BALCONES CANYONLANDS PRESERVE
LAND MANAGEMENT PLAN

TIER III

TRAVIS COUNTY
JOLLYVILLE UNIT
CYPRESS CREEK MACROSITE

August 2007

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1.0 BACKGROUND INFORMATION

1.1 Description of Unit

The Jollyville Unit is located in the Cypress Creek Macrosite and is managed by Travis County's Natural Resources Program of the Transportation and Natural Resources Department. The Jollyville Unit currently consists of 1,957 acres in twelve contiguous tracts. These tracts were acquired at different times with different agreements but are managed together as a Unit (See Table 1 and Figure 1).

Table 1: Tracts within the Jollyville Unit

Tract	Management Status	Date of Acquisition	Acreage
Lake Perspectives	TC Deed	1999	124
Grandview Hills Phase 1 (Vireo Ridge)	TC Deed		263
Grandview Hills Phase 2 (Vireo Ridge)	TC Deed		318
Vista Point	TC Deed		490
Grandview Hills 10a	2 TC Deeds, 4 Conservation Easements		287
Grandview Hills Sec. 14, Lot 2	TC Deed		35
Bunten	TC Deed		141
Grandview Hills Sec. 8	Conservation Easement		24
Tomen Caves	TC Deed		141
Stratton	TC Deed		6
Nootsie	TC Deed		120
Caves Tracts	TC Deed		6
Mirtsching Tract	TC Deed		2
Jollyville Unit Acreage Total			**1,957acres**

Travis County and the City of Austin have competed successfully since implementation of the BCCP in 1996 to leverage locally generated funds with federal grant assistance to acquire lands for the BCP. The Grandview Hills Phase 1 and 2, Vista Point, Grandview Hills Section 14, Lot 2, Bunten, Tomen Caves, Stratton, and Nootsie tracts were acquired fee simple in part with federal assistance through the USFWS Habitat Conservation Plan Land Acquisition (Section 6 funding) Grant awards.

Travis County accepted the Lake Perspectives Tract in fee as the on-site mitigation requirement for the Baldwin/Balfour 10(a)1(B) permit TE-003593-0 issued in March 31, 1999 by the USWS.

Travis County acquired the 2.4 acre Mirtsching Tract fee simple in 2006. Since a house covers part of the tract and this may be sold along with some acreage, only 2.0 acres of the tract are included in Table 1 and included in the Preserve.

The Tomen-Parke Associates was issued a 10(a)1(B) permit PRT-815447 by the USFWS in August 27, 1999. Travis County accepted the on-site mitigation tracts from Tomen Parke or successive owners for two fee simple tracts and five conservation easement tracts. The mitigation land was transferred to Travis County in several land transfers and types of agreements with Tomen-Parke or successive owners over several years (See 1.1.3.2 Special Agreements). All lands held under Conservation Easement Agreements are managed as part of the Balcones Canyonlands Preserve (BCP) under the terms and conditions of the BCCP regional permit.

Historic land uses on the tracts comprising the Jollyville Unit included agricultural (raising cattle, chickens, goats and sheep) and recreational activities (primarily hunting and outdoor enjoyment and wilderness exploration). The heavily wooded canyons provide habitat for the federally listed endangered golden-cheeked warbler (*Dendroica chrysoparia*, hereafter GCWA), the federally endangered black-capped vireo (*Vireo atricapilla*, hereafter BCVI), while the intermittent springs and stream segments host populations of Jollyville Plateau Salamanders (*Eurycea tonkawae*). The karst features in the Unit contain five federally listed karst species, Tooth Cave pseudoscorpion (*Tartarocreagris texana),* Tooth Cave spider (*Neoleptoneta myopica),* Tooth Cave ground beetle (*Rhadine persephone),* Kretschmarr Cave mold beetle (*Texamaurops reddelli),* and Bone Cave harvestman (*Texella reyesi)* and many other karst species of concern.

1.1.1 Location of Unit

The Jollyville Unit is located in western Travis County, approximately twelve miles (19.3 km) northwest of downtown Austin (Figure 1). The unit is located north of Lake Travis (on the Cypress Creek Arm), west of RM 620, east of FM 2769. The preserve is bisected by Bullick Hollow Road. Access to the preserve is from RM 620, FM 2769, and Bullick Hollow Road.

1.1.2 Unit Features

Humans have heavily impacted the lands comprising the Jollyville Unit. There are several old houses, old ranch roads, power lines, trails, retention ponds, dumps, and old fences found on the Unit. Natural features include several creeks and intermittent streams, natural springs, caves, steep canyons, rolling hills, and oak-juniper savannas.

