



United States Department of the Interior

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JUN 20 2005

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Chief, Regulatory Branch
Fort Worth District, Corps of Engineers
P.O. Box 17300
Fort Worth, Texas 76102-0300

Consultation # 2-15-2004-F-0266

Dear Mr. Lea:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed construction of the Wimberley Bypass, a new roadway north of the Village of Wimberley in Hays County, Texas, (Permit Application Number 200400610) and its effects on the federally listed golden-cheeked warbler (*Dendroica chrysoparia*) (GCWA) in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*). Your January 19, 2005, request for formal consultation was received on January 21, 2005.

This Opinion is based on information provided in the February 14, 2005, Biological Assessment, as well as on meetings, emails, and telephone conversations between individuals from the Corps of Engineers (Corps); Loomis Austin consultants; Smith, Robertson, Elliot, Glen, Klein, and Bell, L.L.P.; and the Service. A complete administrative record of this consultation is on file at this office.

Consultation History

On August 23, 2004, the Service met with consultants and representatives for Hays County for informal consultation on the proposed Wimberley Bypass. Loomis Austin requested concurrence with a list of threatened or endangered species occurring in Hays County by letter on September 29, 2004, on which we concurred by letter on October 7, 2004. Loomis Austin submitted a draft Biological Assessment to the Service on November 9, 2004, to which the Service requested changes. On January 21, 2005, the Service received a letter from the Corps requesting formal consultation. A revised draft Biological Assessment was received on January 25, 2005, which still required some revision. On February 22, 2005, the Service received the final Biological Assessment. By letter dated March 2, 2005, we determined we had sufficient information to prepare a Biological Opinion and acknowledged the initiation of formal consultation.

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BIOLOGICAL OPINION

I. Description of Proposed Action

Project Description

The proposed project is the construction of a road, the Wimberley Bypass, in Hays County north of Wimberley (Figure 1). The proposed road is approximately 2.1 miles (3.4 kilometers) long and would connect Ranch-to-Market (R.M.) 12 at the entrance of the Woodcreek residential subdivision with County Road (C.R.) 3237 to the east of the downtown retail district of the Village of Wimberley.

The Wimberley Bypass will initially be constructed as a two-lane, two-way county road consisting of two 12-foot (3.6-meter) lanes with two 6-foot (1.8-meter) shoulders within 226 feet (68.9 meters) of right-of-way. This initial roadway design includes sufficient right-of-way to accommodate future upgrades to the roadway (the Texas Department of Transportation (TXDOT) ultimately envisions upgrading the project to a four lane divided highway and incorporating it into the state highway system). Approximately 26 feet (7.9 meters) of the right-of-way will be used to accommodate a future hike-and-bike trail.

The alignment, typical cross section, and associated water quality controls for the proposed project were selected from a set of alternatives that were analyzed in terms of their impact on environmental resources (i.e., riparian habitat, endangered species, and water quality), cultural resources, permitting requirements, construction costs, and other project considerations. The proposed project had the least amount of environmental impacts, compared to the other analyzed alternatives (Loomis Austin, Inc. 2003).

Conservation Measures

The proposed project lies over the contributing zone of the Edwards Aquifer (Figure 2) and falls under Texas Commission on Environmental Quality (TCEQ) Chapter 213 rules protecting the Edwards Aquifer. These rules require the removal of 80 percent of the total suspended solids generated by the proposed project. These rules not only protect against turbidity and sedimentation, but also remove other pollutants carried by suspended solids.

Glenrose Engineering prepared a report analyzing the expected water quality impacts of the proposed Wimberley Bypass and alternative routes as part of the Phase 1 alternatives analysis for the proposed project. The report evaluated water quality impacts (including changes in runoff volume and flow regime, pollutant loads, and the character of riparian zones) resulting from road construction and future land development along the proposed roadway. The report recommended structural water quality controls for the proposed project that were ultimately incorporated into the project design (Glenrose Engineering 2003). The proposed project will use vegetated filter strips to reduce the water quality impacts of the proposed project and comply with TCEQ Chapter 213 rules.

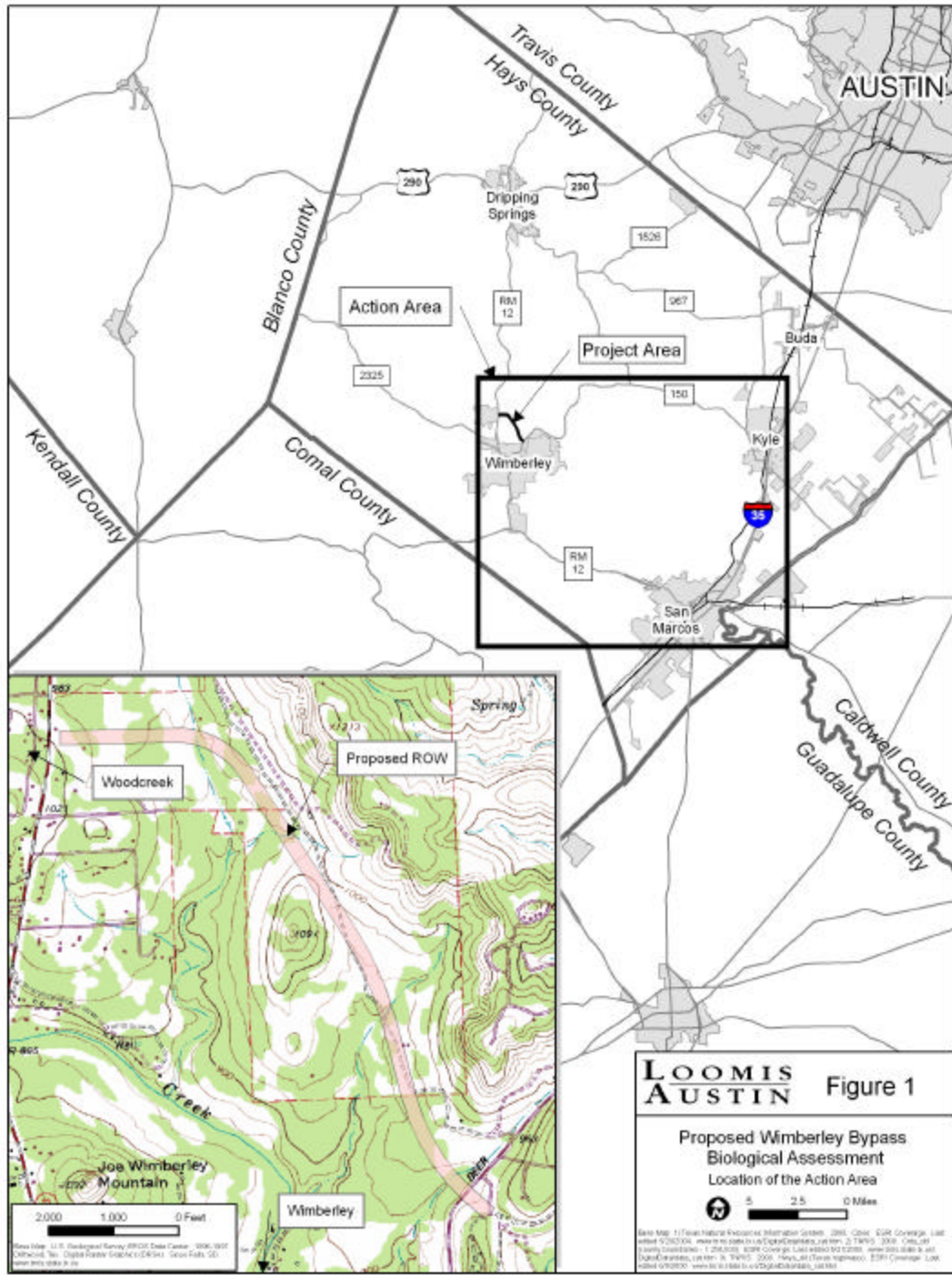


Figure 1

The County will survey the area on both sides of the proposed road for its full length, measured 300 feet (91.4 meters) from the outside edge of the right-of-way, annually under Service guidelines for the presence of the GCWA for 10 years beginning the first year of construction, or until 3 years of surveys find no GCWAs, or until development within 300 feet (91.4 meters) of the right-of-way removes 75 percent of habitat.

