3-201
(1/97)

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

FEDERAL FISH AND WILDLIFE PERMIT

2. AUTHORITY-STATUTES
16 USC 1539(a)(1)(B)

REGULATIONS (Attached)
50 CFR §§ 13 & 17

3. NUMBER
TE-788841-1

1. PERMITTEE

City of Austin
P.O. Box 1088
Austin, Texas 78767

Travis County
P.O. Box 1748
Austin, Texas 78767

4. RENEWABLE	5. MAY COPY
[X] YES	[X] YES
[ ] NO	[ ] NO
6. EFFECTIVE 10/14/2005	7.EXPIRES 5/2/2026

8. NAME AND TITLE OF PRINCIPAL OFFICER (if #1 is a business)
William A. Conrad, BCCP Secretary for the City of Austin and Travis County.

9. TYPE OF PERMIT
Endangered Species – Incidental Take

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED
Travis County, Texas, outside of preserve areas identified in the HCP and final EIS dated March 1996.

11. CONDITIONS AND AUTHORIZATIONS:

GENERAL TERMS AND CONDITIONS

I. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2, ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORDANCE WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

II. VALID FOR USE BY PERMITTEES NAMED ABOVE.

III. ACCEPTANCE OF THIS PERMIT SERVES AS EVIDENCE THAT THE PERMITTEE UNDERSTANDS AND AGREES TO ABIDE BY THE "GENERAL CONDITIONS FOR NATIVE ENDANGERED AND THREATENED WILDLIFE SPECIES PERMITS" **(copy enclosed).**

12. REPORTING REQUIREMENTS: Annual report is due on June 1, beginning in 1997 and continuing until permit expiration.

ISSUED BY:	TITLE	DATE
Bryan Arp	Assistant Regional Director	10/20/05

TERMS AND CONDITIONS SPECIFIC TO BALCONES CANYONLANDS

A. If during the tenure of this permit, the amount of incidental take is exceeded, issuance of Participation Certificates must be stopped and the Permittees must reinitiate consultation with the Service to avoid violation of section 9 of the Endangered Species Act.

B. Acceptance of this permit serves as evidence that the Permittees understand and agree to abide by the terms of this permit and all sections of Title 50 Code of Federal Regulations Parts 13, 17, and 21 (attached) pertinent to issued permits.

C. The authorization granted by this permit is subject to compliance with, and implementation of, the terms and conditions of the Environmental Impact Statement and Habitat Conservation Plan, Biological Opinion, and all specific conditions contained in this permit. If there are any discrepancies between the requirements in these documents, the requirements identified in the special conditions of this issued permit take precedence.

D. Upon locating any dead, injured, or sick individuals from the list of animal species covered by this permit, or any other endangered or threatened animal species, Permittees are required to contact the Service's Law Enforcement Office, Austin, Texas (512) 490-0948, for care and disposition instructions. Extreme care should be taken in handling sick or injured individuals to ensure effective and proper treatment. Care should also be taken in handling dead specimens to preserve biological materials in the best possible state for analysis of cause of death. In conjunction with the care of sick or injured endangered/threatened species, or preservation of biological materials from a dead specimen, the Permittees and their contractor(s) or subcontractor(s) have the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

E. The validity of this permit is also conditioned upon observance of all relevant international, state, local, or other Federal law.

F. The Permittees are authorized to "take" (kill, harm, or harass) the following federally-listed endangered species:

SCIENTIFIC NAME	COMMON NAME
Vireo atricapillus	Black-capped vireo
Dendroica chrysoparia	Golden-cheeked warbler
Tartarocreagris texana	Tooth Cave pseudoscorpion
Neoleptoneta myopica	Tooth Cave spider
Texella reddelli	Bee Creek Cave harvestman
Texella reyesi	Bone Cave harvestman
Rhadine persephone	Tooth Cave ground beetle
Texamaurops reddelli	Kretschmarr Cave mold beetle

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ISSUED BY:	TITLE	DATE
Bryan Arp	Assistant Regional Director	10/20/05

Additionally, the Permittees would be covered for incidental take of the following species of concern if these species become listed during the life of the permit and the mitigation measures identified in this permit are being performed.

Philadelphus ernestii	Canyon Mock-orange
Croton alabamensis	Texabama croton
Sphalloplana mohri	Flatworm
Candona sp. nr. *Stagnalis*	Ostracod
Caecidotea reddelli	Isopod
Trichoniscinae N.S.	Isopod
Miktoniscus N.S.	Isopod
Cicurina wartoni	Spider
C. ellioti	Spider
C. bandida	Spider
C. reddelli	Spider
C. reyesi	Spider
C. cueva	Spider
C. travisae	Spider
Neol eptoneta cocinna	Spider
Neoleptoneta devia	Spider
Eidmannel la recl usa	Spider
Aphrastochthonius N.S.	Pseudoscorpion
Tartarocreagris reddelli	Pseudoscorpion
T. intermedia	Pseudoscorpion
T. N.S.3	Pseudoscorpion
Texella spinoperca	*H*arvestman
T. comanche	New Comanche Trail Cave harvestman
Speodesmus N. S.	Millepede
Rhadine s. subterranean	Ground beetle
R. s. mitchelli	Ground beetle
R. austinica	Ground beetle

G. An annual report, due June 1 of each year beginning in 1997, is to be provided to the Austin Ecological Services Field Office. This report is to include:

1. a list of all development activities west of the MOPAC Railroad that were permitted by the Permit Holders in the previous 12 months,

2. a list of all tracts for which Participation Certificates were purchased,

3. amount of funds collected for land acquisition,

4. amount of funds expended for land acquisition,

5. amount of funds expended for operations and maintenance.

6. an updated map of the lands dedicated to preserve management,

7. a list of public use and habitat management activities that have been undertaken or completed within the bounds of the preserve units, including the status of land management plans undertaken by the permit holders and managing partners, and

8. a copy of all research or investigation reports that have been prepared within the previous 12 months.

In addition to the above annual requirements, the Permit Holders must provide quarterly updates for the tracts for which Participation Certificates were purchased that include the following information:

9. a general map of each tract location and

10. a tract boundary map that identifies the areas for which the Participation Certificate applies. If a location and/or tract map is not provided to the Permit Holder during the normal permitting process, a street address will meet this requirement.

H. A copy of a recorded Participation Certificate provided by the Permit Holders must be posted at the property site from the time vegetation clearing begins until the construction is completed. For residential development, completed construction is when all roads and utilities are completed to the extent that they meet the applicable acceptance criteria of the City of Austin or Travis County. For commercial, industrial, and multi-family developments completed construction is when buildings are suitable for occupancy.

I. The funds collected and expended for this Permit and compliance with the financial requirements of the Permit shall be evaluated by financial audits conducted after the sale of Participation Certificates covering 3,000 fee-paid acres or every five years, whichever comes sooner, until permit expiration. Such audits will be coordinated between the USFWS and the Coordinating Committee. This audit may be part of the Permittees audit processes as required by State law and shall not be more frequent than every two years.

J. The funds collected under this permit will be expended for land or easement acquisition and other preserve system needs in accordance with the following criteria:

1. tracts considered for acquisition will be within or contiguous to the boundaries of the preserve units identified in the issued Permit;

2. expenditure priority should be in the following decreasing order: Bull Creek, Cypress Creek, South Lake Austin, and North Lake Austin; and

3. dispensing of funds from the BCCP Fund account should be accomplished as soon as there are adequate funds to complete a transaction or implement a strategy for acquisition, taking into account opportunity, preserve priority and development threat.

K. The Permit Holders will administer the issuance of the Participation Certificates.

L. Incidental take that may result from the implementation of land management activities within the boundaries of a preserve and contained in a management plan approved by the Coordinating Committee, are covered and authorized under this Permit.

M. Incidental take that may result from the implementation of utility and infrastructure corridor projects approved by the Secretary of the Coordinating Committee and within one of the BCCP-Shared vision approved utility and infrastructure corridors, as provided in the final EIS/HCP, Appendix B, is covered and authorized under this Permit.

AMENDMENT TO CONDITION M

This amendment shall authorize the Lower Colorado River Authority to increase their corridor expansion from the original 100-foot (30.5 meters) right-of-way to 170 feet (51.8 meters). The corridor expansion shall be an aerial expansion only (above treetop level) and will not extend to ground level. No additional habitat will be affected and no additional take of golden-cheeked warblers will occur.

N. Incidental take of the Barton Springs salamander is not covered by this Permit. Entities who purchase Participation Certificates for activities within the Travis County portion of the Barton Springs watershed should obtain guidance with respect to avoiding the impacts of their activities on water quality as they relate to the Barton Springs salamander.

O. The incidental take authorization of this permit does not apply to the "take" of any endangered or threatened species outside of the boundary of the permit as identified in the EIS/HCP- dated March 1996 or any modifications/amendments to that boundary.

P. The Service's "No Surprises" policy provides that additional mitigation, lands or financial compensation shall not be required of the Permittees or their successors beyond the level of mitigation provided for in the EIS/HCP. With respect to this permit, the EIS/HCP and supporting documents adequately addressed the species listed in special condition F above. To be fully covered by the "No Surprises" policy for a specific species, all of the requirements identified for that species must be met.

SPECIES SPECIFIC TERMS AND CONDITIONS

Q. GOLDEN-CHEEKED WARBLER:

1. Ensure at least 28,428 acres within the seven identified macrosites will be acquired and managed for the golden-cheeked warbler during the permit duration. Acquisition and management activities through this Permit, other issued incidental take permits, and section 7 consultations where the mitigation activities are within or contiguous to the proposed preserve boundaries, count toward this goal.
2. In conjunction with the managing partners, control human activities to eliminate or mitigate any adverse impacts of human activities to the warbler on these 28,428 acres, for the acreage acquired.

3. No vegetation clearing activities will be accomplished within golden-cheeked warbler habitat, Zones 1 and 2, from March 1 through August 31 to prevent the disturbance of nesting activities unless current breeding season surveys, conducted in accordance with Fish and Wildlife Service protocol, indicate that the warbler is not nesting within 300 feet of the proposed clearing.

4. Develop and implement an approved land management plan, in accordance with the land management guidelines set forth by the Coordinating Committee, for each tract within 12 months after permit issuance or within 12 months of land acquisition, whichever is later.

Q. BLACK-CAPPED VIREO

1. Ensure at least 2,000 acres within the seven identified macrosites will be acquired and managed for the black-capped vireo during the permit duration. Acquisition and management activities through this Permit, other issued incidental take permits, and section 7 consultations where the mitigation activities are within or contiguous to the proposed preserve boundaries, count toward this goal.

2. In conjunction with the managing partners, control human activities to eliminate or mitigate any adverse impacts of human activities to the vireo on these 2,000 acres, for the acreage acquired.

3. No vegetation clearing activities will be accomplished within black-capped vireo habitat between March 1 and August 31 to prevent the destruction of an active nest unless current breeding season surveys, conducted in accordance with Fish and Wildlife Service protocol, indicate that the vireo is not nesting within 300 feet of the proposed clearing.

4. Develop and implement an approved land management plan, in accordance with the land management guidelines set forth by the Coordinating Committee, for each tract within 12 months after permit issuance or within 12 months of land acquisition, whichever is later.

R. LISTED KARST INVERTEBRATES

1. Acquire and manage, or implement formal management agreements, as provided in subsection (4) below, adequate to preserve the environmental integrity of the following 35 caves that support federally-listed karst invertebrates:

Amber Cave
Bandit Cave
Beard Ranch Cave
Bee Creek Cave
Broken Arrow Cave
Cave Y
Cold Cave
Cotterell Cave
Disbelievers Cave
Eluvial Cave
Fossil Cave
Fossil Garden Cave
Gallifer Cave
Hole-In-The-Road
Japygid Cave
Jest John Cave
Jester Estates Cave
Jollyville Plateau Cave
Kretschmarr Double Pit
Kretschmarr Cave
Lam Cave
Little Bee Creek Cave
M.W.A. Cave
McDonald Cave
McNeil Bat Cave
New Comanche Trail Cave
No Rent Cave
North Root Cave
Rolling Rock Cave
Root Cave
Spider Cave
Stovepipe Cave
Tardus Hole
Tooth Cave
Weldon Cave

2. 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.

3. Where the surface and subsurface hydrogeologic area around a cave identified for protection is not known, the area delineated by the contour level at the bottom of the cave will be managed for cave protection. In the absence of such site specific information, no Participation Certificates are to be awarded within 0.25 miles of the cave entrance until the hydrogeologic areas are properly delineated.

4. Enter into formal management agreement(s) for all caves that are recommended for protection but have yet to be acquired. The management agreement(s) will detail the area to be managed for cave protection, what such management will entail, and who is responsible for the management.

S. KARST SPECIES OF CONCERN

1. Acquire and manage, or implement formal management agreements, as provided in subsection (4) below, adequate to preserve the environmental integrity of the following 27 caves, in addition to the caves protected for the federally-listed species that support the karst species of concern:

Adobe Springs Cave
Airman's Cave
Armadillo Ranch Sink
Arrow Cave
Blowing Sink
Buda Boulder Spring
Cave X
Ceiling Slot Cave
District Park Cave
Jack's Joint
Lost Oasis Cave
Lost Gold Cave
Maple Run Cave
Midnight Cave
Moss Pit
Pennie Cave
Pickle Pit
Pipeline Cave
Flint Ridge Cave
Slaughter Creek Cave
Get Down Cave
Spanish Wells Cave
Goat Cave
Stark's North Mine
Ireland's Cave
Talus Spring
Whirlpool Cave

The caves in which the karst species of concern occur are listed below. To receive the "No Surprises" guarantee for the identified species, the caves identified must be protected, as per "1" above.

SPECIES	CAVE
Sphalloplana mohri	Spanish Wells Cave
Candona sp. nr. *Staqnalis*	Cave X
Caecidotea reddelli	Buda Boulder Cave, Cave X, Jack's Joint
Trichoniscinae N.S.	Bandit Cave
Miktoniscus N.S.	Cave X
Cicurina wartoni	Pickle Pit
C. ellioti	Cotterell Cave, Fossil Garden Cave, Gallifer Cave, No Rent Cave, Weldon Cave
C. bandida	Bandit Cave, Ireland's Cave
C. reddelli	Cotterell Cave
C. reyesi	Airman's Cave
C. cueva	Cave X, Flint Ridge Cave

C. travisae	Amber Cave, Broken Arrow Cave, Kretschmarr Cave, McDonald Cave, Root Cave, Spider Cave, Stovepipe Cave, Tooth Cave
Neoleptoneta cocinna	Lost Gold & Stark's North Cave
N. devia	McDonald Cave
Eidmannella reclusa	Tooth Cave, Gallifer Cave, Kretschmarr Cave, Stovepipe Cave
Aphrastochthonius N.S.	Stovepipe Cave
Tartarocreaqris reddelli	McDonald Cave
T. intermedia	Airman's Cave
T. N.S.3	BCNWR
Texella spinoperca	Airman's Cave
T. Comanche	New Comanche Trail Cave
Speodesmus N.S.	Bandit Cave, Cave X, Get Down Cave, Goat Cave, Pennie Cave, Pipeline Cave, Slaughter Creek Cave, Whirlpool Cave
Rhadine s. subterranean	Cotterell, Fossil, Fossil Garden, No Rent, McNeil Bat, Weldon Cave
R. s. mitchelli	Amber, Kretschmarr, Tooth Cave
R. austinica	Airman's, Arrow, Bandit, Bee Creek, Blowing Sink, Cave Y, Cave X, District Park, Flint Ridge, Get Down, Ireland's, Lost Gold, Lost Oasis, Maple Run, Midnight, Pennie, Whirlpool

2. 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.

3. Where the surface and subsurface hydrogeologic area around a cave identified for protection is not known, the area delineated by the contour level at the bottom of the cave will be managed for cave protection. In the absence of such site specific information, no Participation Certificates are to be awarded within 0.25 miles of the cave entrance until the hydrogeologic areas are properly delineated.

4. Enter into formal management agreement(s) for all caves that are recommended for protection but have yet to be acquired. The management agreement(s) will detail the area to be managed for cave protection, what such management will entail, and who is responsible for the management.

T. CANYON MOCK-ORANGE

Protect and manage the portions of the known populations found within the preserve boundaries, for the acreage acquired.

U. TEXABAMA CROTON

Protect and manage the populations at Pace Bend Park.

– END OF PERMIT # TE-788841 –

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

ADDRESS ONLY THE DIRECTOR
FISH AND WILDLIFE SERVICE

GENERAL CONDITIONS FOR NATIVE ENDANGERED AND THREATENED WILDLIFE SPECIES PERMITS

1. All sections of Title 50 *Code of Federal Regulations* Part 13 are conditions of the permit.

2. All applicable foreign, State, local, or other Federal laws, including those requiring permit, must be observed.

3. Living specimens must be handled and shipped so as to minimize risk of injury, damage to health or cruel treatment.

4. The container in which authorized wildlife is shipped must be plainly marked with names and addresses of shipper and consignee and an accurate description of the contents including common and scientific name and number of each within.

5. Permittee must carry a copy of permit while conducting authorized activities.

6. Permit number must be legibly printed on all documents and advertisements involving activities conducted under permit.

7. Any dead or injured specimens of the authorized wildlife found may be salvaged or cared for.

8. Unless otherwise authorized on the face of the permit, the wildlife must be immediately released at or near the capture site after the permitted activity.

9. Unexpected death, injury, or escape of the authorized wildlife shall be reported to the Fish and Wildlife Service before the end of the next business day.

10. BIRD BANDING, marking, radio tagging, etc., must be conducted in accordance with a Federal Bird Marking and Salvage permit.

THE FOLLOWING CONDITIONS APPLY UNTIL AUTHORIZED DISPOSAL OF THE WILDLIFE, REGARDLESS OF THE EXPIRATION DATE OF THE PERMIT:

11. The authorized wildlife may NOT be sold, donated, or transferred unless the receiver has first been issued authorization by the Director.

12. Any dead authorized wildlife shall be preserved and held for scientific purposes whenever practical.

13. Any live SEA TURTLES held must be maintained in accordance with the "Standards for Care and Maintenance of Sea Turtles Held in Captivity" specified by the Fish and Wildlife Service.

Implemented June 1982

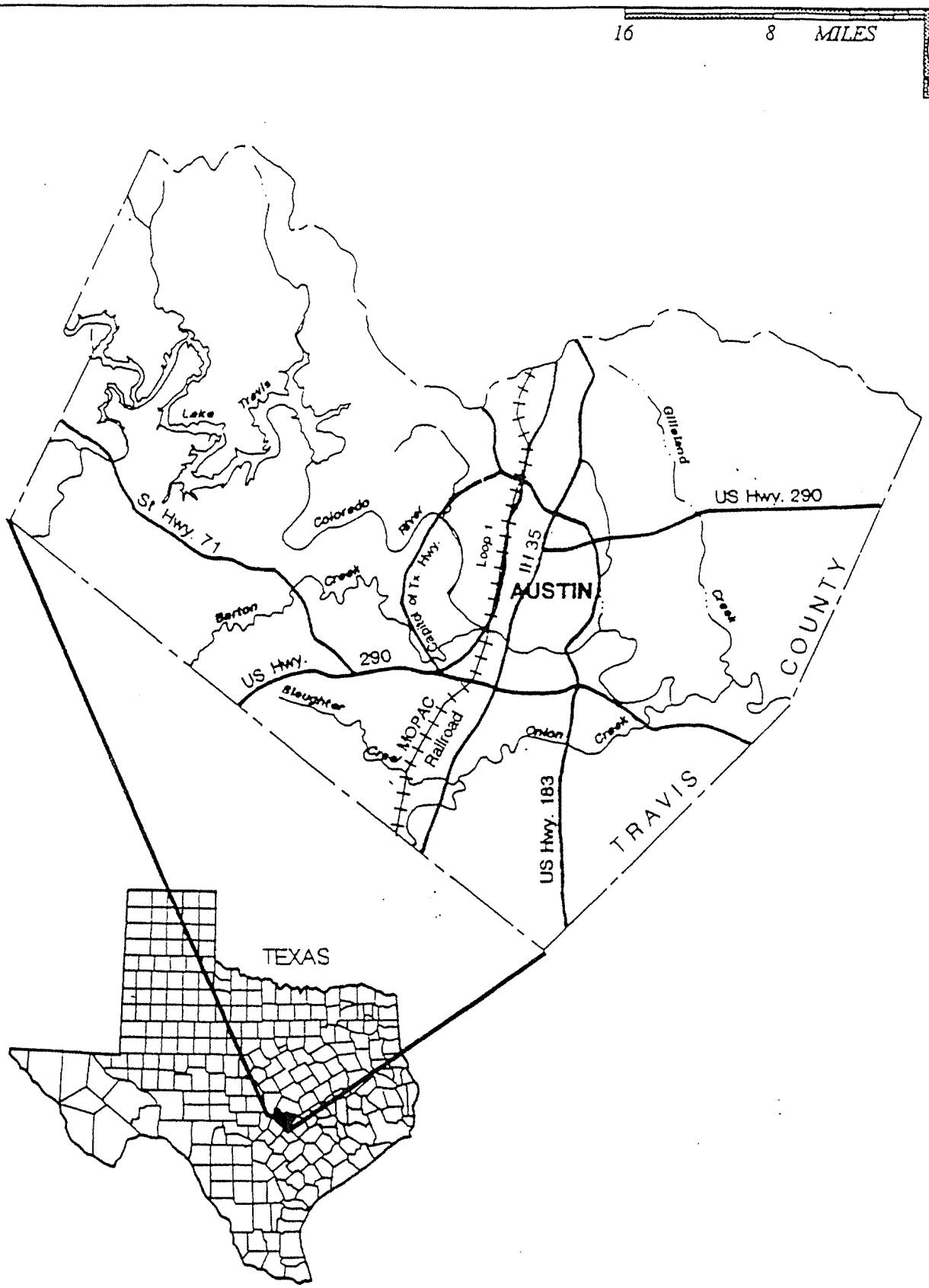
HABITAT CONSERVATION PLAN AND FINAL ENVIRONMENTAL IMPACT STATEMENT

BALCONES · CANYONLANDS · PRESERVE

Austin • Texas

City of Austin & Travis County, Texas

March 1996



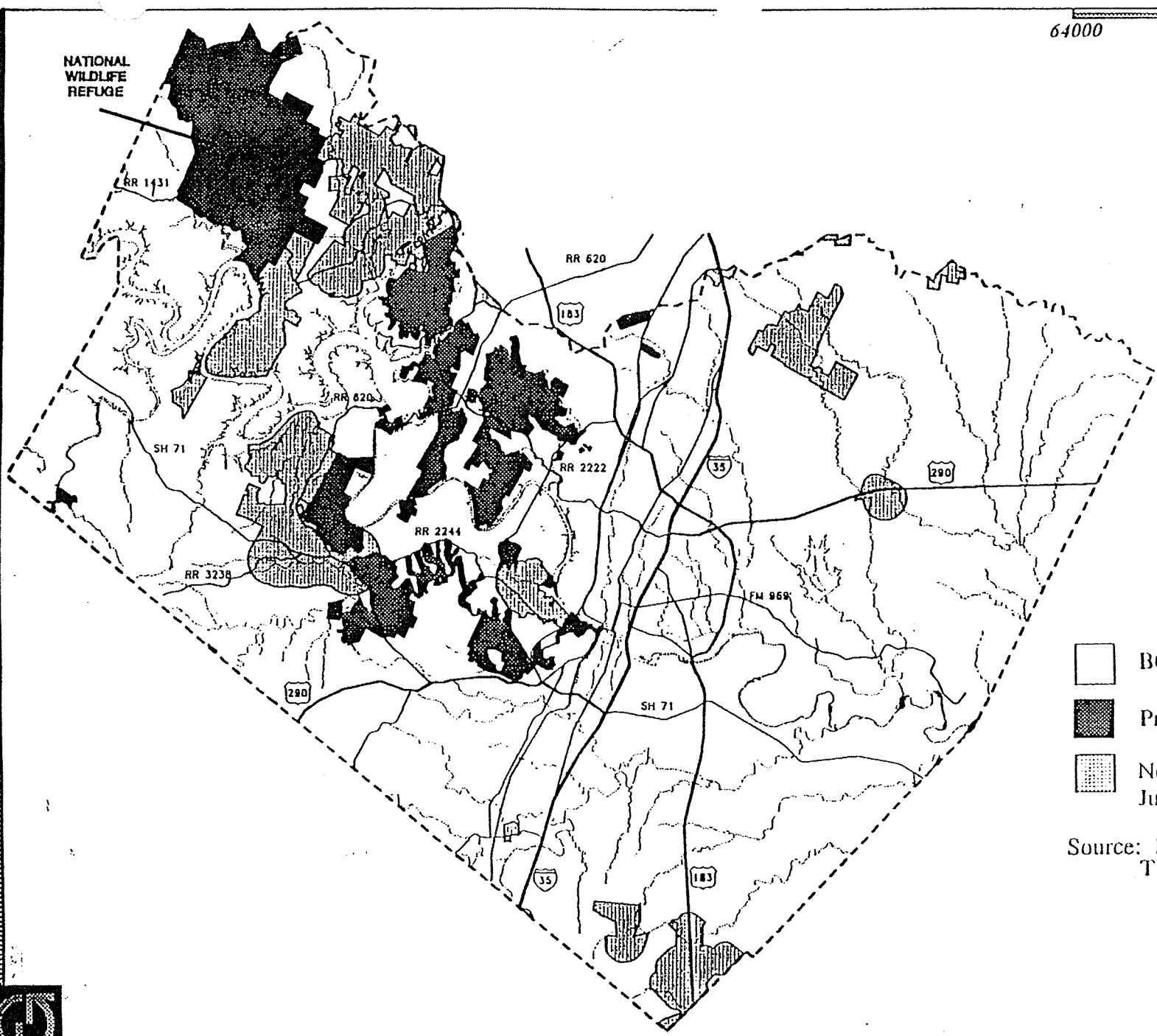
BASE MAP: USGS State Map SE Texas Quadrant

Source: Hicks & Company 1993

FIGURE 1

Location of Travis County Within Texas

RECON



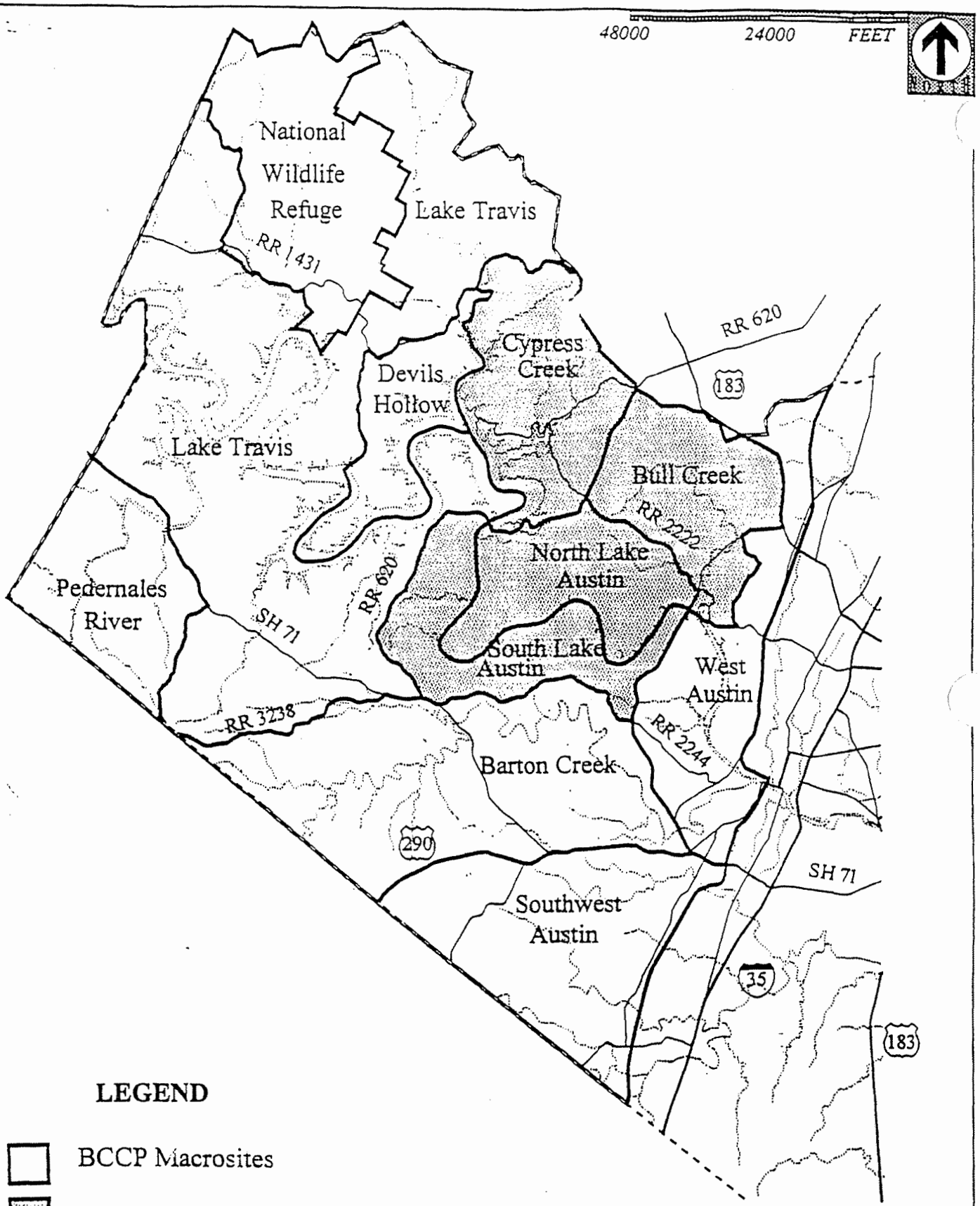
LEGEND

- BCCP Permit Area
- Preserve
- Non-participating Jurisdictions

Source: KSB&A and EH&A 1992
TNRIS in lit.

FIGURE 2
BCCP Permit Area

RECON



LEGEND

BCCP Macrosites

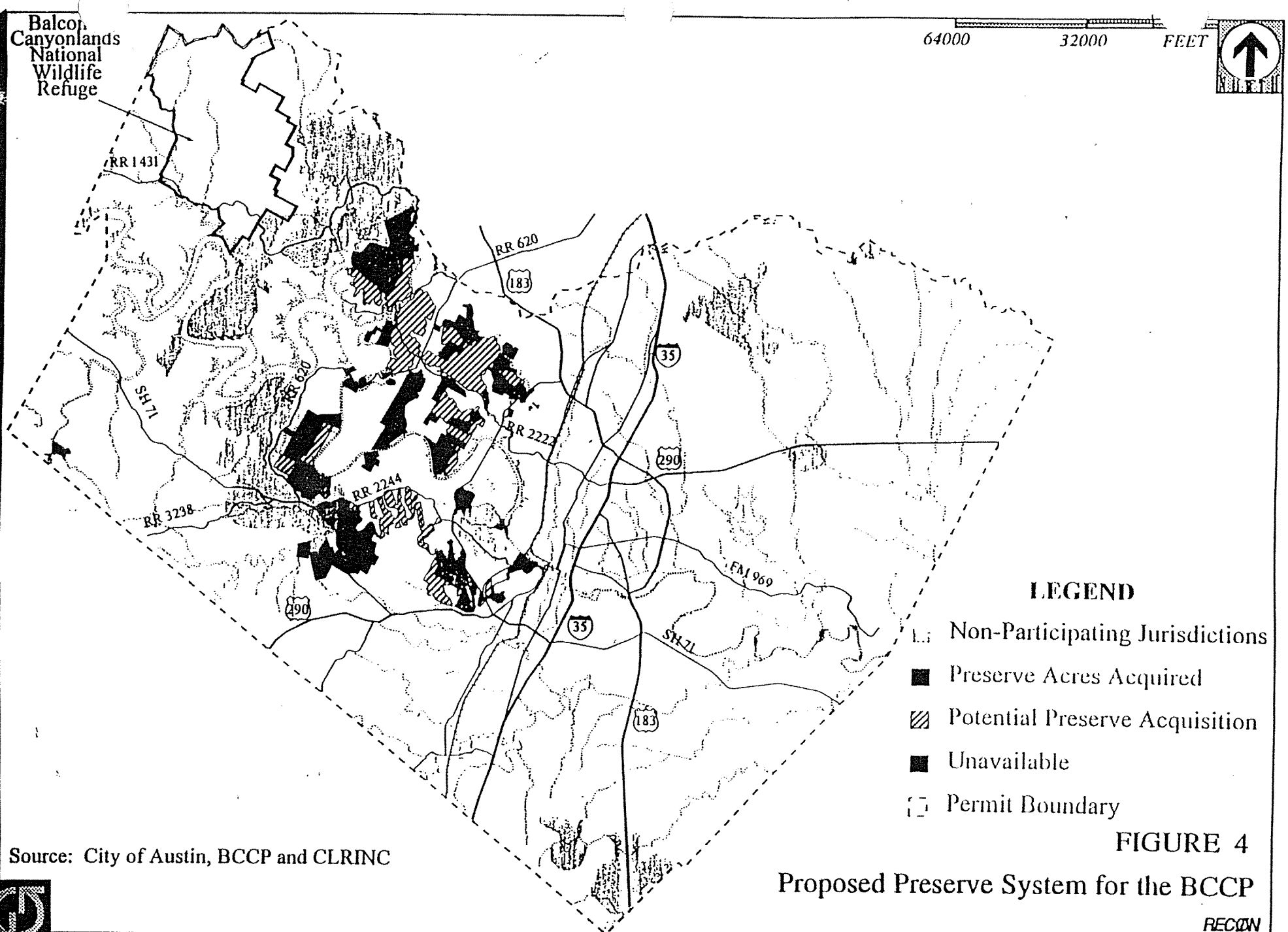
Key Macrosites

Source: KSB&A and EH&A 1992
TNRIS in lit.

FIGURE 3

Macrosites in the BCCP Area

RECON



Source: City of Austin, BCCP and CLRINC

FIGURE 4

Proposed Preserve System for the BCCP

RECON

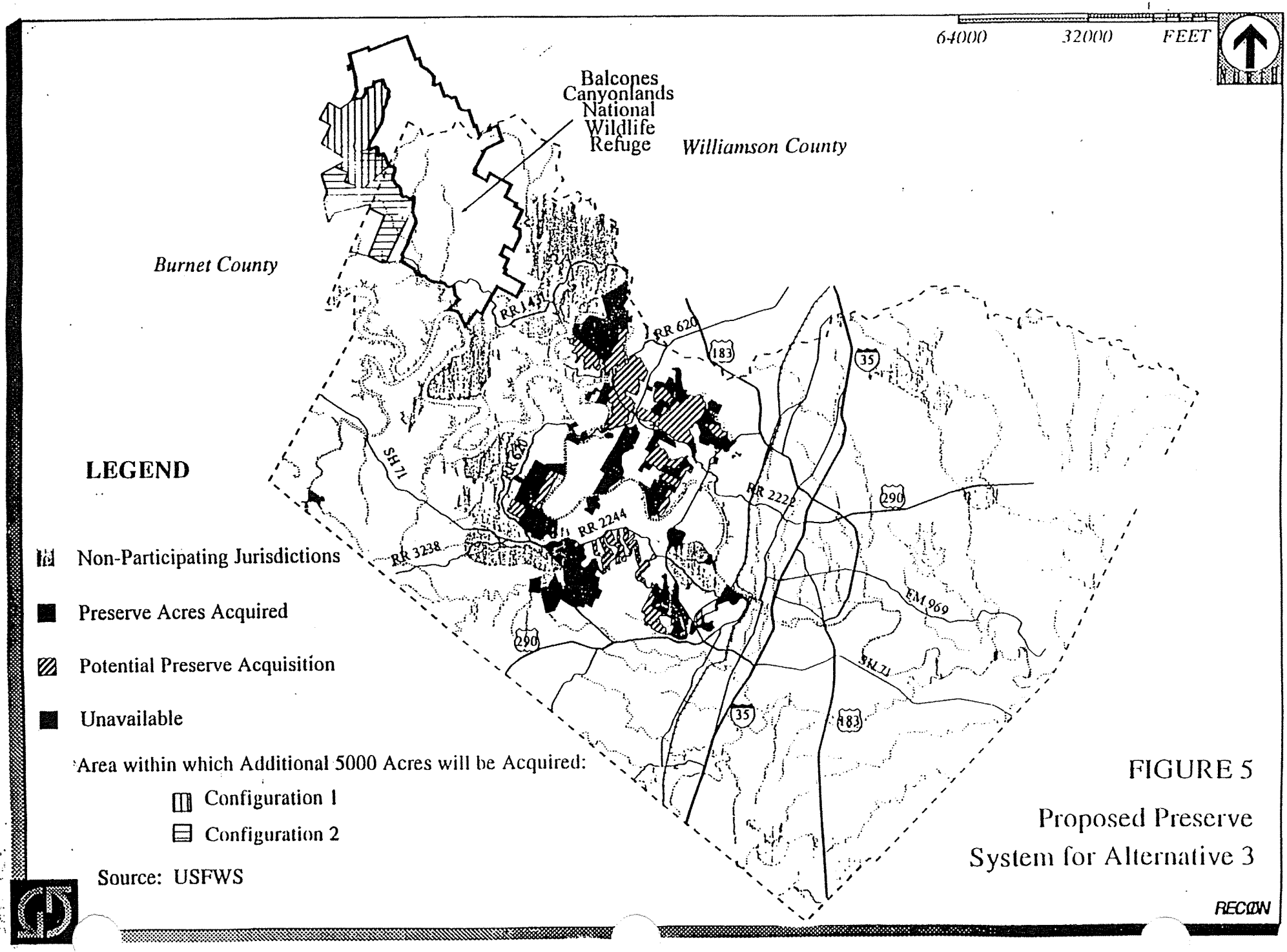
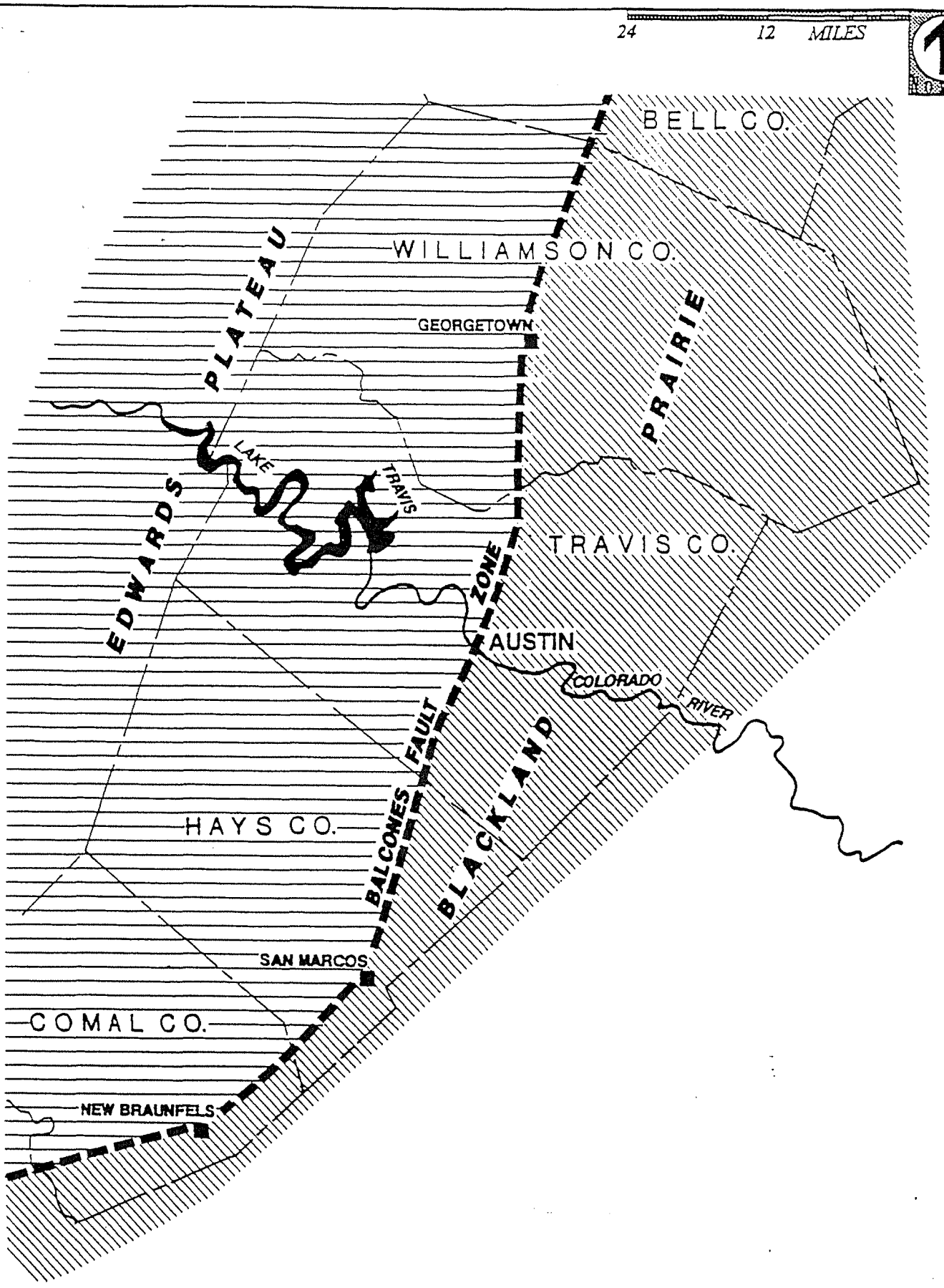


FIGURE 5

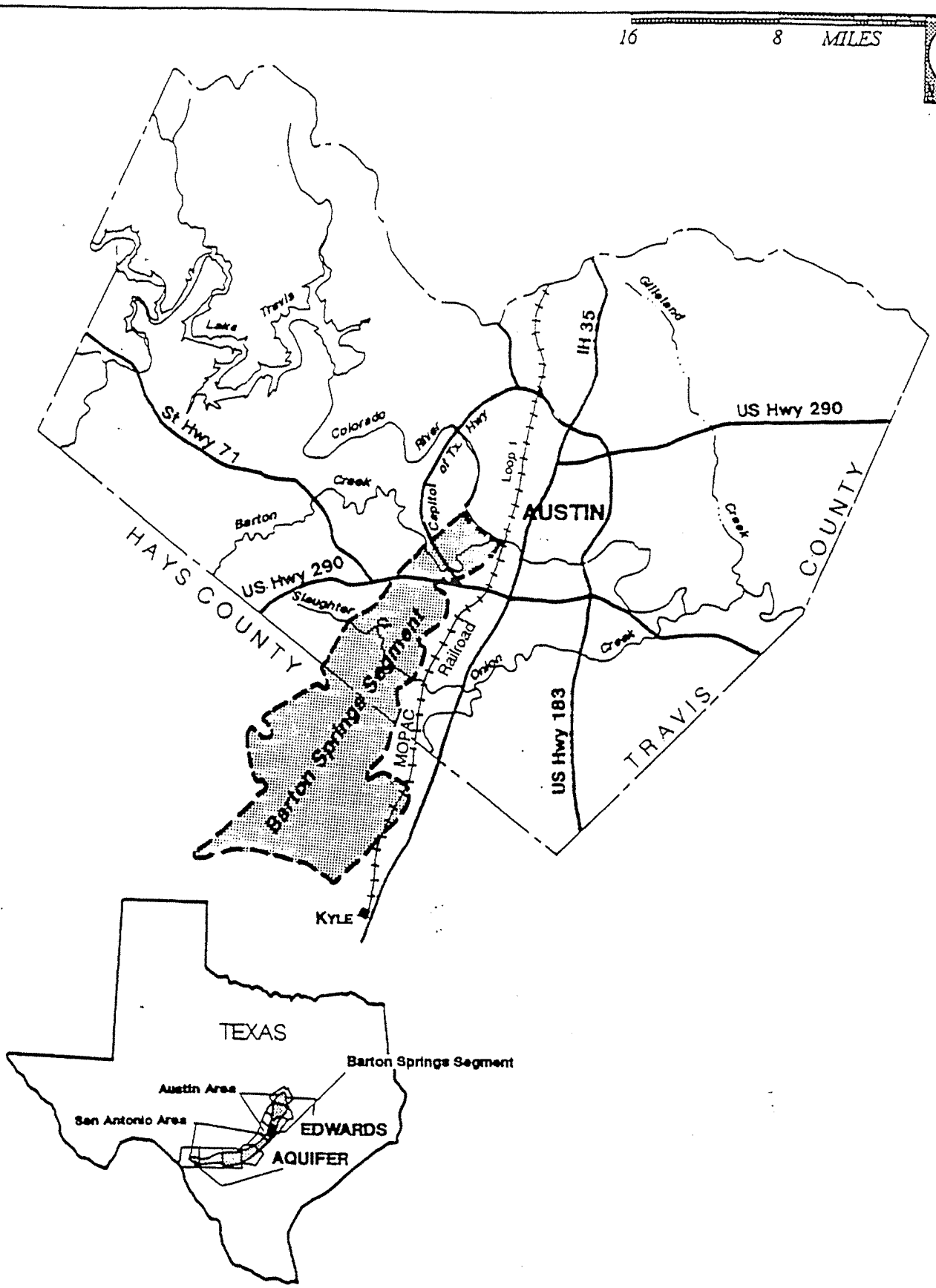
Proposed Preserve System for Alternative 3



Source: Hicks & Company

FIGURE 6
Travis County: Major Physiographic Regions

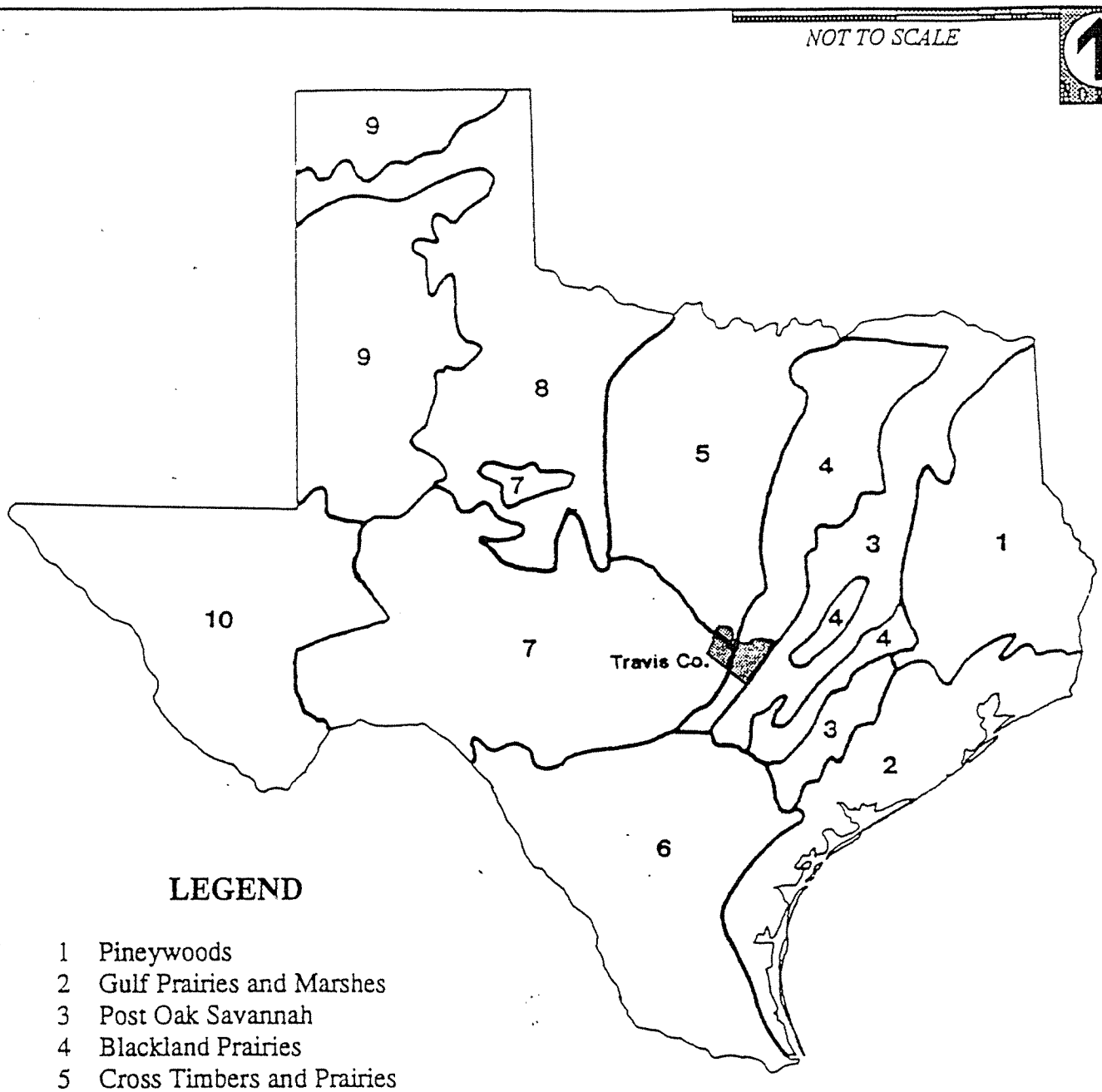
RECON



Source: Hicks & Company

FIGURE
Barton Springs Segment of the Edwards Aquifer

RECON



LEGEND

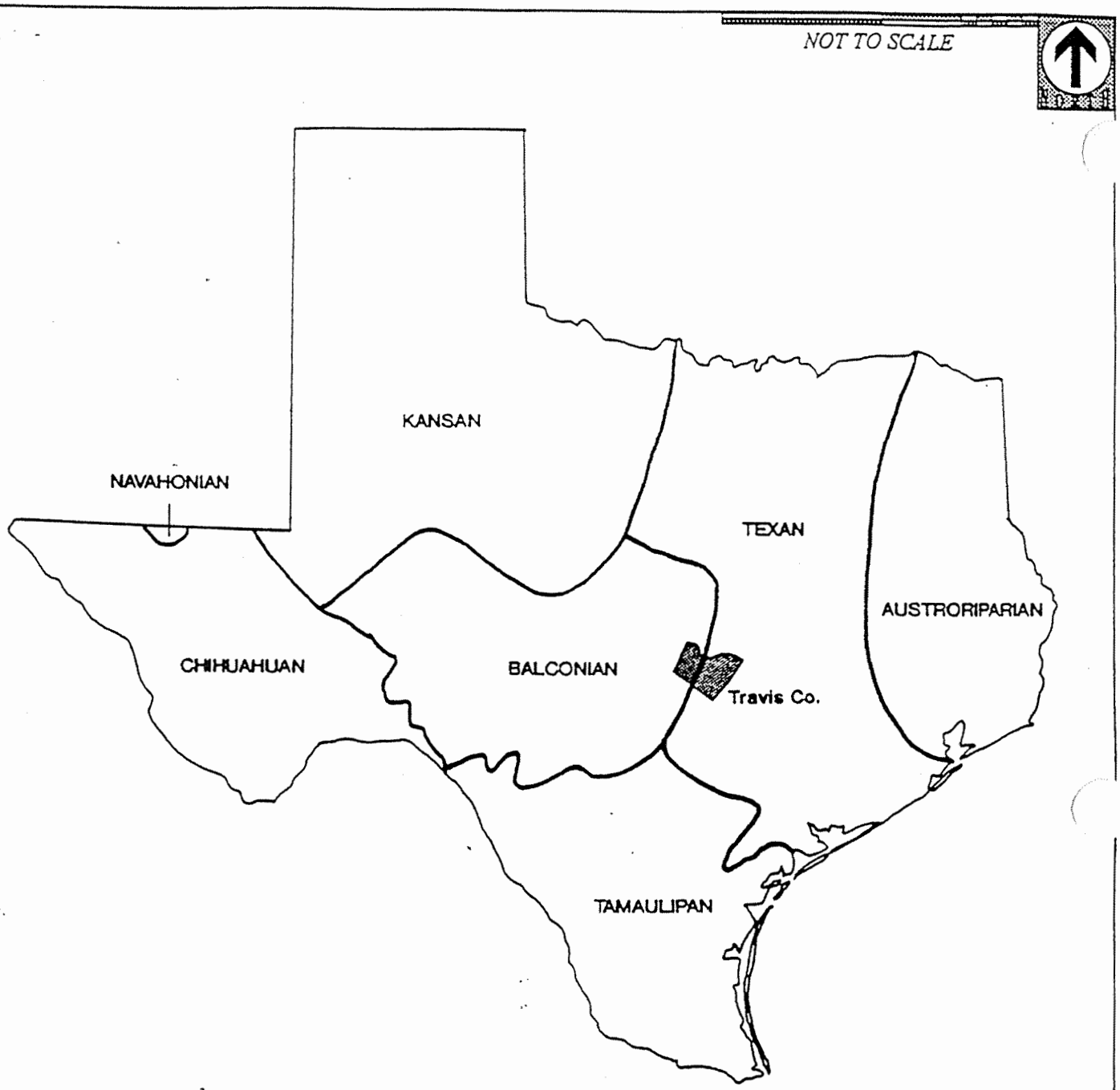
1 Pineywoods
2 Gulf Prairies and Marshes
3 Post Oak Savannah
4 Blackland Prairies
5 Cross Timbers and Prairies
6 South Texas Plains
7 Edwards Plateau
8 Rolling Plains
9 High Plains
10 Trans-Pecos, Mountains and Basins

Source: Gould 1975

FIGURE 8

Travis County and the Ecological Regions of Texas

RECON



Source: Blair 1950

FIGURE
Travis County and the Biotic Regions of Texa

RECON

LEGEND

Breeding Range

Wintering Range

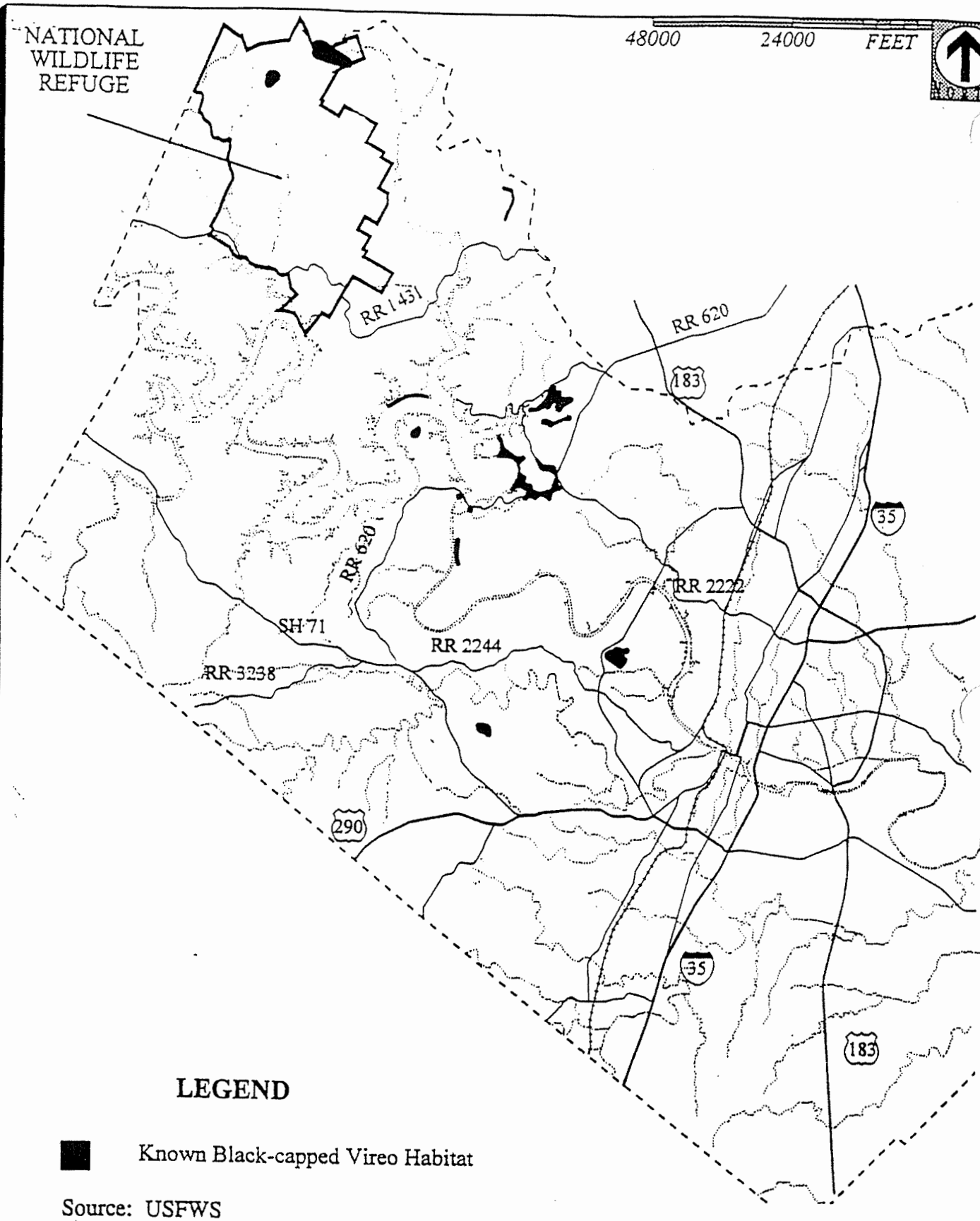
? Possible Wintering Range

Source: USFWS 1991

FIGURE 10

Breeding and Wintering Ranges of the Black-capped Vireo

RECON



LEGEND

Known Black-capped Vireo Habitat

Source: USFWS

FIGURE 1

Known Occupied Black-capped Vireo Habitat in the Permit Area

RECON

LEGEND

Breeding Range

Wintering Range

Source: USFWS 1992b

FIGURE 12

Known Breeding and Wintering Ranges of the Golden-cheeked Warbler

RECON

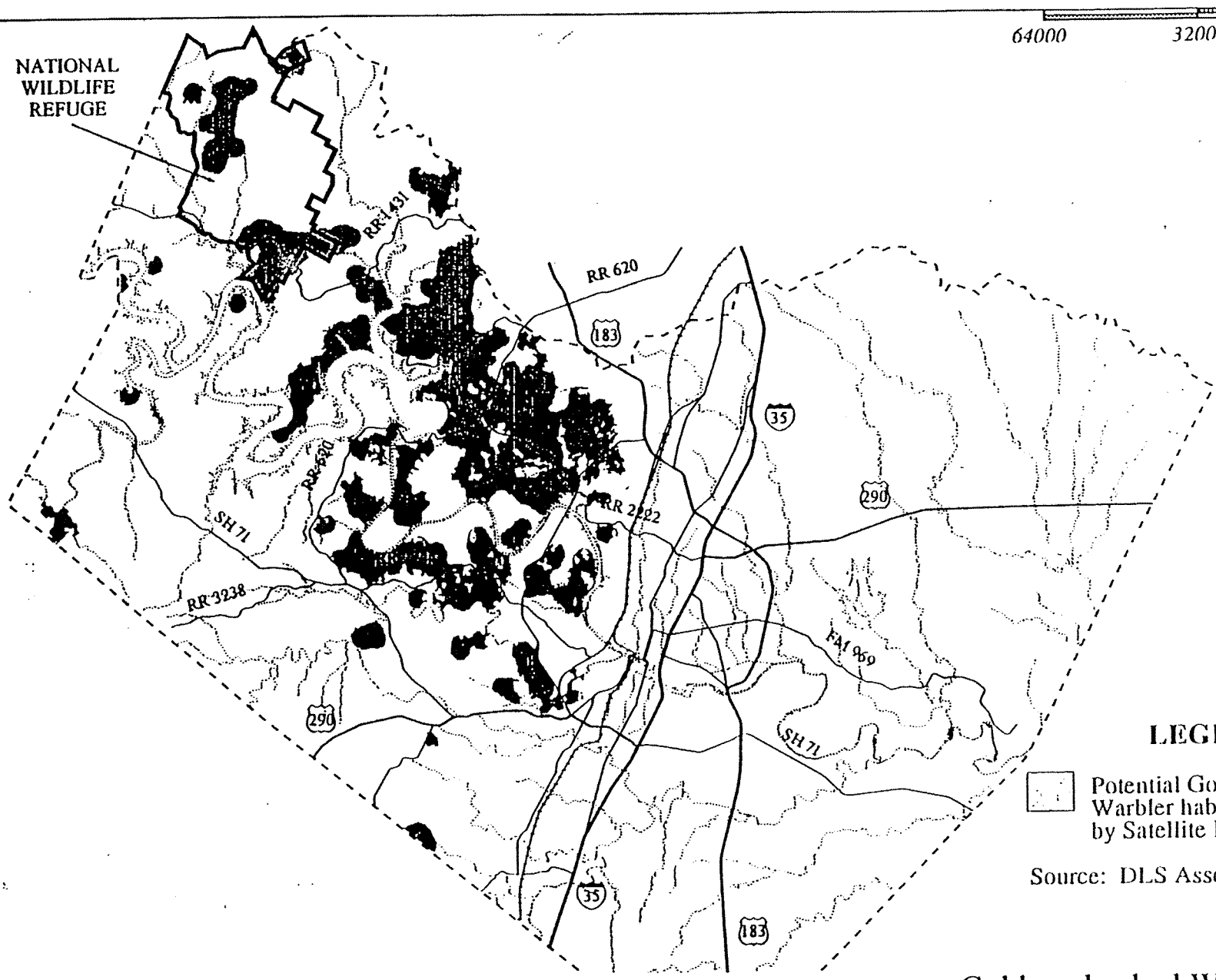
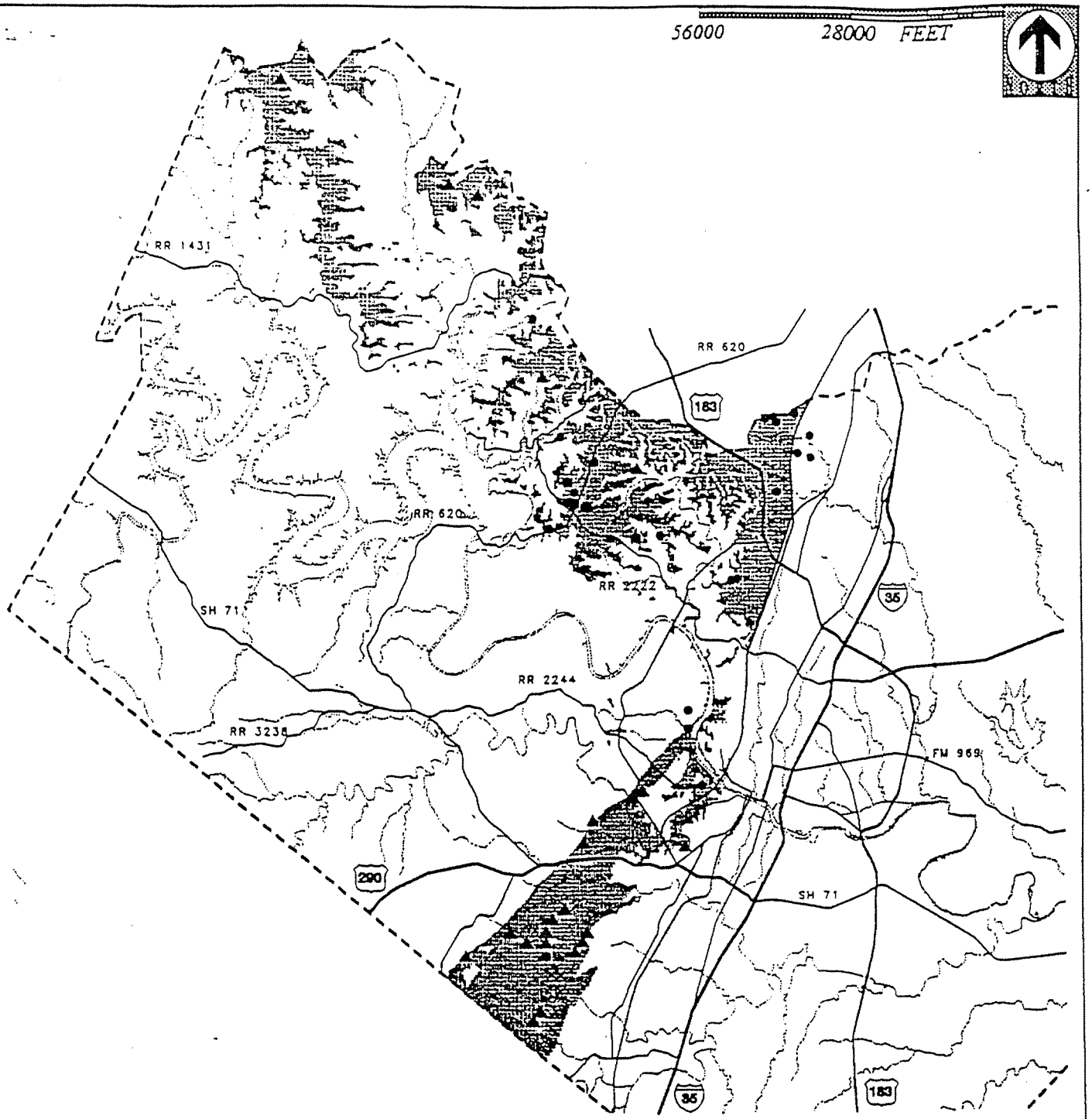


FIGURE 13
Golden-cheeked Warbler Habitat in the Permit Area

RECON



LEGEND

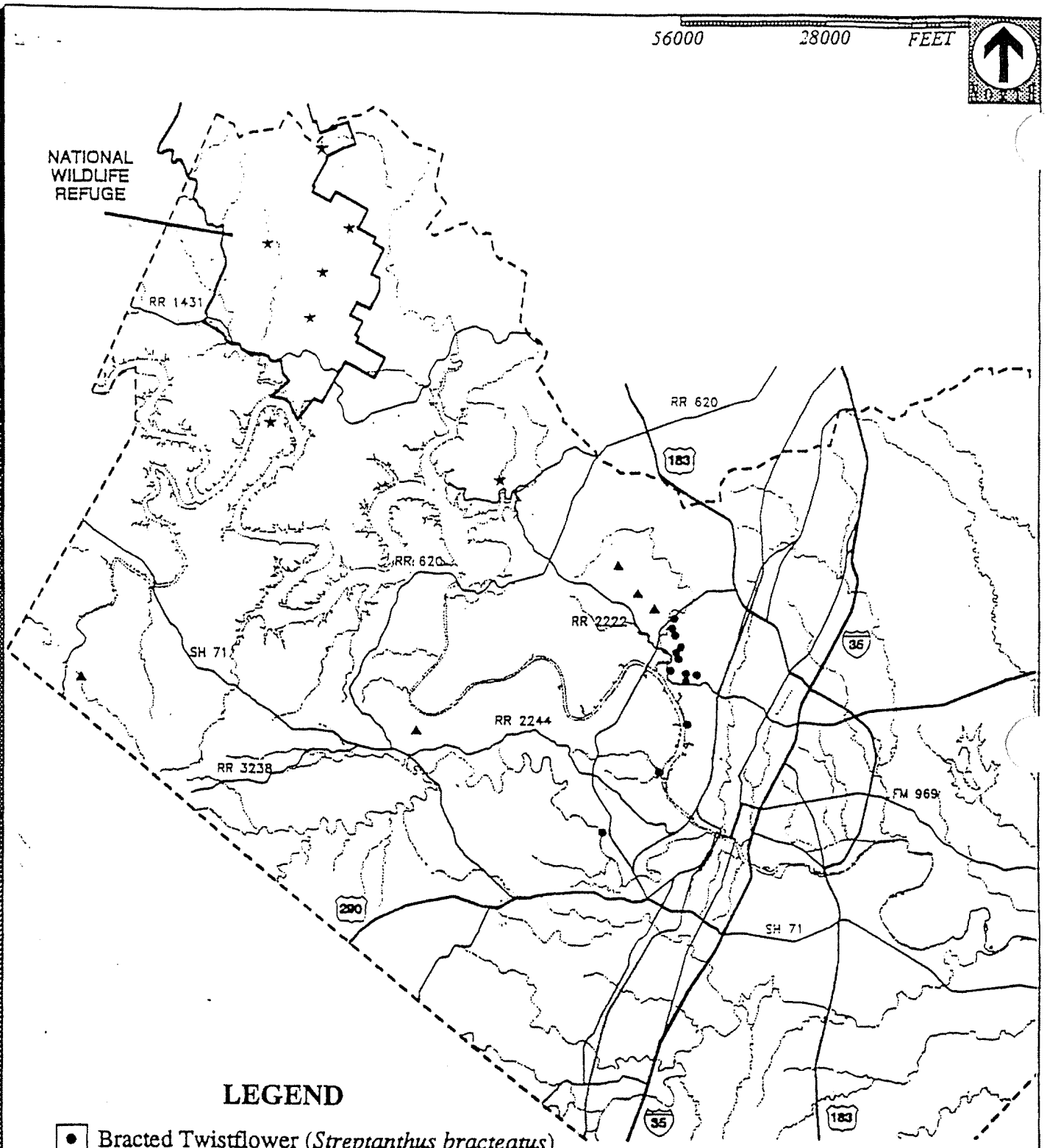
- Karstic Limestone Distribution
- ▲ Rare Karst Species
- • Known Endangered Karst Species

Source: Veni (1991) and Elliot (1992)

FIGURE 14

Karstic Limestone Distribution and Endangered Karst Species Locations

RECON



LEGEND

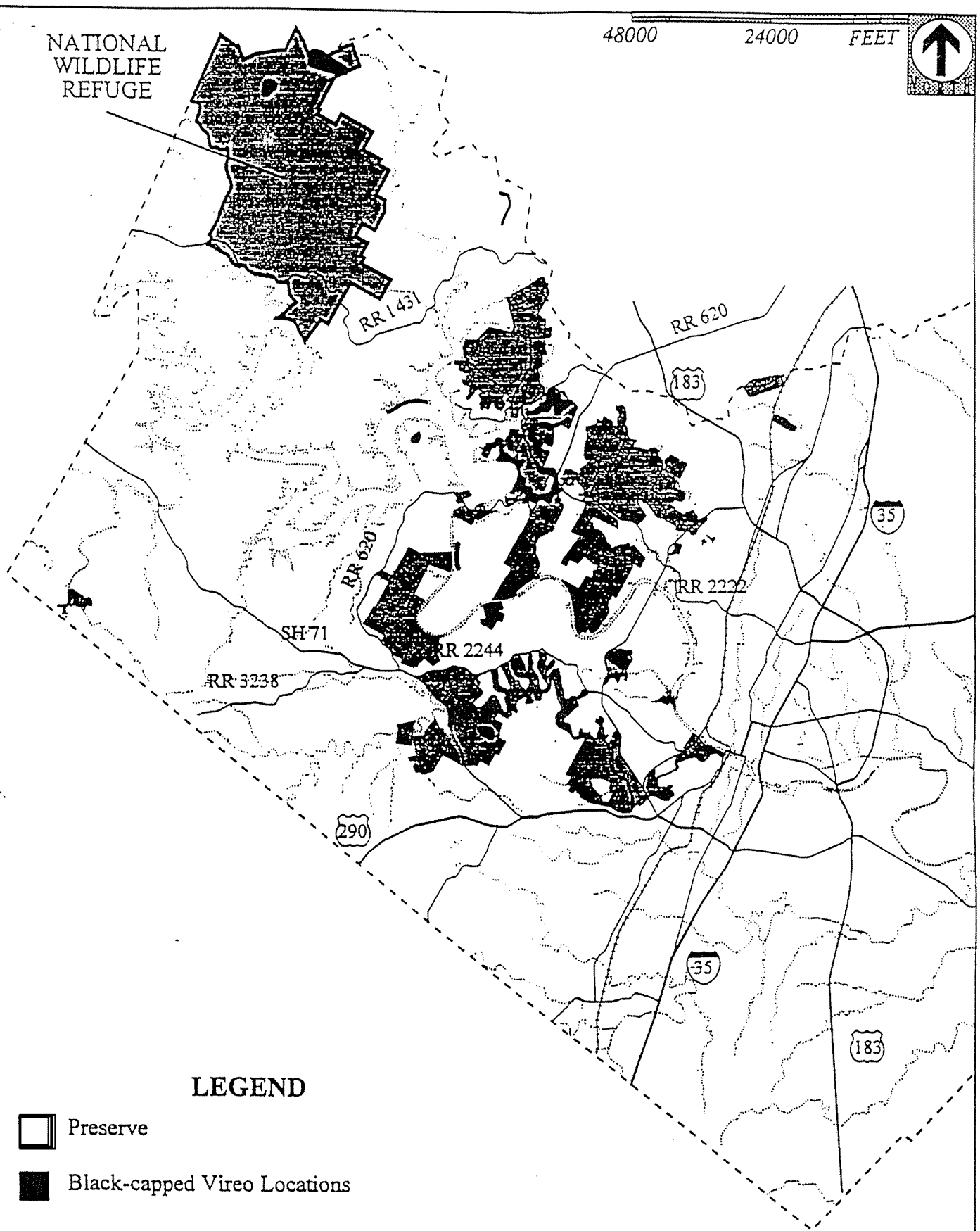
- ● Bracted Twistflower (*Streptanthus bracteatus*)
- ★ Texabama Croton (*Croton alabamensis var. texensis*)
- ▲ Canyon Mock-orange (*Philadelphus ernestii*)

Source: KSB&A and EH&A 1992
TNRIS in lit.

FIGURE 15

Known Localities for Bracted Twistflower, Canyon Mock-orange and Texabama Croton in the Permit Area

RECON



LEGEND

Preserve

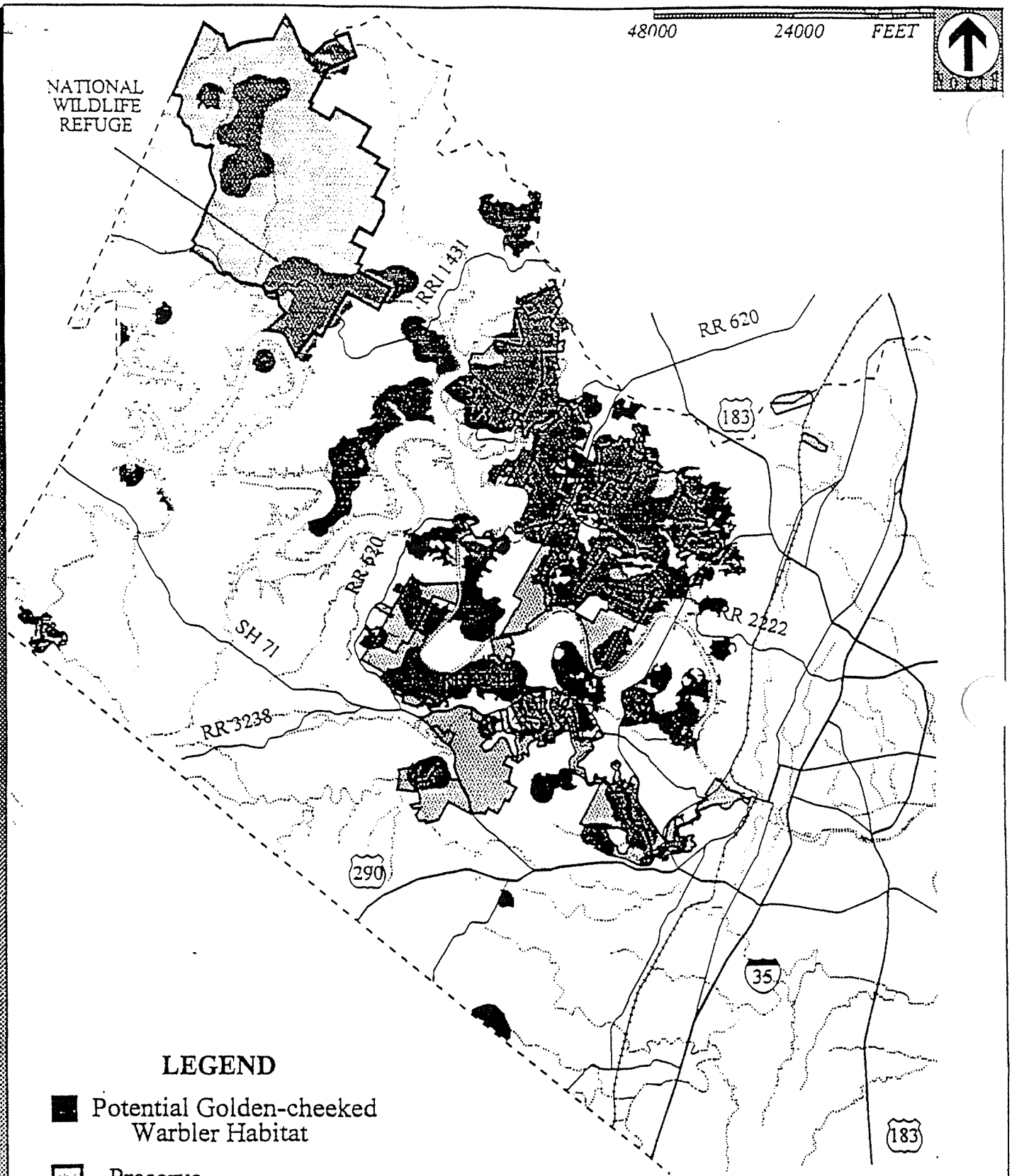
Black-capped Vireo Locations

Source: USFWS

FIGURE 17

Known Occupied Black-capped Vireo Habitat within the Preserve Area

RECON



LEGEND

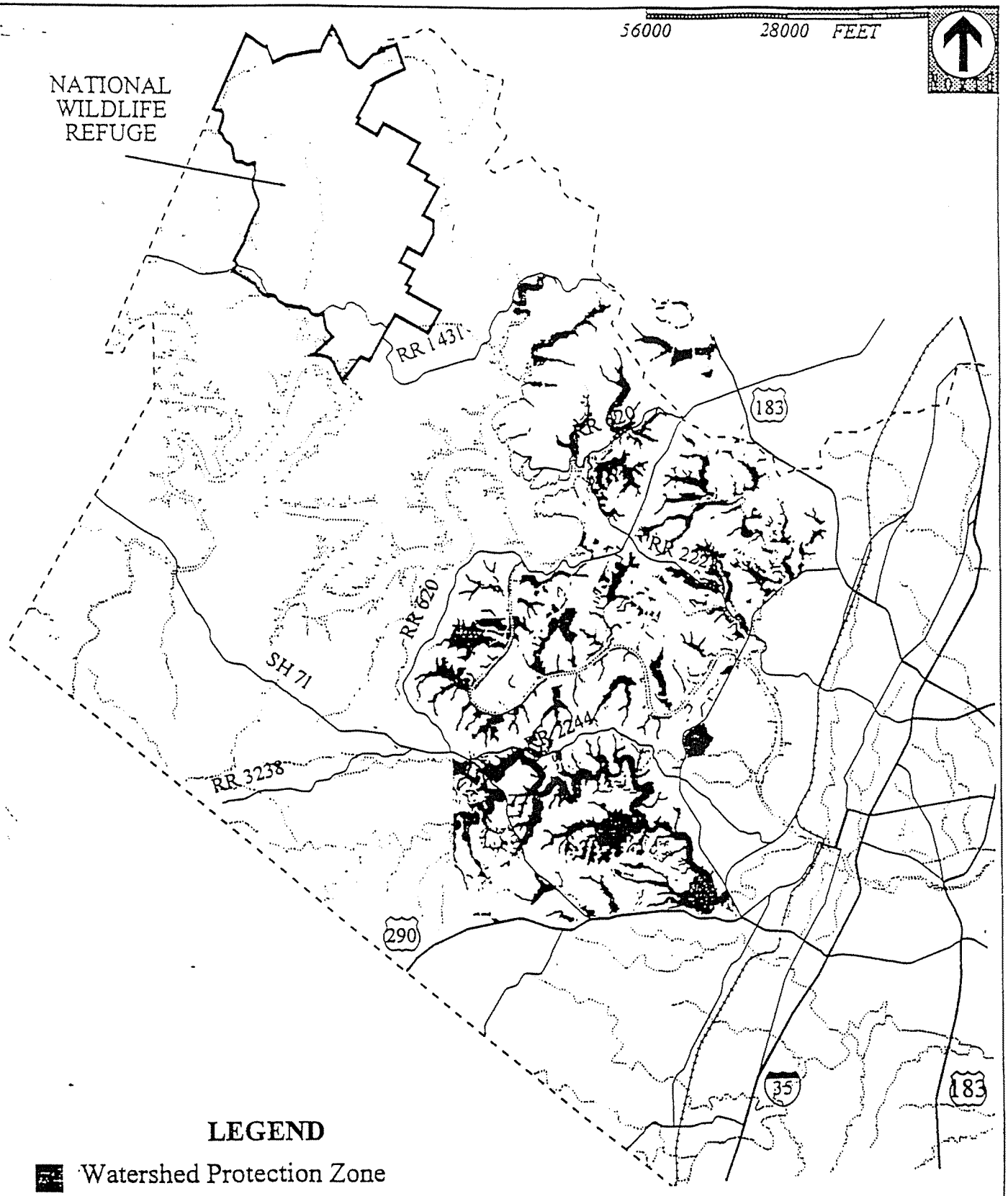
- Potential Golden-cheeked Warbler Habitat
- Preserve

Source: DLS Associates

FIGURE 18

Relationship of Potential Golden-cheeked Warbler Habitat to the Permit Area

RECON



LEGEND

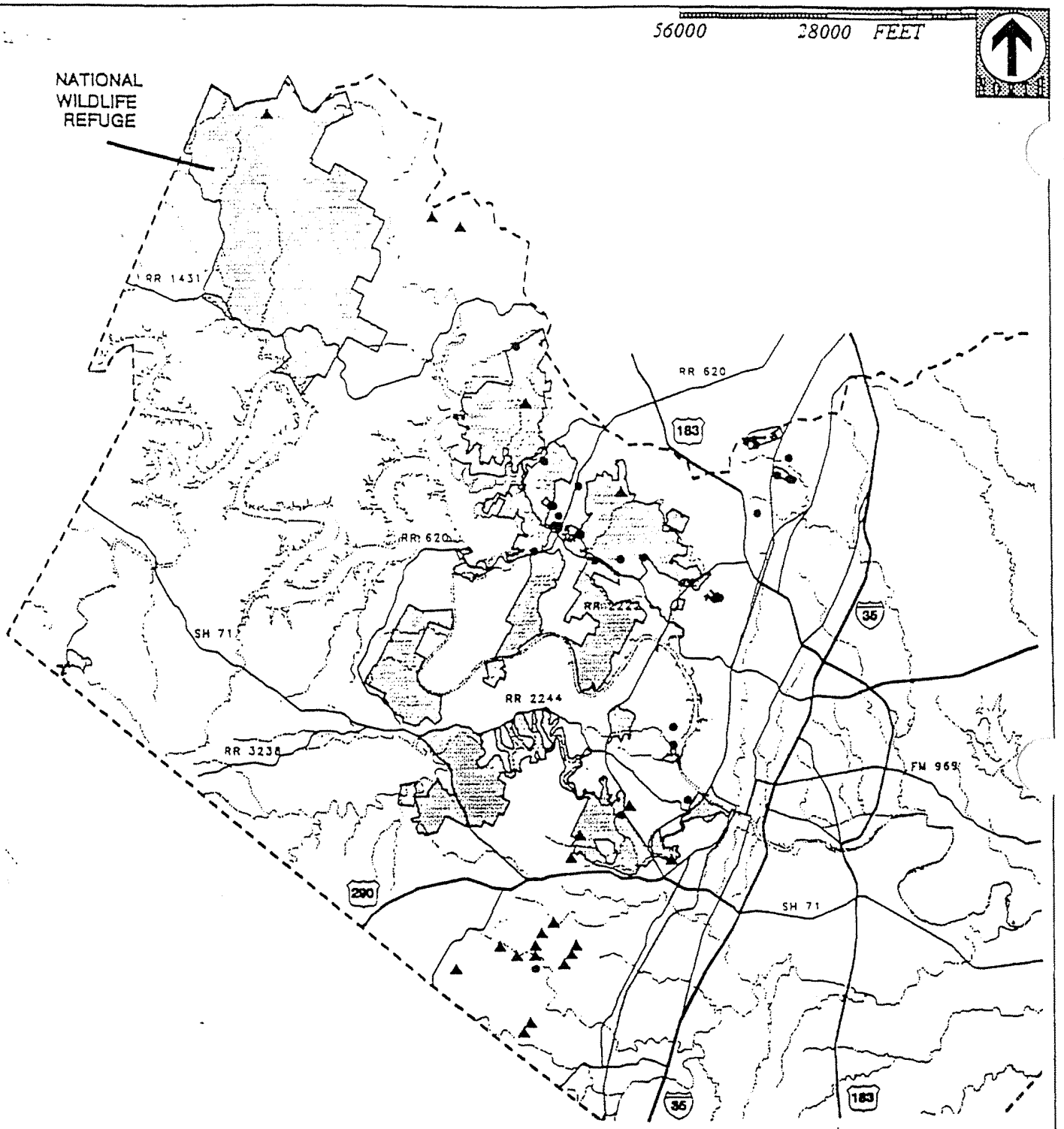
Watershed Protection Zone

Source: KSB&A and EH&A 1992
TNRIS in lit.

FIGURE 19

City of Austin Planning Jurisdiction Watershed Protection Zones

RECON



LEGEND

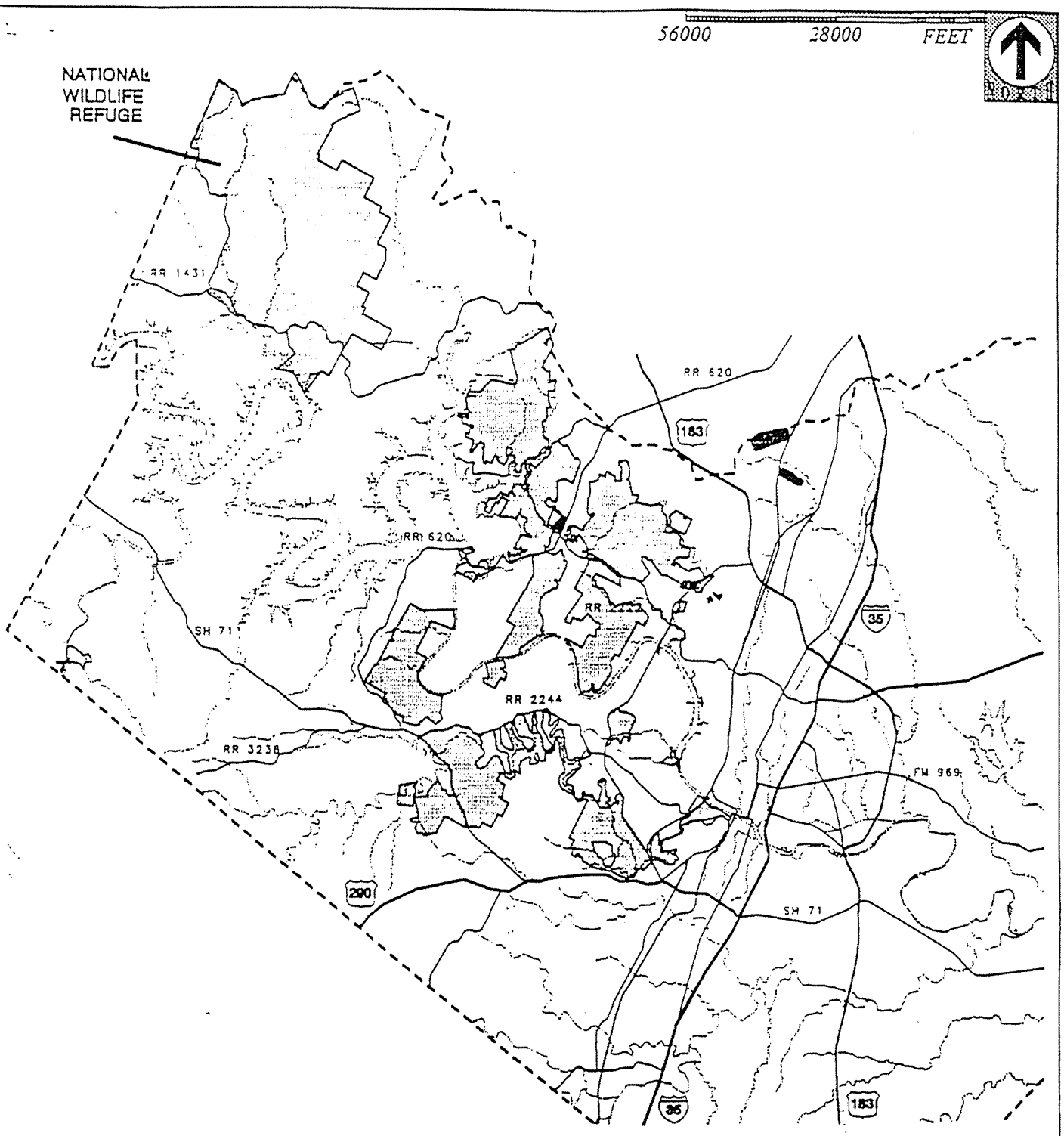
- ▲ Rare Karst Species
- • Known Endangered Species
- Preserve

Source: KSB&A and EH&A 1992
TNRIS in lit.

FIGURE 20

Karst Species Locations
Relative to Proposed Bird Preserv

RECON



LEGEND

Karst Clusters

Preserve

Source: KSB&A and EH&A 1992
TNRIS in lit.

FIGURE 21

Karst Clusters and
Bird Preserves within the Plan Area

RECON

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

Lead Agency: U.S. Department of the Interior
Fish and Wildlife Service

Responsible Official: Nancy M. Kaufman, Regional Director
U.S. Department of the Interior
Fish and Wildlife Service
P.O. Box 1306
Albuquerque, New Mexico 87103

Legal Authority: Endangered Species Act of 1973, as amended. section 10(a), as implemented by 50 CFR 17.22(b)(1)

Prepared By: Regional Environmental Consultants (RECON)
7460 Mission Valley Road
San Diego, California 92108

and

U.S. Department of Interior
Fish and Wildlife Service
Joe Johnston, Biologist, Ecological Services
10711 Burnet Road, Suite 200
Austin, Texas 78758

Abstract: The City of Austin and Travis County (applicants) have applied for a permit from the Fish and Wildlife Service to allow incidental take of the following federally-listed endangered species: black-capped vireo (*Vireo atricapillus*), golden-cheeked warbler (*Dendroica chrysoparia*), Tooth Cave pseudoscorpion (*Tartarocreagris texana*), Tooth Cave spider (*Neoleptoneta myopica*), Tooth Cave ground beetle (*Rhadine persephone*), Kretschmarr Cave mold beetle (*Texamaurops reddelli*), Bone Cave harvestman *Texella reyesi*), and Bee Creek Cave harvestman (*Texella reddelli*) under section 10(a)(1)(B) of the Endangered Species Act. The activity sought to be authorized is the direct and indirect incidental take of federally-listed species that would result from grading, clearing, or other earth-moving activities necessary for residential, commercial, or industrial construction and infrastructure projects as well as the indirect impacts, such as noise, predation, and harassment, that results from the occupancy of these structures

within the permit portions of Travis County, Texas. The nonfederally-listed species of concern included within this plan would be protected and thus implementation of the plan may preclude the need for listing. If a species of concern is listed and the proposed actions in this plan have been implemented, then no further mitigation would be required of the plan participants.

