



United States Department of the Interior

FISH AND WILDLIFE SERVICE

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March 11, 2021

In Reply refer to:

02ETAU00-2021-F-0543

Ms. Clover Clamons
Natural Resource Management Section Director
Environmental Affairs Division
Texas Department of Transportation
Environmental Affairs Division
125 East 11th Street
Austin, TX 78701-2483

Subject: I-35 from North of RM 2243 to RM 1431
Williamson County, Texas
CSJs: 0015-09-185, 0015-09-186, 0015-09-187

Dear Ms. Clamons:

This document transmits the U.S. Fish and Wildlife Service's (Service or USFWS) biological opinion (Opinion) based on our review of the Texas Department of Transportation's (TxDOT) proposed funding of transportation improvements to Interstate Highway (I-35) from Ranch-to-Market (RM) 2243 to RM 1431, in Williamson County, Texas (proposed action) and its effects on two federally listed endangered karst invertebrates; the Bone Cave harvestman (*Texella reyesi*), and Coffin Cave mold beetle (*Batrissodes texanus*), and two federally listed threatened salamanders the Georgetown salamander (*Eurycea naufragia*) and the Jollyville Plateau salamander (*E. tonkawae*) in accordance with Section 7 of the Endangered Species Act (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA). Critical habitat has been designated for *E. tonkawae* and proposed for *E. naufragia*. We received your request to initiate formal consultation on November 2, 2020.

You have further determined that the proposed action will not affect the Piping plover (*Charadrius melodus*), Red knot (*Calidris canutus rufa*), Whooping crane (*Grus americana*), golden-cheeked warbler (*Setophaga (=Dendroica) chrysoparia*), Salado salamander (*Eurycea chisholmensis*), Tooth Cave ground beetle (*Rhadine persephone*), Tooth Cave Spider (*Neoleptoneta myopica*), Bracted twistflower (*Streptanthus bracteatus*), Texas fatmucket (*Lampsilis bracteata*), Texas fawnsfoot (*Truncilla macrodon*), Texas pimpleback (*Cyclonaias petrina*) or designated critical habitat; and these species will not be further addressed in this biological opinion.

Section 7 of the Act 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 designated critical habitat of such species. As per the Memorandum of Understanding dated December 9, 2019, (23 U.S.C. 327) the Federal Highway Administration (FHWA) assigned responsibility for compliance with the National Environmental Policy Act (NEPA) and all federal resource agency consultations, including section 7 consultations, to the TxDOT.

This Opinion is based on information provided in the October 2020, biological assessment (BA) and request to reinitiate consultation, email records, telephone conversations, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, roadway construction and maintenance and its effects, or on other subjects considered in this Opinion. A complete administrative record of this consultation is on file at the Austin Ecological Services Field Office (Austin ESFO or AUSEFO).

CONSULTATION HISTORY

April 29, 2020	Coordination meeting between TxDOT and USFWS to discuss the I-35 from RM 2243 to RM 1431 project and the need for formal consultation.
May 19, 2020	Coordination meeting between TxDOT, Williamson County Conservation Foundation, and USFWS to discuss potential impacts to Inner Space Cavern and mitigation opportunities.
September 24, 2020	Coordination meeting between TxDOT, environmental consultants, and USFWS to discuss mitigation options proposed by TxDOT for the project.
November 2, 2020	TxDOT requested to initiate formal consultation for the I-35 from RM 2243 to RM 1431 improvement project.
February 5, 2021	Coordination meeting between TxDOT and USFWS to discuss the discovery of a new karst feature adjacent to the project area. USFWS requested that TxDOT extend a subset of their conservation measures to include this new location.
February 18, 2021	TxDOT provided a revised conservation measure by email to address the new karst feature location.
February 26, 2021	Conference call between TxDOT and USFWS to discuss timing of <i>Batrachoseps</i> specimen collection and preferred collection locales.
March 1, 2021	The Service issued a draft BO to TxDOT for their review.
March 10, 2021	Conference call between TxDOT and USFWS to discuss TxDOT proposed revisions to the conservation measure language related to

Batrachoseps specimen collection. Ultimately the TxDOT revised language was rejected in favor of a modified version of the language contained in the USFWS draft BO. These changes are reflected in the final BO.

March 11, 2021 The Service issued a final BO.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Regulations implementing the Act (50 CFR 402.02) define “action” as “all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies of the United States or upon the high seas.”

The following is a summary of the proposed action and a detailed description can be found in the BA: Interstate Highway 35 (I-35) From North of RM 2243 to RM 1431, Williamson County, Texas, dated October 2020.

TxDOT is proposing transportation improvements along I-35 from RM 2243 to RM 1431 in Williamson County, Texas (please see Figure 1 in the BA). The proposed action would be constructed as two separate projects. The northern construction project would include improvements along I-35 from north of RM 2243 to north of Southeast Inner Loop and along RM 2243 from west of San Gabriel Boulevard to Scenic Drive. The southern construction project would include improvements along I-35 from north of SE Inner Loop to south of RM 1431. The proposed action also includes installation of high mast lighting along I-35 north of the northern construction project limits. The total length of the proposed action includes approximately 5.5 miles of I-35 and approximately 0.5 mile of RM 2243. The northern construction project, southern construction project, and the high mast lighting project are combined into a single consultation due to the similarity in the nature, timing, and locations of the actions involved; therefore, the three projects are referred to collectively as TxDOT’s project and the proposed action. The proposed action will require approximately 30.9 acres of new ROW and 0.6 acre of driveway license agreements along I-35 (please see Figure 2 in the BA). The proposed action includes the addition of approximately 26.45 acres of new impervious cover, including approximately 4.18 acres of new impervious cover associated with the northern construction project and approximately 22.27 acres of new impervious cover associated with the southern construction project. The project area consists primarily of the existing I-35 transportation facility and ROW with a mixture of commercial and residential development and quarries adjacent to I-35.

Northern construction project

The proposed action includes improving the existing SB I-35 frontage road within the project limits and intersection improvements at RM 2243. Along I-35, a 12-foot-wide auxiliary lane would be added to the SB mainlanes between the existing entrance ramp from SH 29 and the proposed exit ramp to SE Inner Loop. Braided entrance and exit ramps are proposed along SB I-

35 between RM 2243 and SE Inner Loop. The SB I-35 frontage road would be reconstructed and would include one to three 12-foot-wide lanes with 12- to 24-foot-wide shoulders and a 10-foot-wide shared-used path (SUP). The proposed action would also include installation of high mast lighting along I-35.

At the I-35/RM 2243 intersection, the existing RM 2243 bridge would be replaced with a taller, wider bridge to accommodate additional turn lanes and a SUP, and to increase the vertical clearance under the bridge. The proposed bridge would include three additional designated turn lanes and a 10-foot-wide SUP on each side of the bridge. A separated, new turnaround bridge south of the RM 2243 bridge would consist of one 18-foot-wide lane and would allow for travel from the NB I-35 frontage road to the SB I-35 frontage road. The existing turnaround bridge north of the RM 2243 bridge would be reconstructed and consist of one 18-foot-wide lane; this bridge would allow for travel from SB I-35 frontage road to the NB I-35 frontage road.

East of I-35, RM 2243 would be widened and would consist of two 12-foot-wide lanes in each direction with a 12-foot-wide left turn lane for WB traffic, a 7- to 23-foot-wide median, and an 8- or 10-foot-wide SUP on each side of the road. West of I-35, RM 2243 would be widened and consist of two 11-foot-wide lanes in each direction, 11-foot-wide EB right-turn and two left-turn lanes, a 4- to 17-foot-wide median, and an 8-foot-wide SUP on each side of the road.

The proposed drainage on RM 2243 would remain as a closed storm sewer system, while the SB frontage road would have a combination of open ditches and closed storm sewer. Two water quality ponds would be constructed as part of the proposed project located south of RM 2243 between the SB frontage road and the mainlanes and Rockmoor Drive (please see Appendix A to the BA).

Project timeline and Phasing

Construction is currently scheduled to begin in fall 2023 and be complete by fall 2025.

Construction Sequence

Per TxDOT this information is based on schematic-level design and is subject to change because a detailed project construction schedule for this work is not yet available. In general, the construction sequence is as follows:

- Phase 1 – Construct water quality ponds and widen SB frontage road south of RM 2243. Construct SB mainlane auxiliary lane and proposed entrance and exit ramps. Construct eastbound RM 2243 pavement, SB frontage road north of RM 2243, widen NB frontage road south of RM 2243, and reconstruct SB to NB U-turn bridge.
- Phase 2 – Construct eastbound RM 2243 bridge, NB to SB U-turn bridge, and reconstruct existing SB frontage road and NB frontage road pavement south of RM 2243.
- Phase 3 – Construct westbound RM 2243 bridge and NB frontage road north of RM 2243. Construct westbound RM 2243 pavement and complete frontage road reconstruction north of RM 2243.

TxDOT has provided an estimate of duration of construction activities for the northern

construction project (please see Table 1 in the BA). Individual construction activities are estimated to be completed within 5-150 days with maximum bedrock exposure per location ranging from 2-30 days.

Construction Access and Staging

Preliminary Phase 1 construction would likely include the southbound frontage road and ramp improvements. Phase 2 would include the majority of remaining frontage road improvements, U-turn bridges, and eastbound RM 2243. Phase 3 would include westbound RM 2243 and some final frontage road improvements north of RM 2243. There are currently no commitments on when shared-use path and sidewalks would be constructed (please see Appendix A to the BA). Where feasible, water quality controls will be in place before the roadway construction activities are initiated; for example, water quality ponds will act as temporary sedimentation basins during construction. Construction access and staging would likely occur within existing TxDOT ROW. Additional details on access and staging would not be available until the design is finalized and a construction contractor is chosen.

Post-Project Site Restoration

All disturbed areas will be re-vegetated according to TxDOT's standard practices for urban areas and, to the extent practicable, in compliance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping.

