surveys are completed.

Issue 3: Site-Specific Comments

(18) *Comment:* Many individual landowners commented that their property should be excluded from the critical habitat because it did not contain either the caves with the species or the primary constituent elements necessary for critical habitat. Several units have already been significantly disturbed from urban development and others are planned for development.

Response: The specific properties of most of the individual landowners who expressed these concerns have been either removed from the critical habitat designation, or the amount of their property included in the designation is now significantly reduced. This is a result of the reduction in area designated in all of the units based on the updated criteria used in the final rule to determine the areas for critical habitat (refer to the ''Methods'' and the ''Criteria Used to Identify Critical Habitat'' sections of the final rule for the specific changes). All of the revised critical habitat units designated in this final rule contain one or more of the primary constituent elements essential for the conservation of these endangered species. Conservation of some species may be dependent, in part, on habitat restoration activities in some areas that have been disturbed. Such activities may include, but are not limited to, restoration of native vegetation, control of invasive species, and the installation of berms to protect the cave opening from pollutants.

(19) *Comment:* The groundwater drainage basins for Black Cat Cave and Logan's Cave (Units 13 and 17, respectively) extend beyond the boundaries of their proposed critical habitat areas. These units should be expanded to include the appropriate drainage basins. The surface water drainage area for Springtail Crevice Cave (Unit 21) extends more than 6 km outside of its proposed critical habitat area. All, or at least a significantly greater percentage, of the lower drainage area within about 2 km of the cave should be included within the critical habitat area to better protect the cave from degradation of water quality due to urbanization.

Our Response: The subsurface drainage areas associated with the caves from units 13 and 17, and the surface drainage area for the cave in Unit 21, were delineated after the proposed rule was published (Veni 2002). These drainage areas extend outside of the boundaries of the proposed critical habitat boundaries. These areas were not included in this final determination because they were not identified in the proposed rule and, therefore, were not available for public comment. Although not included in the critical habitat designation, minimizing future impacts to the subsurface and surface drainage areas associated with these caves will likely be important for the conservation of the listed species in these caves. We have emphasized the importance of these areas in this final rule (*see* ''Critical Habitat Unit Descriptions'' section).

(20) *Comment:* The boundaries of Unit 20 are arbitrary, and 160 ha (395 ac) are not required to protect the species in Robber Baron Cave.

Our Response: The boundaries of Unit 20 have been redrawn based on the cave footprint and the subsurface drainage area of the cave and reduced to include 23 ha (57 ac). The amount of Zone 1 area included in the critical habitat designation was also reduced due to a lack of information on the importance of this area to the listed species within the cave. We also reduced the area included

in the critical habitat by using coordinate data to describe the boundaries, rather than roads as used in the proposed rule.

(21) *Comment:* Several commenters requested that certain units be excluded because there are other caves with critical habitat, located in the same karst fauna region and containing the same listed species, whose surface habitat is in a more natural and less degraded state. Therefore, the Service should omit those units with degraded surface habitat, because they will not be required for conservation of these species.

Our Response: As discussed above, all of the specific areas being designated contain one or more physical or biological features and primary constituent elements that are essential for the conservation of these endangered species and meet the definition of critical habitat as provided in section 3 of the Act. While some of the designated areas may not be in optimal condition, they are the only known locations for these species. Some of the areas may need intensive special management to restore or maintain some of the conditions important to these species. Conservation efforts involving the designated areas and other areas, including efforts taken to implement a recovery plan when one is adopted, will be dependent on the voluntary cooperation of landowners. This may include, but is not limited to, the cooperation of landowners who may voluntarily allow restoration efforts on their lands.

(22) *Comment:* Unit 1e should be divided into multiple smaller units for critical habitat.

Our Response: We agree and the final designation divides Unit 1e, previously 341 ha (842 ac), into three smaller Units 1e1, 1e2, and 1e3 for a total area of 50 ha (124 ac) (see Table 2 below).

(23) *Comment:* How can the Service designate critical habitat for Unit 19 and Genesis Cave when the urban development on the site has already resulted in take of the species in the cave? If the unit was designated based on the alleged existence of intact subsurface environment, then why are the vegetation buffer zones necessary?

Our Response: We determined that area designated as Unit 19 maintains the biological and physical features essential to the conservation of the species and supports one or more of the primary constituent elements. Thus it warrants inclusion in the final critical habitat designation regardless of whether ''take'' (as defined in Section 9 of the Act) of listed species in Unit 19 has already occurred. Critical habitat for Units 19 and 20 is designated only for the subsurface environment due to the significant surface degradation that has already occurred. We acknowledge that intense management will likely be needed in both of these units for conservation of the species. Identifying areas that contain features essential to the conservation of the species and that may require special management considerations or protection is a primary purpose of designating critical habitat.

(24) *Comment:* The Service should address how intensive management will provide nutrients and water to listed species in caves in heavily urbanized areas, such as units 12 and 19. The Service should also identify who should be responsible for this management, since critical habitat designation does not mandate special management or require removal of existing structures.

Our Response: Under the definition of critical habitat, all of the areas being designated may require special management. Caves in heavily urbanized areas, such as those within Units 12, 19, and 20, may need more intensive management for conservation of the species than some of the other units. We anticipate that the recovery plan for these species will address the specific management strategies recommended for long-term conservation of these species. This designation does not in any way require landowners to undertake any particular management actions for the designated critical habitat or the listed species. As part of the recovery process, we anticipate working cooperatively with landowners and other partners to provide the management needed for conservation.

(25) *Comment:* The proposed rule did not clearly indicate that surface disturbances within Units 19 and 20 would not have the potential to adversely modify sub-surface critical habitat and would not be regulated under Section 7. Similarly, what is the regulatory distinction between units with both primary constituent elements and those units with only one of the primary constituent elements.

Our Response: For critical habitat Units 19 and 20, we designated the subsurface area only as critical habitat, because of the level of disturbance that already has altered the surface habitat. Under section 7 of the Act, Federal agencies are required to insure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to jeopardize the continued existed of a listed species or result in the destruction or adverse modification of designated critical habitat. An action authorized, funded, or carried out by a Federal agency involving the surface of the land is subject to the consultation requirement of section 7, and related regulations at 50 CFR 402, if such action may affect a listed species or its designated critical habitat. The aspect of a consultation involving critical habitat would address the potential effects of a proposed Federal action on the primary constituent elements in the area covered by the consultation. For additional information about consultations and the potential Federal activities that could destroy or adversely modify critical habitat see the ''Section 7 Consultation'' section, below.

(26) *Comment:* Unit 12 should be deleted because the areas around Hairy Tooth and Ragin' Cajun caves are effectively protected. Big Springs Ltd., has established preserves around each cave and has developed a management plan for Hairy Tooth Cave and is considering a management plan for Ragin' Cajun Cave. Also, Unit 9 should be deleted or much reduced to exclude areas under a karst management plan by the University of Texas at San Antonio.

Our Response: In order to consider not including an area that is the subject of a management plan, we first evaluate the plan. Key factors we evaluate include whether the plan or agreement is legally binding, the status of implementation of the plan, whether the plan specifies the management needed to ensure that primary constituent elements are appropriately protected and, if needed, improved. Along with meeting other criteria, the plan also must include a timely schedule for implementation and outline the probability that the funding source or other resources necessary to implement the management will be available. The management plan for Hairy Tooth Cave (Unit 12), which we received after the close of the comment period, did not meet the above criteria. A management plan for Ragin' Cajun Cave was not provided to us.

The University of Texas at San Antonio submitted a draft karst management plan for consideration with respect to Unit 9. This draft plan represents a very positive step for conservation of the listed karst invertebrate species. However, without a final plan, we could not make a determination that the area is receiving adequate special management, in accordance with the criteria described above. (*See* the ''Lands Covered Under Existing Conservation Plans'' for additional information on our process.) Therefore, Unit 9 is part of the final designation, although its size has been reduced (for other reasons) from the

proposed amount of 71 ha (175 ac) to 16 ha (40 ac) in this final rule. The procedures for submitting management plans for possible exclusion of specific areas were clearly described in the proposed rule.

Issue 4: Economic Issues

(27) *Comment:* The draft economic analysis understates the economic impact from the critical habitat designation because it failed to adequately consider effects from: (1) Greater amounts of technical assistance and administrative tasks than estimated; (2) greater numbers of informal and formal section 7 consultations than estimated because of a vast understatement of Federal involvement in private projects; (3) increased difficulty in obtaining state and/or county approval for development; (4) project modifications and delays for planned developments; (5) development of biological assessments; (6) reduced property values; and (7) increased mitigation costs. Generally, the baseline approach used in the draft economic analysis underestimates the impacts to all development activities, whether or not Federal involvement is presumed.

Our Response: Minor modifications were made in the final economic analysis of the proposed rule to reflect increased technical assistance in one unit and to the cost of technical assistance related to Clean Water Act activities. We believe the estimates of formal and informal consultations in the final economic analysis reflect numbers that can be reasonably anticipated. We do not anticipate any increased difficulty in obtaining State or county approvals for development. While uncertainties about the impacts of the critical habitat designation and the perception that the designation will impose land use restrictions could temporarily foster this result, this effect is likely to be temporary in nature as the uncertainties and perceptions dissipate or become clarified over time.

We do not believe that critical habitat designation will impose additional project modifications and delays for projects, including preparation of biological assessments. Additional requirements associated with critical habitat designation apply solely to Federal actions, and since this designation only involves occupied habitat, then the section 7 requirements would have to be met pursuant to consideration of ''jeopardy standard'' regardless of the presence of critical habitat. We do not believe that the designation of critical habitat, when occupied by the listed species, should have any real effect on property value, because it only applies to those activities that involve a Federal action. However, we do recognize that there can be a perceived effect which could adversely affect property values. We will, through outreach and education, do all we can to correct this perception.

We believe mitigation costs associated with critical habitat designation were accurately estimated in the final economic analysis. The anticipated number of HCPs was increased from five to eight, and the cost of purchasing and managing mitigation lands due to the development of HCPs was estimated. The analysis used standard methods for analyzing the economic impacts. These methods have been used in past designations throughout the United States and have generally been found to be sufficient.

(28) *Comment:* The draft economic analysis is clearly prepared to show that minimal effects will be felt by the designation and should be rejected because it does not take an objective view of the matter under consideration. The information sources referenced do not include any discussions with private landowners.

Our Response: The analysis used standard methods for analyzing economic impacts. These methods have been used in past designations throughout the United States and have generally been found to be sufficient. Also, the final economic analysis of the proposed rule considers information gathered from interviews with individual property owners who submitted comments on the draft analysis.

(29) *Comment:* The level of predicted consultations appears to be based on the assumption that only commercial, as opposed to residential, development would trigger consultations, and the only anticipated Federal nexus for development was a party seeking an HCP.

Our Response: We apologize if the assumptions were not clear. We have clarified the assumptions in the final economic analysis.

(30) *Comment:* The draft economic analysis discounts entirely broader regional impacts, focusing only on the costs of consultation. The setting aside of land and delaying and increasing the costs of a variety of projects and activities will undoubtedly have a broader impact. In its draft economic analysis for the Kauai Cave wolf spider, the Service considered some of these broader economic impacts and determined that the impact of designating less than half the acreage proposed in Bexar County could be as high as $1.9 million. This difference in estimated costs is attributable to differences in methodology.

Our Response: We want to stress that the designation of critical habitat does not ''set aside'' land and does not create parks or preserves. We believe the economic analysis fairly estimated the costs of critical habitat designation in Bexar County (*see* our response to Comment 27). The final economic analysis of the proposed rule clarifies the methods used.

(31) *Comment:* Many landowners commented that their individual properties were of high economic value and the designation of critical habitat would substantially impact the future value and development potential of their properties. For this reason, the economic impact on individual property owners, in at least some instances, should outweigh the biological benefits of the designation of critical habitat.

Our Response: The regulatory requirements involving critical habitat apply only to those actions authorized, funded, or carried out by a Federal agency. We do recognize, however, that there can be a perceived effect which could influence property values, but believe any such effect is likely to be temporary in nature as the uncertainties and perceptions dissipate or become clarified over time. We will, through outreach and education, do all we can to correct this perception. We believe that the economic analysis appropriately considered the potential economic impacts of the proposed designation. Further, reductions in the amount of critical habitat in this final designation have resulted in a significant decrease in the amount of private land being designated.

(32) *Comment:* The draft economic analysis evaluates the effect of the total section 7 costs for individual units and then spreads those costs over the entire population of Bexar County. If these costs are attributed to the individual landowners in a single unit they would have a much greater impact. For instance, there are eight landowners in Unit 16, and the economic analysis is defective unless it measures the effects on those individual landowners.

Our Response: The analysis uses standard methods for analyzing the economic impacts of designating the areas included in our proposed rulemaking. These methods have been used in past designations throughout the United States and have generally been found to be sufficient. Time constraints prevented us from applying economic costs to individual property owners. We note also that the size of each unit designated is substantially reduced from what we proposed,

resulting from consideration of comments received and refinements in our methodology for identifying and mapping areas that meet the Act's definition of critical habitat. For instance, for Unit 16 our proposal included 61 ha (152 ac), whereas our final designation for that unit is 16 ha (40 acres).

(33) *Comment:* The draft economic analysis states that all of the critical habitat is over the Edwards Aquifer and then states which units are over the recharge zone. It isn't clear that only the units over the recharge zone get the protection measures that are listed. If the analysis assumed that all of the units get the same level of Edwards Aquifer protection, reevaluation of the numbers may be warranted.

Our Response: The draft economic analysis credited the protections only to those units in the recharge zone. We hope this point is adequately clarified in the final economic analysis of the proposed rule.

(34) *Comment:* For Unit 9, the draft economic analysis estimates only one technical assistance effort is anticipated and that no project modifications are anticipated. One request for assistance has already occurred, and probably one or two more will be required. In addition, a considerable amount of modification to University of Texas—San Antonio's plans in Unit 9 will have to occur to be in compliance with the proposed designation of critical habitat.

Our Response: The Service agrees that the effort was underestimated and corrections in the final economic analysis of the proposed rule have been made to reflect this. The Service agrees that if the proposed activities involve a Federal action, then modification of the proposed action may be needed. However, since this designation only involves occupied habitat, then the section 7 consultation requirements would have to be met (for the ''jeopardy standard'') regardless of the designation of critical habitat, and based on our experience in other situations, the outcome of such consultation is likely to be unchanged when it includes critical habitat.

(35) *Comment:* The estimates in Exhibit 4–4, page 44 (of the draft economic analysis) for anticipated costs to the Service, third parties, and the action agency do not cover the costs to date or future costs for UTSA in Unit 9, which are expected to be substantial.

Our Response: The final economic analysis of the proposed rule has been modified to incorporate expected costs to UTSA that would result from section 7 consultation related to development.

(36) *Comment:* The draft economic analysis does not adequately address the tremendous economic benefits of designating critical habitat, for example, the benefits to water supply protection for area residents.

Our Response: The value of economic benefits are difficult to estimate. The potential benefits of designating critical habitat are described subjectively in section 5 of the final economic analysis of the proposed rule.

(37) *Comment:* Landowners for Unit 12 provided specific value data to show a higher economic impact of the designation than provided in the economic analysis.

Our Response: The economic analysis includes consideration of a potential HCP for private development within this unit. Thus the comment is not inconsistent with the assumptions of the analysis. We do not expect costs to be greater than those represented by the formulation and implementation of the expected HCP.

Issue 5: Other Issues and Comments

(38) *Comment:* One commenter requested additional time so that the taxonomic description of a new subspecies of *Rhadine infernalis* can be completed.

Our Response: The Service is required to designate critical habitat for the Bexar County invertebrates within the time frame specified in the court settlement agreement. We have used the best scientific data available in making this designation.

(39) *Comment:* The City of San Antonio should be provided more exact cave locations for planning and protection of habitat, and to avoid inadvertent damage by the City.

Our Response: The Service and the City of San Antonio regularly exchange information for conservation of listed species. We understand that legally, the City may not be able to keep the cave locations confidential if we provided them, and having the locations generally known would pose an unacceptable risk of vandalism to the caves. Anyone may contact the Service for technical assistance to ensure their activities are consistent with conservation of these species. Helping make the public aware of the sensitive areas inhabited by these species is one of the most significant benefits of this designation. In addition to these critical habitat units, there are likely other localities where these species occur, of which we are not aware, or have not yet been discovered. Although they are not included in this designation, they are likely to be important for conservation of the species and should be considered in planning land management and development activities. We look forward to working with the City, and other partners, for management of their lands for the mutual benefit of the City's citizens and the conservation of the listed species.

(40) *Comment:* The Service should change the name of the Alamo Heights Karst Fauna Region so the public is not misled to believe the City of Alamo Heights is in critical habitat.

Our Response: The name of the Karst Fauna Region was taken from a report by George Veni and Associates (1994), which delineates separate geological regions in the San Antonio area. We recognize that the City of Alamo Heights is not within any of the units designated as critical habitat and regret any confusion the name of the faunal region might have caused. We have not used the Karst Faunal Region names in this final rule.

(41) *Comment:* Does critical habitat designation comply with Environmental Justice laws?

Our Response: Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations. We do not believe that the designation of critical habitat for endangered and threatened species results in any changes to human health or environmental effects on surrounding human populations, regardless of their socioeconomic characterization. As such, we do not believe that Executive Order 12898 applies to critical habitat designations.

(42) *Comment:* The required public notice to interested parties was not satisfied because numerous mailings were returned because of invalid zip codes.

Our Response: We made the best effort to notify all individual landowners involved directly. We sent the letters announcing the proposed rule and requesting comments to over 1,500 interested parties. Of those, about 200 were returned because of out-of-date addresses. We attempted to update addresses and remove duplicate addresses. We followed this mailing with over 1,200 postcards announcing the availability of the draft economic analysis and extension of the comment period. We regret that some of the attempts to contact interested parties

through the mail were unsuccessful. In addition to those efforts, the required public notices were published in the local newspaper. We also issued a news release, and there was coverage in the local newspaper and in other news media. Consequently, we believe we satisfactorily met the requirements for public notice to interested parties.

(43) *Comment:* The Texas Parks and Wildlife Department (TPWD) and the Department of Defense (DOD) submitted karst management plans for Government Canyon State Natural Area (GCSNA) and Camp Bullis, respectively, during the public comment period and requested that their properties be excluded from the final critical habitat designation.

Our Response: We reviewed the management plans submitted for both Camp Bullis and GCSNA. On the basis of our evaluation of these plans, we determined that they provide adequate special management and have not included the areas involved in the final designation of critical habitat. (See ''Lands Covered Under Existing Conservation Plans'' section for more information.)

Peer Review

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited independent opinions from knowledgeable individuals with expertise in one or several fields, including familiarity with the species, familiarity with the geographic region in which the species occurs, and familiarity with the principles of conservation biology. Only one of the eleven peer reviewers requested to review the proposed rule submitted comments. Overall the peer reviewer found the proposed rule to be an ''excellent, comprehensive document.'' The following specific comments were provided by the peer reviewer.

(44) *Comment:* The 36 ha (90 ac) zone of vegetation surrounding each known cave or cave complex should be adequate to preserve foraging habitat for cave crickets.

Our Response: In this final rule we have significantly reduced the areas around occupied caves that are included in the critical habitat designation. However, in most cases, the critical habitat boundaries were drawn to include a 50 m (164 ft) area plus a buffer, and best available information indicates that most cave crickets forage within 50 m (164 ft) of cave entrances (see ''Background'' section for additional information).

(45) *Comment:* The reviewer stated that habitat requirements described in the proposed rule seemed fine; however, the reviewer expressed concern that active management may be required to maintain natural surface habitat for the benefit of the subsurface environment. The reviewer also expressed concern about the encroachment of red imported fire ants and the impacts of predation on and competition with cave crickets and asked if there is a provision for dealing with this threat in the critical habitat units.

Our Response: We recognize the impact that fire ants likely have on listed karst invertebrates and the need for intense management to control this threat. The designation of critical habitat recognizes that these areas may need special management, however, the designation does not require any particular land management activities. Specific actions for management recommendations will likely be included in the future recovery plan for these species. We will work with landowners on a case-by-case basis to assist in land management provisions to protect the karst environment that supports the listed Bexar County invertebrates.

(46) *Comment:* There are no dispersal corridors between these habitat units to provide opportunities for movement of individuals between cave cricket populations.

Our Response: We know that dispersal corridors are likely important for the long-term maintenance of cave cricket populations (*see* Background section for discussion). However, we lack the necessary information to adequately quantify the specific locations of such corridors and therefore have not included them in this critical habitat designation.

(47) *Comment:* The commenter recommends deleting the reference in the ''Background'' section to a study concerning *Ceuthophilu gracilipes*, another species of cave crickets, because it is not appropriate in the context in which it was used.

Our Response: We deleted this reference, which had been included in our proposed designation, and updated the ''Background'' section of this final rule as suggested.

Summary of Changes From the Proposed Rule

On the basis of public comments, we reviewed our methodology for determining the extent of critical habitat designation for the Bexar County karst invertebrates. Consequently, we refined the boundaries of our original proposed critical habitat units for this final designation and clarified our description of the methodology and rationale used in defining the critical habitat boundaries. Overall, these changes resulted in designating 431 ha (1,063 ac) in 22 units as critical habitat, as compared to our proposed designation of 3,857 ha (9,516 ac) in 25 units. Table 2 provides a unit-by-unit list of the changes in this final rule, which are summarized below.

In the proposed rule, we delineated critical habitat boundaries on the basis of the following criteria: Known occupied caves; the cave footprint; surface/subsurface drainage areas associated with the occupied cave; the cave cricket foraging area plus a buffer; the contiguous karst deposit associated with the occupied cave; and a minimum of 36 ha (90 ac), where possible, to support dominant, subdominant, and rare plant species. In the final rule, we revised several of these criteria. We reduced the minimum area needed to support surface vegetation from 36 ha (90 ac) to 16 ha (40 ac), which is the minimum area we determined is needed to support 15 of the 24 plant species common to the Edwards Plateau, including the 7 species with the highest dominance values, as listed in Van Auken *et al.* (1980). We did not include an estimated area to support nine of the rarer plant species in our consideration of this minimum area, because of a lack of definitive information on the importance of such species to the functioning of the karst ecosystem. These nine species all have importance values of less than 1.0 and needed an area of approximately 20 to 80 ha (49 to 198 ac) to maintain their populations. We also reduced the criterion for the amount of contiguous karst deposit surrounding occupied caves. In the proposed rule, we delineated the unit boundaries to maximize the amount of contiguous karst deposit we estimated was necessary to provide for subsurface movement of listed species between and around occupied caves. However, because of lack of data allowing us to quantify the extent of subsurface karst needed to maintain populations of these species, in the final rule we delineated the boundaries to maximize the amount of subsurface karst deposit underlying the cave footprint, drainage areas, cave cricket foraging area plus buffer, and 16 ha (40 ac) vegetation area only. As a result of these revisions, the size of most units was reduced significantly (Table 2). (*See* ''Criteria Used to Designate Critical Habitat'' section for additional details.)

In addition to the changes in criteria, we also completely removed six units that had been proposed for designation (Units 1a, 1b, 1c, 1d, 10, and 11) from the final designation. Units 1a–1d were

located on the Government Canyon State Natural Area (GCSNA) and the majority of Unit 10 and all of Unit 11 were located on Department of Defense land at Camp Bullis. We did not include these six units in the final designation because we determined that the conservation plans for these areas provide adequate special management and protection, such that the areas do not meet the definition of critical habitat under section 3(5)(A)(i) of the Act. We also excluded these areas from designation based on section 4(b)(2). (See ''Lands Covered Under Existing Conservation Plans'' section.) Two of the nine species, the Government Canyon Bat Cave meshweaver and the Government Canyon Bat Cave spider, occur only in caves on the GCSNA. As a result of not including in the final designation the four units originally proposed on the GCSNA, no critical habitat is being designated for these two species.