The proposed permit will allow approved incidental take outside of proposed preserve lands within the proposed permit boundaries. In general, this area includes all of the lands within Travis County, except the following: the mapped preserve area; that portion of Balcones Canyonlands National Wildlife Refuge (BCNWR) that falls within Travis County; and, areas within the city limits and planning jurisdictions of municipalities not participating in the Balcones Canyonlands Conservation Plan (BCCP). The permit period is 30 years. Potential development for this time period is estimated to affect between 30,000 and 60,000 acres within the permit area. Of the approximately 2,000 acres of known occupied black-capped vireo habitat located within Travis County, 933 acres will be preserved within the BCCP preserve area or the BCNWR and up to 10 individuals will be subject to incidental take in the permit area through the loss of approximately 1,000 acres of habitat. For the golden-cheeked warbler, as identified by satellite imagery, approximately 44,068 acres in Travis County have the canopy closure and species distribution to be warbler habitat. As much as 26,753 acres (74 percent) of this potential warbler habitat is located within the permit area and may be subject to alteration and the incidental take of the warblers residing therein. This potential warbler habitat could support from 1,605 to 3,210 pairs of warblers (15-30 pairs/250 acres). Of the 45,368 acres of potential karst invertebrate habitat occurring in the permit area, approximately 38,349 acres will be unprotected by the proposed BCCP. Of the 39 federally-listed karst invertebrate localities currently known in the permit area, 35 will be protected by the BCCP and/or other action.

To minimize and mitigate the impacts of take, the applicants propose to conserve a minimum of 30,428 acres of black-capped vireo and golden-cheeked warbler habitat in a preserve system; provide for the ongoing maintenance, patrol, and biological management of the conserved habitat; and, conduct biological monitoring and research activities in support of the BCCP. A Participation Certificate fee would be used to fund implementation of the habitat conservation plan. Alternatives considered include continuance of development without a regional permit (no action), issuance of the permit with the submitted BCCP (30,428-acre preserve), and issuance of the permit with the submitted BCCP with an additional 5,000 acres added to the preserve system.

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APPENDICES

A Interlocal Agreement
B Infrastructure Planning
C Response to Comments

Executive Summary

A. Purpose of and Need for Action

This final environmental impact statement (EIS) describes the potential impacts of and mitigation measures for the Balcones Canyonlands Conservation Plan (BCCP), which addresses the incidental take of two endangered bird species and six endangered karst invertebrate species under section 10(a)(1)(B) of the Endangered Species Act (ESA). The federal lead agency with responsibility for issuance of the incidental take permit is the U.S. Fish and Wildlife Service (USFWS).

The purpose of the proposed section 10(a)(1)(B) permit (Permit) is to establish the conditions under which land development in Travis County can go forward in compliance with the requirements of the ESA that were triggered by the above endangered species listings. The City of Austin and Travis County seek approval by the USFWS of a permit under section 10(a)(1)(B) of the ESA, authorizing direct and indirect loss of endangered or threatened species and their habitat due to otherwise legally permitted activity (i.e., incidental take). The ESA prohibits activities that will cause harm to a species listed as endangered or threatened; however, section 10(a)(1)(B) of the ESA provides a permitting procedure to allow incidental take.

B. Alternative Actions

1. Alternatives Eliminated from Consideration

During the development of the BCCP, several alternative proposals were considered that were eliminated from detailed consideration.

a. USFWS Would Not Issue Any Section 10(a)(1)(B) Permits

Under this alternative, protection of existing occupied endangered species habitat would occur through enforcement of section 9 of the ESA (i.e., the taking prohibition) by federal agencies, through development and implementation of recovery plans by the USFWS and other parties, and through independent conservation actions of other organizations. Enforcement of the taking prohibition would occur through field investigations, legal actions, and the section 7 consultation process triggered by the

involvement of a federal agency (e.g., the U.S. Army Corps of Engineers proposes to authorize a pipeline crossing occupied endangered species habitat).

This alternative poses potentially severe adverse long-term impacts on the viability of the species and the supporting ecosystems in the area. Those lands that contain any of the species of concern would be protected but would likely be relatively isolated from each other, thereby reducing their habitat value. Comprehensive species management programs, such as cowbird management and systematic monitoring of species populations, would not be undertaken. In addition, a network of fragmented occupied habitat that is not comprehensively designed or managed to function as a system would reduce the likelihood that the species of concern would survive in the local area.

Also, negative impacts on the local economy could be severe. Under this alternative, monetary value of undeveloped land with habitat for endangered species may be based on its open space quality, not on any future development potential. For these reasons, this alternative was not considered for further discussion.

b. Mitigation Outside Travis County

One alternative considered at an early stage in the plan development process was the acquisition of habitat for the vireo and possibly the warbler in a location far removed from the adverse impacts of urbanization, and at a purchase price less expensive than land in western Travis County. For biological reasons that necessitate the protection of all significant populations (e.g., the genetic diversity) of each of the species of concern, the USFWS rejected this alternative. They determined that the only acceptable preserve alternative would be the protection of significant blocks of the remaining suitable habitat in the Austin metropolitan area, if significant amounts of development across the western part of the study area were to be allowed under a regional Permit.

c. Privatized Alternative

The primary purpose of the privatized alternative is to rely on the private sector (landowners, private citizens, and their enterprises) to accomplish the missions mandated by the ESA with the intention of increasing the size of the preserve area in a more cost-effective way. Under this alternative:

- The proposed preserve system would be enlarged by 15 percent, strengthening its ecological quality;
- Landowner participation and cooperative interaction with scientific specialists would increase;

- The BCCP preserve area would be upgraded; and
- Preserve acquisition and operational costs would be lowered.

The operations of the privatized alternative would be directed by a nonprofit public service foundation, the Balcones Canyonlands Foundation. The foundation and its trustees would be assisted by advisory teams. Conservation stewards such as the USFWS, Mexico's Pronatura, the Audubon Society, the Texas Parks and Wildlife Department, and the Nature Conservancy, as well as local resource managers, would be enlisted to help manage preserve land or auxiliary research sites.

The privatized alternative was eliminated from detailed discussion in the EIS because proponents of this alternative have not identified a specific management or administration group nor additional data or mapping to effectively analyze the environmental impacts of such an alternative. Specifically, a graphic exhibit of the alternative's proposed preserve identifying a number of auxiliary preserve sites has yet to be produced; funding levels of the plan have not been provided; and management strategies have not been developed.

d. Alternative Study Area/Permit Area Boundaries

Two categories of boundaries were considered: the outer study area boundary and the boundaries of a somewhat smaller permit area that would be subject to habitat acquisition and management and to assessment of fees for habitat acquisition.

Alternative Study Area Boundaries

The selected outer boundaries of the initial BCCP study area included all of Travis County, southern Williamson County, southeastern Burnet County, and those portions of Hays and Bastrop counties within the five-mile extraterritorial jurisdiction (ETJ) of the City of Austin. Five additional specific alternatives were considered but eliminated from detailed analysis during the course of plan development.

Alternative Permit Area Boundaries

In considering alternatives in permit area boundaries, the objective was to have a clearly defined BCCP permit area for the establishment of habitat preserves, areas subject to assessments for preserve acquisition, and other areas on which take would be permitted under the protection of the regional Permit. Four alternatives were considered for the establishment of focused permit areas within the BCCP study area. Three were

eliminated from further consideration and the fourth was selected as the proposed action alternative.

The first alternative in permit area boundaries considered but eliminated from further discussion included a permit area larger than Travis County. This area would likely be difficult to manage administratively and financially. It would require defining a geographical area of at least six and possibly as many as 30 Texas counties. No existing regional institution covers the entirety of even the minimum six-county regional area, and limited community interest exists among the diverse rural and urban constituents of these larger regions.

The second alternative in permit area boundaries considered but eliminated from further discussion included Travis County and parts of Williamson, Hays, and Burnet counties. Major portions of this study area contained no current habitat for the species that the BCCP proposes to protect. Specifically, the areas of Travis and Williamson counties east of Interstate Highway 35, while included in the study area, have proven to have essentially no documented habitat for the species under consideration. Landowners in these areas would benefit less directly from the plan than landowners in the area of extensive habitat. For these reasons, this geographic configuration was not recommended for the permit area.

A third alternative in permit area boundaries considered but eliminated from further discussion was similar to the proposed action alternative but included the southern portion of Williamson County. This alternative was considered at the request of the City of Georgetown and was subsequently eliminated at the request of the Williamson County Commissioners Court.

2. Alternatives Considered

a. Alternative 1: The No Action Alternative

The No Action Alternative assumes that the USFWS does not issue a regional Permit for Travis County. Although development could occur on lands not occupied by endangered or threatened species, development activities that would cause take of a listed species would require a permit under the ESA on properties containing endangered or threatened species habitat.

Development projects would have the potential to be permitted, provided mitigation was included through preserve land dedication or payment of mitigation fees.

Some developers could seek approval of incidental take through the section 7 consultation process. Section 7 of the ESA requires a federal agency to consult with the USFWS for development projects proposed by that federal agency or which at some level require federal approval. Applicable projects that pose no jeopardy to the survival of an endangered or threatened species in the wild could proceed. The section 7 consultation process requires the involvement of another federal agency and does not have a public review requirement. Formal consultation procedures could cause delays in permit issuance by an agency or approval of a proposed project; however, this delay is normally less than that associated with the section 10 permit process. Therefore, project proponents are likely to use it rather than the section 10 permit process, if available.

b. Alternative 2: Regional Permit (Proposed Action)

The City of Austin and Travis County seek approval by the USFWS of a Permit, authorizing incidental take of the following federally-listed endangered species: black-capped vireo, golden-cheeked warbler, Tooth Cave pseudoscorpion, Tooth Cave spider, Tooth Cave ground beetle, Kretschmarr Cave mold beetle, Bone Cave harvestman, and Bee Creek Cave harvestman. Travis County includes approximately 1,012 square miles (647,680 acres) of both publicly and privately owned lands. The permit area identified in the BCCP encompasses all of Travis County with the exclusion of the city limits and planning jurisdictions of nonparticipating municipalities, that portion of the Balcones Canyonlands National Wildlife Refuge (BCNWR) located within Travis County, and the BCCP preserve area as defined in the BCCP. Thus, the total acreage of the permit area is 561,000 acres, of which about 100,000 acres is currently developed. Over the 30-year permit period, the amount of land likely to be developed within the permit area is estimated to be between 30,000 and 60,000 acres, some of which is endangered species habitat. However, this permit covers the incidental take of the 8 federally-listed species and 27 species of concern on all lands outside of the proposed preserves. The participants in the BCCP have identified areas where endangered species habitat will be lost, have identified preserve areas and other mitigative measures for these species, and have developed a financial and legal framework for implementing the proposed BCCP.

The proposed habitat conservation plan to address potential incidental take includes the establishment of a habitat preserve system encompassing at least 30,428 acres within Travis County. It also includes protection of 35 of 39 known cave locations for listed karst invertebrates. In addition to the listed species, the BCCP preserve also provides protection for other species of concern; they include canyon mock-orange and Texabama croton, and 25 other karst invertebrate species. Additional acreage may need to be acquired for conservation of the 25 karst invertebrate species of concern. The Barton

Springs salamander, Jollyville salamander, Texas salamander and 3 snails in Barton Springs are not currently included in the plan but may be included, subsequent to further evaluation.

Preserve management will be accomplished through an inter-governmental agreement. Funding of preserve acquisition and maintenance will be from the sale of voluntarily purchased Participation Certificates and public funding sources. Creation of the permanent preserve system will be through public acquisition, rather than by land use restrictions (which are limited in Texas).

The proposed action requires USFWS review and approval of a Permit application, which is described in this draft EIS. Concurrent with its evaluation of this Permit, the USFWS will conduct an internal section 7 consultation; the USFWS is not exempt from the requirement that a federal agency undertaking an action that may affect a listed species must demonstrate that the action will not be likely to jeopardize the continued existence of any endangered or threatened species in the wild. Future development projects built outside the proposed preserve will be subject to existing regulatory controls other than the ESA; however, no additional actions or permits under the ESA will be required.

c. Alternative 3: Regional Permit

This alternative is the same as alternative 2 in a number of ways: it seeks approval of a Permit for future development throughout Travis County; it involves the same species; the management structure relies on intergovernmental cooperation; the funding plan is the same; and mitigation occurs through creation of a habitat preserve.

The significant difference between this alternative and alternative 2 is the number and location of acres to be acquired for the proposed preserve. Under this alternative, approximately 5,000 acres would be set aside in addition to the 30,428 preserve acres in alternative 2. These acres would be located in close proximity to and be incorporated into the BCNWR, which is in northwestern Travis County. The BCNWR extends into Burnet and Williamson counties; it is possible that the additional 5,000 acres would be located in Travis, Burnet, and/or Williamson counties. Setting aside additional acres in Travis County would reduce the permit area in which development could occur by that number of acres.

3. Preferred Alternative

Alternative 3 Regional Permit described above is the preferred alternative of the USFWS.

C. Adverse and Irreversible Impacts

Because the BCCP preserve provides overall mitigation by establishing a preserve, the habitat losses outside preserve boundaries will not be required to be mitigated for adequately protected species on a project-by-project basis. Thus, under the proposed Permit, developable land outside the proposed preserve boundaries will be open to development without further ESA restrictions on incidental take for the warbler, vireo, six listed karst invertebrates and our adequately covered species of concern. The mitigation measures needed to adequately address these species can be found in Chapter Two. The BCCP estimates that land development during the 30-year term of the permit will reduce habitats for the listed species as follows: approximately half of known occupied black-capped vireo habitat; 71 percent of potential golden-cheeked warbler habitat; and 84 percent of potential karst invertebrate habitat. Reduction of habitat for other species of concern is estimated with all species of concern being adequately protected except for the bracted twistflower which will lose four of the nine known populations and will not be adequately protected by this plan.

D. Summary of Project Impacts, Mitigation, and Significance After Mitigation

Table S-1 summarizes the environmental effects, including the cumulative impacts, of the proposed action and alternatives. Each major environmental issue listed in the table is separated into and evaluated by subissues. For each subissue, the table describes the impacts of the proposed project and alternatives, recommended mitigation measures, and resulting level of significance after implementation of recommended mitigation measures.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
1. BIOLOGY			
Black-capped Vireo			
Impacts	Total take unknown, resulting from individual approvals under ESA sections 7 and 10.	Loss of up to 1,135 acres of existing occupied habitat (55%)	Same as Alternative 2.
Mitigation Measures	Case-by-case mitigation by on-site or off-site habitat set-aside or mitigation fee.	Acquisition/management of 933 acres of known occupied habitat; enhanced management of 1,000 acres of potential habitat .	Same as Alternative 2.
Significance after Mitigation	Impacts will be reduced to a level below significance on a project-by-project basis.	Not significant with respect to recovery goals.	Not significant with respect to recovery goals.
Golden-cheeked Warbler			
Impacts	Total take unknown, resulting from individual approvals under ESA sections 7 and 10.	Loss of up to 26,753 acres of potential habitat (71%).	Maximum loss of 26,753 acres of potential habitat (71%); minimum loss of 21,753 acres of potential habitat (64%).
Mitigation Measures	Case-by-case mitigation by on-site or off-site habitat set-aside or mitigation fee.	Acquisition/management of 11,086 acres of potential habitat (29%).	Acquisition/management of maximum 16,086 acres (47%) and minimum 11,086 acres (29%) of potential habitat.
Significance after Mitigation	Impacts will be reduced to a level below significance on a project-by-project basis.	Not significant with respect to recovery goals.	Not significant with respect to recovery goals.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Karst Invertebrates			
Impacts	Total take unknown, resulting from individual approvals under ESA sections 7 and 10.	Loss of three known sites of Bone Cave harvestman (Beer Bottle Cave, West Rim Cave, and Millipede Cave); loss of one known site for the Tooth Cave ground beetle (Puzzle Pit Cave); loss of up to 38,349 acres of potential karst habitat (85%).	Same as Alternative 2.
Mitigation Measures	Case-by-case mitigation by on-site or off-site habitat set-aside or mitigation fee.	Acquisition/management of 35 known cave sites for listed species and 27 known cave sites for species of concern; potential habitat outside preserve discovered to be occupied will have acquisition priority.	Same as Alternative 2.
Significance after Mitigation	Impacts will be reduced to a level below significance on a project-by-project basis.	Not significant with respect to recovery goals.	Not significant with respect to recovery goals.
Bracted Twistflower			
Impacts	No protection for candidate species.	Five of nine known populations not included in preserve.	Same as Alternative 2.
Mitigation Measures	None provided.	Cooperative agreements with private landowners and use of platting process to protect populations on private lands.	Same as Alternative 2.
Significance after Mitigation	Significant adverse impacts likely.	Significant adverse impacts likely.	Significant adverse impacts likely.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Canyon Mock-Orange			
Impacts	No protection for candidate species.	All or portions of five known populations included in preserve.	Same as Alternative 2.
Mitigation Measures	None provided.	Management and research directed at preservation of protected populations.	Same as Alternative 2.
Significance after Mitigation	Significant adverse impacts likely.	Not significant.	Not significant.
Eurycea Salamanders	Further study pending.	Further study pending.	Further study pending.
Other Species of Concern			
Impacts	No protection for species of concern.	Populations within the 30,428-acre preserve will be protected from active uses; species in permit area have potential to be taken.	Populations within 35,428-acre preserve will be protected from active uses; species in permit area have potential to be taken.
Mitigation Measures	None provided.	Within preserve, species will be identified, monitored, and managed; no mitigation provided for species found in permit area.	Same as Alternative 2.
Significance after Mitigation	Significant adverse impacts likely.	Not significant.	Not significant.
2. SOCIAL			
Population Growth			
Impacts	Reduction in population growth, compared to Alternative 2 (approximately 62,000) for Austin MSA.	Steady average population growth rate of 2.25% annually for Austin MSA.	Same as Alternative 2.
Mitigation Measures	None provided.	None required.	Same as Alternative 2.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Significance after Mitigation	Adverse impacts possible.	Positive impacts.	Positive impacts.
Housing			
Impacts	New construction in habitat areas evaluated on a project-by-project basis.	Increased housing development due to increased population and reduced ESA compliance costs ($1,500-$5,500/acre).	Same as Regional Alternative 1.
Mitigation Measures	None provided.	None required.	Same as Alternative 2.
Significance after Mitigation	Adverse impacts possible.	Positive impacts.	Positive impacts.
Public Infrastructure			
Impacts	Decreased demand for public infrastructure; added NEPA compliance costs for major projects.	Increased demand for public infrastructure due to increased population and housing; reduced NEPA compliance costs for major projects.	Same as Alternative 2.
Mitigation Measures	None provided.	None required.	Same as Alternative 2.
Significance after Mitigation	Adverse impacts possible.	Positive impacts.	Positive impacts.
3. ECONOMIC			
Employment			
Impacts	Possible reduction of employment opportunities by 8.7% of expected 20-year growth.	Possible increases in employment.	Same as Alternative 2.
Mitigation Measures	None provided.	None required.	Same as Alternative 2.
Significance after Mitigation	Adverse impacts possible.	Positive impacts.	Positive impacts.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Property Valuation/Tax Revenues			
Impacts	Possible loss of potential property tax revenues for City of Austin and Travis County (approximately $440 million at present value).	Possible increases in property tax revenues for City of Austin and Travis County (approximately $440 million at present value).	Same as Alternative 2.
Mitigation Measures	None provided.	None required.	Same as Alternative 2.
Significance after Mitigation	Adverse impacts possible.	Positive impacts.	Positive impacts.
4. LAND USE			
Existing Uses			
Impacts	No significant impacts.	No significant impacts; land acquired for preserve is undeveloped.	Same as Alternative 2.
Mitigation Measures	None required.	None required.	Same as Alternative 2.
Significance after Mitigation	Not significant.	Not significant.	Not significant.
Surrounding Uses			
Impacts	Project-by-project development; cumulative impacts unknown.	Open space preserve compatible with surroundings; surrounding urban uses may adversely affect preserve.	Same as Alternative 2.
Mitigation Measures	Implementation of existing land use regulations and plans.	Preserve design specifies criteria for size, width, edge-to-area ratios, and distances between preserve units.	Same as Alternative 2.
Significance after Mitigation	Not significant.	Not significant.	Not significant.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Consistency with Plans and Policies			
Impacts	Project-by-project development; cumulative impacts unknown.	No significant impacts.	No significant impacts.
Mitigation Measures	Implementation of existing administrative review process.	None required.	None required.
Significance after Mitigation	Not significant.	Not significant.	Not significant.
5. RECREATIONAL			
Loss of Recreation Opportunities			
Impacts	Potential loss of recreational facilities or expansion opportunities due to increased financial burden of individual section 10(a) permits or section 7 consultations.	No significant adverse impacts; increased public open space acreage available in preserve for passive uses.	Same as Alternative 2.
Mitigation Measures	None provided.	None required.	None required.
Significance after Mitigation	Significant adverse impacts not likely.	Not significant.	Not significant.
Interference with Habitat Preservation Goals			
Impacts	Project-by-project development; potential habitat fragmentation.	Potential habitat destruction through expansion of active recreational uses.	Same as Alternative 2.
Mitigation Measures	Implementation of ESA sections 7 and 10 restrictions on incidental take.	Guidelines and tract-specific management plans restrict development and uses of preserve lands.	Same as Alternative 2.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Significance after Mitigation	Impacts will be reduced to a level below significance on a project-by-project basis.	Not significant.	Not significant.
Loss of Cultural Resources			
Impacts	No direct affect on cultural resources.	Potential adverse impact by transfer of cultural resource from private to public ownership, possibly allowing greater access to resource.	Same as Alternative 2.
Mitigation Measures	None provided.	Public preserve restricts uses.	Same as Alternative 2.
Significance after Mitigation	Not significant.	Not significant.	Not significant.
6. WATER RESOURCES			
Surface Water Flows			
Impacts	Potential to increase flows due to vegetation clearing, grading, and impervious cover construction.	No significant impacts expected; potential to increase flows outside preserve due to vegetation clearing, grading, and impervious cover construction.	Same as Alternative 2.
Mitigation Measures	Existing watershed protection ordinances require stormwater volume control measures.	None required within preserves; existing watershed protection ordinances require stormwater volume control measures outside preserves.	Same as Alternative 2.
Significance after Mitigation	Not significant.	Not significant.	Not significant.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Surface Water Quality			
Impacts	Potential for quality to degrade due to increased runoff and pollutant loading.	Impacts within preserve not significant; potential for quality to degrade outside preserve due to increased runoff and pollutant loading.	Same as Alternative 2.
Mitigation Measures	Existing watershed protection ordinances require detention and water quality ponds.	None required within preserve; existing watershed protection ordinances require detention and water quality ponds outside preserve.	Same as Alternative 2.
Significance after Mitigation	Adverse impacts possible. Impacts to water quality will be reduced to a level below significance on a project-by-project basis.	Significant adverse impacts likely outside of preserve areas.	Same as Alternative 2.
Groundwater Recharge			
Impacts	Potential to decrease recharge in developed areas due to increased impervious cover.	No significant impacts within preserve; potential to decrease recharge in developed areas due to increased impervious cover.	Same as Alternative 2.
Mitigation Measures	Existing watershed protection ordinances require development setbacks from critical environmental features connecting surface to groundwater.	None required within preserve; existing watershed protection ordinances require development setbacks from critical environmental features connecting surface to groundwater outside preserve.	Same as Alternative 2.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Significance after Mitigation	Adverse impacts possible. Impacts to water quality will be reduced to a level below significance on a project-by-project basis.	Significant adverse impacts likely outside of preserve area.	Same as Alternative 2.
Groundwater Quality			
Impacts	Potential for quality to degrade in developed areas due to vegetation clearing and runoff from development.	No significant impacts within preserve; potential for quality to degrade in developed areas due to vegetation clearing and runoff from development	Same as Alternative 2.
Mitigation Measures	Existing watershed development ordinances require vegetative buffer zones and development setbacks from critical environmental features connecting surface to groundwater; Texas Natural Resources Conservation Commission restricts location of waste treatment facilities.	None required within preserve; existing watershed development ordinances require vegetative buffer zones and development setbacks from critical environmental features connecting surface to groundwater; Texas Natural Resources Conservation Commission restricts location of waste treatment facilities.	Same as Alternative 2.
Significance after Mitigation	Adverse impacts possible. Impacts will be reduced to a level below significance on a project-by-project basis.	Significant adverse impacts likely outside of preserve area.	Same as Alternative 2.
AIR QUALITY			

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Impacts	Potential for increased degradation as current open space areas are developed/fragmented.	Potential for temporary increases in degradation due to occasional prescribed burning.	Same as Alternative 2.
Mitigation Measures	Project-by-project mitigation for specific project-related impacts.	With planning, no significant impacts within preserve, impacts outside preserve same as for no action alternative.	Same as Alternative 2.
Significance after Mitigation	Impacts will be reduced to below significance on a project-by-project basis.	Not significant.	Same as Alternative 2.
NOISE	Impacts will be reduced to below significance on a project-by-project basis.	No significant impacts	Same as Alternative 2.
CUMULATIVE			
1. Biological Resources			
Impacts	USFWS enforces ESA section 9 take prohibition; amount of incidental take allowed over 30 years is unknown; no preserve created; habitat fragmented. Cumulative impacts could be significant.	USFWS grants ESA section 10(a) permit for 30 years, allowing incidental take in Travis County permit area.	Same as Alternative 2.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Mitigation Measures	Enforcement of ESA sections 7 and 10 incidental take provisions.	Creation of 30,428-acre preserve for listed species and species of concern.	Creation of 35,428-acre preserve for listed species and species of concern.
Significance after Mitigation	Adverse impacts likely for listed species.	Not significant.	Not significant.
2. Social			
Impacts	Higher ESA compliance costs could reduce population growth rate and public infrastructure demand and increase new housing costs in Travis County.	Lower ESA compliance costs could increase population growth rate and public infrastructure demand and decrease new housing costs in permit area.	Same as Alternative 2.
Mitigation Measures	None provided.	None required.	None required.
Significance after Mitigation	Adverse impacts possible.	Positive impacts.	Positive impacts.
3. Economic			
Impacts	Higher ESA compliance costs could reduce employment and property tax revenues in Travis County.	Lower ESA compliance costs could increase employment and property tax revenues in permit area.	Same as Alternative 2.
Mitigation Measures	None provided.	None required.	None required.
Significance after Mitigation	Adverse impacts possible.	Positive impacts.	Positive impacts.
4. Land Use			
Impacts	Project-by-project development; cumulative impacts unknown.	No significant impacts.	No significant impacts.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Mitigation Measures	Implementation of existing land use regulations and administrative procedures.	None required.	None required.
Significance after Mitigation	Not significant.	Not significant.	Not significant.
5. Recreation			
Impacts	Potential losses of near/expanded recreational facilities and potential habitat fragmentation.	Potential impacts through ownership transfers and expansion of active recreational uses.	Potential impacts through ownership transfers and expansion of active recreational uses.
Mitigation Measures	Implementation of ESA sections 7 and 10 restrictions.	Ownership transfers are to public preserve with restricted uses; tract-specific management minimizes potential losses.	Ownership transfers are to public preserve with restricted uses; tract-specific management minimizes potential losses.
Significance after Mitigation	Impacts will be reduced to a level below significance on a project-by-project basis.	Not significant.	Not significant.
6. Water Resources			
Impacts	Potential for increased surface flows/flooding, degraded surface and groundwater quality, and decreased groundwater recharge.	No significant impacts within preserve; impacts outside preserve same as for no action alternative.	Same as Alternative 2.
Mitigation Measures	Implementation of existing watershed protection ordinances.	None required within preserve; implementation of watershed protection ordinances outside preserve.	Same as Alternative 2.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Significance after Mitigation	Adverse impacts possible. Water Quality Protection measures should keep impacts below significant level.	No significant impacts within preserve; impacts outside preserve same as for no action alternative.	Same as Alternative 2.
AIR QUALITY			
Impacts	Likely increased degradation by project-by-project development cumulative impacts unknown.	No significant impacts.	No significant impacts.
Mitigation Measures	On a project-by-project basis.	Not significant.	No significant impacts.
Significance after Mitigation	Impacts will be reduced to below significance on a project-by-project basis.	Not significant.	Same as Alternative 2.
NOISE	Likely increased degradation as a result of development of open spaces. Cumulative impacts unknown.	No significant impacts	Same as Alternative 2.

Chapter One

I. Purpose and Need for the Action

A. Background

On October 6, 1987, the black-capped vireo (*Vireo atricapillus*) was listed by the U.S. Fish and Wildlife Service (USFWS) as an endangered species, thereby invoking the protection provided by the Endangered Species Act (ESA) for the species. On September 16, 1988, the USFWS implemented the same level of protection for five species of karst-dwelling invertebrates by determining endangered status for the following species: Tooth Cave pseudoscorpion (*Tartarocreagris texana*), Tooth Cave spider (*Neoleptoneta myopica*), Tooth Cave ground beetle (*Rhadine persephone*), Kretschmarr Cave mold beetle (*Texamaurops reddelli*), and Bee Creek Cave harvestman (*Texella reddelli*). A refinement of the taxonomy expands this group into seven distinct species. Because *Texella reyesi* and *Barrisodes texanus* were considered to be populations of *Texella reddelli* and *Texamaurops reddelli*, respectively, at the time of listing, they are also considered to be listed as endangered under the ESA. Emergency listing of the golden-cheeked warbler (*Dendroica chrysoparia*) as endangered was posted by the USFWS on May 4, 1990, with permanent listing as endangered on December 27, 1990.

Several land development and public improvement projects in the Austin area were modified or delayed by these listings because of ESA requirements that permits be obtained for activities found to impact endangered species directly or indirectly. Therefore, the City of Austin and Travis County (applicants) have applied for a permit from the USFWS to allow incidental take of the subject federally-listed endangered species under section 10(a)(1)(B) of the Endangered Species Act. This take will be incidental to otherwise lawful activities that would occur as a result of grading, clearing, or other earth-moving activities necessary for residential, commercial, or industrial construction and infrastructure projects within Travis County, Texas. The location of Travis County in the state of Texas is shown on Figure 1. With the permit application, the applicants submitted documentation that complies with the application requirements of 50 CFR 17.22(b)(1) for an incidental take permit under the Endangered Species Act.

The documentation identifies the impacts of the proposed take; shows how the impacts will be minimized, monitored, and mitigated; and demonstrates that the Balcones

Canyonlands Conservation Plan (BCCP) will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.

Travis County includes approximately 989 square miles (632,960 acres) of both publicly and privately owned lands. The permit area identified in the BCCP encompasses all of Travis County, with the exclusion of the projects and activities of nonparticipating municipalities, that portion of the Balcones Canyonlands National Wildlife Refuge (BCNWR) located within Travis County, and the BCCP preserve area as defined in the BCCP (Figure 2). Thus, the total acreage of the permit area is 561,000 acres, of which about 100,000 acres is currently developed. Over the 30-year permit period, the amount of land likely to be developed within the permit area is estimated to be between 30,000 and 60,000 acres, some of which is endangered species habitat. The participants in the BCCP have identified areas where endangered species habitat will be lost, have identified preserve areas and other mitigative measures for these species, and have developed a financial and legal framework for implementing the proposed BCCP.

B. Proposed Action and Decisions Needed

The proposed federal action is the issuance of a section 10(a)(1)(B) permit (Permit) by the USFWS to allow incidental take of black-capped vireos, golden-cheeked warblers, and six karst invertebrates for a 30-year period in designated areas of Travis County, Texas. The permit area where incidental take would occur is shown on Figure 2.

Decisions to be made by the USFWS are as follows:

1. Is the proposed take incidental?

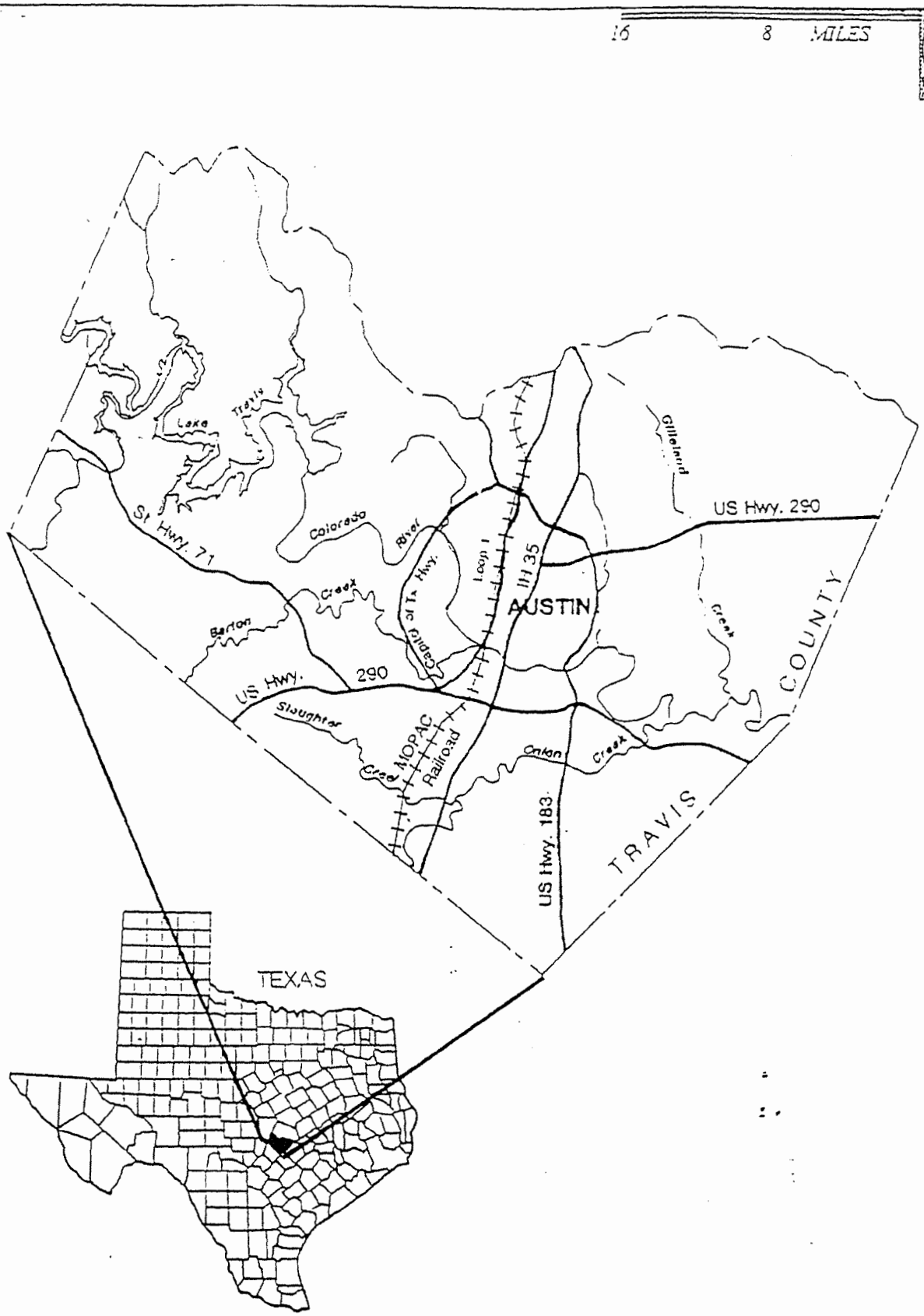
2. Are the impacts of the proposed take minimized and mitigated to the maximum extent practicable?

3. Is adequate funding provided to implement the measures proposed in the submitted HCP?

4. Will the proposed take appreciably reduce the likelihood of the survival and recovery of the species in the wild?

5. Are there other measures that should be required as a condition of the permit?

In considering the above decisions, the USFWS may issue the permit with the submitted BCCP, issue the permit with a modified BCCP, issue the permit with other specific management requirements and mitigation measures, or deny the permit.



BASE MAP: USGS State Map SE Texas Quadrant

Source: Hicks & Company 1993

FIGURE 1

Location of Travis County Within Texa

RECON

Figure 1 Back Side

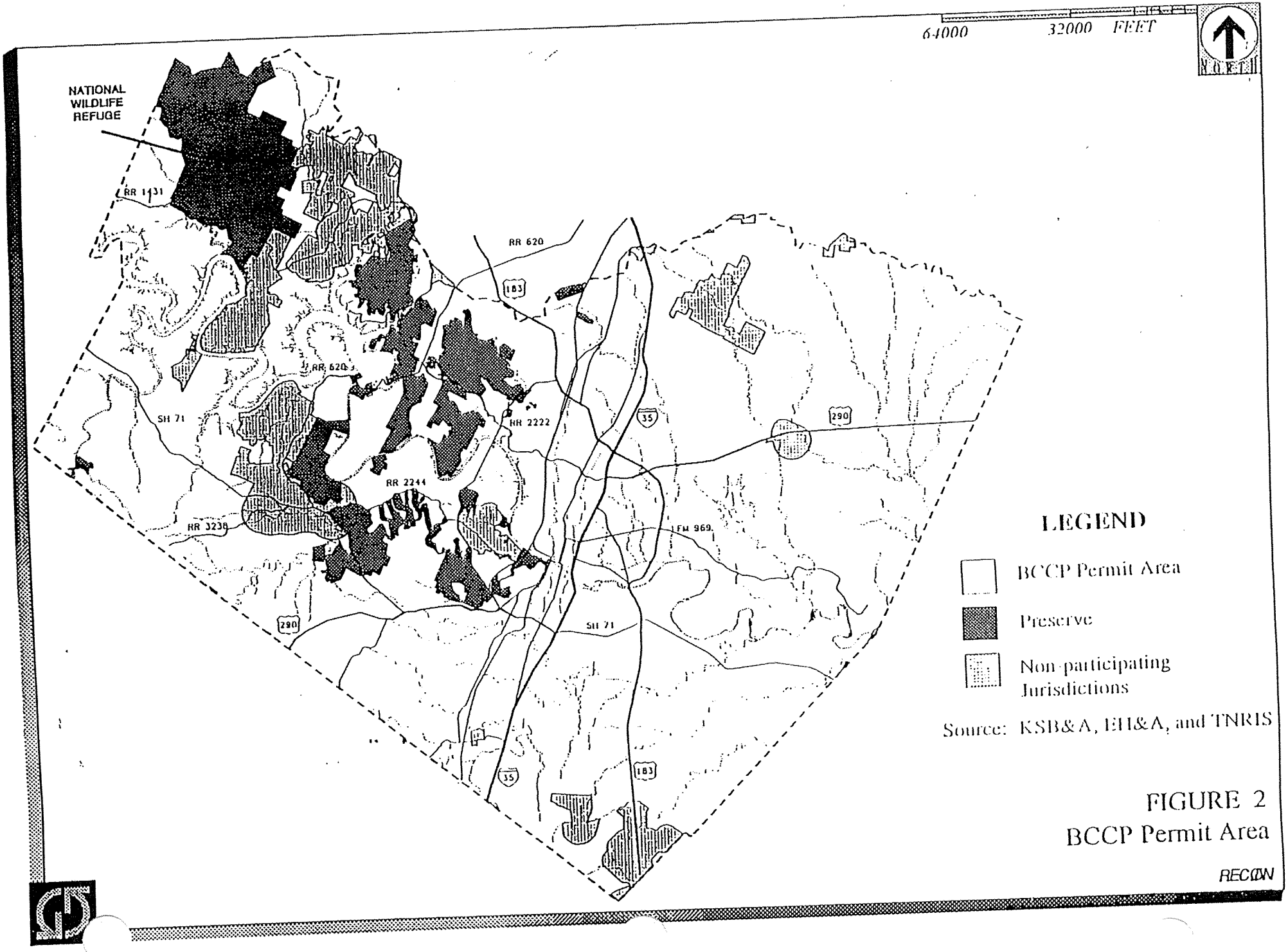


FIGURE 2
BCCP Permit Area

RECON

Figure 2 Back Side

C. Purpose of the Proposed Action

The purpose of the proposed action is to establish the conditions under which the BCCP proposed by the applicants will meet the requirements for a Permit under the ESA. The actions for which this permit is being sought are described in Section B above.

D. Need for the Proposed Action

Compliance with the ESA is necessary if otherwise lawful development of habitat areas on non-federal lands in the proposed permit area is to proceed. Without the proposed action, the applicants could face delays in meeting the housing and infrastructure needs of the local population in the proposed permit area. Furthermore, protection and conservation measures for the black-capped vireo, golden-cheeked warbler, and six karst invertebrates in the still relatively undisturbed areas of Travis County are needed immediately.

E. Scoping the Issues and Concerns

1. Public Involvement

In 1988, in response to the listing of the black-capped vireo and five species of karst-dwelling invertebrates as endangered species by the USFWS, the City of Austin, Travis County, the Lower Colorado River Authority, and the Texas Parks and Wildlife Department (the original applicants) and other entities formed an Executive Committee to initiate the development of the Balcones Canyonlands Conservation Plan and to secure a regional Permit under the Endangered Species Act.

The Executive Committee consisted of representatives from the business community, environmental organizations, city and county government, state agencies, and landowners.

Although all affected parties could not be directly represented on the Executive Committee, a concerted effort was made to bring those interests into discussions. Most of the substantive issues discussed and recommended in the BCCP were individually discussed and evaluated by the Executive Committee during monthly or biweekly public meetings which included time for public input as part of their agenda. A newsletter and meeting agenda distributed regularly to hundreds of interested parties provided

information pertinent to the development of the BCCP and to the meetings of the Executive Committee. Several workshops were held to allow the participation and direct input of governmental leaders in area cities and counties during the BCCP process and to provide input into the development of the BCCP management and planning guides.

2. The BCCP Draft Process

A Biological Advisory Team (BAT) conducted essential research on the species of concern and their habitat in the BCCP study area and acted as an advisory body to the Executive Committee and the plan consultants during plan development. The BAT contributed significantly to the BCCP process by identifying and recommending research needs, conducting critical research and monitoring on the species of concern, and reviewing and commenting on the elements of the plan throughout its development. One of the most significant contributions of the BAT was the preparation of the "Comprehensive Report of the Biological Advisory Team" (1990), which became a basic guide for much of the preserve planning and management included in the BCCP.

A number of working drafts of the BCCP were produced in 1990 and 1991 by the Executive Committee's consultants. In 1991, the mayor of Austin appointed a special task force to seek a reconciliation of outstanding concerns. The task force addressed legal/legislative issues, biology, landowner concerns, public relations, and economic impacts, and made numerous findings leading to the recommendations in the final plan.

In the fall of 1991, the Texas Parks and Wildlife Department (TPWD) issued a "Biological Assessment of the Balcones Canyonlands Conservation Plan," which included recommendations on how to improve the preserve design and acquisition strategy. The USFWS reviewed the biological basis of the BCCP in July 1992 and stated its findings and recommendations in a letter to the TPWD dated July 22, 1992. All of these recommendations were used to help prepare the section 10(a)(1)(B) application.

On February 28, 1992, the Executive Committee approved a resolution to accept a final draft of the BCCP and forwarded it to the BCCP participating entities to be used as the basic foundation of a regional BCCP for later submittal to the USFWS as one component of a Permit application. The resolution further recommended that these four entities review and amend the BCCP as needed in preparation for submitting it to USFWS. The TPWD was directed to assume the lead role to ensure submission of the plan.

In May and June of 1992, the TPWD convened a work group of staff members from the City of Austin, Travis County, and LCRA to review the Final Draft BCCP, to address comments and suggestions for the Final Draft from Executive Committee members, and

to make technical revisions to the Final Draft as needed in preparation for submitting it for review by each of the irrespective governing councils, commissions, and boards. In July 1992, the work group presented as the "Pre-Application Draft (Revision 1 of Final Draft, February 1992)" which received limited distribution to decision-makers of the four BCCP participating entities.

Based on a desire to move the BCCP planning process forward in a timely manner and to take advantage of a proposed Resolution Trust Corporation (RTC) bulk sale of properties within the proposed BCCP preserve system, the BCCP entities initiated an effort in August and September 1992 to reach agreement on many substantive details of the BCCP. The result of those efforts was the Interagency Plan for the BCCP, which comprised the core structure and detail of the BCCP. It was designed and written to serve as a decision-guiding document for consideration by the four governmental entities creating the BCCP. In late September 1992, the Interagency Plan was approved by the Austin City Council, the Travis County Commissioners Court, and the Board of Directors of the LCRA; these entities then became the primary participants in the application process.

A second Pre-Application Draft of the BCCP, based on the Interagency Plan, formed the basis for public review by City of Austin boards and commissions and the City Council as well as review by Travis County and LCRA.

Because of changes in funding provisions, the BCCP was revised and, in January 1995, this revised plan was presented to the City Council by City of Austin staff, and a Community Conservation Plan Working Group of 13 original members was formed to review and make recommendations for a final BCCP. That group made their recommendations to the Austin City Council and Travis County Commissioners Court in April 1995. The Council and Commissioners Court subsequently took action to move forward on the BCCP.

The City of Austin and Travis County executed an Interlocal Agreement (Appendix A) in August, 1995 that replaces and supersedes the Interagency Plan approved in September 1992. As the Coordinating Committee for the Plan, the City and County invited LCRA to enter into a separate Interlocal Agreement which addresses the designation and management of LCRA lands within the proposed preserve system, as well as providing a mechanism by which the LCRA and its wholesale customers may proceed with construction projects without the need to secure separate permits under the Endangered Species Act.

3. The Scoping Process

The process to identify the scope and contents of the draft Environmental Impact Statement (EIS) for the BCCP was formally initiated on August 2, 1990, with publication of the Notice of Intent (NOI) to prepare an EIS in the *Federal Register* (volume 55, number 149, pages 31453-31454). On September 19, 1990, the *Federal Register* published an amendment (volume 55, number 182, pages 38587-38588) to extend the public comment period until October 1, 1990. The initial public scoping meeting was held in Austin, Travis County, Texas, on August 16, 1990, with subsequent hearings on September 14 and 28, 1990.

Three public scoping meetings and 19 letters produced 124 comments. Table 1 contains a summary of these responses to the NOI, presented as a list of issues, with the corresponding number of comments received on each issue. Classifying comments into specific issues involves judgment and, therefore, the list does not reflect each comment exactly. The list is useful in identifying common issues of concern and the general level of concern for each issue.

Fifty percent of the comments addressed two issues: preserve design and equitable funding of the BCCP. Thirty-seven comments discussed preserve design in terms of adequate ecosystem and species protection, appropriate land acquisition strategies, and biologically sound preserve configuration. Twenty-five comments discussed equitable funding of the BCCP in terms of negative fiscal impacts on landowners, proportionate developer responsibility/fees for preserve development, and availability of various funding sources. Other major issues include inadequate public response time/opportunity, invasion of landowner rights, biologically sensitive preserve management, negative and positive economic impacts of the BCCP, and detrimental impacts of development on community resources.

In addition to the formal scoping period, the BCCP Executive Committee provided an opportunity for public comment at 11 of its meetings in 1990-1991:

February 23, 1990	August 24, 1990
March 30, 1990	November 9, 1990
April 27, 1990	December 5, 1990
June 1, 1990	January 11, 1991
June 29, 1990	February 1, 1991
July 27, 1990	

Comments from these meetings address the following topics: (a) basis of data used in BCCP development and functional basics of the BCCP; (b) extent and configuration of BCCP preserve; (c) economic impacts/benefits of the BCCP; (d) broad protection of

biological resources; (e) protection of private property rights; (f) BCCP financing concerns and federal government acquisition role; (g) biologically sensitive preserve management; (h) cumulative impacts of the permit action and of intermediate actions; (i) EIS evaluation and alternatives; and (j) impacts occurring on winter range of the golden-cheeked warbler.

Of 39 comments given, two issues of primary concern emerge: first, financing the BCCP (11 comments in addition to scoping responses), and second, managing the cumulative impacts of actions taken intermediate to and after issuance of the Permit (9 comments in addition to scoping responses). Other issues include extent and configuration of the BCCP preserve; BCCP data and functional basics; and protection of private property rights. Table 2 contains a summary of these comments, which were received in addition to the public scoping comments summarized in Table 1.

4. Definition of the Scope of the EIS

Issues and concerns raised through the public involvement process, the BCCP draft process, and the scoping process identified the overall scope of this EIS, in conjunction with an analysis of the potential for significant impacts on the affected environment. For the purposes of this environmental review, the scope of the proposed action includes the USFWS issuance of a permit as authorized under section 10(a)(1)(B) of the ESA, establishment of the proposed preserve system, and management of these preserves at a programmatic level. Because development of undeveloped lands in Travis County would likely occur whether the proposed action takes place, these activities are considered not connected to the proposed action and therefore are not within the scope of this document. Site specific land management plans will be prepared as units of the preserve system are acquired. Appropriate environmental analyses of land management activities will be conducted upon completion of these plans, as required.

After analyzing the potential for significant impacts to federally-listed species, the USFWS has determined that the following issues potentially could be significantly affected by the proposed action: biological resources; social and economic resources; land use; recreation; and water resources. All of these issues are analyzed in depth in this EIS. Impacts to air quality could occur as a result of preserve management activities, such as prescribed burning. Significant impacts would only occur if the proposed action degrades air quality below the existing quality. No impacts to resources as a result of noise are expected from the proposed project. Therefore, no further analysis of noise is included in this document.

TABLE 1
RESULTS FROM PUBLIC MEETINGS AND LETTERS

Issues	Number of Comments[1] Scoping	DEIS[2]
Preserve establishment Adequate ecosystem and species protection Appropriate land acquisition strategies Biologically sound preserve configuration	37	44
Preserve management	14	10
Economic Impacts Negative fiscal impacts on landowners Proportionate developer responsibility/fees Availability of funding sources	38	34
NEPA Documentation EIS Organization/content Dismissal of Alternatives Cumulative Impacts Public response time/opportunity	12	12
Private property rights	11	11
Detrimental impacts of development on community resources	7	1
USFWS Limitation/responsibility Refuge acquisition/management Certainty Golden-cheeked warbler listing opposition	4	20
Cultural resources sensitivity	2	0
Utilities/infrastructure	0	2
General support for plan/alternative	0	8
General opposition for plan/alternative	0	6

[1]Multiple comments contained in the same letter, or made by speaker during public hearings, fitting under issue category were tabulated as one comment. Each comment letter or speaker may have addressed multiple issues.
[2]Includes comments obtained during public hearing.

TABLE 2
RESULTS FROM BCCP EXECUTIVE COMMITTEE MEETINGS

Issues	Number of Comments
BCCP financing concerns and Federal role	11
Cumulative impacts of permit and intermediate acts	9
Extent and configuration of BCCP preserve	6
BCCP data and functional basics	4
Protection of private property rights	3
Broad protection of biological resources	2
Economic impacts/benefits of BCCP	1
Biologically sensitive preserve management	1
EIS: evaluation and alternatives	1
Impact on golden-cheeked warbler winter range	1
TOTAL	39

F. Other Required Actions

Before a decision can be made regarding the issuance of a Permit, the USFWS must comply with the consultation requirements stipulated in section 7 of the ESA. No other formal federal, state, or local permits or approvals are required prior to the decision by the USFWS. Further permits or approvals may be required for activities outside the scope of this document.

Chapter Two

II. Alternatives Including the Proposed Action

This chapter describes the major alternatives considered in drafting the BCCP and includes the information necessary to comply with the requirements of 50 Code of Federal Regulations 17.22(b)(1)(iii): "What alternative actions to such taking the applicant considered and the reasons such alternatives are not proposed to be utilized.". Section A outlines the process used to formulate the alternatives. Section B outlines alternatives to the proposed action that were considered and ultimately eliminated from further consideration. Section C presents a description of each alternative considered in detail, including the proposed action. The impacts and mitigation for each of these alternatives are compared in Section D. Finally, Section E identifies the alternative preferred by the USFWS.

A. Process Used to Formulate the Alternatives

The BCCP is an attempt at balancing endangered species protection and economic development by establishing preserves that protect substantial portions of the remaining habitat of the species of concern. In return, regulatory requirements of the ESA would be met for portions of Travis County (the permit area).

The proposed action, including mitigation measures and monitoring requirements, as well as several alternatives, were developed to meet project objectives, to answer issues raised by the public during the scoping process, to resolve USFWS concerns related to the issuance of a Permit, and to take advantage of existing opportunities to implement the plan (e.g. availability of land, public desire, etc.).

F. Other Required Actions

Before a decision can be made regarding the issuance of a Permit, the USFWS must comply with the consultation requirements stipulated in section 7 of the ESA. No other formal federal, state, or local permits or approvals are required prior to the decision by the USFWS. Further permits or approvals may be required for activities outside the scope of this document.

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B. Alternatives Eliminated from Further Consideration

During the development of the BCCP, several alternative proposals were considered. These alternatives received varying levels of consideration; however, only four were carried forward as being reasonable or feasible. The range of alternatives is limited by a rule of reason as provided for in the Council on Environmental Quality (CEQ) Regulations, section 1502.14. Following are those alternatives that were eliminated from detailed consideration.

1. USFWS Would Not Issue Any Section 10(a)(1)(B) Permits

Under this alternative, protection of existing occupied endangered species habitat would occur through enforcement of section 9 of the ESA (i.e., the taking prohibition) by the federal agencies, through development and implementation of recovery plans by the USFWS and other parties, and through independent conservation actions of other organizations. Enforcement of the taking prohibition would occur through field investigations, legal actions, and the section 7 consultation process triggered by the involvement of a federal agency (e.g., the U.S. Army Corps of Engineers proposes to authorize a pipeline crossing a stream or wetland in occupied endangered species habitat).

Occupied habitat and habitat necessary for the recovery of the species would be fully protected under the ESA. Unoccupied lands within the proposed action permit area that have a potential use as buffers or corridors would not be protected. This alternative poses potentially severe adverse long-term impacts on the viability of the species and the supporting ecosystems in the area. Those lands that contain any of the species of concern would be protected but would likely be relatively isolated from each other. A network of fragmented occupied habitat that is not comprehensively designed or managed to function as a system would reduce the likelihood that the species of concern would survive in the local area. Comprehensive species management programs, such as cowbird management and systematic monitoring of species populations, may not be undertaken.

Under this alternative, undeveloped land with habitat for endangered species would be relegated to a value based on its open space quality, not on any future development potential. Thus, the adverse impacts on the local economy would be severe.

Additionally, this alternative would not protect the listed species or work for their recovery.

For these reasons, this alternative was not considered for further discussion. The impacts of this alternative would be similar to the impacts associated with the no action alternative described below.

2. Mitigation Outside Travis County

Many alternatives for the preserve system were developed at various stages of the preserve design process. One alternative considered at an early stage in the plan development process was the acquisition of habitat (more than 150,000 acres) for the vireo and possibly the warbler in a location far removed from the adverse impacts of urbanization and at a purchase price less expensive than land in western Travis County. In the winter of 1989-90, the USFWS was requested to consider this alternative so that the plan could proceed with certainty as to the fate of this option's review by the USFWS. For biological reasons that necessitate the protection of representative populations to preserve genetic diversity of each of the species of concern, the USFWS declined to consider this alternative. The USFWS determined that the only acceptable preserve alternative would be the protection of significant blocks of the remaining suitable habitat in the Austin metropolitan area, if significant amounts of development across the western part of the study area were to be allowed under a regional Permit. Thus, genetic characteristics carried by the populations of species native to this area would be preserved in the gene pool and available for exchange to adjacent populations.

3. Alternative Study Area/Permit Area Boundaries

In recommending the geographical boundaries for implementation of the BCCP, the Executive Committee and plan consultant team considered the potential habitat of the species to be protected, the anticipated future activities that might result in incidental take of the species, the political boundaries of local governments, the legal powers of those local governments both within and outside their boundaries, and the number of participants and manageability of each geographical alternative considered. Two categories of boundaries were considered: the outer study area boundary and the boundaries of a somewhat smaller permit area that would be subject to habitat acquisition and management and to assessment of fees for habitat acquisition.

a. Alternative Study Area Boundaries

The selected outer boundaries of the initial BCCP study area included all of Travis County, southern Williamson County, southeastern Burnet County, and those portions of Hays and Bastrop counties within the five-mile extraterritorial jurisdiction (ETJ) of the City of Austin. Five additional specific alternatives were considered but eliminated from detailed analysis during the course of plan development. They included the following: expansion to include most or all of the counties covering the range of the species of concern; a study area similar to the selected alternative, but with a northern boundary extending only to Georgetown and along Highway 29; possible expansion of the study area northward to include more of Williamson County west of Georgetown; removal of the portion of Burnet County originally included in the study area; and expansion southward to include the Colorado River basin in northern Hays County.

b. Alternative Permit Area Boundaries

In considering permit area boundary alternatives, the objective was to have a clearly defined BCCP permit area for the establishment of habitat preserves, areas subject to assessments for preserve acquisition, and other areas on which take would be permitted under the protection of the regional Permit. Four alternatives were considered for the establishment of focused permit areas within the BCCP study area. Three were eliminated from further consideration and the fourth was selected as the proposed action alternative. The alternatives for permit area designation are discussed below.

The first alternative permit area considered but eliminated from further discussion included a permit area larger than the original BCCP study area (discussed above) to encompass more of the current range of the black-capped vireo, the golden-cheeked warbler, and the plants being studied. A permit area larger than the current study area would likely be difficult to manage administratively and financially. It would require defining a geographical area of at least six and possibly as many as thirty Texas counties. No existing regional institution covers the entirety of even the minimum six-county regional area, and limited community interest exists among the diverse rural and urban constituents of these larger regions. Therefore, an entity with authority to implement such a permit did not exist and a permit could not be issued.

Furthermore, the preponderance of other governmental units within the range of the warbler and vireo probably would not desire to undertake the large-scale land acquisition and preserve management which is considered essential for establishment of a regional conservation effort. The likely continuance and imminent threat of urbanization of habitat in metropolitan areas, such as Austin and San Antonio, and the need to provide absolute protection by acquisition of the most suitable remaining habitat, distinguish

metropolitan areas from other, more rural parts of the nesting range of these species. In all likelihood, there are only two or three urban areas with sufficient amounts of remaining contiguous habitat for the warbler and vireo to warrant consideration of an HCP that relies on acquisition of preserves. The areas include the Cities of Austin, San Antonio, and Canyon Lake-New Braunfels. The distance between these areas and their separation by ranching and other nonurban land uses would make a six- to thirty-county BCCP difficult, if not impossible, to accomplish.

The second alternative permit area considered but eliminated from further discussion defined the BCCP study area boundaries as the boundaries for the permit area. This area included Travis County and parts of Williamson, Hays, and Burnet counties. The findings of the BAT and the plan consultant team were that large portions of the study area contained no current habitat for the species that the BCCP proposes to protect. Specifically, the areas of Travis and Williamson counties east of Interstate Highway 35 (IH-35), while included in the study area, have proven to have essentially no documented habitat for the species under consideration. Landowners in these areas would benefit less directly from the plan than landowners in the area of extensive habitat. For these reasons, this geographic configuration was not recommended for the permit area.

A third alternative permit area considered but eliminated from further discussion was similar to the proposed action alternative but included the southern portion of Williamson County. This alternative was considered at the request of the City of Georgetown and was subsequently eliminated at the request of the Williamson County Commissioners Court.

4. Privatized Alternative

The primary purpose of the privatized alternative is to rely on the private sector (landowners, private citizens, and their enterprises) to accomplish the missions mandated by the ESA with the intention of increasing the size of the preserve area in a more cost-effective way. Under this alternative:

- The proposed preserve system would be enlarged by 15 percent, strengthening its ecological quality;
- Landowner participation and cooperative interaction with scientific specialists would increase;
- The BCCP preserve area would be upgraded; and

- Preserve acquisition and operational costs would be lowered.

The operations of the privatized alternative would be directed by a nonprofit public service foundation, the Balcones Canyonlands Foundation. The foundation and its trustees would be assisted by advisory teams. Conservation stewards such as the USFWS, Mexico's Pronatura. the Audubon Society, the Texas Parks and Wildlife Department, and the Nature Conservancy, as well as local resource managers, would be enlisted to help manage preserve land or auxiliary research sites.

The privatized alternative was eliminated from detailed discussion in the EIS because proponents of this alternative have not identified a specific management or administration group nor provided additional data or mapping to effectively analyze the environmental impacts of such an alternative. Specifically, a graphic exhibit of the alternative's proposed preserve identifying a number of auxiliary preserve sites has yet to be produced; funding levels of the plan have not been provided; and management strategies have not been developed.

C. Alternatives Considered Including the Proposed Action

1. Alternative 1: The No Action Alternative

The No Action Alternative assumes that no effort would be made to prepare a BCCP and that a regional Permit would not be pursued. This scenario also includes the possibility that the USFWS would deny the BCCP Permit application. In either case, the landowner whose property encompasses a species or habitat protected under the ESA would have three alternatives for complying with the take prohibition of section 9 of the ESA.

First, the landowner might elect not to develop, i.e., clear or build on the portion of the land supporting the species or modifies their project so that take would not occur (e.g. pollution prevention devices to remove water quality threat to karst invertebrates), leaving the species undisturbed and the habitat intact.

Second, under section 10(a)(1)(B) of the ESA, the landowner could develop the land if the USFWS approves an individual habitat conservation plan for the property and issues a Permit. To be approved, the HCP must provide assurance that the proposed incidental taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild. In addition, an HCP must demonstrate that the landowner will

minimize harm to the species or habitat and will mitigate such harm, to the greatest extent practicable.

And third, if the landowner is the federal government or if a private developer proposes a project involving federal government participation (e.g., through funding or a permit application), the involved federal agency could complete consultation with the USFWS under section 7 of the ESA. Examples of such actions would be funding provided by the Rural Electrification Administration to provide electricity to a rural home, or a permit from the Corps of Engineers to build a dam. During section 7 consultation, the federal agency must evaluate the project's environmental and biological impacts. The USFWS must concur that the project is not likely to jeopardize the continued existence of any endangered or threatened species in the wild. If a "no jeopardy" opinion is rendered, the ESA requires the federal agency to comply with any reasonable and prudent measures that the USFWS considers appropriate to minimize impacts. The measures recommended by the USFWS are then normally made part of the conditions of the permit or funding agreement with the landowner. This action would increase the cost to the federal agency and thus to the applicant and other taxpayers.

Because the burden of complying with the ESA shifts to individual landowners under the no action alternative, the probable result would be that many section 10(a)(1)(B) permits or, if applicable, section 7 consultations would be requested for actions by individual landowners.

Protection of existing occupied endangered species habitat would occur through enforcement of the taking prohibition (section 9 of the ESA) by the federal agencies, through development and implementation of recovery plans by the USFWS and others and through independent conservation actions of other organizations. Enforcement of the taking prohibition would occur through field investigations, legal actions, the Permit process for private development, and the section 7 consultation process triggered by the involvement of a federal agency.

a. Boundaries of the Permit Area

Although no formal boundary lines would be drawn, the area affected by the No Action Alternative would be the jurisdictional boundaries of Travis County. However, within Travis County these boundaries would have no significance for individual section 10(a)(1)(B) applications or section 7 consultations; the boundaries of concern for such actions would be those of the property owner or the proposed project. Nothing in this alternative requires or presupposes that project proponents seeking permits or consultations would coordinate their project boundaries with each other's projects or with existing preserve areas.

b. Management Organization

Because this alternative relies on the USFWS to evaluate individual permits and consultations in order to comply with the ESA, no overall management organization would exist. Each project owner would negotiate the terms and conditions of a Permit or section 7 consultation independently with the USFWS and would be responsible for implementing the agreed-upon mitigation accordingly. If on-site or off-site mitigation is required, a management entity would have to be determined for each site. If mitigation consists of paying a mitigation fee, no management is required.

To the extent that coordinated oversight of habitat management and species conservation occurs under this alternative, it will be through the efforts of the USFWS as it reviews various applications. The USFWS is charged with the statutory responsibility under section 10(a)(1)(B) to ensure the survival and recovery of a listed species in the wild. Under section 7, the USFWS is required to consider whether the proposed project poses a jeopardy to the continued survival of the listed species in the wild. Such decisions necessarily consider the presence or absence of habitat lands for the species. Once the USFWS issues a Permit or completes section 7 consultation, the applicant must comply with the terms and conditions of the permit or authorization involved. Enforcement of ESA is through the law enforcement arm of the USFWS.

c. Funding Sources

In the absence of a regional Permit, any proposed clearing or building within the habitat of an endangered species would require approval of an individual Permit application by the USFWS. Section 10(a)(1)(B) procedures make the project owner/applicant responsible for funding both the application process and any mitigation required by the USFWS.

Each Permit application requires the applicant to prepare and fund an HCP, describing in detail the proposed methods for minimizing and mitigating impacts to the species of concern and the means by which the HCP would be financed and implemented. The section 10(a)(1)(B) application process entails a financial commitment: first, for biological evaluation and other professional studies; second, for acquisition of appropriate off-site land to mitigate the impacts of incidental take occurring on-site; and third, for legal and administrative effort in preparing and submitting the HCP, complying with the requirements of National Environmental Policy Act (NEPA) procedures, consulting with the USFWS, responding to their review and recommendations, and awaiting the issuance of the permit.

The time and resources required to prepare an individual section 10(a)(1)(B) application and HCP are considerable. From initiation to final issuance of a permit, the time period ranges from a minimum of two months up to two years or even longer, depending on the complexity of the proposed take. In California, where approximately 50 HCPs are under development, the costs associated with preparation of the HCP, prior to submittal of the permit application, are typically in the range of $100,000 to $200,000 for individual projects. A Travis County economic study conducted in 1992 estimates the ESA compliance costs per project acre at $9,000, forecasted to grow at the compounded rate of 4 percent per year to reflect inflation (Gau and Jarrett 1992).

Each Permit application, whether for a public or private project, receives no guarantee that the permit will be granted after the applicant proceeds through a lengthy review process by the USFWS. Therefore, this risk becomes a factor in determining whether individual applicants will undertake the expense of preparing HCPs and Permit applications, which will affect the funding and, ultimately, the location of preserved habitat.

d. Incidental Take

The USFWS would evaluate the proposed incidental take for each project it reviews and would establish appropriate mitigation. However, it is impossible to predict with any degree of accuracy the sum of the incidental take that will be sought or approved in Travis County during the next 30 years. Uncertainty about the amount of incidental take is heightened because development might occur anywhere in Travis County in the absence of a regional Permit that directs development away from established preserve areas. Therefore, the primary restriction on incidental take would be the biological judgment of the USFWS applied on a case-by-case basis.

Incidental take in the BCCP permit area will be a function of the amount of land that is developed. Economic forecasters have estimated that approximately 31,550 acres of endangered species habitat will be developed as residential or commercial projects during the next 20 years if the BCCP is not implemented (Gau and Jarrett 1992). In contrast, the BCCP initially expected development of 61,236 acres of single-family projects with habitat over the same time span. However, subsequent analysis projected from 30,000 to 60,000 acres would be developed over the life of the permit.

Certainly there will be many cases in which no take is involved in a proposed development and a permit is not needed. Several hundred landowners in the proposed BCCP permit area have already been informed that they do not appear to have habitat or any likelihood of a take on their property. In many other cases, however, the USFWS will still require biological information on the site, including species surveys during the spring

nesting season if warbler or vireo habitat is involved, before concurring that no take of listed species will likely occur.

Based on the two estimates of future growth in Travis County, the following impacts might occur if habitat occupied by listed (threatened or endangered) species were developed. (Habitat acreage numbers are not available for species likely to be listed or for other species of concern.)

Listed Species. The BCCP estimates the acreages of habitat for the listed species located within Travis County as follows:

Black-capped vireo	2,000 acres
Golden-cheeked warbler	44,068 acres
Karst invertebrates	45,368 acres

Some of these habitats overlap and management concerns may be in conflict. For example, some potential (not occupied) black-capped vireo habitat is occupied by golden-cheeked warblers. The habitat will likely be considered only warbler habitat.

The No Action Alternative has the potential for piecemeal habitat preservation and resulting habitat fragmentation. It is reasonable to assume that habitat loss would be at least as great as described under the BCCP. Implementation of the proposed BCCP preserve system would allow the development of approximately 1,000 acres of black-capped vireo habitat, 71 percent of potential golden-cheeked warbler habitat, and 84.5 percent of potential karst invertebrate habitat.

Other Species of Concern. Approximately 87 species of concern occur or have the potential to occur within Travis County. A detailed listing of these species is included in Chapter 3, Section A of this EIS. In addition to the endangered and threatened species identified above, several more have a high potential for future listing. The BCCP identifies sites for these species as follows:

Bracted twistflower	Eleven sites; undetermined acreage
Canyon mock-orange	Five sites; undetermined acreage
Texabama croton	Numerous sites; undetermined acreage
Eurycea salamanders	
Barton Springs	One population at three sites
Jollyville Plateau	Thirteen localities; six protected within BCCP preserve
Texas	Undetermined number of localities; protected within BCCP preserve
Karst invertebrates	Numerous areas: undetermined occupied acreage

The No Action Alternative poses potentially severe adverse long-term impacts on the viability of the species and the supporting ecosystems in the area. Those lands that would be preserved as a result of successful individual Permit actions would likely be relatively isolated from each other, thereby reducing their habitat value as a result of habitat fragmentation. A network of fragmented potential habitat that is not comprehensively designed or managed to function as a system would reduce the likelihood that the species of concern would survive in the local area. In addition, comprehensive species management programs, such as cowbird management and systematic monitoring of species populations, would not be undertaken.

e. Preserve Design

Without a regional Permit, Travis County landowners would be individually responsible to apply for their own Permits or to participate in section 7 consultations. As a result, development would be carried out through multiple permits and consultation letters issued over time to various individual landowners. Under the No Action Alternative, habitat protection would be focused on any habitat necessary for the recovery of the species. Unoccupied habitat within the proposed action permit area that has a potential for buffers or corridors would be unlikely to be protected because multiple permits would result in piecemeal habitat and species preservation, rather than coordinated preservation according to a regional plan. The preserve design would be the result of the cumulative mitigation resulting from independent decisions on unrelated projects which may or may not result in large block preserve units.

2. Alternative 2: Regional Permit (Proposed Action)

Under Alternative 2, the proposed action will allow incidental take of the federally-listed endangered species—black-capped vireo, golden-cheeked warbler, Tooth Cave pseudoscorpion, Tooth Cave spider, Tooth Cave ground beetle, Kretschmarr Cave mold beetle, Bee Creek Cave harvestman, and Bone Cave harvestman—within the permit area mapped by the applicants in the BCCP (see Figure 2). The duration of the Permit is 30 years, subject to the terms of the revocation or amendment processes described in this document or 50 CFR 13.28. This alternative is proposed by the permit applicants while Alternative 3 is the preferred alternative of the USFWS.

This description contains the applicants habitat conservation plan and complies with the USFWS interpretation of the requirements of 50 CFR 17.22(b)(1)(i): "A complete description of the activity sought to be authorized."

a. Boundaries of the Permit Area

The area covered by the Permit encompasses all of Travis County with the exclusion of projects and activities of nonparticipating municipalities, that portion of the BCNWR located within Travis County, and the BCCP preserve area as defined in the BCCP (see Figure 2). The nonparticipating municipalities include Lakeway, Briarcliff, Lago Vista, Cedar Park, Leander, Jonestown, Pflugerville, Manor, San Leanna, Creedmoor, Mustang Ridge, Rollingwood, West Lake Hills, Bee Cave and the portions of Bastrop, Buda and Round Rock that lie within Travis County. However, individuals from these areas will be allowed to participate in the regional section 10(a) permit process. Additionally, the Southwest Travis County Water District is not a participant in this permit. The permit area covers approximately 561,034 acres (see Figure 2).

The BCNWR is a key element of the species recovery plans for the black-capped vireo and the golden-cheeked warbler. This proposed national wildlife refuge includes about 41,000 acres in Travis, Burnet and Williamson counties. Approximately 65 percent of this refuge will lie within the BCCP permit area; however, this refuge is not included in the BCCP Permit and no incidental take under this permit will be allowed within its boundaries.

b. Implementing Roles of BCCP Permit Holders and USFWS

The City of Austin and Travis County have jointly applied for a 30-year regional Permit to allow incidental take of habitat in Travis County outside of the identified preserves and the proposed Balcones Canyonlands National Wildlife Refuge. As potential permit holders, they have signed an Interlocal Agreement specifying the responsibilities of each agency, the conservation and mitigation measures to be implemented, the monitoring and research procedures, and any other permit conditions that may be required. The BCCP participants will create a Coordinating Committee to provide policy oversight for implementing the interagency agreement. The Coordinating Committee will oversee all aspects of conservation planning, coordination, and implementation, while certain individual participating governmental entities will carry out specific program elements of the BCCP.

Governmental and non-profit entities may participate in the BCCP as Managing Partners. Managing Partners agree to provide land management of designated preserve lands to support the public benefits of the preserve system. Managing Partners will enter into formal agreements with the Permit Holders and manage preserve lands for the public and environmental benefit. Managing Partners mitigate for their capital improvement projects through receiving credit for any of their land contributed to the preserve system (on a 1:1 acreage basis). The mitigation value for such lands is non-transferable.

City of Austin

As a Permit Holder and Managing Partner, the City of Austin will:

- Enter into formal agreements with other Permit Holders and Managing Partners to assure success of the Plan and to administer required programs including the acquisition and management of land to complete the preserves.
- Maintain preserves in Barton Creek and South Lake Austin macrosites (subunits of preserve system) and other City lands contributed to or acquired for preserves.
- Report on a timely basis to USFWS (to be specified in the terms of the permit) on the status of development approvals and assessments.

Travis County

As a Permit Holder and Managing Partner, Travis County will:

- Enter into formal agreements with other Permit Holders and Managing Partners to assure success of the Plan and administer required programs including the acquisition and management of land to complete the preserves.
- Maintain current County parkland identified as preserves and other County lands acquired for preserves.
- Report on a timely basis to USFWS (to be specified in the terms of the permit) on status of development approvals, assessments, and sales of Participation Certificates within the regional Permit boundary.

USFWS Department of the Interior

The USFWS is the federal agency responsible for monitoring compliance with the conditions of the regional Permit. This plan proposes that the USFWS do the following:

- Process individual Permit applications, including alternative review of mitigation requirements for landowners not wishing to utilize the simplified approach under the regional Permit.
- Purchase and maintain the Balcones Canyonlands National Wildlife Refuge.

- Implement a small lot owner expedited process.
- Enforce compliance of individual Permits outside the BCCP permit area. They are also responsible for ensuring that individuals obtain appropriate and sufficient mitigation as required under the Endangered Species Act.
- Administer the issuance and redemption of the Participation Certificates through a contractual arrangement with the permit holders. USFWS shall be obligated to sell Certificates meeting the conditions of the Permit.

Implementation of the BCCP will not relieve federal agencies of their responsibilities under the ESA; section 7 consultation could still be required for those projects that involve a federal action. Measures to minimize the effects of the take recommended as a result of such section 7 consultations shall be consistent with the mitigation proposed in the BCCP. If the actions proposed under Section 7 comply with the requirements under the BCCP, no additional mitigation would be needed.

c. Incidental Take

The potential take for each of the federally-listed wildlife species within the permit area that would occur with the issuance of the Permit and from implementation of the BCCP is summarized below. This section complies with the USFWS interpretation of the requirements of 50 CFR 17.22(b)(1)(ii): "The common and scientific names of the species sought to be covered by the permit, as well as the number, age, and sex of such species if known." The sex, age, and number of individuals will not be known because of the type of impacts anticipated and the use of habitats as an indicator of species.

Federally-listed (Threatened or Endangered) Species

Black-capped Vireo. The black-capped vireo (*Vireo atricapillus*) is a small, neotropical migratory passerine bird (9-10 grams and 11-12 centimeters) occurring in mixed deciduous/evergreen shrubland. Breeding vireos use shrubby growth of irregular height and distribution with spaces between the small thickets and clumps and with vegetative cover extending to ground level. Habitat losses are occurring through development, overbrowsing, and suppression and alteration of natural disturbance regimes. Cowbird nest parasitism has drastically reduced vireo reproduction in many areas. In Texas, there may be up to 1,500 breeding pairs of vireos still present in a number of localities. Travis County has an estimated population of fewer than 100 individual birds (USFWS 1991).

Of the approximately 250,000 acres in western Travis County, about 2,000 acres are occupied by the black-capped vireo. Eastern Travis County does not support any black-

capped vireo populations. Approximately 10 individual vireos will be subject to take through the loss of approximately 1,000 acres of habitat under the proposed BCCP permit. The Biological Resources sections of this EIS discuss in detail the acreages of occupied vireo habitat that are protected and unprotected in the permit area.

The minimum size of a viable black-capped vireo metapopulation is estimated to be at least 500 to 1,000 effectively breeding pairs. Although annual totals have been difficult to compare due to varying observer coverage, during the period of 1989-1992 there were approximately 28 to 59 pairs of vireos known in the BCCP permit area, with a general (and in some cases precipitous) decline indicated at most colonies. The BCCP preserve will exist in a regional context of habitat preserves. Although the BCCP encompasses occupied and potential vireo habitat, implementation of the BCCP alone may not support a viable metapopulation.

Golden-cheeked Warbler. The golden-cheeked warbler (*Dendroica chrysoparia*) is a small, neotropical migratory passerine bird (approximately 9-10 grams and 15 centimeters in length) that breeds only in the mixed evergreen-deciduous woodlands of central Texas and winters in the highland pine-oak woodlands of southern Mexico and northern Central America. Human activities have eliminated much warbler habitat within parts of the warbler's range that existed as recently as 30 years ago. Recent surveys suggest that the rate of habitat loss is accelerating as suburban developments spread into the largest remaining blocks of warbler habitat along the Balcones Escarpment, especially in the growth corridor from Austin to San Antonio (USFWS 1992b).

Travis County contains more potential consolidated golden-cheeked warbler habitat, as determined by satellite imagery, than any other Texas county (44,068 acres). Excluding the BCNWR acreage, approximately 37,839 acres of potential golden-cheeked warbler habitat exists in the BCCP permit area. However, golden-cheeked warbler habitat is more fragmented in the western portion of the permit area. A broad zone of habitat extends from north of Highway 71 in the Barton Springs watershed, northwestward along the Colorado River, and dissipates in the vicinity of the Burnet County line in the Post Oak Ridge area. The greatest concentration of high-quality, consolidated warbler habitat is found within the Cypress Creek, North Lake Austin, and Bull Creek macrosites, which are north of Lake Austin and just west of the City of Austin.

The BCCP estimates that up to 26,753 acres of potential golden-cheeked warbler habitat, as identified by satellite imagery, 71 percent of the warbler's habitat within the permit area, will be subject to loss upon issuance of the requested Permit. Based on a ratio of 15 to 30 pairs of warblers per 250 acres, this lost habitat could result in the incidental take of from 1,605 to 3,210 pairs of warblers.

The estimated minimum effective size of a viable golden-cheeked warbler population is at least 500 to 1,000 breeding pairs. Approximately 5,500 acres of identified warbler habitat exist in the 41,000-acre BCNWR acquisition area. At a density of 15 to 30 pairs per 250 acres, 5,500 acres of habitat could contain 330 to 660 pairs.

The recommended BCCP preserve acquisition area contains a total of 13,969 acres of potential warbler habitat. However, some of this total is probably unoccupied by the warbler, because of the effects of urbanization and patch size on habitat occupancy. As of July 1995, 5,489 acres of the total potential habitat has been acquired. Assuming that the BCCP acquires 66 percent of the as yet unacquired 8,480 acres, there would be about 11,086 acres of potential warbler habitat in the BCCP preserves. Thus, 665 to 1,330 pairs is an upper bound on the number of pairs of warblers in the preserves because of the probability that not all potential habitat will be occupied in the urbanizing west Travis County setting.

At least two golden-cheeked warbler populations should be protected within the Travis County area, because of the probability that a catastrophe such as wildfire could completely destroy one population. If some warbler populations are not viable over the long term, the amount of occupied habitat may eventually be greatly reduced from what is initially included in the preserves. At that point, the populations could be vulnerable to catastrophes. The recommendation to establish two warbler populations is not possible within the BCCP permit area alone. However, the BCNWR represents a significant warbler population in proximity to the BCCP permit area, yet sufficiently separated to provide substantial protection against catastrophes. Approximately 5,500 acres of identified warbler habitat exist in the 41,000-acre BCNWR acquisition area. This issue is discussed in more detail in the Biological Resources sections of this EIS.

Listed Karst Invertebrates. Six species of karst invertebrates located in Travis County are listed as endangered: Tooth Cave pseudoscorpion (*Tartarocreagris texana*), Tooth Cave spider (*Neoleptoneta myopica*), Tooth Cave ground beetle (*Rhadine persephone*), Kretschmarr Cave mold beetle (*Texamaurops reddelli*), Bee Creek Cave harvestman (*Texella reddelli*), and Bone Cave harvestman (*Texella reyesi*). These species inhabit karst topography characterized by numerous subterranean features, including caves, sinkholes, and fissures, formed by the dissolution of the bedrock in subsurface streams and passages.

Of the 45,368 acres of potential karst invertebrate habitat occurring in the permit area, approximately 38,349 acres will be unprotected by the proposed BCCP. Of the 39 federally-listed karst invertebrate localities currently known in the permit area, 35 localities will be protected by the BCCP or other Permits. This issue is discussed in more detail in the Biological Resources sections of this EIS. The following paragraphs

discuss each endangered arthropod in turn, stating what known localities the preserves will protect and how these localities will be protected.

TOOTH CAVE PSEUDOSCORPION. Both confirmed localities of this species (Amber and Tooth caves) and one probable locality (Kretschmarr Double Pit) will be protected in the Four Points cave cluster. Sufficient hydrogeological studies have been done in the Four Points cave cluster to permit acquisition to begin immediately. Two additional probable localities for this species (M.W.A. Cave and Stovepipe Cave) are recommended for protection or have been protected through preserve acquisition as a cave cluster preserve (more than two caves) or an individual cave preserve.

TOOTH CAVE SPIDER. This species is known from only Tooth and New Comanche Trail caves. Tooth Cave will be protected in the Four Points cave cluster. New Comanche Trail Cave lies within the boundaries of a proposed bird preserve. This species is believed to occur in Gallifer Cave and Stovepipe Cave. Gallifer Cave is in the Four Points Cave cluster. Stovepipe Cave is protected in an individual cave preserve.

TOOTH CAVE GROUND BEETLE. Four of the 13 known localities of this species (Kretschmarr, North Root, Root, and Tooth caves) and one probable locality (Gallifer Cave and Kretschmarr Double Pit) are in the Four Points cluster, where acquisition can begin immediately. Broken Arrow Cave and Rolling Rock Cave (known localities) and Spider Cave (probable locality) are in proposed bird areas. Stovepipe Cave is protected in an individual cave preserve. Japygid Cave, Jollyville Plateau Cave, Disbelievers Cave, and M.W.A. Cave will be protected in a cave cluster preserve. Puzzle Pits Cave is not recommended for protection.

KRETSCHMARR CAVE MOLD BEETLE. This species is known from only four localities, three of which will be protected in the Four Points cave cluster (Amber, Kretschmarr, and Tooth caves). Stovepipe Cave will be protected with an individual preserve. This species probably occurs in Japygid Cave and M.W.A. Cave which will be protected in an individual preserve.

BEE CREEK CAVE HARVESTMAN. This species is known from four localities and is probable in three other sites. Jester Estates Cave is near warbler habitat and some acreage has been set aside by the owner. Cave Y, a probable location, has been acquired by the City of Austin along with John Jest Cave and Little Bee Creek Cave. The BCCP will assist the owners of Bandit and Bee Creek caves in protecting these caves. The Bee Creek Cave harvestman probably also occurs in Kretschmarr Double Pit, which is recommended for acquisition as part of the Four Points cave cluster.

BONE CAVE HARVESTMAN. This is the most widely distributed of any of the endangered arthropods encompassed by the BCCP, being known from 19 caves and probable in two caves in the permit area. Three localities (Gallifer, Root, and Tooth caves) are in the Four Points cave cluster, which is proposed for acquisition. Three caves (Jollyville Plateau, M.W.A., and Elluvial) are in the Four Points area and will be protected within an individual preserve. An additional six caves are in the McNeil and Northwood clusters (Cold, Fossil Garden, Hole-in-the-Road, McNeil Bat, No Rent, and Weldon caves). Two caves are owned by the City of Austin and will be managed for protection of the karst community (Cotterell and Fossil caves). Three known localities are in preserve acquisition areas (Beard Ranch Cave, McDonald Cave, and New Comanche Trail Cave). Two probable localities are also recommended for protection: Spider Cave (acquisition) and Stovepipe Cave (individual preserve). Beer Bottle Cave, West Rim Cave and Millipede Cave are not recommended for protection.

Other Species of Concern

The proposed action of this EIS is the issuance of a Permit for the incidental take of eight federally-listed species found in Travis County. "Federally-listed" or "listed" indicates that a species has been the subject of a proposed and final rule or regulation published in the *Federal Register.*

"Proposed" endangered and threatened species are those species for which a proposed regulation has been published in the *Federal Register,* but not a final rule. "Candidate" species are taxa the USFWS is considering for listing as endangered or threatened species. These species, however, have yet to be the subject of a proposed rule. The USFWS periodically publishes a notice of review in the *Federal Register* listing the current candidate species. Collectively, the listed species and species with the potential to be listed are referred to as "species of concern."

Plants. Of the eight plant species considered for inclusion in the Permit, three were initially designated as primary species of concern. These included the bracted twistflower, Texas amorpha, and canyon mock-orange. Texas amorpha was dropped from the list of primary species of concern by the BCCP Executive Committee in January of 1990 because it was found to be locally common, but it is currently included in preserve planning as a secondary species of concern, subject to further review (BCCP Phase I application). A new variation of a rare species of croton was discovered both in the Post Oak Ridge area and at Fort Hood, near Killeen, Texas, during 1989. This species of croton (*Croton alabamensis*) was previously known from only 10 localities in Alabama. Ginzbarg, 1992, described the Texas populations as *Croton alabamensis* var.

texensis, and it was then elevated to Federal Category 2 review status (Ginzbarg 1992). These primary and potential primary species of concern are discussed in greater detail in Chapter 3 of this EIS.

Of the remaining three sensitive plant species found within the BCCP permit area, Correll's false dragon-head (*Physostegia correlli*) is subject to further review, because only a historical locality is known. Hellar's marbleseed (*Onosmodium helleri*) and Buckley tridens (*Tridens buckleyanus*) are not federally-listed C1, C2, threatened, or endangered plants.

BRACTED TWISTFLOWER. Nine sites for bracted twistflower have been reported from the BCCP permit area (McNeal 1989; Texas Natural Heritage Program (TNHP) data (1989); City of Austin files). Five of the locations are in the Bull Creek macrosite, three are in the West Austin macrosite, and one is in the Barton Creek macrosite. The recommended preserve system will protect the Bee Creek Nature Preserve and Mt. Bonnell populations, which are already owned by the City of Austin. The Barton Creek population is partly on City property, and the Barton Creek Greenbelt is recommended to be expanded to provide additional protection for this population. Four populations in the Bull Creek macrosite and a fifth population on Valburn Drive are not included for protection by the BCCP.

No further acquisitions are proposed to protect the remaining five to six populations. All are on private lands. At least three of these latter populations are directly threatened by development. The site on Valburn Drive may have been already lost. Protection of these three populations would require immediate additional land acquisitions, which are presently precluded by funding limitations.

Bracted twistflower is an annual and subject to year-to-year variation in population size and appearance of the population. Some populations may not be visible each year. Therefore, uncertainty exists regarding the exact distribution, abundance, and preservation needs of the species. So little is known about its biology that it is uncertain whether the proposed preserves are large enough to protect the species over the long term. Until further research is done on bracted twistflower life history, there will remain considerable uncertainty about the extinction probabilities of the bracted twistflower populations that the BCCP would protect.

CANYON MOCK-ORANGE. The BCCP will protect all of the known populations of the canyon mock-orange (*Philadelphus ernestii*) within the preserves. Some loss of presently unknown populations may occur. The West Bull Creek canyon mock-orange population is sufficiently large that year-to-year fluctuations in population size are unlikely to cause its extinction. It will be protected through acquisition and voluntary cooperative

management by landowners. The Bohl's Hollow canyon mock-orange population is in the South Lake Austin acquisition area and is in good warbler habitat. The third population, at Hamilton Pool Preserve, is already protected.

Eurycea *Salamanders*. Recent studies of central Texas *Eurycea* salamanders indicate that three species occur in the BCCP permit area: one at Barton Springs (the Barton Springs salamander), a second northeast of the Colorado River (the Jollyville salamander), and a third southwest of the Colorado River (the Texas salamander). Further study is pending and will determine the level of protection necessary for these salamanders.

Generally, the *Eurycea* salamanders occurring in the BCCP permit area are approximately two to four inches (five to ten centimeters) long. They have slender bodies with short, sturdy legs and narrowly finned tails which are about the same length as the body. The front feet have four toes and back feet have five toes. *Eurycea* salamanders possess long, well-developed external gills. While the Barton Springs salamander has poorly developed eyes, the Jollyville and Texas salamanders have well-developed eyes.

BARTON SPRINGS SALAMANDER. An acceptable method to evaluate incidental take of the Barton Springs salamander would be by measuring the degradation of water quality and/or decline in water quantity of their habitat. There are no thresholds established at this time in either of these parameters to identify the point at which this occurs; however, maintenance of at least current conditions is recommended. Only one population has been observed. Although it has been seen at three physically separated aquifer discharge points (Barton Springs proper, Eliza Springs, and Sunken Garden Springs), these locations have some degree of hydrological connection and should not be considered separate localities of occurrence. All three sites are within a public park and will be protected. Preserving a viable population would entail the immediate effort of minimizing loss of individuals in the observable population in the pool area and the more strategic effort of maintaining the water quality and quantity of the aquifer that supports the salamander.