Operation and Maintenance

Once the project is completed, traffic operations are not expected to increase or change. TxDOT's standard practices for roadway operations and maintenance would be implemented following the completion of post-project site restoration activities.

Southern construction project

The proposed action includes improving the existing I-35 SB frontage road within the project limits, reconstructing the intersection of I-35 and Westinghouse Road, intersection improvements at I-35 and SE Inner Loop, adding turn lanes at the intersection of SE Inner Loop and Austin Avenue, reversing entrance/exit ramps along SB I-35, and adding NB and SB auxiliary lanes to I-35 in certain areas. The proposed typical section for the I-35 SB frontage road would consist of three, 12-foot-wide lanes plus an auxiliary lane where applicable, and a 10-foot-wide SUP adjacent to the roadway. On the I-35 NB frontage road at SE Inner Loop, the project proposes adding a 12-foot-wide left-turn lane on the approach. Both the NB and SB frontage roads would be realigned at the intersection of Westinghouse Road. A 10-foot-wide SUP adjacent to the NB frontage road would be added across the intersection of Westinghouse Road for the limits of the realignment.

The I-35 mainlanes are proposed to travel over Westinghouse Road instead of the existing configuration with Westinghouse Road traveling over I-35. In this area, a variable median with a maximum width of 58 feet would be introduced on the I-35 mainlanes between Gateway Drive and Page Whitney Parkway. There would be two separate structures on the I-35 mainlanes over Westinghouse Road with three 12-foot-wide mainlanes; one 12-foot-wide auxiliary lane; and 10-

foot-wide inside and outside shoulders in each direction. Two additional auxiliary lanes are also proposed, including one in the NB direction between the Westinghouse Road entrance ramp and the SE Inner Loop exit ramp, and one in the SB direction between the Westinghouse Road entrance ramp and the Farm-to-Market Road (FM) 3406 exit ramp.

The proposed Westinghouse Road under I-35 would include two 12-foot-wide lanes in each direction. The east and west approaches to the I-35 frontage roads would consist of two 12-foot lanes and proposed signals at the intersections of I-35 and the NB/SB frontage roads. A proposed protected right turn at each approach would allow for direct access onto the frontage roads. The interchange would also include turnarounds from both NB and SB frontage roads. The intersection of Westinghouse Road and the I-35 NB frontage road is proposed to be reconstructed from a traditional intersection to a partial continuous flow intersection with two additional 14-foot-wide left-turn lanes in the WB to SB direction. A SUP is also proposed on both sides of the roadway.

There would be several reversals of entrance and exit ramps along I-35 within the limits of the proposed construction project. The proposed configuration of exit and entrance ramps consist of a 14-foot-wide lane with a 6-foot-wide outside shoulder and a 4-foot-wide inside shoulder. Utility relocation, high mast lighting, and traffic management systems would also be included as part of the proposed project. Additionally, a 10-foot-wide SUP is proposed along the entirety of the SB frontage road.

The proposed facility along SE Inner Loop would include two lanes in the EB direction and three lanes in the WB direction. An EB-to-SB right-turn lane is proposed for SE Inner Loop at the I-35 SB frontage road. This project would also connect SE Inner Loop to SW Bypass. The short, two-way driveway to Inner Space Cavern would be removed and reconstructed. Access to Inner Space Cavern would be maintained during construction and after construction is complete. Additional turn lanes are proposed at the intersection of SE Inner Loop and Austin Avenue.

The proposed drainage would remain a combination of open ditches and closed storm sewer system. Additional closed storm sewer system would be required for the SB frontage road and for the intersecting streets of Westinghouse Road and SE Inner Loop. In addition, water quality and detention would be provided by sand filtration ponds as opposed to the existing vegetated filter strips. Of the six proposed ponds, four would be contained in the existing ROW and two would require additional ROW (please see Appendix A to the BA). Due to the profile revisions at Westinghouse Road, two new 6-foot by 4-foot culverts would be constructed underneath the I-35 mainlanes at a perpendicular angle as opposed to the current skew. This will replace the existing concrete-lined ditch between the NB frontage road and the NB I-35 mainlanes as well as the existing two 6-foot by 4-foot culverts under the I-35 mainlanes. After the mainlanes, drainage will be contained in new concrete-lined ditch until it reaches two new 6-foot by 4-foot culverts under the proposed SB I-35 frontage road. Drainage will then continue to tie to the

existing natural beds and banks headed west beyond TxDOT ROW. As the design progresses, special consideration will be given in addressing the existing spring flow into the culvert (through perforated drains or other means).

Project timeline and Phasing

Construction is currently scheduled to begin in fall 2023 and expected to last approximately 34 months.

Construction Sequence

Per TxDOT this information is based on schematic-level design and is subject to change because a detailed project construction schedule for this work is not yet available. In general, the construction sequence is as follows:

- Phase 1 – Construct retaining wall and additional lanes at SE Inner Loop, temporary pavement along the SB frontage road, permanent pavement at specific locations shown on the layout (including widening on S Austin Ave. and SE Inner Loop). Construct a portion of I-35 profile revision at the Westinghouse interchange, a portion of Westinghouse Rd., and permanent pavement along the SB frontage road and SE Inner Loop at specific locations shown on the layout. Construct a portion of the I-35 bridge over Westinghouse Rd., a portion of Westinghouse Rd under I-35, and the gores/tie-ins for the proposed ramps.
- Phase 2 – Construct the remaining portions of I-35 over Westinghouse Rd., the remaining portion of Westinghouse Rd. under I-35 and near Kelley Dr./Hewlett Loop, and additional permanent pavement on the southbound frontage road. Construct the remaining permanent pavement on the SB frontage road. Construct the remaining portions tie-ins to the new frontage road profile.

TxDOT has provided an estimate of duration of construction activities for the southern construction project (please see Table 2 in the BA). Individual construction activities are estimated to be completed within 20-200 days with maximum bedrock exposure per location ranging from 2-30 days.

Construction Access and Staging

Construction would begin with installation of temporary best management practices (BMPs). Pavement work would then proceed, including the improvements to the I-35 SB frontage road, reconstruction of the intersection of I-35 and Westinghouse Road, intersection improvements, addition of auxiliary lanes, and ramp reversals. Where feasible, water quality controls will be in place before the roadway construction activities are initiated; for example, water quality ponds will act as temporary sedimentation basins during construction. Construction access and staging would likely occur within existing TxDOT ROW. Additional details on access and staging would not be available until the design is finalized and a construction contractor is chosen.

Post-Project Site Restoration

All disturbed areas will be re-vegetated according to TxDOT's standard practices for urban areas and, to the extent practicable, in compliance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping.

Operation and Maintenance

Once the project is completed, traffic operations are not expected to increase or change. TxDOT's standard practices for roadway operations and maintenance would be implemented following the completion of post-project site restoration activities.

High Mast Lighting

The proposed action includes the installation of high mast lighting along I-35 north of the northern construction project limits (north of RM 2243 and south of SH 29). The proposed work would involve the installation of 7 high mast illumination poles between the SB mainlanes and SB frontage road along this portion of I-35. Ground disturbance and construction access and staging for this high mast lighting would likely occur within the existing TxDOT ROW.

Conservation Measures

TxDOT will implement the following conservation measures for *T. reyesi*, *B. texanus*, *E. naufragia*, and *E. tonkawae* with the intent to avoid and minimize adverse effects resulting from the proposed action. TxDOT has also included additional conservation measures to benefit listed species.

Void Discovery Oversight and Reporting

It is possible that previously unknown karst features or caves may be revealed during excavation in previously undisturbed bedrock. Karst features encountered during bedrock excavation activities in Karst Zones 1 and 3 will be evaluated for the presence of karst invertebrate habitat and the potential biological significance of the void to the extent feasible. If a potential karst void is encountered during excavation activities, work within 50 feet of the feature will cease until an evaluation is completed. The feature will be evaluated for potential karst invertebrate habitat by a Professional Geoscientist or karst biologist holding an appropriate 10(a)(1)(A) permit following current USFWS karst survey guidelines. In the case where voids are detected for drilled shafts, potential karst invertebrate habitat will be assessed to the extent feasible using a downhole camera or other similar means. If the feature meets the USFWS criteria for potential karst habitat, then it will be evaluated for its biological significance by a karst biologist holding an appropriate 10(a)(1)(A) permit on a case-by-case basis. If the feature does not meet the criteria for potential karst habitat, then work will continue.

While a feature is being evaluated, the surface expression will be covered to minimize the influence of diurnal variations in surface temperature. Protection of the feature may include a wood cover, plastic sheeting, and/or blanket that is weighted down with rocks around the perimeter. During periods of high temperatures (>100° F), a piece of insulation will be added to the cover. Hazard fencing or barricades may be used to protect the area if there is a fall hazard, such as the case of an open shaft. Appropriate BMPs will be implemented to minimize surface runoff from entering the feature. If a discovered feature is determined to be occupied or presumed occupied by a listed karst invertebrate, then TxDOT will proceed in such a manner as

to minimize impacts to the feature. Occupation by a listed karst invertebrate will be presumed if potentially listed karst invertebrates collected during surveying are immature and cannot be identified to species. If it is possible within the needs of the project, the feature will be capped to preserve as much of the void space as possible. If work must continue at the feature, disturbance to the feature will be minimized but the details will be determined on a case-by-case basis following recommendations from both a permitted scientist and an engineer. When features are closed, they will be closed in a condition as similar as possible to pre-excavation condition regarding water and nutrient inflow and void volume, while protecting the feature from contaminated runoff.