Action Area

The Action Area (the complete area that may be directly or indirectly affected by the proposed project) is located in Hays County, between R.M. 12 near the Village of Woodcreek and Interstate Highway (I.H.) 35 at San Marcos (Figure 2). The Action Area for the proposed project includes the site of the proposed project; portions of the Village of Woodcreek, the Village of Wimberley, Kyle, and San Marcos; segments of Cypress Creek, the Blanco River, and the San Marcos River; and Spring Lake and the San Marcos Springs.

II. Status of the Species

Ten federally listed endangered species and one candidate for listing may occur within Hays County. In addition to the GCWA, the black-capped vireo (*Vireo atricapilla*) and the whooping crane (*Grus americana*) also may occur in Hays County, but this project will not affect these species because there is no habitat for them in or near the project area. Also occurring in the County are: the listed endangered San Marcos salamander (*Eurycea nana*), Texas blind salamander (*E. rathbuni*), fountain darter (*Etheostoma fonticola*), San Marcos gambusia (*Gambusia gerogeii*), and Texas wild rice (*Zizania texana*), Edwards Aquifer dependent species which occur in the springs in San Marcos; Comal Springs dryopid beetle (*Stygoparnus comalensis*) and Comal Springs riffle beetle (*Heterelmis comalensis*), Edwards Aquifer dependent species which occur in Comal Springs in New Braunfels (the Comal Springs dryopid beetle has also been found in Fern Bank Springs on the Blanco River east of Wimberley (Barr 1993)); and Cagle's map turtle (*Graptemys caglei*), a candidate for listing, which occurs in the Blanco River. These aquatic species occur either downstream from the project and/or depend on waters from the Edwards Aquifer. Any runoff from the project will be so diluted by the Blanco River (a portion of which enters the aquifer) and other waters of the aquifer that the impact on water quality would be negligible. Therefore, the project is not likely to adversely affect these species or their designated critical habitat; consequently these other species will not be considered further. Only habitat suitable for the GCWA exists on, or adjacent to, the subject property in the action area, and only the GCWA is likely to be affected by the project.

a. GCWA Description

The GCWA was emergency listed as endangered on May 4, 1990, (55 FR 18844) because of the imminent and ongoing destruction of habitat and was federally listed as endangered without critical habitat on December 27, 1990 (55 FR 53160). The small, neotropical migrant is 4.5 to 5 inches (11.4 to 12.7



Females are similar, but less colorful. The lower breast and belly of both sexes are white with black stripes on the flanks. The GCWA is probably derived from an ancestral form of the black-throated green warbler (*D. virens*) along with sibling species Townsend's warbler (*D. townsendi*), hermit warbler (*D. occidentalis*), and black-throated gray warbler (*D. nigrescens*), which breed in similar habitats in the northern and western United States and Canada (Axelrod 1958, Stein 1962, Mengel 1964).

b. GCWA Life History

The GCWA breeds only in the mixed Ashe juniper (*Juniperus ashei*)/deciduous woodlands of central Texas in the Hill Country west and north of the Balcones Fault, and it winters in the highland pine/oak woodlands of southern Mexico and northern Central America (Pulich 1976, Service 1996, Ladd and Gass 1999).

GCWAs prefer a dense, mixed forest of Ashe juniper and a variable number of mostly deciduous tree species, such as Texas oak (*Quercus texana*), plateau live oak (*Q. fusiformis*), shin oak (*Q. sinuata* var. *breviloba*), cedar elm (*Ulmus crassifolia*), American elm (*U. americana*), Lacey oak (*Q. glaucoides*), blackjack oak (*Q. marilandica*), hackberry (*Celtis laevigata* var. *texana*), Texas ash (*Fraxinus americana*), post oak (*Q. stellata*), little walnut (*Juglans microcarpa*), Arizona walnut (*J. major*), Mexican persimmon (*Diospyros texana*), big-tooth maple (*Acer grandidentatum*), and sycamore (*Platanus occidentalis*), with 50 percent to 100 percent canopy closure – the greater the canopy cover the better the habitat (Pulich 1976, Kroll 1980, Beardmore 1994, Wahl et al. 1990, Ladd 1985, Service 1996).



Male GCWAs arrive in central Texas in early to mid-March from their wintering grounds in Central America and Mexico and begin to establish breeding territories, which they return to year after year and defend against other males by singing from visible perches within their territories. Females arrive a few days later but are more difficult to detect in the dense woodland habitat (Pulich 1976, Ladd and Gass 1999). Pulich (1976) estimated territory size to range between 3.2 acres (1.3 hectares) and 6 acres (2.4 hectares). Kroll (1980) estimated territory size to be 11 to 21 acres (4.5 to 8.5 hectares).

During the first week of April, females begin constructing nests of the shredding bark of mature Ashe junipers over 10 feet (3 meters). Ashe juniper is the most common nesting tree, but other species may occasionally be selected. The average nest height is 15 feet (4.6 meters) above ground, ranging from 5 to 32 feet (1.5 to 9.8 meters). Usually three or four eggs are laid, which are generally incubated in April, and unless there is a second

nesting attempt because of nest failure, nestlings fledge in May to early June. By early August, they begin their migration back south (Bent 1953, Pulich 1976).

GCWAs forage for invertebrates in Ashe juniper and various deciduous tree species (Beardmore 1994). GCWAs feed almost entirely on insects, such as caterpillars, green lacewings, cicadas, katydids, walking sticks, flies, adult moths, small butterflies, and arachnids (spiders). Most foraging occurs in the upper two-thirds of the tree or above 5 feet (1.5 meters) (Pulich 1976, Sexton 1987, Beardmore 1994). GCWAs forage disproportionately more in oaks than in junipers early in the breeding season apparently because of the abundance of soft-bodied lepidopteran larvae in deciduous trees at that time (Kroll 1980, Sexton 1987, Beardmore 1994).

c. GCWA Population Dynamics

Existing estimations of population size have been based on assessments of suitable habitat and territory size. In 1974, Pulich (1976) estimated the total population at 15,000 to 17,000 adults. Wahl et al. (1990) estimated the population size to be 4,822 to 16,016 pairs. The Service corrected these estimates in 1990 to be approximately 13,800 territories [pairs] (Service 1992). There have been no recent estimates of population size.

Studies at Fort Hood military reservation in Bell and Coryell counties have found fledging rates ranging from 0.75 to 1.74 per adult warbler over 10 years of observations (Anders 2000). At Fort Hood, approximately 87 percent of all territorial males are mated (T. Hayden, US Army-CERL, pers. comm.). Over four years, survival rates for GCWAs in their first year were estimated at 30 to 42 percent and after their first year at 56 to 69 percent (Unpublished data, Texas Nature Conservancy, Fort Hood project; Pulich 1976; unpublished data, Balcones Canyonlands National Wildlife Refuge; Service 2002). The dispersal distance of birds from their birth site to their first breeding site is not well known, but could possibly be as much as 124 miles (200 kilometers) (Robinson 1992). Adult GCWAs, on the other hand, show high site fidelity (Holiman and Craft 2000, Anders 2000), and the return rate of banded birds at Fort Hood is considered to approximate the survival rate for adults (Service 2002). An adult breeding male was observed to return to Fort Hood for over 8 years (Ladd and Gass 1999, J. Cornelius, Fort Hood, pers. comm. 2005).

