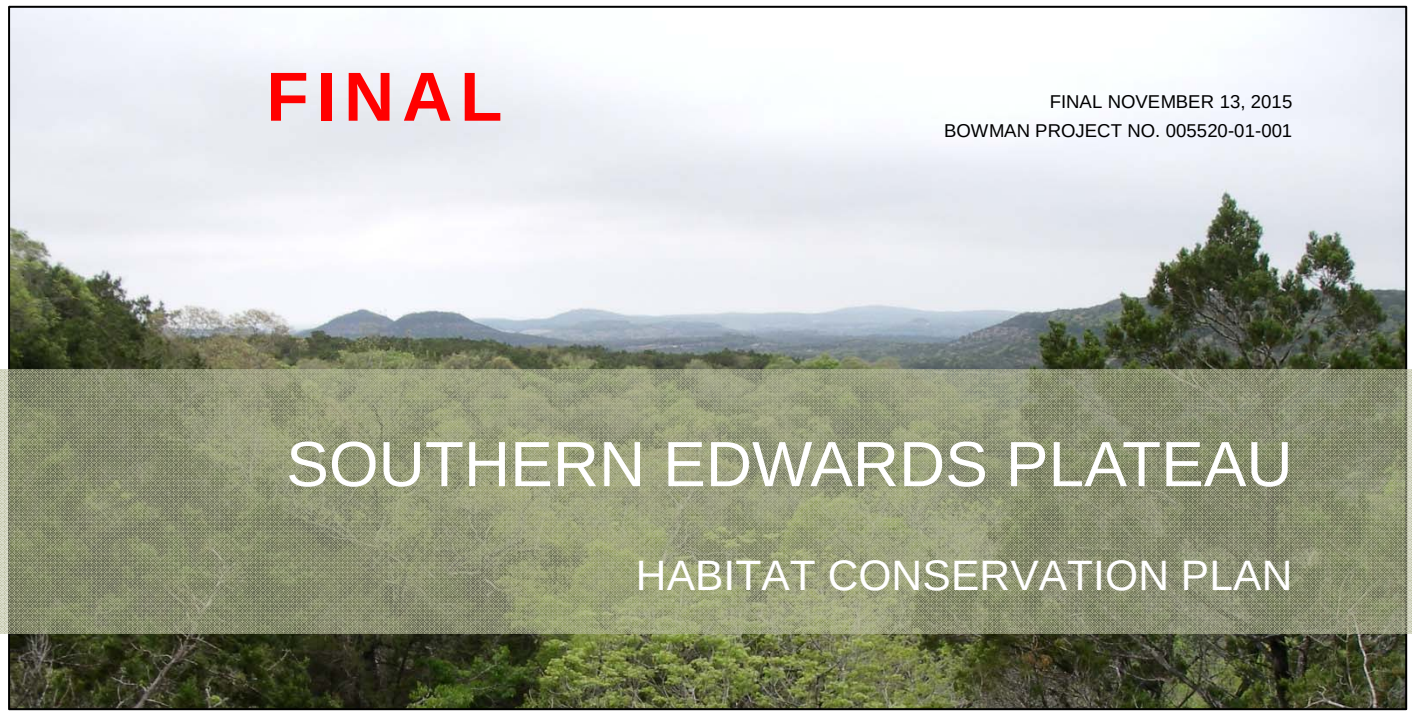

FINAL

FINAL NOVEMBER 13, 2015
BOWMAN PROJECT NO. 005520-01-001

SOUTHERN EDWARDS PLATEAU

HABITAT CONSERVATION PLAN

PREPARED FOR

COUNTY OF BEXAR

INFRASTRUCTURE SERVICES DEPARTMENT

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EXECUTIVE SUMMARY

WHAT IS THE SOUTHERN EDWARDS PLATEAU HABITAT CONSERVATION PLAN?

The Southern Edwards Plateau Habitat Conservation Plan ("SEP-HCP" or the "Plan") is a way for Bexar County and the City of San Antonio (the "Permittees") to assist with compliance of the Endangered Species Act. These compliance issues threaten the economic growth of the greater San Antonio region. The purposes of the SEP-HCP are to: (1) Promote regional conservation; (2) Provide support for Camp Bullis; (3) Involve local stakeholders in conservation planning; (4) Streamline endangered species permitting; (5) Implement locally appropriate and cost-effective permitting and conservation strategies; and (6) Leverage available resources.

Upon approval of the SEP-HCP by the U.S. Fish and Wildlife Service (the "Service"), a 30-year Incidental Take Permit (ITP) under section 10(a)(1)(B) of the Endangered Species Act ("ESA") would be issued. The Permit would authorize a limited amount of "incidental taking" of nine federally listed endangered species (the "Covered Species") within the jurisdictions of Bexar County and the City of San Antonio. In return, the SEP-HCP will promote the conservation of the Covered Species and related natural resources in Bexar County and other counties of the Southern Edwards Plateau. This 7-county region is the SEP-HCP "Plan Area."

WHAT SPECIES ARE ADDRESSED BY THE SEP-HCP?

The Covered Species include the following nine federally listed endangered species:

- Golden-cheeked Warbler[1] (*Setophaga chrysoparia*, "GCW")
- Black-capped Vireo (*Vireo atricapilla*, "BCV")
- Covered Karst Invertebrates:
    - Government Canyon Bat Cave Spider (*Neoleptoneta microps*)
    - Madla Cave Meshweaver (*Cicurina madla*)
    - Braken Cave Meshweaver (*Cicurina venii*)
    - Government Canyon Bat Cave Meshweaver (*Cicurina vespera*)
    - *Rhadine exilis* (a beetle with no common name)
    - *Rhadine infernalis* (a beetle with no common name)
    - Helotes Mold Beetle (*Batrisodes venyivi*)

HOW MUCH IMPACT TO THE COVERED SPECIES WOULD BE AUTHORIZED?

Future land use changes over the next 30 years, such as development or construction activities, are expected to cause the loss and/or degradation of habitat for the Covered Species. The SEP-HCP is designed to offset the impacts associated with up to 9,371 acres of GCW habitat loss, 2,640 acres of BCV habitat loss, and 21,086 acres of development activity over potential habitat for the Covered Karst Invertebrates (i.e., the level of requested incidental take authorization).

[1] The North American Checklist Committee of the American Ornithologist's Union (AOU) published a change to the scientific name of the GCW in the 52nd Supplement to the AOU Checklist of North American Birds (Chesser et al. 2011). The scientific name for the GCW was changed from *Dendroica chrysoparia* to *Setophaga chrysoparia*.

This level of incidental take authorization represents approximately 50 percent of the projected habitat losses for the GCW and BCV and approximately 20 percent of the projected impacts to potential habitat for the Covered Karst Invertebrates within Bexar County or the City of San Antonio for the next 30 years.

WHO MAY USE THE SEP-HCP?

Landowners, developers, Bexar County, the City of San Antonio, and others conducting non-federal activities within the jurisdictions of Bexar County or the City of San Antonio (excluding any portion of Comal County) may be eligible to achieve ESA compliance through the Plan. Those that complete the enrollment process become SEP-HCP "Participants." Participation in the SEP-HCP will be a completely voluntary process and other options for ESA compliance are available.

Potential Participants (or "Applicants") wishing to obtain ESA compliance through the SEP-HCP submit an application to the Permittees. The application requires the submittal of biological information pertaining to the Covered Species within, and to the extent reasonably available, adjacent to the Applicant's project area (the "Enrolled Property"). The SEP-HCP will apply a pre-determined set of impact and mitigation formulas to determine the fees needed to offset anticipated direct and indirect impacts to the Covered Species. Applicants that provide the assessed fees (or provide acceptable preserve land in lieu of fees), complete the enrollment process, and abide by the terms and conditions of their Participation Agreements may rely on the regulatory assurances provided by the SEP-HCP's ITP.

WHAT ARE THE MINIMIZATION AND MITIGATION REQUIREMENTS FOR THE GCW AND BCV?

- Direct Impacts are generally assumed to apply to all areas of GCW or BCV habitat within the boundaries of an Enrolled Property and will be assessed two acres of mitigation for each acre of impact (a 2:1 mitigation ratio) (see Section 3.2.3 for additional information).
- Indirect Impacts are generally assumed to apply to all areas of GCW or BCV habitat within 300 feet outside of the boundaries of an Enrolled Property and will be assessed one-half acre of mitigation for each acre of impact (a 0.5:1 mitigation ratio) (see Section 3.2.3 for additional information).
- Initial mitigation fee is anticipated to be $4,000 per acre of mitigation (i.e., $8,000 per acre of direct impact) or, under certain circumstances, may provide acceptable preserve land in lieu of fees. Fees are subject to change with appropriate notice by the Permittees.
- Enrolled Participants will also be required to comply with seasonal clearing and construction limitations and oak wilt prevention measures within their Enrolled Property.

WHAT ARE THE MINIMIZATION AND MITIGATION REQUIREMENTS FOR THE COVERED KARST INVERTEBRATES?

- Avoidance of occupied karst features by establishing a 750-ft no-disturbance buffer generally[2] around the feature entrance (approximately 40 acres; the "Occupied Cave Zone") until certain

[2] The Permittees will work with willing Participants in designing the Occupied Cave Zone to minimize impacts and maximize conservation of the karst feature(s).

Conservation Baselines are achieved. The Conservation Baselines are derived from the Service's recovery standards for downlisting each of the Covered Karst Invertebrates.

- The SEP-HCP will not offer karst Participation Agreements until the Permittees have secured some level of up-front mitigation for each of the Covered Karst Invertebrates (see Section 4.5.3 for more details). The level and type of mitigation obtained for each species will likely vary (see Section 7.0 for more detail). The Permittees will work with the Service in determining when the appropriate level of up-front mitigation has occurred.
- Avoidance of Service-designated Critical Habitat unless the Service determines, on a case-by-case basis, that Applicant activities will not adversely modify such habitat.
- If access to an Occupied Cave Zone is allowed, Applicants will be assessed a flat fee to conduct activities within the zone. Initial mitigation fee is anticipated to be as follows:
  - Occupied Cave Zone B (750 – 345 ft from entrance) = $40,000
  - Occupied Cave Zone A (345 – 0 ft from entrance) = $400,000
  - Applicants may also provide acceptable preserve land in lieu of fees
  - Fees are subject to change with appropriate notice by the Permittees.
- Within an Enrolled Property, impacts to Covered Species within karst features discovered during construction will be automatically covered for incidental take if certain procedures are followed. Participants will not be required to provide any additional mitigation or engage in any additional consultation with the Permittees or the Service.

WHAT CONSERVATION MEASURES WILL THE SEP-HCP IMPLEMENT?

The Permittees will use collected mitigation fees, available non-federal grants, and public funds to acquire lands or perpetual conservation easements on properties within the 7-county Plan Area that meet certain design criteria and help achieve the biological goals and objectives of the Plan. The acquisitions of these real property interests will only be from willing landowners that voluntarily agree to convey such interests. Conservation actions must be completed before a corresponding amount of participation can be allowed to occur through the Plan.

At full implementation, the SEP-HCP preserve system would include:

- A minimum of 23,430 acres of GCW preserve lands;
- A minimum of 6,600 acres of BCV preserve lands; and
- A minimum of 1,000 acres of preserve lands for the Covered Karst Invertebrates.

The SEP-HCP includes measures for adaptive management and monitoring of the preserve lands in perpetuity. The SEP-HCP also provides for research on the Covered Species and includes education and outreach programs. The SEP-HCP conservation program also seeks to improve the status of several other "Voluntarily Conserved Species" that may share similar habitats as the Covered Species.

HOW MUCH WILL THE SEP-HCP COST AND HOW WILL THESE COSTS BE COVERED?

The total estimated cost to implement the SEP-HCP over 30 years, assuming the Plan is fully implemented at an even rate and costs inflate by 3 percent per year, is approximately $299.5 million.

Approximately 57 percent of the costs are related to the purchase of the preserve system and another 38 percent of the costs are related to the management and monitoring of the preserve system (including the creation of a non-wasting management endowment).

Participation fees and other investment revenues are expected to cover approximately 74 percent of the total costs. Public revenue will be needed to fully fund the Plan and may total approximately $78.7 million over 30 years (or approximately $39.3 million from each of the Permittees). Overall, this level of public funding represents less than 3 percent of the projected annual property tax revenue generated by new development in portions of Bexar County and the City of San Antonio that are supported by the Plan.

The Permittees will also seek other sources of non-assured funding to help reduce public costs, such as grant funding or cost-sharing with other entities or programs with similar conservation goals.

HOW WILL THE SEP-HCP BE ADMINISTERED?

Bexar County and the City of San Antonio will be co-Permittees holding the ITP. The specific roles and responsibilities of each co-Permittee will be detailed by an Interlocal Agreement between Bexar County and the City of San Antonio. It is anticipated that Bexar County will be responsible for most of the tasks needed to implement the SEP-HCP, including enrolling new Participants, acquiring and managing the preserve system, and coordinating with the Service. Bexar County and the City of San Antonio are each expected to provide approximately 50 percent of the public funding needed to support the implementation of the Plan.

The Permittees may delegate aspects of SEP-HCP implementation to other entities. However, the Permittees will remain responsible for the proper implementation of all aspects of the SEP-HCP, as defined by the details of this HCP, the ITP, and their Interlocal Agreement.

The Permittees anticipate that they will convene two advisory committees to provide input and recommendations on the implementation of the SEP-HCP: a scientific advisory committee and a stakeholder advisory committee. Public input may also be received via other special public meetings or hearings called by the Permittees.

The SEP-HCP includes a number of reporting and coordination tasks to demonstrate that the Plan is being properly implemented. Annual reports on Plan enrollment, the preserve system, implementation of other conservation measures, financial status, and compliance issues will be submitted to the Service. Regular coordination with the Service regarding the enrollment of new participants, new preserve acquisitions, adaptive preserve management, and secondary uses of preserve lands is also expected.

WHAT ARE THE EXPECTED BENEFITS OF THE SEP-HCP?

The SEP-HCP would streamline the process of ESA compliance by:

- Setting standards for the level of effort needed to assess project impacts;
- Establishing pre-determined mitigation ratios and fee structures to offset impacts;
- Providing a consistent and uniform process to offset impacts, as an alternative to individual efforts; and

- Shortening the time needed for review and approval of applications from months or years to a period of weeks.

Streamlining compliance with the ESA is expected to reduce the time and cost associated with complying with an existing federal environmental regulation that can present a significant hurdle to otherwise lawful land uses. By helping projects to come to market faster and with less procedural cost, the SEP-HCP would support environmentally responsible economic development in Bexar County and the greater San Antonio area.

The SEP-HCP also provides for the coordinated conservation of the area's important natural resources at a scale that helps secure the status of endangered species and contributes significantly to their ultimate recovery. Protecting endangered species habitat is an important component of the Camp Bullis Joint Land Use Study, and much of this habitat occurs over areas within the recharge and contributing zones of the Edwards Aquifer and would contribute to aquifer protection. Conserving these natural resources helps protect the region's economy now and for future generations.

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- Golden-cheeked Warbler
- Black-capped Vireo
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- Golden-cheeked Warbler
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Appendix F. Illustrative Funding Plan Scenario.

[3] The information included in Appendices B through F was prepared during the research and planning stages of the SEP-HCP development process. The resource assessments in the appendices utilized the best available science and information available at the time of preparation (2011). Since that time, some information and resources used for the development of the SEP-HCP has been updated; however, the updated information does not materially change the fundamentals of the SEP-HCP. Therefore, the SEP-HCP and appendices were not updated, except for the Appendix F: Funding Plan to modify endowment start date to Year 1 instead of Year 11.

1.0 INTRODUCTION AND BACKGROUND[4]

The Southern Edwards Plateau Habitat Conservation Plan ("SEP-HCP" or the "Plan") is an effort by Bexar County, Texas and the City of San Antonio, Texas (the "Permittees") to address endangered species issues that threaten the economic growth of the region and to promote the conservation of endangered species and related natural resources.

The SEP-HCP is a Habitat Conservation Plan (HCP) that describes conservation actions that will benefit several federally listed endangered species within seven counties in south-central Texas. The SEP-HCP Plan Area, shown in Figure 1, includes Bexar County and several other counties of the Southern Edwards Plateau[5].

The SEP-HCP also creates a voluntary tool that non-federal entities acting within the jurisdictions of Bexar County or the City of San Antonio may use to achieve compliance with the federal Endangered Species Act ("ESA") for certain otherwise lawful land uses. The SEP-HCP addresses impacts to nine of the region's federally listed endangered species (the "Covered Species"). The Covered Species include the following:

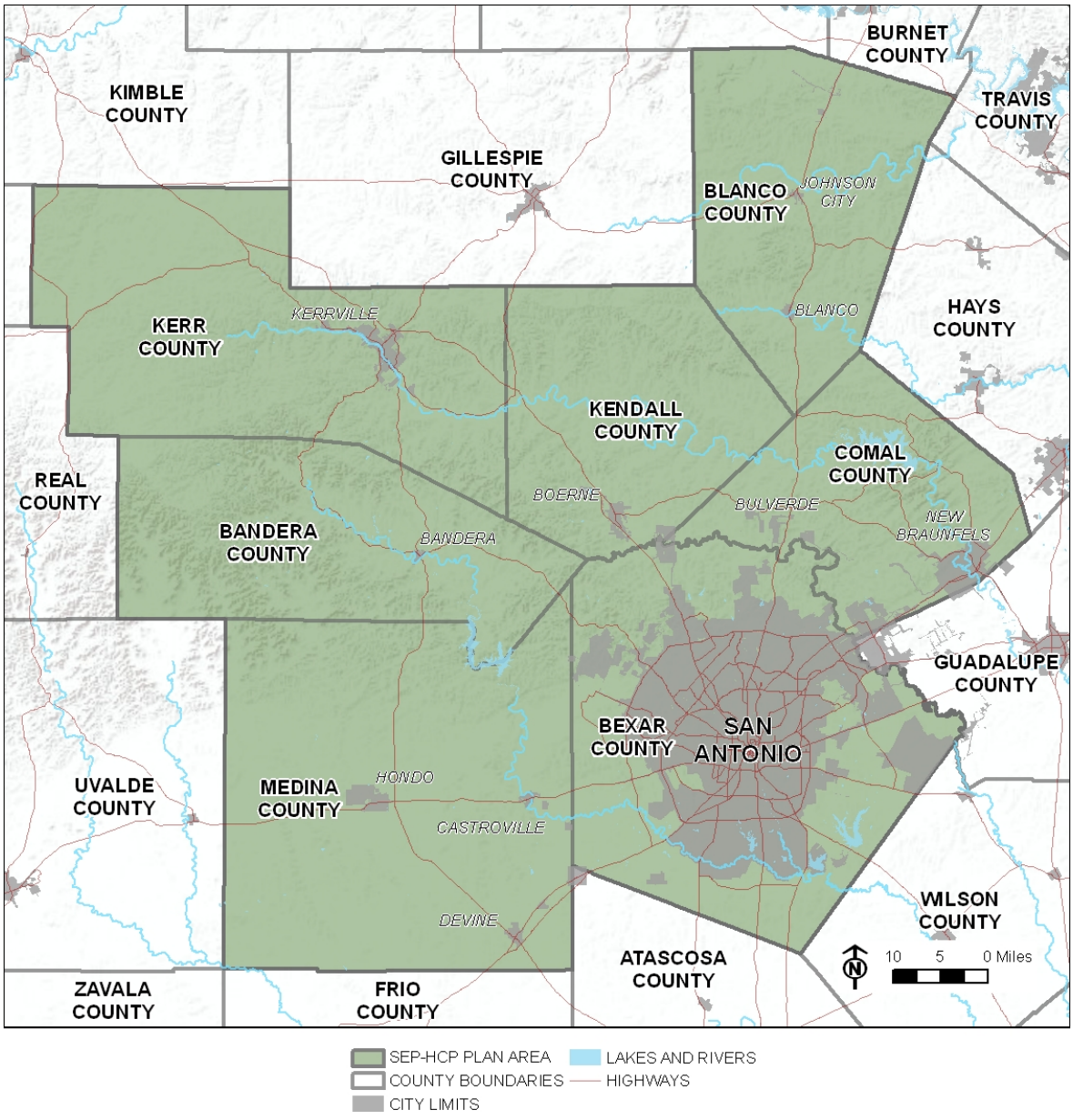
- Golden-cheeked Warbler (*Setophaga chrysoparia*[6], "GCW")
- Black-capped Vireo (*Vireo atricapilla*, "BCV")
- Karst Invertebrates:
    - Government Canyon Bat Cave Spider (*Neoleptoneta microps*)
    - Madla Cave Meshweaver (*Cicurina madla*)
    - Braken Cave Meshweaver (*Cicurina venii*)
    - Government Canyon Bat Cave Meshweaver (*Cicurina vespera*)
    - *Rhadine exilis* (a beetle with no common name)
    - *Rhadine infernalis* (a beetle with no common name)
    - Helotes Mold Beetle (*Batrisodes venyivi*)

[4] Definitions for capitalized terms, acronyms, and other terms or phrases with specific meaning in the context of Endangered Species Act compliance or the SEP-HCP are provided in Section 16 – Glossary of Terms.

[5] Wary of a potential extension of regulatory authority by the Permittees over land development in other jurisdictions, several of the Plan Area's other County Commissioners' Courts passed resolutions voicing concern about the SEP-HCP and requesting to be removed from the Plan Area. While the Permittees never proposed using regulatory authority to control land use activities in other jurisdictions or compel others to use the SEP-HCP, the Permittees limited the use of the Plan to the jurisdictions of Bexar County and the City of San Antonio (see Section 1.5.3 – State Law and Section 3.1 – Covered Activities). Inclusion of the seven counties in the Plan Area does not compel use of the SEP-HCP, but merely allows for the potential that a sufficient number of regionally significant and practicable conservation opportunities would be available to implement the Plan. All SEP-HCP preserve lands will be acquired only with the partnership of willing landowners. The Permittees are committed to respecting the property rights of every landowner and seek to create positive partnerships to achieve the goals and objectives of the SEP-HCP.

[6] The North American Checklist Committee of the American Ornithologist's Union (AOU) published a change to the scientific name of the GCW in the 52nd Supplement to the AOU Checklist of North American Birds (Chesser et al. 2011). The scientific name for the GCW was changed from *Dendroica chrysoparia* to *Setophaga chrysoparia*.

FIGURE 1. SEP-HCP Plan Area.



1.1 NEED AND PURPOSE FOR THE PLAN

The greater San Antonio area is positioned at the southeastern edge of the Edwards Plateau ecoregion in Texas. This ecoregion supports several federally threatened or endangered species that occupy a variety of habitats, including mature woodlands, early-growth shrublands, and subterranean caves. The natural resources of the Edwards Plateau have also been a significant attraction for human

communities. Over the past 30 years, the human population in and around San Antonio increased by more than 75 percent (U.S. Census Bureau (USCB) 1995, 2000, 2010). The vibrant economy of the San Antonio metropolitan area is expected to continue drawing people to the region, with a projected population increase of more than 60 percent over the next 30 years (ESRI Business Solutions (ESRI BIS) 2009, Wendell Davis and Associates (WDA) 2010a[7]).

Unfortunately, land development activities that accompany and support the expanding human population of the greater San Antonio area have caused the loss of habitats for federally threatened or endangered species at the southeastern edge of the Edwards Plateau. The U.S. Fish and Wildlife Service ("USFWS" or the "Service") identifies habitat loss and degradation as the primary factors threatening the survival and recovery of these species.

Under the ESA, otherwise lawful activities that may cause or result in the incidental "taking" of federally threatened or endangered species is prohibited. As defined by the ESA, "take" means "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)). Provided that the taking is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity," section 10(a)(1)(B) of the ESA (16 USC § 1539(a)(1)(B)), authorizes the Service to issue a permit allowing take of species. Non-federal entities may obtain such authorization from the Service by applying for an Incidental Take Permit (the "ITP" or "Permit") and implementing a HCP pursuant to section 10(a)(1)(B) of the ESA.

The process for obtaining an ITP from the Service is often lengthy and expensive, often discouraging people from seeking ESA compliance. Instead, many people elect to proceed with projects without proper coordination with the Service and risk enforcement actions that could delay completion of their projects and/or result in fines. Lack of coordination with the Service and poor compliance with the ESA has resulted in the loss or degradation of endangered species habitats without the benefits of the corresponding conservation measures that would otherwise be implemented as required by the ESA.

Low levels of ESA compliance over the past couple of decades means that only a few conservation actions have been implemented in the greater San Antonio area that specifically benefit the region's threatened or endangered species. While recent conservation initiatives sponsored by the City of San Antonio have protected tens of thousands of acres in the Plan Area from future development (i.e., the City's Edwards Aquifer Protection Program supported by local sales tax revenue), most of these actions did not specifically provide for the protection or management of endangered species habitats. Without specific habitat protections and on-going management, the conservation value of these lands may be limited for endangered species. The region's few conservation actions that have specifically targeted the protection and management of endangered species are relatively small and scattered. However, these efforts alone will not likely support the self-sustaining ecosystem processes that naturally maintain endangered species habitats within the next 30 years.

The U. S. Army identified encroaching land development and conflicts with endangered species as significant compatibility issues threatening the training mission at Camp Bullis. To identify solutions, the City of San Antonio and the military prepared the *Camp Bullis Joint Land Use Study* ("JLUS") with

[7] The information included in WDA (2010a) was prepared during the research and planning stages of the SEP-HCP development process. WDA used the best available information at the time of preparation (2011). Since that time, some information used for the development of the SEP-HCP has been updated; however, the updated information does not materially change the fundamentals of the SEP-HCP. Therefore, the SEP-HCP was not updated.

the input of local stakeholders to help ensure that economic growth is managed in a manner that allows the military installation to achieve its mission and remain a vital contributor to the region's economy. The JLUS recommended the implementation of a regional HCP (JLUS Strategy HAB-1b) to help alleviate endangered species-related compatibility issues (Matrix Design Group 2009).

Similarly, the State of Texas recognizes that endangered species issues can threaten local economies and formed the "Interagency Task Force on Economic Growth and Endangered Species." The Task Force is charged with providing policy and technical assistance regarding compliance with endangered species laws and regulations to local and regional governments and their communities so that compliance with endangered species laws and regulations is as effective and cost efficient as possible. The Task Force also identified HCPs as an innovative and important conservation tool for endangered species that can help alleviate potential conflicts with the economic growth of Texas communities (Interagency Task Force on Economic Growth and Endangered Species 2010).

The SEP-HCP is a regional, multi-species HCP whose overall purpose is to help resolve the region's endangered species issues by streamlining the process of ESA compliance, thereby increasing the overall level of compliance and providing significant conservation actions for endangered species that will contribute to their recovery. The Permittees and their advisory committees identified the following specific purposes for the SEP-HCP:

1. REGIONAL CONSERVATION: Design and implement a regional conservation program focusing on habitat protection for the Covered Species and that supports the conservation of other regionally important natural resources.
    a. Protect and manage habitats for the GCW, BCV, and other native species that depend on these habitats.
    b. Protect and manage endangered karst invertebrate habitat, surface and subsurface drainage basins, and surface vegetative communities for sensitive karst organisms.
    c. Contribute to recovery of the region's other threatened or endangered species.
    d. Contribute to the protection of other important ecosystem functions, such as water quality and quantity in the Edwards Aquifer system.
2. SUPPORT FOR CAMP BULLIS: Support the military training mission at Camp Bullis by helping to alleviate local and regional endangered species issues.
    a. Facilitate and promote ESA compliance on private lands in the vicinity of Camp Bullis.
    b. Prioritize opportunities to protect and manage endangered species habitats in the vicinity of Camp Bullis.
3. STAKEHOLDER INVOLVEMENT: Seek input from and achieve support from a wide spectrum of stakeholders during development and implementation of the SEP-HCP.
    a. Include a broad spectrum of stakeholder interests on advisory committees and teams.
    b. Convene advisory groups after permit issuance to provide feedback on plan implementation.

c. Enable and encourage formal, but flexible, partnerships with other jurisdictions to cooperate on Plan administration and implementation in regionally appropriate ways.

d. Share research results, monitoring data, and other planning information with the public to the extent practicable without compromising sensitive biological, personal, or property information.

4. STREAMLINE PERMITTING: Facilitate ESA compliance for non-federal entities by streamlining the process for obtaining an ITP.

   a. Establish a voluntary and regionally or locally administered option for obtaining incidental take authorization for projects that is clear, certain, timely, and cost-effective.

   b. Ensure that mitigation ratios and participation fees are based on sound biological rationale and are consistent with the level of impact to the species.

   c. Provide guidance to potential Plan Participants on avoiding or minimizing impacts to threatened or endangered species that may reduce mitigation obligations where practicable and appropriate.

5. LOCALLY APPROPRIATE AND COST-EFFECTIVE IMPLEMENTATION: Achieve regional conservation of threatened or endangered species using locally appropriate and cost-effective tools and approaches.

   a. Understand local community and landowner concerns regarding endangered species habitat protection and prioritize the use of compatible land protection tools.

   b. Seek voluntary, willing conservation partners for endangered species habitat protection and management.

   c. Provide opportunities to review progress and adapt the conservation program to changing needs and circumstances over time.

   d. Minimize administrative costs associated with Plan implementation through the use of efficient and effective practices.

6. LEVERAGE RESOURCES: Coordinate conservation planning for endangered species on a regional scale to take best advantage of available conservation opportunities.

   a. Pool available conservation resources from multiple sources, as available, to achieve biologically significant, regional conservation of endangered species.

   b. Leverage available conservation resources with other programs active in the region to maximize the benefits of past, present, and future conservation efforts or opportunities.

   c. Compliment other conservation efforts in the region (such as aquifer protection initiatives, scenic and cultural preservation, and parkland acquisition programs) and avoid competition with complementary programs for conservation resources.

The purposes of the Plan described above reflect the benefits that the Permittees and the stakeholder community expect to achieve as a result of implementing the SEP-HCP.

1.2 PROJECT HISTORY

Recognizing the need to address endangered species issues in the greater San Antonio region, Bexar County and the City of San Antonio jointly applied for a Habitat Conservation Planning Assistance grant in August 2008. These grants are made available by the Service to fund projects conserving threatened and endangered species through the Cooperative Endangered Species Conservation Fund authorized under Section 6 of the ESA. State wildlife agencies, such as the Texas Parks and Wildlife Department ("TPWD"), administer these grants by identifying suitable projects and tracking the status of funded projects.

The SEP-HCP grant application requested approximately $1.8 million in federal grant funds. The Service and TPWD awarded partial funding to the project in June 2009 in the amount of approximately $1.3 million. The grant required the commitment of local matching funds at 25 percent of the total project cost. Bexar County and the City of San Antonio signed an Interlocal Agreement in November 2009 to equally provide this local match at approximately $223,000 each. The grant funds were officially released to the project upon execution of an Interlocal Agreement between Bexar County and TPWD that was approved in December 2009.

The Interlocal Agreement between Bexar County and the City of San Antonio designates Bexar County as the lead agency developing the SEP-HCP. Accordingly, Bexar County retained a team of environmental, financial, real estate, and legal consultants to help prepare the Plan. Bexar County also convened two advisory groups to provide input on the direction and content of the SEP-HCP. The Citizen's Advisory Committee ("CAC") was composed of 21 individuals representing a variety of stakeholder groups, including rural landowners, conservation interests, business/real estate interests, and government/utility providers. The Biological Advisory Team ("BAT") provided guidance on scientific aspects of the Plan, and was composed of professional biologists with expertise ranging from species biology to general land management. An Agency Oversight Group ("AOG") was also created to facilitate coordination between the Permittees and the regulatory agencies. Project team members, advisory committee members, and committee charges are listed in Appendix A.

Preparation of the SEP-HCP began in earnest in December 2009 with the launch of the SEP-HCP website (www.sephcp.com) and the initial meetings of the advisory committees. A summary of committee deliberations and other SEP-HCP events are included in Appendix A. Bexar County released the first draft of the Plan in April 2011 for informal review and comment by the advisory committees, agencies, and the public. Bexar County and the Service sought input on the draft Plan and potential environmental impacts from the general public during meetings in June 2011 and again in February 2015.

Wary of a potential extension of regulatory authority by the Permittees over land development in other jurisdictions, several of the Plan Area's other County Commissioners' Courts passed resolutions voicing concern about the SEP-HCP and requesting to be removed from the Plan Area (see Appendix A for additional information). While the Permittees never proposed using regulatory authority to control land use activities in other jurisdictions or compel others to use the SEP-HCP, the Permittees limited the use of the Plan to the jurisdictions of Bexar County and the City of San Antonio (see Section 1.5.3 – State Law and Section 3.1 – Covered Activities). Inclusion of the seven counties in the Plan Area does not compel use of the SEP-HCP, but merely allows for the potential that a sufficient number of regionally significant and practicable conservation opportunities would be available to implement the Plan. All

SEP-HCP preserve lands will be acquired only with the partnership of willing landowners. The Permittees are committed to respecting the property rights of every landowner and seek to create positive partnerships to achieve the goals and objectives of the SEP-HCP.

1.3 NATURAL ENVIRONMENT[8]

The SEP-HCP addresses a Plan Area that includes seven south-central Texas counties. This Plan Area covers approximately 4,126,000 acres.

1.3.1 ECOLOGICAL REGIONS AND VEGETATION COMMUNITIES

The Plan Area crosses parts of six different ecological subregions, as described by the U.S. Environmental Protection Agency (Griffith et al. 2004). These six distinct ecological subregions include the following communities:

- **Balcones Canyonlands** – This ecological subregion represents approximately 54 percent of the Plan Area. The Balcones Canyonlands has rugged topography with steep-sided canyons formed by the erosion and solution of the underlying limestone bedrock by the numerous springs, streams, and rivers that flow above and below the surface. The Balcones Canyonlands supports a number of endemic plant and wildlife species that are not commonly found elsewhere on the Edwards Plateau. This is the region where most of the habitat for the Covered Species occurs.

- **Edwards Plateau Woodland** – The Edwards Plateau Woodlands represent the central part of the Edwards Plateau (and the northern part of the Plan Area). Edwards Plateau Woodland is characterized by a savanna of grasslands with scattered oak, juniper, and mesquite trees. Some woodlands or shrublands in this region provide habitat for the GCW or BCV.

- **Northern Blackland Prairie** – The Northern Blackland Prairie region represents the relatively flat southeastern end of the Plan Area. Habitat for the GCW and BCV generally does not occur in this area; although, some portions of this ecological subregion are underlain by karst geology.

- **Northern Nueces Alluvial Plains** – The Northern Nueces Alluvial Plains are part of the South Texas Plains ecoregion and occur at the southern edge of the Plan Area. Alluvial geology and deep soils support parkland vegetation dominated by mesquite and live oak. This region does not generally support habitat for the Covered Species.

- **Southern Post Oak Savanna** – The far southeastern edge of the Plan Area is included within the Southern Post Oak Savanna ecological subregion. This area is a mosaic of post oak savanna, improved pasture, and rangeland. This region does not support habitat for the Covered Species.

[8] The information included in the Natural Environment Section and Appendices B and C were prepared during the research and planning stages of the SEP-HCP development process. The resource assessments in the appendices utilized the best available science and information available at the time of preparation (2011). Since that time, some information and resources used for the development of the SEP-HCP has been updated; however, the updated information does not materially change the fundamentals of the SEP-HCP. Therefore, the SEP-HCP was not updated to reflect the more recent information.

- **Llano Uplift** – A very small area at the northern end of the Plan Area occurs within the Llano Uplift, which is unique because of its granite outcrops and acidic soils. This region may contain some areas of habitat for the GCW or BCV.

More information about the ecological regions within the Plan Area is included in the *General Vegetation Communities* assessment in Appendix B.

TPWD identified nearly 70 percent of the vegetation communities in the Plan Area as some combination of oak and juniper woodlands or parklands (McMahan et al. 1984). Similarly, the 2001 National Land Cover Dataset also mapped approximately 70 percent of the Plan Area as woodland or shrubland (Homer et al. 2004). Land cover changes during the 1990's indicate that the conversion of forest/woodland cover to another land cover type (most commonly grassland/shrub vegetation) was the most common land cover change in the Plan Area and resulted in a net loss of approximately 127,447 acres of forest cover (approximately 8 percent of the total) during that decade (U.S. Geological Survey (USGS) 2003). Urban land cover types increased by approximately 12 percent during the 1990's, and were mostly frequently created from areas that were previously forested (USGS 2003).

A detailed summary of the land cover changes in the Plan Area between 1992 and 2001 is included in the *General Vegetation Communities* assessment in Appendix B.

1.3.2 GEOLOGY AND AQUIFERS

The terrain of the Plan Area is highly variable as the Gulf Coastal Plains found at the southeast end of the Plan Area transition to the Blackland Prairie and the Edwards Plateau to the west. This transition occurs along the Balcones Escarpment (also called the Balcones Fault Zone), which is a major geologic feature of this region. The regions to the southeast of the Balcones Escarpment are characterized by rolling hills and subtle terrain that are characteristic of the weathering of younger, less-lithified rocks and unconsolidated sediments. Northwest of the Balcones Escarpment, the terrain and soils change dramatically as the topography transitions to the region known as the "Texas Hill Country", part of the Edwards Plateau ecological region. The Texas Hill Country is characterized by high topographic relief associated with incised valleys. Increased erosion associated with tectonic uplift has weathered away all but a few cap-rock sections of the younger limestone, leaving only the underlying older carbonate rocks.

The geology of the Plan Area includes Cretaceous-era limestones and Quaternary-era alluvial terrace deposits, including limestones of the Edwards Aquifer (i.e., the Edwards Group and Georgetown Formation) and the confining geological units above and below these primary water bearing formations. Other significant aquifer units in the SEP-HCP region include the Trinity Aquifer (consisting of older Cretaceous limestone primarily in the Glen Rose Formation) and to a lesser extent some usable groundwater is found in the Austin Chalk (mostly in rocks younger than the Edwards Group). In areas with significant surface water streams, alluvial terrace and associated sediments provide a thin cover over the limestone.

More information about the geology and aquifers of the Plan Area is attached in Appendix B (see the *Terrains, Soils and Geology* and *Groundwater and Aquifers* assessments).

1.3.3 SURFACE WATER RESOURCES

The Plan Area is crossed by several rivers including the Guadalupe River, Medina River, San Antonio River, and Pedernales River. Medina Lake and Canyon Lake are two major impoundments within the Plan Area created by man-made dams. These major water features, and the numerous streams, creeks, and springs that feed them, are valuable surface water resources for the Plan Area and support wildlife, riparian habitat, recreational uses, and scenic vistas. Several river and stream segments in the Plan Area are designated as "ecologically significant" under the Texas Water Code.

Additional detailed information about the river basins, waterways, dams and lakes, springs, general water quality, and use of the water resources within the Plan Area is included in the *Surface Water* assessment in Appendix B.

1.3.4 WILDLIFE COMMUNITIES

Wildlife communities associated with the ecological subregions of the Plan Area are as diverse as the ecological subregions themselves. Approximately 520 species of amphibians, reptiles, mammals, and birds make up the various wildlife communities within the Plan Area (Dixon 2000, Schmidly 1994, Lockwood and Freeman 2004). Wildlife communities within the Balcones Canyonlands subregion are the most diverse, with approximately 95 percent of the total wildlife species within the Plan Area occurring in this region.

The 2005 Texas Wildlife Action Plan prepared by TPWD identified 301 native wildlife species of conservation concern that may occur in the Edwards Plateau ecoregion (TPWD 2005). These lists identify species with low or declining populations that are important to the health and diversity of the State's wildlife resources. Many of these species of conservation concern would be expected to benefit from the conservation actions provided for by the SEP-HCP.

Additional information about the general wildlife communities within the Plan Area is included in the *General Wildlife Communities* assessment in Appendix B, with more detailed information for many of the individual species of conservation concern provided in the taxa-specific assessments included in Appendix B.

1.3.5 LISTED SPECIES

Several animal and plant species in the Plan Area are listed by the Service or by TPWD as threatened or endangered, or have been identified as candidates for such listing. These designated threatened, endangered, and candidate species are listed in Table 1.

Additional information about most of these listed species is provided in Appendix B for each species group. Detailed information about the biology of the SEP-HCP's Covered Species is included in Appendix C. Species addressed by the Plan are discussed further in Section 2.5 – Species Addressed by the Plan.

TABLE 1. Federal and State-Listed Threatened and Endangered Species within the Plan Area.

Common Name	Scientific Name	Federal Status[1]	State Status[1]	Counties of Potential Occurrence[2]	Species Addressed by the SEP-HCP[3]
AMPHIBIANS					
Cascade Caverns salamander	*Eurycea latitans complex*	P	T	Bexar, Bandera, Comal, Kendall, Kerr	VCS
Comal blind salamander	*Eurycea tridentifera*	P	T	Bexar, Comal, Kendall	VCS
San Marcos salamander	*Eurycea nana*	LT	T	Hays[2]	SNA / A
Texas blind salamander	*Eurycea rathbuni*	LE	E	Hays[2]	SNA / A
ARACHNIDS					
Bracken Bat Cave meshweaver	*Cicurina venii*	LE		Bexar	CS
Cokendolpher Cave harvestman	*Texella cokendolpheri*	LE		Bexar	SNA / A
Government Canyon Bat Cave meshweaver	*Cicurina vespera*	LE		Bexar	CS
Government Canyon Bat Cave spider	*Neoleptoneta microps*	LE		Bexar	CS
Madla Cave meshweaver	*Cicurina madla*	LE		Bexar	CS
Robber Baron Cave meshweaver	*Cicurina baronia*	LE		Bexar	SNA / A
BIRDS					
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T	Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	SNA / A
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL		Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	SNA / A
Bald Eagle	*Haliaeetus leucocephalus*	DL	T	Blanco, Comal, Kendall, Kerr	SNA / A
Black-capped Vireo	*Vireo atricapilla*	LE	E	Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	CS
Golden-cheeked Warbler	*Setophaga chrysoparia*	LE	E	Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	CS

TABLE 1. Federal and State-Listed Threatened and Endangered Species within the Plan Area.

Common Name	Scientific Name	Federal Status[1]	State Status[1]	Counties of Potential Occurrence[2]	Species Addressed by the SEP-HCP[3]
Interior Least Tern	*Sterna antillarum athalassos*	LE	E	Bexar, Bandera, Kendall, Kerr, Medina	SNA / A
Peregrine Falcon	*Falco peregrinus*	DL	T	Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	SNA / A
Sprague's Pipit	*Anthus spragueii*	C		Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	SNA / A
White-faced Ibis	*Plegadis chihi*		T	Bexar	SNA / A
Whooping Crane	*Grus americana*	LE	E	Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	SNA / A
Wood Stork	*Mycteria americana*		T	Bexar	SNA / A
Zone-tailed Hawk	*Buteo albonotatus*		T	Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	SNA / A
CRUSTACEANS					
Texas troglobitic water slater	*Lirceolus smithii*	P		Hays	SNA / A
Peck's Cave amphipod	*Stygobromus pecki*	LE	E	Comal	SNA / A
FISHES					
Fountain darter	*Etheostoma fonticola*	LE	E	Comal	SNA / A
San Marcos gambusia	*Gambusia georgei*	LE	E	Hays[2]	SNA / A
Toothless blindcat	*Trogloglanis pattersoni*		T	Bexar	SNA / A
Widemouth blindcat	*Satan eurystomus*		T	Bexar	SNA / A
INSECTS					
Comal Springs dryopid beetle	*Stygoparnus comalensis*	LE	E	Comal	SNA / A
Comal Springs riffle beetle	*Heterelimis comalensis*	LE	E	Comal	SNA / A
Edwards Aquifer diving beetle	*Haideoporus texanus*	P		Comal	SNA / A

TABLE 1. Federal and State-Listed Threatened and Endangered Species within the Plan Area.

Common Name	Scientific Name	Federal Status[1]	State Status[1]	Counties of Potential Occurrence[2]	Species Addressed by the SEP-HCP[3]
A ground beetle	*Rhadine exilis*	LE		Bexar	CS
A ground beetle	*Rhadine infernalis*	LE		Bexar	CS
Helotes mold beetle	*Batrisodes venyivi*	LE		Bexar	CS
MAMMALS					
Black bear	*Ursus americanus*	LT/SA	T	Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	SNA / A
Jaguarundi	*Herpailurus yaguarondi*	LE	E	Comal	SNA / A
Gray wolf	*Canis lupus*	LE	E	Bexar, Bandera, Blanco, Kendall, Kerr, Medina	SNA / A
Red wolf	*Canis rufus*	LE	E	Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	SNA / A
White-nosed coati	*Nasua narica*		T	Kerr	SNA / A
MOLLUSKS					
False spike mussel	*Quadrula mitchelli*		T	Bexar, Blanco, Comal, Kendall, Kerr	SNA / A
Golden orb	*Quadrula aurea*	C	T	Bexar, Bandera, Blanco, Comal, Kendall, Kerr	VCS
Smooth pimpleback	*Quadrula houstonensis*	C	T	Blanco	SNA / A
Texas fatmucket	*Lampsilis bracteata*	C	T	Bexar, Blanco, Comal, Kendall, Kerr	VCS
Texas fawnsfoot	*Truncilla macrodon*	C	T	Blanco	SNA / A
Texas pimpleback	*Quadrula petrina*	C	T	Bexar, Bandera, Blanco, Kendall, Kerr, Medina	VCS
REPTILES					
Cagle's map turtle	*Graptemys caglei*		T	Comal, Kendall, Kerr	VCS

TABLE 1. Federal and State-Listed Threatened and Endangered Species within the Plan Area.

Common Name	Scientific Name	Federal Status[1]	State Status[1]	Counties of Potential Occurrence[2]	Species Addressed by the SEP-HCP[3]
Texas horned lizard	*Phrynosoma cornutum*		T	Bexar, Bandera, Blanco, Comal, Kendall, Kerr, Medina	VCS
Texas indigo snake	*Drymarchon melanurus erebennus*		T	Bexar, Medina	VCS
Texas tortoise	*Gopherus berlandieri*		T	Bexar, Medina	VCS
Timber/Canebrake rattlesnake	*Crotalus horridus*		T	Bexar	SNA / A
PLANTS					
Tobusch fishhook cactus	*Sclerocactus brevihamatus ssp tobuschii*	LE	E	Bandera, Kerr	VCS
Texas wild rice	*Zizania texana*	LE	E	Hays[2]	SNA / A
Bracted twistflower	*Streptanthus bracteatus*	C		Bandera, Bexar, Comal, Medina	VCS

1: LE – Federally Listed Endangered; E – State Listed Endangered; T – State Listed Threatened; LT/SA - Federally Listed Threatened/by Similarity of Appearance; P – Federally Proposed for Listing; C – Federal Candidate for Listing; DL – Federally Delisted; “blank”: Species of Greatest Conservation Need (SGCN) but with no regulatory listing status

2: Texas Parks and Wildlife Department (TPWD), Wildlife Division, Diversity and Habitat Assessment Programs. County Lists of Texas’ Special Species. Bandera, Bexar, Blanco, Comal, Kendall, Kerr, and Medina Counties; Last Revised August 17, 2011. Updated with new information from USFWS Candidate Notice of Review (76 FR 66370), dated October 26, 2011, USFWS Withdrawal of Proposal to List the Mountain Plover as Threatened (76 FR 27756), and Edwards Aquifer species included within the Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan dated November 20, 2012.

3: CS: Covered Species; VCS: Voluntarily Conserved Species; SNA / A: Species Not Addressed by the SEP-HCP(Avoided)

1.3.6 EXISTING CONSERVATION LANDS

Approximately 128,000 acres of the Plan Area are currently under some degree of conservation, including lands owned by public entities or conservation organizations and private lands under conservation easements. The degree of protection for endangered species on these tracts varies, but all are at least partially protected from future land development and some specifically target conservation of native wildlife and habitats (including endangered species).

Approximately 50,000 acres of potential GCW habitat may occur within these existing conservation lands, and at least some of these currently conserved properties contain known populations of the BCV.

Potential habitat for the federally listed karst invertebrates occurs on 79 of the existing conservation parcels, and these properties include approximately 22,600 acres of potential karst habitat (i.e., Karst Zones 1 through 4[9] as defined by Veni (1994)). In addition, approximately 1,562 acres of Critical Habitat designated by the Service for these species (USFWS 2012a) occurs on 18 of the existing conservation parcels.

More information about the existing conservation lands in the Plan Area is attached in Appendix B (see the *Existing Conservation Lands* assessment).

1.4 HUMAN ENVIRONMENT[10]

Current and projected population and land use estimates for the Plan Area were analyzed at the level of individual "sectors." SEP-HCP sectors are geographic areas comprised of one or more adjacent Census 2000 census tracts[11]. Figure 2 shows the 34 sectors within the Plan Area. Only the portion of Bexar County containing potential habitat for one or more of the Covered Species (and excluding the area of Camp Bullis[12]) is included in a SEP-HCP sector.

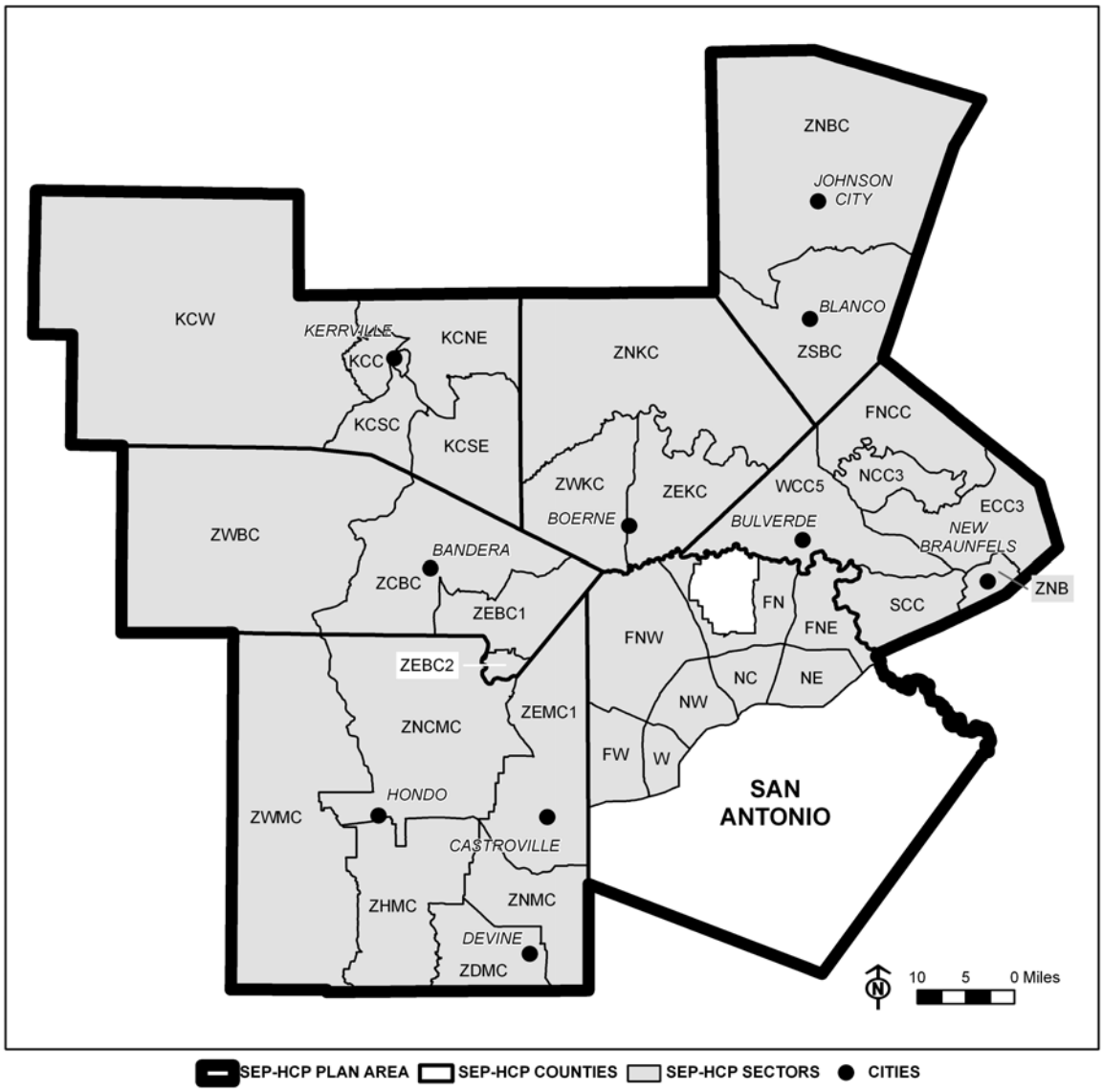
[9] Karst Zone 5 is described as "areas that do not contain listed invertebrate karst species" (USFWS 2008); therefore, the SEP HCP does not include them.

[10] The information included in the Human Environment Section and Appendix D were prepared during the research and planning stages of the SEP-HCP development process. The resource assessments in the appendices utilized the best available science and information available at the time of preparation (2011). Since that time, some information and resources used for the development of the SEP-HCP has been updated; however, the updated information does not materially change the fundamentals of the SEP-HCP. Therefore, the SEP-HCP was not updated to reflect the more recent information.

[11] The analysis of human population data was completed prior to the release of Census 2010 data. The population estimates reported herein for year 2010 (approximately 1.95 million within the Plan Area) are derived from data provided by ESRI BIS (2009) and WDA (2010a). For comparison, the recently released Census 2010 population data report a 2010 population of approximately 1.98 million people within the Plan Area (USCB 2010). The two datasets differ by approximately 2 percent, which is not significant for the long-range projections and analysis supporting this planning effort.

[12] Camp Bullis is excluded from the land use analysis since activities conducted within this federal military installation are not eligible to use the SEP-HCP for incidental take authorization, unless the Service approves such use.

FIGURE 2. SEP-HCP Sector Boundaries.



1.4.1 POPULATION

1.4.1.1 2000—2010

The 2000 Census reported a population of approximately 1.6 million for the entire 7-county Plan Area (including the full extent of Bexar County). The 2010 population of the entire Plan Area was estimated at approximately 1.95 million people, with approximately 86 percent of the estimated population occurring in Bexar County (ESRI BIS 2009) (Table 2).

The population of the Plan Area grew by approximately 22 percent between 2000 and 2010, with individual county population growth rates of between 11 percent and 54 percent. During this period,

Comal and Kendall Counties showed the fastest population growth with increases of 54 percent and 50 percent, respectively. The populations of Kerr County and Blanco County grew the slowest, with population changes of 11 percent and 14 percent, respectively. The population of Bexar County, the most populous county in the Plan Area, grew at a rate of approximately 20 percent between 2000 and 2010.