Groundwater Flow Mitigation and Protection Measures

If standing, seeping, or flowing water is encountered in an excavation, work within 50 feet will cease until an evaluation is completed. Appropriate BMPs will be implemented to minimize surface runoff from entering the excavation. A Professional Geoscientist will evaluate the excavation to determine the source of the water (whether it is connected to the Edwards Aquifer) and whether it represents a groundwater flow path for the Edwards Aquifer. If it is determined that the water is connected to the Edwards Aquifer, a site-specific groundwater mitigation plan will be developed before work can continue in the vicinity of the groundwater feature. Where an excavation contains standing or seeping groundwater, the groundwater mitigation plan will be designed to permanently seal off the excavation from the groundwater feature. Where an excavation contains flowing water that could be a groundwater flow path for the Edwards Aquifer, the mitigation plan will also include measures designed to maintain hydrologic connectivity across, under, or around the excavation. This will generally be accomplished with the use of clean, porous media such as clean washed rock, and PVC pipe of various sizes. The mitigation plan for excavations with flowing groundwater will also include measures designed to permanently isolate and seal off the groundwater flow path from the rest of the excavation.

If standing or seeping groundwater is encountered during the excavation of drilled shafts, the groundwater mitigation plan would generally involve the use of permanent casing to seal off the groundwater source and prevent contamination before pouring concrete. If flowing water is encountered during the excavation of drilled shafts, the mitigation plan would involve the permanent placement of casing in a manner that seals the drilled shaft off from the area of groundwater conductivity while allowing continuity of groundwater flow through the annular space surrounding the casing.

If groundwater is encountered during geotechnical boring activities, the groundwater mitigation plan would generally involve filling the borehole with clean washed 1-inch rock to approximately 2 feet above the groundwater level, placing a hole plug above the rock surface, capping the hole plug with a packed bentonite plug, and then sealing the top of the boring as per normal protocol. The protocol for sealing a boring on the TCEQ Edwards Aquifer Recharge Zone requires plugging with non-shrink grout from the bottom of the hole (top of the bentonite plug in the case of groundwater presence) to within 3 feet of the surface. The remainder of the hole must be filled with cuttings or gravel.

At the intersection of I-35 and Westinghouse Road, where a seep-spring discharge feature occurs (please see Figure 2 in the BA), TxDOT will conduct enhanced oversight/monitoring during

construction activities in addition to the measures described above. An environmental compliance monitor will be present for initial excavation activities and will stop construction and call a USFWS permitted biologist for *Eurycea* salamanders if groundwater is encountered. TxDOT will also trap for *Eurycea* salamanders in this area as described below.

Project Specific Locations (PSLs)

Most PSLs are anticipated to be located within TxDOT ROW; however, PSLs may also occur outside of the project area if the contractor chooses. Environmental compliance for PSLs located outside of the ROW are the project contractor's responsibility. TxDOT will notify the contractor of the possibility of listed species and habitat in the project area and the specific requirements to avoid impacts or the need to consult with USFWS.

TxDOT will implement a PSL restriction area using a 345-foot buffer around the known footprint of Inner Space Cavern and extending northeast of the project area to the action area boundary (please see revised Figure 5 to the BA). Any PSLs in this restriction area will require prior TxDOT approval. In addition, the following activities would not be allowed within the 345-foot buffer around the known footprint of Inner Space Cavern:

- No erodible material or chemical storage within the PSL restriction area.
- No maintenance and refueling activities within the PSL restriction area.
- No concrete washouts within the PSL restriction area.

A PSL restriction area was also created around the springs at the South Fork San Gabriel River (please see Figure 7 in the BA). The restriction area boundaries follow the topographic breaks on either side of the river where the surrounding area sharply declines toward the river; the PSL restriction area extends approximately 230 feet south from the south bank, and approximately 280 feet north from the north bank. No construction activities are anticipated near this area, and no PSLs will be allowed within this PSL restriction area.

Salamander Trapping at Intersection of I-35 and Westinghouse Road

TxDOT will trap for *Eurycea* salamanders in areas discharging groundwater at the I-35 and Westinghouse Road intersection for the duration of construction. The type of trap and deployment method will depend on site conditions (e.g., discharge rate, water depth, available attachment locations) as well as forecasted rain and associated stormwater runoff. Potential trapping methods include drift nets, mopheads, leaf litter bags, gravel bags, and/or bottle traps. Traps will be checked at the frequency required by the USFWS 2014 survey protocol (i.e., daily for bottle traps and twice weekly for drift nets, leaf litter bags, and mopheads). In addition, TxDOT will provide a thorough, manual search of all potential cover objects immediately prior to removal of the drainage structure to ensure that no salamanders are present. Once the structure is removed, traps will be reset for the remainder of construction activities. If *Eurycea* salamanders are captured during the construction monitoring activities, tissue will be collected for genetic analyses from the first three captures and specimens will be vouchered at a permanent academic museum (e.g., the University of Texas Biodiversity and Research Center). Any additional captures will be photographed, tissue collected, and salamanders returned to the seep. Tissue samples will be collected and stored in a repository for future genetic analysis. Specimen preservation will follow the most recent USFWS protocols for listed salamander species.

Water Quality Treatment

Eight proposed water quality ponds will provide permanent water quality treatment, including two ponds within the northern construction project limits and six ponds within the southern construction project limits. Six of these ponds are located within the existing ROW and two will require additional ROW. Water quality BMPs are preliminarily proposed to be sand filter systems. The proposed action includes the addition of impervious cover via pavement expansion within the Edwards Aquifer Recharge Zone; therefore, the associated regulations will apply. Permanent BMPs and measures would be designed, constructed, operated, and maintained to ensure that 80 percent of the incremental increase in the annual mass loading of TSS from the site, caused by the regulated activity, is removed after construction is complete. The detailed design of TSS removal BMPs for the proposed construction projects would consider the following:

- The amount of TSS removed would be based on the actual amount of impervious cover added by the project, which may change during detailed design, and previously constructed projects within the project area with TSS load removal requirements.
- The detailed design must include a comprehensive review of all existing WPAPs and associated as-built plans applicable to the project area.
- Within the northern construction project limits, no previously permitted TCEQ controls have been identified. One de facto vegetated filter strip was identified in the project area and would be impacted by ramp construction associated with the proposed project. TxDOT will calculate the contribution to TSS removal from this unpermitted element and replace the TSS removal with TCEQ-approved BMPs in addition to meeting the current TCEQ regulations. Note that this measure exceeds the TCEQ requirements.
- The existing ROW within the southern construction project limits includes elements that contribute to TSS removal that are currently permitted by TCEQ, including grassy swales and two vegetated filter strips, as well as areas that are not previously permitted and are considered de facto vegetated filter strips. Some of these elements will need to be removed as part of the proposed project. TxDOT will calculate the contribution to TSS removal from the unpermitted elements and replace the TSS removal with TCEQ-approved BMPs in addition to meeting the current TCEQ regulations. Note that this measure exceeds the TCEQ requirements.

During the final design stage of the proposed construction projects, a WPAP would be submitted to the TCEQ that would include specific plans for water quality treatment and BMPs. A courtesy copy of the approved WPAP will be provided to the USFWS at that time.

Conservation Measures during Project Design

1. Design project elements within the existing developed ROW where feasible to minimize additional ROW needs. For example, six of the eight proposed water quality ponds are located within existing TxDOT ROW.
2. Minimize excavation and disturbance to bedrock and maximize the use areas covered by fill material. Appendix G to the BA shows proposed excavation throughout the project area, and Appendix H to the BA depicts areas where improvements are proposed on fill within the known footprint of Inner Space Cavern.

3. Reduce excavation within the known footprint of Inner Space Cavern. For example, all water quality ponds are located outside the known cave footprint.
4. Design appropriate temporary BMPs to minimize construction phase erosion and sedimentation and include these in any required Texas Commission on Environmental Quality (TCEQ) permitting documents such as the Storm Water Pollution Prevention Plan (SWP3), Water Pollution Abatement Plan (WPAP), and construction plans, as applicable.
5. Design appropriate permanent BMPs to remove at least 80 percent of the incremental increase in the annual mass loading of total suspended solids (TSS) and protect sensitive recharge features from water quality impacts, and include these in any required TCEQ permitting documents such as the SWP3, WPAP, and construction plans, as applicable.
6. Select water quality pond locations to maximize the collection of runoff from the existing and proposed roadway pavement for both TSS removal and retention of hazmat spills.
7. Design water quality ponds with impermeable liners to prevent infiltration into the underlying material.
8. Any geotechnical borehole locations within the known footprint of Inner Space Cavern will need written approval by TxDOT Austin District environmental staff.

Conservation Measures during Construction

1. Where feasible, water quality controls will be in place before the roadway construction activities are initiated; for example, water quality ponds will act as temporary sedimentation basins during construction.
2. TxDOT will hold a pre-construction meeting with its employees and contractors working on this project. TxDOT will provide specific instruction on the implementation of TxDOT's proposed conservation measures. Instructions specific to the contractor(s) related to implementation of the conservation measures will be documented in writing.
3. Train personnel and contractors to identify karst features and groundwater. A full-time, on-call construction monitor will be available throughout ground-disturbing activities to monitor for the presence of unanticipated karst voids. Should an unanticipated karst void be discovered, the *Void Discovery Oversight and Reporting* protocol would be followed.
4. Adhere to TxDOT's Standard Plans and Specifications when work is scheduled.
5. Limit the clearing of vegetation and topsoil to only the areas needed to accomplish the project or activity.

6. If possible, use prefabricated bridge elements and systems to reduce the amount of heavy equipment required and the amount of time required on-site for heavy equipment, causing less disruption to sensitive environments, increasing personnel safety, and reducing traffic delays.
7. Properly collect, store, and dispose of all wastes generated during activities in approved landfills. Where possible, “clean” materials should be reincorporated back into stockpiles for future reuse.
8. Contain all chemical substances including fuels, de-icing agents, paints, sealants, lubricants, and epoxies. Use collection mats, such as drop cloths, filter mats, and containment curtains to prevent chemical substances from entering the environment.
9. Disturbed areas will be re-vegetated according to TxDOT’s standard practices for urban areas and the TCEQ Construction General Permit to the extent practicable, in compliance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping. Re-vegetation efforts will provide appropriate and sustainable cover to prevent erosion and siltation.

