United States Department of the Interior

FISH AND WILDLIFE SERVICE
10711 Burnet Road, Suite 200
Austin, Texas 78758
(512) 490-0057
FAX (512) 490-0974

Memorandum

To: Regional Director, Region 2, and Albuquerque, New Mexico

Through: Assistant Regional Director, Ecological Services, Region 2, and Albuquerque, New Mexico

From: Field Supervisor, Austin Ecological Services Field Office, and Austin, Texas

Subject: Biological and Conference Opinion for the San Antonio Water Systems Micron and Water Resources Integration Program Habitat Conservation Plan – Permit TE-36242C (Consultation No. 2016-F-0640)

Enclosed is the biological and conference opinion for San Antonio Water System's (SAWS) Micron and Water Resources Integration Program (WRIP) Habitat Conservation Plan (HCP) to avoid, minimize, and mitigate adverse effects to five federally listed endangered species and one non-listed species from construction of water pipelines. These species include the endangered: *Rhadine exilis* (no common name), *R. infernalis* (no common name), Madla's Cave meshweaver (*Cicurina madla*), Robber Baron Cave meshweaver (*C. baronia*), and Braken Bat Cave meshweaver (*C. venii*); and the non-listed *C. loftini* (no common name)

The biological and conference opinion is based on the SAWS Micron and WRIP HCP and the U.S. Fish and Wildlife Service's (Service) Environmental Assessment prepared pursuant to the National Environmental Policy Act of 1969, both dated November 2017; discussions with species experts; published and un-published literature available on the species of concern and related impacts; and other sources of information available to the Service. A complete administrative record of this consultation is available at the Austin Ecological Service Field Office.

We appreciate your staff's assistance throughout this consultation. If you have any questions regarding this biological and conference opinion, please contact Christina Williams at 512-490-0057, extension 235.

Attachment

Biological and Conference Opinion

This transmits our biological and conference opinion for the issuance of a U.S. Fish and Wildlife Service (Service) 10(a)(1)(B) incidental take permit (Permit or ITP) to San Antonio Water Systems (SAWS) for construction of two sections (Micron and Water Resources Integration Program) of a water pipeline project, as described in their HCP (SAWS HCP or HCP). The HCP describes how SAWS will minimize and mitigate, to the maximum extent practicable, adverse effects from activities potentially affecting five federally endangered karst invertebrate species pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.; Act). These species are: *Rhadine exilis* (no common name), *R. infernalis* (no common name), Madla's cave meshweaver (*Cicurina madla*), Robber Baron Cave meshweaver (*C. baronia*), and Braken Bat Cave meshweaver (*C. venii*) (collectively the Covered Species). The issuance of a Service ITP to authorize incidental take associated with the SAWS HCP is the action for this intra-Service consultation pursuant to section 7 of the Act.

Cicurina loftini (no common name), a non-listed species, is discussed in the HCP and EA as a Covered Species because there is a possibility that it will be synonymized with a listed species. Based on some preliminary morphological and genetic studies, *C. loftini* could become *C. baronia* or *C. madla*, both of which are currently listed as endangered under the Act and are Covered Species addressed in the HCP, EA, and in this biological opinion. Therefore, this conference opinion considers any synonymy with these species and would automatically cover any *C. loftini* locations.

Other species listed as threatened or endangered pursuant to the Act or candidate species that may occur in the action area are: the endangered golden-cheeked warbler (*Setophaga chrysoparia*) and Whooping crane (*Grus americana*), and the candidate bracted twistflower (*Streptanthus bracteatus*). No effect from the Covered Activities is expected due to the lack of suitable habitat for any of these species within the action area. SAWS will coordinate with the appropriate agencies, including Texas Parks and Wildlife Department (TPWD), on a project-by-project basis where State-listed species may be affected.

While critical habitat has been designated for the endangered karst invertebrates in Bexar County, there is no critical habitat in the action area and no critical habitat units will be affected. Therefore, this biological and conference opinion does not analyze effects of the proposed action on designated critical habitat.

Consultation History

After several meetings with the Service, SAWS submitted their draft HCP in August of 2015. SAWS submitted their application for an ITP, along with another draft of the HCP, in June of 2016. A notice of receipt of the application and availability of the draft HCP and draft Environmental Assessment (EA) was published in the *Federal Register* on Friday, October 6, 2017 (82 FR 46828).

I. Proposed Action

The proposed Federal action associated with the accompanying SAWS HCP and permit application is to issue an ITP to SAWS for otherwise lawful activities conducted during construction and operation of a water pipeline project with two named sections: Micron and Water Resources Integration Program (WRIP) lines, in Bexar County, Texas. The SAWS HCP establishes a conservation program that minimizes and mitigates, to the maximum extent practicable, the adverse effects of incidental take of the Covered Species.