Pease and Gingerich (1989) used theoretical models to determine viable population numbers for GCWAs. They found 500-1,000 individuals are needed to avoid extinction through environmental and/or demographic stochasticity. However, their estimations were based on a large amount of uncertainties in the values of parameters due to lack of sufficient data on the warbler. Population viability analyses (PVAs) have shown that the most sensitive factors affecting the continued existence of the species are: population size per patch, fecundity (productivity or number of young per adult), and fledgling survival. Based on the PVAs, a self-sustaining population would need to be approximately 3,000 pairs (Service 1996, 2002). GCWA occupancy of "small" patches of habitat and productivity of the species are considerably lower than in larger patches (Coldren 1998, Maas-Barleigh 1997). The 1996 PVA found that a minimum population of 1,000 pairs would be necessary to avoid the risk of extinction in a breeding population

in a single patch. At an average of 10.6 acres (4.3 hectares) per pair, based on Fort Hood data, 10,637 acres (4,305 hectares) of high quality habitat would be required. If the population shows characteristics of a metapopulation, as is likely, the size of the population per patch can be lower depending on dispersal and recolonization rates (Service 2002).

d. GCWA Status and Distribution

The GCWA's entire breeding range is found within the Edwards Plateau and the Lampasas Cut Plain. The species is known to occur in 26 counties and may possibly occur in another 12 counties. It no longer occurs in three counties within its historic range (Figure 3). However, many of the counties where it is known to occur, now or in the past, have only small amounts of suitable habitat (Pulich 1976, Service 1996, Lasley et. al. 1997).

As of 1988, there were an estimated 814,220 acres (329,503 hectares) of GCWA habitat available rangewide and 106,497 acres (43,098 hectares) in Travis County, which has the most habitat. Hays County had an estimated 50,644 acres (20,495 hectares) of habitat (from Wahl et. al. 1990). In other studies, Shaw et al.(1989) projected that there were approximately 56,834 acres (23,000 hectares) of GCWA habitat in Travis County based on 1988 satellite data. The Biological Advisory Team for the Austin regional habitat conservation plan (BAT 1990) estimated the total available GCWA habitat in large blocks in Travis County at 18,780 acres (7,600 hectares) based on the 1988 Shaw data. Later studies using Landsat data (McKinney and Sansom 1995, Diamond and True ca. 1999) estimated a total of 1,271,236 acres (514,451 hectares) to 1,349,066 acres (545,948 hectares) of GCWA habitat rangewide. However, because of the inherent errors in the necessarily gross estimates and lack of adequate ground truthing, these numbers cannot be translated into estimates of land use change or population size. Nevertheless, in all studies, Travis County ranked first or second in having the most habitat in the largest contiguous blocks. Other large blocks of habitat occur on the Fort Hood military reservation in Bell and Coryell counties and in Real, Bandera, and Kerr counties. Hays, Comal and Bexar counties also have significant amounts of habitat. There is little connectivity between the large habitat blocks in Travis County and other large blocks in adjacent recovery regions to the north and the south (Pulich 1976, Wahl et al. 1990, McKinney and Sansom 1995, Diamond and True ca. 1999).

The greatest threats to GCWAs are loss of habitat and urban encroachment. Human activities have eliminated much GCWA habitat within the central and northern parts of the GCWA's range. Before 1974, the primary reason for habitat loss was clearing for livestock grazing (Pulich 1976). Since then, habitat loss has continued as suburban developments spread into prime GCWA habitat along the Balcones Escarpment, especially in the growth corridor from the Austin metropolitan area (including Williamson County) to San Antonio (BAT 1990, Wahl et al. 1990, Engels 1995, Coldren 1998). Diamond and True (ca.1999) did not detect a significant overall change in habitat between 1988 and 1998, but stressed that the analyzed data were not comparable and that changes particularly in urbanizing areas could be better detected by comparing the raw data on a local level. However, no comprehensive study of habitat loss has been

conducted to date.

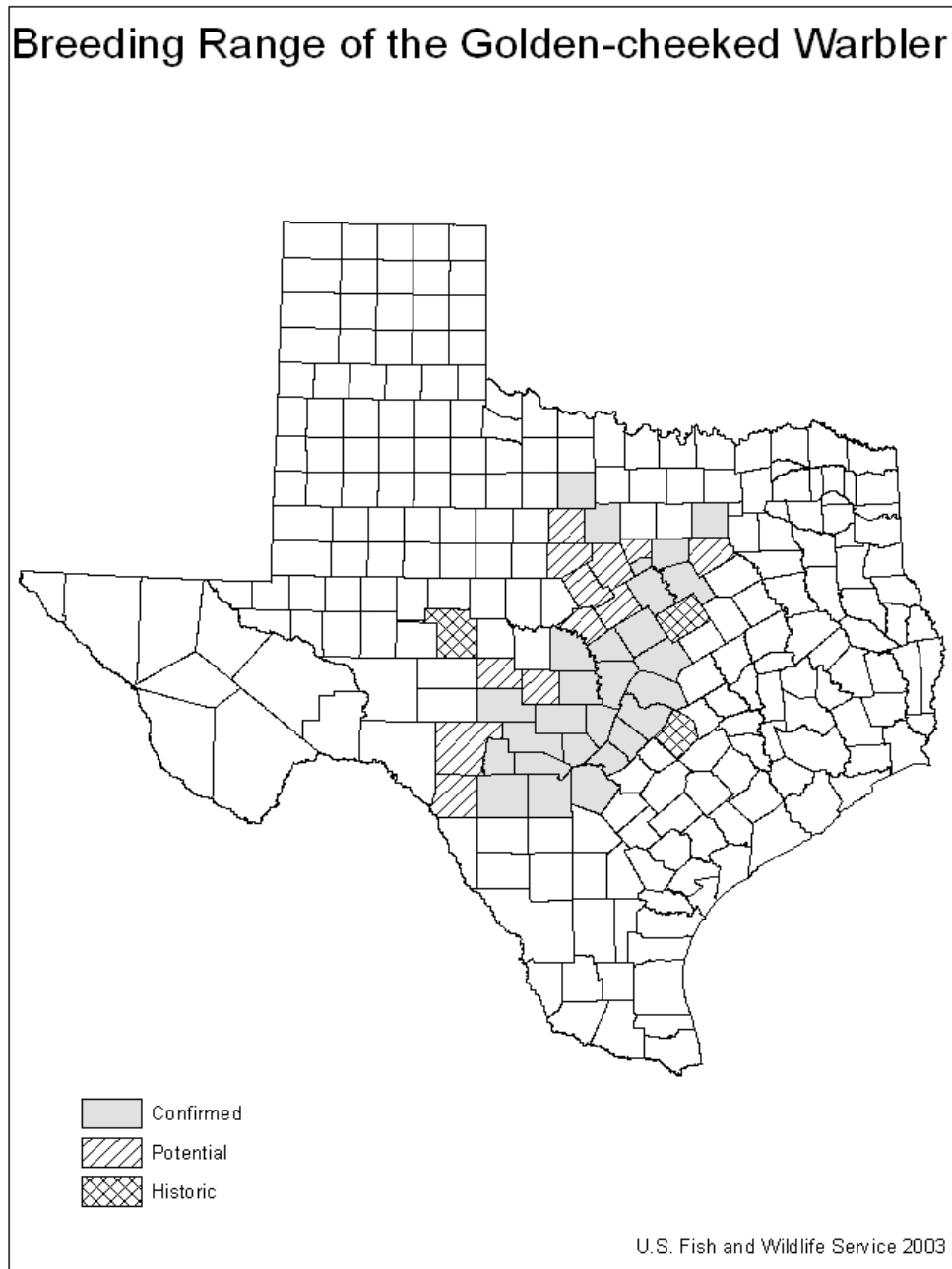


Figure 3

Populations of GCWA and other neotropical migrants are less stable in small habitat

patches surrounded by urbanization (Coldren 1998, Engels 1995, Arnold et al. 1996, Bolger et al. 1997, Moses 1996). The abundance of several bird species, including the GCWA, has been shown to be reduced within 656-1,640 feet (200-500 meters) of an urban edge (Engels 1995, Arnold et al. 1996, Bolger et al. 1997, Coldren 1998, Fahrig & Merriam 1994). Coldren (1998) reported that GCWA occupancy declined with increasing residential development and roadway width. Other factors that threaten the GCWA are the loss of deciduous oaks, on which the warblers forage, to oak wilt (Service 1996); nest parasitism by brown headed cowbirds, which are attracted to livestock operations (Pulich 1976); and predation and competition by blue jays and other urban-tolerant birds (Engels and Sexton 1994, Engels 1995, Service 1996, Arnold & Fink 1996, Fink 1996, Wilcove 1985).