Conservation Measures to Benefit Listed Species

As an additional conservation measure, TxDOT intends to fund the following studies:

1. TxDOT will implement salamander surveys in three recently restored spring runs in San Gabriel Park. Quarterly surveys will be conducted each year for three years. Surveys will include abundance estimates, water sampling, and tissue collection for genetic analyses. Specimen preservation will follow the most recent USFWS protocols for listed salamander species.
2. Additionally, TxDOT has committed to fund new attempts to collect additional *Batrises* specimens from Inner Space Cavern to add to a genetics study that may help resolve ongoing issues with *Batrises texanus* and *B. cryptotexanus*. If right-of-entry to the Inner Space Cavern cannot be obtained, TxDOT would pursue collection of up to three new *Batrises* specimens in total from On Campus Cave and/or Off Campus Cave. In addition, this survey effort would involve collection of up to three new *Texella* specimens from On Campus Cave and/or Off Campus Cave to add to a genetic study that would resolve taxonomic issues in the *Texella* genus. A second collection effort will occur at Waterfall Canyon Cave. This will involve collection of up to three new *Batrises* specimens from Waterfall Canyon Cave.

TxDOT will contact USFWS prior to the collection of samples to ensure collections are properly permitted and to identify the best place to send the samples to make sure they will be available to the researchers. All specimens collected in these efforts will be submitted for genetic analyses as part of the ongoing USFWS *Batrises* study.

The studies listed above will be initiated prior to the start of construction and the results of these studies will be reported to USFWS.

Action Area

The action area is defined at (50 CFR 402.02) as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action.” The Service has determined that the action area for the majority of this project is the approximately 393 acre project area and an area extending 345 feet outward from the project area, which is intended to capture disturbance from construction activities with the potential to extend beyond the project footprint (Please see Figure 2 and revised Figure 5 in the BA). A distance of 345 feet was used to define the action area based on the maximum distance cave crickets were found to forage away from a cave entrance, according to Taylor et al. (2005), which corresponds to the area for potential effects to federally listed endangered karst species.

In two areas the action area has been modified due to either the limited nature of the proposed action in that location or known areas of concern that require a slightly larger action area.

Modifications are as follows:

- For the portion of the project area where only high mast lighting is proposed (north of the northern construction project limits), the action area extends outward from the inner edges of the NB and SB frontage roads (not the ROW line), as all proposed work in this area will occur between the frontage roads.
- For proposed work in the vicinity of Inner Space Cavern the mapped footprint of Inner Space Cavern was used and an area extending 345 feet outward from the footprint of the cavern was included. The presence of a newly discovered karst feature further extended the action area beyond the existing I-35 ROW on the northeast side of the project in this area.

The action area covers approximately 965.52 acres in Williamson County, Texas. The action area is adjacent to the I-35 corridor and is primarily a mix of commercial, industrial, recreational, and residential uses with scattered areas of vacant/undeveloped land.

STATUS OF THE SPECIES AND CRITICAL HABITAT

For more detailed information please see the Service’s 1994 recovery plan for the Endangered Karst Invertebrates, Travis and Williamson Counties, Texas and the Service’s five year review for the Bone Cave harvestman (USFWS 2018). To assess the current status of the species, it is helpful to understand the species' conservation needs which are generally described in terms of reproduction, numbers, and distribution (RND). The Service frequently characterizes RND for a given species via the conservation principles of resiliency (ability of species/populations to withstand stochastic events - numbers, growth rates), redundancy (ability of a species to withstand catastrophic events - number of populations and their distribution), and representation (variation/ability of a species to adapt to changing conditions) (collectively known as the three Rs).

Status of the species

Bone Cave harvestman

Species Description and Life History

The Bone Cave harvestman was placed on the Federal Endangered Species list on September 16, 1988 (53 FR 36029) due to increased urban development, pollution, vandalism, and red-imported fire ants (*Solenopsis invicta*). It is a long-legged, blind, pale orange harvestman with a total length of 2.67 mm at maturity (USFWS 1994).

There is little specific information on the life history and specific habitat requirements of this species. This is largely because troglobites (animals that complete their life cycle underground and exhibit adaptation to the subsurface environment such as absence of eyes) are subterranean, inconspicuous, and difficult to study (Mitchell 1971; Chandler 1992). However, we know that this species is an obligate cave dweller whose continued existence depends on the ecological stability of the karst environments in which they are found. Temperature and humidity are relatively constant within undisturbed karst environments and troglobites are dependent upon moisture and nutrient inputs from the surface.

Historic and Current Distribution

The 2009 five year review for the Bone Cave harvestman listed 168 caves with records of that species (Service 2009). As information was updated for the 2018 five year review it was found that the total number of caves in the 2009 review was in error with the review actually listing 165 caves. The Bone Cave harvestman is a relatively widely distributed karst species and is found within 212 caves spanning 6 of the 8 established Karst Fauna Regions (KFRs) in Travis and Williamson Counties, Texas. The cave distribution by KFR per the five year review (USFWS 2018) and additional information found in Service files for this species is as follows: North Williamson (75 caves), Georgetown (42 caves), McNeil/ Round Rock (70 caves), Cedar Park (2 caves), Jollyville Plateau (21 caves), and the Central Austin KFR (2 caves). The Bone Cave harvestman was determined to not occur at Barker Ranch No. 1 Cave in the South Travis County KFR, which removes that region from the species' distribution.

Reasons for Decline and Threats to Survival

The primary threat to the Bone Cave harvestman is the loss of habitat due to encroaching urban development. This species occurs in an area of central Texas that is undergoing continued urbanization. Direct loss of subterranean habitat may occur when caves and voids are filled and/or collapsed as a result of construction, development, ranching, and quarry and mine-related activities. Alterations of topography, vegetation and drainage patterns from urbanization can ultimately lead to changes in the moisture regime, nutrient loading, and increases in sedimentation into the karst ecosystems. Karst environments are also highly susceptible to groundwater contamination. Sources of this contamination include urban runoff, agricultural pesticide use, transportation and pipeline spills and landfills.

Range-wide Survival and Recovery Needs

The recovery plan for this species (USFWS 1994) calls for the protection of at least three Karst Fauna Areas (KFAs) within each KFR in order to downlist each species from endangered to threatened. According to recovery criterion 1 in the recovery plan three KFAs within each KFR should be protected for downlisting. Protection (or protected) is defined as sufficiently large to maintain the integrity of the karst ecosystem on which the species depends. These areas must also provide protection from threats such as RIFA, habitat destruction, and contaminants.

Recovery criterion 2 requires at least five consecutive years of criterion 1 being met and that perpetual protection of these areas be in place.

The most recent five year review for Bone Cave Harvestman (USFWS 2018) indicates that four karst preserves located in the North Williamson KFR meet the definition of protected KFAs (Priscilla's Well, Twin Springs, Karankawa, and Cobbs Cavern). A fifth site, Shaman Karst Preserve, has been proposed for designation as a KFA in that same region and is pending final recognition. Two sites, Millennium and Wilco Cave Clusters, have been proposed for recognition as KFAs in the Georgetown KFR. No KFAs have been established or proposed in the Cedar Park, Central Austin, Jollyville Plateau, or McNeil/Round Rock KFRs.

Of the six KFRs occupied by the Bone Cave harvestman, the North Williamson County KFR is the only region that has met recovery criterion 1 with at least three KFAs protected in perpetuity. At least three of these sites have been KFAs for more than five years meeting recovery criterion 2.

The species status assessment (USFWS 2018a) identified 28 sites, of sufficient resiliency (i.e., high or moderate), which have potential to be karst fauna areas. Nine sites in the Jollyville Plateau KFR receive some level of protection through the Balcones Canyonlands Preserve. Most remaining sites in the Georgetown, McNeil/Round Rock, and North Williamson County KFRs are not protected and susceptible to conversion to development.

Coffin Cave mold beetle

For more detailed information please see the Service's 1994 Recovery Plan for Endangered Karst Invertebrates in Travis and Williamson Counties, Texas and the five year review for the Coffin Cave mold beetle (USFWS 2018b).

Species Description and Life History

The Coffin Cave mold beetle, *Batrissodes texanus*, is 3 mm in length. It is eyeless, winged, and has long legs. It is a troglobite, which is a species restricted to the subterranean environment. This species exhibits morphological adaptations to the cave environment, such as elongated appendages and loss or reduction of eyes and pigment (Chandler, 1992). Troglotic habitat includes caves and mesocavernous voids in karst limestone (a terrain characterized by landforms and subsurface features, such as sinkholes and caves, which are produced by solution of bedrock) in Travis and Williamson Counties. Within this habitat these species depend on high humidity, stable temperatures, and nutrients derived from the surface. Examples of nutrient sources include leaf litter fallen or washed in, animal droppings (for example, cave crickets), and animal carcasses. It is imperative to consider that while these species spend their entire lives underground; their ecosystem is very dependent on the overlying surface habitat.

This species was first listed as the Kretschmarr Cave mold beetle (*Texamaurops reddelli*) and later split into two species: the Kretschmarr Cave mold beetle and Coffin Cave mold beetle (*Batrissodes texanus*). The Service published a technical correction stating that both species were listed since they were included as part of the *T. reddelli* species at the time *T. reddelli* was listed. More recent taxonomic revisions have been published by Chandler and Reddell (2001) further splitting *B. texanus* into *B. texanus* and *B. cryptotexanus*. According to Chandler and Reddell (2001) *B. texanus* and *B. cryptotexanus* appear to be sister species. They can be distinguished

morphologically by the projection of tergite V (the upper plate of an arthropod's abdominal segment) and the setate lateral ridges of sternite VI (the lower plate of an arthropod's abdominal segment). Another publication by Chandler *et al.* (2009) again stated that these are two distinct species. At this time, *B. texanus* and *B. cryptotexanus* have not been found to occur in the same cave. The Service is considering a technical correction to officially recognize this taxonomic revision as listed under the Act.

Historic and Current Distribution

The Service's 1994 recovery plan listed four caves confirmed and one cave tentatively identified to contain this species within 2 KFRs in Williamson County, Texas. These caves were within the North Williamson County KFR and Georgetown KFRs with 2 and 3 caves respectively.

