

# HAYS COUNTY HABITAT CONSERVATION PLAN

## BIOLOGICAL ADVISORY TEAM

### RECOMMENDATIONS FOR SPECIES INCLUSION IN THE HAYS COUNTY HABITAT CONSERVATION PLAN

**DRAFT JANUARY 4, 2008**

The Biological Advisory Team (BAT) of the Hays County Habitat Conservation Plan (Hays County HCP) was asked to propose a list of species to include in the plan and provide recommendations for the most appropriate type of coverage for included species. This proposal is the BAT's consensus recommendation for consideration by the Citizens Advisory Committee and the Hays County Commissioners Court.

With the assistance of the consultant team, the BAT assembled a comprehensive list of rare or sensitive species known to occur in Hays County based on the following sources:

1. All federal and state listed threatened or endangered species, or designated candidates for such listing;
2. All species tracked by the Texas Parks and Wildlife Department on the Annotated County List of Rare Species for Hays County (as of August 8, 2007) or the Texas Natural Diversity Database (as of October 2, 2006);
3. All species known to occur in Hays County that were included on recent federal listing petitions filed by the Forest Guardians or Karst Waters Institute; and
4. Other species identified by BAT members as rare or sensitive.

This initial comprehensive list of species of concern in Hays County included 112 species, including a number of plants, invertebrates, fish, amphibians, reptiles, and mammals. The BAT refined this comprehensive list of species of concern by selecting species that met the following preliminary criteria:

1. All federally listed species;
2. All state-listed amphibians and reptiles;
3. All species with a NatureServe<sup>1</sup> global rank of G1 through G2G3;
4. All species with a NatureServe subnational rank of S1 or S2; and

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<sup>1</sup> NatureServe is a non-profit conservation organization whose stated mission is to provide the scientific basis for effective conservation action. NatureServe and its network of natural heritage programs are a leading source for information about rare and endangered species and threatened ecosystems. The NatureServe conservation status of a species or community is designated by a number from 1 to 5, preceded by a letter reflecting the appropriate geographic scale of the assessment (G = Global, N = National, and S = Subnational). The numbers have the following meaning: 1 = critically imperiled; 2 = imperiled; 3 = vulnerable to extirpation or extinction; 4 = apparently secure; 5 = demonstrably widespread, abundant, and secure.

5. All species endemic to Hays County.

The BAT further reviewed the comprehensive and filtered lists of species of concern to arrive at the recommended list of species of concern to address in the Hays County HCP. This recommended list of species of concern for the Hays County HCP includes 60 species, shown in Table 1.

The BAT identified three levels of coverage for recommended species of concern to be addressed in the Hays County HCP:

1. Covered Species – Hays County should seek incidental take authorization for species in this category. The HCP must adequately describe the expected amount of take and impacts to the species and demonstrate that the benefits provided by mitigation measures in the conservation program satisfy the issuance criteria for an incidental take permit. This option may be appropriate for federally listed species that would experience take by activities covered by the HCP or species that may become listed in the foreseeable future and would likely experience take by covered activities;
2. Additional Species of Concern – Hays County should not seek incidental take authorization for species in this category because the species is not currently listed as threatened or endangered, the species is not likely to experience take from covered activities, or insufficient information is available to adequately evaluate take and mitigation. However, recognizing the rarity or sensitivity of these species, the HCP should include conservation measures to benefit additional species of concern, where practicable;
3. Evaluation Species of Concern – Incidental take authorization for species of concern in this category may become necessary over the term of the Hays County HCP incidental take permit; however, including these species as “covered” is not justified at this time. Evaluation species of concern may be currently unlisted, but could become listed in the foreseeable future (many have already been petitioned for listing). Sufficient information on these species may also be lacking to support the level of analysis required to meet the issuance criteria for incidental take authorization. Hays County should include conservation measures to benefit evaluation species of concern, where practicable, and support research to help fill existing data gaps on the biology, habitat, distribution, or management of these species. The research supported by the HCP may help preclude the need to list these species, or help facilitate obtaining incidental take coverage if these species become listed in the future.

The BAT assigned each of the species of concern recommended for inclusion in the Hays County HCP to one of the three coverage categories. The BAT recommends that the current body of knowledge and expected regulatory needs justify including the golden-cheeked

warbler and black-capped vireo as covered species under the plan. The County should seek incidental take coverage for these two species.

The BAT assigned the remaining 58 species of concern to a coverage category considering the likelihood of future listing, the current body of knowledge on the species, and potential overlaps with expected conservation measures for covered species.

The BAT recommends that unlisted karst species (both terrestrial and aquatic) be considered as a group as “evaluation species of concern.” The specific list of karst species included in the plan under this category is less important if the plan focuses on the karst environment itself. Little is known about karst habitats in Hays County in general, but the possibility for future listing of one or more of these species is high. Supporting research on karst habitats and the distribution of rare karst species across the County would provide valuable information that would support conservation and planning efforts in the county. The BAT also recommends that the Cagle’s map turtle be included as an evaluation species of concern, since it has been petitioned for listing in the past. Needed research could include additional surveys to define its distribution in Hays County and the effectiveness of conservation/management practices. The proposed list of evaluation species of concern includes 40 species (39 terrestrial or aquatic karst species and the Cagle’s map turtle).