The implementing regulations for section 7(a)(2) of the Act defines an action area to be all areas affected directly or indirectly by the federal action and not merely the immediate area affected by the proposed project (50 CFR § 402.02). For the purposes of this biological and conference opinion, the action area is 218.03 acres and includes the rights-of-way (ROW) of both sections of the lines: WRIP (159.03 acres) and Micron (1.4 acres), and the proposed preserve at 57.6 acres (see Figure 5 of the HCP).

Covered Activities

The ITP associated with the SAWS HCP will authorize a certain amount of incidental take of the Covered Species that is associated with otherwise lawful activities that may cause the permanent or temporary loss or degradation of habitat for one or more of the Covered Species. Covered Activities generally include: vegetation disturbance; excavation; temporary placement of excavated material; permanent placement of pipe, casings, and stabilizing materials; backfilling of excavated trenches; and restoring surface conditions. Covered Activities include both surface and subsurface impacts, as indicated in brackets, and include:

1. Vegetation removal or disturbance within the limits of the action area only to the extent necessary to allow for construction activities. Vegetation clearing and disturbance will be in accordance with all Tree Protection Plans, as required by the City of San Antonio. [Surface Disturbance Only]
2. Excavation of open-cut trenches to a typical maximum width of seven feet and to depths of between 10 and 20 feet. Exact trench measurements are contingent upon the substrate type at the surface (soil, concrete, or asphalt). [Surface and Subsurface Disturbance]
3. Excavation of bore pits for machinery access to tunneled segments of the proposed pipelines. Each bore pit will generally be 25 by 40 feet at the surface and dug to a depth of 10 to 40 feet. Exact pit measurements are subject to contractor discretion based on site conditions. [Surface and Subsurface Disturbance]
4. Excavation by bore, jack, or tunnel through the subsurface beneath streams, roads, or heritage trees approximately 5 to 35 feet below the surface grade. Such excavation may include the use of water for coolant/lubrication of the pipe or casing materials being tunneled. Excavated material will be removed and disposed of off-site. [Subsurface Disturbance Only]

5. Temporary placement and storage of excavated material or clean fill material within the action area for the proposed pipelines. [Surface Disturbance Only]
6. Permanent placement of sand or gravel pipe bedding and subgrade fill, filter fabrics, flowable fill, mortar, and/or grout, as specified by construction plans to encase and stabilize the pipe. [Subsurface Disturbance Only]
7. Application of water during construction to control dust within active construction areas. [Surface Disturbance Only]
8. Bank stabilization to control erosion and sedimentation prior to boring activities at stream crossings. [Surface Disturbance Only]
9. Restoration of disturbed areas as quickly as possible to their original or better condition. This will include replacement of temporarily stored topsoil and revegetation by seeding with native plant seeds and the utilization of a licensed arborist for any replanting of tree species. [Surface Disturbance Only]
10. Pipeline cleaning and hydrostatic pressure and leakage testing on all pipeline installed. [no additional disturbance is anticipated]
11. Movement of vehicles and heavy construction equipment within the action area. [Surface Disturbance Only]

Proposed Conservation Measures

The Covered Activities include the application of industry standard erosion and sedimentation controls, spill prevention plans, and site restoration measures designed to minimize impacts to the surface and subsurface environments during and after construction. For example, measures include:

- the application of hydromulching and permanent plantings, sodding, or seeding for soil stabilization within 14 days of permanently or temporarily ceasing construction activities;
- the installation of silt fences, gravel filtration bags, rock berms, and rock bedding as structural erosion and sedimentation control practices prior to ground disturbance;
- bi-weekly inspections of erosion and sedimentation controls and additional inspections after precipitation events, with the replacement or maintenance of controls as needed to ensure they are in good working order;
- the collection of all waste materials in securely lidded dumpsters to be disposed of at a local dump as necessary, with no construction materials to be buried on site;
- hazardous materials spills responses as specified in the Storm Water Pollution Prevention Plan, with notification to the National Response Center and local authorities for any reportable or life threatening spills of hazardous materials; and
- preservation or mitigation of significant or heritage trees in compliance with the City of San Antonio's Tree Protection Plans.

Additionally, the Micron and WRIP pipelines will tie in at the existing Anderson Pump Station (APS), which is owned by SAWS and is located at the southwest corner of Loop 1604 and SH

151 (see Figure 1 of the HCP). The undeveloped portion of the APS contains habitat for karst invertebrates and is occupied by at least one federally endangered species. SAWS proposes to dedicate approximately 57.6 undeveloped acres of this tract as a permanently protected and managed karst habitat preserve (APS Karst Preserve).