The cave distribution by KFR per the five year review and additional information found in Service files for this species is as follows: 22 caves in the North Williamson County KFR and 3 caves in the Georgetown KFR. Of these twenty five caves, seventeen were identified as containing *B. cryptotexanus* and eight caves were identified as containing *B. texanus* (Chandler and Reddell 2001, Chandler *et al.* 2009). All 17 caves identified as containing *B. cryptotexanus* occur within the North Williamson County KFR. Of the eight caves identified as containing *B. texanus*, five occur within the North Williamson County KFR and three occur within the Georgetown KFR.

Reasons for Decline and Threats to Survival

Batrisesodes texanus was listed as endangered in 1988, based on the threats of: 1) habitat loss to development; 2) cave collapse or filling; 3) alteration of drainage patterns; 4) alteration of surface plant and animal communities, including the invasion of exotic plants and predators (i.e. red-imported fire ants (RIFA), *Solenopsis invicta*), changes in competition for limited resources and resulting nutrient depletion, and the loss of native vegetative cover leading to changes in surface microclimates and erosion; 5) contamination of the habitat, including groundwater, from nearby agricultural disturbance, pesticides, and fertilizers; 6) leakages and spills of hazardous materials from vehicles, tanks, pipelines, and other urban or industrial runoff; and 7) human visitation, vandalism, and dumping; mining, quarrying (limestone), or blasting above or in caves. Currently, *B. texanus* faces the same threats that it did at the time it was listed.

Range-wide Survival and Recovery Needs

According to recovery criterion 1 in the Service's 1994 Recovery Plan for Endangered Karst Invertebrates in Travis and Williamson Counties, Texas, three KFAs within each KFR should be protected for downlisting. Protection (or protected) is defined as sufficiently large to maintain the integrity of the karst ecosystem on which the species depends. These areas must also provide protection from threats such as RIFA, habitat destruction, and contaminants. Recovery criterion 2 requires at least five consecutive years of criterion 1 being met and that perpetual protection of these areas be in place.

In the Georgetown KFR, there are currently no known caves or cave clusters that have potential for meeting the definition of a protected KFA. In the North Williamson KFR there are three KFAs, Priscilla's Well, Karankawa, and Cobbs Cavern. Both Priscilla's Well and Karankawa contain *B. cryptotexanus* while Cobbs Cavern contains *B. texanus* (Chandler and Reddell 2001,

Chandler *et al.* 2009). A fourth site, Shaman Karst Preserve, is proposed for designation as a KFA in that same region. It contains *B. cryptotexanus* and is pending final recognition. The 2018 five year review erroneously lists Twin Springs as a KFA for this species. Although Twin Springs has been recognized as a KFA for *T. reyesi* the only cave currently known to contain *B. texanus* is too close to an edge for this area to function as a KFA for this species.

Jollyville Plateau and Georgetown salamander

Species Description and Life History

The Jollyville Plateau salamander (*E. tonkawae*) was placed on the Federal Endangered Species list as threatened on August 20, 2013, (78 FR 51277) and the Georgetown salamander (*E. naufragia*) was listed as threatened on February 24, 2014, (79 FR 10236). Both species were listed due to increased urban development and associated impervious cover, contaminants, water quantity and quality degradation, quarrying, and destruction of habitat.

Both *E. tonkawae* and *E. naufragia* are endemic to central Texas, are neotenic (retaining juvenile characteristics at maturity), and rely on the Northern Segment of the Edwards Aquifer as the primary supply of water for their habitat (Cole 1995). Surface water infiltrates through the soil and stream beds into the aquifer, which discharges from springs as groundwater (Schram 1995). These salamanders can occur where water emerges from the ground as a spring-fed stream; however, some occur in caves with no immediate spring outlets. All of the salamanders depend on sufficient quantities and particular qualities of water to meet their life requirements for survival, growth, and reproduction. Within the spring ecosystem, proximity to the springhead is important because of the stable water chemistry and temperature, substrate, and flow regime. Scientists believe that these species use the underground aquifer for habitat (TPWD 2011, Bendik 2011). *Eurycea* salamanders move an unknown maximum depth into the interstitial spaces (empty voids between rocks) within the substrate, using these spaces for foraging habitat and cover from predators (Cole 1995, Pierce and Wall 2011). These spaces should have minimal sediment, as sediment fills interstitial spaces, eliminating resting places and also reducing habitat of the prey base (small aquatic invertebrates) (O'Donnell *et al.* 2006). A study using mark-recapture methods found marked individuals moved up to 262 feet both upstream and downstream from a spring opening, demonstrating that *Eurycea* salamanders in central Texas can travel greater distances from a discrete spring opening than previously thought, including upstream areas, if suitable habitat is present (N. Bendik, COA, pers. comm., 2011).

Historic and Current Distribution

The distribution of these salamanders is being studied and continues to evolve. Recently Devitt *et al.* (2019), using phylogenetic and population genetic analysis of genome-wide DNA sequence data, assigned some known spring sites to different species. Salamanders from the Berry Creek watershed, formerly considered as the Georgetown salamander, were more genetically similar to the Salado salamander (*E. chisholmensis*) and assigned to that species. This reassignment of populations expands the range of the Salado salamander and reduces the range of the Georgetown salamander to those spring sites south and east of Lake Georgetown in the North and Middle Forks of the San Gabriel River watershed. A single salamander collected from Georgetown Springs (San Gabriel Springs, previously proposed CHU 14), long considered as the

Georgetown salamander, was more genetically similar to the Jollyville Plateau salamander and assigned to that species. The Service has proposed to remove CHU 14 from critical habitat designation for the Georgetown salamander (85 FR 57578). The Jollyville Plateau salamander population at Georgetown Springs may no longer be extant, as salamanders have not been observed at Georgetown Springs since 1991. Based on the published genetic analyses the current range of the Georgetown salamander is considered as the south and east of Lake Georgetown in the North and Middle Forks of the San Gabriel River watershed, and the Salado salamander occurs north of Lake Georgetown to the Salado Creek Watershed. Jollyville Plateau salamanders occur in approximately 130 springs and caves in Travis and Williamson counties and Georgetown salamanders occur in approximately 11 springs in Williamson County.

Reasons for Decline and Threats to Survival

Threats to the habitat of the Jollyville Plateau and Georgetown salamanders include stressors that affect water quality, water quantity, or the physical habitat and may affect only the surface habitat, only the subsurface habitat, or both habitat types. This includes water quality degradation through urbanization with corresponding increases in impervious cover, increase in contaminants from multiple sources, habitat destruction, and increasing streamflow flashiness. Urbanization is also linked to water quantity stressors including increased groundwater pumping and altering the natural flow regime of streams. Increases in impervious cover reduce the ability of a watershed to allow slow filtration of water through soils following rain events. Instead rainfall runs off impervious surfaces and into stream channels at higher rates, increasing downstream flash flows and decreasing groundwater recharge. Climatic conditions also effect these species including drought. Drought conditions cause lowered groundwater tables and reduced spring flows. The Northern Segment of the Edwards Aquifer, which supplies water to the Jollyville Plateau salamander's habitat, is vulnerable to drought (Chippindale et al. 2000). In particular, the portion of the Edwards Aquifer underlying the Jollyville Plateau is relatively shallow with a high elevation, thus being unlikely to sustain spring flows during periods of drought (Cole 1995). Salamanders are sensitive to direct physical modification of both surface and subsurface habitat. Surface habitat may be altered by sedimentation, impoundments, flooding, feral hogs, livestock, and human activities. Subsurface habitat may be altered by construction of pipelines, shafts, and wells. Tunneling for underground pipelines can destroy potential habitat by removing subsurface material, thereby destroying subsurface spaces/ conduits in which salamanders can live, grow, forage, and reproduce. Additional material can become dislodged and result in increased sediment loading into the aquifer and associated spring systems. In addition, disruption of water flow to springs inhabited by salamanders can occur through the construction of tunnels and vertical shafts to access them.

Range-wide Survival and Recovery Needs

There is currently no recovery plan for these species. The Service reviewed and analyzed the published effects of impervious cover on these salamanders in the final listings (78 FR 51277 and 79 FR 10236). While the effects of an increase in impervious cover for a given site depend on local conditions, the observed trend is a degradation of aquatic habitats that increases with greater levels of impervious cover within the watershed. In the final listing rule the Service also described the contaminants expected in urban runoff as a result of land applications of pesticides, fertilizers, and other chemicals. Adequate springflows and groundwater levels are essential to

maintaining the known populations of salamanders, since the reduction or cessation of springflow at springs supporting salamanders may result in extirpation of that population. Boghici (2011) noted that the northern section of the Edwards Aquifer lacks a contributing zone and recharge is mostly from diffuse infiltration of rainfall on the Edwards Limestone outcrop. The Service expects that recovery will require, at a minimum, a geographically distributed set of preserved springs with low impervious cover and sufficient buffers to protect against water quality degradation and to maintain water quantity.

Status of Critical Habitat

Critical habitat was designated for *E. tonkawae* on August 20, 2013, (78 FR 51327) and a revised critical habitat area was proposed for *E. naufragia* on September 15, 2020, (85 FR 57578), however none occurs within the action area. The Service designated a total of 4,331 acres of critical habitat for *E. tonkawae* within 32 units in Travis and Williamson Counties. The Service revised the proposed critical habitat for *E. naufragia* and Salado salamander (*E. chisholmensis*) based on public genetic analyses. The Service proposed a total of approximately 1,519 acres of critical habitat for both species in Bell and Williamson Counties, Texas. The total amount of critical habitat in the revised proposal increased by approximately 116 acres from the previous proposal.

Designated critical habitat for the Jollyville Plateau salamander (78 FR 51327) defines the surface physical and biological features (PBFs) as 1) water from the Trinity Aquifer, Northern Segment of the Edwards Aquifer, and local alluvial aquifers, 2) rocky substrate with interstitial spaces, 3) aquatic invertebrates for food; and, 4) subterranean aquifer. The subsurface PBFs are defined as 1) water from the Trinity Aquifer, Northern Segment of the Edwards Aquifer, and local alluvial aquifers, 2) subsurface spaces; and, 3) aquatic invertebrates for food.