1.1.3 Land Status

1.1.3.1 Rights-of-Way and Easements

Travis County has a complete list of right-of-way and easements on BCP preserve property and has a file entitled “Jollyville Unit Deed Records” that is maintained by the Transportation and Natural Resources Department.

1.1.3.2 In-Holdings

Travis County managed Preserve lands in the Jollyville Unit are owned in fee or in conservation easements by the County with the exception a three acre in-holding north of the Vista Point Tract, a two acre in-holding in the Grandview Hills Phase 2 Tract, and a one acre Utility in-holding in the Grandview Hills 10a Tract.

1.1.3.3 Boundary Disputes

There are no known boundary disputes.

1.1.3.4 Regulatory Requirements

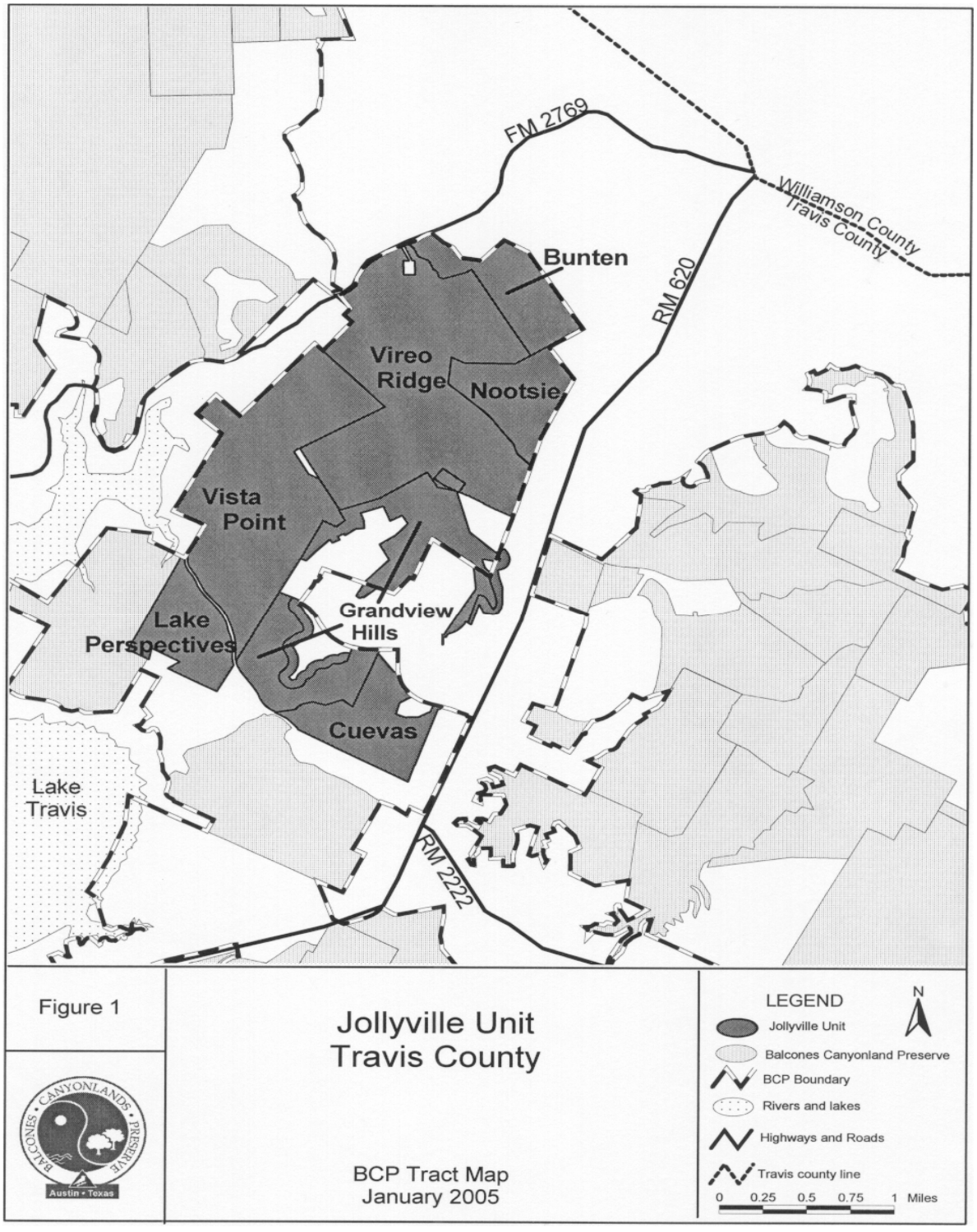
The Grandview Hills 10(a) Conservation Easements have some “Buffer” areas within which the landowner may have picnic areas, some vegetation management, some minor construction projects, and other activities which are outlined in these Conservation Easement Agreements and allowed in the 10(a) permit. Regulatory requirements of the Balcones Canyonlands Conservation Plan (BCCP) are covered in the BCCP permit and in the Balcones Canyonlands Preserve - Land Management Plan Tier II Plan Administration.

