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STAYS IN FILE

AGENDA

Balcones Canyonlands Conservation Plan
Citizens Advisory Committee
Regular Meeting
September 22, 2015 6:30 PM to 8:30 PM
Room 104, Waller Creek Center
625 East 10th Street
Austin, Texas 78701

Action May be Taken on Any Agenda Item

1. Citizens Communication.

2. BCP Partner Reports:
   a. City of Austin BCP
   b. Travis County BCP
   c. LCRA BCP
   d. Other BCP Partners

3. New Business:
   a. Members' issues and concerns.
   b. Chair and Vice-Chair nominations for 2016.

4. Old Business:
   a. Approve the Record of Decision from 7/28/15.
   b. Staff action regarding positive press coverage from 10/22/14.
   c. Funding concerns for rural and small community fire departments adjacent to BCP.
   d. Update on BCCP Cave Substitution Policy.
   e. CAC vacant positions and newly appointed members from City Boards and Commission.
   f. CAC Annual Work Plan:
      i. Report from subcommittees.
         1. Wildfire and fire support.
         2. Invasive species in landscaping.
         3. State of BCP report (joint with SAC).

5. Next meeting – will be scheduled in January 2016.

Came to hand and posted on a Bulletin Board in the Courthouse, Austin, Travis County, Texas on this the 18th day of SEPTEMBER 2015.
Dana DeBeauvoir
County Clerk, Travis County, Texas
By M. MITCHELL Deputy

SEAL OF COUNTY COURT ★ TRAVIS COUNTY, TEXAS ★

FILED AND RECORDED
OFFICIAL PUBLIC RECORDS
Dana DeBeauvoir
Sep 18, 2015 08:40 AM 201581533
MITCHELLM: $3.00
Dana DeBeauvoir, County Clerk
Travis County TEXAS

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CAC Citizen Communication

Tuesday, September 22, 2015

Please Sign-in to Speak

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City of Austin BCP Report
BCCP Coordinating Committee Meeting
August 1, 2015 – September 15, 2015

Program Administration

Acquisition

- The 10-acre Lucas tract was purchased for addition to the City BCP.

Personnel

- Willy Conrad retired from his position as Division Manager of the Wildland Conservation Division on August 31, 2015. Sherri Kuhl is acting BCCP Coordinating Committee Secretary and Kevin Thuesen is acting Wildlands Division Manager. Two positions will be filled and the BCCP Coordinating Committee Secretary will be jointly funded by the City of Austin and Travis County.

BCCP Infrastructure Training Workshop

- Scheduled for October 8, 2015, at the Lady Bird Johnson Wildflower Center.

Biological Monitoring

Karst

- Tawny crazy ants (TCAs) were first observed negatively impacting cave fauna in Whirlpool Cave in June 2013, and on November 20, 2014, TCA's were discovered in No Rent Cave. In an effort to monitor impacts, City and Travis County staff continues to monitor Whirlpool Cave as well as No Rent and Weldon Cave (in close proximity to TCA's). We still anticipate that this new invader will have a major negative effect on cave fauna. The section 6 grant proposal (investigate possible methods of treating TCAs within the cave cricket foraging area) was awarded, with a start date of October 2015.
- BCCP Cave Substitution Policy was officially adopted by the BCCP Coordinating Committee on August 21, 2015. This new policy provides the groundwork for possible future substitutions for BCCP permit caves.
- Conducted cave faunal surveys and cave cricket exit counts (ongoing).
- Monitored cave conditions, removing trash, and treating for red-imported fire ants (ongoing).
- BCP Staff is continuing to assist Nico Hauwert and the Watershed Protection Department with the Blowing Sink critical environmental feature (CEF) stabilization CIP project. Several major recharge features/caves are unstable, leading to large amounts of sediment washing into the aquifer. The project will stabilize these features, thus improving water quality to Barton Springs. This project is nearing completion.
- In an effort to educate the public about the importance of caves and cave fauna, Nico Hauwert initiated an effort to find local non-BCP caves that would be appropriate for educational purposes. Staff and volunteers are currently excavating several karst features. Several significant caves have been opened including grassy cove cave which was recently gated. (ongoing)
- Cave public access: A cave collaboration group of City and County staff and volunteers met regarding guidelines for future public access to local caves including some BCP permit caves. The goal is to try to determine which caves are appropriate for public access, determine the appropriate number allowed per cave, and come up with a permitting system that would determine qualifications needed for leading cave tours (ongoing).
- Restoration and monitoring efforts have begun at 2 endangered species caves located in the courtyard at McNeil High. Nico Hauwert and McNeil High School science teacher Tina Vick are leading the restoration effort along with help from FWS, City and Travis County BCP staff. Travis County and City BCP staffs are currently conducting cave faunal surveys and cricket exit counts with the goal of including student participation for long term monitoring and potential research projects that will benefit the listed species. Travis County and City BCP staff has also held 2

volunteer clean up dates, removing large volumes of trash. City staff has provided plants for this project, planting 86 trees and shrubs, many of which provide forage for cave crickets (ongoing).

Golden-Cheeked Warbler (GCWA)

- USFS Project: Interlocal Agreement with the US Forest Service (Dr. Frank Thompson, Jennifer Reidy) to provide GCWA Population Viability and Habitat Suitability modeling within the BCP.
    - 5-year study, focuses on four primary questions:
        - What is the absolute abundance of the GCWA on the BCP and on individual macrosites?
        - How do demographics (e.g. density, productivity, survival) vary with landscape and habitat factors?
        - How viable are these populations?
        - How do various management scenarios influence population viability?
    - Fifth year of data have been sent to USFS; work on the models is in progress.
- The following 3 publications are now available online:
    - Reidy, J., F. Thompson, C. Amundson, and L. O'Donnell. 2015. Landscape and local effects on occupancy and densities of an endangered wood-warbler in an urbanizing landscape. Landscape Ecology; DOI: 10.1007/s10980-015-0250-0.
    - Reidy, J., L. O'Donnell, and F. Thompson. 2015. Evaluation of a reproductive index for estimating songbird productivity: case study of the Golden-cheeked Warbler. Wildlife Society Bulletin; DOI: 10.1002/wsb.576.
    - O'Donnell, L., C. Farquhar, J. Hunt, K. Nesvacil, J. Reidy, W. Reiner, J. Scalise, and C. Warren. 2015. Density influences accuracy of model-based estimates for a forest songbird. Journal of Field Ornithology; DOI: 10.1111/jofo.12116.

Black-capped Vireo (BCVI)

- COA BCP staff and volunteers are continuing to implement demonstration projects at the Vireo Preserve to promote slope stabilization, soil restoration, and regeneration of native plants on degraded areas that are currently not habitat for either the GCWA or BCVI. Since Vireo Preserve supports many of the habitat types observed throughout the BCP, lessons learned from restoration work at this site should be applicable to other areas within the BCP.

Jollyville Plateau Salamander (JPS)

- COA BCP staff assisted the Watershed Protection Department with several JPS surveys; most surveys were postponed due to recent floods. (ongoing)
- BCP staff conducted a salamander survey in Testudo Tube, the survey area is a 100 meter transect, all salamanders were captured, measured and photographed with the goal of identifying individuals via this set of photos since each individual salamander has distinct markings on the dorsal side of head. The ability to identify individual salamanders will allow for a better understanding of the salamanders life history and future trends.

Bracted Twistflower

- Plans for fence to protect Bracted Twistflower at Mount Bonnell: see Dual-Managed Lands, below.

Preserve Management

Dual-Managed Lands

- AWU and PARD are working to close and restore trails within the Connors Creek critical water quality protection zone in Emma Long Motocross Park. Additional signs are scheduled for installation. Staff is developing a stream assessment, restoration and monitoring plan with assistance from staff in the Watershed Protection Department.