As a result of applying our revisions of the criteria used to delineate the unit boundaries (as described above) we separated two units identified in the proposed rule into separate, smaller units in this final rule. Specifically, Unit 1e as described in the proposed rule has been separated into three smaller units (Units 1e1, 1e2, and 1e3), and we separated Unit 8 into Units 8a and 8b. Removing six units, separating Unit 1e into three smaller units and Unit 8 into two smaller units resulted in a net change of three fewer units in this final rule as compared to the proposed rule.

TABLE 2.—CHANGES IN UNIT NUMBER AND UNIT AREA BETWEEN PROPOSED AND FINAL RULES DESIGNATING CRITICAL HABITAT FOR SEVEN OF THE NINE BEXAR COUNTY KARST INVERTEBRATES

Proposed rule		Final rule	
Unit #	Total area of unit hectares (ha); acres (ac)	Unit #	Total area of unit hectares (ha); acres (ac)
1a	76 ha; 188 ac	1a	Government Canyon State Natural Area—excluded from critical habitat.
1b	47 ha; 116 ac	1b	
1c	47 ha; 116 ac	1c	
1d	47 ha; 116 ac	1d	
1e	341 ha; 842 ac	1e1	15 ha; 38 ac.
		1e2	16 ha; 40 ac.
		1e3	19 ha; 46 ac.
2	99 ha; 245 ac	2	37 ha; 92 ac.
3	63 ha; 154 ac	3	17 ha; 41 ac.
4	63; ha; 154 ac	4	16 ha; 40 ac.
5	47 ha; 116 ac	5	16 ha; 40 ac.
6	45 ha; 111 ac	6	16 ha; 40 ac.
7	50 ha; 123 ac	7	16 ha; 40 ac.
8	174 ha; 428 ac	8a	16 ha; 40 ac.
		8b	28 ha; 69 ac.
9	71 ha; 175 ac	9	16 ha; 40 ac.
10	367 ha; 906 ac	10	Camp Bullis—excluded from critical habitat.
11	1,273 ha; 3,143 ac	11	Camp Bullis—excluded from critical habitat.
12	105 ha; 258 ac	12	21 ha; 51 ac.
13	51 ha; 125 ac	13	16 ha; 40 ac.
14	173 ha; 426 ac	14	26 ha; 64 ac.
15	195 ha; 481 ac	15	34 ha; 85 ac.
16	61 ha; 152 ac	16	16 ha; 40 ac.
17	48 ha; 118 ac	17	16 ha; 40 ac.
18	40 ha; 100 ac	18	16 ha; 40 ac.
19	59 ha; 146 ac	19	5 ha; 12 ac.
20	160 ha; 395 ac	20	23 ha; 57 ac.
21	155 ha; 382 ac	21	27 ha; 68 ac.
Totals: 25 units; 3,857 ha; 9,516 ac		(1) 22 units; 431 ha; 1,063 ac.	

Critical Habitat

Critical habitat is defined in section 3(5)(A) of the Act as—(i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

''Conservation,'' as defined by section 3(3) of the Act, means the use of all methods and procedures which are necessary to bring an endangered or a threatened species to the point that measures provided pursuant to the Act are no longer necessary.

Section 7(a)(2) of the Act requires that Federal agencies shall, in consultation with the Service, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. Section 7 also requires conferences on Federal actions that are likely to result in the destruction or adverse modification of proposed critical habitat. Aside from the added protection that may be provided under section 7, the Act does not provide other forms of protection to lands designated as critical habitats. Consultation under section 7 of the Act does not apply to activities on private or other non-Federal lands that do not involve a Federal nexus (*i.e.*, Federal funding or authorization), and consequently critical habitat designation does not afford any additional regulatory protection or result in additional regulatory requirements under the Act in those circumstances. (*See* ''Effects of Critical Habitat

Designation'' for further discussion of consultations under section 7 of the Act.)

Critical habitat provides nonregulatory benefits to the species by informing the public and private sectors of areas that are important for species conservation, and where such conservation actions would be most effective. Designation of critical habitat can help focus conservation activities for a listed species by identifying areas that contain the physical and biological features that are essential for the conservation of that species, and can alert the public and land-managing agencies to the importance of those areas. Critical habitat also identifies areas that may require special management considerations or protection, and may help provide protection to areas where significant threats to the species have been identified, by helping people avoid causing accidental damage to such areas.

To be included in a critical habitat designation, the habitat must be ''essential to the conservation of the species.'' Critical habitat designations identify, to the extent known and using the best scientific and commercial data available, habitat areas that provide essential life cycle needs of the species (such as areas on which are found the primary constituent elements, as defined at 50 CFR 424.12(b)). Section 3(5)(C) of the Act states that, ''Except in those circumstances determined by the Secretary, critical habitat shall not include the entire geographical area which can be occupied'' by the listed species. In addition, our regulations (50 CFR 424.12(e)) state that ''The Secretary shall designate as critical habitat areas outside the geographic area presently occupied by the species only when a designation limited to its present range would be inadequate to ensure the conservation of the species.''

Section 4 (b)(2) of the Act requires that we take into consideration the economic impact, and any other relevant impact, of specifying any particular areas as critical habitat. We may exclude areas from critical habitat designation when the benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Our Policy on Information Standards Under the Endangered Species Act, published on July 1, 1994 (59 FR 34271), provides criteria, establishes procedures, and provides guidance to ensure that decisions made by the Service represent the best scientific and commercial data available. It requires that our biologists, to the extent consistent with the Act and with the use of the best scientific and commercial data available, use primary and original sources of information as the basis for recommendations to designate critical habitat. When determining which areas are critical habitat, a primary source of information should, at a minimum, be the listing rule for the species. Additional information may be obtained from a recovery plan (if available), articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, and biological assessments or other unpublished reports, and discussion with experts.

Section 4 of the Act requires that we designate critical habitat on the basis of what we know at the time of designation. Since much of the cave-forming rock is located on private property in areas that have not been adequately surveyed, additional populations for some of these species are likely to exist and may be discovered over time. We recognize that our designation of critical habitat for these species may not include all of the habitat areas that may eventually be determined to be necessary for the conservation of the species. For these reasons, this critical habitat designation should not be interpreted to mean that habitat outside the designation is unimportant or may not be required for conservation of the species. Critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning and recovery efforts if new information available to these efforts calls for a different outcome.

Habitat of the listed species that is not included in this critical habitat designation will continue to be subject to conservation actions implemented by Federal agencies under section 7(a)(1) of the Act, which directs Federal agencies to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Habitat outside the designation also will continue to receive regulatory protections afforded by the section 7(a)(2) jeopardy standard, which requires each Federal agency to insure, in consultation with the Service, that any action it authorizes, funds, or carries out is not likely to ''jeopardize the continued existence'' of a listed species. To achieve this objective, action agencies must consult with us whenever a Federal action ''may affect'' a listed species. This requirement applies regardless of whether critical habitat is designated, and Federally funded or assisted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases.

The applicability of the section 9 section take prohibition is not altered by the designation of critical habitat. Section 9 makes it unlawful for any person to ''take'' (defined broadly in section 3 as ''harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct'') a listed wildlife species. Under section 10(a) of the Act, the Service may issue a permit to a non-Federal entity authorizing ''take'' if certain conditions are met. These conditions include a finding by the Service that such take is incidental to otherwise legal conduct, and that the take ''will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.'' The issuance criteria for such take permits also require applicants to minimize and mitigate the effects of their permitted actions, to the maximum extent practicable.

Primary Constituent Elements

In accordance with section 3(5)(A) of the Act and regulations at 50 CFR 424.12(b), in determining which areas to designate as critical habitat, we consider those physical and biological features that are essential to the conservation of the species and that may require special management consideration or protection. As described in our regulations, these features include, but are not limited to, the following:

(1) Space for individual and population growth, and for normal behavior;

(2) Food, water, air, light, minerals, or other nutritional or physiological requirements;

(3) Cover or shelter;

(4) Sites for breeding, reproduction, and rearing of offspring, and generally;

(5) Habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Our regulations at 50 CFR 424.12(b) further direct that, when considering the designation of critical habitat, we are to focus on the principal biological or physical constituent elements within the defined area that are essential to the conservation of the species, and we are to list known primary constituent elements with the critical habitat description. Our regulations describe known primary constituent elements in terms that are more specific than the

description of physical and biological features. Specifically, our regulations state that primary constituent elements may include, but are not limited to, the following: Roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetland or dryland, water quality or quantity, host species of plant pollinator, geological formation, vegetation type, tide, and specific soil types.

Using the best scientific information available to us, we have determined that the primary constituent elements required by the karst invertebrates consist of: (1) The physical features of karst-forming rock containing subterranean spaces with stable temperatures, high humidities (near saturation) and suitable substrates (for example, spaces between and underneath rocks suitable for foraging and sheltering); and (2) the biological features of a healthy surface community of native plants (for example, juniper-oak woodland) and animals (for example, cave crickets) living in and near the karst feature that provide nutrient input and buffer the karst ecosystem from adverse effects (from, for example, nonnative species invasions, contaminants, and fluctuations in temperature and humidity).

Information Sources

As required by the Act and regulations (section 4(b)(2) and 50 CFR 424.12, respectively), we used the best scientific information available to determine critical habitat areas that contain the physical and biological features and primary constituent elements that are essential for the conservation of the karst invertebrate species. This information included: (1) Peer-reviewed scientific publications; (2) the final listing rule for the nine Bexar County karst invertebrate species (65 FR 81419); (3) unpublished field data, survey reports, notes, and communications from qualified biologists or experts; (4) published descriptions of the regional geology (Soil Conservation Service 1962; Veni 1988, 1994, 2002); and (5) recent digital orthophotographs (March 2001) and parcel maps (generated in early 2002) obtained from the Bexar County Appraisal District to determine the current status of habitat surrounding the known occupied caves.

In the proposed rule, we referred to Veni's 1994 karst zone maps to ensure that the majority of the lands within each proposed unit overlaid a contiguous deposit of karst-bearing rock either known to contain the listed species (Zone 1) and/or having a high probability of suitable habitat for the listed species (Zone 2) to maintain subsurface connectivity for species movement throughout the contiguous karst deposit. Recognizing that a significant amount of additional information has become available, either as a result of the discovery of new caves containing the listed species, or additional biological surveys conducted in previously mapped caves and/or as a result of the release of information not available at the time of the 1994 report, we contracted with George Veni & Associates to re-evaluate and, where necessary, redraw the boundaries of the Bexar County karst zones. The resulting report (Veni 2002) also estimated the surface and subsurface drainage areas associated with each occupied cave in Bexar County with the exception of several caves which occur on cliffs and several for which sufficient information was not available. We received the report during the public comment period and used the information to ensure that each unit overlaid a contiguous deposit of karst-bearing rock and that the estimated drainage basins associated with each occupied cave were, where possible, designated as critical habitat. Contiguous deposits of karst-bearing rock associated with occupied caves subterranean spaces were included to protect subsurface voids believed to maintain populations of the listed species and provide for species movement. The drainage basins associated with occupied caves were included in order to protect the quantity and quality of water entering the karst ecosystem which, in turn, maintains stable temperatures and high humidities required by the listed species and protects the system from contamination.

Information on the status and location of occupied caves was obtained from presence/absence survey reports submitted during project consultations conducted with the Service under section 7 of the Act, annual reports on research and conservation activities conducted under a section 10(a)(1)(A) scientific permit, section 6 species status reports, and literature published in peer reviewed journals. Survey reports and scientific permit annual reports typically contained cave location information in the form of a cave location indicated on a U.S. Geological Survey topographic maps and/or UTM coordinates, and a map of the cave footprint.

To improve the accuracy of our cave location information, we submitted a request to the Texas Speleological Survey (TSS) for any available digital location data (UTM coordinates) for Bexar County caves known to contain one or more of the nine endangered species. TSS is a non-profit corporation established in 1961 to collect, organize, and maintain information on Texas caves and karst for scientific, educational, and conservation purposes, and to support safe and responsible cave exploration, and is affiliated with the Texas Memorial Museum, the Texas Speleological Association, and the National Speleological Society. TSS provided the majority of the digital location data, and reviewed and confirmed our location data for caves where no digital information was available. The precision of the locations for which digital location data were available ranges from 1 m to 10 m (3ft to 33 ft) and data documented on topographic maps was estimated to be accurate to within 10 m to 20 m (33 ft to 66 ft). This variability in precision was taken into account when delineating unit boundaries. We further agreed that any requests for such information would be directed to TSS as owners of the data. The precise location of the caves within each unit is not specified on the critical habitat maps in order to protect these caves from potential vandalism and to protect private landowners from potential increases in trespassing.

Criteria Used To Delineate Critical Habitat

Using the best scientific data available (as summarized in the ''Background'' section), we developed the following criteria to identify and delineate lands for designation as critical habitat: caves known to be occupied by one or more of the listed karst invertebrate species; the cave footprint; the surface and subsurface drainage areas associated with each cave, to the extent possible; a 150 m (492 ft) area around each cave to encompass the cave cricket foraging area of 50 m (164 ft) on the surface, measured from the cave entrance(s) and a 100 m (328 ft) area around the cave cricket foraging area to buffer the animal community, including cave crickets, against the effects of urban edges and red imported fire ant invasion; and, where possible, a minimum of 16 ha (40 ac) around each cave or cave cluster. This minimum 16 ha core area consists of a minimum 13 ha (33 ac) needed to support at least 15 of 24 species of the vegetative community commonly found on the Edwards Plateau, plus a 3 ha (7 ac) area to buffer the vegetative community against edge effects associated with urban disturbances. This surface area also acts to incorporate areas of contiguous karst deposit around an occupied cave, which likely contains the listed species that occupy the cave.

In several instances (Units 2, 13, and 21), the surface or subsurface drainage basin associated with the occupied cave, as defined by Veni (2002), extends outside of the area originally designated in the proposed rule and therefore was not included in the final rule (*see* ''Critical Habitat Unit Descriptions'' section). Also, in several instances (Units 1e1, 3, 6, 8b, and 17), the cave, cave footprint, and portions of the cave cricket foraging area plus buffer, the drainage basins, and the 16-ha (40-ac) vegetative area are located on lands protected under the La Cantera HCP which were not included in the designation (see ''Unit Description'' and Lands Covered Under Existing Conservation Plans'' sections). The critical habitat area encompassing Robber Baron Cave (Unit 20) includes both the known and estimated extent of the cave's footprint. This cave is a complex maze cave consisting of approximately 1.51 km (0.94 mi) of passages known within a square area approximately 100 m (328 ft) on each side (Veni 1988). Prior to the extensive development that has occurred in the area, the cave's footprint was estimated to extend at least 100 m (328 ft) farther east to a water well, 600 m (1,969 ft) southwest to a now-sealed, extensive maze cave and about 1.2 km (0.75 mi) to the southwest to another well (Veni 1988). Exploration and mapping of these possible passages is continuing under the direction of the Texas Cave Management Association, which owns the cave entrance.

Critical Habitat Delineation

Lands designated as critical habitat for the seven endangered karst invertebrates occur in 22 separate units, with a total area of approximately 431 ha (1,063 ac). The lands within the critical habitat units are under private, city, and State ownership. Table 3 lists the known occupied caves, the total critical habitat unit area, land ownership, and the listed species that occur within each designated unit. Table 4 shows the listed species and the critical habitat unit(s) where they occur.

Each critical habitat unit contains one or more of the primary constituent elements needed by the karst invertebrate species. The ''Critical Habitat Unit Descriptions'' section (below) provides a description of lands within each unit and a description of how unit boundaries were delineated.

Areas within the boundaries of mapped units that have existing human-constructed, above-ground, impervious structures do not contain the primary constituent elements and are not considered to be critical habitat. Such features and structures include, but are not limited to, buildings and paved roads. However, subsurface areas under these structures are considered to be critical habitat since subterranean spaces containing these species or transmitting moisture and nutrients through the karst ecosystem extend, in some cases, underneath these existing human-constructed structures. Landscaped areas associated with existing human-constructed structures also are also not considered critical habitat because they do not contain the primary constituent elements. Although not considered to be critical habitat, these landscaped areas may provide some foraging area for cave crickets and other trogloxenes which are an important source of nutrients to the karst ecosystem.

TABLE 3.—KNOWN OCCUPIED CAVES, LAND OWNERSHIP AND LISTED SPECIES THAT OCCUR WITHIN EACH CRITICAL HABITAT UNIT DESIGNATED FOR ONE OR MORE OF THE ENDANGERED BEXAR COUNTY KARST INVERTEBRATES

Unit	Known occupied caves in unit	Total area of unit	Ownership	Listed species in unit
1e1	Pig Cave	15 ha (38 ac)	Private, city	*Rhadine exilis*
	San Antonio Ranch Pit			*R. infernalis*
				Batrisodes venyivi
1e2	Continental Cave	16 ha (40 ac)	City	*R. infernalis*
1e3	Creek Bank Cave	19 ha (46 ac)	Private, city	*R. exilis*
	Tight Cave			
2	Logan's Cave	37 ha (92 ac)	Private	*Cicurina madla*
	Madla's Drop Cave			*R. exilis*
				R. infernalis
3	Helotes Blowhole*	17 ha (41 ac)	Private	*C. madla*
	Helotes Hilltop Cave*			*R. exilis*
				R. infernalis
				B. venyivi
4	Kamikazi Cricket Cave	16 ha (40 ac)	Private	*R. exilis*
				R. infernalis
5	Christmas Cave	16 ha (40 ac)	Private	*C. madla*
				R. exilis
				R. infernalis
				B. venyivi
6	John Wagner Ranch	16 ha (40 ac)	Private, city	*R. exilis*
	Cave No. 3*			*R. infernalis*
7	Young Cave No. 1	16 ha (40 ac)	Private	*R. exilis*
8a	Three Fingers Cave	16 ha (40 ac)	Private	*R. exilis*
				R. infernalis
8b	Hills and Dales Pit*	28 ha (69 ac)	Private, city	*C. madla*
	Robber's Cave			*R. infernalis*
				R. exilis
9	Mastodon Pit	16 ha (40 ac)	State	*R. exilis*
12	Hairy Tooth Cave	21 ha (51 ac)	Private	*R. exilis*
	Ragin' Cajun Cave			
13	Black Cat Cave	16 ha (40 ac)	Private	*R. exilis*
14	Game Pasture Cave No. 1	26 ha (64 ac)	Private	*R. infernalis*
	King Toad Cave			
	Stevens Ranch Trash Hole Cave			
15	Braken Bat Cave	34 ha (85 ac)	Private	*Cicurina venii*
	Isopit			*R. infernalis*

TABLE 3.—KNOWN OCCUPIED CAVES, LAND OWNERSHIP AND LISTED SPECIES THAT OCCUR WITHIN EACH CRITICAL HABITAT UNIT DESIGNATED FOR ONE OR MORE OF THE ENDANGERED BEXAR COUNTY KARST INVERTEBRATES—Continued

Unit	Known occupied caves in unit	Total area of unit	Ownership	Listed species in unit
	Obvious Little Cave			
	Wurzbach Bat Cave			
16	Caracol Creek Coon Cave	16 ha (40 ac)	Private	*R. infernalis*
17	Madla's Cave*	16 ha (40 ac)	Private	*C. madla* *R. infernalis*
18	Mattke Cave	16 ha (40 ac)	Private	*R. infernalis*
	Scorpion Cave			
19	Genesis Cave	5 ha (12 ac)	Private	*R. infernalis*
20	Robber Baron Cave	23 ha (57 ac)	Private	*Texella cokendolpheri* *Cicurina baronia*
21	Hornet's Last Laugh Pit	27 ha (68 ac)	City, Private	*R. exilis*
	Kick Start Cave			
	Springtail Crevice			
Totals				
22	31 caves	431 ha (1,063 ac)		

*Indicates caves and associated lands protected by management under La Cantera's Section 10 permit; these are not included in this designation or in the area figures.

TABLE 4.—LIST OF THE NINE ENDANGERED BEXAR COUNTY KARST INVERTEBRATES AND THE CRITICAL HABITAT UNITS WITHIN WHICH THEY OCCUR

Species name	Critical habitat unit(s) of occurrence
Braken Bat Cave meshweaver (*Cicurina venii*).	15
Cokendolpher cave harvestman (*Texella cokendolpheri*).	20
Government Canyon Bat Cave meshweaver (*Cicurina vespera*).	No critical habitat designated.
Government Canyon Bat Cave spider (*Neoleptoneta microps*).	No critical habitat designated.
Madla Cave meshweaver (*Cicurina madla*).	2, 3, 5, 8b, 17
Robber Baron Cave meshweaver (*Cicurina baronia*).	20
Beetle (*Rhadine exilis*)	1e1, 1e3, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 12, 13, 21
Beetle (*Rhadine infernalis*)	1e1, 1e2, 2, 3, 4, 5, 6, 8a, 8b, 14, 15, 16, 17, 18, 19
Helotes mold beetle (*Batrisodes venyivi*).	1e1, 3, 5

Of the 74 caves known to contain one or more of the listed species, 43 were not included in the critical habitat designation. These 43 caves, and the reasons they were not designated, are described in the following summary.

Two caves, referred to as ''unnamed cave ½ mile N of Helotes'' and ''5 miles NE of Helotes,'' were not included in the proposed or final designation because their precise locations are unknown.

One cave, Crownridge Canyon Cave, was confirmed as a new location for one of the listed species during the public comment period. This cave was not included in this final determination because deadlines negotiated under the court-ordered settlement did not allow us to re-propose critical habitat, and thus there was not opportunity for the public to comment on its inclusion. Although we cannot include Crownridge Canyon Cave in this designation of critical habitat, we consider the cave and the associated karst ecosystem to be important to the conservation of the species. Because the cave is known to be occupied, it will receive protection under sections 7 (under the ''jeopardy standard'' standard), 9, and 10 of the Act.

Of the ten occupied caves associated with the La Cantera HCP, none were included in the proposed designation, and we have not included them in the final designation of critical habitat. We authorized two caves for take of *C. madla* under La Cantera's section 10(a)(1)(B) permit associated with the HCP. These two caves were heavily impacted as a result of authorized take and are not expected to contribute to the species' recovery. The other eight caves associated with the La Cantera HCP are protected within five karst management areas that will be perpetually managed and monitored in accordance with the conservation needs of the species. In most cases, these karst management areas were not considered adequate as stand alone preserves. Therefore, where appropriate, we included lands surrounding these occupied caves and associated management areas as part of the designation of critical habitat, as these lands provide physical and biological features that are essential to the conservation of the species. These areas include: Canyon Ranch Pit, Fat Man's Nightmare Cave, and Scenic Overlook Cave and the surrounding approximately 30 ha (75 ac); Helotes Blowhole and Helotes Hilltop caves and the surrounding approximately 10 ha (25 ac); John Wagner Ranch Cave No. 3 and the surrounding approximately 1.6 ha (4 ac); Hills and Dales Pit and the surrounding approximately 28 ha (70 ac); and Madla's Cave and the surrounding approximately 2 ha (5 ac). These eight caves and their associated karst management areas are being protected under the HCP, and we have not included them in this critical habitat designation (see ''Lands Covered Under Existing Conservation Plans'' section). Because of their geographic relationship to the rest of the critical habitat unit, it was difficult to show some of these areas in our mapping process. Thus, although some of these areas occur within the mapped area, they are not included in a legal sense through language in the final determination.

We did not include seven occupied caves in the Government Canyon State Natural Area (GCSNA), which is owned by the Texas Parks and Wildlife Department (TPWD), and 23 occupied caves on the Department of Defense's (DOD) Camp Bullis, in this critical habitat designation. Five of these caves were known to be occupied at the time of the proposed rule and were included in the proposed rule. The presence of listed species in the other two caves was confirmed by TPWD during the public comment period. During the public comment period, the Service received

and approved karst management plans submitted by each agency. These plans commit TPWD and DOD to long-term management and monitoring strategies that for the listed species and their habitat on their respective lands. The ''Lands Covered Under Existing Conservation Plans'' section explains the reasons why we did not include these areas in this designation of critical habitat.