II. Status of the Species for Five Bexar County Karst Invertebrates

a. Status of the Species

Species Description and Life History
Rhadine exilis, *R. infernalis*, *Cicurina madla*, *C. baronia*, and *C. venii* were listed as endangered on December 26, 2000 (65 FR 81419) with critical habitat designated on April 8, 2003 (68 FR 17156). On February 14, 2012, the Service revised critical habitat designations (77FR 8450). *Cicurina loftini*, a non-listed species, was originally described in 2004 (Cokendolpher 2004).

The two *Rhadine* species are insects (ground beetles) and the four *Cicurina* species are arachnids (spiders). Taxonomic verification of these species is usually not possible in the field and usually requires examination of adult specimens under a microscope. Identification often requires dissection of the genitalia by a taxonomic expert. These species range in size from 0.039 inches to 0.39 inches.

All of these invertebrates are troglobites, spending their entire lives underground. They are characterized by small or absent eyes and pale coloration. Their habitat includes caves and mesocavernous voids in karst limestone (landforms and subsurface features, for example, sinkholes and caves, produced by dissolution of bedrock). Within this habitat these animals depend on high humidity, stable temperatures, suitable substrates (for example, spaces between and underneath rocks), and surface-derived nutrients. Examples of nutrient sources include leaf litter fallen or washed in, animal droppings, and animal carcasses. While these species spend their entire lives underground, their ecosystem is dependent on the overlying surface habitat.

In some cases, the most important source of nutrients for a troglobite may be the fungus or microbes that grow on the leaves or troglophile (life cycle occurs both within and outside of the cave) feces rather than the original material itself (Elliott 1994, Gounot 1994). Tree roots can penetrate into caves and may also provide direct nutrient input to shallow caves. In deeper cave reaches, nutrients enter through water containing dissolved organic matter percolating vertically through karst fissures and solution features (Howarth 1983, Holsinger 1988, Elliott and Reddell 1989). For troglobites, accidental species of invertebrates (those that wander in or are trapped in a cave) may be an important nutrient source in addition to other troglobites and troglophiles found in the cave (Service 2000).

The cave cricket (*Ceuthophilus* spp.) is a particularly important nutrient component (Barr 1968, Reddell 1993) and is found in most caves in Texas (Reddell 1966). As a troglophile, cave crickets forage on the surface at night, and are generally known to return to the cave during the

day, where they lays eggs and roost. A variety of troglobites are known to feed on cave cricket eggs (Mitchell 1971), feces (Barr 1968, Poulson et al. 1995) and on the adults and nymphs directly (Elliott 1994).

Historic and Current Distribution
Little information on these species is available prior to the 1960s, when the study of cave organisms began in earnest in Bexar County. The approximate number of caves each species is known from is: *Rhadine exilis* - 56 caves; *R. infernalis* - 53 caves; *Cicurina madla* - 20 caves; *C. baronia* and *C. venii* - 2 caves each; and C. loftini - 8 caves. Each cave occurs in one of six Karst Fauna Regions (KFR) delineated for Bexar County: Stone Oak, University of Texas at San Antonio (UTSA), Helotes, Government Canyon, Culebra Anticline, and Alamo Heights (Veni 1994; see Figure 7 in the HCP). Karst Fauna Regions are geographic areas delineated based on discontinuities of karst habitat that may reduce or limit interaction between troglobite populations.

Additionally, the geologic context of the distribution of the listed karst invertebrates was examined by Veni (1994), who delineated five karst zones within the KFRs to facilitate assessment of the probability of the presence of rare or endangered species (see Figure 7 in the HCP). These zones are:

Zone 1. Areas known to contain listed karst invertebrate species.
Zone 2. Areas having a high probability of containing habitat suitable for listed karst invertebrate species.
Zone 3. Areas that probably do not contain listed karst invertebrate species.
Zone 4. Areas that require further research but are generally equivalent to Zone 3, although they may include sections that could be classified as Zone 2 or Zone 5 as more information becomes available.
Zone 5. Areas that do not contain listed karst invertebrate species.

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

Reasons for Decline and Threats to Survival
The primary threat to these species is habitat destruction. Caves and karst habitat are destroyed or impacted in several ways, including but not limited to (1) completely filling of the cave with cement during development, (2) quarrying activities, and (3) capping or sealing cave entrances. Other causes of habitat degradation include altering drainage patterns, altering native surface plant and animal communities, reducing or increasing nutrient flow, contamination, excessive human visitation, and threats from red-imported fire ants. Red-imported fire ants impact karst invertebrates by competing with the beneficial cave crickets, feeding directly on karst invertebrates, and by competing with karst invertebrates for habitat resources (Service 2011).