- The proposed Mount Bonnell fence to protect bracted twistflower habitat and keep people off the bluff has been designed and construction will begin in the fall.
- PARD and BCP staffs worked with the Hill Country Conservancy on the installation of 911/mile markers in the Barton Creek Greenbelt.
- Barton Creek homeless camps: see Law Enforcement below.

Infrastructure Management

- LCRA successfully completed their upgrade of the T-160 line which runs through the Bull Creek macrosite and received construction approval from BCCP. LCRA worked closely with BCP and WPD staff to avoid impacts to endangered/threatened species and habitats. LCRA staff is currently addressing some erosion issues with guidance from BCP staff.
- BCP is currently working with the West Travis County PUA (WTCPUA) on construction of a new water service line which includes drilling underneath Barton Creek. (ongoing)

Law Enforcement

- Homeless camps are an ongoing management challenge in the Barton Creek Greenbelt. City Wildland Conservation and PARD staffs continue to monitor these sites and remove camps as they are continue to break into the Lanier house and that structure is scheduled for demolition this fall.

Invasive Species/Animal Management

- See Tawny Crazy Ants, above.
- BCP staff is continuing efforts to remove non-native plants on COA BCP tracts.
- BCP staff is actively removing feral hogs.

Oak Wilt

- BCP staff continued to monitor movement of the fungus in known oak wilt centers and success of control trenches.

Fencing Projects

- Bids for fence installation on the Jester and Cortaña tracts have been received and work is close to completion on the Jester game fence.
- Currently scoping surveys to fence the newly acquired Lucas tract, a portion of the Forest Ridge tract, Long Canyon, and Park West.

Fire Management

- Wildland Conservation Division (WCD) staffs have created a final draft of Wildfire Contingency Plan Maps for all WCD properties. These maps are intended to facilitate wildfire suppression on WCD property by illustrating access points, roads, structures, vegetation, and fire potential.
- WCD staff is currently planning additional potential shaded fuel break projects for the fall and winter.

BCCP Administration	
Public Participation	Ten BCCP applications were received and processed; Two Participation Certificates were issued for a total of $4,750.00 in mitigation payments. Fees were split 50:50 between Travis County and City of Austin.
Land Acquisition	The 500-acre Kotrla tract in northwest Travis County was acquired in July. This tract is connected to another 450-acre BCP tract and this combined area provides complete protection of the surface and subsurface drainage basins of the BCCP-listed Spanish Wells cave. This area also contains habitat for warblers, vireos, and a population of Texabama croton, a plant named for protection in the BCCP permit.
	Meetings have been held with the City of Jonestown to discuss City Council's concerns that the purchase of the 228-acre Plains Capital Tract for the BCP has negatively impacted anticipated revenue from development of a residential subdivision on that tract. The tract was purchased February 25, 2015.
Personnel	Four Natural Resources positions were filled during August and September. David Morier is the new Project Manager; Julie Murray and Blake Sissel are Natural Resources Specialists; and Travis Clark is the new Natural Resources Tech. Hiring is in the final stages for the vacant Environmental Specialist position. A Community Liaison position will be advertised in October.
Rare and Endangered Resources Management	
Golden-cheeked warbler and Black-capped vireo	Warblers and vireos have migrated south for the winter. Nesting season officially ended August 31st.
Karst invertebrates	Summer season faunal surveys were performed at nine caves.
	Summer season cave cricket exit counts were performed at six caves.
	BCCP Cave Substitution Policy was adopted by the BCCP Coordinating Committee in August. This policy provides a process that allows caves listed in the BCCP permit to be substituted with other suitable caves in a manner that is transparent, science based, and consistent with the vision and intent established for BCCP.
Plant and Animal Control	
Feral hogs	Signs of hog damage were found on many BCP tracts. Traps were in operation on the Ribelin, Sam Hamilton, and Concordia tracts.
White-tailed deer	Spotlight deer surveys are scheduled for September and October. Deer harvest will begin in October.
Tawny crazy ants	Assessments and surveys of Tawny crazy ant infestation were conducted at Whirlpool and No Rent caves.

Invasive Plants	Invasive plants (*Nandina,* Brazilian Vervain, and Asian jasmine) were removed from the Snowden tract.
Land Stewardship	
Fencing	Fencing projects are planned for this fall/winter on the Collins, Plains Capital, Scott and White, and Kotrla tracts.
Wildfire Preparedness	Fuel mitigation projects are planned for this fall/winter on the Steiner Ranch, Canyon Vista, Greenshores, Grandview Hills, and Concordia tracts.
	FEMA has approved the final award for a Hazard Mitigation Grant Program (HMGP) project to mitigate wildfire in the Wildland Urban Interface (WUI) of the BCP using shaded fuel treatments. The grant project will begin upon receipt of an award notice from the Texas Division of Emergency Management. With or without the grant, plans are underway to begin several new wildfire mitigation projects in the BCP WUI after October 1, using funds approved by Commissioners Court in the Natural Resources Program budget.
Infrastructure Corridor	LCRA conducted inspections and maintenance of the T-160 and T-161 transmission lines which run through the Steiner, Ribelin, and Lucas Tracts.
	An Infrastructure Workshop is scheduled for October 8th at the Wildflower Center. This workshop is designed to help explain the significance of the BCP and provide guidance to infrastructure service providers that cross the BCP or that pass through endangered species habitat outside of the preserve.
Transportation	The status of the following transportation projects have not changed since the last staff report: LISD is pursuing an individual ESA 10(A) permit for the proposed road project in the infrastructure corridor through Travis County Ribelin, Sam Hamilton East, and private 10(A) mitigation lands. Some traffic improvements have been made along RM 2222. Additional improvements involving RM2222 and RM 620 are still in development. There has been no recent discussion of the LISD's proposed new roadway.

	SH 45 SW: Final Environmental Impact Statement (FEIS) was released January 23, 2015. The Record of Decision dated March 4th identified the Preferred Alternative as the Selected Alternative. See http://www.sh45sw.com/about/environment.php USFWS responded to letters from City and County elected officials re concerns. The future status of Flint Ridge Cave remains in question. Details of land management in the vicinity of FRC remain to be resolved. On April 21st the Travis County Commissioners Court directed staff to work with the Central Texas Regional Mobility Authority (CTRMA) to include state-of-the-art stormwater controls for this area of extraordinary sensitivity; and to work with the CTRMA to require a sharing, by the CTRMA, of the risk of non-compliance under the Endangered Species Act. TNR staff are currently engaged in ongoing review of project plans. TNR staff are also participating in a number of technical working groups with CTRMA, City staff and other stakeholders to review and assess design plans, water quality controls, protection of Flint Ridge Cave and other related issues.
	Travis County commissioned a feasibility study for the realignment of Steiner Ranch Boulevard/Comanche Trail. The recommendation rejected any new encroachments on BCP and proposed potential new alignments, but these were contingent on the results of the TxDOT RM 620 Corridor Study which is still in progress.
Adjacent Development	Staff coordinated with City of Austin and developers on current and future development projects adjacent to the Cuevas, Nootsie, The Crossings, and Steiner Ranch tracts. Staff is reviewing fire service road route options for the Travaasa development. The road will cross through The Crossings tract.
Law Enforcement	
Trespass and Criminal Mischief	Four incidents of construction material dumping was discovered on the Cuevas and Plains Capital tracts; Vandalism (damage to PVC pipes) occurred on the Webb tract.
	A 0.3 acre area of tree clearing on the Gray Mountain conservation easement was observed in May. After negotiations, the owner has agreed to restore vegetation on the cleared area.
Outreach/Volunteers	
Volunteers provided 80.5 hours of service to the Travis County BCP during August and September.	