JOLLYVILLE SALAMANDER. Seven of the 13 currently known localities for the Jollyville salamander are either within public parks (Balcones Community Park, Stillhouse Hollow, Wheless Spring, and Barrow Preserve), private preserves (Travis Audubon Sanctuary and three springs), or a recently acquired preserve (Bull Creek Spring). An additional three localities are proposed for protection, either through acquisition or easement, within the Bull Creek macrosite. Three known localities (Canyon Vista Springs, Kretschmarr Salamander Cave, and Anderson Mill Road Spring) and two historical localities (McDonald Well Spring and Jack Dies Ranch Spring) are outside of the proposed acquisition areas. Canyon Vista Springs and Kretschmarr Salamander Cave are within

conservation or drainage easements and are afforded some level of protection from direct physical impacts. Only Anderson Mill Road Spring and Jack Dies Ranch Spring are outside of the protection to be offered by the preserve system or conservation easements.

Potential habitat degradation due to development in the recharge zones of the springs harboring this salamander poses a degree of risk that is difficult to assess. A significant majority (75-100 percent) of the recharge zones for 9 of the 13 known localities are platted for development and 4 of these are substantially built out already. Any spring location where the recharge zone becomes substantially urbanized is at risk of local extirpation from water quality degradation or catastrophic pollution event due to the small size of recharge zones, proximity of salamander population to pollution source, and lack of substantial buffering ability in small-scale aquifer systems.

TEXAS SALAMANDER. Populations of the Texas salamander have recently been discovered in springs along the Pedernales River, south of the Colorado River. No population counts or estimates are available for these sites. At the present time, none of the known populations of the Texas salamander are proposed to be taken.

Invertebrates. Forty-seven species of concern are found in the BCCP permit area. Of these, 43 are representatives of the phylum Arthropoda, and the remaining 4 are snails from the phylum Mollusca. Six of the arthropods are federally-listed as endangered and included as primary species of concern in the BCCP (see discussion of the taxonomic notes of *Texella* in Chapter 3 of this EIS). The federally-listed invertebrate species of concern are discussed above.

Of the remaining invertebrate species, eleven arthropods will be among those subject to future review. These species all occur in only one to a few caves, or localities, and most are considered extremely local. Four aquatic molluscs that occur in Barton Springs will also be subject to further review.

Fish. Four species have the potential of occurring in the permit area but were not found. Two minnows, the smalleye and sharpnose shiners, of the genus *Notropis* were not found in the study area. These are probably bait bucket introductions and are endemic to the Brazos River. A third species, the Guadalupe bass (*Micropterus treculi*), may no longer exist as a distinct genetic entity in the study area due to hybridization with other black bass. The blue sucker (*Cycleptus elongatus*) is a federally-listed C2 species inhabiting the mainstem of the Colorado River. This species has faced serious declines in recent years due to the construction of large dams, which block natural migration routes used by the species (Lee et al. 1980).

Reptiles and Amphibians. Nine species of concern have the potential of occurring in the permit area, including the three *Eurycea* salamanders discussed above. The other six are reptiles including two turtles, two snakes, a lizard, and the American alligator. The Texas horned lizard (*Phrynosoma cornutum*), is a federally-designated C2 species that inhabits flat, open terrain with sparse vegetation in sandy, gravelly, or loamy soils. In Travis County, the Texas horned lizard is a very local resident of the oak-juniper uplands and old field areas. The horned lizards as a group have experienced sharp population declines throughout much of their range, although this phenomenon is not well understood.

The other species have substantial and important portions of their range occurring outside of or habitat for the species generally does not occur in the permit area.

Birds. Twenty-six avian species of concern have the potential to occur in the BCCP permit area. Of these, two federally-listed endangered species are included in the permit application: the golden-cheeked warbler and the black-capped vireo.

The piping plover (*Charadrius melodus*) is federally-listed as threatened and a rare migrant to the permit area. Most Texas specimens documented by Oberholser (1974) were from coastal counties from Chambers to Cameron. Only one fall sighting has been documented in Travis County. The arctic and American peregrine falcons (*Falco peregrinus tundrius* and *F. p. anatum*, respectively) are considered uncommon migrants to this area. Winter and summer sightings are documented for Travis County, but no nesting activity has been recorded (Oberholser 1974). The bald eagle (*Haliaeetus leucocephalus*) is federally-listed as threatened and considered a rare transient to western Travis County. Although the Texas Parks and Wildlife Department conducts annual bald eagle surveys throughout the state, no birds are documented in Travis County from these surveys; however, wintering birds are consistently observed on Lake Buchanan, the northernmost lake of the Highland Lakes system, which includes Lake Travis, and the possibility exists that individual birds may briefly occur within the BCCP permit area. Also, successful nesting has been documented in nearby Bastrop County since 1984.

The remaining 21 bird species of concern have no biologically significant habitat (i.e., breeding or wintering) in the BCCP area. These species are either vagrants or rare migrants.

Mammals. There are no mammal species of concern found in the proposed BCCP permit area.

d. Habitat Preserve

This section fulfills the requirements of 50 CFR 17.22)b)(1)(iii): "What steps the applicant will take to monitor, minimize, and mitigate such impacts . . . ."

The primary mitigation proposed in the BCCP for the incidental take of listed species (black-capped vireo, golden-cheeked warbler, and the six karst invertebrates) and their habitats focuses on the establishment of a preserve system. The proposed preserve would also include habitat for species with the potential to be listed (canyon mock-orange, Texabama croton, and 25 karst species of concern). In the event of the future listing of these species, the proposed BCCP preserve system would be considered by the USFWS to be adequate mitigation for any incidental take of these species, barring the discovery of significant, new biological information. Virtually all of the habitat for these species within the permit area is located in western Travis County. Therefore, within western Travis County, a preserve system is being recommended that will maximize preservation and minimize take.

For the purposes of establishing a preserve system in Travis County, the western portion of the county was divided into 10 primary units known as macrosites. Each macrosite ranges in size from 400 acres to greater than 9,000 acres. Figure 3 shows the location of each of the 10 macrosites. Each macrosite was assessed to determine its relative overall priority as high, medium, or low in terms of long-term viability and long-term habitat quality. Considerations taken into account in making this assessment included distribution and occurrence of species of concern; presence of potentially important karst-forming strata; presence, size, and configuration of potential preserve land; potential long-term viability of the potential preserve area; and quality of the habitat that could be expected with long-term management. Relative priority in terms of species-by-species habitat quality was not assessed. Details for each macrosite are included in Chapter 3, Section A of this EIS.

Preserve Acquisition Guidelines and Strategy

The recommended preserve system consists of a number of large, closely spaced preserve units, which include the major remaining blocks of habitat of the golden-cheeked warbler and black-capped vireo, and additional smaller preserve units for the other species of concern. The preserve system occurs within a broad interrupted band of habitat which extends from western Austin, northwestward toward the proposed Balcones Canyonlands National Wildlife Refuge. The primary gaps within the recommended preserve system are due to the occurrence of centers of existing urban development such as West Lake Hills, Lakeway, Lago Vista, Cedar Park, and Jonestown, as well as large blocks of real

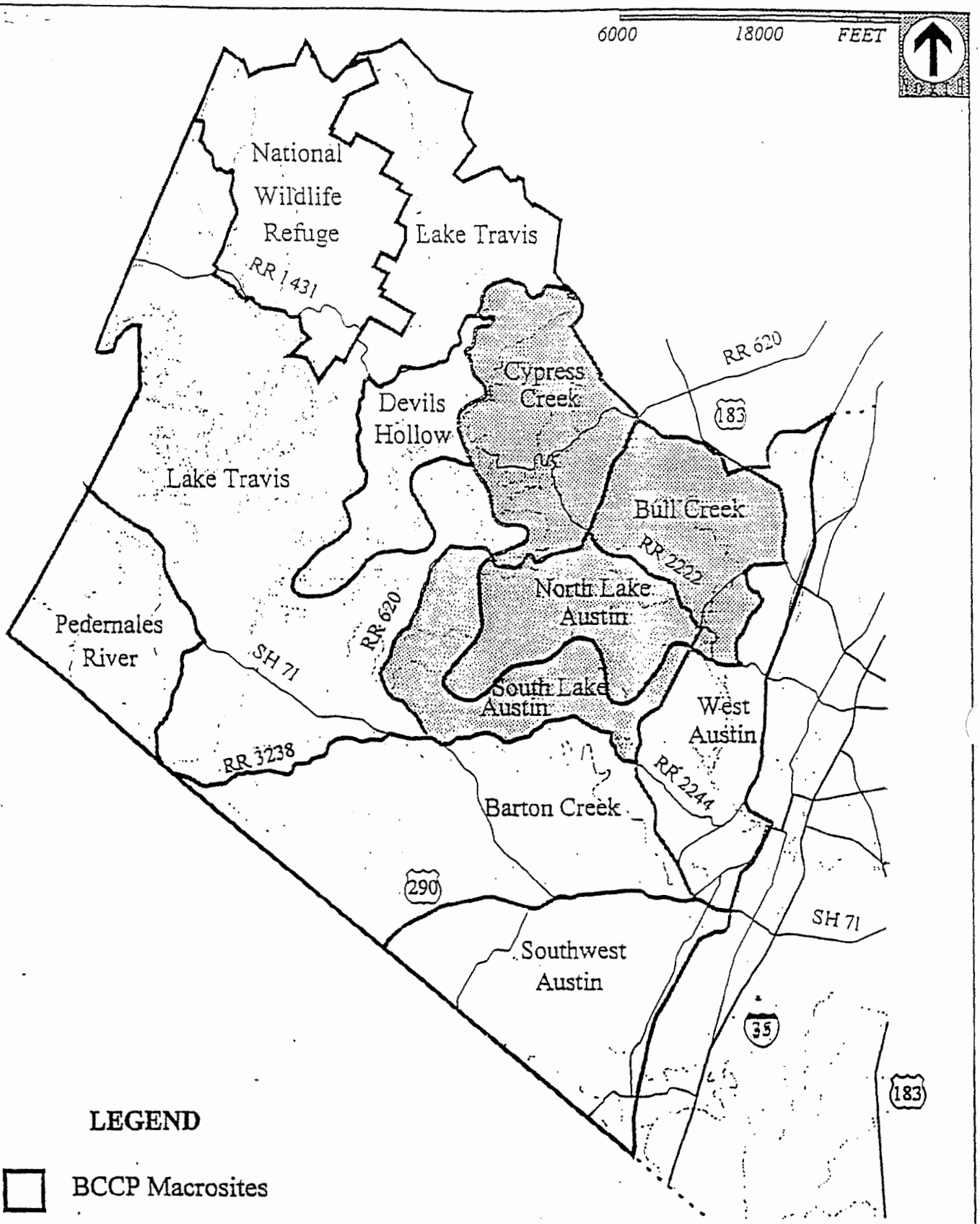
estate that were not considered appropriate or economically feasible as part of a preserve system owing to ongoing suburban development.

Key Macrosites. As much preserve acreage as possible should be located within the macrosites that are considered essential to the success of the BCCP: Cypress Creek, Bull Creek, South Lake Austin, and North Lake Austin macrosites (see Figure 3).

Three other preserve units, the West Austin, Pedernales, and Barton Creek macrosites, are also recommended as part of the BCCP preserve system; however, they are not considered as great a priority for the protection of warbler and vireo populations in the BCCP permit area. The configuration of each preserve unit, nonetheless, must meet or surpass the minimum preserve design standards, include the greatest amount of habitat for species of concern that is possible, and minimize the effects of habitat fragmentation and development inholdings to the greatest extent practicable, given existing biological and economic constraints.

The recommended preserve system is shown in Figure 4. It includes two categories of lands: (1) acres already acquired by the permit applicants; and (2) preserve acres available for future acquisition (of which there are more acres than are projected to be acquired). Table 3 summarizes the preserve acreage acquired and proposed for acquisition as of July, 1995. The minimum acceptable size of the final preserve system is 30,428 acres, of which 20,488 acres have already been acquired. The remaining 9,980 acres will be acquired through various methods of financing explained below under BCCP Funding. In order to reduce the effects of edge, fragmentation, and inholdings, the preserve acquisition strategy will block together the greatest amount of warbler habitat possible, including intervening undeveloped lands, while focusing on maintaining preserve contiguity. This strategy should be carried out particularly in the Cypress Creek, Bull Creek, and North Lake Austin macrosites, in areas of occupied warbler habitat.

Black-capped Vireo Habitat. A useful category of lands recognized here for the purposes of analyzing and planning the preserve design is that of "potential vireo management areas." These areas constitute a much larger area than occupied vireo habitat. They share a set of requisite geologic substrate, slope, and vegetational characteristics in common with actual occupied vireo habitat in the BCCP area. However, at present, they lack the appropriate specific vegetative composition, structure, or age to be attractive to vireos. Their value for planning purposes is that they constitute the acreage most likely to be successful for management into suitable vireo habitat. In discussions of the preserve design and the viability analysis of the proposed preserves, reference is made to acreages of these potential vireo management areas. These should not be confused with suitable or actual (e.g., extant, occupied) vireo habitat.



LEGEND

BCCP Macrosites

Key Macrosites

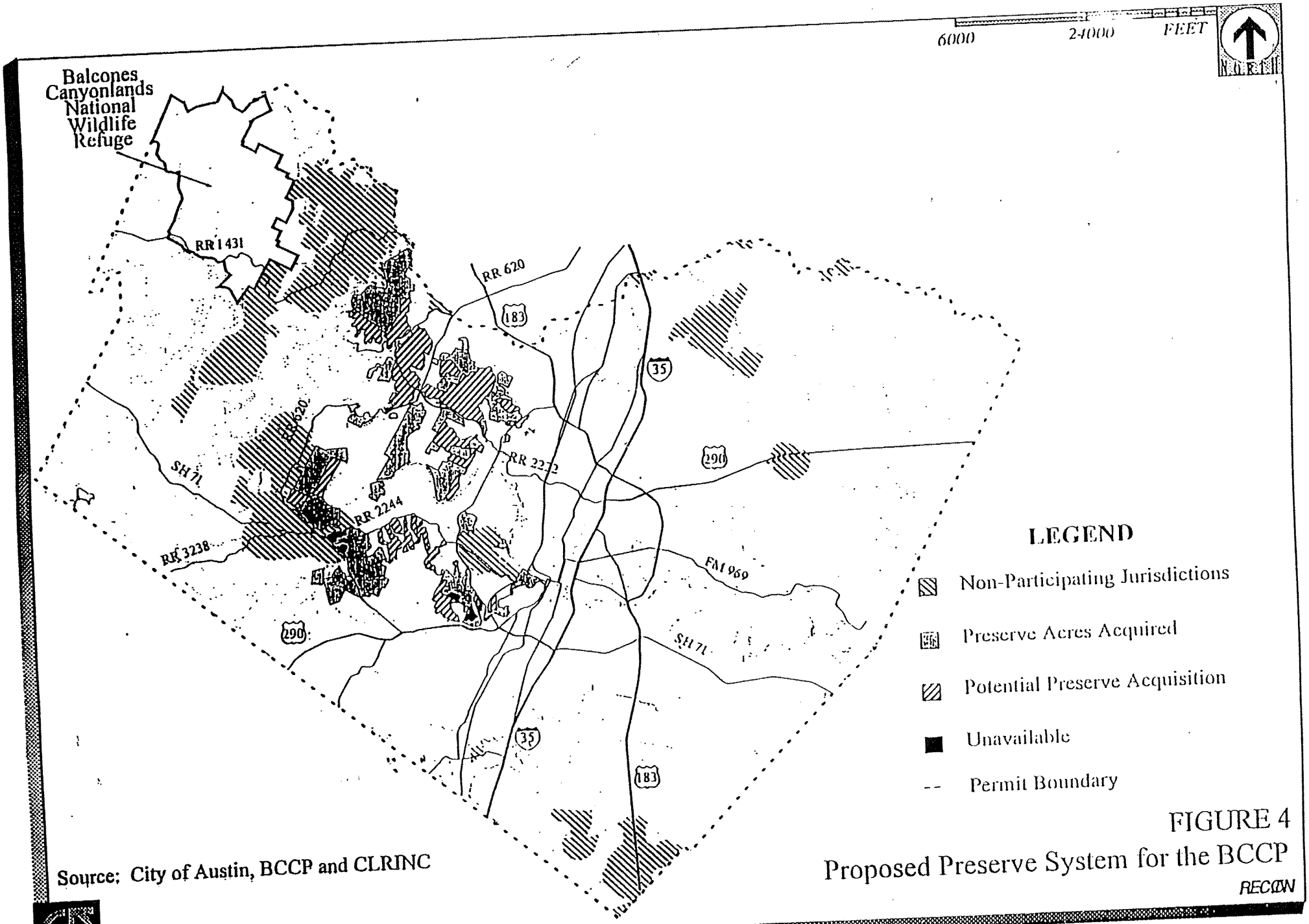
Source: KSB&A, EH&A and TNRIS

FIGURE 3

Macrosites in the BCCP Area

RECON

Figure 3 Back Side



Source: City of Austin, BCCP and CLRINC

FIGURE 4
Proposed Preserve System for the BCCP

RECON

Figure 4 Back Side

TABLE 3
PRESERVE ACREAGE SUMMARY
(July 1995)

Macrosite	City of Austin Owned: Previously Owned	City of Austin Owned: Newly Acquired	City of Austin Owned: Water & Wastewater	LCRA Owned	Travis County Owned	Other Institutional Owned	Acres Acquired to Date	Acres to be Acquired	Target Preserve Size
Bull Creek	291	1,312	138	0	0	870	2,611	3,027	5,638
Cypress Creek	0	494	0	2,688	64	940	4,172	3,939	8,111
South Lake Austin	115	3,011	0	0	0	147	3,273	1,218	4,491
North Lake Austin	950	2,647	0	0	0	160	3,757	1,360	5,117
Barton Creek	813	799	0	0	0	4,282	5,894	436	6,330
West Austin	215	0	40	0	227	0	482	0	482
Pedernales River	0	0	0	29	232	0	259	0	259
Lake Travis	0	0	0	0	0	0	0	0	0
Devil's Hollow	0	0	0	0	0	0	0	0	0
Total, all macrosites*	2,384	8,263	178	2,717	525	6,399	20,488	9,980	30,428

*See important notes below regarding subtotals and grand totals.

ASSUMPTIONS:

Assumes that certain lands derived from section 10(a)(1)(B) permits or section 7 consultations may be counted towards BCCP targeted preserve totals. This assumption holds true where preserve lands acquired through these other permits were selected out of the proposed BCCP preserve area subsequent to its initial publication (i.e., by KSB&A and EH&A in their BCCP "Final Draft, February 1992").

Assumes partial inclusion of selected City of Austin parklands and other tracts. See plan documents for details.

Assumes that mitigation acres needed to offset losses from future take of habitat in proposed infrastructure corridors adjacent to or through the preserves has been accounted for by new acquisitions and the proposed future acquisitions.

Golden-cheeked Warbler Habitat. The ideal outcome of preserve acquisition would be a preserve system that approximates or exceeds the recommended preserve system represented in Figure 4. Because this may not be possible, given economic constraints, acquisition to increase protection for the warbler should be a priority in the Bull Creek macrosite. Additional preserve acquisition will focus on securing warbler habitat in adjacent macrosites in a fashion that maintains proximity to the Bull Creek macrosite and contiguity of the overall preserve system to the greatest extent possible. Also, acquisition of warbler habitat in the Cypress Creek macrosite will be conducted to minimize the distance between warbler populations there and those secured in the BCNWR to the northwest. Specifically, acquisition of occupied habitat and associated land with restoration potential at the northwestern extent of the potential Cypress Creek preserve unit will be a priority.

Karst Preserves. The proposed karst preserves encompass important caves and cave clusters distributed over the extent of potential karst habitat, based on a strategy to protect the federally-listed cave invertebrates as well as a longer list of rare and local species that may be listed in the future. Karst preserves will be appropriate in size and configuration in order for the species in the preserve to be covered by the permit. To be considered "protected," a karst fauna area 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 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. 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 that can eliminate native ant populations. In absence of detailed hydrological studies for use in delineating cave preserve boundaries, land delineated by the contour interval representing the bottom of the cave should be targeted for preservation. Detailed information about caves recommended for protection under the BCCP may be found in Chapter 4, Section A of this EIS.

Minimum Preserve Design Specifications

Minimum preserve design specifications are intended to provide guidelines for the creation of a preserve system that would limit further fragmentation of habitat for the species of concern in the BCCP study area. The preserve design specifications are measurable characteristics such as size, width, ratio of the preserve edge to the overall

area, and distance between preserves. Each macrosite was assessed to determine its relative priority as high, medium, or low. Considerations in this assessment included the distribution and occurrence of species of concern; presence of potentially important karst habitat; presence, size, and configuration of potential preserve land; potential long-term viability of the potential preserve area; and quality of the habitat that could be expected with long-term management. The minimum specifications for each preserve unit are discussed in the Macrosite Descriptions section of Chapter 3.

The preserve design did not account for the possibility of significant in-holdings. If such in-holdings occur, the configuration of the preserve design may need to be adjusted.

Preserve Size. The minimum preserve design specifications are intended to be guidelines for the acquisition of a preserve system that limits further fragmentation of habitat for the species of concern in the BCCP permit area. Although the BAT recommended acquisition of 36,100 acres as mitigation for the incidental take of the species of concern, fiscal and economic analysis reduced that recommendation to 30,428 acres and acquisition or management of 35 caves for listed species and 27 caves for karst species of concern. In a letter, dated July 22, 1992, the USFWS concluded that the preserve system and conservation measures proposed by the BCCP offer adequate protection for the black-capped vireo, the six karst-dwelling invertebrates, and the canyon mock-orange. With regard to the golden-cheeked warbler, the USFWS indicated that the proposed 30,428 acres may not contain adequate warbler habitat. Their recommendations included additional acreage and preserve acquisition strategy. The USFWS agreed to acquire an additional 5,000 acres at the BCNWR to account for this additional requirement. From February to October, 1993, City of Austin and Travis County staff, in consultation with USFWS and members of BAT, set a target preserve size of 30,428 acres as the *minimum* necessary for issuance of a Permit. With regard to the *Eurycea* salamanders, the USFWS also concluded that a combination of measures to protect water quality in areas to be developed combined with strategic land acquisition as proposed in the BCCP may provide adequate protection for the three salamanders.

e. Land Management Plans and Guidelines

The BCCP preserve system is to be managed to permanently conserve and facilitate the recovery of the populations of target endangered species inhabiting western Travis County. This priority objective will govern preserve management activities to improve target species habitat, while protecting preserves against degradation caused by urbanization of surrounding lands and increased public demand for recreation usage within preserves.

The welfare of target species (species of concern) will be the overriding influence on all decisions regarding activities on preserve lands. Decisions about activities within preserves should be made cautiously, so as to meet biological objectives to protect and enhance target species and minimize risk of damage to their habitat.

Land Management Plans

Because individual tracts will have varying types of habitat and may offer varying degrees of public access, each preserve manager will be required to obtain Coordinating Committee Secretary approval of a land management plan for each tract within one year after issuance of the Permit, or within one year after land acquisition, whichever is later.

Tract Land Management Plans. A tract's Land Management Plan will describe both short-term and long-term management objectives and will serve as the primary document for reference and justification for all operations on that preserve. Each plan will identify major operational needs, issues, problems, and strategies, with sufficient information to serve as a complete guidance document. The plan should be written to cover a period of five years, but revisions to the Plan during these five years can be made as appropriate. Management plans for existing parks and preserves which will be included in the BCCP preserve system will need to conform with BCCP management guidelines, goals and policies. Management plans for contiguous or adjacent tracts will be reviewed for compatibility with one another. If such tracts are operated by different managing partners, the land management plans for each tract should be coordinated with the respective preserve managers.

Management Plans will contain the following information: (1) tract descriptions, (2) a management program, and (3) a system for monitoring management activities.

The Tract Descriptions section will provide the location of the tract with acreages and a graphical representation of the tract boundaries. It will also include descriptive information (historical, archeological, administrative, legal, financial, social, physical, ecological) and any other relevant information affecting the preserve to provide the basis for successful and efficient management of the preserve.

The Management Program section will identify any specific goals for the tract and will set priorities based on these goals. It will discuss all current and proposed future activities for the tract and give an analysis of the impact of these activities on the tract and on the endangered species and species of concern located on the tract. No activity will be allowed which results in a "take" of an endangered species, or which degrades or in any way harms the preserve. The management activities will be designed so that observation and monitoring efforts can be used to increase the efficiency of future

management activities. The Management Program will also identify the resources which will be needed for these activities.

When writing land management plans, consideration should be given to restoration and enhancement of endangered species habitat, including vegetation restoration and control of browsing pressure. Consideration should also be given to management and control of fire-ants, oak wilt, cowbirds, nest predators, and other problem species, if they occur on the tract. Each tract should have a fire management plan, including sufficient details to guide decisions on whether to suppress or allow natural fires and/or controlled burns. A multiple-use management approach may be appropriate on some tracts, whereby other uses may be compatible with the primary habitat protection and species management goals, as long as these uses either benefit or have no negative effects on the species of concern and do not significantly compete with other management efforts for personnel or financial resources. Examples of such uses which may be compatible under certain circumstances include recreation, environmental education, scientific uses, watershed protection, and non-endangered wildlife species management.

Since portions of each preserve component may be uninhabited, continually inhabited, or only seasonally inhabited by target species, specific access and management prescriptions may vary within each preserve and may include a variety of access options: year-round unrestricted access; year-round restricted access; or seasonally restricted access. Despite the potential for variability in individual management plans for preserve components, the design and implementation of land management plans must follow the guidelines set forth in the following section. In particular, habitat for target species in BCCP preserves should be managed for existing and expanding populations and for recolonization when local populations decline or are extirpated.

The Management Monitoring section will state what process will be used to monitor and evaluate the progress of management on the preserves and the effects of the management program on the species of concern and their habitats. This evaluation and monitoring will form the basis for management plan revisions.

Interim Land Management Responsibilities. Prior to the submittal to the Coordinating Committing Secretary of a land management plan for a specific tract, the preserve land will be managed per the Land Management Guidelines in the following section. Issues that each managing partner must address during this interim period are controlling access, protecting habitats, law enforcement, and fire control.

Annual Reports. Overall land management activities will be reviewed annually by the Coordinating Committee Secretary. To facilitate this process, preserve managers must submit annual reports to the Coordinating Committee Secretary, documenting compliance with individual land management plans and summarizing any monitoring efforts.

Managing partners shall provide reasonable access to preserve system lands to Coordinating Committee representatives and preserve land managers for inspection, monitoring, or other functions consistent with preserve system goals.

Land Management Guidelines

The following land management guidelines, a modification of TPWD's draft 1993 "Balcones Canyonlands Conservation Plan: Management Standards and Guidelines," attempt to achieve the biological objectives of the Permit by means of relatively standard land-use methodologies in coordination with monitoring programs (TPWD 1993). They generally adhere to the recommendations of the Biological Advisory Team's report (1990) with regard to suitable protective measures and compatible recreational uses of preserve lands. As other land management practices become available, they may be incorporated into the land management guidelines as appropriate.

Long-term monitoring of both the environmental quality of the preserve and the health of its populations of endangered species is a necessary part of this endeavor. This is primarily because the basic biology of most local federally-listed species is not sufficiently well understood to allow prediction of the impact on those species of specific management activities or use-intensity levels for public recreation. Consequently, management practices should be prescribed and monitored with an appropriate multi-species emphasis and overall ecosystem approach.

In accordance with the habitat preserve objectives, the following land management guidelines have been prepared for on-site vegetation management alternatives, management browsing pressure, control of public access, problem animal control, management of springs and associated watercourses, research and monitoring, and species-specific management.

Vegetation Management. Each of the following techniques may be used only in accordance with individual land management plans approved by the Coordinating Committee and USFWS.

PRESCRIBED FIRE. This practice is likely to be an effective tool for creation or maintenance of black-capped vireo habitat. Since uncontrolled hot fires have the capacity to destroy golden-cheeked warbler habitat and sensitive plant areas, use of prescribed burns should be undertaken with proper caution. The proposed location of firelanes should not increase internal woodland edges or fragment woodland communities in golden-cheeked warbler habitat. A firelane construction in occupied habitat should not be constructed during the season that migratory birds are in residence.

MECHANICAL CONTROL. If mowing of grassed areas is necessary (i.e., for control of fires), tired tractors with shredders are permitted. Brush-cutting with hand tools or with

push "brush-hogs" is also permitted. Heavy equipment techniques such as chaining, grubbing, root-plowing, blading, and hydro-axing have a greater potential for long-term soil erosion damage. Unless specifically authorized by the Coordinating Committee Secretary as part of a site-specific land management plan, including individual projects, the practice of vegetation removal by heavy equipment is prohibited.

CHEMICAL CONTROL. Applications of herbicides for specific purposes such as control of stands of exotic, invasive, or nuisance plants, and vegetation management at human access points may be permitted, upon review by the Coordinating Committee Secretary. All applications of chemical herbicides must be performed by licensed applicators. Documentation of all applications must be kept on file by the preserve manager and made available to the Coordinating Committee Secretary upon request.

GRAZING. Grazing, when approved by both the Coordinating Committee Secretary and the USFWS, may be employed on preserve lands as a limited vegetation management tool. Use of cattle grazing will be restricted to locales where other practices are difficult or impossible to use. If used, grazing intensity must not lead to degradation of water quality or increased cowbird populations. A cowbird trapping program should be considered whenever livestock grazing as a management practice is employed.

CONTROL OF OAK-WILT. Treatment of oak-wilt is encouraged and should follow oak-wilt guidelines as established by the Texas Forest Service's Oak Wilt Suppression Project, and must be approved by both the Coordinating Committee Secretary and the USFWS.

Management of Browsing Pressure. Browsers are herbivorous animals, such as native/feral/exotic deer, goats, and sheep, and sometimes cattle, which forage on understory plant growth (i.e., forbs and deciduous and evergreen trees and shrubs).

FENCED ENCLOSURES TO EXCLUDE BROWSERS. Sensitive plant sites may be protected from excessive plant loss through over-browsing by placement of effective fenced enclosures that keep browsing animals out.

BROWSING ANIMAL POPULATIONS. In some cases, over-browsing may suppress the abundance and distribution of tree and shrub species in plant communities preferred by golden-cheeked warblers and black-capped vireos. Management of browsing pressure within these vegetation communities is a complex task that may require perimeter fencing of preserve tracts (when possible), long-term monitoring, hunting programs and intensive control efforts of browsing-animal populations. Browsing-animal control efforts should be instituted when declines in important vegetation components have been documented at a particular site. Appropriate deer population objectives should be set after

consideration of deer and vegetation data from each site. Introduction of browsing animals must be approved by the USFWS.

(1) Indirect Control. Practices designed to increase deer populations are prohibited. This refers to manipulation of vegetation, placement and maintenance of mineral blocks, or establishment of supplemental animal feeding areas. Restrictions on placement of deer feeding stations may be relaxed if such stations are essential for approved population control programs.

(2) Direct Control. Approved deer control efforts should be designed to remove unnecessary animals as quickly, safely, and humanely as possible. Because most preserve tracts will become increasingly surrounded by suburban developments and experience higher recreational use, application of the latest non-lethal population control technologies may be considered.

Public Access. The preserve system may offer public access and recreational opportunities within the Austin and Travis County area where possible and manageable. Public access may be allowed where and when such access does not threaten the welfare of the target species of concern, which is the overriding goal of the preserve system, nor cause the degradation of soil, vegetation, or water resources.

The key to allowing public access which is non-threatening and non-damaging to preserve lands is implementation of effective management strategies to control such access and use. These management strategies must be specified in the individual land management plans and implemented by the preserve tract managers. Demonstration over time of effectively implemented management strategies on a preserve tract may justify increased public access opportunities. Demonstrated non-effectiveness or habitat degradation may justify less public access for a particular tract.

Effective management strategies can be any combination of, but are not limited to: fencing; signage; seasonally-restricted access; selected access to non-habitat areas of a tract only; careful trail and amenities location, design and relocation; ranger patrols and enforcement; or prohibited access to selected sensitive areas of a tract. Preserve managers are encouraged to consider creative plans that could increase public education and recreational opportunities while ensuring the welfare of the target species of concern.

Access to specific sites during specific seasons will be regulated to conserve target species and their associated communities. Creation of new roadways, trails, and cleared right-of-ways that open the canopies of woodland and shrubland communities, create additional impervious cover, or facilitate public use of preserve interiors or high quality sites occupied by target species should be discouraged. Access routes for preserve operation and maintenance can be rerouted if in an approved land management plan.

BASIC PRESERVE ACCESS CONTROL. Provisions for adequate fencing and signage on all preserve components shall be undertaken by BCCP land managers. As preserve lands are acquired, upgrading of fencing along perimeter boundaries should be undertaken as soon as practical to achieve human access control. Interior fencing, if appropriate, should be established as a lower priority. Posting of signs should also be undertaken as soon as practical to identify the land as a preserve component or to prevent unauthorized use. These signs should be placed along perimeter fences, gates and other access points, and long trails and roads.

INDIVIDUAL OR INDEPENDENT GROUP USE. It is necessary to avoid, detect, and reduce the types of localized detrimental impacts associated with human activity on the preserves. The following types of outdoor activities may be allowed if they do not conflict with conservation of target species as described in the individual preserve land management plans.

(1) Walking/Jogging/Hiking. Unsupervised group access should not be allowed within 100 meters of occupied songbird habitat during the breeding/nesting season, unless such access can be documented to show no apparent degradation to the welfare of the species of concern. Relatively extensive trail networks along existing right-of-ways may have to be maintained and monitored if this activity is approved. Creation of new trails will be addressed in preserve land management plans and should leave woodland canopies intact. In golden-cheeked warbler habitat, new trails should not fragment woodland interiors or allow human use intensity that threatens this species.

(2) Fishing. Fishing may be allowed where there is existing access to lake frontage that is not inhabited by target species. If allowed, fishing locations will be designated and fishing will not be allowed outside designated areas. Fishing in environmentally-sensitive springs and deeper spring runs, especially where rare salamander species are present, will be prohibited. Construction of new roads, access points and other support facilities for fishing must be approved in the preserve land management plans. Stocking of native or exotic species is prohibited unless specified in an approved land management plan.

(3) Swimming/Boating/Rafting/Tubing. Designated water access areas may be available at selected locations, based on approved land management plans. Bank access restrictions may be necessary to protect adjacent target species habitats.

(4) Bicycling. This activity is prohibited, except for selected sites designated as experimental sites, with appropriate monitoring for effects on the preserve and enforcement of all applicable rules. As part of an approved plan, creation of new trails should leave woodland canopies intact. In golden-cheeked warbler habitat,

trails cannot fragment woodland interiors or allow human use intensity that threatens this species. Any new bicycle trails should be designed to minimize erosion, and existing approved trails exhibiting significant erosion should be closed and repaired. Any existing trails not approved by the Coordinating Committee Secretary will be closed.

(5) Horseback Riding. This activity is prohibited, except for selected sites designated as experimental sites, with appropriate monitoring for effects on the preserve and enforcement of all applicable rules. Stables and similar facilities for the long-term (overnight or longer) maintenance of groups of horses shall not be constructed within any part of the preserve system. Contracts with private and commercial facilities on adjacent lands may be negotiated for use of tracts during the non-nesting and breeding season, provided that mitigation, clean-up, and cowbird trapping are implemented. However, horses may be used for appropriate preserve O&M activities.

(6) Off-Road Vehicle (ORV) Riding. This is prohibited as a recreational activity because it is not compatible with preserve management objectives and goals. Furthermore, appropriate barriers and enforcement penalties should be established to minimize trespass into preserve properties and subsequent damage by ORV users. However, these vehicles may be used for appropriate preserve O&M activities.

(7) Picnicking. This activity will require provision of trash receptacles and restroom facilities at staging areas located near the periphery of tracts. If preserve managers wish to allow this activity, preserve land management plans will designate picnic sites that can be easily maintained, to avoid creating focal centers for cowbird feeding activity.

(8) Camping. This activity is allowed only in designated areas and if related to O&M or guided educational activities. When allowed, camping should be restricted to minimum-impact camping. Preserve managers will designate suitable camping areas, and these minimum-impact camping areas should be rotated frequently to enable each site to recover from past use. Only closed-burning fires (such as camp stoves) will be allowed.

(9) Nature Viewing. Some examples of permitted nature viewing opportunities are designated viewing areas with blinds, trails with descriptive trail brochures, or guided tours. Educational tours should be encouraged but procedures for review of tour group activities will be established in land management plans, as discussed below. Attempts to artificially improve wildlife viewing by maintenance of supplemental feeding areas are prohibited.

(10) Spelunking. All access to caves must be restricted to permits issued by the appropriate land management agency, based on an appropriate program in the land management plan for the preservation of the caves' ecosystem.

(11) Rock Climbing. Rock climbing and related activities are prohibited, except for selected sites designated as experimental sites, with appropriate monitoring for effects on the preserve and enforcement of all applicable rules.

NON-COMMERCIAL GROUP USE. Non-commercial groups are nonprofit organizations, schools, and educational groups that request visitation to any tract for educational purposes or research. This use should be encouraged as long as it is monitored for possible habitat degradation and adverse impacts. These groups will be issued permits by the appropriate land management agency. The permit process should include user guidelines that protect target species and their respective habitats.

(1) Educational Uses. Educational use is defined as those activities whose primary intent is to present or interpret information about the ecology of the preserve sites or the target species. Daytime field trips by school groups are typical of this public-use category.

(2) Research Uses. Research use activities include those activities that will gather and interpret site-specific data in a way that improves understanding of the ecology of preserve species, plant communities, and aquatic and subterranean environments. Such activities will be coordinated through the appropriate preserve land manager.

COMMERCIAL USE

(1) Guided Tours. Commercial tour groups are allowed to schedule tours of preserve sites, subject to the provision that such groups abide by prevailing visitation guidelines for that tract. The preserve land manager remains responsible for appropriate land management, including public access, regardless of whether operations, including private group tours, are accomplished by the land manager or through contractual arrangement. Contractual arrangements for guided tours will be non-exclusive with regard to public access.

(2) Film-Making. Film production projects may be allowed subject to approval by the preserve manager and the Coordinating Committee Secretary. The film production process must not negatively impact the preserve environment.

Problem Animal Control. Certain animals have been identified as potential direct threats to target species, particularly cowbirds, fireants, and predators. Typical animal control efforts on preserve tracts will likely involve some combinations of the following

approaches: public education; manipulation of problem species habitat; selective relocation of individual problem animals; selective destruction of individual problem animals; and destruction of problem animals on a population level. Control efforts should use methods that emphasize maximum selectivity and effectiveness at minimum cost. Destruction of problem animals will be done in a humane manner.

DEER. White-tailed deer and other browsers can cause serious problems with over-browsing vegetation and need to be controlled. Such methods have been discussed previously in the guidelines found under the section entitled, "Management of Browsing Pressure."

COWBIRDS. Cowbirds, an open-field bird species, are well known for parasitism of songbird nests. It is suggested that management approaches to reduce cowbird populations include the following elements: restoration of native ground cover and dense woodlands for those areas previously disturbed; removal of any supplemental bird feeding stations; elimination of wildlife food plots; and minimization of livestock stables and holding pens. Although these approaches have been associated with reduced cowbird abundances, it may still be necessary to remove individual cowbird eggs from parasitized songbird nests.

Intensive cowbird trapping programs on an interim or permanent basis may be necessary at selected sites. Preserve managers may use trapping, singularly or in conjunction with other habitat manipulation strategies. Trapping should be designed to maximize the effect of cowbird control and minimize capture and loss of nontarget species.

PREDATORS. Bird nest predators may be controlled selectively. Some problem animals which predate songbird eggs and young are domestic and feral cats, raccoons, possums, snakes, jays, and skunks. Managers of preserves adjacent to residential areas should consider a live-trapping program to reduce the number of domestic and feral cats that may hunt songbirds on preserves.

FIRE ANTS. Fire ants may be controlled with an integrated Pest Management (IPM) program using approved chemicals and bait formulations. Fire ant control should be designed to minimize impact on native ants and other flora and fauna. Chemical control of exotic fire ant colonies may be necessary to avoid infestation of caves.

Management of Springs and Associated Watercourses. Flowing springs and spring runs downstream of spring discharges will be protected from destructive human impacts. This could include such suggested methods as informative markers, and/or fencing, in the case of damaged sites or sites occupied by species of concern. For remote springs, this objective may be achieved simply by designing preserve access points to keep such sensitive sites relatively inaccessible to human visitation.

The introduction of non-native fauna into spring runs is prohibited. Where necessary, spring runs may be fenced to exclude livestock from damaging streambanks and wetland vegetation.

Preserve managers should be aware that both water quality and spring discharge quantity are important to the viability of spring ecosystems. Monitoring should be conducted to design and evaluate management plans which prevent degradation of local groundwater resources or loss of aquatic habitats within preserves. This activity will be done subject to the availability of adequate funding.

Monitoring and Research for Endangered Species Viability. Long-term monitoring for endangered species viability will be the responsibility of every managing partner. In order to complete the required 30,428 acre preserve and karst acquisition in a timely fashion, it will be necessary for the Permit holders to direct BCCP fund resources initially towards purchase of the remaining acres needed. As the preserve system grows, additional funds will be needed for ongoing operation and maintenance of the preserves. While the importance of monitoring and research is evident, it is likely to remain a secondary priority for funding by the Permit holders.

Baseline monitoring studies for biological data will be gathered in each preserve tract in accordance with the Land Management Guidelines and the approved land management plans. Subsequent monitoring as identified in the respective land management plan will be implemented to determine the status of each listed endangered species. These activities will be initiated as soon as possible, contingent upon available funding.

The Coordinating Committee may elect to work with managing partners on the establishment of a joint monitoring effort to be prorated on the basis of the number of acres that each managing partner holds.

BIRD SPECIES. Baseline monitoring studies should concentrate on determining basic population levels on preserve lands, key population parameters, and other ecological parameters that may affect the target species. Demonstration or research projects could be undertaken to determine the effects of different management techniques or specific human impacts on songbird productivity and/or habitat use.

CAVE INVERTEBRATES. Baseline monitoring studies should concentrate on basic inventory and distribution assessments for listed and rare karst invertebrates. Considerable information is needed on cave microclimates and related factors important to invertebrate populations. The effects of different management techniques on subterranean environments and on target karst populations may require complex experimental research designs.

SPRING SYSTEMS. Springs and spring runs should be monitored for water quality and seasonal discharge, as well as for populations of aquatic target species. Effects of development within watershed recharge areas might also be considered as research topics for key springs on preserve lands.

PLANTS. Baseline monitoring studies should concentrate on plant distribution and abundance patterns within preserves, factors important to plant species survival, and the effects of different management techniques on those factors and on individual populations. Monitoring of browsing population levels as they relate to levels of hardwood regeneration, especially in golden-checked warbler and black-capped vireo habitat, should be an initial emphasis. Non-native and/or ornamental plant species that invade preserves should be removed where practicable to facilitate recovery of native species.

COMMUNITY-BASED APPROACHES. Monitoring of natural communities within the preserve system should be done at varying scales of detail. For example, randomly-distributed field plots, aerial photographs, and satellite imagery all may be appropriate techniques to assess ecological features. Monitoring of the natural communities will help to determine ecosystem-wide factors affecting the success of the preserve system. Population dynamics for hill-country woodland plants are not well known and will need to be studied in order to predict future woodland and forest distribution and composition.

Species-Specific Management Strategies

MANAGEMENT OF SONGBIRDS. Basic concerns of songbird management include: nest parasitism and predation; vegetation dynamics; habitat fragmentation and edge effects; and conflicts between black-capped vireo and golden-checked warbler habitat requisites and management for the two species when in close proximity.

Nest parasitism by cowbirds and browsing pressure should be controlled using a unified approach. In general, fragmentation of woodlands will decrease habitat quality for target nesting songbirds by increasing exposure of their nests to predation and parasitism. This appears to be true along even narrow trails and small, clear-cut openings within wooded environments. Consequently, vireo and warbler habitat ideally should be managed as large blocks with no interior artificial clearings or cleared right-of-ways. Where existing permanent easements, roads, and trails are already established, site-specific maintenance and monitoring activities should be used.

When the habitats (or potential habitats) of the two key endangered songbirds occupy the same general area, conflicts may arise over which environmental variables to emphasize in preserve land management strategies. Ultimately, resolution of this technical dilemma may require consultation with USFWS staff, species experts, practicing land managers,

and designated species' recover teams. General site characteristics, current vegetation cover type, land use history, terms and conditions of the application section 10(a) permit, and the location of individual tracts within the preserve system should be considered when determining management practices at any given location.

(1) Black-Capped Vireo Management. Public access into the vireo habitat during the breeding/nesting season should be strictly regulated. For the purposes of public access, that period is defined as from March 1 to September 1.

Use of prescribed fires and other types of permissible vegetation management techniques used to create or restore vireo habitat must be conducted outside of the breeding season. Selected vireo management sites need to be identified and then manipulated using previously-described vegetation control techniques designed to create favorable vireo habitat. Vireo population goals for a given area and associated numbers of managed vireo habitat areas should be established using current technical knowledge.

(2) Golden-Cheeked Warbler Management. Public access into warbler habitat during the breeding/nesting season should be strictly regulated. For the purposes of public access, that period is defined as from March 1 to September 1. To minimize impact from humans, preserve managers may rotate public access among various units of habitat, close trails and roads that enter occupied habitat, or allow only supervised access to trails that provide viewing of target species from the periphery of occupied habitat.

Disturbed woodland interior openings and other areas clear of a mature tree cover should be considered for habitat restoration activities. Overall emphasis for warbler habitat should be placed on native hardwood regeneration. This will likely require direct plantings of native hardwood species in combination with exclusion of browsing animals. In addition, localized thinning of young junipers may be required to reduce competition with hardwoods.

CAVE INVERTEBRATES. Public access to caves and larger karst openings should be strictly regulated using a permit system obtained from the appropriate preserve land manager. Fire ant control should be implemented where cave infestations occur that can threaten sensitive cave invertebrates. The surface drainage and sub-surface environment must be maintained in a natural condition with minimal ground and vegetation disturbances.

PLANT SPECIES. Preserve sites with observed stands of target plant species should be protected from human disturbance, browsing, and soil erosion, using fencing and other appropriate measures. Preserve land managers may choose to develop plots using rare

plant species grown through seed recovery from external populations threatened by destruction, or from other internal or external sources.

f. BCCP Funding

BCCP Financing Assumptions

This section fulfills the requirements of 50 CFR 17.22(b)(1)(iii): ". . . the funding that will be available to implement such steps. . . ."

A number of assumptions form the foundation of a financing plan for the acquisition of preserve land and future monies to operate and maintain the preserve system. These assumptions follow:

(1) As a permit holder, the City of Austin has contributed a total of $25.7 million for land acquisition in the BCCP preserve system ($22 million BCCP bond and $3.7 million for Barton Creek Wilderness Park), as well as 2,562 acres held by the City, as of September, 1992.

(2) Travis County will participate financially by allocating to the Plan an annual contribution in an amount equal to 100 percent of the operations and maintenance (O & M) portion of tax revenue from new construction on property for which Participation Certificates were purchased, or for which mitigation rights were purchased, which shall be used to complete land acquisition for the preserve system and to fund capital costs for its acquired and designated preserve system lands.

The Plan is to be based on the initial assumption that public entities will spend on the average of $5,500 per acre for future preserves acquisitions.

Participation levels are established separately for bird and karst species of concern, and in no case are they greater than one Certificate for one acre. The participation level for known golden-cheeked warbler and black-capped vireo habitat is the same 1:1 mitigation ratio and the same per Certificate fee requirement. The identification criteria for known habitat are indicated below.

Special provisions for certain single family residential lots and for agricultural practices (ranching and farming) have been developed. Exemption of fees or substantial fee reductions are provided in these special provisions. See "Special Provisions" below for specific details.

(3) The City of Austin and Travis County will fund administrative costs of the Plan from annual General Fund appropriations.

(4) The Plan will index the price of Participation Certificates to the base cost per acre of $5,500 reviewed on an annual basis, according to changes in applicable land values and meeting the goal of completing the preserve system in 20 years. Certificate fee increases for the Special Provision Certificates (e.g., routine ranching and farming practices and single-family residential lot categories) and Certificates for the mitigation of karst features are limited to no more than (proportional) increases assigned to the standard Certificates.

(5) The Plan assumes that annual operation and maintenance of $25 to $35 per acre will be covered by Permit Holders, Managing Partners, or through in-kind contributions to the preserve system management. The Plan does **not** include an endowment for this future expenditure beyond the 30-year term of the Permit.

(6) The Plan Permit Holders will continue to seek alternative sources of funds (beyond the proposed Participation Certificates) as well as alternative land acquisition methods in order to decrease the amount of time necessary to acquire the remaining preserves.

(7) One method of financing, to be evaluated for preserve acquisition, will be the issuance of Green Bonds and/or other innovative techniques. Green Bonds would be secured by the anticipated stream of mitigation payments under the Plan and paid back with interest on an available cashflow basis. Because Green Bonds would likely not be marketable in traditional bond markets, they could be target marketed to major charitable, conservation, and business organizations with a conservation mission or other strong interest in promoting the acquisition of habitat.

Participation Certificates

Landowners needing to comply with the Endangered Species Act may do so through the purchase from the Permit Holders of Participation Certificates based on a per-acre assessment and participation ratios for the amount of mitigation area. Certificates will be sold for use by those wishing to develop land in Travis County but only outside of the proposed preserves. The sale and use of Participation Certificates would be governed by the following conditions:

- Certificates will only apply to species covered by the regional Permit.

- Funds from Certificate sales would be used for BCCP preserve system land acquisition and BCCP preserve system needs, such as operation and maintenance.
- Participation Certificates will be non-refundable and are only usable for land outside of the preserve area covered under the regional Permit.
- No mitigation credit for development or Participation Certificates under this plan may be provided for property located outside the jurisdictional boundaries of the Permit Holders.
- Certificates will provide purchasers with mitigation credit necessary for development to occur under the BCCP for a specific tract. The Certificates remain with the tracts for which they are purchased when the land ownership changes. The Certificates cannot be applied to lands inside the BCCP preserve system boundaries without approval of the USFWS. As a condition of participating in the regional permit, the holders of Certificates will be required to record them in the Real Property Records of Travis County when they are used and to designate the specific tracts of land to which they apply.

Determination of Acreage for Calculation of Participation Certificates

Simplified Approach

General Guidelines. A Participation Certificate will cover all mitigation needed for the permit's species of concern for a specific tract proposed for development outside of the preserve area. Participation Certificate requirements will not accumulate when habitat for more than one species of concern is present; however, the calculation that produces the highest level of participation, as described below, will be used.

The Permit Holder(s) will provide determinations of mitigation area by applying a simplified approach approved by the USFWS and will sell Participation Certificates to landowners and developers within its jurisdiction based on this approach. The per acre cost of these Certificates will be periodically evaluated and adjusted to reflect cost of acquisition or management.

The entire parcel for which development approvals are sought will be used as the basis for the simplified approach to calculate total Certificate needs. The extent of overlap with the habitat zones as described below will determine the Participation Certificate level. The calculation of the extent of each habitat zone on a parcel (see below), will be rounded up to the nearest whole acre. The following participation categories developed by the Permit Holders as part of the BCCP outline various options for a landowner or developer to participate in the BCCP. These categories form the basis of the funding

mechanism for the Permit Holders' conservation plan, and may be further developed by the Permit Holders to ensure that the goals of the BCCP are being met. Amendments to the participation categories may be made without amending the permit, provided that such amendments are approved by the Coordinating Committee.

Warbler Habitat. Warbler habitat will be determined by the Permit Holders from maps and aerial photos accompanying the "Golden-cheeked Warbler Habitat Analysis" prepared for the USFWS by DLS Associates (June 1993) as updated periodically. Other biological sources may be used in the future as they become available.

Total cost for a Participation Certificate will be based on the total acreage in each habitat zone within the tract. The identification criteria for known habitat used by the Permit Holders will be based on DLS Associates map zones using a simplified approach as follows:

- In Zone 1 ("Habitat known to support warblers"), participation is currently $5,500 per acre.
- In Zone 2 ("Undetermined"), participation is currently $2,750 per acre.
- In Zone 3 ("Does not support warblers"), no participation is necessary.

Vireo Habitat. The identification criteria for known habitat will be provided by the Permit Holders based on a simplified approach as follows:

- Vireo habitat will be determined by Permit Holders based on the most up-to-date survey information provided by USFWS.

Karst Habitat. Karst habitat will be determined from "Geological Controls on Cave Development and the Distribution of Cave Fauna in the Austin, Texas, Region," prepared for USFWS by George Veni & Associates (April 1991), as updated periodically.

Calculation of the participation required for karst habitat mitigation will be provided by the Permit Holders based on the George Veni maps using a simplified approach as follows:

- In Zone 1 ("Areas known to contain endangered cave species") and Zone 2 ("Areas that probably contain endangered cave species"), participation is currently $55 per acre of Zone 1 or 2 karst habitat.
- In Zone 3 and 4 ("Areas that do not or probably do not contain endangered caves species"), no participation is necessary.

Participation Certificates for Karst habitat mitigation are payable in increments of one acre.

Special Provisions Certificate

The intent of the BCCP is to pay for the acquisition of the regional habitat with the private sector funding component being derived primarily from the sale of Participation Certificates purchased voluntarily by developers who might expect to benefit directly from participation. However, it is also the intent of the BCCP to minimize or eliminate the financial burden of the following types of private landowners outside the preserve area: (1) ranchers and farmers in pursuit of legitimate and standard agricultural practices; (2) builders of single-family home residences on individual lots/tracts/parcels in existence prior to May 4, 1990; and (3) small landowners (100 acres or less) who wish to do very low density residential development (one single-family home residence per 15 acres and up).

Consequently, after issuance of the regional Permit, a Special Provisions Certificate for construction of single-family dwellings on existing lots and for ranchers and farmers will be available through the Permit Holder(s) for $1,500.

Single-Family Residential Lot Provision

This provision applies to two categories of landowners:

- One single-family unit constructed on a legal lot, legal tract, or a legally recorded single parcel in Travis County if the lot/tract/parcel was in existence on or before May 4, 1990; or
- A tract of 100 acres or less which existed as a legal tract on or before May 4, 1990, developing low density single-family home residences of not more than one home per 15 acres.

In either case, the following five tests must be met:

(1) The lot/tract/parcel must be located outside the designated preserve boundaries.

(2) Unless special circumstances can be shown by the applicant, the area of disturbance for direct impact would be limited to 0.75 acre (approximately 32,670 square feet), including the house, driveway, utility access lines, septic field, and lawn area.

(3) Lot holders may participate by purchase of a Special Provisions Certificate for $1,500 which would be used for BCCP preserve system land acquisition and BCCP preserve system needs.

(4) For any lot/tract/parcel, three acres or larger, a habitat determination of the area to be cleared will be made and is currently proposed to be recorded at the Real Property Records of Travis County. This determination will be based on habitat zones within the tract as outlined in the simplified version.

(5) If the cleared area becomes part of a subdivision process in the future, the landowner may participate in the Plan for the subdivision by paying the balance per acre (i.e., the total fee level at the time of development minus the Special Provision Certificate amount previously paid).

AGRICULTURAL PROVISION (RANCHING AND FARMING)

- The BCCP mitigates for incidental "take" resulting from any ongoing ranching and farming practice (such as fence and pasture maintenance and stock tank construction) which occurs in Travis County (but not inside the designated preserve areas). Therefore, such activities are permissible under the plan, and they do not require the acqusition of Participation Certificates.

- However, if a rancher or farmer intends to clear an area for new structures (i.e., barns, paddocks, etc.), then he/she may purchase a Participation Certificate at a cost of $1,500 per acre of clearance. At the time, a habitat determination of the area to be cleared will be made and is currently proposed to be recorded at the Real Property Records of Travis County. If the cleared area becomes part of a subdivision process in the future, the landowner may participate in the Plan for the subdivision by paying the balance per acre (i.e., the total fee level at the time of development minus the Special Provision fee previously paid).

Alternative Approach

Any landowner or developer not wishing to use the simplified approach may petition the USFWS to determine the development's actual incidental "take" (both direct and indirect) expressed in terms of habitat acreage and associated operation and maintenance cost.

- In all such cases, the determination of the USFWS will take precedence over any determinations from the simplified approach described herein. Accordingly, determinations by the USFWS conveyed in a valid Section 9 letter indicating

USFWS determination of "no effect" take precedence over determinations under the simplified approach.

- A landowner seeking an individual permit who chooses to pay mitigation acreage costs via the regional Participation Certificate structure will still retain the obligation of accomplishing other studies and requirements assessed through the individual review.

- Standard long-term operation and maintenance costs which might be assessed through, or may be derived from the individual review by USFWS may be waived by the Permit Holder(s) if landowners choose to be covered under the Permit.

Land Acquisition Procedure

Funds from Participation Certificate sales will be used for BCCP preserve system land acquisition and BCCP preserve system operation and maintenance. Because up to 20 years could pass before the lands for the entire preserve system can be purchased, a variety of options to promote habitat protection on private land should be actively used to enhance the preservation of large portions of remaining acreage between now and the time of purchase. These options include:

- preferential assessments;
- multi-year management agreements, leases, and mutual covenants;
- earnest money options;
- first right of refusal contracts;
- purchase of development rights and undivided interests;
- conservation and open space easements; and
- fee simple purchase through installments or with leaseback provisions.

Use of these tools could lower final acquisition costs. As funding is available, negotiations with private landowners should be initiated so that the alternative tools that are available can begin to be used as soon as practical.

Condemnation proceedings for the public health, safety, and welfare may be used to acquire land for the preserves, but only as a last resort and only under the following conditions:

- Not acquiring the land would endanger the Permit, or
- Not acquiring the land would endanger the biological integrity of the preserves, and
- There is no reasonable alternative to the involuntary condemnation proceedings, and
- There is a reasonable expectation that without involuntary condemnation proceedings the habitat will be destroyed.

Total Cost of BCCP

The level of funding required to implement the conservation and mitigation measures, including inflation, is estimated at $159.9 million. The land acquisition and financing strategy utilizing bond financing and public and private sector funds is summarized in Table 4.

The Coordinating Committee will review the financial revenue trends of the BCCP annually and recommend Participation Certificate adjustments in order to assure full acquisition of the preserve system.

g. Plan Amendment Procedures

Circumstances may arise which necessitate amendments to the Permit and/or BCCP. This section complies with the USFWS interpretation of the requirements of 50 CFR 17.22(b)(1)(iii): ". . ., and the procedures to be used to deal with unforeseen circumstances."

Substantive amendments include those actions or decisions which affect the scope of mitigation or method of implementation of the BCCP or Permit and require the consent of the USFWS. Major amendments would involve changes in amount of incidental take allowed under the permit, changes in Permit Holders, or changes in the species covered under the permit. Examples of major amendments include the following:

- Additional or withdrawal of parties to the permit;
- Changes in geographic boundaries of the permit area;

TABLE 4
FINANCING SUMMARY

REQUIREMENTS:	
Land Acquisition (Public Sector)	
City of Austin	$ 25,700,000
Travis County	30,000,000
City of Austin Debt Service Interest	20,992,372
Land Acquisition (Private Sector)	38,754,990
Preserve System Operations & Maintenance	44,481,639
TOTAL REQUIREMENTS	**$ 159,929,001**
SOURCE OF FUNDS:	
Property Tax Revenue	$ 46,692,372
Travis County Tax Benefit Funding *	30,000,000
Land Acquisition (Private Participation) *	38,754,990
Austin Drainage Utility (Land Management)	12,483,103
Austin General Fund Support	4,418,900
Travis County General Fund Support	4,009,000
LCRA Land Management	3,436,438
Travis County Land Management*	9,665,357
Austin Water & Wastewater Utility (Land Management)	321,416
General In-Kind Services (Land Management)	8,252,496
Texas Nature Conservancy (Uplands/Sweetwater)	1,247,000
Participation Certificate Contingency ($100 per Acre)	573,900
Interest Income	1,486,235
Sub-Total Source of Funds	$ 161,341,207
Less: Working Capital Balance	(358)
Contingency Reserve (Participation Fees)	(1,411,848)
TOTAL SOURCES OF FUNDS	**$ 159,929,001**

*Assumes collection of $5,500 per acre of habitat mitigated on 5,739 acres, in conjunction with Travis County Tax Benefit funding of $30,000,000 for land acquisition, land improvements, and karst acquisition, would complete the preserve system by the end of FY 2013 and fund a contingency reserve of $1,411,848. It should be noted that $7,764,390 of private participation is related to the estimated value of the 4,041-acre Uplands and Sweetwater Tracts.

- Changes in the composition or powers of the BCCP Coordinating Committee;
- Additions to or deletions from the list of species of concern protected under the plan;
- Changes in state or local legislation which diminish the authority of parties to the Permit to carry out the terms and conditions of the Permit;
- Changes in the habitat conservation, monitoring, compliance, or enforcement programs which are likely to increase the level of incidental take of a species of concern; and,
- Renewal of the Permit beyond the initial 30-year term.

Minor amendments involve routine or inconsequential administrative revisions or changes to the operation and management programs and which do not diminish the level or means of mitigation. Such minor amendments do not alter the terms of the Permit and do not require the consent of the USFWS. Examples of minor decisions or actions which do not require Permit amendment include the following:

- Changes in personnel or contracted services involved in implementation of the Permit;
- Changes in the day-to-day decisions regarding land acquisition, fee collection, or habitat management and enhancement practices, provided that they are generally in accordance with approved preserve management guidelines;
- Changes in the rules or bylaws of the Coordinating Committee which do not affect the level of incidental take.

Proposed amendments to the plan or Permit will be initiated by a BCCP Coordinating Committee voting member or by the USFWS if the amendments pertain to requirements imposed by the USFWS. Other entities may not initiate a proposed amendment but may petition the Coordinating Committee or the USFWS to do so. The process is summarized below.

A proposed amendment will be submitted as a formal proposal to the Coordinating Committee and USFWS for review and possible action. The proposal will state the reason the amendment is being requested, describe the proposed change and appropriate wording to carry out the change, and include an analysis of the potential effects of the proposed amendment on the species of concern and on the terms and conditions of the

plan. The Coordinating Committee and/or the USFWS may request or furnish additional studies or information from the party proposing the amendment within thirty (30) days of receiving the proposal if they consider additional information necessary to make the decision to approve or deny the proposal. After amendment application is complete, the approval process will be as follows:

(1) Action on a proposed amendment must first be taken by the Coordinating Committee. Unless additional studies or information have been requested, and after any such additional material has been furnished, the Coordinating Committee shall approve or deny the request within ninety (90) days of the date of submittal of the proposed amendment to the Coordinating Committee.

(2) The plan amendment will be referred to Permit Holders for review and action. Action must be taken within forty-five (45) days of referral. The Coordinating Committee, in turn, is responsible for notifying and circulating the proposal to relevant parties for review and possible approval.

(3) A plan amendment which has been approved by Permit Holders will then be forwarded to the USFWS for final consideration.

This same procedure will be followed even when plan amendments are being initiated by the USFWS, such as in the case of a listing of a new species which could result in a change to the plan recommendations.

The USFWS listing process for threatened or endangered species is not under the direct control or influence of the BCCP participants, even though future listings could materially affect the plan. Through a requirement in the ESA to notify the state agency and any county in which a proposed listed species occurs, the BCCP Coordinating Committee will receive timely notification of any such listing proposal. It will be important for the timely resolution of a proposed listing action and timely amendment of the BCCP, if needed, that the BCCP participants and the USFWS maintain an active exchange of relevant information. This will be accomplished through the mechanism of the regular quarterly meetings of the Coordinating Committee.

In the future, if the determination is made by the USFWS to list a species that has been mitigated by the BCCP, the listing will not materially affect the preserve design or acquisition strategy. This will prove to be a material advantage to plan participants.

If a new species is listed by the USFWS as endangered or threatened, and it has not already been adequately addressed by the BCCP, the Coordinating Committee will

recommend to the Permit Holders whether or not to amend the BCCP to include the newly listed species. A revised plan would be required to secure a revised Permit to allow incidental take of the newly listed species. Amendments to the plan for species which are newly listed may affect the preserve design and hence the acquisition strategy and/or biological studies. In this case, until the permit is amended to cover the subject species, it will be the individual's responsibility to assure their action does not affect the newly-listed species.

h. Guidelines for Infrastructure Corridors

The current preserve design involving separate macrosite units allows development to proceed close to preserve perimeter boundaries, so it is important to protect designated preserve lands from fragmentation due to numerous infrastructure crossings. Placement of infrastructure in corridors can minimize this potential disruption. Existing utility and roadway infrastructure to serve development may already be in place, planned, or easements and right-of-ways dedicated when habitat lands are acquired.

Representatives from the BCCP permittees and managing partners have designated infrastructure corridors within the preserve system where concentrated linear routing is preferred for roads, electric services, gas, telephone, cable television, or water and wastewater lines. Non-linear infrastructure facility sites, such as water or wastewater treatment plants, electrical substations, or pump stations, will also be located within the infrastructure corridors to the extent practical.

Detailed guidelines have been prepared in cooperation with the affected utilities. Designation of infrastructure corridors within the preserves has been accomplished using these guidelines. Provisions have also been made for new construction within approved corridors and operation and maintenance of infrastructure facilities within the preserve lands. These management guidelines for minimizing adverse habitat impacts from needed infrastructure within preserves are provided in Appendix B, including a listing of those corridors where activities are currently planned.

The Infrastructure Planning section in Appendix B, part of the conservation plan required under the ESA, was developed primarily by an interagency committee consisting of local governments and utility service providers that have existing and planned facilities adjacent to the proposed habitat preserves. As such, it is the only existing plan at this time concerning roads and utilities management adjacent to the BCCP lands. This plan has not been formally adopted by either the City of Austin or Travis County, but is intended to be a basic guidance document to address this important issue. The guidelines

may be further developed by the Permit Holders to ensure that the goals of the BCCP are being met.

Utility service providers and infrastructure developers will need to prepare plans for their proposed activities within the preserves and submit them in a timely manner to the affected land manager(s) and the Coordinating Committee Secretary for review. The infrastructure guidelines will typically take precedence over the individual land management plans or general land management guidelines; however, the utility will generally be limited to the approved corridors and may still need to mitigate any adverse actions on preserve lands through the purchase of Participation Certificates, donation of equivalent habitat lands as mitigation, or other prescribed compensation to the Plan. Donation of equivalent habitat must be approved by the Coordinating Committee. In the case of a conflict with the Coordinating Committee Secretary over a particular action, utility representatives may elevate the final decision to the Coordinating Committee, at a regular or specially-called meeting, for resolution.

Planned actions within the designated corridors by utility providers associated with permittees and managing partners under the Permit are already covered if direct assignment of mitigation land to the Plan was made. Otherwise, the anticipated loss of preserve due to future expansions will need to be offset by: (1) those City of Austin utilities which have not specifically dedicated land within the preserve, or (2) those service providers who are not associated with the Permit Holders/Managing Partners. Utility and roadway infrastructure activity in habitat throughout the Travis County Permit area outside of the preserve lands will require individual negotiations with the USFWS or participation under the regional Permit through Certificate purchase to offset habitat loss.

3. Alternative 3: Regional Permit

This alternative is the preferred alternative of the USFWS and includes the discussion that meets the USFWS interpretation of the requirements of 50 CFR 17.22(b)(1)(iii)(D): "such other measures that the Director may require as being necessary or appropriate for purposes of the plan."

Like Alternative 2, the proposed action under Alternative 3 would allow incidental take of the federally-listed endangered species—black-capped vireo, golden-cheeked warbler, Tooth Cave pseudoscorpion, Tooth Cave spider, Tooth Cave ground beetle, Kretschmarr Cave mold beetle, Bee Creek Cave harvestman, and Bone Cave harvestman—within the

permit area mapped in Figure 2. The duration of the Permit is also 30 years, subject to the terms of the revocation as identified in 50 CFR 13.28.

a. Boundaries of the Alternative 3 Permit Area

The area covered by the Permit is the same as regional permit alternative 2 except for an additional 5,000 acres within close proximity to the BCNWR would be added to the Refuge and preserved by the USFWS for the benefit of the listed species of the Permit (Figure 5). Consequently, the size of the permit area could be reduced in size by approximately 5,000 acres from 561,034 acres to 555,000 acres in Travis County.

b. Implementing Roles of BCCP Permit Holders and USFWS

To ensure implementation of conservation and mitigation measures under Alternative 3, the permit applicants propose the same management organization, except as identified below, as under Alternative 2. The permit applicants have signed an Interlocal Agreement specifying the responsibilities of each agency (Appendix A). The Interlocal Agreement and the Shared Vision document incorporated into the agreement form the basis of the Permit Holders' conservation plan as required under the ESA. These documents may be further developed by the Permit Holders to ensure that the goals of the BCCP are being met. Amendments to the Interlocal Agreement and the Shared Vision may be made without amending the permit, provided that such amendments are approved by the Coordinating Committee.

Alternative 2 indicates the USFWS will "Administer the issuance and redemption of the Participation Certificates through a contractual arrangement with the permit holders. USFWS shall be obligated to sell Certificates subject only to the conditions of the Permit."

Alternative 3 differs in that this activity will be conducted by the Permit Holders.

c. Incidental Take

The potential take for each of the federally-listed wildlife species within the permit area that would occur with the issuance of the Permit and from implementation of the BCCP is summarized below.

Federally-listed (Threatened or Endangered) Species

Black-capped Vireo. The level of take for this species would be approximately the same as for Alternative 2.

Golden-cheeked Warbler. Because approximately 5,000 additional acres of golden-cheeked warbler habitat would be conserved with this alternative, the level of take would be somewhat reduced for that portion of the 5,000 acres that occurs within Travis County.

The BCCP estimates that up to 25,750 acres of potential golden-cheeked warbler habitat, as identified by satellite imagery, 71 percent of the warbler's habitat within the permit area, will be subject to take upon issuance of the requested Permit. Based on a ratio of 15 to 30 pairs of warblers per 250 acres, this lost habitat could support from 1,545 to 3,090 pairs of warblers.

Under Alternative 3, the recommended BCCP preserve acquisition area contains a total of about 15,000 acres of potential warbler habitat. Assuming that the BCCP acquires 66 percent of the as yet unacquired 9,940 acres, there would be about 11,800 acres of potential warbler habitat in the BCCP preserves. Thus, 735 to 1,475 pairs is an upper bound on the number of pairs of warblers in the preserves because of the probability that not all potential habitat will be occupied in the urbanizing west Travis County setting.

Karst Invertebrates. The level of incidental take of the six species of karst invertebrates located in the permit area would not differ from Alternative 2.

Other Species of Concern

Bracted Twistflower. The additional preserve acreage provided under this alternative does not include additional protection for the bracted twistflower.

Canyon Mock-Orange. All of the known populations of canyon mock-orange found within the preserve boundaries would be protected under both this alternative and Alternative 2.

Texabama Croton. The main population of Texabama croton in Travis County is within the boundaries of the BCNWR. This population would be protected under this alternative.

Eurycea *Salamanders*. Detailed information on potential take is pending further investigation.

d. Habitat Preserve

This alternative's preserve design has been altered to effectively resolve those issues of concern about protecting adequate golden-cheeked warbler habitat in Travis County. The final preserve system will still include a minimum of 30,428 acres located within the boundaries of the recommended preserve system mapped on Figure 4. However, an

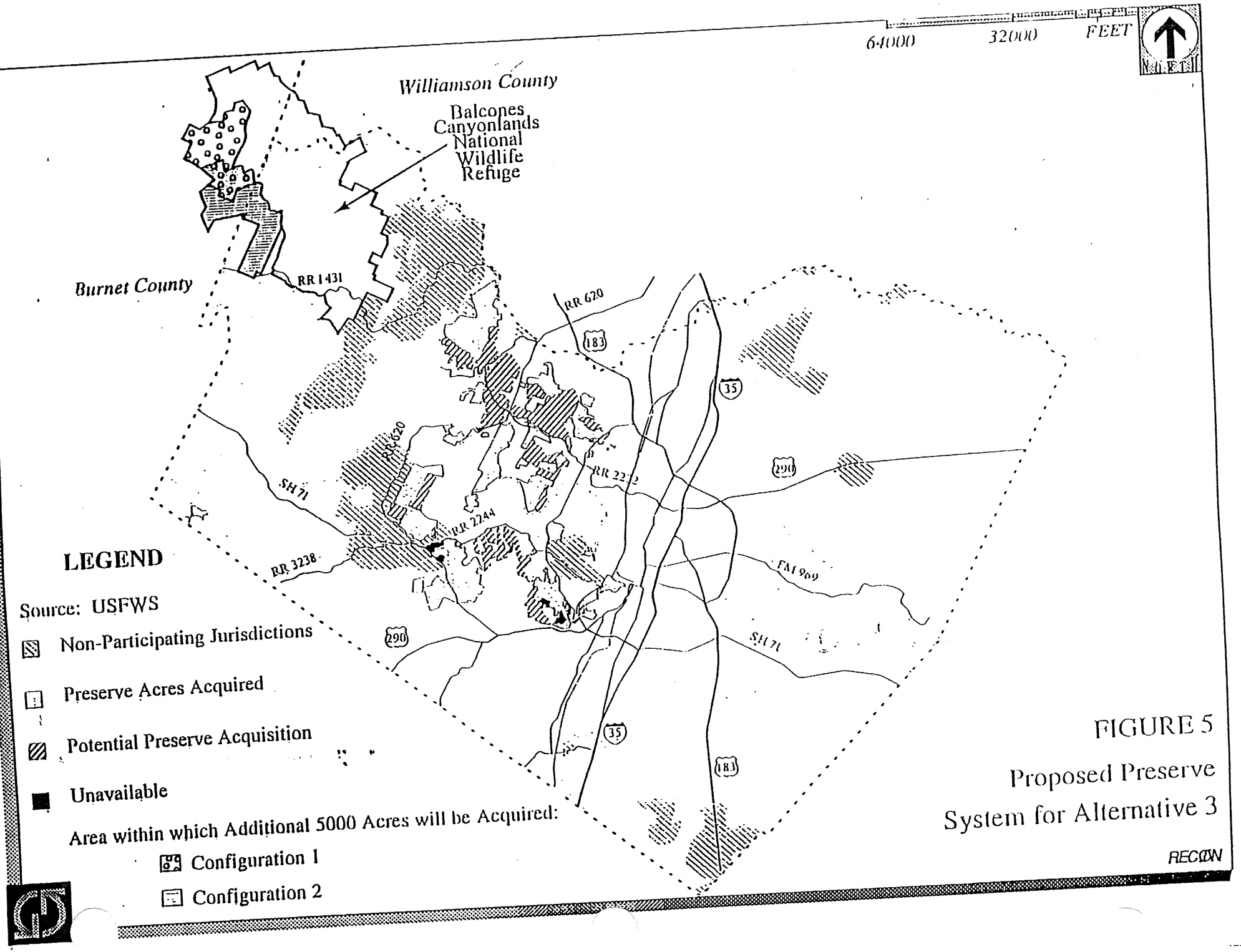


FIGURE 5

Proposed Preserve System for Alternative 3

Figure 5 Back Side

additional 5,000 acres located in the Lake Travis macrosite in close proximity to the Balcones Canyonlands National Wildlife Refuge will be acquired by the USFWS to provide additional golden-cheeked warbler habitat within or adjacent to Travis County (see Figure 5).

e. Preserve Management Standards and Guidelines

Under this alternative, the final preserve system will be managed and operated in the same fashion as under the proposed action alternative. The additional 5,000 acres acquired in the Lake Travis macrosite would be managed by the USFWS as part of the Balcones Canyonlands National Wildlife Refuge.

f. Funding Sources

The level of funding required to implement the conservation and mitigation measures, including inflation, under this alternative would be approximately $5 million more than for Alternative 2. The federal government will provide these monies through the Federal Land and Water Conservation Fund.

g. Plan Amendment Procedures

If the need should arise to amend the Permit or Habitat Conservation Plan, the same procedures outlined in the proposed action shall be implemented under this alternative.

h. Additional Plan Requirements

In addition to the requirements identified in Alternative 2, the following would be a component of Alternative 3.

(1) An annual report, due June 1st of each year beginning in 1997, is to be provided to the Austin Ecological Services Field Office. This report is to include:

(a) A list of all development activities west of the MOPAC Railroad that were permitted by the Permit Holder(s) in the previous 12 months;

(b) a list of all tracts for which Participation Certificates were purchased;

(c) amount of funds collected for land acquisition;

(d) amount of funds expended for land acquisition;

(e) an updated map of the lands dedicated to preserve management;

(f) a list of public use and habitat management activities that have been undertaken or completed within the bounds of the preserve units, including the status of land management plans; and,

(g) a copy of all research or investigation reports that have been prepared within the previous 12 months.

In addition to the above annual requirements, the Permit Holders must provide quarterly updates for the tracts for which Participation Certificates were purchased that include the following information:

(a) A general map of each project location; and,

(b) a project boundary map that identifies the areas for which the Participation Certificates apply. If a location and/or project map is not provided to the Permit Holder during the normal permitting process, a street address will meet this requirement.

(2) Proof of a recorded Participation Certificate provided by the Permit Holders must be posted at the property site from the time vegetation clearing begins until the construction is completed. For residential development, completed construction is when all roads and utilities are completed to the extent that they meet the applicable acceptance criteria of the City of Austin or Travis County. For commercial/industrial/multi-family developments completed development is when buildings are suitable for occupancy.

(3) All vegetation clearing activities within golden-cheeked warbler or black-capped vireo habitat must be completed between September 1 and March 1 to prevent the disturbance of nesting activity unless current breeding season surveys indicate that an active warbler or vireo nest is not within 300 feet of the proposed clearing.

(4) The use of native flora should be encouraged for all landscaping activities within the permit boundaries.

(5) The funds collected and expended for this Permit and its compliance with the financial requirements of the Permit shall be evaluated by financial audits conducted after the sale of Participation Certificates covering 3,000 fee paid acres or every five years, whichever comes sooner, until permit expiration. Such audits will be coordinated between the USFWS and the Coordinating Committee.

(6) The funds collected under this Permit will be expended for land or easement acquisition and other preserve system needs in accordance with the following criteria:

(a) Tracts considered for acquisition will be within or contiguous to the boundaries of the preserve units identified in the issued Permit;

(b) expenditure priority should be in the following decreasing order: Bull Creek, Cypress Creek, South Lake Austin, and North Lake Austin; and

(c) dispensing of funds from the BCCP Fund account should be accomplished as soon as there are adequate funds to complete a transaction taking into account opportunity, preserve priority and development threat.

(7) For the Permit to adequately cover the federally listed birds listed below, the permit holders must acquire at least 30,428 acres within the seven preserve macrosites and manage approximately 2,000 acres for the black-capped vireo and the remainder of the lands for the golden-cheeked warbler. For the federally listed karst invertebrates to be adequately covered by this permit, the permit holders must preserve the environmental integrity for 35 of 39 known locations identified in Chapter 4, Section A, Biological Resources, of this EIS.

For the Permit to adequately cover the Category 2 review species and other species of concern listed below, the permit holders must acquire the lands within the seven preserve macrosites, manage the areas supporting the plant species of concern, and preserve the environmental integrity of the following 27 caves:

Adobe Springs Cave	Lost Oasis Cave
Airman's Cave	Lost Gold Cave
Armadillo Ranch Sink	Maple Run Cave
Arrow Cave	Midnight Cave
Blowing Sink	Moss Pit
Buda Boulder Spring	Pennie Cave
Cave X	Pickle Pit
Ceiling Slot Cave	Pipeline Cave
District Park Cave	Slaughter Creek Cave
Flint Ridge Cave	Spanish Wells Cave
Get Down Cave	Stark's North Mine
Goat Cave	Talus Spring

Ireland's Cave	Whirlpool Cave
Jack's Joint	

(8) The following species are addressed in this document and a determination as to their inclusion and degree of protection may be made by the Permit Holders after review of all available information.

Eurycea sosorum	Barton Springs Salamander
Eurycea N. S.	Jollyville Plateau Salamander
Eurycea neotenes	Texas Salamander
Stygobromus balconis	Amphipod
Stygobromus bifurcatus	Amphipod
Phreatodrobia punctata	Snail
P. nugax nugax	Snail
Stygopyrgus bartonensis	Snail

(9) Permit Holders will enter into formal management agreement(s) with the landowner(s) for all caves that are recommended for protection but have yet to be acquired or kept in private ownership as cave preserves. The management agreement(s) will detail the area to be managed for cave protection, what such management will entail, and who is responsible for the management.

(10) The incident take sought in this permit does not apply to "take" outside of Travis County.

(11) Where the surface and subsurface hydrogeologic area around a cave identified for protection is not known, the area delineated by the contour level at the bottom of the cave will be managed for cave protection and no Participation Certificates are to be awarded within 0.25 miles of the cave entrance until the hydrogeologic area is delineated.

(12) The Permit Holder will administer the issuance and redemption of the Participation Certificates rather than the USFWS, as discussed in section 2(b).

(13) Incidental take that may result from the implementation of land management activities within the boundaries of a preserve and are described in a land management plan approved by the Coordinating Committee, is covered under this permit.

(14) Incidental take that may result from the implementation of infrastructure corridor projects approved by the Secretary of the Coordinating Committee and lie within one of the BCCP approved corridors, is covered under this permit.

(15) If, during investigations for development of a tract, karst features with a significant diversity of trogiobitic fauna are discovered, those karst features may be submitted to the USFWS 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 USFWS, 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.

(16) Since the Barton Springs salamander is not a part of this action, and has never been a part of this action, incidental take of the salamander will not be covered by the Permit that may be issued for this activity. However, since the salamander is proposed for listing as endangered, in accordance with section 7(a)(4) of the Endangered Species Act, the salamander must be considered by the USFWS in evaluating the impacts of permit issuance. Therefore, entities who purchase Participation Certificates for activities within the Barton Springs drainage area of Travis County (Figure 16) that participate in the BCCP should obtain guidance with respect to avoiding the impacts of their activity on water quality as it relates to the Barton Springs salamander.

SPECIES OF CONCERN

Federally-listed Endangered Species

Vireo atricapillus	Black-capped vireo
Dendroica chrysoparia	Golden-cheeked warbler
Tartarocreagris texana	Tooth Cave pseudoscorpion
Neoleptoneta myopica	Tooth Cave spider
Texella reddelli	Bee Creek Cave harvestman
Texella reyesi	Bone Cave harvestman
Rhadine persephone	Tooth Cave ground beetle
Texamaurops reddelli	Kretschmarr Cave mold beetle

Category 2 Review Species

Philadelphus ernestii	Canyon mock-orange
Croton alabamensis var. *texensis*	Texabama croton

Other Species of Concern

FLATWORMS
- *Sphalloplana mohri*

OSTRACODS
- *Candona* sp. nr. *stagnalis*

ISOPODS
- *Caecidotea reddelli*
- *Trichoniscinae* N. S.
- *Miktoniscus* N. S.

SPIDERS
- *Cicurina bandida* (#1)
- *Cicurina cueva* (#4)
- *Cicurina ellioti* (#5)
- *Cicurina reddelli* (#3)
- *Cicurina reyesi* (#6)
- *Cicurina travisae* (#7)
- *Cicurina wartoni* (#9)
- *Neoleptoneta cocinna*
- *Neoleptoneta devia*
- *Eidmannella reclusa*

PSEUDOSCORPIONS
- *Aphrastochthonius* N. S.
- *Tartarocreagris comanche*
- *Tartarocreagris reddelli*
- *Tartarocreagris intermedia (#2)*
- *Tartarocreagris* N. S. 3

HARVESTMEN
- *Texella spinoperca* (#2)

MILLIPEDES
- *Speodesmus* N. S.

GROUND BEETLES
- *Rhadine s. subterranea*
- *Rhadine s. mitchelli*
- *Rhadine austinica*

D. Comparison of the Alternatives

The potential environmental consequences of the alternatives are summarized in Table 5. The alternatives are evaluated in terms of permit area boundaries, management structures, funding sources, incidental take of listed species and species of concern, and location of preserved habitat. The No Action Alternative precludes the issuance of a regional Permit. Protection of threatened and endangered species is provided on an individual project basis by sections 7, 9, and 10(a) of the ESA. Alternative 2 sets aside a cooperatively administered regional preserve of 30,428 acres plus additional acres to protect karst features. Alternative 3 is identical to Alternative 2, with the exception that the preserve includes an additional 5,000 acres in close proximity to the BCNWR. Because of the additional acreage and other features of Alternative 3 that will benefit the listed species of concern, alternative 3 is the USFWS preferred alternative.

1. Permit Area Boundaries

Under the No Action Alternative, the cumulative project areas within Travis County that the USFWS approves under individual section 7 consultations and section 10(a)(1)(B) permits would constitute the permit area. Alternatives 2 and 3 would create bird preserves of 30,428 acres and 35,428 acres, respectively. Additional acres would be required to protect karst invertebrates. All of the acreage from Alternative 2 is included in Alternative 3, with the addition of 5,000 acres in the vicinity of the BCNWR.

2. Management Structures

The No Action Alternative relies on multiple entities and/or individuals to manage individual mitigation lands, with regulatory oversight provided by the USFWS. Alternatives 2 and 3 have identical management structures, based on a Coordinating Committee established by the City of Austin and Travis County. The USFWS participates as an ex-officio member.

TAL
COMPARISON OF ALTERNATIVES

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Permit Area Boundaries	Cumulative project areas in Travis County as approved by USFWS under Sections 7 and 10 of ESA. No active management of preserve lands.	Travis County minus nonparticipating jurisdictions, 30,428-acre preserve, and BCNWR for a total of about 500,000 acres, of which about 100,000 acres is currently developed.	Travis County minus nonparticipating jurisdictions, 35,428-acre preserve, and BCNWR for a total of about 500,000 acres, of which about 100,000 acres is currently developed.
Management	Owners manage individual mitigation lands; USFWS provides regulatory oversight.	City of Austin, Travis County, and other land managers operating under Interlocal and Implementation Agreements.	Same as Alternative 2, including USFWS.
Funding	Mitigation fees and land purchased by project owners on case-by-case basis.	Participation certificates; local government bonding authority; tax benefit financing.	Participation Certificates; local government bonding authority; tax benefit financing; and some federal monies.
Take			
Black-capped vireo	Total take unknown, resulting from individual approvals under ESA Sections 7 and 10.	Loss of birds on 1,135 acres of existing habitat (55%) and 18,759 acres of potential habitat (70%).	Same as Alternative 2.
Golden-cheeked warbler	Total take unknown, resulting from individual approvals under ESA Sections 7 and 10.	Loss of birds on 26,753 acres of potential habitat (71%).	Maximum loss of 25,755 acres of potential habitat (68%).
Karst invertebrates	Total take unknown, resulting from individual approvals under ESA Sections 7 and 10.	Loss of invertebrates at these known sites of Bone Cave harvestman and one known site of the Tooth Cave ground beetle; loss of 38,349 acres of potential karst habitat (85%); and subsequent loss of currently undiscovered species and sites.	Same as Alternative 2.
Bracted twistflower	Total take unknown.	Five of nine known populations not included in preserve.	Same as Alternative 2.
Canyon mock-orange	Total take unknown.	All or portions of five known populations included in preserve.	Same as Alternative 2.

TABLE 5
COMPARISON OF ALTERNATIVES
(continued)

Issue	Alternative 1: No Action	Alternative 2: Proposed Action	Alternative 3: Preferred Alternative
Texabama croton	Known population protected in BCNWR.	Known population protected in BCNWR.	Known population protected in BCNWR.
Eurycea salamanders	Take of entire population(s) of Barton Springs and Jollyville salamanders is possible.	Take of entire population(s) of Barton Springs and Jollyville salamanders is possible. Take of Texas populations unknown.	Same as Alternative 2.
Other Species of Concern	Total take unknown, resulting from individual approvals under ESA Sections 7 and 10.	Populations within 30,428-acre preserve protected; development outside preserve under ESA Sections 7 and 10 require biological survey/consideration.	Same as Alternative 2 and protection of species located in additional 5,000 acres located near BCNWR.
Preserve Location	Mitigation areas required by individual ESA Sections 7 and 10 actions in Travis County will be fragmented, without corridors or buffers. No active management of preserve lands.	30,428 acres selected from several of 10 macrosites in Travis County with buffer and corridor criteria; additional acreage will be required for the preservation of identified karst features; acquisition will focus on the Bull Creek, Cypress Creek, and North Lake Austin macrosites.	35,428 acres; 30,428 acres in same location as Alternative 2 and 5,000 acres added in vicinity of BCNWR.

3. Funding Sources

Mitigation fees and mitigation land purchases by project owners on a case-by-case basis constitute the funding sources for the No Action Alternative. Revenues from Certificate sales, local government bonding authority and tax benefit financing would fund the land purchases for both Alternatives 2 and 3 preserve systems, with an additional federal contribution necessary under Alternative 3.

4. Incidental Take

Under the No Action Alternative, the amount of incidental take for each listed species and species of concern is undetermined because it will be the cumulative result of project-by-project approvals by the USFWS over a 30-year period. On the other hand, the incidental take under Alternatives 2 and 3 can be quantified based upon the species' habitats not included within the preserves proposed by each alternative, respectively. See Table 5 for the quantification of take for each species.

5. Preserved Habitat Location

Preserved habitat under the No Action Alternative will be located wherever the USFWS requires individual project owners to acquire mitigation lands, resulting in habitat fragmentation without necessary buffers and corridors. Alternatives 2 and 3 set aside identified acreages and base their acquisition strategy on specific criteria for preserve unit size, width, edge-to-area ratios, and distances between preserve units.

E. Preferred Alternative

Alternative 3 is the preferred alternative of the USFWS because it sets aside additional habitat for the golden-cheeked warbler in the Lake Travis macrosite in close proximity to the BCNWR. This alternative adequately resolves the USFWS concerns expressed in the July 22, 1992 letter regarding the inadequate amount of warbler habitat located within the proposed preserve system.

Chapter Three
III. Affected Environment

A. Biological Resources

This biology section discusses the existing biological resources and the ecology of the area encompassed by the proposed Permit (Travis County). Sensitive resources known to occur, as well as those with the potential to occur, within the project area are included in the discussion. The section is divided into five parts: (1) regional; (2) plant and animal species of the Edwards Plateau in western Travis County; (3) federal and state threatened, endangered, and candidate species covered by the BCCP; (4) other species of concern; and (5) macrosite descriptions.

1. Regional

This section includes a general discussion of the ways Travis County's geology, soils, hydrology, and vegetation interact to support the proposed permit area's (Travis County) unique ecosystem. Moreover, several of the species included in the Permit are not limited to Travis County. Their ecology is best understood if the regional context of their populations' distributions is known.

a. Geology and Soils

Travis County lies along the transition zone between two major physiographic regions: the Edwards Plateau to the west, and the Blackland Prairie to the east (Figure 6). Many of the major differences between these regions relate to the differing bedrock units beneath them. Aside from the alluvium associated with the Colorado River, which is common to both regions, the dominant rock types differ significantly from east to west. Generally, the Blackland Prairie is underlain by clay, sand, gravels, and, in the area closest to the Edwards Plateau boundary, limestone. The Edwards Plateau is underlain by hard limestone, mixed limestone dolomite, and dolomite limestone. Soils in the permit area grade from deep, fertile mollisols of the Blackland Prairie to thin, stony, poor soils on the Edwards Plateau (Garner and Young 1976).

