Balcones Canyonlands Preserve Karst Management
2003 Annual Report

Travis County Natural Resources
and the City of Austin BCP – WWW

Travis County Parks and Natural Resources
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By Nico Hauwert, Hydrogeologist, City of Austin Watershed Protection and Development Review Department, December 2003

ATTACHMENT C: REPORT BY TEXAS CAVE MANAGEMENT ASSOCIATION (TCMA)

1.0 REGIONAL PERMIT

There are six species of endangered karst invertebrate and 25 karst species of concern covered by the Balcones Canyonlands Conservation Plan (BCCP) (the Regional Permit). If these 25 species of concern become listed as endangered in the future, no additional mitigation by the BCCP would become necessary to protect them if all of the karst protection outlined in the BCCP is fully implemented. Many of the species of concern may actually be as endangered, or more so than the currently listed species. Since these species are not formally listed, many of the Species of Concern (SOC) caves are severely threatened.

The Regional Permit requires protection of 35 endangered species caves and 27 caves additional caves that support species of concern that are not currently listed by the USFWS for a total of 62 karst features (60 caves, 1 mine and 1 karst spring).

The six species of endangered karst invertebrates in Travis County are:

Tooth Cave pseudoscorpion *Tartarocreagris texana*
Tooth Cave spider *Neoleptoneta myopica*
Tooth Cave ground beetle *Rhadine persephone*
Kretschmarr Cave mold beetle *Texamaurops reddelli*
Bee Creek Cave harvestman *Texella reddelli*
Bone Cave harvestman *Texella reyesi*

The 25 additional karst species of concern to be protected by the regional permit are:

FLATWORMS
Sphalloplana mohri
OSTRACODS
Candona sp. nr. *stagnalis*
SPIDERS
Cicurina bandida (#1)*
Cicurina cueva (#4)
Cicurina ellioti (#5)
Cicurina reddelli (#3)
Cicurina reyesi (#6)
Cicurina travisae (#7)
Cicurina wartoni (#9)
Neoleptoneta concinna
Neoleptoneta devia
Eidmannella reclusa
MILLIPEDES
Speodesmus N. S.
PSEUDOSCORPIONS
Aphrastochthonius N. S.
Tartarocreagris comanche
Tartarocreagris reddelli
Tartarocreagris intermedia (#2)
Tartarocreagris N. S. 3
HARVESTMEN
Texella spinoperca (#2)
GROUND BEETLES
Rhadine s. subterranea
Rhadine s. mitchelli
Rhadine austinica
ISOPODS
Caecidotea reddelli
Trichoniscinae N. S.
Miktoniscus N. S.

- Numbers #1-9 correspond to species listing in the Final HCP-EIS, Section 2-66.

2.0 CAVE MANAGEMENT SUMMARY

This annual report covers the fiscal year 10/01/02-9/30/03 and is referred to in this document as "2003". In 2003, the Balcones Canyonlands Conservation Plan (BCCP) partners continued efforts to determine and track cave status of the 62 karst features covered by the BCCP 10(a) permit. The permit holders continued efforts to acquire, protect, and monitor the karst species in the caves included in the Permit. Many of the caves designated here as "protected" with the status of "good" in the following table do not have large enough buffer areas around the caves to be adequately protected to meet the new requirements listed in *the U.S. Fish and Wildlife Service Draft Recommendations for Karst Preserve Design, March, 2001 Version,* including many caves that were considered "protected" under USFWS individual 10a permits in years past. The new USFWS preserve design directs that the protected area surrounding the cave must be 59-89 acres in size to capture the majority the plant and animal community elements in viable numbers needed to support the cave species. The terms "protected" and "good" listed in this document refer to caves with *some* amount of setback around the entrance and *some* amount of protection over the footprint of the cave and do not necessarily provide this large protected area acreage.

It should be noted that the protection and management for some of the caves listed as "good" would not be considered "good" or protected by the most recent USFWS draft protocol for cave protection. Caves on Balcones Canyonlands Preserve (BCP) land generally have adequate buffer areas and are receiving adequate protection, however some are too close to adjacent development or the protected areas are not large enough to adequately protect the caves under the new criteria. Also some of the caves listed as "protected" under individual USFWS Section 10(a) or Section 7 permits may not be managed to adequately protect them.

Cave X and Get Down Cave are being "protected" under cave management agreements between the landowner and the City of Austin. Though the cave management agreements were finalized in 1999 and 2000, the implementation plans for these agreements are not completed yet, with little cooperation from the developer TCMA is managing Get Down Cave. No progress was made in implementing the Cave X management plan prior to the end of the fiscal year. Though the TSNL caves have "protected" entrances, the areas around the caves are not large enough to adequately protect the footprint and drainage areas around the caves. The BCP has received reports that TSNL is not currently active in the Austin area and members have not been visiting, surveying and protecting these cave entrances on a regular basis.

Of these 62 karst features, 43 combined Endangered Species and species of concern caves that are shown as "protected" on the charts that follow:

- 19 are "protected" by the City of Austin through ownership or private landowner agreements.
- 3 are "protected" by other BCP partners (Travis County and The Nature Conservancy)
- 8 are "protected" by individual USFWS Section 10(a) or Section 7 permits
- 7 are "protected" by Texas System of Natural Laboratories (TSNL)
- **2** are "protected" by Texas Cave Management Association (TCMA)
- 1 is "protected" by private landowner agreement (negotiated by the City of Austin and TCMA) (Get Down Cave).
- 1 is "protected" by private landowner agreement (negotiated by the City of Austin and landowner (Cave X)
- 1 is currently "protected" by private landowner (Bandit cave), no future guarantees
- 1 is protected by Travis County on Private land (Talus Springs Cave)

43 of the BCCP caves are "protected" in some way, 19 are "unprotected" (including Fossil Cave since its location and status in the park is unknown. It is the only publicly owned "unprotected" cave).

For the 35 caves containing Endangered Species (out of the 62 total BCCP caves)

- 24 are "protected" by BCCP partners, 10a permits, TSNL, and a private landowner.
- Of the remaining 11 caves, 10 are privately owned and Fossil Cave is COA owned

<u>Threats to Specific BCCP Caves</u>

- The entrance to <u>Pennie's Cave</u> has been covered for several years and this cave should probably be considered lost (though the GPS location is known and the cave could be reopened, the landowner has expressed that he is not interested in ever opening this cave entrance).
- The location of the entrance to <u>Fossil Cave</u> in the City of Austin's Schroeder Park is unknown. There are several likely locations in the park and at present there are no plans to dig at any of these locations to find the cave. Bill Elliott, the original collector, has been contacted and has no recollection of the exact location, and the park has changed greatly. Located in the park, the park area continues to be protected but is listed as "unprotected" in case the cave location was disturbed. The exact cave entrance will need to be relocated or the cave replaced on the BCCP list.

- Caves in the McNeil Cluster (near Round Rock High School) are under threat of development and their status is unclear. The owner was approached in both 2000 and 2001 about selling this area and was not interested.
- The status of the Northwood Cluster is unknown.
- A hydrogeological study was completed in May 2000 for Flint Ridge Cave relating to possible impacts from the proposed extension of SH 45. In 2003, Texas Department of Transportation (TXDOT) decided to go forward with project and hope to break ground in the fall of 2004. Currently TXDOT is constructing a right-of-way fence adjacent to Flint Ridge Cave.
- Many "private" caves have not been surveyed or monitored in many years and their status is unknown. Though Get Down Cave and Cave X are currently "protected" by private landowner agreements with the City of Austin the BCCP partners need to put additional effort into creating more of these private agreements with other private cave owners. In general, threats to private caves continue, primarily due to development. Initially, the agreements have been problematic and additional pressure is needed to ensure that the terms of the agreements are met and actual cave management activities are carried out.

3.0 KARST FEATURE STATUS

The following table lists the names and status in 2002 of the 62 caves/karst features listed in the BCCP permit. The 35 endangered species caves are listed as ES and the 27 additional caves for species of concern are listed as SOC.

Cave Name	ES or SOC	Current tract/owner. On BCP Land or private	Cave Cluster	2002 Status
Adobe Springs Cave	SOC	BCP Lehmann/TNC		Good
Airman's Cave	SOC	BCP Barton Creek/COA		Good
Amber Cave	ES	BCP Jollyville/TC	4 Points Cl (Parke)	Good, too close to roadway
Armadillo Ranch Sink	SOC	Private		Unknown
Arrow Cave	SOC	BCP Slaughter Cr. Pk./COA		Good
Bandit Cave	ES	Private		Good, the owner is ecologically concerned
Beard Ranch Cave (Featherman's Cave)	ES	BCP Ivanhoe/COA		Good
Bee Creek Cave	ES	Private		Unknown
Blowing Sink Cave	SOC	BCP COA		Good
Broken Arrow Cave	ES	BCP Lime Crk Pres/COA		Good
Buda Boulder Spg.	SOC	BCP Shoal Creek Grblt./COA		Good
Cave X	SOC	Private/COA Protection Agreement		Unknown, New agreement not working smoothly yet

Cave Y	ES	BCP Barton Creek Grblt/COA		Good
Ceiling Slot Cave	SOC	Private		Unknown
Cold Cave	ES	Private	Northwood Cl.	Unknown
Cotterell Cave	ES	BCP Spicewood Spgs. Pk./COA		Good
Disbelievers Cave	ES	BCP Private 10(a)	4 Points Cl. (Perot)	Good
District Park Cave	SOC	BCP D.Nickols Pk./COA		Good
Eluvial Cave	ES	BCP Private 10(a)	4 Points Cl. (Perot)	Good
Flint Ridge Cave	SOC	Prop 2/COA		Good
Fossil Cave	ES	BCP Schroeter Pk./COA		Can't find entrance, area in park protected however, FWS thinks taken
Fossil Garden Cave	ES	Private	McNeil Cl.	Unknown
Gallifer Cave	ES	Private TSNL/ surrounding land to TC 12/03	4 Points Cl (Parke)	Good
Get Down Cave	SOC	Private/COA Protection Agreement with TCMA		Good, implementing agreement, COA/TCMA management agreement pending
Goat Cave	SOC	BCP Goat Cave Karst Preserve/COA		Good
Hole-in-the-Road	ES	Private	Northwood Cl.	Unknown
Ireland's Cave	SOC	Private Circle C		Poor, watershed probs., golf course new development, with a proposed grossly inadequatt setback
Jack's Joint	SOC	Private		Unknown
Japygid Cave	ES	BCP Private 10(a)	4 Points Cl. (Perot)	Good
Jest John Cave	ES	BCP Forest Ridge/COA		Good
Jester Estates Cave	ES	BCP Forest Ridge/COA		Good COA recently took over management
Jollyville Plateau Cv.	ES	BCP Private 10(a)	4 Points Cl. (Perot)	Good
Kretschmarr Cave	ES	Private TSNL	4 Points Cl. (Parke)	Good
Kretschmarr Dble. Pit	ES	Private TSNL	4 Points Cl. (Parke)	Good
Lamm Cave	ES	BCP Private Section 7		Entrance OK, FWS considers taken
Little Bee Cr. Cave	ES	BCP Ullrich WTP/COA		Good
Lost Gold Cave	SOC	Private		Unknown, new owner
Lost Oasis Cave	SOC	Private TCMA		Good
M.W.A. Cave	ES	BCP Private 10(a)	4 Points Cl. (Perot)	Good
Maple Run Cave	SOC	BCP Goat Cave Karst Preserve/COA		Good
McDonald Cave	ES	BCP Jollyville/TC		Good
McNeil Bat Cave	ES	Private	McNeil Cl.	Unknown
Midnight Cave	SOC	BCP Slaughter Cr. Pk./COA		Good
Moss Pit	SOC	Private		Unknown
New Comanche Tr. Cave	ES	Private		Unknown
No Rent Cave	ES	Private	McNeil Cl.	Unknown
North Root Cave	ES	Private TSNL	4 Points Cl (Parke)	Good
Pennie's Cave	SOC	Private		Destroyed (cave filled in)
Pickle Pit	SOC	BCP Private Sec. 7		Unknown
Pipeline Cave	SOC	Private		Unknown
Rolling Rock Cave	ES	BCP Lime Cr. Prs./COA		Good

Root Cave	ES	Private TSNL	4 Points Cl (Parke)	Good
Slaughter Creek Cave	SOC	BCP Slaughter Cr.Pk./COA		Good
Spanish Wells	SOC	Private		Unknown
Spider Cave	ES	BCP Park West/COA		Good
Stark's North Mine	SOC	Private		Unknown, Recently sold
Stovepipe Cave	ES	BCP Private Sec. 7		Unknown, (fence cut, illegal acces), Appears permit holder not protecting adequately
Talus Springs Cave	SOC	Private/ 10(a) permit, TC checks entrance		Good/Unknown, only 50' setback from dev.
Tardus Hole	ES	Private TSNL	4 Points Cl (Parke)	Good
Tooth Cave	ES	Private TSNL	4 Points Cl (Parke)	Good
Weldon Cave	ES	Private	McNeil Cl.	unknown
Whirlpool Cave	SOC	Private TCMA		Good

4.0 ACCESS STATUS AND KARST EDUCATION

In the fiscal year 10/01/02-9/30/03, the total number of visitors in the City of Austin's BCCP caves for educational/recreational/rescue training that were issued access permits were: District Park Cave (31), Maple Run Cave (180), Midnight Cave (73 visitors and several aborted attempts to enter due to bad air and including the Austin Fire Departments rescue of local teens who had illegally accessed the cave and were unable to exit), Whirlpool Cave (265), Goat Cave (153) and Get Down Cave (4). The City of Austin issued a Scientific/Research permit to Rob Jackson, Will Pockman, and Scott Hiers for Cotterell Cave.