Lower Colorado River Authority (LCRA) Balcones Canyonlands Preserve (BCP)
Update for McGregor, Wheless and Westcave Preserves

BCCP CAC/SAC Meetings – August 22-23, 2015

Wildlife Surveys at Wheless

LCRA worked with an outside contractor to perform wildlife surveys to determine white-tailed deer population density, buck/doe ratio and fawn survival. A final report is in progress, which will include findings, visibility measurements and copies of completed data sheets for each survey attempt. Incidental observations of other species will be noted in the report.

Erosion Control Work on City of Austin (COA) 3M Preserve for LCRA T-160 Project

LCRA rebuilt the T-160 (Marshall Ford to McNeil) transmission line, which crosses several BCP lands. Concerns arose over erosion control on the 3M preserve that resulted from the construction of the transmission line. LCRA worked with City of Austin (COA) BCCP staff to finalize and implement an erosion control plan for this preserve. Implementation of the erosion control plan began in September 2015 and will continue until early October 2015. Some of the implemented erosion controls include gabion mattresses and berms where pad sites construction occurred (see photos below). Top soil from cave restoration work was removed from various locations in southwest Austin and will be used with a BCCP-approved seed mix from Native American Seed to help stabilize the pad sites. Road work will be conducted and multiple diversion berms created to assist in slowing sheet flow from rain events.

Westcave Preserve Land Management Activities

American Youth Works cut understory woody species in the future prairie area, in preparation for a USFWS prescribed burn. They also established prairie restoration area photo points.

Campers with El Ranchito Service Corps erected a bat box, removed Johnsongrass, and performed brush management on the uplands. The group also cut and treated Chaste Tree (*Vitex agnus-castus*) directly above the waterfall in the upper creek.

Girl Scouts researched and developed laminated informational sheets on birds that can be seen in the area and built a wooden stand to hold the information sheets.

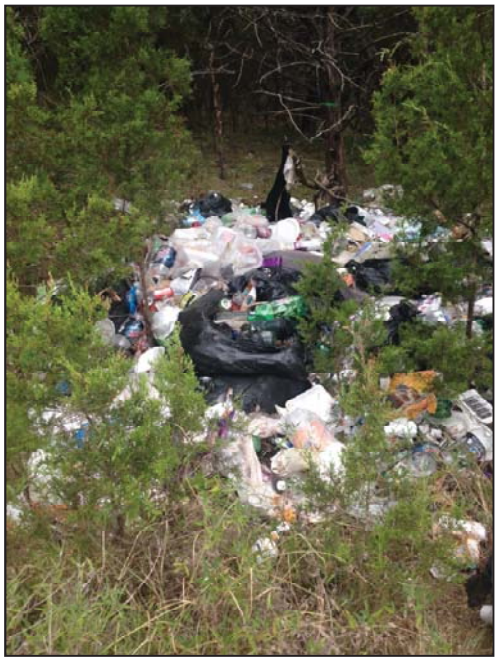
A dragonfly research study was conducted through Migratory Dragonfly Partnership for Citizen Scientists and has been set up in two places on the preserve and one at Hammett's Crossing. Westcave conservation staff will monitor monthly.

Salamander Survey conducted at Westcave with TPWD, Travis County and COA biologists. Biologists found no salamanders on the preserve, but found a unique species at Reimers Ranch. Staff conducted an additional survey but no salamanders were observed.

General trail maintenance and boundary inspections were conducted as well as an endemic plant survey. Westcave staff is preparing for the avian population monitoring project to be conducted by Dawn Houston, a member of the Conservation Committee. The project includes conducting avian point counts throughout the Preserve to monitor population and trends.

Illegal Dumping

An LCRA Transmission Line crew was inspecting the T-142 (Hi Cross to Marshall Ford) transmission line. This line crosses several BCPs. The crew discovered illegal dumping in the transmission line easement at the edge of the Barton Creek Park. LCRA reported the dumping to COA BCCP biologist who informed LCRA that the information was given to staff in the COA Parks and Recreation Department, as they are technically the owners at the location where the dumping occurred.



Exotic Plants on Wheless

Update: COA biologists plan to meet with LCRA between October and December 2015 to flag and discuss the management of exotic plant species.

In June 2015, COA Endangered Species Biologist completed a helicopter survey of the BCP and informed LCRA that no oak wilt was observed on the Wheless Preserve, but they did find some Tree-of-Heaven (*Ailanthus altissima*). The biologist requested access to Wheless to flag the exotic trees or collect GPS points of their locations to aid LCRA staff when managing exotics. The biologist also requested to check the flow for the Jollyville Plateau Salamanders located on the preserve. LCRA granted access, but the biologist have not entered the preserve to date (6/18/15).

BALCONES CANYONLANDS PRESERVE

PARTNER EDUCATION SUMMARY

August 1 –September 15, 2015

- City of Austin staff hosted a volunteer CPR/First Aid training for volunteers that lead projects independently on BCP properties.
- Staff is starting to plan a BCCP 20th Anniversary Event.
- Upcoming events include the BCCP Infrastructure Workshop 10/8 8am-12:30pm
    - http://2015bccpworkshop.eventbrite.com

Guided Hikes

DATE	ACTIVITY	# PARTICIPANTS	PARTNER
8/8/2015	2nd SAT. Guided Hikes	15	WBSN BCP
9/12/2015	2nd SAT. Guided Hikes	12	WBSN BCP
8/22/2015	TAS Bird Hike	16	TAS BCP
9/14/2015	Sun City Hiking Club	19	TAS BCP
8/8/2015	2nd SAT. Guided Hikes	15	WBSN BCP
9/12/2015	2nd SAT. Guided Hikes	12	WBSN BCP
8/22/2015	TAS Bird Hike	16	TAS BCP
2015 Summer QTR. YOUTH EDU PARTICIPANT TOTAL:		**105**	
YEAR TO DATE YOUTH EDU PARTICIPANT TOTAL:		**3069**	

BCP HIKE AND LECTURE SERIES

DATE	ACTIVITY	# PARTICIPANTS	PARTNER
8/1/2015	Flint Knapping	10	WBSN BCP
8/5/2015	Night Hike at Sam Hamilton	10	COA BCP
9/5/2015	Spider Joe	14	WBSN BCP
2015 Summer QTR. HIKE AND LECTURE PARTICIPANT TOTAL:		**34**	
YEAR TO DATE HIKE AND LECTURE PARTICIPANT TOTAL:		**199**	

BCP-Balcones Canyonlands Preserve
COA-City of Austin
TAS-Travis Audubon Society
TC-Travis County
TNC-The Nature Conservancy
WBSN-WILD BASIN ST. EDWARDS UNIVERSITY

BCP gains valuable help completing tasks with the help of numerous volunteers. Below is a summary of volunteer activities from August 1st through August 15th. Tracking volunteer hours includes updates and additions after the printing of this report. The most up-to-date volunteer hours will be available in the year-end report.