The recovery strategy outlined in the Golden-cheeked Warbler Recovery Plan (Service 1992) divides the range of the GCWA into eight regions and calls for the protections of sufficient habitat to support at least one self-sustaining population in each region (Figure 4).

Currently, there are only three large GCWA populations receiving some degree of protection: (1) at the Balcones Canyonlands Preserve (BCP) [a regional habitat conservation plan PRT-788841] in Travis County; (2) the nearby Balcones Canyonlands National Wildlife Refuge (BCNWR) in Travis, Burnet, and Williamson counties (Recovery Region 5); and (3) Fort Hood Military Reservation (Anders 2000) in Coryell and Bell counties (Recovery Region 3). Outside of the BCP and the BCNWR in Recovery Region 5, few large blocks of habitat remain in adjacent areas of southern Travis, Williamson, Hays, and Burnet counties. Other important areas receiving some protection include Government Canyon State Natural Area and Camp Bullis in Bexar County, Kerr Wildlife Management Area in Kerr County (Recovery Region 6); and Lost Maples State Natural Area in Bandera County and Garner State Park in Uvalde County (Recovery Region 8).

Annual reports from Fort Hood and the BCP indicate that the species currently appears to be relatively stable (City of Austin and Travis County 2003, Holiman and Craft 2000, Anders 2000), but urban development is continuing in adjacent GCWA habitat. Fort Hood manages 218,688 acres (88,500 hectares) of GCWA and black-capped vireo habitat, and the BCNWR has acquired over 21,000 acres (8,500 hectares), much of which contains GCWA habitat. The BCNWR has a goal of acquiring 45,000 acres (18,210 hectares). The BCP has now acquired or protected 27,773 acres (11,150 hectares) (Travis County informal report 2005), with a goal of protecting 30,428 acres (12,314 hectares) [including 13,969 acres (5,653 hectares) of GCWA habitat] in seven habitat blocks of 482 to 8,111 acres (195 to 3,282 hectares) (RECON 1996).

To date, 119 §10(a)(1)(B) incidental take permits for the GCWA have been issued in the Austin area. These permits cover about 16,933 acres (6,850 hectares) in Hays, Travis, and Williamson counties. Of these acres, 11,618 acres (4,702 hectares) are included within the 561,034-acre (227,042-hectare) area in Travis County covered by the BCCP regional 10(a)(1)(B) permit. The Service has issued permits covering 4,618 acres (1,869

hectares) within the proposed BCP acquisition area. However, enough acreage remains to complete the preserve required by the

Recovery Regions 1 - 8 for Golden-cheeked Warbler Populations

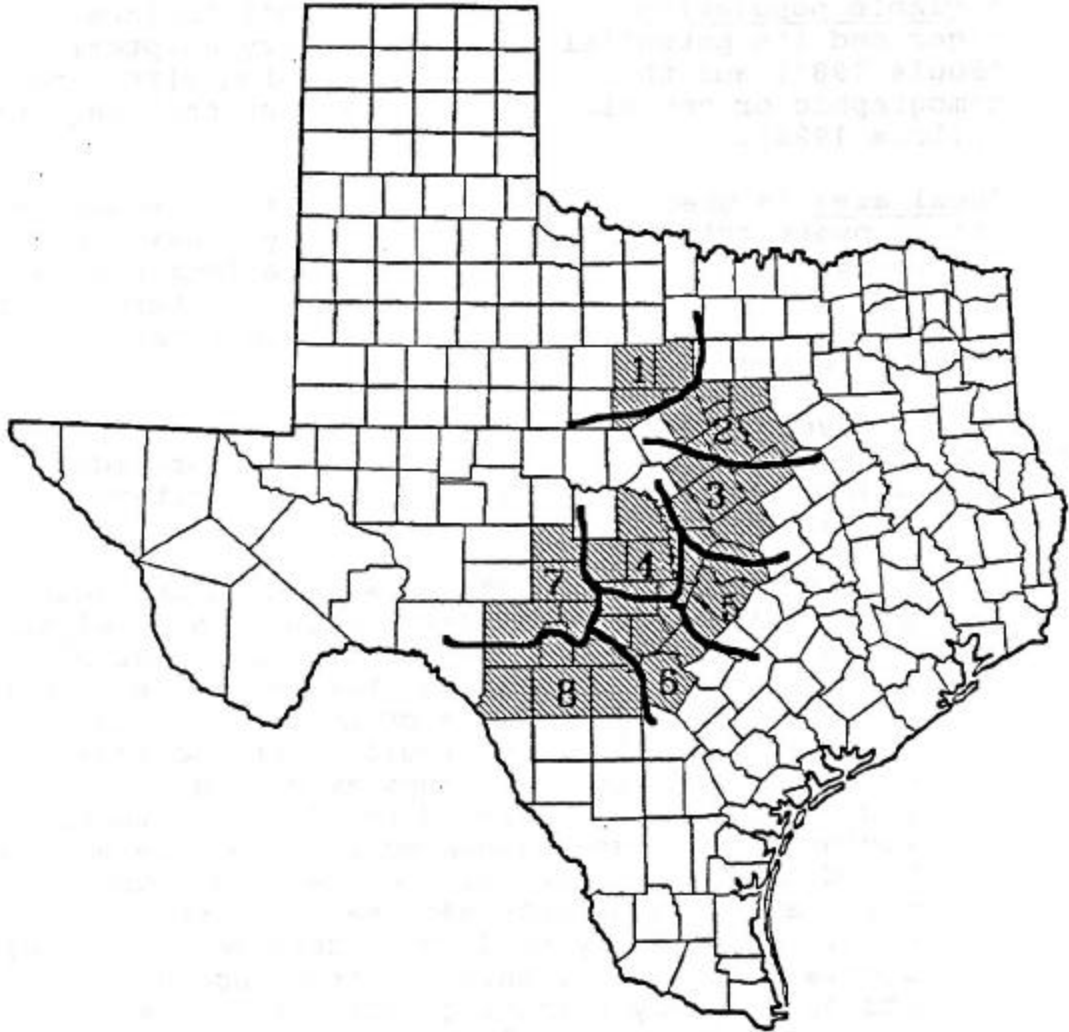


Figure 3

regional permit. There are currently six active GCWA incidental take permit applications being considered by the Service in the Austin area in Travis, Williamson, Burnet and Hays counties. These applications or pre-application consultations cover in excess of 3,946 acres (1,597 hectares), a portion of which is suitable GCWA habitat, and 302 acres (122 hectares) are within the BCP preserve acquisition area.

e. Analysis of the GCWA Likely to be Affected

Because of the relatively extensive range of the GCWA and the lack of data, it is not possible to determine the overall status of the species. However, a significant portion of GCWA habitat is threatened by urban development, and only a small portion of its range is permanently protected. Therefore, the continued existence of the GCWA continues to be at risk. Since Recovery Region 5 has the most habitat in large blocks of all the Recovery Regions and is located in the center of the GCWA's range, preservation of a viable population here is especially important.

III. Environmental Baseline

a. Status of the GCWA within the Action Area

Loomis Austin, Inc. conducted a presence/absence survey for the GCWA during the 2004 breeding season in accordance with Service guidelines. Three individual male GCWAs and two individual female GCWAs were observed during the survey, representing at least two to three GCWA territories (Figure 5). GCWAs were observed within three of seven woodland vegetation patches that contain GCWA habitat. While the total size of these occupied woodland patches is approximately 435.5 acres (176.2 hectares), only approximately 69.7 acres (28.2 hectares) were estimated to be occupied by the affected GCWAs in 2004. This confirmed GCWA habitat was defined for the purpose of the survey as those portions of occupied habitat patches within 300 feet (91 meters) of estimated territory boundaries or individual observations. While the presence/absence survey conducted in 2004 was not sufficient to meet Service standards for mapping territory boundaries, the areas of confirmed habitat indicated on Figure 5 represent the minimum extent of habitat with confirmed occupancy by warblers in 2004 (Loomis Austin, Inc. 2004).

b. Factors Affecting GCWA Habitat within the Action Area

Vegetation in the Action Area is primarily a mix of forest or woodland cover, grassland, shrubland, and agricultural land. An analysis of the 1992 National Land Cover Dataset developed by the USGS shows that urban or residential land cover and vegetation occupy approximately five percent of the land cover in the Action Area (USGS 2000).