The BAT recommends that the species not classified as “covered” or “evaluation species of concern” be included in the Hays County HCP as “additional species of concern.” These species include several of the currently listed aquatic species, as well as unlisted plants and surface aquatic species. Conservation measures likely to be included in the plan, such as habitat protection for the golden-cheeked warbler and black-capped vireo, could provide secondary conservation benefits for these additional species by protecting similar habitats. The proposed list of additional species of concern includes 18 species (six listed aquatic species, three unlisted plants, and nine unlisted surface aquatic species).

The complete list of recommended species of concern to include in the Hays County HCP and the recommended type of coverage for these species is shown in the attached table.

**Table 1. Recommended Species of Concern for the Hays County Habitat Conservation Plan and Recommended Coverage Categories.**

Common Name	Scientific Name	Taxa	Habitat
<b>COVERED SPECIES OF CONCERN</b>			
Golden-cheeked warbler**	<i>Dendroica chrysoparia</i>	Birds	Juniper-Oak Woodland
Black-capped vireo**	<i>Vireo atricapilla</i>	Birds	Deciduous Shrubland
<b>EVALUATION SPECIES OF CONCERN</b>			
Aquifer flatworm	<i>Sphalloplana mobri</i>	Turbellarians	Aquatic / Karst
a cave-obligate spider	<i>Cicurina ezelli</i>	Arachnids	Karst
a cave-obligate spider	<i>Cicurina russelli</i>	Arachnids	Karst

Common Name	Scientific Name	Taxa	Habitat
a cave-obligate spider	<i>Cicurina ubicki</i>	Arachnids	Karst
undescribed cave-obligate spider	<i>Eidmannella n. sp.</i>	Arachnids	Karst
undescribed cave-obligate spider	<i>Neoleptoneta n. sp. 1</i>	Arachnids	Karst
undescribed cave-obligate spider	<i>Neoleptoneta n. sp. 2</i>	Arachnids	Karst
undescribed cave-obligate spider	<i>Neoleptoneta n. sp. eyeless</i>	Arachnids	Karst
a pseudoscorpion	<i>Tartarocreagrís grubbsi</i>	Arachnids	Karst
a cave-obligate harvestman	<i>Texella diplospina</i>	Arachnids	Karst
a cave-obligate harvestman	<i>Texella grubbsi</i>	Arachnids	Karst
a cave-obligate harvestman	<i>Texella mulaiki</i>	Arachnids	Karst
a cave-obligate harvestman	<i>Texella renkesae</i>	Arachnids	Karst
a cave-obligate amphipod	<i>Allotexiweckelia hirsuta</i>	Crustaceans	Aquatic/Karst
a cave-obligate amphipod	<i>Artesia subterranea</i>	Crustaceans	Aquatic/Karst
a cave-obligate amphipod	<i>Holsingerius samacos</i>	Crustaceans	Aquatic/Karst
Texas troglobitic water slater	<i>Lirceolus smithii</i>	Crustaceans	Aquatic/Karst
a cave-obligate crustacean	<i>Tethysbaena texana</i>	Crustaceans	Aquatic/Karst
Balcones cave shrimp	<i>Palaemonetes antrorum</i>	Crustaceans	Aquatic/Karst
a cave-obligate decapod	<i>Calatbaemon bolthuisi</i>	Crustaceans	Aquatic/Karst
a cave-obligate amphipod	<i>Seborgia relicta</i>	Crustaceans	Aquatic/Karst
Balcones cave amphipod	<i>Stygobromus balconis</i>	Crustaceans	Aquatic/Karst
Ezell's cave amphipod	<i>Stygobromus flagellatus</i>	Crustaceans	Aquatic/Karst
a cave-obligate amphipod	<i>Texiweckelia texensis</i>	Crustaceans	Aquatic/Karst
a cave-obligate amphipod	<i>Texiweckelia insolita</i>	Crustaceans	Aquatic/Karst
a cave-obligate springtail	<i>Arrhopalites texensis</i>	Hexapods	Karst
an ant-like litter beetle	<i>Batrisodes grubbsi</i>	Insects	Karst
Comal Springs diving beetle	<i>Comaldessus stygius</i>	Insects	Aquatic/Karst
Edwards Aquifer diving beetle	<i>Haideoporus texanus</i>	Insects	Aquatic/Karst
a cave-obligate beetle	<i>Rhadine austinica</i>	Insects	Karst
a cave-obligate beetle	<i>Rhadine insolita</i>	Insects	Karst
undescribed beetle	<i>Rhadine n. sp. 2 (subterranea group)</i>	Insects	Karst
undescribed beetle	<i>Rhadine n. sp. (subterranea group Boyett's)</i>	Insects	Karst
Flattened cavenail	<i>Phreatodrobia micra</i>	Mollusks	Aquatic/Karst
Disc cavenail	<i>Phreatodrobia plana</i>	Mollusks	Aquatic/Karst
High-hat cavenail	<i>Phreatodrobia punctata</i>	Mollusks	Aquatic/Karst
Beaked cavenail	<i>Phreatodrobia rotunda</i>	Mollusks	Aquatic/Karst
Blanco River springs salamander	<i>Eurycea pterophila</i>	Amphibians	Aquatic/Karst
Blanco blind salamander	<i>Eurycea robusta</i>	Amphibians	Aquatic/Karst
Cagle's map turtle	<i>Graptemys caglei</i>	Reptiles	Aquatic