Volunteer Summary			
		Total Vol. Hours	
August	Weekly volunteer stewardship group (sum for Aug)	6	WB BCP
Aug 1-Sept 15	Collecting Veg plot data	42.5	TAS BCP
Aug 1-Sept 15	Facilities Maintenance	4	TAS BCP
Aug 1-Sept 15	Trail Maintenance	7	TAS BCP
Aug 1-Sept 15	Grounds Maintenance	1.5	TAS BCP
Aug 1-Sept 15	Habitat Restoration	13	TAS BCP
Aug 1-Sept 15	Invasive Plant Removal	9	TAS BCP
Aug 1-Sept 15	Travis County Volunteer Projects	80.5	TC BCP
Aug 1-Sept 15	Land Stewardship Days at the Vireo Preserve	84	COA BCP
Aug 1-Sept 15	Tree Mulching	8	COA BCP
8/8/2015	CPR and First Aid for Volunteers	36	COA BCP
8/22/2015	Saturday stewardship day (Aug)	60	WB BCP
8/31/2015	Pollinator Garden and Tree Mulching Project	164	COA BCP
9/17/2015	Weekly volunteer stewardship group (sum thru Sept 17)	6	WB BCP
2015 Late Summer QTR. VOL ACTIVITIES TOTALS:		2, 204	
VOLUNTEER Late Summer QTR. COST SAVINGS VALUE ($22.14/hr.): $		$48, 807	

BCP-Balcones Canyonlands Preserve
COA-City of Austin
TAS-Travis Audubon Society
TC-Travis County
TNC-The Nature Conservancy
WBSN-WILD BASIN ST. EDWARDS UNIVERSITY

BCCP CITIZENS ADVISORY COMMITTEE MEMBER LIST

MEMBER	REPRESENTING	EXPIRES
Ken Beck	Travis County	Spring 2016
Richard DePalma	COA Parks and Recreation Board	2/28/2019
Mary Ann Neely	COA Environmental Board	Spring 2017
Tom Hegemier	LCRA	Spring 2015
Forrest Arnold	Sunset Valley (Mayor Pro Temp)	Spring 2016
Vacant	Travis County	
John Gosdin	Travis County	Spring 2016
Annie, Kellough	City Water and Wastewater Commission	
Vacant	Travis Co	
Peter Torgrimson, Chair	Consensus Neighborhood or Homeowner's Association	Spring 2016
David Whatley	Consensus Recreation	Winter 2016
Vacant	Consensus Development Interests	
Sherri Kuhl, Acting BCCP Secretary	COA BCP&BCCP	

Revised: 9.9.2015/mp

Record of Decisions

Balcones Canyonlands Conservation Plan
Citizens Advisory Committee
Regular Meeting
July 28, 2015 6:30 PM to 8:30 PM
Room 104, Waller Creek Center
625 East 10th Street
Austin, Texas 78701

Present		**Excused**
Forrest Arnold	Sherri Kuhl, BCP Secretary	Ken Beck
Willy Conrad, BCCP Secretary	Peter Torgrimson, Chair	
John Gosdin	David Whatley	
Tom Hegemier	**Four positions are vacant**	
Annie Kellough		

After call to order, Chair Torgrimson introduced Annie Kellough as the new member representing the Water and Wastewater Commission.

1. **Citizens Communication**
   Pam Thompson representing Save Barton Creek Association read a statement from their board into the record. It reiterated the Associations' support for BCP.

   Dick Kallerman spoke to the committee representing himself. He urged BCCP to buy the Horse Thief Hollow Ranch from the heirs of Joe Neal. He said they are interested in selling to BCP.

2. BCP Partner Reports
   a. **City of Austin BCP** - Sherri Kuhl reviewed her written report with the committee.
   b. **Travis County BCP** - Melinda Mallia reviewed her written report with the committee.
   c. **LCRA BCP** - Erik Huebner reviewed his written report with the committee.
   d. **Other BCP Partners** – none.

3. New Business
   a. **Members' issues and concerns** - Willy Conrad briefed members about plans to fill the BCCP Coordinating Committee Secretary position after he retires August 31, 2015. For the short term Sherri Kuhl will serve as acting Secretary. Travis County is negotiating to provide her with support through the UT School of Law Environmental Law area. They may ask to have Melinda Taylor serve in that role. Long term the City and County will jointly fund a staff position through Austin Water Utility. The funding for this is currently working its way through the budget processes, for the City and County. It might be after the Christmas Holiday season, before the position is actually filled.

4. **Old Business**
    a. **Approve the Record of Decision from 5/12/15** - Motion to accept from Whatley, Second Hegemier, Carried 6/0.
    b. **CAC action regarding positive press coverage from 10/22/14** - Conrad noted that staff is working with PIO and others to advance this recommendation.
    c. **Funding concerns for rural and small community fire departments adjacent to BCP** - Conrad advised members that there is a task group formed from the Austin Travis County Joint Wildfire Coalition to consider this issue. They will meet on July 30, 2015.
    d. **Update on BCCP Karst Substitution Process planning and take action as appropriate** - Conrad advised members that the near-final draft policy document was presented to the Coordinating Committee during their June 26, 2015 meeting. Member Daugherty asked that the final version include a time line for review and action. Chair Torgrimson asked if the task group had considered whether there could be unintended consequences from the policy. Member Whatley commented that the best way to test that would be through evaluating a real world project using this. After discussion members took no action. Conrad asked members to forward any additional comments directly to him and he will address them in the final draft or present them to the Coordinating Committee for consideration.
    e. **CAC vacant positions and expected changes from City Boards and Commission changes** - Conrad advised members that two consensus positions are vacant, Travis County has one vacant position, and the City positions from the newly created Environmental Commission (formerly Environmental Board) and Parks and Recreation Board are still vacant. Sherri Kuhl will be convening the Advisory Committee Task Group soon to develop recommendations for the two CAC consensus positions and one pending vacant position on SAC.
    f. **CAC Annual Work Plan** - no action was taken on these items due to numerous vacant positions on the committee.
        a. Report from subcommittees:
            - Wildfire and fire support.
            - Invasive species in landscaping.
            - State of BCP report (joint with SAC).

Balcones Canyonlands Conservation Plan Coordinating Committee
Cave Substitution Policy

Adopted: 8/21/15

Precinct 3 County Commissioner Gerald Daugherty

District 7 City Council Member Leslie Pool

Acknowledged: _____ William A. Conrad, Coordinating Committee Secretary

Purpose

Provide a process that that will allow the Balcones Canyonlands Conservation Plan (BCCP) Coordinating Committee to implement conditions in the BCCP Endangered Species Permit (ES 788841-2 and future revisions, amended permits, or subsequent permits) that allow caves listed in the permit to be substituted with other suitable caves in a manner that is transparent, science based, and consistent with the vision and intent established for BCCP

BCCP Permit Conditions

BCCP Permit (TE 788841-2) Condition S2 [related to Endangered Species covered by the permit]: If during investigations for development of a tract, karst features are discovered with a significant diversity of troglobitic fauna, those karst features may be submitted to the Service for consideration for exchange with karst features identified for protection by the BCCP. The determination of "significant diversity" will be made by the permit applicants and the Service, in association with karst experts. The inclusion of such a karst feature would not increase the number of caves to be protected by the BCCP, but would result in the new feature replacing a previously identified cave or caves.

BCCP Permit (TE 788841-2) Condition T2 [related to Species of Concern covered by the permit]: If during investigations for development of a tract, karst features are discovered with a significant diversity of troglobitic fauna, those karst features may be submitted to the Service for consideration for exchange with karst features identified for protection by the BCCP. The determination of "significant diversity" will be made by the permit applicants and the Service, in association with karst experts. The inclusion of such a karst feature would not increase the number of caves to be protected by the BCCP, but would result in the new feature replacing a previously identified cave or caves.

Roles and Responsibilities

BCCP Coordinating Committee - was created to implement the BCCP - Shared Vison. The BCCP Interlocal Cooperation Agreement requires that the Coordinating Committee carry out the BCCP Shared Vision as Authorized by the BCCP federal permit. It may adopt policies recommended by its Secretary. They are responsible for adopting this policy, providing public involvement with respect to its implementation, and for making decisions and taking action as provided by this policy including initial approval that would trigger actions to initiate a minor permit amendment.

Permit Covered Governing Bodies - as provided in the BCCP Interlocal Cooperation Agreement include Austin City Council and Travis County Commissioners Court. They are responsible for providing additional opportunities for public involvement and reviewing the Coordinating Committee's decisions to substitute caves for those covered in the permit and for taking action as they deem appropriate as provided for in the BCCP Interlocal Cooperation Agreement for permit amendments.