1.1.3.5 Deed Restrictions

The County is unaware of any current deed restrictions that impact land management on tracts held in fee by the County. Any such restrictions may be appended to this document at a later date.

1.1.3.6 Special Agreements

1) Travis County Commissioners Court on October 2, 2001 approved a “Conservation Easement Agreement” between the Tomen-Parke Associates and Travis County (GVH Sec. 9). The Agreement transferred management of Preserve areas to Travis County and detailed the rights and responsibilities of each party. The Conservation Easement on the tract will remain in effect in perpetuity and limits access to the tract to uses compatible with Preserve management.


FM 2769
Williamson County
Travis County
RM 620
Bunten
Vireo Ridge
Nootsie
Vista Point
Grandview Hills
Lake Perspectives
Cuevas
Lake Travis
RM 2222
Figure 1
Jollyville Unit
Travis County
BCP Tract Map
January 2005
LEGEND
N
Jollyville Unit
Balcones Canyonland Preserve
BCP Boundary
Rivers and lakes
Highways and Roads
Travis county line
0 0.25 0.5 0.75 1 Miles
BALCONES CANYONLANDS PRESERVE
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2) Travis County Commissioners Court on October 2, 2001 approved a "Conservation Easement Agreement" between the Tomen-Parke Associates and Travis County (GVH Sec. 11B, Lot 1). The Agreement transferred management of Preserve areas to Travis County and detailed the rights and responsibilities of each party. The Conservation Easement on the tract will remain in effect in perpetuity and limits access on the tract to uses that are compatible with Preserve management.
3) Travis County Commissioners Court on October 2, 2001 approved a "Conservation Easement Agreement" between the Tomen-Parke Associates and Travis County (GVH Sec. 11A, Lot 2). The Agreement transferred management of Preserve areas to Travis County and detailed the rights and responsibilities of each party. The Conservation Easement on the tract will remain in effect in perpetuity and limits access to the tract to uses compatible with Preserve management.
4) Travis County Commissioners Court on January 29, 2002 approved a "Conservation Easement Agreement" between the LNR Grandview Limited Partnership and Travis County (GVH Sec. 11A, Lot 3). The Agreement transferred management of Preserve areas to Travis County and detailed the rights and responsibilities of each party. The Conservation Easement on the tract will remain in effect in perpetuity and limits access to the tract to uses compatible with Preserve management.
5) Travis County Commissioners Court on April 13, 2004 approved a "Conservation Easement Agreement" between the Houston Lakepoint Partners, L.P. and Travis County (GVH Sec. 8). The Agreement transferred management of Preserve areas to Travis County and detailed the rights and responsibilities of each party. The Conservation Easement on the tract will remain in effect in perpetuity and limits access to the tract to uses compatible with Preserve management.

Table 2: Grandview Hills Conservation Easement Tracts

USFWS Permit #	Conservation Easement Location	Acreage Habitat	Acreage Buffer	Total Acreage in Conservation Easement
PRT-815447	Grandview Hills Sec. 9	117.484	27.974	145.458
PRT-815447	Grandview Hills Sec. 11B, Lot 1	3.578	8.135	11.713
PRT-815447	Grandview Hills Sec. 11B, Lot 2	1.969	1.626	3.595
PRT-815447	Grandview Hills Sec. 11B, Lot 3	0.3	2.59	2.89
PRT-815447	Grandview Hills Sec. 8	20.816	3.354	24.17

1.1.3.7 Mineral Rights

Travis County will compile a complete list of mineral rights on BCP preserve property and establish a file entitled "Jollyville Unit Mineral Rights Records" to be maintained by the Transportation and Natural Resources Department.

1.1.3.8 Legal Issues

Other than those issues associated with participation in the BCCP, no tract-specific legal issues remain. BCCP requirements are treated elsewhere in this document; see Regulatory Requirements section, above.

1.1.3.9 Financial Issues

Other than those issues associated with participation in the BCCP, no tract-specific financial issues remain. BCCP requirements are treated elsewhere in this document; see Regulatory Requirements section, above.

1.2 Physical Characteristics

The preserve is situated along the southwestern edge of the Jollyville Plateau, a significant geographic feature in northwestern Travis County. Topography is hilly with steep canyons and ravines. Preserve elevations range from 700' along tributaries of Lake Travis to 1000' on the Jollyville Plateau. All draws and creeks drain into the Cypress Creek Arm of Lake Travis. Karst topography is associated with the Jollyville Plateau and the slope breaks along the edge of the plateau. Many caves, grottos, and springs occur on the preserve. The Jollyville Unit falls on the Mansfield Dam and Jollyville USGS 7.5" quadrangle maps.