Austin caving organizations and volunteers continue to play key and vital roles in researching, protecting and educating the public about BCCP and other caves in the Austin area.

The following table lists caves that are currently gated, fenced and/or open to the public.

Cave Name	ES or SOC	BCP Tract/owner	Gated/Fenced	Public Access
Amber Cave	ES	BCP/TC	Gated (new & improved 11/03)	
Airman's Cave	SOC	Barton Creek/COA		open
Bandit Cave	ES	Private	Gated	
Blowing Sink Cave	SOC	BCP/COA PARD	Gated	None
Cave X	SOC	Private w/ COA Agreement	Gated and fenced	
Cotterell	ES	Spicewood Sprgs. Pk./COA	Fenced	
District Park Cave	SOC	D.Nickols Pk./COA	Gated after the 1st room.	1st room open, past the 1st room access by permit*
Flint Ridge Cave	SOC	BCP/COA WWW	Gated[2,]	None
Gallifer Cave	ES	Private TSNL	Gated	
Get Down Cave	SOC	Private	Gated	
Goat Cave	SOC	Karst Preserve/COA	Fenced, Gate removed	access by permit*
Jester Estates Cave	ES	Adjacent to Ivanhoe/COA	Gated	
Jollyville Plateau Cv.	ES	Private 10(a)	Gated [1]	
Kretschmarr Cave	ES	Private TSNL	Gated [1] and Fenced	
Lost Gold Cave	SOC	Private	Gated	
Lost Oasis Cave	SOC	Private TCMA	Gated and Fenced	controlled access**
Maple Run Cave	SOC	Karst Preserve/COA	Gated	access by permit*
Midnight	SOC	Slaughter Cr. Pk/COA	Fence was upgraded	access by permit*
Pickle Pit	SOC	Private	Gated	

Pipeline Cave	SOC	Private	Metal frame [1]	
Talus Springs Cave	SOC	Private	Gated 1/04	
Tooth Cave	ES	Private TSNL	Gated	
Whirlpool Cave	SOC	Private TCMA	Gated	controlled access**

* Access by Permit - Permit may be issued by COA - PARD staff.
** Controlled Access - Private cave owners control the access
1 Needs gate repairs/improved gate
2 Wooden temp TCMA gate to be replaced in 1/04 w/permanent metal gate

6.0 MANAGEMENT COORDINATION

In 2002, the City of Austin, Travis County and TCMA karst management staff met with USFWS to further clarify what defines adequate "protection" for the BCCP caves and assess caves listed here for their level of protection under the March 6, 2001 "U.S. Fish and Wildlife Service Draft Recommendations for Karst Preserve Design" which requires up to 99 acres surrounding a karst feature to protect it. Though the management guidelines provide for "Adaptative Management Techniques" to be used as more is learned, it was determined by the group that the BCP permit along with the BCP Land Management Plan requirements were adequate for BCP karst feature protection. In 2003, this group has continued to work to standardize monitoring and reporting procedures.

7.0 BIOLOGICAL MONITORING

The City of Austin's BCCP staff performed species surveys for Airman's**,** Cotterell Cave, District Park, Goat, Maple Run and Midnight Caves, and cricket exit counts at Jest John and Slaughter Creek caves.

Travis County's BCCP staff did surface monitoring of McDonald Cave and Amber Cave. The substandard cave gate on Amber Cave was replaced with an improved gate. No official karst biological surveys were conducted in 2003 since county staff don't currently hold USFWS permits to do this work. Travis County staff continued training activities to prepare staff to obtain the needed permits to do biological surveys in the future. Travis County staff regularly monitored the cave entrances. Staff also did surface monitoring of Talus Springs Cave on adjacent private land, assisted with planning with the homeowners association on the construction of a cave gate (pending for Jan. 2004).

The Texas Cave Management Association (TCMA) performed species surveys in Whirlpool, Get Down Caves, and Lost Oasis Caves (Attachment A). TCMA continued to provide valuable volunteer support activities to the BCCP and Central Texas cave protection efforts. They assisted with monitoring of access to City of Austin sensitive caves, participated in negotiations

with developers to manage caves under City of Austin cave management agreements, visited caves on private land to assess potential threats, and assisted both BCCP partners in assessment and protection of BCP caves. The BCCP partners greatly appreciate the dedication and hard work of this group.

James Reddell reported that Texas System of Natural Laboratories (TSNL) did not do any management activities on their caves in 2003. Since the 7 caves managed by TSNL are some of the most important caves for endangered species protection, the BCCP partners are very concerned about the lack of active management and species surveys. The acquisition of the land surrounding or adjacent to Gallifer, Kretschmarr, Kretschmarr Double Pit, and Tardus Hole by Travis County is pending for December 2003.

It is unknown if there were species surveys done in BCCP caves by the holders of Section 10a or Section 7 permits (to be reported to USFWS).

7.0 KARST MANAGEMENT ACTIVITIES

The BCP Land Management Plan outlined planned activities concerning the 62 BCCP karst features. The following table lists what was promised in the Plan and a summary of activities completed in 2002.

BCP 1999 Approved Land Management Plan (Proposed Activities)	2002 Management Activities or Comments * Designates owner or manager on first line
Adobe Springs Cave 1. May need gate, depending on access situation. The cave gate design should allow for the return of the bats	The Nature Conservancy* The last cave faunal survey was conducted in 1999. The entrance to the cave continues to be undisturbed and is protected on Preserve tract.
Airman's Cave 1. Conduct a study to assess caving use and trash accumulation in the cave to see if it is adversely affecting the cave fauna. This ongoing study should continue to monitor these factors and determine if there is a need for cave gating. 2. Continue biological observations and map the locations of the rare species in the cave. 3. Work with volunteers in the caving community to police themselves and other cave users who use Airman's Cave . 4. Continue doing ongoing cave cleanups and graffiti removal. 5. Conduct studies on caver use and monitor effects on cave fauna .	City of Austin* 1. Completed annual cave faunal survey. (See Attachment) 2. To date, have not noticed any significant increase in litter and any new graffiti. It appears that the caving community are policing themselves and so far no cave gate is warranted.

Amber Cave 1. Control of red imported fire ants . 2. Should be effectively gated as soon as possible in a manner that restricts access, yet allows the free passage of air, water and cave life. The present gate does not prevent access to the cave. Once a gate is installed, it should be regularly inspected to minimize any unrestricted traffic which may breach it 3. Surface and subsurface drainage basins are contained within an area extending from Amber Cave 40 ft. north to Wilson Parke Ave, south for 100 ft., and east and west for 50 ft. The drainage basins delimit the cave's critical area, the zone of greatest direct impact to its ecosystem. The critical area should be left in its natural state. 4. The high density of caves and karst features to the east of Amber Cave deserve serious consideration for equal protection. These features do not directly drain into Amber cave, but hydrologically they are interlinked with it at a lower level. A very large volume of water and nutrients are taken underground in this locale which support the cave ecosystem. A study is needed to access this nutrient area and its importance to the cave fauna. 5. The critical area should be bermed if any neighboring development might drain its runoff into it. 6. Establish a cooperative management plan with the organization that maintains the right-or-way for Wilson Parke Ave. near the cave to implement suggested techniques to protect the cave through modifications in mowing and non-toxic management techniques to protect the cave.	Travis County* 1. This site was inspected frequently and no signs of vandalism were found to the cave entrance or in the cave (one person entered the cave once). 2. Fencing and signs have protect this area from unauthorized access and dumping. 3. Replaced inadequate cave gate with new and improved one in 11/03. 4. Was inspected for RIFA. 5. Official karst monitoring will begin in 2004. 6. The nearby roadway and nearby sewer line may have an effect on the cave and will need to be monitored.
Armadillo Ranch Sink 1. The entrance to the cave receives considerable run-off. The critical area should be bermed if any neighboring development might drain its runoff into it. 2. May need a cave gate, depending on access situation.	Private
Arrow Cave 1. The cave will need a gate, as it is located within a few hundred feet of a new subdivision and its entrance has temporarily been filled with three feet of loose rocks to protect the cave. 2. The cave receives drainage from only a small area. 3. A faunal survey is needed.	City of Austin 1. Quarterly site inspections were conducted 2. The entrance was inspected to make sure that no human access had occurred. 3. The site was also inspected for RiFA infestations. On all visits fire ant mounds were observed in close proximity of the cave entrance, however, ants did not appear to be entering the cave.

4. Monitor and control fire ants. 5. Need a map of the cave interior and sinks nearby.	4. Met with the Park manager regarding illegal encroachment into the park by adjacent homeowners. The manager contacted Park police to help prevent further encroachment especially around the cave. 5. TCMA reports that the construction around Arrow Cave has been completed and that it is ready for a gate. It remains covered with boards, rocks and leaves and the entrance was not disturbed. 6. TCMA visited the cave entrance several times in 2003 and no disturbances around the cave were noted , even though there is neighborhood activity in the immediate area (dog graves and mowed paths).
<u>Bandit Cave</u> 1. Survey for fire ants. 2. Make landowner contact.	Private TCMA reports that several years ago sewer lines were constructed near Bandit Cave and as indicated by a TCMA survey, the lines did not encounter the cave, and no adverse effects have been noted.
<u>Beard Ranch Cave (Featherman's Cave),</u> 1. Obtain Chock Woodruff's cave map, description and information on biological collection. 2. Do a current thorough faunal survey to determine the endangered species status (specifically Texella sp) 3. Monitor and control fire ants. Revised Management Needs (2001): 1. Map the cave.	City of Austin 1. The cave was inspected twice, Spring and Fall. 2. No evidence of vandalism was noted. 3. No red imported fire ants were found. A healthy population of native fire ants was found in close proximity to the cave.
<u>Bee Creek Cave</u> 1. The cave is partially protected by its isolation and bluff entrance. May need a cave gate, depending on the current access situation . 2. Need to confirm the location of the cave and do a biological assessment. 3. Make landowner contact.	Private
<u>Blowing Sink Cave</u> 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. During and after development, the area around and some distance upslope should be protected by setbacks**.** (2003 already negotiated) 3. Add a cave gate that does not interfere with recharge. (2003 Completed) 4. Coordinate planning for runoff and drainage with the developer. To maintain the quantity of	City of Austin 1. This site was inspected 6 times and no signs of vandalism were found in the cave or to the cave entrance. 2. Fire ant mounds were present, (within 150' radius); activity was noted near the entrance but not inside the cave. 3. BCP staff had planned on conducting multiple faunal surveys due to the fact that this cave has never been thoroughly surveyed. Staff also planned on setting up a water quality-monitoring device in the stream. This device would have measured water quality

good-quality water entering the aquifer, consideration should be given to connecting Blowing Sink to the drainage channel leading from the area to the north. Topography indicates a major drainage channel will be somewhere near the cave. After development, even small rains will produce more run-off than can flow through, and much of this water will be of poor quality. A gate on the connecting channel could allow poor-quality water to by-pass the sink and good-quality water to be channeled into the Aquifer. (2003 already negotiated) 5. Provisions should be made for continued biologic studies. 6. Provisions should be made for continued hydrologic studies. Eileen's River originates from a large recharge area and would be an ideal place to monitor the effects of urbanization on water quality. 7. Investigate the possible connection of the newly found cave with this cave. Revised Management Needs (2001): 1. Improve perimeter fence on preserve land to keep prevent illegal trespass. TCMA Needs (2003): 1. Permanent gate inside cave	parameters prior to the opening of the Longhorn gasoline pipeline. Unfortunately, the cave is currently closed due to floods in November and December 2001. TCMA are currently working on excavating the collapsed passageways. 4. BCP staff along with Pard personnel met with representatives of David Weekly Homes, (the new housing development immediately west of the preserve) regarding: illegal dumping, tree removal, fence removal, and soil disturbance. After several visits and negotiations the developer agreed to install a new fence, and remove all trash from the preserve. 5. BCP staff noticed that the Longhorn pipeline crossing at the Western boundary was missing, allowing illegal access into the preserve. Staff contacted Longhorn and requested that they close this access point, Longhorn complied. 6. WPDR staff contacted BCP staff regarding a new proposed development immediately east of the preserve. WPDR staff requested a "wish list" from both BCP and Pard staff regarding preserve needs which might be funded by the developer such as set backs, fencing, cave gating and funding for management. 7. Blowing Sink cave was gated. COA BCP staff sought bids for this project, (Zara Environmental won the bid). The gate was installed approximately 50 feet inside the entrance. 8. BCP staff with the help of the BS/EACD and Pard repaired the electric line leading to the well. Once the repairs were completed the USGS and BS/EACD were able to take water quality samples from the well. 9.TCMA reported that the cave appears in good shape. Work is in progress to bypass the unstable section below the Kirschberg Hall, this area was heavily impacted by flooding in the previous few years. TCMA installed 3 SS bolts to provide for a reliable, safe route thru the cave. 10.TCMA inspects Blowing Sink at least monthly as this cave is more high profile than most of the BCP caves.
Broken Arrow Cave 1. Monitor and control fire ants. 2. Yearly faunal survey in Spring.	City of Austin 1. This cave was inspected 3 times and no sign of human visitation was found. 2. A small amount of fire ant activity was found near the cave entrance but not activity was observed in the entrance.
Buda Boulder Spring	City of Austin