#### ADDITIONAL SPECIES OF CONCERN

Hill Country wild-mercury	<i>Argythamnia aphoroides</i>	Plants	Terrestrial
Warnock's coral-root	<i>Hexaletris warnockii</i>	Plants	Terrestrial
Canyon mock-orange	<i>Philadelphus ernestii</i>	Plants	Terrestrial
Texas wild-rice**	<i>Zizania texana</i>	Plants	Aquatic
Texas austrotinodes caddisfly	<i>Austrotinodes texensis</i>	Insects	Aquatic
Comal Springs riffle beetle**	<i>Heterelmis comalensis</i>	Insects	Aquatic
a mayfly	<i>Procloeon distinctum</i>	Insects	Aquatic

Common Name	Scientific Name	Taxa	Habitat
San Marcos saddle-case caddisfly	<i>Protoptila arva</i>	Insects	Aquatic
Comal Springs dryopid beetle**	<i>Stygoparnus comalensis</i>	Insects	Aquatic
Texas fatmucket	<i>Lampsilis bracteata</i>	Mollusks	Aquatic
Golden orb	<i>Quadrula aurea</i>	Mollusks	Aquatic
Texas pimpleback	<i>Quadrula petrina</i>	Mollusks	Aquatic
Creeper (squawfoot)	<i>Strophitus undulatus</i>	Mollusks	Aquatic
Pistolgrip	<i>Tritogonia verrucosa</i>	Mollusks	Aquatic
Fountain darter**	<i>Etheostoma fonticola</i>	Fishes	Aquatic
Guadalupe darter	<i>Percina sciera apristis</i>	Fishes	Aquatic
San Marcos salamander*	<i>Eurycea nana</i>	Amphibians	Aquatic/Karst
Texas blind salamander**	<i>Eurycea ratbbuni</i>	Amphibians	Aquatic/Karst

\* Federally threatened species

\*\* Federally endangered species

# Decision Points in the Development of a Regional Habitat Conservation Plan

## What is the Basic Scope of the HCP?

### Species Footprint

- Which species does the plan cover for incidental take?
- Where do these species occur?
- How do populations or habitats change over time?

### Impact Footprint

- Which activities does the plan cover?
- Where are these activities expected to occur?
- How do impacts change over time?

### Goals & Objectives

- What are the biological goals of the plan?
- What are the specific objectives proposed for meeting the biological goals?
- What are the community or programmatic goals of the plan?
- How will these programmatic goals be met?

### Plan Area & Permit Duration

- What area will the plan cover?
- How long will the incidental take permit be valid?

## How Much Take Will the HCP Request?

### Impact Assessment

- What is the impact of the covered activities on the covered species within the plan area over the duration of the permit?

### Participation Assessment

- How much take authorization does the permittee seek for its own activities?
- What is the expected rate of participation in the plan by others?
- How much take authorization does the permittee seek for activities undertaken by others?

## Does the HCP Meet the Issuance Criteria for a Permit and Comply with State Law?

- All taking of federally listed and candidate species will be incidental to otherwise lawful activities.
- Impacts from authorized take are minimized and mitigated to the maximum extent practicable.
- The proposed take will not jeopardize the survival and recovery of the species in the wild.
- Adequate funding to implement the plan has been assured.
- The plan complies with all provisions of Texas State Law relating to Regional Habitat Conservation Plans.

## Does the Conservation Program Balance the Impacts from the Requested Take?

### Conservation Measures

- How can impacts from covered activities be avoided or minimized?
- What kind of mitigation measures would help conserve the covered species?
- How do you measure the conservation value of mitigation measures?
- How much mitigation is needed to balance the impacts from the requested take?

### Preserve Design

- What criteria should be used to identify potential preserve land?
- How is the conservation value of potential preserve land assessed?
- What factors influence the conservation value of preserve land?

### Preserve Acquisition Strategy

- What mechanisms will be used to protect preserve land?
- What are the legal implications of various preserve acquisition strategies?
- What are the biological implications of various preserve acquisition strategies?

### Management Program

- What types of monitoring is needed to evaluate the effectiveness of the preserves?
- How will the conservation value of preserve land be maintained over time?
- What types of secondary uses are compatible with the conservation goals of the preserve system?