1.2.1 Geology

Geologic units of the Jollyville Unit include Lower Cretaceous limestones (from oldest to youngest) of the Glen Rose Formation, the Walnut Formation, and the Edwards Group. The Jollyville Plateau is underlain by limestone of the Edwards group. Edwards limestone is relatively resistant to mechanical erosion, but easily soluable by groundwater, resulting in the ready formation of karst features.

Along the abrupt slope breaks that define the edge of the plateau, Edwards limestone has eroded away, exposing the Glen Rose and Walnut formations. Both formations are more easily erodible than Edwards limestone, resulting in intricately dissected, steeply sloping terrain. Shelter caves are ubiquitous along the breaks. The narrow bottomlands of the preserve are underlain by Glen Rose limestone and covered by a layer of wash-debris or stream deposits (Woodruff 1985).

1.2.2 Hydrology

1.2.2.1 Surface and sub-surface water

On the Jollyville Plateau, RM 620 roughly forms the boundary between the Bull Creek and Lake Travis watersheds. Land east of RM 620 is drained by the Bull Creek system; land west of RM 620 is drained by the Lake Travis watershed. The Jollyville Unit falls entirely within the Lake Travis watershed. Water drains generally westward into the Cypress Creek Arm of Lake Travis. The preserve itself is dissected by numerous streams, some intermittent, others flowing throughout the year. All drainages contribute to the Cypress Creek Arm of Lake Travis.

Hydrology of the preserve is highly influenced by the geology of the Jollyville Plateau. Because the layer of Edwards limestone on the Jollyville Plateau is thin (a few tens of feet), most of the surface water on the plateau rapidly drains towards the highly dissected edge, discharging in numerous springs and seeps along the slope breaks (Woodruff 1985). Along the breaks, water run-off and erosion are high. The well-defined stream channels and adjacent floodplains of the lowlands and the less well-defined drainages further upland are both dynamic hydrologic units. These areas are susceptible to flooding, a factor that has constrained development in the past. However, these areas are highly important to wildlife as water retention in the clayey soils helps to maintain riparian vegetation even in dry periods, supporting floral and faunal diversity. Seeps and springs also occur in the narrow bottomland channels that are underlain by Glen Rose limestone. Other important hydrological features include a spring called McDonald Well which supports a population of Jollyville salamanders (*Eurycea tonkawae*), and two man-made ponds formed by small dams. Numerous wildlife species have been observed using the ponds.

A portion of the Edwards Aquifer underlies the preserve with the boundaries of the aquifer corresponding to those of the Jollyville Plateau. A study conducted by a local geologist for developers of The Parke (Woodruff 1985) concluded that the portion of the Edwards Aquifer which underlies the plateau is localized and disjunct. Recharge in this area would influence neither the Northern segment or Barton Springs segment of the Edwards Aquifer.

1.2.2.2 Water quality

Water draining the surface of the Jollyville Plateau descends through a thin layer of Edwards limestone to a local water table, which then discharges through numerous springs and seeps along the breaks at the edge of the plateau. Woodruff (1985) suggested that water penetration into the water table may be highly localized due to the presence of sinkholes and caves. Veni

and Associates (1988) has a discussion of water quality and the potential effects of local development in this area.

Urban run-off from the Grandview Hills subdivision is filtered through a system of detention ponds. Water quality in the preserve has not been tested since the subdivision was built. Impacts of other recent development, such as the Veranda Apartments, have also not yet been studied. Water quality on the plateau could potentially affect both the Jollyville salamander and karst invertebrates on the Unit. In 1999, water quality testing was conducted by the City of Austin for other areas on the Jollyville Plateau (City of Austin 1999), but none located on the Jollyville Unit.

Observations by Travis County field staff since 1999 have found that water clarity in most streams and springs appears good though some negative impacts are observed from run-off during new construction in the Grandview Hills subdivision and the Verandah Apartments, with sediment and building materials being conveyed directly into the canyon, covering vegetation and slopes and decreasing water clarity. The specific effects on water quality and fauna are unknown at this time (See also Section 1.2.4 Caves and sub-surface features).

1.2.3 Soils

Predominant soil types on the Jollyville Unit include those in the Brackett and Tarrant series (see Soil Conservation Service, 1974). Both series have moderately slow permeability and low available water capacity. They are suitable for range and wildlife habitat or recreation. Soils in the Brackett series (BoF) are shallow and well-drained with a generally gravelly surface layer. Brackett soils are found on steeper slopes along creeks or rivers and consist of Brackett soils separated by rock outcroppings. This soil type is benched and underlain by limestone and marl.