Travis County geology is characterized by several distinctive features. The Balcones Escarpment is a fault that runs in a north-south direction just west of Austin. Western Travis County is a hilly area, heavily eroded into numerous small valleys, on the upthrust side of the Balcones Escarpment. The Colorado River, which flows from northwest to east through Austin, marks the boundary between the Hill Country to the southwest and the generally flatter Lampasas Cut Plain to the north. North of the Colorado River, the plateaus and ridges are capped by hard Edwards limestone, which is a porous rock formation containing several large aquifers. Some of the Edwards limestone has formed karst, a limestone topography in which the passage of water creates numerous caves, sinkholes, and fissures (BAT 1990).

The geology of this area accounts for the distribution of rare and endangered species. North of the Colorado River, the geologic formations contain several large aquifers and have characteristics that provide habitat for several rare species. Numerous karst areas of the Edwards limestone are isolated from one another by river and stream canyons, drainage divides, outcroppings of noncavernous formations, and sometimes faults. Similar to an island, each isolated piece of karst has acquired an endemic biota (BAT 1990).

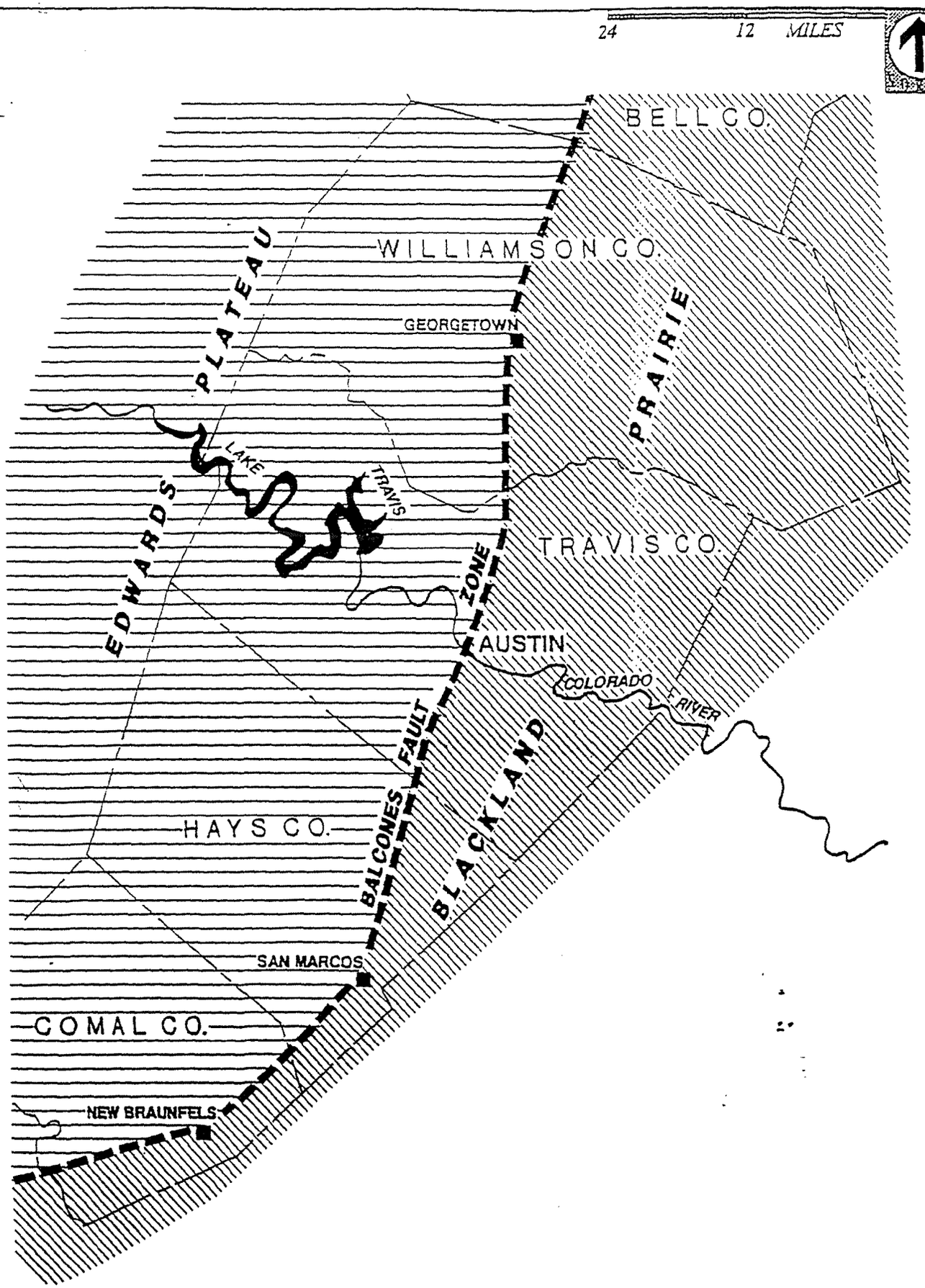
Western Travis County may be characterized as a rocky area with thin soils. Elevations within the permit area range from 400 to 1400 feet above mean sea level. Surface elevation also follows an east to west gradient, with the lowest areas occurring along the Colorado River in eastern Travis County. These physical characteristics give rise to divergent vegetation and wildlife community types as well. Regional vegetation and wildlife resources will be discussed in ensuing baseline sections.

Soil types for each watershed are delineated into 46 [illegible]rate soil mapping units. Each mapping unit describes specific soil characteristics, such as texture, depth, slope, and water-holding capacity.

The predominant upland soils found are Brackett series (B1D and BoF) and Tarrant series soils (TaD and TcA). Brackett soils occupy roughly two to three times the area associated with Tarrant soils. Both B1D and BoF soils are gravelly clay loam or clay loam soils approximately 18 inches in depth, with low permeability. TaD and TcA soils are shallow clays, also with low permeability. Both Brackett and Tarrant series soils have a relatively high runoff potential.

b. Hydrology

Other important physiographic factors which influence the region include surface and groundwater resources. The Colorado River and its tributaries have dramatically shaped



Source: Hicks & Company 1993

FIGURE 6
Travis County: Major Physiographic Regions

RECON

Figure 6 Back Side

the terrain in the permit area. Again, there is an east to west trend which may be observed. Within the permit area, the drainages on the Blackland Prairie are only slightly to moderately dissected, whereas those of the Edwards Plateau are highly dissected. This dissection is most pronounced in the southeastern portion of the Edwards Plateau, known as the Balcones fault zone. Within the permit area, this zone lies west of a northeast to southwest line which roughly approximates the current alignment of the MOPAC Railroad.

Over time, as the Colorado River and its tributaries have entered this fault zone, they have carved an intricate system of canyons through the underlying limestone. The canyons of this southeast portion of the Edwards Plateau are characterized by comparatively high relief. These are the Balcones Canyonlands which give the proposed conservation plan its name.

Along with notable surface water features, this zone of fracturing creates nearly direct contact through recharge features to the Edwards aquifer system. The Edwards aquifer system, which is generally considered to be coterminous with the Balcones fault zone, extends 250 miles in an arc through 10 counties in southwestern and central Texas. This larger system is divided into two hydrologically divided sections referred to as the "San Antonio area" and "Austin area" aquifers. The Austin area portion of the Edwards aquifer extends through parts of Hays, Travis, Williamson, and Bell counties, covering approximately 80 miles between the cities of Kyle and Belton. The Austin area portion of the aquifer is further subdivided into northern and southern segments, with the southern part, between the Kyle area and the Colorado River, referred to as the Barton Springs segment of the Edwards aquifer. Figure 7 illustrates the approximate boundaries of these segments of the Edwards aquifer. Water entering the Edwards aquifer from rainfall events and streamflow south of the Colorado River in Hays and Travis counties flows northward through underground channels towards Barton Springs, located in Austin's Zilker Park. These springs discharge an average of 50 cubic feet per second of water, which flows through the Barton Springs Pool and discharges through Barton Creek into Town Lake on the Colorado River (City of Austin 1983; Garner and Young 1976; Marek et al. 1981; Woodruff and Slade 1986).

The Edwards Plateau portion of the county may be characterized as a strongly dissected limestone outcrop tableland bordered abruptly on the east by the Balcones fault zone or Balcones Escarpment (Amos and Gehlbach 1988). The resulting physiography offers a variety of habitat types for plant and animal species. In addition to terrestrial habitat, the underlying karstic limestone with its fracturing and solution dissolving activity provides diverse subterranean habitat for specially adapted invertebrate and vertebrate species. The cave environment of central Texas, including that within the permit area,

has been recognized to support one of the most important cave faunas in the world (Elliott and Reddell 1989).

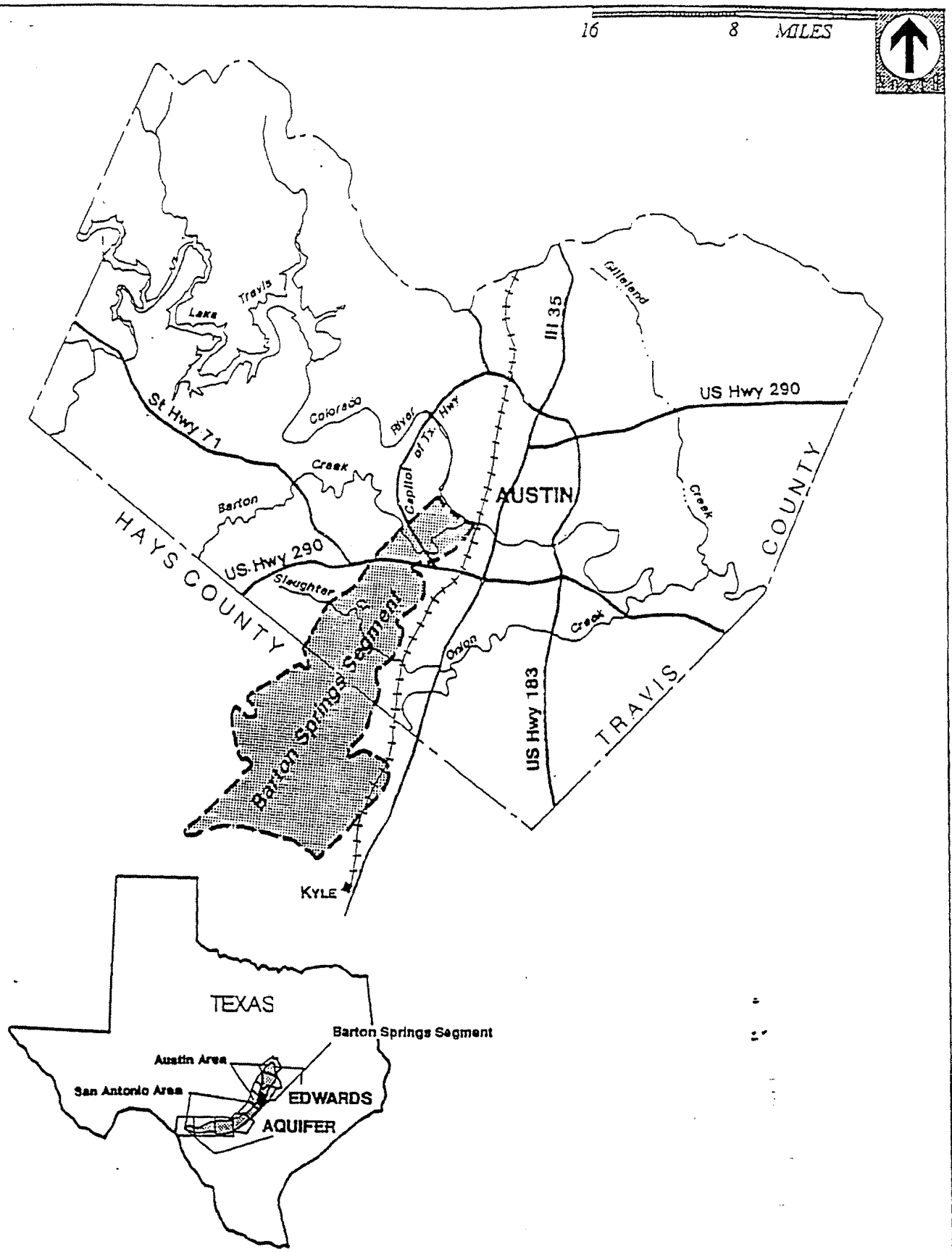
c. Vegetation

The vegetation of the Edwards portion of the permit area is floristically diverse. The permanently watered canyons and fairly widely separated rolling uplands create a system conducive to endemism (a situation where physical or biological factors cause a species to be restricted to a particular locality). The Edwards Plateau is a refuge of numerous floral endemics (Correll and Johnston 1979). As Amos and Rowell (1988) have pointed out, there are four hypotheses that may account for the high occurrence of endemism in the region. The first hypothesis, put forth by Palmer (1920), suggests that these endemic species inhabit relictual refugia created by late Tertiary or early Pleistocene isolation. Another explanation is that the limestone canyons, cliffs, and seeps of the region harbored unique species long before floral isolation from eastern and western forests (Amos and Rowell 1988). A third hypothesis maintains that the Edwards Plateau is an area where eastern forest, western desert, and Mexican subtropical floristic regions overlap, providing an arena for hybridization of many diverse species (Amos and Rowell 1988). A fourth hypothesis is that because none of the first three hypotheses satisfactorily explain all of the endemic occurrences, it is possible that a combination of these factors could be involved (Amos and Rowell 1988). The mesic canyonlands and rocky uplands which support the rare plants also provide habitat for the endangered songbirds.

The key factors within the proposed BCCP preserve area which combine to form such a unique ecosystem are not only its basic physiographic components (bedrock, soils, and water resources) but also its dynamism and synergism. Wildfires historically passed over these uplands, contributing to the low, dense stature of their vegetation, which in turn provided nesting substrate for the black-capped vireo. The surface waters which cut the canyons that support the bracted twistflower, canyon mock-orange, and golden-cheeked warbler also pass through the soluble limestone bedrock to provide the cave habitat and nutrients for the cave-dwelling organisms. The canyons separate the dry, rocky uplands, creating island-type populations of cave-dwelling species between the drainages.

2. Plant and Animal Species of the Edwards Plateau in Western Travis County

Throughout the following sections pertaining to the various floral and faunal groups, references are made to the ecological regions and biotic provinces of Texas. The



Source: Hicks & Company 1993

FIGURE 7

Barton Springs Segment of the Edwards Aquifer

RECON

Figure 7 Back Side

principal sources for these references are Gould (1975) and Hatch et al. (1990) for vegetation and Blair (1950) for faunal resources. Travis County falls in an ecotone where distributional influences from surrounding areas are significant. Figure 8 locates Travis County with respect to the ecological regions of Texas as defined by Gould (1975) and Hatch et al. (1990). Figure 9 illustrates Travis County with respect to the biotic regions of Texas as defined by Blair (1950). Since the proposed permit covers only federally-listed species whose Travis County ranges are limited to its western portion, the primary biogeographic focus in this section is on the Edwards Plateau ecological region and Balconian biotic province.

a. Vegetation

Western Travis County is characterized by high relief and is highly dissected by the Colorado River and its tributaries. Dominant vegetation communities include grassland/savannah, oak-juniper woodlands, and bottomland/riparian woodlands. Numerous endemics, species at the limit of their ranges, and distinct, relictual populations form a unique component of the Edwards Plateau flora. More specific information regarding the vegetation of western Travis County may be found in the Comprehensive Report of the Biological Advisory Team of the BCCP (BAT 1990). Part 3 of this section discusses in detail the natural history of the two plant species to be included on the Permit.

b. Invertebrates

Invertebrates of the Balconian biotic province occupy numerous ecological niches. One example is the unique assemblage of invertebrates inhabiting the subterranean features and associated springs and spring-fed drainages of the Balcones Canyonlands and surrounding Edwards limestone topography. Although little descriptive or quantitative data is available on the magnitude of the invertebrate resource, over 700 species of invertebrate species have been collected from Texas caves with more than 100 species being troglobitic (Mitchell and Reddell 1971). The proposed Permit addresses six federally-listed and 25 other species of subterranean invertebrates, which are addressed in this section and the other species of concern section.

The karst invertebrates of western Travis County consist largely of obligate and facultative troglobitic arthropods including amphipods, isopods, scorpions, spiders, pseudoscorpions, mites and ticks, centipedes, millipedes, and insects. In addition to the numerous troglobitic arthropods inhabiting caves in the permit area, other invertebrates representing the phyla Platyhelminthes, Mollusca, and Annelida are also found inhabiting karst features of the Jollyville Plateau (Elliott and Reddell 1989). In general, those species which are obligate troglobites require high humidity and stable temperatures. It

is also believed that nutrient input (e.g., leaves and dead animals) from "cave visitors" (e.g., raccoons and bats) is an important mechanism for maintaining nutrient cycles and energy flow into the karst ecosystems (Elliott and Reddell 1989). More details regarding the invertebrate species addressed in the proposed Permit may be found in part 3 of this section.

c. Fish

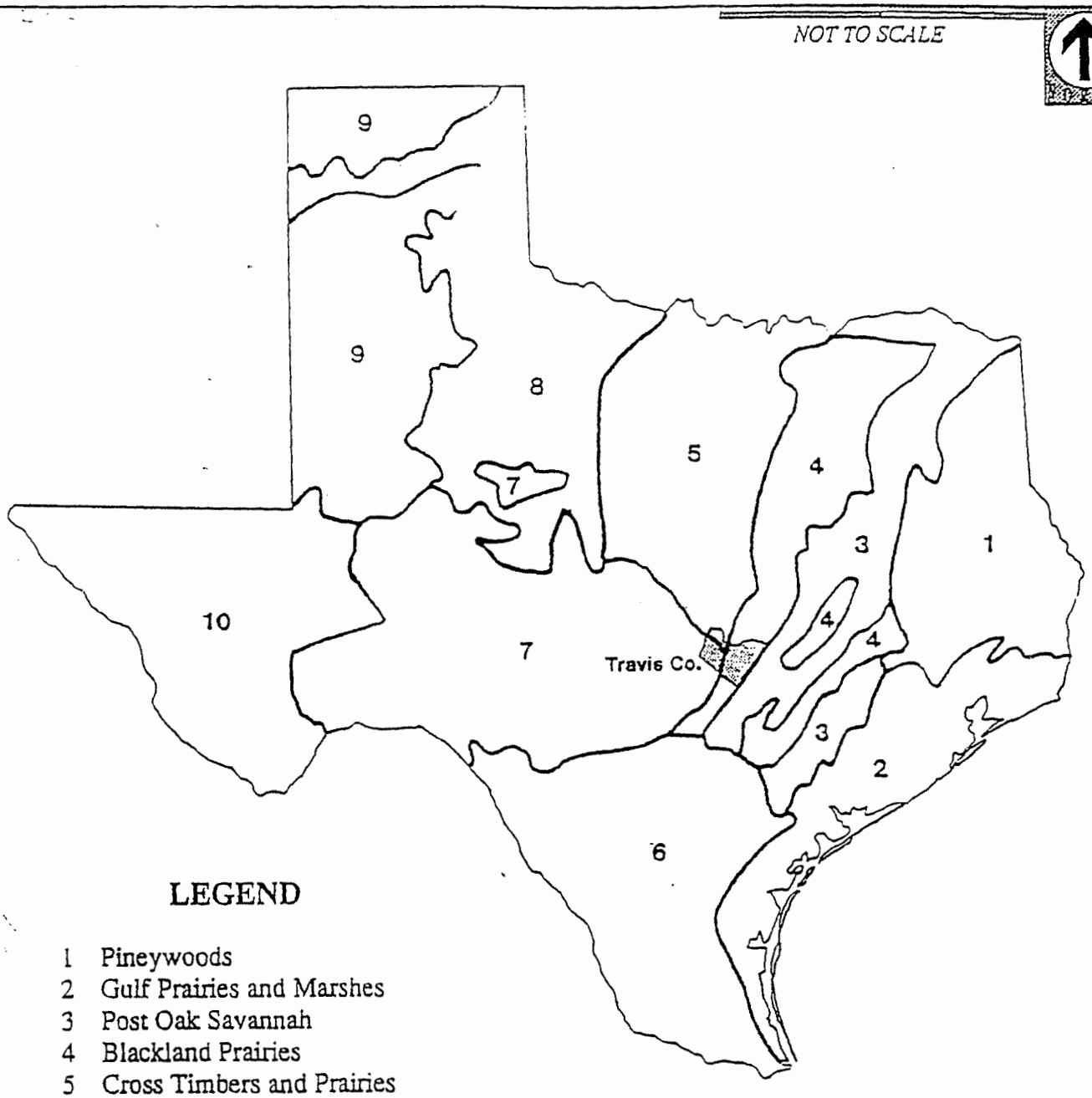
The ichthyofauna of the Colorado River watershed represents an ecotonal assemblage consisting of representatives from eastern (Mississippi Valley) and western (Rio Grande Valley) groups (Mosier and Ray 1992). There are 59 primary freshwater species native to the basin, and a few exotic species have been accidentally or purposefully introduced into the watershed. No species of fish are addressed in the proposed Permit.

The smalleye shiner (*Notropis buccula*), a federally-listed (Category 2 [C2]) species, has apparently been introduced into the Colorado River basin from the Brazos River basin. A single specimen was collected on Waller Creek within the permit area (Lee et al. 1980). The Guadalupe bass (*Micropterus treculi*) is a federally-listed C2 endemic limited to a few drainages along the eastern edge of the Edwards Plateau, including the Colorado River upstream of Austin, and is considered an important game fish. The blue sucker (*Cycleptus elongatus*) is also a federally-listed C2 species inhabiting the mainstem of the Colorado River. Lee at al. (1980) suggested the construction of dams along major drainages has contributed to the decline of this species because dams block their migration routes.

d. Reptiles and Amphibians

Texas is home to 204 species of reptiles and amphibians; of these, 76 inhabit the Balconian biotic province. This province is characterized as an ecotonal region with respect to herpetofaunal distributions. The reptilian fauna of the Balconian province is represented by a single species of land turtle, 10 aquatic turtle species, 16 species of lizards, and 36 species of snakes. None of the reptiles are restricted to the Balconian province. The Balconian province is home to 15 species of frogs and toads and 13 species of salamanders. Eight of the 13 salamanders are endemic to small "islands" of subterranean watercourses and springs of the Edwards aquifer. There are no endangered or threatened reptiles or amphibians addressed as primary species under the proposed Permit. Herpetofaunal species deserving scrutiny throughout the life of the proposed Permit include the *Eurycea* salamanders and the Texas horned lizard. These species are described in more detail in section 3.

Salamanders from the genus *Eurycea* are unique members of epigean (associated with the ground surface) communities. They utilize the isolated units of habitat found only in



LEGEND

1 Pineywoods
2 Gulf Prairies and Marshes
3 Post Oak Savannah
4 Blackland Prairies
5 Cross Timbers and Prairies
6 South Texas Plains
7 Edwards Plateau
8 Rolling Plains
9 High Plains
10 Trans-Pecos, Mountains and Basins

Source: Gould 1975

FIGURE 8

Travis County and the Ecological Regions of Texas

RECON

Figure 8 Back Side

Source: Blair 1950

FIGURE 9
Travis County and the Biotic Regions of Texas

RECON

Figure 9 Back Side

places where the subterranean watercourses meet the aquatic systems on the surface. Many of these neotenic species, such as the Barton Springs salamander, occur only in one geographical location, and like the karst invertebrates, *Eurycea* salamanders exhibit a high degree of biogeographical provincialism. It is probable that a new species, the Jollyville salamander, will be described in the scientific literature and added to the list of endemic biota. More information regarding the *Eurycea* salamanders may be found in part 3)b) of this section.

The Texas horned lizard, federally-listed as C2, inhabits flat, open terrain with sparse vegetation in sandy, gravelly, or loamy soils. In Travis County, the Texas horned lizard is a very local resident of oak-juniper uplands and old-field areas.

e. Birds

This section briefly describes the avian community of the Edwards Plateau. Travis County hosts nearly 400 avian species from 50 families (Audubon Society 1984). The bird life of western Travis County reflects a general trend toward biogeographic overlap in species distribution. The wooded riparian areas allow eastern (Austroriparian) birds to thrive while the more xeric, brushy areas on uplands sustain species with western (Chihuahuan) and southern (neotropical or Tamaulipan) affinities. The federally endangered black-capped vireo and the golden-cheeked warbler are addressed as primary species under the proposed Permit. More specific information regarding these two species may be found in part 3)b) of this section.

f. Mammals

The Balconian biotic province is home, or has been home, to 57 species of mammals, none of which occur solely in this province. As with the other vertebrate groups, the mammals of the Balconian province receive distributional influence from the Austroriparian, Kansan, Chihuahuan, and Tamaulipan provinces. Mammalian population densities are lower in the Balconian province, for the most part, than those in the Tamaulipan province to the south. Blair (1950) attributes this to the transitional nature of the habitat and overgrazing. Both of these factors work to lower potential carrying capacities for species already at the periphery of preferred ranges. There are no mammal species targeted for consideration under the proposed Permit.

3. Federal and State Threatened and Endangered Species Considered in the BCCP Section 10(a)(1)(B) Permit Application

This section is intended (a) to provide brief introductions to the protected species listing and monitoring processes employed by federal, state, and private entities and (b) to give brief life history descriptions of federally-listed threatened and endangered species addressed in the BCCP Permit.

a. Listing and Monitoring Process

Federal-U.S. Fish and Wildlife Service

The USFWS has legislative authority to list and monitor the status of species whose populations are considered to be imperiled. This federal legislative authority for the protection of threatened and endangered species issues from the Endangered Species Act of 1973 and its subsequent amendments. Lists of threatened and endangered species are codified and regularly updated in Sections 17.11 and 17.12 of Title 50 of the Code of Federal Regulations. The federal process stratifies potential candidates based upon the species' biological vulnerability. The vulnerability decision is based upon many factors affecting the species within its range and is always linked to the best scientific data available to the USFWS at the present time. Species listed as endangered (E) or threatened (T) by the USFWS are provided full protection. This protection includes prohibition of destruction of habitat if it results in the take of listed species. The ESA and accompanying regulations provide the necessary authority and incentive for the individual states to establish their own regulatory guidelines for the management and protection of threatened and endangered species. Table 6 presents the current federal status of those species either found or with the potential to be found in the BCCP permit area. Footnotes below the table explain the rationale of the various classifications. All of the described species are discussed below based upon current as well as future (30-year permit period) concerns for the stability and survival.

State-Texas Parks and Wildlife Department

Endangered species legislation was passed in Texas in 1973 and amended in 1981, 1985, and 1987 (TPWD 1991b). Subsequently, the 1975 and 1981 revisions to the Texas Parks and Wildlife Code established a state regulatory vehicle for the management and protection of listed threatened and endangered species. Chapters 67 and 68 (1975 revisions) of the code authorize TPWD to formulate lists of threatened and endangered fish and wildlife species and to regulate the taking or possession of the species. A 1981

TABLE 6
SPECIES OF CONCERN FOUND IN OR WITH THE POTENTIAL TO BE FOUND IN TRAVIS COUNTY

BCCP Status	Species Common Name/Scientific Name	Status USFWS[1]	TPWD	BCD[2]	BCCP Study Area Distribution
KARST ARTHROPODS					
P	Tooth Cave spider *Neoleptoneta myopica*	E	-	G1S1	Two caves
P	Tooth Cave pseudoscorpion *Tartarocreagris texana*	E	-	G1S1	Two caves
P	Tooth Cave ground beetle *Rhadine persephone*	E	-	G1S1	Few caves
P	Kretschmarr Cave mold beetle *Texamaurops reddelli*	E	-	G1S1	Few caves
P	Bee Creek Cave harvestman *Texella reddelli*	E	-	G1S1	See discussion in text
P	*Texella reyesi*	E	-	G1S1	See discussion in text
P	*Texella spinoperca*	-	-	-	One cave
D8	*Diplocardia* sp. T	-	-	-	One cave
P	*Cicurina* (Cicurella) *bandida*	C2	-	-	Two caves
S	*Cicurina* (Cicurella) n. sp. 2	-	-	-	Few caves
P	*Cicurina* (Cicurella) *reddeli*	-	-	-	One cave
P	*Cicurina* (Cicurella) *cueva*	C2	-	-	Two caves
P	*Cicurina* (Cicurella) *ellioti*	-	-	-	Five caves
P	*Cicurina* (Cicurella) *reyesi*	-	-	-	One cave
P	*Cicurina* (Cicurella) *travisae*	-	-	-	Ten caves
S	*Cicurina* (Cicurella) n. sp. 8	-	-	-	One cave
P	*Cicurina wartoni*	C1	-	-	One cave
P	*Neoleptoneta cocinna*	-	-	-	Two caves
P	*Neoleptoneta devia*	-	-	-	One cave
P	*Eidmannella reclusa*	-	-	-	Four caves
D8	*Microbisium* sp.	-	-	-	One cave
P	*Aphrastochthonius N.S.*	-	-	-	One cave
P	*Tartarocreagris comanche*	-	-	-	One cave
P	*Tartarocreagris intermedia*	-	-	-	Two caves

TABLE 6

SPECIES OF CONCERN FOUND IN OR WITH THE POTENTIAL TO BE FOUND IN TRAVIS COUNTY

(continued)

P	*Tartarocreagris reddelli*	-	-	-	One cave
S	*Tartarocreagris infernalis*	-	-	-	Two caves
P	*Tartarocreagris N.S.*	-	-	-	BCNWR
D3	*Tyrannochthonius* n. sp.	-	-	-	Several caves
P	*Stygobromus balconis*	C2	-	-	Three caves
P	*Stygobromus bifurcatus*	-	-	-	Extremely local
P	*Caecidotea reddelli*	-	-	-	Three caves
P	*Trichoniscinae N.S.*	-	-	-	Two caves
P	*Miktoniscus N.S.*	-	-	-	One cave
P	*Speodesmus* n. sp.	-	-	-	Nine caves
D3	*Arrhopalites pygmaeus*	-	-	-	Widespread
S	*Lapygidae* n. gen & n. sp.	-	-	-	One cave
S	*Trichatelura* n. sp.	-	-	-	One cave
P	*Rhadine austinica*	-	-	-	24 caves
S	*Rhadine russelli*	-	-	-	Two caves
P	*Rhadine subterranea mitchelli*	-	-	-	Three caves
P	*Rhadine subterranea subterranea*	-	-	-	Nine caves
S	*Batrisodes* n. sp.	-	-	-	One cave
P	*Candona sp. nr. stagnalis*	-	-	-	Two caves
P	*Sphalloplana mohri*	-	-	-	One cave
MOLLUSCS					
S	*Mesodon leatherwoodi*	-	-	-	One or two localities
S	Phreatodrobia punctata	-	-	-	BartinSprings
S	Phreatodrobia nugax nugax	-	-	-	Barton Springs
S	Stygopyrgus bartonensis	-	-	-	Barton Springs
FISH					
D1	Smalleye shiner *Notropis buccula*	C2	-	G2S2	Waller Creek, 1 specimen
D1	Sharpnose shiner *Notropis oxyrhynchus*	C2	-	G3S3	Not in study area
D9	Guadalupe bass *Micropterus treculi*	C2		G3S3	Colorado River
S	Blue sucker	C2	T	G4S3	Mainstem Colorado River

TABLE 6

SPECIES OF CONCERN FOUND IN OR WITH THE POTENTIAL TO BE FOUND IN TRAVIS COUNTY

(continued)

	Cycleptus elongatus				
AMPHIBIANS					
S	"Barton Springs" salamander *Eurycea* sp.	C1	-	G1S1	Poorly known, very local
S	Texas salamander *Eurycea neotenes*	C2	-	G3S3	Species complex fairly widespread
S	Newly found *Eurycea* sp.	-	-	-	12 locations
REPTILES					
D1	Alligator snapping turtle *Macroclemy temminckii*	C2	T	G5S3	Not in study area
D3	Texas map turtle *Graptemys versa*	3C	-	G4S4	Farly common resident
S	Texas horned lizard *Phrynosoma cornutum*	C2	T	G5S5	Very local resident
D3	Milk snake *Lampropeltis triangulum*	-	-	G5S?	Sparse
D5	American alligator *Alligator mississippiensis*	TS/A	-	G5S4	Sparse
D3	Texas garter snake *Thamnophis sirtalis annectens*	C2	-	G5S3	Edge of original distribution
BIRDS					
D2	Brown pelican *Pelecanus occidentalis*	E	E	G5S1	Accidental vagrant
S	Bald eagle *Haliaeetus leucocephalus*	E	E	G3S2	Rare transient
S	Peregrine falcon *Falco peregrinus*	E/T	E/T	G3S1	Uncommon migrant
D2	Whooping crane *Grus americana*	E	E	G1S1	Very rare migrant
S	Piping plover *Charadrius melodus*	T	T	G3S1	Rare migrant
D2	Interior least tern *Sterna antillarum athalassos*	E	E	G4S2	Very rare migrant

TABLE 6

SPECIES OF CONCERN FOUND IN OR WITH THE POTENTIAL TO BE FOUND IN TRAVIS COUNTY

(continued)

P	Black-capped vireo *Vireo atricapillus*	E	E	G2S2	Local, uncommon, nesting
D2	White-faced ibis *Plegadis chihi*	C2	T	G5S?	Uncommon migrant
D2	Wood stork *Mycteria americana*	-	-	G5S?	Very rare migrant
D2	American swallow-tailed kite *Elanoides forficatus*	C2	T	G5S2	Very rare migrant
D2	White-tailed hawk *Buteo albicaudatus*	-	T	G5S2	Very rare vagrant
D2	Zone-tailed hawk *Buteo albonotatus*	-	T	G5S3	Very rare wintering
D2	Ferruginous hawk *Buteo regalis*	C2	-	G4S3	Rare migrant, winter
D2	Swainson's hawk *Buteo swainsoni*	3C	-	G4S?	Common migrant
D2	Snowy plover *Charadrius alexandrinus*	C2	-	G4S?	Rare migrant
D2	Long-billed curlew *Numenius americanus*	C2	-	G4S?	Uncommon migrant
P	Golden-cheeked warbler *Dendroica chysoparia*	E	T	G3S3	Local, nesting
D2	Tropical parula *Parula pitiayumi*	-	T	G5S3	Accidental vagrant
D2	Fulvous whistling-duck *Dendrocygna bicolor*	C2	-	G5S?	Rare migrant
D2	Masked duck *Oxyura dominica*	-	-	G4S4	Accidental migrant
D2	Golden eagle *Aquila chrysaetos*	-	-	G4S?	Very rare migrant
D2	Merlin *Falco columbarius*	-	-	G4S?	Uncommon migrant
D2	Black skimmer	-	-	G5S?	Very rare migrant

TABLE 6

SPECIES OF CONCERN FOUND IN OR WITH THE POTENTIAL TO BE FOUND IN TRAVIS COUNTY

(continued)

	Rynchops niger				
D2	Northern saw-whet owl	-	-	G5S?	Accidental vagrant
	Aegolius acadicus				
D2	Ringed kingfisher	-	-	G5S2	Very rare visitor
	Ceryle torquata				
D2	Grace's warbler	-	-	G5S3	Accidental vagrant
	Dendroica graciae				
MAMMALS					
None					
PLANTS					
D6	Heller's marbleseed	3C	-	G3S3	Locally common
	Onosmodium helleri				
P	Bracted twistflower	C2	-	G2S2	Eight localities
	Streptanthus bracteatus				
S	Texabama croton	C2	-	G1S1Q	Few populations
	Croton cf. alabamensis				
PD	Texas amorpha	C2	-	G3S3	Locally common
	Amorpha roemerana				
S,D3	Correll's false dragon-head	C2	-	G2S2	One historical locality
	Physostegia correlli				
D6	Buckley tridens	-	-	G2S2	Eleven localities
	Tridens buckleyanus				
P	Canyon mock-orange	C2	-	G1S1	Four localities
	Philadelphus ernestii				
COMMUNITIES					
D7	Tall grass prairie	-	-	G2S2	Nearly extirpated

[1]USFWS 1993
[2]TPWD 1991b, 1991c

TABLE 6
SPECIES OF CONCERN FOUND IN OR WITH THE POTENTIAL TO BE FOUND IN TRAVIS COUNTY
(continued)

BCCP STATUS

P	=	Primary species; only ones included in the BCCP
PD	=	Primary species in early 1989, no longer a primary species
S	=	Secondary species; subject to future review
D1	=	Deleted. Taxa not found in study area
D2	=	Deleted. No biologically significant occurrence in BCCP study area (no breeding or wintering; only migratory or vagrants)
D3	=	Deleted. Substantial and important portions of range are outside BCCP area
D4	=	Deleted. Taxa is no longer valid taxonomically
D5	=	Deleted. The American alligator is classified by the USFWS as "threatened by similarity of appearance" to other listed populations or species. The species is not biologically threatened in the United States.
D6	=	Deleted. Plants that were not Category 1 or 2, threatened or endangered, were deleted.
D7	=	Deleted. Communities are not protectable by a Section 10(a) permit
D8	=	Deleted. Taxonomic status uncertain.
D9	=	Deleted. In the study area, there has been extensive hybridization of this species with others. In the study area, the species probably no longer exists as a distinct genetic entity.

AGENCIES AND ORGANIZATIONS PROVIDING STATUS INFORMATION:

USFWS	=	United States Fish and Wildlife Service
TPWD	=	Texas Parks and Wildlife Department
BCD	=	Biological Conservation Database, Endangered Resource Branch, Texas Parks and Wildlife Department)

USFWS STATUS CODES:

E	=	Endangered (in danger of extinction throughout all or a significant portion of its range)
T	=	Threatened (likely to become endangered within the foreseeable future throughout all or a significant portion of its range)
E/T	=	Two subspecies listed: one as endangered, one as threatened
C1	=	Appropriate to be listed as E or T; proposed rule anticipated
C2	=	Listing "possibly appropriate"; research needed
3C	=	No longer considered for listing; more widespread than previously thought, or no significant threat

TABLE 6

SPECIES OF CONCERN FOUND IN OR WITH THE POTENTIAL TO BE FOUND IN TRAVIS COUNTY

(continued)

TNHP STATUS CODES:

G1	=	Less than 6 occurrences globally
G2	=	6 to 20 occurrences globally
G3	=	21 to 100 occurrences globally
G4	=	Apparently secure globally, may be quite rare in parts of its range
G5	=	Demonstrably secure globally
S1	=	Less than 6 occurrences statewide
S2	=	6 to 20 occurrences statewide
S3	=	21 to 100 occurrences statewide
S4	=	Apparently secure in the state, may be quite rare in parts of the state
S5	=	Demonstrably secure in the state
S?	=	There is no state listing
Q	=	Questionable taxonomy

FOR ALL AGENCIES:

-	=	Not listed. In some cases species are not listed because of bureaucratic delays or because of lack of legal jurisdiction rather than because of biological reasons.

revision (and 1985 amendment) to the code provides authority for TPWD to designate plant species as threatened or endangered and to prohibit commercial collection or sale of these species without permits.

TPWD endangered species regulations are promulgated as Sections 65.171-65.177, 65.181-65.184, and 69.01-69.14 of the Texas Administrative Code (authorized by Chapters 67, 68, and 88 of the Texas Parks and Wildlife Code, respectively). These sections regulate the taking, possessing, transporting, exporting, processing, selling or offering for sale, or shipping of state listed endangered or threatened species of fish, wildlife, and plants. Neither specific criteria for the listing of plant and animal species nor protection from indirect take (i.e., destruction of habitat or unfavorable management practices) is found in either of the above-mentioned statutes or regulations (TPWD 1991b).

Functionally, the TPWD oversees endangered resources through the Resource Protection Division. The division is further divided into branches, including the Endangered Resources Branch. The Endangered Resources Branch lists, regulates, and prepares plans for the recovery of threatened and endangered species; and, catalogs, monitors, and provides information on rare species and communities of concern (TPWD 1991b). Table 6 also includes the status of state-listed endangered or threatened species as well as the Biological Conservation Database's list of rare species and communities of concern.

b. Life History Descriptions of BCCP Species of Concern

There are basically three levels of consideration which have been implemented throughout the habitat conservation planning process for sensitive species in Travis County. The first level of consideration is the eight species (two birds and six invertebrates) discussed below which are currently listed by the USFWS as endangered and are the primary focus of the proposed Permit for Travis County. The second level of consideration includes the bracted twistflower, canyon mock-orange, and Texabama croton, which are federally-listed as C2, three *Eurycea* salamanders (C1 and C2 species), which could feasibly be listed within the life of the proposed permit and approximately 30 invertebrates that could be listed over the life of the Permit. The third level of consideration is the species of concern that are not imminently threatened for various reasons. Common examples of species in this third level include those which are found to be more common than originally suspected, are still pending further scientific review, or are species with large and important portions of their ranges outside Travis County.

While species at this third level do not currently warrant significant protection or management emphasis, they bear consideration and scrutiny throughout the life of the permit.

Black-Capped Vireo

The endangered black-capped vireo is unique among vireos due to differing coloration between sexes and delayed plumage maturation (USFWS 1991). Mature males and females have two wing bars, brownish-red eyes, white eye rings with connecting loral stripes (spectacled), olive-colored backs, and whitish breast and belly. Mature males have glossy black heads and immature males (first breeding season) have gray napes and posterior crowns. Mature females are generally similar to males except their head is slate-gray colored (BAT 1990; USFWS 1991).

The breeding range for the black-capped vireo currently includes portions of Oklahoma, Texas, and Mexico and its wintering range is the Pacific coast of Mexico. Figure 10 illustrates the known breeding and wintering ranges of the black-capped vireo.

The black-capped vireo population in Oklahoma has been reduced to slightly more than 300 birds in three areas. The majority (225-300) of Oklahoma black-capped vireos is found in the Wichita Mountains Wildlife Refuge and adjacent Fort Sill Military Reservation in Comanche County. The other two localities are at high risk. One of these, located on the Canadian/Caddo County border, only had one bird present in 1990.

The remaining group is located in Blaine County and consisted of only six breeding pairs in 1990 (USFWS 1991).

The Texas black-capped vireo breeding population consists of about 1,500 birds or 620 pairs in 34 counties in north central Texas, on the Lampasas Cut Plains, on the Edwards Plateau, on the Stockton Plateau, and in the Trans-Pecos (USFWS 1991). Within the permit area the vireo population numbers less than 100 birds (Kent S. Butler & Associates [KSB&A] and Espey, Huston & Associates, Inc. [EH&A] 1992). The largest concentrations of breeding birds in Texas occur at Fort Hood Military Reservation in Bell and Coryell counties (several hundred), in western Kerr and Bandera counties, and in the canyons of the upper bend of the Rio Grande River and the canyons of the Devil's River (300-400) (USFWS 1991).

The known breeding populations of the black-capped vireo in Mexico are principally located in the state of Coahuila. Population data is sketchy and estimates range from several hundred to more than 9,000 pairs (Benson & Benson 1990, Scott & Garton 1991, and Benson & Benson 1991). The 12 known localities for vireos in Coahuila extend from just south of Big Bend to the Sierra San Marcos (USFWS 1991) (see Figure 10).

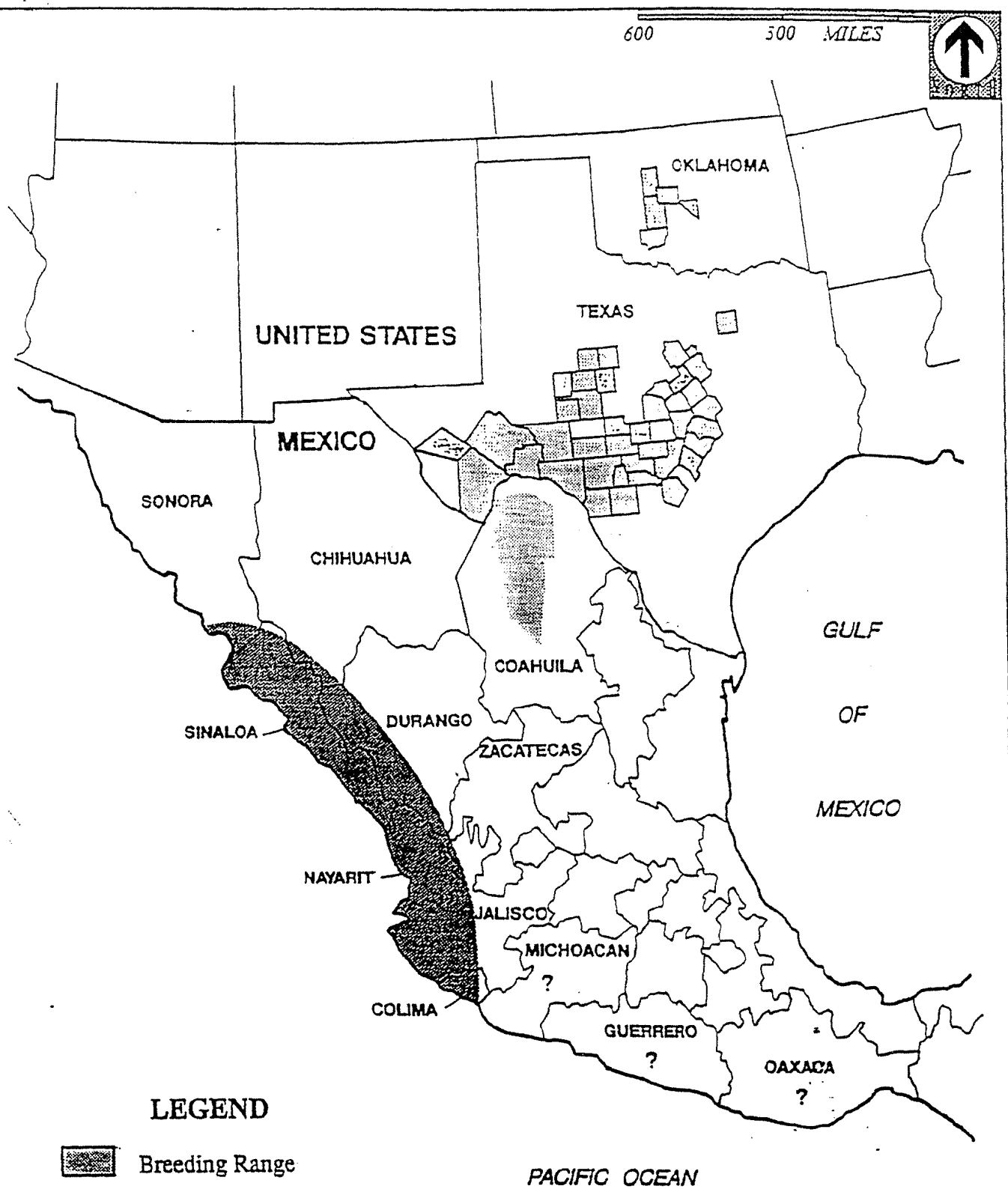
Little is known about the wintering activity of the black-capped vireo. Winter observations come mainly from the Mexican states of Durango, Sinoloa, Nayarit, and Jalisco, with a few records also for Sonora, Guerrero, and Oaxaca (USFWS 1991).

Black-capped vireos arrive in Texas between late March and late April. They leave Texas by late-September. Typically, adult males arrive in Texas before females and first-year males and stay later in the fall. Nest building begins when females arrive, requires two to five days for completion, and continues through mid-August. There are three to four eggs laid per nesting attempt with up to six nesting attempts (USFWS 1991). Black-capped vireos construct small, cup-shaped nests which are usually suspended from forks in horizontal branches at heights between 40-120 centimeters in the densest zones of deciduous vegetation (BAT 1990; USFWS 1991).

Breeding habitat throughout the black-capped vireo's range varies considerably in its vegetational characteristics. Generally, it is described as shrubland composed of thickets and clumps of varying size and distribution where vegetation cover extends to ground level. In Texas and Oklahoma, this configuration typically is found in shallow soils over rocky substrate in gullies, ravine edges, and on eroded slopes. The succession rate of any given habitat patch, which affects suitability for vireos, is primarily influenced by underlying geology and soils, slope, and species composition. Periodic site disturbances (fire, browsing, etc.) also seem to influence the habitat patches' extent and height (USFWS 1991).

In Travis County, the areas most heavily utilized by breeding black-capped vireos are in vegetational areas recovering from burning or clearing which are underlain by Fredericksburg limestones. The most common nesting substrates chosen are sumacs (*Rhus* spp.) (USFWS 1991), which is typically associated with shin oak (*Quercus durandii* var. *breviloba*), Ashe juniper (*Juniperus ashei*), Texas oak (*Quercus buckleyi*), plateau live oak (*Quercus fusiformis*), and other woody vegetation which forms an open to partially closed canopy (KSB&A and EH&A 1992). The status and locations of vireo populations in the permit area are discussed in the following paragraphs, summarized in Table 7, and illustrated in Figure 11. The text, table, and graphic are taken from the City of Austin's Phase I application of the BCCP (1993a).

During the 1990 breeding season, DLS Associates monitored black-capped vireo populations at several areas in western Travis County (DLS Associates 1990a). According to DLS Associates (1990a), field surveys in western Travis County (excluding the Post Oak Ridge area) conducted during the 1990 breeding season revealed a total of 28 black-capped vireo pairs. Vireos in the Comanche Peak area comprise over one-half of the western Travis County breeding population with 15 mated pairs. Six vireo pairs were recorded from the Davenport Ranch/Wild Basin area, five pairs were found in The Parke



LEGEND

- Breeding Range
- Wintering Range
- ? Possible Wintering Range

Source: USFWS

FIGURE 10

Breeding and Wintering Ranges of the Black-capped Vireo

RECON

Figure 10 Back Side

TABLE 7
ACREAGE OF KNOWN OCCUPIED BLACK-CAPPED VIREO HABITAT IN THE BCCP PERMIT AREA

Macrosite	Recommended Preserve Areas: Preserve Acquisition	Recommended Preserve Areas: Public/ Institutional	Total Area Protected (Recommended)	Percent Protected (Recommended)	Total Area Unprotected (Recommended)	Percent Unprotected (Recommended)	Total Area
Lake Travis	0	0	0	0.0	55	100.0	55
Devil's Hollow	0	0	0	0.0	116	100.0	116
Cypress Creek	597	64	661	94.2	41	5.8	702
Bull Creek	0	0	0	0.0	0	0.0	0
North Lake Austin	82	48	130	17.5	614	82.5	744
South Lake Austin	0	0	0	0.0	0	0.0	0
West Austin	0	256	256	100.0	0	0.0	256
Pedernales River	0	0	0	0.0	0	0.0	0
Barton Creek	0	98	98	100.0	0	0.0	98
Southwest Austin	0	0	0	0.0	0	0.0	0
TOTAL	679	466	1,145	58.0	826	42.0	1,971

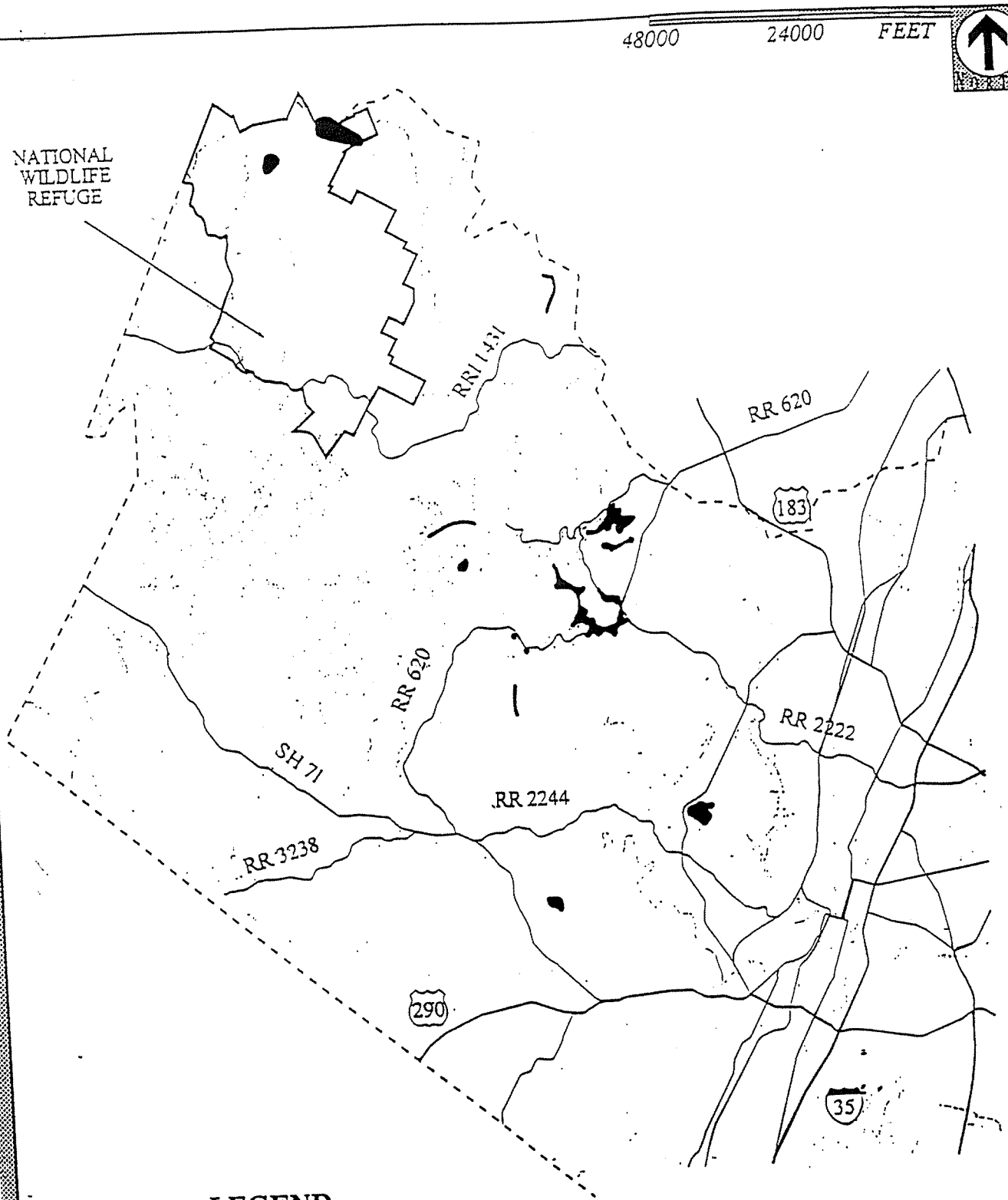
NOTE: The information here is complete through 1995 (see text).

area, one pair was at Vireo Hill on The Uplands, and at least one pair occurred in the north shore/south Jonestown Hills area. Other parts of the study area containing black-capped vireos are the areas on the north shore of Lake Travis, south Jonestown Hills, north of Bee Cave Road on the Wolf Ranch, and near the intersection of Loop 360 and Spicewood Springs Road (DLS Associates 1990a). Reproduction within the four areas containing black-capped vireos monitored by DLS Associates (1990a) in western Travis County (i.e., Comanche Peak, The Parke, Davenport, and Vireo Hill) was lower in 1990 than in 1989. During the 1990 breeding season, 32 black-capped vireo nests were observed, 11 of which were successful. Between 14 and 15 young fledged from these observed nests; an additional 11 young fledged from unobserved nests. By comparison, 39 nests were observed in 1989, 21 of which were successful. Between 58 and 60 black-capped vireo young fledged from the observed nests, while an additional 9 or 10 young fledged from unobserved nests (DLS Associates 1990a).

DLS Associates continued the black-capped vireo monitoring and banding program during the 1991 nesting season. A total of 84-85 adult vireos representing at least 28 nesting pairs were observed in 1991 in the areas previously covered by the 1989 and 1990 censuses (further vireo populations were documented in the Post Oak Ridge area). This represented little overall change, except that, while most groups of vireos had declined, the colony at The Parke had increased from five mated pairs in 1990 to nine in 1991. In 1991, three of the observed vireos changed colony locations from the previous season. These included one male which relocated from Wild Basin in 1990 to The Parke in 1991. Two 1990 fledglings from the Comanche Peak area were also found at The Parke in 1991.

The Texas Department of Transportation (TxDOT) began monitoring of the vireo populations in Travis County in 1992 in the first year of a five-year effort (TxDOT 1993). Access to the vireo colony at The Parke was not granted to researchers in 1992, thereby putting a constraint on overall monitoring efforts and comparisons with previous years. Furthermore, not all recent locations where vireos had been reported in 1991 and earlier were checked by TxDOT. Approximately 24 males, pairs, and/or territories are discussed by TxDOT in their 1992 results. TxDOT indicated that during 1995 they observed 40 to 45 individual vireos in Travis County.

Although data on the Post Oak Ridge vireo population is limited, a substantial number of vireos may exist in the area. Additional research is required to determine the actual size and extent of this group of vireos. Vireo habitat in the Post Oak Ridge vicinity is typified by relatively extensive shinneries occurring on ranch land currently in use for pasturing cattle and/or goats. During 1994 and 1995 two vireos were observed on recently acquired BCNWR lands and in 1993 and 1994 up to 34 vireo territories were



LEGEND

Known Black-capped Vireo Habitat

Source: USF&W Service

FIGURE 11

Known Occupied Black-capped Vireo Habitat in the Permit Area

RECON

Figure 11 Back Side

observed on BCNWR lands outside of Travis County.

The Comanche Peak area includes seven separate habitat localities occupied by vireos, which represent various stages of vegetational succession. One locality, Hippie Hollow, is dominated by mid-successional vegetation on steep, south-facing slopes characterized by a variety of shrub species interspersed with trees and open grassy areas. Another area, Comanche Trail, is predominantly late successional habitat (approaching closed Area canopy) oak-juniper woodland, which will likely be abandoned by the current group of vireos as it matures further.

The Parke is a good example of a recently disturbed area that has become occupied by vireos. This locality was unoccupied prior to 1989 (Sexton, pers. comm. 1992; DLS Associates 1990a). Prior to 1989, the Ashe juniper had been cut and much of it was left as slash on the ground. By 1989 the existing vegetation community that included shin oak, second-growth juniper, and a variety of shrub species, had developed the structure and composition capable of supporting vireos. Eleven males and four to five females representing five breeding pairs were observed at The Parke in 1989 and 1990 (DLS Associates 1990a). Observations of banded individuals indicate that this area has been colonized, at least in part, by vireos from other nearby localities such as Steiner Ranch, Hudson Bend, Hippie Hollow, and Comanche Trail (DLS Associates 1990a).

The north shore of Lake Travis supports vireo habitat on steep, south-facing bluffs with a southern aspect. The vegetation in the area is characterized by a dense growth of a variety of predominantly shrubby species. The combination of steep topography, southern exposure, and shallow soils is likely responsible for maintaining a vegetation community with the composition and structure to support vireos. Generally, even tree species in the locality exhibit a stunted form, and succession to a closed-canopy woodland is unlikely or will be retarded by existing conditions.

The Davenport Preserve/Wild Basin area exemplifies good vireo habitat which supports a declining number of vireos, probably due to its proximity to high-density urban development and fragmentation. Fragmentation and urban development are certainly factors elsewhere, although perhaps not to the extent evident at this locality.

The black-capped vireo has suffered a reduction in range and population size. This species no longer nests in Kansas; it occurs in only three locales in Oklahoma, and is likely to be extirpated from its former north central Texas and some of its current southeast Edwards Plateau range. The bird's Big Bend and Concho Valley populations are also low. The principle reasons appear to be poor reproductive success and low survivorship due largely to nest parasitism by brown-headed cowbirds. Brown-headed cowbird populations are increasing and their range is expanding dramatically. Brown-

headed cowbird females lay their eggs in vireo nests, and, since the cowbird's incubation time is four to five days less than that of the vireo, the vireo eggs either never hatch, the vireo chicks are out-competed or the nest is abandoned. Vireo eggs are also damaged or removed by cowbird females (USFWS 1991).

Secondary threats to the black-capped vireo include direct habitat loss due to urbanization or road developments, overgrazing/browsing, natural vegetation succession, fire suppression, and various indirect results of land uses. Examples of this last category include urbanization-related increases in predation by raccoons, skunks, house cats, and jays and increased cowbird parasitism (USFWS 1991).

Golden-Cheeked Warbler

The endangered golden-cheeked warbler is a small (about 15 centimeters in length), insectivorous neotropical migratory bird that nests only in the mixed juniper-oak woodlands of Texas (BAT 1990; USFWS 1992b). This is the only bird, out of the 611 avian species known to have occurred in Texas, whose breeding range is entirely confined within the state's boundaries (BAT 1990).

Adult males have a black crown, nape, back, throat, and upper breast. Their cheeks are bright yellow and are outlined in black. Their eyes are dark brown and possess a thin, black horizontal eyeline that extends from near the lower mandible through and beyond the eye. Wings are black with two white wing bars and underparts are white with some black spotting and streaking. Adult females are similarly colored except their back is olive green with thin black streaks, their cheeks and eyelines are less brilliant than those of the male, their throat is yellowish grading to buff, the black upper breast is narrower than that of the male, and their underparts are white. The net result is a markedly subdued version of the male (BAT 1990; USFWS 1992b).

The breeding range for the golden-cheeked warbler includes 37 counties on the Lampasas Cut Plain, Edwards Plateau, and Llano Uplift regions of Texas. The warbler is thought to be extirpated in Concho, Tom Green, and Dallas counties. This species winters in southern Mexico (state of Chiapas) and in the Central American countries of Guatemala, Honduras, and Nicaragua. Migrational records indicate the golden-cheeked warbler follows the coniferous-oak woodlands of the Sierra Madre Oriental in eastern Mexico (USFWS 1992b). Figure 12 illustrates the known breeding and wintering ranges of the golden-cheeked warbler.

The USFWS estimates the carrying capacity of central Texas for the golden-cheeked warbler at 10,000 to 30,000 birds of which 2,000 to 4,000 reside in the permit area. In the Golden-cheeked Warbler Recovery Plan, the USFWS (1992b) estimates theoretical

LEGEND

Breeding Range

Wintering Range

Source: USFWS

FIGURE 12

Known Breeding and Wintering Ranges of the Golden-cheeked Warbler

RECON

Figure 12 Back Side

populations at 18,486 pairs in 1962; 14,750 pairs in 1974 and 13,800 territories in 1990.

These figures are based upon habitat availability estimates assuming an average density of 50 acres/pair.

Golden-cheeked warblers return from wintering grounds in mid-March, with females arriving about a week later than males. Females construct cup-shaped nests made of juniper bark strips and cobwebs as early as the first week of April. Males often sing from prominent perches within established territories. These singing displays decrease after fledging and few songs are heard after mid-June. The incubation of the three to four egg clutch lasts 12 days. Nesting usually occurs between April 3 and June 27 (USFWS 1992b).

Golden-cheeked warblers breed in woodlands characterized by a mix of Ashe juniper and various deciduous trees including Texas oak, shin oak, and plateau live oak. The principle limiting factor is the presence of Ashe juniper with stripping bark, that is the warbler's main nest construction component. Other factors conducive to nesting activity likely include high availability of arthropod prey, moderate to high degree of canopy cover, and possible proximity to water (USFWS 1992b).

Golden-cheeked warbler habitat in the permit area is widely considered to be the highest quality and least fragmented of any county in its range (BAT 1990; KSB&A and EH&A 1992). The largest patches of high-quality warbler habitat occur within the Bull Creek, North Lake Austin and Cypress Creek macrosites. Table 8 summarizes the amounts of warbler habitat by macrosite and Figure 13 illustrates warbler habitat distribution in western Travis County. This table and figure are from the City of Austin (1993a).

The principal threat to the golden-cheeked warbler and the reason for the species' emergency listing in 1990 is habitat destruction, modification, and fragmentation from urbanization and some range management practices. Other threats include declining oak regeneration, oak wilt disease, nest parasitism by the brown-headed cowbird, and urban proximity. The USFWS (1992b) shows a 35 percent loss of available habitat since 1962, with a substantial acceleration of habitat loss due to suburban development in Travis, Williamson, and Bexar counties.

Karst Invertebrates

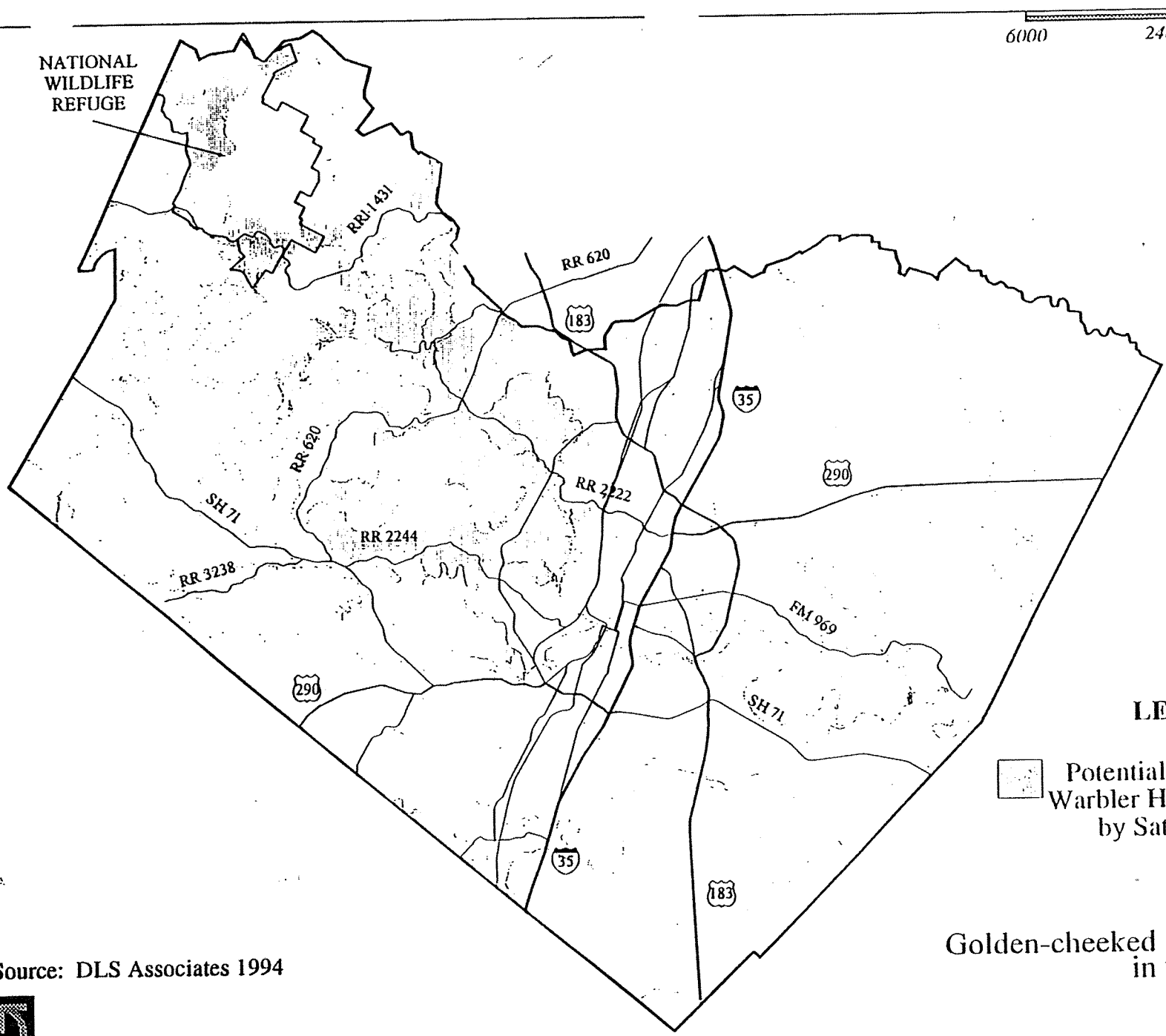
In western Travis County, portions of the soluble Edwards limestone have formed a geomorphic topography known as karst. These areas are characterized by numerous subterranean features including sinkholes, fissures, and caves formed by the dissolution of the bedrock in subsurface streams and passages. Karst areas are typically flat with relatively few surface drainages. Much of the rainfall in these areas is absorbed into the

TABLE 8
ACREAGE OF GOLDEN-CHEEKED WARBLER HABITAT
IN THE BCCP PERMIT AREA

Macrosite	Recommended Preserve Areas: Preserve Acquisition	Recommended Preserve Areas: Public/ Institutional	Total Area Protected (Recommended)	Percent Protected (Recommended)	Total Area Unprotected (Recommended)	Percent Unprotected (Recommended)	Total Area
Lake Travis	0	0	0	0.0	5,379	100.0	5,379
Devil's Hollow	0	0	0	0.0	1,957	100.0	1,957
Cypress Creek	1,289	1,362	2,651	59.6	1,796	40.4	4,447
Bull Creek	2,533	443	2,976	53.2	2,615	46.8	5,591
North Lake Austin	1,336	1,942	3,278	68.8	1,488	31.2	4,766
South Lake Austin	712	355	1,067	29.3	2,572	70.7	3,639
West Austin	56	255	311	9.5	2,968	90.5	3,279
Pedernales River	0	4	4	4.0	96	96.0	100
Barton Creek	2,554	1,128	3,682	52.3	3,353	47.7	7,035
Southwest Austin	0	0	0	0.0	1,646	100.0	1,646
TOTAL	8,480	5,489	13,969	36.9	23,870	63.1	37,839 *

NOTE: As identified by satellite imagery. Data prepared by KSB&A, EH&A, and Texas Natural Resources Information System (TNRIS).

*USFWS indicates that about 2,000 acres of habitat have been destroyed by urban development between 1990 and 1994. This leaves 35,839 acres at this time.



LEGEND

Potential Golden-cheeked Warbler Habitat as Identified by Satellite Imagery

FIGURE 13
Golden-cheeked Warbler Habitat in the Permit Area

Source: DLS Associates 1994

RECON

Figure 12 Back Side

karst features (Veni and Associates 1988). Numerous karst systems in the permit area are isolated from one another by noncavernous formations, river and stream canyons, and faults. As a result of this isolation, each system supports an endemic biota which may represent relictual contiguous karst habitat (Elliott and Reddell 1989). The degree of biogeographical provincialism exhibited here is found only in a few places around the world.

Caves, sinkholes, and fissures along with smaller, less detectable subsurface openings and subterranean passages, are important elements of the karst habitat. Additionally, the surface community above the karst must be considered an integral part of the habitat because it not only buffers the internal environment from fluctuations in temperature and moisture, it also supplies the system with energy and nutrients in the form of detritus, leaf litter, animal droppings, and cave visitors (Elliott and Reddell 1989). The surface vegetation is also important because as dissolved nutrients infiltrate into the karst, vegetation serves as a potential pollution filter and a supplier of nutrients. Because of the complex nature of karst biotic communities and associated physical processes, and the paucity of information available on this subject, the BAT recommended the protection strategy for endangered species in these systems be focused on karst topography.

There are six federally-listed endangered karst arthropods currently known from Travis County. These species include the Tooth Cave spider (*Neoleptoneta myopica*), Tooth Cave pseudoscorpion (*Tartarocreagris texana*), Tooth Cave ground beetle (*Rhadine persephone*), Kretschmarr Cave mold beetle (*Texamaurops reddelli*), the Bone Cave harvestman (*Texella reyesi*), and the Bee Creek Cave harvestman (*Texella reddelli*). Another endangered invertebrate, the Coffin Cave mold beetle (*Batrisodes texanus*), is only known from Williamson County. The original listing on September 16, 1988 (53 CFR 36029) for endangered invertebrates was for only five of the seven species listed above. *Texella reyesi* was originally considered to be a population of *Texella reddelli* and *Batrisodes texanus* was considered to be a population of *Texamaurops reddelli*. Since these newly designated species were originally thought to be members of the originally listed species, they too are now considered endangered under the Endangered Species Act (USFWS 1993a). In addition to the federally-listed invertebrates, approximately 25 rare karst invertebrates are of concern and the following section describes the habitat requirements for the karst invertebrates as a group, followed by a description of each endangered karst species known to occur in Travis County, and a summary of their distribution, status, taxonomic notes, and threats.

The six federally-listed endangered karst invertebrates were previously known only from Travis and adjacent areas in Williamson County, except for a recent record of *Texella reddelli* from Burnet County. Approximately 45,368 acres of potential karst invertebrate

habitat have been identified in the Permit area. The acreage for each macrosite within the permit area is provided in Table 9. Thirty-nine caves are known to harbor one or more endangered karst arthropods in Travis County. Table 10 summarizes the known distribution of endangered karst invertebrates in the county. In addition, known localities for other rare karst species are shown graphically in Figure 14 and a list of caves recommended for protection by the USFWS is provided in Table 11.

Troglobitic species are adapted to the karst environment. They often have reduced or complete loss of eyes and pigment, elongate appendages, well-developed sensory organs, and life histories adapted to a food poor environment (BAT 1990). The following descriptions and species summaries are taken largely from the BAT report (1990) and the Draft Recovery Plan for Endangered Karst Invertebrates in Travis and Williamson Counties, Texas (USFWS 1994).

Tooth Cave Spider. The Tooth Cave spider is the smallest of the endangered arthropods in the permit area with a total length of 1.6 millimeters. It is a pale spider with relatively long legs and rudimentary eyes.

Tooth Cave Pseudoscorpion. The Tooth Cave pseudoscorpion resembles a tiny, tailless scorpion, but it has neither eyes nor a stinger. Reaching a size of four millimeters it preys on small insects by seizing them with its pincers.

Tooth Cave Ground Beetle. The Tooth Cave ground beetle is a reddish-brown predaceous beetle with reduced eyes. It is the largest of the endangered arthropods at seven to eight millimeters.

Kretschmarr Cave Mold Beetle. The Kretschmarr Cave mold beetle is a dark, short-winged, long-legged creature whose diet is unknown, although some members of its family are predaceous. It is less than three millimeters in length and lacks eyes.

Bone Cave Harvestman. The Bone Cave harvestman (originally considered to be the Bee Creek Cave harvestman) is a pale, blind harvestman, or daddy-longlegs, which is orange colored. It ranges from 1.41-2.67 millimeters in length. The Bone Cave harvestman is, thus far, the most commonly found of the endangered invertebrates.

Bee Creek Cave Harvestman. The Bee Creek Cave harvestman has relatively long legs but attains a length of only 1.9-2.18 millimeters. It is an eyeless predator of small insects which is also orange in color (USFWS 1993a). Since the taxonomic reevaluation within *Texella* by Ubick and Briggs (1992), *Texella reddelli*'s range has changed and is now known from Burnet and Travis counties.

The karst-dwelling invertebrates are threatened by direct destruction of the karst, and by

TABLE 9
ACREAGE OF POTENTIAL KARST INVERTEBRATE HABITAT
IN THE BCCP PRESERVE AREA

Macrosite	Acreage of Potential Karst Invertebrate Habitat within Permit Area	Acreage of Potential Karst Invertebrate Habitat Protected [1]	Acreage of Proposed Take of Potential Karst Invertebrate Habitat	Percent of Potential Habitat Subject to Take
Lake Travis	4,462	0	4,462	100.0
Devil's Hollow	78	0	78	100.0
Cypress Creek	6,635	3,252	3,383	51.0
Bull Creek	9,502	3,090	6,412	67.5
North Lake Austin	1,338	428	910	68.0
South Lake Austin	44	0	44	100.0
West Austin	8,307	753	7,554	90.9
Pedernales River	0	0	0	0.0
Barton Creek	2,604	1,775	829	31.8
Southwest Austin	12,398	0	12,398	100.0
TOTAL	45,368	9,298	36,070	79.5

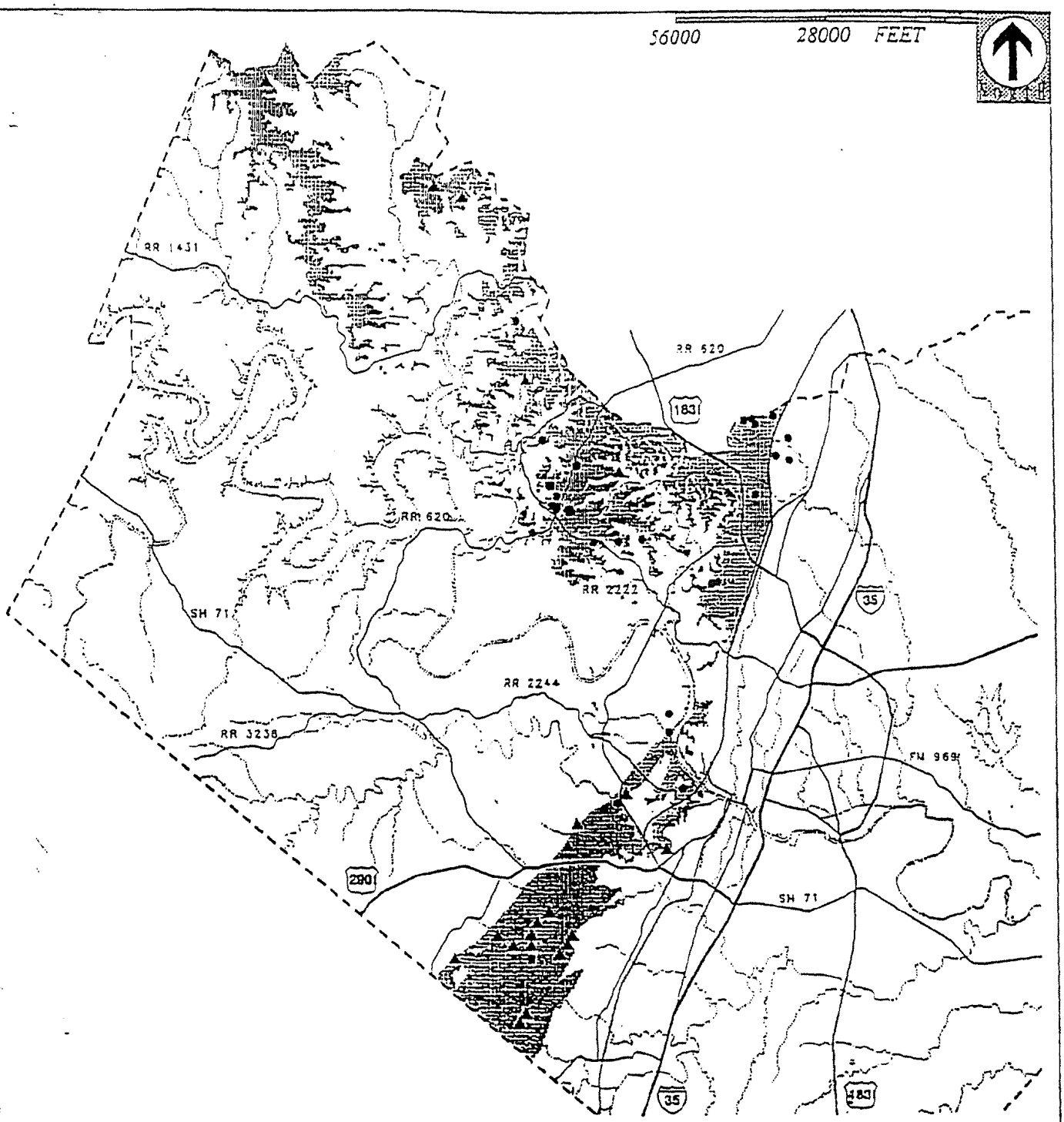
NOTE: Potential karst habitat is that area in Travis County that contains the limestone that may contain caves, sinkholes, and fissures.

[1] Assumes projected 66% acquisition of land. Includes preserves and public/institutional lands.

TABLE 10
SUMMARY OF RECOMMENDED PROTECTION STRATEGIES FOR ENDANGERED KARST INVERTEBRATE LOCALITIES IN THE BCCP PRESERVE AREA

Category	Tooth Cave Pseudoscorpion	Tooth Cave Spider	Tooth Cave Ground Beetle	Kretschmarr Cave Mold Beetle	Bee Creek Cave Harvestman	Bone Cave Harvestman
Total localities in BCCP Conservation Area	5	4	16	6	7	22
Recommended Protection Strategy						
Preserve acquisition	1 (20)	1 (25)	4 (25)	-	3 (43)	4 (18)
Cave cluster	2 (40)	2 (50)	5 (31)	3 (50)	-	9 (41)
Individual preserve	2 (40)	1 (25)	6 (38)	3 (5)	-	4 (18)
Cooperation with owner	-	-	-	-	2 (29)	-
City of Austin management	-	-	-	-	2 (29)	2 (9)
Total protected	5 (100)	4 (100)	15 (94)	6 (100)	7 (100)	19 (86)
Unprotected	0 (0)	0 (0)	1 (6)	0 (0)	0 (0)	3 (14)

NOTE: Numbers in parentheses represent percentages.



LEGEND

Source: Veni (1991) and Elliot (1992)

- Karstic Limestone Distribution
- ▲ Rare Karst Species
- • Known Endangered Karst Species

FIGURE 14

Karstic Limestone Distribution and Endangered Karst Species Locations

RECON

Figure 14 Back Side

TABLE 11

CAVES (CONTAINING LISTED AND NON-LISTED KARST INVERTEBRATES) PROPOSED FOR PROTECTION

Adobe Springs Cave
Airman's Cave
Amber Cave
Armadillo Ranch Sink
Arrow Cave
Bandit Cave
Beard Ranch Cave
Bee Creek Cave
Blowing Sink
Broken Arrow Cave
Buda Boulder Spring
Cave X
Cave Y
Ceiling Slot Cave
Cold Cave
Cotterell Cave
Disbelievers Cave
District Park Cave
Eluvial Cave
Flint Ridge Cave
Fossil Cave
Fossil Garden Cave
Gallifer Cave
Get Down Cave
Goat Cave
Hole-in-the-Road Cave
Ireland's Cave
Jack's Joint
Japygid Cave
Jest John Cave
Jester Estates Cave
Jollyville Plateau Cave
Kretschmarr Cave
Kretschmarr Double Pit
Lamm Cave
Little Bee Creek Cave
Lost Gold Cave
Lost Oasis Cave
M.W.A. Cave
Maple Run Cave
McDonald Cave
McNeil Bat Cave
Midnight Cave
Moss Pit
New Comanchee Trail
No Rent Cave
North Root Cave
Pennie Cave
Pickle Pit
Pipeline Cave
Rolling Rock Cave
Root Cave
Slaughter Creek Cave
Spanish Wells Cave
Spider Cave
Stark's North Mine
Stovepipe Cave
Talus Spring
Tardus Hole
Tooth Cave
Weldon Cave
Whirlpool Cave

threats to the larger ecosystem that supplies the karst communities with water, energy, and nutrients and buffers the moisture and temperature regime of the karst from extreme fluctuations. Twenty percent of the known caves in Travis County were destroyed in the last 20 years as a result of livestock operations and land development. At this rate of destruction, Elliott and Reddell (1989) estimate that less than 80 percent of the presently known caves in Travis County will remain by the turn of the century.

Imported fire ants (*Solenopsis invicta*) threaten the karst community directly by preying on the karst invertebrates and indirectly by reducing the diversity and abundance of the aboveground insect community. Fire ants are most abundant in disturbed areas. The most current estimates indicate 36 out of 78 endangered karst localities (Travis and Williamson counties combined) have some level of imported fire ant activity.

The karst fauna can be harmed as a result of human visitation by direct contact, damage to their habitat (e.g., soil compaction), and by trash and toxic contamination. Most threats to the endangered karst fauna are not well understood because little information is known on the ecology of the community. It is thought that the faunal community is sensitive to pollution from urban runoff, reductions of and alterations to the aboveground biological community, and alterations to groundwater flow patterns. The loss of karst habitat is a major concern because there is substantial evidence that only a fraction of the karst biota is known to science and the benefits of the species and ecosystem to man are not yet known.

Forty-seven species of karst invertebrates found in the proposed Permit area are species of concern. Of these, 43 are representatives of the phylum Arthropoda, and the remaining four are snails from the phylum Mollusca. Currently, six of the arthropods are federally-listed as endangered and are primary species of concern addressed by the proposed Permit. Of the remaining invertebrate species, 25 species are considered in this Plan and inclusion of 16 species will be determined in the future (see Table 6).

Bracted Twistflower

The bracted twistflower, listed as a candidate (C2) for threatened or endangered status, is an erect, herbaceous annual which grows to a height of 0.25-1.5 meters. Its glossy and somewhat succulent leaves vary in coloration from light to dark green. Lower leaves (6-18) have stiff hairs, are stalked, spoon-shaped, lobed, and form a clump 5-20 centimeters across and usually less than five centimeters tall. Upper leaves are arrow shaped, unstalked (clasping), and have entire margins. Axils of these upper leaves give rise to purple flowers 1.25-2.5 cm in length, which have four spoon-shaped petals that arch backwards. The fruit of the bracted twistflower is a long (7.5-17.5 centimeters), thin (0.625 centimeter in diameter) brown pod which has many flat, winged reddish

brown to brown seeds that are oblong to round in shape (McNeal 1989; BAT 1990).

Figure 15 illustrates the known range of the bracted twistflower. This species occurs in locales in Bexar, Medina, Uvalde, and Travis counties with Medina and Travis counties having the largest number of locations. There is also a questionable occurrence in Caldwell County. There are eleven groups at five sites occuring in Travis County. These sites are generally small in areal extent, but densely populated. The following information summarizes the results of the 1989 survey by McNeal (1989). The number of individual plants is not presented because the number of individuals can vary from year-to-year.

- North Cat Mountain (Bull Creek macrosite), three groups
- Cat Mountain (Bull Creek macrosite), four groups
- Mt. Bonnell (North Lake Austin macrosite), one group
- Bee Creek Nature Preserve (North Lake Austin macrosite), one group
- Barton Creek Greenbelt (Barton Creek macrosite), two groups

The blooming period of the bracted twistflower is from March to May. Typically an outcrossing species (must cross pollinate) (autogamy, or self-pollinate, and self-compatibility are also documented), the bee species *Megachile cornata* is its main pollinator (BAT 1990).

The bracted twistflower grows on thin clay soils over limestone in or near dense, brushy areas with high winter soil moisture retention. Travis County known localities are found in oak/juniper, oak/ash/black cherry, or juniper woodland; however, one site is a juniper/little bluestem grassland. Common shrub associates include evergreen sumac (*Rhus virens*), Lindheimer's silk tassel (*Garrya ovata* var. *lindheimeri*), shin oak (*Quercus durandii* var. *breviloba*), myrtlecroton (*Bernardia myricaefolia*), and elbowbush (*Forestiera pubescens*). All Travis County localities occur in the Balcones fault zone above permanent water and are, with one exception, on ridgetops or upper slopes.

The largest populations of the bracted twistflower in Travis County are threatened by housing developments. McNeal (1989) also cites "decreases in suitability of the remaining habitat due to changes in the vegetation, changes in water flow and purity, erosion, brush clearing, trash dumping, foot and vehicular traffic and browse damage from a large and unmanaged deer population" as threats.

Canyon Mock-Orange

Canyon mock-orange is a deciduous shrub which obtains a height of 0.3 to 2 meters. Arching branches, suckering from the base support small (0.6-2.8 centimeters long by 0.3-1.3 centimeters wide), oval to elliptic leaves which are dark green above, lighter below, and pubescent. Four-petaled, solitary white to cream-colored flowers arise from the leaf base. The flowers are about 2.5 centimeters across and appear on first-year wood. The canyon mock-orange produces a small (0.625 centimeter in diameter) nearly spherical woody capsule (BAT 1990; McNeal 1989).

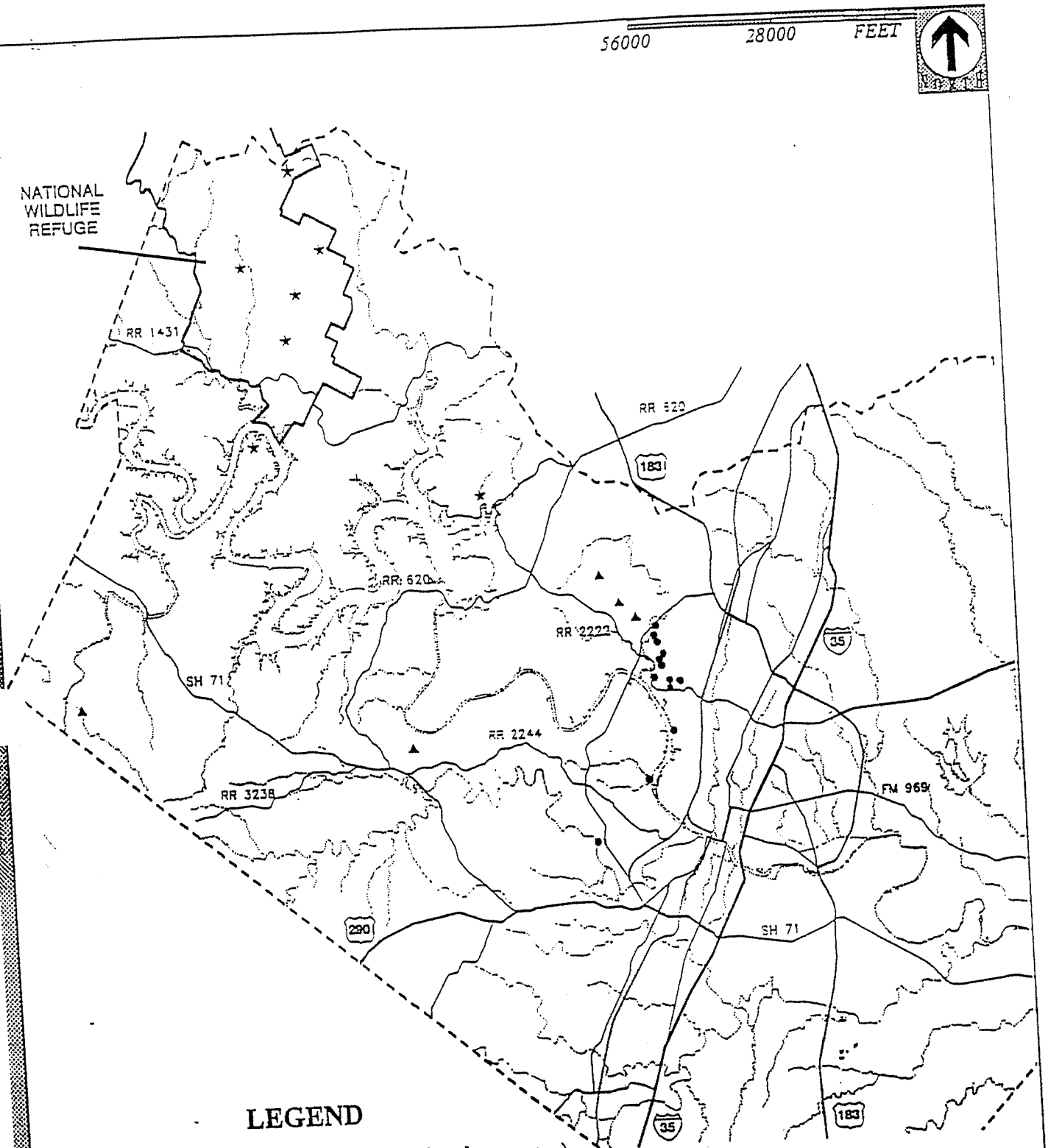
The canyon mock-orange is known from twelve populations in Blanco, Comal, Hays, Kendall, and Travis counties. In Travis County, the entire population is known from three concentrated localities. These occur on Bull Creek and West Bull Creek, at Hamilton Pool County Park in the Pedernales River macrosite, and in Bohl's Hollow in the South Lake Austin macrosite. The West Bull Creek population stretches for five kilometers and contains several thousand individuals. The Hamilton Pool population consists of 50-75 individuals, and little is known of the Bohl's Hollow population (BAT 1990; McNeal 1989). Figure 15 also illustrates the range of the canyon mock-orange.