U.S. Fish and Wildlife Service (Service) - is the federal agency authorized by the Endangered Species Act to issue, suspend, and revoke incidental take permits in accordance with Section 10(a)(1)(B) of the Endangered Species Act and its implementing regulations, policy and guidance. They issued permit TE-788841-2 based on the March 1996 Habitat Conservation Plan and Final Environmental Impact Statement. Under their authorities, they are responsible for reviewing and approving any requests to amend this permit. The Service's role is to advise the BCCP on matters related to permit compliance and Fish and Wildlife Service processes and procedures at the earliest possible opportunity.

Third Parties - many caves identified for protection in BCCP are on property owned by third parties not bound to BCCP. They are not required to coordinate with or seek approval from BCCP before taking action that may affect a BCCP listed cave. Third parties may offer cave protection to BCCP for permit covered caves or for caves that might be considered for substitution by BCCP.

Cave Substitution Process

Background

The regional Endangered Species Act Section 10(a)(l)(B) permit (TE 788841-2), also known as the Balcones Canyonlands Conservation Plan (BCCP), requires the Permit holders (City of Austin and Travis County) to acquire, protect, and ensure management that preserves the environmental integrity of 62 listed caves protecting populations of six endangered karst invertebrates and 25 karst species of concern (SOC). This Permit "is subject to compliance with, and implementation of, the terms and conditions of the Environmental Impact Statement and Habitat Conservation Plan" (EIS/HCP) as well as all specific conditions contained in the Permit itself (USFWS 1996a).

One such condition described in the Permit states that "if during investigations for development of a tract, karst features are discovered with a significant diversity of troglobitic fauna, those karst features may be submitted to the Service for consideration for exchange with caves identified for protection by the BCCP. The determination of 'significant diversity' will be made by the permit applicants and the Service, in association with karst experts. The inclusion of such a karst feature would not increase the number of caves to be protected by the BCCP, but would result in the new feature replacing a previously identified cave or caves" (USFWS 1996a).

In order to meet the terms and conditions of the U.S. Fish and Wildlife Service (USFWS) Permit, Permit holders determined a need to define "significant diversity of troglobitic fauna" as it applies to eligibility of a cave for substitution, and determine parameters that quantify preservation of "environmental integrity" for BCCP-listed caves and candidate substitution caves as it applies to management of caves. These defined criteria will be used in determining both the need to substitute a feature listed on the Permit as well as whether the substitution cave will adequately replace the previously identified BCCP cave or caves. These criteria are not intended to evaluate whether a BCCP-listed caves has met Permit compliance, but rather only to evaluate caves for substitution. Following Permit conditions, a group of karst experts, USFWS staff, and Permit holder staff collaborated on these criteria as members of the BCCP Scientific Advisory Committee Karst Sub-committee (chair: Dr. Nico Hauwert).

Significant Troglobitic Diversity as Applied to Conservation of Karst Species

Due to the predicted loss of the vast majority of potential karst habitat allowed by the BCCP, the EIS/HCP states that "the adequacy of the plan is contingent upon full implementation of the acquisition and management strategies detailed in the BCCP", which includes caves named as specific localities for the six endangered karst invertebrates and 25 BCCP-listed karst SOCs (USFWS 1996b). The EIS/HCP also stresses that given the fact that several BCCP karst SOCs were known from only a few caves when the plan was written, the loss of even one BCCP-listed cave could result in a major reduction to the species' population (USFWS 1996b).

However, the EIS/HCP acknowledges that although the BCCP was designed to protect most known localities of endangered karst invertebrates and karst SOCs at the time of permit issuance, "the possibility remains that features may be found that provide habitat for listed species or other equally rare karst invertebrates", and there is a "high probability that other new rare species will be described from Travis County in the future" (USFWS 1996b). The Permit provides for these types of new discoveries to be considered substitutions for BCCP-listed caves if such karst features provide a "significant diversity of troglobitic fauna" (USFWS 1996a).

In order to adhere to the protection strategy in the EIS/HCP and Permit for listed karst invertebrates, as well as ensuring Permit holders receive the "No Surprises" guarantee for protecting the 25 karst SOCs, a karst feature considered for exchange with a BCCP-listed cave must consider those species for which the BCCP cave was designated to protect. However, the EIS/HCP also guides Permit holders to attempt to protect newly discovered karst features that provide habitat for other equally rare karst invertebrates (USFWS 1996b).

The USFWS Biological Opinion also states that the BCCP "identifies an option that establishes a process that allows any newly discovered cave to be protected in the place of a less biologically significant cave currently identified for protection" (USFWS 1996c).

Incorporating this guidance from the EIS/HCP and Biological Opinion, the determination of a replacement cave's significant biological diversity will consider several factors that include species composition, diversity, and abundance, as well as the cave's location and ecological benefits. See Methodology for Assessing Significant Diversity and Environmental Integrity of BCCP Caves and Potential Substitution Caves for specifics on these factors and methodology used for determining significant troglobitic diversity of karst features.

Environmental Integrity as Applied to Karst and Caves

The EIS/HCP states that for a karst fauna area to be considered protected, it must "contain a large enough expanse of continuous karst and surface area to maintain the integrity of the karst ecosystem on which each species depends." The EIS/HCP also provides protection criteria to meet this goal, stating that "the size and configuration of each karst fauna area must be adequate to maintain moist, humid conditions, air flow, and stable temperatures in the air-filled voids; maintain an adequate nutrient supply; prevent contamination of surface and groundwater entering the ecosystem; prevent or control the invasion of exotic species, such as fire ants; and allow for movement of the karst fauna and nutrients through the interstitium between karst features" (USFWS 1996b).

The EIS/HCP states that, "in most instances, this will entail protecting the entire surface and sub-surface drainage area of each cave and enough of the surface vegetation community to support small animals and buffer against fire ant infestations" (USFWS 1996b).

Although the 1996 EIS/HCP does not provide a quantifiable area for protection of the surface vegetation community, it does address the need for this information by stating that the delineation of appropriate boundaries for individual cave preserves will require additional studies to determine the surface area necessary to maintain the biological resources important to the cave (USFWS 1996b).

Research and information needs such as this were also outlined in the Recovery Plan for Endangered Karst Invertebrates in Travis and Williamson Counties, Texas (1994) as one of four major recovery actions; the EIS/HCP reiterates that the effective enactment of this and other recovery actions are necessary "to assure that the implementation of the BCCP has no negative impact on the population viability of the endangered karst invertebrates" (USFWS 1996b).

This recovery action was met with the completion of USFWS Karst Preserve Design Recommendations in 2012, which quantifies the protection criteria quoted above from the BCCP EIS/HCP, and provides specific preserve components for configuring karst preserves that maintain environmental integrity of the karst invertebrate locations and ecosystems they are designed to protect.

According to USFWS' Karst Preserve Design Recommendations, in addition to protecting the entire surface and sub-surface drainage areas, preserve components which maintain the cave's environmental integrity should include: the cave cricket foraging area; a preserve configuration of at least 40 acres that protects the surface plant and animal communities and ensures that the cave footprint is over 105 meters from the nearest hard edge; and is free of incompatible forms of land use and sources of contamination (USFWS 2012).

These recommendations (USFWS 2012) also reiterate the need for karst preserves to be protected and management assured through acquisition or formal management agreements, which is also a requirement of the Permit and EIS/HCP (USFWS 1996a, USFWS 1996b).

Additional preserve components meeting these objectives and methods for quantifying and evaluating these factors are described in Methodology for Assessing Significant Diversity and Environmental Integrity of BCCP Caves and Potential Substitution Caves.

Caves submitted as substitution caves for BCCP-listed caves will be assessed for their environmental integrity using these factors, and measured against the environmental integrity assessment of the cave or caves suggested for replacement.

Only replacement caves with sufficient environmental integrity and significant diversity of troglobitic diversity, and equivalent to or superior to the BCCP cave it has been submitted to replace will be used as an adequate substitution. See Methodology for Assessing Significant Diversity and Environmental Integrity of BCCP Caves and Potential Substitution Caves for methodology on factors for determining environmental integrity of karst features.