1.4.1.2 2010—2040

The population of the Plan Area is expected to increase from approximately 1.95 million in 2010 to approximately 3.2 million by 2040[13]. This population change represents an increase of approximately 64 percent over 30 years (Table 2). Most of the new population (approximately 86 percent of the total increase) will be added to Bexar and Comal counties. Blanco and Bandera counties are expected to have the smallest increase in population during this time period. Medina County is projected to experience the largest percent increase in population of the seven Plan Area counties. Table 2 summarizes the projected county-level population changes.

TABLE 2. Estimated Population for the Plan Area Between 2010 and 2040.

Area	Year 2010	Year 2020	Year 2030	Year 2040	Population Change 2010 – 2040	% Population Change 2010 – 2040
State of Texas*	25,268,853	29,640,698	34,029,392	38,418,087	13,149,234	52%
7-County Plan Area	1,957,797	2,318,780	2,722,881	3,205,229	1,247,432	64%
Bexar County*	1,672,187	1,955,272	2,242,923	2,530,873	858,686	51%
Medina County	46,719	53,381	78,343	143,303	96,584	207%
Bandera County	22,141	26,406	30,205	34,004	11,863	54%
Kerr County	49,533	56,374	61,447	80,059	30,526	62%
Kendall County	36,081	47,516	60,099	71,442	35,361	98%
Blanco County	9,881	11,423	12,700	14,028	4,147	42%
Comal County	121,255	168,408	237,164	331,520	210,265	173%

SOURCE: ESRI BIS 2009 and WDA 2010a.

*ESRI BIS projections are used for the State of Texas and Bexar County as a whole, since the WDA projections do not completely address these geographic areas.

More information about the current and projected future population in the Plan Area is attached in Appendix D (see the *Population Estimates and Projections* assessment).

1.4.2 LAND USES

Land uses within the Plan Area were estimated from county appraisal district data from circa 2009. The land use analysis was limited to a study area that included only the SEP-HCP sectors (Figure 2). The land use analysis excluded Camp Bullis. Therefore, the land use analysis addressed all of Medina, Bandera, Kerr, Kendall, Blanco, and Comal counties, but addressed only the portion of Bexar County that is generally coincident with potential habitat for the Covered Species.

[13] For simplicity and in recognition of data limitations, the projections of future conditions presented in this document (such as population changes, habitat losses, and budgets) are generally estimated for the period between 2010/2013 and 2040/2043.

In 2009, developed land uses were present across approximately 429,000 acres (12 percent) of the SEP-HCP sectors. At a county level, Bexar and Comal counties were the most developed of the Plan Area counties, with approximately 45 percent of Bexar County (limited to the SEP-HCP sectors) and 24 percent of Comal County occupied by developed land uses. Developed land uses in the other Plan Area counties were generally less than 10 percent of the total area of the county.

Single-family residential use was the most common form of development, which represented approximately 59 percent of all developed uses.

The land use analysis also identifies lands that may be "available" for future development, such as vacant platted lots, unoccupied residential lots in builder inventory, agricultural lands, and lands with farm and ranch-related improvements[14]. Approximately 2.25 million acres of "available" lands occurred in the Plan Area in 2009. Bexar County sectors had approximately 109,000 acres of land that could be available for future development activities.

Table 3 summarizes the current distribution of classified land uses in the Plan Area.

TABLE 3. General Land Uses within the Plan Area in 2009 (acres).

County	Single-Family Res.	Non-Single-Family Res.	Comm. and Industrial	Ad Valorem Tax Exempt	Transp. and Utility ROW	Available Lands	Other and Unclass. Uses
Bandera County	20,546	3,436	3,377	5,479	4,473	266,750	206,254
Bexar County*	74,740	5,937	28,050	1,329	23,936	108,933	57,174
Blanco County	3,231	266	335	732	579	303,880	147,563
Comal County	50,318	6,451	12,553	11,570	13,188	142,192	148,435
Kendall County	20,910	5,246	2,160	2,894	4,284	353,760	35,034
Kerr County	14,742	3,353	2,087	10,883	4,441	499,289	174,042
Medina County	68,314	4,794	1,434	2,281	11,146	578,979	186,936
7-COUNTY PLAN AREA*	252,802	29,483	49,996	35,169	62,046	2,253,782	955,439

Source: WDA 2010b.

*Includes only portions of Bexar County that are within a SEP-HCP sector. Camp Bullis is not included in this analysis.

Projected land use and development changes within the Plan Area through 2040 are based on population projections, housing characteristics and trends, land use data, and other market factors. Changes in single-family residential development were projected using population projections, household sizes, target densities, and historic trends to predict the extent of new single-family development. As the dominant developed land use, single-family residential uses were also used as a benchmark for projecting new development for multi-family residential, commercial/industrial, and exempt uses. Table 4 summarizes the projected distribution of land uses within the Plan Area in 2040.

[14] The *Land Use Summary and Trends* assessment in Appendix D was based on population projections, housing data, and land use information from county appraisal districts collected by Wendell Davis & Associates (WDA) (WDA 2010) and includes all areas of potential habitat for the Covered Species. Summaries of land uses are reported for the Plan Area as a whole, for individual counties, and for each of 34 individual "sectors" that are comprised of one or more adjacent Census 2000 census tracts. However, the analysis excludes the southern half of Bexar County, since the southern portions of the county do not contain habitat for the species covered by the SEP-HCP. The analysis also excluded Camp Bullis, since this military installation would not be eligible to participate in the Plan for incidental take coverage and is not subject to the same types of factors that drive population and housing changes in the rest of the Plan Area. Therefore, information reported for Bexar County and for the Plan Area is limited to the areas included in the SEP-HCP sectors.

Additional information about the projected land uses, including an analysis at the sector level, is included in Appendix D (see the *Land Use Summary and Trends* assessment).

TABLE 4. Projected Distribution of General Land Uses in 2040 (acres).

County	Single-Family Res.	Non-Single-Family Res.	Comm. and Industrial	Ad Valorem Tax Exempt	Transp. and Utility ROW	Available Lands	Other and Unclass. Uses
Bandera County	24,836	4,276	4,168	7,371	5,687	257,795	206,184
Bexar County*	124,014	7,873	40,646	2,124	54,219	23,672	47,551
Blanco County	4,173	313	481	742	1,080	302,486	147,312
Comal County	94,469	7,521	20,641	18,604	35,846	68,945	138,681
Kendall County	30,827	6,127	4,236	6,202	6,787	335,180	34,929
Kerr County	20,781	3,968	2,947	12,747	8,778	487,215	172,401
Medina County	88,725	9,970	4,891	7,781	19,049	537,337	186,131
7-COUNTY PLAN AREA*	387,824	40,049	78,009	55,571	131,445	2,012,629	933,190

Source: WDA 2010b.

*Includes only portions of Bexar County that are within a SEP-HCP sector. Camp Bullis is not included in this analysis.

Table 5 summarizes the projected level of new development for the Plan Area between 2010 and 2040, based on the land use analysis. The land use projections estimate that approximately 241,000 acres of available undeveloped land will be converted to developed land uses between 2010 and 2040, at an average pace of approximately 7,800 acres per year. Bexar County is projected to experience the most new development during this period (approximately 85,260 acres); although, Comal County and Medina County are also projected to experience a high degree of new development (approximately 73,000 acres and 42,000 acres, respectively).

TABLE 5. Projected Acres of New Development (2010 - 2040).

County	Acres of New Developed Land Uses (2010 - 2040)	Average Annual Acre Increase in New Development (2010 - 2040)**
Bandera County	8,955	289
Bexar County*	85,260	2,750
Blanco County	1,395	45
Comal County	73,247	2,363
Kendall County	18,580	599
Kerr County	12,074	389
Medina County	41,642	1,343
7-COUNTY PLAN AREA*	241,152	7,779

Source: WDA 2010b.

*Includes only portions of Bexar County that are within a SEP-HCP sector. Camp Bullis is not included in this analysis.

**Calculated as a 31-year average.

Additional information about the projected acres of new development, including analysis at the sector level for the Plan Area, is included in Appendix D (see the *Land Use Summary and Trends* assessment).

1.5 REGULATORY FRAMEWORK

The development of HCPs and the issuance of ITPs are governed by the provisions of the ESA and related Service policy. The ESA specifies the required content of a HCP and the criteria for issuance of an ITP. Other legal requirements for the issuance of an ITP are related to the National Environmental Policy Act ("NEPA"), which requires a broader analysis of the environmental impacts resulting from the activities covered by an ESA ITP. Both laws require opportunities for public involvement and comment in the development of a HCP. In addition to the ESA and NEPA, Texas state law contains several procedural and substantive requirements that are applicable to the development of regional HCPs by local governments. However, the issuance of an ITP by the Service is not contingent upon state law.

1.5.1 ENDANGERED SPECIES ACT AND RELATED POLICY

Section 9 of the ESA prohibits "take" of any federally listed endangered wildlife species (16 USC § 1538(a)). As defined by the ESA, "take" means "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)).

"Harm" is further defined by Service regulations as "an act which actually kills or injures wildlife and 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." "Harass" in the definition of take is defined by Service regulations as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering" (50 CFR § 17.3).

Section 10(a)(1)(B) of the ESA (16 USC § 1539(a)(1)(B)), authorizes the Service to issue a permit allowing take of federally listed endangered species providing that the taking is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity."

Section 10(a)(2)(A) of the ESA provides that the Service must issue an ITP if the applicant meets several substantive criteria, including that the applicant submit a conservation plan that specifies: (1) the impact that will likely result from the taking; (2) the steps the applicant will take to minimize and mitigate the impacts and the funding available to implement those steps; (3) the alternative actions to the taking that were considered and the reasons the alternatives were not chosen; and (4) other measures that the Service may require as necessary or appropriate for purposes of the conservation plan (16 USC § 1539(a)(2)(A)). The Service's *Habitat Conservation Planning and Incidental Take Permit Processing Handbook* ("HCP Handbook") also provides guidance on the elements of a HCP (USFWS and National Marine Fisheries Service [NMFS] 1996).

ESA implementing regulations also give permittees "No Surprises" assurances, that provide certainty as to their future obligations under an ITP (50 CFR §§ 17.22, 17.32, 222.2; USFWS 1998).

Section 7(a)(2) of the ESA requires that each federal agency must consult with the Service to ensure that agency actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat (16 USC § 1536(a)(2)). "Jeopardize" is defined by the regulations as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, number, or distribution of that species" (50 CFR § 402.02). As described in the HCP Handbook, issuance of an ITP is considered an action for which section 7(a)(2) applies (USFWS and NMFS 1996). With respect to the issuance of ITP, the Service functions as both the "action" agency and the "resource" agency, so that the Service is actually consulting with itself. According to the HCP Handbook, the consultation must include consideration of the direct and indirect effects on the species, as well as the impacts of the proposed project on listed plants and critical habitat, if any (USFWS and NMFS 1996).

1.5.2 NATIONAL ENVIRONMENTAL POLICY ACT

The issuance of an ITP is a federal action subject to the requirements of the National Environmental Policy Act (NEPA) (42 USC §§ 4321-4327). NEPA requires federal agencies to (1) study proposed projects to determine if they will result in significant impacts to the human environment; and (2) review the alternatives available for the project and consider the impact of the alternatives on the human environment. The scope of NEPA is broader than the ESA in that it requires the agency to consider the impacts of the action on the "human environment," including a variety of resources such as water, air quality, cultural and historic resources, and socioeconomic resources.

In the context of a HCP and ITP, the scope of the NEPA analysis covers the direct, indirect, and cumulative effects of the proposed incidental take and the beneficial effects of the proposed mitigation and minimization measures described in the HCP (USFWS and NMFS 1996).

The HCP Handbook describes the Service's procedures for complying with NEPA with respect to HCPs. Most large-scale, regional HCPs will require preparation of an Environmental Impact Statement ("EIS") to comply with NEPA.

1.5.3 STATE LAW

Texas state law establishes requirements related to the development of HCPs and regional HCPs by Texas governmental entities, including counties and municipalities (Subchapter B, Chapter 83 of the Texas Parks and Wildlife Code). Among other things, state law requires that the governmental entity or entities participating in the development of a regional HCP must appoint a Citizens Advisory Committee and a Biological Advisory Team, comply with open records and open meetings laws and public hearing requirements, in certain circumstances provide notice to affected landowners, and acquire identified preserves by specific deadlines.

In addition, local governments participating in a regional HCP are prohibited from:

- Imposing any sort of rule or regulation related to federally listed species (other than regulations involving groundwater withdrawal) unless that rule or regulation is necessary to implement a HCP or regional HCP for which the plan participant was issued a federal permit (Texas Parks and Wildlife Code § 83.014(a));

- Discriminating against a permit application, permit approval, or provision of utility service to land that has been designated as a habitat preserve or potential habitat preserve for a regional HCP, is designated as Critical Habitat under the ESA, or has endangered species or endangered species habitat (Texas Parks and Wildlife Code § 83.014(b));

- Limiting or denying water or wastewater service to land that has been designated as habitat preserve or potential habitat preserve in a regional HCP, is designated as Critical Habitat under the ESA, or has federally listed species or listed species habitat present (Texas Parks and Wildlife Code § 83.014(c));

- Requiring a landowner to pay a mitigation fee or set aside, lease, or convey land as a habitat preserve as the condition to the issuance of a permit, approval, or service (Texas Parks and Wildlife Code § 83.014(d)); and

- Accepting a federal permit in conjunction with a regional HCP unless the qualified voters of the plan participant have authorized the issuance of bonds or other debt financing in an amount equal to the estimated cost of acquiring all land for habitat preserves within the time frame required by Chapter 83 (see below) or the plan participant has otherwise demonstrated that adequate sources of funding exist to acquire all land for habitat preserves within the required timeframe (Texas Parks and Wildlife Code § 83.013(d)).

In addition to the above prohibitions, Texas state law stipulates that a regional HCP, including any mitigation fee and the size of proposed habitat preserves, must be based on the amount of harm to each endangered species the plan will protect (Texas Parks and Wildlife Code § 83.015(a)-(b)). However, after notice and a hearing, a regional HCP, its mitigation fees, and the size of proposed habitat preserves may be based partly on any of the Service's recovery criteria for listed species covered by the plan (Texas Parks and Wildlife Code § 83.015(f)).

According to Texas state law, governmental entities participating in a regional HCP must make offers to acquire any land designated in the plan as a proposed habitat preserve no later than four years after the issuance of the federal permit or six years after the initial application for the permit, whichever is later. Generally, acquisition of all habitat preserves identified in a regional HCP must be completed no later than the sixth anniversary of the date the ITP was issued (Texas Parks and Wildlife Code § 83.018(c)).

Finally, state law imposes a requirement that before adopting a regional HCP, plan amendment, ordinance, budget, fee schedule, rule, regulation, or order with respect to a regional HCP, the participating governmental entities must hold a public hearing and publish notice of such hearing in the newspaper of largest general circulation in the county in which the participant proposes the action. Such notice must include a brief description of the proposed action and the time and place of a public hearing on the proposed action. The governmental entities must publish notice in accordance with the foregoing requirements, and must do so not later than the 30th day prior to the public hearing (Texas Parks and Wildlife Code § 83.019).

2.0 BASIC PLAN COMPONENTS

2.1 PERMITTEES

The County of Bexar, Texas and the City of San Antonio, Texas are the entities applying to the Service for an ITP under section 10(a)(1)(B) of the ESA. These entities will become the SEP-HCP's Permittees. The Permittees will be responsible to the Service for complying with the terms and conditions of the SEP-HCP's ITP.

The Permittees will also be responsible for the implementation and administration of the SEP-HCP. Implementation and administration of the SEP-HCP will require a variety of tasks, including (but not limited to) enrolling Participants, acquiring preserves, managing preserves, monitoring species and habitats, conducting public outreach, monitoring compliance with the terms and conditions of permits and other agreements, and reporting to and coordinating with the Service.

It is generally anticipated that Bexar County will take the lead on most Plan implementation tasks, while each Bexar County and the City of San Antonio will be responsible for providing funding or other resources to address approximately one-half of the Plan's public costs. The Permittees will implement an Interlocal Agreement to describe each entity's specific roles and responsibilities with respect to SEP-HCP implementation.

The Permittees may, at their discretion and in conformance with their Interlocal Agreement, delegate aspects of SEP-HCP implementation to one or more other entities. For example, the Permittees may elect to fully administer the Plan using County or City staff or may decide to contract or partner with outside consultants, organizations, or other entities for such services. However, the Permittees will remain responsible for the proper implementation of all aspects of the SEP-HCP, in accordance with the details of their Interlocal Agreement.

2.2 ADVISORY COMMITTEES

The Permittees anticipate that they will from time to time convene two advisory committees to provide input and recommendations on the implementation of the SEP-HCP: a scientific advisory committee and a stakeholder advisory committee.

Such advisory committees would be appointed, organized, charged, and directed for a particular purpose as the Permittees determine to be necessary and all advisory committee members will serve at the pleasure of the Permittees, as may be more particularly set out in the Interlocal Agreement. Public input may also be received via other special public meetings or hearings called by the Permittees.

While the Permittees anticipate convening these advisory committees for the purpose of obtaining input and recommendations on Plan implementation, the Permittees will not be required to act on their recommendations. Furthermore, the recommendations from advisory committees are non-binding on the Permittees. The Permittees will be ultimately responsible for directing the implementation of the SEP-HCP.

The charge of the scientific advisory committee may include providing guidance on matters concerning the biological goals and objectives of the SEP-HCP conservation program and the conservation value of the preserves. Members of the scientific advisory committee will generally include a cross-section of scientific backgrounds and include people with expertise in the Covered Species, conservation biology, land management, and similar areas. Likely topics for the scientific advisory committee to consider may include, but are not limited to: preserve acquisitions, adaptive preserve management, preserve monitoring, public access and other secondary preserve uses, education and outreach efforts, and research priorities.

The charge of the stakeholder advisory committee may include providing guidance on matters concerning how well the Plan achieves its overall purpose, goals, and objectives, particularly with respect to the use of public funds for Plan implementation and interactions with landowners and Plan Participants. Members of the stakeholder advisory committee will generally include a cross-section of community interests, such as rural landowners, developers and business interests, environmental organizations, and government agencies. Likely topics for the stakeholder advisory committee to consider may include, but are not limited to: administration of the enrollment process, fee structures, preserve acquisition priorities, public access and other secondary preserve uses, and outreach and education efforts.

Other types of committees are possible and needs may change over time. At its discretion, the Permittees may convene other committees to assist it with implementing the SEP-HCP.

2.3 PLAN AREA

Wary of a potential extension of regulatory authority by the Permittees over land development in other jurisdictions, several of the Plan Area's other County Commissioners' Courts passed resolutions voicing concern about the SEP-HCP and requesting to be removed from the Plan Area (see Appendix A for additional information). While the Permittees never proposed using regulatory authority to control land use activities in other jurisdictions or compel others to use the SEP-HCP, the Permittees limited the use of the Plan to the jurisdictions of Bexar County and the City of San Antonio (see Section 1.5.3 – State Law and Section 3.1 – Covered Activities). Inclusion of the seven counties in the Plan Area does not compel use of the SEP-HCP, but merely allows for the potential that a sufficient number of regionally significant and practicable conservation opportunities would be available to implement the Plan. All SEP-HCP preserve lands will be acquired only with the partnership of willing landowners. The Permittees are committed to respecting the property rights of every landowner and seek to create positive partnerships to achieve the goals and objectives of the SEP-HCP.

Implementation of the SEP-HCP will occur within and be limited to the geographic extent of seven Texas counties: Bexar County, Bandera County, Blanco County, Comal County, Kendall County, Kerr County, and Medina County. These seven counties define the Plan Area for the SEP-HCP. The Plan Area is the area within which the SEP-HCP's incidental take authorization may be used and/or the area where conservation measures will be implemented. However, only participants with eligible properties in Bexar County and the City of San Antonio can seek incidental take authorization for Covered Activities (see Section 3.2.2.1 for eligibility criteria).

Notwithstanding the previous sentences above, the Covered Activities described in Section 3.1 establish certain geographic restrictions that address concerns from other Plan Area counties about

implementation of the SEP-HCP. These geographic restrictions limit participation in the Plan for ESA compliance to properties that are located within the jurisdictions of Bexar County or the City of San Antonio (the Permittees). Conservation actions, including those that may cause some incidental take (see Section 4.0) may occur throughout the 7-county Plan Area on land owned or under contract with the Permittees.

2.4 PERMIT AND PLAN DURATION

The Permittees are seeking a renewable ITP from the Service with a term of 30 years from the date of issuance. The planning horizon for the SEP-HCP is based on this duration. For simplicity and in recognition of data limitations, the projections of future conditions presented in this document (such as population changes, habitat losses, and budgets) are generally estimated for the period between 2010/2013 and 2040/2043.

2.5 SPECIES ADDRESSED BY THE PLAN

2.5.1 COVERED SPECIES

The Permit will authorize a certain amount of incidental take of the following nine federally listed species. In return, the SEP-HCP will implement targeted conservation measures that avoid, minimize, and mitigate for the potential impacts of the authorized incidental take of these Covered Species. The conservation of the Covered Species is the focus of the SEP-HCP conservation program. The Covered Species addressed by the SEP-HCP include:

- **Golden-cheeked Warbler (*Setophaga chrysoparia*, "GCW")** – This federally listed endangered migratory songbird uses relatively mature and closed-canopy juniper-oak woodlands in central Texas as breeding habitat during the spring and early summer months. The species was listed as federally endangered on May 4, 1990 and the Service identifies habitat loss and habitat fragmentation as the primary threats to the species. The species arrives in central Texas in early to mid-March to breed. Nesting activities are typically completed by the end of July, and the species begins migration south in June or July (Ladd and Gass 1999). Most warblers have left central Texas by early to mid-August (Wahl et al. 1990).

- **Black-capped Vireo (*Vireo atricapilla*, "BCV")** – Another federally listed endangered migratory songbird that utilizes a range of deciduous shrub habitats from Oklahoma to central Mexico, including the Edwards Plateau in Texas, during its breeding season in the spring and summer months. The BCV was listed as federally endangered on November 5, 1987. The Service identifies habitat loss, grazing and browsing, brood parasitism, and vegetational succession as the primary threats to this species. The vireos arrive in Texas from late March to mid-April, with adult males arriving before females and first-year males. The majority of black-capped vireo breeding activities occur between mid-April and the end of July. However, the species is known to produce more than one clutch per season and adults may continue to rear young until mid-September (Grzybowski 1995). The black-capped vireos leave their breeding

grounds in the late summer and early fall, generally beginning in August and continuing through September and early October (Grzybowski 1995).

- **7 Terrestrial Karst Invertebrates (collectively referred to as the "Covered Karst Invertebrates")** – A group of seven terrestrial invertebrates (named below), including four spiders and three beetles, that were federally listed as endangered on December 26, 2000[15]. These species live entirely underground in the limestone caves and passages of the karst geologic formations that underlie the northern portion of Bexar County and adjacent areas. The Service has designated Critical Habitat for these species in Bexar County (USFWS 2012a). The Covered Karst Invertebrates are primarily threatened by habitat loss associated with filling or collapsing of caves, alternation of natural drainage patterns and surface plant and animal communities, contamination of groundwater, and quarry or mining operations.

    - **Government Canyon Bat Cave Spider (*Neoleptoneta microps*)** – A karst-dwelling spider that is currently known from only two caves in Government Canyon State Natural Area.
    - **Madla Cave Meshweaver (*Cicurina madla*)** – A karst-dwelling spider that is currently known from approximately 20 locations in Bexar County.
    - **Braken Cave Meshweaver (*Cicurina venii*)** – A karst-dwelling spider that is currently known from only two locations in Bexar County.
    - **Government Canyon Bat Cave Meshweaver (*Cicurina vespera*)** – A karst-dwelling spider that is currently known only from one cave in Bexar County.
    - ***Rhadine exilis*** – An unnamed karst-dwelling beetle that is currently known from 45 to 50 caves in Bexar County.
    - ***Rhadine infernalis*** – An unnamed karst-dwelling beetle that is currently known from 36 to 39 caves in Bexar County.
    - **Helotes Mold Beetle (*Batrisodes venyivi*)** – A karst-dwelling beetle that is currently known from known from eight caves in Bexar County.

Additional information about the biology, habitat requirements, and ecology of the Covered Species is provided in Appendix C.

2.5.2 VOLUNTARILY CONSERVED SPECIES

In addition to conserving the Covered Species, the SEP-HCP will voluntarily address some of the conservation needs of several other rare or sensitive species found in the Plan Area. Some of these Voluntarily Conserved Species are federally listed or are being evaluated by the Service for future listing, but most are simply species of conservation concern for TPWD and/or the Service.

[15] Two other Bexar County listed karst invertebrates are not included in the list of Covered Species since these two species only occur in the largely built-out Alamo Heights Karst Fauna Region located in central San Antonio (see Section 2.5.3).

The Voluntarily Conserved Species occur in habitats that are generally associated with areas used by the Covered Species. Habitats for the Voluntarily Conserved Species may be incidentally protected by preserve acquisitions for the Covered Species. The SEP-HCP conservation program will consider the protection and management of habitats for these species as secondary priorities during the evaluation of potential preserve acquisitions and in preserve management plans. However, the conservation needs of the Covered Species will take precedence over the needs of the Voluntarily Conserved Species.

The Voluntarily Conserved Species include the following:

- **Cave Myotis Bat (*Myotis velifer*)** – This bat roosts in clusters of up to thousands of individuals in a variety of natural and man-made structures, including limestone caves of the Edwards Plateau.
- **Cagle's Map Turtle (*Graptemys caglei*)** – This highly aquatic turtle is endemic to the rivers and major streams within the Guadalupe River basin in Texas. Within the Plan Area, the Guadalupe River Basin runs through parts of Kerr, Kendall, Blanco, and Comal counties. Optimal habitat appears to include riffles and pools, as well as areas with gravel bar riffles and transition areas between riffles and pools.
- **Texas Tortoise (*Gopherus berlandieri*)** – The Texas tortoise is found in open scrub woods, arid brush, lomas, and grass-cactus associations often in areas with sandy well-drained soils. The species may live for as many as 60 years.
- **Indigo Snake (*Drymarchon corais*)** – This large snake occurs primarily within the mesquite-grassland-savannah habitats of south Texas, particularly in association with water sources.
- **Spot-tailed Earless Lizard (*Holbrookia lacerata*)** – This small lizard occurs in central and southern Texas and adjacent northern Mexico and utilizes prairies, grasslands, savannas, and open woodlands.
- **Texas Horned Lizard (*Phrynosoma cornutum*)** – The iconic Texas horned lizard is the state reptile of Texas and typically occupies habitats of flat open terrain with sparse plant cover, and is often found in areas of sandy, rocky, or loamy soils.
- **Texas Garter Snake (*Thamnophis sirtalis annectens*)** – The Texas garter snake is a moisture-dependent snake found in a wide variety of habitats, but primarily in the vicinity of streams, rivers, ponds, lakes, and marshes within the central third of Texas, along the eastern edge of the Edwards Plateau.
- ***Eurycea* Salamanders (various species)** – This group of salamanders are all aquatic, karst-dependent species that are associated with the region's aquifers and some spring outlets and spring runs. Currently, seven species of *Eurycea* salamanders are known to occur in spring outflows and water-filled caves within the Plan Area (see the *Amphibians* assessment in Appendix B).

- **Golden Orb (*Quadrula aurea*)** – The golden orb is a rare freshwater mussel that is a candidate for federal listing as threatened or endangered. The golden orb occurs in the flowing waters of moderate-sized streams and rivers of the San Antonio, Guadalupe, Colorado, Brazos, Nueces, and Frio River systems.

- **Texas Pimpleback (*Quadrula petrina*)** – This species is another rare freshwater mussel identified as a candidate for federal listing as threatened or endangered that historically has been known to occur in the flowing water of moderate-sized streams and small rivers of the San Antonio and Guadalupe River systems. However, no populations of the Texas pimpleback are currently known to occur in the Plan Area.

- **Texas Fatmucket (*Lampsilis bracteata*)** – The Texas fatmucket is a rare freshwater mussel that is a candidate for federal listing as threatened or endangered. The Texas fatmucket is known to occur in the flowing water of moderate-sized streams and small rivers in the San Antonio, Guadalupe, and Colorado River systems.

- **Tobusch Fishhook Cactus (*Sclerocactus brevihamatus* ssp. *tobuschii*)** – This species is a federally listed endangered plant (recently recommended for downlisting to threatened status) that is found in open habitats with shallow soils over limestone bedrock within a mosaic of juniper-oak woodlands. The species is known to occur in Bandera County and Kerr County within the Plan Area. The major threats to this species include attack by a parasitic weevil, poor range management practices, and land development activities.

- **Big Red Sage (*Salvia pentstemonoides*)** – Big red sage is an herbaceous plant endemic to the Edwards Plateau of central Texas that is currently petitioned for federal listing as threatened or endangered. This species is associated with seeps and creeks within steep limestone canyons and occasionally on clayey or silty soils of creek banks and terraces. The species is commonly available as a landscaping plant, but may be relatively rare in the wild and is currently only known to occur in Kendall County and Bandera County within the Plan Area.

- **Bracted Twistflower (*Streptanthus bracteatus*)** – This plant species is endemic to the Edwards Plateau. Bracted twistflower occurs in oak-juniper woodlands over limestone, typically on steep to moderate slopes and in canyon bottoms. The species is currently known to occur in Bexar County and Medina County within the Plan Area.

- **Longstalk Heimia (*Nesaea longipes*) –** Longstalk heimia is an herbaceous perennial plant restricted to desert springs-runs of the Chihuahuan Desert region and seepage slopes and perennial streams on the Edwards Plateau.

- **Correll's False Dragon-head (*Physostegia correllii*)** – This plant is an herbaceous, somewhat succulent and robust perennial that is found in wet habitats associated with stream sides, creek beds, irrigation channels, and roadside ditches.

- **Canyon Rattlesnake-root (*Prenanthes carrii*)** – Canyon Rattlesnake-root is an herbaceous perennial plant found in the upper portion of woodland canyon drainages

and in creek-side seepage shelves associated with certain types of deciduous woodlands of the Edwards Plateau.

Additional information about the biology, habitats, and ecology of the Voluntarily Conserved Species is provided in Appendix B.

The Permit will not authorize incidental taking of any of the Voluntarily Conserved Species, and the Permittees will not receive any assurances in connection therewith under the Service's No Surprises Rule. Incidental take authorization is not necessary for federally listed plant species occurring on private property and some of the other Voluntarily Conserved Species are currently listed as threatened or endangered.

2.5.3 LISTED SPECIES NOT ADDRESSED BY PLAN

Table 1 identifies several federally threatened or endangered species that are not addressed by the SEP-HCP as Covered Species or Voluntarily Conserved Species. Incidental take for the Covered Species authorized through the SEP-HCP would not be expected to result in the incidental taking of these unaddressed listed species. Many of these unaddressed species occur in habitats or portions of the Plan Area that do not generally overlap with the habitats used by the Covered Species. Others are only known to occur in the Plan Area on an accidental or very rare basis and would not typically be encountered by users of the SEP-HCP. Incidental take of the Edwards Aquifer species not addressed in the SEP-HCP would be covered by the Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan.

For example, two of the listed karst invertebrates that occur in Bexar County are not included in the group of Covered Species or Voluntarily Conserved Species. These species are the Robber Barron Cave meshweaver (*Cicurina baronia*) and the Cokendolpher Cave harvestman (*Texella cokendolpheri*). These two species are only known to occur in the Alamo Heights Karst Fauna Region, which is generally located in a fully developed portion of San Antonio just north of downtown. The known geographic extent of the Alamo Heights Karst Fauna Region does not co-occur with known areas of potential habitat for the other Covered Species. Therefore, users of the SEP-HCP obtaining incidental take authorization for the Covered Karst Invertebrates would not be expected to affect the two unaddressed karst species. However, it is important to note that Redevelopment Activities within the Alamo Heights Karst Fauna Region could impact these species and take authorization may still be necessary.

The SEP-HCP will only provide regulatory assurances under the Service's No Surprises Rule for the nine Covered Species (seven invertebrates and two birds). Participants conducting otherwise lawful activities that might incidentally take a listed species other than the Covered Species must seek incidental take authorization directly from the Service.

Chapter 4.6 of the *Environmental Impact Statement* includes discussion of potential affects that could occur from the Plan to listed species not addressed by the Plan. Additional information about the biology, habitats, and ecology of the unaddressed listed species is provided in Appendix B and Appendix C.

3.0 COVERED ACTIVITIES

People conducting activities that would not cause the incidental taking of a federally listed species have no obligation under the ESA and no need to coordinate with the Service or participate in the SEP-HCP.

If a person's activities would be likely to cause incidental take of a listed species, then that person has an obligation to comply with the ESA or the person is at risk of an enforcement action by the Service. Incidental take of a listed species may occur through direct impacts to individual animals or plants or indirectly by way of significant impacts to their habitats or related predator/prey/competitor communities (see Section 1.5.1 – Endangered Species Act and Related Policy for a more complete definition of incidental take). Violations of the ESA may result in civil or criminal punishments as described in section 11 of the ESA (16 U.S.C. §1540).

The SEP-HCP provides an efficient and streamlined mechanism for obtaining incidental take authorization for the Covered Species, but is only one of multiple options for achieving compliance with the ESA.

3.1 COVERED ACTIVITIES

The ITP associated with the SEP-HCP will authorize a certain amount of incidental take of the Covered Species that is associated with the following "Covered Activities":

1. Otherwise lawful land uses conducted on Enrolled Properties that are fully or partially located within Bexar County or within portions of the City of San Antonio (including the City's extra-territorial jurisdiction, excluding Comal County); and

2. Management activities related to Covered Species on SEP-HCP preserves that may be located anywhere in Plan Area.

The SEP-HCP will not cover incidental take that occurs on lands that have not been voluntarily enrolled in the Plan for ESA compliance or that are outside of the SEP-HCP preserve system. The SEP-HCP will also not cover incidental take that occurs within Comal County[16], except for incidental take associated with preserve management, monitoring, and research activities. The Covered Activities limit most uses of the SEP-HCP's ESA compliance process to the geographic extents of Bexar County and the City of San Antonio (including the City's extra-territorial jurisdiction).

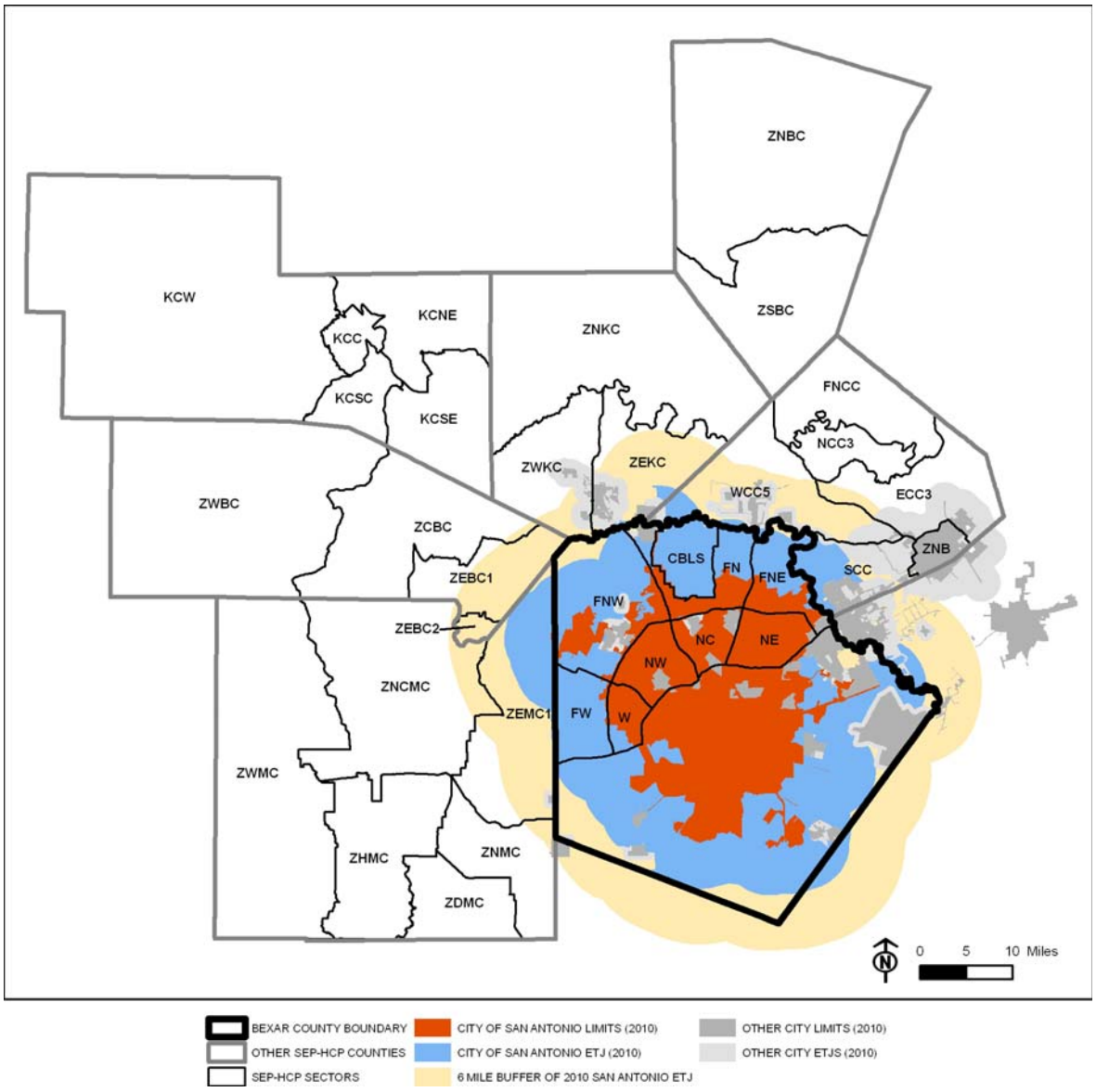
Figure 3 shows the current limits of the Permittees' jurisdictions. However, it is anticipated that the limits of the City of San Antonio's extra-territorial jurisdiction ("ETJ") may expand beyond its current boundary over the next 30 years[17]. While the limits of the Permittees' jurisdictions may change over

[16] Comal County holds its own ITP with an associated regional Habitat Conservation Plan from the Service.

[17] The City's annexation history between 1971 and 2003 (a period of 32 years) indicates that the City of San Antonio expanded to the northwest by approximately six miles during that time (City of San Antonio Planning Department 2003). For the purpose of this Plan, it is assumed that the boundaries of the City's extra-territorial jurisdiction may similarly expand by up to approximately six miles over the 30-year duration of the Plan into areas not already claimed by another municipality. Participation in the Plan will not be limited to the 6-mile assumption, but based on the Permittees' limits of jurisdiction (including its ETJ).

time, only properties fully or partially contained within the limits of the Permittees' jurisdictions (including its ETJ) at the time participation in the Plan is sought will be considered eligible to use the Plan.

FIGURE 3. Bexar County and City of San Antonio Jurisdictions.



Covered Activities may be associated with a variety of different types of non-federal projects or actions, such as (but are not limited to) the following examples:

- The construction, use, and/or maintenance of public or private land development projects, including but not limited to single- and multi-family homes, residential

subdivisions, farm and ranch improvements, commercial or industrial projects, government offices, and park infrastructure;

- The construction, maintenance, and/or improvement of roads, bridges, and other transportation infrastructure through non-federal means;
- The installation and/or maintenance of utility infrastructure, including but not limited to transmission or distribution lines and facilities related to electric, telecommunication, water, wastewater, petroleum or natural gas, and other utility products or services;
- The construction, use, maintenance, and/or expansion of schools, hospitals, corrections or justice facilities, and community service development or improvement projects;
- The construction, use, or maintenance of other public infrastructure and improvement projects (e.g., projects by municipalities, counties, school districts);
- The construction, use, maintenance and/or expansion of quarries, gravel mining, or other similar extraction projects; and
- Any activities necessary to manage habitat for the Covered Species that could temporarily result in incidental take but that would have long-term benefits for the species[18] (see Section 6 – GCW and BCV Conservation Program, Section 7 – Karst Conservation Program, and Section 9 – Adaptive Preserve Management for further information).

3.2 ENROLLMENT PROCESS

3.2.1 OVERVIEW

"Participation" in the SEP-HCP means voluntarily enrolling property in the Plan for the purpose of obtaining ESA compliance for the Covered Species. Those that complete the enrollment process become "Participants." Any non-federal entity conducting a Covered Activity may seek to participate in the SEP-HCP by submitting an application to the Permittees.

As described in Section 3.1, most Covered Activities are limited to the Permittees' jurisdictions.

The Permittees will not require or otherwise compel any landowner, developer, local government, or any other party to participate in the SEP-HCP. The SEP-HCP will not control, regulate, or monitor land use activities on properties that are not voluntarily enrolled in the Plan or that are not part of the SEP-HCP preserve system. SEP-HCP preserves will only be established through agreements with willing landowners.

[18] Such activities might include vegetation manipulation or prescribed fire within BCVI habitat needed to occasionally set back the successional stage of the woody vegetation or limited thinning within dense GCWA habitat to open up areas for enhancing oak regeneration. The occasional need to construct or maintain boundary fencing, access roads, fire breaks, and other similar infrastructure that facilitates effective and responsible preserve management may also result in limited or temporary incidental take of the GCWA, BCVI, or karst invertebrates.

Every individual landowner, developer, local government, or other non-federal entity may make its own decision about whether or not to seek incidental take authorization for a listed species. The SEP-HCP will be only one option for achieving compliance with the ESA, and people may choose which option best suits their needs and circumstances. Other options include implementing activities in such a way as to avoid taking a listed species or seeking individual authorization from the Service.

Potential Participants (or "Applicants") begin the enrollment process by voluntarily submitting an application to the Permittees. These applications will include Applicant and property information and biological information for the Covered Species pertaining to the Applicant's project site as described in more detail in Section 3.2.2 – Application Requirements. The Permittees will review this information and confirm whether or not the Applicant, the property to be enrolled, and the proposed activity are eligible to participate in the Plan. The Permittees will also determine the level of mitigation that the Applicant would need to provide to offset impacts to the Covered Species. If the Permittees and the Applicant mutually agree to complete the enrollment process, the Applicant will provide the assessed mitigation and sign a "Participation Agreement" with the Permittees.

The Participation Agreement is a contract between the Participant and the Permittees that describes the terms and conditions of SEP-HCP participation, including any required measures to minimize impacts to the Covered Species or other special conditions for implementing the Covered Activities. With a fully executed Participation Agreement and satisfaction of the applicable mitigation requirements, the Permittees will then complete the enrollment process by issuing a "Certificate of Participation" to the Participant that certifies that the Participant may rely on the regulatory assurances of the SEP-HCP's ITP.

3.2.2 APPLICATION REQUIREMENTS

Applicants seeking to participate in the SEP-HCP will submit an application to the Permittees. Applications provide information on the specific property within which an Applicant desires to conduct Covered Activities and obtain authorization for Incidental Take of the Covered Species. Once the enrollment process is complete, the property becomes an "Enrolled Property."

The application must include the following information:

1. Applicant and/or property owner contact information;
2. Detailed location and boundary information for the property to be enrolled, including maps, legal descriptions, and/or digital GIS or CAD data;
3. Biological information describing potentially suitable GCW and BCV habitats located within the property to be enrolled and such habitats located within the area up to 300 feet outside of the property to be enrolled;
4. Biological information describing all known karst features and designated critical habitat units[19] inhabited by one or more of the Covered Karst Invertebrates on the property to

[19] The location of designated critical habitat units are publically available information and can be provided upon request from the Permittees or the Service.

be enrolled or within the area up to 750 feet outside of the property to be enrolled (see Section 3.2.3.2);

5. Authorization for representatives of the SEP-HCP to enter the property to be enrolled for an on-site inspection to verify the habitat assessment; and

6. An application fee.

3.2.2.1 ELIGIBILITY

Any non-federal entity may apply to participate in the SEP-HCP and obtain incidental take authorization for the Covered Species that may occur as a result of Covered Activities conducted on Enrolled Properties. The Permittees will assess mitigation needs for the GCW and BCV in terms of "Preservation Credits[20]", where one Preservation Credit is equal to one acre of protected occupied habitat for the affected species. Federal entities may not use the SEP-HCP for incidental take authorization; although, federal entities may independently seek to utilize available Preservation Credits from the SEP-HCP or contribute preserve land to the SEP-HCP to offset impacts to the Covered Species that may be analyzed and authorized through separate ESA section 7 consultations. If a federal agency is involved with a project seeking to mitigate for impacts to the Covered Species through the Plan, the federal agency must complete consultation with the Service pursuant to section 7 of the ESA prior to submitting an application to the Permittees. Section 7 of the ESA requires that all federal agencies consult with the Service to ensure that the actions authorized, funded, or carried out by such agencies do not jeopardize the continued existence of any threatened or endangered species or adversely modify or destroy critical habitat of such species.

The SEP-HCP only offers incidental take authorization for the Covered Species. Persons or entities, including Participants, requiring incidental take authorization for other federally listed species must obtain such authorization independently from the Service.

The Covered Activities have certain geographic limitations that restrict which properties may be enrolled in the Plan. Properties located entirely outside of the jurisdiction of the Permittees or in Comal County may not be enrolled in the Plan for the purpose of obtaining ESA compliance.

As described further in Section 3.2.3.2 – Karst Participation Assessments, the Plan will only offer incidental take authorization for the Covered Karst Invertebrates within the area directly surrounding an occupied karst feature after specific conservation actions have been achieved. If the appropriate level of conservation has not been achieved, avoidance of those areas is required.

Each application and Participation Agreement will be specific to the property identified by the Applicant. Applicants must provide detailed property boundary information, including a map and a legal description, with their application that clearly identifies the area to be enrolled in the Plan. Activities that are conducted outside of an Enrolled Property will not be covered for incidental take. Therefore, Applicants are strongly encouraged to include within the Enrolled Property the extent of all activities associated with a single and complete project, as would be shown on a recorded plat or sealed site plan.

[20] While similar to conservation credits under a conservation bank, Preservation Credits are only available to SEP-HCP Participants impacting warbler and/or vireo habitat, unless otherwise approved by the Service.

3.2.2.2 BIOLOGICAL INFORMATION

Applicants must submit site-specific biological information for each of the Covered Species that may occur within or adjacent to a property to be enrolled in the SEP-HCP. Information on adjacent property should include what is publically or otherwise reasonably available.

Applications will be reviewed and processed by the Permittees or consultants contracted by the Permittees. The Permittees or consultants contracted by the Permittees will use their best professional judgment when reviewing and processing an Applicants habitat assessment. See Section 3.2.2.3 – Verification of Biological Information for additional information on review qualifications.

GCW AND BCV BIOLOGICAL INFORMATION

Applicants seeking to enroll properties that occur within the range of the GCW or BCV must submit a habitat assessment for these species with their application. The habitat assessment must evaluate all areas within the boundary of the property to be enrolled and the area up to 300 feet outside of such property.

Habitat assessments for the GCW and BCV that are submitted with SEP-HCP applications must meet the following criteria:

1. Must be prepared by a biologist holding or named on a valid 10(a)(1)(A) USFWS Threatened and Endangered Species permit for the GCW and BCV;
2. Must delineate all portions of the property to be enrolled that meet the Service's definition of suitable habitat for GCW or BCV (currently reported in Campbell 2003, but subject to future revision) or provide a habitat delineation that has otherwise been approved by the Service;
3. Must delineate areas of suitable GCW and BCV habitat that occur up to 300 feet outside of the property to be enrolled[21];
4. Must be based on a review of the best available information, and must include a discussion of actual site conditions as determined from a site visit to the property to be enrolled by the preparing biologist;
5. Must have been completed no more than two years prior to the date of the application; and
6. Must include a description of the information and methods used to delineate areas of suitable GCW and BCV habitat.

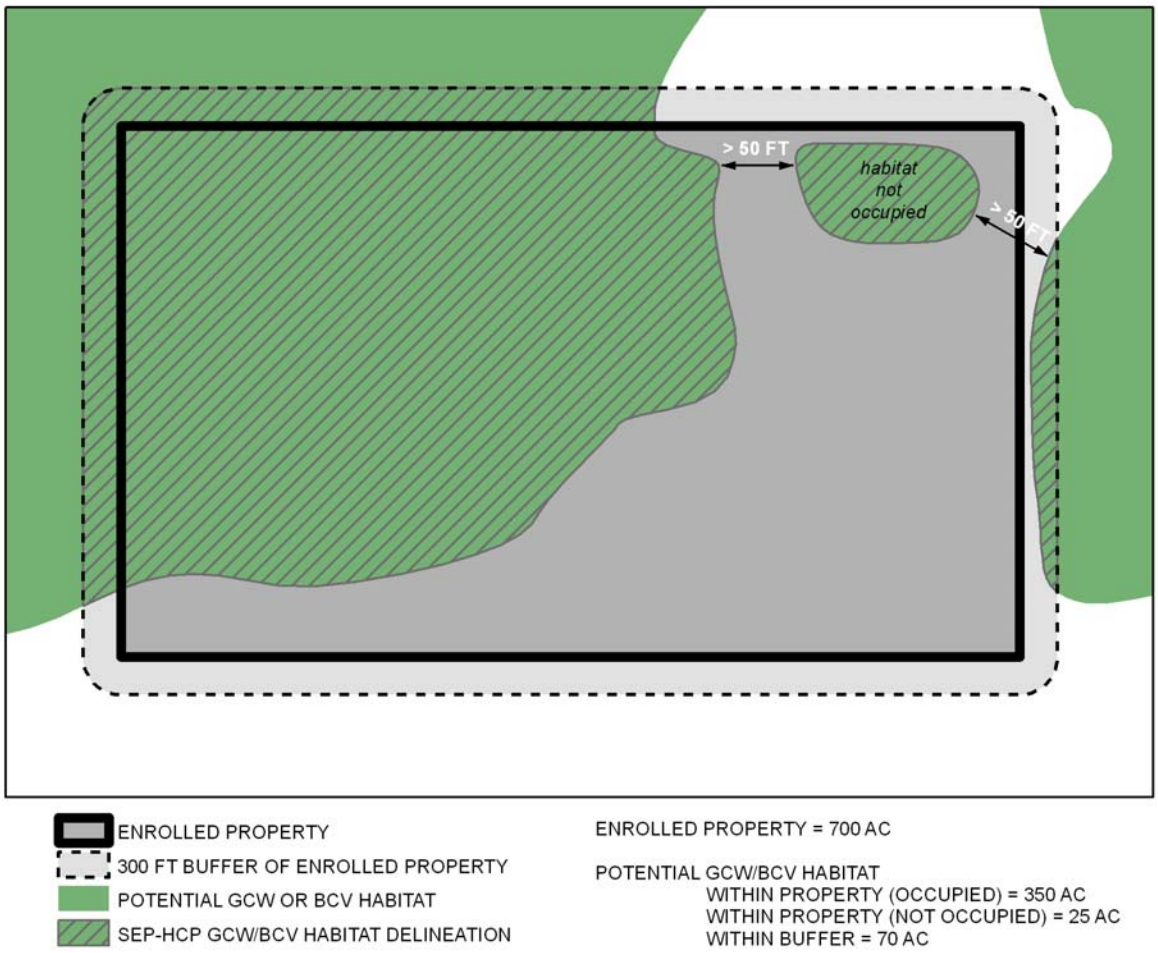
Applicants may optionally submit additional species survey information that identifies occupied and unoccupied habitats within the property to be enrolled. Survey data that is collected in accordance with the Service's GCW and BCV presence/absence survey protocols may refine the Applicant's impacts assessment (see Section 3.2.3.1 – GCW and BCV Participation Assessments for more details).

[21] Delineations of GCW or BCV habitat on areas outside of the property to be enrolled may be based on the best publicly available information and observations made from the Applicant's property.

Applicants are responsible for providing this information. However, to assist Applicants, the Permittees will maintain and distribute a list of qualified biologists that are able to perform GCW and BCV habitat assessments.

Figure 4 depicts generic habitat delineation for the GCW or BCV that identifies potential habitat within a property to be enrolled and within 300 feet outside of the property to be enrolled. This example also shows an isolated area of potential habitat that was shown to be not occupied by the target species (see Section 3.2.3.1 for more information about incorporating the results of presence/absence surveys into the SEP-HCP enrollment process).

FIGURE 4. Sample GCW or BCV Habitat Delineation.



