

**FINAL ENVIRONMENTAL ASSESSMENT
FOR THE
DAVIS RANCH HABITAT CONSERVATION PLAN**

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1. INTRODUCTION

This Environmental Assessment (EA) has been prepared in accordance with the requirements of the National Environmental Policy Act (42 U.S. Code [USC] 4321-4327, NEPA) regarding the proposed issuance of an Incidental Take Permit (ITP) under section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended (ESA) to Davis McCrary Property Trust (the Permittee) for the development, ongoing use, and maintenance of portions of the 724-acre Davis Ranch (Proposed Project or Plan Area) located in northwestern Bexar County, Texas (Figure 1). The Permittee submitted a Habitat Conservation Plan (HCP) that proposes actions to minimize and mitigate the impacts of incidental take of the golden-cheeked warbler (*Setophaga [=Dendroica] chrysoparia*, GCWA) (the “Covered Species”) to the maximum extent practicable.

The requested ITP would provide exceptions to the prohibitions of take of the Covered Species that may result from specific otherwise lawful activities (the “Covered Activities”). The Covered Activities could include the selective clearing and/or modification of vegetation; the construction of homes and other buildings, roads, utilities, storm and water quality controls, and related infrastructure; and the ongoing use and maintenance of land for residential and related purposes within the Plan Area.

Covered Activities could result in the direct or indirect modification of an estimated 652.1 acres of potential GCWA habitat. The loss or degradation of this habitat could incidentally take GCWA via harm, as defined by Federal regulation at 50 Code of Federal Regulations (CFR) 17.3. Take via directly killing or wounding individual GCWAs is also possible, albeit unexpected, with the application of the Permittee’s proposed minimization measures.

The Permittee’s HCP describes the Covered Activities associated with the Proposed Project and the measures the Permittee would take to minimize and mitigate the impacts of the proposed taking to the maximum extent practicable (SWCA Environmental Consultants [SWCA] 2018). Proposed conservation measures include seasonal clearing restrictions during the GCWA breeding season, oak wilt prevention, and permanent conservation through the purchase of GCWA conservation credits from a U.S. Fish and Wildlife Service (Service)-approved conservation bank or, if preferred by the Permittee, participation in the Southern Edwards Plateau HCP (SEP HCP).

Section 9 of the ESA prohibits “take” of fish or wildlife species listed as endangered (16 U.S. Code [USC] 1538(a)). Take is defined in section 3 of the ESA as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 USC 1532(19)). The Service’s ESA implementing regulations define “harm” as “an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering” (50 CFR 17.3).

This EA examines the impact that issuance of an ITP (Proposed Federal Action) and approval of the HCP is expected to have on the human environment.

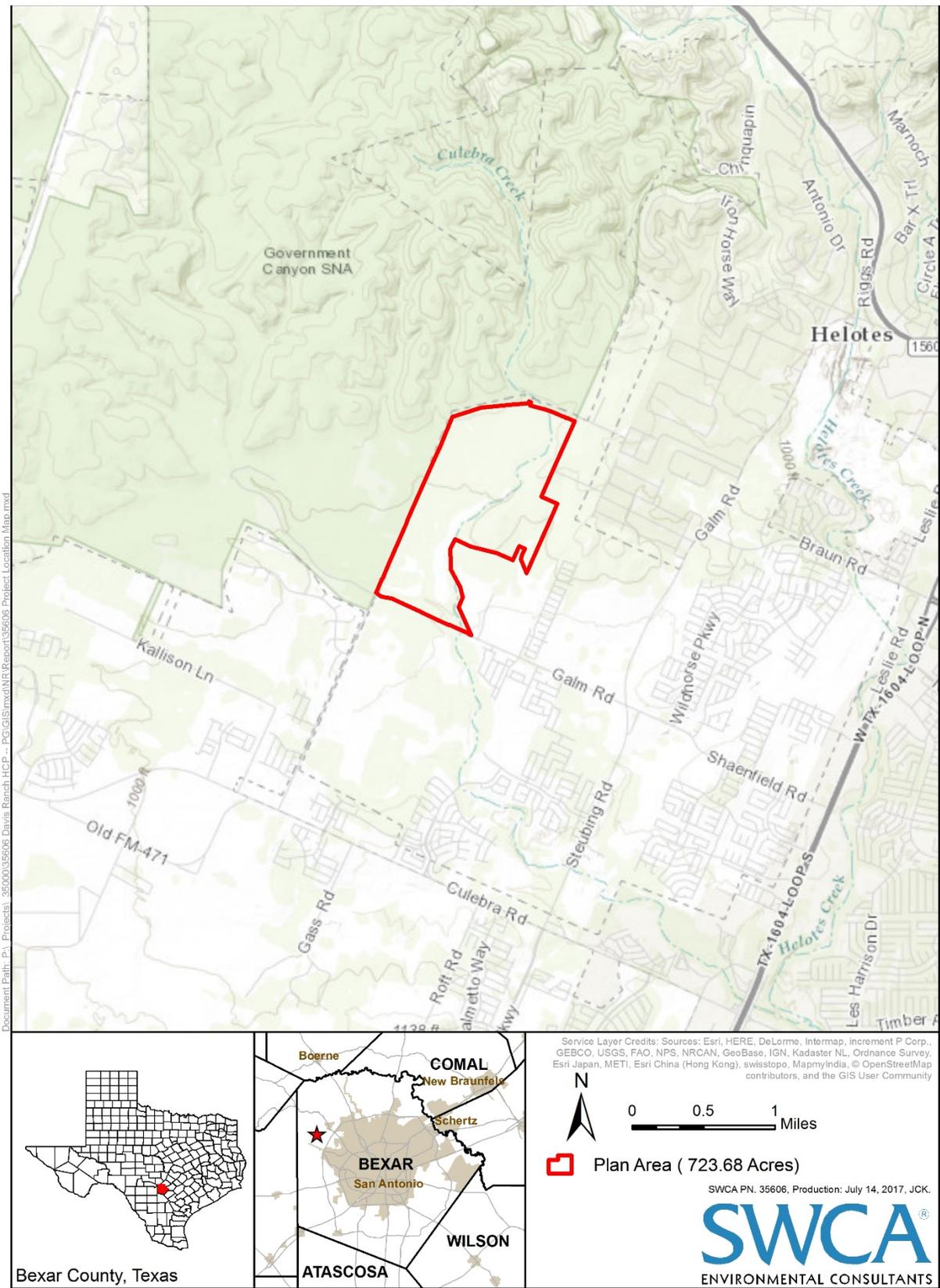


Figure 1. General location of the Proposed Project.

1.1. Project Background

1.1.1. Project Description

The Proposed Project is located approximately 1.5 miles west-northwest of the intersection of Galm Road and Farm-to-Market Road (FM) 1560 in northwestern Bexar County, Texas. The Proposed Project is bordered to the north and west by the undeveloped Government Canyon State Natural Area (GCSNA), while the southern boundary abuts the right-of-way for Galm Road and the eastern boundary is adjacent to proposed and existing low-density residential development.

The Proposed Project consists predominantly of undeveloped ranchland previously used for livestock grazing. The area contains an estimated 5.4 miles of ranch roads as well as a tenant-occupied 1,256-square-foot residence and several small shed-sized buildings. The Permittee has not finalized development plans for the Plan Area; however, mixed use development is likely to occur over some or all of the Plan Area over a 30-year period (Figure 2).

1.1.2. Covered Activities and Permit Term

The Service is considering issuance of a renewable permit with a term of 30 years from the date of issuance to authorize incidental take of Covered Species associated with the development, ongoing use, and maintenance of the Proposed Project. Covered Activities could include, but may not be limited to: the selective clearing and/or modification of vegetation; the construction of homes and other buildings, roads, utilities, storm and water quality controls, and related infrastructure (i.e. commercial); and the ongoing use and maintenance of the Plan Area for residential and related purposes.

1.2. Purpose and Need for the Proposed Federal Action

The purpose of the Federal action is to ensure that the Applicant's HCP includes all elements as required by section 10(a)(2)(A) and meets the criteria listed in section 10(a)(2)(B) of the ESA. Once the Service receives an application for an ITP, the Service must review the application to determine if it meets issuance criteria. The Service also evaluates the impacts of the issuance of the ITP and implementation of the HCP pursuant to NEPA. If the HCP is consistent with issuance criteria, the Service must issue an ITP to authorize incidental take of Covered Species. The Proposed Federal Action considered in this EA is issuance of an ITP under section 10(a)(1)(B) of the ESA to the Applicant to authorize incidental take of GCWAs that could occur as a result of Covered Activities.

An HCP must specify the following:

- The impact that would likely result from the taking.
- What steps the applicant would take to minimize and mitigate such impacts, the funding available to implement such steps, and the procedures to be used to deal with unforeseen circumstances.
- What alternative actions to such taking the applicant considered, and the reasons why such alternatives are not proposed to be utilized.
- Such other measures that the Secretary may require as being necessary or appropriate for the purposes of the plan.