Range-wide Survival and Recovery Needs

The recovery strategy for the endangered invertebrates is to reduce threats to the species by protecting an adequate number of karst areas to ensure a high probability of the species' long-term survival. This includes protecting caves or cave clusters and the associated mesocaverns necessary to support populations that represent the range of the species potential genetic diversity. Maintenance of these karst preserves involves keeping them free from contamination, excessive human visitation, and nonnative fire ants by maintaining an ecologically appropriate surface plant and animal community. Preserve managers are expected to monitor regularly and adaptively manage to control existing and new threats.

For the purposes of recovery, a karst fauna area (KFA) is an area known to support one or more locations of a listed species. A KFA is distinct in that it acts as a system that is separated from other KFAs by geologic and hydrologic features or processes that create barriers to the movement of water, contaminants, and troglobitic fauna. Karst fauna areas should be far enough apart so that if a catastrophic event (for example, contamination of the water supply, flooding, or disease) were to destroy or significantly impact one of the KFAs, that event would not likely destroy any other area occupied by that species. There are three categories of KFAs: high, medium, and low quality. All preserved KFAs should be either medium or high quality as defined in the karst preserve recommendations (http://www.fws.gov/southwest/es/AustinTexas/ESA_Sp_KarstInverts.html). Table 1 shows options for the minimum number and category of KFAs that need to be preserved in each KFR for a species to be considered for downlisting (USFWS 2011). The left column indicates the number of KFRs in which a species occurs. Table 2 identifies the number of KFRs from which each species is currently known.

Table 1: Minimum quality and quantity of KFAs needed for recovery

# of KFRs that species occurs in	Combination of KFAs needed per KFR					Total No. of KFAs
1	KFR #1: 3 High (H) + 3 Medium (M)					6
2	KFR #1: HHM	KFR #2: HMM				6
3	KFR #1: HHM	KFR #2: HMM	KFR #3: HMM			9
4	KFR #1: HHM	KFR #2: HMM	KFR #3: HMM	KFR #4: HMM		12
5	KFR #1: HHM	KFR #2: HMM	KFR #3: HMM	KFR #4: HMM	KFR #5: HMM	15

Table 2: Distribution of covered karst species and preserve quality potential in KFRs

Species	Karst Fauna Region	Potential High Quality	Potential Medium Quality
Rhadine exilis	Government Canyon	4	

	UTSA	3	3
	Helotes	1	2
	Stone Oak	2	
	Culebra Anticline		2
Rhadine infernalis	Government Canyon	8	
	UTSA	4	1
	Helotes	2	1
	Stone Oak	1	
	Culebra Anticline	5	3
Cicurina madla	Government Canyon	6	
	UTSA	3	1
	Helotes	2	
	Stone Oak	2	
Cicurina venii	Culebra Anticline		
Cicurina baronia	Alamo Heights		
Cicurina loftini	Culebra Anticline	3	1

To meet the downlisting criterion for these karst species, the location, quality, and configuration of at least the minimum number of KFAs in each KFR for each species are preserved. Also, legally binding commitments must be in place for perpetual protection and management of these KFAs. To delist these species, the downlisting requirements must be achieved, and the data from monitoring and research support the conclusion that the KFAs will provide a high probability of species survival (greater than 90 percent over 100 years).

b. Environmental Baseline

Ground Beetle with no Common Name (*Rhadine exilis*)
Historically, *Rhadine exilis* was known to occur in the Government Canyon, Helotes, Stone Oak, and UTSA KFRs (Service 2011). Recent collections of a slender, eyeless *Rhadine* beetle have been identified from the Culebra Anticline as *R. exilis* (James Reddell, University of Texas at Austin, pers. comm. to Cyndee Watson, Service's Austin Office, 2015), and additional specimens were collected at the proposed APS Karst Preserve, which were also identified as *R. exilis* (James Reddell, pers. comm. to Amanda Aurora, SWCA, 2016).

Ground Beetle with no Common Name (*Rhadine infernalis*)
Rhadine infernalis is known to occur in the Culebra Anticline, Government Canyon, Helotes, Stone Oak and UTSA KFRs (Service 2011).

Madla's Cave Meshweaver (*Cicurina madla*)
Cicurina madla is known from the Government Canyon, Stone Oak, Helotes, and the UTSA KFRs (Service 2011). However, based on the findings of Paquin and Ledford (2012), *C. madla* could also occur in the Culebra Anticline KFR. Current genetic studies are being conducted in hopes of refining the designation of these specimens.