Critical Habitat Unit Descriptions

Unless otherwise indicated in the unit descriptions below, each unit encompasses the following components: one or more occupied caves; the footprint of each cave; a 150 m (492 ft) area around the cave to encompass the cave cricket foraging area (50 m (164 ft)) and a buffer of 100 m (328 ft) against the effects of urban edges and red imported fire ant invasion; the surface and subsurface drainage areas associated with each cave as estimated in Veni (2002), to the extent possible; and, where possible, a minimum of 16 ha (40 ac) of surface vegetation encompassing each cave or cave cluster. Also, where possible, each unit was delineated to include contiguous deposits of Zone 1 karst-bearing rock as defined by Veni (2002) underlying the cave cricket foraging area plus buffer, the drainage areas, and the vegetative area.

As explained previously (*see* ''Critical Habitat Delineation'' section), some of the units include human-constructed, aboveground, impervious structures (e.g., buildings, paved roads) that do not contain the primary constituent elements and are not considered to be critical habitat. They are included within the mapped unit because subsurface areas under these structures are considered to be critical habitat, since subterranean spaces containing the karst species, or transmitting moisture and nutrients through the karst ecosystem, extend underneath these existing human-constructed structures. Within the units, landscaped areas associated with existing human-constructed structures also are not considered to be critical habitat because they do not contain the primary constituent elements, although they may provide some foraging area for cave crickets and other trogloxenes that are an important source of nutrients to the karst ecosystem.

Critical habitat boundaries are described as the area bounded by coordinates provided as geographic longitude and latitude coordinate pairs (e.g., –98.7612682, 29.4363049), referenced to North American Horizontal Datum 1983 (NAD 83). Coordinates were derived from 2001 digital orthophotographs obtained from the Bexar County Appraisal District. A description of each unit designated, including the current status of the lands in and around the unit, is presented below.

Unit 1e1

Unit 1e1 contains two occupied caves (Table 3). The surface of the unit consists primarily of undeveloped land. The majority of the unit is privately owned, with a small portion occurring on the City of San Antonio's Iron Horse Canyon tract, which was purchased under the Proposition 3 program. Proposition 3 is the Parks Development and Expansion Venue Project passed by San Antonio voters in 2000 for preservation of undeveloped Edwards Aquifer Recharge Zone lands. This unit is surrounded by undeveloped, privately owned land, including the City of San Antonio's Iron Horse Canyon tract and the La Cantera Canyon Ranch karst management area, which is being managed in perpetuity for the conservation of the species under a section 10(a)(1)(B) permit. (See ''Lands Covered Under Existing Conservation Plans'' section.) This unit contains all of the components described above, with the exception of a portion of the groundwater drainage area and cave cricket foraging area and buffer associated with San Antonio Ranch Pit extends onto La Cantera's Canyon Ranch karst management area, which is being managed for the conservation of the listed karst invertebrates.

Unit 1e2

Unit 1e2 contains one occupied cave (Table 3). The surface of the unit consists primarily of undeveloped lands with a few small roads. The entire unit occurs on the City of San Antonio's Iron Horse Canyon property. This unit contains all of the components described above.

Unit 1e3

Unit 1e3 contains two occupied caves (Table 3). The surface of the unit consists of undeveloped land with several small roads. The majority of the land is privately owned with a portion of the unit occurring on the City of San Antonio's Iron Horse Canyon property. This unit is surrounded by undeveloped, privately owned land, the City of San Antonio's Iron Horse Canyon property, and TPWD's Government Canyon State Natural Area. This unit contains all of the components described above, with the exception of a portion of the 21 ha (51 ac) subsurface drainage area shared by both caves that occurs on TPWD's Government Canyon State Natural Area, which we did not include in the designation (*see* ''Lands Covered Under Existing Conservation Plans'' section).

Unit 2

Two occupied caves occur within this Unit 2 (Table 3). The surface of Unit 2 consists of large, privatelyowned tracts, which appear to be primarily undeveloped with the exception of several small buildings and two or three small roads. The unit is surrounded by primarily undeveloped privately owned land. This unit contains all of the components described above, with the exception of a small portion of the 80-acre subsurface drainage basin associated with these caves that extends outside of the western boundary of this unit. This area was not included in this final determination because it was not identified in the proposed rule and therefore was not available for public comment. Although not included in the critical habitat area, minimizing impacts to the subsurface drainage area associated with these caves may be important for the conservation of the species in that cave.

Unit 3

Unit 3 consists of large tracts of primarily undeveloped privately owned land. La Cantera's Helotes Blowhole/Helotes Hilltop karst management area (approximately 10 ha (25 ac)) occurs entirely within this unit and contains two occupied caves (Table 3). This management area was acquired by La Cantera under their Section 10(a)(1)(B) permit, which requires that these caves and the surrounding lands be managed in perpetuity for the conservation of the species. We did not include these caves and associated management areas in the designation of critical habitat (see ''Lands Covered Under Existing Conservation Plans'' section). This unit was delineated to encompass the portion of the cave cricket foraging area plus buffer, the 16 ha (40 ac) vegetation area, and the subsurface drainage basin shared by the occupied caves that extends outside of the area protected under the La Cantera HCP. The majority of the unit overlies a contiguous deposit of Zone 1 karst-bearing rock and a small portion of Zone 3 as defined in Veni (2002), which underlies part of the cave cricket foraging area and buffer.

Unit 4

Unit 4 includes one occupied cave (Table 3). Lands surrounding Unit 4 consist of relatively large undeveloped tracts with some subdivided residential tracts that appear to be partially developed. The majority of the unit

overlies a contiguous deposit of Zone 1 karst-bearing rock with a small portion of Zone 3, which underlies part of the cave cricket foraging area and associated buffer areas. This unit contains all of the components described above.

Unit 5

Unit 5 contains one occupied cave (Table 3). The surface of Unit 5 consists of a large tract of privately owned, undeveloped land and several smaller tracts developed with homes and an associated residential road. The unit is bordered to the north and northwest by large tracts of undeveloped land and bordered on the remaining sides by smaller tracts with some residential development. This unit contains all of the components described above. The majority of the unit overlies a contiguous deposit of Zone 1 karst-bearing rock, with a small portion of Zone3, which underlies part of the cave cricket foraging area and associated buffer area.

Unit 6

La Cantera's John Wagner Ranch Cave #3 karst management area is within this unit, and contains one occupied cave (Table 3). This cave, and approximately 1.6 ha (4 ac) surrounding the cave, were acquired by La Cantera under their section 10(a)(1)(B) permit. The permit requires that the cave and the surrounding lands be managed in perpetuity for the conservation of the species. We did not include this cave, and the associated lands being managed under the permit, in this designation of critical habitat (see ''Lands Covered Under Existing Conservation Plans'' section). The surface of Unit 6 consists of several subdivided, large-lot tracts with homes and their associated roads and a large, undeveloped tract to the north owned by the City of San Antonio as part of the Thrift tract, which was purchased under the Proposition 3 program. The unit is surrounded on most of three sides by the City-owned Thrift tract and is adjacent to large-lot residential development to the south and southwest. This unit was delineated to encompass the portion of the cave cricket foraging area plus buffer, the subsurface drainage basin, and 16 ha (40 ac) vegetation area that extends outside of the area protected under the La Cantera HCP. The majority of Unit 6 overlies a contiguous deposit of Zone 1 karst-bearing rock with a small portion of Zone 3, which underlies part of the cave cricket foraging area and associated buffer area.

Unit 7

Unit 7 contains one occupied cave (Table 3). The surface of Unit 7 consists of relatively large, privately owned, undeveloped tracts with a few residential roads. The unit is surrounded by large, primarily undeveloped, privately-owned land. This unit contains all of the components described above.

Unit 8a

Unit 8a contains one occupied cave (Table 3). The surface of Unit 8a consists of large tracts of undeveloped land with a few small roads. About half of the unit is privately-owned. The other half lies within the City of San Antonio's Medallion tract, which was purchased under the Proposition 3 program. The unit is surrounded by undeveloped, privately owned lands and the City's Medallion property. This unit contains all of the components described above.

Unit 8b

Unit 8b contains two occupied caves (Table 3). The surface consists of large, primarily undeveloped tracts. A large portion of this unit occurs on the City of San Antonio's Medallion property, which was purchased under the Proposition 3 program. This unit also contains a portion of La Cantera's Hills and Dales Pit karst management area, which contains Hills and Dales Pit, one of the two occupied caves within the unit (Table 3). Hills and Dales Pit and 28 ha (70 ac) surrounding the cave were acquired by La Cantera under a section 10(a)(1)(B) permit, which requires that the cave and the surrounding lands be managed in perpetuity for the conservation of the species. We did not include this cave and associated lands in this designation of critical habitat (see ''Lands Covered Under Existing Conservation Plans'' section). This unit was delineated to encompass the portion of the 33-acre surface drainage basin and cave cricket foraging area plus buffer associated with Hills and Dales Pit that extends outside of the 28-ha management area protected under the La Cantera HCP, as well as all of the components associated with Robber's Cave as described above.

Unit 9

Unit 9 contains one occupied cave (Table 3). The surface of the unit consists of a large tract of undeveloped land owned by the University of Texas at San Antonio (UTSA). The unit is bordered to the north by Loop 1604, a major highway, to the west by the UTSA campus, and to the south and east by currently undeveloped land. A portion of the unit overlies a contiguous deposit of Zone 1 karst-bearing rock with the remainder being defined as Zone 2. This unit contains all of the components described above.

Unit 12

Unit 12 contains two occupied caves (Table 3). The unit is surrounded by residential development. Within the unit, there are multiple residential lots surrounding a tract of undeveloped land. The lots appear to be partially developed. Several residential roads and one major roadway occur within the unit. As explained above, these human-constructed features are not considered critical habitat, but subsurface areas under these structures are part of the designation of critical habitat. This unit contains all of the components described above.

Unit 13

Unit 13 includes one occupied cave (Table 3). The surface of the unit consists primarily of large privately owned tracts with some residential development. Bulverde Road, a major roadway, bisects the western portion of the unit. Unit 13 is bordered by dense residential development to the northwest and large-lot residential development to the northeast. The lands to the south, southeast, and southwest consist of large, primarily undeveloped tracts. This unit contains all of the components described above, with the exception of a portion of the subsurface drainage area, which extends outside of the western boundary of the unit underneath an area of existing residential development. This drainage area was not included in this final determination because it was not identified in the proposed rule and therefore was not available for public comment, and because of the legal settlement agreement to complete this designation by a specific deadline, we did not have time to republish the critical habitat proposal to include this area and allow public comment on it. Although this area is not included in the critical habitat area, minimizing impacts to the subsurface drainage area associated with Black Cat Cave may be important for the conservation of the species in that cave.

Unit 14

Unit 14 contains three occupied caves (Table 3). The surface of the unit consists of several large privately owned, undeveloped tracts and is surrounded by large tracts of currently undeveloped land. This unit contains all of the components described above.

Unit 15

Unit 15 contains four occupied caves (Table 3). The unit occurs within and is surrounded by large-lot residential development. This unit contains all of the components described above.

Unit 16

Unit 16 includes one occupied cave (Table 3). The surface of this unit consists of several large privately owned, undeveloped tracts. The unit is surrounded on three sides by privatelyowned undeveloped land. Loop 1604, a major roadway, goes through the eastern part of the unit and lies above the eastern portion of the subsurface drainage area associated with the cave. This unit contains all of the components described above.

Unit 17

Unit 17 consists of several large privately owned undeveloped tracts with a few small roads and is surrounded by privately owned undeveloped land. La Cantera's Madla's Cave management area occurs within this unit and contains the one occupied cave in the unit (Table 3). This cave and the approximately 2 ha (5 ac) surrounding the cave is under a conservation easement acquired by La Cantera under a section 10(a)(1)(B) permit, which requires that this cave and the surrounding lands be managed in perpetuity for the conservation of the species. We did not include this cave, as well as the the associated lands covered by the permit, in the designation of critical habitat (*see* ''Lands Covered Under Existing Conservation Plans'' section). This unit was delineated to encompass the portions of the cave cricket foraging area plus buffer and 16 ha (40-ac) vegetative area that extend outside of the management area protected under the La Cantera HCP. The majority of the unit overlies a contiguous deposit of Zone 1 karst-bearing rock with a small portion of Zone 3, which underlies part of the cave cricket foraging area and associated buffer area.

Unit 18

Unit 18 includes two occupied caves (Table 3). The surface of this unit consists of large privately owned undeveloped tracts and several smaller residential lots developed with homes. Unit 18 is surrounded on three sides by residential and commercial development and on the fourth side by a large undeveloped tract. This unit contains all of the components described above. The majority of the unit overlies a contiguous deposit of Zone 1 karst-bearing rock and a small portion of Zone 3 as defined in Veni (2002), which underlies part of the cave cricket foraging area and buffer.

Unit 19

This unit contains one cave (Table 3). Genesis Cave is one of only two locations currently known to contain *Rhadine infernalis infernalis* (Table 1) and is therefore particularly important for the conservation of the species. Genesis Cave is the deepest explored cave in Bexar County, extending below the water table, and has been mapped down to 78 m (256 ft) (Veni 1988).

The majority of the land within this unit has been developed for residential and/or commercial uses. As a result of the extensive existing development within this unit, the surface vegetation has been reduced and degraded and only small vegetated areas remain. Therefore, this unit does not contain the primary constituent element of a healthy surface plant community and was delineated to encompass the cave, its footprint, the surface and subsurface drainage area, and a portion of the cave cricket foraging area with potential for being restored to native vegetation. The cave is surrounded by approximately 2 acres of undeveloped land, which is adjacent to several small parcels of undeveloped land. We believe that these areas, by themselves, are not sufficient to maintain a healthy plant community and that intensive management will likely be needed to provide nutrients and water to the listed species in this cave. However, these small undeveloped areas surrounding the cave may provide foraging area for crickets inhabiting Genesis Cave and should be managed to benefit the species.

Unit 20

This unit contains one occupied cave (Table 3). Robber Baron Cave is the only known location for two of the nine listed species (Table 1) and because the cave is located within an area that is geologically isolated from other karst areas in the San Antonio region, these two species are not likely to occur outside this area (Veni 1994). Therefore, this cave is particularly important for the conservation of these species. Robber Baron Cave is by far the longest cave in Bexar County consisting of approximately 1.51 km (0.94 mi) of passages known within a square area approximately 100 m (328 ft) on each side (Veni 1988). Prior to the extensive development that has occurred in the area, the cave's footprint was estimated to extend at least 100 m (328 ft) farther east to a water well, 600 m (1,969 ft) southwest to a now-sealed extensive maze cave, and about 1.2 km (0.75 mi) to the southwest to another well (Veni 1988). The estimated footprint of the cave now extends underneath numerous residential and commercial developments. The Texas Cave Management Association (TCMA) now owns and manages the cave entrance and about 0.2 ha (0.5 ac) surrounding the opening. TCMA, in cooperation with the Service's Partners for Fish and Wildlife Program, is currently working to replace the existing cave gate, which consists of a concrete bunker created to deter access, with a new gate that will facilitate exchange of air and nutrients into the cave as well as restrict access. TCMA also plans to restore the grounds immediately surrounding Robber Baron Cave to a more natural state and repair the perimeter fence to regulate access.

The majority of the surface land within this unit has been developed for residential and/or commercial uses. As a result of the extensive existing development within this unit, the surface vegetation has been reduced and degraded and only small vegetated areas remain. Therefore, this unit does not contain the primary constituent element of a healthy surface plant community. The unit was designated to encompass the cave; the cave footprint, both the known and estimated extent; and the surface and subsurface drainage area. Vegetation surrounding the cave entrance consists primarily of nonnative species used for residential landscaping. Intensive management will likely be needed to provide nutrients and water to the listed species in this cave.

Unit 21

Unit 21 contains three occupied caves (Table 3). The majority of this unit occurs within the City of San Antonio's Stone Oak property, purchased under the Proposition 3 program. Several residential lots also occur within the unit boundaries. This unit contains all of the components described above, with the exception of the majority of the over 5,600-ac surface drainage area associated with Springtail Crevice Cave as defined by Veni (2002). This drainage area was not included in this final determination because it was not identified in the proposed rule and therefore was not available for public comment, and because of time deadlines associated with the legal settlement agreement to complete this designation, we did not have time to republish the critical habitat proposal to include this area and allow public comment on it. Although not included in the critical habitat area, minimizing impacts to the surface drainage area associated with this cave may be important for the conservation of the species in that cave.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out are not likely to jeopardize the continued existence of a list species or result in the destruction or adverse modification of critical habitat. In our regulations at 50 CFR 402.02, we define destruction or adverse modification as ''a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.'' However, in a March 15, 2001, decision of the United States Court of Appeals for the Fifth Circuit (*Sierra Club* v. *U.S. Fish and Wildlife Service et al.,* 245 F.3d 434), the Court found our definition of destruction or adverse modification to be invalid. In response to this decision, we are reviewing the regulatory definition of adverse modification in relation to the conservation of the species.

Section 7(a)(2) of the Act requires Federal agencies to evaluate their actions with respect to any species that is listed as endangered or threatened and with respect to its critical habitat, if any is designated. Activities on Federal lands that may affect the listed karst invertebrates or their designated critical habitat will require section 7 consultation with the Service. Federal agencies also must consult with the Service under section 7 with regard to actions they authorize (permit) or fund that occur on private, State, or other non-Federal lands if the action may affect listed species or designated critical habitat. Actions authorized, funded, or implemented by Federal agencies that affect listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. Federal actions that do not affect the species or designated critical habitat, as well as actions on non-Federal lands that are not federally funded or permitted, will not require section 7 consultation. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402.

Section 7(a)(4) of the Act requires Federal agencies to confer on any action likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. Conference reports provide conservation recommendations to assist the agency in eliminating conflicts that may be caused by the proposed action. The conservation recommendations are advisory. We may issue a formal conference report, if requested by the Federal action agency. Formal conference reports include an opinion that is prepared according to 50 CFR 402.14, as if the species was listed or critical habitat was designated. We may adopt the formal conference report as the biological opinion when the species is listed or critical habitat is designated, if no substantial new information or changes in the action alter the content of the opinion (see 50 CFR 402.10(d)).

If we issue a biological opinion, resulting from a section 7 consultation, concluding that a Federal action is likely to result in the destruction or adverse modification of critical habitat, we also would provide reasonable and prudent alternatives to the action, if any are identifiable. Reasonable and prudent alternatives are defined at 50 CFR 402.02 as alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that we believe would avoid destruction or adverse modification of critical habitat.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions under certain circumstances, including instances where critical habitat is subsequently designated and the Federal agency has retained discretionary involvement or control over the action or such discretionary involvement or control is authorized by law. Consequently, some Federal agencies may request reinitiation of consultation with us on actions for which formal consultation has been completed if those actions may affect designated critical habitat.

Activities on Federal lands that may affect any of the nine karst invertebrates or the designated critical habitat will require consultation under section 7 of the Act. Activities on private, State, or other non-Federal lands that involve a Federal action such a permit (*e.g.,* a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act or a Construction General permit from the U.S. Environmental Protection Agency), or Federal funding (*e.g.,* from the Federal Highway Administration, Federal Aviation Administration, Federal Emergency Management Agency, Natural Resources Conservation Service, or Housing and Urban Development) also will continue to be subject to the section 7 consultation process. Federal actions that do not affect listed species or critical habitat, as well as actions on non-Federal lands that are not federally funded or permitted, do not require section 7 consultation.

Section 4(b)(8) of the Act requires us to evaluate briefly in any proposed or final regulation that designates critical habitat those activities which, if undertaken, may adversely modify such habitat or that may be affected by such designation. Activities that may result in the destruction or adverse modification of critical habitat include those that alter the primary constituent elements to an extent that the value of critical habitat for the conservation of any of the seven karst invertebrates is appreciably reduced. These activities may occur outside the designated critical habitat and still result in destruction or adverse modification; for example, activities in the drainage area or locations adjacent to the critical habitat that impacts the karst environment within the designated critical habitat. Activities that may directly or indirectly adversely affect critical habitat for these karst invertebrates include, but are not limited to:

(1) Removing, thinning, or destroying perennial surface vegetation, with the exception of landscaping associated with existing human-constructed, above-ground, impervious structures, occurring in any critical habitat unit, whether by burning, mechanical, chemical, or other means (for example, wood cutting, grading, overgrazing, construction, road building, pipelines, mining, herbicide application);

(2) Alteration of the surface topography or subsurface geology within any critical habitat unit that results in significant disruption of ecosystem processes that sustain the cave environment. This may include, but is not limited to, such activities as filling cave entrances or otherwise reducing airflow, which limits oxygen availability; modifying cave entrances, or creating new entrances that increase airflow and result in drying; altering natural drainage patterns (surface or subsurface) in a manner that alters the amount of water entering the cave or karst feature; removal or disturbance of native surface vegetation that may alter the quality or quantity of water entering the karst environment; soil disturbance that results in increased sedimentation in the karst environment; increasing impervious cover that may decrease water quantity entering the karst

environment within any critical habitat unit (*e.g.,* paving over a vegetated area); and altering the entrance or opening of the cave or karst feature in a way that would disrupt movements of raccoons, opossums, cave crickets, or other animals that provide nutrient input; or otherwise negatively altering the movement of nutrients into the cave or karst feature;

(3) Discharge or dumping of chemicals, silt, pollutants, household or industrial waste, or other harmful material into or near critical habitat units that may affect surface plant and animal communities or that affects the subsurface karst ecosystem.

(4) Pesticide or fertilizer application in or near critical habitat units that drain into these karst features or that affect surface plant and animal communities that support karst ecosystems. Careful use of pesticides in the vicinity of karst features may be necessary in some instances to control nonnative fire ants. Guidelines for controlling fire ants in the vicinity of karst features are available from us (*see* **ADDRESSES** section);

(5) Activities within caves that lead to soil compaction, changes in atmospheric conditions, or abandonment of the cave by bats or other fauna;

(6) Activities that attract or increase access for fire ants, cockroaches, or other invasive predators, competitors, or potential vectors for diseases or parasites into caves or karst features within the critical habitat units (*e.g.*, dumping of garbage in or around caves or karst features); and

(7) Release of certain biological control organisms within or adjacent to critical habitat areas. Biological control organisms include, but are not limited to, predaceous or parastoid (*i.e.*, an organism that lays its eggs in the body of another animal) vertebrates or invertebrates, fungi, bacteria, or other natural or bioengineered organisms.

Not all of the identified activities will necessarily result in the destruction or adverse modification of critical habitat. They indicate, however, the potential types of activities that will require section 7 consultation in the future and, therefore, that may be affected by the designation of critical habitat. To properly portray the effects of critical habitat designation, we must compare the section 7 requirements for actions that may affect critical habitat with the requirements for actions that may affect a listed species. All of the areas designated as critical habitat are known to contain one or more caves occupied by one or more of the listed karst invertebrates. Therefore, all of the actions described above as potentially adversely modifying critical habitat are also likely to adversely affect the listed species. Federal agencies already are required to consult with us on activities in areas where the species may be affected to ensure that the actions of the agency are not likely to jeopardize the continued existence of the species. Therefore, we do not expect that this designation of critical habitat will result in a regulatory burden above that already in place because of the presence of the listed species.

If you have questions regarding whether specific activities would constitute adverse modification of critical habitat, please contact Robert T. Pine, Supervisor, Austin Ecological Services Field Office (*see* **FOR FURTHER INFORMATION CONTACT** section). Requests for copies of the regulations on listed wildlife and plants, and inquiries about prohibitions and permits, should be directed to the U.S. Fish and Wildlife Service, Endangered Species Act Section 10 Program (*see* **ADDRESSES** section).