The proposed project is located in a patchy mosaic of habitat types that includes oak-juniper woodland and grassland. Approximately 43 percent of the proposed right-of-way includes woodland habitat. The remainder of the proposed right-of-way is grassland habitat.

Land in the vicinity of the proposed project has a history of agricultural land use (primarily cattle grazing) that has included periodic brush clearing. Aerial photographs from 1973 show that land along the proposed right-of-way was primarily open woodland,

shrubland, and grassland as late as 30 years ago (Figure 6). A single patch of dense woodland was present at that time west of

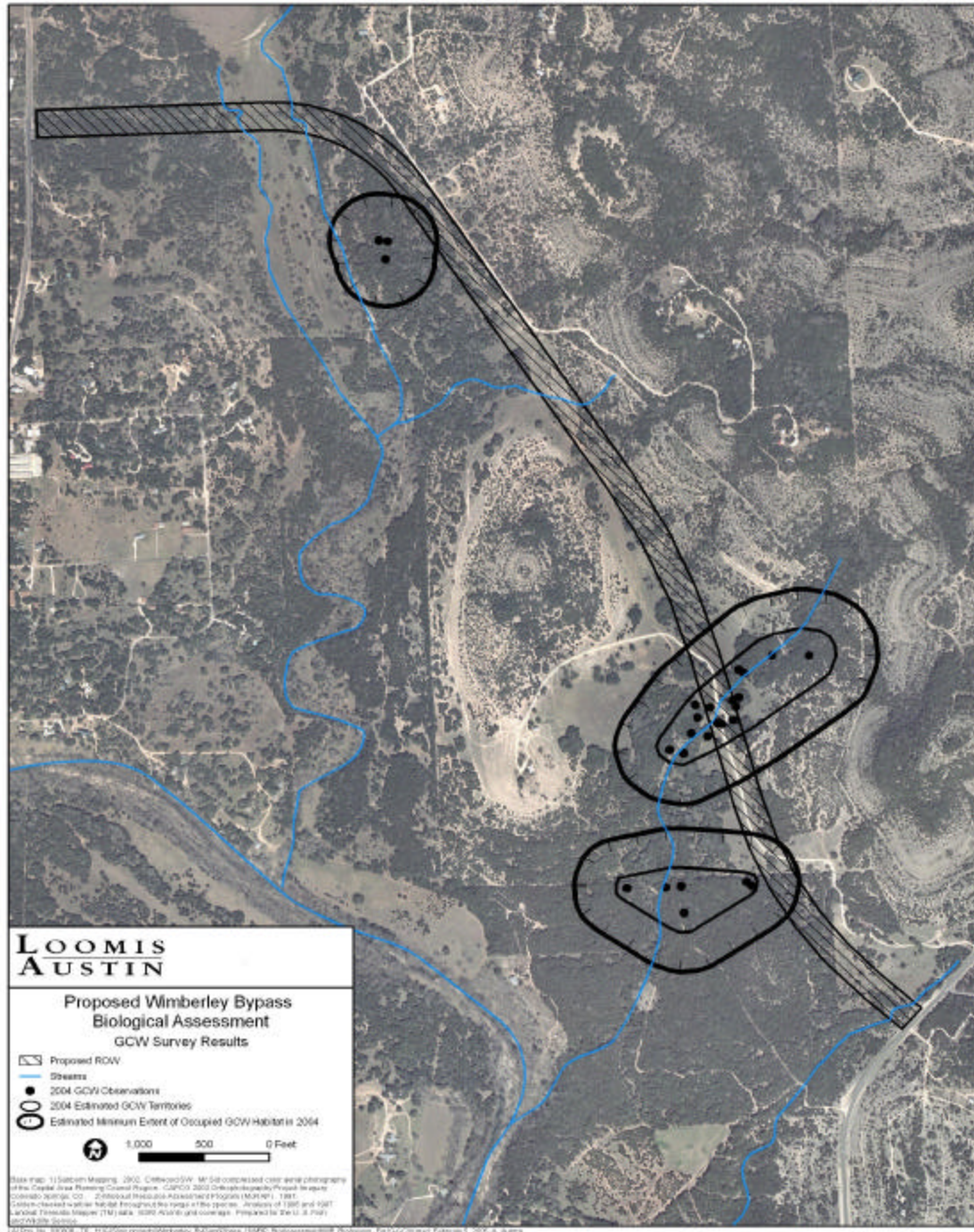


Figure 4

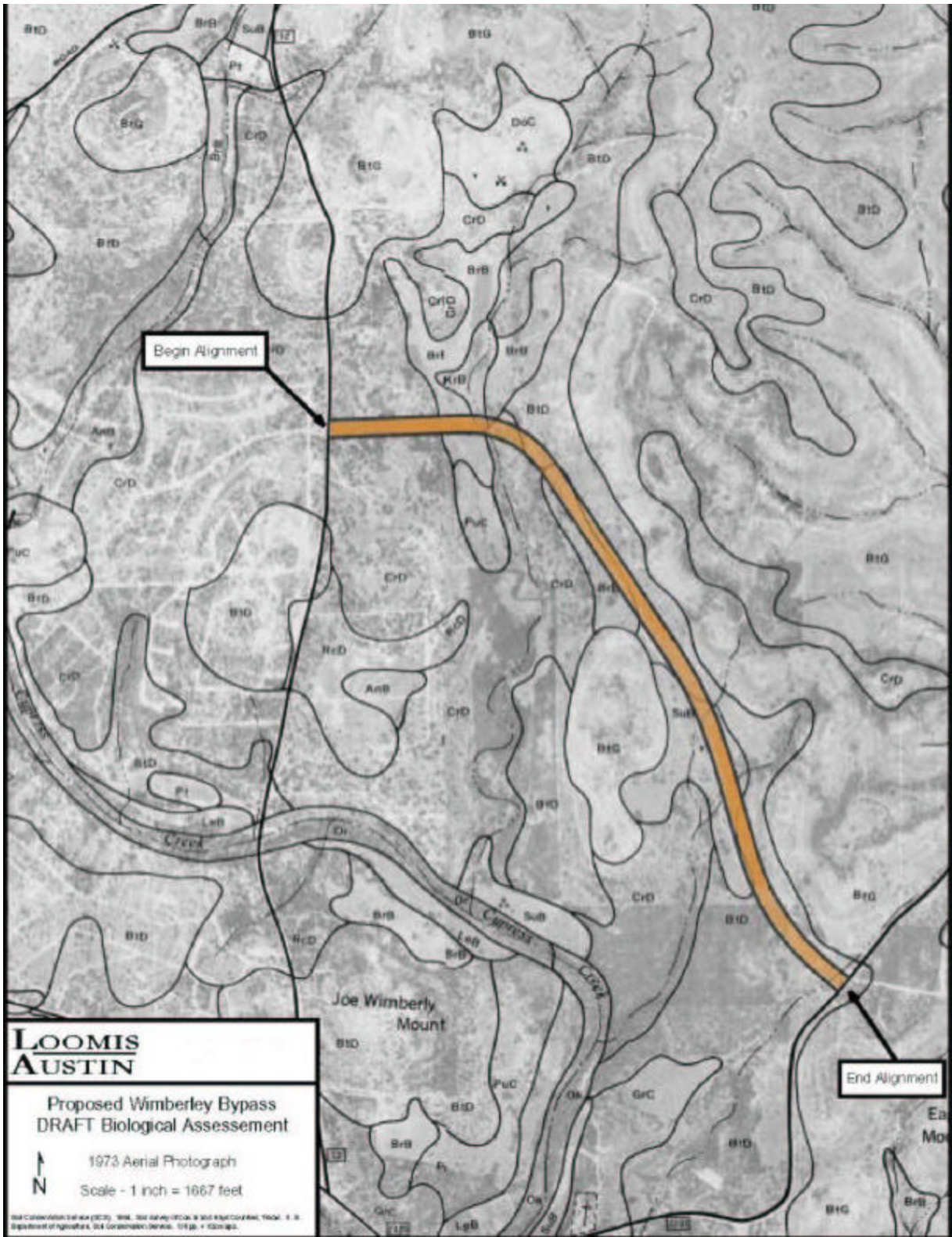


Figure 6

the south end of the proposed alignment (a small portion of the southern part of Patch 2 shown on Figure 7). Therefore, most of the woodland vegetation crossing the proposed

right-of-way may be characterized as mid-aged stands of Ashe juniper (no more than approximately 30 years old) with scattered deciduous trees.