Robber Baron Cave Meshweaver (*Cicurina baronia*)
Cicurina baronia is currently known to only occur in the Alamo Heights KFR (Service 2011). However, there has been some scientific suggestion that the species is synonymous with a non-listed species (*C. loftini*), which is known from the Culebra Anticline KFR (Cokendolpher 2012, Paquin and Ledford 2012). Current genetic studies are being conducted in hopes of refining the designation of these specimens.

Braken Bat Cave Meshweaver (*Cicurina venii*)
Cicurina venii is only known from the Culebra Anticline KFR (Service 2011), and until recently was only known to occur in one cave. During a road construction project, which is immediately adjacent to the Micron and WRIP pipeline project, karst features were exposed and collections were made of adult female *Cicurina* specimens. Cokendolpher (2012) described the specimens from one feature as *C. venii* and specimens from a nearby feature as *C. loftini*. However, distribution of *Cicurinas* suggests that different species do not overlap; therefore, these specimens should either be *C. loftini* or *C. venii*, not both. Based on this general principal, the specimens collected by SWCA in 2014 at the APS Preserve are also assumed to be the same species found at the road construction project, since the preserve is in the immediate vicinity. Additionally, Zara Environmental (2015) collected immature *Cicurina* specimens from Clandestine Cupola Cave, which is within 500 feet of the Micron and WRIP pipeline projects. These specimens are also potentially *C. venii* or *C. loftini*. Current genetic studies are being conducted in hopes of refining the designation of these specimens.

Meshweaver with No Common Name (*Cicurina loftini*)
Cicurina loftini is only known to occur in the Culebra Anticline KFR (Cokendolpher 2004, Zara 2015). However, some scientists suggest that the species is synonymous with either *C. baronia* or *C. madla* (Paquin and Ledford 2012). Current genetic studies are being conducted in hopes of refining the designation of these specimens.

According to our consultations database the Service has issued one section 10(a)(1)(B) incidental take permit for activities within the Culebra Anticline KFR. This consultation was for the Southern Edwards Plateau (SEP) HCP (TE48571B) and authorized impacts to 21,086 acres of karst zones 1 and 2; however, the SEP HCP covered all of the Stone Oak, Helotes, Government Canyon, UTSA, and Culebra Anticline KFRs. At full implementation of the SEP HCP, there will 1,000 acres of newly created karst preserves throughout these five KFRs. Additionally, there have been three formal section 7 consultations on endangered karst invertebrates in the Culebra Anticline KFR. All three consultations were on linear road projects which, in total, resulted in destruction of one cave and impacts to 1,814 acres of karst habitat. The majority of this acreage was indirectly impacted. These consultations resulted in the action agencies funding a genetic analysis, a biota study, refinement of KFR boundaries in Bexar County, and the conservation of a 9-acre setback around a listed species cave and a 40-acre preserve that is a medium quality KFA.

c. Effects of the Action

The impacts of Covered Activities on endangered karst invertebrates can be both direct and indirect. The direct impacts of Covered Activities are habitat loss and degradation from: filling cave entrances by depositing material or collapsing cave ceilings or both; altering natural drainage patterns (by altering topography, increasing impervious cover, installing berms or water collecting devices) resulting in drying or flooding; loss or degradation of the surface plant and animal communities resulting in changes to the moisture, temperature, or nutrient regimes of the karst ecosystem and increasing predation and/or competition; pollution; and increasing impacts related to human visitation, such as vandalism and dumping. Indirect impacts could occur from a loss of connectivity with other features which limits dispersal and genetic diversity, a reduction in the quality of the habitat over time (e.g. drying of a feature, less cave crickets, etc.), and less abundant vegetation for foraging cave crickets.

Only very limited information currently exists regarding the location or number of occupied karst features in Bexar County or the true distribution or abundance of the individual Covered Species. Because quantifying take of individual species is difficult, this biological and conference opinion instead evaluates acres of habitat removed or impacted as a surrogate for the level of take. To estimate the impacts that will result from the taking, SAWS assessed how much impact would occur at the surface and subsurface (see descriptions under Proposed Action) within karst zones 1, 2, or 3 (see HCP Table 6 for full description). Based on their assessment of the project, it is expected that 67.6 acres of surface impacts and 6.7 acres of subsurface impacts will occur for a total of 67.8 acres over karst zones 1 through 3.

There exists the potential for the Covered Species to be present in subsurface spaces lacking obvious surface expressions that may be destroyed or significantly disturbed by construction activities. For example, during construction of Highway 151 at Loop 1604, Bexar County, Texas, several voids were uncovered during trenching, some of which contained listed species. Another example of this is the construction of State Highway 45, Travis County, Texas, where nine additional caves were discovered during construction, and two of them contained listed karst invertebrates (consultation number 1998-F-0205). Undetectable yet occupied karst voids are generally unanticipated because they have no apparent openings to the surface, and for this reason they generally lack the input of moisture and nutrients essential for karst invertebrates. When subsurface spaces are discovered during construction activities they rarely contain listed species. For example, the Buttercup Creek Subdivision in Williamson County, Texas found no additional listed invertebrates in any features found during development of the 438-acre parcel (as noted in the annual reports submitted for the Buttercup HCP PRT836384).