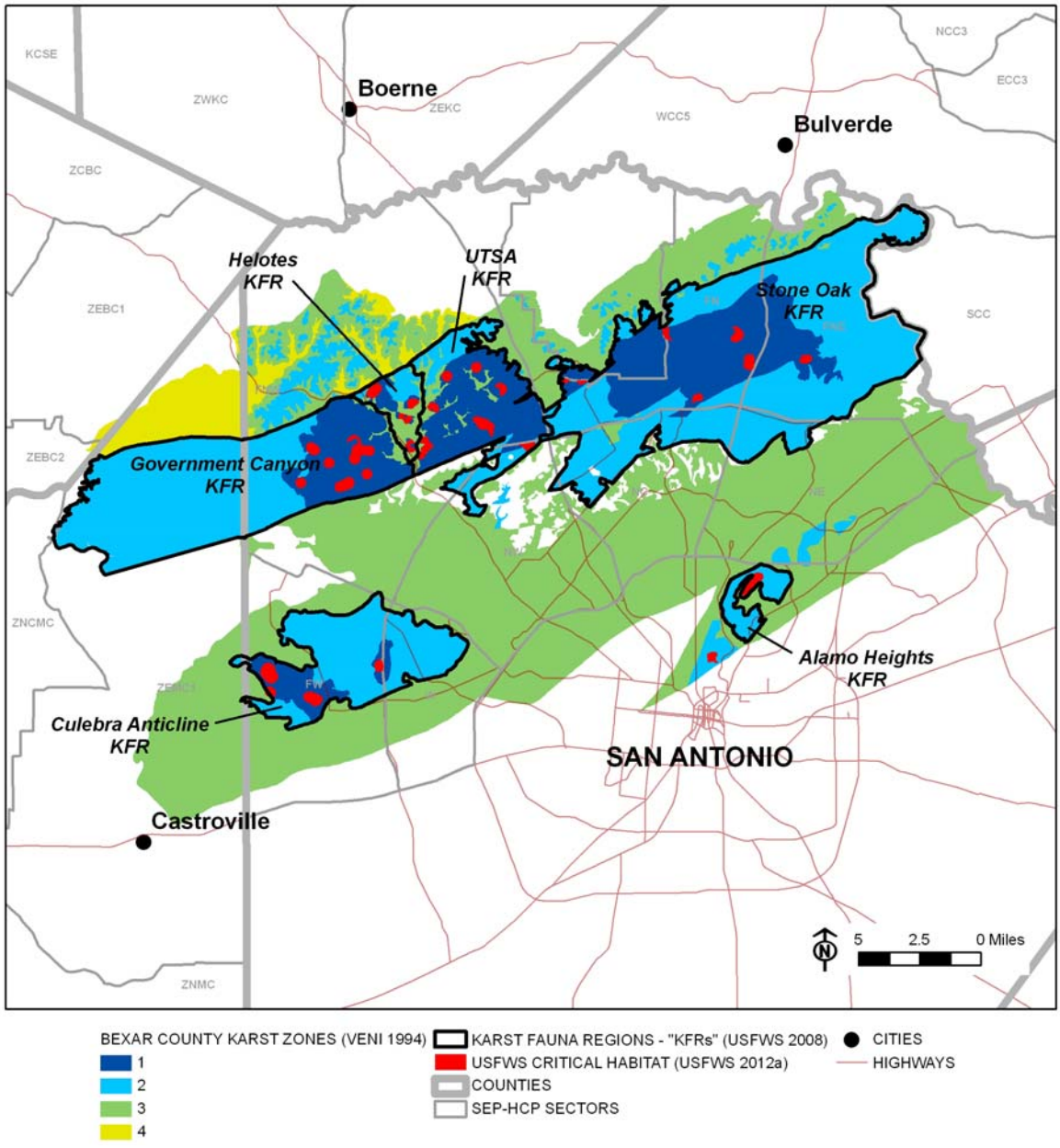
KARST BIOLOGICAL INFORMATION

The Service maintains maps of potential habitat for the listed karst invertebrates. These maps identify five "Karst Zones", each with a different potential to harbor one or more of the listed karst species (Veni 1994). Figure 5 shows the current boundaries of Karst Zones 1 through 4[22]. The Service

[22] Karst Zone 5 is described as "areas that do not contain listed invertebrate karst species" (USFWS 2008) and, therefore, is not shown on Figure 5.

may occasionally update these boundaries based on new information. The Permittees will make available maps of the current Karst Zones to Applicants for review.

FIGURE 5. Karst Zones and Karst Fauna Regions for the Endangered Bexar County Karst Invertebrates[23].



[23] The Service collectively refers to the federally listed karst invertebrates currently known only from Bexar County as the "Bexar County Karst Invertebrates" and the karst zones that collectively define the extent of their potential habitat as the "Bexar County Karst Zones." However, the extent of the Bexar County Karst Zones and the collective potential range of the Bexar County Karst Invertebrates extend beyond the boundary of Bexar County as shown in Figure 5.

Applicants seeking to enroll property that occurs over Karst Zones 1 through 4 must submit the results of detailed karst feature surveys for the property to be enrolled and a review of designated karst Critical Habitat areas and other occupied karst features publicly reported and known to occur in the vicinity of the property.

Applicants will be required to submit karst feature surveys for portions of a property that occur over Karst Zones 1 through 4. The karst surveys must be performed by a person holding or named on a valid section 10(a)(1)(A) USFWS Threatened and Endangered Species permit for Bexar County Karst Invertebrates and in accordance with the Service's requirements for presence/absence surveys for endangered karst invertebrates in Central Texas that are in place at the time the surveys are performed. The current survey protocols are dated May 28, 2015 (USFWS 2015), but the Service may update these protocols at any time.

The Service has determined that since no "take" of endangered species is anticipated while conducting initial surface walking karst feature surveys, this activity does not necessitate a section 10(a)(1)(A) permit. However, the potential for "take" exists with entry into a void or cave where Bexar County Karst Invertebrates may occur. Therefore, the Service recommends that all activity that is being conducted to benefit the species and that involves excavating, entering, or collecting in a void or cave that may contain suitable habitat for endangered karst invertebrates be covered under a valid section 10(a)(1)(A) USFWS Threatened and Endangered Species permit for work with the Bexar County Karst Invertebrates. (USFWS 2015) Generally, karst surveys include the following steps:

- **Step 1:** Have a qualified karst geologist or karst biologist with demonstrated experience identifying karst features conduct an initial karst feature surface survey for the presence of caves, voids, or other karst features. If no karst features are found within the property to be enrolled, then no further investigation is needed.

- **Step 2:** If karst features are identified within the property to be enrolled, a Service-permitted biologist covered to work with the Bexar County Karst Invertebrates must then assess each feature for the characteristics of suitable karst invertebrate habitat. This step may require some excavation to determine if a feature has the potential to lead to a void with suitable habitat. If none of the karst features has the characteristics of suitable karst invertebrate habitat, then no further investigation is needed.

- **Step 3:** If features with suitable habitat are identified and an Applicant wishes to proceed with the application, then a Service-permitted biologist covered to work with the Bexar County Karst Invertebrates must conduct a presence/absence survey of each potentially occupied feature to determine whether or not it is occupied by one or more of the Covered Karst Invertebrates.

In addition to the required karst surveys, Applicants will be required to identify designated Critical Habitat and other known karst features occupied by one or more of the Covered Karst Invertebrates that occur on the property to be enrolled. Applicants must also identify such information with respect to the area that is 750 feet from the property to be enrolled to the extent such information is publically available. The Permittees will assist Applicants with these reviews.

Applicants must submit the following information pertaining to karst resources with their application:

1. A map of the Karst Zones within and adjacent to the property to be enrolled;

2. A copy of all completed karst survey reports for the property to be enrolled that describe the results of all applicable survey steps. Where applicable, reports must demonstrate compliance with the Service's protocols for presence/absence surveys in place at the time the surveys were performed (including the qualifications of the biologists conducting the surveys) and the surveys must have been conducted no more than three years prior to the date of application[24];

3. A detailed map showing the locations of all known karst features occupied by one or more of the Covered Karst Invertebrates that are associated with the property to be enrolled (i.e., features that occur within the property to be enrolled or within the area up to 750 feet outside of such property, to the extent that is readily available from a public source);

4. A map showing 345-ft and 750-ft buffers around the entrance(s) of each occupied karst feature associated with the property to be enrolled (Occupied Cave Zones A and B, respectively)[25], or Occupied Cave Zone boundaries that have otherwise been approved by the Service;

5. A map showing the extent of any designated Critical Habitat that occurs within the property to be enrolled and within 750 feet outside of such property; and

6. A map showing the extent (or footprint) of the cave;

7. A feature-by-feature list of the Covered Karst Invertebrates that have been recorded from each of the occupied karst features associated with the property to be enrolled.

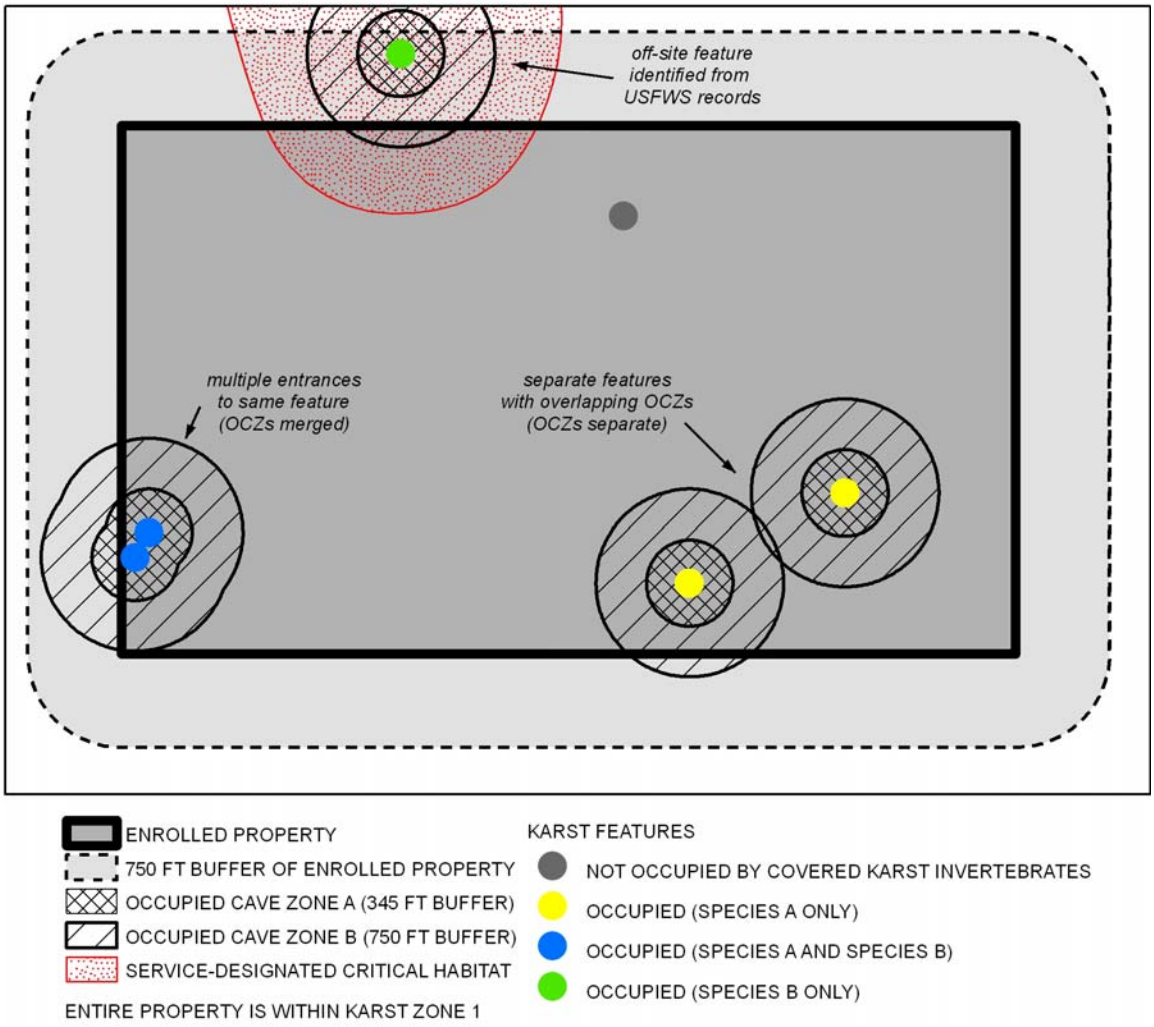
The information required to support an application is intended to identify, to the maximum extent practicable, all occupied karst features that can be discovered through intensive surface surveys within a property to be enrolled in the Plan or that are otherwise already known to occur within or adjacent to such a property based on information maintained by the Service or otherwise available. The Occupied Cave Zones and Critical Habitat designations are intended to encompass the surface and subsurface areas most likely to influence the ecological health of these occupied features.

Figure 6 depicts an example karst habitat assessment showing identified features, Occupied Karst Zones, designated Critical Habitat, and species occurrences.

[24] Features with previously confirmed species locations may submit those surveys, unless they have received authorization from the Service (per the 10(a)(1)(A) requirements) to re-enter the occupied feature.

[25] Overlapping Occupied Cave Zones of the same type ("A" or "B") for multiple entrances to a common feature footprint may be merged into a single zone (see sample in Figure 6).

FIGURE 6. Sample Karst Habitat Assessment[26].



3.2.2.3 VERIFICATION OF BIOLOGICAL INFORMATION

The Permittees will review all submitted biological information to ensure it meets the standards listed above. If submitted biological information does not meet the minimum standards, then the Permittees will notify the Applicant of any deficiencies and request a revision or supplement. The Permittees will not process an application for participation without all of the required information.

The Permittees will also require that Applicants provide access to the property to be enrolled for a site visit to visually confirm habitat conditions; although, the Permittees are not obligated to conduct a site visit.

[26] Overlapping Occupied Cave Zones of the same type ("A" or "B") for multiple entrances to a common feature footprint may be merged into a single zone (yellow and blue depicted on Figure 6).

Applications will be reviewed and processed by the Permittees or consultants contracted by the Permittees. The Permittees will determine the skillsets and qualifications required for reviewers or consultants contracted by the Permittees, as may be more particularly set out in the Interlocal Agreement. At a minimum, reviewers (Permittee's staff or contracted consultants) should have the knowledge and experience of the habitats and requirements of the Covered Species within the Plan Area, and be able to effectively use their best professional judgment when reviewing and processing an Applicants submittal. In the event the Permittees (or their contracted consultants) determine that the property to be enrolled requires a site visit to visually confirm habitat conditions, a qualified biologist(s) holding or named on a valid section 10(a)(1)(A) USFWS Threatened and Endangered Species permit for the Covered Species will perform the site visit in conjunction with the permitted biologist(s) which prepared the biological assessment.

The SEP-HCP enrollment criteria requires habitat assessments and surveys to be prepared by biologists holding or named on a valid section 10(a)(1)(A) USFWS Threatened and Endangered Species permit for the Covered Species. Therefore, the Permittees do not anticipate disputes on the findings of an Applicants habitat assessment. In the event of a dispute between the Permittees and the Applicant, the Service will review the application, at the request of the Applicant.

3.2.3 PARTICIPATION ASSESSMENTS

3.2.3.1 GCW AND BCV PARTICIPATION ASSESSMENTS

The Permittees will determine the level of mitigation that an Applicant must provide for the GCW and BCV in order to obtain incidental take authorization from the Plan for these species. The level of mitigation will be based on the amount of potentially suitable habitat that is present within and adjacent to the property to be enrolled and defined mitigation ratios for impacts to this habitat.

IMPACT ASSESSMENTS

To streamline and simplify participation in the SEP-HCP, the Permittees will typically assess impacts to the GCW and BCV in the following manner:

- **Direct Impacts**: All acres of suitable GCW and BCV habitat within the boundaries of a property to be enrolled are assumed to be directly impacted by Covered Activities, unless such habitat occurs within an Occupied Cave Zone or designated Critical Habitat area where avoidance of the associated karst feature is required;
- **Indirect Impacts**:
    - All acres of suitable GCW and BCV habitat located up to 300 feet outside the boundary of a property to be enrolled are assumed to be indirectly impacted by Covered Activities; and
    - All acres of suitable GCW or BCV habitat within a property to be enrolled and also an Occupied Cave Zone or designated Critical Habitat area, where avoidance of the associated karst feature is required, will also be considered indirectly impacted.

- **Survey-based Exceptions**: To potentially reduce the acres of GCW or BCV habitat that are assumed to be directly impacted by Covered Activities, an Applicant may optionally submit the results of a presence/absence survey for these species that was conducted in accordance with the Service's protocols and a review of previously recorded GCW or BCV observations maintained by the Service. The Permittees will consider patches of potential GCW and BCV habitat to be indirectly impacted if such patches are shown by the site-specific presence/absence survey and the review of Service-maintained observation data to not be occupied by the species. For the purpose of the SEP-HCP, individual "patches" of GCW and BCV habitat are discrete areas of suitable habitat separated from other such patches by at least 50 feet. Presence/absence survey data submitted for this purpose must have been collected in the most recent or prior breeding season and any impacts to that habitat must occur prior to the next breeding season.

MITIGATION RATIOS

The Permittees will apply the following mitigation ratios to the number of acres of GCW and BCV habitat that are considered to be impacted by a Covered Activity:

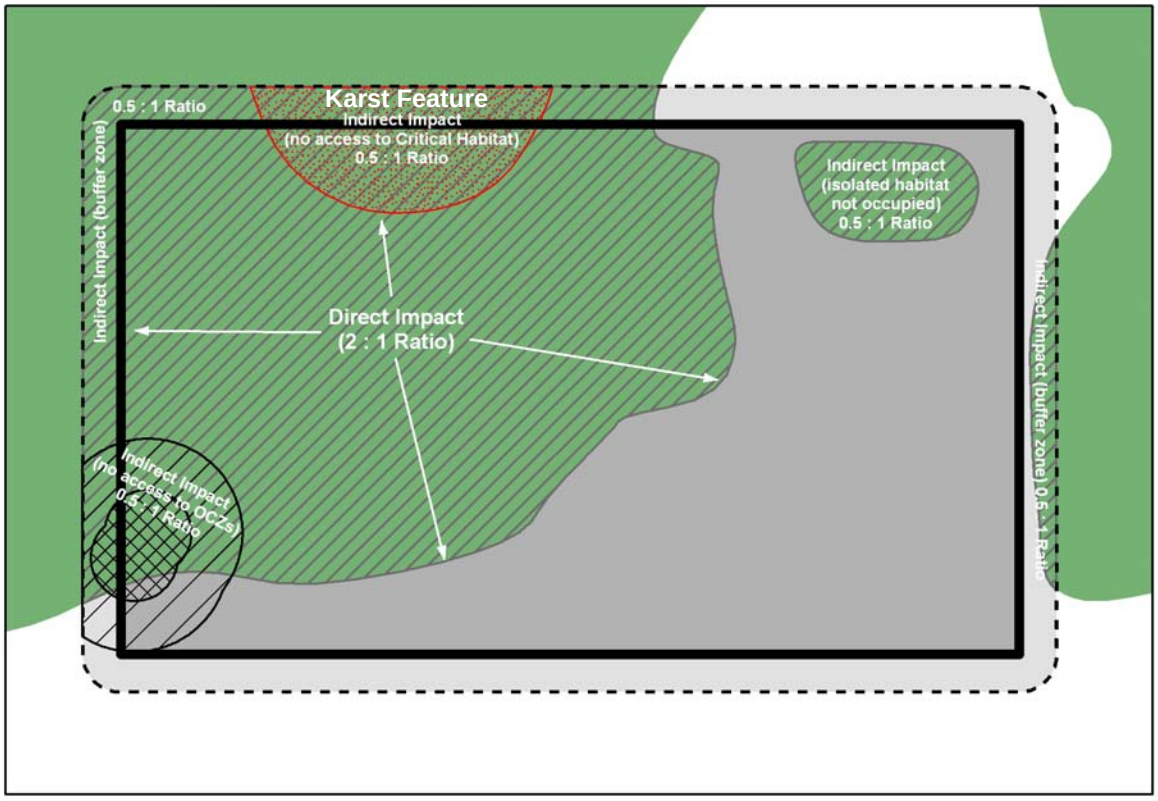
- **Direct Impacts** – Mitigation Ratio of 2:1 (2 acres of protected habitat for each acre of habitat directly impacted); and

- **Indirect Impacts** – Mitigation Ratio of 0.5:1 (0.5 acre of protected habitat for each acre of habitat indirectly impacted).

These mitigation ratios determine how much preserve land for each species must be permanently protected and managed as mitigation for incidental take associated with a participating Covered Activity. The Permittees will assess mitigation needs in terms of Preservation Credits, where one Preservation Credit is equal to one acre of protected occupied habitat for the affected species.

Figure 7 shows a generalized GCW or BCV participation assessment that includes consideration of occupied/unoccupied habitat and karst resources.

FIGURE 7. Sample GCW or BCV Participation Assessment.



3.2.3.2 KARST PARTICIPATION ASSESSMENTS

For the Covered Karst Invertebrates, the SEP-HCP offers incidental take authorization for Covered Activities within an Enrolled Property based on the location of the activity in relation to karst resources and the overall level of conservation that has been achieved for the Covered Karst Invertebrates.

Karst participation certificates will not be issued until the Permittees have secured some level of up-front mitigation for each of the Covered Karst Invertebrates included in the Plan. The level and type of mitigation obtained for each species will likely vary. The Permittees will work with the Service to determine when the appropriate level of up-front mitigation has occurred (see Section 4.5.3 for more details).

OCCUPIED CAVE ZONES

For the purpose of evaluating participation in the SEP-HCP, Occupied Cave Zones will be established around the entrance(s) of each karst feature found within a property to be enrolled or within 750 feet outside of a property to be enrolled that contains one or more of the Covered Karst Invertebrates.

- **Occupied Cave Zone A** – Includes the area generally within 345 feet of the entrance(s)[27] to a karst feature that is occupied by one or more of the Covered Karst Invertebrates. The extent of this zone encompasses approximately 8.5 acres around a feature. Occupied Cave Zone A is intended to include the currently known maximum foraging range of cave crickets (*Ceuthophilus* spp.) associated with central Texas caves (Taylor et al. 2005). Cave crickets are an important component of most karst ecosystems (USFWS 2011b).

- **Occupied Cave Zone B** – Includes the area generally between 345 feet and 750 feet of the entrance(s) to a karst feature occupied by one or more of the Covered Karst Invertebrates. This zone (in combination with Zone A) is intended to encompass all or most of the surface and subsurface resources needed to maintain the long-term viability of an occupied karst feature. The extent of Occupied Cave Zone B is based on the "core buffer zone area" defined in the Texas Commission on Environmental Quality (TCEQ) *Optional Enhanced Measures* (TCEQ 2007). Zone B (in combination with Zone A) circumscribes an area that includes approximately 40 acres and should be sufficient to encompass the surface and subsurface drainage basins of most occupied karst features[28], as well as a representative sample of the most common surface vegetation communities surrounding the feature.

The combined extent of Zone A and Zone B covers approximately 40 acres and is consistent with the minimum area that the Service has recommended for the creation of a medium quality cave preserve (USFWS 2011b). However, additional management may be required for medium quality cave preserves in order to maintain their biological integrity as high quality cave preserves are recommended to be at least 100 acres in size (USFWS 2011b).

Some karst features could have multiple entrances and the Occupied Cave Zone buffers drawn around each of these entrances could overlap. For the purposes of participation in the Plan, overlapping Occupied Cave Zones of the same type (i.e., Occupied Cave Zone A or Occupied Cave Zone B) that are associated with multiple entrances of the same karst feature may be merged together into a single zone. Discrete karst features with overlapping Occupied Cave Zones will remain separate and SEP-HCP participation would require mitigation for access to each discrete zone.

[27] This configuration may not always be a circle, so may not always be 345' or 750' from the entrance(s). For example, adjusting the configuration of the Occupied Cave Zones to protect the cave footprint and/or cave cricket foraging area, but maintaining the 8.5 acre or 40 acre total setback.

28 87% of the subsurface drainage areas estimated by Veni (2002) would be included within a setback with a default radius of 500 feet from the feature(s) (TCEQ 2007).

KARST CONSERVATION BASELINE

The SEP-HCP may provide incidental take authorization for Covered Activities conducted within an Occupied Cave Zone only after certain baseline levels of conservation have been achieved for the Covered Karst Invertebrates that occur in the associated karst feature.

The Conservation Baselines[29] are based on the downlisting criteria described in the Bexar County Karst Invertebrates Recovery Plan (USFWS 2011b). Achievement of the Conservation Baselines will be evaluated and determined on a species-by-species and region-by-region (i.e., by Karst Fauna Regions or "KFRs") basis. All qualifying conservation actions[30] that have been implemented for the Covered Karst Invertebrates will be considered in the determination, regardless of the sponsor of the conservation action. All karst preserves that the Service deems as contributing towards recovery of the Covered Karst Invertebrates will contribute to the karst Conservation Baseline, even if the preserves were protected by an entity or effort other than the SEP-HCP.

Table 6 shows the number, type, and distribution of karst preserves that comprise the Conservation Baselines for the Covered Karst Invertebrates. In practice, the total number of karst preserves needed to achieve the Conservation Baselines may be lower than the sum of the preserves for each species shown in Table 6, since some features may contain more than one of the listed species.

The Service's current standards for high and medium quality karst preserves are described in their Karst Preserve Design Recommendations (USFWS 2012b). In addition to other considerations, the Service currently considers a qualifying medium quality karst preserve as containing at least 40 acres and a qualifying high quality karst preserve as containing at least 100 acres, in addition to other criteria (USFWS 2012b).

[29] The Conservation Baselines are the minimum requirements needed for each of the Covered Karst Invertebrates within each KFR based on the downlisting criteria described in the Bexar County Karst Invertebrates Recovery Plan (USFWS 2011b).

[30] Qualifying conservation actions would be any other activity outside of preserve acquisition, which would be considered and approved by the Service as contributing to the conservation baseline for the Covered Species. Examples of qualifying conservation actions could include, but are not limited to: surveying for new localities for the Covered Karst Invertebrates; establishing additional protections to currently known Covered Karst Invertebrate-occupied features; establishing protection of the areas surrounding a feature in the event that additional protective measures cannot be placed o the features entrance, or implementing protective measures necessary to improve the long-term viability of the occupied feature.

TABLE 6. Conservation Baselines needed for the Covered Karst Invertebrates based on current knowledge of species distribution.

Species	Number of KFRs Where Species is Currently Known To Occur	Minimum Configuration of Preserves Needed in Each KFR[1]					Total Number of Preserves Needed		
		KFR #1	KFR #2	KFR #3	KFR #4	KFR #5	High Quality	Medium Quality	Total
Rhadine exilis	5	1H +2M	1H +2M	1H +2M	1H +2M	1H + 2M	5	10	15
Rhadine infernalis	5	1H + 2M	1H + 2M	1H + 2M	1H + 2M	1H + 2M	5	10	15
Batrisodes venyivi	2[31]	2H + 1M	1H + 2M				3	3	6
Neoleptoneta microps	1	3H + 3M					3	3	6
Cicurina madla	4	1H + 2M	1H + 2M	1H + 2M	1H + 2M		4	8	12
Cicurina Venii	1	3H + 3M					3	3	6
Cicurina vespera	1	3H + 3M					3	3	6

[1] H = High Quality Preserve; M = Medium Quality Preserve

If the Conservation Baselines have been achieved within a particular KFR for each of the Covered Karst Invertebrates known to occur within a particular karst feature, then an Applicant may obtain incidental take authorization for Covered Activities conducted within one or both of the Occupied Cave Zones associated with that feature.

If the Conservation Baselines have not been achieved for one or more of the Covered Karst Invertebrates that are known to occur in a particular karst feature, then the SEP-HCP will not provide incidental take authorization for Covered Activities in the Occupied Cave Zones of the feature. In these cases, a Participant will be required to avoid all surface and subsurface disturbances within designated Occupied Cave Zones until the appropriate Conservation Baseline for each of the Covered Karst Invertebrates that are known to occur in the particular karst feature has been achieved.

For example, if the Service determines that one high quality karst preserve and two medium quality karst preserves containing *R. infernalis* have been created in the Stone Oak KFR, then the SEP-HCP may allow a Participant with an Enrolled Property located in the Stone Oak KFR to access the Occupied Cave Zones of a karst feature containing *R. infernalis*. However, if that same karst feature also contains *R. exilis* and the Service has determined that there are not sufficient karst preserves established for *R. exilis* in the Stone Oak KFR to meet the Conservation Baseline for this second

[31] While the Service has records of this species being known from the UTSA KFR, there is not confirmation of the cave location, therefore at this time; the Service only recognizes this species as occurring in 2 KFRs, and does not recognize the UTSA KFR as having the species.

species, then the Participant must avoid all impacts to that feature until the Conservation Baseline for *R. exilis* in the Stone Oak KFR is also achieved.

The Permittees will make current information from the Service regarding the conservation level of each of the Covered Karst Invertebrates available to Applicants.

Applicants will be requested to coordinate with the Permittees for the purpose of establishing recovery-quality karst preserves around occupied karst features located within properties to be enrolled in the Plan.

KARST FEATURES DISCOVERED DURING CONSTRUCTION

Some karst features may not have surface expression within an Enrolled Property and their presence might not be detected during the pre-application karst surveys required by the SEP-HCP. A Participant who has completed the enrollment process and obtained a Participation Certificate authorizing take might encounter such a feature while engaging in surface grading or subsurface drilling, trenching, or other similar Covered Activities. The pre-application karst surveys and avoidance measures required for Plan participation minimizes the risk of encountering previously undetected, occupied features during construction. Nevertheless, the risk of such an encounter cannot be completely eliminated.

By participating in the SEP-HCP and contributing to the karst conservation program by providing survey data, avoiding known features, and/or paying participation fees, Participants will be fully covered for any unknown or accidental incidental take of the Covered Karst Invertebrates that might occur by encountering a previously undetected karst feature during implementation of Covered Activities within an Enrolled Property. Participation Agreements will include special conditions (see Section 3.2.4.3) for investigating and closing karst features accidentally discovered during Covered Activities.

DESIGNATED CRITICAL HABITAT

Critical Habitat designations are officially published by the Service in the Federal Register. Designated Critical Habitat for the federally listed karst invertebrates in Bexar County was defined by the Service in 2012 after public notice and comment (USFWS 2012a). Currently, 30 units of designated Critical Habitat are defined within Bexar County. The current Critical Habitat designations include approximately 4,216 acres distributed among the 30 individual units. Figure 5 shows the locations of the current Critical Habitat designations.

In general, the SEP-HCP requires that Participants avoid conducting activities within areas of designated Critical Habitat. However, Applicants with properties containing designated Critical Habitat may consult with the Service for a determination of whether or not the proposed project would destroy or adversely modify the designated Critical Habitat for the Covered Karst Invertebrates. Determination will be made by the Service on a case-by-case basis and in consideration of the specific site conditions at the time the request is made. This determination will be through formal consultation (either ESA section 7, if there is a federal agency involved, or section 10 for non-federal entities). If the Service determines that no adverse modification or destruction of that designated Critical Habitat will occur from the proposed project, then the Service may allow that project to participate in the SEP-HCP.

Areas of designated Critical Habitat allowed to participate in the SEP-HCP by the Service will be subject to the requirements of the SEP-HCP, but may also be subject to additional terms and conditions as may be required by the Service.

3.2.4 COMPLETING ENROLLMENT

The Permittees will review complete applications and determine if the Applicant, the property to be enrolled, and the planned activity are eligible to participate in the SEP-HCP. For eligible applications, the Permittees will determine the level of mitigation that would be needed to complete the enrollment process. The Permittees will notify the Applicant of its determinations and describe the options available to complete the enrollment process.

3.2.4.1 DETERMINATION LETTERS

For each complete application submitted by an Applicant, the Permittees will complete the following tasks:

1. Determine if the Applicant, property to be enrolled, and the planned activity are eligible to participate in the SEP-HCP.
    a. Applicants must be non-federal entities conducting Covered Activities that are non-federal actions; and
    b. The property to be enrolled must be consistent with the geographic limitations of the Covered Activities (as described in Section 3.1).
2. Determine if the biological information submitted with the application meets the established standards.
3. Complete participation assessments for the GCW and BCV and determine the level of mitigation needed to compensate for anticipated impacts to these species (as described in Section 3.2.3).
    a. Determine the acres of GCW and BCV habitat associated with the property to be enrolled that would be directly or indirectly impacted;
    b. Calculate the number of GCW and BCV Preservation Credits that would be needed to mitigate for the direct and indirect impacts, based on the established mitigation ratios; and
    c. Determine whether sufficient Preservation Credits are currently available for purchase from the SEP-HCP to cover the mitigation needs for the property to be enrolled.
4. Complete participation assessments for the Covered Karst Invertebrates and determine the level of mitigation needed to compensate for anticipated impacts to these species (as described in Section 3.2.3).

a. Coordinate with the Service to determine whether or not the Conservation Baselines have been met for the Covered Karst Invertebrates associated with Occupied Caves Zones within the property to be enrolled;

b. Verify with the Service to determine whether or not the Service will allow enrollment within a designated Critical Habitat unit;

c. Determine whether or not the SEP-HCP may allow new enrollment within areas of Karst Zones 1 and 2 (see Section 7.2.1 – Pace and Quantity of Karst Preserve Acquisitions);

d. Determine the participation fees that would be needed to provide mitigation for impacts within the Occupied Cave Zones that are eligible for incidental take authorization (discussed in Section 3.4.2.2).

5. Determine whether or not to extend an invitation to Applicant to complete the enrollment process.

The Permittees will document these findings in a "Determination Letter" to the Applicant. The Determination Letter will notify the Applicant of the current fee levels and explain options for offering preserve land in lieu of Preservation Credit purchase or fees (described in Section 3.2.4.2).

If the balance of the SEP-HCP GCW or BCV Preservation Credits is insufficient to meet the mitigation needs for a specific property, the Permittees will encourage the Applicant to offer preserve land in lieu of the purchase of Preservation Credits (see Section 6.2). If that option is unavailable or is not mutually accepted by the Permittees and the Applicant, the Permittees will suspend the invitation to complete enrollment until sufficient Preservation Credits have been established.

Similarly, if the Plan is temporarily unable to provide incidental take authorization within Occupied Cave Zones that may occur within the property to be enrolled, the Permittees will encourage the Applicant to offer karst preserves that would then achieve Conservation Baselines for the affected species. Such conservation actions could also provide mitigation in lieu of participation fees. If incidental take authorization is not available for an Occupied Cave Zone or designated Critical Habitat area on the property to be enrolled, then the Applicant is not authorized under the SEP-HCP to disturb these areas.

The Permittees, at their discretion may elect to reserve a certain number of Preservation Credits for the Permittees' own use. In turn, this reservation of Preservation Credits may result in the suspension of an invitation to participate in the SEP-HCP or full rejection of an application for participation in the Plan until the appropriate amount of Preservation Credits is available for approval of the application (see Section 5.0).

Determination Letters will be valid for a period of no more than one year from the date of issuance by the Permittees, which will be stated in the letter. After one year, the findings of the Determination Letter will be deemed to have expired and a new application (complete with new or updated biological information) would be necessary to continue with the enrollment process.

The Permittees will provide a copy of each Determination Letter and a copy of the associated application package to the Service at the time the Determination Letter is sent to the Applicant.

3.2.4.2 FORMS OF MITIGATION

The Permittees, at their discretion, can offer Applicants three ways of providing the mitigation for their proposed activity: (1) the purchase of GCW or BCV Preservation Credits from the SEP-HCP, (2) the payment of karst participation fees, or (3) the provision of suitable preserve land in lieu of Preservation Credit purchases or fees. A combination of these forms of mitigation may also be acceptable, depending on the Applicant's proposed activity.

GCW AND BCV PRESERVATION CREDITS

GCW and BCV preserve land that meets the minimum standards described in Section 6.2.1 will generate Preservation Credits for the SEP-HCP. One Preservation Credit is generally equivalent to one acre of occupied GCW or BCV habitat that is permanently protected and managed for the benefit of the respective species. Therefore, mitigation will be generated in proportion to the number of acres of GCW and BCV habitat and habitat buffers contained within the preserve. The Permittees will track these Preservation Credits and make them available to Applicants as mitigation as provided herein.

Applicants wishing to complete the enrollment process may purchase the appropriate number and type of Preservation Credits from the Permittees, as described in Section 3.2.3.1 – GCW and BCV Participation Assessments.

The purchase fees for each GCW and BCV Preservation Credit are set at the discretion of the Permittees and may change over time, as may be more particularly set out in the Interlocal Agreement[32]. The Permittees will publically advertise the current fee amounts on a program website, with printed program brochures, and/or through similar methods of communication. Initially, the Permittees anticipate that the fees will be set at **$4,000 per Preservation Credit**. At this fee level, Applicants would be charged $8,000 per acre of directly impacted GCW or BCV habitat and $2,000 per acre of indirectly impacted GCW or BCV habitat.

KARST PARTICIPATION FEES

Applicants may provide mitigation for impacts to the Covered Karst Invertebrates in the form of participation fees that are assessed on the basis of obtaining access to Occupied Cave Zones. If the current Conservation Baseline allows for Covered Activities to occur within an Occupied Cave Zone, then an Applicant may pay participation fees to obtain SEP-HCP incidental take authorization within one or both of Occupied Cave Zones A and B (see Section 3.2.3.2 and Figure 8).

If Conservation Baselines allow for access to discrete, but overlapping, Occupied Cave Zones, then participation fees will be assessed for access to all four zones. Participants must agree to avoid all surface and subsurface disturbances within Occupied Cave Zones for which participation fees have not been provided and all designated Critical Habitat areas for which the Service has determined that destruction or adverse modification of designated Critical Habitat is likely.

[32] Increased costs including, but not limited to: acquisition, management, administration, and research components of the SEP-HCP are each individual and independent factors in which purchase fees for GCW and BCV Preservation Credits could change over time. The Permittees do not anticipate public participation in the fee review process.

Karst participation fees will be set at the discretion of the Permittees, and may change over time, as may be more particularly set out in the Interlocal Agreement[33]. The Permittees will publically advertise the current fee amounts on a program website, with printed program brochures, and/or through other similar methods of communication. Initially, the Permittees anticipate that karst participation fees will be set at the following levels:

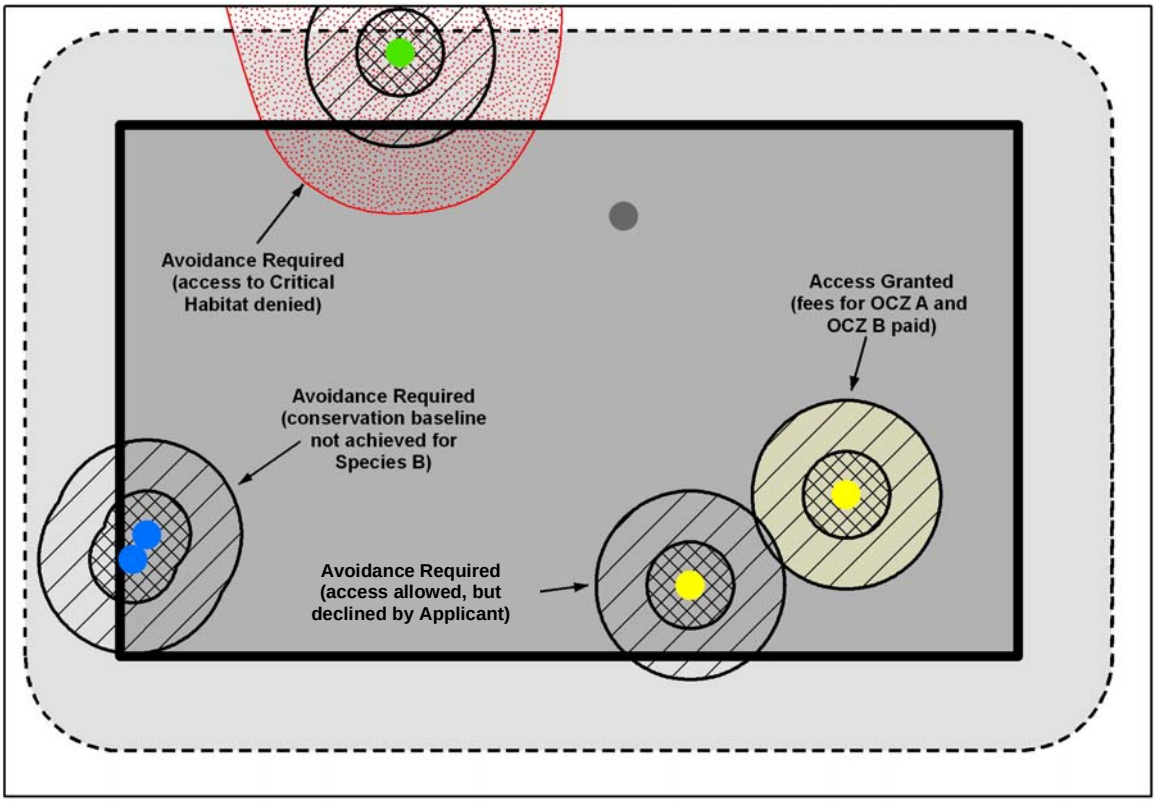
- **Occupied Cave Zone A** = $400,000 per individual zone
- **Occupied Cave Zone B** = $40,000 per individual zone

For Participants in compliance with the terms and conditions of their Participation Agreement, incidental take authorization for the Covered Karst Invertebrates is automatically provided within an Enrolled Property for areas that may occur outside of Occupied Cave Zones and non-accessible designated Critical Habitat areas, including take that may be associated with karst features accidentally discovered during construction. To help ensure that all Covered Activities comply with the terms and conditions of the Participation Agreement, appropriate compliance measures will be developed, as may be more particularly set out in the Interlocal Agreement. Applicants who enter into a Participation Agreement with the Permittees will also be required to comply with all of the special conditions and other applicable laws pertaining to activities conducted on their Enrolled Property that could result in the taking of Covered Species (see Section 3.2.4.3). Furthermore, as a third-party to the Participation Agreement, the Service retains the right to enforce the terms of the Participation Agreement and any related applicable laws.

Figure 8 shows an example of a karst participation assessment indicating areas where avoidance is required and areas where access to Occupied Cave Zones is allowed.

[33] Increased costs including, but not limited to: acquisition, management, administration, and research components of the SEP-HCP are each individual and independent factors in which participation fees for impacts to karst could change over time. The Permittees do not anticipate public participation in the fee review process.

FIGURE 8. Sample Karst Participation Assessment.



GCW OR BCV PRESERVES IN LIEU OF PRESERVATION CREDIT PURCHASES

In lieu of purchasing Preservation Credits from the SEP-HCP, Applicants may offer occupied preserve land for the GCW or BCV as full or partial mitigation for the impacts of their incidental taking. The Permittees will have the discretion to accept or reject all offers of preserve land in lieu of Preservation Credit purchases on a case-by-case basis. Any preserve land offered in lieu of Preservation Credit purchases must meet the minimum standards for GCW or BCV preserves, as described in Section 6.2.1, and be approved by the Service. By accepting an offer of preserve land in

lieu of purchasing Preservation Credits, the Permittees commit to protect and manage the offered preserve land in perpetuity, in the same way as other SEP-HCP preserves.

The level of mitigation provided by an offer of preserve land will be established in the same manner as for other SEP-HCP preserves and will be expressed in terms of the number of Preservation Credits created for each species.

If the Permittees accept an offer of preserve land from an Applicant and the offered preserve land creates more Preservation Credits than are needed to offset the impacts of the Applicant's activity, the excess Preservation Credits may be treated as follows:

- Option 1: The excess Preservation Credits may be added to a special account of the SEP-HCP and reserved for the future use of that Applicant/Participant or its assigns.
- Option 2: The Permittees may negotiate the acquisition of the excess Preservation Credits from the Applicant/Participant and make the excess Preservation Credits available for purchase by other Applicants.

KARST PRESERVES IN LIEU OF PARTICIPATION FEES

In lieu of paying karst participation fees to the Permittees, an Applicant may offer new karst preserves as mitigation for incidental take. The offered karst preserve in lieu must be occupied by one or more of the Covered Karst Invertebrates and can be from within the Enrolled Property or the Applicant can seek to find occupied karst preserves outside of the Enrolled Property. All karst preserves accepted in lieu of participation fees are subject to the same standards and approval process as other SEP-HCP karst preserves (see Section 7.2) and must fulfill an unmet need towards achieving the Conservation Baseline for at least one of the Covered Karst Invertebrates. For each unmet Conservation Baseline need that is fulfilled by an accepted in-lieu karst preserve, an Applicant may apply the Preservation Value[34] as mitigation for one (1) occupied karst feature within the Enrolled Property, assuming the Conservation Baseline for that (those) species has been met in that KFR. For example, an Applicant may offer one karst preserve in an area that would protect two of the Covered Karst Species for which the Conservation Baselines have not yet been met and use the in-lieu preserve as mitigation for obtaining take authorization for two on-site features that contain species for which the regional Conservation Baselines have been met. Any excess Preservation Value from such transactions may not be carried over or applied to other Enrolled Properties[35].

The Permittees will have the discretion to accept or reject all offers of preserve land in lieu of karst participation fees on a case-by-case basis. All offers of preserve land will also require the approval of the Service.

[34] For the purposes of the SEP-HCP, Preservation Value is the assessed level of mitigation required for obtaining take authorization for one (1) occupied karst feature within the Enrolled Property for which the regional Conservation Baselines have been met through the fulfillment of an unmet need towards achieving the Conservation Baseline for at least one of the Covered Karst Invertebrates in an in-lieu transaction. For each unmet Conservation Baseline need that is fulfilled by an accepted in-lieu karst preserve, an Applicant may apply the Preservation Value as mitigation for one (1) occupied karst feature within the Enrolled Property. Any excess Preservation Value from such transactions may not be carried over or applied to other Enrolled Properties.

[35] For example, an Enrolled Property would generate excess Presrvation Value during a karst transaction if the Applicants in-lieu preserve offers one (1) karst preserve in an area that would protect two (2) of the Covered Karst Species for which the Conservation Baselines have not yet been met and would be used by the Applicant as mitigation for obtaining take authorization for one (1) on-site feature that contain species for which the regional Conservation Baselines have been met. The in-lieu mitigation for the Enrolled Property would generate an excess Preservation Value of one (1) on-site feature containing species for which the regional Conservation Baselines have been met.

The option of providing karst preserves in lieu of fees would allow an Applicant to provide a Service-approved karst preserve located anywhere across the range of the Covered Karst Invertebrates and harboring any of the individual Covered Karst Invertebrate species as mitigation for incidental take within an accessible Occupied Cave Zone. Since incidental take authorization within the Occupied Cave Zones is only provided after the regional Conservation Baselines have been achieved for the species in the associated karst feature, the Plan encourages Applicants to find preserve opportunities that fulfill unmet Conservation Baseline needs. With limited resources for karst conservation and a high degree of competition with other land uses, any karst preserve that helps achieve the recovery of any of the Covered Karst Invertebrates is extremely valuable for conservation purposes – even if the "in-lieu" preserve protects species that are not found in the taken Occupied Cave Zone or that occur in a different Karst Fauna Region. This approach is similar to the acquisition priorities that the Permittees will implement as it evaluates available karst conservation opportunities and decides how to apply collected participation fees and other funds allocated to karst conservation. In practice, it is assumed that the most commonly encountered species on Enrolled Properties will also be the most commonly encountered species in potential preserves. For the very rare and least common of the Covered Karst Invertebrates, the conservation value of identifying and protecting new localities is exceptionally high and should be given the highest priority for acquisition.

By accepting an offer of in-lieu preserve land, the Permittees commit to protect and manage the offered preserve land in perpetuity, in the same way as other SEP-HCP preserves.

3.2.4.3 PARTICIPATION AGREEMENTS AND SPECIAL CONDITIONS

Applicants who are invited to complete enrollment in the SEP-HCP may voluntarily elect to provide the necessary mitigation and obtain incidental take authorization for Covered Activities within the Enrolled Property. Applicants may also elect at any time to decline completion of the enrollment process.

Eligible Applicants who elect to complete the process and provide the required mitigation will enter into a "Participation Agreement" with the Permittees. By entering into the Participation Agreement, the Applicant agrees to be bound by and comply with the terms of the agreement and all applicable terms of the SEP-HCP's ITP. Applicants who enter into a Participation Agreement with the Permittees will also be required to comply with all other applicable laws pertaining to activities conducted on their Enrolled Property that could result in the taking of Covered Species. In return for this commitment, the Applicant may benefit from the incidental take authorization and regulatory assurances granted by the Permit.

The Permittees will coordinate with the Service to develop an appropriate form and content for SEP-HCP Participation Agreements that will address, among other items, the special conditions described below. The general form and content of Participation Agreements will be approved by the Service prior to completing the enrollment process for the first Participant; however, the form of Participation Agreements may be subject to change as mutually agreed to by the Permittees and the Service. Any such changes to Participation Agreements would only apply to future Applicants; previously executed Participation Agreements would not be affected by such changes.

SPECIAL CONDITIONS FOR GCW AND BCV

Seasonal Clearing and Construction Restrictions

Participation Agreements will require Participants to minimize impacts to the GCW and BCV during their respective breeding seasons by imposing seasonal clearing and construction restrictions. These seasonal clearing restrictions will only apply to Participants conducting Covered Activities within their Enrolled Property. The Permittees will not impose these restrictions on non-participants or lands not enrolled in the SEP-HCP.

The seasonal clearing and construction restrictions will be in effect between March 1 through July 31 for activities affecting GCW habitat and between March 15 through August 31 for activities affecting BCV habitat. The dates for seasonal restrictions are supported by the breeding phenologies presented in Ladd and Gass (1999) and Grzybowski (1995).

No removal of woody vegetation that would cause the loss or degradation of suitable habitat for the GCW or BCV may occur during these periods, as applicable. Other construction-related activities that do not involve the removal of woody vegetation may occur during these periods provided that (1) the construction activities are part of a continuous set of construction activities that began during the non-breeding season; (2) are performed in a reasonably prompt and expeditious manner; and (3) the Participant is complying with all of the terms and conditions of the Participation Agreement.

The Permittees may grant exceptions to these restrictions if a GCW or BCV survey conducted in accordance with the Service's protocols for presence/absence surveys during that species' breeding season indicates that the species is not present within 300 feet of the planned activity, and an onsite permitted biologist verifies on a daily basis during the Covered Activity that no GCW or BCV are within 300 feet of the planned activity. An applicable species survey for this purpose must be conducted in the same year as the start of the planned clearing or construction activity.

Oak Wilt Prevention

Participation Agreements will require Participants to minimize potential impacts to GCW habitat from oak wilt by requiring that Participants follow the Texas Forest Service's or professional arborist's guidelines for the prevention of oak wilt when clearing or trimming trees within their Enrolled Property. These oak wilt prevention measures will only apply to Participants conducting Covered Activities on their Enrolled Property. The Permittees will not impose implementation of these measures on non-participants or lands not enrolled in the SEP-HCP.

The Texas Forest Service recommends eliminating diseased red oaks, handling firewood properly, and painting wounds on healthy oaks to prevent the spread of oak wilt. According to the Texas Forest Service, all wounding of oaks (including trimming, limbing, and pruning) should be avoided from February through June. The least hazardous periods for trimming are during the coldest days in midwinter and extended hot periods in mid- to late summer. Regardless of season, all trimming cuts or other wounds to oak trees, including freshly-cut stumps and damaged surface roots, should be treated immediately with a wound or latex paint to prevent exposure to contaminated insect vectors.

SPECIAL CONDITIONS FOR KARST INVERTEBRATES

Avoidance Zones for Karst Features

Participation Agreements will require Participants to establish legally enforceable avoidance zones containing all Occupied Cave Zones and Critical Habitat areas for which Participants do not have incidental take authorization. This requirement applies to karst areas for which the SEP-HCP may not authorize incidental take because of an insufficient Conservation Baseline and zones for which Participants do not elect to obtain otherwise available coverage.

Similar to the requirements described in TCEQ's *Optional Enhanced Measures* (TCEQ 2007), within 60 days after the execution of a Participation Agreement, Participants must submit proof to the Permittees that the boundaries of these avoidance zones have been established by an instrument (e.g. recorded through a plat, deed restriction, easement, or other legally enforceable document) recorded in the real property records for the county or counties where the Enrolled Property is located. The legal instrument must restrict all direct surface and subsurface disturbance within the Occupied Cave Zone(s) until such time (if ever) incidental take authorization within that Occupied Cave Zone(s) has been obtained. Such instruments must effectively restrict mineral development by joinder of mineral owner, unless Participant provides a report or letter from a licensed geologist indicating that the likelihood of mineral development on such Enrolled Property is "so remote as to be negligible."

Participants will be required to install fencing and sedimentation controls around Occupied Cave Zones and Critical Habitat areas that are subject to avoidance measures prior to the initiation of Covered Activities.

In some cases, the restrictions associated with avoidance zones will be permanent. In other cases, the restrictions may be lifted if Participants are able to obtain incidental take authorization for the Covered Karst Invertebrates in the future.

Karst Features Discovered During Construction

Participants will be automatically covered for Incidental Take of the Covered Karst Invertebrates that may occur in association with occupied karst features discovered during construction, where such features were not identified during the required pre-application karst surveys (as described in Section 3.2.2.2). A karst feature is defined as a subsurface void that is approximately three feet or more in length or diameter and at least three feet deep for this assessment (USFWS 2015). The risk of encountering such features is reduced by the required surveys and the extent of Occupied Cave Zone boundaries, but cannot be completely eliminated.

As a condition of this automatic coverage, Participants will be required to adhere to additional compliance measures, as may be more particularly set out in the Interlocal Agreement, and implement the following measures if a previously unknown karst feature is discovered during implementation of a Covered Activity:

1. Participants must immediately stop all construction and other Covered Activities within 50 feet of the discovered karst feature (a larger buffer distance may be required for some circumstances to protect the safety of work crews and/or biologists operating in or near the feature); cover the feature with a tarp, sandbags, or other waterproof

materials; and notify the Permittees within 24 hours that a new feature has been identified;

2. Participants must suspend construction and other Covered Activities within 50 feet of the discovered karst feature (or larger area, if appropriate for safety reasons) for a period of up to seven days after notification has been made to the Permittees (suspension period);

3. During the suspension period, Participants must make the feature available to the Permittees for investigations, studies, and/or surveys to be conducted by biologists holding or named on a valid section 10(a)(1)(A) USFWS Threatened and Endangered Species permit for the Covered Karst Invertebrates. The Permittees may use the seven-day suspension period to collect information about the discovered karst feature that may add to the current understanding of the distribution of karst habitats and species. The Permittees will coordinate with the Service on appropriate protocols for such investigations prior to the issuance of karst Participation Certificates;

4. Participants must implement the following measures (or similar measures otherwise approved by the Service) immediately following the suspension period for features that may provide habitat for karst fauna, if the karst feature will not be completely removed by planned construction activities:

    a. Design a feature closure plan that incorporates a minimal amount of blockage of mesocavernous (small openings that are not humanly enterable) connections in the subsurface. The design will create a zone of tunnels among large rocks at the bottom of the feature of at least 3 inches in diameter around large, irregularly shaped rocks that will mimic natural mesocaverns. At a minimum, closure of the feature to exposure from outside elements will use natural materials (i.e., rocks and pebbles) from the immediate vicinity that are grouted together with a brick-mortar substance or comparable substance, pursuant to TCEQ 2007, Appendix A. Materials used to close the feature will not include metal or plastic of any kind. The closure “wall” will be designed to resemble as closely as possible the existing conditions within the feature prior to discovery and will be sturdy enough to prevent any backfill from entering the feature.

    b. Where features are divided by construction activities, to the extent practicable, a small conduit will be constructed to maintain an ecological connection between the two sides of the feature. The conduits will be constructed using natural materials (i.e. rocks and pebbles) from the immediate vicinity that are grouted together with a brick mortar substance.

    c. Drainage will be graded away from the feature such that the first flush of storm water runoff from surrounding area will not likely enter the void.

    d. The use of silt fences and other standard Edwards Aquifer BMP’s, including designating a buffer where vehicles are not stored or re-fueled will be required during construction activities.

e. Reasonable caution will be exercised when working around features to avoid spilling oil, grease, or any other foreign substance on the ground within 50 feet of the feature or in the feature.

f. A summary report describing how the feature was closed will be prepared by the Participant and submitted to the Permittees within 10 business days of completing the closure measures.