1. Monitor water quality in this small spring which may be contaminated by sewage. There was heavy sewage pollution found there in 1992. Check into the source of the possible sewage contamination. A large transient camp immediately above the spring may be the source 2. Monitor the site to see if this spring still harbors the SOC. 3. Coordinate protection efforts between Shoal Creek Park managers, COA Water and Wastewater and PARD/Natural Resources Department about protection strategies.	1. BCP staff visited the site twice and noted no real negative impacts to the spring. Old abandoned transient camps were found nearby. 2. WSPD staff has taken water quality samples at this spring, most recently on 1/7/99. **T**he chemistry looks fairly typical for an urban setting according to David Johns, (WSPD geologist). 3. BCP staff was contacted by TPWD regarding water quality and benthic monitoring sites. This was one of the sites we visited. TPWD decided to add this site to their study.
<u>Cave X</u> 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. Will need a cave gate or a fence that will not interfere with recharge. 3. Development in the area needs to be closely coordinated. The cave is an important recharge feature, with most of the recharge originating from another property.	Private 1. The City of Austin entered into a Private Landowner Agreement "Cave X, Management and Monitoring Plan, Covenants and Restrictions, (see attachment)", with the property owners (Regent's School) in Oct. 1999. The agreement sets aside a 4.5 acre area was set aside to protect the cave footprint. The USFWS was involved in the discussions on protection. 2. The cave entrance is gated and also has a fence for added protection. 3. There are still concerns about the implementation of Private Landowner Agreement that does not seem to be working yet. This site has had quite a lot of new development in close proximity of the cave. With the potential listing of *Cicurina cueva*, Regents expressed interest in a "Candidate Conservation Agreement" . COA, Travis County, Regents, Horizon, and USFWS met regarding what measures would be needed to fulfill this. One suggestion was that Regents should start to implement the "Cave X Management and Monitoring Plan. 4. TCMA is interested in mgt. of this cave, mgt. issues have been neglected by the owners. 5. TCMA worked with Save Our Springs on the USFWS petition for listing of the *Circurina cueva.*
<u>Cave Y</u> 1. May need a cave gate, depending on the access situation. It is relatively isolated and thus unlikely to attract numerous visitors until the surrounding parkland is opened (Russell (undated). The COA is routing the access trail away from this cave. 2. Do yearly faunal survey in Spring and also make collections for James Reddell to determine the status of probable Texella.	City of Austin 1. 4 site visits were conducted to this cave and there was no sign of human visitation or vandalism. 2. No red imported fire ant activity was observed at or near the cave entrance, however, there were fire ant mounds within a 150' radius of the cave.

3. Monitor and control fire ants.	
Ceiling Slot Cave 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. May need a cave gate, depending on the access situation	Private
Cold Cave 1. The surface and nonpoint drainage areas over the cave should be preserved in their natural state. This area should be considered the minimum for any preserve boundary that would be established and may need expansion 2. Any tunneling (as opposed to trenching) to place the proposed wastewater interceptor line should be done according to Veni and Associates recommendations 3. if any roads or facilities are built uphill of the drainage area, impermeable berms should be placed along the uphill margins to prevent the entry of runoff or spilled materials 4. The cave should be gated 5. Follow additional recommendations outlined in the Veni and Associates hydrologic study.	Private
Cotterell Cave 1. There is a high fence around the cave area installed by the City of Austin in 1995. Continue to monitor the condition of the fence and control access to the cave. 2. Continue to work to control red imported fire ants. 3. Do a yearly faunal survey in Spring.	City of Austin 1. Monthly site inspections were conducted, and found no RIFA at or near the cave. Staff did note that some one had cut the fence. Staff responded by repairing the fence and increased the frequency of patrols. 2. RIFA were treated with boiling water, most of the ants were located at the parking lot, approximately 300 feet from the cave. 3. Rob Jackson, professor at Duke and Will Pockman, professor at the University of New Mexico continued their permitted access on water uptake of certain species of trees. 4. Conducted 4 cave faunal surveys. 5. BCP staff helped WSPDR staff collect soil samples which were tested for nitrates and nitrites. (Scott Hiers should provide a report on the results. 6. COA with the help of Will Pockman installed a new probe inside the cave. The probe measures temperature and humidity every 30 minutes in tandem with the outside temperature probe. Now it will be possible to determine exactly how outside temperature and humidity fluctuation influences the cave climate. This information could be useful in determining when a troglobitic species are likely to be found in relation to the weather. 6. City of Austin-Watershed Protection Staff collected cave

	sediment samples from cave for nitrogen compounds analysis
Disbelievers Cave 1. May need a cave gate, depending on the access situation.	Private 10a Permit: PRT-808694 (see FWS files for status)
District Park Cave Approved language: 1. On advice from James Reddell, this cave has an interior gate, blocking unpermitted access to the interior rooms, but not the first section of the cave. The cave has no true troglobitic species and few speleotherms due to heavy vandalism in 1996. The City of Austin-PARD has controlled access by a permit system since 1995. The COA should establish limits telling how many people can go into the first room and how often, and should also set limits for the number and frequency of visitation beyond the first room. 2. Continue semi-annual faunal survey in Spring and Fall and photomonitoring. 3. Work to control red imported fire ants 4. Survey the possible dangers and impacts of flooding on the cave. The cave receives considerable drainage after heavy rains Revised Correct language (2001): 1. On advice from James Reddell, this cave has an interior gate. The open portion of this cave has no troglobitic species and few speleotherms. An interior gate protects the species of concern and delicate formations. The City of Austin-PARD has controlled access by a permit system since 1995. 4. Survey the possible dangers and impacts of flooding on the cave. The cave may receives considerable drainage after heavy rains because of a new nearby flood retention facility which put the cave entrance in the 25 year flood plain.	City of Austin 1. Completed annual faunal survey at this cave. 2. Conducted site surveys quarterly. No red imported fire ants were noted in the cave. 3. Permitted access to this cave was allowed. 4. BCP staff noted violations of the access permit; the flagged trail was piled up in one spot and it appears that someone has been digging in the Aggie level. Because of these infractions access to this cave is currently limited to BCP staff. 5. TCMA reported that the cave did not see much usage from the caver community this year. This cave receives considerable local drainage. However, the cave is now in the hundred-year flood plain due to the construction of the regional detention pond downstream and the effectiveness of the rock gabions encircling the cave is in question. The problem of the crawlway to the gate silting up continues to be an ongoing issue. Though likely not feasible, in the opinion of the TCMA moving the gate to a narrow place approx. 10 feet from the entrance would alleviate the problem of having to excavate before even opening the gate.
Eluvial Cave 1. May need a cave gate, depending on the access situation	Private 10a Permit: PRT-808694 (see FWS files for status)
Flint Ridge Cave 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. This is a major recharge feature. 2. Needs protection such as a cave gate or fence that does not interfere with recharge 3. Because the cave is located near the extension of the Outer Loop and planned development, continue coordinating with the	City of Austin 1. BCP staff conducted 6 site visits and noted no signs of illegal trespass and no fire ant activity inside the cave, however fire ant mounds were noted within a 150 foot radius of the cave entrance. 2. Due to last year's flooding destruction in the cave, TCMA has reassessed its proposed monitoring site and will re-establish the monitoring program. 3. See Attachment B study by City of Austin

City of Austin, Barton Springs/Edwards Aquifer Conservation District and the Texas Department of Transportation.	(Nico Hauwert) on water quality and recharge contribution of the cave.
Fossil Cave 1. This cave was previously filled with large rocks, and should be dug out, resurveyed to determine what exactly is there. i and James Reddell believe that the current rocks in the entrance do allow for small mammal access and are appropriate. George Veni has questions about whether the cave should be opened and gated to allow for access for monitoring and other future research needs 2. Need to confirm the existence of endangered species 3. Monitor and control fire ants. 4. Interior needs to be mapped. 5. Coordinate protection efforts between Schroeter Park managers and PARD/Natural Resources Department about cave protection strategies (Schroeter Park is a low impact, minimally maintained park, consisting of nature trails near the caves, and managed much like a preserve).	City of Austin 1. The site was inspected once and no signs of vandalism or access were found, (the rocks had not been removed) on what is believed might be the cave. Other nearby karst features were in the same condition. 2. No red imported fire ant activity was observed at the cave entrance, however, mounds were found within a 150' radius of the cave. 3. BCP staff contacted the Division Manager of the site requesting that no new construction activities occur without consultation from BCP staff and that management of the areas adjacent to the karst features be limited to trash removal and the mechanical removal of weeds from the hiking trail. Pard agreed to these suggestions.
Fossil Garden Cave 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. Especially needs red imported fire ant control. 3. Needs a cave gate	Private
Gallifer Cave 1. Needs red imported fire ant control. 2. improved gate needed 3. The area surrounding and atop the cave should be maintained in its natural condition. 4. The critical area should be bermed on the uphill side if any neighboring development might drain its runoff into it. 5. The Gallifer Cave gate should be regularly inspected to minimize any unrestricted traffic that may breach it.	TSNL 1. New cave gate was installed several years ago. 2. Surrounding land to be sold to TC in 12/03.
Get Down Cave 1. Continue efforts to work with the developer to protect the entrance and the surrounding area as a park or preserve 2. Monitor the area during construction to prevent the dumping of construction material and other contaminants. 3. Monitor and control fire ants. 4. Continue to monitor the possible effects on the cave of the Longhorn Pipeline, a former crude oil line being converted to a gas line	Private/TCMA 1. The City of Austin entered into a Private Landowner Agreement with Lumberman's investment Corporation in July 2000 and with TCMA to manage the cave. The agreement sets aside an area to protect this cave and several others. The USFWS was involved in the discussions on protection area needed. 2. The existing cave gate was replaced with a much more esthetically pleasing gate. The old gate had altered the entrance sink entrance.

located in the drainage area 1500' away. An emergency response plan should be written (with TNRCC, the COA, BS/EACD) to plan to reduce the impact of a spill. 5. Reconstruct the gate to make the feature look more like a sinkhole. 6. Construct a perimeter fence around the proposed karst preserve. 7. The karst preserve should be managed with an emphasis on karst education.	The new gate design allowed for the restoration of the sink entrance. 3. The implementation of the Private Landowner Agreement in underway and seems to be working well. 4. An educational kiosk has been constructed. The committee put a lot of time and effort in drafting educational information for kiosks at the new preserve. This preserve will go a long way educating the public about caves, cave fauna and their importance, etc. 5. The BSEACD's work on the kiosk has been completed and the Davis Lane entrance kiosk has been fully put in place. 6. TCMA met with the developer's representative several times during the year to work on finishing up last details of the preserve (fencing, access, gates, and wet pond issues.). Items such as fencing and access have been resolved however, the wet pond issue and ownership still remains unresolved.
<u>Goat Cave Karst Preserve</u> 1. The gate will be removed and a fence installed to allow for bat use. Following this, the cave will be monitored for bat use (the COA in consultation with Bat Conservation international) and the COA will take appropriate action if there are access problems 2. Do semi-annual faunal surveys and photo monitoring 3. Monitor and control fire ants.	City of Austin 1. Completed biannual faunal survey and quarterly visits for presence/absence of bats (to date, no bats have been observed). 2. Due to concerns over illegal access, the fence was upgraded with the addition of 3 strands of barbed wire and no trespassing signs were added on all 4 sides. For aesthetic reasons the fence was painted black. 3. Surveyed for and treated RIFA with boiling water. 3. Conducted 12 site inspections. Once the fence was installed trash was no longer thrown into the cave. 4Allow permitted access to this cave. 5. delete 6. Trimmed trees at the entrance for better access for bat entry and exit. 7. TCMA reports that caver usage was very low this year. The preserve however experienced some small amount of vandalism mostly having to do with the destruction of signage.
<u>Hole-in-the-Road Cave</u> 1. Follow the recommendations in the hydrogeologic study by Veni and Associates 2. The surface and nonpoint drainage areas over the cave should be preserved in their natural state. This area should be considered the minimum for any preserve boundary that would be established and may need expansion 3. Any tunneling (as opposed to trenching) to place the proposed wastewater interceptor line should be done according to Veni and	Private

Associates recommendations 4. if any roads or facilities are built uphill of the drainage area, impermeable berms should be placed along the uphill margins to prevent the entry of runoff or spilled materials 5. Construction within a 100-m-radius of the caves may intersect related conduits and passages. Any such discoveries should be evaluated in consultation with USFWS1. The surface and nonpoint drainage areas over the cave should be preserved in their natural state. This area should be considered the minimum for any preserve boundary that would be established and may need expansion 6 Any tunneling (as opposed to trenching) to place the proposed wastewater interceptor line should be done according to Veni and Associates recommendations 7. If any roads or facilities are built uphill of the drainage area, impermeable berms should be placed along the uphill margins to prevent the entry of runoff or spilled materials 8. The cave should be gated	
<u>Ireland's Cave</u> 1. The cave is located on land planned for residential use adjoining a golf course. Meet with the developer to discuss possible protection measures 2. Needs a fence for protection and liability reasons 3. The cave receives considerable drainage and might qualify for TNRCC protection. Consult with TNRCC about this. Also the critical area should be bermed on the uphill side if any neighboring development might drain its runoff into it. 4. Educate researchers that this cave is a bad air cave (low O_2). Survey this during the winter months after a strong cold front 5. Surveys to determine which bat species are using the cave.	Private 1. A new subdivision; Somerset Estates, is being constructed around the cave. 2. City of Austin Watershed Protection and Development Review Department obtained 4. 819 acres critical environmental feature setback surrounding the cave. About 99% of the cave's natural catchment area is preserved. The entire 4.819 acres setback will be fenced with a combination of 6-ft wood and wrought fencing. 3. More info is needed on who will manage the cave. Need to ask about possible landowner agreement with BCP
<u>Jack's Joint Cave</u> 1. May need a cave gate, depending on the access situation	Private
<u>Japygid Cave</u> 1. Needs red imported fire ant control. 2. May need a cave gate, depending on the access situation	Private 10a Permit: PRT-808694 (see FWS files for status)
<u>Jest John Cave</u> 1. Need up-to-date fauna list from J. Reddell. 2. Do a annual faunal survey in the Spring. Also do cricket counts when possible 3. Continue red imported fire ant control.	City of Austin 1. Conducted 2 site visits found and no signs of vandalism or human visitation. 2. No red imported fire ants were present at the cave entrance, however, there were mounds within a 150' radius of the cave entrance.