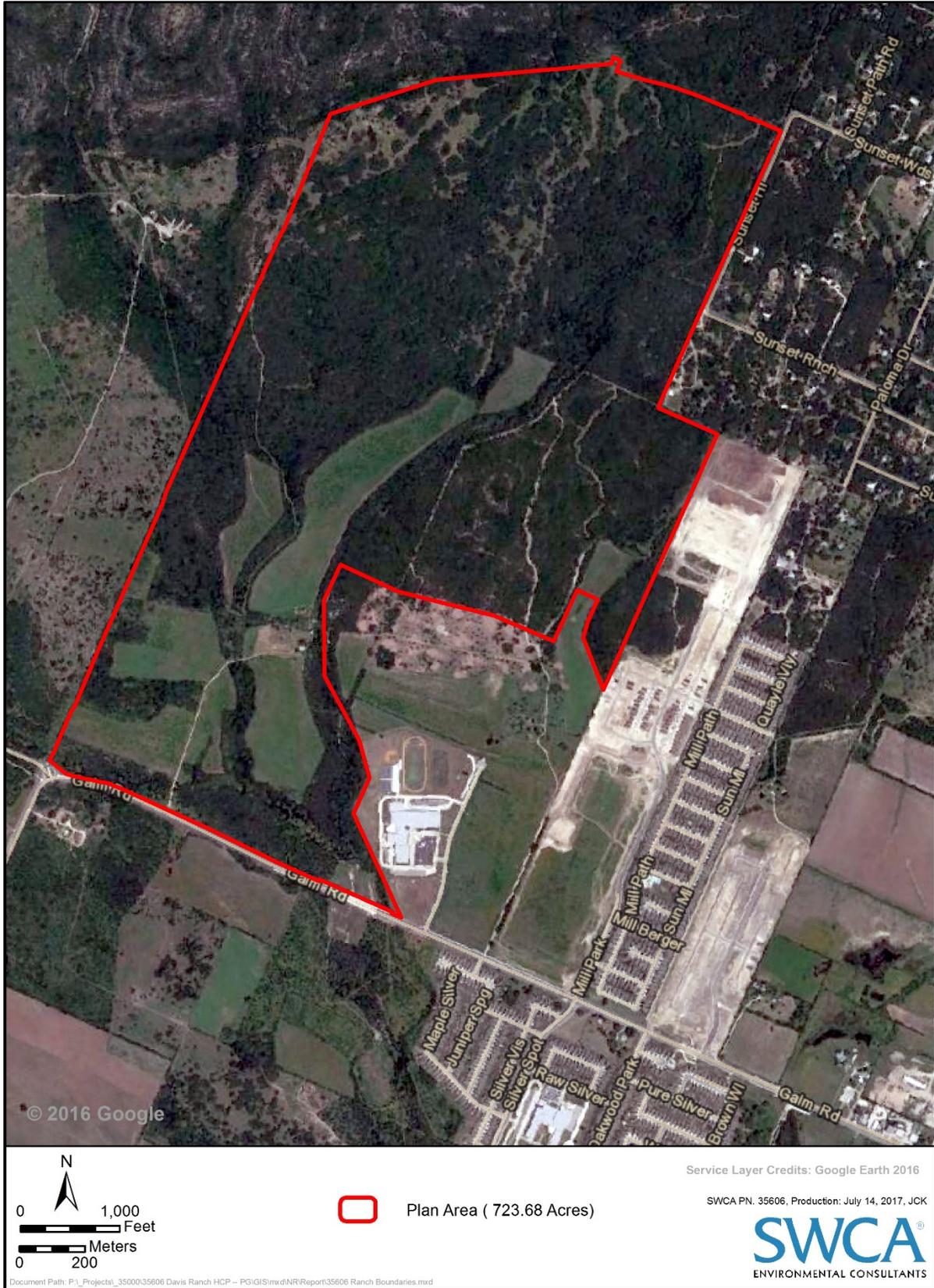


Figure 2. Recent aerial imagery of the Plan Area.

The Service is the lead Federal agency issuing ITPs under the ESA. This EA identifies the impacts associated with alternatives and assists the Service in determining whether issuance of the ITP would have significant impact on the human environment. The scope of the analysis in this EA covers the direct, indirect, and cumulative effects of the proposed incidental take as well as the mitigation measures proposed in the HCP, and HCP administration and funding.

1.3. Public Involvement

The Permittee submitted an ITP application, in conjunction with an HCP, to the Service dated January 10, 2017. Along with the HCP, a draft EA was published for agency and public comment during a 30-day public review period (84 FR 9806). One anonymous comment was received that was unsubstantial. Only minor changes were made to the EA.

2. ALTERNATIVES CONSIDERED

The Service identified two alternatives for consideration:

- Alternative A (No Action) – An ITP pursuant to section 10(a)(1)(B) of the ESA would not be issued by the Service, and the Service would not review or consider the Permittee’s HCP.
- Alternative B (Preferred Alternative) – Issuance of the requested section 10(a)(1)(B) ITP contingent on implementation of the Davis Ranch HCP.

These two alternatives are discussed in the following sub-sections of this chapter and are analyzed in sections 3 and 4 of this EA. Section 2.3 reviews alternatives that were considered but eliminated from detailed analysis, along with an explanation of why these alternatives were dismissed from consideration.

2.1. Alternative A (No Action)

NEPA requires evaluation of a “no action” alternative, which serves as a baseline for comparison of potential project effects. Under the No Action Alternative for the Proposed Project, an ITP pursuant to section 10(a)(1)(B) of the ESA would not be issued by the Service, and the Service would not review or consider the Permittee’s HCP. The Permittee could either elect not to proceed with the Proposed Project or to proceed with development without an ITP in a manner that avoids take of a listed species¹. Therefore, the No Action Alternative in this EA analyzes both of these scenarios. In either scenario, the conservation measures described in the HCP would not be implemented.

2.2. Alternative B (Preferred Alternative)

Alternative B (Preferred Alternative) is the Service’s Proposed Federal Action for issuance of a section 10(a)(1)(B) 30-year ITP (from the date of issuance) to the Permittee to authorize incidental taking of GCWAs that may result from Covered Activities. Covered Activities are discussed in Section 1.1.2 of this EA and Chapter 4.0 of the HCP.

¹ The Permittee could proceed with development lacking an ITP while maintaining compliance with the ESA under the following scenarios:

1. Develop alternate compliance strategy (e.g. participate in SEP HCP),
2. Develop federal nexus that triggers section 7 consultation, or
3. Put the Proposed Project on hold until the GCWA is no longer protected under the ESA.

Authorization of take under this alternative, as described in Chapter 6 of the HCP, would be measured in terms of the direct or indirect modification of 652.1 acres of potential GCWA habitat. With the issuance of a section 10(a)(1)(B) ITP, the Permittee would implement the HCP to minimize and mitigate the impacts of the potential take. The implementation of the HCP would include minimization and mitigation measures, as summarized in Sections 2.2.1 and 2.2.2, below.

2.2.1. Minimization Measures

The following measures would be implemented during development, ongoing use, and maintenance to further minimize impact to GCWAs (HCP Chapter 7.2):

- Observe seasonal woody vegetation clearing restrictions during the GCWA breeding season (defined as between March 1 and July 31).
- Implement Texas A&M Forest Service (TFS) or professional arborist's guidelines for the prevention of the spread of oak wilt, including avoiding trimming, limbing, or pruning oaks from February through June and immediately painting wounds to prevent exposure (TFS 2015).

2.2.2. Mitigation Measures

2.2.2.1. MITIGATION RATIOS AND AMOUNT OF MITIGATION

All GCWA habitat that is directly or indirectly impacted by the Covered Activities would be offset by mitigation. Consistent with long-standing Service practice and existing precedent, proposed mitigation ratios consider the relative magnitude of Proposed Project impacts to GCWAs and GCWA habitat, given the ecological differences between direct versus indirect impacts within the Plan Area. Based on that, the Permittee will mitigate two acres for every one acre directly impacted and half an acre for every acre indirectly impacted (acreage within 300 feet of GCWA habitat directly impacted). The Permittee would provide mitigation to support the perpetual protection of up to 1,176.73 acres of GCWA habitat (see HCP Chapters 7.3 and 7.4 for details).

Prior to initiating Covered Activities, the Permittee would overlay the development plan for a Development Area² over the potential GCWA habitat map (Figure 4 of the HCP) to determine the total number of GCWA habitat acres that would experience direct and indirect (within 300 feet) habitat modification, as further described in Chapter 6.3 of the HCP. Mitigation would only be required where clearing activities result in direct and indirect impacts to GCWA habitat.

2.2.2.2. PERMANENT CONSERVATION

For the Proposed Project, the Permittee would purchase GCWA conservation credits from a Service-approved conservation bank prior to any take authorized by the requested ITP or, if available and preferred by the Permittee, participate in the SEP HCP. If mitigating through a conservation bank, two operational Service-approved conservation banks with GCWA credits available for purchase have service areas that includes the Plan Area: the Bandera Corridor Conservation Bank and the Festina Lente Conservation Bank. Both banks provide GCWA conservation credits backed by GCWA habitat that is permanently protected, managed, and monitored for the long-term benefit of the species. These banks protect several thousand acres of GCWA habitat that is adjacent or near to other protected properties with GCWA habitat. Together this cluster of protected properties forms a focal area for GCWA conservation that contributes substantially to the recovery of the species.

² Defined as portions of the Plan Area that are developed or conveyed for development over the 30-year ITP.

It is expected that over the ITP's duration, the Permittee would sell and convey portions of the Plan Area to other individuals or entities for their development, use, and occupation. To provide an efficient and effective means to assure that such third-parties are obligated to comply with the relevant provisions of the ITP and HCP and benefit from the authorizations granted in the ITP, in addition to the regulatory process for assignment of an ITP, the Permittee would issue "Agreements of Inclusion" to individuals or entities (referred to herein as Participants), whereby they agree to be bound by and comply with those terms and conditions of the ITP applicable to the land they are purchasing within the Plan Area. In exchange for this obligation, the Participant would receive the full benefits and assurances provided by the ITP, including receiving authorization for incidental take resulting from the Covered Activities. The Permittee would provide the Service with an Agreement of Inclusion for review and approval prior to entering into any agreement with a Participant.