## How Will the HCP be Implemented?

### Permitting Strategy

- How will mitigation needs be determined for individual projects?
- What steps will participants need to take to enroll in the plan?
- Will additional terms and conditions be necessary for participation in the plan?
- What types of mitigation will be accepted from individual participants?
- How will the balance of take and mitigation be monitored and maintained?

### Funding Plan

- How much money will be needed to implement the conservation program?
- What are the costs associated with administration of other aspects of the plan?
- What types of funding are available to implement the conservation program and administer the HCP?
- How will funding for the plan be assured over time?
- How will ongoing management of preserves be funded?

### Implementing Partnerships

- Do other municipalities, agencies, or organizations have an interest in becoming a partner in the plan?
- How might implementing partners share the benefits and responsibilities created by the plan?
- What role does each partner have in the implementation and administration of the plan?

Hays County RHCP  
 Comparison of Primary Alternative Structures  
 November 2007

Structure	Costs/Financing	Schedule	Conservation Benefits	Potential Drawbacks	Opportunities for Creative Transactions
<p><b>1. Rolling Conservation Bank: A series of preservation transactions (fee title or easement) as funding is available.</b></p>	<p>This approach generally allows costs to be scaled to demand for credits. No up front commitment to financing beyond a given transaction. State law provides that offers to purchase individual tracts for preserve must be made four years after the tract is identified as habitat preserve.</p>	<p>Schedule of bank transactions can be very flexible and matched with expected demands. Tract must be acquired for preserve within five years after the tract is identified for preservation.</p>	<p>Allows more flexibility to adjust preserve design in future based on new data over time.</p>	<p>Higher likelihood that important parcels will become unavailable prior to preservation.</p>	<p>This approach maximizes opportunities for creative, cost-effective transactions, because efforts will be directed towards those habitat owners most eager to work with the County.</p>
<p><b>2. Predesignated Preserve System: Commitment to acquire (fee title or easement) a large-scale, predetermined preserve system.</b></p>	<p>State law requires that offers be made for acquisition of preserve system within four years after the federal permit is issued or six years after initial application for the permit, whichever is later. Therefore, this approach can represent a very large, early financial commitment. Bonding or other similar mechanisms likely necessary.</p>	<p>If identified up front in the RHCP, preserve system must be acquired within six years after the permit is issued.</p>	<p>Adequacy of ultimate preserve design better assured and, subject to funding, likelihood of getting key parcels is higher.</p>	<p>Less flexibility over time to react to new data. May require large, early financial commitment.</p>	<p>While this approach certainly allows use of creative transactions, the pool of potential landowner partners is limited by the initial preserve design, and the effectiveness of the preserve system can be limited if key landowners decline to participate or seek unreasonable economic terms.</p>