Previous Related Consultations

Five previous consultations have been completed within Williamson County with the loss of 75.91 acres of karst zones 1-3 mitigated by the Williamson County Habitat Conservation Plan (WCHCP) within four consultations (2019-F-0036, 2018-F-1483, 2018-F-406, 2013-F-0028) and the loss of an unknown number of caves within the fourth consultation (2002-F-0453). One habitat conservation plan (HCP) has resulted in the following amount of take and preserve establishment for Bone Cave harvestman and Coffin Cave mold beetle:

1. Williamson County HCP (Service Permit TE-181840) permitted the loss of 210 occupied caves for Bone Cave harvestman or Coffin Cave mold beetle and committed to meet the preservation goals of the downlisting recovery criteria for the two species by acquiring and managing 9 to 15 KFAs totaling approximately 700 acres, a minimum of three KFAs in each of the KFRs occupied by the covered karst species.

Two consultations have been completed for the Georgetown salamander. One on issuance of the 4(d) rule covering the Georgetown salamander within the City of Georgetown, which addresses a voluntary process for minimizing water quality impacts due to development within city limits. The other consultation was with the U.S. Army Corps of Engineers for the issuance of a Clean Water Act section 404 permit for the placement of fill into jurisdictional waters during the

construction of a residential housing development known as Shadow Canyon. The Service determined that the development of this tract could cause harm or death of up to 50 percent of the Georgetown salamanders inhabiting springs on the tract through the reduction of water quality associated with polluted run-off and potential hydrological changes. One consultation (2020-F-1642) has been completed for the Jollyville Plateau salamander resulting in harm or death of 14-69 individuals. There have been four HCPs covering Jollyville Plateau salamanders. Three were for residential subdivisions covering over 1,100 acres, which was the permit area, not the area disturbed. Impacts were due to potential water quality degradation, but all permittees agreed to minimization measures to reduce the potential for degradation. Additionally, lands were set-aside up stream of springs or placed in permanent preserves. The fourth HCP was issued to the Lower Colorado River Authority's Transmission Services Corporation (Service Permit TE-42299D) and permitted the incidental take of 16 acres of JPS habitat.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

Status of the Species and Critical Habitat within the Action Area

T. reyesi and *B. texanus*

The proposed action crosses the Georgetown and North Williamson KFRs and Karst Zones 1 and 3 with the action area extending to include Karst Zone 4 (please see Figure 8 in the BA). Karst Zone 1 is defined as areas known to contain endangered cave species and Karst Zone 3 is defined as areas that probably do not contain endangered cave species. Karst Zone 4 is defined as areas that do not contain endangered cave species. Approximately 207.7 acres of the project area occurs within Karst Zone 1 with the remainder of the project area occurring within Karst Zone 3 (185.3 acres). There is no Karst Zone 2 mapped within the project area. Critical habitat has not been designated for either species.

The proposed action is located mainly within the KFR with the northern end of the proposed action occurring within the North Williamson KFRs. Bone Cave harvestman and Coffin Cave mold beetle are known from a number of caves within the Georgetown and North Williamson KFRs, and one cave occupied by both species, Inner Space Cavern, is within the action area. A second occupied cave has recently been found immediately adjacent to the northern end of the project area and both listed karst invertebrate species are believed to occur in this cave. For the purposes of this consultation this newly discovered location (east of I-35) has been treated as

occupied by both listed karst invertebrate species and TxDOT has extended the action area and their avoidance and minimization measures to include this location. TxDOT completed geologic assessments (GAs) within the project area in 2019 (please see Appendix C to the BA). Other than the known cave locations above, no additional karst features with potential for subsurface development were identified within or adjacent to the project area. The GA for the portion of the project area north of RM 2243 where additional high mast lighting is proposed identified two geologic features within the current project area: F-8 (Boy Scout Cave) and F-16 (listed as a spring). F-16 corresponds to the three springs on the south bank of the South Fork San Gabriel River (please see Table 6 in the BA). Boy Scout Cave is located on a steep slope adjacent to the NB I-35 feeder land bridge on the south side of the South Fork San Gabriel River. A karst habitat survey was conducted by TxDOT in 2019 and it was determined that Boy Scout Cave (F-8) does not contain potential karst invertebrate habitat (please see Table 6 in the BA).

In order to assess the potential for additional near surface karst features to occur within the project area, TxDOT conducted geophysical surveys in 2019 (please see Appendix D in the BA). The geophysical surveys focused on the portion of the project area where the Edwards Limestone outcrops, located roughly along I-35 from RM 2243 to SE Inner Loop. The electrical resistivity imaging (ERI) data indicate that the thickness of overburden (i.e., depth to bedrock) in this area ranges from less than 1 meter (about 3.3 feet) to 2+ meters (about 6.6 feet). The ERI line, located directly above the footprint of Inner Space Cavern, revealed an anomaly that correlates with a mapped room in the cave and is approximately 20 to 25 meters (approximately 65 to 82 feet) deep, as well as several smaller but shallower anomalies that may be karst voids (shallower cave passage), but may also represent solid bedrock. Additional anomalies were observed along several other ERI lines and may represent karst voids located below the project area. TxDOT has also noted a large anomaly located between the I-35 SB frontage road and mainlanes and near Rockmoor Drive. This anomaly was found to have a high probability of being a significant cave passage or room; the estimated dimensions of this passage/room are at least 15 meters by 20 meters (about 50 feet by 66 feet), with a depth to ceiling of approximately 3 meters (about 10 feet).

Within Williamson County there are two preserves (Millennium Park preserve and the WilCo Preserve) that were established with funding from the Williamson County Conservation Foundation, and the Act's Section 6 program, to offset impacts to Bone Cave harvestman from development and to provide recreational opportunities for the citizens of Williamson County. These preserves are managed for the benefit of karst species including the Bone Cave harvestman.

E. tonkawae and E. naufragia

Potential habitat for listed salamanders was identified in the action area at three springs located on the south bank of the South Fork San Gabriel River (please see Figure 2 in the BA). Presence/absence surveys for *Eurycea* salamanders at the springs were conducted in July and August 2019 following the USFWS survey protocol and no *Eurycea* salamanders were observed during the surveys (please see Appendix F to the BA).

One additional discharge feature is located in the project area between the I-35 mainlanes and NB frontage road at Westinghouse Road (please see Figure 2 in the BA). This seep-spring feature is located at the bottom of a concrete-lined channel where groundwater emerges. The feature is discussed as feature NF-2 in the GA in Appendix C to the BA. Discharge from the seep-spring occurs entirely within concrete-lined channels or culverts in the project area. Scattered vegetation occurs in these concrete-lined channels, but not at a sufficient density to provide leaf litter refugia for salamanders and no large rocks or cobbles were observed by TxDOT in the channels. The concrete-lined channel and concrete box culverts where the seep-spring discharges are not considered potential *Eurycea* salamander habitat, however excavation in these areas as part of the proposed action may reveal groundwater conduits that may be suitable salamander habitat. TxDOT has proposed to trap for *Eurycea* salamanders in areas discharging groundwater at the I-35 and Westinghouse Road intersection for the duration of construction.

EFFECTS OF THE ACTION

In accordance with 50 CFR 402.02, effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of all other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see §402.17).

T. reyesi and *B. texanus*

The proposed project may result in direct impacts to karst invertebrate species due to the disturbance and removal of subsurface habitat during geotechnical borehole drilling, bridge foundation drilled shafts, roadway excavation, retaining wall foundations, high mast lighting, bridge sign drilled shafts, areas needed for traffic management operations, and utility trenches. Any of these activities may entirely or partially remove a subsurface void in bedrock that contains habitat for karst invertebrate species and individual karst invertebrates may be harmed or killed due to these activities. One known occupied karst feature, Inner Space Cavern, occurs within the previously disturbed I-35 ROW for the proposed action and a second known occupied feature is within the action area. Both Bone Cave harvestman and Coffin Cave mold beetle are known from Inner Space Cavern and presumed to occur in the second feature. The second feature is not within the project area and TxDOT has expanded the action area and PSL restriction area to include this feature. Impacts to the newly discovered feature are not anticipated, although subsurface connections that extend into the project area cannot be completely discounted.

As the footprint of Inner Space Cavern extends below the existing northbound and southbound lanes of I-35 it is not possible to avoid work in this area. TxDOT has minimized disturbance to bedrock and the depth of excavation over the known footprint of Inner Space Cavern wherever possible to minimize the removal of subsurface limestone. Construction activities would result in an estimated total of approximately 9,141 cubic yards (CY) of excavation over the known

footprint of Inner Space Cavern, including 693 CY associated with the northern construction project and 8,448 CY associated with the southern construction project. This excavation is broken down by activity in Table 9 in the BA with the majority of excavation occurring during excavation for retaining wall foundation (690 CY) in the northern project area and roadway excavation (8,016 CY) in the southern project area. The deepest excavation in this area would occur for a proposed retaining wall and the maximum depth of excavation would be approximately 18.5 feet. A significant portion of the excavation over Inner Space Cavern is expected to occur within existing fill. The average depth of the Inner Space Cavern passage system is approximately 75 feet and the ceiling of Inner Space Cavern is estimated to be roughly 30 feet thick in most places (please see Appendix D in the BA); therefore, construction activities associated with the proposed action are not expected to penetrate into known passages of Inner Space Cavern. TxDOT will implement void discovery monitoring and reporting and any disturbance to Inner Space Cavern would be detected as part of this effort. Additionally, TxDOT will implement a PSL restriction area using a 345-foot buffer around the known footprint of Inner Space Cavern and any construction activity that could cause contamination (concrete washouts, refueling activities, erodible material, or chemical storage) would be prohibited.