	3. Conducted one cricket exit count.
<u>Jester Estates Cave</u> 1. Biological inventory needed from J. Reddell. 2. Replace the gate which is currently unsatisfactory - having no mammal access hole and other design problems. 3. Need a map of the cave interior; the "Jester Cave" map by Warton probably is Jester Pit. 4. Check the actual size and configuration of the preserve area set aside around the cave (in relation to the subsurface profile) to determine how best to protect the cave from neighboring development. The critical area should be bermed on the uphill side if any neighboring development might drain its runoff into it. 5. Natural vegetation should remain undisturbed in the cave preserve area. 6. Contact the owner and discuss cave protection concerns of PARD/Natural Resources Department (the adjoining landowner).	City of Austin 1. COA took over ownership of the property. The immediate neighbors purchased the 3 acre tract and donated it to the COA BCP. The neighbors paid for the property and a new property line survey, COA paid for a Environmental Assessment. 2. BCP staff removed a huge amount of brush and trash from the site. 3. BCP staff repaired the cave gate. 4. The site was treated for fire ants with boiling water (35 mounds were treated).
<u>Jollyville Plateau Cave</u> 1. Work to control the severe red imported fire ant infestation that was observed in July 1995. 2. Grid screens spaced over the entrance needs to be replaced by a proper gate	Private 10a Permit: PRT-808694 (see FWS files for status)
<u>Kretschmarr Cave</u> 1. Work to control the red imported fire ant infestation that was last treated in 1991 2. The critical area should be bermed on the uphill side if any neighboring development might drain its runoff into it. 3. The critical area is contained within the existing fence line and it should be maintained in its natural state. The cuts in the fence should be repaired. A new cave gate has recently been installed. 4. The Kretschmarr Sink should be kept open at least enough to drain its surface sinkhole. if the cave is sealed the sinkhole may pond and prevent water from reaching the cave fauna (Veni and Associates 1988). The sink should not be gated because the fence and entrance sign is adequate liability protection.	TSNL 1. TCMA reports the following needs: The cave gate and lock appear inoperative. A gap in the fence allows access. Need to coordinate with LCRA about any power line ROW clearing that might effect the caves since clearing in 2002 around the caves was extensive. 2. In 2003 TCMA reports the fence situation is still unsecured though the cave is now gated and secure.
<u>Kretschmarr Double Pit</u> 1. Needs a cave gate 2. The critical area should be bermed on the uphill side if any neighboring development might drain its runoff into it.	TSNL
<u>Lamm Cave</u> 1. Monitor the required 150' setback distance as the surrounding area is developed. 2. The critical area should be bermed on the	Section 7 Permit 2-15-93-F-075 (see USFWS files) USFWS considers this cave "taken".

uphill side if any neighboring development might drain its runoff into it. 3. May need a cave gate, depending on the access situation	
<u>Little Bee Creek Cave</u> 1. Protect the cave from visitors that build fires in the entrance (Russell (undated). 2. A gate across the entrance is not recommended, but one in the rear might be necessary . Because of the expense of building a conventional cave gate, perhaps large rocks could be used to partially block the entrance. 3. Construction for the expansion of the Ullrich Plant should avoid any activities that would cause harm to the cave or its species, such as erosion or run-off of contaminants. 4. A more thorough biological survey is needed 5. Periodically monitor the cave	City of Austin's Water and Waste Water Department 1. BCP staff conducted 2 site visits and noted no new vandalism or illegal activity. 2. W&WW are planning on fencing the area, thus reducing the number of people accessing the area. AWU site managers are also planning on gating the cave using a design provided by BCP staff. (Projected completion of the fence and cave gate is 3/04).
<u>Lost Gold Cave</u> 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. Obtain the recently produced cave interior map. 3. Monitor and control fire ants. 4. The loose rocks around the entrance should be removed to prevent vandalism to the wildlife entrance hole (Sanders and Reddell 1998). 5. Remove all trash, especially batteries from the cave .	Private
<u>Lost Oasis Cave</u> 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. Reevaluate the need for a hydro study. 2. Continue biological survey and exploration to determine the full extent of the cave. 3. Try to obtain the existing map from Bill Russell or TCMA for addition to Travis County's BCP Caves File. 4. Monitor and control fire ants.	TCMA In March of 2003 TCMA along with a karst invertebrate biologist and a biology class from the Univ. of TX-Austin monitored the cave for biological life. (See attachment)
<u>Maple Run Cave</u> 1. The BCCP 10(A) Permit requires that a hydrogeologic study be done to assist with management, including ecological conditions, use study, and management needs. This list of required caves is being reexamined and will require approval from USFWS to remove any caves from this list. i (1998) believes that a hydrogeologic study is not a high priority	City of Austin 1. Completed annual faunal survey. 2. Conducted 6 site visits, found no sign of unpermitted access, and on occasion, removed trash from the entrance. 3. Surveyed for and treated red imported fire ants with boiling water. 4. Permitted access to this cave is allowed. 5. BCP staff may curtail access to this cave

because most of the development near the cave has already occurred. 2. Frequently check cave gate and make needed repairs. 3. Work with Bill Russell to obtain a map of the cave.	due to concerns about the violation of the access permit (signs of mud thrown on walls and someone scratched the cave wall with a rock).
<u>McDonald Cave</u> 1. Probably needs a bat gate or fence. The cave gate design should allow for the return of the bats	Travis County 1. There is no plan for a cave gate because there is currently no access pressure. Staff did frequent site visits and no signs of vandalism were found to the cave entrance or in the cave (staff entered the cave once). 3. Installed fences, gate, and signs to protect this tract from unauthorized access. 3. Worked with BCP partners to start training county staff on karst species management, worked with partners to develop unified survey protocol. 4. Official karst monitoring will begin in 2004.
<u>McNeil Bat Cave</u> 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. Needs a bat gate or fence if the colony is being disturbed, unless it's a maternity colony, in which case a gate might cause problems	Private TCMA attempted to observe any bat flights from a remote location at the RR HS and did not sight any emergence from the cave locality.
<u>M.W.A. Cave</u> 1. Fire ant assessment and control needed. 2. Check if the cave is gated.	Private 10a Permit: PRT-808694 (see FWS files for status)
<u>Midnight Cave</u> 1. Do hydrogeologic study to assist with management, including ecological conditions, use study, and management needs. 2. Continue trash removal following a drought because the trash is currently under water. . 3. May need to improve the fence and add signs, depending on the access situation. 4. May want to include an educational signs since it would reach a wide audience	City of Austin 1. Conducted 8 site visits, found no sign of unpermitted access, and on occasion, removed trash from the entrance. 2. Surveyed for RIFA, found no activity at the entrance, however did note mounds within a 150-foot radius of the cave. 3. Permitted access is allowed at the cave. 4. Partially in response to a rescue of local high school kids who climbed over the fence, entered the cave, and then were rescued by the Austin Fire Department, PARD made additional safety improvements to the fence surrounding the cave. BCP staff also made improvements to the fence and added 2 additional "no trespassing" signs. (The trespassers were prosecuted for criminal trespass). 6**.** TCMA reported that of the dozen planned trips to Midnight Cave this year, only 4 trips were successful all others were aborted due to bad air.
<u>Moss Pit Cave</u> 1. Do hydrogeologic study to assist with	Private

management or acquisition, including ecological conditions, use study, and management needs. 2. Need more detailed location information. 3. Survey and map the cave interior. 4. May need a cave gate, depending on access situation. 5. Monitor and control fire ants. 6. Monitor for bats.	
<u>New Comanche Trail Cave</u> 1. Need an updated faunal survey. 2. Monitor the effects of runoff from the roadway and the surrounding area. 3. Survey, monitor, and control RiFA.	Private
<u>No Rent Cave</u> 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. May need a cave gate, depending on access situation.	Private
<u>North Root Cave</u> 1. Need to treat for the red imported fire ant problem that was last treated in 1991.	TSNL
<u>Pennie's Cave</u> 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. The entrance is filled. Need to find the entrance and reopen it. 3. Needs to be mapped. 4. May need a cave gate because of the amount of development planned nearby.	Private 1. The entrance is filled with rock, gravel and graded over and the cave may be lost. City Watershed Protection staff is aware of the issue and will require setbacks for its protection if/when development plans are submitted to the COA. The BCCP may still want to consider replacing this cave on the BCP list or begin work on a private landowner agreement to uncover /protect it. 2. TCMA reported that Scott Heirs, COA Watershed Protection obtained accurate GPS coordinates to the filled cave entrance and the owner has clearly expressed no interest in the cave ever being opened. It is the hope of TCMA that the BCCP will replace this covered cave with Grassy Cove or some other cave in need of BCCP protection (see TCMA report). 3. TCMA reported that Grassy Cove Cave, a cave which would benefit from protection through the BCP, is now owned by the Circle C Neighborhood Assoc. and the entrance to this cave is featured as the entrance photo in the City of Austin Watershed Protection's new poster titled "Austin Underground".
<u>Pickle Pit Cave</u> 1. Needs to be mapped.	Section 7 Permit 2-15-93-F-075 (see USFWS files)

2. Monitor and control fire ants.	City of Austin Staff was unable to locate the cave in 2003. An accurate GPS location is needed.
<u>Pipeline Cave</u> Because local drainage does enter and pass through the cave, but without distinct surface channels, the area contributing recharge to the cave is difficult to determine. Pending a more definitive determination of the drainage area, sources of organic input to the cave, and the type of construction anticipated in the vicinity, the following should be done: 1. Establish setbacks extending at least upslope to the pipeline and the area around the cave should remain undeveloped so that organic material will continue to enter the cave. 2. Prevent upslope erosion into the cave. 3. Replace the grate with a cave gate. 4. Meet with the developer to discuss possible protection measures. 5. Remove trash after rain events 6. Continue to monitor any effects on the cave by the "Rancho" crude oil pipeline. This cave is very near and in the drainage of this pipeline	Private TCMA had a meeting with the Stratus Development Group and has been assured that the cave will be set aside and that the previously planned large commercial development on that tract will likely be scaled down to accommodate the cave.
<u>Rolling Rock Cave</u> (The cave was supposed to be protected as part of a 10(a) to be located on the Austin Simon tract. However, the actual location of the cave was determined to be on the adjoining COA Lime Creek Preserve tract. The City of Austin has taken over ownership of the Austin Simon tract.1The City of Austin manages Rolling Rock cave and has never received compensation from TPWF for this task.2. Do a annual faunal survey in the Spring. 3. Monitor and control fire ants.	City of Austin 1. This cave was inspected twice, and no sign of human visitation or vandalism was found. 2. Was inspected for red imported fire ants, none were present at or near the cave entrance, but did find several species of native ants. RIFA mounds were found within a 150' radius of the cave entrance.
<u>Root Cave</u> 1. Need to treat for the red imported fire ant problem that was last treated in 1991. 2. May need a cave gate, depending on access situation.	TSNL TCMA provided a new detailed map of Root Cave, the previous map combined both Root and North Root Caves on one map (see Tooth Cave). A Wal-Mart is proposed to be built on the site drop gradient of cave.
<u>Slaughter Creek Cave</u> 1. The cave will need a gate because of its obvious location near subdivision. 2. Since the cave receives considerable drainage, monitor runoff from surrounding development. 3. Need a map of the cave interior. 4. A cave gate is being constructed for this cave. 5. Need a thorough biological survey .	City of Austin 1.Quarterly site inspections were conducted. 2. The entrance was inspected to make sure that no human access had occurred. 3. The site was also inspected for RIFA infestations. On all visits fire ant mounds were found in close proximity of the cave entrance, however, ants did not appear to be entering the cave. 4. Conducted a cricket exit count.