If a discovered karst feature does not provide habitat for karst fauna, then the Permittees may notify the Participant that Covered Activities may resume prior to the expiration of the seventh day of the suspension period and must follow all applicable closure regulations in place at the time of discovery (currently TCEQ 2007).

Best Practices to Minimize Impacts to Occupied Karst Features

Participants will be encouraged to implement best practices that may reduce impacts to karst habitats within an Enrolled Property, such as:

1. Limit vegetation clearing and other surface or subsurface disturbances caused by the Covered Activity, to the extent practicable[36];

2. Revegetate disturbed areas with native plants and manage open spaces in a manner that maintains the characteristics of a native woodland or savanna plant community;

3. Install semi-pervious surfaces in place of impervious surfaces, but only where there is no or low risk of contaminants; and

4. During active construction within an Enrolled Property:

    a. use non-permeable drip collectors under construction equipment when the equipment is idle;

    b. inspect equipment daily for leaks and immediately repair all leaks or remove the leaking equipment from the Enrolled Property;

    c. store fuel and other hazardous materials outside of the Enrolled Property;

    d. avoid refueling equipment or vehicles within the Enrolled Property; and

    e. avoid releasing any chemicals, petroleum products, or other hazardous materials into the ground or water.

OTHER CONDITIONS

The Permittees will have the right to inspect Enrolled Properties for compliance with terms of the applicable Participation Agreement. The Permittees may suspend or revoke the incidental take authorization of any Participant that is not in compliance with the terms of its Participation Agreement.

36 To the extent practicable is in reference to the proposed project activities in which take authorization has been sought. The Permittees do not intend to further encumber an Enrolled Property, but encourage Participants that have obtained take authorization as part of the special conditions for Karst Invertebrates to consider incorporating these recommendations in their project in order to further reduce potential environmental impacts to the Plan Areas sensitive natural resources.

Participants will also be required to comply with all other applicable laws with respect to its Enrolled Property and Covered Activities as a condition of signing the Participation Agreement.

By entering into a Participation Agreement with the Permittees, Participants not only agree to comply with the applicable terms and conditions of the Plan, the Permit, and their individual Participation Agreement, but they also agree to comply with all other applicable laws pertaining to activities conducted on Enrolled Properties that could result in the taking of Covered Species. Therefore, Participants who are in compliance with their Participation Agreement ensure that their taking of the Covered Species is incidental to otherwise lawful activities. A Participant who violates the terms and conditions of their Participation Agreement, including by not conducting their activities in an otherwise lawful manner, may not enjoy the regulatory assurances of the SEP-HCP ITP with respect to incidental takings of the Covered Species.

3.2.4.4 CERTIFICATES OF PARTICIPATION

Once an Applicant has signed the Participation Agreement, the Applicant will return it to the Permittees for a counter signature. The Permittees will obtain the necessary counter signatures and promptly after the Applicant has also satisfied the mitigation requirements, will then issue the Applicant (now an enrolled Participant) a “Certificate of Participation” and a fully-executed copy of the Participation Agreement. The Permittees will submit a copy of the fully-executed Participation Agreement and the issued Certificate of Participation to the Service within 10 business days after all signatures have been obtained.

The Permittees will record the issued Certificate of Participation and Participation Agreement in the Real Property Records of the appropriate county or counties where the Enrolled Property is located. The Certificate of Participation will include a specific description of the Enrolled Property to which such certificate applies.

The Participant will be required to post a copy of the Certificate of Participation at the Enrolled Property during the implementation of Covered Activities.

So long as a Participant is in compliance with its Participation Agreement, that Participant shall be deemed to have (with respect to the Enrolled Property) the full rights, benefits, and authorizations of the SEP-HCP ITP. The Service agrees that a breach by a Participant of its obligations under a Participation Agreement will not be considered a violation by the Permittees or any other Participant of the SEP-HCP. In the event that a Participant has materially breached its Participation Agreement and, after reasonable notice by the Permittees and an opportunity to come into compliance, such Participant fails to cure, remedy, rectify, or adequately mitigate the effects of such a breach, then the Permittees may terminate that Participant’s Participation Agreement and revoke all rights granted thereunder.

Certificates of Participation and Participation Agreements are not transferable to other properties, but will run with the Enrolled Property for which they were issued. If ownership of an Enrolled Property is transferred, the Certificate of Participation will not terminate, but will continue in full force and effect and will be fully binding upon any heirs, successors, and assigns in interest to the Enrolled Property, or any portion thereof. In the event that the Enrolled Property is partitioned, including

by platted subdivision or otherwise, such partitioned parcel shall remain subject to the rights and obligations set forth in the Participation Agreement[37].

[37] The Participation Agreement and Certificate of Participation will function like any other legally binding, filed and recorded document associated with a piece of real property, such as an easement or deed restriction. It will be up to the new landowner to determine whether or not they choose to exercise their right to utilize the authorizations as provided by the Certificate of Participation and Participation Agreements. If additional Take Authorization remains available, the Permittees will not require the new landowner to utilize them, as participation in the Plan is voluntary. However, the Permittees, as required by the ITP, will continue to require compliance with the terms and conditions of the Participation Agreement and Certificate of Participation. The Permittees view any encumbrances on an Enrolled Property which would carry over obligations or already permitted authorizations to future land owners (via transfer of ownership or other land transaction), would be discovered as part of a standard due diligence process for purchasing a property. Therefore, prior to and upon purchase of an Enrolled Property, the new landowner should be aware of the terms and conditions, and subsequently acknowledges and accepts them, upon completing the purchase of the Enrolled Property.

4.0 INCIDENTAL TAKE AND IMPACTS

4.1 FORMS OF TAKE

The SEP-HCP covers incidental take associated with Covered Activities conducted on Enrolled Properties that involve the loss or degradation of habitat for the Covered Species. The ESA defines "take" of a listed species "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (see 15 USC §1532(19)). It is important to establish how the Covered Activities may incidentally result in take of the Covered Species.

Loss or degradation of habitat for the Covered Species may occur in relation to removing or substantially altering native vegetation communities that may directly provide food and shelter for the Covered Species; disrupting wildlife communities that are related to the Covered Species; altering the physical attributes of the karst environment, such as the type and abundance of substrates, soil compaction, temperature and humidity, and the flow of air and water through the feature; introducing contaminants to the area; introducing noise, light, or other human activities to an area that may disrupt normal behavior patterns; and other similar effect pathways. Removal or degradation of habitat may reduce the absolute area of habitat available to the species, may directly reduce the quality or suitability of habitat so that it is less effective at supporting the species, and may fragment remaining areas of habitat. Habitat fragmentation exposes previously "core" areas of habitat to more intensive external influences that may also degrade the suitability or quality of the remaining habitat.

The Covered Activities may result in incidental take by: (1) directly killing or wounding members of the Covered Species during implementation of a Covered Activity; (2) harming members of the Covered Species by way of habitat degradation that actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding or sheltering; or (3) harassing members of the Covered Species by creating the likelihood of injury by annoying it to such an extent as to significantly disrupt normal behavioral patterns.

4.2 MEASURES OF TAKE

Impacts to habitat will be used as a proxy for impacts to individual members of the Covered Species, since the actual abundances of the Covered Species within any particular Enrolled Property or SEP-HCP preserve tract are unknown.

Using habitat as a proxy for take of individuals is consistent with the Service's approach utilized in other ITPs and ESA section 7 consultations involving the Covered Species. This approach also appears consistent with the limited case law addressing the issue of habitat as a proxy. For example, in *Arizona Cattle Growers' Association v. U.S. Fish and Wildlife Service*, the Ninth Circuit Court of Appeals held that the use of ecological conditions, such as impacting acres of potential habitat, may be used as a surrogate for defining the amount or extent of incidental take so long as these conditions are casually linked to the take of the covered species (273 F.3d 1229, 1249-50 [9th Cir. 2001]; see also *Oregon Natural Resources Council v. Allen*, 476 F.3d 1031, 1037 [9th Cir. 2007]) noting that an Incidental Take Statement that utilizes a surrogate instead of a numerical cap on take must explain why it was

impractical to express as a numerical measure of take. Because expressing the numerical value of individual GCWs, BCVs, or Covered Karst Invertebrates taken by an action is impracticable, as described in greater detail below, the SEP-HCP expresses take as the number of acres of potential habitat for the Covered Species that may be impacted, directly or indirectly, by participating Covered Activities.

While species surveys provide valuable information for determining the extent of occupation of a given area, they do not provide a precise mechanism for predicting the number of individuals that may actually be "taken" by a proposed action. For example, the effectiveness of bird surveys in counting the number of birds in an area (i.e., an absolute census of a population) can be somewhat limited as males of these species are far more easily observed than females or fledglings during surveys, due to their frequent vocalizations. Similarly, detection probabilities for karst invertebrates can be very low (Krejca and Weckerly 2007).

In contrast, the acreage of habitat that may be impacted or protected by a particular action is a relatively stable metric of take and mitigation, compared to the number, size, and location of individuals or breeding territories on a property that may vary from year to year. In addition, the impacts of a given activity may not be fully felt in a single season and may be spread over many years. During this time, the utilization of a given area may vary quite significantly for reasons unrelated to the activity in question. This variability is influenced by species preferences or environmental factors that may include natural year-to-year variations in the precise habitat utilized by individual animals, variations in individual animal behavior that influence detectability, variations in the ability of surveyors to detect and accurately map individual animals, and survey methodology. Therefore, estimates of take and mitigation based on impacts to individual animals or territories as delineated by surveys in any given year are highly variable.

For these reasons, it is not possible to predict the precise number of GCWs, BCVs, or Covered Karst Invertebrates that may, over time, be "taken" or "preserved" as a result of the SEP-HCP's participating Covered Activities or conservation actions. Therefore, take and mitigation in this document are not characterized by a precise count of individual animals, but by the loss and preservation of habitat for the Covered Species.

4.3 TYPES OF IMPACTS FROM COVERED ACTIVITIES

The incidental take authorized through the Permit could have direct and/or indirect impacts on the Covered Species. In a final rule pertaining to Interagency Consultations published in the Federal Register on December 16, 2008, the Service defines "direct effects" as the immediate effects of the action (in this case, the loss or degradation of habitat associated with the conduct of otherwise lawful land uses within Enrolled Properties) that are not dependent on the occurrence of any additional intervening actions for the impacts to species or Critical Habitat to occur. The Service states that "indirect effects" are those which are caused by the Covered Activities and occur later in time, but still are reasonably certain to occur. The Service goes on to explain in this final rule that if an effect will occur whether or not the action takes place, the action is not an essential cause of the indirect effect.

4.3.1 POTENTIAL DIRECT EFFECTS

For the SEP-HCP, the authorization of incidental take associated with participating Covered Activities (i.e., habitat loss and degradation) may directly affect individuals of the Covered Species that

utilize areas of habitat that would be removed or degraded within or adjacent to Enrolled Properties. Killing, wounding, or injuring individuals of a Covered Species by manipulating habitats would be an immediate effect of the activity. Fragmentation of habitat and exposure of core areas to new edge effects can degrade those habitats and also directly harm individuals that are using those adjacent areas. However, the likelihood of a participating Covered Activity directly killing, wounding, or injuring an individual GCW or BCV is substantially reduced by the seasonal clearing restrictions imposed on Participants as a special condition of their Participation Agreements.

With respect to the Covered Karst Invertebrates, direct effects are most likely to occur in relation to Covered Activities that substantially alter the surface or subsurface components of karst habitat within Occupied Cave Zones. Covered Activities within these zones, particularly within Occupied Cave Zone A (the area within 345 feet of a feature entrance), have a reasonable likelihood of directly and measurably killing, wounding, and/or injuring listed invertebrates. Direct effects to karst invertebrate habitat or individuals may also be possible if an occupied karst feature is accidentally opened during construction activities.

For the Covered Karst Invertebrates, the likelihood of directly killing, wounding, or injuring an individual invertebrate is reduced by the required pre-application biological investigations, by restrictions on conducting activities within Occupied Cave Zones and Critical Habitat areas, and by the special conditions included in Participation Agreements.

4.3.2 POTENTIAL INDIRECT EFFECTS

The authorization of incidental take (measured in terms of habitat that is removed or degraded) through the SEP-HCP may also have indirect effects on the Covered Species.

For example, individual GCWs or BCVs that return to an Enrolled Property where habitat has previously been removed or degraded may be harmed by having to move to alternate habitat areas for breeding, feeding, or sheltering. The authorized habitat loss would be an essential cause of this reasonably certain to occur effect on these returning individuals, but would typically occur after the habitat removal was completed.

Other types of indirect effects associated with Covered Activities may be associated with construction activities or other land use practices conducted within an Enrolled Property after the authorized habitat loss/degradation has occurred. Construction activities and other types of human land uses that cause noise or other disturbances can harass neighboring GCWs or BCVs. Human activities within Enrolled Properties can also cause changes to local populations of predator or competitor species, thereby degrading the adjacent habitat and harming adjacent individuals of the Covered Species. Again, these types of effects are reasonably certain to occur as a result of interrelated or interdependent actions of the authorized habitat loss, but would occur after the authorized habitat loss is completed.

For the Covered Karst Invertebrates, indirect effects may occur as a result of changes to the surface plant and animal communities outside of Occupied Cave Zones. Land use changes that reduce the extent or composition of native communities within an Enrolled Property could diminish the long-term viability of such communities and, over time, could affect the quality or quantity of water and nutrients feeding subterranean karst environments. While the covered activities would be an essential cause of

these types of land use changes within Enrolled Properties, the reasonable certainty to which these types of impacts might occur is less clearly established.

4.3.3 POTENTIAL CUMULATIVE EFFECTS

Section 7 of the ESA requires an analysis of the cumulative effects of a proposed federal action, in this case the authorization of incidental take associated with loss or degradation of habitat for the Covered Species. Under the ESA, cumulative effects are defined as the effects of future, non-federal actions that are reasonably certain to occur within an action area. This cumulative effects analysis is used to help the Service determine whether the proposed action is likely to result in jeopardy for a federally listed species or in the destruction or adverse modification of designated Critical Habitat (USFWS and NMFS 1996). "Jeopardy" is defined as follows: "jeopardize the continued existence of" [as in ESA § 7(a)(2)] means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, number, or distribution of that species (50 C.F.R. § 402.02).

When analyzing cumulative effects, the Service determines whether the aggregate effects of the factors analyzed under the environmental baseline, the effects of the proposed action, and the cumulative effects within the action area (when viewed against the status of the species or Critical Habitat) are likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of Critical Habitat.

A regional HCP, such as the SEP-HCP, would not constitute a new federal program authorizing new activities with potential impacts to the human environment. Rather, it would provide a voluntary, alternative means of compliance with the ESA for non-federal entities. This means that project proponents in the Plan Area would retain the ability to use their property and remain in compliance with the ESA through means other than the SEP-HCP (i.e., through avoidance, individual HCPs, or ESA section 7 consultations). Project proponents might also determine that compliance with the ESA is not necessary for their project and develop their property without coordination with the Service (in some cases possibly risking violation of section 9 of the ESA). Therefore, projected future land development activities that do not occur within Enrolled Properties are not interrelated or interdependent to the SEP-HCP.

Service approval of the SEP-HCP and issuance of the related Permit may help to facilitate an effect, such as future land development, but it is not necessarily an essential cause of the effect. The SEP-HCP is not an essential cause of the habitat losses that are projected to occur across the Plan Area, since this habitat loss and the resulting effects to the Covered Species would happen anyway under other ESA compliance options or without ESA compliance. If an effect will occur whether or not the action takes place, the action is not an essential cause effect. Instead, the projected habitat losses from future development trends should be considered in the context of cumulative impacts on the Covered Species.

Indicators of future, non-federal activities that are reasonably certain to occur may include, but are not limited to, those that have been approved by state or local agencies or governments, activities where such approval is imminent, activities where project proponents have made commitments or assurances that the activity will proceed (including the obligation of funds or venture capital), or the initiation of contracts for the activity. However, the “reasonably certain to occur” standard does not

require that the action will occur. Cumulative effects analyses under section 7 of the ESA do not address the potential impacts of speculative, non-federal actions that may never be implemented, nor do they address the effects of past or present activities in the action area (USFWS and NMFS 1996).

The SEP-HCP land development projections consider and account for a much larger set of possible future land development activities than would meet the Service's definition of "reasonably certain to occur." Since the scope of potential future activities described by the land development projections is greater than what is required for a cumulative effects analysis, the cumulative impacts analysis described below does not rely on a detailed accounting of the specific land development, transportation, and utility service projects that have been or will soon be approved, or for which commitments or assurances have been made that the activity will proceed.

4.4 GCW AND BCV TAKE AND IMPACTS

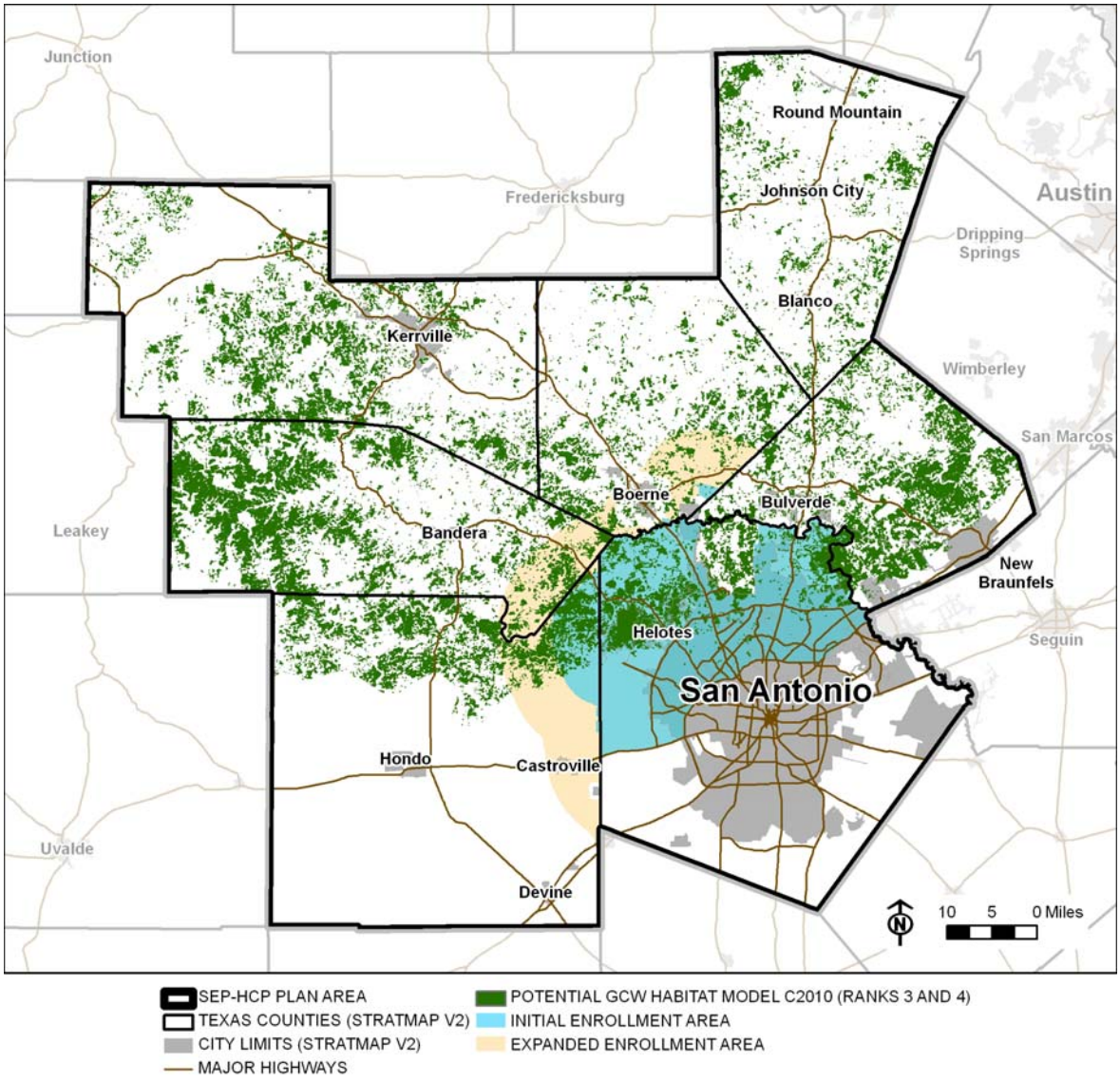
4.4.1 ESTIMATED HABITAT LOSS

The extents of possible future GCW and BCV habitat losses within the Plan Area were estimated by comparing the amount of potentially available habitat for these species to the amount of projected new land development in the region.

For the purposes of this analysis, it is assumed that (1) all potential habitats are occupied by the respective species; (2) development activities result in the complete loss of any co-occurring habitat; and (3) habitats are lost in proportion to the availability of such habitat within a given geographic area and the extent of projected future development within that geographic area. In reality, not all areas of potential habitat will be occupied by the GCW or BCV and the loss of unoccupied potential habitat may not result in incidental take. Furthermore, development intensity is likely to vary among projects and some forms of land development may not result in the complete loss of habitat. Therefore, the estimates of future habitat loss from development activities over 30 years may represent an overestimate of direct habitat losses. However, the presumably generous estimate of direct habitat loss in this analysis should accommodate the undetermined extent of potential indirect habitat losses or degradations from fragmentation or edge effects. It is not possible to reliably predict the nature or extent of potential indirect forms of habitat loss or degradation associated with Covered Activities, such as habitat fragmentation or edge effects, since the precise location and configuration of future development over 30 years is not knowable.

Estimates of available GCW and BCV habitat within the Plan Area are described in Appendix C. Figure 9 shows the general distribution of GCW habitat across the Plan Area. Regional maps of BCV habitat are not available. Section 1.4.2 includes a review of the land development projections for the SEP-HCP and more detail about the land development projections is included in Appendix D.

FIGURE 9. Potential GCW Habitat in the Plan Area.



This analysis assumes that projected new land development will affect potential GCW and BCV habitat in proportion to the availability of such habitat within a SEP-HCP sector. For example, if 25 percent of the area of a sector is identified as potential habitat, then it is assumed that 25 percent of the new development projected for that area will result in habitat loss.

County-level estimates of future habitat losses for the GCW and BCV within the Plan Area are summarized in Table 7. More detailed calculations for estimated habitat losses at the sector level are attached in Appendix E.

TABLE 7. County-level Summaries for Estimated GCW and BCV Habitat Losses Within the Plan Area Over 30 Years.

Plan Area County	Geographic Area	Available Habitat[2]	Percent Habitat	Estimated New Development	Estimated Habitat Loss[3]
GCW HABITAT LOSS					
Bandera	510,319 ac	165,752 ac	32%	8,955 ac	2,428 ac
Bexar[1]	300,101 ac	59,018 ac	20%	85,260 ac	14,883 ac
Blanco	456,589 ac	46,530 ac	10%	1,395 ac	166 ac
Comal	367,673 ac	115,808 ac	31%	73,247 ac	23,163 ac
Kendall	424,289 ac	65,269 ac	15%	18,580 ac	3,413 ac
Kerr	708,840 ac	113,985 ac	16%	12,074 ac	1,565 ac
Medina	853,888 ac	92,308 ac	11%	41,642 ac	5,532 ac
Plan Area Total	*3,621,699 ac*	*658,670 ac*	*18%*	*241,152 ac*	*51,150 ac*
BCV HABITAT LOSS					
Bandera	510,319 ac	7,599 ac	1%	8,955 ac	133 ac
Bexar[1]	300,101 ac	17,856 ac	6%	85,260 ac	5,073 ac
Blanco	456,589 ac	2,275 ac	0.5%	1,395 ac	7 ac
Comal	367,673 ac	3,591 ac	1%	73,247 ac	715 ac
Kendall	424,289 ac	4,945 ac	1%	18,580 ac	217 ac
Kerr	708,840 ac	53,074 ac	7%	12,074 ac	905 ac
Medina	853,888 ac	62,292 ac	7%	41,642 ac	3,034 ac
Plan Area Total	*3,621,699 ac*	*151,632 ac*	*4%*	*241,152 ac*	*10,084 ac*

1 Limited to the extent of the SEP-HCP sectors (i.e., the northwest half of Bexar County). Excludes Camp Bullis.

2 Available GCW habitat per Model C 2010 Ranks 3 and 4. Available BCV habitat per Wilkins et al. 2006. See Appendix C for more detail.

3 Habitat loss estimates summarized herein are based on sector-level analyses and may not be consistent with calculations made at a general county level. See Appendix E for the sector-level calculations.

Participation in the SEP-HCP will be voluntary, and it is expected that not all of the anticipated GCW and BCV habitat losses will actually be authorized through the SEP-HCP. Some project proponents may seek authorization for incidental take directly from the Service via interagency consultations or with individual HCPs. Others may choose to design projects in a way that avoids incidental take and results in no obligation to seek ESA compliance. Finally, some project proponents may otherwise determine that ESA compliance is not necessary or desired for their project.

Therefore, the habitat loss estimates summarized above represent the amount of GCW and BCV habitat losses that may be expected from future land development activities over 30 years, with or without the existence of the SEP-HCP as an ESA compliance option.

4.4.2 INCIDENTAL TAKE AUTHORIZED BY IMPACTS

Excluding some preserves, all Covered Activities are limited to the geographic extent of the Permittees' jurisdictions. This "Enrollment Area" includes all of Bexar County and the portions of the City of San Antonio's jurisdiction (including the City's ETJ) that occur outside of Bexar County (in Medina, Bandera, or Kendall counties, but excluding Comal County, see Figure 9). As described in Section 3.1 – Covered Activities, the Enrollment Area may expand over the duration of the Plan as the City of San Antonio expands its jurisdictional area. For the purposes of estimating the amount of incidental take that the Plan should address and the potential impacts of that taking, this analysis considers take and impacts for an Enrollment Area that includes (1) only the current extent of the Permittees' jurisdictions, including San Antonio's ETJ (the "Initial Enrollment Area") and (2) an "Expanded Enrollment Area" that anticipates possible future expansions of up to six miles beyond the boundary of San Antonio's current ETJ excluding areas already within another municipality's boundary or extra-territorial jurisdictions. Both scenarios exclude any portion of the Permittees' jurisdictions that may occur within Comal County or Camp Bullis.

As described above, it is expected that only a portion of the anticipated GCW and BCV habitat losses within the Enrollment Area will be authorized through the SEP-HCP. The Permittees assume that the level of participation in areas currently within the Permittees' jurisdictions may reach approximately 50 percent (i.e., up to 50 percent of the anticipated habitat losses over 30 years would be authorized through the Plan). The Permittees also assume that approximately 10 percent of the areas that may be subject to future expansions of the City of San Antonio's jurisdiction would participate in the Plan. The lower level of expected participation for the Expanded Enrollment Area considers that these areas will not be eligible for enrollment for the full duration of the Plan.

Table 8 summarizes the currently available habitat, cumulative estimates of new development, and anticipated habitat losses from new development within the Initial and Expanded Enrollment Areas. More detailed calculations at the sector level are included in Appendix E.

TABLE 8. GCW and BCV Available Habitat, Projected Habitat Loss, and Requested Incidental Take for the Enrollment Area[1].

	GCW[3]	BCV[4]
Available Habitat		
Initial Enrollment Area	75,539 ac	20,679 ac
Potential Expansion Areas	37,749 ac	7,645 ac
Total Expanded Enrollment Area	113,288 ac	28,324 ac
Projected Habitat Loss		
Initial Enrollment Area	18,178 ac	5,210 ac
Potential Expansion Areas	2,824 ac	346 ac
Total Expanded Enrollment Area	21,002 ac	5,556 ac
Requested Incidental Take[2]		
Initial Enrollment Area	9,089 ac	2,605 ac
Potential Expansion Areas	282 ac	35 ac
Total Expanded Enrollment Area	9,371 ac	2,640 ac

1 Excludes portions of the Permittees' jurisdictions that occur within Camp Bullis or Comal County.

2 Assumes 50 percent participation level within the current Permittee jurisdictions and 10 percent participation within potential expansion areas.

3 Available GCW habitat based on the results of Model C2010 Ranks 3 and 4 (see the GCW resource assessment in Appendix C).

4 Available BCV habitat based on the county-wide estimates reported in Wilkins et al. (2006). Habitat estimates for Bexar County are adjusted proportionately for the area included in this analysis.

The Permittees request an amount of incidental take authorization for these species that is consistent with these expected levels of voluntary participation.

The Permittees believe that this amount of take authorization (covering up to 9,371 acres of GCW habitat impacts and 2,640 acres of BCV habitat impacts) would be enough to meet a relatively strong demand for participation in the SEP-HCP from landowners, developers, and other non-federal entities over the duration of the Plan and would satisfy the purpose and need for the SEP-HCP.

The Permittees also request incidental take authorization to address the largely self-mitigating management activities (except those covered by a separate section 10(a)(1)(A) USFWS Threatened and Endangered Species permit) conducted within SEP-HCP preserves that might result in temporary incidental take of the GCW or BCV. Such activities might include vegetation manipulation within BCV habitat needed to occasionally set back the successional stage of the woody vegetation or limited thinning within dense GCW habitat to open up areas for enhancing oak regeneration. The occasional need to construct or maintain boundary fencing, access roads, fire breaks, and other similar infrastructure that facilitates effective and responsible preserve management may also result in limited and /or temporary incidental take of the GCW or BCV. As described in Section 9.0 – Adaptive Preserve Management and Monitoring, all management and monitoring activities conducted within SEP-HCP preserves will be implemented in accordance with a site-specific Preserve Management Plan that will have been developed with input from the SEP-HCP advisory committees, other biological experts (as

appropriate), and the Service. Unless otherwise approved by the Service, preserve management activities conducted in accordance with Preserve Management Plans that may cause incidental take will not affect more than 10 percent of the GCW or BCV habitat within the SEP-HCP preserve system in a given year.

4.4.3 REQUESTED TAKE COMPARED TO AVAILABLE HABITAT

The incidental take authorization requested to support the Plan's enrollment process for the GCW and BCV may be used anywhere within the jurisdictions of the Permittees, excluding any part of those jurisdictions that occurs within Camp Bullis or Comal County. This amount of requested incidental take represents only a small amount of the available habitat for the GCW and BCV. Table 9 compares the amount of requested take to the amount of available habitat in the entire Plan Area and in the Initial and Expanded Enrollment Areas.

TABLE 9. Requested GCW and BCV Take Compared to Available Habitat.

	GCW	BCV
Requested Take *(acres of habitat impact)*	9,371 ac	2,640 ac
Available Habitat in:		
Initial Enrollment Area Only	75,539 ac	20,679 ac
Expanded Enrollment Area Only?	113,288 ac	28,324 ac
Plan Area	658,670 ac	151,632 ac
Requested Take as % of Available Habitat in:		
Initial Enrollment Area	12%	13%
Expanded Enrollment Area	8%	9%
Plan Area	1%	2%

In a "worst case" scenario where all of the requested incidental take for the GCW and BCV were to be used only within the Initial Enrollment Area, the requested take would represent approximately 12 to 13 percent of the available GCW or BCV habitat that currently exists in this area. It is more likely that the incidental take authorization will be spread over the entire Expanded Enrollment Area, whereby the requested take would represent only 8 to 9 percent of the currently available habitat. As a percentage of the total amount of GCW or BCV habitat available across the 7-county Plan Area, the requested amount of incidental take would affect less than 2 percent of the currently available habitat.

4.4.4 GCW ANTICIPATED IMPACTS AND RECOVERY POTENTIAL

With respect to the Service's guidance pertaining to cumulative effects analyses, the land development projections and associated estimates of habitat loss for the Plan Area represent a liberal approximation of the potential cumulative extent of such actions over the next 30 years. The potential effects of this estimated cumulative habitat loss on the survival and recovery of the GCW are discussed below.

Table 10 summarizes the possible recovery potential of the GCW in the SEP-HCP region, considering the recovery standards outlined in the 1992 GCW Recovery Plan, current estimates of available habitat, existing and reasonably certain future conservation actions within the Plan Area, and anticipated future habitat losses. To demonstrate that the SEP-HCP incidental take request will not preclude recovery, Table 10 summarizes the cumulative effects of the requested incidental take and the possible recovery potential of the GCW as suggested by the 1992 GCW Recovery Plan, but with the 7-county Plan Area as representative of a single GCW recovery region[38]. An additional scenario was also analyzed, as suggested by the organization of the analysis in Groce et al. (2010) and included Bexar County, Comal County, and Kendall County as representative of a single GCW recovery region.

[38] All 7 counties within the Plan Area occur to some extent with Recovery Region 6 (USFWS 1992). However, for analysis and implementation purposes, the boundary of Recovery Region 6 was extended to the county boundary limits for each of the 7-counties within the Plan Area. Portions of Hays County and Gillespie County included within Recovery Region 6 were excluded for purposes of analysis and implementation since both counties do not occur within the Plan Area and Hays County has their own ITP.

TABLE 10. Estimated GCW Anticipated Impacts and Recovery Potential.

	7-county Plan Area[a]	Bexar/Kendall/Comal Counties[b]
GCW Regional Recovery Standards[1]		
GCW Population	3,000 pairs	3,000 pairs
Protected Habitat	75,000 ac	75,000 ac
Current Environmental Baseline		
Total Current Habitat (Model C2010 Ranks 3 and 4)	658,670 ac	240,095 ac
Explicitly Protected Habitat[2]	8,555 ac	8,529 ac
Partially Protected Habitat[2]	41,511 ac	14,107 ac
Currently Unprotected Habitat	608,604 ac	217,459 ac
Projected Impacts[3]		
Projected Cumulative Habitat Loss (30 years)[3]	51,150 ac	41,459 ac
Unprotected Habitat After Permitted Losses	557,454 ac	176,000 ac
Regional Recovery Progress		
Explicitly Protected Habitat (current)	8,555 ac	8,529 ac
SEP-HCP Protected Habitat[4] (future)	18,742 ac	*Unknown*
Other Reasonably Certain Explicitly Protected Habitat[5] (future)	12,494 ac	6,548 ac
Total Protected Habitat Contributing Towards Recovery (at 30 years)	39,791 ac	15,077 ac
% of Regional Recovery Standard	53%	20%
Remaining Recovery Needs After Existing and Future GCW Conservation Actions	35,209 ac	59,923 ac
Habitat Available for Additional Recovery Actions	517,663 ac	169,452 ac
% of Remaining Recovery Needs	1,449%	283%

1 Recovery standard targets are based on the recommendations of the 1992 GCW Recovery Plan and the 1995 GCW Population and Habitat Viability Workshop. Estimates of the amount of protected habitat needed to support a viable population are based on an average density of 4 GCW pairs per 100 acres (the approximate long-term density of GCWs found on Camp Bullis).

2 See Existing Conservation Lands assessment in Appendix B. These lands are largely protected from future land development activities. Explicitly protected habitats have been recognized by the Service as providing mitigation credit and/or recovery value for the GCW.

3 Includes habitat losses from requested incidental take through the SEP-HCP as well as likely unauthorized losses. Habitat loss estimates summarized in Table 10 were based on sector-level analyses and may not be consistent with calculations made at a general county level. See Appendix E for the sector-level calculations. This analysis assumes that projected new land development will affect potential GCW and BCV habitat in proportion to the availability of such habitat within a SEP-HCP sector. For example, if 25 percent of the area of a sector is identified as potential habitat, then it is assumed that 25 percent of the new development projected for that area will result in habitat loss. See Section 7 and Table 6 in *GCW Resources Assessment* in Appendix C for additional information on habitat loss estimates. County-level estimates of future habitat losses for the GCW and BCV within the Plan Area are summarized in Table 7. More detailed calculations for estimated habitat losses at the sector level are included in Appendix E.

4 Assumes that all authorized incidental take is used by Plan Participants and is mitigated at a ratio of 2:1. It is unknown how much mitigation acreage will be located in any particular county within the Plan Area.

5 Includes the anticipated Comal County Regional HCP preserve system (6,548 acres in Comal County) and the Bandera Corridor Conservation Bank (approximately 6,946 acres in Bandera and Real counties), both at full implementation. These conservation initiatives are in the final stages of completion and are reasonably certain to be completed over the duration of the Plan.

a. The 7-county Plan Area as representative of a single GCW recovery region, as suggested by the 1992 GCW Recovery Plan

b. Bexar County, Comal County, and Kendall County as representative of a single GCW recovery region, as suggested by the organization of the analysis in Groce et al. (2010).

With respect to the GCW, participants at the "Population and Habitat Viability Workshop" held in August 1995 recommended the protection and management of sufficient habitat to support 3,000 breeding pairs in each GCW recovery region (USFWS 1996). At an average density of approximately four GCW pairs per 100 acres of suitable habitat, which is the long-term average density of singing males recorded on Camp Bullis (see the *Golden-cheeked Warbler* assessment in Appendix C), approximately 75,000 acres of protected GCW habitat may be needed to achieve GCW recovery within a region.

A substantial amount of conservation fully or partially benefiting the GCW has already been achieved in the Plan Area. The Plan Area currently contains approximately 50,000 acres of GCW habitat that is within public or privately owned properties having some degree of protection from future development (see the *Existing Conservation Lands* assessment in Appendix C). Nearly half of this habitat occurs on state parks (with a focus on providing natural resource-oriented recreation opportunities), state natural areas (with a focus on the protection and stewardship of outstanding natural attributes), or state wildlife management areas (with a focus on intensive management for the conservation, enhancement, and public use of wildlife resources and supporting habitats). State policies pertaining to the acquisition, use, and management of the state park system have a strong emphasis on the protection and management of endangered species habitats that directly contribute to the long-term conservation of these sensitive resources (see Texas Parks and Wildlife Commission policy at 31 TAC § 59.64). Much of the remaining GCW habitat on existing conservation lands (approximately 41,500 acres) is privately owned and protected by perpetual conservation easements (Table 10). Generally, conservation easements permanently limit uses of the land in order to protect defined conservation values. For easements that include wildlife habitat or, more specifically, endangered species habitat as a conservation value, the restrictions and retained rights of the easement should largely alleviate potential threats to the habitat, even if the easement does not require active management and monitoring of the habitat or species.

Depending on the level of protection specifically afforded the GCW, many of these existing protected lands could already be contributing to the recovery of this species. Approximately 8,500 acres of GCW habitat within the Plan Area are explicitly protected and managed in perpetuity for the benefit of the species and have been recognized by the Service as providing either mitigation and/or contributing to recovery (see the *Existing Conservation Lands* assessment in Appendix C).

Within Bexar County, where most of the Plan's incidental take authorization would be used, approximately 16,000 acres of potential GCW habitat occurs within existing conservation lands, including Government Canyon State Natural Area, parks and natural areas owned by the City of San Antonio, and several privately owned conservation tracts. Approximately 6,400 acres of this GCW habitat occurs within properties that are explicitly protected and managed for the benefit of the species.

If the conservation value of the existing conservation lands containing potential GCW habitat is fully considered, then the approximately 50,000 acres of at least partially protected GCW habitat could represent two-thirds of the protected habitat needed for the equivalent of regional recovery in the Plan Area. If only explicitly protected GCW habitat is considered, which would largely discount the contributions of many significant conservation actions, then the current progress towards the equivalent of regional GCW recovery in the Plan Area may only be slightly more than 10 percent of the total needed. Under the alternate three-county region scenario, GCW habitats within existing conservation lands could be contributing approximately 10 to 30 percent of the equivalent regional recovery standard.

Future habitat loss continues to threaten the status of the GCW across its range. In the Plan Area, approximately 608,600 acres of potential GCW habitat are currently unprotected, including approximately 217,500 acres in Bexar, Kendall, and Comal counties. This unprotected habitat could be subject to future land development actions. The habitat loss projections described in Section 4.4.1 indicate that approximately 51,150 acres of potential GCW habitat in the Plan Area could be lost to land development activities over the next 30 years.

If this level of future cumulative GCW habitat loss comes to pass, there could still be more than 574,000 acres of potential GCW habitat remaining within the Plan Area that is not already protected. In Bexar, Kendall, and Comal counties alone, the amount of remaining unprotected GCW habitat could total approximately 191,000 acres. These acres of habitat could be available for conservation purposes, including acquisition as a SEP-HCP preserve or as part of another recovery effort. This amount of potentially available GCW habitat is well in excess of that needed for recovery purposes.

Therefore, it is unlikely that the amount of incidental take requested for the GCW through the SEP-HCP, in concert with the total amount of projected future habitat loss and the current environmental baseline, would preclude the ability to recover the species in this region.

4.4.5 BCV ANTICIPATED IMPACTS AND RECOVERY POTENTIAL

The 1991 BCV Recovery Plan (USFWS 1991) calls for the protection of 500 to 1,000 breeding pairs in each BCV recovery region. The Plan Area accounts for approximately one-third of the Southeast Edwards Plateau BCV Recovery Region as defined in the 1991 BCV Recovery Plan.

Wilkins et al. (2006) reported a known population of 1,018 BCV males or territories (“breeding units”, which is essentially comparable to the term “breeding pairs” used in the 1991 BCV Recovery Plan) in the Southeast Edwards Plateau BCV Recovery Region. Approximately one-half of this known population resides within the Plan Area (i.e., 527 breeding units), and approximately 420 BCV breeding units occur within public lands or other designated nature preserves (see the Black-capped Vireo assessment in Appendix C). Therefore, prior conservation actions in the Plan Area may already be contributing to approximately 42 to 84 percent of the regional recovery standard for the BCV, which is in excess of the Plan Area’s relative geographic representation within the Southeast Edwards Plateau BCV Recovery Region. It is not known how much, if any, of the BCV habitat or BCV populations known to occur on existing conservation lands are explicitly protected for the benefit of the species.

More recent BCV data available from the Service show the following minimum numbers of BCV males known from 2007 to 2012, by county: Bexar (29, including 28 on public land), Medina (0), Bandera (247, including 25 on public land), Kerr (487, including 402 on public land), Kendall (3), and Comal (0). Of the 766 minimum number of BCV males known in the Plan Area during that period, at least 455 were known to be present on public land (USFWS 2013a). Approximately 1,067 BCV males were known in the BCV South recovery region (USFWS 2013a), which includes 11 counties (the seven Plan Area counties plus Uvalde, Real, Gillespie, and Hays counties (USFWS 2013b).

Conservation actions through the SEP-HCP, assuming that all of its incidental take authorization for the BCV is utilized (i.e., 2,640 acres of habitat loss over 30 years), would result in at least 5,280 acres of additional BCV habitat permanently protected in the Plan Area and managed for the benefit of the species. Considering only the SEP-HCP’s BCV preserves, it is possible that these acres

could protect a BCV population of approximately nearly 800 breeding pairs[39]. A fully protected and managed population of this size would exceed the lower end of the range of protected breeding pairs identified in the BCV Recovery Plan.

It is unlikely given the estimated amount of potential BCV habitat thought to occur within the Plan Area (more than 181,000 acres), the relative contribution of existing conservation efforts to BCV recovery in the region, and the conservation actions that would be completed if the SEP-HCP were fully implemented that the level of incidental take requested by the SEP-HCP would preclude the opportunity to achieve recovery of this species.

4.5 LISTED KARST INVERTEBRATE TAKE AND IMPACTS

4.5.1 KARST HABITAT LOSS AND DEGRADATION

Potential habitat for the federally listed karst invertebrates in Bexar County may occur within the Karst Zones 1 through 4, as delineated by Veni (1994, 2002). Impacts to this potential habitat may arise from future land development activities or other types of land uses that occur over these zones. Unlike habitat losses for the GCW and BCV, which typically occur only on previously undeveloped lands, re-development activities over karst zones could create additional impacts to karst habitat that might result in incidental take. For example, the replacement of overhead utility lines with underground lines in an existing developed neighborhood could encounter subsurface voids occupied by listed karst invertebrates that were not previously known. Therefore, impacts to potential karst habitat will be measured in terms of the acres of potential karst habitat that may be affected by the Covered Activities, including re-development over previously developed lands.

It is important to note that not all of these impacts will represent the complete loss of karst habitat. Depending on the circumstances, the impacts of a Covered Activity might only degrade habitat for the Covered Karst Invertebrates and result in only negligible or no measurable impact on the species.

For the purpose of estimating the extent of possible future impacts to karst habitat within the Plan Area, it is assumed that impacts to potential karst habitat (i.e., areas identified as Karst Zones 1 through 4) from future development and construction activities would occur in proportion to the extent of each Karst Zone in a given geographic area. For example, if 25 percent of a SEP-HCP sector was mapped as potential karst habitat, then 25 percent of the extent of future development in that sector would be assumed to impact potential karst habitat.

Figure 5 shows the boundaries of the Bexar County Karst Zones in relation to the SEP-HCP sectors and the KFRs described in the Bexar County Karst Invertebrates Recovery Plan (USFWS 2011b). For this analysis, each SEP-HCP sector was assigned to the KFR most closely associated with it. As the Government Canyon, Helotes, and UTSA KFRs do not encompass the entire area of potential

[39] This estimate is based on the observations that BCVs tend to occur in clusters, with larger clusters (frequently 15 territories or more) typically found in better habitat with older males and higher reproductive success and survivorship (USFWS 1991). Most individual BCV territories tend to include two to four acres (USFWS 1991). Therefore, a preserve unit of approximately 100 acres should generally be sufficient to support a large BCV cluster (i.e., 15 BCV territories * 4 acres/territory = 60 acres) and the SEP-HCP preserve system could include more than 50 such preserve units.

karst habitat in the northwest part of the range and it is not clear how to best apportion the unassigned acreage, these KFRs were grouped into a single unit to facilitate the analysis[40].

Table 11 summarizes the estimated extent of future impacts to potential Karst Zone habitat for each applicable SEP-HCP sector and KFR Group over the next 30 years. Additional information supporting this analysis is attached in Appendix E.

As with the GCW and BCV, participation in the SEP-HCP will be voluntary, and it is expected that not all of the anticipated karst habitat impacts will actually be authorized through the SEP-HCP. Some project proponents may seek authorization for incidental take directly from the Service via interagency consultations or with individual HCPs. Others may choose to design projects in a way that avoids incidental take and results in no obligation to seek ESA compliance. Finally, some project proponents may determine that ESA compliance is not necessary or desired for their project.

Therefore, the estimated habitat impacts summarized above represent the amount of habitat impacts for the Covered Karst Invertebrates that may be expected from future land development activities, with or without the existence of the SEP-HCP as an ESA compliance option.

[40] The Government Canyon, Helotes, and UTSA KFRs were grouped into a single unit to facilitate the habitat loss and impact analysis. To facilitate more accurate accounting of the status of each KFR upon implementation, the tracking and reporting of impacts to these outliers will be assigned to a designated KFR and not reported as currently grouped for habitat loss and impact analysis.

TABLE 11. Projected Impacts to Potential Habitat for the Covered Karst Invertebrates from Land Development within Bexar County Karst Zones.

Sector[1]	KFR Group	Total Geographic Area	Karst Zones 1 and 2		Karst Zones 3 and 4		New Development and Redevelopment[2]	Estimated Habitat Loss		
			Habitat Acres	Percent Habitat	Habitat Acres	Percent Habitat		Zones 1 and 2	Zones 3 and 4	All Zones
ZEBC1	NW Group	60,791 ac	-	0%	315 ac	1%	2,705 ac	-	14 ac	14 ac
ZEBC2	NW Group	7,230 ac	-	0%	129 ac	2%	1,455 ac	-	26 ac	26 ac
FN	Stone Oak Group	37,318 ac	19,101 ac	51%	9,142 ac	24%	19,136 ac	9,794 ac	4,688 ac	14,482 ac
FNE	Stone Oak Group	37,017 ac	25,808 ac	70%	8,062 ac	22%	17,988 ac	12,541 ac	3,918 ac	16,459 ac
FNW	NW Group	92,020 ac	34,470 ac	37%	31,824 ac	35%	26,216 ac	9,820 ac	9,067 ac	18,887 ac
FW	Culebra Anticline Group	34,869 ac	11,844 ac	34%	14,354 ac	41%	26,790 ac	9,100 ac	11,028 ac	20,128 ac
NC	Stone Oak Group	22,795 ac	7,455 ac	33%	12,506 ac	55%	7,000 ac	2,289 ac	3,840 ac	6,129 ac
NE	Stone Oak Group	28,714 ac	4,184 ac	15%	24,100 ac	84%	6,670 ac	972 ac	5,598 ac	6,570 ac
NW	NW Group	30,871 ac	2,048 ac	7%	24,296 ac	79%	11,055 ac	733 ac	8,700 ac	9,434 ac
W	Culebra Anticline Group	16,497 ac	4,883 ac	30%	6,925 ac	42%	3,470 ac	1,027 ac	1,457 ac	2,484 ac
ZEMC1	NW Group	129,731 ac	20,124 ac	16%	24,358 ac	19%	31,547 ac	4,894 ac	5,923 ac	10,817 ac
ZNCMC	NW Group	199,783 ac	37 ac	0%	-	0%	6,426 ac	1 ac	-	1 ac
Plan Area Total[2]		697,636 ac	129,953 ac	19%	156,012 ac	22%	160,457 ac	51,172 ac	54,259 ac	105,431 ac
NW Group[3]		520,426 ac	56,679 ac	11%	80,923 ac	16%	79,403 ac	15,449 ac	23,730 ac	39,178 ac
Stone Oak Group		125,844 ac	56,547 ac	45%	53,810 ac	43%	50,793 ac	25,596 ac	18,044 ac	43,640 ac
Culebra Anticline Group		51,366 ac	16,727 ac	33%	21,279 ac	41%	30,260 ac	10,127 ac	12,485 ac	22,612 ac

1 See Section 1.4 and Figure 2 for information on SEP-HCP sectors.
2 Analysis excludes Camp Bullis.
3 Includes the Government Canyon, Helotes, and UTSA KFRs.

4.5.2 INCIDENTAL TAKE AUTHORIZED BY IMPACTS

The current extent of the Permittees' jurisdictions (the Initial Enrollment Area) includes nearly all of the potential habitat for the Covered Karst Invertebrates. Therefore, the incidental take analysis below is based on the habitat loss estimates shown in Table 11, without special consideration of an Initial versus an Expanded Enrollment Area.

Given the high standards for avoidance and mitigation required by the enrollment process for the Covered Karst Invertebrates, the Permittees anticipate that there may be a lower demand for participation in the SEP-HCP karst program. Therefore, the Permittees request a level of incidental take for the Covered Karst Invertebrates that corresponds to approximately 20 percent of the total extent of projected impacts from future development and construction activities over potential karst habitat (i.e., Bexar County Karst Zones 1 through 4).

The amount of incidental take requested for the Covered Karst Invertebrates is shown in Table 12 in relation to the total amount of potential karst habitat present in the Plan Area and in relation to the cumulative amount of future habitat impact that is anticipated over the duration of the Plan.

TABLE 12. Requested Level of Incidental Take for the Covered Karst Invertebrates, Summarized by KFR Group[1].

	Karst Zones 1 and 2	Karst Zones 3 and 4	All Karst Zones
Potential Karst Habitat			
NW Group	56,679 ac	80,923 ac	137,602 ac
Stone Oak Group	56,547 ac	53,810 ac	110,357 ac
Culebra Anticline Group	16,727 ac	21,279 ac	38,006 ac
Total Potential Habitat	129,953 ac	156,012 ac	285,966 ac
Projected Habitat Impacts			
NW Group	15,449 ac	23,730 ac	39,178 ac
Stone Oak Group	25,596 ac	18,044 ac	43,640 ac
Culebra Anticline Group	10,127 ac	12,485 ac	22,612 ac
Total Projected Impacts	51,172 ac	54,259 ac	105,431 ac
Requested Incidental Take of Potential Karst Habitat	10,234 ac	10,852 ac	21,086 ac

1 Analysis excludes Camp Bullis.

The Permittees believe that this level of incidental take authorization (21,086 acres of impact over potential karst habitat) will be sufficient to satisfy the potential demand for participation in the SEP-HCP with respect to the Covered Karst Invertebrates.

As with the GCW and BCV, the Permittees also request incidental take authorization of the Covered Karst Invertebrates to address the largely self-mitigating management activities conducted within SEP-HCP preserves. Such activities might include construction activities needed to install cave gates or other protective measures in or around an occupied karst feature. The occasional need to construct or maintain boundary fencing, access roads, fire breaks, and other similar infrastructure that facilitates effective and responsible preserve management may also result in limited and /or temporary

impacts to the Covered Karst Invertebrates and/or their habitat. As described in Section 9.0 – Adaptive Preserve Management and Monitoring, all management and monitoring activities conducted within SEP-HCP preserves will be implemented in accordance with a site-specific Preserve Management Plan approved by the Service. Unless otherwise approved by the Service, preserve management, monitoring, and research activities conducted in accordance with Preserve Management Plans that may cause incidental take that is not otherwise addressed by individual ESA section 10(a)(1)(A) USFWS Threatened and Endangered Species permits will not affect more than 10 percent of the karst habitat within the SEP-HCP preserve system in a given year.

4.5.3 IMPACTS TO SPECIES-OCCUPIED CAVES

While the Karst Zones generally identify where potential habitat for the Covered Karst Invertebrates may exist, these species actually occur in subterranean caves and voids within the underlying bedrock. Only very limited information currently exists regarding the location or number of occupied karst features in the Plan Area or the true distribution or abundance of the individual listed karst invertebrates. For example, within the Plan Area fewer than 100 species-occupied caves or voids are currently known to exist in Bexar County (USFWS 2011c); although, as described below, several hundred such localities may actually occur in this region.

Detailed karst feature surveys and karst faunal surveys conducted on Camp Bullis were used to extrapolate an estimate of the total number of caves that may be occupied by one or more of the Covered Karst Invertebrates in the vicinity of the northern KFRs (i.e., the Government Canyon, Helotes, UTSA, and Stone Oak KFRs). Similar, although less rigorous, data compiled by the Texas Speleological Society on the number and distribution of karst features and species-occupied caves were used to estimate the total number of species-occupied caves that might occur in the vicinity of the Culebra Anticline KFR. The estimated densities of potentially occupied caves, as provided by Zara Environmental (2010), are shown in Table 13.