A small amount of additional impervious cover would be placed over Inner Space Cavern as a consequence of the proposed action. The proposed action would add approximately 0.58 acre of impervious cover above the cave footprint, which would slow the rate and reduce the amount of recharge through fill material reaching the cave. However, nearly all of the 10.42-acre footprint of Inner Space Cavern is currently covered by impervious or poorly pervious cover due its location adjacent to and under I-35.

Listed karst invertebrates could also occur in currently unknown features that may be disturbed during operations that impact subsurface habitat. The destruction of minor void spaces in the project area during subsurface excavation or drilling activities could occur, possibly changing mesocavern connectivity of the caves. If a new occupied karst feature is discovered during excavation and cannot be avoided during construction, take could occur in the form of lethal or non-lethal harm. Direct effects to karst invertebrate habitat may also occur due to surface disturbances such as vegetation removal, which may result in fragmentation of troglodene (e.g. cave crickets) foraging areas, alterations in nutrient input and outflow, reduction in the carrying capacity of karst habitat, and the introduction of invasive species (e.g. red imported fire ant). Changes in surface and subsurface drainage patterns and changes to subsurface temperature and moisture regimes due to the placement of approximately 26.45 acres of additional impervious cover (bridge decks, roadway surfaces, etc.) may also result in direct effects to listed karst species. There is no precise mechanism available to calculate the area of surface and subsurface drainage basins of unknown voids that might be affected and therefore it is not possible to quantify the resulting amount or extent of take associated with the surface disturbance. However, surface vegetation and drainage areas have already been altered by the existing ROW, impervious surface for the IH 35 roadway, and the surrounding residential and commercial development.

It is anticipated that incidental take of Bone Cave harvestman and Coffin Cave mold beetle may occur as a result of the proposed project. Individuals of these species are difficult to detect unless observed undisturbed in their native environment and occupied karst features in this area are often undetectable until they are exposed by surface or bedrock disturbing activities. Direct

effects occurring from the proposed project would be related to removal of or impact to subsurface habitat associated with geotechnical borehole drilling, bridge foundation drilled shafts, roadway excavation, retaining wall foundations, high mast lighting, bridge sign drilled shafts, areas needed for traffic management operations, and utility trenches. Any activity that alters the soil surface and underlying karst geology could result in harm, via direct mortality or injury resulting from rockfall, collapse, vibration, or penetration of a cavern ceiling or wall, to individual Bone Cave harvestman and Coffin Cave mold beetles.

The total area of disturbance within the action area within Karst Zone 1 is approximately 113.4 acres and 145.6 acres in Karst Zone 3 for a total of approximately 259 acres (please see Table 7 in the BA). The proposed project could potentially result in damaging unknown subsurface karst environments due to subsurface drilling and excavation and alteration of surface vegetation and drainage patterns within this acreage.

An estimated total of approximately 209,395 CY of material in Karst Zones 1 and 3 will be directly impacted by roadway excavation, which includes excavation for the roadway pavement section, ditches, water quality ponds, and storm sewer (please see Table 8 in the BA). This includes 37,820 CY associated with the northern construction project, and 171,575 CY associated with the southern construction project. This activity may result in take of listed karst species in the form of harm or harassment via directly killing or injuring individual animals, habitat degradation from temporary exposure of occupied features to surface air (forcing individuals to find new shelter with stable humidity and temperatures), and habitat modification due to the disruption of mesocavernous connectivity (resulting in individuals being prevented from traveling from point to point for feeding, breeding or sheltering).

Drilling boreholes for geotechnical work and drilling shafts for bridge foundations, large sign structure and illumination, high mast illumination, and traffic signals may directly affect listed karst species by removing approximately 3,374 CY of material in Karst Zones 1 and 3 (please see Table 8 in the BA). This includes 1,363 CY associated with the northern construction project, and 2,011 CY associated with the southern construction project. This action may result in take of listed karst species in the form of harm or harassment via directly killing or injuring individual animals, habitat degradation from temporary exposure of occupied features to surface air, and habitat modification due to the disruption of mesocavernous connectivity.

The installation of retaining wall foundations and excavation for traffic management system components may directly affect listed karst species due to the removal of 28,603 CY of material in Karst Zones 1 and 3 (please see Table 8 in the BA). This includes 20,059 CY associated with the northern construction project, and 8,544 CY associated with the southern construction project. In addition, utility relocations may directly affect listed karst species by removing approximately 20,116 CY of material in Karst Zones 1 and 3. This includes 5,509 CY associated with the northern construction project, and 14,607 CY associated with the southern construction project. These actions may result in take of listed karst species in the form of harm or harassment via directly killing or injuring individual animals, habitat degradation from temporary exposure of occupied features to surface air, and habitat modification due to the disruption of mesocavernous connectivity.

The total anticipated volume of material removed as result of the proposed project is 261,488 CY in Karst Zones 1 and 3, of which approximately 38 percent (100,499 CY) will be removed from

Karst Zone 1 (please see Table 8 in the BA). The total anticipated volume of material includes 64,751 CY associated with the northern construction project (of which 100 percent will be removed from Karst Zone 1) and 196,737 CY associated with the southern construction project (of which 18 percent will be removed from Karst Zone 1). While it is not possible to estimate how much of the total excavation would be in previously undisturbed limestone, it is anticipated that much of this excavation reported would be in overlying material (e.g., soil, previously disturbed fill, alluvium) with limited impacts to subsurface limestone.

The degradation of groundwater quality due to increased sediments in runoff from the proposed action entering recharge features off site may cause indirect hydrological impacts and therefore have the potential to indirectly effect Bone Cave harvestman and Coffin Cave mold beetle. Indirect hydrological impacts could occur during the transportation improvements or due to accidental spills relating to the refueling of construction equipment. TxDOT has proposed several conservation measures to avoid and minimize potential effects to water quality. Specifically, the project is subject to TCEQ's Edwards Aquifer Rules and TPDES requirements for a construction general permit. In accordance with these rules and requirements, erosion controls and BMPs would be utilized to reduce sedimentation, erosion, and runoff. All increases in impervious cover would be treated to 80% removal efficiencies of TSS in accordance with TCEQ Edwards Aquifer Rules.

In addition changes in the natural environment beneath a newly constructed road create edge effects that extend beyond the construction timeframe, and therefore constitute indirect effects. One example of an edge effect is the reduction in water vapor transport into and out of the natural environment caused by the addition of the impervious surfaces of roadways. Natural surfaces, especially those with vegetation, use heat energy for evapotranspiration of water, effectively cooling themselves. Roadways store heat energy, maintaining the surface temperature of the roadway, and raising the temperature and lowering the humidity of the area immediately adjacent to the roadway (Barnes *et al.* 2012). Roadway materials, such as dark asphalt pavement, are thermally conductive, meaning they have the ability to absorb more heat and rapidly move it into the ground beneath the road surface. Heat stored by roadways is released at night, after the sun has gone down, creating a heat island when compared with surrounding soil or vegetation (Trombulak and Frissell 2000). Roadway heat islands exacerbate subsurface impacts to temperature and moisture by perpetuating drying conditions which may indirectly affect listed karst invertebrates through future drying of their habitat.

TxDOT has incorporated avoidance and minimization measures into the project description that ensure that direct effects through ground disturbance are minimized and that the project is monitored to detect unknown karst features. A qualified scientist holding an appropriate 10(a)(1)(A) permit will be on call during ground disturbing activities in bedrock to assess all karst features encountered for potential karst invertebrate habitat according to current USFWS protocols. If karst voids are encountered during construction, all work would stop within 50 feet of the void site and a 10(a)(1)(A) permitted scientist would determine if the void is potential karst invertebrate habitat.

E. tonkawae and E.naufragia

Listed salamander species are not known from either the project area or the action area. However, there is a possibility for listed salamanders to be directly harmed or killed through contact with construction equipment, or for salamander habitat to be modified through disruption of previously undiscovered subsurface voids with groundwater or subsurface groundwater conduits that could exist within the project area. The presence of three springs and one seep-spring within the project area indicates that groundwater occurs relatively close to the surface at the northern end of the project area and near the intersection of I-35 and Westinghouse Road. It is anticipated that the potential for encountering groundwater and listed salamander species during excavation activities would be higher at the northern end of the project area and near the intersection of I-35 and Westinghouse Road than in other portions of the project area, where groundwater occurs at lower depths based on the underlying geology.

Excavation activities that could harm listed salamanders would include general excavation for construction of roadway, ditches, water quality ponds, and storm sewer, geotechnical borings, drilled shafts for structure foundations and supports, and trenching for wiring and utilities. Deeper excavations, including geotechnical borings and drilled shafts, are more likely to encounter groundwater. If groundwater is encountered during construction activities TxDOT will implement the groundwater flow mitigation and protection measures described above to minimize the potential for direct impacts to salamanders. Standing, seeping, or flowing water encountered in an excavation would be evaluated and a site-specific mitigation plan would be implemented if it is determined that the water is connected to the Edwards Aquifer. Measures would be implemented to seal off the excavation from the groundwater feature and, if the excavation contains flowing water that could be a groundwater flow path for the Edwards Aquifer, the mitigation plan will also include measures designed to maintain hydrologic connectivity across, under, or around the excavation. These measures are intended to reduce the potential for direct harm to salamanders if groundwater is encountered during construction; these measures will also reduce the likelihood of consequences to salamanders and their habitat located downgradient of the project area.

Effects to Critical Habitat

No critical habitat is located within the action area and therefore none will be effected.

Beneficial effects

As part of the proposed action TxDOT has committed to fund additional surveys and specimen collection for both listed karst invertebrates and listed salamander species. Within San Gabriel Park TxDOT will fund quarterly surveys for three years to facilitate additional salamander collection from this location. The Service recently proposed to remove this area as a proposed CHU for Georgetown salamander as genetic analysis indicated that the salamander collected at this location was a Jollyville Plateau salamander. Additional surveys in this location are needed to determine whether this population remains extant.