Tarrant soil type (TdF) is shallow to very shallow, well-drained, stony, and clayey. Like Brackett soils, they are underlain by limestone. Tarrant soil has steep rocky outcrops, and occurs in ravines along major rivers. Slopes are 18 - 40%. Rock outcrops and limestone fragments comprise up to 50-80% of the coverage. Vertical escarpments are included in this mapping unit. Tarrant soil type (TaD) is rolling and occurs predominantly on slopes of 5 - 12%. Random limestone outcroppings and loose rock cover 30 – 60% of the mapping unit.

Narrow bands of soils in the Volente complex (VoD) have 1-8% slopes and occur throughout the preserve. These soils are deep and well-drained, with concave slopes that occur in narrow valleys. Crops are grown on this soil type, but erosion hazard is high. On the preserve, Volente

soils are associated with stream systems that drain into the Cypress Creek Arm of Lake Travis. Important range sites on the Jollyville Unit include Steep Adobe, Rocky Upland, and Steep Rocky (Soil Conservation Service 1974).

1.2.4 Caves and subsurface features

Numerous karst features occur on the Jollyville Unit. "Karst" is defined as terrain where the rock is dissolved by water such that a significant percentage of surface water drains into the subsurface (Veni and Associates 1988). On the preserve, karst features are associated with the Jollyville Plateau (see Tier II-A Chapter IX). Karst features that have been located on the plateau include caves, sinkholes, pits, and honeycombed rock (Veni and Associates 1988). There are also several shelter caves (large rock overhangs at cliff edges large enough to stand in and may contain archeological sites).

Karst features act as conduits, transmitting water to the subsurface rapidly, with little or no filtration. For this reason, groundwater systems in karst habitats are sensitive to surface activities and conditions (Veni and Associates 1988). Woodruff (1985) noted that, on the plateau, the movement of surface water to groundwater may be highly localized due to the presence of karst features (Woodruff 1985). Surface water quality may potentially affect karst invertebrates, as well as the Jollyville salamander. See Veni and Associates (1988) for a discussion of karst and water quality impacts of local development and see Section 1.2.2 Hydrology.

1.3 Biological Characteristics

1.3.1 Vegetation Currently on Unit

The Jollyville Unit, located in the Edwards Plateau vegetative region, contains approximately 2000 acres of more or less closed-canopy oak-juniper woodlands. This habitat type occurs on gently sloping to steep terrain throughout the preserve. Important plant species include live oak (*Quercus fusiformis*), Ashe juniper (*Juniper ashei*), Spanish oak (*Q. buckleyi*), shin oak (*Q. sinuata*), silktassel (*Garrya lindheimeri*), greenbriar (*Smilax bona-nox*), kidneywood (*Eysenhardtia texana*), grape vine (*Vitis sp.*) and cedar sage (*Salvia sp.*)

Steep canyonheads that drain the Jollyville Plateau support closed canopy, oak-juniper woodlands with an extensive mix of deciduous trees, including cedar elm (*Ulmus crassifolia*), American elm (*U. americana*), black cherry (*Prunus serotina*), Texas ash (*Fraxius texensis*), hackberry (*Celtis sp.*), shin oak, and Spanish oak. The mesic environment also supports extensive understory development that includes a variety of vines (e.g. mustang and winter grape, Virginia creeper, poison ivy, passionflower), ferns (e.g. Southern shield fern, maidenhair

fern, cliffbrakes), shrubs and understory trees (e.g. rough-leafed dogwood, red buckeye, rusty blackhaw, deciduous and yaupon holly, wafer ash, and forbs (e.g. columbine, sages, dayflower, Turk's cap). At lower elevations and where water is present year-round, sycamores (*Plantanus occidentalis*), pecan (*Carya illinoensis*), walnuts (*Juglans spp.*), and willow (*Salix nigra*) also flourish.

The narrow valleys floodplains of stream channels contain Volente soils with thin strips of deeper soils with grasses and live oaks. Grasses in these areas include little bluestem *(Schizachyrium scoparium*), King Ranch bluestem (*Bothriochloa ischaemum*), sideoats grama (*Bouteloua curtipendula*) and Indiangrass (*Sorgastrum spp.*).

Shrubland habitat can by found on the preserve wherever rolling Tarrant soils (TaD) occur. This soil type occurs on the Jollyville Plateau at elevations less than 1000'. Important species of this habitat type include shin oak, live oak, redbud (*Cercis canadensis*), a variety of sumacs (*Rhus spp.*), kidneywood (*Eysenhardtia texana*), elbow bush (*Forestiera pubescens*), prickly ash (*Zanthoxylum hirsutum*), wafer ash (*Ptelea trifoliata*) and Ashe juniper. Although some shrubland habitat has grown into oak-juniper woodland in the absence of disturbance factors, such as wildfire, some areas in the Jollyville Unit have retained the shrubby physiognomy due to harvesting of mature junipers in the 1980's. Over time, however, the regrowth of Ashe juniper has proliferated, and young junipers are currently out competing shrub species.