TABLE 13. Estimated Density of Occupied Karst Features.

	Karst Zones 1 and 2	Karst Zones 3 and 4
Camp Bullis Estimates (applies to the NW and Stone Oak KFR Groups)	3.28 caves per square mile	0.02 caves per square mile
Texas Speleological Society Estimates (applies to the Culebra Anticline KFR Group)	2.22 caves per square mile	0.02 caves per square mile

Table 14 applies these estimated feature densities to the acres of potential karst habitat within the Plan Area. More detailed information about this analysis is attached in Appendix E.

Table 14 also estimates the number of occupied karst features that could be directly or indirectly impacted by all future development activities over potential karst habitat during the next 30

years. This analysis assumes that the number of occupied features that may be impacted by future development will occur in proportion to the extent of such activities in a sector. For example, if 25 percent of a sector is projected to be subject to development activities, then 25 percent of the estimated features in that sector are assumed to be affected by those activities.

However, it is not possible to precisely estimate how many of these affected features would be completely destroyed or significantly degraded by future development activities such that all karst invertebrate habitat within the feature would be lost. Some of these impacted features might experience only negligible or minor effects from land development that would not rise to the level of incidental take or result in the complete loss of the cave as habitat. Other caves might already be affected by existing development and additional impacts to these degraded features might not result in additional incidental take.

TABLE 14. Estimated Number of Occupied Karst Features Impacted by Future Development Over 30 Years.

KFR Group	Karst Zones 1 and 2	Karst Zones 3 and 4	All Karst Zones	% of Total Features
Currently Known Occupied Karst Features[1]				
NW KFR Group			42	
Stone Oak KFR Group			34	
Culebra Anticline KFR Group			9	
Total in Plan Area			85	
Estimated Total Occupied Karst Features[2]				
NW KFR Group	289	3	292	
Stone Oak KFR Group	288	1	289	
Culebra Anticline KFR Group	58	0	58	
Total in Plan Area	635	4	639	
Estimated Occupied Karst Features Impacted by Future Development				
NW KFR Group			80	27%
Stone Oak KFR Group			131	45%
Culebra Anticline KFR Group			36	62%
Total in Plan Area			247	39%
Estimated Occupied Karst Features Associated with Enrolled Properties				
NW KFR Group			16	5%
Stone Oak KFR Group			26	9%
Culebra Anticline KFR Group			7	12%
Total in Plan Area			49	8%

1 Table 1 of USFWS (2011c) identifies 87 known species-occupied caves in Bexar County; including two caves within the Alamo Heights KFR (the text of this publication incorrectly counts 89 such caves).

2 See Appendix E for more details on the formulation of cave estimates. Estimates exclude the area of Camp Bullis.

Since the anticipated impacts to the Covered Karst Invertebrates occurring from activities authorized by the Plan represents approximately 20 percent of the total extent of the anticipated future impacts to potential karst habitat, it is assumed that the number of occupied karst features that might be impacted within Enrolled Properties would also represent approximately 20 percent of the total estimated number of impacted features. Table 14 summarizes the number of occupied karst features that might be encountered within Enrolled Properties and which may be directly or indirectly impacted by incidental take authorized through the SEP-HCP.

Measured in terms of the acres of potential karst habitat that occurs within Enrolled Properties, the Permittees anticipate that 49 features occupied by one or more of the Covered Karst Invertebrates may be impacted by activities authorized by the SEP-HCP. In other words, it is predicted that the required pre-construction karst surveys will identify approximately 49 occupied karst features within properties that are enrolled in the SEP-HCP. However, as a group, the level of impact to these predicted localities would be substantially minimized by the strong avoidance measures set by the karst enrollment process (see Section 3.2.3.2 for more details).

The SEP-HCP will not offer Karst Participation Certificates until the Permittees have secured some level of up-front mitigation for all of the Covered Karst Invertebrate Species. The level and type of mitigation obtained for each species will likely vary[41]. For example, for relatively common species, such as *Cicurina madla, Rhadine exilis,* and *Rhadine infernalis*, opportunities to enhance the conservation value of known localities will be much greater. However, for species like *Cicurina venii*, with only two known but heavily impacted localities, options remain limited. Therefore, other conservation measures and/or recovery efforts, such as surveying for new caves or providing for some increased level of conservation for the heavily impacted known sites, may be the only options to help satisfy up-front mitigation. The Permittees will work with the Service in determining when the appropriate level of up-front mitigation has occurred.

The SEP-HCP's karst enrollment process requires that Plan Participants avoid surface and subsurface disturbances within 750 feet of the entrance of a known occupied karst feature until karst preserves are in place at a level consistent with the downlisting criteria described in the 2011 Bexar County Karst Invertebrates Recovery Plan (USFWS 2011b). For example, *Rhadine exilis* is known to occur in four of the six KFRs and the downlisting criteria for this species specify that at least one high quality preserve and two medium quality preserves are needed in each of the KFRs where this species occurs. Therefore, the SEP-HCP would not allow a Participant to conduct Covered Activities within 750 feet of the entrance of a feature containing *R. exilis* unless and until at least one high quality preserve and two medium quality preserves for this species had been established in the KFR where the feature occurs.

In this way, the SEP-HCP will minimize most of the direct and indirect impacts to the Covered Karst Invertebrates by requiring Participants to avoid conducting activities close to known species localities until the downlisting criteria for the number and type of karst preserves in a KFR (as set forth in USFWS (2011b)) is achieved. The 750-foot buffer circumscribes an area that includes approximately 40 acres around a feature entrance, which is generally consistent with the size of a medium recovery-

[41] For the relatively common species, such as *Cicurina madla, Rhadine exilis,* and *Rhadine infernalis* the expected up-front mitigation will be through the establishment of a medium or high quality karst preserve.

quality karst preserve. This approach will avoid the most severe impacts to known occupied features, such as filling or excavating, which can directly and permanently destroy the physical karst environment and could even directly kill or wound individuals of the Covered Karst Invertebrates. This buffer also retains a substantial amount of surface vegetation around the feature that the Service believes is necessary for maintaining the internal environment of the karst feature. The 750-foot avoidance zone is also based on guidance from the Service and TCEQ that recognizes such a buffer is generally sufficient to avoid any indirect water quality impacts to karst habitat from adjacent development.

Once the Conservation Baseline has been achieved for a particular species in a KFR, then Participants may be authorized to conduct Covered Activities within 750 feet of the entrance of a feature occupied by that species (assuming that feature is not one contributing to the baseline), since the regional recovery potential for that species will have been secured. Continuing the previous example, once one high quality preserve and two medium quality karst preserves are established for *R. exilis* in KFR "A", then Participants with projects in KFR "A" could obtain incidental take authorization from the SEP-HCP for Covered Activities within 750 feet of a feature occupied by *R. exilis*.

Even if the regional recovery potential for a Covered Karst Invertebrate has been secured and the SEP-HCP is able to authorize incidental take from Covered Activities conducted within 750 feet of a species-occupied feature, the participation fees to obtain such coverage are set at a level that continues to encourage minimizing activities close to such features. The Plan establishes an inner Occupied Karst Zone A that applies to the area between 0 and 345 feet of an occupied feature entrance and requires payment of a significant mitigation fee to conduct Covered Activities within this zone. The 345-foot buffer is generally consistent with the known foraging range of cave crickets (*Ceuthophilus* spp.), which are a major component of the cave ecosystem. This buffer would also contain at least 8.5 acres of surface vegetation and drainage basins associated with the feature. Avoiding disturbance within this zone will minimize the intensity of potential changes to the nutrient, hydrologic/humidity, and temperature regimes of the cave ecosystem that might be associated with Covered Activities conducted outside of the 345-foot zone. This measure will also help minimize the potential for invasion of species-occupied caves by red-imported fire ants (*Solenopsis invicta*) which can alter the surface animal community (potentially disrupting natural nutrient pathways) and prey directly on the listed karst invertebrates. Retaining native vegetation around a cave can also help filter pollutants or other contaminants from surface runoff before it enters a cave.

Despite strong avoidance and minimization measures for occupied karst features, the requested incidental take could result in direct and potentially severe impacts to previously unknown features that are discovered accidentally during implementation of a Covered Activity. Applicants will be required to complete pre-application karst studies, which are designed to yield as much information as practicable before construction. Although the expectation is that occupied karst features within an Enrolled Property will be discovered by the pre-application karst studies, some karst features may not have detectable surface expression and might be discovered only during subsurface construction activities. In such cases, the act of discovering the feature could result in direct, physical disruption of the karst habitat and, if the feature were occupied, the incidental take of one or more of the Covered Karst Invertebrates. Indeed, such impacts might even occur without actually discovering the hidden feature. Circumstances such as this, despite all practicable due diligence on the part of a Participant, could unknowingly and unavoidably reduce or eliminate any potential conservation value of an

accidentally discovered feature such that it could no longer contribute meaningfully to the recovery of the species within it.

Participants who have completed the karst enrollment process and are in compliance with the terms of their Participation Agreements are automatically covered for incidental take that may occur in relation to features discovered during implementation of Covered Activities with limited special conditions. These special conditions, including procedures for safely closing features in a manner designed to resemble as closely as possible the existing conditions within the feature prior to discovery, will minimize any unavoidable impacts to habitat for the Covered Karst Invertebrates (see Section 3.2.4.3).

4.5.4 IMPACTS TO INDIVIDUAL KARST SPECIES

Impacts to species-occupied karst features would not be expected to affect the individual Covered Karst Invertebrate species equally, since some of these species are more common and wide-spread than others. In general, three of the Covered Karst Invertebrates are relatively common: *Rhadine exilis*, currently known from 52 sites across five KFRs; *Rhadine infernalis*, currently known from 47 sites across five KFRs; and *Cicurina madla*, currently known from 20 sites across four KFRs. Given the relatively high number of known sites for these species and their distribution across several KFRs, these three relatively common species may be less sensitive on a species level to the impacts from the requested incidental take than the other four Covered Karst Invertebrate species. However, a large number of the known locations for the three relatively common species are impacted and do not qualify for recovery (USFWS 2011d).

The other four Covered Karst Invertebrate species (*Neoleptoneta microps*, *Cicurina venii*, *Cicurina vespera*, and *Batrisodes venyivi*) are known from many fewer sites and KFRs. Given the more restricted known distribution and abundance, the impacts of authorized incidental take could have a proportionately stronger effect on these four relatively rare species than on the more common karst species. However, given their rarity, the likelihood of a Participant even encountering these species is very small.

One of these rare species (*C. vespera*) is currently known only from a single damaged specimen collected from a single locality on Government Canyon State Natural Area in 1965 (Paquin and Duperre 2009). Furthermore, the identification of this specimen as a separate species is in question, with molecular data suggesting that *C. vespera* may be synonymous with the much more common *C. madla* (Paquin and Hedin 2004)[42]. The type locality for *C. vespera* has been designated as Critical Habitat (USFWS 2012a) and the Service currently recognizes *C. madla* and *C. verspera* as two distinct species. *C. venii* had been known only from a single specimen collected in 1980 from a cave located in the Culebra Anticline KFR that has been subsequently sealed with concrete (Paquin and Duperre 2009), until a second location was discovered in 2012 during highway construction and excavation. *C. venii i*s now known only from these two impacted sites, and the type locality is currently designated as Critical Habitat, making it essentially off limits to Participants. It is likely that the Plan will have little or no adverse impact on the continued survival and recovery of these two species. If these two species are more widely distributed than the current data suggests, then it must be assumed that

[42] It should be noted that despite this controversy, the Service currently considers *C. vespera* and *C. madla* to be different species.

there are more opportunities for both conservation actions and take to occur; the true impacts of which are not currently knowable. In either case, the Plan would not be able to authorize Covered Activities within 750 feet of the entrance of their known localities until at least six karst preserves are established for each species, which will be a very difficult standard to meet. Additionally, the Plan would not offer coverage for previously undetected karst features encountered during implementation of Covered Activities until some level of protection for the rarest species, *N. microps*, *C. venii*, and *C. vespera* is achieved. The Permittees will analyze the level of take that has occurred with the level of conservation achieved and adjust the pace of Covered Activities accordingly, as discussed in Section 7.2.1 – Pace and Quantity of Karst Preserve Acquisitions.

It is possible that Covered Activities could impact up to 21,086 acres of potential karst habitat. These activities could affect (via mostly very low intensity, indirect effects) approximately 49 known karst features occupied by one or more of the Covered Karst Invertebrates. It is not known precisely which of the listed species may be found in these 49 occupied features. However, it may be assumed that the relatively common species will be encountered more frequently than the relatively rare species.

Table 15 describes the known distribution of each of the Covered Karst Invertebrates across the 87 known occupied karst features in Bexar County (USFWS 2011c). Since several localities are occupied by more than one of the Covered Species, this table also includes the relative proportion of known species localities in each KFR Group as compared to the total number of occupied features in that KFR Group. For example, per USFWS 2011c, of the 87 known occupied features, there are 42 total occupied caves within the Northwest Group; 34 total occupied caves in the Stone Oak Group; and 9 total occupied caves in the Culebra Anticline Group of which *R. infernalis* is known to occur within 64 percent of the occupied features within the Northwest Group, 12 percent of the occupied caves within the Stone Oak Group, and 100 percent of the occupied caves within the Culebra Anticline Group.

TABLE 15. Known Karst Species Distribution by KFR Group (USFWS 2011c).

Species	Number of Known Occupied Features[1]				% of All Known Occupied Features[2, 3]		
	NW Group	Stone Oak Group	Culebra Anticline Group	Total	NW Group	Stone Oak Group	Culebra Anticline Group
Rhadine exilis[43]	20	31	0	51	48%	91%	0%
Rhadine infernalis[44]	27	4	9	40	64%	12%	100%
Batrisodes venyivi[45]	8	0	0	8	19%	0%	0%
Neoleptoneta microps	2	0	0	2	5%	0%	0%
Cicurina madla	19	1	0	20	45%	3%	0%
Cicurina venii	0	0	2	2	0%	0%	22%
Cicurina vespera	1	0	0	1	2%	0%	0%

1 Summarized from Table 1 in USFWS (2011c).
2 Several localities are occupied by more than one of the Covered Species. NW Group = 42 total occupied caves; SO = 34 total occupied caves; CA = 9 total occupied caves.
3 Species otherwise known to collocate based on existing survey information: *R. infernalis, C. malda, R. exilis, C. vespera, N. microps,* and *B. venyivi* (Table 1, USFWS 2011c)

[43] The distribution of *R. exilis* was updated based on new location information in 2015. *R. exilis* is currently known from 52 sites across five KFRs (pers. comm. USFWS Austin Ecological Field Office).

[44] The distribution of *R.infernalis* was updated based on new location information in 2015. *R.infernalis* is currently known from 47 sites across five KFRs (pers. comm. USFWS Austin Ecological Field Office).

[45] While eight caves have been reported to contain *B. venyivi*, the Service only has specimen confirmation of four caves.

Table 16 estimates the distribution of each Covered Karst Invertebrate species among the predicted total number of occupied features. The estimates are based on the relative distribution of each species among the currently known occupied features for each KFR Group (see Table 15) as applied to the total number of predicted species-occupied caves in each KFR (see Table 14). The true distribution of Covered Karst Invertebrates across Bexar County will probably be different than the assumed distribution in Table 16, but this approximation provides a reasonable estimate of potential species-level impacts until more detailed, site-specific data is available.

This analysis suggests that there may be six or seven times more localities for each of the Covered Karst Invertebrates than are currently known. Given current data, the estimated number of species localities that could be impacted by the SEP-HCP's incidental take authorization might be only 8 percent (49/649) of the predicted total number of such localities. This analysis also suggests the extent to which participating SEP-HCP activities are likely to encounter the relatively common karst species compared to the rarer species.

In any case, given the limits on karst participation described above, it is unlikely that many of the occupied features encountered by Participants and associated with authorized incidental take would be subject to complete and permanent habitat loss (i.e., by way of direct physical destruction or severe degradation of occupied features). Furthermore, the SEP-HCP would allow such severe habitat loss only after a substantial level of conservation for the affected species was in place, effectively securing upfront the regional downlisting and recovery potential of the species.

6. Predicted Distribution of Covered Karst Species by KFR Group[1].

pecies	Total Number of Possible Species Localities[2] (639 predicted features)				Localities Impacted by Future Development and Construction[2] (247 predicted features)				Localities Associated with Enrolled Properties[2] (49 predicted features)			
	NW	SO	CA	Total	NW	SO	CA	Total	NW	SO	CA	Total
exilis	139	264	0	403	38	119	0	158	8	24	0	32
infernalis	188	34	58	280	51	15	36	103	10	3	7	20
s venyivi	56	0	0	56	15	0	0	15	3	0	0	3
neta microps	14	0	0	14	4	0	0	4	1	0	0	1
madla	132	9	0	141	36	4	0	40	7	1	0	8
venii	0	0	6	6	0	0	4	4	0	0	1	1
vespera	7	0	0	7	2	0	0	2	0	0	0	0

oup names are abbreviated in this table for convenience: NW KFR Group = NW; Stone Oak KFR Group = SO; Culebra Anticline KFR A.

s are extrapolated from observed densities of karst features in defined areas and projected impacts from anticipated future nt (see text in Section 4.5.3, and Appendix E, Table 4).

4.5.5 KARST ANTICIPATED IMPACTS AND RECOVERY POTENTIAL

The environmental baseline for the Covered Karst Invertebrates includes approximately 130,000 acres of potential karst habitat (Karst Zones 1 and 2) that have a relatively high likelihood of containing one or more of the Covered Karst Invertebrates and another approximately 156,000 acres of potential karst habitat (Karst Zones 3 and 4) with a lower likelihood of containing these species. Currently, approximately 85 karst features are known to contain one or more of the Covered Karst Invertebrates; although, several hundred such localities may actually exist given the density of species-occupied caves on intensively studied sites, such as Camp Bullis.

Only a few occupied karst features in Bexar County receive explicit protection and/or management for the benefit of endangered karst invertebrates, and the Service has not to-date recognized any recovery quality "Karst Fauna Areas" in this region. However, approximately 17,400 acres of Karst Zones 1 and 2 and approximately 5,250 acres of Karst Zones 3 and 4 occur within 79 properties that currently have some degree of protection from future development activities (see the *Existing Conservation Lands* assessment in Appendix B). These existing conservation lands include approximately 26 of the 85 currently known localities for one or more of the Covered Karst Invertebrates (as determined from a review of the information reported in USFWS 2011c). While the potential karst habitat and known species localities within the existing conservation lands may not be fully protected and managed for the benefit of the Covered Karst Invertebrates, the conservation status of these lands does impart some benefits to these species.

The Service recently issued a 5-year status review of the listed Bexar County karst invertebrates (USFWS 2011d) that indicates approximately 16 currently known species-occupied caves or cave clusters may, with adequate protection and management, be able to qualify as recovery quality karst preserves. Table 17 summarizes the Service's review of karst preserve potential for currently known species localities by KFR. Indeed, as described above and as noted in the Service's status review, several of these caves might already be receiving some degree of protection and management by virtue of being located within existing conservation lands, such as Government Canyon State Natural Area, lands owned by the City of San Antonio, or private karst mitigation preserves.

TABLE 17. Currently Known Localities of the Covered Karst Invertebrates with Potential for Recovery Quality Karst Preserve Designation (USFWS 2011d)[1].

Species	Government Canyon KFR	Helotes KFR	UTSA KFR	Stone Oak KFR	Culebra Anticline KFR	Total
Rhadine exilis	3 HQ	1 HQ / 1 MQ	3 HQ	1 HQ	-	8 HQ / 1 MQ
Rhadine infernalis	5 HQ	2 HQ / 1 MQ	2 HQ	-	2 HQ	11 HQ / 1 MQ
Batrisodes venyivi	1 HQ	1 MQ	N/A	N/A	N/A	1 HQ / 1 MQ
Neoleptoneta microps	1 HQ	N/A	N/A	N/A	N/A	1 HQ
Cicurina madla	4 HQ	2 HQ / 1 MQ	4 HQ	-	N/A	10 HQ / 1 MQ
Cicurina venii	N/A	N/A	N/A	N/A	-	-
Cicurina vespera	1 HQ	N/A	N/A	N/A	N/A	1 HQ
Unique Potential Preserves	6 HQ	2 HQ / 1 MQ	4 HQ	1 HQ	2 HQ	15 HQ / 1 MQ

1 HQ = High quality karst preserve; MQ = medium quality karst preserve

Projections of the extent of cumulative land development activities and other redevelopment construction activities (including incidental take authorized through the SEP-HCP) suggest that approximately two-thirds of the total extent of potential karst habitat in the Plan Area could be affected by such activities over the next 30 years. Approximately 247 known karst features occupied by one or more of the Covered Karst Invertebrates may be associated with these projected habitat impacts. Some of the projected land development and construction activity would likely occur in areas where karst habitats are already partially or fully degraded by existing land uses. Where habitat is already degraded, additional impacts to occupied localities may not be as significant to the species compared with impacts within otherwise intact habitats.

For localities that do currently have potentially significant conservation value for the Covered Karst Invertebrates, it may be difficult for the Service to authorize incidental take for these species until the potential for their recovery is secured (hence, the strong avoidance measures built into the SEP-HCP's karst enrollment process). However for activities outside of the SEP-HCP, unauthorized incidental take could occur without a clear instance of incidental take, reducing the area around an occupied locality and thus precluding the ability to establish a high or medium quality karst preserve.

In consideration of the uncertainties regarding the current status and future recovery potential of the Covered Karst Invertebrates, the SEP-HCP karst conservation program and enrollment process contains built-in safeguards to avoid precluding recovery, adversely modifying designated Critical Habitat, or jeopardizing the survival and recovery of the Covered Karst Invertebrates in the wild. By seeking to achieve the Service's current downlisting criteria for the Covered Karst Invertebrates, minimizing the impacts from authorized incidental take, and funding karst conservation measures independently of direct participation in the SEP-HCP karst conservation program, the SEP-HCP will ensure that Covered Activities do not preclude the recovery of these critically endangered species.

The SEP-HCP would not authorize actions that could reduce the recovery potential associated with any of the currently known localities included within designated Critical Habitat. The enrollment process would compel Participants to largely avoid the direct destruction of most occupied features, would minimize other impacts to known and unknown features containing the Covered Karst Invertebrates, and would actively implement preserve acquisitions and other conservation actions for karst. Further, the SEP-HCP funding plan anticipates a public funding stream for karst conservation that would be independent of actual levels of participation in the Plan.

Therefore, the level of incidental take requested for the Covered Karst Invertebrates is not expected to preclude the recovery of these species on its own or in consideration of the potential impacts to the species from land development over the next 30 years.

5.0 BIOLOGICAL GOALS AND OBJECTIVES

Biological goals are the broad, guiding principles for the operating conservation program of a HCP. Biological objectives are the different components needed to achieve the biological goals, such as preserving a sufficient extent of habitat, managing habitats to meet certain criteria, or ensuring the persistence of a specific minimum number of individuals. The biological goals and objectives are the rationale behind the Plan's conservation strategies.

In accordance with the Service's HCP Handbook, the biological goals of an individual HCP are not necessarily equivalent to the range-wide recovery goals and conservation strategies for a listed species. However, the biological goals and objectives of a HCP should support the conservation and recovery of listed species. The Service recommends that the biological goals and objectives for a HCP define a conservation plan that is commensurate with the specific impacts to Covered Species and duration of the Covered Activities.

Although attaining the biological goals and objectives is not required to maintain compliance with the terms and conditions of an ITP, the Permittees will be obligated to implement the SEP-HCP's operating conservation program (see Sections 6.0 and 7.0).

5.1 BIOLOGICAL GOALS

The biological goals and objectives for the SEP-HCP set the overall direction for the conservation programs. The SEP-HCP biological goals are as follows:

1. Contribute to the recovery of the Covered Species by minimizing and mitigating impacts to the maximum extent practicable at a level that:

    a. avoids jeopardy and contributes substantially to the recovery of the Covered Species; and

    b. is sufficient to obtain incidental take authorization for the Covered Species for those projects voluntarily participating in the SEP-HCP.

2. Contribute to the conservation of the other species (namely the Voluntarily Conserved Species) addressed in the SEP-HCP to help prevent or minimize possible future declines in the status of these species.

3. Expand the current body of knowledge pertaining to the species addressed in the SEP-HCP to further their conservation and management.

5.2 BIOLOGICAL OBJECTIVES

The biological objectives are measurable criteria for evaluating progress towards achieving the broader biological goals listed above. The biological objectives are specific to each set of Covered Species. Where warranted, the rationale behind these objectives is discussed to clarify or highlight important considerations.

5.2.1 GCW AND BCV BIOLOGICAL OBJECTIVES

OBJECTIVE 1: At full implementation of the Plan, permanently protect and manage approximately 23,500 acres of GCW habitat and 6,600 acres of BCV habitat in the Plan Area.

One of the stated purposes of the SEP-HCP and a principle biological goal is to contribute to the recovery of the Covered Species in a substantial or meaningful way.

The SEP-HCP will contribute to the recovery of the GCW and BCV by the acquisition and management of preserve lands. At full implementation of the SEP-HCP, the Plan could contribute approximately 23,500 new acres of explicitly protected GCW habitat and 6,600 new acres of explicitly protected BCV habitat to the suite of existing conservation lands in the Plan Area.

On their own, the SEP-HCP's GCW preserves could represent approximately one-third of the acreage needed to support one viable GCW population. When combined with the acres of GCW habitat that are already at least partially conserved, the total level of GCW conservation could represent nearly 60 to 100 percent of the acreage thought to be needed for recovery in Region 6 (see Section 4.4.4 – GCW Anticipated Impacts and Recovery Potential for more discussion).

The SEP-HCP will also contribute to the recovery of the BCV by acquiring and actively managing habitat for the benefit of the BCV. The 1991 BCV Recovery Plan (USFWS 1991) calls for the protection of 500 to 1,000 breeding pairs in each BCV recovery region. The Plan Area accounts for approximately one-third of the Southeast Edwards Plateau BCV Recovery Region as defined in the 1991 BCV Recovery Plan. The protection and management of approximately 6,600 acres of BCV habitat could support a population of nearly 800 BCV breeding pairs. A population of 800 breeding pairs would nearly meet or exceed the population estimates proposed as a viable population for recovery purposes (USFWS 1991, USFWS 2013a, USFWS 2013b). Therefore, the SEP-HCP could raise the total protected population of BCVs in the Southeast Edwards Plateau BCV Recovery Region to a level that exceeds even the upper end of the proposed population numbers called for in the 1991 BCV Recovery Plan (see Section 4.4.5 – BCV Anticipated Impacts and Recovery Potential for more discussion).

Further, GCW and BCV habitat protected within SEP-HCP preserves will be managed in perpetuity for the benefit of the respective species. The SEP-HCP will also seek to increase protections and management actions for the GCW and BCV on some existing conservation lands, particularly those with large areas of habitat that are not currently being managed for the benefit of the species, and thereby increasing their relevance to recovery.

OBJECTIVE 2: Over the life of the Permit, create GCW preserves that include at least 500 acres of GCW habitat and prioritize the creation of larger "focal" preserves that contain at least 5,000 acres of GCW habitat in each of the Plan Area counties.

Researchers have found that larger patches of GCW habitat have been shown more likely to result in higher probabilities of occupancy and better pairing and reproductive success than smaller patches (Coldren 1998, DeBoer and Diamond 2006, Morrison et al. 2010). Patches containing at least 500 acres of GCW habitat have an almost certain probability of occupancy by the species (Morrison et al. 2010). Establishing a 500-acre minimum size for GCW preserves increases the likelihood that the SEP-HCP preserve system will retain long-term conservation value for the species.

While 500 acres may provide a reasonable minimum size for a preserve with long-term conservation value, GCW populations are likely to be even more secure and effectively managed within larger preserves. Larger preserve units will help to buffer protected habitats from threats related to adjacent, potentially incompatible land uses and can help minimize management costs. Therefore, the SEP-HCP will prioritize the creation of focal preserves that are an order of magnitude larger than the minimum size either as new individual preserve units or by expanding on existing conservation lands. Focusing on preserve acquisitions around existing conservation lands addresses another purpose of the SEP-HCP, namely, to make the most efficient use of conservation resources. Where practicable, building upon existing protected lands will leverage past and present financial resources to achieve biologically significant, regional conservation of the GCW and will complement other conservation efforts in the region, such as aquifer protection.

By seeking to achieve these preserve configuration objectives, the SEP-HCP will contribute to the formation of a preserve system that is consistent with the vision of the 1992 GCW Recovery Plan, whereby larger focal preserves are connected by corridors or stepping stones of smaller (but still biologically significant) preserves.

OBJECTIVE 3: Over the life of the Permit, create BCV preserves that at a minimum, will support moderate–sized, managed BCV populations and prioritize the creation of one focal BCV preserve that contains at least 2,000 acres of BCV habitat.

BCVs tend to occur in clusters, with larger clusters (frequently 15 territories or more) typically found in better habitat with older males and higher reproductive success and survivorship (USFWS 1991). Most individual BCV territories tend to include two to four acres (USFWS 1991). Therefore preserve size should generally be sufficient to support a large BCV cluster (i.e., 15 BCV territories * 4 acres/territory = 60 acres).

As explained above, larger preserves tend to have advantages for minimizing edge effects and reducing management costs associated with addressing such effects. Recognizing this, the SEP-HCP will also require BCV preserves to be contained within a larger protected area and the Plan prioritizes the creation of at least one “focal” BCV preserve that includes 2,000 acres of managed BCV habitat. Given the need for periodic successional setbacks of woody vegetation to create conditions suitable for use by BCVs, this larger focal preserve may also have the advantage of maximizing the likelihood of a large area always being in a suitable condition for BCV occupancy.

OBJECTIVE 4: Collaborate with the Service to achieve a baseline level of conservation for the GCW in or within five miles of Bexar County that includes at least 7,500 acres of habitat permanently protected and managed for the benefit of the GCW.

The Service desires that the SEP-HCP contribute to a Conservation Baseline of land permanently protected and managed for the expressed benefit of the GCW within Bexar County. Permanent protection and management of GCW habitat in Bexar County would help conserve the species in a rapidly developing part of the species’ range, help prevent range contraction, and help alleviate the threat of habitat loss to the species. Habitat protection in Bexar County also addresses one of the stated purposes of the SEP-HCP, which is to help protect the military training mission at Camp Bullis.

Within Bexar County there are approximately 59,000 acres of potential GCW habitat, which is approximately 10 percent of the 543,000 acres of potential GCW habitat that is present throughout the Plan Area (see Table 7 for more details). If the Plan Area supports the average density of the species in suitable habitat, approximately 4 pairs per 100 acres, then an estimate for the amount of habitat needed to achieve regional recovery in the Plan Area is approximately 75,000 acres all things being equal. Therefore, Bexar County's proportional contribution to GCW recovery would be approximately 7,500 acres (i.e., 10 percent of the total acres needed). The amount of GCW habitat in Bexar County that is explicitly protected and managed for the species currently totals approximately 6,400 acres, meaning that this area has already nearly met its proportional contribution to recovery (see Section 4.4.4 for additional details). However, the SEP-HCP can assist with completing this recovery-based goal by purchasing acreage adjacent to existing preserves, seeking cost sharing opportunities for establishing new GCW preserves, and/or by spearheading efforts to establish new protections on existing conservation lands that are not currently managed for the long-term benefit of the GCW.

OBJECTIVE 5: Permanently protect GCW and BCV habitat in the Plan Area at a level that mitigates for the impacts of incidental take from participating projects to the maximum extent practicable.

To establish an appropriate level of mitigation for the GCW and BCV, the Permittees considered the mitigation requirements specified by the ESA, Service policy for mitigation as expressed in the HCP Handbook, and the mitigation provided under other regional HCPs for these species.

The ESA requires that "the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking" (see section 10(a)(2)(B)(ii) of the ESA).

Service policy, articulated in the HCP Handbook (page 3-21, USFWS and NMFS 1996), states: "Generally, the location of replacement habitats should be as close as possible to the area of impact; it must also include similar habitat types and support the same species affected by the HCP. However, there may be good reason to accept mitigation lands that are distant from the impact area--e.g., if a large habitat block as opposed to fragmented blocks can be protected or if the mitigation lands are obtained through a mitigation fund." The SEP-HCP conservation programs for the GCW and BCV provide both a greater level of conservation than other regional plans for these species and will seek to establish preserves that are generally larger than the mitigation needs of a single project or even several individual projects.

As described in more detail in Section 6.0, the GCW and BCV mitigation ratios for Participants will generally be set at the equivalent of 2 acres of protected habitat for each acre of habitat that is impacted. While other regional HCPs for these species only require a 1:1 basic mitigation ratio, the geographic extents of these plans are confined to a single county and ensure that mitigation will be located close to the impacts. For the SEP-HCP, a higher 2:1 mitigation ratio is used to compensate for the potentially wide-ranging distribution of preserves across a seven-county Plan Area. The Permittees believe that this approach provides an appropriate and practicable level of mitigation for the anticipated impacts to the GCW and BCV.

The Preservation Credit fees assessed by the SEP-HCP are also higher than the fees assessed by the other regional HCPs in central Texas. The Permittees anticipate that they will initially charge $8,000 per acre of direct habitat loss for the GCW and BCV, which is higher than the fees proposed or in

place for the Balcones Canyonlands Conservation Plan (currently $5,500 to $2,750 per acre of impact), Williamson County Regional HCP (initially set at $7,000 to $5,000 per acre of impact), Hays County Regional HCP (initially set at $7,500 per acre of impact), and the proposed Comal County Regional HCP (proposed to be set at $7,500 per acre of impact).

At full implementation of the Plan, the level of mitigation provided for the GCW and BCV will provide a substantial contribution to the recovery of these species, particularly when considered in concert with the existing conservation actions already in place across Bexar County and the Plan Area that fully or partially benefit the GCW and/or BCV.

As the conservation measures proposed for the GCW and BCV are scalable with respect to actual participation in the Plan and it is anticipated that habitat losses for these species will continue to occur even without the SEP-HCP, it is important that the Plan's mitigation ratios and fees are set at a level that encourages robust participation in the Plan in order to achieve the full extent of the anticipated conservation benefits. With mitigation fees set at a level that is comparable to, though somewhat higher than, other nearby regional plans, the Permittees believe that robust participation in the SEP-HCP is possible.

Furthermore, by seeking to place GCW and BCV mitigation in more rural parts of the Plan Area (which is generally sized to represent the extent of GCW Recovery Region 6) the Plan will be able to achieve more conservation than would be practicable if the mitigation were located in the more rapidly developing parts of Bexar County and immediately adjacent areas (see the Single-County and Increased Mitigation alternatives).

Therefore, the Permittees believe that the GCW and BCV minimization and mitigation measures are adequate to address impacts from the authorized incidental take, are at a level that is politically and financially practicable for the Permittees to implement, contribute to the recovery of the species in a meaningful way, and encourage a robust level voluntary participation that will help achieve the social and biological purposes of the Plan. This approach is consistent with the requirements of the ESA, Service policy, and the purpose, goals, and objectives of the SEP-HCP.

OBJECTIVE 6: Maintain or optionally enhance the conservation value of protected GCW and BCV habitats in perpetuity through a flexible and adaptive management program that prioritizes the use of management and monitoring resources for on-the-ground activities that address threats to protected GCW and BCV habitats.

Adaptive management for GCW and BCV preserves will occur via a continuous process of assessing needs, forming strategies, implementing actions, and monitoring results. In attainment of this management and monitoring objective, the Permittees will commit to implementing within the preserves such measures as are both necessary and practicable to maintain suitable habitat conditions for the GCW and BCV and address threats to these species. This management approach compliments the flexibility of the Preservation Crediting strategy that forms the basis for the GCW and BCV conservation program.

5.2.2 COVERED KARST INVERTEBRATE BIOLOGICAL OBJECTIVES

OBJECTIVE 1: Take immediate effective action to increase protection of the Covered Karst Invertebrates at known sites and on existing public land.

As described in the 2011 Bexar County Karst Invertebrates Recovery Plan (USFWS 2011b) and the associated Karst Preserve Design Recommendations (USFWS 2012b), the Service's downlisting criteria and karst preserve standards specify the on-the-ground conservation actions that are currently thought to be needed to achieve recovery of the Covered Karst Invertebrates. While attainment of recovery standards is not a requirement for HCPs, the critically endangered status and limited knowledge about the Covered Karst Invertebrates means that it is important for the Permittees to demonstrate they are not precluding recovery before incidental take of these species is authorized. Therefore, the SEP-HCP includes several measures that are designed to assist with recovery of the Covered Karst Invertebrates.

The Permittees will delay karst participation in the Plan until they have secured some level of up-front mitigation for every karst invertebrate species that is covered by the Plan. For example, the Permittees will pursue adding conservation value to known localities and survey existing public lands to discover karst features that may harbor listed species and will complete biological surveys of newly discovered features in a concerted effort to find and protect new localities. The level and type of mitigation obtained for each species will likely vary. For example, for relatively common species, such as *Cicurina madla* and *Rhadine infernalis*, opportunities to enhance the conservation value of known localities will be much greater than for *Cicurina venii*, whose only two known localities are heavily impacted. The Permittees will work with the Service to determine when the appropriate level of up-front mitigation for each species has occurred.

If approved by the Service, increased protections added by the Permittees during Plan development and approval (i.e., prior to Permit issuance) will count towards the Permittees mitigation responsibilities upon Permit issuance.

OBJECTIVE 2: Collaborate with the Service to achieve a Conservation Baseline for the Covered Karst Invertebrates that is consistent with the downlisting criteria and karst preserve standards described in the Bexar County Karst Invertebrates Recovery Plan and associated documents.

The SEP-HCP will not allow take of Covered Karst Invertebrates within an Occupied Cave Zone until regional Conservation Baselines are achieved. These Conservation Baselines are based on the Service's downlisting criteria (as described in USFWS (2011b)) that specify the number and type of karst preserves needed for recovery of the species. This strategy creates a strong incentive for potential Participants seeking access to the SEP-HCP's streamlined permitting process to assist the Service with identifying new localities for the Covered Karst Invertebrates and to help establish their permanent protection. Until the appropriate Conservation Baseline is achieved, Participants will be required to set aside a 40-acre buffer around occupied karst features through a deed restriction or conservation easement, to the extent that this buffer occurs within the boundary of their Enrolled Property. This requirement both largely avoids any incidental take of the Covered Karst Invertebrates in the buffered feature and preserves an opportunity for the feature to contribute to the survival and recovery of the species, at least until the feature is redundant in terms of the Conservation Baseline.

The SEP-HCP also establishes funding sources dedicated to karst conservation. One such funding source is the karst participation fees collected from Participants. Given the strong incentives for avoiding impacts to occupied karst features, this funding source is not expected to contribute substantially to preserve acquisitions. However, it is anticipated that participation fees will help fund other karst conservation actions such as investigations of accidentally discovered voids, cave

management, and supporting new studies. The primary funding source proposed for karst preserve acquisitions is not tied directly to participation fees, but instead relies on public funds from Bexar County and the City of San Antonio. The SEP-HCP provides a funding plan that assumes that the Permittees dedicate a portion of the property tax revenue generated from new development that occurs after the Plan is implemented to fund implementation, including the acquisition of karst preserves. This funding stream would generate substantial revenues for the Plan after the first few years of operation and support the creation of a market for karst conservation.

Finally, the SEP-HCP prioritizes karst preserve acquisitions that fulfill unmet Conservation Baseline needs, both for how the Plan directs karst conservation funds and for accepting karst preserves in lieu of participation fees from Participants. In this way, limited karst conservation resources are always applied to conservation actions that move the Covered Karst Invertebrates toward recovery and avoid redundant or duplicative conservation actions.

OBJECTIVE 3: Over the life of the Permit, acquire the equivalent of approximately 1,000 acres of new recovery-quality karst preserves for the Covered Karst Invertebrates as mitigation for authorized incidental take.

As a substantial contribution to the recovery of the Covered Karst Invertebrates, the SEP-HCP budgets for the acquisition of approximately 1,000 acres of new recovery-quality karst preserves as mitigation for authorized incidental take of these species (see Section 4 for additional discussion on potential impacts and take authorization request). The anticipated size of the SEP-HCP karst preserve system is roughly equivalent to the acquisition of one high quality karst preserve and two medium quality karst preserves in each of the five Karst Fauna Regions that represent the combined range of the Covered Karst Invertebrates.

OBJECTIVE 4: Substantially improve knowledge about karst habitats and the Covered Karst Invertebrates.

Little is currently known about even the most basic aspects of the biology, habitats, and conservation of the Covered Karst Invertebrates. This lack of information presents a significant challenge to the effective conservation and management of these species; a point that is acknowledged in the Karst Recovery Plan.

Implementation of the SEP-HCP would dramatically increase the amount of information collected about the distribution and abundance of occupied karst features and the Covered Karst Invertebrates. The enrollment process requires pre-application karst surveys for all properties to be enrolled in the Plan that occur over Karst Zones 1 through 4. Participation Agreements contain special conditions requiring Participants to report voids discovered during construction and allow the Permittees an opportunity to conduct brief investigations of these voids before they are closed. The Plan will also sponsor new studies and research projects with the purpose of finding new localities for the Covered Karst Invertebrates and increasing our understanding of their distribution and ecology.

Increasing the state of knowledge about the Covered Karst Invertebrates and their habitats is a key conservation and recovery measure provided by the SEP-HCP.

OBJECTIVE 5: Improve management at known localities for the Covered Karst Invertebrates.

As with GCW and BCV preserves, the SEP-HCP's karst preserves will be managed via an adaptive process that regularly assesses preserves for threats, designs appropriate management strategies to address threats and maintain conservation values, implements management actions, and monitors the results of management actions and tracks the status of the protected species. SEP-HCP Preserve Management Plans will also consider the Service's guidance for the management of karst preserves.

However, since the Permittees will only seek to acquire preserves from willing landowners, there may be known localities for the Covered Karst Invertebrates that might not be included in a SEP-HCP preserve. Landowners may not be interested in selling land outright or creating easements for karst preserves. These "under-protected" sites could benefit from additional management and monitoring, even if they are not formally a part of the SEP-HCP preserve system. The SEP-HCP includes measures to work with the owners of under-protected sites and help them manage important localities for the Covered Karst Invertebrates. These actions, while not as ideal as outright ownership or easement purchase, may significantly increase the relevance of individual sites toward species recovery.

6.0 GCW AND BCV CONSERVATION PROGRAM

6.1 OVERVIEW AND APPROACH

The SEP-HCP will use a Preservation Credit accounting strategy to achieve the biological goals and objectives for the GCW and BCV. Under this strategy, the Permittees will permanently protect and manage GCW and BCV habitats within the Plan Area. With each new preserve acquisition, the SEP-HCP will be awarded a number of Preservation Credits[46] for the GCW or BCV based on the number of habitat acres that are protected. The Permittees will track these Preservation Credits and will debit the ledger after each allocation to a Participant as mitigation for the impacts of their projects.

This conservation strategy ensures that implementation of the SEP-HCP is scalable and flexible with respect to actual participation levels, availability of funds, and conservation opportunities with willing landowners over time. It also ensures that the conservation is always in place *before* the impacts to the species occur.

Participation in the SEP-HCP extends the Plan's incidental take authorization to individual landowners, developers, or non-federal government entities for activities that destroy or degrade habitat for the GCW or BCV. In return, Participants receive Preservation Credits from the Permittees as mitigation for the impacts of their projects. However, the Permittees may only allow new participation if an equivalent amount of conservation is already in place. In other words, the Permittees cannot provide Preservation Credits that do not yet exist. If an insufficient number of Preservation Credits have been established, then the Permittees must acquire a new preserve to create the needed mitigation.

Unlike conservation strategies with a defined preserve commitment, the proposed conservation strategy does not compel the Permittees to acquire and manage more preserve land than it needs to keep up with the demand for participation. Instead, the conservation strategy establishes mitigation ratios that determine how many Preservation Credits are needed to offset the impacts of each participating project. In this way, the size of the preserve system is scaled to the amount of actual participation in the Plan. If the overall demand for participation in the SEP-HCP is less than anticipated, then the SEP-HCP preserve system will also be smaller than anticipated. The amount of incidental take authorization allocated to the Plan determines the maximum amount of participation that may be allowed. However, the preserve size will always be in line with the established mitigation ratios.

The SEP-HCP conservation strategy also remains flexible if the Permittees have insufficient funds to acquire a new preserve or if the Permittees are unable to find willing landowners with whom to negotiate preserve acquisitions. If the Permittees have not accumulated sufficient Preservation Credits to offset the mitigation needed for proposed Covered Activities by Applicants, then new participation in

[46] While similar to conservation credits under a conservation bank, Preservation Credits are only available to SEP-HCP Participants unless otherwise approved by the Service.

the Plan will be suspended so that authorized impacts do not exceed the level of conservation that was able to be achieved.

6.2 GCW AND BCV PRESERVES

The primary conservation measure for the GCW and the BCV is the acquisition, permanent protection, and management of their habitats within the Plan Area. The SEP-HCP GCW and BCV preserve systems will be assembled over the duration of the Plan at a level or rate that is sufficient to stay ahead of the demand for participation. With full utilization of the SEP-HCP's incidental take authorization, the Plan would protect approximately 23,500 acres of preserves for the GCW and approximately 6,600 acres of preserves for the BCV. The biological goals and objectives described in Section 5.1 and Section 5.2 provide guidance for the preferred locations and configurations of these preserve systems.

6.2.1 MINIMUM STANDARDS FOR PRESERVE ACQUISITIONS

6.2.1.1 LEGAL PROTECTION

The Permittees will only acquire preserve lands from willing landowners. The Permittees will not exercise their powers of eminent domain or otherwise take any property for SEP-HCP preserves from landowners on an involuntary basis. All preserve acquisitions will require the willing consent and agreement of the landowner.

To be eligible for Preservation Credits, GCW or BCV habitat must be legally protected in perpetuity from land uses that are not compatible with the conservation of these species. SEP-HCP preserves must also be bound by legal commitments for perpetual management and monitoring of the GCW and/or BCV and their habitats in order to be eligible for generating Preservation Credits. These protection standards may be accomplished through dedicated fee simple property acquisitions (which will be subject to the protections of the management plan) or by conservation easements. Other similar legal mechanisms for land protection may also be possible.

All fee simple lands and conservation easements contributing to the SEP-HCP preserve system must be held by a responsible party approved by the Service prior to generating Preservation Credits. Responsible parties may include Bexar County, the City of San Antonio, other governmental entities, established land trusts, or other entities as approved by the Service.

To help ensure that preserve acquisitions are protected and managed in perpetuity, thereby fulfilling their role as mitigation for authorized incidental take, the Service will be named as a third-party beneficiary to each preserve acquisition with the right to enforce the established legal protections.

6.2.1.2 MINIMUM PROPERTY SIZE

Properties eligible for generating Preservation Credits should meet the following criteria:

1. For the GCW, the property should include at least 500 acres or contribute to a cluster of adjacent protected properties that in the aggregate totals at least 500 acres of GCW habitat (including habitat buffers);

2. For the BCV, the property at a minimum, should support moderate–sized, managed BCV populations or contribute to a cluster of adjacent protected properties that at a minimum supports a moderate–sized, managed BCV population;

Properties that are smaller than the recommended minimum acreages for GCW and/or BCV may be eligible for generating Preservation Credits if the property is adjacent to one or more previously protected properties that, if the group was evaluated as a whole, could meet the minimum size criteria and/or the minimum density recommendations for the species[47], subject to Service approval. These previously protected properties do not need to be part of the SEP-HCP preserve system, but must be reasonably protected from land uses that are not compatible with the conservation of the GCW and/or BCV. As such, public open spaces (including nature parks, preserves, natural areas, and/or wildlife management areas) and private properties protected by conservation easements (including easements that do not specifically provide for endangered species protections) may contribute to the formation of a "cluster" of protected properties.

6.2.1.3 OCCUPANCY

To be eligible for Preservation Credit, the presence of the GCW or BCV (depending on the type of habitat being protected) must be confirmed within the property. Species observations recorded up to two years prior to the request for Preservation Credit may support this criterion.

6.2.1.4 LOCATION

Any property located within the boundary of the Plan Area that meets the legal protection, minimum size requirements, occupancy criteria, or that is otherwise given case-by-case approval by the Service will be eligible for Preservation Credits. GCW or BCV habitats that occur outside of the Plan Area will not be eligible for SEP-HCP Preservation Credit.

6.2.1.5 EXCEPTIONS

The Service may award GCW or BCV Preservation Credits on a case-by-case basis for properties that do not meet the minimum preserve criteria for potential preserves, based on a review of site-specific circumstances. Exceptions must be requested by the Permittees.

This provision is necessary to provide some latitude for acquiring preserves that might not strictly meet some of the minimum preserve criterions, but that otherwise represent important conservation opportunities for the GCW and BCV. Circumstances warranting an exception to the minimum preserve criteria are expected to be rare, and may require additional management, monitoring, or protection.

6.2.2 ACQUISITION PRIORITIES

All SEP-HCP preserves will be acquired with the agreement of willing landowners and will meet the minimum preserve criteria (more specifically described in Service 2013c), unless granted an exception by the Service. However, the Permittees will also prioritize preserve acquisitions that best fulfill the Plan's biological goals and objectives within the limits of the available resources. For example,

[47] Minimum size criteria and/or the minimum density recommendations for each of the species is discussed in detail in Section 5.2.1. Additional information regarding species specific habitat needs/requirements are included in Appendix C.

the Permittees may give higher priority to practicable conservation opportunities that contribute to the baseline of protected GCW habitats in or near Bexar County or that establish new focal preserves within the Plan Area.

When evaluating potential preserve acquisitions, the Permittees will consider the potential conservation benefits to the Covered Species as first-level priorities. The Permittees will consider potential conservation benefits to the Voluntarily Conserved Species or other resources of concern (such as aquifer protection) as secondary priorities.

The Permittees may seek input from the Service and the SEP-HCP advisory committees when evaluating potential preserve acquisitions to help ensure that the Plan's biological goals and objectives are attained and that public conservation dollars are used responsibly.

6.2.3 USES OF PRESERVE LANDS

The required legal protections for SEP-HCP preserves will establish that the primary purpose of GCW and BCV preserve lands is for the long-term conservation of these species. However, it is anticipated that many preserve lands, particularly those acquired through conservation easements, will come with existing land uses other than the conservation of endangered species. Most private lands with endangered species are also used for private or commercial residential, agricultural, hunting, and/or recreational purposes to varying intensities. Many landowners negotiating conservation easements may want to retain the right to engage in some or all of these existing land uses. There may also be an expectation that preserves acquired in fee simple by governmental entities, fully or partially with public funds, have some form of limited public access.

Secondary uses of SEP-HCP preserve lands may be allowed if these uses: (1) are conducted in a manner consistent with the conservation of the GCW and BCV; (2) are conducted in accordance with an adaptive management plan that identifies and substantially minimizes potentially related threats to the species; and (3) are approved by the Service.

The Permittees and affected preserve landowners will jointly negotiate the conditions for any secondary preserve uses, which shall be subject to approval by the Service. If the Service determines that proposed secondary uses of GCW and BCV preserves would have a reasonable likelihood of materially reducing the long-term conservation value of the protected habitat for the GCW or BCV, then the Service may deny the request for such uses or reduce the number of Preservation Credits awarded to the Permittees to compensate for the reduction in conservation value.

6.3 PRESERVATION CREDITS

The SEP-HCP will include a ledger of Preservation Credits purchased and debited where Preservation Credits are created by permanently protecting and managing habitat for the GCW or BCV. Preservation Credits are debited by using them as mitigation for incidental take from Covered Activities or otherwise formally extinguishing them.

6.3.1 PRESERVATION CREDIT LEDGER

The Permittees will maintain a ledger of Preservation Credits acquired and debited for the GCW and BCV. The purpose of the preservation ledger is to record all GCW and BCV Preservation Credit

transactions and track the current balance of Preservation Credits. Specifically, the preservation ledger will separately record the following information for each GCW and BCV Preservation Credit transaction:

- The date of the addition or debit of Preservation Credits;
- The number of Preservation Credits added or debited as a result of the transaction; and
- The source or recipient of the Preservation Credits.

With each Preservation Credit transaction, the Permittees will update the current Preservation Credit balance. Preservation Credits for the GCW and BCV will be tracked separately.

The Permittees may also maintain separate accounts for Preservation Credits reserved for a particular use. For example, the Permittees may wish to reserve a certain number and type of Preservation Credits for their own use, or a Participant may have provided preserve land in lieu of credit Preservation Credit purchases and have excess Preservation Credits reserved for its later use. In these cases, the Preservation Credits in these separate accounts would not be available for use by other Participants.

The Permittees will submit a copy of the complete preservation ledger to the Service with each annual report and at other times upon the request of the Service.

6.3.2 CREATION OF NEW PRESERVATION CREDITS

New Preservation Credits for the GCW and BCV are created by establishing preserves for these species that meet the minimum standards described in Section 6.2.1. The number and type of Preservation Credits created by a preserve acquisition generally reflects the conservation value of the preserve property for the GCW or BCV. Preservation Credits for the GCW and BCV will be approved by the Service in accordance with official Service policy related to establishment of mitigation lands (currently USFWS 2013c).

Generally, each acre of GCW or BCV habitat that is included in a SEP-HCP preserve will generate one Preservation Credit for that species. Non-habitat buffers may count towards a partial Preservation Credit. Habitats that were partially conserved prior to acquisition as a SEP-HCP preserve may also be awarded a partial Preservation Credit.

Some of the existing conservation lands, such as City of San Antonio natural areas or lands acquired for water quality protection may be able to generate partial Preservation Credits for the Plan. For example, if the Plan establishes additional species-specific conservation measures on existing conservation lands, partial Preservation Credit may be awarded to the Plan in connection therewith.

For each preserve acquisition, the Permittees will submit a GCW and BCV habitat assessment to the Service for review. The habitat assessment will document the extent of potentially suitable GCW and BCV habitat contained within the potential preserve boundary and the extent of any buffer and non-habitat that may be suitable for mitigation. These habitat assessments will be prepared in accordance with the following standards (USFWS 2013c):

1. Be prepared by a biologist holding or named on valid section 10(a)(1)(A) USFWS Threatened and Endangered Species permits for the GCW and BCV, as appropriate for the species being addressed;

2. Delineate portions of the preserve property that meet the Service's definition of suitable habitat for GCW or BCV (currently reported in Campbell 2003);

3. A recent survey, within the last two breeding seasons, which indicates that the habitat is occupied by the GCW and/or BCV.