Additionally, TxDOT has committed to fund new attempts to collect additional *Batrachoseps* specimens from Inner Space Cavern to add to a genetics study that may help resolve ongoing

issues with *Batrises texanus* and *B. cryptotexanus*. If right-of-entry to the Inner Space Cavern cannot be obtained, TxDOT would pursue collection of up to three new *Batrises* specimens in total from On Campus Cave and/or Off Campus Cave. In addition, this survey effort would involve collection of up to three new *Texella* specimens from On Campus Cave and/or Off Campus Cave to add to a genetic study that would resolve taxonomic issues in the *Texella* genus. A second collection effort will occur at Waterfall Canyon Cave. This will involve collection of up to three new *Batrises* specimens from Waterfall Canyon Cave. All specimens collected in these efforts will be submitted for genetic analyses as part of the ongoing USFWS *Batrises* study. The studies listed above will be initiated prior to the start of construction and the results of these studies will be reported to USFWS.

CUMULATIVE EFFECTS

Cumulative effects are those “effects of future State or private activities, not involving federal activities, that are reasonably certain to occur within the action area” considered in this Opinion (50 CFR 402.02). The Service is not aware of any future state, tribal, local, or private actions other than continued residential and commercial development that are reasonably certain to occur within the action area at this time. Effects to listed karst invertebrates and listed salamander species from residential and commercial development may result from removal of surface vegetation and excavation, additional impervious cover, and alterations to the surface and subsurface hydrological regimes.

TxDOT included a cumulative effects analysis (Please see Figures 10.1 and 10.2 in the BA) that predicted reasonably foreseeable future development along the project corridor by 2040. Within the action area, approximately 690 acres (72 percent of the action area) are currently developed for commercial, industrial, institutional, mining, mixed-use, residential, and transportation land uses. An additional approximately 252.3 acres (26 percent of the action area) is reasonably certain to be developed by 2040 with the majority of that development occurring through future commercial development (please see Table 10 in the BA). Areas mapped as Karst Zones 1 and 3 account for approximately 960.4 or 99 percent of the 965.1-acre action area. Of the 960.4 acres in Karst Zones 1 and 3 in the action area, 71.3 percent is developed and 26.3 percent is reasonably certain to develop in the future by 2040 (please see Table 11 in the BA).

CONCLUSION

After reviewing the current status of *T. reyesi*, *B. texanus*, *E. naufragia*, and *E. tonkawae*, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the *T. reyesi*, *B. texanus*, *E. naufragia*, and *E. tonkawae* or adversely modify critical habitat for the two salamander species.

T. reyesi and *B. texanus* are found in Inner Space Cavern within the action area and are presumed to occupy a newly discovered cave immediately adjacent to the action area. *E. naufragia*, and *E. tonkawae* are not known to occur within the action area and impacts to these species may not occur as a result of this project. However, the presence of groundwater discharge at three springs at the South Fork San Gabriel River and a seep-spring located at the intersection of I-35 and Westinghouse Road indicates that groundwater occurs relatively close to the surface in some

portions of the project area. If ground disturbing activities conducted as part of the proposed action were to encounter previously undiscovered subsurface voids with groundwater or subsurface groundwater conduits direct harm to salamanders or habitat modification could occur. The Service cannot discount the possibility of these species occurring within undiscovered subsurface voids with groundwater or subsurface groundwater conduits within the action area.

All existing known karst features and spring sites within the project area have been surveyed for the presence of listed karst invertebrates and listed salamanders. It is unknown if there are any additional karst features or groundwater conduits which have yet to be discovered within the action area beneath the existing soil surface, although the presence of additional karst features and groundwater conduits is likely. If either of these features are present, it is also unknown if they are occupied by listed species. Any impacts to previously unknown locations for these species and the roadway activities that would uncover new locations would make those locations unsuitable for KFA establishment for listed karst invertebrates. For listed salamander species, flow through any groundwater conduits intercepted by construction activities would be preserved following the groundwater flow mitigation and protection measures proposed by TxDOT. The proposed conservation measures and modifications of roadway construction will minimize possible impacts to both known and unknown locations for these species and will not appreciably reduce the likelihood for species survival and recovery.

We base this conclusion on the following:

1. Any karst features discovered during construction are currently unknown and are not part of the baseline populations of *T. reyesi* and *B. texanus*. Therefore, impacts to karst features within the action area that contain these species would not decrease the baseline of the populations or reduce the potential for species recovery.
2. The estimated amount of take is based on the amount of surface habitat in Karst Zones 1 and 3 to be directly impacted (259 acres), however, much of this area has been previously disturbed, and a 345 foot buffer area outside of the project area (960.42 acres), which could be indirectly affected. Incidental take of *T. reyesi* and *B. texanus* will occur as a result of construction activities including excavation, vegetation removal, and addition of impervious surface over Inner Space Cavern and potential impacts to unknown karst features within Karst Zones 1 and 3.
3. Previously unknown groundwater conduits containing *E. naufragia*, and *E. tonkawae* may be present beneath the action area and could be impacted by construction excavation activities. TxDOT has included groundwater flow mitigation and protection measures as part of the proposed action and will monitor construction activities for the presence of groundwater.
4. Water quality BMPs to be put into place before construction begins would help to treat existing roadway runoff which may contaminate the surface or subsurface drainage basins of karst features within the action area. These water quality BMPs would also reduce the likelihood of consequences to listed salamanders and their habitat located downgradient of the project area.
5. The maximum amount of surface habitat that would be altered for this project is approximately 259 acres (all Karst Zones), the majority of which occurs within the existing cleared ROW, including the existing paved main lanes and frontage roads. The

proposed action would add an additional 26.45 acres of impervious cover and disturb or remove approximately 261,488 cubic yards of material that may contain karst invertebrate habitat.

Destruction or adverse modification of designated critical habitat refers to the direct or indirect alteration of the physical or biological features of critical habitat that appreciably diminishes the value of critical habitat for the conservation of the listed species. The Service has determined that the project would not result in the destruction or adverse modification of designated or proposed CH for *E. tonkawae* and *E. naufragia*, respectively. No CHUs for either species are located within the action area.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any conservation measures that were incorporated into the project design.

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 as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. “Harm” is further defined (50 CFR § 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. “Harass” is defined (50 CFR § 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. “Incidental take” is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of 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 the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the TxDOT as appropriate, for the exemption in section 7(o)(2) to apply. The TxDOT has a continuing duty to regulate the activity covered by this incidental take statement. If the TxDOT (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the TxDOT must report the progress of the action and its impact on the species as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

The Service anticipates incidental take of *T. reyesi*, *B. texanus*, *E. naufragia*, and *E. tonkawae* will be difficult to detect for the following reasons: individuals of these species are small, are difficult to detect unless observed undisturbed in their environment, and occupied karst features

and groundwater conduits in this area are often undetectable until they are exposed by surface or bedrock disturbing activities. Therefore, a precise mechanism for predicting the number of individuals that may actually be harmed by the proposed project is not available. Available information that would inform the potential distribution of these species within the project area is acreage of occupied Karst Zones and surface and subsurface disturbance within these Karst Zones.

The extent of incidental take for *T. reyesi* and *B. texanus* is therefore equated to the approximately 960.42 acre portion of the action area that occurs within Karst Zones 1 and 3. This includes the approximately 207.7 acres of Karst Zone 1 and approximately 185.3 acres of Karst Zone 3 that occur within the project area. These areas include locations where known and unknown karst features containing karst invertebrates are expected to occur. For *E. naufragia* and *E. tonkawae* the extent of incidental take is limited to the project area acreage where subsurface disturbance could intercept an unknown groundwater conduit causing take of salamanders. The extent of incidental take for *E. naufragia* and *E. tonkawae* is therefore equated to the approximately 393 acre project area.

EFFECT OF THE TAKE

In the accompanying biological opinion, we have determined that the level of anticipated take is not likely to result in jeopardy to *T. reyesi*, *B. texanus*, *E. naufragia*, and *E. tonkawae*. Although we anticipate some incidental take to occur, the implementation of the conservation measures proposed should result in avoidance and minimization of adverse effects.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

All conservation measures including avoidance and minimization measures, surveys, biological and compliance monitoring, and reporting measures are incorporated herein by reference as reasonable and prudent measures and terms and conditions to address the incidental take of *T. reyesi*, *B. texanus*, *E. naufragia*, and *E. tonkawae*. No additional reasonable and prudent measures were identified during the I-35 from RM 2243 to RM 1431 roadway improvements consultation.

MONITORING AND REPORTING REQUIREMENTS

TxDOT must monitor and report to the Service the amount of incidental take that occurs in association with this project. This must be done through sufficient on-site inspections to determine if construction related impacts have or would occur outside of the action area, as described in this Opinion. The monitoring reports must include a summary of construction actions implemented during the previous six-month period, any unanticipated actions or delays in project completion, and any known incidental take that has occurred (disturbance to Inner Space Cavern, discovery of unknown, occupied karst voids, or discovery of occupied groundwater conduits within the project area) and the reasons for that take. Monitoring reports must be submitted in January and June of each year during construction, once at the completion of construction, and a final report one year after construction was completed.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species notification must be made to the Service's San Antonio Law Enforcement Office, 5563 De Zavala Rd #290-A, San Antonio, TX 78249, 210-681-8419, within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

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 and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Provide assistance to resolve uncertainty regarding the distribution of karst invertebrate and salamander species included in this consultation.

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.

REINITIATION NOTICE

This concludes formal consultation on the proposed I-35 from RM 2243 to RM 1431, Williamson County, Texas, roadway improvements project. As provided in 50 CFR §402.16, reinitiation of consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this biological opinion or written concurrence; 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.

Please refer to consultation number, 2021-F-0543 in future correspondence concerning this project. Should you require further assistance or if you have any questions please contact Charlotte Kucera at 512-490-0057, ext. 224.

Sincerely,
ADAM ZERRENNER
Digitally signed by ADAM
ZERRENNER
Date: 2021.03.11 08:11:49 -06'00'
Adam Zerrenner
Field Supervisor

cc: Dennis Palafox, TxDOT ENV, Austin, Texas (electronic)
Andy Blair, TxDOT Austin District, Austin, Texas (electronic)

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