Following acceptance of a Participant and completion of the purchase of conservation credits, the Service would review a mitigation summary submitted by the Permittee that includes 1) the mitigation assessment completed as part of the transaction, 2) proof of secured mitigation; and, 3) any relevant Agreement of Inclusion documentation (Chapter 7.3.2 of HCP).

The Service approved the SEP HCP in December 2015. The Permittee or any individual or entity wishing to conduct Covered Activities within the Plan Area could, at their discretion, choose to participate in the SEP HCP rather than the conservation program prescribed by the Davis Ranch HCP. If the Permittee or other individual or entity opts to participate in the SEP HCP for any portion of the Plan Area, mitigation would be provided pursuant to the participation requirements of the SEP HCP.

2.2.3. Reporting and Adaptive Management

Over the duration of the ITP, the Service's Austin Ecological Services Field Office would receive a report of HCP-related activities from the Permittee by January 15th of each year. This annual report would document the total number of Development Areas encumbered under the HCP, the total acres of incidental take authorization used to-date, and the amount and method of mitigation. Adaptive management would be incorporated into the operating conservation program under the responsibility of the Service-approved third-party conservation bank or through the SEP HCP (HCP Chapter 7.5).

2.2.4. Funding

The total cost to implement the HCP is estimated at approximately \$5,295,285 and \$5,883,650 (HCP Chapter 8.0). However, this amount could fluctuate due to inflation over the ITP term since the Permittee would purchase mitigation as needed over time rather than all at once. The Permittee has provided the necessary assurances that funding would be available to implement the proposed HCP. If for some reason the funding is not available to implement the HCP, the taking would not occur.

2.2.5. Changed Circumstances

The HCP identifies provisions to address potential changes in circumstances that could affect GCWAs. If circumstances were to change, the Permittee would implement the changed circumstances provisions included in the HCP (Chapter 10.1).

2.3. Alternatives Eliminated from Further Analysis

2.3.1. Reduced Mitigation

Development of a reduced mitigation alternative that mitigated direct habitat loss at a 1:1 ratio was considered during preparation of the EA. This alternative would meet the Proposed Project purpose and need, but only resulted in 609.6 conservation credits if the entire Plan Area were developed (compared to 1,176.73 credits under Alternative B (Preferred Alternative)). Since this alternative would provide less long-term protection for GWCA, it was not carried forward for analysis.

2.3.2. Additional Mitigation

The Service considered development of an alternative providing mitigation above and beyond the Proposed Action. This alternative would meet the project purpose and need, but the Service Habitat Conservation Planning Handbook (Service and National Marine Fisheries Service [NMFS] 2016) states that mitigation should be commensurate with the impacts of the taking. The Permittee has committed to avoiding or minimizing potential takings of Covered Species through its HCP conservation measures. The Permittee would also fully offset the impacts of its requested taking by providing mitigation that permanently protects Covered Species habitat as compensation for potential impacts associated with the Covered Activities. If these measures are successful, additional mitigation would not be needed. If these measures are not successful, then additional mitigation would be provided through the changed circumstance section in the HCP. Therefore, additional mitigation is neither warranted nor practicable, and this alternative is not recommended for further analysis.

2.3.3. Exclusive Enrollment in SEP HCP

Exclusive participation in the SEP HCP was considered as an alternative to preparing a separate HCP. However, the SEP HCP does not fully address the Permittee's need for incidental take authorization because the Permittee wishes to retain operational control over implementation of their own HCP and compliance with the associated ITP. Enrollment would subject the Permittee to application and administrative fees imposed by the SEP HCP. Further, the Permittee's desire the ability to receive mitigation credit for indirect habitat modification when calculating mitigation costs for direct habitat modification, which is not possible under the SEP HCP.

3. ENVIRONMENTAL SETTING

The affected environment describes the current environmental conditions for resources within the Plan Area. Discussion of resources is restricted to those that would be affected by the Proposed Federal Action. Resources that were dismissed from analysis are addressed in Section 3.3.

For consistency with the HCP, this EA uses the HCP's Plan Area for analysis purposes, which consists of the 724-acre area within which GCWAs and other affected resources could experience direct and indirect impacts. The Project Area for cumulative effects varies by resource and is defined within each effect analysis.

3.1. Regional Environmental Setting

Bexar County, Texas, is located predominately within the Texas Blackland Prairies Level III (i.e., "national scale") ecoregion (Griffith *et al.* 2007). Tall-grass prairies once characterized this ecoregion, but currently much of this region has been converted to agricultural, urban, and industrial uses (Griffith *et al.*

2007). Historical climate records from the San Antonio, Texas, international airport weather station, located approximately 14 miles east of the Project Area, indicate that mean annual precipitation (from 1942 to 2016) in the region was approximately 30.5 inches, with precipitation peaks occurring in May to June and again in September to October. January mean temperatures (min./max.) range between 40°F and 62°F, while July mean temperatures range between 74°F and 95°F (Western Regional Climate Center 2016). Kunkel *et al.* (2014) suggest that the southern U.S. Great Plains (which includes the State of Texas) will experience a trend towards lower precipitation and higher temperatures in the future due to climate change.

3.2. Resources Considered for Detailed Analysis

The Service reviewed all human environment³ resources that the Proposed Federal Action could affect. This review determined which resources should be carried forward in this EA for further detailed analysis and which resources could be eliminated from detailed analysis (see Section 3.3). The resources identified with the potential to be affected by the Proposed Federal Action above an insignificant level, either adversely or beneficially, are listed below, as well as described in greater detail later in this section and analyzed in detail in Section 4.

- **Vegetation:** Any surface disturbance associated with the modification of Covered Species habitat could affect the composition and productivity of vegetation resources (Section 3.2.1).
- **General Wildlife:** Impacts to wildlife habitat, as well as human activity associated with the modification of Covered Species habitat could affect, either adversely or beneficially, general wildlife within the Project Area (Section 3.2.2).
- **GCWAs:** Direct or indirect modification of Covered Species habitat could incidentally take Covered Species via harm. Take via directly killing or wounding individual birds is also possible albeit unexpected with the application of the Applicant's proposed avoidance and minimization measures (Section 3.2.3).

3.2.1. Vegetation

The National Land Cover Database (NLCD), last updated in 2011, serves as a resource for assessing land use and land cover in the United States (Homer *et al.* 2015). As mapped by the NLCD, deciduous and evergreen forest vegetation communities cover 606 acres (84 percent) of the Project Area. Approximately 117 acres (16 percent) is composed of other shrub/scrub or herbaceous cover. Less than one percent of the Project Area has developed land cover. This land cover is consistent with the larger watershed that the Project Area is located within (Table 1).

Woodlands within the Project Area include mixed tree species such as plateau live oak (*Quercus fusiformis*), Ashe juniper (*Juniperus ashei*), cedar elm (*Ulmus crassifolia*), hackberry (*Celtis reticulata*), and mesquite (*Prosopis glandulosa*). Cedar elm trees and Texas red oak (*Quercus buckleyi*) are dominant along the banks of Culebra Creek. Mature Ashe juniper trees occur throughout the Project Area in various densities. Tree canopy height of woodlands generally ranges from 18 to 40 feet, with average tree canopy height slightly higher along the banks of Culebra Creek and within low-lying areas. Woody canopy closure is relatively high and ranges from 75 percent to almost 100 percent within wooded portions of the Project Area (SWCA 2018).

³ The Council on Environmental Quality defines the human environment as the natural and physical environment, and the relationship of people with that environment (1508.14).

Shrub layer species occur in low densities under canopy and in moderate densities along woodland margins. Shrub species include Texas persimmon (*Diospyros texana*), elbowbush (*Forestiera pubescens*), wafer ash (*Ptelea trifoliata*), Texas mountain laurel (*Sophora secundiflora*), and catclaw (*Senegalia roemeriana*). Deciduous holly (*Ilex decidua*) occurs along Culebra Creek. King Ranch bluestem (*Bothriochloa ischaemum*) dominates the fallow pastureland, with various herbaceous species occurring in lower densities. Mesquite saplings and Texas prickly pear (*Opuntia engelmannii* var. *lindheimeri*) have begun to invade many of the fallow pastureland areas (SWCA 2018).

Table 1. Land Cover Types within the Project Area and Surrounding Watershed

NLCD Land Use/Land Cover Type*	Acres in the Project Area	Acres in Upper Culebra Creek Watershed
Evergreen Forest	470	13,387
Deciduous Forest	136	2,625
Grassland/Herbaceous	76	4,768
Shrub/Scrub	41	3,083
Developed, Open Space	<1	1,003
Cultivated Crops	<1	592
Woody Wetlands	0	37
Developed, Low to High Intensity	0	301

*Excludes water and barren lands with no vegetation.

3.2.2. General Wildlife

Wildlife species expected to be in the Project Area include a number of terrestrial woodland, scrub, and grassland birds, mammals, reptiles, and some amphibians that are typically abundant to common in both undeveloped and suburban settings (Kutac and Caran 1994). Based on Texas Parks and Wildlife Department ([TPWD] 2016b) hunting permits available for Bexar County, local mammals include white tailed deer (*Odocoileus virginianus*), jackrabbits (*Lepus californicus*), and javelina (*Tayassu tajacu*). Bird species include mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), wood duck (*Aix sponsa*), black duck (*Anas rubripes*), blue-winged teal (*Anas discors*), northern bobwhite quail (*Colinus virginianus*), and turkey (*Meleagris gallopavo*) (TPWD 2016b).