The flowering period of the canyon mock-orange is April to mid-June. McNeal (1989) reports sexual and asexual (suckering from base) reproduction. Viable seeds in each capsule are low in number (10-15); germination percentage is low (below 25 percent); and seedling mortality due to soil-borne fungus is high (above 50 percent). Pollinators and seed dispersal mechanisms are not known (BAT 1990).

The canyon mock-orange grows in continuous, massive and unbroken strata of Cow Creek and Edwards limestone. The known localities are often on cliffs two to ten meters high and one to five kilometers long which receive varying amounts of sunlight. The known populations are found either in xeric juniper woodland or a more mesic and diverse vegetation community. Individuals in the mesic environment are healthier and more robust. Typical woody associates include shrubby boneset (*Eupatorium havanense*), elbowbush, shin oak, Lindheimer's silk tassel, and Texas mulberry (*Morus microphylla*).

The main threats to Travis County populations are related to suburban development. Direct harm to populations by site clearing and landscaping has been observed. Other indirect development-related threats include increased erosion, herbicides, pesticides (pollinator threat), fluctuations in moisture regime, competition from exotic plants, increased deer densities, and increased vehicular/foot traffic (BAT 1990).

Texabama Croton



LEGEND

- ● Bracted Twistflower (*Streptanthus bracteatus*)
- ★ Texabama Croton (*Croton alabamensis var. texensis*)
- ▲ Canyon Mock-orange (*Philadelphus ernestii*)

Source: KSB&A, EH&A and TRNIS

FIGURE 15

Known Localities for Bracted Twistflower, Canyon Mock-orange, and Texabama Croton in the Permit Area

RECON

Figure 15 Back Side

A new variety of a rare species of croton was discovered in both the Post Oak Ridge area and at Fort Hood, near Killeen, Texas, during 1989. This species of croton (*Croton alabamensis*) was previously known from only ten localities in Alabama. Ginabarg, 1992, described the Texas populations as *Croton alabamensis* var. *texensis*. *Croton alabamensis* var. *texensis* occurs on Post Oak Ridge and in the adjacent tributaries in Travis and Williamson counties as well as a few other scattered locations in Travis County including Pace Bend Park. Figure 15 shows the location of the Post Oak Ridge population within Travis County.

Eurycea Salamanders

The Balconian biotic province is characterized in part by the presence of at least eight endemic species of neotenic salamanders which inhabit isolated portions of the Edwards aquifer and associated spring runs of the Balcones fault zone.

The following information on the description, status, distribution, and taxonomy of and threats to *Eurycea* salamanders within the permit area was taken from the BCCP Phase I application (City of Austin 1993a) and the USFWS notification of publication of 90-day finding on petition to list and the proposed rule to list the Barton Springs salamander (USFWS 1993b, 1995).

It is now thought that three species occur in the BCCP permit area: one at Barton Springs (the Barton Springs salamander), a second northeast of the Colorado River (the Jollyville Plateau salamander), and a third undescribed *Eurycea* southwest of the Colorado River (referred to in this document as Texas salamander).

Generally, *Eurycea* salamanders inhabit small subterranean streams, spring seepages, and the headwaters of creeks. Field experience indicates that known populations are closely associated with spring exits (Sweet 1982). Springs provide thermal stability, a reliable aquatic habitat, and minimal siltation in the gravel beds used by the salamanders. The Barton Springs salamander is believed to be an underground species, and, recently, has rarely been found on the surface, while the Jollyville Plateau and Texas salamanders are comparatively more surface-dwelling, and may also occur in the aquifer. Figure 16 shows all of the known *Eurycea* salamanders locations within Travis County.

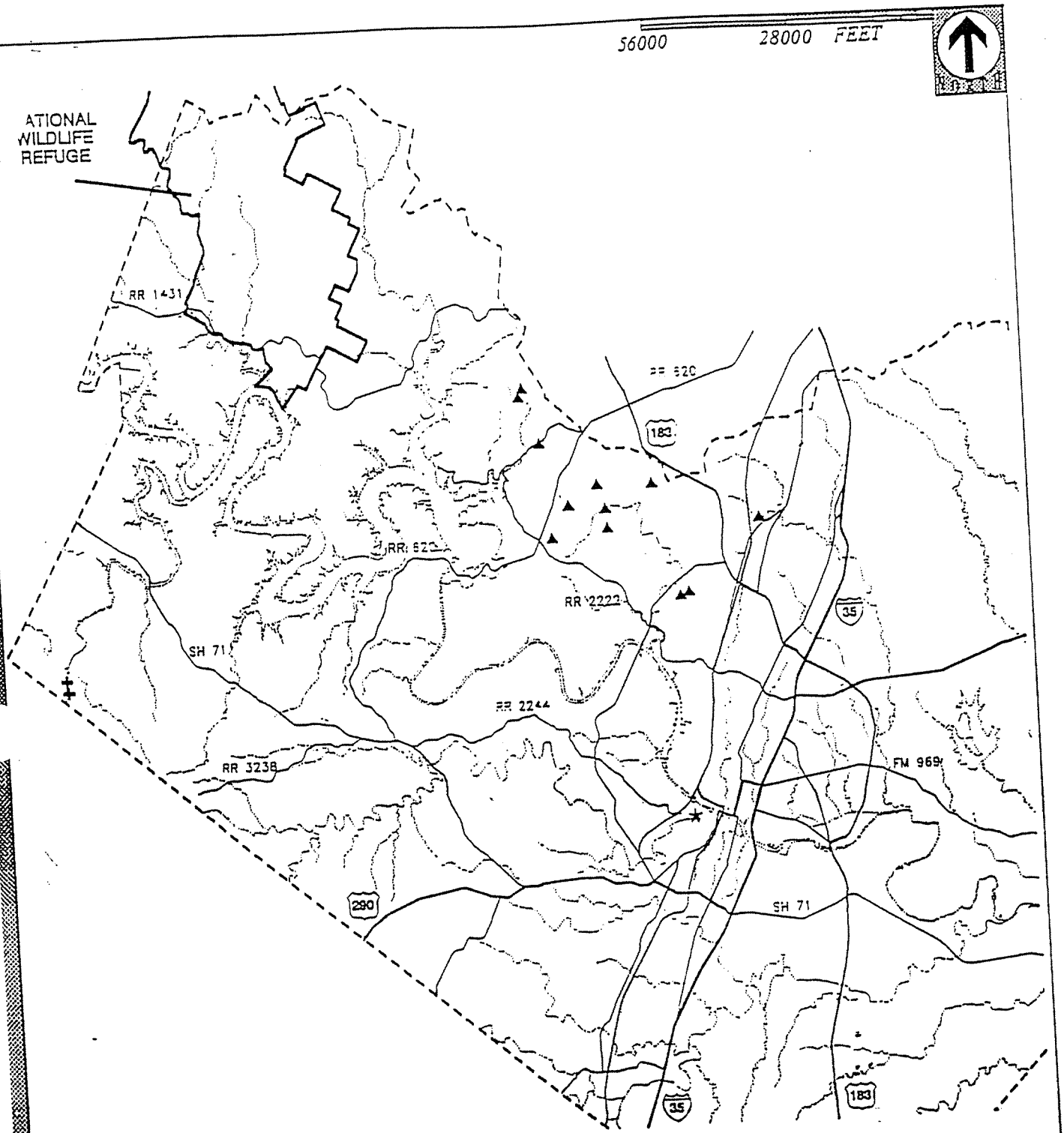
Generally, the adult *Eurycea* salamanders occurring in the BCCP preserve area are approximately two to four inches (five to ten centimeters) in body length. They have slender bodies with elongated legs, and narrowly finned tails which are about the same length as the body. The front feet have four toes and the back feet have five toes. *Eurycea* salamanders possess long, well-developed external gills. The Barton Springs salamander has poorly developed eyes. The Jollyville Plateau salamander and Texas

salamander have well-developed eyes.

Central Texas *Eurycea* salamanders are distributed along the Balcones Escarpment in the Edwards Plateau from Bell County west-southwest to Val Verde County. Sweet (1982) stated that the populations northeast of the Colorado River are uncommon and appear to consist of small numbers of individuals. In contrast, *Eurycea* populations southwest of the Colorado River appear to be widespread and consist of numerous individuals. Hillis, Chippendale, and Price (1993) indicated that the salamander group north of the Colorado River appears to consist of four species while those south of the river are members of the *Eurycea neotenes* group. The only species north of the river that occurs in Travis County is the Jollyville Plateau salamander.

The Barton Springs salamander is not known to occur anywhere but the Barton Springs segment of the Edwards aquifer. Specimens have been collected only from Barton Springs in Zilker Park in Austin, Texas. The extent to which the Barton Springs salamander occurs in the aquifer is unknown. However, there is currently no evidence indicating that the species' range extends beyond the immediate vicinity of Barton Springs. Surveys of other spring outlets (including the spring outlet immediately above Barton Springs Pool) in the Barton Springs segment and other portions of the Edwards Aquifer have failed to locate additional populations (Chippendale et al. 1993). The Jollyville Plateau salamander is currently known to occur at only 13 localities in Travis County at Stillhouse Hollow Springs, Barrow Hollow Springs, Horse Thief Hollow Springs, Bull Creek Spring, Bull Creek Tributary Spring, Schlumberger Springs, Canyon Vista Springs, the Travis Audubon Wildlife Sanctuary (Baker Springs and Salamander Springs), a tributary to Bull Creek, and a tributary of Walnut Creek in the Balcones Community Park in Austin (see Figure 16). It has also been observed at MacDonald Well Springs, which has been dry for approximately four or five years. Another historic locality from Jack Dies Ranch Spring has not been specifically located or confirmed (Price, pers. comm. 1991). The distribution of the Texas salamander is widespread south of Travis County and known from Hamilton Pool in Travis County.

The three salamanders described above are apparently genetically distinct from populations elsewhere and merit specific status (Hillis, pers. comm. 1992; Price, pers. comm. 1991). Considered as species within the neotenes complex, these species are possible candidates for listing as threatened or endangered. Formal description of the Barton Springs salamander (*Eurycea sosorum*) was published in June 1993 (Chippendale et al. 1993). The USFWS (1994) published a proposed rule to list the Barton Springs salamander as endangered on February 17, 1994 (59 FR 7968). A notice to extend the final decision (60 FR 13105) on whether or not to list was published on March 10, 1995. A November 27, 1995 court order (Save Our Springs Legal Defense Fund, Inc., et al.



LEGEND

- ✚ Texas Salamander
- ▲ Jollyville Plateau Salamander
- ★ Barton Springs Salamander

Source: KSB&A, EH&A, and TNRIS

FIGURE 16

Known *Eurycea* Salamander Locations within Travis County

RECON

Figure 16 Back Side)

v. Babbitt) invalidated this notice of extension and ordered the USFWS to make a final determination regarding listing. An appeal filed by the USFWS was granted and is pending further action.

Finalization of the BCCP and the further consideration by the USFWS of the status of the salamander are proceeding concurrently. If the salamander is federally listed, the Permit Holders will coordinate a public process for all interested parties to have an opportunity for input before any decision is made about inclusion in this plan.

The Jollyville Plateau salamander and the salamander found near the Pedernales River also appear to be genetically and geographically distinct from populations elsewhere and to merit specific status (Chippendale et al. 1994). Both species were previously considered to be part of the broad *Eurycea neotenes* species group, which was designated as a Category 2 candidate on the USFWS's notices of review on December 30, 1982 (47 FR 58454). The Jollyville Plateau salamander was added to the November 15, 1994 notices of review as a distinct, but as yet undescribed, Category 2 candidate.

Because *Eurycea* salamanders are closely associated with spring discharge, changes in groundwater recharge and discharge and water quality may adversely affect populations. Development in recharge zones introduces impervious cover, thereby altering drainage patterns and potentially diminishing spring flow. Runoff from construction sites can carry silt into the karst and springs and may plug or fill such areas. In addition, pollutants carried in solution through the karst environment can harm salamanders directly or impact plants and animals on which the salamanders are integrally dependent.

4. Other Species of Concern

In addition to the black-capped vireo, the golden-cheeked warbler, six karst invertebrates, three candidate plant species, and three *Eurycea* salamanders, 76 other species of concern are associated with the area covered by the BCCP incidental take permit. Table 6 presents the current federal status of those species either found, or with the potential to be found, in Travis County. These other species of concern are described below in the following categories: vegetation, fish, reptiles and amphibians, birds, and mammals.

a. Vegetation

A total of seven plant species are considered species of concern in the permit area. In addition to the above-described three species, four are discussed here. Texas amorpha is found to be locally common, but it is currently included in preserve planning as a secondary species of concern, subject to further review. Correll's false dragon-head is

subject to further review, because only a historical locality is known in the permit area. Heller's marbleseed and Buckley tridens were deleted from the list of species of concern because they were not federally-listed C1, C2, threatened, or endangered (see Table 6).

b. Fish

Four species of fish that have the potential to occur in the proposed Permit area are considered sensitive. Two minnows, the smalleye and sharpnose shiners, of the genus *Notropis* were not found in the study area. A third species, the Guadalupe bass , probably no longer exists as a distinct genetic entity in the study area due to hybridization with other black bass. The blue sucker is designated a secondary species of concern under the BCCP requiring periodic review (see Table 6).

c. Reptiles and Amphibians

Nine reptile and amphibian species of concern have the potential of occurring in the permit area, including the three *Eurycea* salamanders discussed above (see Table 6). See discussion under Chapter 2,C.2) Other Species of Concern.

The remaining five species of reptiles have substantial and important portions of their range occurring outside the permit area. The alligator snapping turtle (*Macroclemys temminckii*) does not occur in the area, and the American alligator (*Alligator mississippiensis*) was found to be not biologically threatened in the United States.

d. Birds

Twenty-six avian species of concern have the potential to occur in the BCCP permit area. All of these species are vagrants or migrants and therefore not included as part of this Permit (see Table 6). See discussion under Chapter 2.C.2) Other Species of Concern.

Three species of birds were included as secondary species of concern, subject to future review. The piping plover (*Charadrius melodus*) is federally-listed as threatened and a rare migrant to the permit area. Most Texas specimens documented by Oberholser (1974) were from coastal counties from Chambers to Cameron. Only one fall sighting has been documented in Travis County. The arctic and American peregrine falcons (*Falco peregrinus* var. *tundrius* and *anatum*, respectively) are considered uncommon migrants to this area. Winter and summer sightings are documented for Travis County, but no nesting activity has been recorded (Oberholser 1974). The bald eagle (*Haliaeetus leucocephalus*) is federally-listed as endangered and considered a rare transient to western Travis County. Although the TPWD conducts annual breeding bald eagle surveys throughout the state, no birds are documented in Travis County from these surveys; however, wintering birds are consistently observed on Lake Buchanan, the northernmost

lake of the Highland Lakes system, which includes Lake Travis. Also, successful nesting has been documented in nearby Bastrop County since 1984.

The remaining 21 bird species of concern have no biologically significant habitat (i.e., breeding or wintering) in the BCCP permit area. These species are either vagrants or rare migrants (see Table 7).

e. Mammals

Currently no mammals of concern to the USFWS are expected to occur in the proposed permit area. No further discussion of mammals occurs in this document.

f. Snails

Three aquatic snail species occur in Barton Springs. Aquatic species are currently not included in this plan but may be addressed in the future.

5. Macrosite and Proposed Protection Area Descriptions

To facilitate the planning of a preserve system, the western portion of Travis County was divided into ten primary geographic units known as macrosites. The proposed preserve system consists of a number of large, closely spaced preserve units within the macrosites that include the major remaining blocks of habitat of the golden-cheeked warbler and the black-capped vireo, and of additional, smaller preserve units for the other species of concern. It will encompass a minimum of 30,428 acres amassed within approximately 35,338 acres identified for potential acquisition within the macrosites.

Each macrosite ranges in size from 400 acres to greater than 9,000 acres. Figure 3 (located in Section 2) shows the location and boundaries of each of the ten macrosites. Designation of macrosites was, for the most part, oriented around discrete habitat areas proposed for preservation. Each macrosite was assessed to determine its relative overall priority as high, medium, or low in terms of long-term species viability and long-term habitat quality. Considerations taken into account in making this assessment included: distribution and occurrence of species of concern; presence of potentially important karst-forming strata; presence, size, and configuration of potential preserve land; potential long-term viability of the potential preserve area; and quality of the habitat that could be expected with long-term management. Relative priority in terms of species-by-species habitat quality was not assessed. Of the ten macrosites, seven contain habitat identified as appropriate for inclusion in the proposed preserve system, out of which five contain

major preserve units and two contain smaller preserves.

The following section describes each macrosite and its potential for habitat preserves, recommended preserve design specifications for elements of the preserve system, and the justification for the preserve design recommendations. The order with which the macrosites are addressed is due to their geographical arrangement, which is generally from north to south, not by priority or importance. Table 12 summarizes the species and preserve characteristics of each macrosite.

a. Lake Travis

Description

The largest of all the macrosites, the Lake Travis macrosite represents approximately one-third of western Travis County and encompasses 103,500 acres. It encompasses nearly the entire watershed of the Colorado River above Lake Travis, with the exception of those areas within the proposed Balcones Canyonlands National Wildlife Refuge, within the watersheds of the Pedernales River and Cypress Creek, and that area located north of Lake Travis known as Devil's Hollow. Golden-cheeked warbler habitat within the macrosite is fragmented and impacted by development and ranching practices. Black-capped vireos are known from only two localities in the entire macrosite, in areas isolated by surrounding development. Consequently, no preservation is planned in this macrosite at this time.

Justification

The Lake Travis macrosite has a low preserve potential due to the relatively small areal extent and dispersed distribution of suitable habitat for the species of concern. The macrosite area is also severely limited from the standpoint of preserve design by the distribution of existing development and land cleared for agricultural purposes. McNeal (1989) identified an area of potential habitat (approximately 2,161 acres) for the plants of concern in the southern portion of this macrosite in the vicinity of Bee Creek. However, surveys for these plants have yet to be conducted. If populations of the plant species of concern are found as a result of future research, site-specific protection measures may be recommended.

b. Devil's Hollow

Description

The Devil's Hollow macrosite encompasses approximately 12,870 acres located north of Lake Travis. Approximately 1,957 acres of the area are suitable golden-cheeked

TABLE 12
SPECIES AND PRESERVE CHARACTERISTICS BY MACROSITE

Macrosite	Species of Concern	Other Species and Communities	Long-Term Viability	Long-Term Habitat Quality
Lake Travis	Warbler, vireo		Low	Low to Moderate
Devil's Hollow	Vireo, warbler		Moderate	Moderate
Cypress Creek	Invertebrates, vireo, warbler	Important karst ecosystems, *Eurycea* salamanders	High	High
Bull Creek	Plants, invertebrates, warbler	Botanically rich; spring communities, *Eurycea* salamanders	High	High
North Lake Austin	Vireo, warbler		High	High
South Lake Austin	Plants, vireo, warbler		Low to high	High
West Austin	Plants, invertebrates, vireo	*Eurycea* salamanders	Low	Moderate
Pedernales River	Warbler, plants	Botanically rich; riparian communities	High	High
Barton Creek	Invertebrates, vireo, warbler	Botanically rich; riparian communities	High	High
Southwest Austin	None	Important karst ecosystem	Low	Low

SOURCE: City of Austin 1993a:Table 8-1.

warbler habitat, and a small percentage (approximately 116 acres) is habitat supporting black-capped vireos along the steep bluffs adjacent to Lake Travis (DLS Associates 1989a, 1990a). This macrosite has a low probability of supporting the plant species of concern or suitable karst-forming substrate.

The management potential for this macrosite is moderate for the golden-cheeked warbler, with potential for short-term and long-term impacts from surrounding developed areas (Lago Vista, Jonestown, and development along Lake Travis). The majority of the potential preserve lands are undeveloped and support golden-cheeked warbler habitat. The portion of the macrosite that does not support habitat for the species of concern has been cleared for agriculture, development, or land speculation. The importance of this macrosite for preservation of the black-capped vireo is considered low. Potential for expansion of existing occupied black-capped vireo habitat is severely restricted due to the proximity of existing development and incompatible land use practices.

Justification

The prospects for developing a preserve in the Devil's Hollow macrosite are considered low, due to the inherent impacts currently resulting from surrounding development and current land use, as well as economic considerations.

c. Cypress Creek

Description

The Cypress Creek macrosite represents roughly 21,606 acres in northwestern Travis County, located south of Rural and Market Road (RM) 1431 and north of Farm and Market Road (FM) 620. Approximately 8,510 acres within the Cypress Creek macrosite have significant potential for increasing available habitat for the species of concern, of which approximately 8,111 acres are identified for acquisition. In this macrosite, existing habitat for golden-cheeked warblers, and black-capped vireos, and endangered karst invertebrates could be incorporated into a large preserve with additional land of suitable ecological quality to allow habitat management of these species. Habitat management in this macrosite should promote protection of existing populations of the species of concern and establish practices that would allow for the expansion of habitat for the golden-cheeked warbler and black-capped vireo.

Of the 4,447 acres of potential golden-cheeked warbler habitat estimated within the macrosite, approximately 2,651 acres are included within the recommended preserve area. The Travis Audubon Society currently maintains a 680-acre wildlife sanctuary in the northern portion of the Cypress Creek macrosite, specifically established to protect habitat for the golden-cheeked warbler. The Lower Colorado River Authority owns the

Wheless tract, approximately 2,308 acres adjacent to the Audubon property, that might be available for a preserve. Golden-cheeked warblers occur on portions of the Wheless tract. The LCRA also maintains the 380-acre MacGregor tract (site of Hippie Hollow County Park), which includes several black-capped vireo territories. Additional public/institutional lands available in this macrosite include the Nature Conservancy of Texas (160 acres), Austin Simon Ltd. (232 acres), Romberg tract (50 acres), and the City of Austin's Lime Creek tract (494 acres). Approximately 5,352 acres of potential vireo management areas occur within the proposed Cypress Creek preserve acquisition area. Black-capped vireos are known from several locations within the Cypress Creek macrosite (DLS Associates 1989a), most of which are proposed to be included within the preserve, including intervening undeveloped lands that have habitat management potential for this species.

One area within the Cypress Creek macrosite is recommended as a karst preserve (Elliott and Reddell 1989). This area (the Four Points cave cluster) is northeast of the intersection of FM 620 and Ranch Road (RR) 2222. Karst-forming strata encompassed within the macrosite are estimated to be 6,635 acres. Approximately 3,252 acres of this and all of the karst features known to contain federally-listed species are included within the recommended preserve area.

Plant surveys conducted in 1989 and 1990 (McNeal 1989; EH&A 1991) did not identify populations of bracted twistflower or canyon mock-orange in surveyed portions of this macrosite. However, this does not preclude the possibility that these species may occur in the Cypress Creek macrosite. McNeal (1989) identified approximately 4,433 acres of potential habitat for these plants in the macrosite. Three localities are documented as supporting *Eurycea* salamander species within the Cypress Creek macrosite, and there is the potential that others will be identified, pending additional investigations. These locations are McDonald Well Springs, Travis Audubon Wildlife Sanctuary, Salamander Spring, and Baker Spring. Another unconfirmed salamander occurrence is an historic account reported from an unspecified location known as Jack Dies Ranch Spring within the Cypress Creek Macrosite (Price, pers. comm. 1991).

Minimum Specifications

Acquisition of the Cypress Creek component of the preserve system is essential to the success of the BCCP. The minimum area recommended for this high priority preserve unit would include no less than 7,700 acres. The Cypress Creek preserve unit should be configured with a minimum width of 3,000 feet or greater, and so that a maximum of 20 percent of the minimum preserve area occurs within 330 feet of the perimeter. The outer edge of the Cypress Creek preserve unit should be no greater than 0.75 mile from either Bull Creek or North Lake Austin preserve units and no more than 3.5 miles

for the proposed BCNWR.

Justification

The proposed preserve area mapped within the Cypress Creek macrosite represents an effort to maximize protection of habitat for the golden-cheeked warbler, black-capped vireo and karst invertebrates that occur on parcels greater than 15 acres in size. In some cases, smaller tracts containing occupied warbler habitat were included in the preserve design in order to minimize the potential impact of development intrusion. Property that was not included within the proposed preserve in the western portion of the macrosite includes very expensive, small, developed tracts, existing lakefront development, and developed land in the vicinity of the town of Volente. Cedar Park is an urban center that presents a barrier to the northeast. Much of the area to the east of the proposed preserve unit, southwest of Cedar Park in the Cypress Creek watershed, has potential for the occurrence of karst features; however, limited habitat for other species of concern occurs due to clearing for cattle grazing. Much of the area omitted from the potential preserve area along RM 620 is because utility infrastructure is already provided.

The management potential for this preserve area is very high. It consists primarily of large tracts that, to varying degrees, contain habitat for the species of concern and are relatively undeveloped or in agricultural use. However, internal edge impacts resulting from existing development, roads, and other rights-of-way represent a challenge to management for the species of concern in this area.

d. Bull Creek

Description

The Bull Creek macrosite is in north central Travis County, between RR 2222 and RM 620 on the south and west, U.S. Highway 183 on the north, and Loop 360 and Mesa Drive on the east. Most of the undeveloped land in this macrosite supports good golden-cheeked warbler habitat, as well as botanically rich communities and numerous springs, seeps, and associated hydric habitats (wetlands). The Bull Creek macrosite has a total area of approximately 17,744 acres. It is centrally located within the proposed preserve system, and contains significant populations of most of the species of concern. The entire macrosite contains approximately 5,591 acres of potential warbler habitat, 4,880 acres of potential vireo management areas, 9,502 acres of karst-forming strata, and 3,093 acres of potential habitat for the plants of concern. Approximately 3,434 acres of potential black-capped vireo management areas, and 2,976 acres of potential golden-cheeked warbler habitat occurs in the recommended preserve. Golden-cheeked warbler habitat within the Bull Creek macrosite that is not included for acquisition is

generally highly fragmented or impacted by existing development. The potential preserve area includes approximately 1,673 acres that are identified as potential habitat for both bird species. Additional research will be required to determine the actual amount of existing and potentially manageable habitat that occurs for the vireo and warbler within the proposed preserve unit. The recommended preserve area (see Figure 4) consists of approximately 5,995 acres, which encompasses an estimated 3,090 acres containing karst-forming limestone which includes all but one of the known locations for listed karst invertebrates. Additional research is necessary to determine the actual distribution of this species and appropriate protection measures. A large population of canyon mock-orange occurs in the vicinity of Jester Estates. Bracted twistflower is known from localities in the vicinity of North Cat Mountain and Cat Mountain (McNeal 1989). Currently, eight localities for the Jollyville Plateau salamander are documented within the Bull Creek macrosite.

Approximately 638 acres of public/institutional lands within this macrosite are potentially available for preserve management, including portions of City of Austin parks and preserves and other city-owned lands (e.g., Barrow Preserve).

The Jester Estates subdivision represents an existing intrusion into any possible preserve design in this macrosite, and poses a significant challenge to management for the species of concern in the area, particularly for the golden-cheeked warbler and a large population of canyon mock-orange. Aside from property acquisition, landowner cooperation will be necessary to restrict activities that could jeopardize the species of concern in parts of this proposed preserve, particularly in the vicinity of the plant localities.

Minimum Specifications

The long-term viability of the Bull Creek preserve is high for the several species of concern occurring in the macrosite, assuming that properties are secured to form a contiguous preserve without significant developed in-holdings. The Bull Creek preserve unit is considered essential to the BCCP and is recommended to include a minimum of 5,200 acres. The outer boundaries of this preserve should be no more than 0.5 mile from the North Lake Austin preserve unit and 0.75 mile from the Cypress Creek preserve unit. The central core of the Bull Creek preserve unit would be configured to have a minimum width of 5,500 feet and a maximum of 20 percent of the total area occurring within 330 feet of the boundary.

Justification

The recommended Bull Creek preserve design encompasses the majority of habitat for the species of concern in the Bull Creek macrosite and is configured to minimize the impacts from existing and future development in the area. The core of this preserve unit consists of a number of large tracts where the majority of the warbler habitat and ten of eleven known karst features containing endangered species occur. Another protected cave (Cotterell Cave) was recently acquired by the City of Austin. Stovepipe Cave and Jester Estates Cave are within areas established as part of section 7 consultations. Certain properties along RR 2222 and RM 620 were not included in the preserve design, primarily due to the extent of existing development and the expense of acquiring these small parcels with highway frontage. The preserve boundary occasionally cuts across property boundary lines in this area to include important habitat and avoid potential intrusions from future development. Small parcels supporting warbler habitat were also included along the eastern boundary of this potential preserve unit in the vicinity of Bull Creek to protect a significant amount of suitable habitat, primarily for the warbler, and to delimit the extent to which development may encroach from the east. A vireo territory in the vicinity of Loop 360 and Spicewood Springs Road (DLS Associates 1990a) is also included within the recommended Bull Creek preserve unit.

Additional areas that are isolated from the major preserve unit are also proposed for protection. These occur east of Loop 360 and are important for the protection of the bracted twistflower, golden-cheeked warbler, and Bone Cave harvestman. This area is also important for the *Eurycea* salamander which, in the Bull Creek macrosite, occurs in Stillhouse Hollow Springs, Bull Creek Spring, Schlumberger Spring, Bull Creek Tributary Spring, Barrow Hollow Spring, Horse Thief Hollow, unnamed springs on a Bull Creek tributary, and Canyon Vista Springs. Of these locations, only Canyon Vista Springs is not included within the Bull Creek preserve unit.

e. North Lake Austin

Description

The North Lake Austin macrosite is located south of the Cypress Creek and Bull Creek macrosites. RM 620 and RR 2222 generally form the northern boundary, with Lake Austin delineating the western, southern, and eastern sides. This macrosite constitutes 15,921 acres. It has a low-relative importance for preserving karst invertebrates and the plants of concern. This macrosite historically supported black-capped vireos in the Comanche Peak/Four Points area and along City Park Road. Currently, black-capped vireos persist on Steiner Ranch in the northeast portion of the macrosite, along Lake Austin south of Mansfield Dam, and along the transmission line right-of-way parallel to

RM 620 (EH&A 1989; DLS Associates 1990a). Preservation of known vireo nesting locations and acquisition of adjacent unoccupied and potentially manageable land would provide the opportunity to actively manage the presently declining vireo population in this macrosite. Approximately 2,779 acres with potential for vireo habitat management are estimated to occur in the North Lake Austin macrosite.

The golden-cheeked warbler occurs throughout this macrosite, although habitat for this species is limited in the western portion. Much of the historic warbler habitat in the western part of the macrosite has been reduced due to clearing for agriculture and residential development. Major intrusions into the preserve north of the Cow Fork of Bull Creek and west of Emma Long Metropolitan Park represent areas already impacted by development. The majority of the area in the western part of the macrosite consists of three large tracts severely impacted by development activity and ranching practices. The middle and eastern portions of the macrosite support large tracts of good warbler habitat. Emma Long Metropolitan Park and adjacent properties, owned and managed by the City of Austin, represents a core unit of a larger preserve within the proposed system which would have high long-term management potential for this species.

The preserve design proposed within the North Lake Austin macrosite includes approximately 6,044 acres with significant potential for conservation of the species of concern of which approximately 5,117 will be acquired in a major preserve areas in the eastern part and two smaller preserve areas to the west. The large preserve area includes Emma Long Metropolitan Park and the majority of remaining golden-cheeked warbler habitat in the eastern one-half of the macrosite. A smaller recommended preserve area south of RM 620 and Comanche Trail includes occupied vireo and warbler habitat. The LCRA property in the vicinity of Mansfield Dam is not proposed to be included in the preserve system due to the likelihood that vireos will no longer use the area. Approximately 3,278 acres of potential golden-cheeked warbler habitat, 980 acres of potential management area for the black-capped vireo, and approximately 428 acres of potential karst habitat are included within the preserve. One karst feature known to contain a federally-listed species is included within this proposed preserve area.

Minimum Specifications

The major preserve unit within the North Lake Austin macrosite is an essential component of the proposed preserve system. The area recommended for this preserve would include a minimum of 3,000 contiguous acres. The minimum width of the minimum core of 3,000 acres should be no less than 3,000 feet and the configuration should allow a maximum of 20 percent of the preserve area within 330 feet of the boundary.

Justification

Several tracts of land in the macrosite are not incorporated into the preserve system, mainly because of overall economic constraints on funding preserve acquisition, incompatible land use, and the extent of existing development. This proposed preserve is particularly important as a complement to the Bull Creek preserve unit and is recommended to be within 0.5 mile of the Bull Creek preserve unit. Priority was given to securing the existing warbler habitat in the eastern part of the macrosite to establish a single manageable preserve unit that would link the potential Bull Creek preserve unit to Emma Long Metropolitan Park. The small preserve area south of the intersection of RM 620 and Comanche Trail encompasses a small group of vireos and potential habitat and is adjacent to the proposed Cypress Creek preserve. Some of the LCRA property adjacent to Mansfield Dam could be managed for the vireo, subject to the need to maintain electric transmission operations on the site. Costs and habitat fragmentation may preclude additional preserve acquisition in the area.

f. South Lake Austin

Description

The South Lake Austin macrosite represents approximately 16,397 acres delimited by Lake Austin on the north, RM 620 on the west, RM 2244 (Bee Cave Road) on the south, and Loop 360 on the east.

The potential preserve unit identified in this macrosite delimits approximately 4,491 acres that support an estimated 1,067 acres of potential warbler habitat. Most of the higher-quality warbler habitat is concentrated within the forested canyons that characterize the area. The intervening plateau areas do not currently support warbler habitat due to previous clearing for livestock grazing. If managed as part of the preserve system, regenerated warbler habitat on these uplands could provide additional habitat over the long term.

The main benefits of the preservation of habitat within this macrosite would be those resulting from the protection of golden-cheeked warbler habitat. The South Lake Austin macrosite is of low importance for the black-capped vireo and karst invertebrates. Sightings of the vireo in this macrosite are limited to an area adjacent to the Low Water Crossing Road near Mansfield Dam and the Wolf Ranch. Very few outcrops of karst-forming Fredericksburg limestone occur in this macrosite, making it unlikely that karst invertebrates occur in the area.

This macrosite includes agricultural and undeveloped land that supports habitat for the golden-cheeked warbler. Development in this macrosite is located primarily in the

extreme northwestern portion, the extreme eastern portion, and along the highways. The undeveloped interior area of this macrosite has potential for a contiguous preserve containing good golden-cheeked warbler habitat. Approximately 3,639 acres of potential habitat for this species is estimated to occur in the entire macrosite. A 115-acre portion of the City of Austin Commons Ford Park is included within the recommended preserve for this macrosite.

This macrosite is important for canyon mock-orange; a large population is located in Bohl's Hollow. McNeal (1989) indicated the occurrence of approximately 5,020 acres of potential habitat for the plants of concern. Bracted twistflower and additional populations of canyon mock-orange may occur in this macrosite; however, surveys that have been conducted thus far have not documented additional occurrences of the plants of concern (McNeal 1989; EH&A 1991).

Minimum Specifications

A minimum preserve area of 3,000 acres is recommended for this macrosite. This preserve should be no less than 3,000 feet wide at its narrowest point and should be configured so that greater than 20 percent of the area is within 330 feet of the perimeter. The South Lake Austin preserve unit is recommended to be situated 3.2 miles or less from the North Lake Austin preserve and 0.5 mile or less from the Barton Creek preserve.

Justification

The potential preserve area offers protection for a portion of the warbler population south of the Colorado River and for adjacent land that can be managed for warblers. If the recommended minimum specifications are not achieved, acquisition of the canyons supporting warblers within the South Lake Austin macrosite should still be considered, due to their value as biological corridors linking preserve units in the Barton Creek and North Lake Austin macrosites. This area would provide some degree of mitigation for take occurring outside of the preserve system, assuming that the warbler population increases as habitat improves within the preserve units. Canyons to the east are similar to those encompassed by the potential preserve and support suitable warbler habitat. However, they are surrounded by development to an extent that precludes any remediation of the fragmentation problem in this area.

g. West Austin

Description

The West Austin macrosite is generally delimited by Loop 360, U.S. Highway 183, and Mesa Drive on the west and the MOPAC Railroad on the east. It is much more heavily influenced by urbanization than other macrosites. This macrosite encompasses 22,599 acres in the vicinity of West Lake Hills and west Austin. Approximately 1,433 acres of the total area have potential for incorporation into preserve units for species of concern, including the golden-cheeked warbler, black-capped vireo, karst invertebrates, and bracted twistflower. Preservation in the West Austin macrosite is proposed around existing preserve areas and other public/institutional property, such as the Wild Basin Wilderness Preserve, Davenport Vireo Preserve, Bee Creek Preserve (a portion of the Ullrich Water Treatment Plant site), Mount Bonnell Park, and the Barton Creek Greenbelt. Six caves supporting protected fauna are currently known from this macrosite and adjacent karst habitat outside the permit area to the northeast. Five are recommended for protection under the BCCP. Approximately 311 acres of potential golden-cheeked warbler habitat, 237 acres of potential black-capped vireo management areas, 753 acres of potential karst habitat, and 17 acres of potential habitat for protected plants, occur within the recommended preserve area.

Justification

This macrosite is considered to be of high importance for karst invertebrates and the black-capped vireo, and of moderate importance for the bracted twistflower, with overall preserve viability low. Potential preserve areas for birds in this macrosite are small, fragmented, and surrounded by development. Although it is possible to buffer existing preserve lands listed above, it may be impossible to reverse the negative impact of urbanization on populations of the species of concern. This effect is of particular concern regarding the long-term management prospects for the black-capped vireo, golden-cheeked warbler, and bracted twistflower. Although additional habitat for species of concern occurs within this macrosite, the cost, degree of fragmentation, and extent of surrounding urbanization preclude considering additional acquisition for preserves. However, consideration should be given to such habitat areas, particularly if they support species of concern and an opportunity for inclusion in the preserve occurs. An example of such an area is a 215-acre parcel, the Lucas tract, which has historically supported golden-cheeked warblers in close proximity to the City of Austin and was recently obtained by TPWD. This site has been used for avian and botanical research for approximately 40 years, and is unique within the permit area for the bird census data that has been generated. It would continue to be valuable for research relevant to the BCCP.

h. Pedernales River

Description

The Pedernales River macrosite occurs in the extreme western portion of the permit area and is separated geographically from the rest of the potential preserve system. It is the least well-known macrosite, and little of it has been surveyed by biologists. Review of aerial photos indicates it apparently contains relatively little habitat for the birds of concern. However, golden-cheeked warblers are known to occur at Hamilton Pool Preserve, Westcave Preserve, and in scattered habitat in protected canyons along the Pedernales River. The warbler may occur in other isolated pockets of habitat south of Highway 71 in this macrosite. A substantial population of canyon mock-orange is located at the Hamilton Pool Preserve, and the potential exists that other populations of the species may occur in the area (McNeal 1989). The Pedernales River macrosite includes the only undisturbed riparian habitat in the BCCP permit area. All other riparian habitat in the permit area (i.e., along the Colorado River) was impacted many years ago by the construction and operation of Lake Travis and Lake Austin.

Minimum Specifications

Acquisition in this macrosite is considered a low priority relative to other proposed preserve units. Other than the existing 232 acres at Hamilton Pool Preserve and 29 acres at Westcave Preserve, no acquisitions or designations are recommended at this time.

Justification

Other preserve options are possible in this area, particularly in the canyons associated with the Pedernales River and Cypress Creek, which offer potential habitat for the canyon mock-orange and other rare flora, the black-capped vireo, and the golden-cheeked warbler, and the land adjacent to Westcave Preserve and Hamilton Pool Preserve. Additional research is needed to determine the actual distribution of canyon mock-orange in this area. If other occurrences of this species are identified, a revision of preservation measures may be appropriate. The addition of buffer areas around Westcave Preserve and Hamilton Pool Preserve would be beneficial, but is precluded by funding limitations.

i. Barton Creek

Description

The Barton Creek macrosite is the second largest macrosite within the BCCP permit area, having a total area of approximately 44,744 acres. The macrosite encompasses the majority of the Barton Creek Watershed, between SH 71 to the east, RR 3238 to the

North, and US 29 to the south. The preserve area in this macrosite includes approximately 9,631 acres; it encompasses approximately 3,682 acres of potential golden-cheeked warbler habitat, 1,775 acres of potential karst habitat that include one cave with listed species, 285 acres of potential management areas for the black-capped vireo, and 735 acres of potential habitat for the rare plants. The recommended preserve area in the eastern portion of the macrosite is included for the protection of the golden-cheeked warbler, karst, Barton Springs salamander habitat, water quality, and the bracted twistflower.

The easternmost portion of the macrosite, in the proximity of Loop 1 and the Travis County and Lost Creek subdivisions, is affected by intensive development pressures. This area also includes part of the Barton Creek greenbelt. This portion of the macrosite is of high importance due to the presence of a significant amount of golden-cheeked warbler habitat, a cave supporting the endangered Bee Creek Cave harvestman, a population of the bracted twistflower (which is known to occur in the vicinity of the Barton Creek greenbelt), and the Edwards aquifer recharge zone (which is critical to protection of groundwater quality and quantity for the Barton Springs salamander). The area south of RM 2244, which is adjacent to existing development occurring between the Lost Creek subdivision and The Uplands, is the site of several canyons that support habitat for the golden-cheeked warbler.

Areas further to the west (including The Uplands, Sweetwater Ranch, Paisano Ranch, and west to the Shield Ranch) are considered to have moderate importance for the black-capped vireo and golden-cheeked warbler. One small locality occupied by vireos occurs on The Uplands. A significant, large block of warbler habitat is located on Sweetwater Ranch, and small areas of warbler habitat are scattered throughout the area. A preserve is recommended in this area because it contains populations of the warbler, the vireo, and large blocks of land that could be effectively managed for these species and buffered from future development. This potential preserve is configured to reduce urban impacts around the edge, and it has the potential for the regeneration of large areas of warbler habitat over the long term. Management of existing habitat may be possible for the vireo, even over the short term. A preserve unit in this area would increase the prospects for viability of the warbler and possibly for the vireo in the southern and central portions of the preserve system.

The large preserve unit considered in the western portion of the macrosite is relatively removed from urban influence except for roadway intrusions and includes relatively large tracts of land that could be configured to minimize external impacts. Impacts from the construction and operation of State Highway 71 and Southwest Parkway effect this recommended preserve unit; however, commercial and residential development does not

occur along those roadways within the recommended preserve unit. Long-term management potential for this area, which includes habitat for the warbler and vireo, is high. Although much of the area within the recommended preserve is affected by past ranching activities, a significant amount of land is present that could be managed for the vireo and warbler.

Minimum Specifications

The recommended preserve unit in the western portion of the Barton Creek macrosite is a high priority. Excluding existing roadway intrusions, minimum preserve design standards recommended for a preserve in this area apply to a block of no less than 4,000 acres, having a minimum width of 8,000 feet or greater. The configuration of the minimum recommended preserve would have no more than 20 percent of the total area occurring within 330 feet of the preserve edge. Such a preserve unit should be situated no greater than 0.5 mile from the South Lake Austin preserve unit and 4.7 miles from the North Lake Austin preserves. The preserve area recommended for the eastern portion of the Barton Creek macrosite is proposed primarily to protect water quality and aquifer recharge, and no minimum preserve design specifications for warbler or vireo protection are provided.

Justification

The preserve design recommended for the Barton Creek macrosite was influenced by the extent of existing and proposed development within the area and the expense that would be involved to acquire property supporting habitat for the species of concern. The large, recommended preserve area in the western portion of this macrosite is considered important to the overall preserve system design, due to the occurrence of occupied warbler habitat and the potential for habitat management for the warbler and black-capped vireo. Although the eastern portion of the Barton Creek macrosite is seriously impacted by existing development, the preserve area recommended for this portion of the macrosite is considered important for the protection of existing golden-cheeked warbler populations, populations of bracted twistflower, Barton Creek salamander habitat, and water quality associated with these habitats. Notwithstanding the water quality benefits of protecting the Edwards Aquifer recharge zone of Barton Creek, the preserve area recommended in the eastern portion is not considered as important to the overall preserve system as the area in the western portion of the macrosite, due to its proximity to existing development and distance from other preserve areas.

j. Southwest Austin

Description

The Southwest Austin macrosite consists of 30,945 acres in the southernmost corner of the BCCP permit area, south of U.S. Highway 290. This area contains little significant or contiguous habitat for the birds or plants of concern. However, this macrosite contains approximately 12,398 acres of potential karst invertebrate habitat. Although the Southwest Austin macrosite is a low priority for the development of bird preserves, and none are currently proposed for the area, site-specific protection for endangered species supporting karst features may be proposed if they are identified.

Justification

As stated above, no endangered species preserves are currently proposed in this macrosite, although karst preserves are recommended for unlisted species. No potential habitat for the plants of concern was identified by McNeal (1989) in this area. The golden-cheeked warbler habitat that does occur here is extremely fragmented.

k. Travis County Caves

The preceding discussion of the recommended preserve system presents information about karst features and karst preserves to the extent that they relate to individual macrosites and overall preserve design within the macrosite.

Currently, 39 caves have been identified in Travis County that contain endangered species (Elliott 1992). Three cave clusters have been identified within the permit area and immediately outside the permit area to the northeast: the Four Points cluster, McNeil cluster, and Northwood cluster. The Four Points cluster is located northeast of the intersection of Highway 620 and Highway 2222 in the Cypress Creek macrosite. The Northwood and McNeil clusters occur in close proximity in the vicinity of Walnut Creek near Howard Lane and McNeil Drive in North Austin. Cumulatively, these recommended preserves contain 14 of the endangered species caves. The majority of the remaining endangered species caves (11) occur in areas identified for preserve acquisition within a preserve macrosite. Ten of the 14 remaining caves have the cave openings protected from development due to the willingness on the part of private owners or the City of Austin to manage them for the species of concern. However, hydrogeologic studies have not been conducted on these ten caves. The other four, Beer Bottle Cave, Puzzle Pits Cave, West Rim Cave, and Millipede Cave, have not been recommended for protection because of limited biological value and species recovery can be attained without these caves.

Twenty additional caves have been identified in Travis County that support rare invertebrates that are not currently listed by the USFWS. These are recommended for protection for a variety of ecological reasons. These particular caves support a number of rare invertebrate species and are also important recharge features.

Additional information, particularly regarding hydrogeologic characteristics, is required to determine an adequate protection strategy for each karst feature proposed for protection. The boundaries of the recommended karst preserves are estimations of what is thought to be necessary to protect the caves within them. These boundaries are likely to be adjusted as the appropriate data is obtained. A key consideration regarding the merits of acquisition of any given cave or karst preserve unit will be the adequacy of existing water quality regulations or other measures or agreements (e.g., conservation easements) to adequately protect the feature and its resident fauna and thereby obviate the need for fee simple acquisition.

B. Social Resources

After a period of sluggish economic growth during the late 1980s, the Austin area has seen significant growth in population and housing over the past few years. This growth has been fueled by major increases in employment in the high technology and service sectors. As a result of the job growth, which is discussed in Section C of this chapter. Travis County has experienced an increase in population and housing growth. Most of this new growth has been in the western Travis County area.

1. Population

Travis County has seen a tremendous amount of growth in population over the past 20 years. As shown in Table 13, from 1970 to 1980 the county's population increased 47.7 percent from 295,576 in 1970 to 419,335 in 1980. From 1980 to 1990, the population grew 37.5 percent from 419,335 in 1980 to 576,407 in 1990 (City of Austin 1991b). Recent figures (July 1995) estimate the county population to be 641,017 (City of Austin 1995). This growth can be attributed to a booming economy in the late 1970s and early 1980s. Since the mid 1980s growth has slowed, but more recently it has increased again.

The portions of Travis County that are west of the MOPAC Railroad grew at a faster rate than the county as a whole during the 1970s and 1980s. As shown in Table 13, the population of western Travis County grew 84.4 percent during the 1970s, from 66,770 in 1970 to 123,120 in 1980. Likewise, western Travis County grew 64.8 percent during

TABLE 13
TRAVIS COUNTY POPULATION GROWTH 1970-1990

	1970	1980	% Change	1990	% Change 1980-1990	% Change 1970-1990
City of Austin	251,808	345,496	37.2	465,622	34.8	84.9
Travis Co. w/o Austin	43,708	73,839	68.9	110,785	50.0	153.5
Travis County	295,516	419,335	47.7	576,407	37.5	95.1
Tract 1.00	6,869	6,033	-12.2	5,850	-3.0	-14.8
Tract 13.01	5,764	5,859	1.7	5,979	2.1	3.7
Tract 16.01	14,082	12,281	-12.8	11,855	-3.5	15.8
Tract 16.02	4,296	3,711	-13.6	3,331	-10.2	-22.8
Tract 17.01	10,872	36,264	233.6	65,627	81.0	503.6
Tract 17.02	10,439	31,148	198.4	68,383	119.5	555.1
Tract 19.00	7,639	17,768	132.6	28,861	62.4	277.8
Tract 20.00	6,809	10,056	47.7	13,011	29.4	91.1
Total of Tracts (including areas west of MOPAC)	66,770	123,120	84.4	202,897	64.8	203.9

SOURCE: City of Austin Census Report #1, 1991.

the 1980s to reach a population of 202,897 in 1990 (City of Austin 1991b). These areas are more attractive to area residents who move there to enjoy the hills, lakes, and scenic vistas.

A result of western Travis County's faster growth is that the distribution of population in the county is shifting westward. In 1970, western Travis County contained 22.59 percent of the county's population. This percentage has grown over the last two decades to 29.36 percent in 1980 and 35.20 percent in 1990.

2. Housing

The number of total housing units in Travis County grew by 52.1 percent during the 1980s (Table 14). In 1980, there were 173,732 housing units in the county, compared to 264,173 in 1990. The number of units in western Travis County grew by 75.4 percent over the same time period. In 1980, there were 52,442 total housing units in Travis County west of the MOPAC Railroad. This number increased to 91,992 in 1990 (City of Austin 1991b). The increase in housing is also a response to Austin's growing economy of the early 1980s and early 1990s.

Western Travis County's percentage of the total units in the county also increased during the 1980s. In 1980, 30.19 percent of the total housing units in Travis County were west of the MOPAC Railroad. In 1990, the percentage increased to 34.82 percent.

More recent data from the City of Austin Department of Planning and Development shows that the vast majority of new housing units in Travis County are being constructed in western Travis County. In 1991, 78.1 percent of the Certificates of occupancy issued for new housing units in Travis County were for residences in western Travis County. This figure rose to 85.5 percent in 1992 and increased again to 88.7 percent in 1993 (City of Austin 1991b, 1992a, 1993b, and 1994). New development activity increased during 1994 fueling new construction. Residential construction increased 43 percent; commercial activity decreased 23 percent from 1993 but is expected to rise in 1995 (City of Austin 1995). Development activity in 1995 is projected to exceed the 1994 totals, continuing an upward trend during the 1990s (City of Austin 1995).

TABLE 14
TRAVIS COUNTY HOUSING GROWTH, 1980-1990
(Total Housing Units)

			% Change
Travis	173,732	264,173	52.1
Tract 1.01	1,990	1,955	-1.8
Tract 1.02	944	1,045	10.7
Tract 13.03	1,528	1,549	1.4
Tract 13.04	1,449	1,804	24.5
Tract 16.02	1,750	1,585	-9.4
Tract 16.03	1,978	1,969	-0.5
Tract 16.04	1,708	1,758	2.9
Tract 16.05	2,081	2,202	5.8
Tract 16.06	31	5	-83.9
Tract 17.03	2,100	3,516	67.4
Tract 17.04	3,037	3,378	11.2
Tract 17.05	920	1,450	57.6
Tract 17.06	903	1,701	88.4
Tract 17.07	1,831	2,373	29.6
Tract 17.08	1,442	4,279	196.7
Tract 17.09	1,497	6,384	326.5
Tract 17.10	1,306	3,738	186.2
Tract 17.11	2,315	5,464	136.0
Tract 17.12	1,426	1,831	28.4
Tract 17.13	1,249	1,631	30.6
Tract 17.14	2,469	6,882	178.7
Tract 17.15	2,369	7,691	224.7
Tract 17.16	1,853	3,258	75.8
Tract 17.17	3,022	6,888	127.9
Tract 19.01	2,184	3,054	39.8
Tract 19.02	1,057	1,316	24.5
Tract 19.03	3,069	6,085	98.3

TABLE 14
TRAVIS COUNTY HOUSING GROWTH, 1980-1990
(Total Housing Units)
(continued)

	1980	1990	% Change 1980-1990
Tract 19.04	1,675	2,064	23.2
Tract 20.01	2,042	3,753	83.8
Tract 20.02	1,217	1,384	13.7
W of MoPAC	52,442	91,992	75.4
	(30.19)	(34.82)	

SOURCE: City of Austin Census Report #3, 1991.

3. Transportation

The primary roadways serving western Travis County are U.S. 183, U.S. 290, SH 71, RR 620, RR 2244 (Bee Cave Road), RR 2222, RR 1431, Loop 360, and Loop 1 (MOPAC). Several of these roadways are in various stages of upgrade. Widening or extension projects are currently under way on U.S. 183, U.S. 290, RR 2222, and Loop 1. Most of the major roads in western Travis County pass in close proximity to areas recommended for the preserve system. The roadways are being upgraded as a response to traffic increases in the area. As the population of Travis County shifts westward, the transportation network must develop to meet the needs of the area.

4. Recreation

For a detailed discussion of the recreational resources found in western Travis County, see Chapters 3 and 4, Section E of this EIS. Public parks operated by Travis County include Pace Bend Recreation Area, Arkansas Bend County Park, Mansfield Dam County Park, Wild Basin Wilderness Park, Hamilton Pool Preserve, and Windy Point. The City of Austin also operates several large parks within western Travis County, including Emma Long Metropolitan Park, Bull Creek District Park, and the Barton Creek Greenbelt.

There are also many private recreational resources in western Travis County. These include golf courses and campgrounds. Some of the larger private recreational areas that are located near the proposed preserve boundaries include Barton Creek Country Club, Lost Creek Country Club, Great Hills Country Club, and the River Place Golf Course.

5. Schools

Three area school districts are located wholly within western Travis County. The Eanes Independent School District, which has seven schools, occupies much of the southeastern portion of western Travis County. The Lake Travis Independent School District has three schools and serves the areas west of the Eanes District and south of Lake Travis. The Lago Vista Independent School District, which has three schools, serves the area north of Lake Travis. Other districts that cover a substantial portion of western Travis County include the Austin Independent School District, the Round Rock Independent School District, and the Leander Independent School District. Additionally, there are

several private schools in the area. As the population of western Travis County increases, a need for additional school facilities can be assumed.

C. Economic Resources

1. Employment

Total employment in Travis County has grown rapidly over the past few years. Table 15 shows that the majority of the employment sectors in the county have shown increases in jobs since 1984. The total number of jobs has increased 27.6 percent from 270,962 during the second quarter of 1984 to 345,616 during the second quarter of 1992. The only sectors that decreased their employment over the past eight years were mining and construction. The construction sector had a net loss of 8,866 jobs from 1984 to 1992. The largest increases were seen in the services sector. This sector posted a net increase of 35,468 jobs from 1984 to 1992 (Texas Employment Commission [TEC] 1992).

Per 1990 census information, the Travis County unemployment rate was listed at 6.03 percent. The census tracts west of the MOPAC Railroad had a combined unemployment rate of 5.04 percent, while those to the east of the railroad had a combined unemployment rate of 8.64 percent (City of Austin 1992a).

2. Personal Income

The median family income for Travis County in 1989 was $35,931. As in most places, incomes vary greatly over the region. The median family incomes for census tracts in the Permit area ranged from $19,722 to $96,345. The median family income for the Permit area as a whole was $51,260. Median family incomes for the tracts outside of the preserve area are generally lower, with several tracts in the eastern portions of Austin below $20,000.

3. Property Tax Base and Revenues

The Travis Central Appraisal District (TCAD) was contacted regarding baseline property tax information similar to that projected by Gau and Jarrett in the Economic Impact Study of the Balcones Canyonlands Conservation Plan (Gau and Jarrett 1992). TCAD personnel indicated that any readily available information would not be comparable to the

TABLE 15
TRAVIS COUNTY EMPLOYMENT BY INDUSTRY
(SECOND QUARTER 1984-1992)

Industry	1984	1986	1988	1990	1992	% Change 1984-1992
Agriculture	1,086	1,348	1,518	1,769	2,141	97.1
Mining	607	631	405	484	530	-12.7
Construction	20,950	20,575	11,786	9,734	12,084	-42.3
Manufacturing	33,457	34,608	34,285	40,314	45,300	35.4
Transportation, commer	7,723	9,679	9,436	10,607	11,780	52.5
Trade	63,130	70,265	67,296	69,591	71,630	13.5
Fire	19,220	23,347	21,767	21,402	22,035	14.6
Service	56,467	68,298	70,491	81,251	91,935	62.8
State government	46,322	46,423	49,310	53,207	56,189	21.3
Local government	22,000	25,900	28,328	29,751	31,992	45.4
Total	270,962	301,074	294,622	318,110	345,616	27.6

SOURCE: Texas Employment Commission 1984, 1986, 1988, 1990, 1992.

projected tax revenue effects. TCAD has tax base information segregated by taxing jurisdiction, but not by tracts or other agglomerations that would allow for an existing property tax base evaluation of the proposed permit area (Cory, pers. comm. 1992).

D. Land Use

1. Land Use Controls in the Permit Area

a. Comprehensive Plans

Comprehensive plans are policy documents intended to guide growth and development within a community. In addition to stated growth policies, comprehensive plans typically include a future land use plan, a transportation plan, utilities plans, and other elements related to future land use. Texas zoning enabling legislation requires a city's zoning ordinance to be consistent with a comprehensive plan, although comprehensive plan coverage in a city's extraterritorial jurisdiction is not to be construed as zoning, which applies only within the city limits. A city's ETJ is that area within a prescribed distance from the city limits within which no other city or special district can annex land or provide services without the permission of the city. The size of an ETJ is based on the city's population and proximity to other municipalities. Cities can apply their subdivision controls in their ETJs. State subdivision law requires subdivisions to be consistent with the "general plan" of the community.

The 561,000-acre BCCP permit area lies completely within Travis County (see Figure 2). The participating governmental jurisdictions are the City of Austin, Travis County, and the City of Sunset Valley. The nonparticipating jurisdictions are the cities and ETJs of Lakeway, Briarcliff, Lago Vista, Cedar Park, Leander, Jonestown, Pflugerville, Manor, San Leanna, Creedmore, Mustang Ridge, Rollingwood, West Lake Hills, and Bee Cave plus small portions of the ETJs of Round Rock, Hutto, Bastrop, Buda, and Dripping Springs. With the exclusion of the nonparticipating incorporated areas and their ETJs, the permit area comprises approximately 91 percent of Travis County's total area.

The City of Austin has the strongest planning capabilities of all the jurisdictions within the permit area. Austin's city charter requires that the City adopt a comprehensive plan by ordinance. Austin has never adopted a comprehensive plan by ordinance, which would have the full force and effect of law. The Austin City Council declined to adopt *Austinplan*, the first, and also most recent, attempt to adopt a comprehensive plan by

ordinance. *Austin Tomorrow*, which was adopted by city council resolutions in 1977 and 1979, is the policy document intended to guide comprehensive planning in Austin.

Austin Tomorrow has a map of preferred growth areas by priority for the city and its ETJ as it existed in 1979, rather than a traditional future land use map. The plan policies give priority to development within the 1977 city limits and expansion in a northeast-southwest corridor approximately six miles wide along IH-35. The western edge of the city and the western ETJ are the lowest priorities for development (Priorities IV and V). Priority IV areas are primarily along U.S. 183 North, U.S. 290 West, and Loop 360, where commitments for roads and utilities have been made. Growth in Priority V areas does not conform to the goals and objectives of the comprehensive plan.

The City of Sunset Valley also has an adopted comprehensive plan. The *City of Sunset Valley Master Plan* was adopted by ordinance in 1984 and is in the process of being updated. Travis County, by Texas law and consistent with other counties, does not have a comprehensive plan.

Table 16 includes all of the jurisdictions in the Section 10(a)(1)(B) permit area and lists their land use controls. Each of these controls is briefly discussed below.

b. Zoning Ordinances

With very few exceptions, only cities have ordinance-making authority in Texas. Furthermore, cities can apply their zoning regulations only within their corporate limits. Austin and Sunset Valley have zoning ordinances. Travis County does not. Austin has extended its corporate boundaries to include limited-purpose annexations. The primary function of the limited-purpose annexations is to extend zoning controls without having to extend services. Since 1987, limited-purpose annexations must be converted to full-purpose status within three years.

Austin's zoning ordinance is part of the Land Use chapter of the city's *Land Development Code*. The *Land Development Code* covers land development procedures, land use, utilities and on-site disposal, special districts, transportation, drainage, environmental protection and management, and buildings (uniform building code). In addition to zoning, the Land Use chapter addresses subdivisions, water quality-related development intensities (watershed ordinance), site development, and signs. The *Land Development Code* is supported by a series of technical manuals for engineering analysis. Not all aspects of the *Land Development Code* can be applied in the city's ETJ, however.

TABLE 16
LAND USE CONTROLS BY JURISDICTION IN THE PERMIT AREA

Jurisdiction	Comprehensive Plan	Zoning	Subdivision Regulations	Watershed Ordinance	Site Permit	Building Permit
Travis County			•		•	
Austin						
Inc. Area	•	•	•	•	•	•
ETJ	•		•	•	•	•*
Sunset Valley						
Inc. Area	•	•	•	••		•
ETJ	•	•	•	•		

NOTE: County regulates only septic tanks, floodplains, and roadways.

*Code review for electrical, water, wastewater, and fire codes in areas that the City provides these services.

c. Subdivision Controls

Cities are allowed to control the platting of subdivisions within their city limits and their ETJs. Counties do not have the authority to regulate subdivisions outside incorporated areas, including subdivisions within a city's ETJ. Counties only have the authority to regulate roadways, floodplains, and septic tanks. Within a city's ETJ, the city typically leads the subdivision review process, although the county commissioners must also take action on the plat. In case of conflicting requirements, the stricter standard applies. Austin, Sunset Valley, and Travis County all have subdivision regulations.

d. Watershed Ordinances

Cities get their authority to regulate development within watersheds that feed a community's drinking water supply through state subdivision and annexation acts and the Federal Clean Water Act. Both Austin and Sunset Valley have watershed ordinances that overlay additional regulations on their respective subdivision ordinances. Both ordinances regulate impervious cover and, in effect, require that runoff after development not exceed runoff quantity and velocity before development. Both ordinances define critical water quality zones within 100-year floodplains in which very little construction is allowed. They also allow transfers of development intensity from water quality transition zones to uplands.

County subdivision regulatory authority comes from different state enabling legislation than that for cities. County authority is based on the need to provide adequate and safe access to property and to protect the public health in the design of on-site wastewater disposal systems. Although Travis County does require a site development permit, it only assures that minimum engineering standards are met for roads and erosion control during construction. Travis County requests from the Lower Colorado River Authority any authority that it does not itself have to protect water quality. The LCRA issues construction permits within the Lake Travis watershed outside Austin's ETJ and the jurisdictions of the other cities in western Travis County.

e. Site Permits

The City of Austin has a site development permit process to implement its watershed ordinance. The permit applicant is required to show intended land use, the locations of all proposed improvements, other impervious cover, and proposed water quality controls on the site. This permit process is applied both within the city limits and the ETJ. Sunset Valley's site plan requirements in its watershed ordinance are patterned after Austin's site development permit process. Travis County's site development permit,

as restricted by state law, mentioned above, does not address land use, building placement, or impervious cover.

f. Building Permits

General building permits can be required only within incorporated areas. Both Austin and Sunset Valley issue building permits within their city limits. Austin also requires code review within its ETJ for electrical, water, wastewater, and fire codes in areas that the city provides these services.

2. Existing Land Use

Austin's current incorporated area covers approximately 145,240 acres, of which 143,982 acres are in Travis County and comprise about 24 percent of the permit area. The city's five-mile ETJ within the permit area covers an additional 266,095 acres for a total of 410,077 acres, or 69 percent of the permit area.

The City of Austin Department of Planning and Development has updated its 1985 existing land use inventory. That update includes western Travis County and other jurisdictions within the county. Travis County has no land use inventory.

The 1985 City of Austin land use inventory, as updated and expanded through May 18, 1993, shows the existing land uses for most of the urbanized area in Travis County (Table 17). Of the developed areas in 1985, 67 percent was for residential uses. Nonresidential uses comprised 17 percent of the developed area, and public uses comprised 16 percent. Of the public uses, 56 percent of the acreage was educational uses, and 31 percent was parkland (City of Austin 1986).

Sunset Valley's incorporated area is 797 acres. Its ETJ is 184 acres. The 1984 Master Plan divides the city into (single-family) Residential, Non-Residential (retail and office), and Deed-restricted Residential (possible future zoning for local retail and office on U.S. 290) land uses. No data are available for existing land use acreages.

3. Growth Trends

The populations of Austin and Travis County grew by 1.2 percent in 1992. The city grew by 2.3 percent in 1991. From 1980 to 1990, the city's population increased by 35 percent, with the highest population growth occurring in the northeastern and

TABLE 17
EXISTING LAND USES
IN AUSTIN METROPOLITAN AREA (TRAVIS COUNTY)

Land Use Type	Acreage
Open space	10,199
Single-family residential	57,329
Mobile home	1,412
Multi-family residential	5,296
Office	2,932
Commercial	6,252
Industrial	7,019
Transportation	11,788
Mining	1,646
Utilities	1,169
Civic	8,134
Water	14,210
TOTAL	127,386

NOTE: Preliminary data comp[illegible] for Austin incorporated area, Cedar Park, and urbanized ETJ [illegible]y.

southwestern suburban fringes (City of Austin 1991b). Section C of this chapter discusses growth patterns in the county in more detail.

A significant percentage of undeveloped land with potential habitat for the species of interest in this EIS has already been planned and platted and, in some cases, partially developed with roads and utilities. A significant amount of this subdivision activity has occurred in Austin's western ETJ over the past five or six years (City of Austin 1989, 1990a, 1991a, 1992a, 1993b).

E. Recreation

Recreational facilities located in the proposed permit area (Travis County) include neighborhood, district, and metropolitan parks with sports facilities owned and operated by the City of Austin. Table 18 lists the recreational facilities in western Travis County by size, manager, type, and use. The Lower Colorado River Authority, Travis County, and the State also own and operate recreational facilities with some of the same features of the city-owned parks, as well as expanded camping and water sports opportunities. In addition, some private recreational facilities provide camping sites, resorts, game fields, golf courses, summer camps, marinas, and boat ramps. The recreational network provided by the public and private entities has been established to provide access to the public both on a fee and open basis, according to the primary goals of the sponsoring entities.

Although the permit area consists of Travis County in its entirety, there is very little identified habitat for the protected species east of MOPAC Expressway (Loop 1). In general, public and private recreational facilities east of Loop 1, although within the permit area, are not affected by the proposed preserve system. Therefore, the facilities located in those areas will be discussed in detail only if particular environmental consequences or issues are raised. This will be done as part of Chapter 4, Environmental Consequences.

Table 18
RECREATIONAL FACILITIES WEST OF LOOP 1

Facility Name	Approx. Acres	Owner/Mgr	Type	HISTORIC	FEE	BCCP	Camping	PICNIC	FISHING	SWIMMING	BOATING	SPORTS	HIKING	GOLF	PETS	Other
Allen Park	10	TC	CP					●					●		●	
Arkansas Bend Park	195	LCRA/TC	CG		●	●	Primitive	●	●	●	●		●		●	Boat Ramp
Austin Country Club	a	P	CC	●	●									●		
Austin Nature Center	60	COA	PR			●										Educational Facility, Museum
Austin Simon Ltd.	232	P	RA													
Balcones National Wildlife Refuge	41,000	FED	R	●		●										Partially in Burnet & Williamson
Balcones Country Club	a	P	CC		●									●		
Balcones District Park	52	COA	DP					●		●		●	●		●	
Barrow Preserve	8	COA	PR			●										
Barton Creek Country Club	a	P	CC		●									●		
Barton Creek Greenbelt	813	COA	GB			●							●		●	
Bee Creek Preserve	30	COA	PR			●										
Bob Wentz Park at Windy Point	23	LCRA/TC	CP		●	●		●	●	●	●		●		●	
Bull Creek District Park	48	COA	DP			●		●				●			●	
Bull Creek Greenbelt	120	COA	GB												●	
Bull Creek Parkway	16	COA	GB												●	
Bull Creek/Austin Hills Park	61	COA	GB												●	
Camp Chautauqua	115	LCRA	PCG		●			●	●	●	●	●	●		●	Boat Ramp
Camp Pedernales	a	P	PC				Private Camp									
Camp Texlake	475	P/LCRA	PC				Private Camp									
Canyon Vista Pool	1	COA	NP												●	
Circle District Park	80	COA	D												●	
Circle C Green Belt	332	COA	GB					●	●			●			●	
Commons Ford Metropolitan Park	215	COA	MP			●		●								
Cypress Creek Park	15	LCRA/TC	CG		●		Primitive	●	●	●	●		●		●	
Cypress Creek Resource Area	37	LCRA/TC	RA/MA								●					Size without Travis County Park
Dave Reed Park	a	TC	CP						●	●	●				●	
Dick Nichols District Park	156	COA	DP					●							●	
Dick Pearson	4	TC	CG				Primitive	●	●	●	●				●	
Eagle Ridge Resource Area	69	LCRA	RA													Private Boat Rental Dock
Eilers Park	9	COA	MP		●			●	●		●	●	●		●	Fee for Swimming
Emma Long Metropolitan Park	1,147	COA	MP	●	●	●	Improved	●	●	●	●	●			●	Archery, Motorcycle Track
Fritz Hughes	5	TC	CP					●	●						●	
Gloster Bend Primitive Recreation Area (PRA)	586	LCRA	CG	●	●		Primitive			●			●			Boat Ramp

Tabl

RECREATIONAL FACILI WEST OF LOOP 1

Facility Name	Approx. Acres	Owner/Mgr	Type	HISTORIC	FEE	BCCP	Camping	PICNIC	FISHING	SWIMMING	BOATING	SPORTS	HIKING	GOLF	PETS	Other
Great Hills Country Club	a	P	CC		●									●		
Hamilton Pool Preserve	232	TC	CP		●	●		●		●			●			
Highland Lake Campground	b	P	PCG				Private Camp									
Hippie Hollow Park	109	LCRA/TC	CP		●	●		●		●			●			
Johnson Creek Greenbelt	59	COA	GB										●			
Laura Reed Park	a	TC	CP					●		●			●		●	
Legend Oaks at Escarpment Blvd.	36	COA	NP												●	
Lions Municipal Golf Course	156	COA	GC		●									●		
Loop 360 Boat Ramp	5	TC	CP					●	●	●	●				●	
Lost Creek Country Club	a	P	CC		●									●		
Mansfield Dam (West)	5	LCRA/TC	MA						●							Private Marina
Mansfield Dam Park	71	LCRA/TC	CG/MA	●	●	●	Improved	●	●	●	●		●		●	Trailer Dump Station, boat ramp
Mary Moore Searight District Park	345	COA	MP					●	●				●		●	
Mary Quinlan	6	TC	CP					●	●	●	●				●	
Mayfield Park	23	COA	PR	●				●					●			
McGregor Resource Area	259	LCRA	RA			●										Size without Travis County Park
Mt. Bonnell	5	COA	GB	●		●		●							●	
Muleshoe Bend PRA	986	LCRA	RA	●	●		Primitive						●			Partly in Burnet County
Murchison Pool	1	COA	NP							●					●	
North Cat Mountain	13	COA	GB												●	
Oakhill Park	15	COA	NP												●	
Oakview Park	7	COA	NP									●	●		●	
Pace Bend Park	1,336	LCRA/TC	CG		●		Primitive & RV	●	●	●	●		●		●	Trailer Dump Station
Perry Park	7	COA	NP									●			●	
Red Bud Isle	12	COA	MP						●		●				●	
Reed Park	6	COA	NP	●				●		●					●	
River Place Golf Course	a	P	CC		●										●	
Sandy Creek Park	25	LCRA/TC	CG		●	●	Improved	●	●	●	●		●		●	Trailer Dump Station
Schroeter Park	12	COA	NP					●				●	●		●	
Selma Hughes	5	TC	CP					●	●	●					●	
Spicewood Park	a	COA	NP												●	
Spicewood Springs Park	8	COA	RA			●										
Starnes Island	2	LCRA	RA												●	
Steck Valley Park	38	COA	GB													

Table 18
RECREATIONAL FACILITIES WEST OF LOOP 1

Facility Name	Approx. Acres	Owner/Mgr	Type	HISTORIC	FEE	BCCP	Camping	PICNIC	FISHING	SWIMMING	BOATING	SPORTS	HIKING	GOLF	PETS	Other
St. Edwards District Park	79	COA	DP			●									●	
Tarrytown (Triangle) Park	2	COA	NP									●			●	
Texas Nature Conservancy	160	P/NP	PR			●									●	
Tom Hughes	5	TC	CP		●			●		●			●			
Travis Audubon Sanctuary	680	P/NP	PR			●							●			
Travis Country Park	a	P	NP					●							●	
Vireo Preserve	212	COA	PR			●										
Westcave Preserve	29	TP/LCRA	PR			●										
Westenfield Park	11	COA	NP					●		●		●			●	
Wheless Resource Area	2,294	LCRA	RA			●										Size without Travis County Park
Wild Basin Wilderness Preserve	212	TC	PR			●							●			
Williamson Creek Greenbelt	123	COA	GB												●	
Windmill Run	50	TC	CP					●					●		●	
Yett Creek Park	41	COA	NP												●	
Zilker Park	291	COA	MP	●	●	●		●		●	●	●	●		●	

a - Size unknown b - Area included in Pace Bend Acreage

PARK TYPES			
BR	BOAT RAMP	MP	METROPOLITAN PARK
C	CEMETARY	MU	MUSEUM
CC	COUNTRY CLUB	NP	NEIGHBORHOOD
CG	CAMPGROUNDS	PC	PRIVATE CAMP
CP	COUNTY PARK	PCG	PRIVATE CAMPGROUND
DP	DISTRICT PARK	PR	PRESERVE
GB	GREENBELT	RA	RESOURCE AREA
GC	GOLF COURSE	RC	RECREATION CENTER
MA	MARINA	SAC	SENIOR ACTIVITY CENTER
		SP	SCHOOL PLAYGROUND
		TC	TENNIS CENTER

1. Public Recreational Facilities

The public recreational areas within the permit area can be categorized by the following:

Recreational Facilities	Acres
Within permit area	20,922
West of Loop 1	11,551
Within preserve system	7,087

The recreational resources include public parks, preserves, and areas for active recreational use. Some facilities, such as Mansfield Dam, serve other public functions as well. The acreage also includes tracts that are publicly owned but have never been developed for recreational use, such as portions of the McGregor and Wheless tracts and other property owned by LCRA.

For the most part, the recreational facilities west of Loop 1 are regional attractions. The notable exceptions are smaller parks closer to the center of Austin, which are designated neighborhood parks or pools. The remainder of the tracts, both public and private, offer varying types of recreational opportunities, including camping (both primitive and improved), hiking, swimming, boating, water skiing, golf, disc golf, game fields, group activity areas, playgrounds, and areas of historic interest.

This section presents the discussion of recreational facilities in two parts, public and private. Public facilities are organized according to their managing entity: Travis County, LCRA, joint Travis County-LCRA agreement, and City of Austin. Cultural resources are discussed in a third part. The detailed inventory of resources included in this section includes only those resources that are part of the proposed preserve. The area is bounded by Loop 1 and its extensions on the east and the Travis County boundary on the north, south, and west.

a. Travis County Recreational Facilities

Travis County Parks Department maintains several types of parks within the permit area. The facilities are developed to provide a variety of recreational opportunities to all county residents. The facilities offer camping and/or day use and access and sports facilities in areas that historically have been in unincorporated areas. Within Travis County, facilities are not evenly distributed either by acreage or by type. The sports facilities are all in eastern Travis County. All of the camping facilities are located in western Travis

County. The day use areas are more evenly distributed, although 11 out of the 16 facilities are located west of Loop 1.

Management Rules, Guidelines, and Standards

Travis County has general rules pertaining to conduct in County-owned or County-operated parks. They include prohibitions against firearms, weapons, fireworks, and excessive noise and rules regarding control of pets, leashed pets, or no pets (depending on location). Swimming is allowed except when signs are posted. The facilities are generally open year-round, although each park or facility has its own hours of operation. Hours of operation for some day use facilities change seasonally.

Other regulations pertain to resource protection:

- Horses are allowed in two County facilities, neither of which is proposed for the preserve system.
- Generally, plants, animals, and natural formations are not to be disturbed. Animals and plants are not to be introduced in a County park.
- Cutting or gathering firewood is also prohibited. Fires are permitted in camp stoves, grills, or fireplaces as posted or provided. Ground fires are permitted in designated areas only. No fires, cooking, or stoves of any kind are permitted in Wild Basin Preserve or Hamilton Pool Preserve. No ground fires are allowed in any day use facility.
- Motorized vehicles are confined to designated roadways. Only street-legal vehicles are allowed on designated roadways. No all-terrain or other off-highway vehicles are allowed. Motorized boats are to be launched at designated boat ramps only.

Maintenance

Maintenance policies for Travis County parks are developed individually for each facility. Maintenance methods for facilities are standardized.

Capital Improvements

The County recently signed a 30-year lease to continue its operation of the County parks on LCRA land. As lessee, the County also has responsibility for the capital improvements for the areas used as County parks.

Travis County has several capital improvements planned, including major improvements at Mansfield Dam Park and Pace Bend Park. Improvements at Mansfield Dam are planned by both the County and the LCRA. Work includes the designation and improvement of parking areas, development of controlled access, and replacement and addition of toilet and, possibly, shower facilities. A major project at Mansfield Dam may involve the construction of a visitor and interpretive center by the LCRA.

The schedule for other planned improvements is under development. In addition to Mansfield Dam, it tentatively includes improvements at several recreational areas designated for the preserve, as follows.

- Addition of a handicapped ramp to the water's edge at Hippie Hollow. County staff believes this project can be accomplished without the removal of any trees.
- Sandy Creek currently has one lane available at the boat ramp; both the LCRA and the County have agreed to expand the ramp to two lanes. A boat ramp grant for this work was approved in 1995.
- Cypress Creek is split by a cove and provides vehicular access from both sides of the cove. Due to heavy use, the County would like to build a pedestrian bridge across the cove and eliminate one of the vehicular access points. The LCRA agrees on the merits of the project but has not backed it at this time.
- The County completed improvements and renovations at Bob Wentz Park at Windy Point and does not have any formal plans for additional improvements at this time.

The County prepared a biological assessment of Pace Bend Park, Mansfield Dam Park and Arkansas Bend Park in 1993 which will be used in the improvement and master planning of these parks.

Travis County Recreational Facilities within the Preserve

Hamilton Pool Preserve. Hamilton Pool is a unique natural pool, with limestone cliffs and associated streamside vegetation. Activities include swimming, pack-in/pack-out picnics, and day hikes. No pets or fires of any kind are allowed and visitors must remain on designated trails. Swimming is not allowed when the bacteria count is high due to either the nesting activities of a swallow colony in the cliff surrounding the pool or run-off from pastures upstream.

- *Wild Basin Wilderness Preserve.* Wild Basin Preserve is owned by Travis County and managed by the Committee for Wild Basin Wilderness, Inc., through a management contract. A small, approximately one-acre portion is owned by the Committee which is a private nonprofit organization. The organization operates an educational facility on this portion of the tract. The management philosophy for this tract of land is more stringent than other County facilities. The area is open only during the day, and only walking is allowed. No picnics, fishing, or access to areas off the trails is allowed.

b. LCRA Recreational Facilities

The Texas legislature established the Lower Colorado River Authority as a conservation and reclamation district with no taxing authority that provides reliable low-cost utility and public services. Its responsibilities also include soil conservation, flood control, water management, preservation of fish and wildlife, and pollution abatement. To the extent that other use of the land does not interfere with these primary goals, lands are managed to provide access and recreational opportunities for the public.

Some of the facilities are managed as primitive recreational areas. Unlike traditional parks, these areas are intended to be enjoyed in their natural state. Few if any improvements are offered. Maintenance of existing access roads, access barriers, parking areas, and installation of informational signs are the notable exceptions.

Management Rules, Guidelines, and Standards

By law, LCRA lands are open to the public for recreational uses, including fishing. Areas may be restricted to public access when such use would interfere with the proper conduct of business of the district or would interfere with the lawful use of the property. The following specific regulations also apply.

- All vehicle operation on LCRA land must be confined to designated roads and parking areas. They must be licensed for street use, operated only by persons with a valid driver's license and follow posted speed limits.
- Campfires are permitted only in established fire rings or contained in camp stoves.
- No natural resources may be destroyed or removed from LCRA property without prior written permission from LCRA. Protected resources include timber, shrubs, other vegetation, rock, sand, gravel, caliche or similar substances or materials, or geologic features.

- Possession or discharge of fireworks, explosives, or firearms are prohibited on LCRA land.
- All pets must be under direct control of their owners. Some properties expressly prohibit pets and livestock.
- Archaeological and historical features are protected by law and cannot be disturbed without a permit from the State Antiquities Committee and without prior written permission from the LCRA.
- Habitation on LCRA lands is prohibited. Camping is limited to five consecutive days in designated areas only. No person may construct electric, water, wastewater, or other utilities without prior written permission from the LCRA.
- Low-impact camping techniques are required for primitive recreational areas. This includes minimal disturbance of the camping area, use-designated camping, and fire areas. Specific suggestions are also given for camp construction, fires, garbage, sanitation, and water usage.
- Disposal of trash, garbage, hazardous materials or other solid wastes are prohibited, along with waste water, sewage or other liquid effluents.
- Littering, public consumption or display of alcoholic beverages, glass containers and excessive noise are not allowed.
- Groups larger than 20 individuals must obtain a land use permit.

Maintenance

Regular maintenance differs depending on the type of facility. Maintenance is minimal in the primitive recreational areas, but most offer composting toilets and a dumpster. Access is limited to existing facilities. Trails are existing pathways only and are designed and constructed for minimum maintenance.

Capital Improvements

Plans for LCRA facilities within the preserve include an interpretive and visitor center at Mansfield Dam, a kayak run below Tom Miller Dam, and primitive recreation site improvements.

The LCRA also has a policy of consolidating smaller tracts of land and buying and trading parcels of land to form larger tracts that can more readily fit into the overall

system. The LCRA also sells smaller tracts to raise capital for additional larger tracts or for capital improvements.

LCRA Recreational Facilities within the Preserve

McGregor Resource Area. Portions of the shoreline areas of this tract are leased to Travis County for part of Bob Wentz Park and Hippie Hollow Park. A portion of the proposed preserve area is a steep upland area adjacent to Hippie Hollow Park. This area is open to the public but is not open to vehicular traffic. The LCRA has classified the property for conservation and recreational use.

Westcave Preserve. Westcave Preserve is similar to Hamilton Pool Preserve but is a separate parcel of land that is owned by the LCRA and is operated by a private nonprofit organization. The tract is intended primarily as a preserve and is available for educational purposes.

Wheless Resource Area. This area is open to the public for recreational purposes but is not open to vehicular traffic. The LCRA has classified the property for conservation and recreational use.

c. Joint LCRA - Travis County Recreational Facilities

Several public recreational facilities within the permit area are on property owned by LCRA and operated by Travis County. The LCRA has entered into one master park lease agreement for operation of the seven parks leased to Travis County for recreational purposes. In western Travis County; this lease agreement provides public access to Lake Travis.

Management Rules, Guidelines, and Standards

The management of these areas is determined by the management policies of the entities involved and follows that outlined above for Travis County and the LCRA. Where there are conflicts between the rules and regulations at a particular facility and the general guidelines of the entity, the facility rules govern. Special management policies are discussed as part of the facility description.

Maintenance

The maintenance of the facilities is determined by the guidelines of the managing entity and changes according to the facility.

Capital Improvements

Capital improvements for joint LCRA-Travis County facilities are the responsibility of Travis County, which is currently in the process of preparing its capital improvement program.

Recreational Facilities within the Preserve

Bob Wentz Park at Windy Point. This park is shoreline property made up of a leased portion of the McGregor tract and acreage owned by Travis County known as the Romberg tract. The Bob Wentz Park shoreline is not part of the preserve system.

d. City of Austin Recreational Facilities

The City of Austin Parks and Recreation Department maintains various types of parks. Some of the parks also perform ancillary functions not associated with recreation. District parks usually have been established in major floodplains and are managed as part of regional detention and flood control program. Greenbelts are generally small, with very few improvements, following creek beds and other natural waterways. They serve as pedestrian connections to larger facilities as well as drainageways. Metropolitan parks are conceived as regional recreation facilities with a variety of activities. Each metropolitan park has a unique blend of available attractions, some of which may charge a fee.

Management Rules, Guidelines, and Standards

Rules, regulations, and management practices vary from park to park depending on the types of activities allowed or encouraged. However, there are some guidelines that are consistent for all facilities, including the prohibition of firearms and hunting, fires in designated areas only, and animals under direct control of owner except when in a posted no-leash area. The preserve areas have restricted access and more stringent use regulations. The Parks and Recreation Department is developing consolidated park rules and regulations; this document is currently in draft form and has not been formally adopted.

Maintenance

The City has a maintenance plan and program for the park system. Maintenance and development of City resources vary according to the type of park.

Neighborhood and school parks are generally highly maintained. In the past that has included turf areas that had to be replanted and groomed on a regular basis. There is a

trend toward providing natural areas within these neighborhood parks, where maintenance is minimized. The use of wildflowers and native plants, coupled with an emphasis on passive recreational opportunities, is the goal for urban park maintenance.

District parks tend to be highly developed, offering a variety of major indoor and outdoor facilities; however, the parks' natural features play a role in the type of areas maintained. Routine maintenance is very similar to nonpark facilities because of the presence of the buildings and other structures, including maintenance of parking areas, internal roads, and water distribution systems.

Metropolitan parks provide the greatest diversity of recreational opportunities and also offer facilities for special interest groups. Maintenance is according to the requirements of specialty activities, such as archery, theater, bicycling, model airplane flying, tennis, camping, and boating. Passive activities are also encouraged in order to make use of the unique environmental features present at these locations. Although the improved facilities may require specialized maintenance programs, the remainder of the park is usually managed to enhance unique natural features.

Capital Improvements

The City of Austin prepares capital improvement plans annually, with a seven-year projection, which have been done considering the creation of the preserve. Consequently, improvements have not been scheduled for areas designated as part of the preserve. The active use areas have been scheduled for routine maintenance. No capital improvements are currently planned for the facilities in this inventory.

City of Austin Recreational Facilities within the Preserve

Upper Bull Creek and Bull Creek District Park. There are no improved trails in the Upper Bull Creek system. Access points for fishing and off-street parking are provided.

Vireo Preserve. The Vireo Preserve is managed as a preserve. This area is not generally open to the public; access is by prior arrangement only.

Emma Long Metropolitan Park. This is Austin's largest district park. Most of this regional park is within the preserve. However, acreage along the lake and other active use areas is not included in the preserve system. The park offers a variety of activities, among the most diverse offered in a City or County park. Activities not offered at other facilities include archery and a motorcycle track. The facility also includes boat ramps, a dock, and a handicapped-accessible boathouse. Many other improved areas are part

of the park; playgrounds, picnic sites, and camping are offered on an individual and group basis.

Commons Ford Metropolitan Park. This park offers access to the water for fishing and various types of day use for picnics and barbecues. The facilities are offered on both an individual and a group basis. Active use areas of the park are not part of the preserve.

Bee Creek Preserve. The preserve is located on a site with the Ullrich Water Treatment Plant. This facility is managed as a preserve and does not offer recreational activities.

Zilker Metropolitan Park/Barton Creek Greenbelt. This is the most varied resource included in the preserve. It includes several separate parks: Zilker Hillside Theater, Barton Springs Pool, Barton Creek Greenbelt, Gus Fruh District Park, and Zilker Park. There are several concessions in the park, including food, canoe rental, and miniature train service. Activities are varied, including regional events, such as the Trail of Lights and the lighted Zilker Christmas tree. There are improved playgrounds, hike and bike trails, botanical gardens, and numerous playing fields. Swimming pools and public boat docks round out the facility offerings.

The active use areas of this park system have not been removed from the preserve. Instead, the Parks and Recreation Department is developing a management plan for Barton Creek Greenbelt that will take into account the presence of endangered species. This will, hopefully, become the model for all such management plans for city properties having endangered species and sensitive environmental conditions.

Zilker Park has recently been listed on the National Register of Historic Places. Many of its natural as well as man-made features are considered contributing structures, features, and objects to the National Register District.

Mt. Bonnell. Mt. Bonnell is a popular local and tourist attraction because a short climb on an improved trail offers a spectacular view of Lake Austin below the cliffs. The property is of local historic significance and has been so recognized by the City. Picnic facilities are provided. There are no improved trails, other than the main access, but the entire site is open to the public.

Barrow Preserve. The facility is managed as a preserve and has limited recreational offerings. Educational use of the site is permitted.

2. Private Recreational Facilities

a. Private For-Profit Recreational Facilities

Private and commercial facilities can be divided into three categories: first, private country clubs with golf courses and various indoor and outdoor courts; second, private camps, resorts, bank fishing, swimming areas, marinas, and boat ramps; and third, private for-profit game fields and courts, including soccer, basketball, softball, playgrounds, and golf.