Currently, the woodland patches are typically thick, with bushy young to middle-aged Ashe juniper creating a dense mid-story vegetative layer. Relatively mature Ashe juniper (e.g., trees approximately 15 to 20 feet tall with peeling bark) was observed by Loomis Austin on Patch 2. Few young regrowth Ashe juniper trees were present in this area and the understory layer was relatively open. Several small white shin oak trees (*Quercus sinuata*) were also observed within the woodland vegetation on Patch 2.

Woodland vegetation in the vicinity of the proposed project is composed mainly of a mix of Ashe juniper (*Juniperus ashei*) and plateau live oak (*Quercus fusiformis*). Other overstory tree species observed in woodland patches along the proposed right-of-way include cedar elm (*Ulmus crassifolia*) and netleaf hackberry (*Celtis reticulata*). Few other tree species were present within the proposed right-of-way. The relative abundance of trees in delineated woodland vegetation patches inside of the proposed right-of-way with a diameter of at least eight inches, by species, is shown in Table 1. Table 1 does not include data regarding trees with a diameter of less than eight inches and may be biased against complex, multi-trunk individuals (i.e., trees with more than three or four stems), which are difficult to measure. Woodland vegetation had an overall woody canopy cover of approximately 83 percent (Loomis Austin 2004).

Table 1. Relative Species Composition of Large Trees (diameter at least eight inches) within Woodland Vegetation Patches in the Proposed Right-of-Way (Loomis Austin 2004).

| Species | Number | Minimum Diameter (in)(cm) | Maximum Diameter (in)(cm) | Average Diameter (in)(cm) | Relative Species Composition |
|---------------------------|--------|---------------------------|---------------------------|---------------------------|------------------------------|
| <i>Quercus fusiformis</i> | 776 | 8 (20) | 40 (102) | 11.2 (28) | 59% |
| <i>Juniperus ashei</i> | 519 | 8 (20) | 52 (132) | 14.7 (37) | 39% |
| <i>Ulmus crassifolia</i> | 17 | 8 (20) | 27 (69) | 14.5 (37) | 1% |
| <i>Celtis laevigata</i> | 1 | 9 (23) | 9 (23) | 9 (23) | <1% |
| <i>Cercis canadensis</i> | 1 | 9 (23) | 9 (23) | 9 (23) | <1% |
| <i>Ilex vomitoria</i> | 1 | 12 (30) | 12 (30) | 12 (30) | <1% |
| Unidentified Sp. | 4 | 0 | 0 | 0 | <1% |
| All Trees | 1,319 | | | | |

Eight GCWA habitat patches (Figure 7) intersect the proposed right-of-way, which encompass approximately 604.7 acres (244.7 hectares) of woodland habitat (Table 2). The woodland patches vary in size from less than an acre to over 400 acres (161.9 hectares). The average patch size is approximately 75.6 acres (30.6 hectares), standard deviation of 146.4 acres (59.2 hectares). Distance between patches, as measured by the lengths of line segments along the

varied from 4,151.4 feet (1,265 meters) to 19.1 feet (6 meters).

Open grassland vegetation within the vicinity of the project area includes a variety of grasses and forbs that are typical of grazed native pasture or rangeland in the area. Common and conspicuous herbaceous plants observed in grassland portions of the proposed right-of-way include King Ranch bluestem (*Bothriocloa ischaemum*), little bluestem (*Schizachyrium scoparium*), three-awn (*Aristida* sp.), one-seed croton (*Croton monanthogynous*), and other forbs.

Woody plants, primarily Ashe juniper, have invaded the open grassland areas. Other woody or succulent plants observed within grassland areas included agarito (*Berberis trifoliata*), twisted-leaf yucca (*Yucca rupicola*), and Texas pricklypear (*Opuntia engelmannii*).

Table 2. Size and Character of Woodland Vegetation Patches Intersecting the Proposed Right-of-Way. (Loomis Austin 2004)

| Patch No. | Area (ac) (ha) | Area within Proposed Right-of- Way (ac)(ha) | GCWA Habitat |
|-----------|-------------------|---|-----------------|
| 1 | 160.8 (65) | 7.8 (3.2) | No |
| 2 | 411.7 (167) | 13.3 (5.4) | Yes |
| 3 | 3.5 (1.4) | 0.0 | Yes |
| 4 | 1.0 (0.4) | 0.4 (0.2) | Yes |
| 5 | 22.4 (9.0) | 0.6 (0.2) | Yes |
| 8 | 1.4 (0.6) | 0.7 (0.3) | Yes |
| 9 | 3.7 (1.5) | 1.4 (0.6) | Yes |
| 10 | 0.2 (0.1) | 0.2 (0.1) | Yes |
| Total | 604.7 (244.7) | 24.4 (9.9) | |

IV. Effects of the Action

a. Factors to be Considered

The proposed road will cut through habitat patches in a currently rural and sparsely populated area. The removal of habitat will be permanent and the traffic on the new road will be ongoing and will likely increase. Clearing will be done outside of the breeding season, which is March 1 to August 1.

b. Analyses for Effects of the Action

The proposed project crosses through portions of five parcels used primarily for agricultural purposes (e.g., cattle grazing). These properties are primarily undeveloped ranchland with little impervious cover and few improvements. Existing improvements

include a few gravel roads, unimproved vehicle trails, and fences. A small number of single-family homes and agricultural structures are also located within the immediate vicinity, but none will be directly impacted by the proposed project (Figure 5). Eight patches of oak-juniper woodland vegetation intersect the proposed right-of-way (Figure 7). These woodland patches contain approximately 443.9 acres (180 hectares) of GCWA habitat (Table 3).

Table 3. Summary of Direct and Indirect Impacts to Golden-cheeked Warbler Habitat.

| Habitat Categories | Total Area (ac) (ha) | Direct Impacts within Propose d Right- of-Way (ac) (ha) | Indirect Impacts to Remaining Small Fragments (ac) (ha) | Indirect Impacts to Remaining Large Fragments (ac) (ha) | Total Indirect Impacts (ac) (ha) |
|--|-------------------------|---|--|--|---|
| Warbler Habitat (Delineated Woodland Vegetation Patches) | 443.9 (180) | 16.6 (6.7) | 36.6 (14.8) | 35.9 (14.5) | 72.5 (29.3) |
| Occupied Habitat Patches (Patches 2, 5, and 8) | 435.5 (176) | 14.6 (5.9) | 33.7 (13.6) | 35.9 (14.5) | 69.6 (28.2) |
| Confirmed Habitat within Occupied Patches (based on 2004 Survey) | 69.7 (28) | 4.0 (1.6) | 13.2 (5.3) | 15.1 (6.1) | 28.3 (11.4) |

Direct effects on warbler habitat would include the permanent loss of habitat and temporary breeding season disturbances from construction activities. Indirect effects, defined as those effects likely to occur after the actual construction of the proposed project, will include increased habitat fragmentation, habitat degradation, noise pollution from increased traffic in the area, increased populations of predators accompanying more urbanized development, and other factors.