Commonly found terrestrial reptiles and amphibians found in Bexar County include the checkered gartersnake (*Thamnophis marcianus*), western diamond-backed rattlesnake (*Crotalus atrox*), eastern racer (*Coluber constrictor*), coachwhip (*Masticophis flagellum*), common kingsnake (*Lampropeltis getula*), eastern hog-nosed snake (*Heterodon platirhinos*), Texas spiny lizard (*Sceloporus olivaceus*), prairie lizard (*Sceloporus undulatus*), ornate box turtle (*Terrapene ornata*), eastern box turtle (*Terrapene carolina*), Gulf Coast toad (*Bufo nebulifer*), and Texas toad (*Bufo speciosus*) (Herps of Texas 2016).

Bat species that may migrate through the Project Area or forage in woodland areas include the silver-haired bat (*Lasiurus noctivagans*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and Brazilian free-tailed bat (*Tadarida brasiliensis*) (Mammals of Texas 2016).

Wildlife associated with aquatic or riparian habitats could occur in the Project Area but are not addressed in detail because the Proposed Project would not impact these habitats (see Section 3.3.2).

3.2.3. Golden-Cheeked Warbler

The Service listed the GCWA as an endangered species in 1990 due to habitat loss and fragmentation (55 FR 53153). GCWAs are small insectivorous songbirds that arrive in Texas between mid-March and mid-April to establish breeding territories and begin nesting shortly thereafter. For successful first nesting attempts, the fledging of young typically occurs in the first half of May. Migration to their wintering grounds, located in the highlands of Mexico and Central America, generally begins in July or early August (Service 1992).

3.2.3.1. SPECIES ABUNDANCE AND DISTRIBUTION

The breeding range of the GCWA is restricted to Texas, where it occurs primarily in the Edwards Plateau and Cross Timbers regions of central and north-central Texas. Service-permitted biologists conducted Service-protocol presence/absence surveys within portions of the Project Area in 2007, 2013, and 2015 (Figure 3 in the HCP). In 2007, SWCA biologists conducted a presence/absence survey for GCWAs and black-capped vireos (*Vireo atricapilla*) on 350 acres. SWCA (2007) detected only one GCWA within the survey area adjacent to the GCSNA over seven survey days. SWCA (2007) concluded that it was extremely unlikely that the detected male was maintaining a territory within the Project Area in 2007, and was likely a transient individual.

In 2013, biologists with Pape-Dawson Engineers (Pape-Dawson) conducted a GCWA survey on 244 acres of the Project Area. Pape-Dawson (2013) observed GCWAs on only one survey day, recording two individuals in the northwest portion of the survey area. Pape-Dawson concluded that the observed individuals were likely transient and there was no evidence that GCWAs regularly occupied the 2013 survey area. Pape-Dawson (2013) further concluded that the lack of regular occupation was likely a result of the “marginal quality of the habitat.”

In 2015, Pape-Dawson again conducted a presence/absence survey within the 244-acre portion of the Project Area considered in 2013 (however, the survey effort in 2015 was limited to portions of the tract with woody vegetation). Unlike previous survey efforts, Pape-Dawson identified GCWAs during five of the six 2015 survey days (Pape-Dawson 2015). During the 2015 survey, Pape-Dawson made a total of 62 detections, leading biologists to conclude that four to five GCWA territories occurred within the survey area during the 2015 breeding season (Pape-Dawson 2015).

Service-permitted biologists have not surveyed the rest of the Plan Area for the presence of GCWAs; however, surveys conducted by TPWD within the GCSNA in 2017 documented occupancy within the GCSNA along the northern boundary of the Plan Area.

3.2.3.2. HABITAT REQUIREMENTS AND AVAILABILITY

GCWA breeding habitat typically consists of relatively dense and mature woodland composed of a combination of Ashe juniper and broad-leafed hardwood tree species, especially oaks such as Texas oak and plateau live oak. There is no designated critical habitat for this species.

SWCA conducted a habitat delineation of the Project Area in 2016 based on aerial imagery, modeled vegetation communities, available environmental reports including presence/absence survey data, and a site inspection (SWCA 2016a, Chapter 5.2.2 of the HCP). SWCA delineated approximately 567.12 acres of potential GCWA habitat within the Plan Area, as well as an additional 84.98 acres of potential GCWA habitat within 300 feet of the Plan Area (Figure 4 of the HCP). Areas delineated as potential habitat by SWCA meet the habitat requirements described by Campbell (2003).

Regional habitat modeling indicates that potential habitat for the species is available in Bexar County and within the GCSNA adjacent to the Project Area (Morrison *et al.* 2010). There are approximately 2,778,207 acres of potential GCWA habitat across the breeding range (Morrison *et al.* 2010) and approximately 59,000 to over 84,000 acres in Bexar County (Diamond *et al.* 2010, Hayes 2010). Of the total acreage available to GCWAs in Bexar County over 23,800 acres are currently in some form of park or preserve managed for the GCWA.

3.3. Resources Not Considered for Detailed Analysis

Per the Service and NMFS's 2016 revised *Habitat Conservation Planning and Incidental Take Permit Processing Handbook*, "The extent of the [Service's] environmental review under NEPA is dictated by the environmental effects triggered by the Federal action – issuance of the ITP and required conservation actions of the HCP." Therefore, the NEPA analysis is limited to only those resources that would be affected by proposed take and conservation measures.

3.3.1. Air Quality

The Clean Air Act requires that the U.S. Environmental Protection Agency (USEPA) set air quality standards, referred to as the National Ambient Air Quality Standards (NAAQS). Areas that do not meet the NAAQS are referred to as *non-attainment* areas. Bexar County was recently designated as a nonattainment area (83 FR 35136). San Antonio's nonattainment area is also being classified as Marginal, which indicates areas that have ozone levels that are closest to the NAAQS at the time of designation.

Neither the authorization of incidental take of Covered Species, nor the implementation of the HCP is expected to affect air quality. The Project Area is not in the immediate vicinity of any large-scale point source emissions (e.g., from industrial plants and fossil fuel-fired power plants). We anticipate that the only potential construction impact to air quality would occur intermittently during development through the use of heavy equipment and machinery to clear vegetation and construct buildings. These emissions would be minimized through the use of standard construction best management practices. It is also assumed that air quality effects from residential traffic, once development is complete, would not result in an overall measurable increase in emissions since some portion of these residents would be local and already contributing to existing air quality conditions. Therefore, this issue is not considered for further analysis.

3.3.2. Aquatic Resources

3.3.2.1. SURFACE WATER

Culebra Creek flows north to south across the central portion of the Project Area, eventually flowing into Leon Creek and later the San Antonio River. An unnamed tributary (UNT) to Culebra Creek flows west to east across the southern portion of the Project Area and has a confluence with Culebra Creek in the southeastern corner of the Project Area. A second UNT to Culebra Creek flows northwest to southeast across the southwestern portion of the Project Area, and confluences with the first UNT in the southern portion of the Project Area. A fourth stream segment flows north to south along the eastern portion of the Project Area but does not appear to have any downstream connections to other water bodies.

Neither the authorization of incidental take of GCWA, nor the implementation of the HCP is expected to affect the surface water resources. Since development would not occur within unsuitable areas (e.g. floodplains and surface waters), it is anticipated that potential impacts to surface water quality would only occur intermittently during development through stream crossings by heavy equipment and machinery to

access the site and clear vegetation. These impacts would be minimized through the use of standard construction best management practices and once construction is complete no additional surface water impacts would be expected. Therefore, this issue is not considered for further analysis.

3.3.2.2. GROUNDWATER RESOURCES

The Project Area occurs predominately over the Edwards Aquifer Artesian Zone. Water collects within the Edwards Aquifer Recharge and Contributing zones and flows underground within the aquifer to the Artesian Zone, where it discharges through natural springs or anthropogenic wells (Hovorka *et al.* 1998). Neither the authorization of incidental take of GCWA, nor the implementation of the HCP is expected to affect the Edwards Aquifer Recharge and Contributing zones. Therefore, this resource is not considered for further analysis.

3.3.2.3. FLOODPLAIN

Approximately 176.3 acres of Federal Emergency Management Agency (FEMA) mapped 100-year floodplain transect the Project Area. The floodplain is currently undeveloped and includes open spaces as well as woody vegetation. The Permittee is not proposing to construct any residential or commercial structures within the floodplain; however, some ancillary infrastructure (such as linear roadways and utility lines) may cross the mapped floodplain. These impacts would be minimized through the use of standard construction best management practices and, once construction is complete, no additional floodplain impacts would be expected. Since floodplain effects would be negligible and consistent across alternatives, this issue was not carried forward for analysis.

3.3.3. Cultural Resources

SWCA (2016b) conducted a desktop search of the Texas Archeological Sites Atlas to identify historic properties listed in the National Register of Historic Places or designated State Antiquities Landmarks, as well as previously recorded prehistoric archeological site locations and cultural resources within one mile of the Project Area. No previously recorded archaeological sites and only five potential historic-age buildings, which represent a farm complex that appears to be currently in use, were identified within the Project Area (SWCA 2016b). Since the Proposed Project would avoid direct impacts to any known significant cultural resources, this issue is not considered for further analysis.

3.3.4. Energy and Depletable Resource Requirements and Conservation Potential

The Project would not affect scarce or depletable energy resources, such as oil or coal, which have finite amounts, since none exist within the Plan Area. Therefore, this issue is not considered for further analysis.

3.3.5. Environmental Justice

Executive Order 12646 issued in 1994 directs Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their actions on minority communities and low-income communities.