Marinas and Boat Ramps. There are approximately 25 private marinas on Lake Travis and Lake Austin within or adjacent to areas designated as potentially having habitat suitable for the species of concern. The marinas serve many of the recreational boaters on the lakes. Services offered vary from location to location and include food, fuel, rest rooms, and sewage pump-out stations.

There is a private marina leased from the LCRA at Mansfield Dam.

Private Camps, Fishing, and Swimming. There are several private, fee-only facilities that offer improved camping, fishing, and swimming.

Country Clubs. Most of Travis County's country clubs and golf courses are located west of Loop 1. None of these resources are a part of the preserve system.

b. Private Non-Profit Recreational Facilities

Travis Audubon Sanctuary. Travis Audubon Society has maintained a sanctuary for the golden-cheeked warbler. Access is limited to member-only, guided tours for educational purposes. The facility is managed for the preservation of habitat for the species. A resident caretaker's house exists on the property.

3. Cultural Resources

Cultural resources are historical and archaeological sites, buildings, objects, structures, and features that meet the criteria established under the National Historic Preservation Act (NHPA; Public Law 89.665 as amended). The cultural resources inventory listed in this subsection (historical and archaeological resources) has been prepared to satisfy the requirements of the NHPA.

Section 106 of NHPA affords the Advisory Council on Historic Preservation the opportunity to review and comment on federal undertakings that affect properties included in or eligible for inclusion in the National Register of Historic Places. Section 106 also requires that every federal agency take into account how each of its undertakings could affect historic properties. A federal undertaking includes a broad range of federal activities and the USFWS has the legal responsibility for complying with Section 106.

a. Historical Resources

For the purpose of Section 106 of the NHPA, any property listed in or eligible for listing in the National Register of Historic Places is considered historic. The protection afforded by Section 106 also extends to the properties that are eligible but have not been formally placed on the Register or historically designated by state or local authorities. Eligible properties can be of nationwide, state, or local significance.

Several sites of historic significance are included in the proposed preserve and are listed below. However, a full inventory of the tracts proposed for the preserves has not been conducted.

Emma Long Metropolitan District Park. The historic resources at this park include the remains of a Civilian Conservation Corps camp (1938), a stone bridge, and a stone and timber pavilion; neither of the latter structures is marked by a plaque.

Mansfield Dam. The State Historic Preservation Office may determine that the dam structure is eligible for inclusion on the National Register.

Mt. Bonnell. Mt Bonnell is recognized as a locally significant historical site.

Romberg Tract. The Romberg tract is the site of a historic homestead. A portion of the property has new public-use facilities while the Romberg House and immediate landscape are preserved for future restoration.

Zilker Park. Zilker Park has been listed on the National Register. Both natural and artificial features are listed as contributing to its National Register status.

b. Archaeological Resources

The full acreage proposed for the preserve system has not been independently and systematically inventoried for potential archaeological sites. The Archaeological Research Laboratory at the Balcones Research Center of the University of Texas has

U.S. Geological Survey (USGS) maps on file showing locations of identified archaeological sites. The maps are not included in this EIS because the location of an archaeological site is not public information, according to Section 191.004 of the Antiquities Code of Texas.

Of the many archaeological sites located in the proposed preserve system, two have been tested for significance. They have both been identified as a potentially significant archaeological resource.

F. Water Resources

In Travis County, water resources are affected by physical hydrology and regulatory water resources protection measures. Consequently, this section presents the discussion of water resources in two parts. The first part describes the physical hydrology in terms of the climate, geology, soils, and watershed configurations for the 11 watersheds comprising the 33 drainage areas that may be affected by the proposed action. The second part discusses water quality protection and runoff volume control measures as they are implemented through state policies and standards and through local ordinances.

The information contained in this section has been summarized from a water resources report prepared by Raymond Chan Associates of Austin, Texas, in May 1993. The report titled: *Water Resources in Travis County Affected by the BCCP* is located at the City of Austin, Environmental & Conservation Services Department, 206 E. 9th Street, Austin, Texas 78767-8844 and the USFWS, 10711 Burnet Road, Suite 200, Austin, Texas 78758.

1. Climate

The climate of Travis County is a humid subtropical climate, with hot summers and mild winters. Precipitation averages 31.9 inches annually, with an average minimum of 1.7 inches in January and an average maximum of 4.8 inches in May (National Oceanic and Atmospheric Administration [NOAA] 1993). Peak rainfall occurs in late spring, with a secondary peak in September. Precipitation from April through September usually results from thundershowers; most winter precipitation occurs as light rain. Snow is insignificant as a source of moisture (NOAA 1982).

2. Geology

See discussion under Chapter 3.A.1a.

3. Soils

See discussion under Chapter 3.A.1.a.

4. Watersheds

See discussion under section A.1)b) of this chapter.

Inside the permit area, 11 watersheds encompass 33 drainage areas that include proposed preserve lands. All of the watersheds enter one of three reservoirs: Lake Travis, Lake Austin, or Town Lake, each of which is an impoundment of the Colorado River. Nine of the watersheds consist of a single drainage area and two watersheds, Lake Austin watershed and Lake Travis watershed, include multiple drainage areas. The 11 watersheds and their relationship to the 33 drainages are shown in the list below and drainage area characteristics are presented in Table 19.

Barton Creek watershed (drainage area 30)
Bull Creek watershed (drainage area 25)
Eanes watershed (drainage area 29)
Hamilton Creek watershed (drainage area 31)
Lake Austin watershed (drainage areas 14-24)
Lake Travis watershed (drainage areas 1-13)
Bee Creek watershed (drainage area 26)
Little Bee Creek watershed (drainage area 27)
Rattan Creek watershed (drainage area 32)
Town Lake watershed (drainage area 28)
Walnut Creek watershed (drainage area 33)

Table 19
Affected Drainage Areas Physical Characteristics

Drainage Area Number	Drainage Area Name	Drainage Area (acres)	Drainage Area (mi2)	River Length (Miles)	River Maximum Elevation (ft-msl)	Drainage Area Minimum Elevation (ft-msl)	River Slope (ft/ft)	Drainage Area Maximum Elevation (ft-msl)	Drainage Area Elevation Difference (ft)
1	Cow Creek	29,800	46.6	16.8	1420	710	0.008	1350	640
2	Post Oak Creek	5,546	8.7	4.9	1160	710	0.0174	1300	590
3	Drainage Area No. 3*	2,761	4.3	N/A	N/A	680	N/A	1200	520
4	Drainage Area No. 4*	1,848	2.9	N/A	N/A	690	N/A	1270	580
5	Big Sandy Creek	19,891	31.1	6.2	1100	800	0.0092	1320	520
6	Cherry Hollow	4,377	6.8	5.9	1250	710	0.0173	1280	570
7	Collier Hollow	419	0.7	2.5	1100	850	0.0189	1230	380
8	Lime Creek	3,909	6.1	4.1	1000	690	0.0143	1100	410
9	Drainage Area No. 9*	3,769	5.9	N/A	N/A	680	N/A	1075	395
10	Long Hollow Creek	1,956	3.1	2.4	940	680	0.0205	1075	395
11	Cypress Creek	3,803	5.9	3.3	940	710	0.0132	1080	370
12	Drainage Area No. 12*	3,349	5.2	N/A	N/A	680	N/A	1060	380
13	Drainage Area No. 13*	1,232	1.9	1.8	980	720	0.0274	1020	300
14	Bear Creek	1404	2.2	2.8	900	490	0.0277	980	570
15	Harrison Hollow	1,467	2.3	3	860	490	0.0234	940	450
16	Honey Creek	1,853	2.9	2.4	900	490	0.0324	1060	570
17	Cedar Hollow	459	0.7	1.4	900	490	0.0555	980	490
18	Bohls Hollow	739	1.2	1.2	840	490	0.0552	940	
19	Drainage Area No. 19*	1,439	2.2	2.4	800	490	0.0245	960	
20	Drainage Area No. 20*	1,226	1.9	N/A	N/A	490	N/A	940	450
21	Panther Hollow	2,732	4.3	3	950	490	0.029	1100	610
22	Turkey Creek	1,359	2.1	3.6	1000	490	0.0268	1060	570
23	Conners Creek	398	0.6	1.1	740	490	0.043	860	370
24	Coldwater Creek	699	1.1	1.3	740	595	0.0211	910	315
25	Bull Creek	22,804	35.6	10.2	1000	490	0.0095	1040	550
26	Bee Creek	2,094	3.3	2.8	930	610	0.0216	1000	390
27	Little Bee Creek	751	1.2	2.2	890	485	0.0349	920	435
28	Drainage Area No. 28*	395	0.6	1.3	720	485	0.0342	780	295
29	Banes Creek	2,369	3.7	6.1	960	430	0.0165	960	530
30	Barton Creek	78,650	122.9	40	1390	330	0.005	1400	1070
31	Hamilton Creek	5,335	8.3	4.7	1280	680	0.0242	1400	720
32	Rattan Creek	2,157	3.4	4.1	920	770	0.0069	950	180
33	Walnut Creek	2,584	4	3	940	670	0.017	980	310
TOTAL		213,574	333.7						

*Drainage areas having no main channel.

5. Edwards Aquifer Recharge Zone

Along with notable surface water features, a zone of fracturing creates nearly direct contact, through recharge features, to the Edwards aquifer system. The Edwards aquifer system, which is generally considered to be coterminous with the Balcones fault zone, extends 250 miles in an arc through 10 counties in southwestern and central Texas (see Figure 7). This larger system is divided into two hydrologically divided sections referred to as the "San Antonio area" and "Austin area" aquifers. The Austin area portion of the Edwards aquifer extends through parts of Hays, Travis, Williamson, and Bell counties, covering approximately 80 miles between the cities of Kyle and Belton. The Austin area portion of the aquifer is subdivided into northern and southern segments, with the southern part, between the Kyle area and the Colorado River, referred to as the Barton Springs segment of the Edwards aquifer (composed of the Barton Creek and Onion Creek systems). Water entering the Edwards aquifer from rainfall events and streamflow south of the Colorado River in Hays and Travis counties flows northward through underground channels toward Barton Springs, located in Austin's Zilker Metropolitan Park. These springs discharge an average of 50 cubic feet per second of water, which flows through the Barton Springs Pool and discharges through Barton Creek into Town Lake on the Colorado River (City of Austin 1983; Garner and Young 1976; Marek et al. 1981; Woodruff and Slade 1986). The portion of the Edwards aquifer recharge zone that is hydrologically associated with Barton Springs extends approximately 20 miles southwest from Town Lake in Travis County to Highway 150 near the city of Kyle in Hays County. The zone width ranges from about 2.5 miles near Town Lake to 7 miles to the south.

The Edwards aquifer is composed of limestone ranging in thickness from 40 to 300 feet. An upper confining bed is composed of a 60- to 75-foot-thick clay stratum overlain by a 35- to 500-foot limestone formation. A lower confining bed of limestone ranges in thickness from 15 to 60 feet (Slagle et al. 1986). Faulting of the limestone comprising the aquifer has created near-vertical planes, joints, and fractures that allow large volumes of water to enter the aquifer. Streams draining the Edwards Plateau lose flow as they cross fractured and dissolutioned limestone.

Most recharge occurs where the aquifer surfaces in the channels of six major creeks within two major systems. Water entering via the recharge zone generally flows north-northeast towards Barton Springs, which is the major discharge point in the Austin area. This source provides municipal, industrial, domestic, and agricultural water

supplies for approximately 30,000 people in southern Travis and Hays counties (Slagle et al. 1986).

6. Water Quality Protection Measures

a. Water Quality Policies and Standards

Antidegradation Policy

The State of Texas antidegradation policy for protection of water quality affords three levels of protection: (1) maintenance of existing uses of the water body; (2) protection of water quality that exceeds fishable/swimmable criteria; and (3) special protection for high-quality waters (Texas Water Commission [TWC] 1992).

Water Quality Uses and Criteria

Discharge permits issued by the Texas Natural Resource Conservation Commission and the Environmental Protection Agency limit the amount of industrial and domestic pollutants discharged to receiving waters. Water quality uses and criteria established for the receiving stream or reservoir set the discharge limits.

Many large or significant water bodies are considered "classified segments" having specific designated uses and associated criteria. Smaller, unclassified water bodies have presumed uses and associated criteria. Water quality uses include aquifer protection, agricultural water supply, contact and noncontact recreation, industrial water supply, domestic water supply, navigation, and aquatic life categories (TWC 1992).

Unclassified waters include perennial and intermittent streams for which site-specific uses have not been assigned. Unclassified perennial waters are presumed to have a high-quality aquatic life use. Therefore, dissolved oxygen criteria require a mean of 5.0 milligrams per liter (mg/L) and a minimum of 3.0 mg/L, with higher values (5.5 mg/L mean and 4.5 mg/L minimum) during spring months. Intermittent streams are required to be maintained with a 24-hour mean dissolved oxygen concentration of 2.0 mg/L and an absolute minimum of 1.5 mg/L. In addition, the basic uses of navigation, agricultural water supply, and industrial water supply are assumed for all unclassified waters (TWC 1992).

Toxics Standards

Texas Water Commission standards concerning toxic pollutants include general provisions, specific numerical criteria, and total toxicity limitations. Although a discharger may exceed acute criteria in a zone of initial dilution (ZID) at the point of discharge in a receiving water (other than intermittent streams), lethal impacts to aquatic organisms passing through the ZID are not allowed.

The water body may not be chronically toxic outside the mixing zone, below critical flow (7Q2), or where there are aquatic life uses. For discharges into intermittent streams, discharge permits prevent acute toxicity at the point of discharge. Within three miles of the discharge point, the permit prohibits chronic toxicity in any downstream perennial waters or any enduring pools with significant aquatic life uses. Permits for discharges into classified and unclassified stream segments are designed to protect against chronic toxicity in waters having aquatic life uses (TWC 1992).

b. Watershed Ordinances

Three separate ordinances protect watersheds and the Edwards aquifer within the City of Austin jurisdictional limits. These limits include the corporate limits and the five-mile extraterritorial jurisdiction. The primary development ordinances are the Comprehensive Watershed Ordinance of 1986, the Composite Watersheds Ordinance of 1991, and the SOS Ordinance of 1992. The Composite Ordinance was amended in 1994 to provide water quality protection from new development after a state court overturned the SOS ordinance in Hays County ETJ areas.

Comprehensive Watershed Ordinance

Protective measures required by the City of Austin watershed ordinances within the five-mile ETJ include the use of buffer zones along waterways; sediment/filtration or water quality ponds; erosion and sedimentation controls; and wastewater loadings restrictions.

Critical Environmental Features. Critical environmental features must be surveyed and delineated, and development must be set back minimum buffer distances (usually 150 feet) to avoid direct communication of surface runoff with such features. These include caves, sinkholes, springs, other karst features, canyon rimrocks, and similar formations.

Impervious Cover Restrictions. Under the CWO, impervious cover includes roads, driveways, parking areas, buildings, decking, rooftop landscapes, pools discharging to storm sewers, and other impermeable construction covering natural land surface. Sidewalks, detention basins, swales, and other conveyances used solely for drainage

purposes are not considered impervious cover. The CWO provides rules for transfer of land to increase the amount of impermeable cover allowed in a development.

Water Supply Watershed Protection. Special restrictions apply to developments located in rural and suburban water supply watersheds. Water supply rural watersheds affected by the proposed BCCP include the Lake Austin, Lake Travis, Little Barton Creek, and Barton Creek (excluding the area east of Barton Creek and north of Loop 360) watersheds. Water supply suburban watersheds affected by the BCCP include Barton Creek drainage east of Barton Creek and north of Loop 360, Bull Creek, West Bull Creek, Rattan Creek, and Town Lake (south bank between Barton Creek and Tom Miller Dam).

Regulations concerning wastewater treatment are designed to protect groundwater resources from on-site facilities and surface waters from nonpoint runoff. Within a water supply watershed, projects providing wastewater treatment by land application must have at least 8,000 ft^2 of irrigated land per living unit equivalent (or 7,000 ft^2 per living unit equivalent and six inches of topsoil). No irrigation is allowed on slopes greater than 15 percent, within CWQZs, or in the 100-year floodplain, nor is irrigation allowed during wet weather conditions. Residential lots utilizing on-site treatment must be at least one acre in size and have one-half acre of contiguous land with a slope less than 15 percent (or three-quarters of an acre of contiguous land and less than 25 percent slope). Package treatment plants must have at least 100 days of storage capacity; however, package treatment plants using subsurface effluent disposal are required to have 48 hours of storage capacity.

Sewer lines cannot be located in CWQZs unless deemed necessary by the City. If allowed inside a CWQZ, a sewer line must be located outside the two-year floodplain.

Development located within a water supply watershed requires an environmental assessment, which includes a description of hydrogeologic characteristics, a vegetative survey, wastewater disposal considerations, identification of any critical environmental features, stormwater management, and mitigation of industrial activities affecting water quality.

Industrial development projects that are not completely enclosed in a building require a pollution attenuation plan. The plan must propose methods for capturing the first half inch of runoff from developed areas while containing and filtering pollutants generated on-site. Hazardous materials storage facilities must include loss detection and containment barriers as regulated by the City of Austin Hazardous Materials Ordinance.

Edwards Aquifer Protection. In addition to regulations protecting water resources for watersheds outside the Edwards aquifer recharge zone, the following summarizes the more-stringent regulations that apply when the aquifer may be affected.

A certified report must be prepared by a qualified hydrologist or geologist for any property located within 1500 feet of the Edwards aquifer recharge zone that assesses the affect that property drainage might have on the aquifer.

All basins located inside the Edwards aquifer recharge zone must have impervious liners. Recharge features must be avoided when possible. Basins within the recharge zone that drain up to 40 percent impervious cover in residential areas may be designed to recharge groundwater. Recharge basins must include sedimentation/filtration.

All sewer lines crossing the Edwards aquifer recharge zone must comply with City of Austin construction standards (City of Austin 1988). Unsewered lots in water supply watersheds overlying the Edwards aquifer recharge zone must use sewage disposal systems, other than those utilizing drain fields.

Within water supply suburban and rural watersheds, irrigation disposal systems inside the recharge zone must meet biochemical oxygen demand/total suspended solids/nitrogen/phosphorus limits of 5/5/2/1 mg/L, respectively.

Inside water supply suburban and rural watersheds, no development other than that permitted in the CWQZ is permitted in the water quality buffer zone where such zone lies over the South Edwards aquifer recharge zone.

Other CWO Provisions. The CWO also contains provisions governing buffer areas, clearing restrictions, slope protection, erosion and sedimentation controls, and wastewater treatment and irrigation.

Composite Watershed Ordinance

The Composite Watershed Ordinance (No. 911017-B) adopted nondegradation regulations for the Barton Creek watershed and the watersheds contributing to Barton Springs. The ordinance was developed to prevent degradation of the water quality, quantity, and clarity of Barton Creek and Barton Springs. A multifaceted approach controls nonpoint source pollutants from developing sites by establishing on-site controls, requiring flow control, employing pollution reduction measures, limiting impervious cover, and requiring monitoring and inspection of water quality controls.

Critical Water Quality Zones. The CWQZ must generally remain free of all construction and development activity. Major waterways may be crossed by arterial streets, and

minor and intermediate streams may be crossed by arterial streets and collector streets. Minor waterways may be crossed by residential or commercial streets only when necessary. Wet ponds are allowed in the contributing zone in drainage areas less than 100 acres. Wastewater irrigation is prohibited in the critical or transition zones.

Water Quality Transition Zones. Water quality transition zones are established parallel to all CWQZs and extend from the outer boundaries of the CWQZ for 300 feet along major waterways, 200 feet along intermediate waterways, and 100 feet along minor waterways. No development other than that permitted in the CWQZ is permitted in the water quality transition zone. That portion of the zone that lies over the Edwards aquifer recharge zone must remain free of all development activity. Otherwise, streets, minor drainage facilities, water quality controls, one- and two-family housing units developed at a specified density, and vegetative strips must meet the criteria in the Environmental Criteria Manual (City of Austin 1991c).

Erosion and Sedimentation Controls. Additional controls were added for erosion and sedimentation control for developments in the Barton Springs zone or Barton Creek watershed. Development requires a temporary erosion and sedimentation control plan and a water quality plan, which must be certified by a registered professional engineer and approved by the City of Austin. Controls include temporary structural restrictions, site management practices, or other approved methods until permanent revegetation is certified complete. The length of time between clearing and final revegetation of development projects cannot exceed 18 months.

Water Quality Controls. Under the composite ordinance, the postdevelopment stormwater concentration of total suspended solids, total phosphorus, total nitrogen, and total organic carbon from developed areas must not exceed 144 mg/L, 0.11 mg/L, 0.95 mg/L, and 14.0 mg/L, respectively. All developments must provide stormwater detention for the two-year storm, unless deemed nonbeneficial by the City of Austin. Commercial developments must include pollution reduction measures, such as fertilizer reduction methods, street sweeping, pervious pavement, and reirrigation with captured runoff. The City of Austin conducts stormwater sampling and analysis to monitor nonpoint source pollutants generated by commercial and multi-family developments. Excessive violations result in suspension of the operating permit or other measures.

Water Quality Monitoring for Commercial and Multi-Family Controls. The City must take a minimum of four sample events per year for rainfall events greater than one-quarter inch. Sampling protocol calls for three samples a minimum of two hours apart for each of the sampled rainfall events. If a violation occurs on two consecutive sampling events, the developer and/or operator is given 30 days to regain compliance.

Further violations may result in suspension of the operating permit or other actions to gain compliance. The City may perform random inspections to verify compliance. If a phased development project does not meet stated provisions, the City may halt additional project phases until proof of compliance is submitted to the City.

SOS Ordinance

The SOS ("Save Our Springs") Ordinance (No. 920903-D), as approved in August 1992, amended the Austin City Code to establish special requirements for development of land in watersheds within the City's planning jurisdiction that contribute to Barton Springs. The new ordinance enacted more stringent regulations to protect Barton Creek, Barton Springs, and the Barton Springs Edwards aquifer.

During the fall of 1994, a state district court in Hays County overturned the SOS Ordinance in certain ETJ areas within Hays County. The City of Austin has appealed the court decision and no resolution of this legal dispute has occurred to date. The City of Austin currently requires developers undertaking new projects in the Barton Springs zone to comply with SOS requirements or the amended Composite Watershed Ordinance adopted by the Austin City Council in December, 1994. New State legislation in 1995 allows ETJ developers to proceed under those ordinances and rules in place when their first development application was filed.

Impervious cover in all watersheds contributing to Barton Springs is limited to a greater extent than under the CWO in the recharge zone and contributing zone. Runoff from developments within the contributing zone must be managed through water quality controls and on-site pollution prevention and assimilation techniques. No increases in the average annual loadings of total suspended solids, chemical oxygen demand, volatile organic carbon, total organic compounds, biochemical oxygen demand, lead, cadmium, coliforms, nutrients, and pesticides are allowed.

Critical Water Quality Zones. A CWQZ is established along all minor, intermediate, and major waterways in the Barton Springs zone. Inside the contributing area, the CWQZ cannot be less than 200 feet from the centerline of a major waterway or less than 400 feet from the main channel of Barton Creek. No pollution control structure or residential or commercial building may be constructed in the CWQZ.

Waterway definitions (minor, intermediate, and major) by which CWQZ widths are determined under the SOS Ordinance are shown in Table 2.7 of the water resources technical report.

Water Quality Transition Zones. Water quality transition zones are established parallel to all CWQZs, except the shorelines of [illegible] Austin and Town Lake. These zones extend from the outer boundaries of the C[illegible] or 300 feet along major waterways, 200 feet along intermediate waterways, and 100 feet along minor waterways. No development, other than that permitted in the CWQZ, is permitted in the water quality transition zone where such zone lies over the South Edwards aquifer recharge zone. Otherwise, the projected impervious cover in any development within the water quality transition zone may not exceed established maximums (Section 13-2-544) within the zone, exclusive of land within the 100-year floodplain. No water quality controls that serve development in the uplands or transition zone are permitted in the water quality transition zone.

In August 1994, a study assessing the risk of accidental contamination of water bodies by toxic or hazardous materials was prepared for the City of Austin Environmental and Conservation Department. The study, "Hazardous Materials Water Contamination Risk Study," was performed by RMT/Jones and Nuese, Inc., and provided an inventory of use and transportation of toxic and hazardous materials in and through Austin. Included in the study were recommendations to the City Council to reduce the risk of accidental contamination of the Barton Springs Edwards aquifer as well as other water bodies in the preserve area.

This 1994 ordinance, which revised the 1991 Composite Watershed Ordinance somewhat by tightening exemptions and limiting impervious cover transfers, was intended to maintain a high level of water quality protection (i.e., non-degradation) despite the successful legal challenge to the SOS Ordinance. Developers filing new projects may select this option over the SOS Ordinance but will be required to meet the discharge concentration values for the same four constituents that the original Composite Watershed Ordinance regulates.

Additional Requirements

Austin City Code. Development in the Barton Springs zone must comply with the water quality control and pollution prevention standards in Chapter 13-7, Article I, Division 5 of the Austin City Code of 1992 (City of Austin 1992b). Water quality controls for the reduction of postdevelopment pollutant load must be designed, constructed, and maintained in accordance with the specifications in the Environmental Criteria Manual (City of Austin 1991c). The applicant must substantiate pollutant removal efficiencies of such controls through the use of values found in published literature or values from verifiable engineering studies. Controls must be located in sequence, where needed to

achieve the required removal rate. The sequence of controls must be established based on criteria in the Environmental Criteria Manual or on sound engineering principles.

Federal Clean Water Act (Section 404). Fill material deposited to drainages considered "waters of the United States" and their associated wetlands, amounting to more than one acre but less than ten acres, requires notification of the U.S. Army Corps of Engineers (USACE) for determination and issuance of a nationwide permit as outlined in Section 404 of the Clean Water Act. Impacts greater than 10 acres would require an individual project 404 permit. If a project also involves a federally endangered or threatened species, a project 404 permit is automatically required as well as a consultation between the USFWS and the USACE under section 7 of the Federal Endangered Species Act.

LCRA Water Quality Ordinance. The Lower Colorado River Authority implements water quality regulations affecting new development in the portion of Travis County which lies within the Lake Travis watershed. These regulations require new residential, commercial and industrial development to use various best management practices to mitigate the increased pollutant loading caused by the proposed development. The regulatory approach used by the LCRA sets a water quality target for runoff from new development. It does not mandate specific setbacks from waterways or limit density of impervious cover. Within the City of Austin ETJ, the LCRA generally considers compliance with Austin's regulations to be equivalent to meeting the LCRA requirements for water quality protection.

G. Air Quality

The Austin metropolitan area and Travis County are currently full attainment areas for all air quality criteria pollutants of the Environmental Protection Agency (EPA) and the Texas Natural Resource Conservation Commission (TNRCC). However, degradation of air quality, particularly due to automobile exhaust, has been a concern in the Austin metropolitan area for over a decade.

Continued development and urbanization in the Austin metropolitan area will contribute to a potential for higher concentrations of vehicle and industry air emissions in the future. To date, Texas has no comprehensive air quality policy or management plan regarding regional air quality protection.

Chapter Four
IV. Environmental Consequences

Chapter 4 forms the analytical basis for the discussion of the environmental impacts of the alternatives. It includes discussions of:

(1) Direct effects and their significance.

(2) Indirect effects and their significance.

(3) Means to mitigate adverse environmental impacts.

The action that is being evaluated is the USFWS issuance of a Permit pursuant to the Endangered Species Act. The chapter discusses the environmental consequences of this action on biological, social, economic, recreation, water resources, and land uses in Travis County, Texas. The cumulative effect of the proposed action is also analyzed in this section. The following discussion complies with the USFWS interpretation of 50 CFR 17.22(b)(1)(iii)(A): "The impacts that will likely result from such taking;" and "what steps the applicant will take to monitor, minimize, and mitigate such impacts."

A. Biological Resources

This section is intended to provide a detailed analysis of the environmental consequences of the issuance of a Permit and the establishment of a habitat preserve system on the biological resources of the permit area. Although administratively included within the permit area, the portion of the county located east of the MOPAC Railroad line is not generally impacted by federally protected species compliance issues; thus, discussion of this portion of the county will be limited. The major focus of the discussion will be on the Edwards Plateau of the permit area containing at least 95 percent of the habitat for the species covered by the Permit.

The section is divided into subsections listing the most sensitive biological issues first. The subsections describe the impacts and mitigation of each alternative to the sensitive biological resources found within the permit area. For a description of the existing biological resources found in the permit area affected by issuance of a Permit and the

establishment of the preserve system, see Chapter 3, Section A. The subsections of this chapter include:

- Black-capped vireo
- Golden-cheeked warbler
- Karst invertebrates
- Bracted twistflower
- Canyon mock-orange
- *Eurycea* salamanders
- Other species of concern

Assumptions and Assessment Guidelines. The analyses of environmental consequences of the alternatives detailed below draws upon the guidance in section 10(a)(1)(B) for the assessment of impacts of the proposed action on each of the included species. With reference to biological issues, the HCP submitted as a draft EIS and part of the Permit application must specify:

(1) The impact that will likely result from the proposed taking of the species.

(2) Steps that the applicant will take to monitor, minimize, and mitigate such impacts.

The criteria that are key in the decision whether or not to issue the permit are that:

(1) The take will be incidental (to otherwise lawful activities).

(2) The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the take.

(3) The take will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.

For the purposes of this analysis, these criteria are addressed for each of the included species as follows:

(1) The amount and character of proposed incidental take is described under impacts.

(2) The consistency with existing recovery plans and assessment of the likelihood of survival and recovery in the wild is described under significance of impacts.

(3) The steps proposed to monitor, minimize, and mitigate impacts are described under mitigation.

1. Black-capped Vireo

a. Alternative 1: No Action

Impacts

The No Action Alternative assumes that no effort would be made to prepare a BCCP and that a regional Permit would not be pursued. Under this alternative, protection of existing occupied black-capped vireo habitat would occur through enforcement of the taking prohibition (section 9 of the ESA), through development and implementation of recovery plans by the USFWS and others, and through independent conservation actions of other organizations. Enforcement of the taking prohibition would occur through field investigations, legal actions, the Permit process for private development, and the section 7 consultation process triggered by the involvement of a federal agency (e.g., the U.S. Army Corps of Engineers proposes to issue a permit for a wastewater line crossing a stream within occupied endangered species habitat).

Of the approximately 250,000 acres in western Travis County, about 2,000 acres are known to be occupied by the black-capped vireo. Currently, about 485 acres of this habitat is publicly owned. Approximately 1,000 acres of habitat supporting from 40 to 60 individual vireos will be subject to take under the proposed BCCP permit described as Alternative 2 or Alternative 3. This loss amounts to about 55 percent of the permit area's known vireo population and habitat.

Currently, habitat losses are occurring through development, overbrowsing, and suppression and alteration of natural disturbance regimes. Cowbird nest parasitism has drastically reduced vireo reproduction in many areas. In Texas, there may be up to 1,500 breeding pairs still present in a number of localities. Travis County has an estimated population of fewer than 100 individual birds and from 28 to 59 pairs.

Under the No Action Alternative, ESA enforcement is not likely to reduce the direct loss of vireo habitat (compared to the other alternatives); additionally, much habitat fragmentation, urban encroachment, and increased cowbird parasitism could be assumed due to the lack of a regional management approach used under this alternative.

Significance of Impacts

To the extent that coordinated oversight of habitat management and species conservation occurs under this alternative, it will be through the efforts of the USFWS as it reviews various applications. The USFWS is charged with the statutory responsibility under section 10(a)(1)(B) to ensure the survival and recovery of a listed species in the wild. Under section 7, the USFWS is required to consider whether the proposed project poses a jeopardy to the continued survival of the listed species in the wild. Such decisions necessarily consider the presence or absence of preserve lands for the species. Once the USFWS issues a Permit or completes section 7 consultation through another Federal agency, the recipient is responsible to comply with the terms and conditions contained in the subject permit or agreement. Enforcement is through the Division of Law Enforcement of the USFWS.

This alternative has the potential for piecemeal habitat preservation and resulting habitat fragmentation, and the direct loss of vireo habitat may be more than the proposed action.

Mitigation

Because this alternative relies on the USFWS to evaluate individual permits and consultations to comply with the ESA, no overall habitat management entity or comprehensive effort to conserve habitat participation would exist. Each project owner would negotiate the terms and conditions of a Permit with the USFWS or section 7 consultation independently with another Federal agency and would be responsible for implementing the agreed-upon mitigation accordingly. If on-site mitigation is required, the land would be conveyed to a conservation entity for management. If off-site mitigation is required, a conservation entity would be identified and the lands transferred fee title to that group for management. If mitigation consists of paying only a mitigation fee, a management fee may be included in that cost.

The No Action Alternative poses potentially severe adverse long-term impacts on the viability of the black-capped vireo and the supporting ecosystems in the area. Those lands that would be preserved as a result of successful individual Permit actions or section 7 consultation may be relatively isolated from each other, thereby reducing their habitat value as a result of habitat fragmentation. Comprehensive species management programs, such as cowbird management and systematic monitoring of species populations, would be less organized and possibly more expensive. In addition, a network of fragmented preserve lands that is not comprehensively designed or managed to function as a system would reduce the likelihood that the species of concern could survive in the local area.

b. Alternative 2: Regional Permit

Impacts

The black-capped vireo's occurrence and area of occupation in Travis County is well-documented. For purposes of this take analysis, vireo habitat is defined as the union of all known habitat areas occupied by vireos during any of the breeding seasons from 1986 through 1995. Isolated black-capped vireo territories that were not studied by field biologists sufficiently to map the areal extent of the territory were assumed to be ten acres in size. The distribution of occupied vireo habitat, as defined above, in the area just west of Austin is shown in Figure 11. Table 7 shows the area of black-capped vireo habitat included in preserve acquisition areas and existing public/institutionally owned land. Note that the impacts discussed below are based on the assumption that any take that may occur is incidental to otherwise lawful activities.

Approximately 933 acres of the approximately 2,000 acres of identified occupied vireo habitat known in the BCCP permit area are included in the preserve area proposed by this alternative (Figure 17). This protected habitat will be concentrated in confirmed, occupied vireo habitat. Conversely, the area of occupied vireo habitat not included in preserve acquisition areas or public/institutionally owned land is approximately 1,000 acres. This is the maximum limit of allowable take of occupied vireo habitat under the proposed BCCP. Based upon a review of bird surveys conducted in these areas by DLS Associates (1989b, 1990a, 1990b), TxDOT, EH&A, and others, a total of approximately 40-60 individuals will be subject to take.

Unprotected (subject to allowable take) occupied vireo habitat includes isolated vireos in the South Jonestown Hills, on the west shore of Anderson Bend, on the northwest side of the Loop 360 bridge over Lake Austin, two areas on Steiner Ranch, and along Highway 620 south of Four Points, on the Wolf Ranch, north of the Davenport vireo preserve, and on Hudson Bend.

According to the USFWS's *Black-capped Vireo (Vireo atricapillus)* Recovery Plan (1991a), the black-capped vireo will be considered for reclassification from endangered to threatened when:

(1) All existing populations are protected and maintained;

(2) At least one viable breeding population (comprised of at least 500 to 1,000 effectively breeding pairs) exists in each of the following six locations:

- Oklahoma
- Mexico (wintering grounds)
- Four of the six Texas regions (including the Austin vireo population at the eastern edge of the vireo's range);

(3) Sufficient and sustainable area and habitat on the winter range exists to support the breeding populations outlined in 1 and 2 above; and

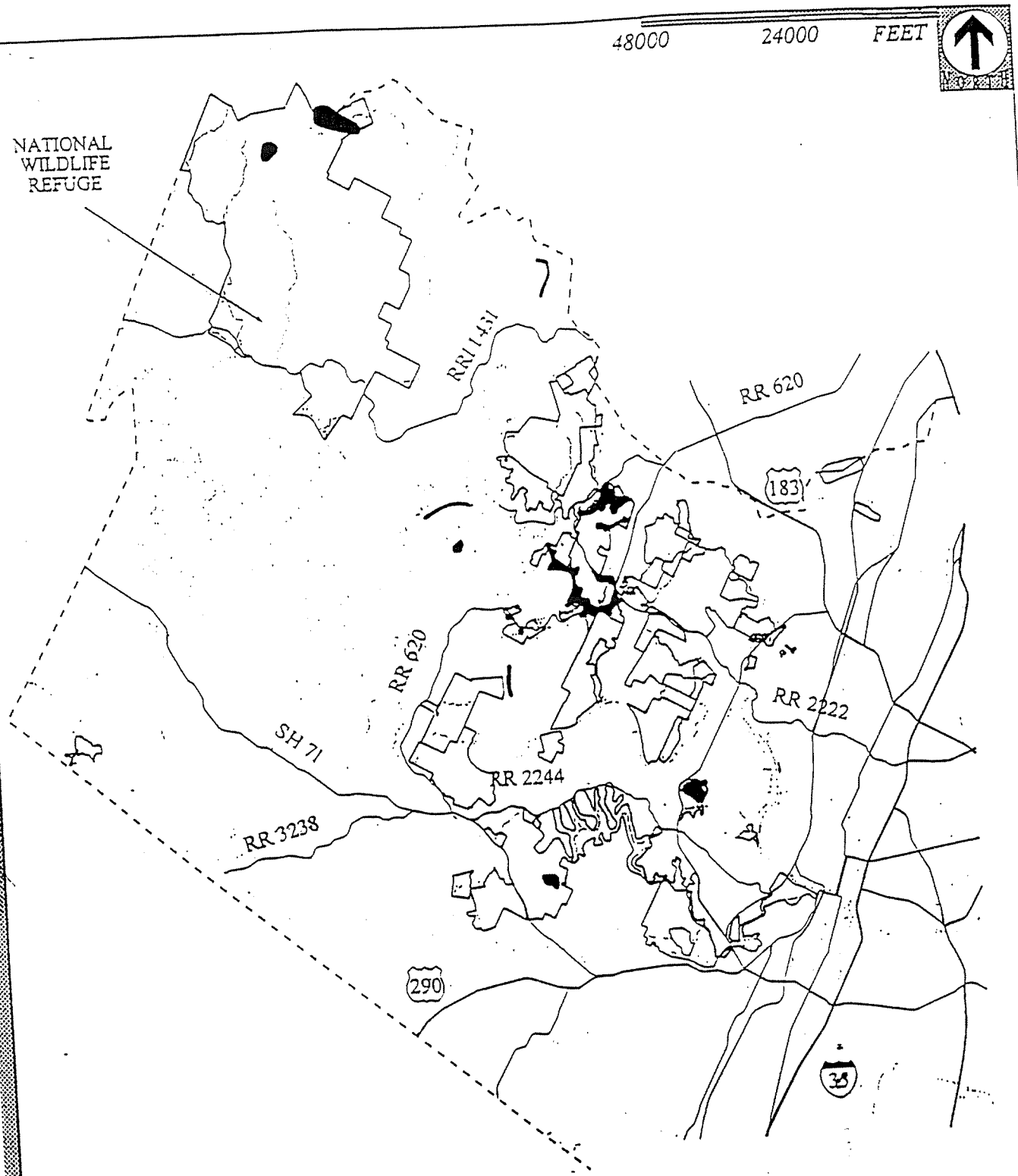
(4) All of the above have been maintained for at least five consecutive years and available data indicate that they will continue to be maintained.

One of the goals of the BCCP is the enhancement and maintenance of the population of vireos in the permit area. The accomplishment of this goal would partially fulfill an important component of the recovery plan's goal to establish six, viable breeding populations by stabilizing and increasing the local subpopulation and allowing for interchanges with a larger metapopulation from surrounding areas. The success of this endeavor will depend on the effectiveness of management activities in establishing new vireo colonies adjacent to the Cypress Creek and North Lake Austin populations through an increase in available habitat.

A viable population of black-capped vireos was estimated by Pease and Gingerich (1989) to be between 500 and 1000 effectively breeding pairs. To provide a preserve system to reasonably ensure survival of a metapopulation of the species, Pease and Gingerich estimated that between 125,000 and 865,000 acres must be managed for the species. The minimum population size and area estimates assume a variety of configuration and management conditions are met by the preserve system, including (1) conservation of all of the land between colonies be within the preserve, (2) only lands with the appropriate habitat or potential habitat, geology, slope, and aspect to support the mid-successional habitat used by the vireo, (3) allowance for the fact that not all land capable of supporting vireos will have vegetation at the correct successional stage, and (4) each colony within a preserve should have less than five percent of its area within 100 meters of the preserve boundary (Pease and Gingerich 1989). Travis County is one of 14 counties that are totally or partially included within a recovery region. Therefore, all of the habitat for a viable population does not have to be established within Travis County.

Significance of Impacts

The USFWS, in its Review of Biological Basis of the Balcones Canyonlands Conservation Plan (USFWS 1992a) states that ". . . the proposed preserve system would



LEGEND

Preserve

Black-capped Vireo Locations

Source: USF&W Service

FIGURE 17

Known Occupied Black-capped Vireo Habitat within the Preserve Area

RECON

Figure 17 Back Side)

appear to be adequate for the proposed take of the black-capped vireo in Travis County." This statement was based on several assumptions regarding the plan. The first assumption was that land acquisition and subsequent intensive management practices would be implemented in full, prior to the destruction of the habitat. These guidelines are outlined in the BCCP and discussed in the Measures to Mitigate Take section of this discussion.

A second assumption was that take would not be allowed to occur until (1) 50 percent of the minimum preserve area in the Cypress Creek and North Lake Austin macrosites is under exclusive option for purchase or has been acquired, (2) management for the vireo in those macrosites is occurring (including appropriate vireo monitoring and cowbird and habitat management activities), and (3) there is an increase in the local vireo populations. These interim restrictions on the clearing of occupied vireo habitat have been deleted from the current version of the BCCP. Given the predicted incidental take of 40 to 60 vireos (totaling 55 percent of the estimated Travis County populations), the possibility for immediate incidental take of a significant portion of the population could have a negative impact on the viability of the local population as a whole. However, the location of the vireos and trends in current development would indicate that the take would not be immediate.

The protection of 8,219 acres of potential vireo management area is beneficial because it provides opportunities for future habitat management and vireo colonization which would otherwise not be possible. The USFWS recognizes that there is not enough vireo habitat in Travis County to provide for a minimum viable population of this species. However, the vireo habitat conserved in the county will provide an appropriate part of the regional conservation effort for this species. The continued survival of the black-capped vireo will require conservation activities in significant portions of its range outside Travis County.

Mitigation

Plans to Minimize and Monitor Take. The discussion of minimization of impacts focuses on the alternatives evaluated in the process of preparing the proposed plan. Minimization also includes modifications incorporated into the plan with the intent of reducing the direct and indirect take of the species of concern, such as site specific design considerations. In addition, because the BCCP covers more than one listed species with potentially overlapping distributions, there is a need for optimization between the species within and among the various elements of the preserve system. The concept of cumulative minimization (or balancing of impacts and management among the species of concern) will be considered in the analysis.

In addition, annual monitoring and reporting to the USFWS will be required during implementation of the BCCP. Such reporting will include an estimate of the amount of habitat lost during the report year, the amount of habitat protected, and the amount of habitat restored. The summary of taken and protected habitat will be used by the USFWS as a tool to monitor compliance by the BCCP Coordinating Committee with the conditions of the Permit (KSB&A and EH&A 1992).

Measures to Mitigate Take. Acquisition of potential vireo management areas is the central element of BCCP mitigation for the loss of black-capped vireo habitat. Management for the vireo is most likely to succeed in those macrosites with the largest acreage of potential management areas, the most vireos present or nearby to colonize, and the longest history of vireo occurrence. The Cypress Creek, Bull Creek, and North Lake Austin macrosites contain approximately 16,534 acres (61 percent) of the 26,978 acres of potential management areas in the BCCP (Table 20). Approximately 6,435 acres of potential vireo management areas are in the preserve acquisition areas in these three macrosites; if the BCCP protects 66 percent of the preserve acquisition land, then 4,247 acres would be included in the final preserve configuration. in addition to 3,320 acres protected on public/institutional land. This amounts to a total of 7,567 acres, or 28 percent of total potential vireo management areas.

Some of the potential vireo management areas recommended for protection in the preserve system are currently warbler habitat. While the vireo is the rarer of the two bird species in the BCCP permit area and is arguably in greater jeopardy from urbanization factors, the blocks of warbler habitat within the permit area, particularly in the Bull Creek, Cypress Creek, and North Lake Austin macrosites, are acknowledged to be among the most important in that species' entire range (BAT 1990; Sexton 1992). Combined with the fact that warbler habitat is in essence an old growth woodland type with a long lead time for regeneration (Sexton 1992), it is, therefore, assumed that most of the potential vireo management areas presently occupied by warblers would best be retained and managed for the warbler and not for the vireo. The appropriate balance between the habitat management requirements of these two endangered songbirds will continue to be reexamined as further research is available and as individual management plans for preserve units are written.

Table 20 also shows the area of potential vireo management areas. Within the preserve acquisition areas in these three macrosites, there is approximately 3,700 acres of potential vireo management area that is not currently warbler habitat and is, thus, more suitable for management for the vireo. If 66 percent of the preserve acquisition area is acquired, then approximately 2,442 acres would be available for management towards vireo

TABLE 20
ACREAGE OF POTENTIAL BLACK-CAPPED VIREO MANAGEMENT AREAS IN THE BCCP

	Recommended Preserve Area						
Macrosite	Preserve Acquisition	Public/ Institutional	Total Area Protected	Percent Protected	Total Area Unprotected	Percent Unprotected	Total Area
Lake Travis	0	0	0	0.0	7,249	100.0	7,249
Devil's Hollow	0	0	0	0.0	215	100.0	215
Cypress Creek	2,899	2,453	5,352	60.3	3,523	39.7	8,875
Bull Creek	3,168	255	3,423	70.1	1,457	29.9	4,880
North Lake Austin	368	612	980	35.3	1,799	64.7	2,779
South Lake Austin	135	0	135	28.4	341	71.6	476
West Austin	0	237	237	46.8	269	53.2	506
Pedernales River	0	91	91	6.4	1,334	93.6	1,425
Barton Creek	148	137	285	49.7	288	50.3	573
Southwest Austin	0	0	0	0.0	0	0.0	0
TOTAL	6,718	3,785	10,503	38.9	16,475	61.1	26,978

habitat. An additional 2,114 acres on public/institutional land would also be available for vireo habitat management, for a potential total of approximately 4,556 acres.

An additional mitigating factor is the configuration of the preserves. The vireo habitat, which will be acquired under the proposed plan, will be protected in large blocks, and thus, will be more beneficial for the long-term survival of the vireo than the currently occupied habitat, which is severely fragmented.

The loss of vireo habitat will also be mitigated by management of the preserves as outlined in the BCCP Management Plan. The BCCP will implement cowbird trapping as necessary to enhance vireo nesting success. Experience at other sites indicates that cowbird trapping can be successful (e.g., Fort Hood, Texas); preliminary information also suggests that similar results can be achieved in the BCCP preserve area.

Additional mitigation discussed in the plan will focus on the establishment of a disturbance regime (e.g., fire plans or brush manipulation) to maintain the successional habitat required by the black-capped vireos, as well as the control of browsing ungulates such as deer and goats via controlled hunting, grazing exclusion, and fencing.

Prior to full acquisition of the preserves, certain interim constraints and restrictions are proposed in order to allow development to proceed. In the event that the preserve acquisition schedule is delayed following issuance of the Permit, incidental takings will still be allowed. However, the BCCP Coordinating Committee will be obligated in such a case to assure and document that the rate of development outside of designated preserves does not impair the chances for survival of the species in the area.

Habitat conversions will be allowed to occur throughout the BCCP as soon as the Permit is issued, but the Permit must stipulate that an acceptable proportion of habitat conversion area-to-land area set aside as preserves is maintained. This provides a margin of assurance that the rate of habitat conversion will not proceed so fast relative to preserve acquisition that the species of concern would incur irreversible losses before the preserve and management program are given the chance to succeed. Thus, it provides an assurance that any unforeseen slowdown in the acquisition schedule will not jeopardize the permit, nor cancel the opportunity for orderly land development in the interim.

In order to meet conservation needs for the black-capped vireo in the permit area and allow for postpermit taking of vireo habitat, the following guidelines are proposed:

(1) Currently occupied vireo habitat and land with high potential for creation of vireo habitat within the proposed preserve system will receive a high priority for acquisition; and

(2) Initial land management emphasis on preserve units shall prioritize vireo habitat.

c. Alternative 3: Regional Permit

Impacts

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and that the proposed preserve system includes the preservation of an additional 5,000 acres located in close proximity to the BCNWR (see Figure 5). This acreage may be located entirely within Travis County, or partially located within either or both, Burnet and Williamson counties. If the acreage is located entirely within Travis County, the permit application for incidental take would be revised to reflect 5,000 fewer acres to 555,000.

These 5,000 acres would be primarily golden-cheeked warbler habitat and not black-capped vireo habitat. The target acquisition area does not include any known vireos. To the extent, however, that vireo habitat is added under this alternative compared to Alternative 2, the assumption is that about 20 acres can support one additional pair of vireos. Overall, the impact of this alternative will be to reduce the area of potential take of the vireo and increase the acreage conserved.

Significance of Impacts

To the extent that this alternative sets aside more vireo habitat or potential vireo habitat than Alternative 2, the ability of the BCCP's acquisition and management guidelines to achieve the desired level of species recovery will be enhanced.

Mitigation

Plans to Minimize and Monitor Take. Provisions to minimize take and to monitor take and report annually will be set forth in the BCCP and site-specific management guidelines. Whether this alternative preserves the same amount of vireo habitat as Alternative 2 or more vireo habitat, the guidelines for minimizing and monitoring take will be the same. Their effectiveness depends on their implementation rather than on the size of the area concerned. Assuming effective implementation, however, to the extent that the guidelines are applied to more acres of vireo habitat, the chance for vireo recovery will be improved.

Measures to Mitigate Take. Acquisition of potential vireo management areas is the central element of BCCP mitigation for the loss of black-capped vireo habitat. This alternative includes at least 2,000 acres of potential vireo habitat that will be managed for the benefit of the black-capped vireo.

2. Golden-cheeked Warbler

a. Alternative 1: No Action

Impacts

The golden-cheeked warbler is more abundant in Travis County than is the black-capped vireo. Because of the warblers' nesting habits and location, it is difficult to measure the local population and document population trends. Therefore, it is more appropriate to discuss the documented decline in the warbler's habitat in the Austin area.

Habitat destruction harms the golden-cheeked warbler both because of the direct loss of habitat, and because it fragments the remaining habitat into smaller patches. Estimates of the rate of loss of warbler habitat near Austin range from 5 percent (Wahl et al. 1989; Pease and Gingerich 1989) to 7 percent (Clark 1985) per year. By adding together the area of several major developments, roads, and other known losses of warbler habitat, the City of Austin estimated that at least 2,700 acres of good warbler habitat were lost between 1974 and 1985 (City of Austin 1985). Losses have continued since the time of that estimate, as have city approvals for projects which will cause further habitat losses.

Encroachment of urbanization on areas coterminous with the warbler's habitat has continued to accelerate the fragmentation of large habitat blocks and the creation of opportunities for predation and cowbird encroachment and parasitism within blocks of habitat.

The continuation of this trend, as would be the case given the No Action Alternative, will maintain a situation which is not conducive to the perpetuation of a viable warbler metapopulation in Travis County.

Significance of Impacts

The rate of decline is difficult to predict given uncertainties regarding enforcement of the ESA as well as the unsuitability of a significant portion of the warbler habitat for development (due to watershed protection zone restrictions and topography).

Mitigation

Because this alternative relies on the USFWS to evaluate individual permits and consultations in order to comply with the ESA, no overall management organization would exist. Each project owner would negotiate the terms and conditions of a Permit or section 7 consultation independently with the USFWS and would be responsible for implementing the agreed-upon mitigation accordingly. If on-site mitigation is required, the land would be conveyed to a conservation entity for management. If off-site mitigation is imposed, a conservation entity would be identified and the lands conveyed, fee title, to that group for management. If mitigation consists of paying a mitigation fee, a management fee may be included in that cost.

The No Action Alternative poses potentially severe adverse long-term impacts on the viability of the golden-cheeked warbler species and the supporting ecosystems in the area. Those lands that would be preserved as a result of successful individual Permit actions would likely be relatively isolated from each other, thereby reducing their habitat value as a result of habitat fragmentation. Comprehensive species management programs, such as cowbird management and systematic monitoring of species populations, would not be undertaken. In addition, a network of fragmented preserve lands that is not comprehensively designed or managed to function as a system would reduce the likelihood that the species of concern would survive in the local area.

b. Alternative 2: Regional Permit

Impacts

The existing potential warbler habitat in the BCCP permit area is shown in Figure 13. Existing potential habitat is defined as the warbler habitat mapped from Landsat imagery by the University of North Texas Center for Remote Sensing, which was ground-truthed by members of the BAT in 1989. The results of this mapping effort were reported by Shaw et al. (1989). The mapped data were converted (from raster to vector format) and stored on the Arc-Info geographic information system (GIS) developed for the BCCP by the Texas Natural Resources Information System.

Table 8 summarizes the distribution of existing potential warbler habitat in the BCCP permit area. Approximately 35,839 acres of identified warbler habitat currently exist in the permit area. Of this total, approximately 8,480 acres (24 percent) of warbler habitat is targeted for preserve acquisition and 5,489 acres (15 percent) are in public/institutional land. However, current projections are that only 66 percent of the lands in the preserve acquisition category will be protected; thus, 5,597 acres (16 percent) is a reasonable estimate of the identified warbler habitat the plan will protect in this category, plus 100

percent in public/institutional areas (5,489 acres) for a total of 11,086 acres (31 percent) of warbler habitat. This number may vary depending on the specific tracts which are included in the final preserve system, and may increase if sufficient funding is available. The unprotected habitat, may be as much as 26,753 acres (71 percent), is the area that would be subject to take under the proposed plan. Figure 18 shows warbler habitat located with and without the proposed preserve system

At an estimated density of 15 to 30 pairs per 250 acres of habitat, the loss of as much as 26,753 acres would result in the take of approximately 1,485 to 2,970 pairs of warblers (assuming 100 percent occupation, which is unlikely). While this density assumption yields a "take" figure which appears to be out of line with the currently recognized population figures for the county, it is useful for comparative purposes.

The inclusion of warbler habitat located in watershed protection zones (WPZs) (discussed below) would result in a much smaller projected net loss of approximately 16,352 acres, resulting in a take ranging from 981 to 1,962 pairs of warblers, based on the density figures presented above.

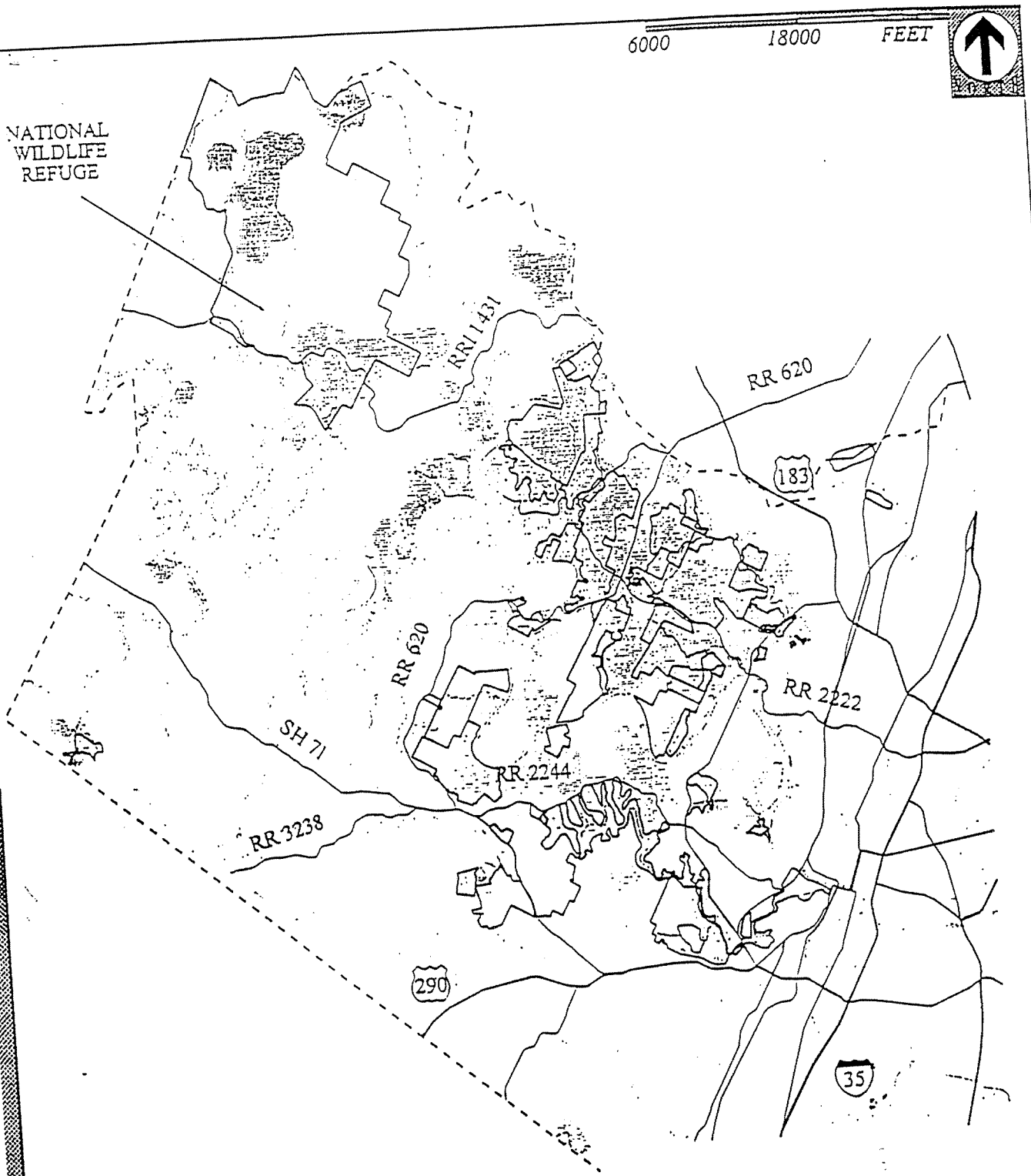
The addition of approximately 4,900 acres of identified warbler habitat existing in the 25,000 acres of BCNWR acquisition area located in Travis County would result in a reduction of estimated take ranging from 294 to 588 pairs.

Thus, given the inclusion of WPZ and BCNWR lands as protected habitats (the best case scenario), approximately 11,452 acres of warbler habitat would be lost after the 30-year life of the permit, resulting in the take of approximately 687 to 1,374 pairs (1,374 to 2,748 individuals) of warblers.

USFWS comments and concerns regarding the inclusion of WPZ and BCNWR lands in the take analysis will be presented in the Significance of Impacts subsection below.

Significance of Impacts

The golden-cheeked warbler has been referred to as the "driving force" of the BCCP, with concerns for the warbler's viability arguably occupying center stage in the preserve design process. This focus is based on the fact that Travis County (1) has 40 percent more warbler breeding habitat than any other Texas county (USFWS 1991b; Wahl et al. 1990); (2) has the least patchy habitat of any Texas county; and (3) is on the eastern edge of the warbler's breeding range (so loss of the Austin population could result in a range reduction). The main concerns regarding the adequacy of the preserve design were primarily focused on the preserve's edge-to-area ratio, subsequent nest parasitism, and



LEGEND

Potential Golden-cheeked Warbler Habitat

Preserve

Source: DLS Associates 1994

FIGURE 18

Relationship of Potential Golden-cheeked Warbler Habitat to the Permit Area

RECON

Figure 18 Back Side

fragmentation. Additional comments during the USFWS's review of the plan questioned the inclusion of WPZs in the protected warbler acreage, the exclusion of BCNWR lands, and the acquisition strategy being pursued at the time of review.

In particular, BCCP assumptions regarding habitat restoration/regeneration and the amount of habitat which will actually receive adequate protection from WPZ ordinances were called into question by the USFWS. The reasoning behind the calculation methodologies has since been explained more thoroughly; nevertheless, the expected take of acreages was discussed in the previous sections of this report from both a "with WPZ" and "without WPZ" perspective.

Similarly, an estimate of incidental take based upon the inclusion of the BCNWR warbler habitat located in Travis County was discussed, despite the fact that the establishment of the BCNWR entails a separate federal action to protect endangered species. Thus, the habitat within the refuge area will not be available for calculating protect/release ratios for development activity in the BCCP permit area.

With regard to the issue of the proposed preserves not meeting the 5 percent edge-to-area goals set by the BAT, the TPWD states that ". . . this simply provides a desirable ideal, and should not be used to decide whether a proposed configuration will succeed or fail." They also stated that the proposed preserves, ". . . will be so small and possibly so disrupted by in-holdings and invaginations that management will eventually have to be highly intensive and more or less oriented toward a few species" (KSB&A and EH&A 1992: Exhibit D).

The current consensus of the wildlife agencies appears to be that, due to widespread misgivings based upon the aforementioned questions, the proposed action could threaten the population viability of the golden-cheeked warbler in the permit area. This assertion is conditioned on the assumption that all management activities described in the plan are somewhat theoretical and their ultimate success is not guaranteed. The acquisition priorities outlined by the USFWS will provide a solid basis upon which to base a habitat conservation plan; however, a larger base acreage (discussed in Alternative 3) is necessary to allay fears over the adequacy of management initiatives. This assertion concurs with the USFWS finding that, ". . . acquisition and management of these areas in conjunction with the management, research, and combined control programs proposed provide a solid foundation toward protecting the warbler over the permit life" (KSB&A and EH&A 1992: Exhibit E). This protection and the ultimate recovery of the golden-cheeked warbler in Recovery Unit 5 are the ultimate goals of this plan.

The objective of the Golden-cheeked Warbler Recovery Plan (1992b), as stated by the

USFWS, is to outline steps necessary to recover the golden-cheeked warbler to the point that it can be removed from the endangered and threatened species list.

The golden-cheeked warbler will be considered for delisting (removal from the list) when:

(1) Sufficient breeding habitat has been protected to ensure the continued existence of at least one viable, self-sustaining population in each of eight regions (including the BCCP);

(2) If no population in a given region is viable by itself, then there should be at least one population in the region that (a) is large enough to be demographically self-sustaining and (b) has the potential for gene flow to be maintained between the population and at least one other self-sustaining population so that genetic viability is provided for;

(3) Sufficient and sustainable non-breeding habitat exists to support the breeding populations in number 1 above;

(4) All existing golden-cheeked warbler populations on public lands are protected and managed to ensure their continued existence, at least until the optimum and spatial arrangement of populations needed for long-term maintenance of the species (viability) is determined;

(5) All of the above have been maintained for at least 10 consecutive years.

Using similar modeling and conservation theory as with the black-capped vireo, Pease and Gingerich (n.d.) also estimated that minimum viable population size for the golden-cheeked warbler should be between 500 and 1,000 effectively breeding pairs. They recommend that a minimum of two populations of golden-cheeked warbler should be conserved within Travis County with the following characteristics: (1) each preserve should be continuous and unfragmented; (2) each preserve should support a minimum viable population of 500 to 1,000 effectively breeding pairs on 3,000 to 6,000 hectares (7,400 to 14,800 acres); and (3) less than 5 percent of the preserve area should be within 100 meters of the preserve edge (requiring preserves of 5,000 hectares (12,350 acres) for undisturbed sites and 10,000 acres or more for disturbed sites).

The stated goals of the BCCP, if successfully implemented, are consistent with the objectives outlined in the recovery plan. In particular, the establishment and protection of a viable population (of at least 500 to 1,000 effectively breeding pairs) within the BCCP and the concurrent protection of a viable population in the BCNWR would comply with the recovery plan's regional population protection goal and provide the opportunity for genetic exchange between the two populations. In addition, concerns that a catastrophe such as wildfire could destroy one population would be allayed.

Mitigation

Plans to Minimize and Monitor Take. The discussion of minimization of impacts focuses on the alternatives evaluated in the process of preparing the proposed plan. Minimization also includes modifications incorporated into the plan with the intent of reducing the direct and indirect take of the species of concern, such as site specific design considerations. In addition, because the BCCP covers more than one listed species with potentially overlapping distributions, there is a need for optimization between the species within and among the various elements of the preserve system. The concept of cumulative minimization (or balancing of impacts and management among the species of concern) will be considered.

In addition, annual monitoring and reporting to the USFWS will be required during implementation of the BCCP. Such reporting will include an estimate of the amount of habitat lost during the preceding year, the amount of habitat protected, and the amount of habitat restored. The summary of taken and protected habitat will be used by the USFWS as a tool to monitor compliance by the BCCP Coordinating Committee with the conditions of the Permit (KSB&A and EH&A 1992).

Measures to Mitigate Take. The loss of warbler habitat will be mitigated in part by the acquisition and management of the preserve system, including regeneration of warbler habitat within managed areas. The following paragraphs discuss how the amount of warbler habitat can be increased in managed areas, and how this helps mitigate against the loss in unprotected areas.

Although the preserve system under consideration has been designed to include as much habitat as possible for the species of concern, a significant portion of each recommended preserve unit lacks habitat for either the vireo or warbler, and would require management to create or restore such habitat. For example, five macrosites have at least a moderate potential for long-term management for the vireo and/or warbler (Cypress Creek, Bull Creek, North Lake Austin, South Lake Austin, and Barton Creek). Within the mapped preserve areas in these five macrosites, there are over 10,400 acres that have not been

identified as potential vireo habitat or as existing warbler habitat, as defined above. This represents a substantial area wherein warbler habitat regeneration can occur without reducing the area of potential vireo habitat.

Table 21 also shows the estimated total warbler habitat area in each macrosite at the end of the 30-year period representing the proposed life of the Permit. Assumptions were made in developing the information shown in Table 21 regarding (1) habitat regeneration in managed areas and (2) protection of habitat in regulated areas.

The projected area of warbler habitat regeneration was determined by subtracting the amount of existing warbler habitat in each recommended preserve unit from the total area of the preserve (with an allowance made for only 66 percent acquisition in the preserve acquisition category). It was then assumed that approximately three-fourths of the remainder of the preserve area could grow warbler habitat, and that one-fourth of that actually would mature into suitable habitat in 30 years. These fractions were selected for the assumptions after consultation with selected members of the BAT. (This can be expressed with the following formula: [(preserve lands: 66% preserve acquisition + 100% P/I) - (warbler habitat: 66% preserve acquisition + 100% P/I)(0.75)(0.25) = area of regenerated warbler habitat in 30 years.]

The area of warbler habitat outside of recommended preserves that is currently protected by existing development restrictions was also estimated. The area restricted from development by City of Austin watershed protection zones has been mapped for the Cypress Creek, Bull Creek, North Lake Austin, and South Lake Austin (Figure 19). The amount of warbler habitat in watershed protection zones outside of preserves was obtained and reduced by one-fourth to represent areas where exemptions may be granted. This figure was then divided by the total area of warbler habitat outside of preserves in these macrosites to obtain the percentage of warbler habitat protected in watershed protection zones. The result (21 percent) was applied to all warbler habitat outside of preserves to estimate the warbler habitat outside of preserves which could reasonably be expected to remain if the entire preserve area was built out, except for areas left undeveloped for the protection of water quality. (This can be expressed with the following formula: [(golden-cheeked warbler in WPZ outside of preserves)(0.75)]/ [golden-cheeked warbler outside of preserves] = % of golden-cheeked warbler habitat in WPZ outside of preserves.) No allowance was given for regeneration in watershed protection zones.

If 66 percent of the preserve acquisition area is acquired (and all of the public/institutional land warbler habitat is included), the projected total net loss of warbler habitat over 30 years would be approximately 18,352 acres, and the net percent

TABLE 21
THIRTY-YEAR PROJECTED GOLDEN-CHEEKED WARBLER HABITAT IN THE BCCP

Macrosite	Acres of Habitat in: Preserve Acquisition	Public/ Institutional	Total	Final Preserve Size	Habitat Regeneration (.75)(.25)	In WPZ	Habitat in 30 Years	Existing Habitat	Net Habitat Gain/Loss	Percent Protected
Lake Travis	0	0	0	0	0	1,130	1,130	5,379	-4,249	21.0
Devil's Hollow	0	0	0	0	0	411	411	1,957	-1,546	21.0
Cypress Creek*	851	1,362	2,213	7,184	932	377	3,522	4,447	-925	79.2
Bull Creek*	1,672	443	2,115	4,248	400	549	3,064	5,591	-2,527	54.8
North Lake Austin*	882	1,942	2,824	5,164	439	312	3,575	4,766	-1,191	75.0
South Lake Austin	470	355	825	3,181	442	540	1,807	3,639	-1,832	49.7
West Austin	37	255	292	955	124	623	1,040	3,279	-2,239	31.7
Pedernales River	0	4	4	259	48	20	72	100	-28	72.0
Barton Creek	1,686	1,128	2,814	8,165	1,003	704	4,521	7,035	-2,514	64.3
Southwest Austin	0	0	0	0	0	346	346	1,646	-1,300	21.0
TOTAL	5,597	5,489	11,086	29,157	3,388	5,013	19,487	37,839	-18,352	51.5

*High-quality golden-cheeked warbler habitat.

protected would be 51 percent, based on the assumptions given above (see Table 21).

The size of habitat blocks in protected and unprotected areas is an additional factor to be considered for the warbler. The recommended plan concentrates protection efforts in those parts of the BCCP preserve area which already contain the most large blocks of warbler habitat. Unprotected areas are generally left out of the preserve system because they contain smaller and fewer blocks of habitat or are more heavily influenced by urbanization. Approximately 82 percent of all patches less than 50 acres are outside the mapped preserve areas. The mean patch size within preserves is 42.0 acres. The mean patch size outside preserves is 18.8 acres.

According to the BCCP Phase I application, warbler habitat in the unprotected areas will become sparser and more fragmented than it is today as a result of the take that will occur upon implementation of the plan. However, because of the regeneration of habitat in managed areas, the protected habitat should become more dense than that which currently exists or that would be likely to occur in the absence of a regional plan. In essence, what would occur would be trading habitat blocks which are less valuable to the warbler for better habitat in the preserve areas.

The BCCP provides a set of recommendations for minimizing the impacts of a Permit's issuance based on habitat conversion restrictions, habitat management, and monitoring.

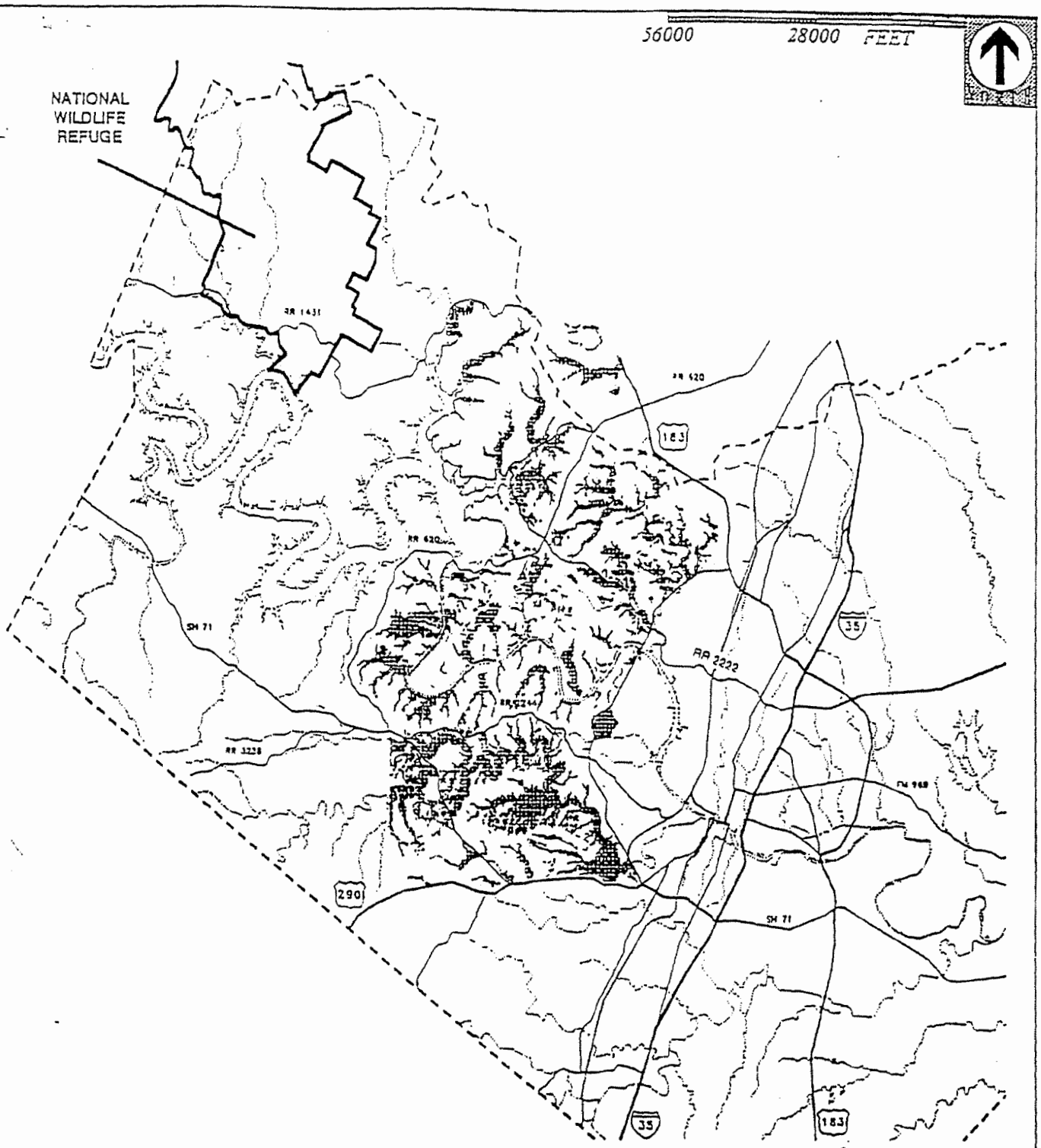
Habitat management will emphasize the protection of large blocks of unfragmented land which have the potential to mature into warbler habitat. The relatively low-intensity management needs of the warbler will include the control of brown-headed cowbirds and increased research into the habitat needs of the golden-cheeked warbler.

c. Alternative 3: Regional Permit

Impacts

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and acquisition of an additional 5,000 acres located in close proximity to the BCNWR. This acreage has not been concretely identified yet and may be located entirely within Travis County or possibly within parts of Williamson or Burnet counties (or both). If the permit acreage is entirely within Travis County, the permit application would be revised to reflect 5,000 fewer acres available to incidental take (to 555,000).

All or most of the additional 5,000 acres acquired as a result of Alternative 3 would have



LEGEND

Source: KSB&A, EH&A, and TNRIS

Watershed Protection Zone

FIGURE 19

City of Austin Planning Jurisdiction Watershed Protection Zones

RECON

Figure 19 Back Side

the potential of developing into golden-cheeked warbler habitat that could support 300-600 pairs, in the vicinity of the BCNWR.

Significance of Impacts

This alternative will protect more warbler habitat and potential warbler habitat than Alternative 2; thus, the ability of the BCCP's preserve acquisition and management strategies to adequately preserve the golden-cheeked warbler in Travis County and enhance the species' chances for survival and recovery will be significantly increased.

Mitigation

Plans to Minimize and Monitor Take. Provisions to minimize take and to annually monitor and report take would be the same as set forth in Alternative 2. Site-specific management guidelines would be the same also. Assuming effective implementation of these guidelines, the additional acreages included in this alternative would significantly minimize the take of warblers in comparison to Alternative 2.

Measures to Mitigate Take. The loss of warbler habitat will be mitigated in part by the acquisition and management of the preserve system, including regeneration of warbler habitat within managed areas. In addition to the acreages described in the discussion of Alternative 2, this alternative has the potential to contribute 5,000 acres of current or potential future warbler habitat.

3. Karst Invertebrates

a. Alternative 1: No Action

Impacts

Under the No Action Alternative, any proposed land clearing, development, or other major landscape alterations within potential karst invertebrate habitat may need authorization under the Endangered Species Act to proceed. The impacts likely to occur under this action are difficult to assess because of the limited knowledge of where development will occur, when development will occur and the level of compliance with the ESA. Furthermore, it is probable that, without protection of caves with rare species as provided in the BCCP that could preclude listing, additional karst species will be added to the federal threatened or endangered list. To assess the impacts of the "no plan" alternative on the endangered arthropods of Travis County requires some

speculation regarding these two factors.

It is already recognized that habitat destruction, the fundamental threat to species encompassed by the BCCP, can be manifested by altering the plant community, habitat fragmentation, and land use changes which cause changes in the abundance and spatial arrangement of other organisms in the community (BAT 1990). There is also concern over levels of pollution and moisture regime alteration that negatively impact the karst fauna.

There are many undescribed species of karst invertebrates endemic to the BCCP study area. Elliott and Reddell (1989) found 12 potential new species of karst arthropods from five genera within the permit area, and there is considerable evidence that many species may be present which have never been collected.

Twenty percent of the known caves in Travis County have been destroyed in the last 20 years as a result of certain land use practices and land development. At this rate, Elliott and Reddell (1989) estimate that less than 80 percent of the presently known caves in Travis County will remain by the turn of the century. This trend represents the only available information on destruction rates for the karst features. While this trend may be slowed by virtue of the enforcement of the Endangered Species Act, the adverse affects of pollution, vegetation alteration, and flow changes due to current urbanization may increase the rate of cave destruction.

Significance of Impacts

The rate of loss of karst species and karst habitat is difficult to predict given uncertainties regarding enforcement of the ESA, rate of development, and location of development. Ongoing reliance on individual section 7 consultations or Permits will do little to stem the primary threats to the endangered arthropods of Travis County.

Mitigation

Because this alternative relies on the USFWS to evaluate individual permits and consultations in order to comply with the ESA, no overall management organization would exist. Each project owner would negotiate the terms and conditions of a Permit or section 7 consultation independently with the USFWS and would be responsible for implementing the agreed-upon mitigation accordingly. If on-site mitigation is required, the project owner may also be the manager. If off-site mitigation is imposed, either the applicant or a designated entity, which might be a conservation agency, would be responsible. If mitigation consists of paying a mitigation fee, no management is

required.

b. Alternative 2: Regional Permit

Impacts

All known localities of the endangered karst invertebrates in the BCCP preserve area and the current protection status for them are listed in Table 22. Some of these caves will be protected in individual cave preserves and others will be in cave clusters (Figure 20). Cave clusters include the general area surrounding caves and other karst features at three locations in the plan area (Figure 21). These clusters are the McNeil, Northwood, and Four Points clusters. Hydrogeological investigations will be performed for each cave cluster prior to the delineation of final boundaries of the areas to be protected. Detailed hydrogeological studies have been completed for the Four Points cave cluster (Veni and Associates 1988); thus, acquisition can proceed for this cave cluster.

The delineation of appropriate boundaries for the individual preserves will require additional studies by the BCCP Coordinating Committee to delineate the surface and subsurface hydro-geologic boundaries for the cave and the surface area necessary to maintain the biological resources important to the cave.

Some caves in the area are currently protected to varying degrees by the landowner (e.g., Bandit Cave, Bee Creek Cave); in such cases, the Coordinating Committee or their designated representative will work with the owners to obtain written conservation agreements to protect the caves.

There are 39 known endangered karst invertebrate localities shown in Table 22. Of these, all but four are proposed for protection by the BCCP. Beer Bottle Cave, Millipede Cave, Puzzle Pits Cave, and West Rim Cave do not support a diverse fauna and contain the most widely distributed federally-listed cave invertebrates. The take of these caves would still allow protection of the species.

There are an additional 27 karst features that contain one or more of the 25 karst species of concern. This plan will protect the environmental integrity of these features through acquisition and management or implementation of a management/conservation agreement with entities that influence the hydrogeological area needed to protect the feature.

The recommended plan protects most of the known localities. However, although the BCCP permit area has been extensively searched for caves and karst features, the possibility remains that features may be found that provide habitat for listed species or

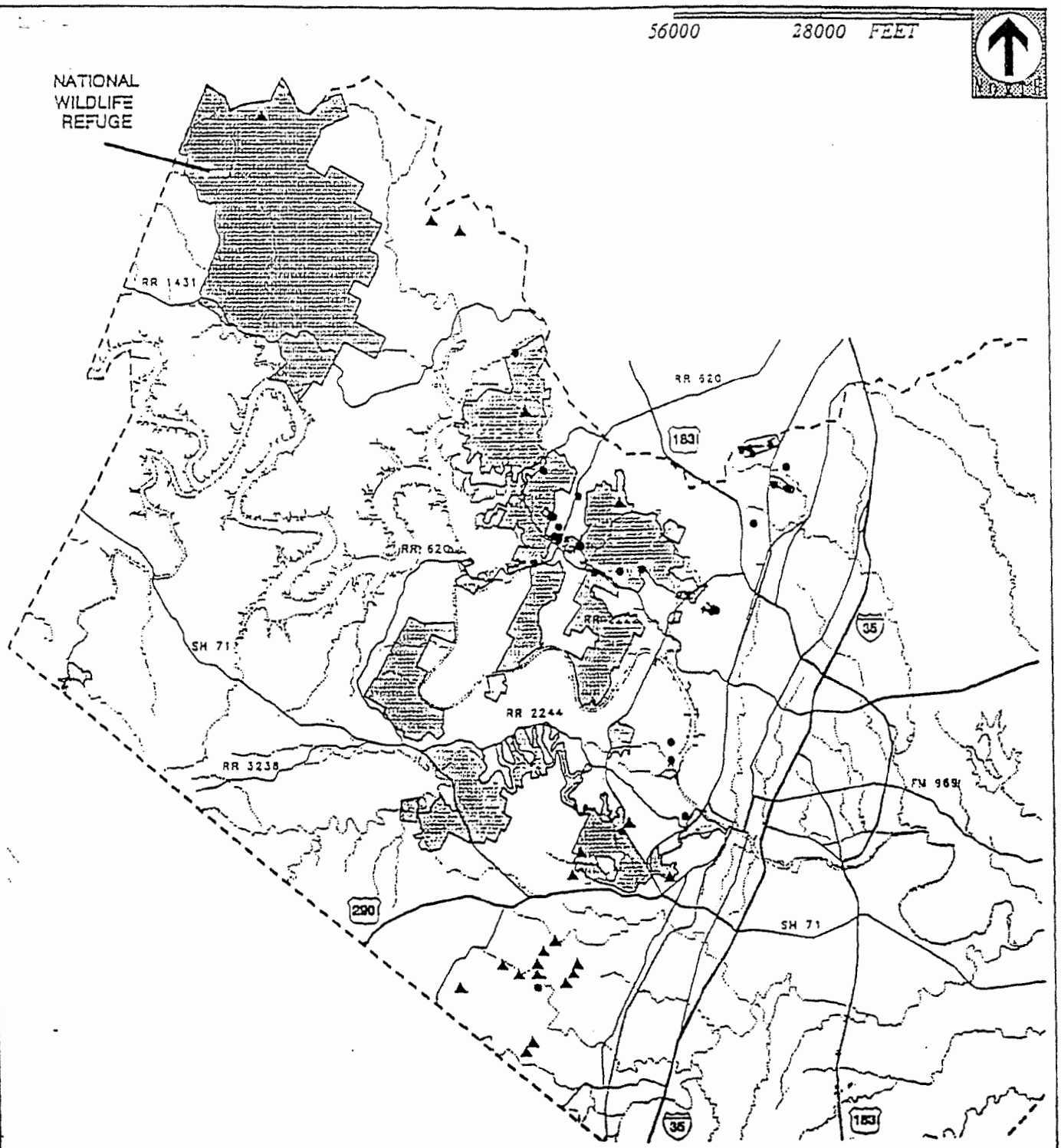
TABLE 22
ENDANGERED KARST INVERTEBRATE LOCATION IN TRAVIS COUNTY, TEXAS

Cave Name	Current Preserve Status	Karst Fauna Region	Occurrence of Projected Species					
			Tooth Cave Pseudoscorpion	Tooth Cave Spider	Tooth Cave Ground Beetle	Kretschmarr Cave Mold Beetle	Bee Creek Cave Harvestman	Bone Cave Harvestman
Amber Cave		Jollyville Plateau	X			X		
Bandit Cave	Owner Cooperation	Rollingwood					P	
Beard Ranch Cave		Jollyville Plateau						X
Bee Creek Cave	Owner Cooperation	Rollingwood					X	
Beer Bottle Cave	Not Protected	NcNeil/Round Rock						X
Broken Arrow Cave	COA	Cedar Park			X			
Cave Y	COA	Rollingwood					P	
Cold Cave	Protected by Owner	McNeil/Round Rock						X
Cotterell Cave	COA	Central Austin						X
Disbelievers Cave		Jollyville			X			
Eluvial Cave		Jollyville						X
Fossil Cave	COA	McNeil/Round Rock						X
Fossil Garden Cave		McNeil/Round Rock						X
Gallifer Cave		Jollyville Plateau		P	P			X
Hole-in-the-Road		McNeil/Round Rock						X
Japygid Cave		Jollyville			X	P		
Jest John Cave	COA	Jollyville Plateau					X	
Jester Estates Cave	Protected by Owner	Jollyville Plateau					X	
Jollyvide Plateau Cave		Jollyville			X			X
Kretschmarr Cave		Jollyville Plateau			X	X		
Kretschmarr Double Pit		Jollyville Plateau	P		P		P	
Lamm Cave	Semi-protected	Jollyville Plateau			X			
Little Bee Creek Cave	COA	Rollingwood					X	
McDonald Cave		Jollyville Plateau						X
McNeil Bat Cave		McNeil/Round Rock						X
Millipede Caven	Not Protected	McNeil/Round Rock						X
M.W.A. Cave		Jollyville	P		X	P		X
New Comanche Trail Cave		Jollyville Plateau		X				X
No Rent Cave		McNeil/Round Rock						X
North Root Cave		Jollyville Plateau			X			
Puzzle Pits Cave	Not Protected	Jollyville			X			
Rolling Rock Cave	TPWD	Cedar Park			X			
Root Cave		Jollyville Plateau			X			X
Spider Cave	COA	Jollyville Plateau			P			P
Stovepipe Cave	Individual Preserve	Jollyville Plateau	P	P	X	X		P
Tardus Hole		Jollyville Plateau			X			
Tooth Cave		Jollyville Plateau	X	X	X	X		X
Weldon Cave		McNeil/Round Rock						X
West Rim Cave	Not Protected	Central Austin						X
KNOWN LOCATION			2	2	14	4	4	20
POSSIBLE LOCATION			3	2	3	2	3	2

SOURCE: Elliott 1992 and USFWS (1994).

X = confirmed occurrence based on collected specimen

P = probable occurrence based on observation but not confirmed with collected specimen



LEGEND

Source: KSB&A, EH&A, and TNRIS

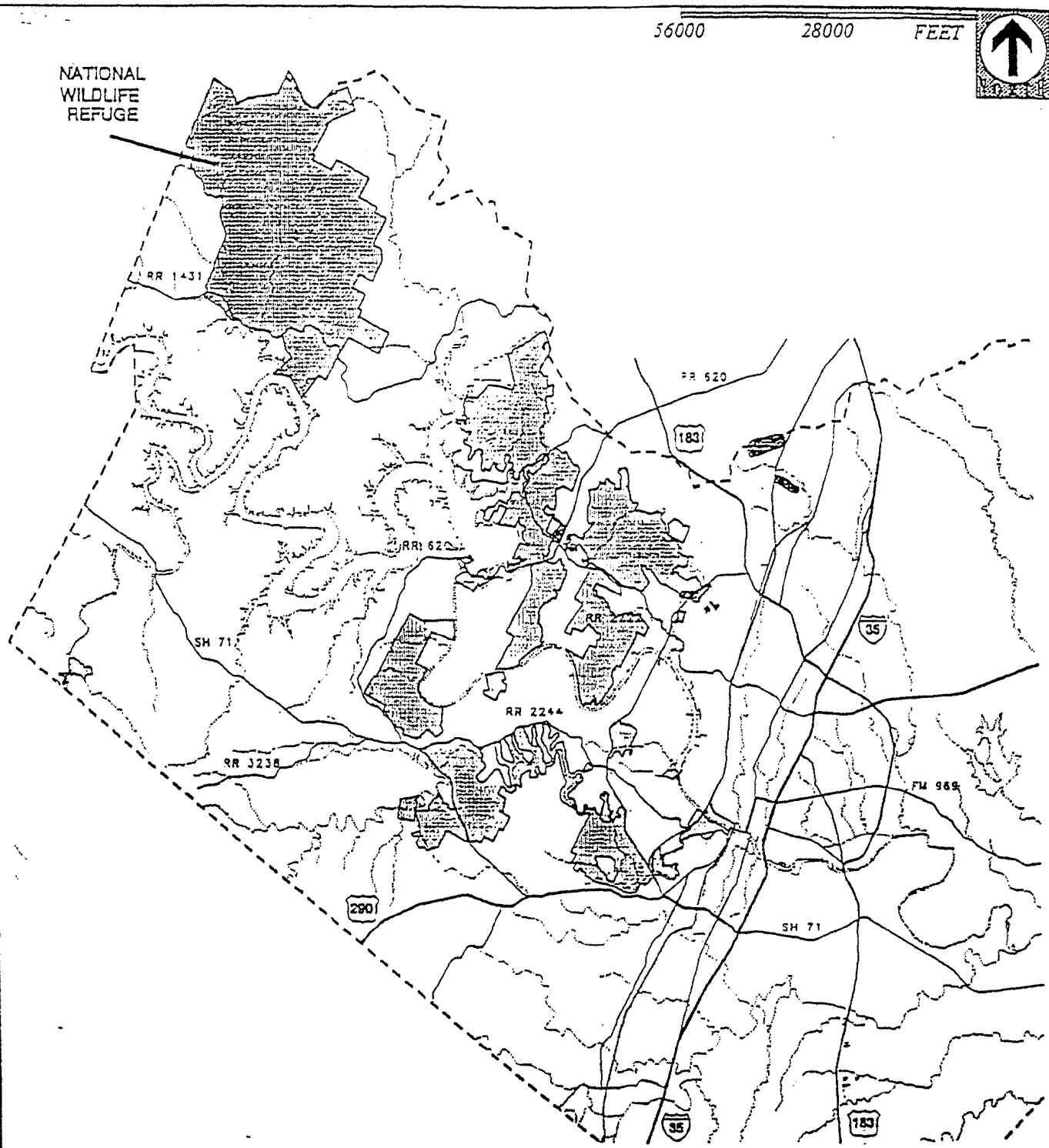
- ▲ Rare Karst Species
- ● Known Endangered Species
- Preserve

FIGURE 20

Karst Species Locations
Relative to Proposed Bird Preserve

RECON

Figure 20 Back Side



LEGEND

Source: KSB&A, EH&A, and TNRIS

Karst Clusters

Preserve

FIGURE 21

Karst Clusters and
Bird Preserves within the Plan Area

RECON

Figure 21 Back Side

other equally rare karst invertebrates. In such cases, the BCCP Coordinating Committee will attempt to protect such karst features, using the protection strategies discussed above.