Lands Covered Under Existing Conservation Plans

The first portion of the definition of critical habitat in section 3(5)(A) of the Act states that critical habitat means: ''(i) The specific areas within the geographical area occupied by the species, at the time it is listed * * * on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection.'' As part of our process of developing a critical habitat designation, we evaluate existing management plans to determine whether an area may require special management or protection and thus qualifies as critical habitat. The Service believes that special management or protection is not required if an area is covered by a legally operative plan that addresses the maintenance and improvement of essential habitat elements and that provides for the long-term conservation of the species.

We consider a current plan to provide adequate special management or protection if it meets three criteria: (1) The plan is complete and provides a conservation benefit to the species (*i.e.*, the plan must maintain or provide for an increase in the species' population, or the enhancement or restoration of its habitat within the area covered by the plan); (2) the plan provides assurances that the conservation management strategies and actions will be implemented (*i.e.*, those responsible for implementing the plan are capable of accomplishing the objectives, and have an implementation schedule or adequate funding for implementing the management plan); and (3) the plan provides assurances the conservation strategies and measures will be effective (*i.e.*, it identifies biological goals, has provisions for reporting progress, and is of a duration sufficient to implement the plan and achieve the plan's goals and objectives).

When we assess the likelihood of whether the special management and protection will be implemented, we consider whether: (1) A management plan or agreement exists that specifies the special management actions being implemented or to be implemented; (2) there is a timely schedule for implementation; (3) there is a high probability that the funding source(s) or other resources necessary to implement the special management will be available; and (4) the party(ies) have the authority and long-term commitment to the agreement or plan to implement the special management and provide the protection, as demonstrated, for example, by a legal instrument providing enduring protection and special management of the areas that contain the primary constituent elements.

When we evaluate whether an action is likely to be effective, we consider whether: (1) The plan specifically addresses the special management needs, with respect to the conservation and enhancement, where possible, of the primary constituent elements; (2) actions similar to those being proposed or used as special management and protection have been successfully used in the past; (3) there are provisions for monitoring and assessment of the effectiveness of the special management and protection; and (4) adaptive management principles have been incorporated into the plan.

If an area provides physical or biological features essential to the conservation of the species, and also is covered by a plan that meets these criteria described above, then such an area does not constitute critical habitat as defined by section 3(5)(A)(i) of the Act because the primary constituent elements found there are not in need of special management.

With the ''may require special management or protection'' clause, Congress determined that certain areas should not be included in a designation despite the fact that they contain features essential to the conservation of the species. However, it has been suggested that the need for any management of physical or biological features, regardless of whether that

management is in place, qualifies an area as meeting this part of the definition of critical habitat. This interpretation ignores the question of whether the special management or protections are or are not required. Under this interpretation, any area on which an action needs to be taken to provide special management consideration or protection for a species constitutes critical habitat for that species. We believe that this interpretation of section 3(5)(A)(i) is incorrect because it essentially reads the special management clause out of the definition. Thus, under this interpretation, critical habitat would include all areas within the range of the species on which are found features essential to the conservation of the species, notwithstanding the additional requirement in the language of the Act. In contrast, our interpretation of the language, as described above, gives independent meaning to the special management clause because there will be some areas with features essential to the conservation of the species that will not require special management because they already have such management.

La Cantera Habitat Conservation Plan

Section 10(a) of the Act authorizes the Service to issue to non-Federal entities a permit for the incidental take of endangered or threatened species. This permit allows a non-Federal landowner to proceed with an activity that is legal in all other respects, but results in the incidental taking of a listed species (*i.e.*, take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity). The Act specifies that an application for an incidental take permit must be accompanied by a conservation plan. A permit may not be issued unless the conservation plan submitted to the Service meets certain requirements, as provided in section 10(a)(2)(A) of the Act. For example, the conservation plan must specify what steps the applicant will take to minimize and mitigate such impacts, and the funding that will be available to implement such steps. After an opportunity for public comment on the conservation plan, the Service may issue the permit provided we determine that certain conditions, as specified in section 10(a)(2)(B), are met. For instance, the Service must find that the taking will be incidental, and the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.

In our proposed rule for designating critical habitat for the karst invertebrates, we considered the lands covered by the La Cantera Habitat Conservation Plan. (A notice of availability for the HCP was published on July 2, 2001, opening a 30-day period for public comment. The section 10 permit was issued on October 31, 2001.) The goals of the HCP are to minimize and mitigate for the potential negative effects of constructing and operating commercial, light industrial, recreational, and residential development near and adjacent to currently occupied habitat of the endangered karst invertebrates, and to contribute to conservation of the covered species and other listed and non-listed cave or karst fauna. To accomplish these goals, the plan requires the following special management and protection:

- Routine inspections will be conducted and will include, but may not be limited to: Signs of vandalism and unauthorized entry; damage to cave gates, fencing, and/or signs; damage to vegetation; presence of fire ants or other nonnative species; dumping; and any other conditions that could affect the listed species or the karst ecosystem. Native vegetation will be maintained or improved within the karst management area. A baseline survey will be conducted and repeated every 10 years thereafter.
- A fire ant control and treatment program will be implemented. Boiling water will be used within 50 m of the cave footprint. Boiling water and/or chemical bait will be used between 50 and 150 m. Baits may be ''broadcast'' more than 150 m from a cave footprint according to protocols outlined in the HCP. The control and monitoring of fire ants will occur at least twice a year over the entire karst management area. Documentation of mounds will also occur during routine inspections. An increase in treatment will occur if mounds exceed stated numbers in the HCP.
- Cave security fences will be installed around all caves according to specifications outlined in the HCP, and some caves will have cave gates installed. Signs will be placed along all fences to further minimize the potential for vandalism and unauthorized access to the management areas. These areas will have officially designated points of access or entry. Entry gates will remain locked at all times when unattended. Cave security fences and their signs and cave gates will be maintained and routinely inspected; barbed-wire fences will be inspected at least every 6 months. Necessary repairs to fencing, gates, and signs will be initiated within one week if any of these are found to have incurred damage.
- In addition, the plan requires the control of impacts from increasing population densities of white-tailed deer and other mammals on surface plant and animal communities. Cattle, other domestic and/or exotic livestock, and pets will not be allowed in the karst management areas unless approved by the Service. No fertilizers, herbicides, or pesticides will be used within the management areas unless approved by the Service. No new roads, new utilities, or other development, including stormwater or wastewater lines, treatment ponds, structures or other facilities, are allowed within the karst management area boundaries unless allowed for under the HCP or approved by the Service. Motorized vehicles will be prohibited from the management areas at all times, unless utilized to facilitate operation, monitoring, and maintenance. No public access, including hiking, biking, and horseback riding, will be allowed unless approved by the Service. Karst management and monitoring plans will be developed for each management area and will include monitoring of the baseline conditions (biological and physical conditions of the area prior to the other scheduled activities), surface and subsurface animal species, and surface vegetation, as well as measurement of cave and surface climates.
- An adaptive management strategy will be used in the implementation of the plan. On the basis of this strategy, if monitoring or other information indicates that the goals or requirements of the HCP are not being met, then adjustments will be made as outlined in the HCP.

As explained in the proposed rule (67 FR 55064), based on our evaluation of the adequacy of special management considerations and protection provided by the La Cantera HCP, and in light of the definition of critical habitat in section 3(5)(A) of the Act, we did not include the five karst management areas established by La Cantera as part of the proposed designation of critical habitat. These areas were established as a requirement of their section 10(a)(1)(B) permit, which is titled ''Environmental Assessment and Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of Two Troglobitic Ground Beetles (Rhadine exilis and Rhadine infernalis) and Madia Cave Meshweaver (Cicurina madia) During the Construction and Operation of Commercial Development on the Approximately 1,000-Acre La Cantera Property, San Antonio, Bexar County, Texas, dated October 11, 2001.'' These five karst management areas

include: (1) Canyon Ranch (including Canyon Ranch Pit, Fat Man's Nightmare Cave, and Scenic Overlook Cave and the surrounding approximately 30 ha (75 ac) within critical habitat Unit 1e, as proposed; (2) Helotes Blowhole and Helotes Hilltop caves and the surrounding approximately 10 ha (25 ac), within Unit 3 as proposed; (3) John Wagner Cave No. 3 and the surrounding approximately 1.6 ha (4 ac), within Unit 6 as proposed; (4) Hills and Dales Pit and the surrounding approximately 28 ha (70 ac), within Unit 8 as proposed; and (5) Madla's Cave and the surrounding approximately 2 ha (5 ac), within Unit 17 as proposed.

We believe that the La Cantera HCP meets the three criteria used by the Service to determine if a plan provides adequate special management or protection to a listed species. First, the HCP provides a conservation benefit to the species through the protection of eight caves, each occupied by one or more of the three listed species covered under the HCP. The various management actions (*e.g.*, installation of security fences, controls on numerous potential human impacts, fire ant control and treatment program) will provide conservation benefits. Second, the HCP provides assurance that the conservation management strategies and actions will be implemented. These caves and associated management areas are protected, in perpetuity, by appropriate legal mechanisms, and will be managed, in perpetuity. The HCP provides assurances that the conservation strategies and actions will be implemented by outlining a schedule of management and monitoring activities to be conducted at each karst management area. Also, based on our review of available information, estimates, and budgets, La Cantera committed to provide funding for all management, monitoring, repair, and adaptive management actions described in the HCP up to an aggregate of $38,032 per year, as adjusted for inflation. Third, to provide assurances that the conservation strategies and measures will be effective, the HCP was developed on the basis of the best available information, and La Cantera is required to conduct periodic surveys of the cave environment, as well as the surface plant and animal community to determine the status of these environments and the need for adaptive management. If monitoring or other information indicates that the goals or requirements of the HCP are not being met, then adjustments will be made as appropriate. La Cantera is required to submit a report of all management and monitoring activities conducted each year to the Service annually.

For the reasons described above, the five karst management areas established by La Cantera and being provided for under their HCP are not included in this designation of critical habitat because they are receiving adequate special management considerations and protection, and therefore do not meet the definition of critical habitat as stated in section 3(5)(A)(i) of the Act.

Camp Bullis Conservation Plan for Karst Species

During the comment period for the proposed designation of critical habitat, the U.S. Army Garrison, Fort Sam Houston submitted a ''Management Plan for the Conservation of Rare and Endangered Karst Species, Camp Bullis, Bexar and Comal Counties, Texas,'' for the 23 caves on Department of Defense (DOD) property that are known to contain listed karst species. These 23 caves were included within Units 10 and 11 of the proposed designation of critical habitat. The Camp Bullis conservation plan calls for the following special management considerations and protection:

- The Army will identify karst management areas (KMAs) and determine the appropriate size and shape of each KMA necessary to incorporate the biological and physical components needed for the conservation of the species (*e.g.*, cave footprint, surface and subsurface drainage areas associated with the occupied cave, cave cricket foraging area, surface plant and animal community). The KMAs will be preserved in perpetuity within the limits possible through the authority of Camp Bullis and its operational and mission requirements. The Plan stipulates that should Camp Bullis ever be transferred in whole or in part, local Army officials will request that the Secretary of the Army, or other appropriate authority, review and incorporate provisions from this management plan into the property disposal procedures in order to transfer responsibility for appropriate management of any former Camp Bullis karst management areas to all subsequent owners by deed recordation or other binding instrument.
- Fire ants will be controlled. Only boiling water will be used up to 50 m from a cave's footprint, chemical fire ant bait or boiling water, if feasible, will be used between 50 and 150 m, and ''broadcasting'' of bait may be used at distances greater than 150 m. Pesticide and fertilizer use will be prohibited within KMAs unless specifically authorized. Special management will protect important sources of nutrients for KMAs, prevent siltation and/or entry of other contaminants into KMAs, dprevent vandalism, dumping of trash, and unauthorized entry into caves. Certain caves may require cave gates and/or security fences.
- In addition, the Army will: (1) Continue conducting karst and biospeleological surveys; (2) complete hydrogeologic studies on KMAs; (3) continue studies on the ecology of karst species; (4) develop educational programs to raise awareness and encourage protection of karst ecosystems by Camp Bullis personnel and the public; (5) monitor all KMAs to determine success or failure of management actions; and (6) document all fauna and flora encountered during monitoring. Monitoring will occur every 1–3 years based on changes in the extent that Camp Bullis uses areas in or around the cave.
- Finally, only native xeriscape plants will be used to landscape for new construction within 150 m of a KMA. Two of the caves are near the boundary of Camp Bullis. We intend to form a partnership with Camp Bullis and the private landowners to gain their support for protecting the habitat that is on private lands near these caves.

In addition to the activities outlined in their plan, Camp Bullis began conducting surveys for cave and karst features and karst fauna in 1993 and plans to complete karst surveys of the entire approximately 28,000-acre installation in 2003. Camp Bullis submitted a draft karst management plan to us in 1999 and has been implementing measures to conserve listed karst invertebrate species since then. These measures include, but are not limited to, control of red-imported fire ants, control of unauthorized access through cave gating, and limiting training activities in areas around occupied caves. The 2002 karst management plan, received and approved by the Service during the comment period, includes these and additional measures to conserve the listed species and their ecosystems on Camp Bullis.

Based on our evaluation of the Camp Bullis conservation plan for the karst invertebrates, we find that it provides adequate special management considerations and protection for the species occurring within Units 10 and 11 that were proposed for designation as critical habitat. We believe that Camp Bullis' karst management plan (Plan) meets the three criteria used by the Service to determine if a plan provides adequate special management or protection to a listed species. The Plan

provides a conservation benefit to the species through the protection of twenty-three caves occurring on Camp Bullis. Each cave is occupied by one or more of the listed species. Under the terms of a memorandum of understanding (MOU) signed by Camp Bullis and the Service on December 20, 2002, Camp Bullis agreed to protect, manage and monitor caves containing listed species as specified in the Plan within the limits possible through the authority of Camp Bullis and its operational and mission requirements. The Plan stipulates that should Camp Bullis ever be transferred in whole or in part, local Army officials will request that the Secretary of the Army, or other appropriate authority, review and incorporate provisions from this management plan into the property disposal procedures in order to transfer responsibility for appropriate management of any former Camp Bullis karst management areas to all subsequent owners by deed recordation or other binding instrument. The Plan provides assurances that the conservation strategies and actions will be implemented by outlining a schedule of management and monitoring activities to be conducted at each occupied cave. The Plan also stipulates that funding for the management actions will be programmed in the Environmental Project Requirements database which is submitted annually. To provide assurances that the conservation strategies and measures will be effective, Camp Bullis has agreed to conduct periodic surveys of the cave environment, as well as the surface plant and animal community to determine the status of these environments and the need for adaptive management. If monitoring or other information indicates that the goals or requirements of the Plan are not being met, then adjustments will be made as appropriate. Under the Plan, Camp Bullis is required to submit a report of all management and monitoring activities conducted each year to the Service annually.

For the reasons described above, we have not included the Camp Bullis lands in proposed Units 10 and 11 in this final designation of critical habitat because these areas do not meet the definition of critical habitat as stated in section 3(5)(A)(i) of the Act.

Government Canyon State Natural Area Conservation Plan

During the comment period for the proposed rule, Texas Parks and Wildlife Department (TPW) submitted the ''Karst Management and Maintenance Plan for Government Canyon State Natural Area, Bexar County, Texas.'' Government Canyon State Natural Area (GCSNA) was designated as a state natural area in 1993. As of 2002, GCSNA includes a total of 8,199 acres. As a designated natural area, GCSNA's mission is to protect the outstanding natural attributes found on the property, including caves inhabited by the listed karst invertebrates. Surveys for cave and karst features and cave fauna have been ongoing at GCSNA since 1994. To protect the listed karst invertebrates, GCSNA began treating for fire ants around the occupied caves in 1999 and has continued to implement this and other conservation measures benefitting the listed species and their ecosystem. Such on-going measures include, but are not limited to, ongoing surveys for cave and karst features and cave fauna, control of fire ants, and control of unauthorized access. As described in the following paragraphs, the 2002 karst management plan, received and approved by the Service during the comment period, includes these and additional measures to conserve the listed species and their ecosystems on GCSNA.

TPWD committed to limiting human use to a trail system and 12 primitive campsites on the portions of the property overlying the Edwards Aquifer. At least two surveys a year for fire ant mounds around cave openings will be conducted with fire ant mound densities being recorded within 50 m of cave entrances. Searches for fire ant mounds also will be made during routine maintenance inspections. Control will be conducted twice a year, with an increase in frequency if more than 80 mounds are located within 50 m of a cave entrance. Boiling water will be used to control fire ants within 50 m of the footprint of any cave. Boiling water or chemical baits will be used between 50 and 100 m from the footprint. Baits may be ''broadcast'' in areas greater than 150 m, and the bait use protocol is outlined in the management plan.

Wildfire fighting will, to the fullest extent practical, avoid direct or indirect impacts to caves. Pesticide and herbicide use will be prohibited unless expressly agreed to by all partners involved in the special management. Monthly monitoring and inspections of all endangered species caves will occur. Data collection will include: evidence of vandalism, evidence of vegetation damage due to off-trail use, condition of the cave gate and/or security fence, evidence of feral hogs and/or white tailed deer, presence of fire ants, and results of recent fire ant treatments. Cave cricket counts will be performed yearly at all caves. Through photographic documentation, changes in vegetation structure and composition around caves will be monitored. Volunteers holding valid scientific research and recovery permits for karst invertebrates will assist in monitoring listed and unlisted species. An annual report of activities will be submitted by October 31st of each calendar year.

Based on our evaluation of the Karst Management and Maintenance Plan for Government Canyon State Natural Area, we find that it provides adequate special management considerations and protection for Units 1a, 1b, 1c, and 1d that were proposed for designation as critical habitat. We believe that TPWD's karst management plan submitted for GCSNA meets the three criteria used by the Service to determine if a plan provides adequate special management or protection to a listed species. The Plan provides a conservation benefit to the species through the protection of seven caves, each occupied by one or more of the listed species. As a designated natural area, GCSNA's mission is to protect the outstanding natural attributes found on the property, including caves inhabited by the listed karst invertebrates. The property will be protected in perpetuity and used in a sustainable manner for scientific research, education, aesthetic enjoyment, and appropriate public use, not detrimental to the primary purposes for which the property was acquired. The Plan provides assurances that the conservation strategies and actions will be implemented by outlining a schedule of management and monitoring activities to be conducted at each occupied cave. Surveys for cave and karst features and cave fauna have been ongoing at GCSNA since 1994. The Plan also stipulates that funding for the management actions will be programmed into GCSNA's operating budget annually. To provide assurances that the conservation strategies and measures will be effective, TPWD has agreed to conduct periodic surveys of the cave environment, as well as the surface plant and animal community to determine the status of these environments and the need for adaptive management. If monitoring or other information indicates that the goals or requirements of the Plan are not being met, then adjustments will be made as appropriate. Under the Plan, TPWD is required to submit a report of all management and monitoring activities conducted each year at GCSNA to the Service annually. Therefore, we are not including these units in this final designation of critical habitat because

these areas do not meet the definition of critical habitat as stated in section 3(5)(A)(i) of the Act.

Exclusions Under Section 4(b)(2)

As described above, based on our evaluation of the adequacy of special management and protection that is provided in current management plans involving the karst invertebrates, and in accordance with section 3(5)(A)(i) of the Act, we have not included the areas covered by the La Cantera HCP, or Units 1a, 1b, 1c, 1d, 10 and 11 as proposed, in this final designation of critical habitat. To the extent that special management considerations and protection may be required for these areas, and they therefore qualify as critical habitat according to section 3(5)(A)(i), they are properly excluded from designation under section 4(b)(2) of the Act, based on the following analysis.

Section 4(b)(2) of the Act requires us to designate critical habitat on the basis of the best scientific information available and to consider the economic and other relevant impacts of designating a particular area as critical habitat. We may exclude areas from critical habitat upon a determination that the benefits of such exclusions outweigh the benefits of specifying such areas as critical habitat. We cannot exclude such areas from critical habitat when such exclusion will result in the extinction of the species concerned. We believe exclusion under section 4(b)(2) of the Act applies to the areas encompassed in the special management and protection plans for the La Cantera HCP, GCSNA, and Camp Bullis.

La Cantera HCP

The principal benefit of any designated critical habitat is that Federal activities that may affect the habitat require consultation under section 7(a)(2) of the Act. Consultation is designed to ensure that adequate protection is provided to avoid adverse modification or destruction of critical habitat resulting from an action authorized, funded, or carried out by a Federal agency. Where HCPs are in place and lands are covered by a section 10(a)(1)B) permit, our experience has shown that any benefit of designation of such lands as critical habitat is small to none when the areas concerned are occupied by the species, because the occupied areas already are subject to section 7 consultation based on the ''jeopardy standard.'' Permitted HCPs are designed to ensure the long-term survival of listed species within the area covered by the permit. Under an HCP, an areas that might be designated as critical habitat already will be protected in reserves and other conservation lands by the terms of the HCP and its implementation agreements. The HCP and implementation agreements include management measures and protections for conservation lands that are crafted to protect, restore, and enhance their value as habitat for covered species.

In addition, a section 10(a)(1)(B) permit issued by us as a result of an HCP application must itself undergo consultation. While this consultation may not look specifically at the issue of the likelihood of adverse modification or destruction of critical habitat, it will look at the very similar concept of jeopardy to the listed species in the plan area. Since HCPs address land use within the plan boundaries, habitat issues within the plan boundaries will have been thoroughly addressed in the HCP and the consultation on the HCP.

The development and implementation of HCPs provide other important conservation benefits, including the development of biological information to guide conservation efforts and assist in species recovery and the creation of innovative solutions to conserve species while allowing for development. The educational benefits of critical habitat, including informing the public of areas that are important for the long-term survival and conservation of the species, are essentially the same as those that would occur from the public notice and comment procedures required to establish an HCP, as well as the public participation that occurs in the development of many HCPs. For these reasons we believe that designation of critical habitat has little or no benefit in areas covered by HCPs.

The benefits of excluding HCPs from designation as critical habitat are significant. Benefits of excluding HCPs include relieving landowners, communities, and counties of any additional minor regulatory review that might be imposed by critical habitat. Many HCPs take considerable time—sometimes years—to develop and, upon completion, become the basis for regional conservation plans that are consistent with the conservation of covered species. Many of these plans benefit many species, both listed and unlisted. Imposing an additional regulatory review after HCP completion may jeopardize conservation efforts and partnerships in many areas and could be viewed as a disincentive to those developing HCPs. Excluding HCPs provides us with an opportunity to streamline regulatory compliance and confirms regulatory assurances for HCP participants.

Another benefit of excluding HCPs is that exclusion encourages the continued development of partnerships with HCP participants, including States, local governments, conservation organizations, and private landowners, that together can implement conservation actions that we would be unable to accomplish alone. By excluding areas covered by HCPs from critical habitat designation, we preserve these partnerships, and, we believe, set the stage for more effective conservation actions in the future.

Specifically, for the lands covered by the La Cantera HCP, in a letter dated April 18, 2002, Mr. Alan Glen, representing the La Cantera Development Company, noted the following. ''The significant mitigation measures and conservation benefits provided by the La Cantera HCP would likely not have been realized through a section 7 consultation. As a result, it is highly unlikely that the inclusion of the areas covered by the HCP in a designation of critical habitat would provide any benefit for the listed species. In contrast, the benefits of excluding the La Cantera HCP from the designation are expected to be significant for many of the same reasons identified in the Quino analysis set forth above. La Cantera and the Service worked together for years to produce the first HCP covering any of the listed Bexar County invertebrate species, and as the Service has acknowledged, the result is a model that can be followed throughout the region. The imposition of even a minor regulatory burden that will not yield substantial benefits for the species may hinder the orderly and effective implementation of the La Cantera HCP and, perhaps more importantly, discourage similar efforts to conserve the listed species by other parties in the future.''