Reports from the USEPA's Environmental Justice Screening and Mapping Tool for Census Tract 48029182106, which encompasses the Proposed Project, indicate that the census tract's minority population represents 49 percent of the total population, while 10 percent of the census tract is classified as low income, as compared to 56 percent minority and 39 percent low-income for the state of Texas (USEPA 2016). In comparison, Bexar County's minority and low-income population represent

approximately 70 percent and 17 percent of the total population, respectively (U.S. Census 2016a, 2016b). Given that the Proposed Project's demographic setting is comprised of lower minority and low-income resident percentages than either Bexar County or the State of Texas, any effects to the affected minority or low-income population from Proposed Project actions would not be disproportionately greater (more severe) than those experienced by the population as a whole. Therefore, environmental justice was not considered as an issue for further analysis.

3.3.6. Farmland and Soils

The Natural Resources Conservation Service (NRCS) characterizes eligible farmland as being "prime" or "unique" or of "statewide or local importance." The designations are based on NRCS soil types and are protected by Federal and state legislation. Soils considered to be prime farmland are present within the Project Area and consist of Lewisville silty clay. However, Part 523.10 of the Farmland Protection Policy Act (FPPA) Manual stipulates that projects utilizing private lands and having no Federal funding are not subject to the FPPA. Therefore, this issue was not carried forward for further analysis.

3.3.7. Geology

The Project Area occurs along the southern edge of the Balcones Fault Zone (BFZ). During the middle Tertiary, structural down-warping occurred to the southeast associated with the formation of the ancestral Gulf of Mexico. The earth's crust was stretched in response and the BFZ formed along a zone of weakness, which today marks the boundary between the Edwards Plateau and the Gulf Coastal Plain throughout central Texas. This zone consists of a series of northeast-trending, predominantly normal, nearly vertical, echelon faults. One mapped northeast-trending fault occurs along the northern edge of the Project Area and several mapped faults occur within the vicinity of the Project Area (Barnes 1984). The Project Area is underlain by the Upper Cretaceous Austin Chalk and Pecan Gap (Barnes 1984).

Neither the authorization of incidental take of GCWA, nor the implementation of the HCP is expected to affect this underlying geology. Therefore, this resource is not considered for further analysis.

3.3.8. Karst Resources

Veni (2003) delineated five Karst Zones to help assess the probability of rare or endangered karst invertebrate species occurring across Bexar County, Texas. The Veni (2003) Karst Zones include:

- Karst Zone 1: Areas known to contain listed karst invertebrate species.
- Karst Zone 2: Areas having a high probability of containing habitat suitable for listed karst invertebrate species.
- Karst Zone 3: Areas that probably do not contain listed karst invertebrate species.
- Karst 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 as more information becomes available.
- Karst Zone 5: Areas that do not contain listed karst invertebrate species.

The Project Area occurs over Karst Zone 3. In the spring of 2016, SWCA conducted Service-protocol presence/absence surveys (Service 2015) for Bexar County karst invertebrates within the Project Area. SWCA identified 30 potential karst features. However, none of the features exhibited the characteristics of potential habitat for karst invertebrates. Given these findings, it is highly unlikely that listed karst

invertebrates would be impacted by the Covered Activities, so this resource is not considered for further analysis.

3.3.9. Land Use

The Project Area is situated at the base of the Edwards Plateau and appears on the Helotes, Texas, U.S. Geological Survey (USGS) 7.5-minute topographic map quadrangle (USGS 1992). Topography across the Project Area ranges from relatively flat to slightly hilly, with elevation increasing gradually toward the center and toward the northern boundary of the Plan Area. The total relief is approximately 110 feet with elevations ranging from approximately 950 to 1,060 feet above mean sea level.

The Project Area consists predominantly of undeveloped ranchland previously used for livestock grazing. A portion of Davis Ranch could be used for commercial development; however, most development is likely for residential purposes. This tract represents less than one percent of the overall land available in Bexar County. Therefore, neither the authorization of incidental take of GCWA, nor the implementation of the HCP is expected to affect land use. Considering at least a portion of the Project could occur with or without an ITP and still maintain compliance with the ESA (Section 2.1), there is no causal relationship between the Proposed Federal Action and land use; therefore, the issue is not carried forward for analysis.

3.3.10. Noise

The Project Area is located adjacent to the undeveloped GCSNA, Dr. John M. Folks Middle School, and a mix of residential developments, some with high density lots (~0.1 acre) and some with lower density lots (~0.8 to 1.5 acre). Vehicle traffic from local residents travelling along residential roads and Route 1604 are the primary sources of ambient noise in the vicinity.

Neither the authorization of incidental take of GCWA, nor the implementation of the HCP is expected to affect ambient noise levels already emitted by adjacent development. It is unlikely noise emitted from the Proposed Project would be distinguishable from noise produced by similar residential projects already in existence or being built around the Project Area. Proposed Project construction activity would include the use of heavy equipment and vehicle traffic, which produce a typical range of sound from 55–85 decibels (dBA) at 50 feet from the noise source. However, most construction noise would be produced sporadically and temporarily, and all noise sources would be expected to dissipate over short distances and not adversely affect surrounding residents or land uses. Post-construction residential traffic noise would be consistent with existing noise sources from adjacent neighborhoods and sound levels. Therefore, this issue was not considered for further analysis with regards to human impacts. Noise impacts to wildlife are discussed in Sections 4.4.2 and 4.4.3.

3.3.11. Other Threatened, Endangered, or Candidate Species

Table 2 provides a list of species protected by the ESA or that are candidates for future protection and that may occur within Bexar County, Texas (Service 2016). The Service evaluated the habitat requirements and known distributions of each of these species and assessed their likelihood of occurrence within the Project Area. Except for the GCWA, no other federally listed species, or candidates for such listing, are known or suspected to occur within the Project Area, nor are the Covered Activities likely to impact such species.

Table 2. Federally Listed or Candidate Species Occurring in Bexar County, Texas

Species Name	Listing Status*	Habitat Characteristics	Likely Occurrence in the Project Area
ARACHNIDS			
Bracken Bat Cave meshweaver (<i>Cicurina venii</i>)	FE	Karst features in north and northwest Bexar County.	Low – SWCA conducted a protocol karst survey on the Project Area in 2016 and did not identify any karst invertebrate habitat. The Project Area occurs within Karst Zone 3. See Chapter 5.1.1 of the HCP for additional discussion.
Cokendolpher Cave harvestman (<i>Texella cokendolpheri</i>)	FE		
Government Canyon Bat Cave meshweaver (<i>Cicurina vespera</i>)	FE		
Government Canyon Bat Cave spider (<i>Neoleptoneta microps</i>)	FE		
Madla Cave meshweaver (<i>Cicurina madla</i>)	FE		
Robber Baron Cave meshweaver (<i>Cicurina baronia</i>)	FE		
CRUSTACEANS			
Peck’s Cave amphipod (<i>Stygobromus pecki</i>)	FE	Aquatic caves within the San Marcos and Comal Springs aquatic ecosystems and the San Antonio Segment of the Edwards Aquifer.	None – Suitable aquatic habitat is not present within the Project Area and the Covered Activities are not expected to measurably affect aquifer recharge. See Chapter 5.1 of the HCP for additional discussion.
AMPHIBIANS			
San Marcos salamander (<i>Eurycea nana</i>)	FT	Aquatic caves within the San Marcos and Comal Springs aquatic ecosystems and the San Antonio Segment of the Edwards Aquifer.	None – Suitable aquatic habitat is not present within the Project Area and the Covered Activities are not expected to measurably affect aquifer recharge. See Chapter 5.1 of the HCP for additional discussion.
Texas blind salamander (<i>Typhlomolge rathbuni</i>)	FE		
BIRDS			
Golden-cheeked warbler (<i>Setophaga chrysoparia</i>)	FE	Juniper-oak woodlands.	Known – GCWA have been documented within the Project Area.
Whooping crane (<i>Grus americana</i>)	FE	Potential migrant via plains throughout most of the state to the coast.	Low – Bexar County occurs on the fringe of the whooping crane migration corridor and is not regularly used by this species.
FISHES			
Fountain darter (<i>Etheostoma fonticola</i>)	FE	Resides in the San Marcos and Comal Springs aquatic ecosystems and the San Antonio Segment of the Edwards Aquifer. It is thought that this species may be impacted by activities that impact the water quality and quantity within the Edwards Aquifer Recharge or Contributing Zones.	None – Suitable aquatic habitat is not present within the Project Area and the Covered Activities are not expected to measurably affect aquifer recharge. See Chapter 5.1 of the HCP for additional discussion.
INSECTS			
Ground beetles (<i>Rhadine exilis</i> and <i>R. infernalis</i>)	FE	Karst features in north and northwest Bexar County.	Low – SWCA conducted a protocol karst survey on the Project Area in 2016 and did