Taxon	Common Name	Scientific Name	Habitat Type	Nature Serve G Rank <i>a</i>	Nature Serve S Rank	Updated G/S Rank (Zara Env)	Federal Status	State Status	Forest Guardians Petition <i>b</i>	Karst Waters Inst. List <i>c</i>	Texas NDD List <i>d</i>	TPWD Rare Spp List <i>e</i>	County (green highlights are Hays County endemics per Randy Gibson)	Localities in Hays	Other info	YES	NO	Prelim BAT Filter (Nov Mtg)**	Refined BAT Filter (Dec Mtg)	Proposed LAI Categories	LAI Category comments	
Arachnids	A cave obligate spider	Cicurina ubicki	Karst	G1G2	SNR	S1				x			Hays (endemic)	Fern Cave, McGlothlin Sink		LE, RG	GS	x	x	E		
Arachnids	Undescribed Chernetid pseudoscorpion	Dinocheirus sp.	Karst			probably should strike this from list, undetermined specimen and guano associate, see Muchmore 1992 for verification on this.						x	Hays, Edwards	a chernetid pseudoscorpion known only from Wheat Cave in Edwards Co and Arrowhead Cave in Hays County		RG	GS					
Arachnids	Undescribed cave obligate spider	Eidmannella n. sp.	Karst			G1 S1						x	Hays	a definite new species from Ezells, possibly also in McCarty Cave and Mclaughlin Sink in Hays Co.		RG	GS		x	E		
Arachnids	A Cave spider	Gaucelmus augustinus	Karst	G3G4		S3S4				x			Comal, Hays, Kendall, Travis, Comal			RG	GS					
Arachnids	Pseudoscorpion	Hesperochernes unicolor	Karst			probably strike from list, a surface thing that just shows up in caves						x	SWG	a chernetid pseudoscorpion known only from Lakeline Cave in Wmson Co and Ezells Cave in Hays County: ask James about me!!		RG	GS					
Arachnids	Undescribed cave obligate spider	Neoleptoneta n. sp. 1	Karst			G1 S1						x	Hays (endemic)	sp. 1 from Boyett's Cave, sp. 2 from Burnett Ranch Cave		RG--	GS	x	x	E		
Arachnids	Undescribed cave obligate spider	Neoleptoneta n. sp. 2	Karst			G1 S1							Hays	sp. 1 from Boyett's Cave, sp. 2 from Burnett Ranch Cave					x	E		
Arachnids	Undescribed cave obligate spider	Neoleptoneta n. sp. eyeless	Karst			G1 S1							Hays	Katy's Cave (Paquin, pers. comm. 2007)						x	E	
Arachnids	Undescribed species	Psilochorus sp.	Karst			probably strike from list, not very cave adapted and likely is much more widely distributed						x				RG	GS					
Arachnids	A pseudoscorpion	Tartarocreagris comanche	Karst	G2G3	SNR	probably not troglobite, probably strike from list, see Muchmore 1992 and Muchmore 2001 for verification on this.				x			Burnet, Hays, Travis			LE, RG	GS	x				
Arachnids	A pseudoscorpion	Tartarocreagris cookei	Karst	GNR	SNR	not troglobite, probably strike from list, see Muchmore 1992 and Muchmore 2001 for verification on this.				x			Bandera, Bexar, Comal, Hays	Magen's Sink		RG	GS					
Arachnids	A pseudoscorpion	Tartarocreagris grubbsi	Karst	GNR	SNR	G1 S1				x			Hays (endemic)	Wissman's Sink		LE, RG-	GS	x	x	E		
Arachnids	A cave obligate harvestman	Texella diplospina	Karst	G1G2	SNR	S1				x			Hays (endemic)	Ladder Cave		LE, RG-	GS	x	x	E		
Arachnids	A cave obligate harvestman	Texella grubbsi	Karst	G1G2	SNR	S2				x			Burnet, Hays, Travis	Burnett Ranch Cave, Wissman's Sink, Wissman's Sink #2		LE, RG-	GS	x	x	E		
Arachnids	A cave obligate harvestman	Texella mulaiki	Karst	G2G3	SNR	G2 S2				x			Comal, Hays, Williamson, Travis	Boggus Cave, Ezell's Cave, Fern Cave, Ladder Cave, McCarty Cave, McGlothlin Sink, Tricophorous Cave		RG	GS	x	x	E		
Arachnids	A cave obligate harvestman	Texella renkesae	Karst	G1G2	SNR	S1				x			Hays (endemic)	Ezell's Cave, Maggens Sink Hole		LE, RG-	GS	x	x	E		
Arachnids	A cave obligate pseudoscorpion	Tyrannochthonius texanus	Karst	G2G3	SNR	strike from list, widespread on surface				x			Hays (endemic)	Arrowhead Cave		RG--	GS	x				
Arachnids	Undescribed pseudoscorpion	Tyrannochthonius n. sp.	Karst			G1 S1, but not a troglobite (Muchmore said), genus is not well worked out, probably should strike from list				x			Bexar, Hays	Wissman's Sink		RG	GS					
Crustaceans	A cave obligate amphipod	Allotexiweckelia hirsuta	Aquatic/Karst	G2G3	SNR	G1 S1				x			Bexar, Hays	TSU Well		RG	GS	x	x	E		
Crustaceans	A cave obligate amphipod	Artesia subterranea	Aquatic/Karst	G1G2	SNR	G1 S1				x			Comal, Hays	Diversion Spring, TSU Well		LE, RG	GS	x	x	E		
Crustaceans	A terrestrial cave obligate isopod	Brackenridgia cavernarum	Karst	G3G4	SNR	S3S4				x			?	Beaver Cave, Ezell's Cave		RG	GS					
Crustaceans	An aquatic isopod	Caecidotea reddelli	Aquatic/Karst	G4	SNR	S3S4				x			Bell, Coryell, Dallas, Hays, Henderson, Limestone, San Augustine, Travis, Williamson	central to northeastern TX		RG	GS					
Crustaceans	An aquatic cave obligate isopod	Cirolanides texensis	Aquatic/Karst	G4	SNR	G3 S3				x			southern Edwards Plateau region in TX and N Mexico	Diversion Spring, Ezell's Cave, Rattlesnake Cave, TSU Well		RG	GS					
Crustaceans	A cave obligate amphipod	Holsingerius samacos	Aquatic/Karst	G1G2	SNR	G1 S1				x			Hays (endemic)	TSU Well		LE, RG-	GS	x	x	E		
Crustaceans	Texas troglobitic water slater	Lirceolus smithii	Aquatic/Karst	G1G2	S1	G1 S1			x			x	Hays (endemic)	Diversion Spring, TSU Well		LE, RG-	GS	x	x	E		
Crustaceans	A cave obligate crustacean	Tethysbaena texana	Aquatic/Karst	G2G3	S1	G1 S1						x	Bexar, Comal, Hays, Uvalde	Diversion Spring, Ezell's Cave, TSU Well	new name - <i>Tethysbaena texana</i>	RG	GS	x	x	E		
Crustaceans	Balcones cave shrimp	Palaemonetes antrorum	Aquatic/Karst	G2G3	S1	G2 S2				x			Hays, Bexar	Diversion Spring, Ezell's Cave, TSU Well	Uvalde Record probably bad, known from 8 localities in 2 cos.	RG	GS	x	x	E		