Additional information on the vegetation in this area may be found in a checklist of vascular plants compiled by Brother Daniel Lynch based on his studies on the Jollyville Unit (at that time known as Tomen-Parke) between 1969 and 1975 (Lynch 1977). Collections were made on uplands underlain by Edwards limestone, canyon and valley slopes of Walnut clay, and in the open valleys underlain by Glen Rose limestone.

1.3.2 Animal Species Currently on Unit

Jollyville Plateau Salamanders are found in several springs in this Unit. A number of bird species on the Audubon Watch List for Texas, 2001, have been observed on the preserve. These include the Yellow-billed Cuckoo, Northern Bobwhite, Black-chinned Hummingbird, Scissor-tailed Flycatcher, Painted Bunting, and Rufus-crowned Sparrow. A large population of feral hogs also occurs on the preserve.

1.3.3 Endangered Species and Species of Concern

1.3.3.1 Golden-cheeked Warbler

Prime nesting habitat for the GCWA occurs in the uplands and canyons of this Unit. This prime habitat contains large, mature junipers and a mix of deciduous hardwoods in a closed-canopy woodland. Travis County has performed two 100-acre GCWA survey plots on this Unit as well as territory mapping in this Unit for several years.

1.3.3.2 Black-capped Vireo

Some prime nesting habitat and potential habitat occur in the uplands in this Unit, however much of the historic habitat had been rapidly becoming unsuitable for BCVI through plant community succession and historic suppression of fire. Since 2001, Travis County has restored approximately 100 acres to vireo habitat in this Unit (see Section 2.2.1.2) and will continue to restore additional areas.

1.3.3.3 Karst species

There are nine BCP karst features in this Unit that contain endangered karst invertebrates (see Table 3 below) plus many other karst species of concern.

Table 3. Endangered Karst Invertebrate Locations in the Jollyville Unit.

Cave Name	Tooth Cave Pseudoscorpion	Tooth Cave Spider	Tooth Cave Ground Beetle	Kretschmarr Cave Mold Beetle	Bee Creek Cave Harvestman	Bone Cave Harvestman
Amber Cave	X			X		
Gallifer Cave		P	X			X
Kretschmarr Cave			X	X		
Kretschmarr Dble. Pit	X		X		P	
McDonald Cave						X
North Root Cave			X			
Root Cave			X			X
Tardus Hole			X			
Tooth Cave	X	X	X	X		X

Source: Elliott 1992, USFWS (1994), Reddell 2004, HNTB 2005
X = confirmed occurrence based on collected specimen
P = probably occurrence based on observation but not confirmed with collected specimen

Due to an informal arrangement between the Ridge at Grandview Hills Homeowners Association and Travis County, Talus Springs Cave is monitored by county staff since it is located adjacent to Travis County preserve property. This cave provides habitat for several karst species of concern.

Many additional karst features, named as well as unnamed, are located on the Jollyville Unit and will need to be surveyed and monitored.

Two Trunks Cave, located in the Unit, contains the endangered Tooth Cave ground beetle but is not one of the 62 karst features listed on the BCP permit. Though not listed on the permit, this cave will be protected in the same manner as other BCP caves containing endangered species.

1.3.3.4 Plant species

No plant species covered under the regional permit (BCCP) are known to occur on this unit.

1.3.3.5 Other species of concern

Many of the karst species of concern are located in the caves in this Unit.

1.4 Land Uses

1.4.1 Pre-historic

Prehistoric sites on the Unit have been recorded with the Texas Historical Commission and the Texas Archeological Research Laboratory. Additional sites found will be similarly recorded. Known cultural sites are regularly monitored for illegal activities such as evidence of surface collecting of artifacts or unauthorized excavation.

Travis County is committed to conserving archeological sites within the preserve. When land management activities may prove potentially harmful to cultural resources, Travis County will make every effort to locate and avoid destruction of any such resources and will consult with the Texas Historical Commission.

1.4.2 Historic

The historic period sites appear to represent late nineteenth/early twentieth century ranching occupations. Old ponds, roads, and several old houses remain from this period.

1.4.3 Current

1.4.3.1 On-site land use

The Jollyville Unit was set aside and protected as preserve land. A staff field office is located in an existing house on the Unit.

1.4.3.2 Adjacent land use

This large tract has many adjacent land uses including single-family residences, an apartment

complex, a golf course, large and small commercial tracts, LCRA's McGregor Tract (BCP land), and undeveloped open space.