Species Name	Listing Status*	Habitat Characteristics	Likely Occurrence in the Project Area
Helotes mold beetle (<i>Batrisodes venyivi</i>)	FE		not identify any karst invertebrate habitat. The Project Area occurs within Karst Zone 3. See Chapter 5.1.1 of the HCP for additional discussion.
Comal Springs dryopid beetle (<i>Stygoparnus comalensis</i>)	FE	Occur within the San Marcos and Comal Springs aquatic ecosystems and the San Antonio Segment of the Edwards Aquifer. It is thought that they may be impacted by activities that impact the water quality and quantity within the Edwards Aquifer Recharge or Contributing Zones.	None – Suitable aquatic habitat is not present within the Project Area and the Covered Activities are not expected to measurably affect aquifer recharge. See Chapter 5.1 of the HCP for additional discussion.
Comal Springs riffle beetle (<i>Heterelmis comalensis</i>)	FE		
MAMMALS			
Gray wolf (<i>Canis lupus</i>)	FE/SE	Formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands.	None – Likely extirpated in Texas.
Red wolf (<i>Canis rufus</i>)	FE/SE	Formerly known throughout eastern half of Texas in brushy and forested areas as well as coastal prairies.	None – Likely extirpated in Texas.
MOLLUSKS			
Golden orb (<i>Quadrula aurea</i>)	C/ST	Occurs within the Guadalupe, San Antonio, Lower San Marcos, and Nueces River basins in sand and gravel or mud.	None – Suitable aquatic habitat is not present for this species.
Texas fatmucket (<i>Lampsilis bracteata</i>)	C	Streams and rivers on sand, mud, and gravel substrates; Colorado and Guadalupe River basins.	
Texas pimpleback (<i>Quadrula petrina</i>)	C/ST	Occurs within the Colorado and Guadalupe river basins in mud, gravel and sand substrates; generally in areas with slow flow rates.	
PLANTS			
Bracted twistflower (<i>Streptanthus bracteatus</i>)	C	Shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms. Several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations.	Low – Potential habitat not present within the Project Area.
Texas wild-rice (<i>Zizania texana</i>)	FE	Occurs in the San Marcos Springs aquatic ecosystem. Does not occur in Bexar County; however, it is thought that it may be impacted by activities that impact the water quality and quantity within the Edwards Aquifer Recharge or Contributing Zones.	None – Suitable aquatic habitat is not present within the Project Area and the Covered Activities are not expected to measurably affect aquifer recharge. See Chapter 5.1 of the HCP for additional discussion

U.S. Fish and Wildlife Service 2016.

* FE = Federally Endangered; FT = Federally Threatened; C = Federal Candidate for Listing; SE = State Endangered; ST = State Threatened

3.3.12. Other State-Protected Species

Table 3 provides a list of state-protected species occurring in Bexar County, Texas (state-protected species that are also federally listed are discussed above in Table 3). Based on an evaluation of species foraging and breeding habitat needs, Covered Activities are not likely to adversely impact state-protected species that could be present within the Project Area. The two subspecies of peregrine falcon (*Falco*

peregrinus anatum and *Falco peregrinus*) and the zone-tailed hawk (*Buteo albonotatus*) could utilize the Project Area temporarily, but the Project would result in minimal (<3 percent) long-term foraging habitat removal in the surrounding watershed. Since the species would have sufficient alternative vegetation for use, they were not considered for further analysis.

Table 3. State-Protected Species Occurring in Bexar County, Texas

Species Name	Listing Status*	Habitat Characteristics**	Occurrence in Project Area
BIRDS			
Black-capped vireo (<i>Vireo atricapilla</i>)	FE	Oak-juniper woodlands with distinctive patchy, two-layered aspect. Shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover.	None – Potential habitat for the black-capped vireo (as described by Campbell 2003) is not present within the Project Area.
American Peregrine Falcon (<i>Falco peregrinus anatum</i>)	FDL/ST	Migrates across Texas from northern breeding areas in United States and Canada to winter along coast and farther south; <i>F.p. anatum</i> occupies a wide range of habitats during migration.	Low – Project Area offers no breeding habitat or unique migratory habitat, but may be visited by this species during spring and fall migration.
Peregrine Falcon (<i>Falco peregrinus</i>)	FDL/ST	Migrates across Texas from northern breeding areas in United States and Canada to winter along coast and farther south; Because the subspecies are not easily distinguishable at a distance, reference is typically made only to the species level.	Low – Project Area offers no breeding habitat or unique migratory habitat, but may be visited by this species during spring and fall migration.
White-faced Ibis (<i>Plegadis chihi</i>)	ST	Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	None – Project Area lacks appropriate aquatic habitat.
Wood Stork (<i>Mycteria americana</i>)	ST	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with	None – Project Area lacks appropriate aquatic habitat.

Species Name	Listing Status*	Habitat Characteristics**	Occurrence in Project Area
		forested areas; formerly nested in Texas, but no breeding records since 1960.	
Zone-tailed hawk (<i>Buteo albonotatus</i>)	ST	Open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers.	Low – Project provides foraging habitat but is outside of typical year-round or breeding locales.
AMPHIBIANS			
Cascade Caverns salamander (<i>Eurycea latitans complex</i>)	ST	Springs and caves in Medina River, Guadalupe River, and Cibolo Creek watersheds within Edwards Aquifer area.	None – Suitable aquatic habitat is not present for this species. The Project Area does not include any springs associated with the Edwards Aquifer.
Comal blind salamander (<i>Eurycea tridentifera</i>)	ST	Found in springs and waters of caves.	None – Suitable aquatic habitat is not present for this species.
AQUATIC INVERTEBRATES			
False spike mussel (<i>Quadrula mitchelli</i>)	ST	Probably medium to large rivers; substrates varying through mixtures of sand, gravel and cobble.	None – Suitable aquatic habitat is not present for this species.
FISH			
Toothless blindcat (<i>Trogloglanis pattersoni</i>)	ST	Blind catfish endemic to the San Antonio Pool of the Edward's Aquifer.	None – Suitable aquatic habitat is not present for this species. The Project Area does not include any springs associated with the Edwards Aquifer.
Widemouth blindcat (<i>Satan eurystomus</i>)	ST	Blind catfish endemic to the San Antonio Pool of the Edward's Aquifer.	None – Suitable aquatic habitat is not present for this species. The Project Area does not include any springs associated with the Edwards Aquifer.
MAMMALS			
Black bear (<i>Ursus americanus</i>)	ST	Bottomland hardwoods and large tracts of inaccessible forested areas.	None – Louisiana black bear is not known to be found in Texas and two other subspecies are found in West Texas (TPWD 2016c).
REPTILES			
Texas horned lizard (<i>Phrynosoma cornutum</i>)	ST	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees.	Low – Limited suitable open brush habitat is available in the Project Area and soil types are not conducive to species needs.
Texas indigo snake (<i>Drymarchon melanurus erebennus</i>)	ST	Texas south of the Guadalupe River and Balcones Escarpment; thornbush-chaparral woodlands of south Texas, in particular dense riparian corridors; can do well in suburban and irrigated croplands if not molested or	None – The range of this species is not believed to extend into northern Bexar County.

Species Name	Listing Status*	Habitat Characteristics**	Occurrence in Project Area
		indirectly poisoned; requires moist microhabitats, such as rodent burrows, for shelter.	
Texas tortoise (<i>Gopherus berlandieri</i>)	ST	Open brush with a grass understory and sandy, well-draining soils is preferred; open grass and bare ground are avoided; when inactive occupies shallow depressions at base of bush or cactus, sometimes in underground burrows or under objects.	Low – Limited suitable open brush habitat is available in the Project Area and soil types are not conducive to species needs.
Timber rattlesnake (<i>Crotalus horridus</i>)	ST	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto.	Low – Limited suitable riparian habitat is available in the Project Area and Covered Activities would avoid development in floodplains.

* FDL= Federally Delisted; SE = State Endangered; ST = State Threatened

** TPWD 2016a

3.3.13. Public Health and Safety

Neither the authorization of incidental take of GCWA, nor the implementation of the HCP is expected to affect public health and safety, since all development would be constructed in accordance with all applicable local, state, and federal regulations. Therefore, public health and safety issues are not considered for further analysis.

3.3.14. Socioeconomics

Neither the authorization of incidental take of GCWA, nor the implementation of the HCP is expected to affect socioeconomic conditions. The Project Area lies within Bexar County, which had a total population of 1,897,710 as of 2016 (Bexar County 2016a). Area population is projected to experience a slight increase (2 percent) over the next five years (from 2016 to 2021). The county’s top economic industries by employment include healthcare and social assistance, retail, and accommodation and food service (Bexar County 2016b). The Proposed Project could provide county tax revenue as well as potential employment and income for some residents hired during development. However, since the Proposed Project—and any associated socioeconomic benefits—could occur with or without issuance of an ITP, the issue was not considered for further analysis.

3.3.15. Visual and Aesthetic Resources

Neither the authorization of incidental take of GCWA, nor the implementation of the HCP is expected to affect visual and aesthetic resources, since the Project Area is adjacent to suburban development in a rapidly developing region of Bexar County. Adjacent development includes the existing Dr. John M. Folks Middle School at the Project Area’s southeastern boundary, plus new residential development

(Silver Canyon by Centex) along the Project Area’s eastern boundary. Any alternative for the Proposed Project that would involve the construction of residences and supporting infrastructure would be visible on the landscape. However, views of the local landscape that could be affected (i.e., woodland, grassland, or shrub/scrub habitat) are prevalent in the adjacent undeveloped GCSNA. Surrounding existing low-density residential land uses are also expected to be compatible with additional new residential development. Therefore, this resource was not considered for detailed analysis.

4. ENVIRONMENTAL CONSEQUENCES

4.1. Analysis Framework

The scope of a NEPA analysis associated with an ITP addresses the direct, indirect, and cumulative effects of the “incidental take resulting from the Covered Activities and the impacts of the plan’s conservation program” (Service and NMFS 2016). In this case, the proposed incidental take involves the removal or alteration of vegetation used by the GCWA and the conservation measures employed to avoid, minimize, and offset impacts to GCWA.

An *effect* is defined by NEPA regulations as either a direct result of an action that occurs at the same time and place as the action or is an indirect result of an action that occurs later in time or in a different place and is reasonably foreseeable (40 CFR 1508.8). *Cumulative effects* are the incremental environmental impact or effect of the action considered together with impacts of past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (40 CFR 1508.7). The purpose of an EA is to determine whether the proposed action has significant effects on the quality of the human environment. The potential significance of an effect should be considered in the context of the effect and the relative magnitude or intensity of the effect.