4. Include a review of the best available information, including a discussion of actual site conditions as determined from a site visit by the preparing biologist no more than two years prior to the request; and

5. Include a description of the information and methods used to delineate areas of suitable GCW or BCV habitat and abundance surveys.

In addition, the Permittees will demonstrate to the Service that the preserve property meets the minimum standards for a SEP-HCP preserve, as described in Section 6.2.1, or explain the reasons why an exception from the Service may be warranted.

The Permittees may request a determination from the Service prior to the actual acquisition of a potential preserve property in order to establish the probable number of credits Preservation Credits that could be awarded if the acquisition were to be completed. The provided documentation of the conservation value will be promptly reviewed and the number of GCW or BCV Preservation Credits that may be generated by the preserve acquisition will be determined. Actual award of Preservation Credits to the SEP-HCP will be made upon completion of the required legal protections.

All Preservation Credit awards to the SEP-HCP will be made in writing by notice to the Permittees.

6.3.3 PURCHASE OF THIRD-PARTY PRESERVATION CREDITS

The Permittees may purchase conservation or mitigation credits for the GCW or BCV from Service-approved, independent, third-party conservation banks, provided that such credits are created from protected habitats occurring within the Plan Area and the Plan Area is located within the service area of the conservation bank. Upon purchase of third-party conservation or mitigation credits, these credits will be added to the SEP-HCP preservation ledger as Preservation Credits at a ratio equivalent to the standards for the creation of new Preservation Credits (i.e., one credit is the equivalent of one acre of suitable habitat permanently protected and managed for the benefit of the species). These added Preservation Credits may be debited to Participants similar to new Preservation Credits created by SEP-HCP preserves.

However, the SEP-HCP will not be responsible for the ongoing management or monitoring of lands associated with any purchased Preservation Credits from third-party conservation banks. These responsibilities will have already been negotiated between the Service and the third-party bank operator and will remain with the operator, as determined by their individual conservation banking agreement.

6.3.4 DEBIT AND EXTINGUISHMENT OF PRESERVATION CREDITS

GCW and BCV Preservation Credits may be purchased by Participants or otherwise debited from the SEP-HCP as mitigation for authorized incidental take under the SEP-HCP ITP. At the discretion of the Service, Preservation Credits may be purchased by entities simply seeking to extinguish the credit, without applying it as mitigation for incidental take and thereby making those credits unavailable to Applicants.

SEP-HCP Preservation Credits that are debited or otherwise conveyed to Participants or other entities will be subtracted from the preservation ledger. SEP-HCP Preservation Credits that are associated with a Participation Agreement and provide mitigation for an Enrolled Property will be applied to the Participant's project and not available for transfer or re-use at the time the Participation Agreement is issued. Re-allocation or re-use of Preservation Credits will not be permitted, unless the Participation Agreement is terminated prior to the "take". SEP-HCP Preservation Credits that are debited or conveyed for purposes other than enrollment in the SEP-HCP may only be re-used with the approval of the Permittees and the Service, at their discretion.

The Permittees will track the addition of Preservation Credits to and the subtraction of Preservation Credits from the SEP-HCP and will ensure that the preservation ledger does not experience a negative Preservation Credit balance for the GCW or the BCV. A negative Preservation Credit balance (even if temporary) would be a violation of the ITP.

6.4 RESEARCH

The SEP-HCP will contribute to the understanding of the biology, ecology, and conservation of the GCW and BCV by providing access on a limited basis to SEP-HCP preserves for research projects. The Permittees will review requests for such access on a case-by-case basis and will seek input from the Service and the SEP-HCP scientific advisory committee, as applicable on research priorities. Generally, priority will be given for research projects that address uncertainties related to effective preserve management and maintaining the long-term conservation value of protected GCW and BCV habitats. Research activities will in no way degrade the conservation values for which the preserves were set up for.

7.0 KARST CONSERVATION PROGRAM

7.1 OVERVIEW AND APPROACH

The biological goals and objectives for the karst conservation program described in Section 5.2.2 seek to help the Service achieve recovery of the Covered Karst Invertebrates. The Bexar County Karst Invertebrates Recovery Plan provides the guidance for how downlisting and/or recovery of the listed karst invertebrates may be accomplished. Therefore, the conservation measures proposed for the SEP-HCP karst conservation program are based largely on this recovery plan, particularly with respect to the recommended number, type, and distribution of karst preserves and guidance for long-term management of karst preserves.

Due to the extreme rarity of many of the Covered Karst Invertebrates and the limited extent of potential habitat that may be suitable for conservation purposes, the SEP-HCP karst conservation program relies heavily on a strategy of: 1) collecting new information about the distribution of these species on public and private lands; 2) avoiding or minimizing incidental take on Enrolled Properties; 3) limiting the use of the Plan's incidental take allowance until certain recovery-based Conservation Baselines have been achieved; and 4) dedicating resources for karst conservation actions that are independent of fees and other mitigation provided by voluntary Plan Participants.

With full implementation of the SEP-HCP, the Permittees commit to the acquisition of approximately 1,000 acres of karst preserves for the benefit of the Covered Karst Invertebrates. The SEP-HCP funding plan described in Section 11 budgets for this level of preserve acquisition primarily through a funding stream that is independent of actual Plan participation. However, despite a secure funding source, it will still take a robust level of voluntary participation in the Plan to achieve the biological goals and objectives. For instance, measures to avoid or minimize incidental take of listed karst invertebrates will only apply to Participants; non-participants would not be bound by the terms of the SEP-HCP's ITP or the special conditions of individual Participation Agreements. The Permittees' obligation to achieving the goal of 1,000 acres of new karst preserves is also dependent on robust Plan participation, since lower levels of voluntary enrollment would require less mitigation to balance the amount of take authorization that is actually used.

To encourage robust participation, the Plan will evaluate applications based on the level of conservation achieved for individual species within individual KFRs. In this way, more opportunities for participation will be available for species in regions where Conservation Baselines have been met or exceeded, without first requiring full achievement of the Service's downlisting criteria for all species in all regions. This approach incrementally expands the availability of incidental take authorization as the recovery potential for individual species become more secure.

Mitigation measures for the Covered Karst Invertebrates may include sponsoring studies or other surveys to search for and document new localities for these species, contributing to the management of unprotected or under-protected localities, and (most importantly) establishing new karst preserves. Studies or surveys to identify new occupied karst features will focus on existing conservation lands, as most existing preserves and natural areas in the Plan Area have not been fully investigated for the presence of the Covered Karst Invertebrates. Similarly, the pre-application surveys required for

properties to be enrolled in the Plan promote the investigation of private lands for the presence of occupied karst features. The Plan will encourage the Permittees to seek and create cooperative partnerships with the owners of currently known localities to enhance the management of these sites, even if full protection of the locality as a karst preserve is not possible. Finally, the Permittees will establish new karst preserves for the Covered Karst Invertebrates that have significant conservation value to the species and that help achieve recovery goals of the Covered Karst Invertebrates to the extent that appropriate opportunities and sufficient resources are available.

The SEP-HCP enrollment process (described in Section 3.2) includes many of the Plan's key conservation measures for the Covered Karst Invertebrates, including requirements for pre-application karst surveys, limitations on incidental take, and the special conditions of Participation Agreements for karst impacts. The following sections describe the standards for SEP-HCP karst preserves to be acquired as mitigation for incidental take and the requirements for ongoing management and monitoring of these preserves. Other mitigation measures, such as Plan-sponsored studies to document new localities and management of unprotected or under-protected sites, are also described below since other conservation measures, such as surveying for new caves or providing for some increased level of conservation for the heavily impacted known sites, may be the only options available to help satisfy up-front mitigation.

The level and type of up-front mitigation obtained for each species will likely vary[48]. For example, for relatively common species, such as *Cicurina madla, Rhadine exilis,* and *Rhadine infernalis*, opportunities to enhance the conservation value of known localities will be much greater. However, for species like *Cicurina venii*, with only two known but heavily impacted localities, options remain limited. Therefore, other conservation measures and/or recovery efforts, such as surveying for new caves or providing for some increased level of conservation for the heavily impacted known sites, may be the only options to help satisfy up-front mitigation. The Permittees will work with the Service in determining when the appropriate level of up-front mitigation has occurred. The SEP-HCP will not offer Karst Participation Certificates until the Permittees have secured some level of up-front mitigation for all of the Covered Karst Invertebrate Species.

7.2 KARST PRESERVES

The primary conservation measure for the Covered Karst Invertebrates is the acquisition, protection, and perpetual management of karst preserves. The biological goals and objectives for the Covered Karst Invertebrates direct the SEP-HCP to contribute to the creation of approximately 1,000 acres of karst preserves that help fulfill the downlisting criteria described in the Bexar County Karst Invertebrates Recovery Plan (USFWS 2011b).

The SEP-HCP Karst Conservation Program is designed to contribute to recovery of the Covered Karst Invertebrates and contains strong incentives for acquiring preserves that implement the Service's Karst Preserve Design Recommendations (see USFWS 2012b[49]) for high and medium quality

[48] For the relatively common species, such as *Cicurina madla, Rhadine exilis,* and *Rhadine infernalis* the expected up-front mitigation will be through the establishment of a medium or high quality karst preserve.

[49] U.S. Fish and Wildlife Service (USFWS). 2011b. Bexar County karst invertebrates recovery plan. August 2011. Southwest Region, USFWS, Albuquerque, NM. 84 pp + on-line modules.

Karst Fauna Areas. The most important incentive driving the acquisition of recovery-quality karst preserves is the requirement for recovery-based regional Conservation Baselines to be achieved *prior to* allowing Participants to gain access to Occupied Cave Zones. The Permittees will work with the Service to determine whether or not karst preserves will contribute to the Conservation Baseline. Providing incidental take authorization for activities within Occupied Cave Zones will be one of the most valuable benefits of the SEP-HCP for potential Participants.

However, SEP-HCP preserve acquisitions will also be subject to the timely availability of suitable and practicable acquisition opportunities. While the Permittees are committed to achieving all of the Plan's biological goals and objectives, these "real-world" considerations could affect the Plan's contribution to recovery of the Covered Karst Invertebrates in an already urbanizing and highly subdivided landscape. Indeed, the Service's analysis of land use around currently known localities for the Covered Karst Invertebrates (USFWS 2011d) demonstrated that most known localities (i.e., 50 of the 88 known localities within the Plan Area, or greater than 56 percent) no longer have recovery potential. Many of these localities are also designated as Critical Habitat for one or more of the Covered Karst Invertebrates (USFWS 2012a). It must be assumed that a significant portion of the SEP-HCP's potential preserve acquisition opportunities will not be able to strictly meet all of the criteria set forth in the Service's Karst Preserve Design Recommendations as established in the Bexar County Karst Invertebrates Recovery Plan (USFWS 2012b). Karst preserves that may not strictly meet the Service's definitions for high or medium quality preserves as expressed in USFWS (2012b), but still represent valuable conservation opportunities (particularly in areas where conditions for establishing high or medium quality preserves do not exist) may also be accepted as suitable mitigation for the SEP-HCP. However, consistent with USFWS (2012b), the Service may determine that such preserves do not contribute to achieving the karst Conservation Baselines.

7.2.1 PACE AND QUANTITY OF KARST PRESERVE ACQUISITIONS

The Permittees will compare the acres of completed karst preserve acquisitions against the amount of participation over Karst Zones 1 and 2 prior to enrollment of a property in the program and upon acquisition of new karst preserves to ensure that karst preserve acquisitions keep pace with the level of Plan participation. If preserve acquisitions have not kept pace with Plan participation over these areas of potential karst habitat, then the Service may at any time during Permit issuance require the Permittees to suspend new participation for properties located over Karst Zones 1 or 2, noting that if a species location is found in Karst Zone 3 or 4 they immediately become zone 1, until any deficits are rectified.

These "Karst Conservation Program Evaluations" will take place in Year 5, Year 10, Year 15, Year 20, and Year 25 of Plan implementation[50]. The evaluations will consider the following criteria:

- For Year 5, the goal of immediate increased protection of known karst sites that currently lack adequate protection, and to survey existing public lands for new locations, including any protections placed by the Permittees prior to Plan approval;

[50] Karst Conservation Program Evaluations will continue at five year intervals, if the Permit is renewed beyond the original expiration date.

- Goal of achieving 1,000 acres of new karst preserves for the Covered Karst Invertebrates;
- Acres and percent of Service-approved SEP-HCP karst preserves acquired to-date (or equivalent, if "partial credit[51]" is awarded for SEP-HCP contributions to achieving additional protections for Covered Karst Invertebrates on existing conservation lands, as agreed by the Permittees and Service prior to Plan approval and Permit issuance);
- Limit of 10,234 acres (20 percent) of the total of Karst Zone 1 and 2 that may be included within Enrolled Properties (i.e., the Plan's incidental take limit for these zones);
- Acres and percent of Karst Zones 1 and 2 contained within the boundaries of Enrolled Properties to-date.

If a scheduled evaluation shows that the completed karst preserve area protected is less than the incidental take utilized over Karst Zones 1 and 2, then the Service may require the Permittees to suspend new participation over Karst Zones 1 and 2 until the deficit is eliminated. Generally, suspensions will only apply to the enrollment of property over Karst Zones 1 or 2 and will not affect enrollment over other Karst Zones, unless a species is located within one of those zones thereby redesignating it to Zone 1.

For example, if at Year 10 of Plan implementation the Permittees have created 300 acres of Service-approved karst preserves (30 percent of the 1,000-acre preserve goal) and have Enrolled Properties in the Plan containing 3,000 acres of Karst Zones 1 or 2 (29 percent of the 10,234-acre incidental take limit for these zones), then the Permittees may continue to implement the karst program without interruption since the proportion of incidental take authorization used by the Plan over Karst Zones 1 and 2 does not exceed the proportion of preserve lands acquired. However, if the Enrolled Properties were to contain 3,600 acres of Karst Zones 1 and 2 (35 percent of the incidental take limit for these zones), then the Service could require the Permittees to suspend new enrollment of properties over Karst Zones 1 or 2 until the Permittees acquire an additional 50 acres of karst preserves.

This provision for Karst Conservation Program Evaluations does not consider enrollment over Karst Zones 3 and 4 since these areas are much less likely to actually contain the Covered Karst Invertebrates. The evaluations also do not consider whether or not Participants have access to Occupied Cave Zones, which is only possible after the appropriate karst Conservation Baselines are met (see Section 3.2.3.2) and is independent of how many new acres of karst preserves have been established through the SEP-HCP.

Despite a robust funding source for karst conservation, it is possible that the SEP-HCP will not accomplish the acquisition of 1,000 acres of new karst preserves for the Covered Karst Invertebrates over the duration of the Plan because development may not impact caves at such a rate to reach 100 percent of the incidental take limit for Karst Zones 1 and 2. However, the Karst Conservation Program

[51] When the SEP-HCP achieves additional Service-approved protections in perpetuity for one or more of the Covered Karst Invertebrates on existing conservation lands, such as on State Natural Areas or city nature preserves, for example, by placing a conservation easement on areas around caves without existing permanent protections satisfying the Service's recovery standards, such actions will contribute "partial credit" towards the SEP-HCP's karst preserve system. See Section 7.2.2 for further explanation of what constitutes "partial credit."

Evaluations are intended to measure the pace of actual karst conservation relative to Plan participation over areas of potential karst habitat with a relatively high likelihood of being occupied and to provide assurances to the Permittees that they need not provide more mitigation than is warranted by actual participation.

7.2.2 SERVICE APPROVAL AND MITIGATION

All lands contributing to the SEP-HCP's karst preserve system will have Service approval prior to being counted as mitigation for incidental take of the Covered Karst Invertebrates. The standards for SEP-HCP karst preserve acquisitions are described in the following section and preserves meeting these standards are expected to receive prompt Service review and approval.

It is anticipated that some lands included in the SEP-HCP karst preserve system will have been acquired and/or protected entirely by actions sponsored by the SEP-HCP. Such conservation actions, with Service approval, will fully contribute (acre-for-acre) towards the SEP-HCP's karst preserve system.

However, the SEP-HCP may also collaborate with other conservation partners to establish karst preserves. When the SEP-HCP achieves additional Service-approved protections[52] for one or more of the Covered Karst Invertebrates on existing conservation lands, such as on TPWD State Natural Areas[53] or city nature preserves, such actions will contribute partial credit towards the SEP-HCP's karst preserve system. It is expected that such actions would generate credit at a level equivalent to no less than 50 percent of the acreage subject to the enhanced karst protections.

Grant funding may be available for land acquisition contributing to the karst Conservation Baseline.

The SEP-HCP may also receive credit for protecting areas adjacent to existing karst conservation lands (whether formally part of the SEP-HCP karst preserve system or conserved through other means) that expand protections for the Covered Karst Invertebrates. For example, the SEP-HCP may protect land on private property containing a significant portion of the subsurface drainage basin for an occupied karst feature located on an adjacent TPWD State Natural Area. Since protection of the subsurface drainage basin by the SEP-HCP directly contributes to and enhances the overall conservation of the previously protected karst feature, the newly protected acreage would be expected to contribute acre-for-acre to the SEP-HCP karst preserve system. In such cases where credits are sought for conservation actions that may not include the actual entrance to an occupied karst feature, the feature entrance must (at a minimum) already be permanently protected from direct physical loss or alteration and the combined characteristics of the protected area should be consistent with the preserve standards described below. In this way, the SEP-HCP may contribute to improving potential low quality karst preserves to a level that contributes to recovery of the species.

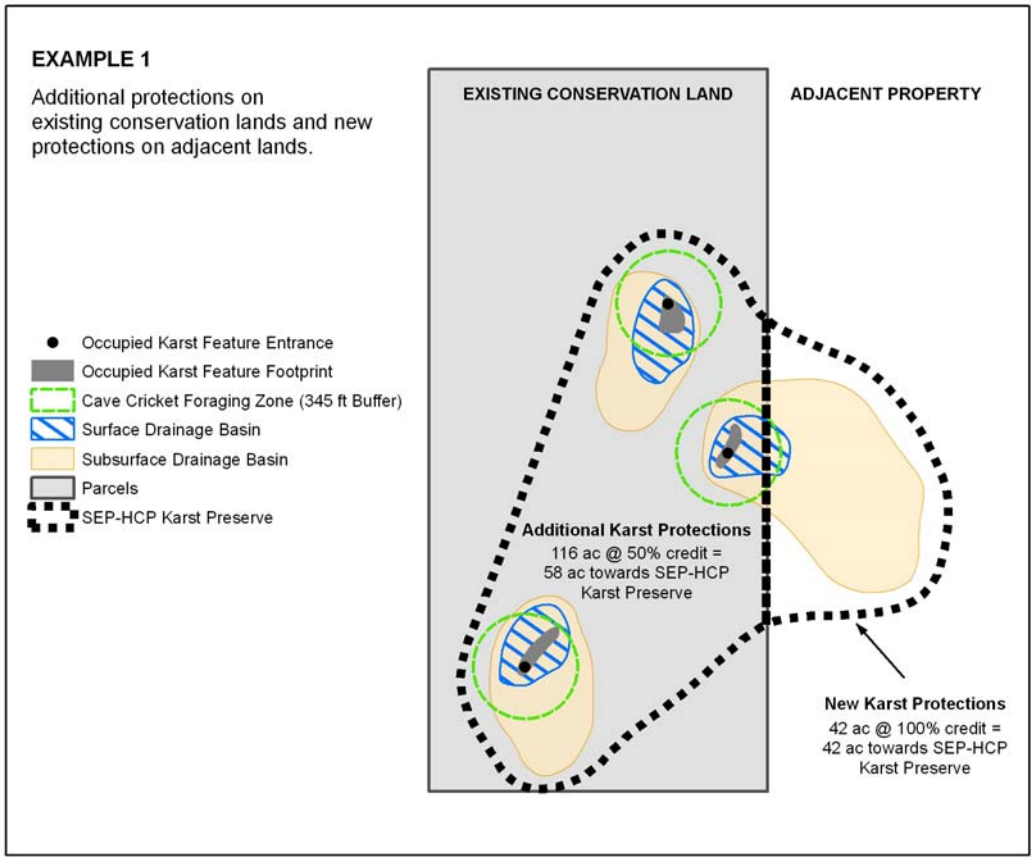
Figure 10 shows examples of possible karst preserve configurations and acreage contributions to the SEP-HCP karst preserve system. In Example 1, the existing conservation land could be a

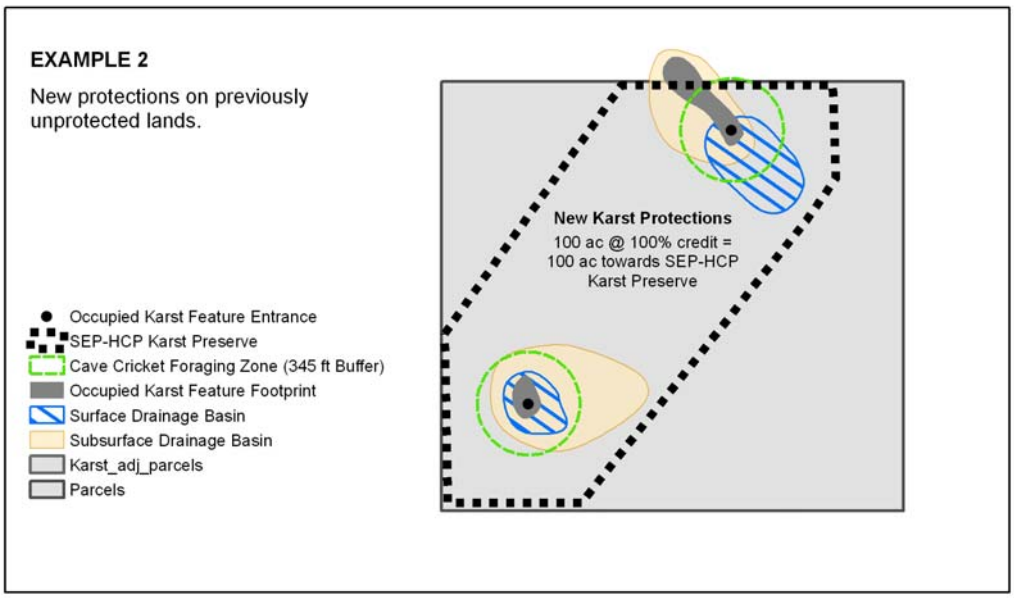
[52] For example, by placing a conservation easement on areas around caves without existing permanent protections satisfying the Service's recovery standards, such additional perpetual protection actions will contribute partial credit towards the SEP-HCP's karst preserve system.

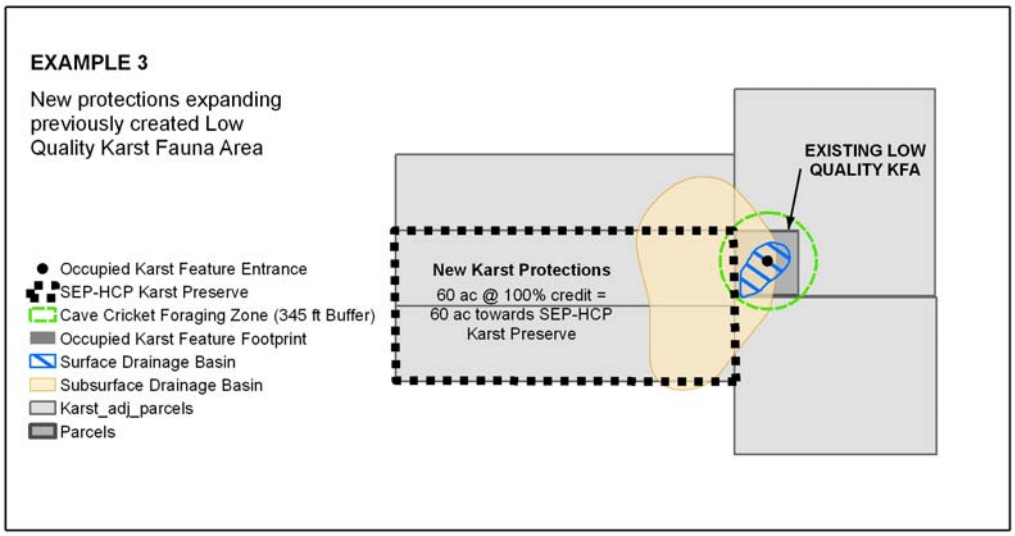
[53] The SNA's purpose is to protect the area's natural and cultural resources, with special emphasis on endangered and threatened species, aquatic life and spring flows, and to provide recreational and educational opportunities that do not compromise resource stewardship objectives.

publicly-owned land conserved for a purpose unrelated to karst conservation. Permanent protection for karst preservation could be added, such as specifically encumbering the property through a modified easement, and instituting additional management, monitoring, and reporting efforts. In this example, the additional protections would provide credit for additional acreage preserved at a ratio of 50 percent of the total acreage permanently protected. The permanent protection of currently unprotected adjacent property with, for example, additional subsurface drainage area, would be satisfactory to qualify for 100 percent of the available acres preserved. Example 2 shows a situation with new protection in previously unprotected lands, which would generate 100 percent of available credit for acres preserved. Example 3 shows an existing low quality preserve with permanent protection that is too small to meet recovery standards. The additional permanent protection of a large part of the subsurface drainage area and an additional 60 acres would bring the protected area up to medium quality, and would thus be eligible for 100 percent of available credit.

FIGURE 10. Example SEP-HCP Karst Preserves.







7.2.3 STANDARDS FOR KARST PRESERVE ACQUISITIONS

7.2.3.1 LEGAL PROTECTION

The Permittees will only acquire preserve lands from willing landowners. The Permittees will not exercise their power of eminent domain or otherwise take any property for SEP-HCP preserves from landowners on an involuntary basis. All preserve acquisitions will require the willing consent and agreement of the landowner.

To qualify as a part of the SEP-HCP karst preserve system, habitat for the Covered Karst Invertebrates must be legally protected in perpetuity from land uses that are not compatible with the

conservation of these species. SEP-HCP preserves must also be bound by legal commitments for perpetual management and monitoring of the Covered Karst Invertebrates and their habitats. These protection standards may be accomplished through dedicated fee simple property acquisitions or by conservation easements. Other similar legal mechanisms for land protection may also be possible.

All fee simple lands and conservation easements contributing to the SEP-HCP preserve system must be held by a responsible party approved by the Service prior to being designated a qualifying karst preserve. Responsible parties may include Bexar County, the City of San Antonio, other governmental entities, established land trusts, or other entities as approved by the Service.

To help ensure that preserve acquisitions are protected and managed in perpetuity, thereby fulfilling their role as mitigation for authorized incidental take, the Service will have the right to enforce the established legal protection with respect to each acquired preserve.

7.2.3.2 SIZE AND CONFIGURATION

In addition to providing mitigation for the impacts of authorized incidental take, the SEP-HCP karst preserves are also intended to contribute to the recovery of the Covered Karst Invertebrates to the maximum extent practicable (see Section 7.1 for additional information). Therefore, lands contributing to the SEP-HCP karst preserve system are generally expected to have the following characteristics, which are based on the Service's recommendations for recovery-quality karst preserves (USFWS 2012b):

- Karst preserves should protect the footprint, surface drainage basin, and subsurface drainage basin for a cave, which should also be free of impervious cover, pipelines, or water retention improvements.
- Karst preserve boundaries should be at least 100 meters (approximately 328 feet) from the cave footprints.
- Karst preserves should protect a buffer of at least 345 feet from the cave footprint that represents the maximum known foraging range of central Texas cave crickets.
- "High quality" karst preserves should include at least 100 acres of native vegetation surrounding the cave footprint.
- "Medium quality" karst preserves should include at least 40 acres of native vegetation surrounding the cave footprint. Approval by the Service would be required for any preserve not meeting the medium quality criteria.

Karst preserves that meet these characteristics should provide suitable mitigation for the impacts of incidental take of the Covered Karst Invertebrates and are also expected to contribute to the Conservation Baselines for the associated Covered Karst Invertebrates. Karst preserves that may not strictly meet the Service's definitions for high or medium quality preserves as expressed in USFWS Karst Preserve Design Recommendations (USFWS 2012b), but still represent valuable conservation opportunities (particularly in areas where conditions for establishing high or medium quality preserves do not exist) may also be accepted as suitable mitigation for the SEP-HCP. However, consistent with USFWS Karst Preserve Design Recommendations (USFWS 2012b); the Service may determine that such preserves do not contribute to achieving the karst Conservation Baselines.

7.2.3.3 OCCUPANCY

SEP-HCP karst preserves that may be accepted as mitigation for incidental take must be known to be occupied by one or more of the Covered Karst Invertebrates, as established by biological surveys conducted by a biologist holding or named on a valid section 10(a)(1)(A) USFWS Threatened and Endangered Species permits for the karst species. The Permittees will provide documentation from a taxonomic expert confirming the identity of Covered Karst Invertebrates collected from preserve localities where they are not currently reported to occur. See USFWS Bexar County Karst Invertebrate Distribution (USFWS 2011e) for the current list of known species localities.

7.2.3.4 LOCATION

The Bexar County Karst Invertebrates Recovery Plan specifies the number, type, and distribution of karst preserves that would be needed for the Service to consider downlisting these species from endangered to threatened. These criteria are summarized in Table 6. The biological goals and objectives for the SEP-HCP karst conservation program are consistent with these recommendations. Given the distribution of potential habitat for the Covered Karst Invertebrates, all preserves for these species will be located within the northern part of Bexar County and possibly limited portions of adjacent counties. At this time, the Covered Karst Invertebrates are not known to occur within the counties surrounding Bexar County; therefore all karst preserves would be located within Bexar County until such time that they are.

7.2.4 USES OF PRESERVE LANDS

The required legal protections for SEP-HCP preserves will establish that the primary purpose of karst preserve lands is for the long-term conservation of the Covered Karst Invertebrates. Similar to GCW and BCV preserves, many lands acquired as karst preserves may come with existing secondary uses or expectations for limited public use.

Secondary uses of SEP-HCP preserve lands may be allowed if these uses: (1) are conducted in a manner consistent with the conservation of the Covered Karst Invertebrates; (2) are conducted in accordance with an adaptive management plan that identifies and substantially avoids potentially related threats to the species; and (3) are approved by the Service.

The Permittees and the affected preserve landowners will jointly negotiate the conditions for any secondary preserve uses, which shall be subject to the further approval of the Service. If the Service determines that proposed secondary uses of karst preserves have a reasonable likelihood of materially reducing the long-term conservation value of the protected habitat, then the Service may deny that secondary use of the preserve. Secondary uses must be consistent with the primary purpose of karst preserve lands.

7.3 OTHER KARST CONSERVATION MEASURES

In addition to preserve acquisitions (which are the primary focus of the karst conservation program), the SEP-HCP allocates $300,000 over the duration of the plan to other types of karst

conservation measures[54] (see Appendix F for annual funding allocated to other karst conservation measures). These other conservation measures are intended to help fill important data gaps, minimize threats to currently known species localities and Critical Habitat, and engage the community in karst conservation.

7.3.1 KARST HABITAT AND BIODIVERSITY STUDIES

To help address important gaps in the current knowledge of the true distribution, abundance, and conservation status of the Covered Karst Invertebrates, the SEP-HCP will sponsor studies of existing conservation lands and seek partnerships with willing private landowners to help identify new species localities and gain a better understanding of species abundance and distribution.

As described in Section 3.2.4.3 – Participation Agreements and Special Conditions, the SEP-HCP will allow for brief investigations of karst features discovered during construction by Participants on Enrolled Properties. These brief investigations, to be completed by the Permitees within a seven-day construction suspension period, will collect information on the habitat characteristics of the feature and the species occurring within it. Conducting these brief investigations will be optional for the Permittees, and are not intended to include detailed karst feature or faunal surveys per the Service's standard protocols, but rather are rapid assessments to collect very basic information about a feature and its possible inhabitants (if any). The Permittees will collaborate with the Service to develop an appropriate protocol for conducting such studies that is practicable to implement under the time allowed for such investigations and within the budget of the karst conservation program. The protocol will be developed prior to any incidental take being authorized for karst, unless specifically approved by the Service.

The SEP-HCP will sponsor karst habitat surveys and biodiversity surveys on other accessible properties over Karst Zones 1 through 4, with a focus on properties over Zones 1 and 2. These actions may include funding independent studies or utilizing program staff to conduct studies. Priority will be given to studies on existing public and private protected lands, but may be expanded to other accessible properties as resources and opportunities allow.

The extent to which existing conservation lands contain occupied karst features is largely unknown since comprehensive surveys have not been conducted on most sites and few of the known sites have been extensively surveyed for the presence or absence of listed species. Currently, existing conservation lands (not including Camp Bullis) are known to contain approximately 26 species-occupied karst features. However, extensive karst survey work conducted on Camp Bullis suggests that many more localities could occur within the approximately 22,600 acres of existing public and private conservation lands over the Bexar County Karst Zones. Further, due to low detection probabilities, it could take tens or dozens of karst fauna surveys to detect the presence of some of the rarest species.

The Permittees will report the results of all karst surveys to the cooperating property owners and to the Service as part of the SEP-HCP annual report.

[54] Allocated funds will be used to assist in the discovery of new features and species localities, contribute to management activities at undermanaged features not within the preserve, and research projects.

7.3.2 MANAGEMENT OF UNPROTECTED AND UNDER-PROTECTED CAVES

Almost none of the currently known karst features harboring one or more of the Covered Karst Invertebrates receive sufficient protection or management to secure the long-term conservation value of the karst habitat. However, it may not be possible for the SEP-HCP to acquire many of these sites as karst preserves. While full protection as a karst preserve may not be possible, some landowners with known species-occupied karst features might be willing to accept assistance with the management and monitoring of these sites. Therefore, the SEP-HCP anticipates that it will also dedicate resources to management and monitoring actions on unprotected or under-protected localities. Such resources may be in the form of funding to landowners in return for specific management actions, funding to independent contractors for services, or use of program staff to implement management practices.

Management actions may, as appropriate, include perimeter fencing or cave gating, fire ant control, restoring native vegetation within the drainage basin of a cave, implementing best practices for integrated pest management, improving the quality of runoff draining to a cave, and/or minimizing threats of contamination by other potentially hazardous substances. Other types of management actions may also be appropriate, depending on the circumstances of the site.

The management actions sponsored by the SEP-HCP at a particular site will be negotiated individually with each landowner and may include one-time actions (such as installing fencing or cave gates) or term agreements for repeated or continual activities (such as fire ant treatments or mowing deferments). It is also possible that some landowners would agree to perpetual management agreements.

The Permittees will collaborate with the Service to develop site-specific management and monitoring recommendations for landowners willing to accept such assistance. The Permittees will report to the Service on all management activities funded or conducted on unprotected or under-protected caves as part of its annual report.

7.3.3 RESEARCH

The SEP-HCP will contribute to the understanding of the biology, ecology, and conservation of the Covered Karst Invertebrates by providing access on a limited basis to SEP-HCP preserves for research projects. The Permittees will review requests for such access on a case-by-case basis and will seek input from the Service and may seek input from the SEP-HCP scientific advisory committee, as applicable on research priorities. Generally, priority will be given to research projects that address research and monitoring needs identified in the Bexar County Karst Invertebrates Recovery Plan. Researchers utilizing SEP-HCP preserves as study sites will be expected to obtain all appropriate permits to perform such work, including valid ESA section 10(a)(1)(A) Threatened and Endangered Species permits from the Service, if necessary. Research activities will in no way degrade the conservation values for which the preserves were set up for.

8.0 CONSERVATION PROGRAM FOR VOLUNTARILY CONSERVED SPECIES

The SEP-HCP will voluntarily address some of the conservation needs of several other rare or sensitive species found in the Plan Area: the Voluntarily Conserved Species. The Voluntarily Conserved Species occur in habitats that are generally associated with areas used by the Covered Species. The SEP-HCP conservation program will consider the protection and management of habitats for the Voluntarily Conserved Species as secondary priorities during the evaluation of potential preserve acquisitions and in preserve management plans. However, the conservation needs of the Covered Species will take precedence over the needs of the Voluntarily Conserved Species.

Any protection, management, or monitoring efforts for the Voluntarily Conserved Species that are implemented through the SEP-HCP will be considered by the Service and other resource agencies as possibly contributing to the Conservation Baseline of these species.

8.1 CONSIDERATION IN PRESERVE ACQUISITION DECISIONS

The Permittees will conduct a preliminary assessment of the potential occurrence of the Voluntarily Conserved Species on properties being considered for acquisition as SEP-HCP preserves. The preliminary assessment may be limited to a brief review of available records or, at the discretion of the Permittees, may include more intensive field assessments of habitat conditions or species presence/absence.

To the extent that such information is available, the Permittees will consider the presence of one or more of the Voluntarily Conserved Species as conferring additional conservation value to a preserve. While this added conservation value will not affect the number of Preservation Credits generated for the GCW or BCV or affect the Service's evaluation of karst preserves, the ability to protect a Voluntarily Conserved Species may help the Permittees decide among otherwise equal preserve acquisition opportunities.

8.2 CONSIDERATION IN PRESERVE MANAGEMENT DECISIONS

To the extent that resources are available and activities do not conflict with the conservation of the Covered Species, the Permittees will investigate SEP-HCP preserves for the presence of Voluntarily Conserved Species and will plan and implement appropriate management strategies for the benefit of these species within SEP-HCP preserves. However, the protection and management of the Covered Species will always take priority over actions for the Voluntarily Conserved Species.

8.3 RESEARCH

The SEP-HCP will contribute to the understanding of the biology, ecology, and conservation of the Voluntarily Conserved Species by providing access on a limited basis to SEP-HCP preserves for research projects focusing on these species. The Permittees will review requests for such access on a case-by-case basis and will seek input from the Service and the SEP-HCP scientific advisory committee

on research priorities. Generally, priority will be given for research projects that address uncertainties regarding the distribution, abundance, or effective management of one or more of the Voluntarily Conserved Species. Research activities will in no way degrade the conservation values for which the preserves were set up for.

9.0 ADAPTIVE PRESERVE MANAGEMENT AND MONITORING

The biological goals and objectives pertaining to the management and monitoring of SEP-HCP preserves are listed in Section 5.0. In attainment of these goals and in accordance with the minimum standards for SEP-HCP preserves that will legally require management and monitoring of the Covered Species, the Permittees will commit to implementing within the preserves such measures as are both necessary and practicable to maintain suitable habitat conditions for the Covered Species and address threats to these species.

The Permittees will implement an adaptive management process for the SEP-HCP preserves. The adaptive management process will include the following steps (which are described in more detail below):

1. ASSESSING BASELINE CONDITIONS – This first step in the adaptive management process documents the current condition of a preserve and determines management needs. Baseline Preserve Assessments will be completed with each new preserve acquisition and will be updated approximately every 10 years; over two times the life of the permit;
2. PRESERVE MANAGEMENT PLANNING – The next step in the process involves planning appropriate, property-specific management strategies and practices that address the identified management needs for each preserve. Initial Preserve Management Plans will be completed with each new preserve acquisition, will be in accordance with Service guidelines (currently USFWS 2013c or 2011b), will be approved by the Service, and will be updated approximately every 10 years;
3. IMPLEMENTING MANAGEMENT ACTIONS – The implementation of Preserve Management Plans will occur on an on-going basis, as directed by the specific provisions of each management plan. It is anticipated that some types of management activities will occur more frequently than others. The implementation phase of the cycle also includes annual reviews of the effectiveness and appropriateness of planned management actions, with adjustments to management plans implemented as needed.
4. MONITORING RESPONSES – The last step in the adaptive management process collects information to help evaluate the effectiveness of the management actions. Some types of monitoring activities will be relatively small-scale or action-specific, while other types of monitoring will help detect long-term or system-wide trends. The frequency of monitoring activities will depend on the nature of the response or condition being evaluated. The evaluated monitoring results and any adjustments, if needed, associated with the monitoring activity information feeds back into the updated Baseline Preserve Assessments and the adaptive management cycle repeats.

Personnel responsible for conducting management and monitoring actions on SEP-HCP preserves that could result in incidental take of the Covered Species will either hold or be listed on the appropriate ESA section 10(a)(1)(A) Threatened and Endangered Species permits from the Service or

be under the guidance of a permitted biologist. Permitted personnel are responsible for maintaining the terms and conditions of their individual permits, including any coordination and reporting requirements.

9.1 ASSESSING AND UPDATING BASELINE CONDITIONS

One of the goals of SEP-HCP preserve management is to maintain (or optionally enhance) the conservation value of protected habitats in perpetuity. The term "preservation value" does not have a specific definition from the Service, but generally represents the overall benefit or value conferred to a species from a preservation or conservation action. Preservation value may be measured or evaluated (at least in relative terms) using measures such as:

- Habitat characteristics – What is the relative condition or state of important habitat elements?
- Use of protected habitats by the target species – Is the protected habitat occupied and at what level? Is the species able to successfully survive and reproduce in the habitat?
- Level of threat to the species – Are there internal or external pressures negatively affecting the species or protected habitats?

The initial Baseline Preserve Assessment prepared prior to enrollment of a preserve will include estimates of Preservation Credits and a management plan. Each Baseline Preserve Assessment will include the following minimum information, using biological survey information prepared by a biologist named on valid section 10(a)(1)(A) USFWS Threatened and Endangered Species permits, as described in Section 6.3.2 and Section 7.2.3.3:

1. For GCW and BCV habitats:
    a. A description and map of suitable habitats for the GCW and BCV present on the preserve, including an assessment of the relative quality of the GCW and BCV habitats;
    b. An estimate of the abundance of GCWs and BCVs occurring on the preserve and the general distribution of these species within the preserve (USFWS 2013c);
    c. The methods used for determining suitable habitats and abundance.
2. For Covered Karst Invertebrate habitats[55]:
    a. A map and description of occupied karst features, including the approximate cave footprint (with detailed cave maps and plan/profile views), other passable lengths (with approximate heights and widths), possible inaccessible leads or breakdown areas that could be invertebrate habitat, and the locations of flowing or standing water;

[55] For any occupied karst features in which reentry would be required to prepare the preserve baseline assessment or other information necessary for establishment of a KFA, USFWS approval would be required prior to re-entry of the occupied feature, unless the feature already has an USFWS approved cave management plan.

b. A description of the interior environment of the occupied karst feature, including principle formations and their activity, cave floor composition, water feature characteristics, temperature, relative humidity, and air conditions;

c. A description of any excavation or other signs of human activity in the feature;

d. A list of all species observed or collected within the cave, including listed or unlisted troglobites, troglophiles, trogloxenes, and accidentals, with notes regarding activity, abundance, and microhabitat conditions where they were observed. If applicable, include final taxonomist reports regarding species identifications and collection/curation information;

e. A map of the approximate surface and subsurface drainage basins of the karst feature;

3. General Preserve Information:

a. A description and map of other major vegetation communities and special or unique habitats on the preserve that may warrant special management consideration;

b. An assessment of the extent to which Voluntarily Conserved Species are known to occur or may occur within the preserve, and other information that may be available and relevant to the protection and management of these species;

c. A description and map of the soils, geology (including any known karst features), and water resources on the preserve;

d. A description and map of all structures or other property improvements on the preserve, including the size or aerial extent, condition, and use of such improvements. Improvements to be described include, but are not limited to, fences, gates, buildings, roads or trails, utilities, and dams and impoundments;

e. A description and map of all existing or allowed secondary uses of the preserve, including areas used for agricultural purposes, public recreational purposes, or easements;

f. A description and assessment of potential threats to the Covered Species or their habitats within the preserve system, such as information including (but not limited to) deer, feral hogs, cowbirds, fire ants, oak wilt, invasive species, human intrusion, erosion, degraded water quality, or degraded plant or animal communities. Such assessment will also include the potential impacts of land uses (including recreational uses) within or adjacent to the preserve on the Covered Species or their habitats, as applicable; and

g. Other information regarding the property that may be relevant to the management of the preserve.

Periodically updating the Baseline Preserve Assessments will enable the Permittees to target appropriate management actions to achieve the preserve management goals. Therefore, within 10 years of each new preserve acquisition, the Permittees will update the Baseline Preserve Assessment of that

property, to document its current condition and assemble the information needed to update the management plan. Updates to the Baseline Preserve Assessments will build upon and refine the information used to establish Preservation Acres for each preserve, as described for the GCW and BCV in Section 6.2.1 and for the karst species in Section 7.2.2. These assessments may be updated more frequently, if conditions warrant. However, the first update for a preserve property that was established as an addition to a previously acquired preserve might be delayed for a few years to coincide with the update cycle for the original parcel.

A copy of all completed Baseline Preserve Assessments, and subsequent updates, will be provided to the Service for review as part of Plan's annual reporting requirements.

9.2 MANAGEMENT PLANNING

The Permittees will prepare a Preserve Management Plan that addresses the specific management needs of a particular preserve or cluster of adjacent preserves. A Preserve Management Plan will be completed prior to the acquisition of a new preserve. The Permittees may seek input from the SEP-HCP advisory committees, other biological experts, and the Service (as appropriate) when preparing a Preserve Management Plan to help ensure that the most up-to-date science regarding management and monitoring practices is considered.

Preserve Management Plans will, at a minimum, include the following content:

1. A description of the management needs for a preserve. Management needs may address general habitat quality issues or they may target specific threats. The Baseline Preserve Assessments will help identify and prioritize the management needs for each preserve property;

2. A description of the specific management objectives and/or desired results that would address or alleviate the management needs. Where possible, these objectives should be expressed in terms of measurable criteria or targets;

3. Identification and description of practicable management practices or activities that would be expected to achieve the stated objectives or desired outcomes;

4. A description of any appropriate monitoring activities for tracking site-specific threats to target species or their habitats and evaluating the effectiveness of specific management practices (such as an invasive species plan or grazing plan). Long-term and short-term monitoring activities for basic habitat conditions and species status are addressed separately, as described in the *Monitoring Results* section below; and

5. An implementation schedule for preserve management and related monitoring activities for up to the next 10 years. The implementation schedule should identify the anticipated frequency and/or timing of management and related monitoring activities. The schedule may also identify or rank management priorities to assist the Permittees with allocating available management and monitoring resources.

The Permittees will implement a comprehensive review of each Preserve Management Plan approximately every 10 years, following the release of the relevant updated Baseline Preserve

Assessment. Preserve Management Plans may be revised more frequently, if conditions warrant. Further, if appropriate, the Preserve Management Plans may also include their own short-term adaptive management cycles to improve the effectiveness of specific management practices between the comprehensive updates.

Review and approval by the Service for each new or updated Preserve Management Plan will be completed prior to implementation and such approval will not be unreasonably delayed or withheld. The Permittees will submit a copy of each completed Preserve Management Plan to the Service as part of the Plan's annual reporting cycle.

9.3 IMPLEMENTING MANAGEMENT ACTIONS

The Permittees will implement each Preserve Management Plan, with a focus on addressing the highest priority management needs. The management activities to be implemented on a preserve will be tailored to the specific circumstances and needs of each property. Where preserve management activities may result in the taking of Covered Species, such activities will be conducted by or under the guidance of a biologist covered by a valid ESA section 10(a)(1)(A) research and recovery permit for the appropriate Covered Species. Management activities might include vegetation manipulation or prescribed fire within BCV habitat needed to occasionally set back the successional stage of the woody vegetation or limited thinning within dense GCW habitat to open up areas for enhancing oak regeneration. The occasional need to construct or maintain boundary fencing, access roads, fire breaks, and other similar infrastructure that facilitates effective and responsible preserve management may also result in limited or temporary incidental take of the GCW, BCV, or karst invertebrate habitats.

On an annual basis, the Permittees will prepare a brief summary of management activities completed for each preserve during the previous year. These summaries should include a list of the specific management actions that were implemented on a preserve, a short discussion or evaluation of the effectiveness of these management actions, any proposed modifications or changes that would improve the management effort, any level of take that occurred from those management actions, and a list of prioritized management activities for the next year. These summaries will help fine tune implementation of the Preserve Management Plans on an annual basis, and should be attached as addendums to the longer-term Preserve Management Plans. The summaries will also be submitted to the Service for review as part of the SEP-HCP annual report.

9.4 MONITORING RESULTS

Two types of monitoring activities are envisioned under the adaptive preserve management process: short-term and long-term monitoring. Short-term monitoring activities are conducted on a monthly or annual basis while long-term monitoring is based on years. Short-term monitoring includes red-imported fire ant mound counts and treatment; assessment and remediation of vandalism, trespass, herbivory, and feral hogs; in-cave faunal surveys; and cave cricket counts. Long-term monitoring includes bird population monitoring and BCVI vegetation management.

Monitoring for the existence and/or intensity of potential threats to the Covered Species is necessary to support the evaluation of management needs in the Baseline Preserve Assessments. It is anticipated that this type of monitoring will be implemented to evaluate threats from human land uses

and activities, competition or predation by other animals, and other threats to the suitability of protected habitats. Examples of threats monitoring may include patrolling preserve boundaries and access roads or trails for unauthorized entry or surveying deer or fire ant populations on a preserve to determine if these nuisance animals are negatively affecting habitats. It is anticipated that many types of threats monitoring will be routine activities, particularly for potentially pervasive or intense threats. However, other types of threats monitoring, such as browse surveys or water quality sampling, may occur periodically to help detect if new threats are emerging. Since the type, frequency, and intensity of appropriate threats monitoring will vary from preserve to preserve and species to species, these monitoring activities will be addressed in the Preserve Management Plans and will be consistent with Service recommendations (currently USFWS 2011b and 2013c). The results will feed back into the adaptive management process and help guide future management decisions.

Effectiveness monitoring for management practices will focus on providing information to determine if specific management activities are achieving the desired results. This type of monitoring may include studies such as monitoring the responses of oak mottes to different BCV habitat management techniques, evaluating the extent of oak regeneration after brush management in dense juniper-oak woodlands, or evaluating how woodland restoration activities affect the internal cave environment. The planning and implementation of monitoring for management effectiveness will also be addressed in the Preserve Management Plans. In all cases, such monitoring will be conducted by individuals covered by the appropriate ESA section 10(a)(1)(A) research and recovery permits.

9.5 ADAPTIVE MANAGEMENT COMMITMENTS

The legal protections required for SEP-HCP preserves commit the Permittees to implement management and monitoring activities for the Covered Species that help ensure that the conservation value of the preserves is maintained in perpetuity.

The funding plan (see Section 11.0) includes an example schedule of management and monitoring activities that illustrates the components of a typical management plan for SEP-HCP preserves that are consistent with the preserve management goals. The example schedule in the funding plan provides the basis for establishing the practicable limits of funding for the overall SEP-HCP preserve management and monitoring program. As part of the adaptive management process, the available management and monitoring funds will be allocated to those activities that best achieve the preserve management goals.

Specific management or monitoring activities that are not necessary to achieve the preserve management goals will be considered secondary options contingent on availability of surplus funds, and will not be required. For example, rural preserves may require less frequent monitoring for unauthorized access than urban or suburban preserves. The specific schedule of management and monitoring activities for a particular preserve will be determined on a periodic basis through the adaptive management process described in Section 9.0 and will be tailored to the specific circumstances and ongoing needs of an individual preserve tract.

The Permittees also may, at their discretion, elect to implement management or monitoring activities that go beyond the minimum commitment needed to maintain a preserve's conservation value. Furthermore, the Permittees are encouraged to do so and to seek the most effective and efficient methods for achieving the preserve management goals. For example, the Permittees may elect to work

with landowners adjacent to preserves as a way to reduce the impacts from adjacent land uses and more efficiently address threats within the preserves.

The adaptive preserve management process described in Section 9.0 through Section 9.4 herein represents the framework for achieving the identified preserve management goals via a continuous and cyclical process of assessing needs, forming strategies, implementing actions, and monitoring results instead of implementing adaptive management strategies after a potential trigger or issue has arose. Specific management practices are not rigidly prescribed within the adaptive preserve management process in order to avoid practices that may become unnecessary, inappropriate, impractical, or out-of-date over time. This management approach also compliments the flexibility of the Preservation Credit accounting strategy that forms the basis for the GCW and BCV conservation program and uncertainties regarding the biology and conservation of the Covered Karst Invertebrates.

10.0 EDUCATION AND OUTREACH PROGRAM

The Permittees will distribute information about the SEP-HCP and the species addressed by the Plan (with a focus on the Covered Species). The Permittees may prepare new materials and/or assemble previously prepared materials for the Plan's outreach and education program. Materials may be distributed via the internet, printed materials, and/or presentations to groups. A number of materials were created during the preparation of the SEP-HCP that could be adapted to this purpose, such as habitat maps, program brochures, resource assessments, and website content. The Permittees will periodically review SEP-HCP outreach and education materials to ensure that they remain current and provide up-to-date information about the SEP-HCP and the species and habitats addressed in the plan.

The Permittees will implement the following outreach and education measures:

1. Promote participation in the SEP-HCP by landowners, developers, or other non-federal entities.

   The Permittees will prepare and distribute educational materials about the ESA and the SEP-HCP for distribution to persons or entities applying for subdivision or development-related permits or approvals from the Permittees. These materials will briefly describe the responsibilities of private entities under the ESA, the purpose and benefits of participation in the SEP-HCP, and information on the SEP-HCP participation process. However, in accordance with Chapter 83 of the Texas Parks and Wildlife Code, the Permittees will not condition approval of subdivision plats, development permits, or other local permits or services on participation in the SEP-HCP or compliance with the ESA.

2. Provide support to Applicants during the enrollment process.

   The Permittees will assist Applicants with the preparation of biological information needed to enroll property in the SEP-HCP by maintaining lists of biologists qualified to prepare habitat assessments and species surveys, providing access to current information from the Service regarding the Covered Species (including how to obtain the locations of known occupied karst features and Critical Habitat areas), and providing information from the Service about the current conservation status of the Covered Karst Invertebrates.

3. Encourage willing landowners to become voluntary conservation partners with the SEP-HCP.

   The Permittees will prepare and distribute information about opportunities for voluntary conservation partnerships with willing landowners. Such information may include advertising requests for conservation proposals for new preserves, highlighting conservation successes and partnerships, and creating voluntary "good neighbor" programs for landowners adjacent to SEP-HCP preserves.