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Crustaceans	A cave obligate decapod	<i>Calathaemon holthuisi</i>	Aquatic/Karst	G1G2	SNR	G1 S1				x			Hays (endemic)	Ezell's Cave, TSU Well?	new name - <i>Calathaemon holthuisi</i>	LE, RG-	GS	x	x	E	
Crustaceans	A cave obligate amphipod	<i>Seborgia relicta</i>	Aquatic/Karst	G2G3	SNR	G1 S1				x			Comal, Hays, Medina	Ezell's Cave, TSU Well		RG	GS	x	x	E	
Crustaceans	Balcones cave amphipod	<i>Stygobromus balconis</i>	Aquatic/Karst	G2G3	S1	G1 S1				x			Hays, Travis	Autumn Woods Well, Boyett's Cave		RG	GS	x	x	E	
Crustaceans	Ezell's cave amphipod	<i>Stygobromus flagellatus</i>	Aquatic/Karst	G2G3	S1	G1G2/S1S2				x			Comal, Hays, Travis	Diversion Spring, Ezell's Cave, Rattlesnake Cave, TSU Well	for sure known from TSU well and SM Springs, possibly known from 3 wells in Bexar Co., plus a questionable specimen from Rattlesnake Cave in hays Co.	LE, RG	GS	x	x	E	
Crustaceans	An Amphipod	<i>Stygobromus russelli</i>	Aquatic/Karst	G4	S3	G3G4/S3S4				x			widespread in central TX - hyporheic	widespread in springs and hyporheic		RG	GS				
Crustaceans	A cave obligate amphipod	<i>Texiweckelia texensis</i>	Aquatic/Karst	G2G3	SNR	G1 S1				x			Bexar, Hays	Diversion Spring, TSU Well	Jeans comment: ONLY in 2 localities in Hays, we're 90% sure of this, see Holsinger and Longley 1980 to verify	RG	GS	x	x	E	
Crustaceans	A cave obligate amphipod	<i>Texiweckelia insolita</i>	Aquatic/Karst	G3	SNR	G1 S1				x			Bexar, Hays	Diversion Spring, TSU Well		RG	GS		x	E	
Diplopods	A cave obligate millipede	<i>Speodesmus echinourus</i>	Karst	G2G3	SNR	G3G4/S3S4				x			Bexar, Hays, Travis			RG	GS	x			
Hexapods	A cave obligate springtail	<i>Arrhopalites texensis</i>	Karst	G3G4	SNR	G2G3 S2S3				x					only definitively known from 8 localities, but probably more widespread.	RG	GS		x	E	
Hexapods	A cave obligate thysanuran	<i>Texoreddellia texensis</i>	Karst	G4	SNR	G2 S2				x					current manuscript splits this species like crazy, but type locality is Ezell's and therefore T. texensis may be a G1	RG	GS				JK says G2S2 was in error, really a G4
Insects	A mayfly	<i>Allenhyphes michaeli</i>	Aquatic	G5	SNR							x	Blanco, Hays, Kendall, Tom Green, Uvalde			RG	LE (G5)				
Insects	Leonora's dancer damselfly	<i>Argia leonora</i>	Aquatic	G3	S2							x	from Burnet south to Brooks and west to Hudspeth			RG					
Insects	Texas austrotinodes caddisfly	<i>Austrotinodes texensis</i>	Aquatic	G2	S2							x	Hays, Bandera, Val Verde	Fern Bank, ?		RG	GS	x	x	A	
Insects	An ant-like litter beetle	<i>Batrissodes grubbsi</i>	Karst	G1G2	SNR	G1 S1				x	x		Hays (endemic)	Grapvine Cave		LE, RG-	GS	x	x	E	
Insects	Rawsons metalmark	<i>Calephelis rawsoni</i>	Terrestrial	G4	SNR							x	central, south, west TX - 3 disjunct populations - Quinn?			RG					
Insects	Flint's net-spinning caddisfly	<i>Cheumatopsyche flinti</i>	Aquatic	G3	S3							x	Bandera, Hays, Uvalde, Val Verde	San Marcos River		RG	LE				
Insects	Comal Springs diving beetle	<i>Comaldessus stygius</i>	Aquatic/Karst	G1	S1				x			x	Comal, maybe Hays	might be at Fern Bank but not confirmed		LE, RG	GS	x	x	E	
Insects	Edwards Aquifer diving beetle	<i>Haideoporus texanus</i>	Aquatic/Karst	G1G2	S1				x			x	Comal, Hays	TSU Well		LE, RG	GS	x	x	E	
Insects	Comal Springs riffle beetle	<i>Heterelmis comalensis</i>	Aquatic	G1	S1		LE					x	Comal, Hays	San Marcos Springs		LE, LL, RG-		x	x	A	
Insects	A mayfly	<i>Procloeon distinctum</i>	Aquatic	G1G3	SNR							x	Hays, Williamson			LE, RG		x	x	A	
Insects	San Marcos saddle-case caddisfly	<i>Protoptila arca</i>	Aquatic	G1	S1				x			x	Hays (endemic)	upper San Marcos River		LE, RG-	GS	x	x	A	
Insects	A Cave Obligate Beetle	<i>Rhadine austinica</i>	Karst	G1G2	SNR	G2G3 S2S3				x			Hays, Travis	Dahlstrom Cave, Michaelis Cave	known from about 20 caves	LE, RG	GS	x	x	E	
Insects	A Cave Obligate Beetle	<i>Rhadine insolita</i>	Karst	G1G2	SNR	G1 S1						x	Comal, Hays	Grapevine Cave	only 2 localities; fissure Cave and Grapevine Cave	LE, RG	GS	x	x	E	
Insects	Undescribed species	<i>Rhadine n. sp. 2 (subterranea group)</i>	Karst			G1 S1						x	Hays (endemic)	Ezell's Cave, Lime Kiln Quarry Cave, McCarty Cave		LE, RG	GS	x	x	E	
Insects	Undescribed species	<i>Rhadine n. sp. (subterranea group Boyett's)</i>				G1 S1							Hays	Boyett's Cave					x	E	
Insects	Comal Springs dryopid beetle	<i>Stygoparnus comalensis</i>	Aquatic	G1G2	S1		LE					x	Comal, Hays	Fern Bank		LE, RG-		x	x	A	
Mollusks	Rock pocketbook	<i>Arcidens confragosus</i>	Aquatic	G4	SNR							x	east Texas			RG					
Mollusks	Texas fatmucket	<i>Lampsilis bracteata</i>	Aquatic	G1	SNR				x			x	Colorado, Concho, San Saba, San Marcos, Guadalupe, San Antonio			LE		x	x	A	
Mollusks	Flattened cavenail	<i>Phreatodrobia micra</i>	Aquatic/Karst	G2G3	S2S3	G2 S2				x			Comal, Hays, Kendall		6 reliable records	RG		x	x	E	aquatic karst?