Irrespective of the extent to which undiscovered features are impacted in the future, these features do not contribute to the environmental baseline for the species, since their presence and extent are undeterminable. At the time of their discovery, these features are simultaneously increasing the known distribution of a species and significantly degrading or destroying their habitat. Furthermore, a feature discovered during construction could, at most, be defined as a

low quality KFA, thereby not contributing to recovery because the impacts from typical construction methods will have one or more of the following consequences: total loss of the feature, alteration of the surface or sub-surface drainage basin, loss or reduction of the cave cricket foraging area, or loss of the supporting vegetation (Service 2011).

SAWS has committed to the following, if a significant subsurface void (one that is humanly enterable without additional excavation) is located during construction:

1) Construction equipment operators will be required to notify the construction foreman immediately who will then notify SAWS.
2) SAWS will engage a Service permitted karst biologist to investigate the feature and document the approximate size, condition, and climate of the feature, and collect a specimen of any troglobitic species of a listed genus that may be incidentally observed.
3) Service protocols will be followed for the identification of any collected specimens.
4) SAWS will require its contractors to close the feature as soon as practicable following discovery to minimize exposure from outside elements.
5) To the extent possible, closure will be achieved using natural materials (i.e., rocks and pebbles) from the immediate vicinity that are grouted together with a brick-mortar substance or comparable substance.
6) 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.
7) If structural integrity is in question, SAWS may consult geotechnical or structural engineers to design an appropriate closure wall that may use alternate materials.

Additionally, SAWS has proposed to preserve an undeveloped portion of land associated with the Anderson Pump Station. This 57.6-acre parcel of land will meet the criteria for a medium quality preserve upon implementation of perpetual management and monitoring. This preserve will contribute to recovery for at least one species (*R. exilis*, which has been confirmed on the site) and possibly another (*C. venii*, which is currently undergoing genetics for identification along with a number of other specimens from the immediate area). If the genetic studies on the *Cicurinas* conclusively assigns the specimens collected in and adjacent to this preserve as *C. venii*, *C. baronia*, or *C. madla*, the APS Preserve would be the first recovery quality preserve for each of these species in the Culebra Anticline.

Critical habitat has been designated for the covered, listed karst invertebrates; however, there is no critical habitat being impacted by the Micron and WRIP projects. Therefore, adverse impacts to designated critical habitat are not expected from implementation of the SAWS HCP.

d. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological and conference

opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. For the purposes of a better understanding and analysis of future actions, we are looking at an area larger than the action area, which only encompasses the proposed project area and ROW.

According to the Southern Edwards Plateau Habitat Conservation Plan, an estimated 22,612 acres of karst zones 1 through 3 will be impacted within the Culebra Anticline KFR between 2010 and 2040. Many of these expected impacts may not be subject to Federal authorization or funding and may alter the habitat or increase incidental take of karst invertebrates. These impacts are cumulative to the proposed project and include: (1) loss of karst habitat due to urbanization; (2) increase in drying of features, due to increased impervious cover; (3) contaminated runoff from agriculture and urbanization; and, (4) an increase in red imported fire ants. Specific project types that can be expected within the action area that could have an effect on karst invertebrates include, but are not limited to: residential development, including associated infrastructure; roads, including more roads and widening of existing roads; and conversion of surface habitat to agriculture, quarries, or impervious cover.

The term climate refers to a "complex, interactive system consisting of the atmosphere, land surface, snow and ice, oceans and other bodies of water, and living things" (Le Treut et al. 2007). Different factors can act to change the climate; there are natural factors, such as volcanic eruptions and solar variations, as well as human factors, such as changes in atmospheric composition (Le Treut et al. 2007). Climate change refers to a major shift in weather patterns over a number of years due to these factors. One of these major shifts is a spike in global temperatures caused by an excess of carbon dioxide in the atmosphere (Le Treut et al. 2007). The reason the Earth's surface is warm is the presence of greenhouse gases, which act as a partial blanket keeping heat in. One of the most important greenhouse gases is carbon dioxide. Studies have shown that human activities have intensified the blanketing effect through the release of greenhouse gases, primarily through the combustion of fossil fuels and removal of forests (Le Treut et al. 2007). It can be expected that the increase in population and the associated infrastructure in the action area will continue to increase the production of greenhouse gases.