6. Monitor and control fire ants.	5. TCMA made several inspection visits to the entrance of the cave. Things appear unchanged.
Spanish Wells Cave 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. Determine more precise location of the cave 3. Do faunal survey.	Private
Spider Cave 1. Need a map of the cave interior. 2. Monitor and control fire ants.	City of Austin 1. 2 site visits were conducted, and no sign of human access, or vandalism was found. 2. Surveyed for red imported fire ants, found no activity at or near cave entrance, but did find mounds within a 150' radius.
Stark's North Mine 1. Littered with junk and refuse left by neighborhood children and needs cleanup. 2. Needs a cave gate because it presents a potential safety hazard for neighborhood children. TCMA needs (2003) 1. Need to establish new landowner relations, if tract has been sold.	Private 1. TCMA reports that they visited the mine and it appears undisturbed. TCMA was contacted about sewer line construction in the vicinity, and the engineer of the project was advised of the sensitivity of this locality. 2. TCMA reports the tract of land where the cave is has been put on the market. It is unknown at this time if the land has sold and what the status of the cave will be after the new owner takes possession. 3. City of Austin accurately GPS the cave position. Trash was visible inside the cave passage.
Stovepipe Cave 1. Probably needs red imported fire ant control. 2. Developer or MUD has fenced the preserve with an inadequate 4-strand barbless wire fence. Check to see if the 55-acre karst preserve is being protected. Encourage them to place an adequate fence or cave gate to protect the cave. 3. Monitor the 10(a) holder's management of the cave that is required by their permit.	Section 7 Permit 2-15-93-F-075 (see USFWS files) 1. In 2002 James Reddell did a biological study of cave fauna and initial monitoring found the cave in good shape. 2. COA BCP staff noticed that the fence was cut into the preserve allowing for illegal vehicular access. BCP staff contacted Canyon Creek and USFWS regarding this issue (to date, the fence has not been repaired). 3. COA BCP staff noticed what appears to be a potential natural gas line leak adjacent to the preserve (dead trees near the valve). This was reported to Southern Union Gas and to USFWS.
Talus Springs Cave 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. Need a map of the cave interior. 3. May need a cave gate, depending on access situation.	Private 1. The 10a permit PRT 815447 mitigation requirement intended this cave to go to Travis County, however, the cave is located on private land just outside of the mitigation area. The developer Pulte Holmes has done nothing to donate the land and cave to Travis County. In 2003, Travis County has been in negotiation

	with Pulte Homes and the Homeowners Association about donating the cave to Travis County and they are interested in this idea but not completed yet. 2. In 2003, Travis County staff regularly checked the cave entrance. The temporary fencing and signs have been repeatedly vandalized and yard clippings dumped near the cave entrance and the owner was informed of the problem. 3. Plans for constructing a cave gate and 8' fencing are underway with Pulte and the HOA.
<u>Tardus Hole Cave (Kretschmarr Fluted Sink)</u> 1. Obtain faunal list and endangered species list from Reddell. 3. May need a cave gate, depending on access situation.	TSNL
<u>Tooth Cave</u> 1. Improved gate needed (remove expanded metal on gate, roughen interior or animal access hole) . The cave gate design should allow for the return of the bats. 2. The hydrologically critical area of Tooth-Russell Cave should be maintained in its natural state 4. The critical area should be bermed on the uphill side if any neighboring development might drain its runoff into it. 5. Need to treat for the red imported fire ant problem that was last treated in 1991.	TSNL TCMA reported on a 2003 visit where they noticed that the filled entrance to Russell Cave, which connects to Tooth Cave appeared to have had several rocks removed and this could increase air circulation. Recommends that the rocks be replaced.
<u>Weldon Cave</u> 1. Do hydrogeologic study to assist with management or acquisition, including ecological conditions, use study, and management needs. 2. Determine the location more precisely. The cave reportedly has its entrance in Travis County and terminal room in Williamson county. 3. May need a cave gate, depending on access situation.	Private
<u>Whirlpool Cave</u> 1. Do hydrogeologic study to assist with management, including ecological conditions, use study, and management needs. 2. Prior to the construction of the present gate, the cave received large amounts of floodwater, acting as a major recharge site. Changes in gate design should follow the recommendations of the hydrogeologic study. One possibility might include constructing a recharge shaft in the creek bed near the entrance. Water flowing into the cave could be controlled so that only good quality water would	TCMA 1. Conducted a biological survey in December 2003. 2. Controlled and monitored public access. 3. Planning to relocate the survey areas in 2003. 4. Education usage of the cave continues to be very regular and high as compared to the other Austin area caves. The main groups utilizing the cave are The Austin Nature Center, The University of Texas, Texas State University, Texas A&M, and various outdoor groups from around central Texas. This cave has

be recharged. 3. Monitor the cave to evaluate the effect or non-effect of human visitation. Continue doing faunal surveys. 4. Monitor and control fire ants. 5. TCMA should complete the draft management plan which will include plans to monitor the effects on the cave of the development on the adjacent property, including utility trenches, a sewer line that crosses the property which may cause contamination and other excavations	tremendous potential as an educational resource and receives in excess of 1000 visits annually and observations indicate that visitor impact to be minimal.

8.0 RECOMMENDATIONS

In addition to the specific cave actions listed above, the following recommendations are to assist the BCCP permit holders to meet the obligations of the permit:

- Have regular meetings of the BCCP Karst Management group to work on various issues.
- BCCP partners should work with TSNL and TCMA to discuss possible options for protecting the TSNL caves. Determine if TSNL is an effective organization to protect the 7 TSNL caves. Coordinate with Nevenna Travis and James Reddell.
- BCCP partners should work with TCMA and USFWS to discuss replacing Pennie's Cave with another important cave for BCCP protection since it appears that this cave has been lost.
- BCCP partners should work to get the Cave X management plan operational. BCCP partners assist with discussions between Travis Country residents and Regent's School to clear up any controversy that will allow the cave management plan to go into effect (currently in progress).
- BCCP partners should decide what to do about Fossil Cave in Schroeder Park. Decide if the cave can be relocated and then monitored and if not, replaced with another cave on the BCCP list. Coordinate any decision with the appropriate groups.
- BCCP partners should work on developing private landowner agreements to protect additional caves listed here as "private".
- BCCP partners should work with USFWS to determine the status of caves with individual 10a permits, and get copies of the annual karst reports required under their permits. Contact and visit these 10a permit caves to assess their status. Encourage USFWS to enforce the requirements of these permits to protect these caves.

SPECIAL THANKS

TCMA continued to provide valuable volunteer support activities to the BCCP and Central Texas cave protection efforts. The BCCP partners greatly appreciate their dedication and hard work to protect the caves and karst species of this area.

8.0 LITERATURE CITED

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U.S. Fish and Wildlife Service. 1994. Endangered Karst Invertebrates (Travis and Williamson Counties): Recovery Plan.

ATTACHMENT A:

Texas Cave Management Association (TCMA)
December 2003

Submitted by: Julie Jenkins and Bill Russell, TCMA

WHIRLPOOL CAVE

Whirlpool Cave is utilized primarily for educational/recreational activity by the City of Austin Nature Center and other outdoors and nature related organizations. Other uses include safety and fire rescue training, science monitoring for the TCMA and BCP and caver training by local Texas cave grottos. The cave is typically visited on a weekly basis by one or more organizations. In the fall new cavers receive training and experience in Whirlpool. Groups using the cave stay to the well-worn path and seldom if ever stray from the established route. Visits may take as little as an hour or last for several hours, depending on the educational needs, age and background of the group touring the cave. Whirlpool received 1079 registered visitors in 2003.

Bill Russell and Julie Jenkins, TCMA staff, performed a biological survey in April 2003. Year 2003 was even dryer than last year. By the end of 2003 the rainfall will be over 10 inches below normal. Observations of the routine cave critters decreased slightly over last year presumably due to the drier conditions. This seems to have especially affected the entrance area, it's drier and the numbers of Slimy Salamander sightings was down.

Last year'plan to relocate one of the monitoring sites to include an area that was more damp has been postponed so that the effective dryness will be evident in the survey. Having observed various areas within the cave during this current dry period our intent is to add the old south bypass route as it is little used and is thought to have permanent pools. Observations from the Nature Center staff, Shannon Kennedy noted that the permanent pool was dry in the late spring of 2003.

LOST OASIS CAVE

In March of 2003 TCMA accompanied University of Texas doctoral student Jean Krejca, and TA Kate Walker, along with 5 biology students to monitor critters in the cave. This is greatest number of visitors to the cave in several years. Historically, Lost Oasis, a small cave has been monitored for its biology and has had little interest from local cavers.

Considerable numbers of animals were found presumably due to the favorable moisture conditions following several days in the spring of light rain. The cave has air-flow and the moist air in the cave has likely attracted cave animals to the entrance area of the cave.

GET DOWN CAVE

The annual Spring Cave Day was held at the Western Oaks Karst Preserve. This year it was decided to use Live Oak Cave, a non BCP cave located within the preserve as the premier cave that people could enter. The event like last year was a tremendous success with over 450 people visiting the preserve. The City of Austin, Travis County, TPWD, Bat Conservation International, The Lady Bird Johnson Wildflower Center, the Barton Springs Edwards Aquifer Conservation District, and other agencies were present to educate the Western Oaks neighbors and the city of Austin visitors about the importance of our water and the caves thru which the water flows.

Through the repeated efforts of the TCMA, Lumbermen's Investment Corp., the developer finally agreed to replace the old, unattractive cave gate. This gate was completed in May of 2003. The new gate, while not being bat friendly at the very least allows for observation into the entrance room of the cave.

CITY OF AUSTIN- GOAT CAVE KARST PRESERVE, DICK NICHOLS PARK AND THE SLAUGHTER CREEK METROPOLITAN PARK

The TCMA does not "officially" manage any of the city owned caves, we do provide valuable volunteer support activities one such activity is monitoring access to these caves.

TCMA administered access permits for the following caves in 2003:

Maple Run Cave: 105
Goat Cave: 25
Midnight Cave: 12 successful visitors, 4 aborted attempts to enter due to bad air and 3 gas monitoring trips from the surface only which indicated oxygen levels below 19%
District Park: 0
Get Down: 4

ATTACHMENT B:

UPDATE ON FLINT RIDGE CAVE SURFACE CATCHMENT RESEARCH

By Nico Hauwert, Hydrogeologist
City of Austin Watershed Protection and Development Review Department
December 2003

Introduction

Flint Ridge Cave is a 1,038 feet long, 154 feet deep cave, located on the City of Austin-owned Tabor tract in south Travis County. The surface catchment area to Flint Ridge cave has not been definitively determined. George Veni & Associates (2000) estimated the surface catchment to be about 40 acres in size. Using a field GPS survey and available two-feet contour interval surface contour map, the surface catchment area may be as large as 53 acres in size (Figure 1). Further refinement of the surface catchment is possible through detailed surveying, additional GPS surveys, and examination of surface flow during and after significant rain events. The sinkhole basin is drained internally, such that no runoff from its drainage area ever generates runoff to nearby Bear Creek. Flint Ridge Cave contains cave invertebrate species of concern and is listed on the Travis County/City of Austin joint Balcones Canyonlands Conservation Plan submitted to U.S. Fish and Wildlife.

The drainage basin to Flint Ridge may potentially be affected by disturbance associated with the proposed State Highway 45 South. Vegetation clearing for the proposed highway is expected to begin by Fall of 2004. It is not known how drainage will be routed from Highway 45 near the cave, or the effects of the highway construction and regular operation on the recharge water quantity and quality to Flint Ridge Cave.

Monitoring of the water flow entering Flint Ridge Cave has occurred since May 2003. The goals of this monitoring include:

1) Establish background and transient water-quantity to Flint Ridge through the course of highway construction and operation to measure changes that can potentially affect cave invertebrates and recharge to Barton Springs Edwards Aquifer.
2) Measure the recharge contribution of an upland sinkhole for purposes of improving existing water balances aquifer-wide.

Flow Monitoring Design

Surface runoff from the Flint Ridge drainage area enters the sinkhole rim through three main drainages and two minor drainages (Figure 2). Over 90% of the surface flow to the entrance of Flint Ridge cave flows through these three major drainages. By individually monitoring

the flow passing each or the three major drainages, the monitoring system will be more sensitive to changes in flow due to land use affecting a particular drainage. Furthermore, flumes and weirs will be placed at higher elevations than at the location where the drainages converge, avoiding problems of water backing up and inundating the monitoring structures. High water marks observed in the sinkhole after the early July 2002 floods indicated water backed up about 2 feet high inside the rim. Therefore, to avoid floodwaters backing up into the flumes and affecting the flume's ability to measure flow, the cave entrance will require a different gate than the wooden one that restricts flow within the sinkhole drain. A new gate is proposed to be installed inside the cave in January 2004 that hopefully will allow a higher rate of flow to enter the cave entrance.

The two largest drainages to Flint Ridge Cave are outfitted with monitoring structures consisting of two-foot high H flumes. Flumes are generally preferable to weirs since they have a larger range of accurate flow measurement and they do not backup or restrict the flow under the expected flow conditions. Weirs require the accumulation of a sufficient volume before flowing over the notch where measurement can occur. However, weirs can slow potentially erosive flows and trap some amount of sediment and for this purpose was selected for the smallest of the major drainages (D3), which directly drains the closest portion of the Highway 45 right-of-way to the cave entrance. The weir for drainage D3 was cut from unpreserved ¾ inch plywood.

Flow monitoring is accomplished with three Isco bubbler flow meters each powered by 12-volt marine deep cycle battery. The water level of each of the three major drainages is continuously measured at 5-minute intervals by the meters and directly relates to flow rate in each of the structures (2 flumes and 1 weir). The batteries are recharged with a single solar panel. A light-weight retention wall, constructed out of ¾" untreated plywood was cemented upright with metal posts and located at the upstream side of the flume. The retention wall insures flow does not bypass the flumes or weir. Rainfall is currently measured on the site using a visually read rain gauge. A tipping bucket rain gauge is proposed to be installed and maintained by the Barton Springs/Edwards Aquifer Conservation District in January 2004.

Because of the sensitivity of Flint Ridge Cave as a preserve for karst species of concern, the construction of the monitoring station required particular consideration. A similar flow station was construction first at nearby Headquarter Flat sink, so that the land-disturbance involved with such a station can be appreciated and minimized. The construction of the monitoring sites required minor trenching for the retention wall footing and for the placement of conduit piping used to convey and protect the bubbler and sampling lines. The retention

walls and berms serve to reduce sediment loading to the cave. Ground disturbance was minimized as much as possible to avoid the introduction of additional sedimentation to the cave as well as interference with potential future water-quality monitoring goals. The materials used in construction were carefully examined to minimize the potential for cross contamination of monitored parameters and to prevent the introduction of potentially toxic materials to the cave. Hence polyvinyl glue, wood containing preservatives such as arsenic or chromium, and other identified contaminated materials were not used. Because of the poor condition of the access road to the sinkhole site, access to Flint Ridge Cave may be limited to foot traffic during wet conditions. Due to the precautions taken during construction and lack of heavy rainfall during the time required for the site to stabilize, no sediment plumes or other disturbed materials have been observed to enter the cave since construction began on the monitoring station in December 2002.