It is important to keep in mind that NEPA regulations require the analysis of “no action” as a benchmark that enables decision makers to assess the relative magnitude of environmental effects of the action alternatives (Service 2003). If no difference is anticipated for the future condition under the No Action Alternative and the action alternatives, then the action may be said to have no effect.

4.2. Reasonably Foreseeable Projects

The Proposed Federal Action is issuance of an ITP under section 10(a) of the ESA that would authorize take of the GCWA associated with the direct or indirect modification of up to 652.1 acres of potential habitat over a period of 30 years. This EA also examines other likely trends and “reasonably foreseeable” projects that could, along with the Proposed Federal Action, cumulatively result in effects to area resources.

SWCA reviewed a variety of city and county planning documents for potential future projects. Table 4 provides a list of reasonably foreseeable transportation actions within or adjacent to the Project Area. This list demonstrates some of the types of transportation-related activities predicted to occur during the ITP in the vicinity of the Project Area. In addition, the Far West Subarea System Plan more generally recognizes a need for additional neighborhood and community parks in the region (City of San Antonio 2006) and the City of San Antonio’s SA Tomorrow Comprehensive Plan also identifies the Texas State Highway 151/Loop 1604 area as an important regional center for future focused commercial and residential growth, as well as improved transit services (City of San Antonio 2015). Future land use in the Project Area is classified as predominately “suburban,” consisting of neighborhood residential and commercial uses (City of San Antonio 2011).

Table 4. List of Reasonably Foreseeable Transportation Projects

Project	Description
Farm-to-Market Road (FM) 1560	Expand from two to four lanes with raised medians, or center turn lane, bike lanes and sidewalks.
Alamo Ranch Parkway Traffic Signals	Project involves the study, design and construction of traffic signals at four intersections.
FM 471 (Culebra Road)	The construction will complete the capacity gap that currently exists on FM 471 from FM 1560 to Old FM 471. The proposed improvements will widen Culebra Road from its existing two-lane configuration to a four-lane divided roadway with anticipated bicycle and pedestrian amenities.
Old FM 471 and Talley Road	Roadway expansion from two lanes to three lanes with curbs, sidewalks and drainage improvements due to new schools and development in the area.
Galm Road Phase III	Galm Road is currently a two-lane Roadway and will be reconstructed to include four 12-foot travel lanes, turn lanes, curb and gutter, drainage improvements, a 6-foot sidewalk, and 5-foot bike lanes.

4.3. Summary of Potential Impacts

A brief summary of the potential direct and indirect environmental consequences of the alternative actions is provided in Table 5. More complete descriptions of potential environmental effects are included in the following sections.

Table 5. Summary of the Potential Environmental Consequences

Resource	Alternative A (No Action Alternative)	Alternative B (Preferred Alternative)
Vegetation Communities	Clearing of vegetation in non-GCWA habitat during construction could result in direct effects. Potential indirect project-related increases in fugitive dust; sedimentation; offsite pollution; introduction of exotic species; and spread of oak wilt could occur (see Section 4.4.1).	Similar construction impacts as Alternative A, but across a larger area. Negligible benefits through permanent conservation of GCWA habitat.
Wildlife Communities	Clearing of acreage in non-GCWA habitat could impact wildlife habitat during construction (direct effects). Indirect project-related increases in noise, human activity, and traffic could occur (see Section 4.4.2).	
Golden-cheeked warbler (<i>Setophaga chrysoparia</i>)	No effect to suitable GCWAs or their habitat (see Section 4.4.3).	Direct or indirect modification of up to 652.1 acres of potential GCWA habitat (see Section 4.4.3). Permanent conservation of GCWA habitat through purchase of up to 1,176.7 GCWA credits.

4.4. Effects Analysis

4.4.1. Vegetation Communities

4.4.1.1. ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, the Service would not issue the requested ITP and the Permittee could either elect not to proceed with development of Davis Ranch or develop without issuance of an ITP or an HCP in those areas not designated as GCWA habitat, or within 300 feet of occupied GCWA habitat. If no development occurred, there would be no Project-related effects to vegetation communities. If the Permittee chooses to develop without issuance of an ITP or an HCP, then that development in the non-

GCWA habitat would result in the clearing of vegetation due to the construction of homes and other buildings, roads, utilities, storm and water quality controls, and related infrastructure, but would be negligible.

Potential indirect impacts to vegetation present adjacent to construction areas could include the accumulation of fugitive dust on vegetation, thereby temporarily reducing primary production; sedimentation of downstream plant communities as a result of soil erosion; offsite pollution of adjacent plant communities as a result of runoff carrying oil and grease from heavy equipment; introduction of exotic species through equipment and human activity; and spread of oak wilt. However, the Permittee could minimize these impacts through use of best management practices such as:

- Installation/maintenance of erosion and sedimentation controls in accordance with local and state regulations and industry best practices.
- Implementation of the TFS or professional arborist's guidelines for the prevention of oak wilt (TFS 2015).

Under the No Action Alternative, vegetation communities would not be preserved permanently off-site.

4.4.1.2. ALTERNATIVE B (PREFERRED ALTERNATIVE)

Alternative B (Preferred Alternative) would result in the removal of up to 723 acres of vegetation during development. Potential adverse impacts to vegetation communities would likely be minor over the long-term since these vegetation types are prevalent within the local area.

Proposed minimization measures and mitigation to offset GCWA impacts could also provide negligible beneficial vegetation effects by taking steps to prevent the spread of oak wilt and contributing to the permanent protection and management of GCWA suitable habitat within the region. Alternative B would prohibit future development and land use conversions and maintain protected vegetation communities over the long-term. Therefore, although the intent of the proposed mitigation is to protect GCWAs, vegetation communities associated with mitigation lands would also experience an incidental benefit.

4.4.1.3. CUMULATIVE EFFECTS

The USGS has assigned the Project Area to the 25,809-acre Hydrologic Unit Code-12 subwatershed that overlaps the Project Area (Upper Culebra Creek). Land uses within this cumulative Project Area are similar to the Proposed Project, consisting largely of low-density residential homes and recreation associated with the undeveloped GCSNA.

The predominant cumulative impacts to vegetation resources would be the removal of vegetation from implementation of the Proposed Project combined with unrelated past, present, and reasonably foreseeable future activities. Potential reasonably foreseeable trends in the Project Area include additional residential and commercial development, as well as road maintenance and construction activity. These activities have not been quantified, but are expected to result in increased vegetation clearing based on historic land cover trends. From 2001 to 2011, land cover in the cumulative Project Area (based on NLCD data) has trended towards increased developed lands and decreased vegetation cover types as a result of ongoing land uses (Table 6).

Table 6. Change in land cover within the cumulative Project Area from 2001 to 2011

NLCD Land Cover Type*	2001 Acres	2011 Acres	Change in Total Watershed Land Cover Composition**
Developed, Open Space	1,003	1,646	2.49%
Developed, Low Intensity	224	1,203	3.79%
Developed, Medium Intensity	47	1,070	3.96%
Developed High Intensity	31	309	1.08%
Deciduous Forest	2,625	1,923	-2.72%
Evergreen Forest	13,387	12,609	-3.01%
Shrub/Scrub	3,083	2,707	-1.46%
Grassland/Herbaceous	4,768	3,513	-4.86%
Cultivated Crops	592	672	0.31%
Woody Wetlands	37	31	-0.02%

Source: Homer et al. 2015

* Excludes open water and barren land due to lack of vegetation

** Calculated as the difference in individual land cover types as a percentage of the Upper Culebra Creek watershed between 2001 and 2011.

Long-term, the Proposed Project would add 723 acres of vegetation removal to past, present, and reasonably foreseeable disturbance, which represents <3 percent of the total vegetation in the cumulative Project Area. These Project effects would cumulatively contribute to changes in the abundance and distribution of vegetation communities, when considered in conjunction with other reasonably foreseeable trends, but would represent small acreages of affected vegetation relative to the total watershed. Protection of GWCA habitat through permanent conservation under Alternative B would provide a negligible cumulative benefit to vegetation by preserving current vegetation communities and preventing further development on conservation lands.

4.4.2. General Wildlife

4.4.2.1. ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, the Permittee would either elect to not proceed with construction of the Project or to construct and operate the Proposed Project without issuance of an ITP or an HCP. If no construction occurred, there would be no Project-related effects to wildlife, although wildlife habitat and individual species could still be impacted by human activity or vehicle traffic along existing ranch roads.

Potential wildlife impacts if the Permittee chooses to construct within the Plan Area but outside of, and 300 feet away from, occupied GCWA habitat, displacement of wildlife species could occur. This displacement could lead to reduced physical condition and health of affected individuals (Adams and Geis 1981), but would not affect the long-term viability of local populations because of the high proportion of similar, alternative habitat that occurs in the surrounding area.

Proposed Project development could, in addition to the previously discussed direct habitat changes, increase potential for collisions causing wildlife injury or mortality. Vehicle and equipment operation could result in mortality of smaller-bodied or slow-moving species—such as rodents, reptiles or amphibians—taking shelter in an area cleared or excavated or in the path of moving vehicles. Impacts to

these species would be considered minor or negligible as the impacts would be localized and would not affect the species on a broader population landscape level.

Proposed Project-induced increases in human activity (e.g., increased noise and movement) could also result in wildlife displacement or altered behavior during construction. Wildlife can be negatively impacted by human-produced noise, including changes in vigor and productivity, especially if disturbed during critical times of year such as breeding and wintering (Knight and Cole 1995, Gabrielsen and Smith 1995). Project construction activity would include the use of heavy equipment and vehicle traffic, which produce a typical range of sound from 55–85 dBA at 50 feet from the noise source.