Expected beneficial cumulative effects that are reasonably expected to occur include continued State, local government, and private lands preservation. While these lands may not all be conserved specifically for the Covered Species, these species are likely to benefit from land conservation. It can also be reasonably expected that other karst preserves will be established by other means, including the recently issued SEP HCP, grants, donations of land or easements, or preserves established as part of separate consultations with the Service. Thus, it is likely that the long-term, cumulative, beneficial impacts to karst invertebrates will achieve downlisting criteria for many of the listed karst invertebrates in Bexar County.

e. Conclusion

After reviewing the current status of *R. exilis*, *R. infernalis*, *C. madla*, *C. venii*, *C. baronia*, *and C. loftini*; the environmental baseline for the action area; the effects of the proposed project; and the cumulative effects, it is the Service's biological and conference opinion that the action, as proposed, is not likely to jeopardize the continued existence of these species. The proposed action will not appreciably reduce the survival and recovery of the five endangered and one non-listed karst invertebrates. While critical habitat has been designated for the endangered karst invertebrates, the Micron and WRIP water pipelines will not be impacting any designated critical habitat units; therefore, no adverse effects to designated critical habitat are expected as part of the SAWS HCP.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined by the Service as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is further defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding and sheltering (50 CFR §17.3). Harm is also further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns, including breeding, feeding, and sheltering. Incidental take is defined by the Service as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act, provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are nondiscretionary and must be implemented by the Service so that they become binding conditions of any authorization issued to implement a project covered by this biological and conference opinion, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Service (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the authorizations, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Service must report the progress of the action and its effect on the species [50 CFR 402.14(i)(3)].

The Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

Amount or Extent of Take

The Service anticipates incidental take of karst invertebrates will occur as a result of the proposed action. Individuals of these species are difficult to detect unless they are observed undisturbed in their environment. Most close-range observations of any of these species represent chance encounters that are difficult to predict. Because quantifying take of individual species is difficult, this biological and conference opinion instead evaluates acres of habitat removed as a surrogate for the level of incidental take. The incidental take from the proposed action is expected to occur in the form of harm and harassment through direct loss of habitat and indirect adverse effects resulting from a loss of connectivity with other features, a possible reduction in the quality of the habitat over time, and less abundant vegetation for foraging cave crickets. The following amount of incidental take will be authorized by the proposed Permit:

1. No more than 67.8 acres of karst habitat over karst zones 1 through 3.

An estimate cannot be made of the number of endangered karst invertebrates expected to be taken through authorization of this Permit, since the true distribution or abundance of these species is unknown. Of the acreage amount (67.8 acres), the chances of voids containing listed species with no surface expression being damaged during construction are expected to be rare, as discussed under the effects of the action on karst invertebrates. Therefore, the Service does not expect a significant loss of caves with no surface expression as part of this ITP.

Effect of the Take

In the accompanying biological and conference opinion, the Service has determined that this level of anticipated take is not likely to jeopardize the continued existence of the Covered Species or appreciably reduce their survival and recovery. While critical habitat has been designated for the endangered karst invertebrates, the Micron and WRIP water pipelines will not be impacting any designated critical habitat units; therefore, no adverse effects to designated critical habitat are expected as part of the SAWS HCP.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of the Covered Species in the action area. The Service shall:

- Require that SAWS fully implements the SAWS HCP and complies with all terms and conditions of the issued section 10(a)(1)(B) incidental take permit.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Service must comply with the following term and condition that implements all of the reasonable and prudent measures

described above and outlined reporting/monitoring requirements. These terms and conditions are non-discretionary.

- Ensure that SAWS fully mitigate the effects of the incidental take of the Covered Species from all covered activities, as described in the SAWS HCP dated November 2017;

The reasonable and prudent measures, with their implementing term and condition, are designed to minimize the effects of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered or threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or designated critical habitat, to help implement recovery plans, or to develop information.

- The Service with SAWS should work to get the APS Preserve confirmed as a Karst Fauna Area in accordance with Service standards, so that the preserve can be counted toward recovery and delisting of the occupying species.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Review Requirements

The reasonable and prudent measures, with their implementing term and condition, are designed to avoid, minimize, and mitigate effects of incidental take that might otherwise result from the proposed action. If, during the course of the authorized activities, this level of incidental take is exceeded prior to the annual review, such incidental take represents new information requiring review of the reasonable and prudent measure provided. The Service must immediately provide an explanation of the causes of the taking and review the need for possible modification of the reasonable and prudent measures. This biological and conference opinion will expire at the expiration of the incidental take permit issued to implement the SAWS HCP. Issuance of a new biological and conference opinion will be subject to evaluation of the recovery of the species.