Taxon	Common Name	Scientific Name	Habitat Type	Nature Serve G Rank <i>a</i>	Nature Serve S Rank	Updated G/S Rank (Zara Env)	Federal Status	State Status	Forest Guardians Petition <i>b</i>	Karst Waters Inst. List <i>c</i>	Texas NDD List <i>d</i>	TPWD Rare Spc List <i>e</i>	County (green highlights are Hays County endemics per Randy Gibson)	Localities in Hays	Other info	YES	NO	Prelim BAT Filter (Nov Mtg)**	Refined BAT Filter (Dec Mtg)	Proposed LAI Categories	LAI Category comments	
Mollusks	Domed cavesnail	Phreatodrobia nugax	Aquatic/Karst	G3G4	S3	G3 S3				x			Bexar, Comal, Hays, Kendall, Travis		check this paper: Hershler, R. and G. Longley. 1986a. Phreatic hydrobiids (Gastropoda: Prosobranchia) from the Edwards (Balcones Fault Zone) Aquifer region, south-central Texas. Malacologia 27:127-172	RG						
Mollusks	Disc cavesnail	Phreatodrobia plana	Aquatic/Karst	G2	SNR	G1 S1				x			Comal, Hays		3 localities Artesian Well, SM springs, Nat. Bridge caverns	RG		x	x	E		
Mollusks	High-hat cavesnail	Phreatodrobia punctata	Aquatic/Karst	G2	SNR	G1 S1				x			Hays, Travis	Diversion Springs	2 localities: SM springs, Barton Spgs	RG		x	x	E		
Mollusks	Beaked cavesnail	Phreatodrobia rotunda	Aquatic/Karst	G1G2	SNR	G1 S1				x			Hays (endemic)	TSU Well AND SM SPRINGS	2 localities only	LE, RG-		x	x	E		
Mollusks	Golden orb	Quadrula aurea	Aquatic	G1	SNR							x	Colorado, San Marcos, Guadalupe, San Antonio, Frio, Nueces			LE, RG		x	x	A		
Mollusks	Texas pimpleback	Quadrula petrina	Aquatic	G2	SNR							x	Colorado and Guadalupe river basins			LE, RG		x	x	A		
Mollusks	False spike mussel	Quincuncina mitchelli	Aquatic	GH	SH							x	Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins			RG						
Mollusks	Creepers (squawfoot)	Strophitus undulatus	Aquatic	G5	S1							x	Colorado and Guadalupe river basins			RG			?	A		
Mollusks	Pistolgrip	Tritogonia verrucosa	Aquatic	G4G5	S2							x	central to eastern Texas						?	A		
<b>VERTEBRATES</b>																						
Fishes	American eel	Anguilla rostrata	Aquatic	G4	S5							x										
Fishes	Blue sucker	Cycleptus elongatus	Aquatic	G3G4	S3			T				x										
Fishes	Fountain darter	Etheostoma fonticola	Aquatic	G1	S1		LE	E			x	x						x	x	A	only at SM springs and upper SM river; land preservation over edwards recharge and contributing could contribute to recovery	
Fishes	Largespring gambusia	Gambusia geiseri	Aquatic	G4	S4						x											
Fishes	San Marcos gambusia	Gambusia georgei	Aquatic	GX	SX		LE	E			x	x						x				
Fishes	Guadalupe bass	Micropterus treculii	Aquatic	G3	S3							x										
Fishes	Guadalupe darter	Percina sciera apristis	Aquatic									x								?	A	
Amphibians	San Marcos salamander	Eurycea nana	Aquatic/Karst	G1	S1		LT	T		x	x	x	Hays (endemic)	upper San Marcos River		LE, LL, RG--	GS	x	x	A	aquatic karst; only at SM springs; no need for additional research?	
Amphibians	Blanco River springs salamander	Eurycea pterophila	Aquatic/Karst	G2	S2						x	x	Blanco, Hays, Kendall	springs flowing into Blanco River		LE	GS	x	x	E		
Amphibians	Texas blind salamander	Eurycea rathbuni	Aquatic/Karst	G1	S1		LE	E			x	x	Hays (endemic)	Diversion Spring, Ezell's Cave, Rattlesnake Cave, Primer's Well, Sessoms Cr., TSU Well		LE, LL, RG--	GS	x	x	A	is it suspected that this species is more common and doesn't need to be listed?	
Amphibians	Blanco blind salamander	Eurycea robusta	Aquatic/Karst	G1Q	S1			T	x	x	x	x	Hays	underneath the Blanco River		LE, RG-	GS	x	x	E		
Reptiles	Cagle's map turtle	Graptemys caglei	Aquatic	G3	S3			T			x	x	Guadalupe River system	Blanco River		RG--	LE (OLD DATA)	x	x	E	surface species, but has been candidate for listing in the past	
Reptiles	Spot-tailed earless lizard	Holbrookia lacerata	Terrestrial	G3G4	S3?							x							LE (OLD DATA)			
Reptiles	Texas horned lizard	Phrynosoma cornutum	Terrestrial	G4G5	S4			T				x						x	x	NA	No TXNDD records of species in county; Does species still occur in county? Is there possible overlap with BCV habitat?	
Reptiles	Texas garter snake	Thamnophis sirtalis annectens	Terrestrial	G5T4	S3						x	x							LE (OLD DATA)			