Since the Flint Ridge flow station was operational in May 2003, rainfall has been limited to about 1.5 inch events or less and there has been little evidence of surface flow to the cave entrance. During this period of only minor rainfall events, recharge to the cave may be limited to diffuse infiltration through the soils within the subsurface catchment area. The monitoring system at Flint Ridge does not directly measure the portion of diffuse infiltration. However, a second research site on City of Austin J-17 Water-Quality Protection Land, is collecting more detailed data that can potentially be applied to Flint Ridge. The J-17 site is only about 1 mile north of Flint Ridge. The J-17 site contains Headquarter Flat sinkhole that has a 36-acre internal drainage surface catchment area. Flow to this cave has been monitored similar to flow monitoring at Flint Ridge since late June 2002. Relatively large rain events occurred during the first 7 months of the operation of HQ Flat flow station, where significant flow to both HQ Flat and Flint Ridge caves were observed. HQ Flat cave can serve as an undisturbed paired microwatershed to help quantify possible effects to the surface flow to Flint Ridge, in the event the Flint Ridge surface drainage area is impacted prior to the collection of long-term background data. Furthermore, the HQ Flat sink research site is outfitted with University of Texas-owned sensors on a 40-foot high tower that directly measure evapotranspiration using eddy covariance techniques. Direct measurement of the discrete flow to HQ Flat Cave, rainfall within the HQ Flat sink surface catchment, evapotranspiration, and changes in soil-moisture storage allow the calculation of diffuse infiltration that can be applied to estimate the quantity of diffuse infiltration at Flint Ridge Cave.

Water Quality Monitoring

In the event that roadway runoff from Highway 45 south is diverted to the surface or subsurface catchment of Flint Ridge cave, it would be desirable to know the water quality of the runoff to the cave entrance and diffuse infiltration through cave drips during background, construction, and traffic phases of proposed Highway 45 South. Water-quality monitoring of the surface flow to Flint Ridge Cave is currently beyond the scope of the current recharge study of Flint Ridge, and be may be possible through NPDES monitoring that TxDOT regularly performs for its permit. The City of Austin Wildlands Conservation office of the Water Wastewater Utility is seeking to conduct limited water-quality monitoring of drips inside Flint Ridge Cave.

Literature Cited

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ATTACHMENT C:
KARST FAUNAL REPORTS:

TEXAS CAVE MANAGEMENT ASSOCIATION

Surveyor(s): B. Russell, J. Jenkins Date: April 12, 2003

Surface Temperature: 70's Surface Humidity: high Weather Conditions: dry

Cave: **GET DOWN CAVE** Survey Section: A. Discovery Landing

Time Stated: 9:30 noon Time Ended: 10:00pm

☐ *Solenopsis invicta* (fire ant) Infestation: NO x YES ☐ Heavy ☐ Moderate ☐Light

☐ Vandalism: NO x YES ☐ Gate ☐ Broken Speleothems ☐ Grafitti

Cave Temperature: _____°F (C) Cave Humidity: _____°F (C)

Air Flow: ☐ In x Out

FAUNAL SURVEY

SPECIES	COUNT	OBSERVATIONS
Spiders: Circurina	3	
Wall Web		
Harvestman: L. townsendii		Near entrance but not in survey area
*Texella mulaiki		
Millipedes: Cambala speobia		
*Speodesmus sp. "small"		
*Speodesmus sp. "large"		
Cave Crickets: Ceuthophilus sp. B		
Ceuthophilus secretus	12	
Ceuthophilus cunicularis		
Ceuthophilus nymphs	4	
Springtails: Collembola sp		
Silverfish: Texoreddellia tex.		
Beetles: Coleoptera sp		
*Rhadine austinica	2	
Flies: Diptera		
Scorpion: V. redelli		
Snails: Gastropoda		Empty snail shells
Salamander: Plethodon glutinosus		
Cliff Chirping Frog: Syrrhophus marnocki		
Rattlesnakes: Crotakus atrox		

☐ Section Map of Survey Area attached

☐ Photographs taken? (please provide copies of photos with titles for this report)

* Use the back of the report for additional notes and comments.

TEXAS CAVE MANAGEMENT ASSOCIATION

Surveyor(s): B. Russell, J. Jenkins Date: April 12, 2003

Surface Temperature: 70's Surface Humidity: high Weather Conditions: dry

Cave: **GET DOWN CAVE** Survey Section: B. South end of Canon del Blanco Vista

Time Stated: 11:00 noon Time Ended: 11:30pm

☐ *Solenopsis invicta* (fire ant) Infestation: NO x YES ☐ Heavy ☐ Moderate ☐Light

☐ Vandalism: NO x YES ☐ Gate ☐ Broken Speleothems ☐ Grafitti

Cave Temperature: _____°F (C) Cave Humidity: _____°F (C)

Air Flow: ☐ In x Out

FAUNAL SURVEY

SPECIES	COUNT	OBSERVATIONS
Spiders: Circurina		
Wall Web		Webs but, no spiders
Harvestman: L. townsendii		
*Texella mulaiki		
Millipedes: Cambala speobia		
*Speodesmus sp. "small"	2	1 on candle remnant,
*Speodesmus sp. "large"		
Cave Crickets: Ceuthophilus sp. B		
Ceuthophilus secretus	12	Along right canyon wall
Ceuthophilus cunicularis	5	Along right canyon wall
Ceuthophilus nymphs	several	Right canyon wall jumping all over
Springtails: Collembola sp		
Silverfish: Texoreddellia tex.		
Beetles: Coleoptera sp		
*Rhadine austinica	2	In pulveralite on floor when first entering area, later none were to be found
Flies: Diptera		
Scorpion: V. redelli		
Snails: Gastropoda		Empty snail shells
Salamander: Plethodon glutinosus		
Cliff Chirping Frog: Syrrhophus marnocki		
Rattlesnakes: Crotakus atrox		

☐ Section Map of Survey Area attached

☐ Photographs taken? (please provide copies of photos with titles for this report)

* Use the back of the report for additional notes and comments.

TEXAS CAVE MANAGEMENT ASSOCIATION

Surveyor(s): __B. Russell, J. Jenkins_____ Date: _____May 10,2003_____

Surface Temperature:__80's_____ Surface Humidity: _____ Weather Conditions:____partly cloudy, no major change_____

Cave: ____**WHIRLPOOL CAVE**_____ Survey Section:___A. Natural Bridge_____

Time Stated: __10a.m_____ Time Ended:___10:30am_____

☐ *Solenopsis invicta* (fire ant) Infestation: NO__x__ YES___ ☐ Heavy ☐ Moderate ☐Light

☐ Vandalism: NO_x___ YES___ ☐ Gate ☐ Broken Speleothems ☐ Grafitti

Cave Temperature: _____°F (C) Cave Humidity: _____°F (C)

Air Flow: ☐ In ☐ Out

FAUNAL SURVEY

SPECIES	COUNT	OBSERVATIONS
Amphipods: Stygobromus sp.		Area was very dry and no bugs were observed on initial inspection of area. The survey was not completed.
Isopods: Trichoniscidae		
Spiders: Circurina		
Wall Web		
Harvestman: L. townsendii		
*Texella mulaiki		
Millipedes: Cambala speobia		
*Speodesmus sp. "small"		
*Speodesmus sp. "large"		
Oxidus gracillis (hothouse millepede)		
Cave Crickets: Ceuthophilus sp. B		
Ceuthophilus secretus		
Ceuthophilus cunicularis		
Ceuthophilus nymphs		
Springtails: Collembola sp		
Silverfish: Texoreddellia tex.		
Beetles: Coleoptera sp		
*Rhadine austinica		
Flies: Diptera		
Scorpion: V. redelli		
Snails: Gastropoda		
Salamander: Plethodon glutinosus		
Cliff Chirping Frog: Syrrhophus marnocki		
Rattlesnakes: Crotakus atrox		

☐ Section Map of Survey Area attached

☐ Photographs taken? (please provide copies of photos with titles for this report)

* Use the back of the report for additional notes and comments.

TEXAS CAVE MANAGEMENT ASSOCIATION

Surveyor(s): __B. Russell, J. Jenkins_____ Date: _____May 10,2003_____

Surface Temperature:__80's_____ Surface Humidity: _____ Weather Conditions:____partly cloudy, no major change_____

Cave: ____**WHIRLPOOL CAVE**_____ Survey Section:___B. Entrance to County Travis Room_

Time Stated: __11a.m_____ Time Ended:___11:30am_____

☐ *Solenopsis invicta* (fire ant) Infestation: NO__x__ YES___ ☐ Heavy ☐ Moderate ☐Light

☐ Vandalism: NO_x___ YES___ ☐ Gate ☐ Broken Speleothems ☐ Grafitti

Cave Temperature: _____°F (C) Cave Humidity: _____°F (C)

Air Flow: ☐ In ☐ Out

FAUNAL SURVEY

SPECIES	COUNT	OBSERVATIONS
Amphipods: Stygobromus sp.		
Isopods: Trichoniscidae		
Spiders: Circurina		
Wall Web		
Harvestman: L. townsendii		
*Texella mulaiki		
Millipedes: Cambala speobia		
*Speodesmus sp. "small"		
*Speodesmus sp. "large"		
Oxidus gracillis (hothouse millepede)		
Cave Crickets: Ceuthophilus sp. B		
Ceuthophilus secretus	5	Ceiling along room
Ceuthophilus cunicularis	1	Floor just after entering area
Ceuthophilus nymphs		
Springtails: Collembola sp		
Silverfish: Texoreddellia tex.		
Beetles: Coleoptera sp		
*Rhadine austinica	3	Off path on the right side, moving fast
Flies: Diptera		
Scorpion: V. redelli		
Snails: Gastropoda		
Salamander: Plethodon glutinosus		
Cliff Chirping Frog: Syrrhophus marnocki		
Rattlesnakes: Crotakus atrox		

☐ Section Map of Survey Area attached

☐ Photographs taken? (please provide copies of photos with titles for this report)

* Use the back of the report for additional notes and comments.

TEXAS CAVE MANAGEMENT ASSOCIATION

Surveyor(s): __B. Russell, J. Krejca, K. Walker_____ Date: _____March 3, 2003_____

Surface Temperature:__50's_____ Surface Humidity: _____ Weather Conditions:_cloudy, light rain,

Cave: ____**Lost Oasis Cave**__ Survey Section:___Entire Cave_____

Time Stated: __10a.m_____ Time Ended:___11:30am_____

☐ *Solenopsis invicta* (fire ant) Infestation: NO__x__ YES___ ☐ Heavy ☐ Moderate ☐Light (mounds but, no active individuals)

☐ Vandalism: NO_x___ YES___ **x** Gate ☐ Broken Speleothems ☐ Grafitti

Cave Temperature: _____65_____°F (C) Cave Humidity: _____°F (C)

Air Flow: ☐ In ☐ Out

FAUNAL SURVEY

SPECIES	COUNT	OBSERVATIONS
Amphipods: Stygobromus sp.		
Isopods: Trichoniscidae	2	large
Spiders: Circurina	Numerous	Blind and eyed species
Wall Web		
Harvestman: L. townsendii		
*Texella mulaiki		
Millipedes: Cambala speobia	10	
*Speodesmus sp. "small"	5	
*Speodesmus sp. "large"		
Oxidus gracillis (hothouse millepede)		
Cave Crickets: Ceuthophilus sp. B		
Ceuthophilus secretus	200	On ceiling near entrance
Ceuthophilus cunicularis	10	
Ceuthophilus nymphs	Numerous	
Springtails: Collembola sp	30	
Silverfish: Texoreddellia tex.		
Beetles: Coleoptera sp		
*Rhadine austinica		
Beetles? Staphylinid	1	
Beetles?	2	Small brown surface dwellers?
Flies: Diptera		
Scorpion: V. redelli	1	2 surface scorpions sighted
Snails: Gastropoda	Several	Live tightly curled

Salamander: Plethodon glutinosus		
Cliff Chirping Frog: Syrrhophus marnocki		
Rattlesnakes: Crotakus atrox		
Monarail worm	1	
Fungus mats	5	
Psocoptera	1	Looks like large collembolan with bulbous abdomen.

☐ Section Map of Survey Area attached

☐ Photographs taken? (please provide copies of photos with titles for this report)

* Use the back of the report for additional notes and comments.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 10/28/02 No. of pages: 3

Location: Airman's cave GPS coordinates (NAD 1983)_____ Section No. 2

Time Started: 2:18 pm Time ended: 2:46 pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) graffiti

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☒ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☒graffiti

Temperature Inside: 67º F Outside:_____ Humidity Inside: 97% Outside: _____
Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) see section 1

Organic matter encountered in survey area: small amounts of mammal scat.

Surface area moisture conditions: (dry, dripping, pools) dry

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*			
Earthworms: *Haplotaxida*			
Isopods: *Oniscoidea*			
Scorpions: *Vaejovis reddelli*			
Spiders: wall web	5		
Cicurina sp.	17	Under rocks	
Eidmannella sp	4		
* *Texella spinoperca*		On floor	Found in-between sections 1 and 2. Collected for DNA work for clarification on species.
Cambala speobia	1	Under rock	
* *Speodesmus sp*.	4	Under rocks	
* *Rhadine austinica*	6	Under rocks & in the open (floor, and walls)	9 noted in-between sections 1 & 2. One in plot was injured.
Rove beetles: *Orus rubens*	1		
Texoreddellia texensis			
Springtails: *Collembola*	9		
Crickets*: Ceuthophilus secretus*			
Ceuthophilus sp. B	4		
Ceuthophilus cunicularis	2		
Ceuthophilus nymphs	9		
Blow flies: *Calliphora* accident			
Fungus gnats	1		
Plethodon albagula			4 noticed in-between sections 1 & 2.