Reinitiation Notice

This concludes formal consultation and conference for *Rhadine exilis* (no common name), *R. infernalis* (no common name), Madla's Cave meshweaver (*Cicurina madla*), Robber Baron Cave meshweaver (*C. baronia*), Braken Bat Cave meshweaver (*C. venii*), and *C. loftini* (no common name); on the issuance of a Service 10(a)(1)(B) permit for the SAWS Micron and WRIP HCP to minimize and mitigate, to the maximum extent practicable, adverse effects to the endangered Covered Species from Covered Activities described in the SAWS Micron and WRIP HCP over a period of 30 years. You may ask our office to confirm the conference opinion on *C. loftini* as a biological opinion issued through formal consultation if the proposed species is listed or critical habitat is designated. The request must be in writing. If our office reviews the proposed action and finds there have been no significant changes in the action as planned or in the information used during the conference, we will confirm the conference opinion as the biological opinion for the project and no further section 7 consultation will be necessary.

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

Approved:

Adam Zerrenner, Field Supervisor
Austin Ecological Services Field Office

December 28, 2017
Date

Concur:

Assistant Regional Director – Ecological Services
Region 2

1/2/18
Date

Literature Cited

Barr, T.C., Jr. 1968. Cave ecology and the evolution of troglobites. Evolutionary Biology 2: 35-102.

Cokendolpher, James C., 2004. *Cicurina* spiders from caves in Bexar County, Texas (Araneae: Dictynidae). Texas Memorial Museum, Speleological Monographs, 6:13-58.

Cokendolpher, J.C. 2012. Adult female Cicurina spider identifications - features 151-015 and 151-019 – Hwy 151 at Loop 1604, Bexar County, Texas. revised October 29, 2012.

Elliott, W.R. 1994. Community ecology of three caves in Williamson County, Texas: a three-year summary. 1993 Annual Report for Simon Development Co., Inc., U.S. Fish and Wildlife Service and Texas Parks and Wildlife.

Elliott, W.R. and J.R. Reddell. 1989. The status and range of five endangered arthropods from caves in the Austin, Texas, Region. A report on a study supported by the Texas Parks and Wildlife Department and the Texas Nature Conservancy for the Austin Regional Habitat Conservation Plan.

Gounot, A.M. 1994. Microbial ecology of groundwaters. Pages 189-215 in J. Gibert, D.L. Danielopol, and J.A. Stanford, editors. Groundwater Ecology. Academic Press, San Diego, California.

Holsinger, J.R. 1988. Troglobites: the evolution of cave-dwelling organisms. American Scientist 76: 147-153.

Howarth, F.G. 1983. Ecology of cave arthropods. Annual Review of Entomology 28: 365-389.

Le Treut, H., R. Somerville, U. Cubasch, Y. Ding, C. Mauritzen, A. Mokssit, T. Peterson and M. Prather, 2007: Historical Overview of Climate Change. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Mitchell, R.W. 1971. Food and feeding habits of troglobitic carabid beetle *Rhadine subterranea*. Speleology 3: 249-270.

Paquin, P., and J. Ledford. 2012. Identification of four mature Cicurina specimens from the State Highway 151 Project. Technical Report submitted to ZARA Environmental. 21 September 2012, pp. 13

Poulson, T.L., K.H. Lavoie, and K. Helf. 1995. Long-term effects of weather on the cricket (*Hadenoecus subterraneus*, Orthoptera, Rhaphidophoridae), guano community in Mammoth Cave National Park. American Midland Naturalist 134:44 226-236.

Reddell, J.R. 1966. A checklist of the cave fauna of Texas. II. Insecta. The Texas Journal of Science 18: 25-56.

Reddell, J.R. 1993. The status and range of endemic arthropods from caves in Bexar County, Texas. A report on a study for the U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department.

Service (U.S. Fish and Wildlife Service). 2000. Final rule to list two cave animals from Kauai, Hawaii, as endangered. Federal Register 64: 2348-2357.

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

Veni, G. 1994. Geologic controls on cave development and the distribution of endemic cave fauna in the San Antonio, Texas, region. Report prepared for Texas Parks and Wildlife Department and U.S. Fish and Wildlife Service.

Veni, G. 2002. Delineation of hydrogeologic areas and zones for the management and recovery of endangered karst invertebrate species in Bexar County, Texas. Report prepared for the U.S. Fish and Wildlife Service. 75 pp.

Zara Environmental LLC. 2015. Results of biota surveys for *Cicurina* spiders in Bandera, Bexar, Comal, Edwards, Medina, and Uvalde counties, Texas. Prepared for Texas Department of Transportation. 231 pp.