4. Inform individuals about ways to avoid harming the Covered Species and other rare or sensitive natural resources.

   The Permittees will prepare and distribute materials that describe the habitat characteristics of the Covered Species to help the public understand where these species might occur. This information may include distribution of "no take" guidelines for the Covered Species, such as those currently published by Texas Parks and Wildlife Department (Campbell 2003). The Permittees may also distribute information about other applicable local, state, and federal regulations pertaining to endangered species or rare or sensitive natural resources.

11.0 FUNDING PLAN

11.1 OVERVIEW AND MAJOR ASSUMPTIONS

Both the ESA and Texas state law require that a HCP indicate the funding that will be available to implement the plan. Under the ESA, the Service must find that "the applicant will ensure that adequate funding for the plan will be provided" (see 16 USC §1539(a)(2)(B)(iii)).

For the GCW and BCV, the Preservation Credit accounting approach ensures that preserve acquisitions always precede incidental take authorized through the SEP-HCP. In other words, funding and actual acquisition of preserves will in all events precede any impacts to these species that would be mitigated by those preserves. There is, by definition, no likelihood that an authorized GCW or BCV impact might go unmitigated if funding does not materialize. In these circumstances, the burden to demonstrate the availability of specific funding is lessened.

The Plan will not authorize the loss or substantial degradation of any known locality for the Covered Karst Invertebrates until a level of preservation consistent with the regional recovery of the affected species is achieved, although some incidental take of the Covered Karst Invertebrates may occur before new karst preserves are established through the SEP-HCP. The enrollment process for the Covered Karst Invertebrates substantially limits the extent of incidental take that may be covered by the Plan until sufficient preserves are in place to provide reasonable assurances that regional recovery of these species may be achieved.

The implementation of the SEP-HCP is intended to be flexible, adaptive, and scaled to the actual use of the program by voluntary Participants. However, a more definitive implementation scenario is needed to illustrate the Plan's anticipated budget and to establish practicable limits on the financial obligations of the Permittees. The funding plan described in this section evaluates a "full implementation" scenario where it is assumed that the full amount of incidental take allocated to the SEP-HCP is used by Participants.

The funding plan also assumes that: (1) all biological goals and objectives are achieved, particularly with respect to the sizing and distribution of preserves; (2) preserve management and monitoring activities include components of a typical management plan for avian and karst preserves that would satisfy the adaptive management process; (3) preserve acquisitions and use of the Plan's take authorization occur at a constant rate across the Plan duration; and (4) estimated costs and revenues are initially estimated in 2011 dollars and incorporate inflation at 3 percent per year[56].

The funding plan demonstrates the availability of reliable and well accepted sources of funding. The Permittees will fund or otherwise provide for the SEP-HCP conservation programs using three types of resources: (1) participation fees collected from Participants; (2) public revenue from Bexar County

[56] The information included in the Funding Plan was prepared during the research and planning stages of the SEP-HCP development process. The Funding Plan and associated appendix utilized the best available science and information available at the time of preparation (2011). Updating the information does not materially change the fundamentals of the SEP-HCP Funding Plan since inflation was incorporated. Therefore, the SEP-HCP Funding Plan was not updated to reflect the more recent Year 1 start date. The only modification made to the Funding Plan and associated appendix was establishment of the endowment start date to Year 1 instead of Year 11.

and the City of San Antonio, mostly likely from a small diversion of property tax revenue generated by new development in certain Bexar County sectors[57]; (3) investment income from endowment fund contributions; and (4) savings gained from placing additional species-specific protections on some existing conservation lands (see Appendix F for additional details on funding sources).

The funding plan shows that most of the operational costs for Plan implementation during the 30-year duration can be supported by participation fees. Public revenues will be used to both guarantee a certain level of funding for the Plan, which may become important if participation levels are lower than expected, and to fund a non-wasting endowment for preserve management and monitoring after the Plan has expired.

The funding plan does not rely on grant awards or other types of speculative or difficult to quantify revenue sources to fund Plan implementation. Even so, the SEP-HCP contemplates seeking such opportunities to reduce preserve acquisition costs and/or help fund other SEP-HCP programs. Success in securing other forms of funding could reduce the level of public revenues needed from Bexar County and the City of San Antonio.

Finally, the mix and scale of the anticipated line item costs and available funding sources depicted in the funding model is not intended to bind the Permittees to a particular allocation of these resources. Rather, the funding plan demonstrates that the likely costs have been considered and the necessary revenues to cover those costs are available from reliable sources.

The Permittees commit to providing resources (including funding, services, or other support) for:

1. The acquisition of GCW and BCV preserve as needed to ensure that the preservation ledger retains positive GCW and BCV balances;

2. To establish up to approximately 1,000 acres of new karst preserves over the duration of the Plan;

3. To implement the adaptive preserve management program on all acquired preserve lands at a level of effort and funding consistent with the assumptions described in this funding plan;

4. To annually implement other SEP-HCP programs (e.g. education and outreach, research), establish a contingency fund, and build a management endowment at the levels described in this funding plan; and

5. Program administration.

In practice, the Permittees will annually review the funding plan to ensure that adequate resources are provided to meet the Permit obligations and to establish a budget for other aspects of SEP-HCP implementation. As such, the Permittees may periodically take steps to adjust the components of the funding plan, including, but not limited to, increasing or decreasing the annual level of public revenues applied to the SEP-HCP, increasing or decreasing participation fees, suspending or

[57] See Figure 2 in Section 1.4 for a map of Bexar County sectors. Generally, these sectors include the portion of Bexar County and the City of San Antonio that is north and west of State Highway 90, Loop 410, and Interstate Highway 35, but exclude Camp Bullis.

otherwise restricting the use or sale of Preservation Credits, and/or seek other forms of revenue (such as the ability to use public debt instruments or new taxes, with voter approval) to fund the Plan implementation.

A detailed budget for the SEP-HCP implementation is attached as Appendix F and provides the basis for establishing the practicable limits of funding for implementation of the Plan. Additional assumptions and rationale for various components of the funding plan are described in more detail below.

11.2 COST ESTIMATES

The funding plan considers costs for preserve acquisitions, administrative tasks, preserve management and monitoring, other conservation measures (such as outreach and education and research programs), a contingency fund for other occasional or unbudgeted needs, and a non-wasting endowment to support preserve management after the Plan has expired (see Appendix F for additional details on cost estimates). Cost estimates include anticipated labor, equipment, materials, and overhead costs for the range of services and functions that may be required to fully implement the SEP-HCP.

For simplicity, the funding plan assumes that most labor is provided by program staff employed by the Permittees, with salaries, benefits, and overhead costs estimated accordingly. However, the estimated staffing and overhead costs could also be applied to contracted services at the discretion of the Permittees. The staffing approach modeled in the funding plan is intended to be illustrative of the approximate costs for labor, but does not bind the Permittees to using public employees for implementation of the SEP-HCP.

At full implementation, the approximate cost for SEP-HCP implementation may be approximately $299.5 million, which includes funding the non-wasting management endowment that will support preserve management and monitoring activities in perpetuity. Table 18 summarizes the estimated SEP-HCP costs over 30 years. Additional detail regarding the assumptions and rationale behind these cost estimates are discussed in the sections below and in Appendix F. Appendix F also shows the estimated annual budget for each program function or task.

TABLE 18. Estimated Costs for SEP-HCP Implementation, Assuming Full Participation.

	YR 1-10	YR 11-20	YR 21-30	30-YR PLAN DURATION	% TOTAL COSTS	AVE ANNUAL
Preserve Acquisitions (acres)						
GCW Preserves	7,809	7,809	7,809	23,428		781
BCV Preserves	2,200	2,200	2,200	6,600		220
Karst Preserves	333	333	333	1,000		33
Total Preserve Acquisitions	10,343	10,343	10,343	31,028		1,034
Preserve Acquisition Costs (incl. transaction fees)						
GCW Preserves	$18,249,507	$24,525,811	$32,960,640	$75,735,958		$2,524,532
BCV Preserves	$5,141,255	$6,909,416	$9,285,678	$21,336,349		$711,212
Karst Preserves	$17,568,052	$23,609,992	$31,729,856	$72,907,900		$2,430,263
Total Acquisition Costs	$40,958,813	$55,045,220	$73,976,173	$169,980,207	57%	$5,666,007
Plan Administration						
Labor	$1,224,418	$3,005,664	$6,165,528	$10,395,611		$346,520
Overhead	$75,800	$197,298	$397,065	$670,162		$22,339
Total Administration Costs	$1,300,218	$3,202,962	$6,562,593	$11,065,773	4%	$368,859
Preserve Management and Monitoring						
Labor and Overhead	$2,817,140	$6,939,751	$14,218,951	$23,975,841		$799,195
Servc., Equip., & Mat.	$2,530,389	$4,917,189	$8,395,522	$15,843,099		$528,103
Total Mgt. & Monitoring Costs	$5,347,529	$11,856,940	$22,614,473	$39,818,941	13%	$1,327,298
Other Conservation Measures						
Karst Studies and Non-preserve Management						
Labor and Overhead	$108,352	$266,913	$546,883	$922,148		$30,738
Contract Services	$182,430	$81,724	$109,830	$373,984		$12,466
Outreach and Education						
Labor and Overhead	$108,352	$266,913	$546,883	$922,148		$30,738
Non-labor Expenses	$12,162	$16,345	$21,966	$50,473		$1,682
Total Other Preservation Costs	$411,296	$631,895	$1,225,561	$2,268,752	0.8%	$75,625
Contingency and Endowment Funds						
Contingency Fund	$253,039	$491,719	$839,552	$1,584,310		$52,810
Mgt. Endowment Fund	$24,918,550	$24,918,550	$24,918,550	$74,755,650		$2,491,855
Total Contingency and Endowment Contributions	$25,171,589	$25,410,269	$25,758,102	$76,339,960	25%	$2,544,665
Total Estimated Program Costs	**$73,189,445**	**$96,147,286**	**$130,136,902**	**$299,473,633**		**$9,982,454**

[1] All costs are estimated in 2011 dollars and inflated annually by 3 percent, assuming YR1 starts in 2013.

11.2.1 PRESERVE ACQUISITIONS

Preserve acquisitions represent the majority of the SEP-HCP budget. The size, distribution, type, form, and acquisition schedule of the preserves are the primary variables for estimating most other

Plan costs. Assumptions pertaining to preserve acquisitions are summarized in Table 19 and are described more fully below.

Full implementation of the SEP-HCP would utilize all of the Plan's incidental take authorization, including 9,371 acres of habitat impacts to the GCW, 2,640 acres of impact to the BCV, and approximately 21,086 acres of impact over Karst Zones 1 through 4. The anticipated Karst Zone impacts would be associated with approximately 49 occupied karst features and it is expected that impacts to many of these occupied features will be avoided through the requirements of the Plan's enrollment process.

Since it is not possible to precisely predict the level of Plan participation in any given year, the funding plan assumes that use of the Plan's take authorization and the corresponding preserve acquisitions will occur evenly over the 30-year Plan duration.

TABLE 19. Preserve Acquisition Assumptions.

	GCW	BCV	Karst	Total
Incidental Take *(acres of habitat loss/impact)*	9,371	2,640	21,086	
Basic Mitigation Ratio	2 : 1	2 : 1	n/a	
Preserve Buffers	+25%	+25%	n/a	
Preserve Lands (acres)[1]				
Rural Preserves	23,430	6,600	-	30,030
Suburban Preserves	-	-	-	-
Urban Preserves	-	-	1,000	1,000
Total	23,430	6,600	1,000	31,030
Fee Simple Land Purchase Prices - 2011 (per acre)				
Rural Preserves				$4,500
Suburban Preserves				$25,000
Urban Preserves				$45,000
Conservation Easement Purchase Prices – 2011 *(per acre at 33% of Fee Simple Purchase Price)*				
Rural Preserves				$1,500
Suburban Preserves				$8,300
Urban Preserves				$14,900
Anticipated Distribution of Fee Simple vs. Easement Purchases				
Rural Areas				10% Fee Simple : 90% Easement
Suburban Areas				60% Fee Simple: 40% Easement
Urban Areas				90% Fee Simple: 10% Easement
Real Estate Transaction Fees				3% of Fee Simple Purchase Price

[1] Rural Areas = generally more than 5 miles outside of Bexar County; Suburban Areas = generally within relatively rural parts of Bexar County or within 5 miles of Bexar County; Urban Areas = mostly within developed parts of Bexar County or City of San Antonio

The estimated total size of the GCW and BCV preserve system at full implementation would be approximately 30,000 acres. This estimate is based on the level of incidental take authorized by the Permit, the mitigation ratios described in Section 3.2.3.1 – GCW and BCV Participation Assessments, and an estimate that approximately 25 percent additional acres will be needed to generate the appropriate number of Preservation Credits for these species. The additional land would be needed to provide adequate buffers for protected habitats and to account for some areas of non-habitat that are likely to be present in most large land holdings suitable for potential preserves.

The funding plan assumes that all GCW and BCV preserve land will be located in rural parts of the Plan Area. However, to help achieve the Plan's biological objectives for contributing to a large baseline of GCW preserves in or near Bexar County, it is expected that at least some new GCW and/or BCV preserves will be acquired within or adjacent to Bexar County. The funding plan assumes that the Permittees will seek cost-sharing assistance, such as available grants, to complete any such "suburban" GCW or BCV preserve acquisitions. This approach should reduce the local costs of suburban GCW or BCV preserve acquisitions to a level that would be more comparable to the cost of rural preserve acquisitions. Therefore, suburban GCW and BCV preserves are not explicitly modeled in the funding plan.

The target size of the SEP-HCP's karst preserve system is 1,000 acres, which represents the acquisition of approximately three new high or medium quality karst preserves in each of the five KFRs comprising the range of the Covered Karst Invertebrates. It is assumed that all of the karst preserves will be acquired over Karst Zones 1 or 2, which are predominantly in relatively urban parts of Bexar County and the City of San Antonio.

Current per-acre market values for land suitable for conservation purposes (i.e., large acreage properties with suitable habitat for the Covered Species) vary substantially between the rural parts of the Plan Area and urban parts of the City of San Antonio. Land prices are approximately five to ten times higher in Bexar County and the City of San Antonio than they are in the far western or northern parts of the Plan Area. Based on a review of market values for large acreage tracts[58], including information from the Real Estate Center of Texas A&M University (http://recenter.tamu.edu) and from personal communications with local land trust staff, the funding plan[59] assumes that current (i.e., 2011) market value land prices are approximately:

- $4,500 per acre in rural areas;
- $25,000 per acre in suburban areas (i.e., areas generally within five miles of the Bexar County boundary); and
- $45,000 per acre in urban areas (i.e., within mostly developed parts of Bexar County and the City of San Antonio).

[58] See information provided to the SEP-HCP Citizens Advisory Committee on February 21, 2011 by Christopher Allison, Chief Financial Officer for M.E. Allison & Co. (www.sephcp.com/docs/CAC/20110221_CAC_materials3.pdf).

[59] The information included in the Funding Plan was prepared during the research and planning stages of the SEP-HCP development process. The Funding Plan and associated appendix utilized the best available science and information available at the time of preparation (2011). Updating the information does not materially change the fundamentals of the SEP-HCP Funding Plan since inflation was incorporated. Therefore, the SEP-HCP Funding Plan was not updated to reflect the more recent Year 1 start date. The only modification made to the Funding Plan and associated appendix was establishment of the endowment start date to Year 1 instead of Year 11.

To increase the conservation power of available funds, the Permittees will preferentially seek to acquire conservation easements instead of purchasing property in fee simple. For the purposes of this funding plan, conservation easements are assumed to cost approximately one-third of the land's market value. Additionally, it is expected that landowners will be more willing to offer conservation easements in rural areas than in urban areas. Therefore, the funding plan assumes that 90 percent of rural preserves, 40 percent of suburban preserves, and 10 percent of urban preserves will be acquired as conservation easements. Given these assumptions, the SEP-HCP preserve system could ultimately include approximately 3,900 acres owned by the Permittees or their partners in fee simple and 27,125 acres acquired through conservation easements.

Finally, the funding plan considers the likely real estate transaction costs associated with purchasing land or conservation easements. Real estate transactions often include costs associated with land appraisals, land surveys, environmental reviews, attorney fees, broker fees, title insurance premiums, recordation fees, trash removal, and initial security measures. The funding plan assumes that transaction costs for land purchases or conservation easement acquisitions will represent approximately 3 percent of the corresponding market value land price.

11.2.2 PROGRAM ADMINISTRATION

Administration of the SEP-HCP will require tasks, including, but not limited to:

- Identifying opportunities for preserve acquisitions and negotiating real estate transactions with willing landowners;
- Evaluating applications for participation and enrolling new Participants;
- Coordinating with preserve landowners and Plan Participants to ensure compliance with the terms of conservation easements and Participation Agreements;
- Coordinating program activities among the Permittees, advisory committees, and the Service;
- Record keeping and preparing annual reports and other information for submittal to the Service; and
- Generally managing program budgets and staff.

Bexar County and the City of San Antonio will be the holders of the permit and, therefore, are obligated to oversee implementation of the HCP; as such they are the HCP Administrators. For the purpose of this funding plan, it is assumed that administration of the SEP-HCP will be accomplished by program staff members that are employees of Bexar County or the City of San Antonio. Staff salaries, benefits, and overhead costs for office space, equipment, and materials are estimated accordingly (see Appendix F). However, the Permittees may choose to hire contracted professionals to provide the necessary labor to implement the SEP-HCP, either in addition to or in place of hiring program staff.

The funding plan models staffing needs based on the cumulative amount and types of preserve land acquired through the Plan. The funding plan assumes that, over time, the implementation of the SEP-HCP will require a staff composed of program managers and senior biologists, staff biologists, part-time wildlife technicians, preserve rangers, and maintenance personnel. By the end of the Plan

duration, the funding plan assumes a staff of approximately 14 full-time employees and seven part-time technicians to administer the Plan, manage approximately 31,000 acres of preserve land, and implement other conservation measures. Appendix F shows estimated annual staffing levels in relation to the cumulative preserve size.

The level of staffing modeled in the funding plan is similar to staffing for the Balcones Canyonlands Conservation Plan in Travis County (another regional HCP for the GCW, BCV, and karst invertebrates with a preserve of approximately 30,000 acres) and is consistent with staffing levels used to manage the 12,000-acre Government Canyon State Natural Area in Bexar County. For example, Travis County and the City of Austin maintain a combined staff of approximately 18 full-time program managers, biologists, rangers, and grounds managers to implement their conservation plan and manage their largely urban and suburban preserve system. TPWD manages Government Canyon State Natural Area with a staff of approximately 12 to 15 people. The management programs for the Balcones Canyonlands Preserve and Government Canyon State Natural Area both rely heavily on temporary seasonal employees and trained volunteers to support the dedicated full-time staff.

It is assumed that approximately 30 percent of staff labor and overhead costs will be dedicated to the administrative functions described above. The remaining staff labor and overhead costs are assumed to apply to the management and monitoring of preserves and the implementation of other conservation measures.

11.2.3 PRESERVE MANAGEMENT AND MONITORING

Preserve management and monitoring will be implemented in accordance with the adaptive management process described in Section 9.0. Each preserve will be periodically evaluated for threats and management needs and detailed land management plans will be developed and implemented to maintain their conservation value. The specific schedule of management and monitoring activities for a particular preserve may be adjusted annually and will be tailored to the specific circumstances and ongoing needs of an individual preserve tract.

The funding plan models the anticipated costs of management activities that are typically required for maintaining habitats for the Covered Species. Appendix F describes the typical management activities considered in the model and the general schedule for implementation. Line item costs for management activities do not include labor, unless a specialized contract service is required. Most of the labor for preserve management is assumed to be covered by program staff. The funding plan assumes that approximately 65 percent of the program staffing costs will be dedicated to preserve management and monitoring activities, including implementation of the adaptive management process steps such as assessing baseline conditions, developing management plans, and performing monitoring studies.

Preserve management and monitoring costs are scaled to the total size of the preserve system, the method of acquisition (i.e., conservation easement or fee simple land purchase), and/or the type of habitat being managed. Typical management activities generally include protecting boundaries, controlling a variety of animal predators or competitors, managing vegetation and other habitat elements, and maintaining preserve infrastructure. Appendix F shows how preserve management costs may change over time with preserve size.

The estimated level of intensity and budget for each of the preserve management items is based on the recent experience of Travis County and the City of Austin for managing the Balcones Canyonlands Preserve and from various other sources experienced with management activities for the Covered Species.

These cost estimates provide the basis for establishing the practicable limits of funding for the adaptive preserve management and monitoring program. The funding plan estimates that average annual preserve management and monitoring costs (including related program staff labor and overhead costs) may be approximately $96 per acre of preserve land. The Permittees will not be required to spend more than is actually needed to properly implement the adaptive preserve management and monitoring program, if such costs are less than the average annual per acre estimate. However, the Permittees are obligated to adequately manage and monitor the preserves to the extent practicable for the specific species in perpetuity to meet the mitigation obligations per the ITP.

The funding plan does not address preserve management costs associated with any authorized public access to SEP-HCP preserves. If such access is allowed within the preserve system, the Permittees would be responsible for providing the additional funds necessary to adequately address such costs. However, as most of the preserve system is expected to be acquired through conservation easements, opportunities for public access on publicly owned preserve tracts are likely to be limited.

11.2.4 OTHER CONSERVATION MEASURES

The SEP-HCP conservation program includes other conservation measures for the Covered Species in addition to the acquisition and management of preserves. For the Covered Karst Invertebrates, the Plan will dedicate resources to finding new locations of the listed species and to assisting landowners with managing unprotected or under-protected species-occupied features. Public outreach and education activities are also proposed for both the avian and the karst conservation programs.

11.2.4.1 ADDITIONAL KARST CONSERVATION MEASURES

The karst conservation program includes assisting in the discovery of new species localities, evaluating karst features accidentally discovered during construction on Enrolled Properties, and contributing to the management of unprotected or under-protected sites. The funding plan assumes that the Plan will dedicate a certain level of funding for these activities each year. To help jump-start karst conservation efforts, a higher level of funding will be provided in the first decade of the Plan, with dedicated funds tapering to lower levels in later decades. It is expected that these funds would be used to contract with karst biologists to conduct studies or would be disbursed as grants to landowners or other organizations to conduct approved karst conservation activities.

In addition to the dedicated funds, approximately 2.5 percent of the Plan's staffing costs will be applied to implementing additional karst conservation measures.

11.2.4.2 OUTREACH AND EDUCATION

The funding plan includes a dedicated line item for the cost of developing, distributing, and updating website content, presentation materials, flyers, and brochures about the SEP-HCP and the Covered Species. Labor for content development and presentation, including working with community

groups, is assumed to be a responsibility of program staff. The funding plan assumes that approximately 2.5 percent of the Plan's staffing costs will be applied to outreach and education activities.

11.2.5 CONTINGENCY AND MANAGEMENT ENDOWMENT FUNDS

The funding plan anticipates establishing two funds that will help ensure that sufficient resources are available to operate the Plan (the contingency fund) and to provide for the management and monitoring of SEP-HCP preserves in perpetuity (the non-wasting management endowment fund).

The Permittees will budget for miscellaneous contingencies associated with the operation of the Plan. The annual contingency budget is set at 10 percent of the estimated annual preserve management costs, including related labor and overhead costs. It is anticipated that any unused contingency funds in a given year will be reserved and accumulated for future use. The Permittees may use the contingency funds to address special or unanticipated needs related to the administration of the SEP-HCP or the management of the preserve system.

The Permittees will also fund a management endowment that will provide a consistent source of revenue for preserve management and monitoring activities after the Plan has expired. The management endowment capital at Year 30 of Plan implementation is sized to: (1) return investment income each year at a level sufficient to cover the average annual preserve management and monitoring costs (including related labor, overhead, and contingency costs); and (2) increase the endowment capital with the annual rate of inflation.

The funding plan estimates the size of the management endowment principal based on the average cost per acre for preserve management over the 30 year Plan duration (i.e., approximately $96 per acre per year). The funding plan assumes that investment of the management endowment principal will return an average of 7 percent interest income annually and that 3 percent will be used to increase the endowment principal with the rate of inflation. Therefore, the management and monitoring revenue supplied by the endowment is assumed to be based on a return of 4 percent per year. At this rate of return, the funding plan assumes that Permittees will deposit approximately $2,409 per acre of acquired preserve land to the management endowment fund[60].

Contributions to the management endowment fund will begin in Year 1 of the Plan and will be fully funded by Year 30. In the event that the Permittees or the Service terminate the Permit prior to its natural expiration date, the Permittees commit to fully funding the management endowment for the preserve acres that have been acquired to-date at the time of termination or on a schedule that is otherwise approved by the Service.

The Permittees will select a person or entity to invest and manage the management endowment. The endowment fund manager will have a sound track record of investment responsibilities including for-profit entities such as banks, trust companies, or investment companies, or significant non-profit entities. Selection of the endowment fund manager will be subject to the approval of the Service. If the Service has not approved or rejected the Permittees' selection within 30 days after the Permittees provided notice to Service of its selection, then the Permittees will move forward with the selection of the

[60] The size of the per acre endowment deposit is calculated as the Average Annual Cost Per Acre for Preserve Management (estimated herein as $96.37 per acre) divided by a 4 percent rate of return (i.e., $96.37 / 0.4 = $2,409).

endowment fund manager since Service approval is not required. The Permittees will also have the right from time to time to remove and replace the endowment fund manager for any or no reason. If an endowment fund manager is removed, then its replacement will also be subject to Service approval as described above.

The endowment fund manager, in its sole discretion, but in consultation with the Permittees, will invest and manage the endowment fund for the perpetual benefit of the SEP-HCP in a manner that does not decrease the value of the fund through expenditure and prudently minimizes investment risk. Interest earnings beyond those necessary to provide for growth of the endowment capital commensurate with the rate of inflation will be made available to fund annual management of the SEP-HCP preserves.

With the non-wasting management endowment in place by Year 30 of the Plan, no additional public revenue or participation fees will be needed to continue the required management and monitoring of SEP-HCP preserves after the Permit expires.

11.3 REVENUE SOURCES AND ESTIMATES

As described above, the SEP-HCP must demonstrate that assured funding sources are available to address the costs of Plan implementation (estimated at approximately $299.5 million over 30 years). Table 20 summarizes the estimated level of participation fees generated at full Plan implementation and the estimated public revenues needed to make up any difference between anticipated costs and collected participation fees.

Over the 30-year Plan duration, the funding plan shows that participation fees and revenue from the investment of the endowment fund during Years 1 through 30 would cover approximately 74 percent of the estimated costs, including contributions to the management endowment. Public tax revenues, including tax increment diversions (or “TIDs”) and assumed savings created from placing additional protections on existing conservation lands (in lieu of purchasing some new land or easements), would address the remaining 26 percent of Plan costs.

The combined revenue generated from participation fees and public sources over 30 years provide a secure and reliable source of funds to implement the SEP-HCP in perpetuity.

Additional detail regarding the assumptions and rationale behind these revenue estimates are discussed in the sections below and in Appendix F. Appendix F also shows the estimated annual collection of revenues from the various sources.

TABLE 20. Summary of Estimated SEP-HCP Revenue[1].

	YR 1-10	YR 11-20	YR 21-30	30-YR PLAN DURATION
Participation Fees				
Application Fees	$90,352	$121,426	$163,186	$374,964
GCW Participation Agreement Sales	$30,392,101	$40,844,442	$54,891,515	$126,128,059
BCV Participation Agreement Sales	$8,562,069	$11,506,705	$15,464,049	$35,532,822
Karst Participation Fees	$1,260,410	$1,698,827	$3,213,112	$6,172,349
Total Participation Fee Revenue	$40,304,932	$54,171,399	$73,731,862	$168,208,193
Public Funding				
Bexar County	$14,546,545	$13,927,760	$10,735,610	$39,209,915
Bexar County TID	6.02%	1.56%	0.55%	1.27%
City of San Antonio	$14,546,545	$13,927,760	$10,735,610	$39,209,915
City of San Antonio TID	4.50%	1.17%	0.41%	0.95%
GCW Preservation Credit Savings	$251,560	$-	$-	$251,560
Total Public Revenue	$29,344,650	$27,855,520	$21,471,220	$78,671,389
Investment Revenue	$3,539,863	$14,120,367	$34,933,820	$52,594,051
Total Estimated Plan Revenues	**$73,189,445**	**$96,147,286**	**$130,136,902**	**$299,473,633**

[1] All costs are estimated in 2011 dollars and inflated annually by 3 percent, assuming YR1 starts in 2013.

The SEP-HCP contemplates periodic changes to the participation fees set forth herein, as well as minor changes to the level of public funding that will be necessary to satisfy the requirements of the ESA, its implementing regulations, and the Permit. The SEP-HCP has been developed and approved in accordance with all provisions of Chapter 83 of the Texas Parks and Wildlife Code. State law (Texas Parks and Wildlife Code § 83.019(a)) requires that a public hearing be held before a local government adopts any "regional habitat conservation plan, plan amendment, ordinance, budget, fee schedule, rule, regulation, or order..." Since the SEP-HCP contemplates periodic fee and budget changes and will be approved with these potential changes as part of the Plan, future periodic changes to participation fees and public funding contributions will not require additional public notice and hearing under state law. The Permittees' right to periodically adjust participation fees and modify its budget with respect to the SEP-HCP is set forth with specificity in the SEP-HCP, and the Plan will be adopted after the requisite public hearing. Therefore, additional notice and hearing pursuant to Texas Parks and Wildlife Code section 83.019(a) is not required for potential future fee or budget changes.

11.3.1 PARTICIPATION FEES

Application fees, sales of GCW and BCV Preservation Credits, and karst participation fees collected from voluntary Participants are expected to provide approximately 56 percent of the revenues needed to operate the Plan and fund the management endowment.

Like the schedule for preserve acquisitions, the funding plan models revenue from the collection of participation fees based on an even distribution of participation over the Plan duration. For example, the Plan requests 9,371 acres of incidental take for the GCW and requires mitigation generally at a 2:1

ratio. Therefore, the Plan would sell approximately 18,742 GCW Preservation Credits over the duration of the Plan, with an estimated 625 Preservation Credits sold each year.

For the purpose of the funding plan, application fees are estimated at a rate equivalent to $1 for every acre of GCW and/or BCV incidental take and $10 for every acre of karst incidental take that is authorized through the Plan (i.e., 9,371 acres of GCW habitat loss, 2,640 acres of BCV habitat loss, and 21,086 acres of karst zone impacts over 30 years). However, actual application fees will be set at the discretion of the Permittees at a level necessary to help offset the costs of processing applications and coordinating with potential Participants. The funding plan assumes that the average acres of incidental take authorized for the Covered Species is approximately 1,504 acres per year.

The funding plan assumes that the Permittees will sell GCW and BCV Preservation Credits for $4,000 per Preservation Credit and will collect participation fees for karst impacts at $400,000 per feature taken by impacts within Occupied Cave Zone A and $40,000 per feature taken by impacts within Occupied Cave Zone B. As with application fees, the actual price for Preservation Credits or karst participation fees may be adjusted at the discretion of the Permittees.

With respect to karst participation fees, the funding plan assumes that only 50 percent of the estimated 49 occupied karst features associated with Enrolled Properties will be taken by Participants. The impacts to the remaining occupied karst features are assumed to be avoided through the limitations of the karst enrollment process, as described in Section 3.2.3.2. For the approximately 24 caves that are expected to be taken, 17 features are assumed to be mitigated with participation fees for Occupied Cave Zone B (approximately 70 percent of the taken features) and seven features are assumed to be mitigated at the level of Occupied Cave Zone A (approximately 30 percent of the taken features).

The level of participation fees modeled in this funding plan would be sufficient to address nearly all of the costs associated with preserve acquisitions over 30 years.

11.3.2 INVESTMENT REVENUE

The funding plan assumes that the Permittees will begin making regular contributions to a non-wasting management endowment in Year 1 of Plan implementation. As described in Section 11.2.5 (Contingency and Management Endowment Funds), these endowment contributions will be invested and managed by an endowment fund manager with a sound track record of investment responsibilities. It is assumed that the ongoing investment of the endowment fund will generate investment revenue at a 7 percent annual rate of return, based on the amount of the prior year's fund balance plus any current year endowment fund contributions made by the Permittees. During Years 1 through 30 of Plan implementation, these investment revenues will be added to the endowment fund balance, thereby reducing the Permittees contributions to the fund. After Year 30, investment revenues will be used to fund preserve management and monitoring activities and grow the endowment capital with the rate of inflation.

The funding plan estimates that investment revenues will generate approximately $52.6 million for the endowment fund over 30 years.

11.3.3 PUBLIC REVENUE SOURCES

The funding plan assumes that public revenues will be necessary to balance the SEP-HCP's budget, since participation fees alone will not be sufficient to cover both the Plan's operational costs and establish funds for contingencies and the non-wasting management endowment. Over 30 years, public revenues may be needed to cover approximately 30 percent of the total Plan costs.

It is necessary to show that any deficits (both annually and over the entire Plan duration) between anticipated costs and participation fee revenue can be covered by reliable and well accepted funding sources, such as public tax revenue from the Permittees. Another type of public revenue considered in the funding plan comes from savings obtained by getting some Preservation Credit from additional protections placed on existing protected lands, primarily public lands for which species-specific protections are not currently secured (see Section 6.0 and Section 7.0 with respect to each species for additional information). However, in practice this funding deficit might also be fully or partially offset by various types of non-assured funding sources, such as grants, donations of land or easements (including lands accepted in lieu of participation fees), or volunteer services.

11.3.3.1 TAX INCREMENT DIVERSIONS

The funding plan assumes that Bexar County and the City of San Antonio will equally contribute funds for Plan implementation at a level that fills any gaps between total Plan costs and the revenues generated by the collection of participation fees and savings from mitigation generated by additional protections on existing conservation lands. The funding plan estimates that approximately $78.7 million in public revenues will be needed to fully fund the Plan over 30 years, approximately $39.2 million from each jurisdiction.

The primary source of this public funding is expected to be the diversion of a small percentage of the projected tax revenue created by new development within Bexar County SEP-HCP sectors after the Plan is in place. The tax increment diversion would only apply to newly developed property that occurs in portions of Bexar County and the City of San Antonio that are served by the Plan. It is assumed that this tax increment diversion will be discontinued at the end of the Plan duration.

The amount of each jurisdiction's annual tax increment diversion is estimated from the average annual acres of new land development projected to occur in Bexar County sectors. It is assumed that approximately 70 percent of this new development will occur within the taxing jurisdiction of both Bexar County and the City of San Antonio. Newly developed lands are assumed to have a taxable value of approximately $425,000 per acre, based on a review of current (2010) land prices in northern Bexar County and San Antonio. The total amount of new tax revenue generated by projected future development is estimated at the current (2011) tax rates for Bexar County and the City of San Antonio.

A tax increment diversion by Bexar County and the City of San Antonio is an appropriate funding source for the SEP-HCP, since implementation of the Plan will facilitate continuing economic growth in the Permittees' jurisdictions in a way that addresses important regional endangered species issues. The Plan would use only a small portion of new tax values from lands that might not have been developed without the Plan and taxpayers will directly or indirectly benefit from the implementation of the Plan. Participants directly benefit by accessing a streamlined ESA compliance option. However, most importantly, Bexar County and City of San Antonio taxpayers benefit from the Plan by helping to protect

the continued mission of Camp Bullis that is critical to the current expansion of Fort Sam Houston and the related Brooke Army Medical Center facility.

While the funding plan models a small tax increment diversion from a relatively large tax base (i.e., all new development projected to occur in Bexar County sectors after initiation of the Plan), other options for tax increment diversions are possible. One such alternative would be to divert a much larger portion of the new tax revenue from only Enrolled Properties. However, this strategy would not be as assured as the approach modeled herein, since it would depend heavily on voluntary participation in the Plan. Collection of revenues under this strategy would also be complicated since contributing properties would not be contiguous.

The funding plan illustrates how the Plan may be funded using the most assured and practical funding options that are readily available to the Permittees. However, the funding plan does not preclude the Permittees from seeking other types of revenue sources including those that may currently be considered less certain or reliable. Other potential public funding sources could include sales tax revenue or real estate transfer fees, both of which would require local voter and/or state legislative approval. The Plan does not “lock in” any particular funding mechanism, but rather demonstrates that the Plan can be funded with reliable means.

11.3.4 OTHER PUBLIC FUNDING

The funding plan assumes that some existing conservation lands, such as City of San Antonio natural areas or lands acquired for water quality protection, may be able to generate partial GCW Preservation Credit for the Plan. If the Plan establishes additional species-specific conservation measures on existing conservation lands, the Service may award partial Preservation Credit to the Plan. It is assumed that establishing these new protections would generate approximately 250 GCW Preservation Credits for the SEP-HCP. The value of these GCW Preservation Credits is assumed to be equivalent to 50 percent of the normal acquisition cost for 250 acres of GCW preserves. The funding plan assumes that these savings would be spread over the first five years of the Plan.

12.0 REPORTING AND COORDINATION

12.1 ANNUAL REPORTS AND ROUTINE COORDINATION

The Permittees will submit an annual report to the local field office of the Service by March 1 of each year to document progress towards achieving the goals and objectives of the SEP-HCP and demonstrate compliance with the terms and conditions of the Permit.

Annual reports will cover the period of October 1 through September 31, to coincide with the Bexar County and City of San Antonio fiscal years. The reporting deadline will provide ample time to collect, review, and summarize data related to Plan administration and routine preserve management and monitoring. The Permittees will coordinate as necessary with preserve landowners or other entities as necessary to obtain the required information for the annual report.

Specifically, annual reports shall include:

1. A summary of participation in the SEP-HCP, including a list of Participants and Enrolled Properties and the corresponding acreages covered for incidental take for each of the Covered Species;

2. A summary of the lands and habitats included in the SEP-HCP preserve system, including the total preserve acres and the acres of suitable habitat for each of the Covered Species;

3. A copy of the conservation ledger documenting Preservation Credits generated and deducted for the GCW and BCV;

4. A summary of the financial status of the SEP-HCP, including the balance and performance of the non-wasting management endowment;

5. A summary of management activities conducted on SEP-HCP preserve lands and a copy of Preserve Management Plan updates for the previous year;

6. The results of biological monitoring activities conducted on SEP-HCP preserve lands, including all reports documenting surveys of the Covered Species and their habitats;

7. A summary of the status of community education and outreach programs and other conservation measures for the Covered Species, including the results of any research conducted with the support of the SEP-HCP;

8. Recommended modifications to Preserve Management Plans or the SEP-HCP's conservation programs that may be warranted via the adaptive management process or changed circumstances;

9. A summary of any compliance-related issues or actions involving Participants, Enrolled Properties, or preserves (including conservation easements); and

10. Other pertinent information or recommendations, as appropriate.

The Service may review the annual reports and determine whether the Permittees are properly implementing the SEP-HCP and are in compliance with the terms of the ITP and other applicable agreements. The Service may request additional information from the Permittees to determine if they are in compliance with the terms and conditions of the Permit. The Permittees will be promptly notified in writing if the Service determines that the Permittees may not be in full compliance with the Permit and provide the Permittees a reasonable opportunity to address any deficiencies.

In addition to standard annual reporting, the Permittees will routinely coordinate with the Service on the following matters:

- **Enrolling Participants** – The Permittees will forward to the Service copies of all Determination Letters (including the biological information submitted with each application for SEP-HCP participation), fully executed Participation Agreements, and Certificates of Participation as these documents become available. The Service may review this correspondence and may provide comment to or seek additional coordination with the Permittees or enrolled Participants, as the Service deems necessary and appropriate. However, additional approval of these documents by the Service is not required unless case-by-case Service approval is required for offers of preserve land in lieu of participation fees or other exceptions. To authorize exceptions to the standard enrollment process, Service approval of the terms of non-standard Participation Agreements will be required prior to execution and such approval will not be unreasonably be withheld or delayed.

- **Preserve Acquisitions** – The Permittees will coordinate with the Service with respect to SEP-HCP preserve acquisitions. From time to time, the Permittees will submit habitat assessments and other site-specific biological information for potential preserves to the Service for consideration, review of the information, and a determination of the number of GCW and BCV Preservation Credits that may be added to the SEP-HCP conservation ledger as described in Section 6.3.2 – Creation of New Preservation Credits and/or a determination whether or not potential karst preserves meet the standards listed in Section 7.2. – Karst Preserves. The Permittees may also request case-by-case Service approval of exceptions to the minimum standards for SEP-HCP preserves; although, approval of exceptions is expected to be rare. Service approval of a preserve acquisition is required before such acquisition may be considered as mitigation for the SEP-HCP and such approval will not be unreasonably be withheld or delayed. The Service will also be a third-party beneficiary to all SEP-HCP conservation easements with a right to enforce the terms and conditions of the easements. As such, the Permittees will coordinate with the Service when negotiating conservation easements for preserve acquisitions.

- **Adaptive Preserve Management Planning** –The Permittees will coordinate with the Service during preparation of Preserve Management Plans and provide the Service an opportunity to review and comment on draft plans before they are finalized. The Permittees will also provide the Service an opportunity to review and comment on proposed methodologies for conducting system-wide preserve monitoring activities prior to implementation. Service approval of individual Preserve Management Plans

and monitoring protocols is required; although, Service approval will not be unreasonably withheld or delay approval of Preserve Management Plans if they are in accordance with the Plan's biological goals and objectives and the scope of the adaptive management process described in Section 9.0.

- **Secondary Uses of Preserve Lands** – The Permittees will coordinate with the Service to determine if any proposed secondary uses of SEP-HCP preserve lands may be allowed and establish the terms and conditions of any such approved uses. The guidelines for allowing such uses are described in Section 6.2.3 (pertaining to GCW and BCV preserves) and Section 7.2.2 (pertaining to karst preserves). Some of these coordination efforts may occur in concert with the Permittees' and landowners' negotiations of the terms of conservation easements for preserve acquisitions, to which the Service would be a party, while other secondary use agreements may be negotiated as part of the adaptive preserve management process. All secondary uses of SEP-HCP preserves shall have the prior approval of the Service.

- **Karst Conservation Program Evaluations** - The Permittees will coordinate with the Service in Year 5, Year 10, Year 15, Year 20, and Year 25 of Plan implementation to determine whether or not Service-approved karst preserve acquisitions have kept pace with Plan participation over Karst Zones 1 and 2. If Plan participation has exceeded preserve acquisitions at an evaluation period, then the Service may require the Permittees to suspend new enrollments over Karst Zone 1 and 2 until additional karst preserves are in place to close the gap. The Permittees will be notified in writing if a suspension in enrollment is required.

Notwithstanding the above, the Permittees or the Service may request an opportunity to consult with the other party regarding implementation of the SEP-HCP or compliance with the terms and conditions of the ITP at any time.

12.2 PERMIT AMENDMENTS

Amendments to the SEP-HCP and/or the ITP may be necessary during the duration of the Plan. Such amendments may be necessary to reflect changes to the conservation program made through the adaptive management process, as a response to changed circumstances, or for other matters.

Plan and/or Permit amendments may include relatively minor and mostly administrative changes or may involve major changes that substantially alter the Covered Activities, the level of mitigation provided by the conservation program, or other substantive aspects of Plan implementation. Amendments to the SEP-HCP and/or the ITP will be made in accordance with applicable laws and regulations.

Minor amendments, while still required to be approved by the Service, are defined as those that have little or no impact on the amount of incidental take authorized by the ITP, the degree of negative impacts to the Covered Species from Covered Activities, or the biological effectiveness of the conservation program. Minor amendments may include, but are not limited to:

- Administrative changes addressing the implementation of the SEP-HCP, such as the delegation of administrative responsibilities to other partners, participation procedures, fee structures, reporting requirements, and oversight;

- Applicable alterations of the operating conservation program that arise from the implementation of the adaptive preserve management process and/or pre-determined responses to changed or unforeseen circumstances, as contemplated in the Plan; and

- Other types of amendments to the language or format of the Plan that would not require substantive changes to the Permit.

Minor amendments, in accordance with Service policy and articulated in the HCP Handbook (page 3-32 to 3-33), may be incorporated into the SEP-HCP and/or ITP administratively provided that both the Permittees and the Service agree on the proposed changes, the proposed amendments are documented in written form, and the proposed amendments do not significantly change the net effect of the Covered Activities on the Covered Species or the amount of incidental take requested by the originally approved Plan and Permit.

Major amendments, as defined in Service policy and articulated in the HCP Handbook (page 3-32 to 3-33), are those that would substantially alter the scope of the SEP-HCP. Major amendments are likely to change the amount of take or impacts authorized by the ITP, and/or have a significant impact on the structure, implementation, or effectiveness of the conservation program. Incorporating major amendments may require completion of a formal amendment procedure similar to the original permit application process. This procedure may include public review through the Federal Register, additional analysis to comply with NEPA requirements, and an internal Service ESA section 7 consultation (USFWS and NMFS 1996).

The scope of any major amendment proposed by Permittees will be limited to that which is deemed necessary to address the particular issue prompting the amendment process. For example, pursuing a major amendment to change the mitigation measures for the Covered Karst Invertebrates would not trigger a reevaluation of the mitigation measures for the GCW or BCV (40 CFR 13.23).

12.3 PERMIT RENEWAL

The SEP-HCP's ITP will have a 30-year duration and, as envisioned in the HCP Handbook (see page 6-28), the Permittees request that the Service designate the Permit as renewable.

It is expected that the Permittees will have used all of the incidental take authorization allocated to the Plan by the end of this duration. However, in the event that some of the original take allocation remains unused by the Permit expiration date, the Permittees may request a renewal of the Permit to continue drawing upon the unused allocation. To request for a Permit renewal, the Permittees must:

1. Not then be in default under the terms and conditions of the original Permit, including reporting requirements;

2. File an application for a Permit renewal with the Service at least 30 days prior to the Permit's expiration date that references the Permit number;

3. Certify that all statements and information presented in the original Permit application are still correct or include a list of changes; and

4. Provide specific information concerning the amount of incidental take has occurred under the original Permit and the amount of incidental take that remains unused.

If the Permittees file such a request at least 30 days prior to the Permit expiration date, then the Permit will remain valid while the request is being processed. If the Permittees fail to file a request at least 30 days prior to Permit expiration, then the Permit will become invalid on the original expiration date,.

Permit renewals will not authorize any additional incidental take of the Covered Species beyond the level allocated to the original Permit. Additional public comment may be required for the Service to authorize a Permit renewal.

13.0 NO SURPRISES POLICY AND ASSURANCES

An important incentive for encouraging participation in the SEP-HCP are the assurances provided by the Service's "No Surprises" Rule (63 FR 8859, codified at 50 CFR §§ 17.22, 17.32, 222.2). Under the No Surprises Rule, the Service assures incidental take permittees that, so long as an approved HCP is being properly implemented, no additional land use restrictions or financial compensation will be required of the permittee with respect to the covered species, even if unforeseen circumstances arise after the permit is issued indicating that additional mitigation is needed. These assurances also extend to Participants who are in full compliance with their Participation Agreement.

The No Surprises Rule recognizes that the Permittees and the Service can reasonably anticipate and plan for some changes in circumstances affecting a species or geographic area covered by a HCP (e.g., the listing of additional species as threatened or endangered or a natural catastrophic event in areas prone to such events). To the extent that changed circumstances are provided for in the HCP, the Permittees must implement the appropriate measures in response to the changed circumstances if and when they occur.

This section describes the changed circumstances anticipated by and provided for in the SEP-HCP and explains the Service's assurances to the Permittees and Participants with respect to any unforeseen circumstances.

13.1.1 CHANGED CIRCUMSTANCES

The No Surprises Rule defines "changed circumstances" as "circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the Service and that can be planned for (e.g., the listing of new species, or a fire or other natural catastrophic event in areas prone to such events)."

A HCP must identify provisions to compensate for negative impacts to covered species from changed circumstances in order to qualify for No Surprises assurances. If circumstances change, the permittee must implement any provisions included in the HCP and/or ITP that address such circumstances.

The Permittees and the Service recognize that many changes in human conditions and attitudes, development pressures, environmental conditions, and scientific understanding of ecological systems, among other things, could and will occur over the 30-year Plan duration. Changed circumstances that can reasonably be anticipated by the Permittees and the Service and that can be planned for are described below.

The SEP-HCP identifies funding to ensure that a response will occur in the event of a changed circumstance. The funding plan anticipates funding for unforeseen contingencies that may arise during the operation of the SEP-HCP and/or management of preserves. An allowance for contingency funding is also built into the Plan's capital contributions to the non-wasting management endowment fund so that such costs may be addressed even after the Permit has expired. The Permittees believe that the

funding plan ensures that most, if not all, of the reasonably foreseeable costs and many of the currently unforeseeable or unexpected costs that may occur during Plan implementation are adequately considered. Section 11 and Appendix F contain details of the funding plan and anticipated budget allocations in event of a changed circumstance.

The responses provided for each changed circumstance represent an opportunity for the Permittees and the Service to reevaluate the effectiveness of the conservation program and adjust priorities, reallocate resources, or otherwise modify how the Plan is implemented. The "sideboards" noted in each response indicate the extent to which the Service may require modifications of the SEP-HCP. The responses to changed circumstances protect the Permittees' assurances that additional resources will not be required if the conservation program is being properly implemented.

CHANGED CIRCUMSTANCE 1: The Service publishes a new or revised version of a final recovery plan for a Covered Species.

The SEP-HCP is intended to contribute to the recovery of the Covered Species. The minimum standards for preserve acquisitions are designed to be consistent with current recovery plans and other current Service guidance for establishing preserves that have long-term conservation value for the Covered Species. In addition, the enrollment process for the Covered Karst Invertebrates relies heavily on the recovery standards articulated in the Bexar County Karst Invertebrates Recovery Plan and related modules (USFWS 2011b).

However, the Service is currently revising the recovery plan for the GCW and its 5-year status review of the BCV indicated that the recovery plan for the BCV is out-of-date. The Service recently issued a final version of a recovery plan for the listed karst invertebrates, but the recovery plan includes a number of stand-alone "modules" that are intended to be updated and revised more frequently than the final recovery plan itself. Furthermore, there is scientific evidence that suggests the Karst Fauna Region biogeographic hypothesis, which forms the basis for the current recovery strategy of the Covered Karst Invertebrates, may not adequately describe the species and/or habitat distributions for at least some of these species (White et al. 2001, White 2006, and White et al. 2009). Therefore, it is foreseeable that the Service may publish a new or revised version of a final recovery plan or other such guidance for one or more of the Covered Species over the duration of the Plan. It is also possible that any new versions of a final recovery plan or similar guidance will contain updated recommendations for achieving recovery of the Covered Species.

The Permittees and the Service agree that a changed circumstance will have occurred if the Service publishes a final recovery plan or similar document for a Covered Species that includes recovery standards that differ substantially from the standards described in the SEP-HCP.

If this changed circumstance occurs within the duration of the Plan, the Service may notify the Permittees that it must amend the aspects of the SEP-HCP's enrollment process and/or conservation program (such as preserve design standards) that are based on the guidance in the current recovery plans so that these measures are consistent with the new recovery recommendations to the maximum extent practicable. Unless the conservation measures or mitigation will preclude recovery based upon the new recovery plan, the Service will not require the Permittees to increase the amount of mitigation (i.e., acres of preserve land) required by the Permit, increase the distance of Occupied Cave Zone buffers, or increase the Conservation Baseline standards for karst enrollment in terms of the number or

type of required preserves. The Service will also not reduce the number of GCW or BCV Preservation Credits already generated by preserve acquisitions or reduce the level of Conservation Baseline achieved for individual karst species in a KFR. Any changes to the SEP-HCP minimum preserve standards required by the Service will apply only to future enrollment or conservation actions.

CHANGED CIRCUMSTANCE 2: Protected habitat in SEP-HCP preserves is temporarily lost or degraded due to catastrophic events.

Catastrophic events are natural and/or unavoidable occurrences, including but not limited to *force majeure*, which may affect SEP-HCP preserves. Catastrophic natural events such as wild fires, tornadoes, floods, outbreaks of tree diseases (e.g., oak wilt), prolonged periods of severe drought, and similar events could temporarily reduce or degrade potential habitat for the Covered Species within the SEP-HCP preserve system. Other types of catastrophic events, such as a hazardous materials spill or large-scale vandalism of protected habitats, have human causes but may also affect SEP-HCP preserves. Many of these acute and catastrophic events are a normal or at least occasional occurrence, particularly at wildland-urban interfaces, and/or may be reasonably foreseen.

The Permittees and the Service agree that a changed circumstance will have occurred if more than 100 acres of protected GCW or BCV habitat or one protected species-occupied karst feature within the SEP-HCP preserve system is lost or substantially degraded due to catastrophic events.

Upon recognition of such an event, the Permittees will mobilize available resources as soon as reasonably practicable, such as program staff and/or contingency funds, to evaluate the situation and stabilize or minimize further damages. The Permittees will notify the Service within 30 days of such an event and will coordinate with the Service to implement measures to minimize damage to the affected habitats within the SEP-HCP preserves to the maximum extent practicable. The Permittees will update the Baseline Preserve Assessment and Preserve Management Plan for the affected preserves within one year of the event. The updated Preserve Management Plan will prioritize management activities that seek to regenerate or restore suitable habitat in an amount equal to or in excess of the amount of habitat that was lost or substantially degraded by the catastrophic event.

If such an event occurs, the Service may require the Permittees to utilize contingency funds and/or program staff for habitat restoration efforts in addition to the efforts made to minimize damage to the affected habitats within the SEP-HCP preserves to the maximum extent practicable. However, any changes to the adaptive management program or the Plan's overall budget that are agreed to be appropriate for addressing the impacts of catastrophic external events will not require the acquisition or management of additional preserve lands or the provision of additional funds or other resources.

The Permittees and the Service also agree that the loss of less than 100 acres of protected GCW or BCV habitat or less than one protected species-occupied karst feature within the SEP-HCP preserve system does not rise to the level of a changed circumstance as restoration and recovery of affected habitats within the SEP-HCP preserve system can be achieved through an adjustment of management activities.

CHANGED CIRCUMSTANCE 3: Protected habitat in SEP-HCP preserves is permanently lost or degraded due to global climate change or other landscape-scale changes.

The SEP-HCP preserve system will permanently protect large areas of habitat for the Covered Species. It is possible that large-scale changes to vegetation communities or species distributions due to global climate change or other form of landscape-scale change could cause the permanent loss of habitat for the Covered Species within the SEP-HCP preserve system. Unlike habitat lost due to reasonably foreseeable catastrophic events, it is possible that these large-scale changes to climate or landscapes could irreparably change the essential habitat characteristics of the SEP-HCP preserve system and prevent the regeneration or restoration of suitable habitat for the Covered Species.