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒

☐ Photographs taken? How many? _____ If so, attach to this report.

We took a photo of the Texella that we collected. (See back)
We noticed more *Rhadine* beetles than usual, probably the highest # of any of our surveys.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 10/28/02 No. of pages: 3

Location: Airman's cave GPS coordinates (NAD 1983)_____ Section No. 3

Time Started: 3:35 pm Time ended: 3:58 pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism)

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: 68.5º F Outside:_____ Humidity Inside: 100% Outside: _____
Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) see section 1

Organic matter encountered in survey area: nothing.

Surface area moisture conditions: (dry, dripping, pools) dry

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*			
Earthworms: *Haplotaxida*			
Isopods: *Oniscoidea*			
Scorpions: *Vaejovis reddelli*			
Spiders: wall web	2		
Cicurina sp.	2	Under rocks	
Eidmannella sp			
* *Texella spinoperca*			
Cambala speobia		Out in the open	Several noted in nearby Aggie art gallerie
* *Speodesmus sp*.		Out in the open	Several noted in nearby Aggie art gallerie
* *Rhadine austinica*			
Rove beetles: *Orus rubens*			
Texoreddellia texensis			
Springtails: *Collembola*			
Crickets*: Ceuthophilus secretus*			
Ceuthophilus sp. B			
Ceuthophilus cunicularis			
Ceuthophilus nymphs	3		
Blow flies: *Calliphora* accident			
Fungus gnats			
Plethodon albagula			

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒

☐ Photographs taken? How many? _____ If so, attach to this report.

Survey area was very dry and lacked organic material, however, we noticed several *Speodesmus* and *Cambala* nearby at the "Aggie Art Gallerie." This area was loaded with fungus located on old candle wax.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 10/28/02 No. of pages: 3

Location: Airman's cave GPS coordinates (NAD 1983)_____ Section No. 1__ _____
Time Started: 12:55 pm Time ended: 1:15 pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) small amount of vandalism

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☒ Vandalism If so, ☒ trash ☐ speleothems ☐ gate ☒ graffiti

Temperature Inside: 65.5º F Outside: 68º F Humidity Inside: 95% Outside: 90% @ 12:15

Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) Recent flooding of nearby creek which had minimal to no impact on the cave.

Organic matter encountered in survey area: Small amounts of old mammal scat.

Surface area moisture conditions: (dry, dripping, pools) mostly dry, but some dripping

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*	2		
Earthworms: *Haplotaxida*	1		
Scorpions: *Vaejovis reddelli*	2		
Spiders: wall web	3		
Cicurina sp.	5	Under rocks	
Eidmannella sp	26		
Millipedes: *Diplopoda* accident	2		
* *Rhadine austinica*		Walking on floor	1 was noted in-between section 1 and the entrance of the cave, (we have never seen one that close to the entrance)
Rove beetles: *Orus rubens*	6		
Springtails: *Collembola*	5		
Crickets*: Ceuthophilus secretus*	1		
Ceuthophilus sp. B	38		
Ceuthophilus cunicularis	6		
Ceuthophilus nymphs	63		
Fungus gnats	4		
Plethodon albagula	5		All were very tiny juveniles
Pipistrellus subflavus			One dead individual was found in-between section 1 and the entrance.

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒

The new trash was very minimal and non-toxic, the major concern we had was the new graffiti which we removed and took a photo of. (See photo on back) It had been over a year since we were here last and it appears that the new graffiti was done by one individual group.
The recent flooding did not impact the cave, however, it made it difficult to get to the cave.

Name: Mark Sanders	Agency: COA
Date: 2/13/03	No. of pages: 1

Location: Cotterell cave GPS coordinates (NAD 1983) _____ Section No. Entire cave

Time Started: 2:15pm Time ended: 3:25pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) Nothing new, just old trash that I removed.

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: NA Outside: NA Humidity Inside: NA Outside: NA
Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood)

Organic matter encountered in survey area: rotting wood, damp soil, not much of anything.

Surface area moisture conditions: (dry, dripping, pools) Portions are dry, however, some area were damp and wet.

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*			
Vaejovis reddelli	1		
Pseudo Scorpion	1	Under Rock	Un-described species
Spiders: wall web			
**Cicurina sp.*	12	Under rocks	
Eidmannella sp.			
☼ *Texella reyesi*	3	Under rocks in moist area	
* *Speodesmus sp.*	7	On walls	
Cambala speobia			
Rove beetles: *Belonuchus sp*			
Springtails: Collembola	~50		
Crickets*: Ceuthophilus secretus*			
Ceuthophilus sp. B	8		
Ceuthophilus cunicularis			
Ceuthophilus nymphs	19		
Blow fly			
Fungus gnats	2		
Plethodon albagula	6		

(*) signifies species of concern

(☼) signifies endangered species

See back for additional Field Notes and Comments? ☐ Section map attached? ☐

☐ Photographs taken? How many? _____ If so, attach to this report.

My search was not extensive or thorough.

Name: Mark Sanders	Agency: COA
Date: 5/30/03	No. of pages: 1

Location: Cotterell cave GPS coordinates (NAD 1983) _____ Section No. Entire cave

Time Started: 10am Time ended: 11am Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) Nothing new, just old trash that I removed.

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: NA Outside: NA Humidity Inside: NA Outside: NA
Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) Approximately 1 inch of rain fell on 5/26/03, otherwise it's been a draught.

Organic matter encountered in survey area: rotting wood, damp soil, not much of anything.

Surface area moisture conditions: (dry, dripping, pools) Portions are dry, however, some area were damp and wet.

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*			
Earthworms: *Haplotaxida*			
Pseudo Scorpion	1	Under Rock	
Spiders: wall web	1		
**Cicurina sp.*	7	Under rocks	
Eidmannella sp.			
☼ *Texella reyesi*	1	Under rock in moist area	An immature
* *Speodesmus sp.*	2	On walls	
Cambala speobia			
Rove beetles: *Belonuchus sp*			
Springtails: Collembola	20		
Crickets*: Ceuthophilus secretus*			
Ceuthophilus sp. B	6		
Ceuthophilus cunicularis			
Ceuthophilus nymphs	11		
Blow fly	1		
Fungus gnats	1		
Plethodon albagula	4		

(*) signifies species of concern

(☼) signifies endangered species

See back for additional Field Notes and Comments? ☐ Section map attached? ☐

☐ Photographs taken? How many? _____ If so, attach to this report.

My search was not extensive or thorough.

Jan., 2005 Name: Mark Sanders Agency: COA
Date: 8/28/03 No. of pages: 1

Location: Cotterell cave GPS coordinates (NAD 1983) _____ Section No. entire cave

Time Started: 9:30am Time ended: 10:15am Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) Nothing new, just old trash that I removed.

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: NA Outside: NA Humidity Inside: NA Outside: NA
Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) Draught, and recent temperatures over 100 F.

Organic matter encountered in survey area: rotting wood, damp soil, not much of anything.

Surface area moisture conditions: (dry, dripping, pools) Portions are dry, however, some area were damp and wet.

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*			
Earthworms: *Haplotaxida*	3		
Scorpions: *Vaejovis reddelli*			
Spiders: wall web			
**Cicurina sp.*	15	Under rocks	
Eidmannella sp.			
☼ *Texella reyesi*	1	Under rock in moist area	
* *Speodesmus sp.*	2	On walls	
Cambala speobia	2		
Rove beetles: *Belonuchus sp*			
Springtails: Collembola	~80		
Crickets*: Ceuthophilus secretus*	5		
Ceuthophilus sp. B			
Ceuthophilus cunicularis			
Ceuthophilus nymphs	16		
Fungus gnats			
Plethodon albagula	8		

(*) signifies species of concern

(☼) signifies endangered species

See back for additional Field Notes and Comments? ☐ Section map attached? ☐

☐ Photographs taken? How many? _____ If so, attach to this report.

Scott Hiers and Sylvia Pope collected soil samples to determine if nitrate and nitrite levels were high. Recently washed in soils were high, however, the much older clays were not. They may test for other contaminants.

Name: Mark Sanders	Agency: COA
Date: 11/22/02	No. of pages: 1

Location: Cotterell Cave GPS coordinates (NAD 1983)_____ Section No. Entire cave

Time Started: 9:30am Time ended: 11am Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) Nothing new, just old trash that I removed.

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: NA Outside: NA Humidity Inside: NA Outside: NA
Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, **flood**) wetter than usual, some areas were damp due to recent heavy rains.

Organic matter encountered in survey area: rotting wood, damp soil, not much of anything

Surface area moisture conditions: (dry, dripping, pools) portions are dry, however, more areas were damp and some were actually wet.

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*	3		
Earthworms: *Haplotaxida*			
Scorpions: *Vaejovis reddelli*	1		
Spiders: wall web	4		
Cicurina sp.	22	Under rocks	
Neoleptoneta sp.			
☼ *Texella reyesi*	8	Under rocks in moist area	Several were immatures
Cambala speobia	5	On walls	
* *Speodesmus sp*.	28	All over	2 distinct sizes, possibly 2 separate species.
Rove beetles: *Orus rubens*			
Springtails: *Collembola*	~ 100		
Crickets*: Ceuthophilus secretus*	10		
Ceuthophilus sp. B			
Ceuthophilus cunicularis	5		
Ceuthophilus nymphs	38		
Blow flies: *Calliphora* accident			
Fungus gnats			
Plethodon albagula	3		
Syrrhophus marnocki			
Bufo valliceps valliceps	1		Large adult (very dehydrated)

(*) signifies species of concern
(☼) signifies endangered species

See back for additional Field Notes and Comments? ☐ Section map attached? ☐

☐ Photographs taken? How many? _____ If so, attach to this report.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 10/23/02 No. of pages: 2

Location: District Park Cave GPS coordinates (NAD 1983)____ Section No. 1 (aquifer room)

Time Started: 5:35 pm Time ended: 5:56 pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) a small amount of trash.

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☒ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: 71.5º F Outside: 69º F Humidity Inside: 95% Outside: 90% @ 5pm

Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) recent heavy rains washed organic material into the cave.

Organic matter encountered in survey area: leaf litter, decaying wood, fungus, and mammal scat.

Surface area moisture conditions: (dry, dripping, pools) _____

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*			
Earthworms: *Haplotaxida*			
Isopods: *Oniscoidea*	2		
Scorpions: *Vaejovis reddelli*			
Spiders: wall web	4		
Cicurina sp.	2	Under rocks	
* *Speodesmus sp*.			
* *Rhadine austinica*			
Texoreddellia texensis			
Springtails: *Collembola*	~ 250		
Crickets*: Ceuthophilus secretus*	1		
Ceuthophilus sp. B	42		
Ceuthophilus cunicularis	7		
Ceuthophilus nymphs	102		
Fungus gnats	10		2 were larvae

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒

More organic material was observed in this section than usual.
The flagging marking the "trail" was broken and sections were missing making it impossible for people who have access (permits) to know exactly where they can and can not go. No one contacted me about this, it's possible that the flood and maybe raccoons might have moved the tape, however, I doubt it. I will look into this matter and try to find out which group did this and I may have to further limit access.
The lock was on facing the wrong direction, thus lots of mud washed into the key hole making it very difficult to open. I had to take the lock outside of the cave and clean it.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 10/23/02 No. of pages: 2

Location: District Park Cave GPS coordinates (NAD 1983)____ Section No. 2 (aggie level)

Time Started: 6:15 pm Time ended: 6:40 pm Scientific permit # _TE798920-0_

Surface area observations: (gate condition, fire ants, vandalism) a small amount of trash.

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☒ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: 68º F Outside: 69º F Humidity Inside: 99% Outside: 90% @ 5pm

Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) recent heavy rains washed organic material into the cave.

Organic matter encountered in survey area: _ mammal scat.____

Surface area moisture conditions: (dry, dripping, pools) _____

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*			
Earthworms: *Haplotaxida*			
Isopods: *Oniscoidea*			
Scorpions: *Vaejovis reddelli*			
Spiders: wall web	3		
Cicurina sp.	8	Under rocks	
Neoleptoneta sp.			
* *Texella mulaiki*			
Millipedes: *Diplopoda* accident			
Cambala speobia	4	On floor and under rocks	
* *Speodesmus sp*.	1	On wall	
* *Rhadine austinica*			
Rove beetles: *Orus rubens*	1		
Texoreddellia texensis			
Springtails: *Collembola*	~400		
Crickets*: Ceuthophilus secretus*	1		
Ceuthophilus sp. B	1		
Ceuthophilus cunicularis	4		
Ceuthophilus nymphs	37		
Blow flies: *Calliphora* accident			
Fungus gnats	10		all were larvae

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒
More organic material was observed in this section than usual (mammal scat).
A portion of the flagging was broken in this section also, we repaired the flagging on both levels.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 10/23/02 No. of pages: 2

Location: Goat cave GPS coordinates (NAD 1983)_____ Section No. 1 (landing zone)

Time Started: 11 am Time ended: 11:22 am Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) _____

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: 68.5º F Outside: 66º F Humidity Inside: 97% Outside: 95% @ 10:40

Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) recent flood_____

Organic matter encountered in survey area: leaf litter, and decaying wood, fungus.