Literature Cited

U. S. Fish and Wildlife Service. 1994. Recovery Plan for Endangered Karst Invertebrates in Travis and Williamson Counties, Texas. Albuquerque, New Mexico.

U. S. Fish and Wildlife Service. 1996a. Federal Fish and Wildlife Permit No. TE-788841-2.

U. S. Fish and Wildlife Service. 1996b. Final Environmental Impact Statement /Habitat Conservation Plan for Proposed Issuance of a Permit to Allow Incidental Take of the Golden-cheeked Warbler, Black-capped Vireo, and Six Karst Invertebrates in Travis County, Texas.

U. S. Fish and Wildlife Service. 1996c. Biological Opinion for the Issuance of a Section 10(a)(l)(B) Permit for the Balcones Canyonlands Conservation Plan. Albuquerque, New Mexico.

U. S. Fish and Wildlife Service. 2012. Karst Preserve Design Recommendations. Austin Ecological Services Field Office. Austin, Texas.

Methodology for Assessing Significant Diversity and Environmental Integrity of BCCP Caves and Potential Substitution Caves

The following methodology describes criteria that will: 1) define significant diversity of troglobitic fauna in caves considered for replacement of BCCP-listed caves and 2) determine protection measures that quantify preservation of environmental integrity for BCCP-listed caves and candidate substitution caves.

These criteria will be used in determining both the need to substitute a feature listed on the Permit, such as when a cave ecosystem has been significantly damaged or destroyed or if Permit holders have been unable to secure adequate protections for a cave, as well as whether the substitution cave will adequately replace the previously identified cave or caves.

Caves submitted as substitution for BCCP-listed caves will be assessed for equal or superior significant diversity of troglobitic fauna and environmental integrity using the factors below, and measured against the assessment of the cave or caves suggested for replacement.

Evaluation to Determine Substitution Need and Suitability of Replacement Caves

Caves submitted as substitution caves for BCCP-listed caves will be assessed for whether they meet objectives for significant diversity of troglobitic fauna and environmental integrity using the

factors detailed below, and measured against equal assessments of the cave or caves suggested for replacement.

Only replacement caves meeting significant diversity requirements and with sufficient environmental integrity equal or superior to the BCCP cave it has been submitted to replace will be used as an adequate substitution.

Essential to this evaluation is that the replacement cave(s) be a confirmed locality for the same federally listed karst invertebrate(s) and/or karst species of concern (SOC) as the BCCP-listed cave designated for substitution.

Evaluations for BCCP-listed caves and candidate replacement cave(s) will be made using the most up-to-date research and karst preserve design recommendations available at the time of the assessment. If additional research valuable to this evaluation process becomes available in the future, the BCCP Scientific Advisory Committee's karst sub-committee will review the new information and incorporate or revise assessment factors below if deemed appropriate.

This document is not intended to be a precise rating system or contain a complete scoring rubric, but rather serves as a comprehensive list of the data that would be ideal to have in hand to evaluate cave substitution.

Caves are not easily comparable in terms of biology, ecosystem health, and value to preserve strategies. Each situation is different, and it is impossible to anticipate the variety of issues that may arise when comparing two caves.

The purpose of this document is to provide the evaluation team with a list of all reasonably measured factors relevant to the decision for approving a cave for substitution.

This document is strictly designed for the cave substitution process and not intended to be used to evaluate whether a BCCP-listed cave's protections are compliant with the Permit.

Evaluations for proposed substitutions will occur on a case by case basis, which includes determining if sufficient data are available to evaluate both BCCP-listed caves proposed for substitution and their candidate replacement cave(s).

If there are too many unknowns or assumptions about either cave, evaluators are allowed to reject the substitution proposal until the proposer fills in more of the dataset, up to the discretion of the evaluation team.

Proposers allowing cave access to evaluators may provide one option for obtaining missing evaluation data.

Factors for Determining Significant Diversity of Troglobitic Fauna for a Candidate Substitution Cave

Candidate replacement caves will be compared with BCCP caves designated for substitution and will only be accepted as replacements if the following conditions are met:

1. Replacement cave has similar or greater species composition in relation to target species (federally listed taxa or karst SOCs), as determined by the following factors:
    a. The replacement cave must be a confirmed locality for the same federally listed karst invertebrate(s) as the BCCP cave it will be replace.

b. For BCCP caves containing one of the 25 karst SOC, the replacement cave must contain the same SOC(s) as the BCCP cave it will replace.
    i. Exception: If the BCCP cave does not contain any of the 25 karst SOC (Talus Spring Cave), then the replacement cave must contain either: 1) one or more karst SOC listed on the Permit or 2) one or more troglobitic species of similar taxa to the SOCs listed on the Permit considered to be at least as rare as the BCCP-listed SOCs.
    Rare karst invertebrates not listed as SOCs on the Permit will be evaluated using information from the BCP Karst Database, Texas Memorial Museum's TexBio Database, Texas Park and Wildlife Department's Species of Greatest Conservation Need (SGCN) list rankings (TPWD 2011), and NatureServe's Conservation Status Assessments (Master et al. 2012) to quantify significance of the species in terms of rarity and need for protection.

2. Replacement cave has similar or greater overall troglobitic karst invertebrate species diversity, as determined by the following factors:
    a. Demonstrate through repeated biological surveys that the replacement cave has greater or equal diversity; for example, by graphing the number of troglobitic taxa seen on each visit and noting those previously seen vs. new occurrences. Karst invertebrate surveys should follow survey methodology described in USFWS 2014b, which explains that in order to assess presence/absence of endangered karst invertebrates with a high level of confidence, caves should be surveyed at least 14 times.
    b. Evaluate whether the caves in consideration have been thoroughly measured in terms of diversity. Since many karst species are rare and poorly studied, problems with detection and taxonomy hamper creating a complete list. Evaluate and explain the status of the diversity list for the cave(s).
    c. Evaluate the numbers of troglobitic taxa vs. other taxa (troglophiles, trogloxenes, or accidentals). In some cases the cave entrance has great diversity, but the deep cave community structure is limited.
    d. Additional rare karst invertebrates not listed as SOCs on the Permit will be evaluated using information from the BCP Karst Database, Texas Memorial Museum's TexBio Database, Texas Park and Wildlife Department's SGCN list rankings (TPWD 2011), and NatureServe's Conservation Status Assessments (Master et al. 2012) to quantify significance of the species in terms of rarity and need for protection.
    e. Consider non-troglobitic karst species, which rank high on TPWD's SGCN list and NatureServe's Conservation Status Assessments list that could be affected/protected by the substitution (ex: bats, salamanders), as contribution to the overall biological diversity of the cave being considered for substitution.
3. Replacement cave has similar or greater Permit-listed species abundance, as determined by the following factors:
    a. Demonstrate through repeated biological surveys the relative abundance of taxa on the cave's species list. With well-delineated in-cave survey methodology, it should be clear where the rare species are found within the cave, and how many are typically seen in a visit. If collection methods are not performed in a uniform fashion, results may not be comparable among sites or within a site on different survey days; this should be explained or accounted for in the evaluation. Karst invertebrate surveys should follow survey methodology described in USFWS 2014b.

b. If the entire cave isn't inventoried during each visit, then an estimate of the non-surveyed area would help determine the total potential of the cave to support a healthy population. This estimate will account for the fact that, on average, larger caves have more habitat available and a greater diversity of habitat, thus having a greater diversity and abundance of fauna (Schneider and Culver 2004).

4. Replacement cave's location is within the same karst fauna region as defined by Veni (1992) or future USFWS-approved revisions of the KFRs.
5. Replacement cave's location is within the same BCCP-protected cave cluster (Northwood, McNeil, or Four Points). Note: only applicable if BCCP cave to be substituted is within one of these cave clusters. This requirement ensures that the replacement cave is contributing to a Karst Fauna Area that helps meet the recovery criteria for the federally listed karst invertebrates in the BCCP cave to be substituted.