The uniformity of distribution of the karst invertebrates throughout the potential karst habitat is not well understood, and creates some uncertainty about the extent of take which may occur under the proposed plan. The results of studies on the proposed Lakeline Mall site indicate that these species may be distributed through at least portions of the karst that are not accessible to humans. Studies from other locations indicate that the distribution of subterranean invertebrates is limited by the availability of nutrients from the surface. Even where substantial subsurface voids occur there may not be invertebrates without a nutrient connection to the surface. While the proposed plan attempts to protect known localities and significant areas of potential karst habitat, some areas of occupied karst habitat that are not known to be occupied may be taken under the plan.

Table 9 summarizes the acreage of potential karst invertebrate habitat in the BCCP area, as shown in Figure 14. Approximately 45,368 acres of potential karst invertebrate habitat occurs in the plan area (52,972 acres, according to Community Land Resources, Inc.). Of this total, approximately 6,702 acres (15 percent) occurs in preserve acquisition areas, including cave clusters, and 2,596 acres (6 percent) is in public/institutional land, for a total of 9,298 acres (20 percent) in preserve areas. However, it is projected that 66 percent of the lands in preserve acquisition areas will be acquired, thus, 7,019 acres (15 percent) is the best available estimate of the potential karst invertebrate habitat the plan will protect. This number may vary depending on the specific tracts which are included in the final preserve system, and may increase if sufficient funding is available. The unprotected habitat is at least 36,070 acres (80 percent), and may be as much as 38,349 acres (85 percent). This is the area of unprotected potential karst invertebrate habitat that would be subject to take under the proposed plan.

Significance of Impacts

According to the USFWS review of the BCCP, ". . . the draft BCCP has done an excellent job of identifying species and karst systems that should be protected." Further, the USFWS states that, ". . . based upon the information available at this time, the BCCP would provide adequate protection for the current federally-listed cave invertebrates and the majority of the cave invertebrates likely to be listed over the life of the permit" (KSB&A and EH&A 1992: Exhibit E).

Despite this endorsement of the protection strategy outlined in the BCCP it must be stressed that the adequacy of the plan is contingent upon full implementation of the acquisition and management strategies detailed in the BCCP. Given the fact that several of the BCCP karst species of concern are known from only four or five caves, the loss of even one cave could result in a 20- to 25-percent reduction in the species' population. This is especially important given the predicted 80 to 85 percent loss of potential karst habitat allowable under the proposed plan. In addition, numerous newly discovered species which are currently undergoing taxonomic verification have the potential to be federally-listed, with a high probability that other new rare species will be described from Travis County in the future. This Plan addresses 25 such species that would be protected upon full implementation.

The Draft Recovery Plan for Endangered Karst Invertebrates in Travis and Williamson Counties, Texas (USFWS 1993a) outlines four major recovery actions: (1) research and information needs, (2) long-term protection for karst fauna areas, (3) monitoring, and (4) education. In order to assure that the implementation of the BCCP has no negative impact on the population viability of the endangered karst invertebrates, the BCCP must effectively implement these goals.

Mitigation

Plans to Minimize and Monitor Take. Site specific management recommendations will be implemented based upon management plans approved by the Coordinating Committee.

It is important to note that a Permit, if issued, applies only to those karst species which are currently listed as endangered. The Plan also addresses 25 non-listed species that would be covered upon listing or not be listed if the Plan is fully implemented.

Measures to Mitigate Take. The proposed plan seeks to prevent the loss of known occupied caves and includes protection for significant areas of karst in cave clusters and preserve acquisition areas through preservation of 35 cave features for listed karst invertebrates and 27 cave features for karst species of concern. The Coordinating Committee will consider protection for karst habitat which is discovered to be occupied after the plan is approved, and will attempt to secure such habitat. The loss of potential habitat described above will be mitigated through management. Management in karst preserves will include maintenance of native vegetation, imported fire ant control, control of disturbance by humans, and protection of water quality and nutrient input.

c. Alternative 3: Regional Permit

Impacts

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and an additional 5,000 acres located adjacent to the BCNWR. This acreage has not been concretely identified yet and may be located entirely within Travis County or possibly within parts of Williamson or Burnet counties (or both). If the permit acreage is entirely within Travis County, the permit application would be revised to reflect 5,000 fewer acres available to incidental take (to 555,000).

The level of incidental take of the six species of karst invertebrates found in the permit area would not likely be different for this alternative than for Alternative 2.

Significance of Impacts

This alternative would have a roughly equivalent significance of impacts as Alternative 2 discussed in the previous subsection.

Mitigation

Plans to Minimize and Monitor Take. Site specific management recommendations will be implemented based upon the management plan commissioned by the BCCP Coordinating Committee. In addition to species monitoring and ongoing research in known caves, it is recommended that all newly discovered karst features undergo a biotic survey in order to monitor the occurrence of karst invertebrates and comply with all current and future endangered species regulations.

Measures to Mitigate Take. As with the previously discussed alternative, the proposed plan seeks to prevent the loss of known occupied caves and includes protection for significant areas of karst in cave clusters and preserve acquisition areas. The Coordinating Committee will consider protection for karst habitat, which is discovered to be occupied after the plan is approved, and will attempt to secure such habitat. The loss of potential habitat described above will be mitigated through management and research. Management in karst preserves will include maintenance of native vegetation, imported fire ant control, control of disturbance by humans, and protection of water quality and nutrient input.

4. Bracted Twistflower

a. Alternative 1: No Action

Impacts

Eleven populations of the bracted twistflower are known from western Travis County. Three of the known populations are currently protected from destruction on public lands. The other eight known unprotected populations will be subject to destruction under the No Action Alternative. In fact, two of the known populations are likely to be destroyed due to current construction activities.

Significance of Impacts

Given the ephemeral nature of this species and the almost total lack of knowledge regarding its reproductive needs, it is doubtful whether the protection of the aforementioned populations located on public lands could guarantee the viability of the bracted twistflower in Travis County.

Mitigation

Because this plant is a C2 species and, therefore, is not currently protected under the ESA, mitigation of impacts on privately held lands is voluntary and contingent upon landowner cooperation with interested resource protection agencies.

b. Alternative 2: Regional Permit

Impacts

Identification of potential habitat locations for this species was accomplished through surveys of the species' potential habitat. All known populations were delineated. Therefore, impact on this species is identified as actual populations destroyed rather than potential habitat destroyed. According to the USFWS, this is an acceptable method of impact determination (USFWS 1992a).

Nine populations of bracted twistflower are known from the BCCP area (McNeal 1989; TNHP 1989; City of Austin 1993); all of them occur in the area covered by the Austin West 7.5-foot quadrangle. Five of the locations are in the Bull Creek macrosite, three are in the West Austin macrosite, and one is in the Barton Creek macrosite. Two of the populations and portions of two others are currently protected on public lands which will be designated as part of the BCCP preserve system.

No further acquisitions are proposed to protect the remaining five to six populations, thus, all five would be subject to destruction. All are on private lands. At least three of these populations are directly threatened by development. One site may have been already lost. Protection of these three populations would require immediate additional land acquisitions which are presently precluded by funding limitations.

Increased protection for the remaining populations through acquisition is advisable, but is also precluded by funding limitations. The Coordinating Committee will consider acquisition of additional area around these populations, if more funds become available.

Significance of Impacts

In its Review of Biological Basis of the Balcones Canyonlands Conservation Plan, the USFWS states that, ". . . if all the recommendations in the draft BCCP to protect the known populations of the bracted-twistflower within Travis County are implemented, it appears that additional mitigation would not be required upon listing this species as endangered or threatened." This assertion was made based upon the understanding, at that time, that four of the (then) eight known populations would be at least partially protected by the BCCP via land acquisitions and the other four populations would be protected by non-acquisition means. At present, this is not the case, with five of the nine known populations (56 percent) in the permit area and subject to take. Furthermore, two of the known populations are being lost to construction activities at the present time, giving greater urgency to protection efforts.

Given the ephemeral, annual growth habit of this plant coupled with a lack of real knowledge regarding its reproductive requirements, it is unrealistic to assume that the species' population viability could be guaranteed in the permit area based upon the potential loss of 56 percent of the known populations in the county as permitted by the BCCP. Without further preserve acquisition targeted at the bracted twistflower or binding landowner cooperative agreements, the species long-term viability will not be guaranteed by the plan.

The bracted twistflower is a Federal Category 2 (C2) species. The USFWS will prepare a recovery plan for these plants only if their status is changed to threatened or endangered.

Mitigation

Plans to Minimize and Monitor Impact. The City of Austin's Environmental and Conservation Services Department (ECSD), the USFWS, and a number of local botanists

are currently involved in efforts to monitor known bracted twistflower populations and to transplant or collect seeds from those populations which are in immediate danger of destruction. Additional efforts are needed, however, in order to aggressively acquire known populations which are in danger of being lost and to collect more data on this poorly understood species.

Measures to Mitigate Impact. Opportunities will be sought through cooperative agreements with landowners and through the platting process to put into effect some level of enhanced protection for those populations on private lands that are not acquired in fee simple. The BCCP will provide for management of those bracted twistflower populations that are on protected lands as well as those currently unprotected and unmanaged. Management efforts will include herbivore control, protection from trampling and trash dumping, removal of non-native vegetation, and revegetation of eroded areas. The BCCP Coordinating Committee and TPWD will enlist the support of homeowners and other interested parties to protect this species.

c. Alternative 3: Regional Permit

Impacts

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and an additional 5,000 acres located adjacent to the BCNWR. This acreage has not been concretely identified yet and may be located entirely within Travis County or possibly within parts of Williamson or Burnet counties (or both). In any case, the additional preserve acreage provided under this alternative does not include additional protection for the bracted twistflower.

Significance of Impacts

The significance of the impacts resulting from this alternative are expected to be the same as those outlined in the Alternative 2 subsection.

Mitigation

Plans to Minimize and Monitor Impact. The plans to minimize and monitor take resulting from this alternative are expected to be the same as those outlined in the Alternative 2 subsection.

Measures to Mitigate Impact. The planned measures to mitigate take resulting from this alternative are expected to be the same as those outlined in the Alternative 2 subsection.

5. Canyon Mock-orange

a. Alternative 1: No Action

Impacts

Canyon mock-orange populations are known to occur at five sites in western Travis County. Only one of these populations, located at the Hamilton Pool Preserve, is currently protected from take. The No Action Alternative would allow all of the other four populations to be taken, since the canyon mock-orange is a C2 species which is not protected by law.

Significance of Impacts

The possibility of losing 80 percent of the known populations in the county is not conducive to the protection of a viable population in Travis County and could, in fact, lead to its extinction locally.

This assessment is tempered with the acknowledgment that the remaining populations may be protected from development to some degree by watershed protection ordinances or inaccessible topography. Neither of these conditions is by any means guaranteed and could easily change on short notice.

Mitigation

Because this plant is a C2 species and, therefore, is not currently protected under the ESA, mitigation of impacts on privately held lands is voluntary and contingent upon landowner cooperation with interested resource protection agencies.

b. Alternative 2: Regional Permit

Impacts

Identification of potential locations for this species was accomplished through surveys of the species' potential habitat. All known populations were delineated. Therefore, impact on this species is identified as actual populations destroyed rather than potential

habitat destroyed. According to the USFWS, this is an acceptable method of impact determination (KSB&A and EH&A 1992:Exhibit E).

Canyon mock-orange populations are known to occur at five sites within the BCCP area, including three populations within the Bull Creek macrosite, one in the South Lake Austin macrosite, and one at Hamilton Pool Preserve in the Pedernales River macrosite (McNeal 1989; TNHP 1989). The proposed plan includes recommendations for the protection of the Hamilton Pool and South Lake Austin sites, and at least partial protection for two of the Bull Creek sites.

Two of the three populations in the Bull Creek macrosite are on the west-facing ridge of West Bull Creek canyon (McNeal 1989; TNHP 1989). These are the two largest populations known in the plan area. Since a preserve in the Bull Creek macrosite is considered essential to the success of the plan, it is likely that these populations will be at least partly protected. The proposed plan will protect these populations by acquisition, landowner agreements, and homeowner education. A smaller isolated population within the Bull Creek macrosite occurs in a small canyon north of Beauford Drive in the Jester Estates subdivision. Protection of this population may be feasible by arranging an agreement with the landowner.

The canyon mock-orange population known in the South Lake Austin macrosite occurs in Bohl's Hollow (McNeal 1989; TNHP 1989). The area including this population is recommended for acquisition. However, limitations on available funding may prevent the acquisition of enough area to protect this population. The BCCP Coordinating Committee will attempt to arrange an agreement with the landowner to protect this population, if protection by other methods is not successful.

The population in the Pedernales River macrosite is in Hamilton Pool Preserve and is now protected by management of the preserve. Acquisition of a larger area of the Hamilton Creek watershed (approximately 120 acres) is advisable to better protect the canyon mock-orange and riparian habitat at the preserve, but is precluded by funding limitations.

The proposed plan will protect known populations of canyon mock-orange, although loss of unknown populations would occur in areas not otherwise protected by ordinances or topography.

Threats to this shrub—including habitat destruction, herbicides, pesticides, browsing animals, erosion, and hydrologic degradation—will be minimized through aggressive management on preserves in order to assure the population's long-term viability.

The canyon mock-orange is a Federal Category 2 (C2) species. The USFWS will prepare a recovery plan for these plants only if their status is changed to threatened or endangered.

Significance of Impacts

The protection measures outlined in the BCCP for the canyon mock-orange should be adequate to assure the population viability of the species in the BCCP permit area, if all recommendations regarding protection of the five known Travis County populations are implemented.

Mitigation

Plans to Minimize and Monitor Impact. If aggressive land or easement procurement is a practicable alternative, full protection of the known populations could be possible. If this is not the case, provisions to minimize take and to annually monitor take will be established by the BCCP Coordinating Committee.

Measures to Mitigate Impact. In addition to partial protection of known populations, the BCCP will also protect this species through management and research. Management for this species will include prevention of vegetation clearing in adjacent areas, restricting the improper use of herbicides and pesticides, prevention of trash dumping in plant areas, management for high water quality, control of herbivores, and protection from trampling and other human access problems.

c. Alternative 3: Regional Permit

Impacts

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and an additional 5,000 acres located adjacent to the BCNWR. This alternative will not result in additional protection being afforded to any of the known populations of canyon mock-orange; however, some potential habitat may be included in this additional acreage, and additional populations may be established through management efforts.

Significance of Impacts

The significance of the impacts resulting from this alternative are expected to be the same as those outlined in the Alternative 2 subsection.

Mitigation

Plans to Minimize and Monitor Impact. The plans to minimize and monitor take resulting from this alternative are expected to be the same as those outlined in the Alternative 2 subsection.

Measures to Mitigate Impact. The planned measures to mitigate take resulting from this alternative are expected to be the same as those outlined in the Alternative 2 subsection.

6. Texabama Croton

a. Alternative 1: No Action

Impacts

The majority of the known populations of Texabama croton are within the proposed acquisition boundaries of the BCNWR. Therefore, impacts from development or other activities would be limited to the few sites outside that acquisition area.

Significance of Impacts

Given that the majority of the known distribution of this species is within the proposed boundaries of the BCNWR, the majority of the distribution within Travis County would be protected. Therefore, overall impacts would be limited to a small portion of the known range.

Mitigation

Because this plant is a C2 species and, therefore, is not currently protected under the ESA, mitigation of impacts on privately held lands is voluntary and contingent upon landowner cooperation with interested resource protection agencies.

b. Alternative 2: Regional Permit

Impacts

Since the majority of the known distribution of this species is within the proposed acquisition boundaries of the BCNWR, the impacts would be the same as under Alternative 1.

Significance of Impacts

See discussion under Alternative 1.

Mitigation

Plans to Minimize and Monitor Impact. The distribution of this species is primarily within the proposed boundaries of the BCNWR and species protection will be provided by that action. The limited distribution does not leave any room for minimization or monitoring of the take. The BCNWR will continue to monitor and search for the species within the boundaries of the refuge.

Measures to Mitigate Impact. There are no additional requirements to mitigate the take of Texabama croton outside of the UFSWS acquisition of the BCNWR.

c. Alternative 3: Regional Permit

Impacts

See discussion under Alternative 1.

Significance of Impacts

See discussion under Alternative 1.

Mitigation

Plans to Minimize and Monitor Impact. See discussion under Alternative 2.

Measures to Mitigate Impact. See discussion under Alternative 2.

7. *Eurycea* Salamanders

The USFWS published a proposed rule to add the Barton Springs salamander to the list of endangered and threatened wildlife as endangered on February 17, 1995.

A report from the Aquatic Biological Advisory Team addressing conservation of local salamander species is currently undergoing public as well as agency review.

The salamanders are currently not addressed in the Plan but may be added in the future.

8. Other Species of Concern

a. Alternative 1: No Action

Impacts

The No Action Alternative would not directly affect other species of concern; however, other species could be indirectly affected in Travis County due to actions authorized through any local government permitting process. Conservation and mitigation measures for any adverse effects would be limited to enforcement of existing state and federal wildlife laws. Other species of concern located in threatened and endangered species habitat would benefit from the prohibition on take of the threatened or endangered species.

Significance of Impacts

No significant impacts are likely to occur to other species of concern under the No Action Alternative.

Mitigation

Mitigation is only available through enforcement of existing state and federal wildlife laws.

b. Alternative 2: Regional Permit

Impacts

Under Alternative 2, only take of black-capped vireos, golden-cheeked warblers, and six species of karst invertebrates would be authorized in the proposed permit area. The Permit does not authorize the take of any other species listed by the USFWS. However, 76 other sensitive plants and animals are associated with the habitat in the permit area and, where they occur in the same location as the above-mentioned species, have been indirectly protected by the listing of those species. Approval of the permit would remove the indirect protection of these species and would allow development to occur, possibly affecting the other species of concern.

Issuance of the proposed Permit and implementation of the BCCP, however, will not result in significant adverse impacts to any of the other species of concern. The proposed BCCP has been designed to prevent inconsistency with conservation measures for other species and includes information to ensure that impacts on other species is

avoided, minimized, and mitigated. In addition, other species of concern would potentially benefit from the management of the preserve areas.

Based on existing literature regarding the other species of concern and their occurrence in the permit area, the BCCP identifies the potential beneficial or neutral (neither beneficial nor detrimental) impacts to the species that would result from implementation of the BCCP. These potential effects on the other species of concern observed or assumed to exist in the permit area are discussed below.

Texas amorpha. The potential impacts of the BCCP are expected to be neutral relative to this plant, which is locally common. It is currently included in preserve planning as a secondary species of concern, subject to further review.

Correll's false dragon-head. The potential impacts of the BCCP are expected to be neutral relative to this plant; however, it is subject to further review, because only a historical locality is known in the permit area.

Heller's marbleseed. This plant is not federally-listed C1, C2, threatened, or endangered (see Table 6). It is locally common and is not likely to be impacted negatively by the BCCP.

Buckley tridens. This plant is not federally-listed C1, C2, threatened, or endangered (see Table 6). It is found in 11 locations within Travis County and impacts are unknown.

Arthropods. The potential impacts of the BCCP are expected to be positive to approximately 25 arthropods found in the BCCP permit area. These species all occur in only one to a few caves, or localities, and most are considered extremely local and all known caves are proposed for protection (see Table 6).

Mollusks. The potential impacts of the BCCP are expected to be neutral relative to three snails from the phylum Mollusca found in Barton Springs, which is protected by the BCCP. The third snail is found in one or two localities in the permit area. The potential impacts of the BCCP are expected to be neutral relative to this species.

Smalleye shiner. The potential impacts of the BCCP are neutral relative to this minnow because it was not found in the study area.

Sharpnose shiner. The potential impacts of the BCCP are neutral relative to this minnow because it was not found in the study area.

Guadalupe bass. The potential impacts of the BCCP are neutral relative to this fish which probably no longer exists as a distinct genetic entity in the study area due to hybridization with other black bass.

Blue sucker. The potential impacts of the BCCP are expected to be neutral relative to this fish requiring periodic review. It is a federally-listed C2 species inhabiting the mainstem of the Colorado River but does not occur within the permit area. This species has faced serious declines in recent years due to the construction of large dams, which block natural migration routes used by the species (Lee et al. 1980).

Texas horned lizard. This lizard is a federally-listed species (C2) which inhabits flat, open terrain with sparse vegetation in sandy, gravelly, or loamy soils. In Travis County, it is a very local resident of the oak-juniper uplands and old field areas. The horned lizards as a group have experienced sharp population declines throughout much of their range, although this phenomenon is not well understood. The potential impacts of the BCCP are likely to be neutral relative to this species, although its status will be periodically reviewed.

Alligator snapping turtle. The potential impacts of the BCCP are neutral relative to this species because it does not occur in the area.

American alligator. This species does not occur in this area and is not biologically threatened in the United States.

Texas map turtle. The potential impacts of the BCCP are neutral relative to this species because it has substantial and important portions of its range occurring outside the permit area.

Milk snake. The potential impacts of the BCCP are neutral relative to this species because it has substantial and important portions of its range occurring outside the permit area.

Texas garter snake. The potential impacts of the BCCP are neutral relative to this species because it has substantial and important portions of its range occurring outside the permit area.

Piping plover. This bird is federally-listed as threatened and a rare migrant to the permit area. Most Texas specimens documented by Oberholser (1974) were from coastal counties from Chambers to Cameron. Only one fall sighting has been documented in Travis County. No impacts on this species are expected.

Arctic peregrine falcon. The potential impacts of the BCCP are neutral relative to this species. It is considered an uncommon migrant to the permit area. Winter and summer sightings are documented for Travis County, but no nesting activity has been recorded (Oberholser 1974).

American peregrine falcon. The potential impacts of the BCCP are neutral relative to this species. It is considered an uncommon migrant to the permit area. Winter and summer sightings are documented for Travis County, but no nesting activity has been recorded (Oberholser 1974).

Bald eagle. The potential impacts of the BCCP are neutral relative to this species. It is federally-listed as endangered and considered a rare transient to western Travis County. Although the TPWD conducts annual bald eagle surveys throughout the state, no birds are documented in Travis County from these surveys; however, wintering birds are consistently observed on Lake Buchanan, the northernmost lake of the Highland Lakes system, which includes Lake Travis. Also, successful nesting has been documented in nearby Bastrop County since 1984.

Birds. The potential impacts of the BCCP are neutral relative to the remaining 21 sensitive species of birds shown on Table 6 because the permit area has no biologically significant habitat (i.e., breeding or wintering) for these species. They are either vagrants or rare migrants.

Mammals. The potential impacts of the BCCP are neutral relative to mammals because no sensitive species are found in the permit area.

Significance of Impacts

No potentially significant adverse effects on other species of concern would result from the proposed Alternative 2.

Mitigation

No mitigation would be required under this alternative.

c. Alternative 3: Regional Permit

Impacts

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and an additional 5,000 acres located adjacent to the BCNWR.

This alternative will result in additional protection being afforded to those other species of concern that inhabit the 5,000 acres near the BCNWR. They will also benefit from being located near a large continuous section of habitat such as the BCNWR.

Significance of Impacts

No potentially significant adverse effects on other species of concern would result from the proposed Alternative 3.

Mitigation

No mitigation would be required under this alternative.

B. Social Resources

This section analyzes the potential adverse social impacts that could result from implementation of the proposed action or its alternatives. The majority of the following conclusions are derived from the Economic Impact Study of the Balcones Canyonlands Conservation Plan prepared by Gau and Jarrett (1992). This study projects economic costs and benefits of the BCCP over a 20-year period (1992-2011) within a study area that includes all of Travis County and parts of southern Williamson County. Key variables affecting social resources were assessed with and without adoption of the BCCP; they include direct Endangered Species Act compliance costs, population growth, and expected habitat mitigation fee revenues with the BCCP.

Gau and Jarrett's report was updated by Dr. Milton Holloway of Southwest Econometrics, Inc., (SEI) in a report entitled "An Analysis of Mitigation Fee Alternatives in the Balcones Canyonlands Conservation Plan" (Holloway 1992) (hereinafter, the SEI report). The SEI report conducted additional runs of the economic and land development models used in Gau and Jarrett to reflect two analyses: (1) projected changes in long-term development patterns resulting from the enactment of the City of Austin's SOS Ordinance and (2) additional revenues available to the BCCP if a $1,075 per acre mitigation fee were imposed instead of the $600 per acre fee used in Gau and Jarrett. The fees proposed by the BCCP are $5,500 per zone.

It should be noted that the economic growth in Travis County since 1992 has exceeded that projected by Gau and Jarrett. This growth is likely related to the large lot inventory in northern and southern Travis County that occurred during the economic decline in the

mid and late 1980s. Nevertheless, this study is still useful in analyzing possible social and economic impacts of implementing the BCCP.

Assumptions and Assessment Guidelines. The following impact assessment addresses those social conditions that would change as a result of the implementation of the proposed action or an alternative. These impacts will be considered significant if they:

- Represent growth to existing population in the area that would result in a substantially increased demand for development of new land for housing or the provision of additional public infrastructure.
- Represent substantial constraints to growth and development resulting in attenuation of projected population growth, shortages in or inability to construct housing, commercial facilities, or needed additional public facilities in locations required to serve area populations.

1. Alternative 1: No Action

a. Impacts

The No Action Alternative assumes no issuance of a Permit for Travis County. Under ESA sections 7 and 10(a)(1)(B), development would be restricted on land containing threatened or endangered species habitat unless authorization was obtained.

Development projects would have the potential to obtain their own Permits, providing mitigation through preserve land dedication or fees. Under section 7 of the ESA, federal actions that pose no jeopardy to an endangered species could proceed; this provision also applies to any private project requiring a federal permit or funding. The impacts of the No Action Alternative on population growth, housing, and public infrastructure needs are discussed below.

Population Growth

The Gau and Jarrett population projections indicate that, without the proposed action, 30,030 fewer people will reside in the Austin Metropolitan Statistical Area (MSA) in 2001. By the year 2011, the MSA population would be 1,182,710, or 62,290 fewer persons than would be expected if the proposed action is implemented. However, the current population, approximately 900,000, for the Austin MSA is greater than what is indicated in Table 23. This table projects the population with the BCCP in place and the

TABLE 23
AUSTIN MSA
EMPLOYMENT AND POPULATION PROJECTIONS, WITH BCCP
1993-2011 (TUCSON ECONOMIC CONSULTING)
(in thousands)

Year	Total Employment	High Tech Employment	Service Employment	Population
1993	409.2	31.1	109.8	828.5
1994	428.5	31.6	116.2	846.5
1995	445.6	32.1	121.2	865.8
1996	460.9	33.1	125.7	884.7
1997	476.8	34.5	131.4	903.5
1998	494.9	36.4	138.3	922.3
1999	516.3	38.5	146.5	941.4
2000	539.9	40.4	156.1	961.2
2001	565.0	42.2	166.1	983.1
2002	589.7	43.9	176.1	1,006.9
2003	614.5	45.3	186.3	1,031.8
2004	639.1	46.6	196.9	1,057.0
2005	664.0	47.8	201.8	1,082.2
2006	689.5	49.0	219.4	1,107.8
2007	716.1	50.0	231.7	1,133.8
2008	745.1	50.9	245.3	1,160.3
2009	775.8	51.6	260.1	1,187.7
2010	807.3	52.2	275.8	1,216.0
2011	840.3	52.9	292.8	1,245.5

SOURCE: Gau and Jarrett 1992.

projection is greater than what Gau and Jarrett projected if the BCCP were not in place.

Housing

Without the proposed action, housing developments in habitat areas of western Travis County would be required to obtain individual Permits or, in cases where federal action is required, obtain ESA clearance through a section 7 consultation.

City of Austin records of Certificates of occupancy indicate that, since 1991, about 80 percent of new housing units were located in western Travis County. This statistic reflects a clear consumer preference, particularly in the single-family housing market for the environmental amenities of the hill country west of the Balcones fault zone. Moreover, personal income data for the Austin MSA show that median family income for census tracts in western Travis County exceed the county-wide average by $15,329 ($51,260 vs. $35,931). These data depict a pattern of new housing activity that is heavily concentrated both geographically, in western Travis County, and socioeconomically, at the upper end of the personal income range. This observation is entirely consistent with the logic and findings of the econometric models of the Gau and Jarrett report, which link the availability of desirable locations for housing and office development to future growth in business relocations and expansions.

Public Infrastructure

The limitations on residential development in western Travis County under the No Action Alternative will result in decreased demand for new or improved roads, schools, and other public infrastructure in that area. Roads, schools, water and wastewater infrastructure, and other projects that are required in the area will face the additional expense of individual compliance with the ESA. As described in the discussion of Alternative 2 that follows, the widening of RR 620 in northwest Travis County required compliance and mitigation activities that cost $63,600 more than would have been required under the BCCP two percent fee structure for public projects. These additional costs will ultimately be borne by the taxpayers residing in the city, county, or school district that is financing the capital construction project.

Although direct revenue benefits from recreational uses of the proposed BCCP preserves are not expected to be substantial, the opportunity for public use of the preserves for hiking, bird-watching, climbing, and other non-consumptive uses of the preserves represents a positive benefit. This public benefit would be foregone under the No Action Alternative.

b. Significance of Impacts

The No Action Alternative could result in constraints upon economic growth within Travis County. Econometric and land development studies performed by Gau and Jarrett (1992) indicate that by the year 2011, failure to implement the BCCP would cause:

(1) An attenuation of population growth of more than 62,000 persons; and

(2) For individual landowners seeking to develop land within potential habitat areas, either outright prohibition of development or compliance/mitigation costs of approximately $9,000 per acre, representing an inequitable burden on small landholders and non-corporate developers.

Implementation of a streamlined single-family lot process and knowledge of the permit process has reduced this cost recently and no developments have been prohibited.

For these reasons, the No Action Alternative could have adverse effects on the social conditions in Travis County.

c. Mitigation

The No Action Alternative does not include any mitigation measures for social impacts.

2. Alternative 2: Regional Permit

a. Impacts

Alternative 2 (proposed action) is the approval by the USFWS of a permit under section 10(a)(1)(B) of the ESA, authorizing the incidental take of unspecified numbers of two endangered bird species and six endangered karst invertebrate species in Travis County. Incidental take includes direct and indirect loss of endangered species and their habitat due to otherwise legally permitted land development. Mitigation for the potential incidental losses of endangered species or their habitat includes the establishment of a habitat preserve system of at least 30,428 acres in western Travis County. This alternative has the potential to affect social conditions throughout Travis County by directing new population and housing (with the accompanying public infrastructure needs) away from proposed preserve areas.

Population Growth

Tucson Economic Consulting (TEC) provides the City of Austin with an annual economic forecast of the Austin MSA (encompassing Travis, Williamson, and Hays counties) based on a regional econometric model and the national forecasts of Data Resources, Inc. Results of the forecasts appear in Table 23. These projections assume the presence of the BCCP. The Austin MSA had a 1990 population of 781,572. The TEC model estimates the current Austin MSA population to be 828,500. As seen in Table 23, with the implementation of the BCCP the Austin MSA will continue steady growth at an average rate of approximately 2.25 percent per year.

To estimate the Austin MSA population without the BCCP, Gau and Jarrett derived the population changes through the use of employment projections. They concluded that without the BCCP, the population of the Austin MSA in the year 2001 would be 30,030 less than if the BCCP were in place. By the year 2011, the population would be 62,290 less than the 1,245,500 projected with the BCCP. However, the current population, approximately 900,000, for the Austin MSA is greater than what is indicated in Table 23. This table projects the population with the BCCP in place and the projection is greater than what Gau and Jarrett projected if the BCCP were not in place.

Housing

The Gau and Jarrett report concludes that the implementation of the BCCP will lead to increased housing development in the permit area in response to the increases in population and employment. The number of housing units in the area is also expected to increase because the BCCP will reduce the development costs of compliance with the ESA from an average of $9,000 per acre to an amount in the range of $600-$1,900 per acre. (Model runs for the Gau and Jarrett report used the $600 per gross acre figure specified in the BCCP; the Gau and Jarrett report concluded that at this rate, mitigation fee revenues would fall short of projections and require additional property tax subsidies. Subsequently, the SEI report substituted a fee amount of $1,075 per gross acre and concluded that, at that rate, mitigation fees would meet the targeted revenues identified in the BCCP.) This Plan does not have a "per gross acre" cost, but instead uses a "per habitat acre" cost of $5,500.

Public Infrastructure

Although implementation of the BCCP is not expected to create a large increase in the development of roadways, recreational areas, and schools, it will create the opportunity for timely and economically feasible development of these types of public infrastructure.

One roadway project that could have benefited from the BCCP was the widening of RR 620 in northwest Travis County. The USFWS determined that the highway project could result in the taking of nine acres of potential golden-cheeked warbler habitat and the destruction of approximately 31 acres of black-capped vireo habitat. Consequently, the Texas Department of Transportation was required to take mitigative actions, such as bird surveying and cowbird eradication, that cost an estimated $342,600. The compliance costs were approximately 2.45 percent of the total project expenditures. Under the BCCP participation fee proposal of $5,500 per acre, the cost would have been $220,000.

A report prepared by Dr. Vicky Langston of the Lower Colorado River Authority summarized the recreational value of the BCCP (Gau and Jarrett 1992). Direct revenue from use of the preserve areas as a recreational resource may not be substantial. The proposed BCCP funding plan identified $1 million in revenue from preserve user fees for non-consumptive recreational purposes, such as hiking, bird-watching, climbing, and other minimal impact recreational uses. However, the Gau and Jarrett report suggests that other impacts on the local economy might be experienced. Nearly $14 million is spent annually on bird-watching and photography in the United States. The average bird watcher spends approximately $13 per day while on a bird-watching retreat. Also, new bird watchers and hikers will spend money initially on the equipment needed for the activities. Gau and Jarrett conclude that the bulk of any dollars spent by tourist or nature enthusiasts will be derived from the development of the BCNWR; however, it is also reasonable to think that large pieces of contiguous habitat located nearer the Austin urban center will be very attractive to nature enthusiasts. The National Park Service also concludes in its resource book, *Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors,* that real property values are increased, resulting in increased property tax revenues.

b. Significance of Impacts

Alternative 2 could result in enhanced population growth in the Austin MSA and higher levels of residential and commercial land development in the western part of Travis County (Gau and Jarrett 1992). With respect to land development in the environmentally sensitive areas of western Travis County, most of the area affected by the proposed BCCP is located within watersheds that are subject to restrictive municipal development ordinances. Thus, although the proposed action will result in somewhat higher levels of development in the permit area, such development is expected to be orderly and consistent with the environmental sensitivities of the area. Given the positive social benefits of the BCCP, therefore, this alternative will not have a significant adverse effect on social conditions within the project area. However, the 1995 employment (approxi-

mately 450,000) and population (approximately 900,000) levels for the Austin MSA, without the BCCP in place, exceed those projected in Table 23 with the BCCP in place.

c. Mitigation

Because the proposed action will not result in significant adverse social effects, no mitigation measures need be considered.

3. Alternative 3: Regional Permit

a. Impacts

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and an additional 5,000 acres located adjacent to BCNWR. This acreage has not been concretely identified yet and may be located entirely within Travis County or possibly within parts of Williamson or Burnet counties (or both). If the permit acreage is entirely within Travis County, the permit application would be revised to reflect 5,000 fewer acres available for incidental take.

Population Growth

Like Alternative 2, this alternative would allow for steady and unencumbered population growth in the western portion of Travis County. Moreover, the additional 5,000 acres that will be dedicated to the preserve are located in an area not as desirable for development as areas nearer Austin.

Housing

Like the Alternative 2, this alternative would allow for increased housing development in the permit area in response to the increases in population and employment.

Public Infrastructure

Implementation of Alternative 3 will not create a greater increase in the development of roadways, recreational areas, and schools than Alternative 2. It will create the opportunity for timely and economically feasible development of these types of public infrastructure.

b. Significance of Impacts

Like Alternative 2, Alternative 3 will result in somewhat higher levels of development in the permit area, although such development is expected to be orderly and sistent with the environmental sensitivities of the area. Given the positive social benefits of the BCCP, therefore, this alternative will not have a significant adverse effect on social conditions within the project area.

c. Mitigation

Because the proposed action will not result in significant adverse social effects, no mitigation measures need be considered.

C. Economic Resources

This section analyzes the potential adverse economic impacts that could result from implementation of the proposed action or its alternatives. The evaluation of potential economic impacts is based on a sequence of assumptions. The first assumption is that the long-term economic growth and stability of the Austin metropolitan area is dependent in large measure upon the continued expansion of existing businesses and relocation of new businesses, particularly those in the high technology research and development (R&D) and manufacturing sectors. To the extent those businesses are attracted to Austin because of the amenities associated with its natural environment, particularly in the hill country west of the Balcones fault zone, any substantial constraint upon the ability of firms to expand or relocate in that area, or to offer their employees housing opportunities in that area, will serve as a disincentive for such expansion and/or relocation.

Slowing of construction due to a need to seek permits may affect job growth in economic sectors of the community, and may result in an attenuation of population growth that would have occurred in the absence of the constraint. Lower population growth, combined with the land development, would have long-term effects on projected property tax revenues of the various taxing jurisdictions and, in the case of the City of Austin, on sales tax revenues as well. The following sections deal with these economic impacts by comparing potential effects on employment and tax revenues both with and without the issuance of regional Permit.

The majority of the following conclusions on economic impacts are derived from the Economic Impact Study of the Balcones Canyonlands Conservation Plan prepared by Gau and Jarrett (1992) of the Bureau of Business Research of the Graduate School of Business at the University of Texas at Austin. This study projects economic costs and benefits of

the BCCP over a 20-year period (1992-2011) within a study area that includes all of Travis County and parts of southern Williamson County. Key variables, assessed with and without implementation of the BCCP, include direct ESA compliance costs, population growth, real estate and property values, local government property and sales tax revenues, and expected habitat mitigation fee revenues under the BCCP.

The Gau and Jarrett study was updated by Dr. Milton Holloway (1992) of SEI in a report entitled "An Analysis of Mitigation Fee Alternatives in the Balcones Canyonlands Conservation Plan." The SEI report conducted additional runs of the economic and land development models used in Gau and Jarrett. The models reflect (1) projected changes in long-term development patterns resulting from the enactment of the City of Austin's SOS Ordinance; and (2) additional revenues available to the BCCP if a $1,075 per acre mitigation fee were imposed instead of the $600 per acre fee used in Gau and Jarrett.

The extent (acreage) of potentially developable endangered species habitat in western Travis County is an extremely important variable in the Gau and Jarrett econometric and land development models, as it provides the measure of (1) limitations on land development without the BCCP and (2) the expected mitigation fee revenue with the BCCP. Because of the sensitivity of the models to this habitat factor, Gau and Jarrett have undertaken to provide an independent estimate of actual habitat acreage, based on a sample of USFWS response to project development inquiries from landowners over the 1990-1992 period. This sample analysis yielded a much lower estimate of actual habitat acreage that the estimate provided by the BCCP. Gau and Jarrett then calculate the effects of habitat constraints on employment tax revenues and other variables, using both the USFWS sample estimate and BCCP estimate. The variation in result, depending upon which habitat estimate is used, is quite significant.

For the purpose of this impact assessment, the Gau and Jarrett calculations based on the BCCP habitat estimates are preferred to those based on the USFWS sample for two reasons: (1) the USFWS sample reflects development priorities, such as proximity to urban areas, roadway access, and ordinance constraints, that are unrelated to the presence of habitat, and thus are not likely to be representative of all potential habitat areas in western Travis County; and (2) the USFWS sample does not reflect substantial changes in the habitat criteria applied by the USFWS since 1992. These changes include a shorter permit processing time and consideration of economic cost. These changes impact population, employment, and revenue projections. All of Gau and Jarrett's projections must be considered with respect to these changes.

Although the model runs based on the BCCP habitat estimates are preferable, they do present some risk of overstating the economic benefits of the BCCP and its potential

mitigation fee revenues. For this reason, in several instances the discussion of impacts includes the model results using both sets of assumptions, for comparison purposes.

Assumptions and Assessment Guidelines. Economic impacts consist of those fiscal conditions that would change as a result of the implementation of the proposed action or an alternative. These impacts will be considered significant if they represent substantial constraints to growth and development resulting in:

- Shortages in housing and commercial facilities; undue or uneven distribution of economic burdens on landowners; or
- Substantial decreases in assessed valuation and tax revenues to local taxing jurisdictions.

1. Alternative 1: No Action

a. Impacts

The No Action Alternative assumes no issuance of a Permit for the permit area. Although development could occur on lands not occupied by endangered species, development activities would require ESA authorization on properties containing endangered species habitat. Development projects would have the potential to obtain their own Permits, providing mitigation through land dedication or fee payment. Under section 7 of the ESA, federal actions that pose no jeopardy to an endangered species could proceed; this provision also applies to any private project requiring a federal permit or funding.

The following discussion involves employment and property values/tax revenues in Travis County, particularly in the areas otherwise subject to endangered species constraints.

Employment

The econometric model developed by Gau and Jarrett (1992) indicated that, without Alternative 2, as many as 10,000 R&D and 5,000 high technology manufacturing jobs would be lost over the next 20 years. Using employment multipliers provided by the Texas Input/Output model, the absence of these jobs would result in the loss of a total of 39,050 jobs in all economic sectors, representing 8.7 percent of expected employment growth over the 20-year time frame.

Property Valuation/Tax Revenues

The Gau and Jarrett (1992) land development/valuation model estimated the tax revenues for the major Travis County taxing jurisdictions that could be lost over the 1992-2011 time period if Alternative 2 is not implemented. (Austin Independent School District [ISD] and Eanes ISD figures represent estimates based on their geographical similarities to the City of Austin and the model's Eanes market area, respectively.) The net present value of these amounts, using a six percent discount rate, are summarized as follows:

Travis County	$283,171,182
City of Austin	162,443,200
Southwest Road District	-10,298,714
Austin ISD (estimate)	160,000,000
Eanes ISD (estimate)	1,000,000
Net Total	656,315,668

Under the No Action Alternative, total tax revenues that could be lost to Travis County and the City of Austin, which together have primary financial responsibility for the BCCP, could amount to $439.6 million in 1992 dollars. This is approximately 2.5 times the estimated cost of $179.8 million for implementing the BCCP. Total net present value of tax revenues that could be lost by all the jurisdictions listed above (including the gain to the Southwest Road District [SWRD]) is approximately $650.0 million. Note that the listed entities represent only five of the 117 taxing jurisdictions potentially affected by the compliance requirements of the ESA.

If Alternative 2 is not implemented, Gau and Jarrett predicts that the City of Austin will lose sales tax revenues of approximately $6.0 million ($3.9 million net present value) over the 20-year time period (Gau and Jarrett 1992).

As noted in the introduction to this section, the Gau and Jarrett report used two alternative estimates of potentially developable habitat acreage, one taken from the BCCP report and the other based on a sample of USFWS responses to landowner inquiries. While the BCCP report estimates are preferred, the model results using the USFWS sample estimate is also presented for comparison purposes. Using the USFWS sample estimate, net present value tax revenues lost to the City of Austin and Travis County without Alternative 2 would amount to $244.5 million, rather than the $439.6 million estimated using the BCCP acreage estimate. This more conservative estimate is still considerably higher than the estimated cost of implementing Alternative 2.

b. Significance of Impacts

Compared with Alternative 2, Alternative 1 could result in constraints upon economic growth within Travis County. Econometric and land development studies performed by Gau and Jarrett (1992) indicate that by the year 2011, failure to implement the BCCP would cause:

- A loss of approximately 10,000 R&D jobs, 5,000 manufacturing jobs, and other related jobs collectively representing about 8.7 percent of total employment growth over the 20-year period;
- A loss of approximately $439.6 million in net present value property tax revenues to the City of Austin and Travis County (adding estimates of tax losses to the Austin and Eanes ISDs brings the total to more than $650.0 million);
- A loss of approximately $6.0 million in City of Austin sales tax revenues; and
- For individual landowners seeking to develop land within potential habitat areas, compliance/mitigation costs of approximately $9,000 per acre, representing an economic cost on small landholders and noncorporate developers.

However, recent development trends and issuance of section 10(a)(1)(B) permits have resulted in limited economic impact on growth and development in Travis County.

c. Mitigation

The No Action Alternative does not include any mitigation measures for economic impacts.

2. Alternative 2: Regional Permit

Alternative 2 (proposed action) is the approval by the USFWS of a permit under section 10(a)(1)(B) of the ESA, authorizing the incidental take of two endangered bird species and six endangered karst invertebrates in Travis County. Incidental take includes direct and indirect loss of endangered species and their habitat due to otherwise legally permitted land development. Mitigation for the potential incidental losses of endangered species or their habitat includes the establishment of a habitat preserve system of at least 30,428 acres in western Travis County. The preserve system will also provide habitat protection for other species of concern. Alternative 2 has the potential to affect

employment and property values/tax revenues in Travis County, particularly in the areas otherwise subject to endangered species constraints.

a. Impacts

Employment

The econometric models used in both the Gau and Jarrett and the SEI reports rely heavily on the anticipated effects of endangered species development constraints on future business relocations to the Austin area and the consequent effects on new jobs. Business relocation decisions are affected by tangible and intangible factors. Tangible factors include labor costs and skill levels, transportation services, resource availability, market proximity, and local government policies (especially, tax abatements). Intangibles include quality of life, attitudes toward business, aesthetics, and climate. In the national market for business relocations, the Austin area is considered to be especially attractive with respect to intangibles. Austin also scores high with respect to a number of tangible factors, particularly its skilled labor force and low cost of living and housing. The considerable constraints associated with the presence of endangered species habitat on the ability of national firms to locate new facilities in the high-amenity areas of western Travis County is shown by the Gau and Jarrett models to impose a substantial limiting effect, in the absence of the BCCP, on population and employment growth, land development, assessed valuation, and tax revenues for the affected taxing jurisdictions.

Projected employment growth for the Austin MSA is shown in Table 23. The projections made by Tucson Economic Consulting, which assume the presence of the BCCP, show that the total employment in the Austin MSA will reach 840,300 by the year 2011. High technology employment will increase from a 1993 estimate of 31,100 to a 2011 estimate of 52,900. Likewise, the service sector will also see significant increases. TEC estimates that the service sector employs 109,800 in 1993. This number is projected to increase to 292,800 by the year 2011.

The Gau and Jarrett report (1992) also concludes that the growth in employment in the Austin area would be severely limited if the BCCP were not in effect. The report estimates that as many as 10,000 R&D jobs would be lost over the next 20 years without the BCCP. These 10,000 jobs are an estimated 65 percent of the forecasted R&D employment growth with the BCCP. Additionally, Gau and Jarrett projects that the Austin MSA could suffer a loss of up to 5,000 high technology manufacturing jobs over the study period without the BCCP. This figure is approximately 20 percent of the projected growth in high technology manufacturing. However, as indicated previously,

the population and employment growth in the Austin MSA over the past three years has exceeded that projected by Gau and Jarrett.

Job losses in these sectors lead to losses in other sectors. Using the 1990 conversion of the Texas Input-Output Model developed by the Texas State Comptroller's Office, the Gau and Jarrett study estimated the employment multipliers for the R&D and high technology sectors. They found that each R&D job loss in the Austin MSA causes a total employment reduction of 2.248 jobs in the study area. Each high technological manufacturing job loss creates a total MSA employment reduction of 3.314 jobs. Based on these employment multipliers, the Gau and Jarrett study estimated that if the BCCP were not adopted, 39,050 jobs would be lost by the year 2011. This represents 8.7 percent of the expected employment growth.

Property Values/Tax Revenues

The Gau and Jarrett land development/valuation model concentrated on the impact of the BCCP to three of the most affected local taxing jurisdictions: the City of Austin, Travis County, and the SWRD. These are only three of the 117 taxing jurisdictions in the county.

As shown in Table 24, the BCCP is projected to increase the property tax collections of Travis County and the City of Austin by substantial amounts. Travis County is expected to receive an additional $649.0 million in property tax revenue, while the City of Austin will receive an estimated $356.5 million. At a discount rate of 6 percent, these revenues have a combined present value in 1992 of approximately $439.6 million, which is significantly greater than the BCCP's forecasted total cost, in present value terms, of approximately $87.0 million. This number is currently undergoing reevaluation, most likely upward; however, the eventual number is not likely to be greater than the forecasted revenue.

The Gau and Jarrett report (1992) predicted an adverse impact on the SWRD due to a loss of taxing revenue. However, since that report, Barton Creek Properties has purchased the Upland and Sweetwater tracts in the SWRD. These properties make up almost 70 percent of the land in the SWRD. The bonds obligation issue was resolved by converting the SWRD from a taxing district to an assessment district. This action is likely to have a positive impact on the area and result in increased tax revenues. The negative impact indicated by the G study was also eliminated by the assessment district conversion.

TABLE 24
PROJECTED NET PROPERTY TAX REVENUE
WITH BCCP

Year	Travis County	City of Austin	Southwest Road District*
1992	$ 319,968	$ 895,790	$ -558,071
1993	3,141,211	1,906,203	-574,996
1994	5,105,455	2,995,953	-593,249
1995	7,221,227	4,169,769	-612,911
1996	9,497,505	5,432,633	-634,064
1997	11,943,746	6,789,791	-656,797
1998	14,569,903	8,246,766	-681,202
1999	17,386,457	9,809,371	-707,376
2000	20,404,437	11,483,727	-735,422
2001	23,635,451	13,276,272	-765,447
2002	28,010,874	15,605,809	-860,485
2003	32,697,928	18,100,404	-962,769
2004	37,714,542	20,769,533	-1,072,728
2005	43,079,582	23,623,168	-1,190,810
2006	48,812,897	26,671,799	-1,317,490
2007	54,935,363	29,926,460	-1,453,267
2008	61,468,939	33,398,755	-1,598,666
2009	68,436,719	37,100,887	-1,754,240
2010	75,862,984	41,045,689	-1,920,569
2011	83,773,266	45,246,650	-2,098,266
Total	$649,018,454	$356,495,428	$-20,748,823
Present Value (6%)	$283,171,182	$156,443,200	$-10,298,714

SOURCE: Gau and Jarrett 1992.

*Conversion of the Southwest Road District from a district with taxing authority to an assessment district has eliminated any adverse impacts the BCCP may have on this jurisdiction.

The Gau and Jarrett report (1992) also examined the impact of the BCCP on the property tax revenue of two ISDs in Travis County, Austin and Eanes. The results show that both districts will benefit from the BCCP.

For the Austin ISD, the present value of the additional property tax revenue under the BCCP is approximately $160.0 million. The Eanes ISD will receive a projected $61.0 million in additional property tax revenue under the BCCP. The Gau and Jarrett report states that these findings also suggest that the BCCP may have significant impacts on the property tax revenue of other school districts in western Travis County.

As with the No Action Alternative, the property tax revenue projections using the USFWS sample estimate of developable habitat are presented for comparison purposes. Using the USFWS sample data, total net present value tax revenues for the City of Austin and Travis County would amount to $244.5 million. This amount is still considerably higher than implementing Alternative 2, as projected in the BCCP report. By enabling higher levels of population and employment growth, the BCCP proposed action will also indirectly contribute to the growth of the City of Austin's sales tax revenues. With the BCCP in place, total Austin sales tax revenues over the 1992-2011 period are expected to be about $6.0 million ($3.9 million in net present value) higher than without the BCCP (Gau and Jarrett 1992).

b. Significance of Impacts

Compared with Alternative 1, Alternative 2 will result in:

- Enhanced employment growth in the Austin MSA,
- Higher levels of residential and commercial land development in the western part of Travis County,
- Significantly increased property and sales tax revenues for the principal taxing jurisdictions in the area, and
- Decreased cost of development in Travis vs. surrounding counties.

With respect to the greater level of land development in the environmentally sensitive areas of western Travis County, most of the area affected by the proposed BCCP is located within watersheds which are subject to some of the most restrictive municipal development ordinances in the country. Thus, while Alternative 2 will result in somewhat higher levels of development in certain areas, such development is expected to be orderly, economically feasible, and consistent with the environmental sensitivities

of the area. Given the positive economic benefits of the BCCP, Alternative 2 will not have a significant adverse effect on economic conditions within the project area.

c. Mitigation of Impacts

Because Alternative 2 will not result in significant adverse social and economic effects, no mitigation measures need be considered.

3. Alternative 3: Regional Permit

a. Impacts

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and an additional 5,000 acres located in the vicinity of the BCNWR. This acreage has not been concretely identified yet and may be located entirely within Travis County or possibly within parts of Williamson or Burnet counties (or both). If the permit acreage is entirely within Travis county, the permit application would be revised to reflect 5,000 fewer acres available to incidental take.

Employment

Like Alternative 2, this alternative would allow for steady and unencumbered growth in the western portion of Travis County. Moreover, the additional 5,000 acres that will be dedicated to the preserve are located in an area not as desirable for development as areas nearer Austin. The cost of land in the BCNWR area is much less than those lands targeted in the proposed 30,428-acre preserve of Alternative 2.

Property Values/Tax Revenues

Like Alternative 2, this alternative would increase tax revenues in major jurisdiction within the permit area, again with the exception of the SWRD.

b. Significance of Impacts

Like Alternative 2, Alternative 3 will result in somewhat higher levels of development in the permit area, although such development is expected to be orderly and consistent with the environmental sensitivities of the area. Given the positive economic benefits of the BCCP, therefore, this alternative will not have a significant adverse effect on economic conditions within the project area.

c. Mitigation

Because Alternative 3 will not result in significant adverse economic effects, no mitigation measures need be considered.

D. Land Use

The Land Use section analyzes the potential direct and indirect environmental impacts related to land use that could result from implementation of the proposed action or its alternatives. For a description of land use regulatory mechanisms in the City of Austin and Travis County and existing and future land uses within the BCCP permit area, see Chapter 3, Section D.

Assumptions and Assessment Guidelines. For the following environmental analysis, impacts will be considered significant if the action presents a conflict with existing land uses, poses a conflict with surrounding land uses, or creates inconsistency with established land use plans or policies.

1. Alternative 1: No Action

a. Impacts

The No Action Alternative assumes no issuance of a Permit for the permit area. Although development could occur on lands not occupied by endangered species, development activities would be required to obtain ESA authorization on properties containing endangered species habitat. Development projects would have the potential to be permitted, provided mitigation was included through preserve land dedication. Under section 7 of the ESA, federal actions that pose no jeopardy to an endangered species could proceed; this provision also applies to any private project requiring a federal permit or funding.

b. Significance of Impacts

The effect of the No Action Alternative in comparison to Alternatives 2 and 3, would be to slow otherwise lawful development activities in the permit area. Only large development projects would have the potential for amassing adequately sized habitat preserves in mitigation of endangered species take. Whereas the impact of small-scale development projects on the preservation of the species of concern may be small, the cumulative effect would be great. Only an adequately sized preserve that addresses the

cumulative effects of development in the permit area is adequate mitigation for the impacts of development. No such mitigation is offered under the No Action Alternative. On the contrary, it promotes fragmentation of the preserve system and the potential for undersized, isolated habitat blocks. Substantially more infrastructure corridors will occur under "no action."

c. Mitigation

The No Action Alternative would require mitigation in the form of dedicated open space having endangered species habitat on a project-by-project basis. Such mitigation is adequate only if minimum acreages for preserves are maintained and fragmentation is minimized. The No Action Alternative offers neither.

2. Alternative 2: Regional Permit

a. Impacts

Alternative 2 (proposed action) is the approval by the USFWS of a permit under section 10(a)(1)(B) of the Endangered Species Act, authorizing the incidental take of two endangered bird species and six endangered karst invertebrates in Travis County. Incidental take includes direct and indirect loss of endangered species and their habitat due to otherwise legally permitted land development. Mitigation for the potential incidental losses of endangered species or their habitat includes the establishment of a habitat preserve system of at least 30,428 acres in western Travis County. Creation of the preserve system would be through public acquisition, rather than by land use restrictions. The effect of the proposed permit action would be to remove the ESA restrictions on land development outside the preserve boundaries and to ensure long-term preservation of the acreage within the boundaries.

Compatibility with Existing Land Uses

Acquisition of the land for preserve system changes the status of the properties acquired from private ownership to public property. However, because most of these properties are currently void of human development and the preserve would retain that status, the actual land use would not change.

Compatibility with Surrounding Land Uses

The creation of an open space preserve system does not conflict with adjacent land uses and carries with it no adverse environmental impacts. On the contrary, the preservation of open space is desirable within urbanizing areas.

However, surrounding land uses and activities will have a material impact on the viability of the preserve system and the species of concern. A full range of land uses exists within a half mile of the edges of the potential preserve (Table 25). In the absence of any adopted future land use map, existing and future land uses are determined by the real estate market. As an area urbanizes, the impacts of people, pets, traffic noise, and other disturbances may have adverse effects on many species of wildlife and are likely to be particularly severe for the vireo and warbler. Cowbird parasitism and nest predation are also known to be higher in urban and suburban areas. Consequently, public open space or other protected areas are given considerable attention in the preserve design and delineation. In addition, buffer areas are included for the recommended preserve whenever adjacent land uses are likely to be incompatible with habitat utilization. These impacts and their mitigation are fully addressed in Chapter 4, Section A.

Consistency with Plans and Policies

The issuance of the Permit and creation of the proposed preserve system is not likely to have any bearing on the administration of any of the land use plans or development codes and ordinances in effect in the permit area. Three jurisdictions are participating in the implementation of the preserve system: the City of Austin, the City of Sunset Valley, and Travis County.

The City of Austin currently addresses comprehensive land use planning through *Austin Tomorrow*, a policy adopted by resolution in 1977 and 1979. *Austin Tomorrow* is consistent with the preserve design. It assigns the lowest development priorities to the City of Austin's jurisdiction and ETJ in western Travis County, where preserve acquisition will occur. If an inconsistency were to develop, city policies do not have the force and effect of law; therefore, the preserve system would not be bound by *Austin Tomorrow*.

The City of Sunset Valley adopted a comprehensive plan by ordinance in 1984, which assigns one of two categories to land within its jurisdiction, residential or nonresidential. The residential uses category includes parks and greenbelts, which would be consistent with preserve development. The only parcel in Sunset Valley that is proposed for preserve acquisition is relatively small, approximately 32 acres, and is owned by the City

TABLE 25
PROPOSED LAND USES AROUND THE PRESERVE BOUNDARIES

Land Use Type	Acreage
Undeveloped	22,936
Open space (park, greenbelt, preserve)	2,636
Single-family residential	348
Mobile home	0.12
Multi-family residential	18
Office	66
Commercial	5
Industrial	34
Transportation	208
Mining	0
Utilities	39
Civic	121
Water	56
TOTAL[1]	26,467.12

NOTE: Preliminary data complete for Austin incorporated area, Cedar Park, and urbanized ETJ only.

[1]The total measured acreage of the potential preserve system is 36,485 acres. The difference in this total and the sum of the land use acreages above is presumed to be areas not surveyed.

under a parkland/greenbelt deed restriction. Therefore, the preserve creates no inconsistency with the Sunset Valley comprehensive plan. Sunset Valley is in the process of updating its plan; however, no major shifts in land use designation are anticipated.

Travis County by state law cannot develop a comprehensive land use plan. Comprehensive plans (which include land use plans) are enforced by ordinance only within a city's corporate limits. In Texas, only activities prescribed by law can be undertaken by counties.

Because the proposed preserve would be acquired in fee simple, local development ordinances would apply within the preserve system, but are not likely to be applied on dedicated public open space. Therefore, preserve acquisitions would not create the potential transfer of development rights or land use intensities to other properties outside the preserve but within the permit area.

b. Significance of Impacts

Alternative 2, including the creation and management of a 30,428-acre preserve system in western Travis County (1) will not present a conflict with existing land uses, (2) is entirely compatible with surrounding land uses, (3) does not conflict with anticipated development in the permit area, and (4) is consistent with adopted land use plans and policies. Issuance of the permit will allow otherwise lawful development activities to resume subject to existing land development regulations. The resumption of the regulated development process is desirable. Creation of the preserve system will enhance rather than conflict with development in the permit area. Thus, no adverse impacts have been identified with the implementation of this alternative.

c. Mitigation

The mitigation for development impacts that will result from the issuance of a Permit is the proposed 30,428-acre preserve system.

3. Alternative 3: Regional Permit

a. Impacts

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and an additional 5,000 acres located in the vicinity of the BCNWR. This acreage has not been concretely identified yet and may be located

entirely within Travis County or possibly within parts of Williamson or Burnet counties (or both). If the permit acreage is entirely within Travis County, the permit application would be revised to reflect 5,000 fewer acres available for incidental take.

Compatibility with Existing Land Uses

Acquisition of the additional 5,000 acres near the BCNWR would change the ownership, but not the land use. These lands are also generally outside any jurisdiction's ETJ with no land use policies in force. Therefore, no incompatibility with existing land uses exists.

Compatibility with Surrounding Land Uses

The creation of an additional 5,000 acres of open space does not conflict with adjacent land uses and carries with it no adverse environmental impacts. On the contrary, the preservation of an even larger preserve system than proposed in Alternative 2 is desirable. By locating the additional 5,000 acres near the BCNWR, there will be benefits derived from increasing the size of the existing surrounding land uses and activities (a wildlife refuge).

Consistency with Plans and Policies

The issuance of the Permit and creation of the larger preserve system is not likely to have any bearing on the administration of any of the land use plans or development codes and ordinances in effect in the permit area, as explained in Alternative 2 above.

b. Significance of Impacts

Alternative 3, including the creation and management of a 35,428-acre preserve system in western Travis County (1) will not present a conflict with existing land uses, (2) is entirely compatible with surrounding land uses, (3) does not conflict with anticipated development in the permit area, and (4) is consistent with adopted land use plans and policies. Thus, no adverse impacts have been identified with the implementation of this alternative.

c. Mitigation

The mitigation for development impacts that will result from the issuance of a Permit is the proposed 35,428-acre preserve system.

E. Recreation

This recreation section discusses the potential environmental impacts to recreational facilities and cultural resources that could result from implementation of the project alternatives. For a description of the recreational facilities and historic resources affected by the proposed preserve system, refer to Chapter 3, Section E.

Assumptions and Assessment Guidelines. For the following environmental analysis, impacts to recreational facilities will be considered significant if (1) first, the action causes a net loss of recreational opportunities by either displacing recreational uses, degrading recreational values, or decreasing the overall recreational diversity within the permit area; or (2) recreational uses within the preserve system threaten or interfere with the goal of long-term species and habitat preservation.

Impacts on historic and archaeological resources will be considered significant in accordance with the criteria for "effect" and "adverse effect," as described in 36 CFR 800.9(a) and (b) below.

(a) Criteria of Effect. An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the national Register. For the purpose of determining effect, alteration to features of the property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered.

(b) Criteria of Adverse Effect. An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, material, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

(1) Physical destruction, damage, or alteration of all or part of the property;

(2) Isolation of the property from or alteration of the character of the property's setting when the character contributes to the property's qualification for the National Register;

(3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;

(4) Neglect of property resulting in its deterioration or destruction; and

(5) Transfer, lease, or sale of the property.

Under the National Historic Preservation Act and as directed in the Advisory Council on Historic Preservation regulations, Protection of Historic Properties, the USFWS:

> has the legal responsibility for complying with Section 106. It is the responsibility of the Agency Official to identify and evaluate affected historic properties, assess an undertaking's effect upon them, and afford the Council its comment opportunity (36 CFR 800.1)
>
> In conjunction with the SHPO [State Historic Preservation Officer], the Agency Official shall make a reasonable and good faith effort to identify historic properties that may be affected by the undertaking and gather sufficient information to evaluate the eligibility of the properties for the National Register (36 CFR 800.4).

1. Alternative 1: No Action

a. Impacts

The No Action Alternative assumes no issuance of a Permit for the permit area. Development activities would require ESA authorization on properties containing endangered species habitat. Development projects would have the potential to obtain their own Permits, providing mitigation through preserve land dedication.

Under section 7 of the ESA, federal actions that pose no jeopardy to an endangered species could proceed; this provision also applies to any private project requiring a federal permit or funding.

Recreation

Every project, whether public or private, may have to secure an individual 10(a)(1)(B) permit or undertake a separate section 7 consultation.

Cultural Resources

The No Action Alternative has no direct effect on cultural resources. The potential sites that are located on privately controlled property, and remain on private property, will not be guaranteed the discovery and protection that is part of the NHPA process.

b. Significance of Impacts

Recreation

The cost of the research and application for individual 10(a)(1)(B) permits may limit the number undertaken. If an individual project may be evaluated through a section 7 consultation instead, a project proponent will probably prefer this approach because it is less costly and time consuming (e.g., in contrast to section 10(a)(1)(B), section 7 does not require NEPA review and analysis of alternative proposals, and it specifies relatively brief timelines for USFWS review and decision).

The small size of some of the recreational resources will make managing the habitat for the benefit of the species of concern difficult.

Cultural Resources

Some cultural resources on private property may be lost due to lack of private support for their preservation or ignorance of the significance of the resource.

c. Mitigation

Recreation

Active recreational activities in existing parks will not be impacted by this Permit.

Cultural Resources

No mitigation is required.

2. Alternative 2: Regional Permit

a. Impacts

Alternative 2 (proposed action) is the approval by the USFWS of a permit under section 10(a)(1)(B) of the Endangered Species Act authorizing the incidental take of two endangered bird species and six endangered karst invertebrates in Travis County. Incidental take includes direct and indirect loss of endangered species and their habitat due to otherwise legally permitted land development. Mitigation for the potential incidental losses of endangered species or their habitat includes the establishment of a habitat preserve system of at least 30,428 acres in western Travis County. The effect

of the proposed permit action on recreational facilities will be to transfer 30 percent of the designated existing recreational and preserve facilities in western Travis County into the proposed BCCP preserve system for long-term maintenance and management.

Effects on Recreational Resources

Alternative 2 will increase the recreational opportunities for the region by transferring into public ownership and potential recreational use approximately 20,000-22,000 acres of land not currently accessible to the public. Many recreational activities occur on land designated as part of the preserve. The preserve will also increase the opportunity for minimum-impact activities engaged in by individuals and small groups, developing the educational potential of the preserve and appreciation for the environment and species.

The nature of the use of some facilities may change with the creation of the BCCP preserve system. The system has been designed to preserve known habitat for the species of concern, as well as to provide area that has the potential for being managed for the increased viability of the species. Table 26 shows which recreational areas discussed in Chapter 3, Section E, are being managed for the benefit of particular species of concern.

Development and improvements of facilities within the preserve will be monitored and, as appropriate, restricted for the benefit of the species of concern. In some cases, the number of existing roads and trails may be decreased. Routine maintenance may be changed to allow establishment and conservation of woodland canopy. Certain undeveloped areas, especially those with known populations of karst invertebrates and flora, will not be opened to the public. New trails, roads, and parking areas that open the woodland canopy will be prohibited. The creation of additional impervious cover is also prohibited. Public use of target species sites or environmentally sensitive areas will not be promoted, except as is compatible with the adopted management guidelines and standards. Intense uses of sites will be prohibited, including foot or bike races, concerts, or activity associated with permanent campgrounds. The impacts of such types of development on the biological resources within the preserve system are discussed in Chapter 4, Section A.

Creation of a preserve system for the affected species does not have a detrimental effect on the existing recreational resources in the permit area for several reasons. First, only approximately 30 percent of the total recreational resources in the permit area will be transferred to the preserve system. Second, the addition of approximately 20,000 acres of privately held land to the preserve almost doubles the available open space in Travis County. And third, improved recreational facilities and active recreational opportunities

TABLE 26
MANAGEMENT FOR SPECIES OF CONCERN BY RECREATION AREA

Property	Macrosite	Vireo	Warbler	Invertebrates	Flora
Barrow Preserve	Bull		●	●	●
Barton Creek Greenbelt	Barton	●	●	●	●
Bee Creek Preserve	W. Austin	●	●	●	●
Commons Ford Park	S. Lake	●	●		
Emma Long Metropolitan Park	N. Lake	●	●		●
Hamilton Pool	Pedernales		●		●
McGregor Tract	Cypress	●	●		●
Mount Bonnell	W. Austin				●
Romberg Tract	Cypress		●		
Spicewood Springs Park	W. Austin			●	●
Travis Audubon Sanctuary	Cypress	●	●	●	●
Bull Creek	Bull		●		●
Vireo Preserve	W. Austin	●	●		
Water Treatment Plant #4	Bull	●	●	●	●
Westcave Preserve	Pedernales		●		●
Wheless Tract	Cypress		●		●
Wild Basin Preserve	W. Austin	●	●		

will continue to operate. Therefore, even with changes in operation and seasonal public access, opportunities for use of recreational facilities will not be significantly reduced for the citizens of Travis County.

Effects on Cultural Resources

Because the creation of the preserve sets aside the areas within it from development, it does not change any of the characteristics that define the historic status of the cultural and archaeological resources located within the preserve. Therefore, no negative effects on these resources are anticipated, even though no field surveying specifically to locate such cultural resources is currently planned.

As previously stated, Alternative 2 would have a potential effect on a cultural resource if it alters the characteristics, location, setting, or place that may qualify the property for inclusion in the National Register. Adverse effect is described as physical harm to the resource, isolation or change in setting, introduction of inappropriate visual elements, neglect of property, and or sale or lease of resource. With the exception of sale or leasing, none of these effects are expected to occur through implementation of the BCCP preserve. The transfer or sale of a potential cultural resource into the preserve, which is publicly controlled and subject to federal guidelines, does not constitute adverse effect.

b. Significance of Impacts

Recreation

Creation of the preserve allows expansion and improvements to occur at park sites outside the preserve without an individual endangered species Permit or section 7 consultation, even those that may have habitat suitable for the listed species. Likewise, the preserve system also allows private facilities outside the system to plan and construct future improvements, some of which may involve incidental take, without an individual section 10(a)(1)(B) Permit or section 7 consultation.

Within the proposed preserve, existing resources will each be affected in slightly different ways. In general, all facilities within the preserve will have some limitation placed on improvements that will be allowed. Acreage designated for the preserve, although not currently used for active recreational purposes, may have been designated for expansion of active recreational purposes. The planned expansion will not be able to occur if the proposed activities conflict with the adopted management guidelines.

The recreational areas immediately adjacent to the preserve may find their expansion capability reduced because the available expansion acreage may already be part of the preserve.

Cultural Resources

The creation of the preserves allows for the protection of cultural, historical, and archaeological sites that are currently in private control. Management guidelines, especially for karst invertebrates and flora, result in protection for archaeological sites that may coincide with protected habitat. The public control of additional acreage, the lack of intensive use of the preserve areas, and the constant monitoring of the preserve will all enhance the preservation of the cultural resources.

c. Mitigation

Recreation

Proposed management standards and guidelines form the basis for mitigation of the impacts of the BCCP preserve system. Site-specific implementation of these standards and guidelines will ensure minimal effects on recreational opportunities while reducing negative impacts on protected species and habitats. Within these constraints, a wide range of activities will continue, as described in Chapter 2(C)(2)(e). These activities may include walking, hiking and jogging; fishing, swimming and boating; bicycling, horseback riding and RV use. Other activities may include picnicking, camping, nature viewing, spelunking, and rock climbing.

Cultural Resources

The Area of Potential Environmental Impact will be determined in consultation with the SHPO; however, no formal action has been initiated at the present time. Because the preserve will not introduce activities likely to affect currently unknown cultural resources, field surveys for potentially eligible resources are only required prior to actions that would result in soil disturbance.

Proposed management guidelines and standards suggest individual tract management plans that take into consideration the requirements for the particular tract. In the course of recording the physical properties, including geology, soils, hydrology, and topography, potential archaeological sites recorded by Texas Archaelogical Research Laboratory should be identified.

Man-made features will also be inventoried in the process of developing the tract-specific management plans. The following inventory is as a survey mechanism to determine possible cultural significance:

- All trails and roads (both improved and unimproved) should be identified on cover maps and described in terms of current use, condition of road surface, right-of-way width, distance to the nearest target species sites, and locations of any associated watershed or plant community damage.
- All buildings, ruins, and foundations should be mapped and described in terms of present condition, age of structure, nature of surrounding vegetation (particularly with respect to presence of exotic plants), and presence and condition of wells and waste treatment devices (e.g., septic tanks).
- For utility easements, include the method of utility transmission and describe the easement right-of-way in terms of its width, presence of any maintenance roads, nature of right-of-way vegetation, and any evidence of associated environmental damage.
- All boundary and internal fences should be described in terms of present condition and function; right-of-way width, vegetation, and soil condition; and location with respect to adjacent plant communities and nearest target species localities.
- Water body descriptions should include lake frontage, perennial streams, intermittent streams, springs, seeps, wells, artificial impoundments, and artificial watering sites. They should also describe current use by livestock or people, accessibility by road or trail, and presence of any nearby human structure.
- Archaeological sites should be identified with profiles, if available.
- Access points should be described in terms of those that are readily known and on the ground and of their impacts on the tract.

Other land uses and open areas should be identified.

Unrecorded Historical Resources. Any man-made structure or object that is 50 years or older should be evaluated for its potential historic status.

Landscape features should be evaluated for their historical integrity. Landscapes that were historically cultivated will have to be evaluated for their compatibility with the

required habitat revegetation plan. A conflict may arise concerning the degree of cultivation required to maintain a homestead or other site in its historic context.

As soon as possible after the discovery of a resource, a plan should be developed for its proper maintenance and upkeep.

Unrecorded Archaeological Sites. These guidelines should address unrecorded sites that may be discovered during the term of the permit. Any activity consistent with the adopted management standards and guidelines that results in the discovery of a potential archaeological site will start the process that will follow the federal regulations pertaining to an emergency discovery situation. Several agencies must be contacted in accordance with 36 CFR 800.11--the SHPO, the Advisory Council on Historic Preservation, and the Texas Antiquities Committee. Consultation with an archaeologist will be necessary for field surveying and evaluating the findings. The specific requirements and mitigation measures would then be determined in accordance with the review and comments prepared by the SHPO at the time of the emergency discovery.

3. Alternative 3: Regional Permit

a. Impacts

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and an additional 5,000 acres located in the vicinity of the BCNWR. This acreage has not been concretely identified yet and may be located entirely within Travis County or, possibly, within parts of Williamson or Burnet counties (or both). If the permit acreage is entirely within Travis County, the Permit application would be revised to reflect 5,000 fewer acres available for incidental take.

Effects on Recreational Resources

Alternative 3 will have the effect of transferring an additional 5,000 acres of private land to the preserve system proposed under Alternative 2, making this acreage accessible to the public for low impact uses for the first time. In this respect, recreational opportunities within Travis County will be expanded.

Because the additional 5,000 acres are privately owned and relatively remote from population centers, it is reasonably certain that these properties do not presently include any recreational facilities. Therefore, transferring them into the preserve system will not impair any existing recreational uses.

Effects on Cultural Resources

Because the creation of a preserve sets aside the areas within it from development, none of the characteristics that define the historic status of the cultural and archaeological resources located within the preserve are changed. This principle holds true for the additional 5,000 acres to be added to the preserve system under this alternative. Therefore, no negative effects on these resources are anticipated, even though no field surveying specifically to locate such cultural resources is currently planned.

b. Significance of Impacts

Addition of 5,000 acres to the proposed preserve does not cause a net loss of recreational opportunities by either displacing recreational uses, degrading recreational values, or decreasing the overall recreational diversity within the permit area; nor does this action create recreational uses within the preserve system that threaten or interfere with the goal of long-term species and habitat preservation. Likewise, the integrity of any cultural resources is not threatened by the addition of 5,000 acres to the proposed preserve. Therefore, no adverse impacts have been identified with the implementation of this alternative.

c. Mitigation

The mitigation for impacts that will result from the issuance of a Permit for this alternative is a 35,428-acre preserve system. Because no active recreational uses or identified cultural resources currently exist within the privately held properties in the vicinity of the BCNWR from which the 5,000 acres will be selected, no mitigation is required for implementation of Alternative 3.

F. Water Resources

This Water Resources section discusses the impacts to surface and groundwater that could result from implementation of the proposed action or its alternatives. The information contained in this section has been summarized from a water resources technical report prepared by Raymond Chan Associates of Austin, Texas in May, 1993. The report titled: *Water Resources in Travis County Affected by the BCCP* is located at the City of Austin, Environmental & Conservation Services Department, 206 E. 9th Street, Austin, Texas 78767-8844 and the USFWS, 10711 Burnet Road, Suite 200, Austin, Texas 78758.

Assumptions and Assessment Guidelines. An adverse water resources impact would be considered significant if it were to result in one or more of the following:

- Alter surface flows so as to adversely affect downstream properties;
- Cause substantial flooding, erosion, or siltation;
- Degrade surface water quality, thereby affecting downstream use(s);
- Interfere substantially with groundwater recharge; or
- Degrade groundwater quality by the exceeding threshold criteria set forth in water quality protection standards.

1. Alternative 1: No Action

The No Action Alternative assumes no issuance of a Permit for the permit area. No take of listed species could occur without a developer successfully completing an individual section 7 consultation or Permit.

Existing watershed protection ordinances would remain in force under the No Action Alternative. These include provisions for controlling peak stormwater runoff, pollutant loadings, and disturbance of natural areas. Peak flows are controlled by requirements for retention facilities and impervious cover restrictions. Pollutant loadings are reduced by water quality ponds, buffer areas along waterways and critical environmental features, and permit requirements for wastewater discharges.

a. Significance of Impacts

Development that occurs on land without species or habitat constraints, or with a Permit or section 7 consultation, must still comply with existing water quality protection standards and ordinances. In particular, the ordinances dealing with critical environmental features prevent degradation of water associated with karst formations, which may contain federally-listed invertebrates, through the use of setbacks and feature boundary surveys. In general, watershed protection ordinances in Travis County and the City of Austin are strict; if they are conscientiously enforced, development projects will not substantially degrade water quality or quantity.

If fewer and larger projects are built due to financial considerations, they are more likely to operate under master plans that would include regional stormwater controls. Regional

controls are less expensive to operate per unit of runoff and tend to be more effective in controlling increased flows and pollutant loadings.

b. Mitigation

Because Alternative 1 will not have significant water resource impacts, no mitigation measures will be required beyond conscientious enforcement of existing water quality and quantity standards and ordinances. As described in Chapter 3, Section F, existing watershed ordinances require new developments to implement structural and nonstructural controls for peak flows and pollutant loadings.

2. Alternative 2: Regional Permit

a. Impacts

Permit Area

Alternative 2 is the proposed action for which the applicants seek approval by the USFWS of a Permit authorizing the incidental take of two endangered bird species and six endangered karst invertebrates located in Travis County. Incidental take includes direct and indirect loss of endangered species and their habitat due to otherwise legally permitted land development.

The activities associated with this land development include clearing vegetation, grading and contouring slopes, and constructing buildings and impervious cover. Although peak discharges from such future land development can be attenuated by detention ponds, increased impervious cover will decrease the amount of rain infiltration and increase stormwater runoff volume and duration within affected watersheds. Increased impervious cover results from the grading and paving of building sites, addition of streets, parking lots, sidewalks, and buildings that are characteristic of urban developments. Urbanization effectively reduces the storage capacity of a watershed through the elimination of porous surfaces, small ponds, and other areas that retain water.

In response to this problem, watershed protection ordinances require that certain drainage areas construct detention or retention ponds to control stormwater runoff in developed areas. Detention basins are designed to capture runoff, which is held and released at a rate at or below existing conditions, minimizing the potential for flooding or channel

scouring. Where these ponds are required, no net increase in flow peaks or velocities should occur in channelized areas; however, a longer sustained above-normal flow will result.

The watershed ordinances include several provisions that control stormwater volume. All developments generally must provide detention to attenuate peak discharges resulting from the 2-year to the 100-year storms. The amount of impervious cover allowed is based on a percentage of the developed site area, the type of development, and its location. These ordinances may require establishment of detention or retention ponds, depending on the amount of impervious cover and the watershed land use designation. Developments located within water supply watersheds must prepare an environmental assessment that includes a description of stormwater management facilities.

Watershed protection ordinances sometimes require basins that are combinations of detention and water quality ponds. Water quality ponds capture and treat the "first flush" of stormwater runoff associated with the first half inch of runoff. Water quality ponds use sedimentation and/or filtration methods for the removal of pollutants from captured stormwater. Both types of ponds remove undissolved particles that may contain or be composed of contaminants. Filtration systems utilize filter media to trap suspended sediment particles. Settling basins are designed with an expanded cross-sectional flow area that produces reduced velocities, thereby enhancing settling of suspended particles. Filtration ponds, and to a greater extent retention/filtration ponds, have demonstrated the highest removal efficiencies for most pollutants from stormwater runoff in Austin area developments. Sedimentation ponds and wet ponds have exhibited reduced removal efficiencies (City of Austin 1990b).

City of Austin watershed ordinances also include provisions for protection of critical environmental features, such as bluffs, springs, canyon rimrocks, karst formations, and wetlands. Development and wastewater irrigation areas must be set back minimum buffer distances (usually 150 feet) to avoid direct communication of surface runoff to such features. Vegetative cover must be retained in the buffer zone to the maximum extent practicable. No clearing, alteration, or development of any kind is permitted within 50 feet of a critical environmental feature, except hiking trails used for educational purposes, and no residential lot may encompass or be located within 50 feet of any critical environmental feature. For developments located within water supply watersheds, the required environmental assessment must include a description of critical environmental features. No untreated runoff arising from development may flow over aquifer recharge features.

The Texas Natural Resources Conservation Commission (TNRCC) considers active geologic features, such as karst formations, when deciding whether to issue a permit for wastewater disposal, waste piles, landfills, surface storage impoundments, and hazardous waste storage, processing, disposal, or land treatment. The TNRCC does not issue a permit for a new facility or the substantial change of an existing facility unless it finds that the site, when evaluated in light of proposed design, construction, or operational features, minimizes possible contamination of surfacewater and ground water (Texas Administrative Code Sections 309.12, 335.204, and 335.205). The TNRCC Edward's Rules allow the state to permit development projects in recharge zones.

The Regional Stormwater Management Program of TNRCC provides for planning, design, and construction of drainage improvements to control increased stormwater runoff on a regional basis. Financing is through fees paid by developers who participate in a shared-cost program that eliminates the need for on-site controls. Participation is limited to approved watersheds and projects that will not adversely affect other properties due to increased runoff. Fees are based on the size of the development, proposed land use, and development intensities.

Preserve Area

Implementation of the BCCP would provide for the long-term preservation of approximately 30,428 acres of habitat within the BCCP permit area. This preserve system area includes 11 watersheds, comprised of 33 drainage areas; these areas are discussed briefly in Section F of Chapter 3 of this EIS and more extensively in the water resources technical report.

No development would be allowed in the preserve areas and strict management guidelines would be applied to maintain or improve the habitat of the endangered species. While some adverse impacts to water quality could occur due to management activities occuring on the preserve (such as prescribed burning), these impacts are expected to be short-term and not significant.

b. Significance of Impacts

Existing watershed protection ordinances will remain in force under the proposed action. They provide requirements for controlling increased stormwater runoff and pollutant loadings resulting from the new developments expected to occur outside preserve areas. These requirements generally include maintenance of buffer strips along waterways, limits on impervious cover, establishment of water quality ponds or retention ponds, slope protection, limits on pollutant loadings in wastewater discharges, and buffers or

setbacks around critical environmental features. In general, the less impervious cover, the less water pollution. Therefore, existing environmental ordinances appear to be adequate to minimize development impacts on water resources.

Implementation of the proposed action is not expected to produce a significant increase in surface runoff peak flows or degradation of water quality in the affected watersheds. In fact, due to the maintenance of a natural condition of the preserved areas, watersheds within or downstream from the BCCP preserve should benefit in terms of surface water runoff quality and quantity. Development directed outside the preserve area should tend to be more concentrated and therefore capable of using more regional methods of surface runoff control, which are more cost-effective and require less maintenance.

c. Mitigation

Implementation of the BCCP preserve system will not adversely affect the water quality within the 30,428 acres because this area will be maintained in native vegetation rather than be developed. This will reduce siltation, water pollution, and water diversion that is normally associated with development activities.

Development outside of the proposed preserves will continue in some areas without this action and that development may affect water quality in the ways identified above. The area outside of the proposed preserves that are currently habitat will be allowed to develop as a result of this action. That area includes less than half of the lands west of MoPac in Travis County. All the developments in Travis County will be evaluated on a case by case basis with respect to meeting local, State, and/or Federal water quality standards. The goal of those standards is to maintain a quality of surface and ground water acceptable for human contact. Project by project review, reduction of development area, the limited additional area that will be developed as a result of this action, and the goal of water quality regulations, indicate this action will not adversely affect the water quality of Travis County.

3. Alternative 3: Regional Permit

a. Impacts

Permit Area

Alternative 3 is the same as Alternative 2 except for some management requirements, reporting requirements, and an additional 5,000 acres located in the vicinity of the

BCNWR. This acreage has not been concretely identified yet and may be located entirely within Travis County or possibly within parts of Williamson or Burnet counties (or both). If the permit acreage is entirely within Travis County, the permit application would be revised to reflect 5,000 fewer acres available for incidental take. The activities associated with this alternative (in a slightly reduced permit area) will be the same as with Alternative 2 (clearing vegetation, grading and contouring slopes, and constructing buildings and impervious cover). All of the same water protection ordinances will apply under this alternative as well. Retention ponds to control stormwater runoff in developed areas will be required. The amount of impervious cover (allows increased runoff) will be limited and sedimentation ponds or filtration methods will be required.

Preserve Area

To mitigate incidental take of an endangered species or its habitat that may result from land development, Alternative 3 proposes that an additional 5,000 acres located in the vicinity of the BCNWR will be added to the proposed 30,428-acre preserve system, making a total of 35,428 acres. No development would be allowed in the additional 5,000 acres of preserve areas and strict management guidelines would be applied to maintain or improve the habitat of the endangered species. While some adverse impacts to water quality could occur due to management activities occuring on the preserve (such as prescribed burning), these impacts are expected to be short-term and not significant.

b. Significance of Impacts

Since existing watershed protection ordinances are the same under this alternative, development impacts on water resources and critical environmental features, such as karst formations would be expected to be the same as under Alternative 2. In the permit area, potential water quality impacts will be reduced to below a level of significance under Alternative 3. In the preserve area, including the additional 5,000 acres in proximity to the BCNWR, no significant impacts to water quality would be expected because no development would be allowed. Impacts occurring as the result of management activities on the preserve would be short-term and not significant.

c. Mitigation

Water quality impacts from this alternative will be less than that anticipated under Alternative 2 because this alternative proposes an additional 5,000 acres to be maintained in native vegetation. As described in Chapter 3, Section F, existing watershed ordinances require new developments to implement structural and nonstructural controls for peak flows and pollutant loadings.

G. Air Quality

1. Alternative 1: No Action

Continued growth and urban expansion in the Austin metropolitan area is likely to impact air quality. Future air quality impacts could occur as concentrations of vehicle and industry emissions increase (City of Austin 1991). Elevated levels of CO, CO^2, and SO^2 could be expected with increased traffic levels.

a. Significance of Impacts

With no regional plan in place increases in concentrations of vehicle and industry emissions could result in long-term degradation of air quality within Travis County.

b. Mitigation

Mitigation of impacts to air quality from the no action alternative would occur on a project-by-project basis. Such mitigation will reduce impacts to a level below significance on an individual project basis.

2. Alternative 2: Regional Permit

a. Impacts

Within the proposed preserve system, land is predominantly vacant and levels of human activity are minimal. Acquisition of preserve lands will not result in a change of this minimal use status for those acreages. Allowable uses will be primarily recreational or scientific and will be carried out under strict guidelines. Localized short term effects may occur as a result of preserve management activities if tools such as prescribed burning are used. These activities would be minor in terms of air quality degradation because they have very short duration and wind can be used to carry smoke away from sensitive areas.

If the USFWS grants the requested Permit, development will be allowed to proceed outside preserve boundaries without further permits from the USFWS for the subject

species. The result may be to direct development into undeveloped areas outside the preserve; however, approving a preserve system does not cause or induce such development to occur. Market forces will determine the location, type, and density of new development in Travis County. Therefore, air quality impacts associated with such development, if any, are not a direct effect of the proposed action. All such air quality impacts will comply with state/federal regulations.

b. Mitigation

Specific management strategies will be addressed in individual land use plans prepared for units of the preserve system. Opportunities to avoid impacts will be included, as will opportunities for mitigation of unavoidable impacts.

c. Significance of Impacts

Because air quality impacts occurring as a result of the issuance of a regional permit would be short-term and/or minor, impacts are not expected to be significant.

3. Alternative 3: Regional Permit

Impacts to air quality resulting from the additional acreage consistent with Alternative 3 is not expected to differ significantly from those discussed in Alternative 2.

H. Comparison of Impacts by Alternatives

Table S-1 (Summary of Impacts and Mitigation of Alternatives, Executive Summary) presents an overall comparison of the impacts of Alternatives 1, 2, and 3 on the affected environment. Overall, Alternative 1 would cause some impacts that could not be mitigated below a level of significance; however, both Alternatives 2 and 3 have sufficient mitigation measures to reduce impacts below a level of significance. As in the preceding discussion, affected environment is divided into six categories: biological resources, social factors, economic elements, land use, recreation, and water resources.

1. Biological Resources

Under the No Action Alternative, determination of incidental take is possible only through tracking the cumulative sum of species and habitat losses resulting from independently approved projects over the next 30 years. The criteria for USFWS evaluation of these projects exist under sections 7 and 10(a)(1)(B) of the ESA, which do not require coordination of mitigation resulting from approved projects or set a quantifiable limit on incidental take for an entire area prior to implementation of all future projects. Under Alternatives 2 and 3, incidental take can be quantified based on known or anticipated habitat losses outside the established preserve boundaries. Descriptions of the incidental take for the listed species and species of concern are provided in this chapter and in Table S-1. In every instance, under Alternatives 2 and 3, the impacts can be mitigated to a level below significance; however, under Alternative 1, impacts would be reduced to a level below significance only on a project-by-project basis.

2. Social

The No Action Alternative may result in adverse impacts for population growth, housing, and public infrastructure in Travis County because of ESA requirements. In contrast, both Alternatives 2 and 3 avoid such consequences by creating a sizable preserve system as mitigation for unrestricted development in their respective permit areas. Therefore, positive impacts on population growth, housing, and public infrastructure are projected under either of these alternatives.