The construction of the proposed project is expected to cause the direct loss of approximately 16.6 acres of warbler habitat within the right-of-way. This construction will fragment the woodland vegetation in the vicinity and introduce new road traffic. Remaining fragments of woodland vegetation that are smaller than 40 acres (16 hectares) (based on the approximate patch size of “prime habitat,” as described in Ladd and Gass (1999)) are not likely to support GCWAs. Similarly, indirect negative impacts to warbler habitat are expected at the edge of remaining woodland patches that are larger than 40 acres (16 hectares). This assessment assumes that the indirect negative impacts to large

woodland patches will occur within 300 feet (91 meters) of the proposed right-of-way. Therefore, the construction of the proposed project is also likely to cause the indirect loss or degradation of an additional 72.5 acres (29.3 hectares) of warbler habitat (Table 3).

c. GCWA's Response to the Proposed Action

GCWAs are especially sensitive to the effects of urbanization and are not usually found in close proximity to human developments. Resident GCWAs displaced by the habitat clearing would likely be unable to find suitable nesting sites or displace other GCWAs in remaining habitat nearby resulting in the loss of reproductive potential. This is expected to take GCWAs in the form of harassment and harm adversely impacting up to three GCWA territories.

V. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to §7 of the Act.

The creation of a new transportation corridor may facilitate new residential and/or commercial land development along proposed bypass and between the proposed bypass and the Village of Wimberley. Land development in this area would result in the further loss and fragmentation of the eight GCWA habitat patches impacted by the proposed project, which may contain an unknown number of GCWAs in parts beyond the surveyed areas. Human population growth and associated land use changes in the Village of Wimberley to the south and land use changes along the proposed bypass to the north could eventually extirpate GCWAs from these habitat patches.

Cumulative impacts from expected human population growth and associate land development are also likely to occur elsewhere within the Action Area. GCWA habitat occurs throughout this area. Therefore, additional land development in the area is likely to cause the loss, fragmentation, and degradation of GCWA habitat.

Hays County is proposing to improve R.M.12 from the intersection with Joe Wimberley Road in the Village of Wimberley north to U.S. Highway 290 (US 290) at Dripping Springs (approximately 13.9 miles [22.4 kilometers]). The northwest end of the proposed Wimberley Bypass intersects R.M.12 at the Wood Creek subdivision (Figure 1). The purpose of the proposed R.M.12 upgrade is to improve the safety and mobility on the roadway, while preserving the rural nature of the road and the aesthetics of the surrounding area. Between Dripping Springs and the Village of Wimberley (approximately 14 miles[22.5 kilometers]), approximately 2,500 acres (1,012 hectares) of warbler habitat (i.e., dense to moderately dense oak-juniper woodland) occurs within 1,500 feet (457 meters) of the current R.M.12 alignment, as delineated from aerial imagery produced in 2004 by Sanborn Mapping. However, this habitat is not likely to be

occupied given the disturbance from existing traffic loads on R.M.12 and the amount of residential and commercial development along the roadway. The design of R.M.12 upgrades will also seek to avoid impacts to GCWA habitat wherever possible. The proposed R.M.12 upgrade will likely include a widening of the existing roadway and realignments, where necessary, to improve substandard roadway geometry (i.e., tight curves, insufficient line of sight, and narrow lanes).

The Population Estimates and Projections Program of the Texas State Data Center estimates, under their recommended projection scenario, predicts that the population of Hays County will nearly double by the year 2040 (Texas State Data Center 2004). The Action Area includes three population centers within Hays County: the Village of Wimberley, the City of San Marcos, and the City of Kyle. Land development in and around these populated areas and along major transportation corridors, including R.M.12, R.M.150, I.H.35, and the proposed bypass is likely to occur as a consequence of the increased human population.

VI. Conclusion

After reviewing the current status of the GCWA, the environmental baseline for the action area, the effects of the proposed road construction, and the cumulative effects, it is the Service's biological opinion that the construction of the Wimberley Bypass, as proposed, is not likely to jeopardize the continued existence of the GCWA. No critical habitat has been designated for this species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to §4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of §7(b)(4) and §7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to Hays County, as appropriate, for the exemption in § 7(o)(2) to apply. The Corps has a

continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require Hays County to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of § 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps or Hays County must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take Anticipated

The Service anticipates up to three breeding pairs could be taken as a result of this proposed action. The incidental take is expected to be in the form of harm and harassment.

Approximately 16.6 acres (6.7 hectares) of GCWA habitat would be permanently and directly modified by the development. In addition, approximately 72.5 acres (29.3 hectares) of suitable habitat would be impacted by indirect effects of development, such as increased numbers of competitive, predatory, or parasitic urban birds; increased noise levels; invasion of exotic species; and human intrusion. Therefore, a total of approximately 89.1 acres (36.0 hectares) of GCWA habitat may be adversely affected by the development, with associated birds harmed by the action.

Effect of the take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of GCWAs:

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impacts of incidental take that might otherwise result from the proposed actions. If during the course of the action this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures.

- A. Minimize impacts to breeding GCWAs by conducting all clearing activities outside of the breeding season.
- B. Minimize harm by restoring areas that are disturbed during construction with native vegetation and avoiding practices that are conducive to the spread of oak wilt.

Terms and Conditions

In order to be exempt from the prohibitions of §9 of the Act, the following non-discretionary terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements, must be complied with:

Terms and conditions that implement Reasonable and Prudent Measures A and B:

1. Clearing of vegetation in, or within 300 feet (91.4 meters) of, occupied GCWA habitat will be initiated only between August 1 and March 1, unless breeding-season surveys performed by a Service-permitted biologist indicate that no GCWAs are present within 300 feet (91.4 meters) of the activity, or as otherwise approved on a case-by-case basis by the Service. Clearing within the proposed development areas shall be consistent with the current practices recommended by the Texas Forest Service to prevent the spread of oak wilt (for further information call the Texas Forest Service at (210) 223-9963).
2. Clearing for construction of the road will be minimized to the greatest extent practicable. Areas that are disturbed during construction, but are not occupied by impervious surfaces, will be replanted with native vegetation.
3. Construction may be conducted year round as long as the construction activities promptly follow the clearing activities and/or were initiated before March 1, therefore being a continuous activity before the breeding season began.

Reporting Requirement

Written annual reports of the year's activities, including status of clearing and construction, will be submitted by October 1 of each year until the Bypass is complete to the U.S. Fish and Wildlife Service Field Office, 10711 Burnet Road, Suite 200, Austin, Texas 78758; and to the U.S. Fish and Wildlife Service, P.O. Box 1306, Room 4102, Albuquerque, New Mexico 87103. GCWA survey results will also be submitted to the Service by October 1 of each year.

CONSERVATION RECOMMENDATION

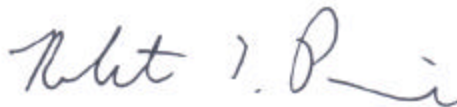
Hays County should seek regional conservation opportunities for the GCWA and other rare species in the County. We note that Hays County is seeking section 6 non-traditional Habitat Conservation Planning Assistance Program grant that would benefit these species by supporting development of a regional habitat conservation plan to address key terrestrial species in the County.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law), and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this biological opinion, please contact Sybil Vosler at (512) 490-0057, extension 225.