Surface area moisture conditions: (dry, dripping, pools) lots of dripping and a couple of pools

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*	5		
Earthworms: *Haplotaxida*	30		
Isopods: *Oniscoidea*			
Scorpions: *Vaejovis reddelli*			
Spiders: wall web	3		
Cicurina sp.	5	Under rocks	
Surface spiders	3		
* *Texella mulaiki*			
Cambala speobia			
Ceuthophilus sp. B			
Ceuthophilus cunicularis			
Ceuthophilus nymphs	5		
Fungus gnats larvae	10		
Plethodon albagula	47		Most with broken tails that have grown back.
Thamnophis cyrtopsis ocellatus	1 (dead)		Just outside of survey area, very large adult, may have died of natural causes, (fall) or could have been killed and thrown in???
Bufo valliceps valliceps	3		

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒

☒ Photographs taken? How many? 1 If so, attach to this report.

See back for photo of possible new graffiti near survey area 1, I'm just not certain if it's new or not.
No bats were observed inside the cave.
It appears that more water and organic material is washing into the cave since the gate and concrete were removed last February.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 10/23/02 No. of pages: 2

Location: Goat cave GPS coordinates (NAD 1983)_____ Section No. 2(alcove)

Time Started: 11:50 am Time ended: 12:27 pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism)

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: 68.5º F Outside: 66º F Humidity Inside: 97% Outside: 95% @ 10:40

Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) recent flood_____

Organic matter encountered in survey area: _____

Surface area moisture conditions: (dry, dripping, pools)

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*	3		
Earthworms: *Haplotaxida*			
Isopods: *Oniscoidea*			
Scorpions: *Vaejovis reddelli*	1		
Spiders: wall web	1		
Cicurina sp.	8	Under rocks	
Neoleptoneta sp.	3	Under rocks	One was collected live for Reddell to ID, species clarification.
* *Texella mulaiki*			
Millipedes: *Diplopoda* accident			
Cambala speobia	2	Under rock, on wall	
Speodesmus sp.	5	On wall	
Rove beetle	1		
Collembola	10		
Ceuthophilus sp. B	5		
Ceuthophilus cunicularis			
Ceuthophilus nymphs	35		
Fungus gnats	1		
Plethodon albagula	47		
Thamnophis cyrtopsis ocellatus			
Bufo valliceps valliceps			

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒
☐ Photographs taken? How many? _____ If so, attach to this report.

.

No bats were observed inside the cave.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 3/28/03 No. of pages: 2

Location: Goat cave GPS coordinates (NAD 1983)_____ Section No. 2(alcove)

Time Started: 4:07pm Time ended: 4:52 pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) _____

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: 62.5º F Outside:____ Humidity Inside: 97% Outside: ____

Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) cold front the night before

Organic matter encountered in survey area: _____

Surface area moisture conditions: (dry, dripping, pools) dry

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*	1		
Earthworms: *Haplotaxida*			
Isopods: *Oniscoidea*			
Cicurina sp.	7	Under rocks	
Neoleptoneta sp.			
* *Texella mulaiki*			
Millipedes: *Diplopoda* accident			
Cambala speobia	1	Under rock	
Rove beetle	1		
Collembola	5		
Ceuthophilus secretus	5		
Ceuthophilus cunicularis			
Ceuthophilus nymphs	38		
Fungus gnats	2		

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒

☐ Photographs taken? How many? _____ If so, attach to this report.

.No bats were observed inside the cave.
We believe that the noted lack of troglobitic species was probably due to a sudden drop in temperature and probably humidity with the previous nights cold front. With the large entrance, Goat cave could be considered a cold trap.
The AFD recent visit and the filming of the Barton Springs documentary may have all been factors.
Nicky Lake with Travis County was an observer.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 3/28/03 No. of pages: 2

Location: Goat cave GPS coordinates (NAD 1983)_____ Section No. 1 (landing zone)

Time Started: 3:25pm Time ended: 3:55pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) trash, cut grass, shrub, and tire marks at and near the entrance.

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: 62º F Outside: 65.5º F Humidity Inside: 92% Outside: 44% @ 3pm

Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) cold front the night before, upper 40's ??

Organic matter encountered in survey area: live oak leaf litter.

Surface area moisture conditions: (dry, dripping, pools) dry

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*	1		
Earthworms: *Haplotaxida*	9		
Isopods: *Oniscoidea*	4		
Springtail	4		
Solenopsis invicta	1		One queen "accidental".
Scorpions: *Vaejovis reddelli*			
Surface spiders	3		
* *Texella mulaiki*			
Millipede (surface)	1		
Ceuthophilus cunicularis			
Ceuthophilus nymphs	1		
Rove beetle	3		
Fungus gnats adult	2		
Plethodon albagula	14		Most with broken tails that have grown back.
Thamnophis cyrtopsis ocellatus			
Bufo valliceps valliceps	3		

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒

☐ Photographs taken? How many? _____ If so, attach to this report.

No bats were observed. It is interesting to note that the Austin Fire Department had trained at this cave the previous week. I believe that they were responsible for the cut grass, shrub, trash, and ATV tract found at or near the entrance. I will be investigating this and possibly further limit AFD's access to this site.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 6/19/03 No. of pages: 2

Location: Jest John Cave GPS Datum NAD 27 Conus UTM Zone: 14 East: 0617453 North: 3361905

Section surveyed: Cave Cricket exit count

Time Started: 9:03 pm Time ended: 11:03 pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) fire ants were noted near and inside the entrance.

Survey area: ☒ *Solenopsis invicta* If so, ☐ heavy infestation ☒ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: Outside: 82º F @ 8:46 pm Humidity Inside: Outside: 61%
Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) The area has experienced a draught broken by recent heavy rains (3 to 4 inches) 2 weeks earlier.

Organic matter encountered in survey area: Lots of leaf litter in the entrance area

Surface area moisture conditions: (dry, dripping, pools)

CAVE CRICKET EXIT COUNT

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Camponotus sp	~50		Near entrance
Solenopsis invicta	~100		Near entrance
Surface spiders	3		One attempted to capture exiting crickets
Leiobunum townsendii	~ 1000		Many remained near entrance
Assassin bug	2		
Crickets*: Ceuthophilus secretus*	281		
Ceuthophilus sp. B	7		
Ceuthophilus nymphs	1406		Probably an undercount
Syrrhophus marnocki	1		Near entrance

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☐

☐ Photographs taken? How many? If so, attach to this report.

When this cave was discovered the entrance was too small for human access so it was enlarged. In order to keep the cave from drying out, and to prevent potential vandalism the entrance was restored to it's original size. The entrance to the cave looks much like a armadillo burrow, very small with a shrub growing in the entrance.
BCP staff determined that the best method for measuring the health of this cave would be via cricket exit counts. The count was complicated due to the small size of the entrance, leaf litter and vegetation, these obstructions made it difficult to see the very tiny cricket nymphs emerging.
BCP staff speculate that the high ratio of nymphs to adults this late in the season may be partially due to the lack of rain during the spring, and recent summer rains.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 10/23/02 No. of pages: 2

Location: Maple Run Cave GPS coordinates (NAD 1983)_____ Section No. 1

Time Started: 2:24 pm Time ended: 2:42 pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) trash near the entrance of the cave

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: 69.5º F Outside: 70º F Humidity Inside: 95% Outside: 93% @ 2pm

Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) flood within the last week

Organic matter encountered in survey area: nothing

Surface area moisture conditions: (dry, dripping, pools) dripping

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*			
Earthworms: *Haplotaxida*			
Isopods: *Oniscoidea*			
Scorpions: *Vaejovis reddelli*			
Spiders: wall web			
Cicurina sp.	3		
Neoleptoneta sp.			
* *Texella mulaiki*	3	Under rocks	
Millipedes: *Diplopoda* accident			
Cambala speobia			
* *Speodesmus sp*.	1	Under rock	
* *Rhadine austinica*	1	In the open	
Rove beetles: *Orus rubens*			
Texoreddellia texensis			
Springtails: *Collembola*	10		
Crickets*: Ceuthophilus secretus*			
Ceuthophilus sp. B	6		Many adults were noted in-between section 1 and the entrance.
Ceuthophilus cunicularis			
Ceuthophilus nymphs	23		
Blow flies: *Calliphora* accident			
Fungus gnats			
Plethodon albagula	5		Tiny juveniles
Syrrhophus marnocki			

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒

☐ Photographs taken? How many? _____ If so, attach to this report.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 10/23/02 No. of pages: 2

Location: Maple Run Cave GPS coordinates (NAD 1983)_____ Section No. 2

Time Started: 3:14 pm Time ended: 3:42 pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) new trash near the entrance of the cave which we removed.

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: 70.5º F Outside: 70º F Humidity Inside: 98% Outside: 93% @ 2pm

Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) flood within the last week

Organic matter encountered in survey area: nothing

Surface area moisture conditions: (dry, dripping, pools) dripping, damp

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*			
Earthworms: *Haplotaxida*			
Isopods: *Oniscoidea*			
Scorpions: *Vaejovis reddelli*			
Spiders: wall web	1		With several egg sacks.
Cicurina sp.	2	Under rocks	
Neoleptoneta sp.			
* *Texella mulaiki*			
Millipedes: *Diplopoda* accident			
Cambala speobia			
* *Speodesmus sp*.	1	Out in the open	
* *Rhadine austinica*			
Rove beetles: *Orus rubens*			
Texoreddellia texensis			
Springtails: *Collembola*			
Crickets*: Ceuthophilus secretus*			
Ceuthophilus sp. B	1		More than usual were noted in-between sections 1 and 2.
Ceuthophilus cunicularis			
Ceuthophilus nymphs			
Blow flies: *Calliphora* accident			
Fungus gnats			
Plethodon albagula	1		Tiny juvenile
Syrrhophus marnocki			

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☒

☐ Photographs taken? How many? _____ If so, attach to this report.

Name: Mark Sanders and Carlo Abbruzzese Agency: COA
Date: 7/1/03 No. of pages: 1

Location: Slaughter Creek Cave GPS Datum NAD 27 UTM Zone: 14 East: 0608639 North: 3340778

Section surveyed: Cave Cricket exit count

Time Started: 8:50 pm Time ended: 10:50 pm Scientific permit # TE798920-0

Surface area observations: (gate condition, fire ants, vandalism) a few fire ants were noted near the entrance.

Survey area: ☒ *Solenopsis invicta* If so, ☐ heavy infestation ☒ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: Outside: 75.5º F @ 10:58 pm Humidity Inside: Outside: 91%
Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) The site must have received a downpour earlier in the day, the soil and duff was wet. I did not realize it had rained until I reached the site.

Organic matter encountered in survey area: Some juniper duff and decaying branches

Surface area moisture conditions: (dry, dripping, pools) damp.

CAVE CRICKET EXIT COUNT

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Camponotus sp	~100		Near entrance
Solenopsis invicta	~50		Near entrance
Terrestrial isopod	~100		
Surface spiders	2		
Leiobunum townsendii	~ 100		Perhaps most had already left before we got there
Scorpion: *Centruroides vittatus*	4		One was eating a cricket
Crickets*: Ceuthophilus secretus*	825		
Ceuthophilus sp. B	12		
Ceuthophilus nymphs	2315		Probably an undercount
Syrrhophus marnocki	1		Near entrance

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☐

☐ Photographs taken? How many? If so, attach to this report.

Due to the close proximity of new homes and other construction, BCP staff and volunteers temporarily camouflauged and closed the entrance to this cave in order to protect it. One irregular sized gap was left for mammal access.
The cave is scheduled to be gated next fiscal year.
When we arrived at the cave entrance at 8:47 pm crickets were already exiting. It was still light outside, however, it appeared to have rained earlier in the day, and we speculate that this event may have triggered an earlier than usual exit start time.

Name: Mark Sanders and Nico Hauwert Agency: COA
Date: 11/11/02 No. of pages: 2

NOT A BCCP Cave

Location: Seibert Sink (Barton Creek Wilderness Park GPS coordinates (NAD 1983) ??_____ Section No. entire cave_____

Time Started: 12pm____ Time ended: 1pm___ Scientific permit # _TE798920-0_

Surface area observations: (gate condition, fire ants, vandalism) everything looked fine

Survey area: ☐ *Solenopsis invicta* If so, ☐ heavy infestation ☐ moderate ☐ light

☐ Vandalism If so, ☐ trash ☐ speleothems ☐ gate ☐ graffiti

Temperature Inside: 70º F Outside: 66º F @ 10:30am Humidity Inside: 93% Outside: 57% @ 10:30am_

Humidity was measured with a Psychrodyne analog psychrometer.

Weather conditions during the past week: (freeze, over 100 F, draught, flood) no

Organic matter encountered in survey area: _leaf litter, wood debris, and fungus_____

Surface area moisture conditions: (dry, dripping, pools) damp

FAUNAL SURVEY

Species	No. seen	Microhabitat for troglobites	Comments (if specimen was collected state where it was sent to)
Snails: *Gastropoda*	3		
Scorpions: *Vaejovis reddelli*	1		
Spiders: wall web	3		
Cicurina sp.	13	Under rocks	
Neoleptoneta sp.			
* *Texella sp*	4	Under rocks	Collected one for DNA species ID work
Millipedes: *Diplopoda* accident	2		
Cambala speobia	2	Under rock	
* *Speodesmus sp.*	7	Under rocks & wall	
* *Rhadine austinica*			
Rove beetles: *Orus rubens*			
Texoreddellia texensis	1	Floor and wall	
Springtails: *Collembola*	25		
Crickets*: Ceuthophilus secretus*			
Ceuthophilus sp. B	7		
Ceuthophilus cunicularis			
Ceuthophilus nymphs	51		
Slug	1		
Blow flies: *Calliphora* accident	1		
Fungus gnat larvae	3		
Plethodon albagula	5		
Rana berlandieri	1		Large adult

(*) signifies species of concern

See back for additional Field Notes and Comments? ☐ Section map attached? ☐

☐ Photographs taken? How many? _____ If so, attach to this report.
Nico and I mapped the cave. I removed a small amount of old trash from the cave.