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Birds	Western Burrowing Owl	Athene cunicularia hypugaea	Terrestrial	G4T4	S2B							x									
Birds	Zone-tailed Hawk	Buteo albonotatus	Terrestrial	G4	S3B			T				x									
Birds	Mountain Plover	Charadrius montanus	Terrestrial	G2	S2							x						x	x	NA	possible winter habitat in short, overgrazed pastures; conservation actions in the plan not likely to encourage habitat conditions for species; should remove from list; rare winter resident and occasional migrant; not recorded from Hays?
Birds	Golden-cheeked Warbler	Dendroica chrysoparia	Woodland	G2	S2B		LE	E			x	x				LE, LL, GS, RG		x	x	C	
Birds	Peregrine Falcon	Falco peregrinus	Terrestrial	G4	S3		DL	E T				x									
Birds	American Peregrine Falcon	Falco peregrinus anatum	Terrestrial	G4T4	S2B		DL	E				x									
Birds	Arctic Peregrine Falcon	Falco peregrinus tundrius	Terrestrial	G4T3T4	S3N		DL	T				x									
Birds	Whooping Crane	Grus americana	Terrestrial	G1	S1		LE	E				x					LE, LL, RG	x			
Birds	Bald Eagle	Haliaeetus leucocephalus	Terrestrial	G5	S3B, S3N		DL	T				x									
Birds	Black-capped Vireo	Vireo atricapilla	Shrubland	G2G3	S2B		LE	E			x	x				LE, LL, GS, RG		x	x	C	
Mammals	Red wolf	Canis rufus	Terrestrial	G1Q	SX		LE	E				x						LE, LL, RG	x		
Mammals	Cave myotis bat	Myotis velifer	Terrestrial	G5	S4							x									
Mammals	Plains spotted skunk	Spilogale putorius interrupta	Terrestrial	G5T4	S3							x									
																Filtered Count		60	62	62	
																Evaluation					40
																Additional					18
																Covered					2
																n/a					2
<b>Initial BAT Comments (Key)</b>																					
<b>BOLD</b> initials represent federally listed taxa																					
RG-- (Randy Gibson) taken from emailed list of species to include as "additional"																					
RG (Randy Gibson) assumed from email last paragraph "I would also recommend that the non-listed karst and aquifer-dependent species be included as "additional species" because there are so many endemics..."																					
LE (Lee Elliot)																					
LL (Linda Lack)																					
GS (Garry Stephens)																					
<b>Preliminary BAT Filter (20071101)</b>																					
All Hays County endemics																					
All NatureServe G-ranks of G1 or G2 (i.e., ranks G1 through G2G3)																					
All State-listed amphibians or reptiles																					
All Federally listed species																					