We have weighed the small benefit, if any, of including the lands in the HCP against the benefits of exclusion, which include the benefit of relieving both the property owners and the Service of the extra time and funds associated with the additional layer of approvals and regulation, including reinitiation of the intra-Service section 7 consultation, together with the encouragement of conservation partnerships. We have determined that the benefit of excluding the land covered by the La Cantera HCP from designation as critical habitat outweighs the benefits of including the areas, so we have excluded them from designation on the basis of section 4(b)(2) of the Act.

Government Canyon State Natural Area and Camp Bullis

The benefits of designating as critical habitat the State-owned GCSNA lands in proposed Units 1a, 1b, 1c, and 1d, and the DOD-owned Camp Bullis lands in proposed Units 10 and 11, are small to none. As previously stated, the listed species and their habitat on both Camp Bullis and the GCSNA already are being managed and protected under Service-approved karst management plans. These management plans provide long-term conservation benefits to the listed species on these properties. The only additional protection for the primary constituent elements that could occur on GCSNA would be the requirement for Federal agencies to consult on any action they permit, fund, or carry out, that may affect designated critical habitat, were it designated, on the State-owned lands. However, all of the caves on the Natural Area that could have been included in the designation are known to be inhabited by one or more species of the endangered karst invertebrates. Therefore, the section 7(a)(2) jeopardy standard for Federal agency actions already is in place and Federal agencies are required to consult with the Service on any action that may affect a listed species. Since take of the species would almost certainly be a result of harm to the habitat, no added section 7(a)(2) protections would be provided by designation of critical habitat in this situation.

Also, the primary purpose for GCSNA is for the protection and stewardship of outstanding natural attributes of statewide significance under Policy, TAC 59.61–59.64. Given this stated purpose, it is highly unlikely that the State would allow any federally funded or permitted project that would harm the habitats associated with the caves on the Natural Area. Therefore, it is highly unlikely that section 7(a)(2) consultation would ever be required. Also, GCSNA's karst management plan stipulates that TPWD intends to coordinate with the Service on any activities on GCSNA that may impact listed species or their habitat. Further, in the unlikely event that the State should ever propose an action that lacks Federal agency involvement and that might result in incidental take of the listed karst invertebrates on the Natural Area, an incidental take permit would be required under section 10(a)(1)(B) of the Act. Section 10(a)(1)(B) requires that the applicant minimize and mitigate, to the maximum extent practical, the impacts to listed species. While the Service would have to complete an intra-Service section 7(a)(2) consultation to ensure that issuing the permit did not jeopardize the listed species or adversely modify critical habitat, were it designated, it is highly unlikely that the designation of critical habitat on the Natural Area would add any measures that would increase the minimization and mitigation of harm to the habitat.

Camp Bullis' mission is to provide field training and support for military activities in south Texas. The mission requirements demand the presence of large tracts of undeveloped land for training operations. The management plan discussed above represents the cumulative efforts of Camp Bullis to eliminate, mitigate, and prevent harm to the federally and state-listed karst species. Camp Bullis has an approved and signed Integrated Natural Resource Management Plan (INRMP). This INRMP provides yet another layer of protection for the natural resources on Camp Bullis. The INRMP includes specific goals for managing the karst resources on Camp Bullis to ensure protection and enhance understanding. This includes: (1) Management of water resources on Camp Bullis, including wetlands, that protects the Edwards Aquifer Recharge Zone; (2) supporting research to measure the relationship between species diversity and the amount of water flowing into the recharge zones; and (3) continuing to support work done by the U.S. Geological Survey. Given these layers of protection for the habitats associated with the occupied caves, inclusion of Camp Bullis lands in this designation of critical habitat would have little or no benefit to the listed karst species.

The benefits of excluding areas within GCSNA and Camp Bullis from designation are significant. If special management and protection plans were not implemented as called for the in the GCSNA conservation plan, the State would be required to complete section 10(a)(1)(B) habitat conservation planning for any action that might result in incidental take of the listed species. In the case of Camp Bullis, section 7(a)(2) consultation would be needed on any action likely to result in the destruction or adverse modification of designated critical habitat. However, since both areas are implementing special management and protection plans that preclude take of listed species and harm to the associated habitat, no HCPs or consultations are needed. Completion of section 10(a)(1)(B) permits can require extensive lengths of time, in some cases, years and thousands of hours. Likewise, completion of formal section 7(a)(2) biological opinions may require completion of biological assessments that can require extensive lengths of time and thousands of hours to complete. Both processes may require the employment of consultants. Thus, by having special management and protection plans in place that preclude actions that might harm species and associated habitat, there is a great savings, in terms of both money and time, and a great benefit, to the Service, the State, and the DOD.

In the situations of GCSNA and Camp Bullis, the State and the DOD assumed the additional cost of putting in place and implementing special management for endangered species in their resource management plans. The special management far exceeds the protections that would be afforded by designation of critical habitat. If these areas were included in the critical habitat designation, the cooperative partnership that motivated these two agencies to assume the cost and work would be damaged. Since the added special management and protection measures for endangered karst invertebrates on the part of the State is voluntary, the designation could result in an adverse change to the cooperative partnership with the Service and changes to future management and protection. The primary constituent elements and species will greatly benefit from the implementation of these plans.

We believe recovery of listed species is best accomplished through partnerships and voluntary actions. If areas that are subject to adequate management plans are not excluded from designations of critical habitat, there will be a chilling effect on other potential partners. There is a great incentive to not having Federal regulations encumbering non-Federal land. It is likely that many potential partners will not assume the cost and work associated with implementing voluntary special management and protection if critical habitat is designated regardless of their efforts. As a result, listed species and their habitat will not have the benefits of voluntary special management. We believe that the benefits of excluding these areas already under special management as a result of voluntary action by the landowners greatly outweighs the benefits of including such areas as part of critical habitat. We believe that excluding these areas is beneficial to these and other species.

In the case of Camp Bullis, there also are national security benefits from exclusion of Units 10 and 11 from critical habitat designation which exceed any benefits from including these areas. In a prior consultation under section 7 of the Act, the Service

found: ''All available land at Camp Bullis is being used for training for the Army, Air Force, Marine Corps, Reserve components, San Antonio police, FBI, U.S. Marshals and Academy Health Sciences.'' Training includes search and rescue, escape and evasion, survival, mechanized infantry maneuvers, urban warfare tactics, reconnaissance in enemy territory, parachute operations and combat assault landing, air base ground protection and low-level helicopter assault and maneuvering. An average of over 36,000 Army and other services' medical personnel undergo field medical training at Camp Bullis, and total military training use averages over 720,000 person-days annually.

The space and facilities for this training at Camp Bullis cannot readily be duplicated elsewhere. The benefits of avoiding adverse impacts to the U.S. Army's mission if training were delayed due to the need to reinitiate section 7 consultation as a result of concerns for irreversible or irretrievable commitment of resources with respect to the agency's action (section 7(d)) exceed the benefits of designation of proposed Units 10 and 11 as critical habitat.

Based on section 4(b)(2) and the consideration of the information described above, we find that the benefits of excluding the areas covered by the La Cantera HCP, proposed Units 1a, 1b, 1c, and 1d of the GCSNA lands, and proposed Units 10 and 11 on Camp Bullis, greatly exceed the limited benefits of including these areas in the designation of critical habitat. Benefits of exclusion include implementation of special management and protection plans that provide protection and management far in excess of any protection afforded by the Act through designation of critical habitat, by encouraging the formation of partnerships that will be the key to recovery of the species, by reducing the time and money that would have been needed to complete regulatory processes under sections 7(a)(2) and 10(a)(1)(B) of the Act, and by ensuring that the U.S. Army's role in protecting the Nation is not impaired.

We may exclude areas from the critical habitat designation unless the Secretary determines, ''based on the best scientific and commercial data available, that the failure to designate such areas as critical habitat will result in extinction of the species concerned.'' Here, we have determined that the exclusion of the La Cantera HCP, GCSNA, and Camp Bullis lands will not result in the extinction of the species. First, activities authorized, funded, or carried out by Federal agencies in these areas that may affect the listed karst invertebrates will still require consultation under section 7 of the Act, based on the requirement that Federal agencies ensure that such activities are not likely to jeopardize the continued existence of listed species. This requirement applies even without critical habitat designation on these lands. Second, these three entities have committed to protecting and managing these endangered species in accordance with their special management plans and natural resource management objectives. In short, they have committed to greater conservation measures on these areas than would be available through the designation of critical habitat. With these natural resource measures, we have concluded that these exclusions from critical habitat will not result in the extinction of these karst invertebrates.

We have determined that, with the exceptions noted above, for the rest of the areas included in the designation of critical habitat in this final rule, the benefits of exclusion do not outweigh the benefits of critical habitat designation. As part of this determination, we conducted an economic analysis of the proposed rule designating critical habitat for these species.

Economic Analysis

Section 4(b)(2) of the Act requires that we designate critical habitat on the basis of the best scientific information available and that we consider the economic and other relevant impacts of designating a particular area as critical habitat. We may exclude any area from designation as critical habitat upon a determination that the benefits of such exclusion outweigh the benefits of specifying such an area as critical habitat, unless we determine, on the basis of the best scientific and commercial data available, that the failure to designate such area will result in the extinction of the species concerned. Following the publication of the proposed critical habitat designation, we completed a draft economic analysis to estimate the potential economic effect of the designation. The draft analysis was made available to the public for review on November 21, 2002 (67 FR 70203) and we accepted comments on the proposed rule and the draft economic analysis of it until December 23, 2002.

In making our final critical habitat designation, we utilized the economic analysis and our analysis of other relevant impacts, and considered all comments and information submitted during the public hearing and comment period. No areas proposed as critical habitat were excluded or modified because of economic impacts. This analysis first identifies land use activities within or in the vicinity of those areas being proposed for critical habitat that are likely to be affected by section 7 of the Act. To do this, the analysis evaluates a ''without section 7'' scenario and compares it to a ''with section 7'' scenario. The ''without section 7'' scenario constitutes the baseline of this analysis. It represents the level of protection currently afforded the species under the Act, absent section 7 protective measures, which includes other Federal, State, and local laws. The ''with section 7'' scenario identifies land-use activities likely to involve a Federal nexus that may affect the species or its designated critical habitat, which accordingly have the potential to be subject to future consultations under section 7 of the Act.

Upon identifying section 7 impacts, the analysis proceeds to consider the subset of impacts that can be attributed exclusively to the critical habitat designation. To do this, the analysis adopts a ''with and without critical habitat approach.'' This approach is used to determine those effects found in the upper-bound estimate that may be attributed solely to the proposed designation of critical habitat. Specifically, the ''with and without critical habitat'' approach considers section 7 impacts that will likely be associated with the implementation of the jeopardy provision of section 7 and those that will likely be associated with the implementation of the adverse modification provision of section 7. In many cases, impacts associated with the jeopardy standard remain unaffected by the designation of critical habitat and thus would not normally be considered an effect of a critical habitat rulemaking. The subset of section 7 impacts likely to be affected solely by the designation of critical habitat represents the lower-bound estimate of this analysis.

This analysis estimates that, over 10 years, 10 formal consultations and 22 informal consultations will occur on projects with the potential to affect the proposed critical habitat area. As mentioned, most of the future section 7 consultations associated with the area proposed as critical habitat are likely to address private landowner HCPs and participation in Partners for Fish and Wildlife. In addition, the Service expects to provide technical assistance to parties on 431 occasions.

The economic impact associated with section 7 consultations for the invertebrates is anticipated to be approximately $33.4 million over the next 10 years, $23.4 million when

discounted to present value using a rate of 7 percent. Approximately 87 percent of these total costs are expected to result specifically from designation of critical habitat while the remainder are coextensive with the listing of these species. While a range of activities may be affected by designation of critical habitat for the species, approximately 85 percent of the total designation costs are expected to stem from private landowner Habitat Conservation Plans (HCPs) intended to mitigate impacts from development of private lands within critical habitat. HCP impacts result from administrative costs associated with the section 7 consultation process and related project modifications. Remaining costs are expected to stem from review of management plans (*e.g.*, within Government Canyon State Natural Area and Camp Bullis), review of Clean Water Act permits, and participation in Partners for Fish and Wildlife projects on private lands.

A copy of the final economic analysis and supporting documents are included in our administrative record and may be obtained by contacting the Austin Ecological Services Office (*see* **ADDRESSES** section).

Required Determinations

Regulatory Planning and Review

In accordance with Executive Order 12866, the Office of Management and Budget (OMB) has determined that this is a significant regulatory action because it may raise novel legal or policy issues. As required by the Executive Order, we provided a copy of the rule, which describes the need for this action and how the designation meets that need, and the economic analysis, which assesses the costs and benefits of this critical habitat designation, to OMB for review.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever a Federal agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (*i.e.*, small businesses, small organizations, and small government jurisdictions). No regulatory flexibility analysis is required, however, if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.

SBREFA amended the Regulatory Flexibility Act (RFA) to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities. SBREFA also amended the RFA to require a certification statement. We are hereby certifying that this final critical habitat designation for seven Bexar County invertebrates will not have a significant economic effect on a substantial number of small entities. The following discussion explains our rationale.

The economic analysis determined whether this critical habitat designation potentially affects a ''substantial number'' of small entities in counties supporting critical habitat areas. It also quantifies the probable number of small businesses likely to experience a ''significant effect.'' SBREFA does not explicitly define either ''substantial number'' or ''significant economic impact.'' Consequently, to assess whether a ''substantial number'' of small entities is affected by this designation, the economic analysis considers the relative number of small entities likely to be impacted in the area. Similarly, this analysis considers the relative cost of compliance on the revenues/profit margins of small entities in determining whether or not entities incur a ''significant economic impact.'' Only small entities that are expected to be directly affected by the designation are considered in this portion of the analysis. This approach is consistent with several judicial opinions related to the scope of the RFA, including *Mid-Tex Electric Co-op., Inc.* v. *F.E.R.C.,* 773 F.2d 327 (D.C. Cir. 1985) and *American Trucking Associations, Inc.* v. *U.S. E.P.A.,* 175 F.3d 1027 (D.C. Cir. 1999).

The economic analysis examines the total estimated section 7 costs, including those impacts that may be ''attributable coextensively'' with the listing of the species. This results in a conservative estimate (*i.e.*, more likely to overstate impacts than understate them), because it utilizes the upper bound impact estimate.

Small entities include small organizations, such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; and small businesses (13 CFR 121.201). Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential impacts to these small entities are significant, we consider the types of activities that might trigger regulatory impacts under this rule as well as the types of project modifications that may result. In general, the term ''significant economic impact'' is meant to apply to a typical small business firm's business operations.

To determine if the rule would affect a substantial number of small entities, we consider the number of small entities affected within particular types of economic activities (*e.g.*, housing development, grazing, oil and gas production, timber harvesting, *etc.*). In estimating the numbers of small entities potentially affected, we also consider whether their activities have any Federal involvement; some kinds of activities are unlikely to have any Federal involvement and so will not be affected by critical habitat designation. We apply the ''substantial number'' test individually to each industry to determine if certification is appropriate.

The economic analysis identifies land use activities within our proposed critical habitat designation for the seven invertebrate species that are expected to be affected by section 7 of the Act. The following land use activities were identified as being potentially impacted by section 7 (*i.e.*, requiring consultations or associated project modifications) under the ''with section 7'' scenario: Private residential and commercial development; issuance of National Pollution Discharge Elimination System permits by Texas Natural Resource Conservation Commission (TNRCC); development of Karst Management Plan for Camp Bullis; roadway expansions by Texas DOT; Campus expansion of UTSA; and Partners for Fish and Wildlife conservation projects on private lands.

Of the projects that are potentially affected by section 7 consultation for the invertebrates, Camp Bullis occurs exclusively on Federal lands and does not have third party/small entity involvement (*i.e.*, only the Federal action agency and the Service are expected to be involved). In addition, under Small Business Administration (SBA) guidelines, State governments are considered independent sovereigns, not small governments. As such, TNRCC,

Texas DOT, and UTSA are not considered ''small entities.''

Of the projects potentially impacted by section 7, some do not involve any project modifications. Specifically, Partners for Fish and Wildlife conservation projects on private lands are not expected to involve any project modifications. The greatest share of the costs associated with the section 7 consultation process stem from project modifications, as compared to the consultation itself. Indeed, costs associated with the consultation itself are relatively minor, with third-party costs estimated to range from $1,200 to $6,900 per consultation. Therefore, Partners for Fish and Wildlife conservation projects are unlikely to be significantly affected by consultations because these do not involve costly project modifications.

Several developers were identified as having activities with a Federal nexus and therefore are potentially affected by section 7 implementation for the nine invertebrates for which we proposed critical habitat designation. Six landowners are expected to complete HCPs for single- or multi-family homes or commercial development on their lands. These developers would each bear costs associated with the consultation and any related project modification for the HCP.

The SBA defines small development businesses as having less than $28.5 million in average annual receipts (also referred to as sales or revenues). The following steps were taken as part of the economic analysis to estimate number of small businesses affected: Estimate the number of businesses within the study area affected by section 7 implementation annually (assumed to be equal to the number of annual consultations); calculate the percent of businesses in the affected industry that are likely to be small; calculate the number of affected small businesses in the affected industry; calculate the percent of small businesses likely to be affected by critical habitat. Using these steps, the economic assessment done for the Bexar County Invertebrate Species Critical Habitat designation indicates that a total annual percentage of about 1 percent of small businesses would bear a significant cost in industry.

In summary, of the projects potentially impacted by section 7 implementation, some are excluded from consideration because they are on Federal or State lands, and some do not involve any project modifications. Specifically, Partners for Fish and Wildlife conservation projects on private lands are not expected to involve any project modifications. The greatest share of the costs associated with the consultation process stem from project modifications (as opposed to the consultation itself). Indeed, costs associated with the consultation itself are relatively minor, with third-party costs estimated to range from $1,200 to $6,900 per consultation. Therefore, small entities are unlikely to be significantly affected by consultations as these consultations do not involve costly project modifications. Additionally, because the costs associated with designating critical habitat for the seven invertebrates are likely to be significant for an total percentage of about one small business per year in the affected industries in the study area, this analysis concludes that a significant economic impact on a significant number of small entities will *not* result from the designation of critical habitat for the nine invertebrates. This would be true even if all of the effects of section 7 consultation on these activities were attributed solely to the critical habitat designation.

Executive Order 13211

On May 18, 2001, the President issued Executive Order 13211 on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. Although this rule is a significant action under Executive Order 12866, it is not expected to significantly affect energy supplies, distribution, or use since the majority of the lands being designated as critical habitat occur on privately owned lands that are primarily developed for agricultural and residential uses, and not for energy production or distribution. Therefore, this action is not a significant energy action and no Statement of Energy Effects is required.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 *et seq.*):

1. On the basis of information contained in the economic analysis, we determine that this rule will not ''significantly or uniquely'' affect small governments. A Small Government Agency Plan is not required. Small governments will be affected only to the extent that any of their actions involving Federal funding or authorization must not destroy or adversely modify the critical habitat or take the species under section 9 of the Act.

2. This rule will not produce a Federal mandate of $100 million or greater in any year (*i.e.*, it is not a ''significant regulatory action'' under the Unfunded Mandates Reform Act).

Takings

In accordance with Executive Order 12630 (''Government Actions and Interference with Constitutionally Protected Private Property Rights,'' March 18, 1988; 53 FR 8859), we have analyzed the potential takings implications of the designation of critical habitat for the seven karst invertebrates. The takings implications assessment concludes that this final rule does not pose significant takings implications. A copy of this assessment can be obtained by contacting the Austin Ecological Services Field Office (*see* **ADDRESSES** section).

On the basis of the above assessment, we find that this final rule designating critical habitat for the seven karst invertebrates does not pose significant takings implications.

Federalism

In accordance with Executive Order 13132, the rule does not have significant Federalism effects. A Federalism assessment is not required. As discussed above, the designation of critical habitat in areas currently occupied by the seven endangered karst invertebrates would have little incremental impact on State and local governments and their activities. The designations may have some benefit to these governments in that the areas essential to the conservation of these species are more clearly defined, and the primary constituent elements of the habitat necessary to the survival of the species are identified. While this designation does not alter where and what federally sponsored activities may occur, it may assist these local governments in long-range planning.

Civil Justice Reform

In accordance with Executive Order 12988 (February 7, 1996; 61 FR 4729), the Office of the Solicitor has determined that this rule would not unduly burden the judicial system and would meet the requirements of sections 3(a) and 3(b)(2) of the Order. We designate critical habitat in accordance with the provisions of the Act. The rule uses standard coordinates that are geographic longitude and latitude, decimal degree coordinate pairs, referenced to North American Horizontal Datum 1983 (NAD 83), and identifies the primary constituent elements within the designated areas to assist the public in understanding the

habitat needs of the seven karst invertebrates.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any information collection requirements for which OMB approval under the Paperwork Reduction Act is required. Information collections associated with Endangered Species permits are covered by an existing OMB approval, which is assigned control number 1018–0094 and which expires on July 31, 2004. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information, unless it displays a valid OMB Control Number.

National Environmental Policy Act

We have determined that an Environmental Assessment or an Environmental Impact Statement as defined by the National Environmental Policy Act of 1969 need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act as amended. A notice outlining our reason for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244). This proposed rule does not constitute a major Federal action significantly affecting the quality of the human environment.

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, ''Government-to-Government Relations with Native American Tribal Governments'' (59 FR 22951), Executive Order 13175, and 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a Government-to-Government basis. The designation of critical habitat for the seven karst invertebrates does not contain any Tribal lands or lands that we have identified as impacting Tribal trust resources.

References Cited

A complete list of all references cited in this final rule is available, upon request, from the U.S. Fish and Wildlife Service, Austin Ecological Services Field Office (*see* **ADDRESSES** section).

Author

This rule was prepared by the U.S. Fish and Wildlife Service, Austin Ecological Services Field Office (*see* **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

■ Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

PART 17—[AMENDED]

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

■ 2. Amend § 17.11(h), the List of Endangered and Threatened Wildlife, as set forth below:

■ a. By revising the entries for Beetle, Helotes mold; Beetle [no common name] (*Rhadine exilis*); and Beetle [no common name] (*Rhadine infernalis*) under ''INSECTS'' to read as follows;

■ b. By removing the entries for Harvestman, Robber Baron Cave; Spider, Government Canyon Cave; Spider, Madla's Cave; Spider [no common name] (Cicurina venii); Spider, Robber Baron Cave; and Spider, vesper cave; and

■ c. By adding entries for Harvestman, Cokendolpher cave; Meshweaver, Braken Bat Cave; Meshweaver, Government Canyon Bat Cave; Meshweaver, Madla Cave; Meshweaver, Robber Baron Cave; and Spider, Government Canyon Bat Cave under ''ARACHNIDS'' to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*	*	
INSECTS							
*	*	*	*	*	*	*	
Beetle, Helotes mold	*Batrisodes venyivi*	U.S.A. (TX)	NA	E	706	17.95(i)	NA
*	*	*	*	*	*	*	
Beetle, [no common name].	*Rhadine exilis*	U.S.A. (TX)	NA	E	706	17.95(i)	NA
Beetle, [no common name].	*Rhadine infernalis*	U.S.A. (TX)	NA	E	706	17.95(i)	NA
*	*	*	*	*	*	*	
ARACHNIDS							
*	*	*	*	*	*	*	
Harvestman, Cokendolpher cave.	*Texella cokendolpheri*	U.S.A. (TX)	NA	E	706	17.95(g)	NA
Meshweaver, Braken Bat Cave.	*Circurina venii*	U.S.A. (TX)	NA	E	706	17.95(g)	NA
Meshweaver, Government Canyon Bat Cave.	*Circurina vespera*	U.S.A. (TX)	NA	E	706	NA	NA
Meshweaver, Madla Cave.	*Cicurina madla*	U.S.A. (TX)	NA	E	706	17.95(g)	NA

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Meshweaver, Robber Baron Cave.	*Cicurina baronia*	U.S.A. (TX)	NA	E	706	17.95(g)	NA
*	*	*	*	*	*	*	
Spider, Government Canyon Bat Cave.	*Neoleptoneta microps*	U.S.A. (TX)	NA	E	706	NA	NA
*	*	*	*	*	*	*	

■ 3. Amend § 17.95 by adding, in the same alphabetical order as these species occur in § 17.11(h):

■ a. In paragraph (g), critical habitat for the Cokendolpher cave harvestman (*Texella cokendolpheri*);

■ b. In paragraph (g), critical habitat for the Braken Bat Cave meshweaver (*Cicurina venii*);

■ c. In paragraph (g), critical habitat for the Madla Cave meshweaver (*Cicurina madla*);

■ d. In paragraph (g), critical habitat for the Robber Baron Cave meshweaver (*Cicurina baronia*);

■ e. In paragraph (i), critical habitat for the Helotes mold beetle (*Batrisodes venyivi*).