Global climate change has the potential to alter the regional distribution of plant and animal communities by large-scale changes in average temperature, levels and frequency of precipitation, groundwater regimes, and fire regimes. The specific effects of climate change on the south-central Texas region are uncertain, but many researchers expect climate change to produce a greater number of shorter, but more intense, precipitation events and more intense (and possibly more prolonged) periods of drought. The region may also experience warmer weather year-round, with fewer freezes during the winter and a longer "warm" season (U.S. Global Change Research Program 2009, Nielson-Gammon 2008).

There is currently insufficient knowledge upon which to base a projection of the potential for the SEP-HCP preserve system to increase or decrease in value to the Covered Species over the next 30 years as a result of climate change. Nor is there currently sufficient knowledge upon which to design alternative or additional mitigation measures that would compensate for any adverse effects of climate change on the preserves.

It is possible that large-scale changes to vegetation communities or species distributions due to other forms of landscape-scale change could cause the permanent loss of habitat for the Covered Species within the SEP-HCP preserve system. The internal ecosystem processes within a patch of habitat may be influenced by the types of land uses adjacent to and in the vicinity of the patch. Habitat patches of similar size and vegetation characteristics may not be ecologically equivalent due to differences in their surroundings. Large-scale changes to land uses in the vicinity of SEP-HCP preserves that are unrelated to the SEP-HCP may ultimately reduce or eliminate the long-term conservation value of some preserves. The SEP-HCP conservation program identifies the minimum criteria for SEP-HCP preserves that will have mitigation value under the Plan. These conservative preserve design standards, combined with required Service approvals for Preservation Credit allocations and karst preserves, provide a mechanism for dealing with uncertainty in preserve design criteria.

The Permittees and the Service agree that a changed circumstance will have occurred if global climate change or other landscape-scale change causes the SEP-HCP preserve system to significantly increase or decrease in relative value with regard to continued survival of one or more of the Covered Species. To the extent that knowledge about the effects of such changes to the Covered Species is gained over the life of the SEP-HCP from information collected as part of the Plan's management program or through research endorsed by the Service, the Permittees will seek advice from the Service about the implications of such knowledge. The Permittees will also take such knowledge into account when revising management plans and evaluating subsequent preserve acquisitions.

The Service, based on the best available scientific information and the biological information reported annually by the Permittees, may notify the Permittees that such a changed circumstance has occurred. With such notification, the Permittees will consult with the Service to determine whether any changes in preserve management practices are appropriate to respond to the effects of climate or landscape-scale changes. Based on the climate change or landscape-scale change impacts, the Service may require the Permittees to implement appropriate and practicable changes to preserve management practices or modify criteria for future preserve acquisitions. However, any changes to the preserve system or management program agreed to be appropriate for addressing the impacts of these types of changes will not require the acquisition or management of additional preserve lands or the dedication of additional funds or resources.

Under this changed circumstance, if replacement preserves are warranted and available, the Permittees and the Service will discuss the possibility of replacing preserves that are no longer contributing to the conservation of the Covered Species with other preserves that provide a higher level of conservation value. However, the Service may not require the Permittees to do so. The Permittees agree that replacement preserves would not generate any new or additional conservation value for the SEP-HCP without prior Service approval.

CHANGED CIRCUMSTANCE 4: A Covered Species becomes delisted.

The goal of the ESA is to conserve endangered and threatened species to ensure their long-term survival in the wild. At that point, species are “recovered” and the protection of the ESA is no longer necessary. To delist an endangered or threatened species, in accordance with section 4 of the ESA, the Service is required to determine that threats have been eliminated or controlled, based on several factors including population sizes and trends and the stability of habitat quality and quantity. For delistings that result from recovery, section 4(g) of the ESA requires the Service to monitor the species for at least five years in order to assess their ability to sustain themselves without the protective measures of the ESA. Conservation programs like the SEP-HCP may contribute to the recovery of one or more of the Covered Species.

If the Service formally delists one or more of the Covered Species due to recovery, the Permittees will continue to honor any obligations for perpetual protection and management of SEP-HCP preserves as described in this Plan, since these conservation actions are likely to have contributed to the Service’s decision to declare the species recovered. However, the Permittees will not continue to assess impacts or collect mitigation for the delisted species.

CHANGED CIRCUMSTANCE 5: A Covered Species is declared extinct.

Despite the presence of conservation programs like the SEP-HCP, one or more of the Covered Species could become extinct due to a variety of factors across their ranges, including conditions at wintering grounds.

If the Service declares one or more of the Covered Species to be extinct in the wild, the Permittees and the Service will complete in good faith an amendment to the Permit and Plan to discontinue or reduce conservation obligations pertaining to the extinct species as reasonably appropriate. It is anticipated that acceptable actions under this changed circumstance may include releasing the Permittees from management and monitoring obligations within preserves established for the extinct species, allowing more intensive uses of preserves established for the extinct species (such

as public access or limited land development), or allowing the Permittees to divest holdings of preserve lands for the extinct species.

CHANGED CIRCUMSTANCE 6: A listed karst species is subject to a taxonomic change.

The SEP-HCP addresses seven Covered Karst Invertebrate species. However, on-going or future genetic analysis or other information could result in changes to the taxonomy of one or more of the Covered Karst Invertebrates.

Karst-adapted species are exceptionally difficult to differentiate because of convergent evolution. The extreme environment of caves and other karst environments place similar natural selection pressures on different ancestral species and may produce similar morphological adaptations. In karst environments, convergent traits typically include reduced or lost eyes and pigmentation, attenuated limbs, and enhanced olfactory organs, among other traits, and may make morphological identification of different species difficult or impossible. For this reason, it is common for karst populations that had been previously considered to be a single species to be split into two or more different species as more detailed research is performed. It is also possible that future work could result in one or more of the Covered Karst Invertebrates becoming grouped with another currently separate species.

A change in taxonomy could affect the relative magnitude of threats to a possibly smaller or larger population of invertebrates. However, the likelihood of any such future changes to taxonomy or the effects of any potential changes to a species' status is uncertain.

The Permittees and the Service agree that a changed circumstance will have occurred if the Service recognizes a change in the taxonomy of one or more of the Covered Karst Invertebrates in the federal list of threatened and endangered species. If the taxonomic change results in the "new" species (or multiple species) being named as one or more of the Covered Karst Invertebrates, then the Permittees will address the new species in the same manner as the other Covered Karst Invertebrates, including the evaluation of current conservation levels as they affect activities eligible for coverage through the SEP-HCP. Examples of continuation as a Covered Karst Invertebrate include: if two Covered Karst Invertebrates become one species, if one Covered Karst Invertebrate splits into two species, or if one Covered Karst Invertebrate and one non-covered karst invertebrate are named as a Covered Karst Invertebrate. In these circumstances, the Service will consider these Covered Karst Invertebrates to be adequately addressed by the SEP-HCP and will amend the ITP to add those species to the list of Covered Species. If, however, a non-covered, but listed karst invertebrate (for example *C. baronia*) is merged with a wider ranging non-listed species, then a major amendment to the HCP may be warranted. There are numerous possibilities when discussing future potential taxonomic changes with karst invertebrates. Therefore, the Permittees and the Service will work together to determine what type, if any, amendment is necessary.

CHANGED CIRCUMSTANCE 7: Upfront mitigation requirements or Conservation Baselines for Covered Karst Invertebrate Species cannot be met.

The geographic extent of three of the seven Covered Karst Invertebrates known occurrences is limited to two localities or less. For example, the only two localities for *Cicurina venii* are privately owned and provide little opportunity for enhancement. Government Canyon State Natural Area contains the only known localities of *Neoleptoneta microps* and *Cicurina vespera.* Within Government Canyon

State Natural Area, *Neoleptoneta microps* distribution is limited to only two caves and *Cicurina vespera* is known only from a single locality.

Control, regulation, and/or monitoring land use activities on properties by the SEP-HCP is limited to only those properties voluntarily enrolled in the Plan or that are part of the SEP-HCP preserve system. Furthermore, establishment of SEP-HCP preserves will only be through agreements with willing landowners and the SEP-HCP will not require or otherwise compel any landowner, developer, local government, or any other party to participate in the SEP-HCP. Incidental Take Authorization for the Covered Species through SEP-HCP Participation cannot be offered until the Permittees have secured some level of up-front mitigation for each of the Covered Karst Invertebrate species. However, due to the extremely limited geographic range of some of the Covered Karst Invertebrates and preserve establishment only through agreements with willing landowners, SEP-HCP implementation and participation could be postponed indefinitely.

The Permittees and the Service agree that a changed circumstance will have occurred if the up-front mitigation or Conservation Baselines for a Covered Karst Invertebrate species cannot be met. In such an event the Permittees will work with the Service in determining an appropriate level of up-front mitigation. The Permittees will recommend other conservation measures, such as surveying for new caves containing the Covered Karst Invertebrates, which they will implement prior to issuing any Participation Agreements in Karst Zones 1 through 4. The Permittees recommendations will be considered to help satisfy up-front mitigation or Conservation Baseline requirements and enable Participation Certificates to be issued.

In any case, the Permittees will not be required to increase the amount of mitigation (i.e., acres of preserve land) required by the Permit, increase the distance of Occupied Cave Zone buffers, or increase the Conservation Baseline standards for karst enrollment in terms of the number or type of required preserves. Also, the number of GCW or BCV Preservation Credits already generated by preserve acquisitions and/or the level of Conservation Baseline achieved for individual karst species in a KFR will not be reduced.

CHANGED CIRCUMSTANCE 8: The Covered Karst Invertebrates range is expanded into Comal, Bandera, and/or Medina counties.

The Permittees and the Service agree that a changed circumstance will have occurred if the Service recognizes an expansion of the range of one or more of the Covered Karst Invertebrates into Comal, Bandera, and/or Medina counties. If this changed circumstance occurs within the duration of the Plan, the Permittees will notify the Service that it will cover those new locations (but only to the extent such areas are also within the City of San Antonio's jurisdictional boundaries or ETJ). This incidental take authorization will only be geographically expanded to Comal and/or Medina counties if the Service determines those new locations are part of an existing KFR or revises the current KFR boundaries to include the new locations.

The Permittees will address the newly expanded Covered Karst Invertebrate's ranges or Service designated KFRs in the same manner as the current occupied caves and KFRs established for the Covered Karst Invertebrates in this HCP, including the evaluation of current conservation levels as they affect activities eligible for coverage through the SEP-HCP (see Section 7.0). The Permittees and the Service agree that an increase in take authorization is not requested and the existing take

authorization for Covered Karst Invertebrates would only be expanded to those areas within Comal and Medina counties that fall under the City of San Antonio's jurisdictional limits.

Information contained in the SEP-HCP and respective HCP Appendices includes county specific data for the entire Plan Area, including Comal and Medina counties. The City of San Antonio's future ETJ expansion area was already analyzed as part of the SEP-HCP Plan Area (Section 1.4), and new locations of Covered Karst Invertebrates are already expected to be the major contributor for future karst preserve acquisitions (Section 4.5). While the SEP-HCP estimates of karst zone impacts were based on existing karst zone acreages, only 20 percent of the projected impacts are proposed to be authorized in the Plan Area. Any additional karst zone acreage added in Comal and/or Medina counties will likely be minimal, if any, since studies to date have yet to verify any listed karst species within the projected ETJ area. It should be noted there already exists a few occupied caves that are not included within existing KFRs in Bexar County. Since the KFRs have not been revised to include these features, the Service recognizes them as being part of the nearest KFR. Finally, since no increase in incidental take will be requested, the impacts authorized through the SEP-HCP will remain the same.

The Permittees and the Service agree, assuming no new KFR is established, that the expansion of the range of any of the Covered Karst Invertebrates into Comal and/or Medina counties will not require the acquisition or management of additional preserve lands or the provision of additional funds or other resources. Additionally, the Service will not require the Permittees to increase the amount of mitigation (i.e., acres of preserve land) required by the Permit, increase the distance of Occupied Cave Zone buffers, or increase the Conservation Baseline standards for karst enrollment in terms of the number or type of required preserves. This changed circumstance is invoked only when a KFR or Covered Karst Invertebrates' range is expanded, and does not apply to potential new KFRs, should they be established.

CHANGED CIRCUMSTANCE 9: The Comal County Regional HCP is not implemented.

Comal County holds its own ITP with an associated regional HCP from the Service which was issued February 2014 (USFWS 2014). Therefore, the SEP-HCP will not cover incidental take that will occur within Comal County, except for incidental take associated with preserve management, monitoring, and research activities. Incidental take coverage for Covered Activities within Comal County was limited based on the assumption that Comal County will implement their HCP, thereby providing the ESA compliance process within Comal County.

As described in Section 3.1, the current limits of the Permittees' jurisdictions already extend into Comal County, and it is anticipated that the limits of the City of San Antonio's extra-territorial jurisdiction may expand beyond its current boundary over the next 30 years further into Comal County. The Permittees and the Service agree that a changed circumstance will have occurred if Comal County does not utilize their ITP and implement their HCP.

If this changed circumstance occurs within the duration of the Plan, the Permittees will notify the Service that it will amend the aspects of the SEP-HCP's Covered Activities to include those portions of Comal County currently excluded from the Plan. The Permittees and the Service agree that this changed circumstance would be a minor amendment to the Permit and no increase to the existing incidental take authorization would occur.

The Permittees and the Service agree that inclusion of Comal County will not require the acquisition or management of additional preserve lands or the provision of additional funds or other resources. In any case, the Service will not require the Permittees to increase the amount of mitigation (i.e., acres of preserve land) required by the Permit or increase the distance of Occupied Cave Zone buffers. The Service will also not reduce the number of GCW or BCV Preservation Credits already generated by preserve acquisitions or reduce the level of Conservation Baseline achieved for individual karst species in a KFR.

CHANGED CIRCUMSTANCE 10: Inadequate funding for Plan implementation.

The anticipated budget for operating the SEP-HCP is estimated in Section 11.0. The financial models used to develop the Plan incorporated the best available data to estimate anticipated costs and available funding. The funding plan is currently considered to be adequate for meeting Permittees' obligations to fully implement the SEP-HCP and comply with the terms and conditions of the ITP.

However, the funding plan is built on several assumptions, such as annual inflation, scheduling of participation, typical management costs, staffing levels, land acquisition costs (including the mix of fee simple and conservation easement acquisitions and the geographic distribution of acquired preserve lands), land development patterns, rate of investment return, and other factors that may not come to pass despite reasonable efforts to predict future trends and conditions. In the event that circumstances change with respect to anticipated costs or available revenue, and the Permittees cannot practicably dedicate sufficient funds to continue operating the SEP-HCP as intended (after consideration of other applicable Changed Circumstances described herein), the Permittees will suspend future participation in the SEP-HCP and implement one or more of the following procedures as needed to ensure that the conservation value of the SEP-HCP preserve system (acquired as mitigation for authorized impacts) is protected:

- Use funds budgeted for non-preserve conservation actions, as feasible given any encumbrances for the use of these funds, for the implementation of essential preserve management activities; and/or
- Negotiate alternative preserve management, monitoring, or reporting requirements with the Service to reduce the cost of preserve management and monitoring.

The Permittees will notify the Service if changes in funding levels occur that substantially affect the implementation of the SEP-HCP. The Permittees will coordinate with the Service to implement one or more of the procedures described above to help ensure protection of the mitigation value of the acquired preserve system. The Service will notify the Permittees in writing when new enrollment in the Plan may continue.

13.1.2 CHANGED CIRCUMSTANCES NOT PROVIDED FOR IN THE PLAN

If additional conservation or mitigation measures are deemed necessary to respond to changed circumstances and such measures were not provided for in the SEP-HCP, the Service will not require any conservation or mitigation measures in addition to those provided for in the Plan without the consent of the Permittees, provided that the SEP-HCP is being properly implemented.

13.1.3 UNFORESEEN CIRCUMSTANCES

"Unforeseen circumstances" are changes in circumstances affecting a species or geographic area covered by a HCP that could not reasonably have been anticipated by plan developers and the Service at the time of the conservation plan's negotiation and development, and that result in a substantial and adverse change in the status of any covered species. The Service will have the burden of demonstrating that unforeseen circumstances exist and must base the determination on the best scientific and commercial data available. The Service shall notify the Permittees in writing of any unforeseen circumstances the Service believes to exist.

No Surprises assurances apply to the species that are "adequately covered" under a HCP. Species are considered to be "adequately covered" if the HCP satisfied the permit issuance criteria contained in ESA section 10(a)(2)(B) with respect to that species. The species currently considered adequately covered under the SEP-HCP, and thus benefited by the No Surprises policy, are the GCW, BCV, and the seven Covered Karst Invertebrates.

The No Surprises policy states that the Service may require additional conservation measures of an incidental take permittee as a result of unforeseen circumstances "only if such measures are limited to modifications within conserved habitat areas, if any, or to the conservation plan's operating conservation program for the affected species, and maintain the original terms of the conservation plan to the maximum extent possible." The Service shall not require the commitment of additional land, water, or financial resources by the permittee without the consent of the Permittees, or impose additional restrictions on the use of land, water, or other natural resources otherwise available for use by the Permittees under the original terms of the ITP. No Surprises assurances apply only to the species adequately covered by the HCP, and only to those permittees who are in full compliance with the terms of their plan, ITP, and other supporting documents.

In the event of an unforeseen circumstance, the Service shall provide at least 30 days written notice of a proposed finding of unforeseen circumstances to the Permittees and will work with these entities to develop an appropriate response to the new conditions. The Permittees shall have the opportunity to submit information to rebut the proposed finding, if it deems necessary. The Service may request that the Permittees alter the conservation program to address the unforeseen circumstance, provided that the requested alterations are limited to the conservation program and maintain the original terms of the SEP-HCP to the maximum extent possible. Pursuant to the No Surprises policy, the Service may not require the dedication of additional resources, including land, water, funding, or restrictions on the use of resources otherwise available for development or use by Permittees or Participants.

14.0 DESCRIPTION OF ALTERNATIVES

Section 10(a)(2)(A) of the ESA requires that HCPs include a description of the "alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized." The Service's HCP Handbook states that this analysis commonly includes, at a minimum, a "no action" alternative and one or more alternatives that reduce the amount of take associated with the activity. Other alternatives may be evaluated to demonstrate the limits of practicability for the conservation program.

The alternatives selected for analysis in this document illustrate the range of ideas considered by the Permittees and its advisory committees during development of the SEP-HCP. These alternatives highlight some of the major decision points encountered during Plan development, including:

- **No Action Alternative** – Whether or not to implement a regional HCP at all;
- **10% Participation Alternative** – Whether or not to implement a plan scaled to meet only minimal participation levels with a correspondingly lower incidental take request;
- **Single-County Alternative** – Whether or not to implement a plan modeled on the single-county regional HCPs implemented or proposed for other central Texas counties; and
- **Increased Mitigation Alternative** – Whether or not to implement SEP-HCP advisory committee recommendations or suggestions for increased mitigation.

The major differences between the proposed SEP-HCP and these four alternatives are explained in the following sections and summarized in Table 21. Except for these major differences, it may be assumed that most of the other details about the alternative plans (including, but not limited to, such details as administrative structure, plan duration, and preserve management) would be similar to the measures proposed for the SEP-HCP. The estimated budgets for each of the SEP-HCP alternatives were calculated with the same budget model used for the SEP-HCP funding plan, adjusted to the particulars of each alternative.

The Permittees evaluated each of these alternatives, including the proposed Plan, with respect to its ability to meet the purpose and need for a regional HCP and with respect to various economic, regulatory, and policy considerations that affect the practicability of the alternative approach. The discussion below describes the reasons why each alternative plan was not chosen and why the proposed Plan is the Permittees' preferred alternative.

TABLE 21. Summary of Alternatives to the Proposed SEP-HCP.

	Proposed SEP-HCP	No Action Alternative *(some individual ESA compliance actions may occur in the region)*	10% Participation Alternative	Single-County Alternative	Increased Mitigation Alternative
PLAN AREA					
Enrollment Area	Bexar County and City of San Antonio Jurisdictions	not applicable	Bexar County and City of San Antonio Jurisdictions	Bexar County and City of San Antonio Jurisdictions	Bexar County and City of San Antonio Jurisdictions
Conservation Actions	7 counties: Bexar, Medina, Bandera, Kerr, Kendall, Blanco, and Comal	not applicable	7 counties: Bexar, Medina, Bandera, Kerr, Kendall, Blanco, and Comal	Bexar County and up to 10 miles outside of Bexar County	7 counties: Bexar, Medina, Bandera, Kerr, Kendall, Blanco, and Comal
COVERED SPECIES					
	GCW, BCV, 7 Listed Karst Invertebrates		GCW, BCV, 7 Listed Karst Invertebrates	GCW, BCV, and 7 Listed Karst Invertebrates	GCW, BCV, 7 Listed Karst Invertebrates
INCIDENTAL TAKE REQUEST					
GCW *(acres of habitat loss or degradation within Enrolled Properties)*	9,371 ac	none	2,100 ac	9,371 ac	9,371 ac
BCV *(acres of habitat loss or degradation within Enrolled Properties)*	2,640 ac	none	556 ac	2,640 ac	2,640 ac
Listed Karst *(acres of Karst Zone 1-4 within Enrolled Properties and the number of associated occupied karst features)*	10,234 ac (Z1&2) 10,852 ac (Z3&4) 49 occupied features	none	5,117 ac (Z1&2) 5,426 ac (Z3&4) 25 occupied features	10,234 ac (Z1&2) 10,852 ac (Z3&4) 49 occupied features	10,234 ac (Z1&2) 10,852 ac (Z3&4) 49 occupied features
MITIGATION MEASURES					
GCW					
Mitigation Ratio	2 : 1 direct impact 0.5 : 1 indirect impact	not applicable	2 : 1 direct impact 0.5 : 1 indirect impact	1 : 1 direct impact 0.5 : 1 indirect impact	3 : 1 direct impact 0.5 : 1 indirect impact
Preserve Size	23,430 ac	not applicable	5,250 ac	11,714 ac	35,141 ac

TABLE 21. Summary of Alternatives to the Proposed SEP-HCP.

	Proposed SEP-HCP	No Action Alternative *(some individual ESA compliance actions may occur in the region)*	10% Participation Alternative	Single-County Alternative	Increased Mitigation Alternative
Preserve Distribution	Anticipated to be in mostly rural areas	not applicable	Anticipated to be in mostly rural areas	Requires all preserves to be within or within 10 miles of Bexar County	Requires at least 60% of preserve acres (21,085 ac) to be within or within 5 miles of Bexar County and no more than 40% of preserves (14,056 ac) in rural areas
Preservation Credit Fee	$4,000 per credit (calculates to $8,000 per acre of direct loss)	not applicable	$4,000 per credit (calculates to $8,000 per acre of direct loss)	$10,000 per credit (calculates to $10,000 per acre of direct loss)	$5,500 per credit (calculates to $16,500 per acre of direct loss)
<u>BCV</u>					
Mitigation Ratio	2 : 1 direct impact 0.5 : 1 indirect impact	not applicable	2 : 1 direct impact 0.5 : 1 indirect impact	1 :1 direct impact 0.5 : 1 indirect impact	2 : 1 direct impact 0.5 : 1 indirect impact
Preserve Size	6,600 ac	not applicable	1,390 ac	3,300 ac	6,600 ac
Preserve Distribution	Anticipated to be mostly in rural areas	not applicable	Anticipated to be mostly in rural areas	Within or within 10 miles of Bexar County	Anticipated to be mostly in rural areas
Preservation Credit Fee	$4,000 per credit (calculates to $8,000 per acre of direct loss)	not applicable	$4,000 per credit (calculates to $8,000 per acre of direct loss)	$10,000 per credit (calculates to $10,000 per acre of direct loss)	$5,500 per credit (calculates to $11,000 per acre of direct loss)
<u>Covered Karst Invertebrates</u>					
Conservation Goal	1x of preserves needed to achieve downlisting criteria for most species	not applicable	Avoid, minimize, and mitigate to maximum extent practicable, commensurate with the degree of impact	1x of preserves needed to achieve downlisting criteria for most species	2x of preserves needed to achieve downlisting criteria for most species

TABLE 21. Summary of Alternatives to the Proposed SEP-HCP.

	Proposed SEP-HCP	No Action Alternative *(some individual ESA compliance actions may occur in the region)*	10% Participation Alternative	Single-County Alternative	Increased Mitigation Alternative
Preserve Size	Approx 1,000 ac of new preserves; based on acquisition of 3 new karst preserves in each of 5 KFRs with Covered Karst Invertebrates	not applicable	Approx. 750 ac of new preserves; based on acquisition of 1 high quality and 1 medium quality preserve in each of 5 KFRs with Covered Karst Invertebrates	Approx 1,000 ac of new preserves; based on acquisition of 3 new karst preserves in each of 5 KFRs with Covered Karst Invertebrates	Approx 2,000 ac of new preserves; based on acquisition of 6 new karst preserves in each of 5 KFRs with Covered Karst Invertebrates
Preserve Distribution	Distributed across Bexar County Karst Zones; excluding Alamo Heights KFR	not applicable	Distributed across Bexar County Karst Zones; excluding Alamo Heights KFR	Distributed across Bexar County Karst Zones; excluding Alamo Heights KFR	Distributed across Bexar County Karst Zones; excluding Alamo Heights KFR
Participation Fees	Avoidance required 750 ft from feature until regional downlisting criteria achieved OCZ B (345 to 750 ft buffer) = $40,000 OCZ A (0 to 345 ft buffer) = $400,000	not applicable	Avoidance required 750 ft from feature until regional downlisting criteria achieved OCZ B (345 to 750 ft buffer) = $40,000 OCZ A (0 to 345 ft buffer) = $400,000	Avoidance required 750 ft from feature until regional downlisting criteria achieved OCZ B (345 to 750 ft buffer) = $40,000 OCZ A (0 to 345 ft buffer) = $400,000	Avoidance required 750 ft from feature until regional downlisting criteria achieved OCZ B (345 to 750 ft buffer) = $40,000 OCZ A (0 to 345 ft buffer) = $400,000
ESTIMATED BUDGET *(alternatives rounded to nearest $10,000)*					
Plan Costs					
Preserve Acquisition Costs	$169,980,207		$76,150,000	$445,940,000	$888,360,000
Plan Administration	$11,065,773		$4,970,000	$9,530,000	$19,530,000
Preserve Mgt. and Monitoring	$39,818,941		$15,480,000	$35,200,000	$72,120,000
Other Conservation Measures	$2,268,752.35		$1,250,000	$2,010,000	$3,680,000
Contingency Fund Contributions	$1,584,310		$470,000	$1,460,000	$2,980,000
Mgt. Endowment Contributions	$74,755,650		$32,740,000	$69,880,000	$135,420,000
TOTAL ESTIMATED COSTS	$299,473,633	not applicable	$131,060,000	$564,010,000	$1,122,090,000
Participation Fee Revenues					
Application Fees	$374,964		$180,000	$370,000	$370,000
GCW Preservation Credit Sales	$126,128,059		$28,260,000	$157,660,000	$260,140,000
BCV Preservation Credit Sales	$35,532,822		$7,480,000	$44,420,000	$48,860,000

TABLE 21. Summary of Alternatives to the Proposed SEP-HCP.

	Proposed SEP-HCP	No Action Alternative *(some individual ESA compliance actions may occur in the region)*	10% Participation Alternative	Single-County Alternative	Increased Mitigation Alternative
Karst Participation Fees	$6,172,349		$2,860,000	$6,170,000	$6,170,000
Total Participation Fee Revenue	$168,208,193		$38,790,000	$208,620,000	$315,540,000
Public Funding					
Bexar County	$39,209,915		$34,490,000	$153,090,000	$355,600,000
Bexar County TID%	1.27%		1.12%	4.95%	11.51%
City of San Antonio	$39,209,915		$34,490,000	$153,090,000	$355,600,000
City of San Antonio TID%	0.95%		0.83%	3.74%	8.61%
GCW Preservation Credit Savings	$251,560		$250,000	$60,000	$100,000
Total Public Funding	$78,671,389		$69,240,000	$306,240,000	$711,300,000
Endowment Fund Investment Revenue	$52,594,051		$23,030,000	$49,150,000	$95,2400,000
TOTAL ESTIMATED REVENUES	$299,473,633	not applicable	$131,060,000	$564,010,000	$1,122,090,000
% Participation Fees	74%		47%	46%	37%
% Public Funding	26%		53%	54%	63%

14.1 NO ACTION ALTERNATIVE

The No Action Alternative addresses the scenario whereby Bexar County and the City of San Antonio neither seek a broad-scale/long-term ITP from the Service nor implement a regional HCP. Bexar County and the City of San Antonio would not sponsor a locally administered program to streamline ESA compliance for the region and would have no involvement with ESA compliance actions by other entities.

Under the No Action Alternative, compliance with the ESA would continue to occur only on an individual basis through project-specific consultations with the Service. Local governments, business entities, private landowners, and others would independently determine whether or not ESA compliance is necessary for a particular project and, if needed, would work with the Service to obtain authorization for incidental take. Each independent consultation would require an analysis of the incidental take and impacts to listed species, the identification and implementation of appropriate and practicable mitigation measures, and the preparation of appropriate documentation to support the permitting action.

These individual permitting actions would occur at the level and scope of an individual project, such as a new subdivision, road project, utility line, or quarry. Mitigation requirements would be individually negotiated with the Service on the basis of the level of impact to listed species and the conservation value of the mitigation options and opportunities available to the individual applicant. Possible forms of mitigation could include on-site preservation of habitat, acquisition of off-site preserve lands, or purchase of Preservation Credits from an independent conservation bank. With the exception of conservation bank credit purchases, it is likely that many preserve lands offered as mitigation for individual projects would be relatively small, isolated, and/or widely distributed across the region. The perpetual management and monitoring of individual habitat preserves would also be a consideration for individual permittees.

Individuals seeking an ITP from the Service for non-federal actions would prepare their own HCP. Such plans require a description of the proposed action, an analysis of take and impacts to listed species, and development of a conservation program that avoids, minimizes, and/or mitigates for the impacts of the requested incidental take. In addition, HCPs must also include a funding plan, an analysis of alternatives, and measures to address changed and unforeseen circumstances.

Individuals would also be responsible for assisting the Service with preparation of other environmental documentation under NEPA. For most individual projects, NEPA documentation at the level of an Environmental Assessment would likely be sufficient; although, some larger projects could require an Environmental Impact Statement with public involvement. Documentation of environmental impacts would likely be very detailed for the direct (and possibly indirect) effects of the proposed action within the individual project area. However, the level of analysis for broader indirect and cumulative environmental impacts would likely be limited in most cases.

Assembling the necessary project-related and species information, negotiating the details of the conservation program, and preparing the required documentation for obtaining an individual ITP can take several months to multiple years, depending on the circumstances of the individual project. Individual applicants would be responsible for bearing all the costs of preparing the permit application package. Even after a complete application has been submitted to the Service, permit processing can

also last many months (and in some cases, years) before the Service issues a permit authorizing incidental take.

The No Action Alternative represents the status quo, whereby individuals seeking authorization for incidental take of an endangered species must work directly with the Service and are responsible for completing the entire permitting process on a project-by-project basis. A rapidly growing human population and a vibrant economy suggest substantial losses or degradation of potential habitat for the region's endangered species have occurred. Regional data on land use changes and models of potential species habitat also support the assertion that habitat losses are occurring. However, the Service has authorized incidental take for only a small number of projects in the region since these species were listed and has prosecuted few, if any, enforcement actions for unauthorized take.

The minimal level of compliance with the ESA in the Southern Edwards Plateau region that has occurred to-date despite habitat losses associated with human activities demonstrate that the No Action Alternative does not meet the need for addressing the Permittees' or the region's endangered species issues.

Nor does the No Action Alternative accomplish the purpose of the project, which is to create a regional HCP that achieves regional conservation for endangered species, supports Camp Bullis, streamlines permitting, involves stakeholders, provides locally appropriate solutions, and leverages available resources. Reliance on individual permitting actions would not be expected to provide many of these potential benefits for the community or wildlife, even with more robust levels of ESA compliance.

From an economic and policy perspective, the No Action Alternative could affect the schedule and budget of important projects sponsored by Bexar County or the City of San Antonio. Each project that could cause incidental take of one or more of the region's endangered species would require a separate authorization from the Service. Since each project would be evaluated and negotiated individually, the Permittees would have little certainty regarding the potential mitigation requirements for a particular project. The Permittees have determined that a programmatic, regional HCP would help alleviate schedule and budget uncertainties associated with their public projects, which would not occur under the No Action Alternative.

14.2 10% PARTICIPATION ALTERNATIVE

The 10% Participation Alternative illustrates a regional HCP that is sized to address only 10 percent of the anticipated future habitat losses for the Covered Species over the next 30 years within the Permittees' jurisdictions. Therefore, this alternative would request substantially less incidental take authorization for the Covered Species and would (at full implementation) result in proportionately less conservation within the Plan Area.

By requesting incidental take authorization for up to only 10 percent of the anticipated habitat losses in the Permittees' jurisdictions, this alternative plan models a scenario whereby participation levels are similar to those estimated for the Balcones Canyonlands Conservation Plan.

Implementation of the 10% Participation Alternative would, for most people in the Plan Area, represent a scenario similar to the No Action Alternative, since the plan would only address a small portion of the anticipated need for ESA compliance. Given the City of San Antonio's ordinance requiring

developers to submit an affidavit describing their actions towards obtaining ESA compliance for their projects, it is likely that the amount of incidental take allocated to this alternative plan would be exhausted well before the 30 year expiration of the Permit. Just a few relatively large projects could use up the entire allocation of incidental take.

With a smaller plan, the overall estimated costs for implementation would be less than one-half of the estimated cost to implement the proposed SEP-HCP. Although, since there would be fewer Participants paying fees to use the plan, a larger portion of the revenue needed for implementation of the 10% Participation Alternative would require public funding. It is not likely that the Permittees, as public entities, would decide to proceed with an alternative that required substantial and long-term public financial support, but would benefit only a few Participants. A regional HCP limited to only a very small scale would not meet the purpose and need for a regional plan and the low level of allowed participation would likely be insufficient to justify the creation and administration of a new public program.

14.3 SINGLE-COUNTY ALTERNATIVE

The Single-County Alternative is modeled after the approach taken by the other recently approved or proposed single-county regional HCPs in central Texas (i.e., the Williamson County, Hays County, and Comal County plans).

Under this alternative, implementation of the plan (including all conservation actions) would be essentially limited to the extent of the Permittees' jurisdictions. For this purposes of modeling this alternative, it is assumed that the plan area for the Single-County Alternative would include Bexar County and the area within 10 miles outside of Bexar County (which would be generally sufficient to accommodate the City of San Antonio's current extra-territorial jurisdiction and possible future expansions). As habitat for the Covered Species within Bexar County only occurs in the northwest half of the county, the plan area for this alternative is still roughly equivalent to the geographic area of a single central Texas county.

The other single-county regional HCPs in central Texas generally require only 1 acre of mitigation for each acre of habitat loss for the GCW or the BCV. The Single-County Alternative would utilize a similar mitigation ratio for direct habitat impacts to these species. Therefore, the ultimate size of the GCW and BCV preserve systems at full implementation of this alternative would be approximately one-half of the preserve size for the proposed SEP-HCP. The karst conservation program under the Single-County Alternative would be the same as for the proposed SEP-HCP.

An important consideration for this alternative is the substantially higher price of land in the vicinity of San Antonio, compared to more rural parts of the Plan Area. This alternative assumes that approximately 75 percent of the GCW and BCV preserve lands would be acquired in relatively "suburban" areas and approximately 25 percent of the land would be acquired in relatively rural areas (see Section 11.2.1 for estimated per acre land prices in suburban and rural areas). This distribution of preserve lands would have a significant impact on the method of acquisition (fee simple vs. easement) and the anticipated cost for acquisition.

With more preserves in relatively suburban areas, it is also likely that more of the GCW and BCV preserve acquisitions would occur as fee simple purchases by the Permittees. Preserves owned by the Permittees in fee simple would require somewhat greater management and stewardship

commitments on the part of the Permittees. A largely suburban preserve system would also likely require more intensive management to address threats from adjacent land uses, would be more prone to permanent habitat impacts from external landscape-level changes (see Changed Circumstance 5), and may also attract more requests for public access that could be difficult to deny.

So, despite achieving only one-half of the conservation of the proposed SEP-HCP, the Single-County Alternative would likely cost nearly twice as much overall to implement (approximately $564,000,000 over 30 years) due to higher land prices and more intensive management needs. To help address the issue of higher costs, Preservation Credit fees for the GCW and BCV would be increased to $10,000 per acre of direct habitat impact, compared to $8,000 under the proposed SEP-HCP. However, these increased fees (which would be the highest in the region and would test the limits of practicability for potential Participants, likely leading to lower participation levels), would not be sufficient to cover the additional costs. Therefore, this alternative would require more than three times the amount of public revenue as called for under the proposed SEP-HCP to ensure the alternative would be fully and reliably funded.

The Permittees believe that the meager conservation benefits of this alternative do not justify the substantially higher public and private costs, and that the proposed SEP-HCP represents a better alternative for the species, the Permittees, and the public.

14.4 INCREASED MITIGATION ALTERNATIVE

The Increased Mitigation Alternative would implement recommendations of the SEP-HCP's Biological Advisory Team (BAT) which the SEP-HCP's Citizens Advisory Committee could not come to concensus on pertaining to mitigation for the GCW and the Covered Karst Invertebrates.

The BAT passed a recommendation calling for impacts to GCW habitat within Bexar County be mitigated at a 3:1 ratio (i.e., 3 acres of habitat protected for each acre of direct habitat loss) and that at least 60 percent of that mitigation must be placed within Bexar County or within five miles outside of Bexar County. This recommendation was featured in a scenario developed by a group of CAC members during a small group workshop in December 2010 (i.e., the "Group 1 Scenario") that received support from a majority of committee members participating in the informal exercise. However, the CAC was not able to pass a vote formally recommending these measures to the Permittees, which required support from at least two-thirds of the committee members. For the purpose of modeling this alternative, it is assumed that all of the incidental take of the GCW requested by the Permittees would be mitigated at a 3:1 ratio and that 60 percent of the GCW preserve system would be acquired in relatively suburban parts of the Plan Area, with the remaining preserve lands acquired in rural areas.

The BAT also passed a recommendation that the karst preserve system be sized to achieve roughly twice the level of conservation specified by the Service's downlisting criteria for the Covered Karst Invertebrates. The CAC formally adopted the BAT's recommendation. This recommendation is modeled as a requirement to acquire approximately 2,000 acres of recovery-quality karst preserves over 30 years, with at least two high quality (100 acres each) and four medium quality preserves (50 acres each) created in each of the five KFRs where the Covered Karst Invertebrates occur.

The BCV mitigation ratios and preserve standards for this alternative are the same as for the proposed SEP-HCP; although mitigation fees would be increased to $11,000 per acre of habitat loss.

This alternative would achieve a higher level of conservation for the GCW and Covered Karst Invertebrates (i.e., approximately 50 percent more preserve lands for the GCW and 100 percent more preserve lands for the Covered Karst Invertebrates), but at a financial cost that would be approximately 275 percent higher than the proposed SEP-HCP. Similar to the Single-County Alternative, this Increased Mitigation Alternative requires the acquisition of a large portion of the preserve system in relatively high-cost suburban or (for the karst preserves) urban areas, which would disproportionately increase the expected preserve acquisition and management costs.

The estimated total cost for this alternative at full implementation would exceed $1 billion over 30 years, with only 37 percent of the costs covered by participation fees (which would be increased to $16,500 per acre of habitat loss for the GCW; more than double or triple what other regional plans in central Texas charge for similar mitigation) or investment revenue. The level of public revenue needed to sustain this alternative would be more than eight times the amount required under the proposed SEP-HCP and in the first decade an average of 40 to 50 percent of the annual property tax revenue from new development in the area served by the plan would need to be diverted to plan implementation. In the first year of the plan, the amount of public revenue needed to support the plan would exceed the amount of tax revenue generated from new development.

Notwithstanding the impracticability of the costs associated with implementing this alternative, it is not likely that the increased mitigation would be necessary to avoid jeopardizing the survival and recovery of the GCW or the Covered Karst Invertebrates in the wild. As described in Section 4.4.4, habitat for the GCW appears to be relatively abundant and widespread in the Plan Area, with a comfortable margin of opportunity to achieve regional recovery goals without the high mitigation ratios required under this alternative. For the Covered Karst Invertebrates, this alternative's strong avoidance measures and 2,000 acres of recovery-quality karst preserves would, by definition, well exceed the level required to meet the Service's recovery standards for downlisting.

Therefore, the Permittees' believe that the level of mitigation required for the GCW and Covered Karst Invertebrates under this alternative would exceed the maximum extent practicable for most individual Participants and the public, and would exceed what is necessary to adequately compensate for the impacts of the requested incidental take. It is unlikely that the Permittees would adopt a plan with such high public costs without a clearer demonstration that such measures would be robustly supported by the community (i.e., would result in robust plan participation) and would be necessary to prevent a jeopardy determination.

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16.0 GLOSSARY OF TERMS

Adequately Covered	Species are considered to be "adequately covered" by a HCP if the plan meets all of the incidental take permit issuance criteria contained in ESA section 10(a)(2)(B) with respect to that species. The species currently considered adequately covered under the SEP-HCP are the golden-cheeked warbler, black-capped vireo, and the seven Covered Karst Invertebrates.
Agency Oversight Group ("AOG")	SEP-HCP advisory committee composed of representatives from Bexar County, the City of San Antonio, Texas Parks and Wildlife Department, and the U.S. Fish and Wildlife Service. The AOG was created to facilitate coordination among the Permittees and the regulatory agencies.
AOG	Agency Oversight Group
Applicants	People seeking to enroll a property in the SEP-HCP for the purpose of obtaining incidental take authorization. Upon completing the application process, Applicants become Participants.
Baseline Preserve Assessments	A report prepared for a SEP-HCP preserve that documents its current condition and identifies potential management concerns. Baseline Preserve Assessments are initially prepared by the Permittees within one year of acquisition and updated approximately every 10 years.
BAT	Biological Advisory Team
BCV	Black-capped vireo (*Vireo atricapilla*); a Covered Species
Biological Advisory Team ("BAT")	SEP-HCP advisory committee appointed by Bexar County and the Texas Parks and Wildlife Department to advise the Permittees on technical matters relating to the biology and conservation of the species and habitats addressed in the SEP-HCP, including calculating the degree of harm to the species covered by the plan and calculating the size and configuration of the needed habitat preserves. The BAT included eight members and met the requirements of Chapter 83 of the Texas Parks and Wildlife Code.
CAC	Citizen's Advisory Committee
Certificate of Participation	Document issued by the Permittees to a Participant upon execution of a Participation Agreement and payment of mitigation fees.
CFR	Code of Federal Regulations (the codification of the general and permanent rules and regulations published in the *Federal Register* by the executive departments and agencies of the federal government)

Changed Circumstances	Changed circumstances are defined in federal regulations as "circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the Service and that can be planned for..."
Citizen's Advisory Committee ("CAC")	SEP-HCP advisory committee appointed by Bexar County to assist with development of the SEP-HCP, including reviewing the work of the Biological Advisory Team and the form and level of mitigation proposed in the plan, identifying appropriate funding mechanisms to implement the plan, and determining the method of participation in the plan. The CAC included 21 members representing a variety of community stakeholder interests and met the requirements of Chapter 83 of the Texas Parks and Wildlife Code.
Conservation Bank	A system of virtual mitigation "credits" and "debits", where credits are created by permanently protecting and managing habitat, under an agreement approved by the Service for habitat protection. Such credits are debited from the conservation bank by using them as mitigation. Conservation banks are not a permit under the ESA.
Covered Activities	Otherwise lawful activities that may cause the permanent or temporary loss or degradation of habitat for one or more of the Covered Species.
Conservation Baseline	The Conservation Baselines are the minimum requirements needed for each of the Covered Karst Invertebrates within each KFR based on the downlisting criteria described in the Bexar County Karst Invertebrates Recovery Plan (USFWS 2011b).
Covered Karst Invertebrates	A group of seven invertebrates, including four spiders and three beetles, that were federally listed as endangered on December 26, 2000 (*Neoleptoneta microps, Cicurina madla, Cicurina venii, Cicurina vespera, Rhadine exilis, Rhadine infernalis,* and *Batrisodes venyivi*). These species live entirely underground in the limestone caves and passages of the karst geologic formations that underlie the northern portion of Bexar County and adjacent areas. These karst invertebrates are Covered Species.
Covered Species	The species for which incidental take will be authorized and which are the focus of the SEP-HCP conservation program. Includes the GCW, BCV, and the Covered Karst Invertebrates (*Neoleptoneta microps, Cicurina madla, Cicurina venii, Cicurina vespera, Rhadine exilis, Rhadine infernalis,* and *Batrisodes venyivi*).

Critical Habitat	A specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection which has been designated as such by the Service. Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery. An area is designated as "critical habitat" after the Service publishes a proposed federal regulation in the Federal Register, receives and addresses public comments on the proposal, and publishes a final rule in the Federal Registers announcing the final boundaries of the designated critical habitat areas.
Determination Letter	A letter issued to an Applicant by the Permittees that identifies the Applicant's cost of participation in the SEP-HCP.
Direct Effects	The immediate effects of an action that are not dependent on the occurrence of any additional intervening actions for the impacts to species or critical habitat to occur.
EIS	Environmental Impact Statement
Endangered Species Act ("ESA")	Endangered Species Act of 1973, as amended (16 USC §1531 et seq.) is federal legislation intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing extinction of plants and animals.
Enrolled Property (collectively, "Enrolled Properties")	A tract of land that is voluntarily enrolled in the SEP-HCP for the purpose of obtaining incidental take authorization for the Covered Species.
Environmental Impact Statement ("EIS")	A document required by the National Environmental Policy Act for certain actions "significantly affecting the quality of the human environment." An EIS is a tool for decision making that describes the positive and negative environmental effects of a proposed action.
ESA	Endangered Species Act of 1973, as amended (16 USC §1531 et seq.)
FR	Federal Register
GCW	Golden-cheeked warbler (*Setophaga chrysoparia*); a Covered Species
Geographic Information System "GIS"	Computer software that processes geographic data and is commonly used to map and analyze landscape features.
Habitat Conservation Plan (HCP)	A plan prepared under the Endangered Species Act by non-federal parties wishing to obtain permits for the incidental taking of threatened and endangered species. A HCP is required to obtain an ITP under section 10(a)1(B) of the ESA.

Harass	An intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering (50 CFR § 17.3).
Harm	An act which actually kills or injures wildlife and 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).
HCP	Habitat Conservation Plan
HCP Administrator	Bexar County and the City of San Antonio will be the holders of the Permit and, therefore, are obligated to oversee implementation of the SEP-HCP, as such they are the HCP Administrators.
Incidental Take	Taking of a threatened or endangered species that result from carrying out an otherwise lawful activity.
Incidental Take Permit ("Permit" or "ITP")	A permit issued by the Service under section 10(a)(1)(B) of the ESA to non-federal entities authorizing the incidental taking of a threatened or endangered species.
Indirect Effects	Effects for which an action is an essential cause, and that are later in time, but still are reasonably certain to occur.
Interlocal Agreement	An interlocal agreement is a contract between government agencies.
Jeopardize	Defined by the ESA as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, number, or distribution of that species" (50 CFR § 402.02)
JLUS	Camp Bullis "Joint Land Use Study" prepared by the City of San Antonio and the U.S. Army with the input of local stakeholders to help ensure that economic growth is managed in a manner that allows the installation to achieve its mission and remain a vital contributor to the region's economy.
Karst	A terrain characterized by landforms and subsurface features, such as sinkholes and caves, which are produced by solution of bedrock. Karst areas commonly have few surface streams and most water moves through cavities underground.
Karst Conservation Program Evaluations	Regularly scheduled reviews of the relative progress of karst preserve acquisitions against enrollments over Karst Zones 1 and 2. These reviews are intended to prevent incidental take of the Covered Karst Invertebrates from outpacing preserve acquisitions.

Karst Fauna Region ("KFR")	KFRs are geographic areas delineated based on discontinuity of karst habitat that may reduce or limit interaction between populations of karst species.
Karst Recovery Plan	The Bexar County Karst Invertebrates Recovery Plan (USFWS 2011b)
Karst Zones	Geographic areas delineated by Veni (1994) based on geologic and topographic features that facilitate assessment of the probability of the presence of rare or endemic karst species. Potential karst habitat for the Covered Karst Invertebrates occurs in Karst Zones 1 through 4. Karst Zone 5 is not considered to contain habitat for rare or endemic karst species.
KFR	Karst Fauna Region
KFR Groups	Groups of SEP-HCP sectors that generally correspond to the region of one or more of the KFRs described in the Bexar County Listed Karst Invertebrates Recovery Plan.
Mitigation	Actions that compensate for the impacts of incidental take on a species.
National Environmental Policy Act ("NEPA")	A United States environmental law that established a national policy promoting the enhancement of the environment. Establishes procedural requirements for all federal government agencies to prepare documentation evaluating the environmental effects of proposed federal agency actions.
NEPA	National Environmental Policy Act (42 USC § 4321 et seq.)
NMFS	National Marine Fisheries Service
No Surprises Rule	The Service's HCP Assurances (''No Surprises'' Rule) provides regulatory assurances to the holder of a HCP ITP issued under section 10(a) of the ESA that no additional land use restrictions or financial compensation will be required of the permit holder with respect to species covered by the permit, even if unforeseen circumstances arise after the permit is issued indicating that additional mitigation is needed for a given species covered by a permit.
Occupied Cave Zone A	Includes the area within 345 feet of the entrance to a karst feature that is occupied by one or more of the Covered Karst Invertebrates. The extent of this zone encompasses approximately 8.5 acres around a feature.

Occupied Cave Zone B	Includes the area between 345 feet and 750 feet of the entrance to a karst feature occupied by one or more of the Covered Karst Invertebrates. This zone (in combination with Zone A) is intended to encompass all or most of the surface and subsurface resources needed to maintain the environmental integrity of an occupied karst feature.
Participant	Any non-federal entity, including private citizens, businesses, organizations, or state or local governments or agencies, that voluntarily obtains incidental take authorization for the Covered Species through the SEP-HCP.
Participation Agreement	An agreement between the SEP-HCP Administrator and a voluntary Participant whereby the Participant agrees to be bound by and comply with the applicable terms of the SEP-HCP ITP, and in return benefits from the authorizations granted by the Permit. The Participation Agreement describes the terms and conditions of participation, including any required minimization measures or other special conditions for implementing the Covered Activities.
Patch	Discrete areas of suitable GCW and BCV habitat that are separated from other such patches by at least 50 feet.
Permittee	The County of Bexar, Texas and the City of San Antonio are jointly applying to the Service for an ITP under section 10(a)(1)(B) of the ESA. As the Permittees of the ITP, Bexar County and the City of San Antonio will be responsible to the Service for complying with the terms and conditions of the ITP and overseeing the implementation of the SEP-HCP. The specific responsibilities and duties of each Permittee will be specified in an Interlocal Agreement, which will require Service approval.
Plan	Southern Edwards Plateau Habitat Conservation Area
Plan Area	The geographic extent of the SEP-HCP's operational conservation program. Includes seven Texas counties: Bexar County, Bandera County, Blanco County, Comal County, Kendall County, Kerr County, and Medina County.
Preservation Credit	For purposes of the SEP-HCP, "Preservation Credits" means units of measure representing the ecological value associated with permanently protected Covered Species habitat and applicable buffer areas. Generally, one (1) Preservation Credit is equivalent to one (1) acre of applicable habitat and one-half (1/2) Preservation Credit is equivalent to one (1) acre of applicable buffer.

Preservation Value	For the purposes of the SEP-HCP, Preservation Value is the assessed level of mitigation required for obtaining take authorization for one (1) occupied karst feature within the Enrolled Property for which the regional Conservation Baselines have been met through the fulfillment of an unmet need towards achieving the Conservation Baseline for at least one of the Covered Karst Invertebrates in an in-lieu transaction. For each unmet Conservation Baseline need that is fulfilled by an accepted in-lieu karst preserve, an Applicant may apply the Preservation Value as mitigation for one (1) occupied karst feature within the Enrolled Property. Any excess Preservation Value from such transactions may not be carried over or applied to other Enrolled Properties.
Preserve Management Plan	A management plan for a SEP-HCP preserve or cluster of adjacent preserves that describes the specific management actions needed to maintain the conservation value of the preserve. Preserve Management Plans are initially prepared within one year of the acquisition of a new preserve and updated approximately every 10 years.
Redevelopment / Redevelopment Activities	The process in which demolition of existing improvements and construction of new improvements on a site occurs. The new improvements are often a different type from the old.
SEP-HCP	Southern Edwards Plateau Habitat Conservation Plan
Sectors	Subsections of the Plan Area used to develop geographically explicit projections of population, housing, and land use changes. Sector boundaries were based on U.S. Census Bureau census tract boundaries and included one or more adjacent census tracts. Only the portion of Bexar County that includes habitat for the Covered Species was assigned to a sector.
Service	U.S. Fish and Wildlife Service
Southern Edwards Plateau Habitat Conservation Plan (“SEP-HCP” or the “Plan”)	An effort by Bexar County, Texas and the City of San Antonio to address endangered species issues that are threatening the economic growth of the region and promote the conservation of these species and related natural resources. The SEP-HCP supports an Endangered Species Act section 10(a)(1)(B) ITP from the U.S. Fish and Wildlife Service.
Take	As defined by the Endangered Species Act, “take” means “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)).
TNRIS	Texas Natural Resources Information Service
TPWD	Texas Parks and Wildlife Department

TPWD State Natural Area	A State Natural Area is part of the TPWD state park system. The purpose of a SNA is to protect the area's natural and cultural resources and to provide recreational and educational opportunities that do not compromise resource stewardship objectives.
Unforeseen Circumstances	Changes in circumstances affecting a species or geographic area covered by a HCP that could not reasonably have been anticipated by plan developers and the Service at the time of the conservation plan's negotiation and development, and that result in a substantial and adverse change in the status of any covered species.
USC	United Stated Code (the codification of the general and permanent laws of the United States)
USFWS	U.S. Fish and Wildlife Service
Voluntarily Conserved Species	Species for which incidental take coverage will not be authorized, but for which targeted conservation measures would be voluntarily implemented as part of the SEP-HCP.