2.0 MANAGEMENT PROGRAM

2.1 Plan Administration

See Tier II-B Plan Administration for the description of Travis County as a managing entity, County staffing levels, equipment inventory, budget and annual reports as they pertain to the County's management of BCP lands.

2.2 Management Goals

2.2.1 Primary Management Goals

- Maintain or improve vegetation quality and coverage to provide habitat area for the GCWA and BCVI.
- Maintain and improve habitat for the karst endangered species and species of concern.
- Participate in the development and implementation of the BCP long-term biological monitoring program in conjunction with other preserves within the macrosite and with other BCP agencies.
- Manage the preserve in accordance with applicable BCP Land Management Plan sections, including the Tier II-A Management Handbook.

2.2.1.1 Golden-cheeked Warbler

Management for GCVI will include limiting human disturbance of potential habitat areas and maintaining or improving existing habitat. The preserve will be surveyed for GCVI to measure the success of management activities.

2.2.1.2 Black-capped Vireo

Management for BCVI will include limiting human disturbance of potential habitat areas and maintaining, improving existing habitat, or restoring habitat. Potential BCVI habitat on the preserve will be surveyed to measure the success of management activities. BCVI habitat restoration is planned on more than 120 acres of the Jollyville Unit.

The goal is to maintain and enhance vireo habitat to stabilize or increase the colony population. Travis County will continue to the habitat restoration program initiated in 2001 based on mechanical methods, including shredding and hand cutting. Two techniques will continue to be employed: 1)large areas of unoccupied potential habitat will be selectively cleared, leaving islands of deciduous woody species favored as nesting substrates by vireos, and 2) narrow lanes

will be cut through occupied, yet marginal, vireo habitat in order to create edge and promote growth of deciduous shrubs.

Travis County staff will continue to assess the suitability of potential BCVI habitat restoration sites within the Jollyville Unit for possible future habitat restoration locations.

2.2.1.3 Federally listed karst species

Management for the endangered karst invertebrates will include limiting human disturbance of karst features and in karstic habitats. The Recovery Plan for Endangered Karst Invertebrates in Travis County, Texas (USFWS 1994) outlines four major recovery actions: (1) research and information needs, (2) long-term protection for karst fauna areas, (3) monitoring, and (4) education. Travis County will implement these goals in order to assure that the implementation of the BCCP has no negative impact on the population viability of the endangered karst invertebrates.

2.2.1.4 Species of concern

The karst features containing species of concern will receive the same protection measures as the karst features containing endangered species (see Sec. 2.2.1.3 above).

2.2.2 Secondary Management Goals

Secondary management goals include habitat restoration, erosion controls where needed, control of invasive species and protection of the BCP karst features to protect local water quality.

2.3 Issues

2.3.1 Conservation Easement Agreements

Working with the several owners of the Conservation Easements tracts will require active cooperation and coordination between the parties especially since many of the property owners have changed and/or properties have been subdivided into smaller parcels since the agreements were signed.

2.3.2 Development pressures

With increasing development of land adjacent to the Preserve land into big box stores, commercial developments, apartment complexes, and single family residential developments, the issues related to development, such as erosion, trash, dumping, trespass, fire, and non-native animals, will continue to be a major concern and will require active protection efforts for many years.

2.3.3 Public access to the Preserve

With increasing development may come increased pressure for public access onto preserve land. Preserve managers will use the BCP Public Access Permitting Process for approval of any public access locations and programs.

2.4 Management Objectives

The main objectives for this macrosite are, in the order of priority:

1. Protection of endangered species and species of concern, the land and water;
2. Management of endangered species and species of concern and their habitats;
3. Monitoring of the habitats for endangered species and species of concern; and
4. Enhancement of the habitats for endangered species and species of concern; and
5. Public education and outreach about endangered species and species of concern and their habitats.

Following are the four categories with associated activities listed:

Vegetation Management:

a) Monitor oaks for oak wilt and regeneration to assess action needed.
b) Maintain, enhance and restore GCWA and BCVI habitat to the extent possible.
c) Maintain protective vegetation in areas around karst features.
d) Monitor encroachment of invasive and/or non-native species throughout the preserve and control as needed.
e) Inventory plants in the preserve.
f) Map vegetation zones and significant occurrences.
g) Monitor changes in vegetation over time to the extent possible.

Animal Management:

a) Continue to monitor GCWA, BCVI, and karst species and habitat within the Unit.
b) Monitor other species' impacts on GCWA, BCVI, and karst species to assess actions needed.
c) Continue to inventory animals (native and non-native) in the preserve.
d) Continue management of native and non-native wildlife (brown-headed cowbirds, deer, feral hogs, fire ants, cats, dogs, etc.).