■ f. In paragraph (i), critical habitat for the beetle (no common name) (*Rhadine exilis*); and

■ g. In paragraph (i), critical habitat for the beetle (no common name), (*Rhadine infernalis*).

§ 17.95 Critical habitat-fish and wildlife.

* * * * *

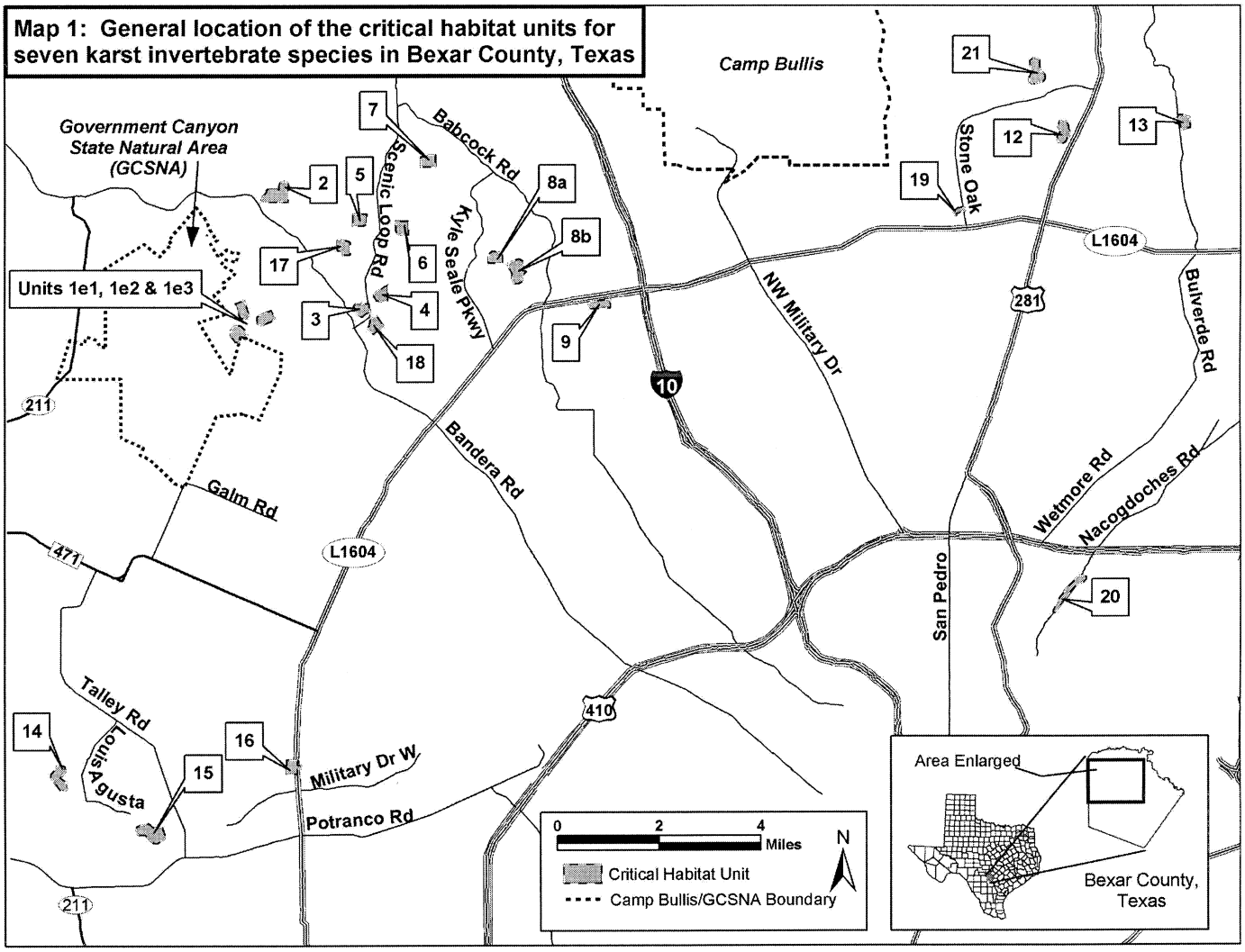
(g) *Arachnids.*

Cokendolpher cave harvestman (*Texella cokendolpheri*)

(1) Critical habitat for the Cokendolpher cave harvestman occurs in Unit 20 as described below and depicted on Map 1 (index map) and Map 2 below. All coordinates are geographic longitude and latitude, decimal degree coordinate pairs, referenced to North American Horizontal Datum 1983. Coordinates were derived from 2001 digital orthophotographs.

(2) Map 1—Index map of critical habitat units for karst invertebrate species in Bexar County, Texas—follows:

BILLING CODE 4310–55–P



BILLING CODE 4310–55–C

(3) The primary constituent elements include:

(i) The physical features of karst-forming rock containing subterranean spaces with stable temperatures, high humidities (near saturation), and suitable substrates (for example, spaces between and underneath rocks suitable for foraging and sheltering); and

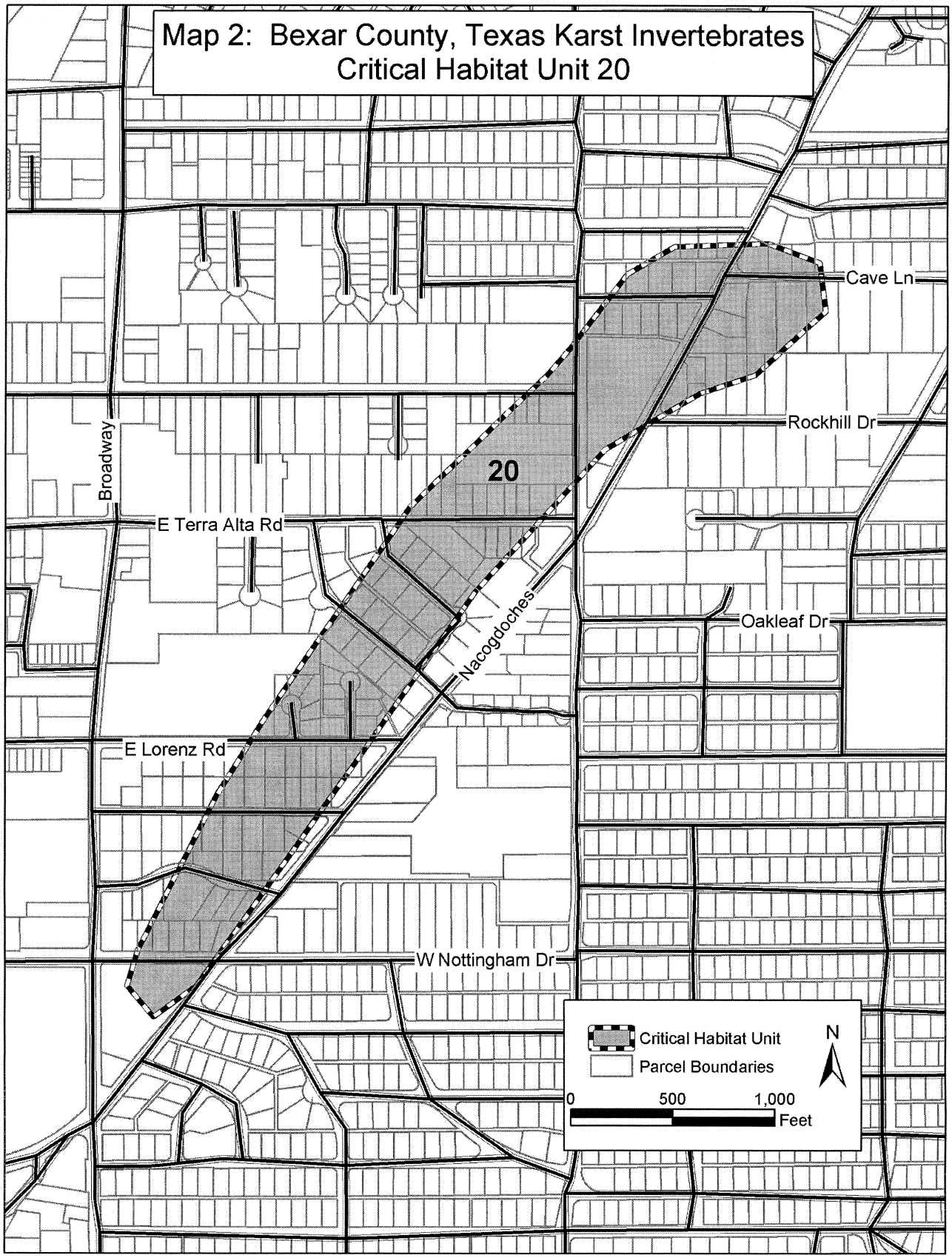
(ii) The biological features of a healthy surface community of native plants (for example, juniper-oak woodland) and animals (for example, cave crickets) surrounding the karst feature that provide nutrient input and buffer the karst ecosystem from adverse effects (from, for example, nonnative species invasions, contaminants, and fluctuations in temperature and humidity).

(4) Existing human-constructed, above-ground, impervious structures do not contain the primary constituent elements and are not considered to be critical habitat. Such features and structures include, but are not limited to, buildings and paved roads. However, subsurface areas under these structures are considered to be critical habitat since subterranean spaces containing these species and/or transmitting moisture and nutrients through the karst ecosystem extend, in some cases, underneath these existing human-constructed structures. Landscaped areas associated with existing human-constructed structures also are not considered critical habitat.

(5) Unit 20 (23 ha (57 ac)) is an area bounded by points with the following coordinates: –98.4582897, 29.5087489; –98.4575517, 29.5091199; –98.4561171, 29.5091615; –98.4553228, 29.5088978; –98.4552343, 29.5082394; –98.4563160, 29.5073726; –98.4571671, 29.5071204; –98.4586325, 29.5063688; –98.4606616, 29.5044311; –98.4637341, 29.5006275; –98.4649997, 29.4990919; –98.4656642, 29.4986719; –98.4660631, 29.4991019; –98.4658881, 29.4995898; –98.4646589, 29.5017013; –98.4639396, 29.5027162; –98.4616730, 29.5055952; –98.4595256, 29.5073856; –98.4591719, 29.5077488; –98.4582897, 29.5087489.

(6) Map 2—Unit 20 follows:

BILLING CODE 4310–55–P



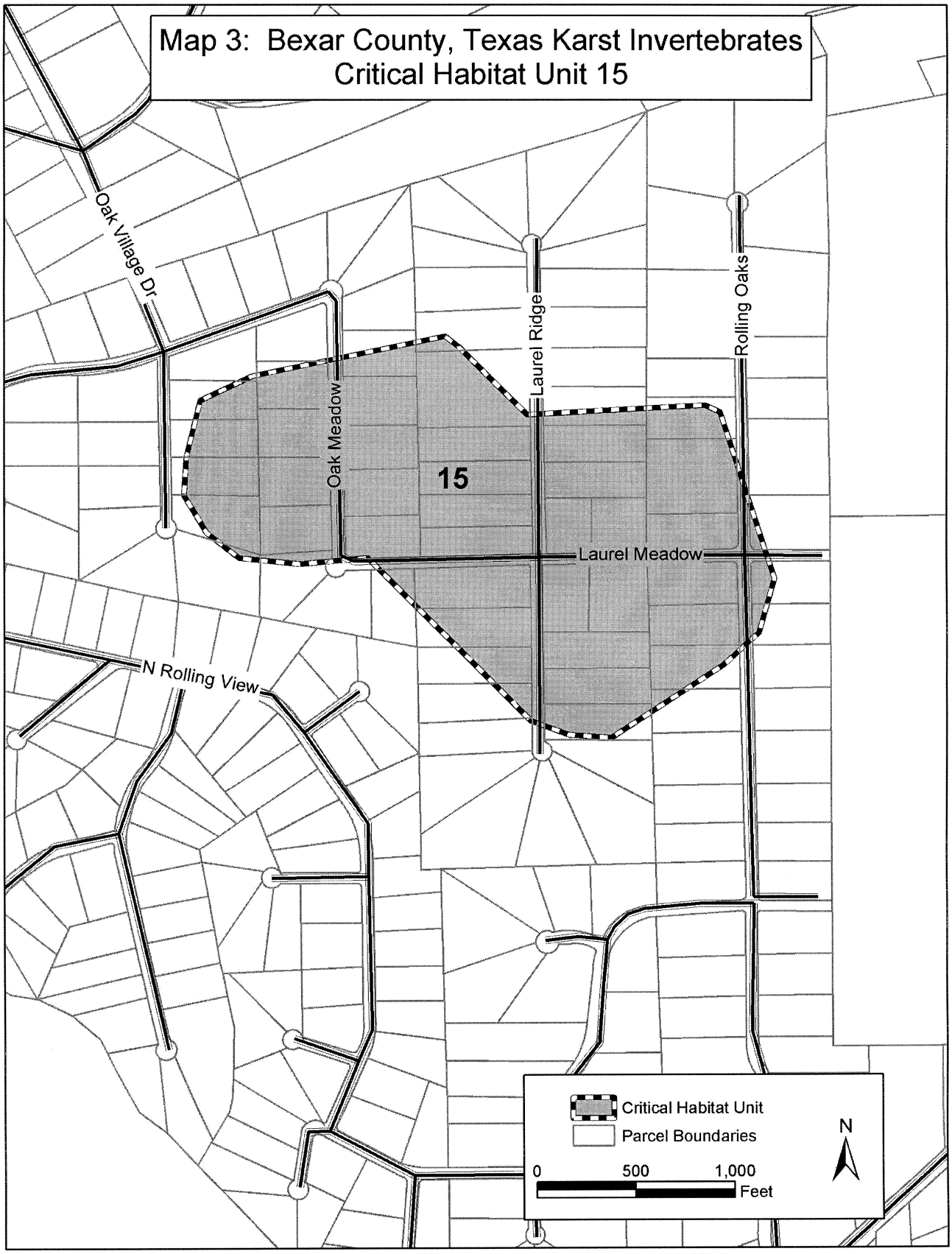
Braken Bat Cave meshweaver (*Cicurina venii*)

(1) Critical habitat for the Braken Bat Cave meshweaver in Bexar County, Texas, occurs in Unit 15 as described below and depicted on Map 3 below.

Unit 15 also is depicted on Map 1 (index map) provided in the entry for Cokendolpher cave harvestman in this paragraph (g). The primary constituent elements and statements regarding existing structures and associated landscaping, as described in the entry for Cokendolpher cave harvestman in this paragraph (g), are identical for this species.

(2) Unit 15 (34 ha (85 ac)) is an area bounded by points with the following coordinates: –98.7631005, 29.4388531; –98.7600316, 29.4394009; –98.7598094, 29.4392533; –98.7587180, 29.4382984; –98.7558932, 29.4384257; –98.7556537, 29.4383265; –98.7547983, 29.4359982; –98.7550418, 29.4352415; –98.7555963, 29.4347910; –98.7573878, 29.4337784; –98.7580646, 29.4338220; –98.7586605, 29.4340159; –98.7612682, 29.4363049; –98.7623440, 29.4362183; –98.7633120, 29.4363085; –98.7638206, 29.4366668; –98.7641806, 29.4371861; –98.7641397, 29.4377268; –98.7639175, 29.4385170; –98.7631005, 29.4388531.

(3) Map 3—Unit 15 follows:



Madla Cave meshweaver (*Cicurina madla*)

(1) Critical habitat for the Madla Cave meshweaver in Bexar County, Texas, occurs in Units 2, 3, 5, 8b, and 17 as described below and depicted on Maps

4 through 7 below. These units also are depicted on Map 1 (index map) provided in the entry for Cokendolpher cave harvestman in this paragraph (g). The primary constituent elements and statements regarding existing structures and associated landscaping, as described in the entry for Cokendolpher cave harvestman in this paragraph (g), are identical for this species.

(2) Four caves and their associated karst management areas established under the La Cantera section 10(a)(1)(B) permit are within the boundaries of units but are not designated as critical habitat. These include Helotes Blowhole and Helotes Hilltop caves and the surrounding approximately 10 ha (25 ac) (within Unit 3); Hills and Dales Pit and the surrounding approximately 28 ha (70 ac) (within Unit 8b); and Madla Cave and the surrounding 2 ha (5 ac) (within Unit 17).

(3) Unit 2 (37 ha (92 ac)) is an area bounded by points with the following coordinates: –98.7233687, 29.6171088; –98.7232109, 29.6176729; –98.7226506, 29.6187073; –98.7223227, 29.6191855; –98.7219946, 29.6195016; –98.7215653, 29.6198980; –98.7214108, 29.6206847; –98.7175298, 29.6206847; –98.7174011, 29.6219810; –98.7170539, 29.6225993; –98.7162170, 29.6229506; –98.7153881, 29.6229101; –98.7147133, 29.6225995; –98.7143375, 29.6220053; –98.7142667, 29.6214953; –98.7144462, 29.6206782; –98.7144750, 29.6170924; –98.7145361, 29.6170162; –98.7165027, 29.6170258; –98.7163850, 29.6174867; –98.7177246, 29.6172351; –98.7177252, 29.6170317; –98.7211420, 29.6170764; –98.7233687, 29.6171088.

(4) Map 4—Unit 2 follows:

(5) Unit 3 (17 ha (41 ac)) is an area bounded by points with the following coordinates: –98.6924522, 29.5880654; –98.6884953, 29.5878232; –98.6883750, 29.5869448; –98.6879295, 29.5850798; –98.6894469, 29.5850833; –98.6906186,

29.5841182; –98.6929315, 29.5855036; –98.6936461, 29.5865268; –98.6931713, 29.5875652; –98.6924522, 29.5880654.

(6) Map 5—Unit 3 follows:

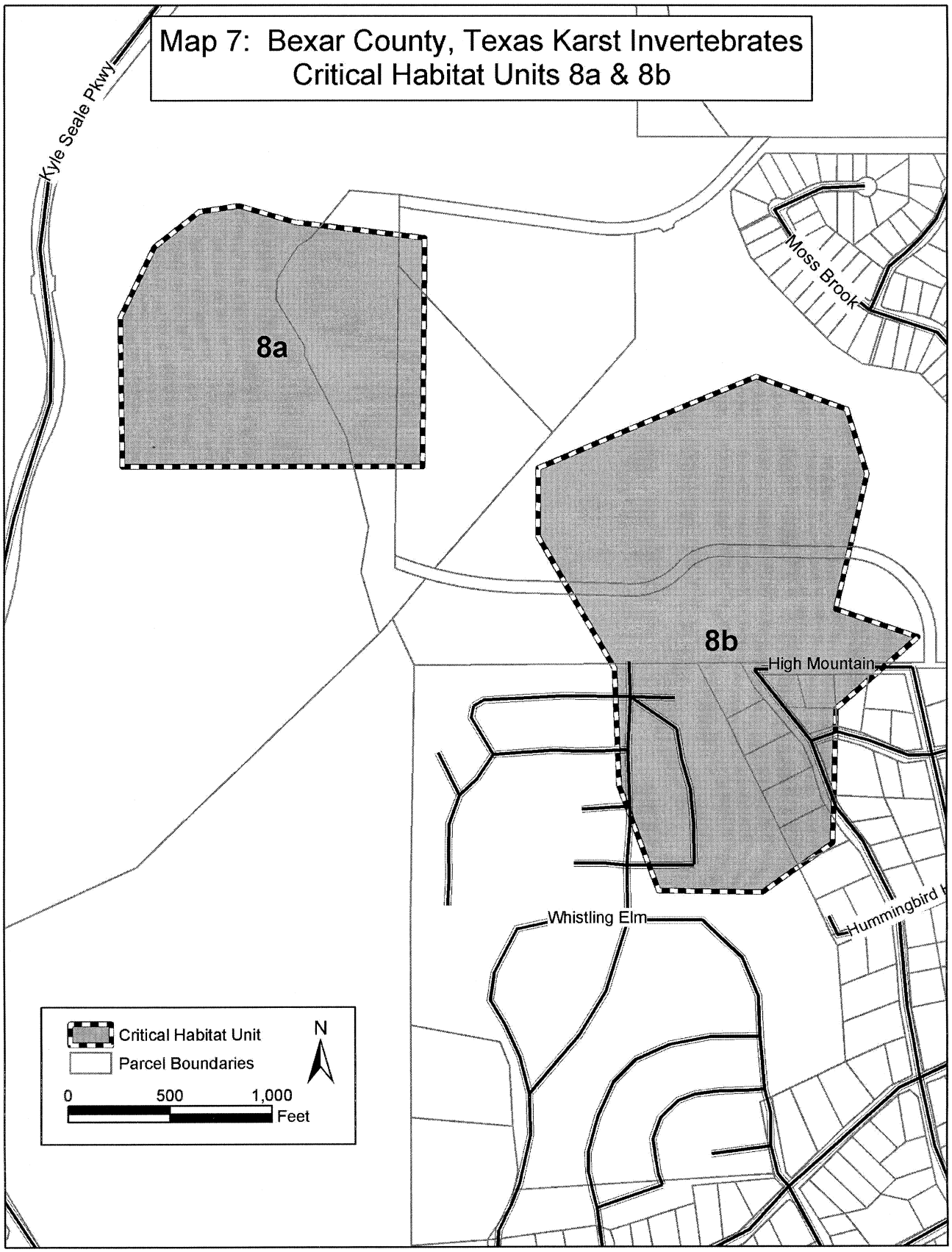
(7) Unit 5 (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.6935478, 29.6136095; –98.6890212, 29.6135990; –98.6890205, 29.6111931; –98.6891305, 29.6109546; –98.6896239, 29.6104067; –98.6903350, 29.6101696; –98.6935582, 29.6101663; –98.6935478, 29.6136095.

(8) Map 6—Unit 5 (which also depicts Unit 17) follows:

(9) Unit 8b (28 ha (69 ac)) is an area bounded by points with the following coordinates: –98.6429582, 29.5992695; –98.6395799, 29.6005152; –98.6381868, 29.6000556; –98.6378758, 29.5991778; –98.6383595, 29.5973398; –98.6370868,

29.5969511; –98.6383585, 29.5959854; –98.6384179, 29.5941526; –98.6395017, 29.5934820; –98.6411044, 29.5935108; –98.6417193, 29.5949384; –98.6417849, 29.5965421; –98.6429721, 29.5983417; –98.6429582, 29.5992695.

(10) Map 7—Unit 8b (which also depicts Unit 8a) follows:



(11) Unit 17 (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.6986633, 29.6061189; –98.6978901, 29.6064178; –98.6968967, 29.6060042; –98.6955470, 29.6059909; –98.6944214, 29.6056088; –98.6944325,

29.6018959; –98.6967798, 29.6018910; –98.6967762, 29.6031320; –98.6986774, 29.6031773; –98.6986633, 29.6061189.