Factors for Determining Environmental Integrity of BCCP Listed Caves and Potential Replacement Caves

The following protection criteria, largely based on USFWS Karst Preserve Design Recommendations (2012), will be used to quantify the environmental integrity of BCCP caves and candidate substitution caves for determining both the need for substitution of a BCCP cave and adequate replacement by a candidate substitution cave.

Ideally preferred protection goals are also described for each factor to guide evaluation assessments.

A. Karst feature surface area protection measures:
   1. Percent of cave footprint within protected area:
      a. Determined by GIS spatial analysis and use of footprint digitized from cave map to quantify percent protected.
      b. Protected area – lands owned or acquired by the Permit holders (City of Austin and Travis County) or BCP managing partners that are managed for protection of the cave or caves, or lands that have formal management agreements with the Permit holders as described in S-4 and T-4 of the Permit (USFWS 1996a).
      c. Ideally preferred protection goal: 100 percent of cave footprint is within protected area (USFWS 2012).

   2. Distance of cave footprint to nearest preserve edge:
      a. Determined by GIS spatial analysis by calculating the distance of edge of the digitized cave footprint to nearest preserve boundary.
      b. Edge: defined as the cave preserve's property boundary and/or where impervious cover dissects the natural area surrounding the karst feature, such as paved roads or urban development areas detrimental to surface protection efforts.
      c. Ideally preferred protection goal: footprint is as near to the center of the protected area as possible, and at least 105 m from the preserve edge (USFWS 2012).

   3. Percent of surface drainage within protected area:
      a. Determined by GIS spatial analysis by quantifying percent of delineated surface drainage basin that is within protected area(s).

b. Surface drainage basins will be conservatively over-estimated with high confidence by licensed geologists performing hydrogeologic studies of caves using methods described in Veni 2003, Hauwert et al. 2005, Hauwert 2009, or other methods approved by the BCCP Scientific Advisory Committee's karst sub-committee.
c. Where surface drainage basin delineations are unable to be performed due to denied access, this analysis will be performed based on the area draining to the cave entrance using available topographic and cave map data.
d. Ideally preferred protection goal: the entire surface drainage basin is within the protected area (USFWS 2012).

4. Percent of subsurface drainage basin within protected area:
    a. Determined by GIS spatial analysis by quantifying percent of delineated subsurface drainage basin that is within protected area(s).
    b. Subsurface drainage basins will be conservatively over-estimated with high confidence by licensed geologists performing hydrogeologic studies of caves using methods described in Hauwert and Cowan 2013, Veni 2003, or other methods accepted by the SAC karst sub-committee.
    c. Where subsurface drainage basin delineations are unable to be performed due to denied access, this analysis will be performed using a delineation made by the contour level at the bottom of the cave, as required by S-3 and T-3 of the Permit (USFWS 1996a).
    d. Ideally preferred protection goal: the entire subsurface drainage basin is within the protected area (USFWS 2012).

5. Percent of cave cricket foraging area (105 meters from cave footprint) within protected area:
    a. Determined by GIS spatial analysis by creating a 105m buffer area around the cave's footprint digitized from its cave map, and quantifying percent of this buffer area that is within protected area(s).
    b. Ideally preferred protection goal: 100 percent of cave cricket foraging area is within the protected area (USFWS 2012).
    c. As an alternative to assuming a 105m buffer, site-specific cave cricket surveys could be performed in order to determine the foraging area around a specific cave. Methods should include an adequate survey area and effort during appropriate season and over enough nights to capture the large diversity of exit and foraging patterns known for *Ceuthophilus* spp. Taylor et al. (2005) and Zara Environmental (2013, 2014) give examples of methods used for site specific cave cricket foraging studies in Texas.

6. Preserve tract size:
    a. Determined by GIS spatial analysis. In cases where BCP or other preserve tracts are adjoining each other, all connected interior preserve tract boundaries will be dissolved to account for connectivity to all preserve areas. Cave preserve tract delineations also cease at hard edges such as paved roads or impervious cover detrimental to surface protection efforts.
    b. NOTE: This environmental factor is extremely important when determining environmental integrity of a candidate replacement cave. A large, intact tract has ecological stability and natural buffers that are difficult if not impossible to create artificially or manage successfully. Large preserves protect the quality of native

surface plant, arthropod, and animal communities necessary for adequate nutrient input (USFWS 2012). Large preserves are also more resilient and typically support caves that need less active management (USFWS 2012). Large preserves with contiguous karst areas have abundant mesocavernous zones which are likely to support immeasurable populations of rare troglobites. Having naturally resilient preserves also makes them less sensitive to problems associated with loss of funding and staffing resources that may happen over time.

c. USFWS has chosen preserve size as a critical indicator in determining quality of a karst preserve (USFWS 2012). Ideally preferred protection goals include a preserve size of at least 100 acres to be considered a high quality preserve, or at least 40 acres to be considered a medium quality preserve (USFWS 2012).

7. Net gain in protected land for BCP:
   a. Determined by subtracting acreage of BCCP cave's protected area from the replacement cave's preserve tract size.
   b. Ideally preferred protection goal: Cave preserves with larger protected areas will be favored due to benefits described above in item 6, preserve tract size.

8. Shape of protected area:
   a. Subjective determination using map that shows cave's location within delineated preserve area boundaries.
   b. Ideally preferred protection goal: USFWS 2012 defines preserves that are circular in shape and/or are connected to other preserves as an ideally preferred protection measure, along with the cave or caves being as near to the center of the preserve area as possible to reduce edge effects.

9. Landscape mosaic of protected area (% woodland/grassland):
   a. Determined by GIS spatial analysis using NAIP aerial imagery and/or LIDAR data to classify landscape components in the protected areas within 100 acres of cave.
   b. Proper landscape mosaic helps to ensure the quality of the native surface plant, arthropod, and animal communities, beneficial to the cave's nutrient input (USFWS 2012).
   c. Ideally preferred protection goal: according to USFWS (2012), cave preserve areas should include ≥80% woodland to 10% grassland mosaic.

10. Number of adjacent karst features within protected area:
    a. Quantified by performing karst feature surveys in protected area within a 100 acre radius of cave which includes the surface and subsurface drainage basins, following recommendations in USFWS 2014b.
    b. Ideally preferred protection goal: cave preserves should be designed to protect as many caves or karst features as possible to support nutrient input from cave crickets (USFWS 2012).

11. Incompatible land use/fragmentation:
    a. Subjective determination using aerial map that demonstrates the cave's location and incompatible forms of land use within delineated preserve area boundaries.
    b. Incompatible forms of land use within the delineated karst preserve itself such as paved roads, impervious cover, livestock, water retention ponds, or hiking and

biking trails should also be documented for consideration of this factor (USFWS 2012). Also describe adjacent land use outside of the preserve including developments, roads, impervious cover, etc.

c. Ideally preferred protection goals: There should be no paved roads, development, impervious cover or other structures that result in permanent habitat loss within the cave's protected area (USFWS 2012). Protected areas should also not include trails or picnic tables inside the cave cricket foraging area, the surface or subsurface drainage basin or within 105m of the cave footprint (USFWS 2012).

12. Proximity to infrastructure/ utilities:
    a. Subjective determination using aerial map that illustrates the cave's location and infrastructure within and adjacent to delineated preserve area boundaries.
    b. Ideally preferred protection goal: cave preserve is free of underground pipelines, storage tanks, water retention ponds, or other structures/facilities that could cause contamination (USFWS 2012).