Since the Project Area and surrounding land is rural to suburban in nature with moderately low ambient noise levels, the No Action Alternative could increase current noise levels by up to 50 dBA during construction. However, this noise would be produced sporadically and temporarily, and all noise sources would only impact species that are in the range (0.25 to 0.5 mile) of the produced sound. Due to the high proportion of similar habitat that occurs in the surrounding landscape, many species displaced due to human noise and activity would likely be able to use equivalent suitable habitat available on adjacent lands.

Indirect wildlife habitat impacts from pollutants such as oil and grease originating from machinery and construction-related activities; fugitive dust; proliferation of exotic plant species, and sedimentation could all occur during Covered Activities. However, these impacts would be minimized by the implementation of spill prevention and control methods, proper inspection and maintenance of equipment, and proper runoff and erosion control measures, as required by other applicable laws and ordinances.

Under the No Action Alternative, wildlife communities that thrive within GCWA-preferred habitat conditions would benefit indirectly from the permanent conservation of mitigation lands. Because the majority of the Plan Area is GCWA habitat, sufficient alternative habitat would remain functional to maintain the viability of existing wildlife populations, thus the No Action Alternative would have negligible effects on wildlife species.

4.4.2.2. ALTERNATIVE B (PREFERRED ALTERNATIVE)

Alternative B (Preferred Alternative) would result in similar construction impacts to wildlife as described for the No Action Alternative, but would be on a slightly larger scale, which would result in minor localized impacts to wildlife species. Some species could gain additional indirect benefits associated with conservation efforts. Contributing to the perpetual protection and management of GCWA habitat would preserve and manage vegetation capable of providing shelter, breeding, and foraging habitat for a variety of wildlife species. Although the mitigation measure only seeks to offset take of GCWAs, other wildlife species present in the same location would also be protected from future development and habitat loss.

4.4.2.3. CUMULATIVE EFFECTS

The predominant cumulative impacts to wildlife resources in the local area would be the removal of habitat from implementation of the proposed Project combined with unrelated past, present, and reasonably foreseeable future activities. Potential reasonably foreseeable trends in the Project Area include additional residential and commercial development, as well as road maintenance and construction activity. These activities have not been quantified, but are expected to result in increased wildlife habitat clearing based on historic land cover trends. From 2001 to 2011, land cover in the cumulative Project Area (based on NLCD data) has trended towards increased developed lands and decreased vegetation cover types as a result on ongoing land uses.

Long-term, the Proposed Project would add up to 723 acres of wildlife habitat removal to past, present, and reasonably foreseeable disturbance, which represents <3 percent of the total habitat in the cumulative Project Area. These Project effects would cumulatively contribute to changes in the abundance and distribution of wildlife habitat, when considered in conjunction with other reasonably foreseeable trends, but would represent only small acreages of affected vegetation relative to the local area. Protection of GCWA habitat through permanent conservation under Alternative B would provide a negligible cumulative benefit to wildlife by preserving current habitat and preventing further development on conservation lands.

4.4.3. Golden-cheeked Warbler

4.4.3.1. ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, the Permittee would either elect not to proceed with construction of the Proposed Project or to construct and operate the Proposed Project without issuance of an ITP or an HCP. If no construction occurred, there would be no Project-related effects to GCWA, although individual species could still be impacted by human activity or vehicle traffic along existing ranch roads.

If construction occurs, selective clearing and/or modification of vegetation from the Project Area would occur. However, the Service assumes that the Permittee would comply with the ESA and avoid impacts to the GCWA by avoiding development within 300 feet of potentially suitable GCWA habitat; therefore, there would be no effect to the species under this alternative.

4.4.3.2. ALTERNATIVE B (PREFERRED ALTERNATIVE)

Given the circumstances of the Proposed Project and the ecology of the GCWA, it is not possible to precisely estimate the number of individual GCWAs that could be taken as a result of the Covered Activities under Alternative B (Preferred Alternative). However, up to 652.1 acres of potential mapped GCWA habitat would be directly or indirectly modified by development, which comprises approximately 0.02 percent of the approximately 2,778,207 acres of seasonally occupied GCWA habitat across the breeding range (Morrison *et al.* 2010).

Removal or alteration of GCWA habitat is not expected to result in death or injury of viable eggs, nestlings, or recently fledged juveniles, since activities will only occur March 1 and July 31 when the GCWA are either not here or are fully fledged from their nests (Pulich 1976, Kroll 1980). Additionally, mobile adults and juveniles would likely be able to flee from disturbance and avoid physical encounters with machinery or falling trees that could directly kill or wound them.

The direct and indirect modification of up to 652.1 acres of GCWA habitat could displace returning GCWAs from their former territories, resulting in potential for decreased fitness or reproductive output of the displaced individual and other individuals using habitats that receive displaced GCWAs. Similar outcomes are also possible for GCWAs that are forced to adjust territory boundaries to address reduced habitat area or quality.

Covered Activities could result in minor long-term effects from habitat fragmentation leading to habitat patch sizes below the thresholds where continued breeding, feeding, or sheltering activity is likely. Habitat occupancy and reproductive success for GCWAs appear to be associated with a minimum habitat patch size (Arnold *et al.* 1996, Butcher *et al.* 2010, Campomizzi *et al.* 2012). Therefore, fragmentation could lead to reduced occupancy or reproductive success. Fragmentation could also increase the species' exposure to potential edge effects. Researchers (e.g., Coldren 1998) have documented that conditions at the edge of GCWA habitat patches could influence the occupancy, territory distribution, territory size,

pairing success, and reproductive success of the species. The density of forest edge within 330 feet of a GCWA nest has also been shown to influence nest survival, such that nest survival was higher in areas with less forest edge (Peak 2007, Reidy *et al.* 2009). Increased edge effect could also potentially decrease food availability and increase nest predation (particularly by snakes and birds, such as crows and jays). However, not all studies have found a relationship between GCWA habitat patch size and parasitism, predation, or prey biomass (Butcher *et al.* 2010, Reidy *et al.* 2008).

To offset potential GCWA take, under Alternative B (Preferred Alternative) the Permittee would implement all minimization measures described in the HCP (SWCA 2018). The Permittee would also provide permanent conservation for the GCWA through the purchase of credits in a Service-approved conservation bank or, if preferred by the Permittee, participation in the SEP HCP. Assuming the entire Project Area is eventually developed, the provided mitigation would support the perpetual protection of 1,176.7 acres of GCWA habitat, which represents nearly double the total acreage expected to be impacted by the Covered Activities. The Service has assumed that these actions would result in a long-term net conservation benefit to the species and offset authorized take.

4.4.3.3. CUMULATIVE EFFECTS

The Project Area falls within the mapped, multi-county GCWA Recovery Region 6, which, in part due to its large size, contains highly varied land uses ranging from low-density residential homes and rural lands used for private farming, hunting, and ranching purposes to high-density residential and commercial development. GCWA habitat estimates for Recovery Region 6 ranged from 389,436 (Morrison *et al.* 2010) to 575,944 (Duarte *et al.* 2013) acres. Project Area habitat modification (652.1 acres) within Recovery Region 6 is estimated to affect 0.11 to 0.17 percent of the habitat available. On a more local scale, approximately 64,467 acres of GCWA habitat is mapped within 10 miles of the Project Area. Project Area GCWA habitat modification would account for 1.01 percent of available local habitat. Detailed acreage impact analysis with regards to affected habitat acreage and estimated GCWA territories is discussed in section 6.4 of the HCP.

The predominant cumulative impacts to GCWAs would be the removal or disturbance of suitable habitat from implementation of the Proposed Project combined with unrelated past, present, and reasonably foreseeable future activities. Potential reasonably foreseeable trends in the Project Area include additional residential and commercial development, as well as road maintenance and construction activity. These activities have not been quantified, but are expected to result in increased vegetation clearing based on historic land cover trends. From 2001 to 2011, land cover in the vegetation and wildlife cumulative Project Area (based on NLCD data) has trended towards increased developed lands and decreased vegetation cover types as a result on ongoing land uses.

Construction of the Proposed Project would cumulatively contribute to changes in the abundance and distribution of GCWA habitat, when considered in conjunction with other reasonably foreseeable trends, but would only represent small acreages of affected habitat relative to the larger landscape. Displaced GCWAs would also have the potential to re-fill vacated territories or unoccupied habitat within the adjacent GCSNA, but at an energy cost and potentially delayed reproduction. Accordingly, construction of the Proposed Project and subsequent residential use is not expected to preclude recovery of the species. Protection of GWCA habitat through permanent conservation under Alternative B would provide a negligible cumulative benefit to the species by preserving current habitat and preventing further development on conservation lands.

5. AGENCY CONSULTATION AND LIST OF PREPARERS

5.1. Agency Consultation

Agencies consulted during the preparation of this EA were as follows:

- Texas Parks and Wildlife Department
- U.S. Fish and Wildlife Service

5.2. List of Preparers

Table 7 provides a list of Service and consultant staff involved in the preparation of this EA.

Table 7. List of Preparers

Agency or Entity	Name	Role
U.S. Fish and Wildlife Service (Service), Austin Ecological Services Field Office	Christina Williams	Service Biologist
Service, Austin Ecological Services Field Office	Tanya Sommer	Supervisory Service Biologist
SWCA Environmental Consultants (SWCA)	Jenna Cantwell	SWCA Project Manager
SWCA	Sue Wilmot	NEPA Writer
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