Physical and Cultural Management:
a) Monitor erosion and sedimentation sources and stabilize/restore as needed.
b) Conduct archeological assessments as needed and protect cultural resources.

Visitor Management and Education:
a) Monitor the boundary for fence damage or trespass, and take appropriate action.
b) Work with the neighbors, homeowners groups, and conservation easement holders about management activities.
c) Increase public awareness of BCP and endangered species protection through use of tours, brochures, kiosk displays and signs.

Staff will collaborate with other managing partners to support and achieve common goals.

2.5 Specific Implementation Strategies

(See BCP Land Management Plan, Tier II-A Management Handbook for more detailed guidance and applicable strategies and constraints.)

2.5.1 Vegetation management procedures

2.5.1.1 Control methods

Invasive and non-native vegetation will be controlled with hand tools, digging, or, occasional herbicide applications. Other methods such as mowing and drill seeding may be incorporated to boost native species' competitive edge against non-native and/or invasive species.

2.5.1.2 Oak wilt

No known oak wilt centers are located on the Jollyville Unit. Travis County will continue to monitor the preserve's oaks and take appropriate action should this disease be discovered.

2.5.1.3 Prescribed fire and wildfires

No prescribed fires are planned and all wildfires will be controlled.

2.5.1.4 Restoration and protection efforts

Areas within the preserve found to have erosion problems will be stabilized, revegetated and/or restored to the extent possible. Where appropriate, old roads and trails will be restored to habitat. Potential BCVI habitat areas will be restored to suitable habitat (follow procedures in Tier II-A, Chapter VIII).

2.5.1.5 Protection efforts for species of concern

Both the known karst features and karstic habitat will be protected from human disturbance (follow procedures in Tier II-A, Chapter IX).

2.5.2 Animal Management Procedures

2.5.2.1 Endangered species

(a) Golden-cheeked warbler

Surveys will continue to be conducted no more than once per week in the same area during the nesting season. The vegetation will be managed to maintain/enhance closed-canopy mixed oak-juniper woodland to the extent applicable.

(b) Black-capped vireo

Surveys will continue to be conducted to determine the presence of BCVI, both in known habitat and also in areas that may be able to support populations of this species with restoration efforts. Surveys will continue to be conducted no more than once per week in the same area during the nesting season. Potential habitat areas will continue to be restorated in this Unit.

2.5.2.2 Animal control methods

(a) Browsing animals

Deer populations and regeneration of woody species will be monitored. Management of deer populations has been implemented in accordance with Tier II-A Chapter X and with Travis County's "Wildlife and Vegetation Management Guidelines".

(b) Feral animals

Presence of feral animals will be monitored and feral animals will be removed from the preserve whenever possible and in accordance with Travis County's "Wildlife and Vegetation Management Guidelines". See Tier II-A Chapter X for information concerning management of feral animals.

(c) Predation and parasitism

The Brown-headed cowbird population will be monitored and birds of any species feeding cowbirds will be noted. Cowbird trapping will be conducted when necessary. Red imported fire ants will be monitored and controlled with approved methods. Tier II-A Chapter X provides guidance concerning management of predaceous and parasitic organisms.

2.5.3 Physical and Cultural Management Procedures

2.5.3.1 Hydrology and water quality

Contamination of water via run-off and groundwater sources will be minimized to the greatest extent possible through cooperative efforts with neighboring landowners.

2.5.3.2 *Geology*

The areas will be managed in accordance with Tier II A, Chapter IX for karst protection.

2.5.3.3 Soils

Areas of soil loss will be stabilized/restored to the extent possible.

2.5.3.4 Cultural resource protection

Cultural resources will be protected through careful management and monitoring. The Texas Historical Commission will be consulted prior to taking any action which might impact archeological or historical resources.

2.5.4 Visitor Management Procedures

2.5.4.1 Access control

There are several areas considered as "buffer" areas in the Grandview Hills Conservation Easements where the landowners are legally allowed specific rights. Travis County staff will enforce these allowed uses.

2.5.4.2 Individual or independent group use

(a) Non-commercial use

There is no non-commercial use anticipated.

(b) Commercial use

There is no commercial use anticipated except for possibly in the "Buffer" Areas where the landowners are allowed specific rights. Travis County staff will enforce these allowed uses.

(c) User/resource conflicts

There will be potential user conflicts with endangered species management in the "Buffer" areas since endangered species are currently using some of these areas. There will need to be coordination between landowners and USFWS to determine activities allowed and timing of these activities.

3.0 MANAGEMENT PROGRAM MONITORING

The County will monitor and evaluate habitat management in accordance with applicable biological monitoring procedures as defined in BCP Land Management Plan, Tier II-A Management Handbook. Evaluation and reporting procedures will comply with applicable portions of the Tier II-B Plan Administration.

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