Sincerely,



Robert T. Pine
Supervisor

Literature Cited

- Anders, D.D. 2000. Demography of golden-cheeked warblers on Fort Hood, Texas, in 2000: productivity, age structure, territory density, and adult return rates. In Endangered species monitoring and management at Fort Hood, Texas: 2000 annual report. Fort Hood project, The Nature Conservancy of Texas, Fort Hood, Texas.
- Arnold, K.A., C.L. Coldren, and M.L. Fink. 1994. Progress Report: Interactions between avian predators and golden-cheeked warblers in Travis County, Texas. Unpublished report submitted to the Service, Austin, Texas, in fulfillment of responsibilities under consultation #2-15-92-F-0145 with the Federal Highway Administration (FHWA).
- Arnold, K., C. Coldren, and M. Fink. 1996. The interaction between avian predators and golden-cheeked warblers in Travis County, Texas. Sponsored by the Texas Department of Transportation. Research report 1983-2, study number 7-1983, Texas Transportation Institute, Texas A&M University, College Station, Texas.
- Axelrod, D.I. 1958. Evolution of the Macro-Tertiary geoflora. *Bot. Rev.* 24:433-509.
- Barr, C. G. 1993. Final Report: Survey for Two Edwards Aquifer Invertebrates: Comal Springs Dryopid Beetle, *Stygoparnus comalensis* BARR and SPANGLER (Coleoptera: Dryopidae) and Peck's Cave Amphipod *Stygobromus pecki* HOLSINGER (Amphipoda: Crangonyctidae). Prepared for U.S. Fish and Wildlife Service, Austin, Texas.
- Beardmore, C.J. 1994. Habitat use of golden-cheeked warblers in Travis County, Texas. Master's Thesis. Texas A & M University, College Station, Texas.
- Bent, A.C. 1953. Life histories of North American wood warblers. *U.S. National Mus. Bull.* 203:1-734.
- Biological Advisory Team (BAT). 1990. Comprehensive Report of the Biological Advisory Team. Prepared for the Austin Regional Habitat Conservation Plan, Austin, Texas.
- Bolger, D.T., T.A. Scott, and J.T. Rotenberry. 1997. Breeding bird abundance in an urbanizing landscape in coastal southern California. *Conservation Biology* 11(2):406-421.
- Campbell, L. 1995. Endangered and Threatened Animals of Texas: Their Life History and Management. Texas Parks and Wildlife, Austin, Texas.
- City of Austin and Travis County. 2003. Balcones Canyonlands Conservation Plan 2002 Annual Report (Permit PRT-788841), Austin, Texas.
- Coldren, C.L., 1998. The effect of habitat fragmentation on the golden-cheeked warbler. Ph.D. Dissertation. Texas A&M University, College Station, Texas.

- Diamond, D.D., and C.D. True. ca 1999. Golden-cheeked warbler nesting habitat area, habitat distribution, and change and landcover within Edwards Aquifer Recharge Zone. Final Report. Submitted to U.S. Fish and Wildlife Service for Grant #1448-20181-98-G941, Austin, Texas.
- Engels, T.M. and C.W. Sexton. 1994. Negative correlation of blue jays and golden-cheeked warblers near an urbanizing environment area. *Conservation Biology* 8(1):286-290.
- Engels, T.M. 1995. Conservation biology of the golden-cheeked warbler. Ph.D. dissertation, University of Texas, Austin, Texas.
- Fahrig, L. and G. Merriam. 1994. Conservation of fragmented populations. *Conservation Biology* 8(1):50-59.
- Fink, M. 1996. Factors contributing to nest predation within habitat of the golden-cheeked warbler, Travis County, Texas. Master's thesis, Texas A&M University. College Station, Texas.
- Glenrose Engineering. 2003. Wimberley Bypass: Consideration of water quality impacts. Prepared for Loomis Austin, Inc. Austin, Texas.
- Holiman, W.C., and R.A. Craft. 2000. Population monitoring of the golden-cheeked warbler (*Dendroica chrysoparia*) of Fort Hood, Texas, in 1999. In: Endangered species monitoring and management at Fort Hood, Texas: 1999 annual report. Fort Hood Project, The Nature Conservancy of Texas, Fort Hood, Texas.
- Kroll, J.C. 1980. Habitat requirements of the golden-cheeked warbler: management implications. *J. Range Manage.* 33:60-65.
- Ladd, C.G. 1985. Nesting habitat requirements of the golden-cheeked warbler. Master's Thesis. Southwest Texas (now Texas State) University, San Marcos, Texas.
- Ladd, C., and L. Gass. 1999. Golden-cheeked warbler (*Dendroica chrysoparia*). *The Birds of North America*, No. 420, Cornell Laboratory of Ornithology and the Academy of Natural Sciences, Philadelphia, Pennsylvania.
- Lasley, G.W., C. Sexton, W. Sekula, M. Rockwood, and C. Shackelford. 1997. Texas region, spring migration, Mar. 1 - May 31, 1997. *National Audubon Society Field Notes* 51:892-897.
- Loomis Austin, Inc. 2004. Endangered species survey summary and habitat assessment for the golden-cheeked warbler along the proposed Wimberley Bypass. Prepared for Turner, Collie & Braden, Inc. Austin, Texas.

- Maas-Burleigh, D.S. 1997. Summary of the 1995 and 1996 field seasons: effects of habitat fragmentation on golden-cheeked warblers (*Dendroica chrysoparia*). University of Oklahoma, Norman, Oklahoma.
- McKinney, L.D. and A. Sansom. 1995. Draft Final Report: Remote Sensing and GIS of Golden-cheeked Warbler Breeding Habitat and Vegetation Types on the Edwards Plateau. Texas Parks and Wildlife Department Project 39. Submitted to U.S. Fish and Wildlife Service in fulfillment of Grant No. E-1-7, Austin, Texas.
- Mengel, R.M. 1964. The probable history of species formation in some northern wood warblers (Parulidae). *Living Bird* 3:9-43.
- Moses, E. 1996. Golden-cheeked warbler (*Dendroica chrysoparia*) habitat fragmentation in Travis County, Texas: a remote sensing and geographical information system analysis of habitat extent, pattern and condition. Master's thesis, Texas A&M University. College Station, Texas.
- Pease, C.M. and L.G. Gingerich. 1989. The habitat requirements of the black-capped vireo and golden-cheeked warbler populations near Austin, Texas. University of Texas, Austin, Texas.
- Pulich, W.M. 1976. The Golden-cheeked Warbler. A Bioecological Study. Texas Parks and Wildlife Department, Austin, Texas.
- Regional Environmental Consultants (RECON). 1996. Habitat Conservation Plan and Final Environmental Impact Statement for Proposed Issuance of a Permit to Allow Incidental Take of the Golden-cheeked Warbler, Black-capped Vireo, and Six Karst Invertebrates in Travis County, Texas (Balcones Canyonlands Conservation Plan, Permit PRT-788841).
- Robinson, S.K. 1992. Population dynamics of breeding neotropical migrants in a fragmented Illinois landscape in *Ecology and Conservation of Neotropical Migrant Landbirds* (J.H. Hagan and D. Johnston, eds.). Smithsonian Institution Press, Washington, D.C.
- Sexton, C. 1987. A comparative analysis of urban and native bird populations in central Texas. Ph.D. Dissertation. University of Texas, Austin, Texas.
- Shaw, D.M., B.A. Hunter, S.F. Atkinson, and K.J. Smith. 1989. Remote Sensing and GIS for the Austin Regional Habitat Conservation Plan. Institute of Applied Science, Center for Remote Sensing, University of North Texas, Denton, Texas.
- Stein, R.C. 1962. A comparative study of songs from five closely related warblers. *Living Bird* 1:61-70.
- Texas State Data Center. 2004. 2004 Methodology for Texas population projections: Projections of the population of Texas and counties in Texas by age, sex and

race/ethnicity for 2000-2040. Population Estimates and Projections Program, Texas State Data Center, Office of the State Demographer, University of Texas at San Antonio. http://txsdc.utsa.edu/tpepp/2004projections/2004_txpopprj_method.php. Last modified June 16, 2004.

U.S. Fish and Wildlife Service (Service). 1992. Golden-cheeked warbler (*Dendroica chrysoparia*) recovery plan. Austin, Texas.

_____. 1996. Golden-cheeked warbler population and habitat viability assessment report. Austin, Texas.

_____. 2002. Population Viability Analysis of the Golden-cheeked Warbler. Final Report, submitted to Austin Field Office, Austin, Texas.

U.S. Geological Survey (USGS). 2000. Texas-Southwest Land Cover Data Set. Raster digital data. U. S. Geological Survey. Sioux Falls, South Dakota.
<http://edcwww.cr.usgs.gov/programs/lccp/natl/landcover.html>

Wahl, R., D.D. Diamond, and D. Shaw. 1990. The golden-cheeked warbler: a status review. Final report submitted to: Office of Endangered Species, Fish and Wildlife Service, Albuquerque, New Mexico.

Wilcove, D.S. 1985. Nest predation in forest tracts and the decline of migratory songbirds. Ecology 66: 1211-1214.