B. Hydrogeologic quality of troglobitic habitat measures:
1. Contribution to water quality/quantity within the karst ecosystem. Quantified by:
    a. Surface Catchment Area size
    b. Maximum Potential Subsurface Catchment Area based on data collected
    c. Average combined drip rate per cave following methodology described in Hauwert and Cowan (2013).
    d. Lack of subsurface pipelines or retention basins (USFWS 2012).
    e. Ideally preferred protection goals: larger catchment areas are preferred due to their more significant contribution to water quantity within the karst ecosystem.

2. Total accessed length, depth, and volume of cave:
    a. Determined by cave maps. Also, if applicable, describe potential of undiscovered cave passages with supporting evidence.
    b. Volume of cave determined by methods described in Krejca and Weckerly (2007).
    c. Ideally preferred protection goal: USFWS (2012) states that larger, deeper caves may help protect against impacts to protected species from climate change by better maintaining in-cave stable temperatures and high humidity.

3. Presence of permanent water bodies within cave:
    a. Determined by in-cave surveys and/or documentation on cave maps and data from access to phreatic zone habitat where aquatic life such as aquatic salamanders may potentially be found.
    b. Ideally preferred protection goal: caves with permanent bodies of water (pools, cave streams) are preferred for their contribution of habitat for aquatic life, potentially increasing biological diversity.

C. Ecological health measures:
These parameters may not be a critical factor on their own, but are important for the evaluation team to help understand the current ecological status and potential future management needs of the cave.

1. Healthy/stable cave cricket population:
    a. Use existing cave cricket exit count survey results to assess population trends at caves.
    b. If cave cricket data are absent or lacking, perform cave cricket monitoring following recommendations in USFWS 2014a.
    c. Ideally preferred protection goal: results at caves will demonstrate a healthy and stable cave cricket population as demonstrated by repeated surveys.

2. Density of red-imported fire ants (RIFA), tawny crazy ants, and/or other invasive species that could impact the cave ecosystem:
    a. Perform surveys using a scientifically accepted protocol for tawny crazy ants (*Nylanderia fulva*) to confirm absence at sites: caves suggested as candidates for replacement caves should not have infestations of tawny crazy ants.
    b. Quantify RIFA densities using survey methods detailed in USFWS 2014a to ensure that RIFA threshold levels have not been reached at replacement caves.

Evaluation Documentation Requirements

The following documents and information should be included for conducting the evaluation to determine substitution need of a BCCP-listed cave and suitability of its replacement cave(s) (see above for details/definitions of specific factors):

1. Maps of each cave preserve area demonstrating the following:
    a. Cave location and footprint.
    b. Cave protection area.
    c. Surface and subsurface drainage basin delineations.
    d. Cave cricket 105 meter foraging area delineation.
    e. Adjacent karst feature locations.
    f. Landscape mosaic of karst preserve.
    g. Incompatible forms of land use within the delineated karst preserve.
    h. Infrastructure within and adjacent to delineated preserve area boundaries.
    i. Surrounding land use.

2. Cave map for each cave demonstrating length, depth, and permanent bodies of water.

3. Documentation confirming presence of federally-listed karst invertebrates and/or BCCP karst SOC's.

4. Species lists for each cave.

5. In-cave faunal survey results demonstrating species abundance and methodology for conducting surveys.
6. Hydrogeologic study reports demonstrating methodology to assess drainage basin delineations and average combined drip rate results.

7. Cave cricket exit count survey results at caves and methodology for conducting surveys.

8. RIFA survey data for caves demonstrating mound densities.

See the Cave Comparison Worksheet below (Table 1) for a summary of cave substitution evaluation criteria.

Table 1 Cave Comparison Worksheet

	Cave Substitution Evaluation Criteria Worksheet	BCCP Cave	Substitution Cave	Comments
	Significant Diversity Criteria			
1a.	Confirmed endangered species locality?			
1a.	List of endangered species (ES) present			
1b.	BCCP Species of Concern (SOC) locality?			
1b.	List of BCCP SOC present			
2a - 2c.	Replacement cave has similar or greater overall species diversity			
2d.	List of additional troglobitic species			
2d.	SGCN list ranking of additional troglobitic species			
2d.	Natureserve rarity rank of additional troglobitic species			
2e.	List of rare non-troglobitic species			
3.	Replacement cave has similar or greater overall species abundance			
4.	Karst Fauna Region			
5.	Replacement cave is within same BCCP cave cluster (if applicable)			
	Environmental Protection Criteria			
A.	**Karst feature surface area protection measures:**			
1.	Percent of cave footprint within protected area			
2.	Distance of cave footprint to nearest preserve edge			
3.	Percent of surface drainage within protected area			
4.	Percent of subsurface drainage within protected area			
5.	Percent of cave cricket foraging area within protected area			
6.	Preserve tract size			
7.	Net gain in protected land for BCP			
8.	Shape of protected area			
9.	Landscape mosaic of protected area (% woodland/grassland)			
10.	Number of adjacent karst features within protection area			
11.	Incompatible land use/fragmentation			
12.	Proximity to infrastructure/pipelines/utilities			
B.	**Hydrogeologic quality of troglobitic habitat measures:**			
1a.	Surface catchment area size			
1b.	Maximum potential subsurface catchment area			
1c.	Average combined drip rate			
2.	Total accessed length of cave			
2.	Total accessed depth of cave			
2.	Total accessed volume of cave			
3.	Presence of permanent water bodies in cave			
C.	**Ecological health measures:**			
1.	Cave cricket population: in-cave survey and exit count results			
2.	Red-imported fire ant density at site			
2.	Tawny crazy ants present at site?			

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How is a Cave Substitution Made?

a. A BCCP Coordinating Committee Member makes a proposal to substitute for a cave listed in condition S1 or T1 in the BCCP Federal Permit
b. BCP staff(s) assembles information required, as described in the Evaluation Documentation Requirements
c. Refer the proposal to the BCCP Scientific Advisory Committee – Karst Subcommittee for review, assessment, and recommendation to the Coordinating Committee for action.
d. When the Coordinating Committee takes action to accept a cave substitution proposal, the coordinating committee will initiate the BCCP amendment process for a minor amendment to the BCCP federal permit (Article 7, section 7.2, Interlocal Cooperation Agreement Between Travis County and City of Austin Implementing the Balcones Canyonlands Conservation Plan – Shared Vision)
e. Proposals for cave substitution will be completed within one year from the date of submission by a Coordinating Committee member. This allows for any needed information gathering, additional field investigations, data analysis, and limited Coordinating Committee meeting schedules. This timeline will allow BCCP to appropriately address issues of non-compliance in a manner that would not result in an immediate permit violation while allowing third party actions to proceed in a reasonable manner.

Karst Preserve Protection and Management Measures

These management measures must be able to be enacted at BCCP caves or candidate replacement caves. If for some reason the candidate replacement cave's site can not adhere to these measures, then it may not be considered as a substitution.

1. No public access allowed in cave:
    a. Ideally preferred protection goal: USFWS 2012 states that no public access should be allowed at caves: "to protect the subsurface habitat, several things should be carefully controlled including ensuring that the cave is entered for monitoring purposes only".
    b. Candidate replacement caves should not allow public access.

c. If recreational use is allowed in the cave's protected area, it should not interfere with karst management objectives as described in 11. c. (Incompatible land use) above and as defined in the most recently approved BCP Land Management Plan (Chapter IX, Karst Species Management).

2. Cave is (or will be) gated and/or fenced:
    a. Ideally preferred protection goal: perimeter fencing around cave preserves is preferred for protection of the karst ecosystem from dumping, vandalism, and trespass (USFWS 2014a). Properly designed and installed cave gates are also preferred where there is a history of trespass and vandalism, and where human health or safety may be at risk (USFWS 2014a).

3. Cave is (or will be) monitored/managed per most recent USFWS Karst Preserve Management and Monitoring Recommendations (2014a). Ideally preferred protection goals for this factor:
    a. Biological monitoring is being conducted.
    b. Vegetation management supports health of karst habitat.
    c. Red-imported fire ant management is performed.