(12) For a map of unit 17, refer to Map 6—Unit 5 in paragraph (8) of this entry.

Robber Baron Cave meshweaver (*Cicurina baronia*)

(1) Critical habitat for the Robber Baron Cave meshweaver in Bexar County, Texas, occurs in Unit 20 as provided in the critical habitat unit description and depicted on Map 1 and Map 2 in the entry for Cokendolpher cave harvestman in this paragraph (g). The primary constituent elements and statements regarding existing structures and associated landscaping, as described in the entry for Cokendolpher cave harvestman in this paragraph (g), are identical for this species.

* * * * *

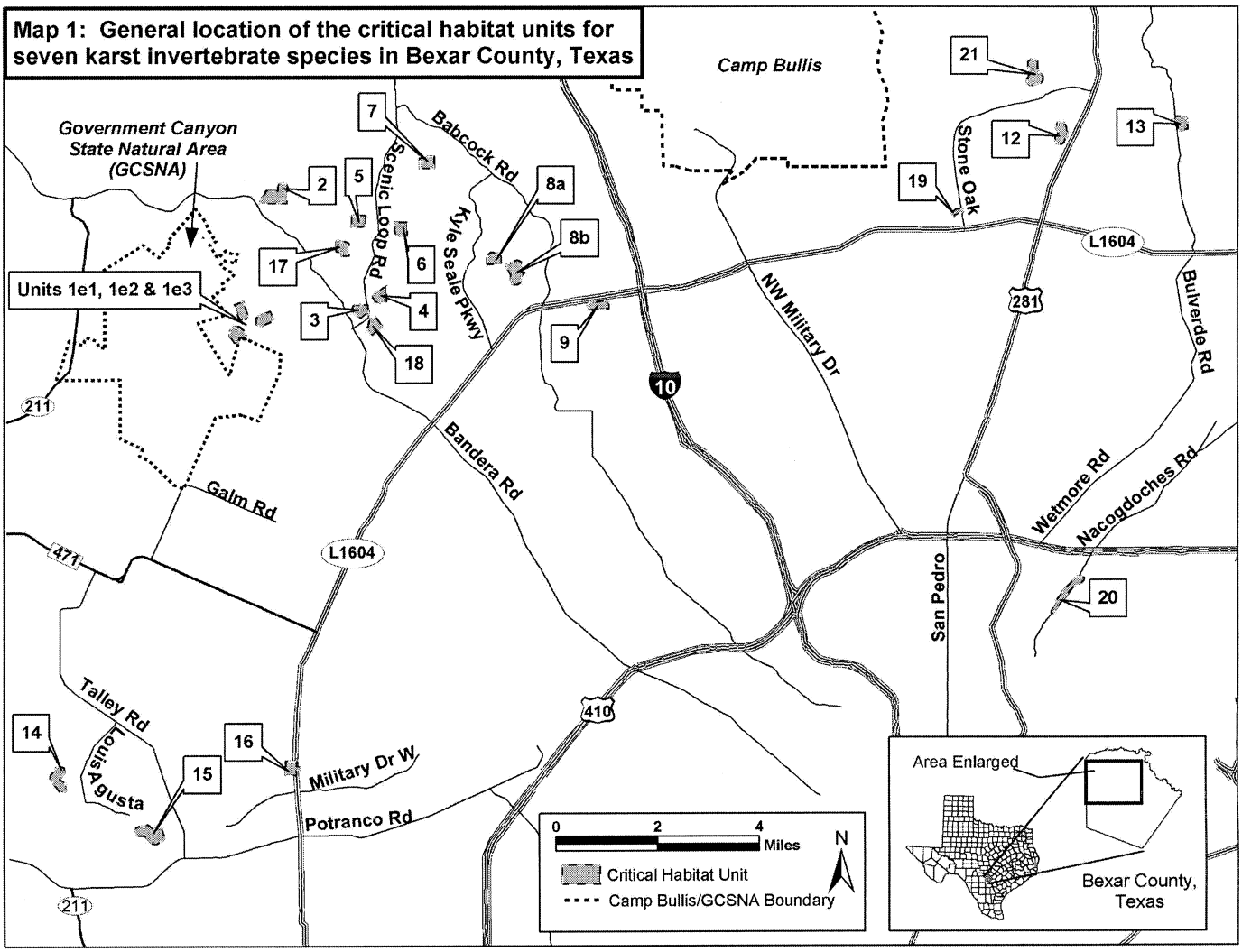
(i) *Insects.*

* * * * *

Helotes mold beetle (*Batrisodes venyivi*)

(1) Critical habitat for the Helotes mold beetle occurs in Units 1e1, 3, and 5 as described below and depicted on Map 1 (index map) and Maps 2 through 4 below. All coordinates are geographic longitude and latitude, decimal degree coordinate pairs, referenced to North American Horizontal Datum 1983. Coordinates were derived from 2001 digital orthophotographs.

(2) Map 1—Index map of critical habitat units for karst invertebrate species in Bexar County, Texas—follows:



(3) The primary constituent elements include:

(i) The physical features of karst-forming rock containing subterranean spaces with stable temperatures, high humidities (near saturation), and suitable substrates (for example, spaces between and underneath rocks suitable for foraging and sheltering); and

(ii) The biological features of a healthy surface community of native plants (for example, juniper-oak woodland) and animals (for example, cave crickets) surrounding the karst feature that provide nutrient input and buffer the karst ecosystem from adverse effects (from, for example, nonnative species invasions, contaminants, and fluctuations in temperature and humidity).

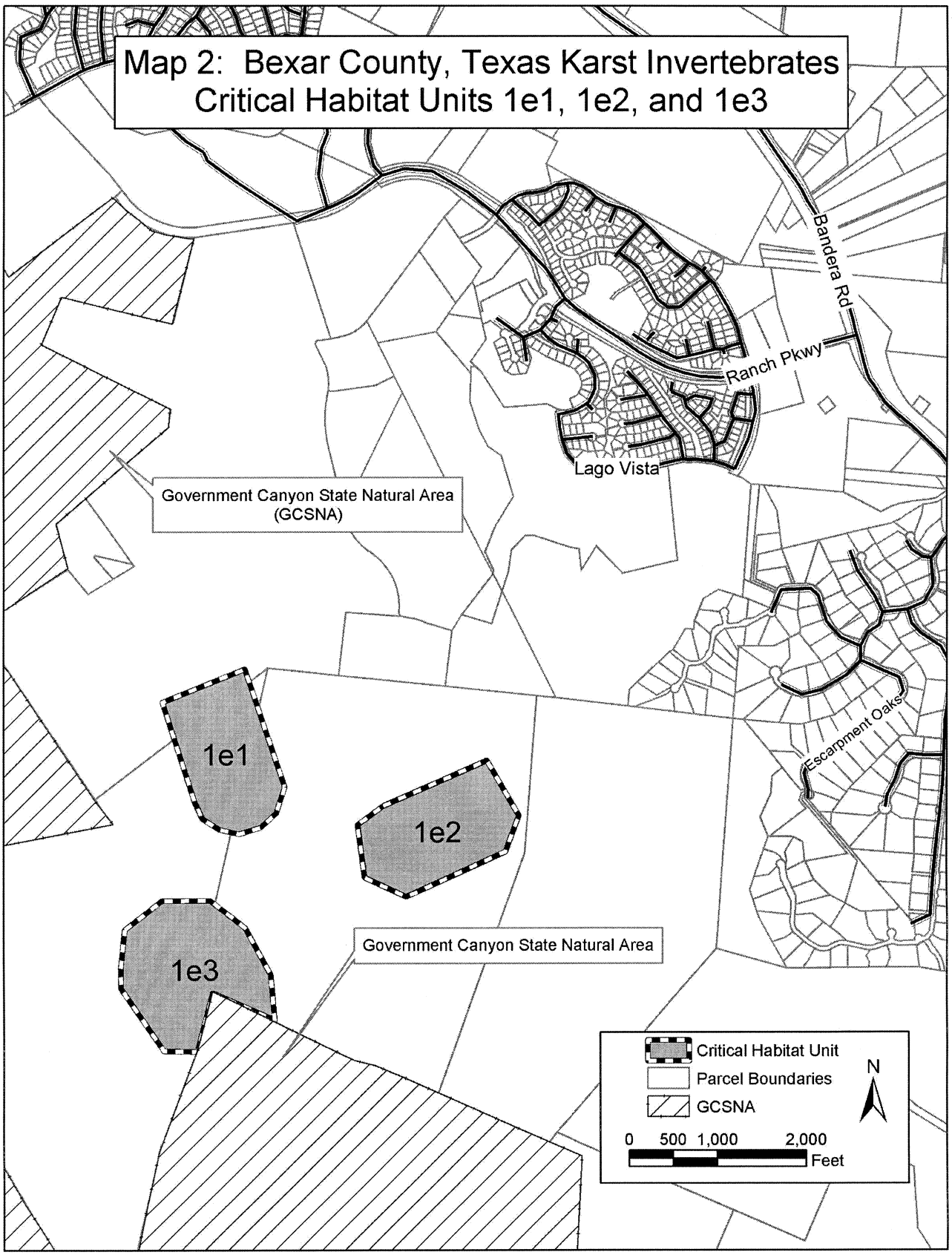
(4) Existing human-constructed, above ground, impervious structures do not contain the primary constituent elements and are not considered to be critical habitat. Such features and structures include, but are not limited to, buildings and paved roads. However, subsurface areas under these structures

are considered to be critical habitat since subterranean spaces containing these species and/or transmitting moisture and nutrients through the karst ecosystem extend, in some cases, underneath these existing human-constructed structures. Landscaped areas associated with existing human-constructed structures are also not considered critical habitat.

(5) Two caves, Helotes Blowhole and Helotes Hilltop caves, and their associated approximately 10 ha (25 ac) karst management area established under the La Cantera section 10 permit, are within the boundaries of Unit 3 but are not designated as critical habitat.

(6) Unit 1e1 (15 ha (38 ac)) is an area bounded by points with the following coordinates: –98.7273522, 29.5853221; –98.7276682, 29.5844887; –98.7282285, 29.5840393; –98.7289978, 29.5838347; –98.7296876, 29.5839736; –98.7302983, 29.5843184; –98.7305603, 29.5848409; –98.7317069, 29.5879827; –98.7287776, 29.5890153; –98.7285230, 29.5883695; –98.7273522, 29.5853221.

(7) Map 2—Unit 1e1 (which also depicts Units 1e2 and 1e3) follows:



(8) Unit 3 (17 ha (41 ac)) is an area bounded by points with the following coordinates: –98.6924522, 29.5880654; –98.6884953, 29.5878232; –98.6883750, 29.5869448; –98.6879295, 29.5850798; –98.6894469, 29.5850833; –98.6906186,

29.5841182; –98.6929315, 29.5855036; –98.6936461, 29.5865268; –98.6931713, 29.5875652; –98.6924522, 29.5880654.

(9) Map 3—Unit 3 (which also depicts Units 4 and 18) follows:

(10) Unit 5 (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.6935478, 29.6136095; –98.6890212, 29.6135990; –98.6890205, 29.6111931; –98.6891305, 29.6109546; –98.6896239, 29.6104067; –98.6903350,

29.6101696; –98.6935582, 29.6101663; –98.6935478, 29.6136095.

(11) Map 4—Unit 5 (which also depicts Unit 17) follows:

BILLING CODE 4310–55–C

Beetle (no common name) (*Rhadine exilis*)

(1) Critical habitat for the beetle *Rhadine exilis* in Bexar County, Texas, occurs in Units 1e1, 3, and 5 as provided in the critical habitat unit descriptions and depicted on Maps 1 through 4 in the entry for Helotes mold beetle in this paragraph (i). Critical habitat for this species also occurs in Units 1e3 and 4 as described below and depicted on Maps 2 and 3 in the entry for Helotes mold beetle in this paragraph (i). In addition, critical habitat for this species occurs in Units 2, 6, 7, 8a, 8b, 9, 12, 13, and 21 as described below and depicted on Maps 5 through 12 below. The primary constituent elements and statements regarding existing structures and associated landscaping, as described in the entry for Helotes mold beetle in this paragraph (i), are identical for this species.

(2) Four caves and their associated karst management areas established under the La Cantera section 10(a)(1)(B) permit are within the boundaries of units but are not designated as critical habitat. These include Helotes Blowhole and Helotes Hilltop caves and the surrounding approximately 10 ha (25 ac) (within Unit 3); John Wagner Ranch Cave No. 3 and the surrounding approximately 1.6 ha (4 ac) (within Unit 6); and Hills and Dales Pit and the surrounding approximately 28 ha (70 ac) (within Unit 8b).

(3) Unit 1e3 (19 ha (46 ac)) is an area bounded by points with the following coordinates: –98.7330644, 29.5808303; –98.7317429, 29.5817323; –98.7300245, 29.5817484; –98.7287834, 29.5808858; –98.7278797, 29.5794152; –98.7277522, 29.5779929; –98.7299554, 29.5788393; –98.7305067, 29.5770049; –98.7316838, 29.5770266; –98.7331986, 29.5789722; –98.7332119, 29.5796238; –98.7330644, 29.5808303.

(4) A map of Unit 1e3 is provided in Map 2 of the entry for Helotes mold beetle in this paragraph (i).

(5) Unit 2 (37 ha (92 ac)) is an area bounded by points with the following coordinates: –98.7233687, 29.6171088; –98.7232109, 29.6176729; –98.7226506, 29.6187073; –98.7223227, 29.6191855; –98.7219946, 29.6195016; –98.7215653, 29.6198980; –98.7214108, 29.6206847; –98.7175298, 29.6206847; –98.7174011, 29.6219810; –98.7170539, 29.6225993; –98.7162170, 29.6229506; –98.7153881, 29.6229101; –98.7147133, 29.6225995; –98.7143375, 29.6220053; –98.7142667, 29.6214953; –98.7144462, 29.6206782; –98.7144750, 29.6170924; –98.7145361, 29.6170162; –98.7165027, 29.6170258; –98.7163850, 29.6174867; –98.7177246, 29.6172351; –98.7177252, 29.6170317; –98.7211420, 29.6170764; –98.7233687, 29.6171088.

(6) Map 5—Unit 2 follows:

BILLING CODE 4310–55–P

(7) Unit 4 (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.6867019, 29.5907363; –98.6858306, 29.5913949; –98.6821967, 29.5933020; –98.6821915, 29.5888925; –98.6838368, 29.5884340; –98.6861597,

29.5888524; –98.6867424, 29.5898281; –98.6867019, 29.5907363.

(8) A map of Unit 4 is provided in Map 3 of the entry for Helotes mold beetle in this paragraph (i).

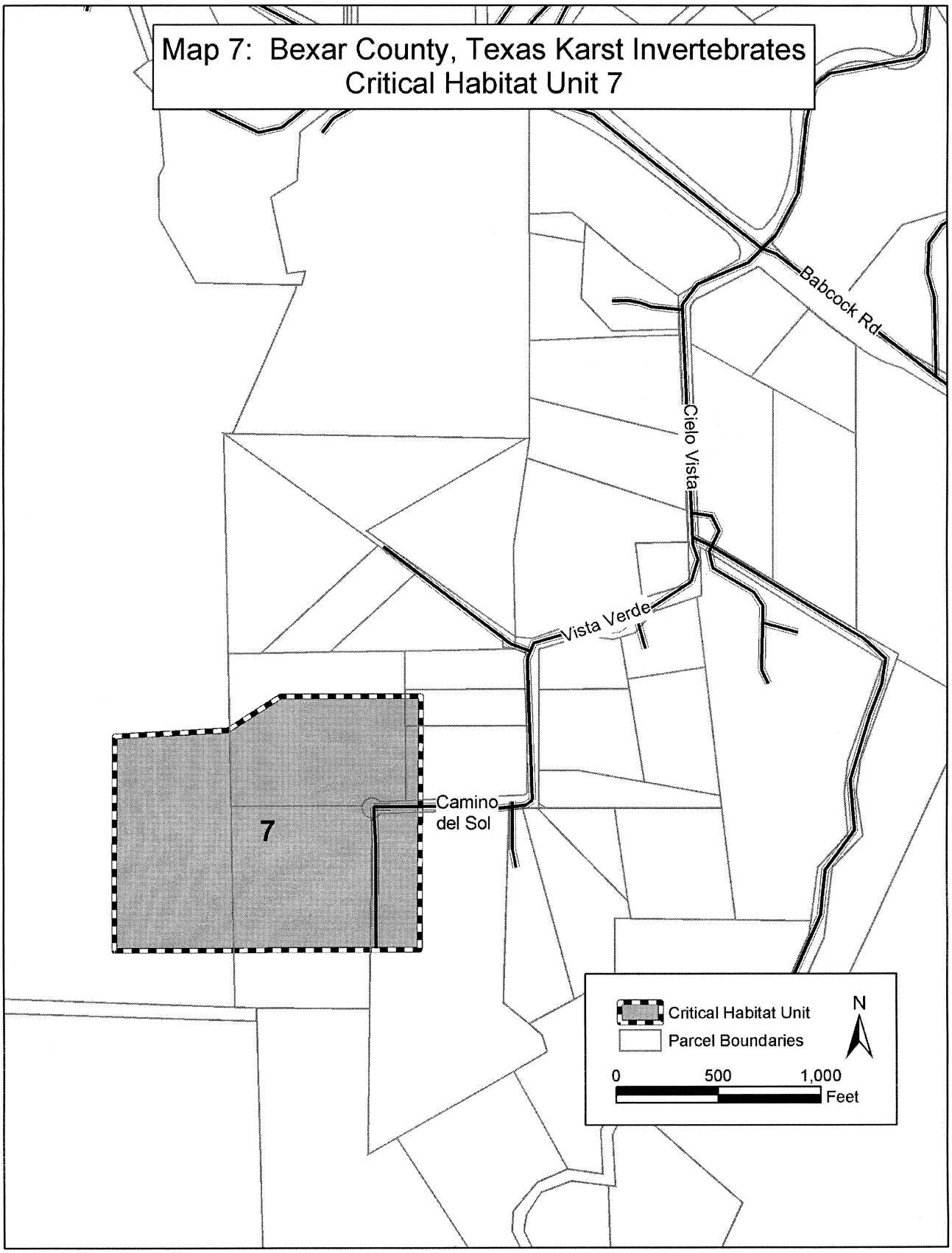
(9) Unit 6 (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.6754738, 29.6114940; –98.6754991, 29.6076989; –98.6783407, 29.6077443; –98.6790700, 29.6080113; –98.6795845, 29.6087581; –98.6796498, 29.6115041; –98.6754738, 29.6114940.

(10) Map 6—Unit 6 follows:

(11) Unit 7 (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.6713696, 29.6269338; –98.6713466, 29.6298459; –98.6696115, 29.6299251; –98.6688040, 29.6303752;

–98.6666183, 29.6303712; –98.6666569, 29.6269341; –98.6713696, 29.6269338.

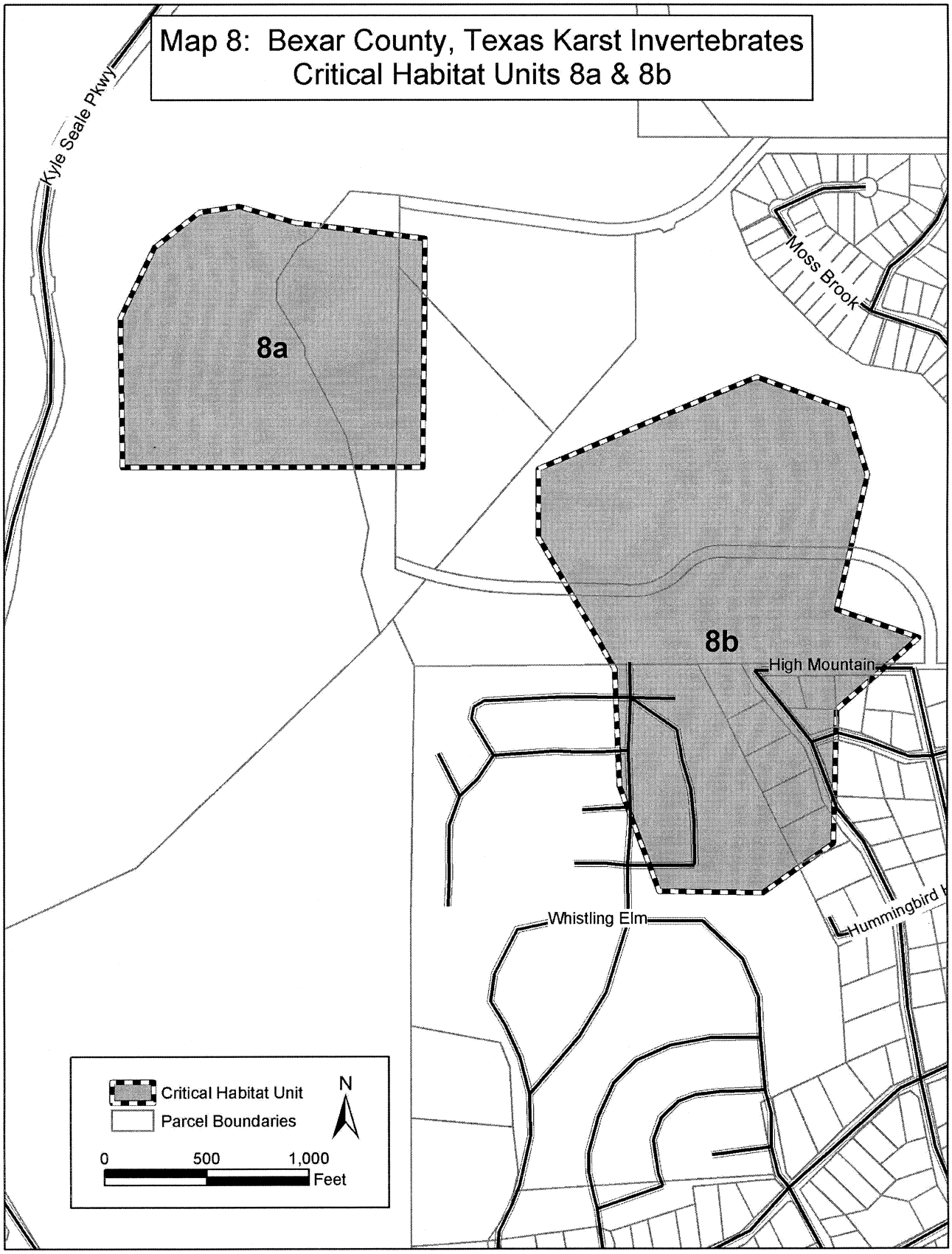
(12) Map 7—Unit 7 follows:



(13) Unit 8a (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.6467402, 29.6026321; –98.6447253, 29.6024097; –98.6447648, 29.5992959; –98.6494110, 29.5993090; –98.6494384, 29.6013452; –98.6489127, 29.6023010; –98.6482203, 29.6027779; –98.6476087, 29.6028598; –98.6467402, 29.6026321.

(14) Unit 8b (28 ha (69 ac)) is an area bounded by points with the following coordinates: –98.6429582, 29.5992695; –98.6395799, 29.6005152; –98.6381868, 29.6000556; –98.6378758, 29.5991778; –98.6383595, 29.5973398; –98.6370868, 29.5969511; –98.6383585, 29.5959854; –98.6384179, 29.5941526; –98.6395017, 29.5934820; –98.6411044, 29.5935108; –98.6417193, 29.5949384; –98.6417849, 29.5965421; –98.6429721, 29.5983417; –98.6429582, 29.5992695.

(15) Map 8—Units 8a and 8b follows:



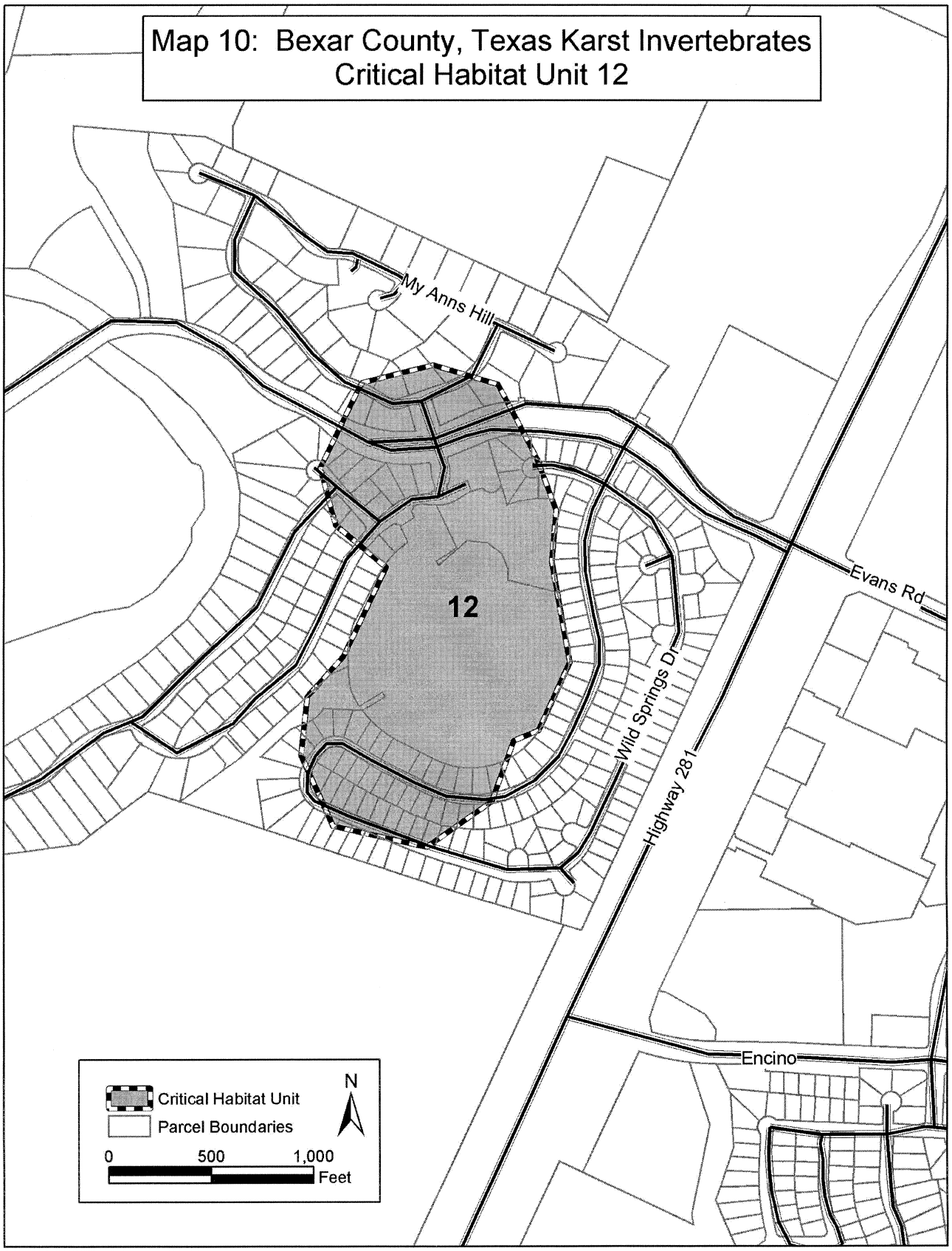
(16) Unit 9 (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.6166421, 29.5881679; –98.6097995, 29.5889549; –98.6094772, 29.5865751; –98.6141408, 29.5862370;

–98.6158210, 29.5862418; –98.6165749, 29.5871541; –98.6166421, 29.5881679.

(17) Map 9—Unit 9 follows:

(18) Unit 12 (21 ha (51 ac)) is an area bounded by points with the following coordinates: –98.4631439, 29.6393535; –98.4620337, 29.6395912; –98.4610270, 29.6393230; –98.4604275, 29.6383078; –98.4601340, 29.6376003; –98.4602053, 29.6369053; –98.4599272, 29.6355399; –98.4604201, 29.6346170; –98.4608048, 29.6344781; –98.4611518, 29.6336481; –98.4621637, 29.6330425; –98.4636173, 29.6333332; –98.4641049, 29.6342973; –98.4640055, 29.6350951; –98.4634444, 29.6356360; –98.4627791, 29.6368420; –98.4635574, 29.6374176; –98.4637899, 29.6381796; –98.4637898, 29.6382043; –98.4631439, 29.6393535.

(19) Map 10—Unit 12 follows:



(20) Unit 13 (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.4218888, 29.6404393; –98.4212080, 29.6405040; –98.4208242, 29.6372953; –98.4239377, 29.6367357; –98.4241724, 29.6382709; –98.4250182,

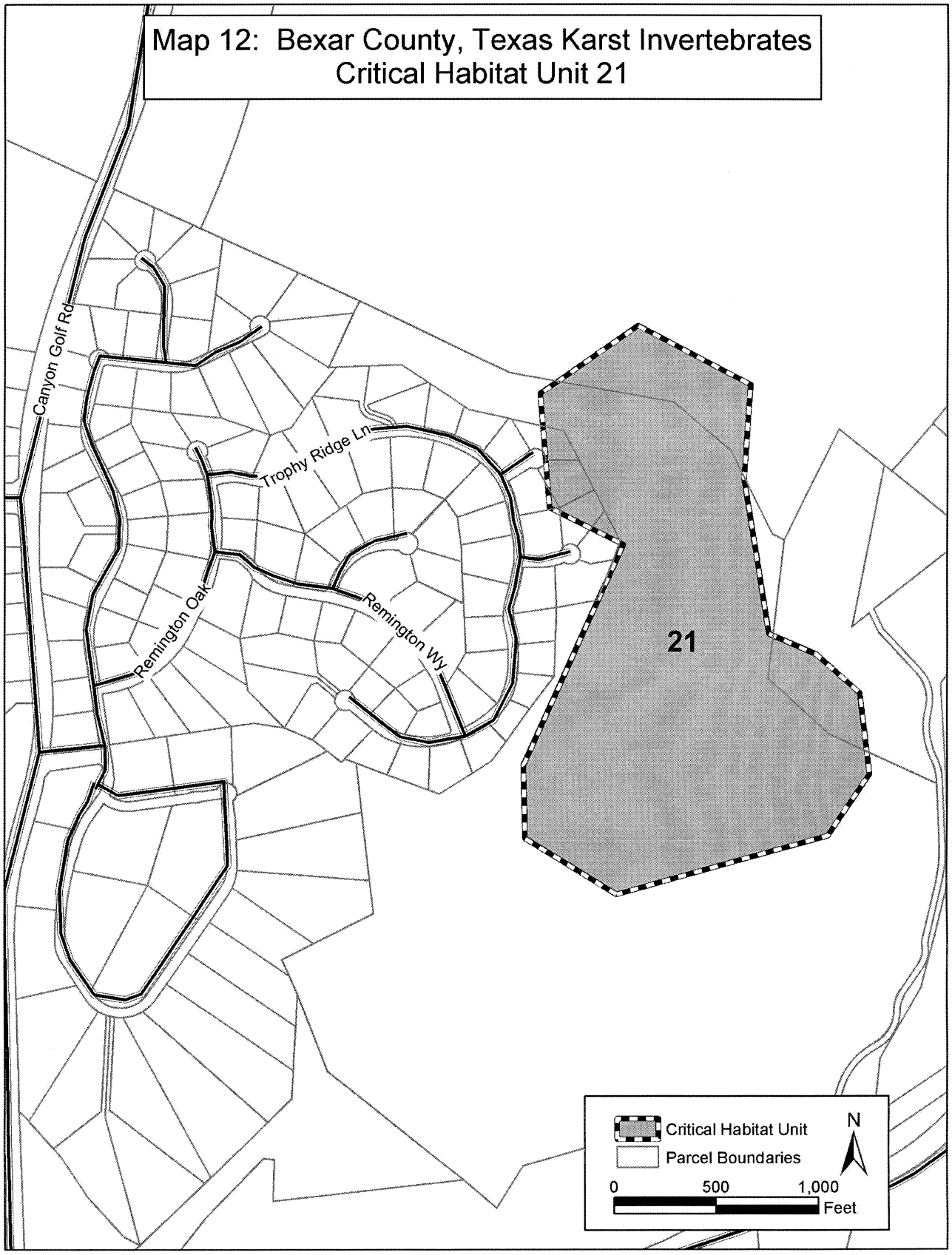
29.6383670; –98.4255670, 29.6386096; –98.4260182, 29.6390832; –98.4257350, 29.6392361; –98.4260492, 29.6397945; –98.4250314, 29.6403527; –98.4246243, 29.6411168; –98.4229768, 29.6409069; –98.4218888, 29.6404393.

(21) Map 11—Unit 13 follows:

(22) Unit 21 (27 ha (68 ac)) is an area bounded by points with the following coordinates: –98.4716469, 29.6499842; –98.4730641, 29.6507507; –98.4730857, 29.6517491; –98.4715209, 29.6547384; –98.4726672, 29.6552447; –98.4728036,

29.6567962; –98.4712860, 29.6577112; –98.4695532, 29.6569100; –98.4696535, 29.6556282; –98.4692815, 29.6535131; –98.4685518, 29.6532365; –98.4678845, 29.6527093; –98.4677417, 29.6516106; –98.4683879, 29.6507722; –98.4716469, 29.6499842.

(23) Map 12—Unit 21 follows:



BILLING CODE 4310–55–C

Beetle (no common name) (*Rhadine infernalis*)

(1) Critical habitat for the beetle *Rhadine infernalis* in Bexar County,

Texas, occurs in Units 1e1, 3 and 5 as provided in the critical habitat unit descriptions and depicted on Maps 1 through 4 in the entry for Helotes mold beetle in this paragraph (i). This species also occurs in the following units: Unit 1e2 as described below and depicted on Map 2 in the entry for Helotes mold beetle in this paragraph (i); Units 2, 6, 8a, and 8b as described in the text and depicted on Maps 5, 6, and 8 in the entry for beetle (*Rhadine exilis*) in this paragraph (i); Unit 4 as provided in the critical habitat descriptions for beetle (*Rhadine exilis*) and depicted on Map 3 in the entry for Helotes mold beetle in this paragraph (i); Units 17 and 18 described below and depicted on Maps 3 and 4 found in the entry for Helotes mold beetle in this paragraph (i); and Units 14, 15, 16, and 19 as described below and depicted on Maps 13 through 16 below. The primary constituent elements and statements regarding existing structures and associated landscaping, as described in the entry for Helotes mold beetle in this paragraph (i), are identical for this species.

(2) Five caves and their associated karst management areas established under the La Cantera section 10(a)(1)(B) permit are within the boundaries of units but are not designated as critical habitat designation. These include Helotes Blowhole and Helotes Hilltop caves and the surrounding approximately 10 ha (25 ac) (within Unit 3); John Wagner Ranch Cave No. 3 and the surrounding approximately 1.6 ha (4 ac) (within Unit 6); and Hills and Dales Pit and the surrounding approximately 28 ha (70 ac) (within Unit 8b); and Madla Cave and the surrounding 2 ha (5 ac) (within Unit 17).

(3) Unit 1e2 (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.7238284, 29.5847161; –98.7201061, 29.5861352; –98.7189558, 29.5844029; –98.7194474, 29.5832652; –98.7230107, 29.5818492; –98.7245095, 29.5824623; –98.7247550, 29.5841155; –98.7238284, 29.5847161.

(4) A map of unit 1e2 is provided in Map 2 of the entry for Helotes mold beetle in this paragraph (i).

(5) Unit 14 (26 ha (64 ac)) is an area bounded by points with the following coordinates: –98.7863612, 29.4495294; –98.7869725, 29.4489471; –98.7875551, 29.4486522; –98.7883435, 29.4486781; –98.7889905, 29.4489913; –98.7918932, 29.4524710; –98.7918632, 29.4533747; –98.7904052, 29.4548676; –98.7899060, 29.4556966; –98.7887880, 29.4561713; –98.7872743, 29.4556964; –98.7870331, 29.4543351; –98.7888385, 29.4523567; –98.7868531, 29.4511085; –98.7863591, 29.4505317; –98.7863612, 29.4495294.

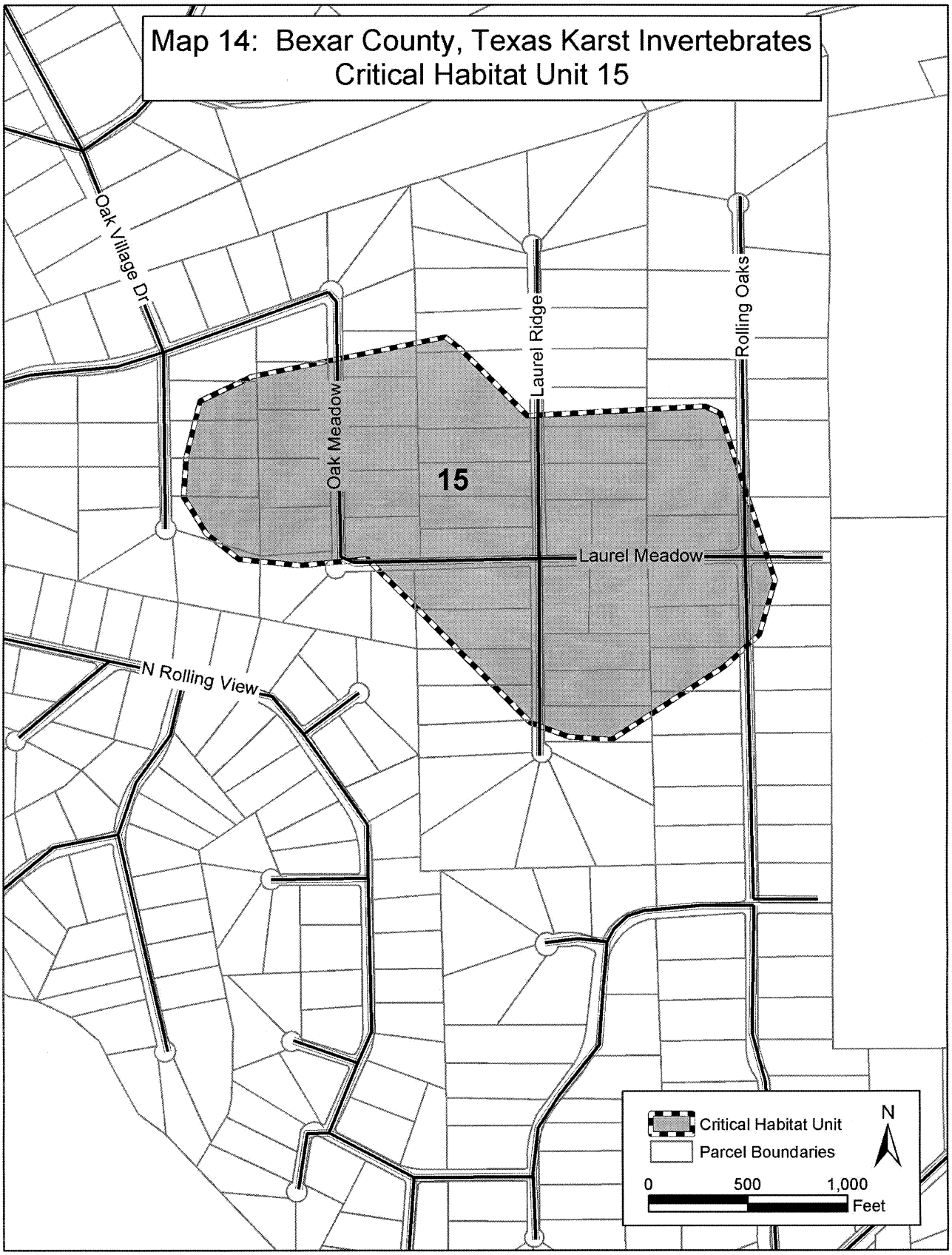
(6) Map 13—Unit 14 follows:

BILLING CODE 4310–55–P

(7) Unit 15 (34 ha (85 ac)) is an area bounded by points with the following coordinates: –98.7631005, 29.4388531; –98.7600316, 29.4394009; –98.7598094, 29.4392533; –98.7587180, 29.4382984; –98.7558932, 29.4384257; –98.7556537,

29.4383265; –98.7547983, 29.4359982; –98.7550418, 29.4352415; –98.7555963, 29.4347910; –98.7573878, 29.4337784; –98.7580646, 29.4338220; –98.7586605, 29.4340159; –98.7612682, 29.4363049; –98.7623440, 29.4362183; –98.7633120, 29.4363085; –98.7638206, 29.4366668; –98.7641806, 29.4371861; –98.7641397, 29.4377268; –98.7639175, 29.4385170; –98.7631005, 29.4388531.

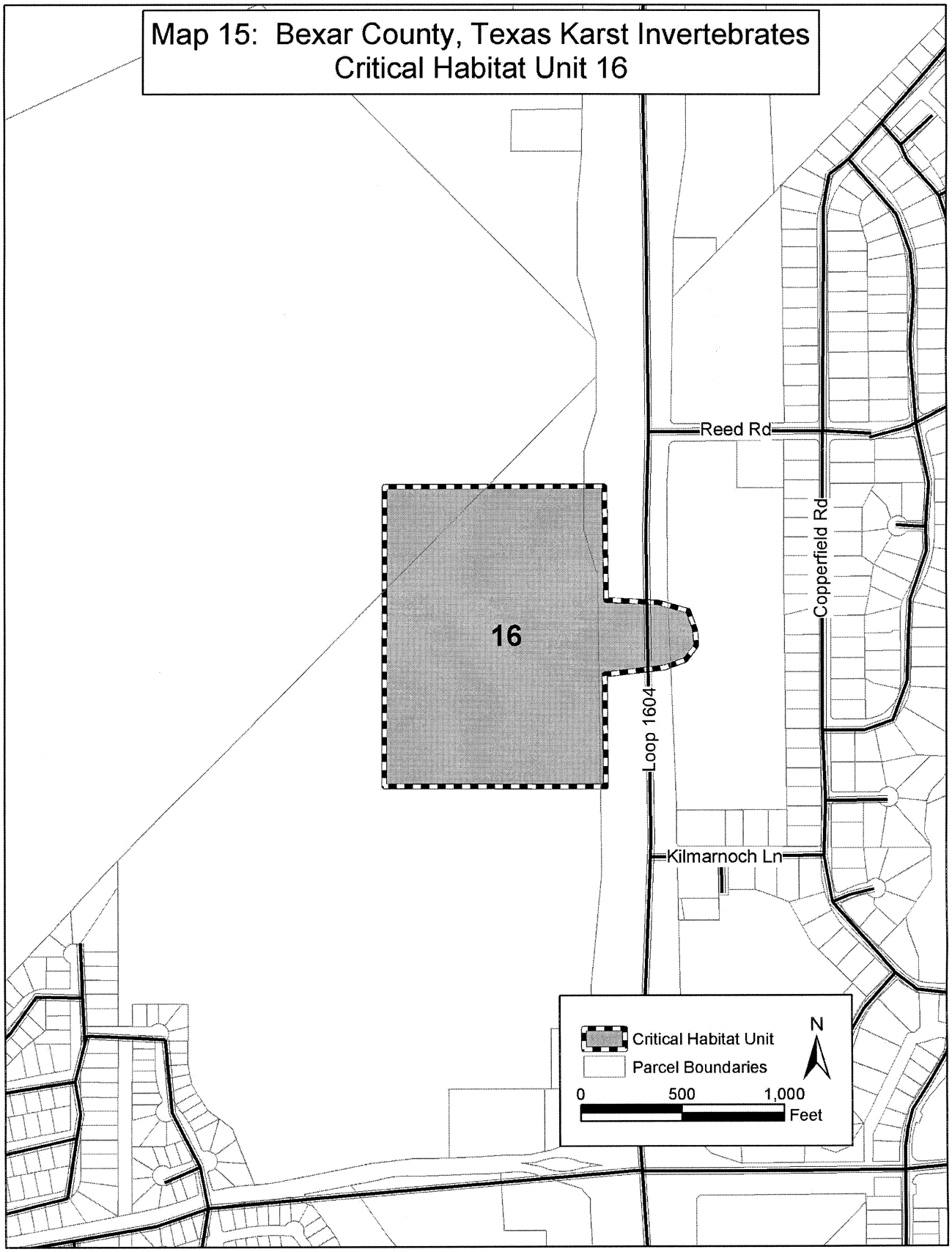
(8) Map 14—Unit 15 follows:



(9) Unit 16 (16 ha (40 ac)) is an area bounded by points with the following coordinates: –98.7154218, 29.4533018; –98.7153995, 29.4573801; –98.7119857, 29.4573751; –98.7119610, 29.4558232; –98.7111540, 29.4557860; –98.7106973,

29.4556731; –98.7105899, 29.4554235; –98.7105693, 29.4552002; –98.7107385, 29.4550044; –98.7110558, 29.4549040; –98.7119873, 29.4548136; –98.7119764, 29.4532848; –98.7154218, 29.4533018.

(10) Map 15—Unit 16 follows:



BILLING CODE 4310–55–C

(11) Unit 17 (16 ha (40 ac)) is an area bounded by points with the following coordinates: —98.6986633, 29.6061189; —98.6978901, 29.6064178;

—98.6968967, 29.6060042;
—98.6955470, 29.6059909;
—98.6944214, 29.6056088;
—98.6944325, 29.6018959;
—98.6967798, 29.6018910;
—98.6967762, 29.6031320;
—98.6986774, 29.6031773;
—98.6986633, 29.6061189.

(12) A map of Unit 17 is provided in Map 4 in the entry for Helotes mold beetle in this paragraph (i).

(13) Unit 18 (16 ha (40 ac)) is an area bounded by points with the following coordinates: —98.6879353, 29.5840278;
—98.6871403, 29.5838597;
—98.6859450, 29.5845069;
—98.6838609, 29.5817508;
—98.6870156, 29.5791593;
—98.6889591, 29.5810380;
—98.6883743, 29.5818521;
—98.6879353, 29.5840278.

(14) A map of Unit 18 is provided in Map 3 in the entry for Helotes mold beetle in this paragraph (i).

(15) Unit 19 (5 ha (12 ac)) is an area bounded by points with the following coordinates: —98.4945129, 29.6147150;
—98.4940750, 29.6145674;
—98.4938755, 29.6141954;
—98.4939880, 29.6138063;
—98.4942787, 29.6135970;
—98.4952809, 29.6135500;
—98.4956056, 29.6133414;
—98.4963069, 29.6130155;
—98.4967699, 29.6130881;
—98.4966492, 29.6123219;
—98.4973783, 29.6125657;
—98.4978516, 29.6131158;
—98.4974600, 29.6135445;
—98.4971077, 29.6136897;
—98.4970745, 29.6140495;
—98.4968571, 29.6142911;
—98.4962556, 29.6145285;
—98.4954870, 29.6146791;
—98.4945129, 29.6147150.

(16) Map 16—Unit 19 follows:

BILLING CODE 4310–55–P

Map 16: Bexar County, Texas Karst Invertebrates
Critical Habitat Unit 19
Contadora
Sonterra Blvd
19
Stone Oak Pkwy
Sonterra Place
Loop 1604
Critical Habitat Unit
Parcel Boundaries
N
0
500
1,000
Feet

BILLING CODE 4310–55–C

* * * * *

Dated: March 26, 2003.

Craig Manson,

Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 03–7735 Filed 4–7–03; 8:45 am]

BILLING CODE 4310–55–P