3. Economic

Under the No Action Alternative, Travis County may face adverse impacts in employment and property valuation/tax revenues because of ESA requirements. In contrast, both Alternatives 2 and 3 would lead to increased employment and property valuation/tax revenues. Both Alternatives 2 and 3 avoid the adverse consequences of the No Action Alternative by creating a sizable preserve system, which serves as mitigation under a Permit that authorizes development without restrictions in the respective permit areas.

4. Land Use

Under all of the alternatives considered, no significant land use impacts would occur. For areas subject to development, even though such areas vary under the different alternatives, implementation of existing land use regulations and administrative procedures would ensure that such development occurred consistently with plans and policies. Acquisition of areas within the proposed preserves (Alternatives 2 and 3) has no significance because preserve units would be acquired from existing open space and would remain in that status during the 30-year term of the proposed Permit. Under "no action," substantially more infrastructure corridors would occur.

5. Recreation

The No Action Alternative poses some potential for losses of recreational opportunities because individual permit seekers may be unable to shoulder the greater financial burden caused by the lack of a regional Permit. Cultural resources on private property may be lost due to development, and the potential for habitat fragmentation resulting from development is increased. On the other hand, Alternatives 2 and 3 would avoid all of these adverse impacts.

6. Water Resources

Under Alternatives 1, 2, and 3, no significant water resources impacts would occur. For areas subject to urbanization, implementation of existing watershed protection ordinances would ensure that such development occurred consistently with stormwater control and surface and groundwater quality regulations. Areas within the proposed preserves (Alternatives 2 and 3) would have little or no development during the 30-year term of the proposed Permit.

I. Cumulative Effects

NEPA regulations define cumulative effects as ". . . the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can

result from individually minor, but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

By analyzing the effects of the issuance of the proposed BCCP Permit with the past and present county projects that have affected listed species habitat within the permit area and the reasonably foreseeable projects requiring either a section 7 consultation or a Permit, the cumulative effect of all these projects can be projected. Section 1 below lists the past, present, and reasonably foreseeable projects within the proposed permit area, and Section 2 analyzes the cumulative effect of these projects and the proposed issuance of the BCCP permit.

1. Cumulative Projects

As noted in the Land Use, Social, and Economic sections of this EIS, the populations of Austin and Travis County have increased by 35 percent since 1980. With this population increase is an attendant loss of undeveloped lands with habitat for all of the species of concern in the proposed Permit.

Gau and Jarrett (1992) completed a study entitled "Economic Impact Study of the Balcones Canyonlands Conservation Plan." This study indicates that from 11,544 to 31,550 acres of land with habitat will be developed over the next 20 years. On the other hand, by comparing the 1985 and 1990 existing land use maps for the City of Austin planning area, western Travis County experienced approximately 2,560 acres of built development over that five-year period. At an average of 512 acres per year, approximately 15,360 acres will be developed in western Travis County over the next 30 years (Table 27). The disparity between these numbers shows the difficulty in predicting future growth in Travis County. Moreover, it is important to point out that these acreages do not predict the extent of habitat loss associated with development. We do know, however, that development in Travis County has occurred primarily in the western and northeastern portions of Austin's ETJ (City of Austin 1989, 1990a, 1991b, 1992a, 1993b).

The purpose of this section is to consider the past, present, and reasonably foreseeable future projects, authorized or under review, that are considered to contribute to the cumulative loss of species of concern habitat within and adjacent to Travis County. This section is divided into three parts:

TABLE 27
CHANGES IN WESTERN TRAVIS COUNTY DEVELOPMENT
1985/1990

Sector Number	1985 Total Area	1985 Vacant	1985 Developed Area	PA Number	1990 Total Area	1990 Vacant	1990 Developed Area	Acres Developed 1985-1990
2	4,540	508	4,031	2	5,315	427	4,889	
4	5,799	1,999	3,800	3	5,269	1,746	3,524	
11	19,605	9,669	9,936	4	4,433	1,890	2,543	
12	5,713	767	4,947	14	8,572	4,102	4,470	
13	14,030	7,366	6,664	15	8,290	5,200	3,090	
14	18,336	8,980	9,356	16	4,245	715	3,530	
20	39,862	35,475	4,387	17	5,627	431	5,196	
21	79,778	69,390	10,388	18	5,687	1,451	4,236	
22	59,951	50,255	9,695	19	129,205	114,124	15,081	
				20	130,075	115,638	14,437	
				26	76,246	71,478	4,769	
TOTAL	247,612	184,408	63,204		382,966	317,201	65,764	2,560

(1) Past and present projects that affect the habitats of the species of concern;

(2) Reasonably foreseeable projects, authorized or under review, that comply with the USFWS's formal consultation process under section 7 of the ESA; and

(3) Reasonably foreseeable projects, authorized or under review, that comply with the USFWS's habitat conservation plan process under section 10(a)(1)(B) of the ESA.

The black-capped vireo was listed as endangered by the USFWS in October of 1987, five species of karst-dwelling invertebrates in September of 1988, and the golden-cheeked warbler in May of 1990 (emergency listing). Subsequently, one of the karst species was divided into two subspecies, for a total of six endangered karst invertebrates. Several land development and public improvement projects in the Austin area were significantly affected by these listings. They were required to obtain permits under the Endangered Species Act.

a. Past and Present Projects Requiring Section 7 Consultation

Section 7 of the ESA provides regulatory mechanisms for actions affecting federally-listed species on public and private lands, respectively. Section 7(a)(1) directs federal agencies to use their authorities to carry out programs for the conservation of endangered and threatened species. Through the section 7(a)(2) process, all federal agencies are required to ensure that any action they authorize, fund, or carry out in the United States is not likely to jeopardize the continued existence of any listed species [50 CFR 402.01(a)].

Since the listing of the black-capped vireo in October 1987, the USFWS has reviewed many proposals for activities that could adversely affect the listed species. In response to this listing, the USFWS, other federal agencies, and state wildlife agencies have developed and implemented measures to minimize harm and mortality to BCCP listed species resulting from project activities. These measures include provisions for avoiding impacts to listed species found in project areas, land acquisition and protection as compensation for destruction of listed species' habitat, increased law enforcement, improved management, public education, and research. Table 28 lists past section 7 consultations in the proposed BCCP permit area. The table includes the size of the project (acreage), the affected species, and the required mitigation.

TABLE 28
SECTION 7 CONSULTATIONS IN THE BCCP PERMIT AREA
July, 1995

Development Name	Applicant	Acres	Species	Date Initiated	Status
Jester Point 2 (I)	Jester Estates	425	warbler, cave invertebrates	June 1990	Completed
RM 2222 (Loop 360 to 0.2 mile west of Jester Boulevard)	Texas Dept. of Transportation		warbler	June 1990	Completed
3M Austin Center	3M Austin Center	± 100	warbler	July 1990	Completed
RM 620 (Debba Lane to RM 2222)	Texas Dept. of Transportation		warbler, vireo, cave invertebrates	March 1991	Completed
Jester Point 2 (II)	Jester Estates	425	warbler, cave invertebrates	August 1991	Completed
River Place	Sierra Development	1,453	warbler, vireo	September 1992	Completed
Westview	Westview Development	± 400	warbler	February 1993	Completed
Whitestone Development	FAMCO Services, Inc.	1,558	warbler, vireo	March 1993	Completed
Canyon Creek	FAMCO Services, Inc.	1,327	warbler, cave invertebrates Jollyville salamander potential vireo	March 1993	Completed

b. Past and Present Projects Requiring Section 10(a)(1)(B) Permits

Section 10(a)(1)(B) of the ESA gives the USFWS the authority to issue permits to nonfederal and private entities for the take (defined in section 9 of the ESA) of listed species, as long as such taking is incidental to and not the purpose of carrying out otherwise lawful activities (16 U.S.C. 1539). A Permit is granted only if the applicant institutes appropriate conservation measures for habitat maintenance, enhancement, and protection coincident with the action. Table 29 lists all of the pending Permit applications in the proposed BCCP permit area. The table includes the size of the project (acreage), the affected species, and the proposed mitigation.

c. Other Anticipated Section 7 Consultations and Section 10(a)(1)(B) Permit Applications

As one of the fastest-growing areas in the country, the City of Austin and Travis County continue to accept building permit applications. If these development projects include lands that contain endangered species habitat, they will require either section 7 consultations or Permits to proceed. Table 30 lists all of the anticipated section 7 consultations and Permit applications in the permit area as of July 1, 1995.

d. Other Projects in the Permit Area

Balcones Canyonlands National Wildlife Refuge. An action that positively affects species of concern habitat within Travis County is the USFWS acquisition of land for a 41,000-acre national wildlife refuge in Travis and Burnet counties, called the Balcones Canyonlands National Wildlife Refuge. This refuge is a key element of the species recovery plans for the black-capped vireo and the golden-cheeked warbler. Approximately 65 to 70 percent of this refuge will lie within the BCCP permit area; however, it will not figure directly into the allowable take under the BCCP Permit. Funding is being secured from the Federal Land and Water Conservation Fund, building on extensive cooperation from BCCP participating jurisdictions, elected officials, and the Texas Nature Conservancy.

2. Cumulative Impacts

The proposed action is to issue a Permit for incidental take of endangered species within Travis County for a 30-year period. Incidental take includes direct and indirect loss of endangered species and their habitat due to otherwise legally permitted land development. Mitigation for the potential take of species or their habitat includes the establishment of

TABLE 29
SECTION 10(a) APPLICATIONS IN THE BCCP PERMIT AREA
July, 1995

Development Name	Applicant	Acres	Species	Date Submitted	Status
LakeLine Mall	H. Co., Simon LakeLine Mall Partnership	116	cave invertebrates	November 1991	Completed
Canyon Ridge	Beard Family Trust	198	warbler, mock-orange	October 1992	Completed
Davenport Ranch	Davenport Ltd.	70	vireo	February 1993	Completed
Davenport Ranch	Davenport Ltd.	140	warbler	February 1993	Pending
Spicewood at Bull Creek	Richland Bull Creek Assoc.	182	warbler	March 1993	Completed
Great Hills Reserve	Crown Oaks, Inc.	290	warbler	May 1993	Pending
Lake Pointe	Southwest Travis County, Ltd.	496	warbler	May 1993	Completed
Overlook at Cat Mountain	Overlook, Inc.	213	warbler	August 1993	Pending
Barton Creek Properties	Barton Creek Community	1,750	warbler, vireo	September 1993	Completed
Canyon Ridge Phase A Sect. 3	Beard Family Trust	24	warbler	September 1993	Completed
Wallace Tract	Highway 71 Properties	74	warbler, vireo, cave invertebrates	September 1993	Pending
Westminster Glen		120	warbler	September 1993	Completed
Hilltown	Coleman-Prewitt Investments - Hilltown, Inc.	51	warbler	May 1994	Pending
Cedar Park Waterline	City of Cedar Park	3.4 miles	warbler	November 1993	Completed
Treetop	J.P.I Texas Dev., Inc.	66	warbler	March 1994	Completed

TABLE 30
OTHER SECTION 7 CONSULTATIONS AND
SECTION 10(a) APPLICATIONS IN THE BCCP PERMIT AREA
JULY 1, 1995

Development Name/Applicant	Description
D.C. Reed Estate	Considering Section 10(a)
Four Points Development	Considering Section 10(a)
Continuum Park	Considering Section 10(a)
Vista Pointe	Section 10(a) in preparation

Table 30

a habitat preserve system of at least 30,428 acres in western Travis County. The effect of the proposed permit action would be to remove the ESA restrictions on land development outside the preserve boundaries and to ensure long-term preservation of the acreage within the boundaries. The direct and indirect environmental impacts of the issuance of the permit and the establishment of a preserve system are considered under the resource-specific discussions of "Environmental Consequences" in the preceding sections of this chapter.

The development of private projects could generate the need for various new regional public works projects, such as roads and transportation facilities, public utilities, and water facilities. Together, these private and public projects could contribute to incremental increases in the general level of urbanization in portions of Travis County outside the BCCP preserve boundaries. On the basis of these considerations, the USFWS anticipates that issuance of the proposed Permit, together with other reasonably foreseeable projects in the region, could have a cumulative impact on the species of concern in terms of decreasing and further fragmenting their habitats.

a. Biological Resources

The USFWS has examined the potential cumulative biological impacts of the proposed action on the species of concern and has concluded that occupied habitat in Travis County would be lost to natural causes and development, with or without the proposed Permit. However, the consensus is that acquiring at least 30,428 acres of habitat for a preserve system will benefit the species of concern. The acquisition and management of habitat adjacent to the Balcones Canyonlands National Wildlife Refuge will enhance the probability of the continued existence of the species of concern. The USFWS will continue to evaluate proposed projects for regional cumulative impacts in conjunction with the BCCP and proposed Permit.

Following is a discussion of the potential cumulative impacts of the proposed action on each of the endangered species included in the Permit.

Black-capped Vireo

The No Action Alternative poses potentially severe adverse long-term impacts on the viability of the black-capped vireo species and the supporting ecosystems in the area. Those lands that would be preserved as a result of successful individual Permit actions would likely be relatively isolated from each other, thereby reducing their habitat value as a result of habitat fragmentation. Comprehensive species management programs, such as cowbird management and systematic monitoring of species populations, would not be

undertaken. In addition, a network of fragmented preserve lands that is not comprehensively designed or managed to function as a system would reduce the likelihood that the species of concern would survive in the local area.

Not including the BCNWR lands, either Alternative 2 or 3 will protect approximately 50 percent of the occupied black-capped vireo habitat in Travis County. Each alternative proposes to manage additional acres of potential vireo habitat for the vireo with the intention of increasing the vireo population in the county during the life of the permit. This preserve system provides a regional guarantee that the proposed permit and BCCP will not endanger the black-capped vireo in Travis County and that the cumulative effects on the vireo will be less severe with the proposed Permit than without.

Golden-cheeked Warbler

Under the No Action Alternative, the rate of decline of the golden-cheeked warbler is difficult to predict given uncertainties regarding enforcement of the ESA as well as the unsuitability of a significant portion of the warbler habitat for development (due to WPZ restrictions and topography). Ongoing reliance on individual Permits will do little to stem the primary agents that are responsible for the warbler's decline; thus, the downward trend of the population is expected to continue. Cumulative negative impacts to the warbler under this alternative are considered significant.

Both Alternatives 2 and 3 could allow loss of up to 71 percent of potential golden-cheeked warbler habitat in the permit area. Alternative 3 proposes to protect up to 5,000 acres more than Alternative 2. The additional acreage would be located near the BCNWR, a large block of warbler habitat. This preserve system provides a regional guarantee that the proposed permit and BCCP will not endanger the golden-cheeked warbler in Travis County and that the cumulative effects on the warbler will be less severe with the proposed Permit than without.

Karst Invertebrates

Under the No Action Alternative, the loss of karst species and karst habitat is difficult to predict given uncertainties regarding enforcement of the ESA and uncertainties on where and when development would occur. Ongoing reliance on individual section 7 consultations or Permits will do little to stem the primary threats to the endangered arthropods of Travis County. Significant adverse cumulative impacts to karst habitat and species could occur under the No Action Alternative due to filling in or collapse of caves, alteration of drainage patterns, alteration of surface plant and animal communities, and increased contamination and human visitation.

Both Alternatives 2 and 3 will protect all but four of the caves in the BCCP preserve area known to harbor the six endangered cave invertebrates. An additional 27 karst features would be protected for the karst species of concern. The cumulative effect of either action will be to provide a much greater degree of protection than is currently provided under the No Action Alternative.

Bracted Twistflower

Alternatives 1, 2, and 3 would result in the possible loss of five of the nine known populations of bracted twistflower in the permit area. Without stronger protective measures, this would have the cumulative effect of putting the local population in serious peril, especially given the current destruction of two of those populations by development activities.

Canyon Mock-orange

Under the No Action Alternative, possibly 80 percent of the known populations in the county could be cumulatively lost. This could lead to its extinction locally. This assessment is tempered with the acknowledgment that the remaining populations may be protected from development to some degree by watershed protection ordinances or inaccessible topography. Neither of these conditions is by any means guaranteed and could easily change on short notice. This alternative could lead to a significant adverse cumulative impact.

Both Alternatives 2 and 3 will protect all of the known populations of canyon mock-orange in the permit area and ensure that the issuance of a Permit will not endanger this plant in Travis County.

Other Species of Concern

Alternative 1 could have adverse cumulative impacts to other karst species of concern. Alternatives 2 and 3 could not result in cumulative impacts to any of the other species of concern discussed in Chapter 4, Section A of this EIS.

Eurycea Salamanders

If these three species are included in this action, the cumulative impacts on the three *Eurycea* salamanders will be addressed in accordance with the appropriate recommendations of the aquatic advisory team.

b. Social Resources

Creation of the proposed preserve will direct development away from the preserve into areas outside its boundaries, with a positive potential cumulative social impact on population growth, housing, and public infrastructure.

Without a preserve, Travis County may experience reductions in population growth, housing, and public infrastructure because of increased costs of ESA compliance.

c. Economic Resources

The No Action Alternative could result in constraints upon economic growth within Travis County due to the increased costs of complying with the ESA. During 20 to 30 years, the cumulative effect of economic costs could also be significant.

Both Alternatives 2 and 3 would have a positive affect on the economic resources of Travis County.

d. Land Use

Under any of the alternatives, development will be subject to existing local land use and development regulations; however, there will be fewer infrastructure corridors under Alternative 2 or 3. The cumulative effects on land use will be greater without the proposed Permit as proposed under Alternative 2 or 3.

e. Recreation Resources

Cumulative impacts to recreational facilities in the region will be positively affected by the proposed action; the proposed preserve maintains existing activities in parks incorporated into it and provides additional acreage for specified types of public recreation. No adverse impacts to known cultural resources will result from implementing either Alternative 2 or 3.

f. Water Quality

Existing state water quality and quantity protection laws will remain in force within Travis County under any of the alternatives. They provide stringent requirements for controlling water uses, criteria, and pollutant loadings resulting from new developments. Cumulatively, the effect of either Alternative 2 or 3, in conjunction with foreseeable regional projects, should be to maintain water quality standards and water quantity levels as required by law.

g. Air Quality

Because continuation of growth is expected in the Austin Metropolitan area, air quality would be expected to degrade regardless of the decision made regarding the issuance of a regional permit under the ESA. Should a permit be issued that involves the protection of large tracts of land from development, air quality would be less likely to be degraded in those areas over the long term.

J. Adverse and Irreversible Environmental Changes

The proposed action is the issuance of a permit under section 10(a)(1)(B) of the ESA to allow the incidental taking of eight endangered species. Under the proposed Permit, land outside the proposed BCCP preserve boundaries will be open to development without ESA restrictions on incidental take of the black-capped vireo, the golden-cheeked warbler, and six karst-dwelling invertebrates. The Permit and BCCP preserve will also make prelisting provisions for species of concern.

Issuance of the permit by the USFWS will cause adverse and irreversible environmental changes to the habitat of the species for which the incidental take permit is issued. Because the BCCP provides overall mitigation by establishing a preserve system, the habitat losses outside preserve boundaries will not be further mitigated on a project-by-project basis. Once converted to a development use, existing habitat will no longer function as natural habitat for these species. In some cases, direct loss of listed species will occur. Under the proposed Permit, land development during the 30-year term of the permit may irrevocably convert to a development use: up to 55 percent of Travis County's known black-capped vireo habitat; 71 percent of potential golden-cheeked warbler habitat; and 84.5 percent of potential karst invertebrate habitat. Significant loss of habitat is estimated for the bracted twistflower.

The amount of taking and habitat loss due to the proposed action would be largely irreversible. However, as a result of the manner in which the proposed preserve system is designed, the species of concern habitat occurring outside the preserve areas tends to be more isolated and in smaller patches than that within the preserves. Thus, these changes to endangered species habitat will not threaten the continued existence of any of the listed or other species of concern.

Chapter Five

V. Relationship Between Local Short-term Uses of the Human Environment and the Maintenance and Enhancement of Long-term Productivity

The proposed BCCP and Permit are an attempt to balance short-term development of a portion of Travis County's human environment with creation of a relatively long-term (30-year) natural preserve. Under this proposal, development projects that would harm an endangered species could proceed under the BCCP's Permit, instead of being required to complete a separate section 7 consultation or Permit application. At the same time, the BCCP provides for the acquisition within 20 years of a minimum of 30,428 acres of potentially developable acres in Travis County, primarily for habitat and species preservation.

Because eight species inhabiting Travis County are listed as endangered under the Endangered Species Act, the USFWS must consider the level of protection afforded these species when evaluating the BCCP application for a Permit. Development that would occur during the 30-year permit term would eliminate up to 55 percent of the occupied and 70 percent of the potential black-capped vireo habitat, 71 percent of the potential golden-cheeked warbler habitat, and four known locations of karst invertebrates in Travis County. Elimination of endangered species habitat in conjunction with short-term development may adversely affect the long-term viability of those species.

The BAT conducted long-term viability analyses for the endangered species in the BCCP preserve area. They concluded that a viable black-capped vireo metapopulation requires at least 500 to 1,000 breeding pairs; only 28 to 59 pairs were observed in the BCCP area during the years 1989-1992. However, the proposed preserve will protect an estimated 8,219 acres of potential vireo habitat, which would be managed (e.g., cowbird trapping) to benefit sufficient habitat to support a substantially increased number of vireos.

The BAT's analysis for golden-cheeked warblers also set the size of a viable metapopulation at 500 to 1,000 breeding pairs. Based on estimates, approximately 330 to 660 warbler pairs inhabit about 5,500 acres of identified warbler habitat. Although the estimated 11,086 acres of warbler habitat planned for the BCCP preserve are substantially fragmented, the BCCP strategy is to focus on acquisition of larger blocks of habitat. The BAT concluded that it had identified enough habitat to support two viable warbler populations around the Bull Creek watershed and the south Post Oak Ridge area. (See also Appendix A for a detailed discussion of golden-cheeked warbler population viability.)

Long-term effects of the loss of one known location of karst invertebrates are difficult to assess. Of 39 karst invertebrate sites that have been located, the take of Beer Bottle Cave, West Rim Cave, Millipede Cave, and Puzzle Pits Cave have been determined to be acceptable under the ESA. The BAT noted that many unknown and undescribed karst invertebrate species probably exist in Travis County; however, until more data are available, the BAT has recommended preservation of sites known to harbor some of the six karst invertebrates currently listed as endangered.

Beyond endangered species concerns, establishment of a permanent, biologically sound preserve serves the interests of a variety of other sensitive plant and animal species, such as the canyon mock-orange and texabama croton. (See discussion of "Other Species of Concern" in Chapter 3.A.4 for a description of other sensitive plant and animal species in the proposed preserve area.) It is possible that several of these species may be designated as endangered or threatened in the future. A key factor in any subsequent species listing would be threatened loss of habitat. The establishment of permanent BCCP preserves may avert such a listing by providing the permanent habitat necessary for species viability.

Implementation of the BCCP sets in motion several processes that potentially enhance the environment over the long term. Without the BCCP, the probability that contiguous, high-quality habitat would be systematically preserved is low. Publicly owned lands and mitigation lands required from developers would probably become the basis for habitat and species preservation in Travis County. These areas would be acquired opportunistically, without a master plan, and could easily be too fragmented to provide sufficient high-quality habitat for long-term species protection. With the BCCP in place, preserve areas can be selected and acquired with species protection as the primary objective, which would greatly enhance the probability of preserving species for the long term.

A significant feature of the BCCP, which would otherwise be lacking for habitat acquisition, is a comprehensive funding program. The BCCP provides that impact fees, taxes, and assessments, in conjunction with bond issuance, would provide the financial resources necessary to acquire private holdings and protect them from development pressures. Furthermore, having an identified funding program allows the BCCP to acquire targeted habitat within 20 years.

Once acquired, BCCP preserve lands would be subject to continuing biological analysis and management intended to enhance long-term species viability and habitat conservation.

In the short term, the issuance of a Permit removes an obstacle from development (habitat loss) occurring in portions of Travis County. However, negative effects of allowing development in a defined area are more than balanced with the long-term positive effects of establishing and maintaining a large, mainly contiguous preserve of high-quality habitat for the federally-listed endangered species.

Chapter Six

VI. Coordination and Consultation

This chapter is divided into three sections. According to Section 1501.7 of the CEQ guidelines, Section A summarizes the public involvement in determining the scope of issues addressed in this EIS, and Section B lists the federal, state, and local agencies and the other interested persons who participated in the process and to whom copies of the EIS have been sent. Section C lists agencies, organizations, and persons with whom the USFWS consulted during the preparation of the EIS.

A. Public Involvement

Public involvement is described in detail in Chapter 1. It has been a continuing element of BCCP preparation, beginning in 1988 with the selection of the Executive Committee, whose membership reflected a concerted effort to bring representatives of affected interests to the table. Agendas and newsletters describing the Executive Committee's work were regularly distributed to hundreds of interested parties. Several workshops were held to solicit direct input from governmental leaders in the region as well.

In August 1990, the NEPA public scoping process to identify issues for the draft EIS for the BCCP began. From three public scoping meetings, two issues emerged as being of greatest concern—preserve design and equitable funding of the BCCP. In addition, the Executive Committee heard public comments at 11 of its meetings in 1990 and 1991. Two issues dominated—financing the BCCP and managing the cumulative impacts of actions taken in the interim before issuance of a Permit with actions allowed after issuance of the proposed permit. After analyzing legal and legislative issues, biological resources, landowner concerns, and economic impacts, the Executive Committee prepared a final draft of the BCCP in 1992.

B. Distribution List

Copies of the final EIS have been placed in the following locations for public use:

U.S. Fish and Wildlife Service
10711 Burnet Road, Suite 200
Austin, TX 78758

Travis County
Stokes Building
Law Library, 4th Floor
314 W. 11th Street
Austin, TX 78701

Travis County, Precinct 2
4501 RR 620N
Austin, TX 78732

Travis County, Precinct 3
14624 Hamilton Pool Road
Austin, TX 78738

City of Austin Municipal Building
124 W. 8th Street
Austin, TX 78701

City of Austin
Environmental & Conservation Services Department
206 E. 9th Street
Austin, TX 78701

City of Austin, Annex Building
Environmental & Conservation Services Department
301 W. 2nd Street
Austin, TX 78701

City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

Copies of the final EIS have been distributed to the following federal, state, and local agencies:

City of Austin
- Water and Wastewater Department
- Public Works & Transportation Department
- Planning & Development Department

University of Texas, Austin, TX
Lower Colorado River Authority, Austin, TX (Mark Rose, Executive Director)
Texas Department of Agriculture
Texas Department of Transportation
- Environmental Studies

Texas General Land Office
Texas Natural Resources Conservation Commission
Texas Parks and Wildlife Department, Resource Protection
Texas Water Development Board
Federal Aviation Administration, Fort Worth, TX
Federal Communications Commission, Washington, D.C.
Federal Energy Regulatory Commission, Office of Environmental Affairs, Wash., D.C.
Federal Highway Administration, Austin, TX
National Park Service, Santa Fe, NM
U.S. Army Corps of Engineers, Fort Worth, TX
U.S. Bureau of Reclamation, Austin, TX
U.S. Department of Agriculture
- Rural Electrification Administration, Washington, D.C.
- Natural Resources Conservation Service, Temple, TX

U.S. Department of Housing and Urban Development, Region IV, San Antonio, TX
U.S. Environmental Protection Agency, Region 6, Dallas, TX
U.S. Farmers Home Administration, Temple, TX
U.S. Geological Survey, Austin, TX

Copies of the final EIS have been provided to the members of BCCP committees (not included on any other list):

Strasburger & Price, Armbrust & Brown (David Armbrust)
Austin Sierra Club (Steve Beers)
Robert R. Brandes, Austin, TX
Bull Creek Foundation (Judy Jennings)
William Bunch, Austin, TX
- Attorney at Law

Capital Area Builders Association (Robert Carnes)
DBCS, Inc., Austin, TX (Don Bosse)
Fulbright and Jaworski (Alan Glen)
GSD&M, Austin, TX (Steve Gurasich)

Minter, Joseph & Thornhill, Austin, TX (John Joseph)
Lonnie Moore, Austin, TX
National Audubon Society, Austin, TX
Commissioner Garry Mauro, Texas General Land Office (Bob Hengley)
SWCA Environmental Consultants, Austin TX (Steve Paulson)
The Nature Conservancy of Texas, Austin, TX
Travis Audubon Society, Austin, TX (John Kelly)
Lower Colorado River Authority (Pat Oles)
Texas Parks and Wildlife Commission

Copies of the final EIS have been sent to the following State and Federal congressional offices:

State Senator Gonzalo Barrientos, Austin, TX
State Senator Jeff Wentworth, San Antonio, TX
Senator Kay Bailey Hutchinson, Austin, TX
Senator Phil Gramm, Dallas, TX
Congressman Lloyd Doggett, Austin, TX
Congressman Greg Laughlin, Round Rock, TX
Representative Elliott Naishtatt, Austin, TX
Representative Sherri Greenberg, Austin, TX
Representative Dawna Dukes, Austin, TX
Representative Glen Maxey, Austin, TX

Copies of the final EIS have been sent to the following organizations:

C.A.R.E., Austin, TX
Espey, Huston & Associates, Inc.
Lumberman's Association of Texas (Barbara Douglas)
National Wildlife Federation
Travis County Taxpayers Coalition (John W. Lewis)
Austin Board of Realtors
Austin Neighborhoods Council
Barton Springs/Edwards Aquifer Conservation District, Austin, TX
Clean Water Action, Austin, TX
CODA, Austin, TX
Earth First!, Austin, TX (Robert Singleton)
Environmental Connection: Austin
Friends of the Parks, Austin, TX
The Real Estate Council of Austin, Inc. (Amy McElhenney)
Greater Austin Chamber of Commerce
Greenpeace, Austin, TX
Hill Country Foundation, Austin, TX
Lone Star Sierra Club, Austin, TX
National Environmental Law Center, Austin, TX
National Wildflower Research Center, Austin, TX

Chapter Seven
VII. List of Preparers

The Balcones Canyonlands Conservation Plan Environmental Impact Statement was prepared by Regional Environmental Consultants for the United States Fish and Wildlife Service under the direction of Joseph E. Johnston, USFWS Field Office, Austin, Texas.

Donald E. Haines. Senior Project Manager (RECON)
Qualifications: 7 years' experience in environmental impact analysis and management of large-scale/regional environmental projects. B.A. English Composition/Literature; M.A. English Literature.
Responsibilities: Overall project manager and principal preparer of EIS.

Paul S. Fromer. Director, Conservation Planning (RECON)
Qualifications: 20 years' experience in academia and conservation biological consulting. B.A. Zoology; M.S. Biology; Ph.D. Zoology (advanced to candidacy).
Responsibilities: Principal in charge and quality assurance supervisor.

Carol J. Schultz. Environmental Planner (RECON)
Qualifications: 14 years' experience in natural resources planning and land use/environmental law. B.A. American Studies; M.S. Urban and Regional Planning; J.D. California Bar.
Responsibilities: EIS preparer and technical editor.

Harry J. Price. Graphics Supervisor (RECON)
Qualifications: 10 years' experience in EIS graphics supervision and production. B.A. Anthropology.
Responsibilities: Supervisor of EIS graphics production and principal graphic artist.

Randolph Hankamer, AICP. President, Community Land Resources, Inc. (CLRINC)
Qualifications: 15 years' experience in urban planning. B.A. Urban/Community Planning; M.S. Community and Regional Planning.
Responsibilities: Principal preparer of Land Use section of EIS; contributor to Social and Economics sections; and principal manager of RECON field office in Austin, Texas.

Charles C. Watts. Landscape Architect and Planner (CLRINC)
Qualifications: 11 years' experience in landscape architecture and planning. B.L.A.; M.S. Community and Regional Planning.
Responsibilities: Geographic information system data analyst and map creator in support of Land Use section preparation.

Donna Dean Carter, AIA. President, Carter Design Associates (Carter)
Qualifications: 15 years' experience as an architect and planner. B.A., M.A. Architecture.
Responsibilities: Principal preparer of Recreation section of EIS.

Alan Schuman. Architect (Carter)
Qualifications: 18 years' experience related to architecture and planning. M.A. Architecture.
Responsibilities: Information compiler concerning resources and entity management.

Thomas Van Zandt. Principal and Senior Project Manager, Hicks & Company, Inc. (Hicks)
Qualifications: 20 years' experience in water resources planning, environmental law and management. B.A. Government/History; M.Sc. Water Resources Management; J.D. Texas Bar.
Responsibilities: Project supervisor for Hicks & Company and principal preparer of Social and Economics sections of EIS.

Brad Peel. Environmental Planner (Hicks)
Qualifications: 3 years' experience in planning and environmental management consulting. B.A., M.A. Community and Regional Planning.
Responsibilities: Preparer of Social and Economics sections of EIS.

Don Blanton. Senior Project Manager (Hicks)
Qualifications: 10 years' experience as environmental/water resources planner. B.A. Biology; M.S. Environmental and Water Resources Planning.
Responsibilities: Principal preparer of Biology section of EIS.

John J. Kuhl. Wildlife Ecologist (Hicks)
Qualifications: 7 years' experience as a wildlife biologist. B.S. Wildlife and Fisheries Sciences.
Responsibilities: Preparer of Biology section of EIS.

David C. Severinson. Ecologist (Hicks)
Qualifications: 7 years' experience in academia and plant ecology consulting. B.A. Biology; M.A. Botany.
Responsibilities: Preparer of plant discussions in Biology section of EIS.

Larry Cox. Ecologist (Hicks)
Qualifications: 3 years' experience in soil science and rangeland ecology management. B.S. Soil and Crop Sciences; M.S. Rangeland Ecology and Management.
Responsibilities: Preparer of Biology section of EIS and report editor for Hicks.

Mark Kainer. Wildlife Ecologist (Hicks)
Qualifications: 2 years' experience in wildlife and environmental management studies. B.A., M.S. Wildlife Biology.
Responsibilities: Preparer of Biology section of EIS.

Raymond Chan, P.E. President, Raymond Chan & Associates (Chan)
Qualifications: 17 years' experience in civil engineering. B.S. Civil Engineering; Registered Professional Engineer.
Responsibilities: Principal in charge and quality assurance supervisor.

Don Wolford. Hydrologist (Chan)
Qualifications: 8 years' experience in aquatics biology; 3 years' experience in water resources engineering. B.S. Civil Engineering; Engineer-in-Training; B.S. Environmental Science.
Responsibilities: Preparer of Water Resources section of EIS.

Chapter Eight

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Chapter Nine

IX. Glossary of Terms and Acronyms

7Q2 - Flow for seven consecutive days during a two-year period; used in stream flow measurement.

Alluvium - Sedimentary matter deposited within recent times by flowing water in the valley of a large river.

Aquifer - The water-bearing portion of subsurface earth material.

BAT - Biological Advisory Team.

BCCP - Balcones Canyonlands Conservation Plan.

BCNWR - Balcones Canyonlands National Wildlife Refuge.

Biogeography - Study of the geographical distribution of living things.

Biological diversity - Dealing with variety of life forms, the ecological roles they perform, and genetic diversity they contain.

Bond - Financial instrument used by government agencies to fund major capital improvement projects, typically either a general obligation bond or a revenue bond.

Browse - Tender shoots, twigs, or leaves used as forage or food for herbivores or the act of feeding on these.

C1 - Category 1. Taxa for which the USFWS currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list the taxa as endangered or threatened species.

C2 - Category 2. Taxa for which information now in the possession of the USFWS indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules.

Capital costs - Expenditures by local governments on physical infrastructure.

CEQ - Council on Environmental Quality.

Conservation easement - A legal agreement with a property owner to restrict the alteration or destruction of habitat or other activities within a specified zone that may be detrimental to habitat management for the species of concern.

Coordinating Committee - The BCCP permit holders, City of Austin, and Travis County will create a Coordinating Committee to provide policy oversight for implementing the interagency agreement. The Coordinating Committee will oversee all aspects of conservation planning, coordination, and implementation of the plan and regional permit.

Critical habitat - The specific areas legally defined by the USFWS within a geographic area occupied by an endangered species, on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection.

CWO - Comprehensive Watershed Ordinance.

CWQZ - Critical water quality zone.

Dissected area - Area, such as a plateau, that is separated into many closely spaced valleys by erosion.

Ecosystem - An ecological system or the living system of organisms and their environment.

Ecotone - Transition zone between two different plant communities.

ECSD - Environmental and Conservation Services Department, City of Austin.

EH&A - Espey, Huston & Associates, Inc.

EIS - Environmental Impact Statement.

Endangered species - A species that is in danger of extinction throughout all or a significant portion of its range and that is specifically listed by the USFWS as having protection under the Endangered Species Act.

Endemic - Confined to a given region whether through natural or political boundaries.

ESA - Endangered Species Act.

Escarpment - A long cliff or steep slope separating two comparatively level or more gently sloping surfaces, usually the result of erosion or faulting.

ETJ - *See* Extraterritorial jurisdiction.

Expenditure - A disbursement of funds by a government entity; includes operation and maintenance costs as well as capital costs.

Extraterritorial jurisdiction - Area within a prescribed distance from a city's boundaries within which no other city or special district can annex land or provide services without the permission of the city.

Facultative - Having the capacity to live under more than one specific set of environmental conditions (opposed to obligate).

Fault - A fracture or zone of fractures along which there has been movement of the sides relative to one another or parallel to the fracture.

Fault zone - An area or region that is expressed as a zone of numerous fractures or faults.

Fauna - Animals; organisms of the animal kingdom of a given area taken collectively.

Federal candidate species - Taxa placed in Federal Categories 1 and 2 by the USFWS that are candidates for possible inclusion in the list of endangered species.

Fee simple - Title to real property belonging to a person or government where full and unconditional ownership exists. Such ownership does not necessarily include mineral rights.

Flora - Plants; organisms pertaining to the plant kingdom taken collectively.

FM - Farm and Market Road.

Forage - Food for animals (e.g., deer), especially when taken by browsing or grazing.

Formation - A sequence of naturally created rock layers with distinctive upper and lower boundaries.

Geographic information system - A computerized database management system for capture, storage, retrieval, analysis, and display of locationally defined data. A GIS combines digital mapping technology with relational database information, resulting in a system that allows analysis of various information within a specific geographic area.

Geomorphic - Pertaining to the forms of the earth's surface.

GIS - *See* Geographic information system.

Habitat - The environment in which a plant or animal naturally occurs.

HCP - Habitat conservation plan.

Hydrology - The science dealing with the properties, distribution, and circulation of water on the surface of the land and in the soil and underlying rocks.

IH - Interstate Highway.

Impact - An assessment of the meaning of changes in all attributes being studied for a given resource, usually measured using a qualitative and nominally subjective technique.

Incidental take - Direct or indirect loss of a species listed as endangered or threatened under the Federal Endangered Species Act, or of the species' habitat, due (incidental) to an otherwise legally permitted activity or development (*see also* Take).

Indirect impacts - Project-related impacts indirectly attributable to the project itself; for example, soil disturbance causing water quality impacts.

ISD - Independent school district.

Karst - A limestone topography in which there are numerous caves, sinkholes, and fissures created by water passing through and dissolving away the limestone. Potential karst habitat is that area which contains the limestone that may have caves, sinkholes, and fissures.

KSB&A - Kent S. Butler & Associates.

LCRA - Lower Colorado River Authority.

Limestone - A sedimentary rock composed of calcium carbonate.

Macrosite - A subunit within the BCCP study area that is oriented around a biologically segregated habitat area defined by natural or man-made boundaries.

Mesic - Adapted to an environment having a balanced supply of moisture.

Metapopulation - A population of plants or animals in which each individual has an equal chance of breeding with any other individual.

mg/L - Milligrams per liter.

Minimum preserve area - The least amount of preserve area that could still present a viable preserve unit within the preserve system.

Mitigation - The process by which any adverse change or loss of a public resource is avoided or minimized and the compensation for such.

MSA - Metropolitan Statistical Area.

Native vegetation - Plant life that occurs naturally in an area through nonhuman intervention.

NEPA - National Environmental Policy Act.

Net development area - The total lot or site development area, excluding publicly dedicated, undisturbed open space on the same tract and excluding any land currently not platted or approved for development.

NHPA - National Historic Preservation Act.

NOAA - National Oceanic and Atmospheric Administration.

NOI - Notice of Intent.

Obligate - Restricted to a particular condition of life or set of environmental conditions (opposed to facultative).

Occupied habitat - For the black-capped vireo, habitat is defined as the union of all habitat areas occupied by vireos during any of the breeding seasons from 1986-1991. For the golden-cheeked warbler, no occupied habitat has been defined or described in the BCCP area. *See also* Potential habitat.

Open space - Any undeveloped land use, such as range and pasture land, noncommercial forests, riparian areas, water bodies, and vacant land.

ORV - Off-road vehicle.

Participation Certificate - Certificates providing purchaser with mitigation credits necessary for development of a particular tract to occur under the BCCP.

Pers. comm. - Personal communication.

Physiography - Science of physical geography; geomorphology.

P/I - *See* Public/institutional land.

Plan operator - Entity that will take lead role in implementing the BCCP.

Potential habitat - For the black-capped vireo, potential vireo management areas are habitat with the potential to support vireos with management. For the golden-cheeked warbler, potential habitat is defined as the warbler habitat mapped by Landsat imagery by the University of Texas Center for Remote Sensing, which was ground-truthed by members of the BAT in 1989.

Potential preserve area - Areas defined in the proposed BCCP wherein the final preserves will be located. Includes habitat for species of concern, areas potentially managed for species of concern, and intervening land considered necessary to maintain contiguity of preserve design.

Preserve - An area that is set aside specifically for the purpose of retaining suitable habitat for an endangered, threatened, or rare species (or other species of concern), but which may also provide such benefits as improved water quality, open space recreation areas, and aesthetic resources.

Preserve acquisition area - The area of privately owned land that is included in the potential preserve area and that is under consideration for inclusion in the preserve system.

Property tax - Tax imposed by a local government based on the value of property within its jurisdiction.

Public/institutional land - Land owned by public agencies or private institutions that is included in the potential preserve area and that is recommended for inclusion in the preserve system.

R&D - Research and development.

Recharge - The process by which water is absorbed and added to the zone of saturation, either directly into a formation through sinkholes or indirectly by way of percolation.

Revegetation - Regrowth or replacement of a plant community. Revegetation may be assisted by site preparation, planting, and treatment, or it may occur naturally.

Revenue bond - Financial instrument by which government agencies may fund major capital improvements. Used for projects that generate revenue from user charges or

similar fees or charges that are applied toward both project operation and debt retirement.

Riparian - Of or relating to land lying immediately adjacent to a water body and having specific characteristics of that transitional area, such as riparian vegetation.

RM - Rural and Market Road.

RR - Ranch Road.

RTC - Resolution Trust Corporation.

Section 7 - The section in the ESA that states, among other things, that no federal action shall jeopardize the survival of an endangered or threatened species in the wild and that provides for consultation between a federal agency and the USFWS on such actions.

Section 10(a)(1)(B) - The section in the ESA that, among other things, allows permits to be issued for incidental take of an endangered or threatened species (*see also* Incidental take and Take).

SEI - Southwest Econometrics, Inc.

SH - State Highway.

Shinnery - Low, shrubby growth of oaks that may cover extensive thin-soiled upland areas; often provides suitable black-capped vireo habitat in the Austin area.

SHPO - State Historic Preservation Officer.

Soil series - Collection of soils developed from similar parental material under comparable climate and plant communities.

Soil types - A category or detailed mapping unit used for soil surveys based on phases or changes within a series (e.g., slope, salinity).

SOS Ordinance - "Save Our Springs" Ordinance.

Special assessment funds - One of the governmental fund types, used to account for financing of public improvements or services deemed to benefit the properties against which special assessments are levied.

Special district - Local government unit charged with provision of a specific service (e.g., water supply districts, flood control districts). Generally, funding is from property taxes levied on the property benefiting from the service.

Species - A population or series of populations within which free gene flow occurs under natural conditions. The ESA includes any subspecies of fish, wildlife, or plants and any distinct population segment of any species that interbreeds when mature.

Study area - An area with designated boundaries in which intensive research on ecology and land use took place.

Substrate; substratum - Base or material on which an organism lives.

SWRD - Southwest Road District.

Take - As defined by the ESA: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in such conduct toward any endangered or threatened species. Court decisions have interpreted the ESA to include the destruction or degradation of endangered species habitat as a form of take.

Taxon, (pl.) Taxa - A taxonomic entity (e.g., species, subspecies, or variety) or group of these.

Taxonomy - Science dealing with the identification, naming, and classification of organisms.

TCAD - Travis Central Appraisal District.

TEC - Texas Employment Commission.

Terrestrial - Living on or in, or growing from the land.

Threatened species - Taxa likely to become endangered in the foreseeable future.

TNHP - Texas Natural Heritage Program.

TNRCC - Texas Natural Resources Conservation Commission, previously known as Texas Water Commission.

TNRIS - Texas Natural Resources Information System.

TOES - Texas Organization for Endangered Species.

TPWD - Texas Parks and Wildlife Department.

Troglobite - An organism restricted to a belowground environment.

TWC - Texas Water Commission, now known as the TNRCC.

TxDOT - Texas Department of Transportation.

USACE - U.S. Army Corps of Engineers.

USFWS - U.S. Fish and Wildlife Service.

USGS - U.S. Geological Survey.

Viable population - A group of organisms of the same species that are able to successfully breed so as to indefinitely perpetuate the group's survival.

Watershed - A drainage or catchment area of a watercourse or body of water.

WPZ - Watershed protection zone.

Xeric - Pertaining to or adapted to a dry environment.

ZID - Zone of initial dilution.

APPENDIX "A"

INTERLOCAL AGREEMENT

Interlocal Cooperation Agreement between Travis County and the City of Austin Implementing the Balcones Canyonlands Conservation Plan-Shared Vision

Article I. PREAMBLE

Sec. 1.1. Brief History of the Balcones Canyonlands Conservation Plan-Shared Vision

The Balcones Canyonlands region of Central Texas is home to several species of animals and plants listed as endangered under the federal Endangered Species Act of 1973, as amended. 16 U.S.C. § 1531, et seq. (the "Act"). Development of endangered species habitat in the region is subject to approval under the Act, and to avoid the burden of project-by-project approval, a group of individuals representing federal, state, and local governments, the private business sector, private landowners and environmental interests has worked since 1988 to create a regional habitat conservation plan in accordance with Section 10(a) of the Act.

Balcones Canyonlands Conservation Plan-Shared Vision ("BCCP-Shared Vision") will ensure the protection of endangered species under the Act, while providing a mechanism to permit continued economic development in the region without the need for individual project approval. BCCP-Shared Vision provides for the issuance of a permit under Section 10(a) of the Act to the City of Austin and Travis County as joint permit holders, establishes a mechanism by which permit holders may proceed with public capital improvement projects in compliance with the Act, provides a funding mechanism for the purchase and management of preserve system land, and provides a mechanism to allow private sector participation.

Sec. 1.2. Goals of the Plan

The goals of the BCCP-Shared Vision are:

(a) To ensure protection of the habitat of the species of concern in Travis County by acquiring and setting aside in public preserves the best remaining habitat.

(b) To manage the habitat preserve system so as to continue to support viable populations of the species of concern.

(c) To obtain and hold a permit under Section 10(a) of the Act.

(d) To provide adequate revenue to ensure the goals of the BCCP-Shared Vision are met.

(e) To provide a mechanism for public entities to proceed with public capital improvement projects in compliance with the Act.

Sec. 1.3. Authority and Purpose of the Agreement

(a) This Interlocal Cooperation Agreement ("Agreement") is entered into pursuant to the Interlocal Cooperation Act, Tex. Government Code Chapter 791, and other applicable law and creates the BCCP Coordinating Committee ("Coordinating Committee") to supervise the performance of this Agreement and to implement the BCCP-Shared Vision in cooperation with the parties to this Agreement, interested governmental entities, and the citizens of the region and in accordance with the permit application, permit no. 788841 PRT, filed by the parties March 19, 1993.

(b) Expenditures under this Agreement shall be made from current revenues available to the parties.

Sec. 1.4 Parties

(a) The parties to this Agreement are Travis County ("County") and the City of Austin ("Austin"). Permit holders are the County and Austin as set out in Section 1.5 of this Agreement.

(b) This Agreement may be modified in accordance with Section 7.2 to, inter alia, allow additional governmental entities to become parties.

(c) A party may not withdraw from this Agreement until the party satisfies its obligations set out in the BCCP-Shared Vision and in this Agreement.

Sec. 1.5 The Balcones Canyonlands Conservation Plan Approval, Amendments, and Section 10(a) Permit

(a) The City of Austin and Travis County shall jointly apply for and hold a permit under Section 10(a) of the Act ("the Permit") and shall be jointly responsible for implementing the conditions of the Permit as granted by the USFWS, and further, shall jointly apply to the USFWS for amendments to the Permit as necessary.

(b) The parties hereto have or by execution of this Agreement do hereby adopt and approve the BCCP-Shared Vision attached hereto as Exhibit "A". This Agreement replaces and supersedes the Interagency Plan previously adopted by the parties. To the extent that this Agreement is inconsistent with the BCCP-Shared Vision, this Agreement shall control.

(c) Amendments to the BCCP-Shared Vision or the Permit may be initiated by the parties to this Agreement pursuant to Section 7.2 of this Agreement.

(d) For the purpose of this section, "amendments" is defined to include those changes to the BCCP-Shared Vision or the Permit which may materially affect the scope of mitigation or method of implementation of the terms of the BCCP-Shared Vision or the Permit.

(e) For the purpose of this Agreement, "preserve system" is defined to include all land required to provide preserves to protect the species of concern including the Golden-cheeked Warbler, Black-capped Vireo and six cave invertebrates as specified in the BCCP-Shared Vision and the Permit.

(f) For the purpose of this Agreement, "Participation Certificate sales" is defined to include any sale or transfer of mitigation value by the parties to this Agreement.

ARTICLE II. CREATION OF COORDINATING COMMITTEE

Sec. 2.1. Creation and Purpose

(a) The Balcones Canyonlands Coordinating Committee ("the Coordinating Committee") is hereby created pursuant to Section 791.013 of the Texas Government Code, as an instrumentality of the parties to this Agreement.

(b) The parties to this Agreement are authorized by state laws to implement the BCCP-Shared Vision and the Coordinating Committee is created to carry out those essential governmental purposes.

Sec. 2.2. Effective Date of Creation

The Coordinating Committee is created on the effective date of this Agreement.

Sec. 2.3 Coordinating Committee Membership

(a) The Coordinating Committee shall consist of two (2) voting members and one (1) non-voting ex-officio member to be appointed as follows:

(1) One voting member appointed by the County from among the County Commissioners Court,

(2) One voting member appointed by Austin from among the City Council, and

(3) One non-voting ex-officio member appointed by the United States Fish and Wildlife Service ("USFWS").

(b) The position of Coordinating Committee Chair shall rotate annually between the member appointed by the County and the member appointed by Austin. The first Chair shall be the member appointed by the County.

(c) Members of the Coordinating Committee by virtue of their membership on the Coordinating Committee, do not hold a civil office, an office of profit of trust, or civil office of emolument, within the meaning of Article XVI, Section 12, 30, or 40 of the Texas Constitution.

(d) The governing body appointing a Coordinating Committee member shall furnish a certified copy of the appointing resolution to the Coordinating Committee Secretary; and the Coordinating Committee members shall serve at the pleasure of the appointing governing body.

Sec. 2.4 Term

(a) Coordinating Committee members shall serve one year terms.

(b) A member whose term expires continues to serve until a successor is appointed.

(c) Coordinating Committee members may be re-appointed for successive terms by the party appointing a member.

Sec. 2.5. Meetings of the Coordinating Committee

(a) The Coordinating Committee members shall meet regularly at least once each quarter, on the dates and at locations determined by resolution of the Coordinating Committee.

(b) The Coordinating Committee shall meet specially if called by the Chair or requested in writing by any Coordinating Committee member. A request by a Coordinating Committee member for a special meeting must be in writing, addressed to the Chair, and describe the purpose or purposes of the meeting. Only that business reasonably related to the purpose or purposes described in the request may be conducted at the special meeting.

(c) A quorum of the Coordinating Committee is two voting members. A majority vote is required to enact Coordinating Committee motions. A Coordinating Committee member may send a proxy to vote in his or her place, provided that the proxy is a member of the same governing body as the Coordinating Committee member.

(d) Except where this Agreement or the bylaws of the Coordinating Committee provides otherwise, the conduct of Coordinating Committee meetings is governed by the latest edition of Robert's Rules of Order Newly Revised.

Sec. 2.6. Notice

(a) Written notice, including an agenda, of each regular or special meeting of the Coordinating Committee must be mailed or personally delivered to each Coordinating Committee member. The notice and agenda must be mailed or delivered at least three calendar days before a regular or special meeting.

(b) Meetings of the Coordinating Committee are subject to the Texas Open Meetings Act, Chapter 551 of the Texas Government Code.

Sec. 2.7. Bylaws

The Coordinating Committee may adopt, amend, and repeal bylaws to govern its operations.

Article III. ADMINISTRATION AND DUTIES OF THE COORDINATING COMMITTEE

Sec. 3.1. Administration

(a) Secretary services for the Coordinating Committee shall be provided by either Austin through the City Manager or the County through the Executive Manager for Transportation and Natural Resources. The Coordinating Committee may in their discretion vote to rotate said function after two years from the effective date of this Agreement. Initially the City of Austin shall provide secretary services.

(b) The Secretary serves as the chief administrative officer to the Coordinating Committee. The Secretary's duties include, but are not limited to, negotiation and oversight of contracts, execution of contracts upon authorization by the Coordinating Committee, assuring that Participation Certificate Sales proceed in accordance with established policies and with the Permit, authorization of payments, oversight of the Operating Fund and mitigation bank, policy and plan amendment recommendations, land management compliance recommendations, and development of administrative guidelines and reports to the Coordinating Committee.

Sec. 3.2. Annual Budget, Capital Program and Report

(a) The Secretary shall prepare a proposed annual budget, including, when necessary, a capital program, for review and submission by the Coordinating Committee to the permit holders. Submission by the Coordinating Committee shall occur no later than

May 1 for the following fiscal year; provided that FY 1994-95 and 1995-96 proposed annual budget submissions shall be made by the Secretary directly to the governing bodies of the County and Austin for review and approval. Consistent with Article IV of this Agreement, the budget must be reviewed and approved by the governing bodies of the County and Austin.

(b) The budget shall include a calculation of the direct and indirect costs, excluding land management related costs, of implementing the BCCP-Shared Vision. This amount shall be funded by the County and Austin in equal shares, through general fund contributions.

(c) The Coordinating Committee's fiscal year shall be October 1 through September 30.

(d) The Secretary shall prepare an annual program report for review and submission by the Coordinating Committee to the permit holders.

Sec. 3.3. General Powers

The Coordinating Committee has all of the powers of the parties to this Agreement that are necessary and consistent with its duties set forth in this Agreement.

Sec. 3.4. Principal Duties

(a) The Coordinating Committee is created and shall operate to carry out the BCCP-Shared Vision, whose goals are described in Section 1.2 of this Agreement. The Coordinating Committee shall not jeopardize the Permit by any action or inaction.

(b) To this end, the Coordinating Committee's principal duties are:

(1) To make recommendations to the parties to this Agreement regarding proposed amendments to the BCCP-Shared Vision or the Permit.

(2) To make recommendations to the parties of this Agreement regarding the annual budget, in accordance with Section 3.2 of this Agreement.

(3) To provide policy oversight and coordination for implementing the BCCP-Shared Vision.

(4) To establish advisory groups as appropriate to implement the BCCP-Shared Vision.

(5) To assist the parties in recommending alternative funding sources.

(6) To approve contractual agreements with governmental or non-profit entities who wish to participate in BCCP-Shared Vision as Managing Partners.

(7) To approve contractual agreements with USFWS or others for the issuance and redemption of Participation Certificates.

(8) To assist the parties in assessing biological quality and preserve value of lands for acquisition of property rights.

(9) To develop and administer guidelines for the management of all the lands in the BCCP-Shared Vision preserve system to ensure protection of the species of concern therein, pursuant to Section 5.2.

(10) To review and evaluate on an ongoing basis the effectiveness of the BCCP-Shared Vision's adopted policies and their implementation to assure that the conditions of the Permit are being met.

(11) To educate the public about the species of concern and the importance of carrying out the BCCP-Shared Vision.

(12) To make recommendations to the parties to this Agreement regarding actions necessary to implement the BCCP-Shared Vision.

Article IV. FUNDING THE BALCONES CANYONLANDS CONSERVATION PLAN

Sec. 4.1. Obligations of Parties

(a) To ensure that the goals of the BCCP-Shared Vision as stated in Article I of this Agreement are met, the parties agree to the following obligations:

(1) The City of Austin's obligations:

a. Provide 2,562 acres of its current lands owned prior to October 1, 1992 for designation as preserve systems lands as illustrated in Exhibit "B" to this Agreement;

b. Prior to execution of this Agreement, issue general obligation bonds in the amount of $25.7 million for the purpose of funding preserve system land acquisition and preserve system needs;

c. Provide an annual contribution from its general fund in the amount calculated by the Coordinating Committee in accordance with Section 3.2 of this Agreement and adopted in its budget as the City's equal share of funds necessary for implementation of BCCP-Shared Vision. Contributions may be made through in-kind services or staff support provided that such services are clearly delineated in Austin's operating budget;

d. Manage its designated and acquired preserve system lands in accordance with Article V of this Agreement;

e. Use funds from Participation Certificate sales for preserve system land acquisition and preserve system needs; and

(2) Travis County's obligations:

a. Provide 507 acres of its current lands for designation as preserve system lands as illustrated in Exhibit "B" to this Agreement;

b. Provide an annual contribution from its general fund in an amount calculated by the Coordinating Committee in accordance with Section 3.2 of this Agreement and adopted in its budget as the County's equal share of funds necessary for implementation of BCCP-Shared Vision. Contributions may be made through in-kind services or staff support provided that such services are clearly delineated in the County's operating budget;

c. Provide an annual appropriation in an amount equal to 100% percent (100%) of the operations and maintenance (O & M) portion of tax revenue from new construction on property for which Participation Certificates were purchased, or for which mitigation rights were purchased from a party to this Agreement, or which is utilizing the permit, as set forth in more detail in subsection 4.1(b) below, which shall be used to complete land acquisition for the preserve system and to fund capital costs for its acquired and designated preserve system lands in accordance with Article V of this Agreement. After preserve system land acquisition is complete, the annual appropriation may be reduced to an amount equal to the County's annual land management

costs for its acquired and designated preserve system lands in accordance with Article V of this Agreement;

d. Manage its designated and acquired preserve lands in accordance with Article V of this Agreement; and

e. Use funds from Participation Certificate sales for preserve system land acquisition and preserve system needs; and

(b) Travis County shall establish with the Travis Central Appraisal District (TCAD) a mechanism to collect and aggregate information for the determination of the value of new construction on all acreage of properties (existing plats as of January 1, 1996) using the permit through the mechanism of a special certificate or a regular participation certificate. Beginning in 1996, this information will be reported, by the Chief Appraiser of TCAD, annually at the same time as the tax roll is certified to Travis County.

(c) The parties agree to deposit all funds collected from Participation Certificates sales in the appropriate fund as established in Section 4.2 of this Agreement on a monthly basis.

(d) The parties agree that all mitigation value associated with preserve system land which is not needed for public capital improvement projects shall be made available for sale through Participation Certificates sales.

(e) The party providing secretary services to the Coordinating Committee shall establish an Operating Fund as specified in Section 4.2 of this Agreement. The party not providing secretary services to the Coordinating Committee shall, no later than 60 days after adoption of the budget, forward to said Operating Fund the funds so required by the budget.

(f) Permit holders may initiate amendments to this Agreement, to BCCP-Shared Vision or to the Permit pursuant to Section 7.2 of this Agreement.

(g) Upon execution of this Agreement, Travis County shall pay to City of Austin an amount equal to $54,000.00 to cover the County's share of costs for the Environmental Impact Statement currently being prepared for the parties.

(h) The obligations set forth in subsections (a) through (e) above and in Section 4.2(c) below are contingent upon the issuance of the Permit by USFWS. The obligations set forth in subsections (a) through (e) above constitute the sole financial obligations of the parties. No further financial obligations shall be inferred

from this Agreement, the BCCP-Shared Vision, or the Permit.

Sec. 4.2. Operating Fund

(a) The party providing secretary services to the Coordinating Committee shall establish an Operating Fund with a local depository bank for the receipt of BCCP-Shared Vision related revenues collected or provided by or on behalf of the parties and for the payment of all BCCP-Shared Vision expenses excluding land management expenses.

(b) The Operating Fund shall be an interest-bearing account, and all interest earned shall be added to the principal in said account, except interest earned on funds collected from Participation Certificates sales.

(c) Funds collected from Participation Certificates sales, and the interest earned thereon, shall be disbursed by the Coordinating Committee Secretary to Austin and the County in equal shares on a semi-annual basis. Disbursements from Funds may be authorized by the Secretary or his or her designee for authorized BCCP-Shared Vision purposes, only in compliance with the approved expenditure level in the respective Austin and County approved budgets.

Article V. PRESERVE MANAGEMENT

Sec. 5.1. Land Management

(a) Upon issuance of the Permit, each party shall be responsible for management of BCCP-Shared Vision preserve lands owned by that party. The party may elect to manage the property, or may contract with another party or entity to do so, but cannot assign its underlying obligation for land management. All BCCP-Shared Vision preserve system lands shall be managed in a manner which will not jeopardize the Permit and in accordance with land management guidelines and land management plans adopted pursuant to Sections 5.2 and 5.3 of this Agreement, provided that reasonable access to preserve system lands shall be provided to Coordinating Committee representatives for inspection and monitoring or other functions as authorized in the annual budget.

(b) The Coordinating Committee Secretary will receive information on all land transactions and shall provide recommendations to the Permit Holders to ensure the integrity of the preserve system, will receive annual land management reports from each party, and will prepare a comprehensive annual land management report to be submitted to the Coordinating Committee, the Permit Holders, and USFWS.

(c) The Coordinating Committee Secretary shall identify, prioritize, review, and authorize research on species of concern on BCCP-Shared Vision preserve lands pursuant to Coordinating

Committee guidelines for research and monitoring and its annual budget.

Sec. 5.2. Land Management Guidelines

(a) Land management guidelines which identify minimum standards and limitations for land management were submitted to USFWS for its review and approval prior to execution of this Agreement.

(b) Once approved by USFWS, the approved land management guidelines shall be used in land management of all BCCP-Shared Vision preserve system lands.

(c) Amendments to the approved land management guidelines may be initiated by a member of the Coordinating Committee or by the Coordinating Committee Secretary and shall be processed pursuant to the following procedures:

(1) The Coordinating Committee shall conduct at least one public hearing to receive input on the proposed amendments to the land management guidelines prior to approval; and,

(2) After approving the amendments to the land management guidelines, the Coordinating Committee shall submit the amended guidelines to the Permit Holders governing bodies for approval and then to USFWS for its review and approval.

Sec. 5.3 Land Management Plans

(a) A proposed land management plan for a particular preserve system parcel shall be produced by the party who owns the property. An annual report regarding management of the particular preserve system parcel shall be produced by the party who owns the property and provided to the Coordinating Committee Secretary.

(b) Each proposed land management plan should be submitted to the Coordinating Committee Secretary and shall be approved by the Coordinating Committee Secretary only if the plan is in compliance with the approved land management guidelines.

Article VI. DISSOLUTION OF THE COORDINATING COMMITTEE

Sec. 6.1. Vote to Dissolve

(a) The parties to this Agreement may dissolve the Coordinating Committee by affirmative votes of a majority of each parties' governing bodies; provided that a liquidation plan pursuant to Section 6.2 of this Agreement has been previously adopted.

(b) A party's approval of dissolution of the Coordinating

Committee must be adopted by written resolution to dissolve and a certified copy of the resolution must be delivered to the Coordinating Committee Secretary.

Sec. 6.2. Liquidation Plan

(a) Prior to consideration by the parties of dissolution of the Coordinating Committee, the Coordinating Committee shall adopt a plan to liquidate the Coordinating Committee and furnish a copy of the plan to each voting parties' governing body for review and approval prior to submittal to USFWS for approval regarding Permit changes.

(b) Among other things, the liquidation plan must provide a timetable for liquidation, for transferring or otherwise disposing of the Permit, for collecting all of the Coordinating Committee's assets and discharging its liabilities, for a final audit, and for distributing the Coordinating Committee's net assets or assessing its net liabilities in accordance with Section 6.3.

Sec. 6.3. Distribution/Assessment Formula

The Coordinating Committee's net assets, other than interests in preserve system lands that will revert to a party, must be distributed to, or its net liabilities assessed against, each party in equal shares provided that said distribution shall not be in equal shares in the event that this Agreement is terminated pursuant to Section 7.1(b).

Sec. 6.4. Dissolution

(a) When the net assets are distributed to, or the net liabilities satisfied by, the parties, the Coordinating Committee ceases to exist and this Agreement is terminated.

(b) Dissolution of the Coordinating Committee shall not obviate obligations under the Permit except as allowed by the Section 6.2 liquidation plan.

Article VII. GENERAL PROVISIONS

Sec. 7.1. Term, Termination

(a) This Agreement becomes effective on October 1, 1995 or the date it is executed by all parties, whichever is earlier. This Agreement terminates upon termination of the Permit, unless terminated earlier pursuant to Section 6.4 or Section 7.1(b) of this Agreement.

(b) Notwithstanding anything to the contrary within this Agreement, if at any time during the term of this Agreement, the

Commissioner's Court of Travis County, Texas or the City of Austin, Texas, fails to provide funding for all or any part of its obligations herein for the following fiscal year of said party, the failing party shall give notice to the Coordinating Committee and the parties to this Agreement of such failure to fund and upon delivery of such notice shall no longer be liable for said unfunded obligations. Upon receipt of such notice, the non-failing party may elect to terminate this Agreement as their sole recourse.

(c) If a party defaults in the performance of any of the terms or conditions of this Agreement, other than by failure to fund, the defaulting party shall have 30 days after receipt of written notice of such default within which to cure the default. If the default is not cured within such period of time, then the non-defaulting party shall have the right without further notice to terminate this Agreement and to seek relief as specified in Section 7.1(d) below.

(d) The parties agree the preserve system land to be designated or acquired pursuant to Article IV of this Agreement is unique and irreplaceable, and that the failure of a party to designate property as preserve system land or to designate as preserve system land those tracts which have been purchased with funds from Participation Certificate sales pursuant to the terms of this Agreement would result in damage to the party seeking to maintain the Permit that could not be adequately compensated by a monetary award. The parties therefore agree that if either party fails to perform the following covenants incumbent on it due under the terms of this Agreement: (1) designate preserve system land pursuant to Section 4.1 of this Agreement, or (2) designate as preserve system land those tracts which have been purchased with funds from Participation Certificate sales, the other party may appropriately seek an order from a court of appropriate jurisdiction requiring the defaulting party to specifically perform those covenants. Such order shall not require the failing party to maintain, repair, or otherwise expend funds, but only to designate the land in question.

Sec. 7.2. Amendment of Agreement, BCCP-Shared Vision, the Permit

(a) A voting member of the Coordinating Committee or any party to this Agreement may propose an amendment to this Agreement, the BCCP-Shared Vision, or the Permit by presenting it in writing to the Coordinating Committee with the meeting notice for a regular or special meeting of the Coordinating Committee. The Coordinating Committee shall review and make a recommendation to the governing bodies of the parties to this Agreement concerning the proposed amendment no more than ninety (90) days after receipt of the written proposal.

(b) An amendment is adopted if the governing bodies of all the parties to this Agreement adopt the amendment and furnish the

Coordinating Committee Secretary with certified copies of the adopting resolutions.

(c) When an amendment is adopted, the Coordinating Committee shall furnish a copy of the amendment to USFWS for approval.

Sec. 7.3. Notice to Parties

(a) Notice to be effective under this Agreement must be in writing and received by the party to whom it is directed. Notice is received by a party: (1) when it is delivered to the party personally; (2) on the date shown on the return receipt if mailed by registered or certified mail, return receipt requested, to the party's address specified in subsection (b) and the receipt is signed on behalf of the party; or (3) three calendar days after its deposit in the United States mail, with first-class postage affixed, addressed to the party's address specified in subsection (b).

(b) The Coordinating Committee's address is its principal office address, attention: Chair of the Coordinating Committee. Each party's address is set out following its signature line on this Agreement.

Sec. 7.4. Miscellaneous

(a) This Agreement states the entire agreement of the parties, and it may be amended only as provided in Section 9.1.

(b) This Agreement is binding on the successors in interest to the parties.

(c) This Agreement is performable in Travis County, Texas, and Texas law governs its interpretation and application.

(d) This Agreement may be executed in multiple counterparts.

CITY OF AUSTIN
P.O. Box 1088
Austin, Texas 78767

By: _____ Date: 6-3-95
Jesus Garza
City Manager

COUNTY OF TRAVIS
P. O. Box 1748
Austin, Texas 78767

By: _____ Date: 8/1/95
Bill Aleshire
County Judge

APPROVED AS TO FORM:

_____
City of Austin
Department of Law

APPROVED AS TO FORM:

_____
Travis County, Texas
~~Department of Law~~
Travis County Attorney's Office
MC/HN/alc/26376

EXHIBIT "A"

Balcones Canyonlands Conservation Plan - Shared Vision

July 26, 1995

BALCONES CANYONLANDS CONSERVATION PLAN (BCCP)
SHARED VISION

This proposal for a habitat conservation plan in Travis County is designed to secure the issuance by the U.S. Fish & Wildlife Service (USFWS) of a regional Section 10(a) permit. In November 1993, voters rejected a county bond issue which would have accomplished the remainder of the land acquisition required for the county-wide regional plan with public funds. Subsequently, discussions among public entities and various interest groups focused on how to fund land acquisition primarily from private funds. As recently as April 1994, concepts of a mitigation fee of as much as $6,800 per acre coupled with mitigation ratios of as much as 3:1 were still being discussed. The present proposal takes a substantial step towards improving the affordability of the Plan for the private sector while maintaining the commitment to establish the complete regional preserve system.

This proposal provides a guide for the private sector needing to meet their obligations under the Endangered Species Act. Additionally, the proposal will provide the basic information to allow affected governmental jurisdictions to determine whether they might choose to become a Permit Holder, Managing Partner, or to remain a non-participant. Participation in the Plan is voluntary. Most administrative processes are not intended to be detailed in this proposal since they will be developed through formal negotiated agreements among the Permit Holders and with Managing Partners. This proposal also forms the primary application document to be submitted to USFWS in completing and receiving the section 10(a) permit.

This present document includes a list of the key concepts embodied in the proposal, along with further detail on aspects such as the preserve design, financing, special provisions for small lot owners, habitat and acreage determinations, etc. Also attached is a list of the species anticipated to be covered by the plan (Table 1 - Species of Concern), a Karst List, and a detailed pro forma describing the projected financing for the plan. A set of examples of simplified development scenarios (Participation Calculations under the BCCP) is attached to this proposal to offer a visual representation of how the Participation Certificates described herein would be applied in a variety of situations. Also attached is a "Legal Authority" document and USFWS "No Surprises" policy document.

I. Key Concepts

1. The preserve land will be acquired to complete an estimated 30,428 total acres protected in five major macrosites to protect habitat for the following endangered species: Golden-cheeked Warbler, Black-capped Vireo, and six cave invertebrates (see Table 1). All land acquisition for all preserves will be completed as soon as possible, but no later than 20 years.

2. The USFWS, through its review of the Plan and preparation of NEPA documentation, will assess the degree to which the species listed in Table 1, as Category 2 Candidate Species and Other Species of Concern, are covered under the BCCP. These species, along with the Federally Listed Endangered Species, covered by the BCCP, will be subject to the "No Surprises" policy (see Attachment) announced by Secretary Babbitt in August 1994.

3. Local governmental jurisdictions in Travis County wishing to establish the preserve system and to develop a regional plan will jointly apply for a 30-year regional 10(a) permit. The regional 10(a) permit will cover incidental take of habitat in Travis County outside of the identified preserves and the Balcones Canyonlands National Wildlife Refuge.

4. A Permit Holder is a governmental entity who has contributed sufficient land acquisition funds or preserve lands in excess of that required to mitigate its own capital improvement projects. Its contribution level will be based on securing the public benefit of establishing the preserves as a community and environmental asset and on providing an economic lift to the landowning public to meet their obligations under the Endangered Species Act. A Permit Holder accepts primary responsibility for the success of the Plan by entering into a formal agreement with all other permit holding entities. The Permit Holders will create a policy board or other entity responsible for oversight of Plan implementation.

5. Governmental and non-profit entities may participate in the Plan as Managing Partners. Managing Partners agree to provide land management of designated preserve lands in order to support the public benefits of the preserve system. Managing Partners will enter into formal agreements with the Permit Holders to hold title and manage preserve lands for the public and environmental benefit. Managing Partners are mitigated for their capital improvement projects to the extent of their land contributed to the preserve system (on a 1:1 acreage basis). The mitigation value for such lands is non-transferable. At the discretion of a Managing Partner, its wholesale electric customers may participate under the regional permit under similar terms.

6. Landowners needing to comply with the Endangered Species Act may do so through the purchase from the Permit Holders of Participation Certificates based on a per-acre assessment and participation ratios for the amount of mitigation area. Certificates will be sold for use by those wishing to develop land in Travis Coun' but only outside of the proposed preserves.

   - Certificates will only cover species covered by the regional section 10(a) permit.

   - Funds from Certificate sales would be used for BCCP preserve system land acquisition and BCCP preserve system needs.

   - Participation Certificates will be non-refundable and are only usable for land outside of the preserve area cover nder the regional section 10(a) permit.

   - No mitigation credit for development or Participation Certificates under this plan may be provided for property located outside the jurisdictional boundaries of the Permit Holders.

   - The Permit Holders will evaluate the feasibility and viability of selling Certificates on a periodic and limited issue basis. This approach is preferred to an on-going continuous sale, if proven to be feasible. Each Certificate would provide a purchaser with mitigation credit for one acre of incidental "take" of Golden-cheeked Warbler and/or Black-capped Vireo habitat and/or 100 acres of incidental "take" of karst habitat, covered by a regional section 10(a) permit. See Section VII for calculation of "take."

   - An evaluation of making the Certificates transferable will be completed prior to Certificate sales. Potentially, Certificates will be transferable between owners and between properties, provided that they are assigned to specific tracts of land once they are used or redeemed for development. The Certificates can not be applied to lands inside the BCCP preserve system boundaries, without approval of the USFWS. As a condition of participating in the regional permit, the holders of Certificates will be required to record them in the Real Property Records of Travis County when they are used and to designate the specific tracts of land to which they apply.

7. USFWS will, through a contractual arrangement with the Permit Holders, administer the issuance and redemption of the Certificates. USFWS shall be obligated to sell Certificates subject only to the conditions of the section 10(a) permit.

8. Private Sector participation is voluntary: There is no mandated requirement to develop under the regional 10(a) permit. Landowners and developers in Travis County may apply at any time to the USFWS for individual 10(a) permits. BCCP Permit Holders will not condition any local development approval or permit upon an applicant participating in the BCCP. However, landowners are encouraged to use mitigation measures that will contribute to the completion of the already defined preserve system.

9. Private landowners inside of the jurisdiction limits of a permit holding governmental entity will be able to purchase certificates for $5,500 each (See Section V, #6). Participation levels are established for each of the species of concern, and in no case are they greater than one certificate for one acre. The participation level for known Golden-cheeked Warbler and Black-capped Vireo habitat are the same 1:1 mitigation ratio and the same per Certificate fee requirement. The identification criteria for known habitat are indicated in Section VII.

10. Private landowners outside of the jurisdiction limits of a permit holding governmental entity will need to pursue authorization from USFWS if their actions will "take" a federally listed species.

11. Special Provisions: A reduced Certificate of $1,500 (See Section V, #6) will be available to landowners wishing to build only one single family dwelling on lots which were in existence on or before the listing of the Golden-cheeked Warbler. See Section VI, "Special Provisions."

12. Special provisions: For existing, routine ranching and farming practices, there is no Participation Certificate requirement. However, if the existing activity requires new clearing activity (i.e., for new barns, paddocks, stock ponds, etc.), the Certificate requirement will be $1,500 (see Section V, #6) per acre of clearing.

13. A governmental entity choosing to become a Permit Holder is mitigated for its capital improvement projects that use habitat and receives the level of participation no greater than one certificate for one acre of land for its private sector land needing Participation Certificates (see item #9). The participation level for known Golden-cheeked Warbler and Black-capped Vireo habitat are the same 1:1 mitigation ratio and the same per Certificate fee requirement. The identification criteria for known habitat are indicated in Section VII.

14. Governmental entities which are Managing Partners and which need to comply with the Endangered Species Act for their capital improvement projects (e.g., in excess of their benefit from contributed preserve lands) may purchase non-transferable certificates for $5,500 each (See Section V, #6). The participation level for known Golden-cheeked Warbler and Black-capped Vireo habitat are the same 1:1 mitigation ratio and the same per Certificate fee requirement. The identification criteria for known habitat are indicated in Section VII.

15. Other governmental entities which are not included under the participation of a Permit Holder or a Managing Partner and which need to comply with the Endangered Species Act for their own capital improvement projects, will need to pursue authorization from USFWS if their actions will "take" a federally listed species.

16. Within the jurisdiction of a Permit Holder, the construction of public primary and secondary schools or community colleges are exempt from Participation Fees for the construction of any such facilities which they will own and which are built within that jurisdiction. Projects of this same type which are within the jurisdiction of a city or county which is a Managing Partner (rather than a Permit Holder) may participate under the regional 10(a) permit at a level no greater than one certificate for one acre. Similar projects which are not built within the jurisdiction of such Permit Holders or Managing Partners will need to pursue authorization from USFWS if their actions will "take" a federally listed species.

17. For all activities described above in items 8 through 16, the donation of proposed preserve land may be considered, at the discretion of the Permit Holder(s), as credit toward the purchase of certificates.

18. Aquatic species in Travis County will not initially be included in the list of species of concern under the regional 10(a) permit. The City of Austin and Texas Parks & Wildlife Department have established an Aquatic Biological Advisory Team to address the conservation needs of those species. The issuance and use of Participation Certificates under the permit requested here should never be conditioned upon obtaining a permit or meeting any requirements that may be prescribed in the future for the protection of such aquatic species.

19. Permit Holder(s) will be responsible for reporting to USFWS regarding development approvals within their jurisdictions and participation under the regional 10(a) permit (e.g. acquisition of Participation Certificates) by development applicants, and otherwise ensuring compliance with the conditions of the issued permit. USFWS will retain primary responsibility for enforcement actions regarding compliance with the Endangered Species Act and monitoring compliance of all individual 10(a) permits as well as the regional 10(a) permit.

20. Under this permit, USFWS will continue to have the sole responsibility to determine and approve (1) the preserve boundaries, (2) which properties need a permit due to the existence of endangered species, and (3) which properties are eligible to use Participation Certificates within the jurisdictional boundaries of the Permit Holders.

21. The existence of this regional section 10(a) permit and BCCP will not be the basis for denial by USFWS of any individual section 10(a) permit application in Travis County.

II. Plan Biology and Preserve Design

1. Preserves are based on biological background already submitted (BCCP Phase I Application, March 1993, as updated for final permit application).

2. Preserve land will include approximately 30,428 acres in five major and two minor macrosites to protect species of concern and will be assembled generally as follows:

City of Austin (currently owned):	11,285 acres	
City of Austin (est. future acquisition):	293 acres	
Subtotal		11,578 acres
LCRA:		2,717 acres
Travis County:		507 acres
The Nature Conservancy:		4,183 acres
Other entities (currently owned):		1,809 acres
TC Tax Benefit Financing:		4,000 acres
Participation Certificates:		5,634 acres
Total		30,428 acres *

* These numbers do not include all of the land identified for karst acquisition.

3. Protection of karst identified on the attached USFWS Karst List will be required. An acquisition assessment of each site is recommended to be completed prior to permit issuance.

III. Future Land Acquisition Procedure

1. Funds from Certificate sales would be used for BCCP preserve system land acquisition and BCCP preserve system needs.

2. A variety of options are available to promote habitat protection on private land, and these alternatives should be actively used to enhance the preservation of large portions of remaining acreage between now and the time of purchase. Alternatives include: (a) preferential assessments; (b) multi-year management agreements, leases, and mutual covenants; (c) earnest money options; (d) first right of refusal contracts; (e) purchase of development rights and undivided interests; (f) conservation and open space easements; and (g) fee simple purchase through installments or with leaseback provisions. Use of these tools could lower costs. As funding is available, negotiations with private landowners should be initiated so that the alternative tools that are available can be used as soon as practical.

3. Condemnation proceeding for the public health, safety, and welfare may be used to acquire land for the preserves, but only as a last resort and only under the following conditions:

   (1) Not acquiring the land would endanger the Section 10(a) permit, OR,
   (2) Not acquiring the land would endanger the biological integrity of the preserves, AND,
   (3) There is no reasonable alternative to the involuntary condemnation proceedings, AND,
   (4) There is a reasonable expectation that without involuntary condemnation proceedings the habitat will be destroyed.

IV. Land Management

The goal of operating and maintaining the preserves should be to contribute to the recovery of the species of concern in an affordable way, which includes public education. All other uses of the preserves must be compatible with the primary goal of habitat preservation, but compatible

public uses should be allowed, specially if they can be a source of revenue to pay the operations and maintenance costs. Costs associated with public use of a preserve property that are beyond those required for habitat preservation should be the sole responsibility of the managing partner in charge of the property.

It is recommended that the operations and maintenance of the preserves be conducted with the assistance and support of other governmental entities, volunteer organizations, neighborhood associations, and other organizations that will agree to carry out the responsibilities of a managing partner in specific preserve properties for prescribed periods of time or for specific maintenance projects. Minimum management responsibilities for the Golden-cheeked Warbler preserves include:

1. Establishing preserve boundaries through fencing and signs on perimeter properties;
2. Providing preserve security to control incompatible uses;
3. Removing invasive vegetation periodically;
4. Controlling white-tailed deer and other detrimental species;
5. Allowing, in cooperation with the permit holders and USFWS, any studies required to maintain the Section 10(a) permit;
6. Fire management.

Vireo preserve management will also require active intervention to maintain the appropriate successional stages of vegetation. The requirements for karst preserve maintenance should be determined on a site-by-site basis.

V. Plan Financing Assumptions

1. $25.7 million from the City of Austin for their land acquisition contribution as a Permit Holder ($22 million BCCP bond and $3.7 million for Barton Creek Wilderness Park), along with certain lands (2,562 acres) held by the City as of September, 1992.

2. Travis County shall participate financially by allocating to the Plan an annual contribution in an amount equal to 100% of the operations and maintenance (O&M) portion of tax revenue from new construction on property for which Participation Certificates were purchased, or for which mitigation rights were purchased, which shall be used to complete land acquisition for the preserve system and to fund capital costs for its acquired and designated preserve system lands.

3. The Plan is to be based on the initial assumption that public entities will spend on the average $5,500 (see Section V, #6) per acre for future preserves acquisitions.

4. $5,500 (see Section V, #6) per Participation Certificates. Participation levels are established for each of the species of concern, and in no case are they greater than one certificate for one acre. The participation level for known Golden-cheeked Warbler and Black-capped Vireo habitat are the same 1:1 mitigation ratio and the same per Certificate fee requirement. The identification criteria for known habitat are indicated in Section VII.

5. Special provisions for certain single family residential lots and for agricultural practices

(ranching and farming) have been developed. Exemption of fees or substantial fee reductions are provided in these special provisions. See Section VI, Special Provisions, for specific details.

6. The Plan will index the price of Participation Certificates to the base cost per acre of $5,500 reviewed on an annual basis, according to changes in applicable land values and meeting the goal of completing the preserve system in 20 years. Certificate fee increases for the Special Provision Certificates (e.g., routine ranching and farming practices and single family residential lot categories) are limited to no more than (proportional) increases assigned to the standard Certificates.

7. The Plan will not include an endowment for future O&M. The Plan will assume that annual O&M, averaging not less than $25 per acre (in current dollars), will be covered by Permit Holders, Managing Partners, or through in-kind contributions to the preserve system management.

8. The Plan Permit Holders will continue to seek alternative sources of funds (beyond the proposed Participation Certificates) as well as alternative land acquisition methods in order to decrease the amount of time necessary to acquire the remaining preserves to no more than five (5) years.

   One method of financing, to be evaluated for preserve acquisition, will be the issuance of Green Bonds and/or other innovative techniques. Green Bonds would be secured by the anticipated stream of mitigation payments under the Plan and paid back with interest on a cashflow redemption basis. Because Green Bonds would likely not be marketable in traditional bond markets, they would be target marketed to major charitable, conservation, and business organizations with a conservation mission or other strong interest in promoting the acquisition of habitat.

VI. Special Provisions

1. USFWS has a streamlined individual 10(a) permit process available to landowners for $1,500 (see Section V, #6) for a qualifying lot, tract, or parcel. It is completed by an interested landowner in less than 60 days (including a required 30-day comment period).

2. After issuance of the regional 10(a) permit, the Special Provisions Certificate for ranchers and farmers and for construction of single family dwellings on existing lots will be available through the Permit Holder(s) for $1,500 (see Section V, #6). Landowners outside the jurisdiction of Permit Holder(s) will need to pursue authorization from USFWS if their actions will "take" a federally listed species.

3. The intent of the Plan is to pay for the acquisition of the regional habitat with the private sector funding component being derived primarily from participation fees paid voluntarily by developers who might expect to benefit directly from participation. Any rules, regulations or guidelines promulgated in furtherance of the Plan should be made and interpreted with the goal of minimizing or eliminating any financial burden of participation for the following, all assumed to be outside of the preserve areas: (1) ranchers and farmers in pursuit of legitimate and standard agricultural practices; (2) builders of single family home residences on individual lots/tracts/parcels in existence prior to May 4, 1990; and (3) small landowners (100 acres or less) who wish to do very low density residential development (one single family home residence per 15 acres and up).

a. Single Family Residential Lot Provision -

• Applies to one single family unit constructed on a legal lot, legal tract, or a legally recorded single parcel in Travis County if the lot/tract/parcel was in existence on or before May 4, 1990.

• Also applies to landowners of 100 acres or less, developing low density single family home residences of not more than one home per 15 acres.

• The lot/tract/parcel must be located outside the designated preserve boundaries.

• Unless special circumstances can be shown by the applicant, the area of disturbance for direct impact would be limited to 0.75 acres (approximately 32,670 sq. feet), including the house, driveway, utility access lines, septic field and lawn area.

• Lot holders may participate for a fee of $1,500 (see Section V, #6), payable to the City of Austin Balcones Canyonlands Conservation Fund, which would be used for BCCP preserve system land acquisition and BCCP preserve system needs.

• For any lot/tract/parcel, three acres or larger, a habitat determination of the area to be cleared will be made and recorded at the Real Property Records of Travis County.

• If the cleared area becomes part of a subdivision process in the future, the landowner may participate in the Plan for the subdivision by paying the balance per acre (i.e., the total fee level at the time of development minus the Special Provision fee previously paid).

b. Agricultural Provision (ranching and farming) -

• Provision is subject to Travis County participation as a joint Permit Holder.

• Exempts incidental "take" resulting from any existing, routine ranching and farming practices, as defined by USFWS, which occur in Travis County (but not inside the designated preserve areas).

• However, if a rancher or farmer intends to clear an area for new structures, (i.e., barns, paddocks, ponds, etc.), then he/she may purchase a Participation Certificate at a cost of $1,500 (see Section V, #6) per acre of clearance. At the time, a habitat determination of the area to be cleared will be made and recorded at the Real Property Records of Travis County. If the cleared area becomes part of a subdivision process in the future, the landowner may participate in the Plan for the subdivision by paying the balance per acre (i.e., the total fee level at the time of development minus the Special Provision fee previously paid).

VII. Determination of Acreage For Calculation of Participation Certificates

A. Overall:

1. A Participation Certificate will cover all mitigation needed for the permit's species of concern on any given acre of land proposed for development outside of the preserve area (i.e. fee

requirements will not accumulate when habitat for more than one species of concern is present). However, the calculation that produces the highest level of certificates to mitigation area, as described below, will be assessed.

2. The Permit Holder(s) will provide determinations of mitigation area by applying a simplified approach approved by the USFWS and will sell Participation Certificates to landowners and developers within its jurisdiction based on this approach.

3. Any landowner or developer not wishing to use the simplified approach may petition the USFWS to determine the development's actual incidental "take" (both direct and indirect) and to translate it into terms of an acreage determination. The acreage determination can then be used by the applicant to purchase BCCP Participation Certificates, at a 1:1 ratio.

   a. In all such cases, the determination of the USFWS will take precedence over any determinations from the simplified approach described herein. Accordingly, determinations by the USFWS conveyed in a valid Section 9 letter take precedence over determinations under the simplified approach.

   b. A landowner seeking an individual permit who chooses to pay mitigation acreages costs via the regional Participation Fee structure will still retain the obligation of accomplishing other studies and requirements assessed through the individual review.

   c. Standard long-term operation and maintenance costs which might be assessed through, or may be derived from the individual review by USFWS may be waived by the Permit Holder(s) for landowners paying the regional Participation Fees.

4. The entire parcel for which development approvals are sought will be used as the basis for the simplified approach to calculate total certificate needs. The extent of overlap with the habitat zones as described below will determine the Participation Fee. The calculation of the extent of each habitat zone on a parcel (see below), and thus the amount of participation fees, will be rounded up to the nearest whole acre. Demonstration of ownership of adequate certificates will be required by the Permit Holder(s) to meet compliance conditions of the regional 10(a) permit.

B. Warbler:

1. Warbler habitat will be determined by the Permit Holders from maps and aerial photos accompanying "Golden-cheeked Warbler Habitat Analysis" prepared for the USFWS by DLS Associates (June 1993) as updated periodically.

2. The identification criteria for known habitat will be provided by the Permit Holders and will be based on DLS Associates map zones using a simplified approach as follows:

   a. In Zone 1 ("Habitat known to support warblers"), one certificate covers one acre of mitigation area.

   b. In Zone 2 ("Undetermined"), a certificate covers two acres of mitigation area.

   c. In Zone 3 ("Does not support warblers"), no certificate is required.

C. Vireo:

1. The identification criteria for known habitat will be provided by the Permit Holders based on a simplified approach as follows:

   a. Vireo habitat will be determined by Permit Holders based on all recent survey information provided by USFWS.

   b. One Participation Certificate covers one acre of vireo mitigation area.

D. Karst:

1. Karst habitat will be determined from "Geological Controls on Cave Development and the Distribution of Cave Fauna in the Austin, Texas, Region," prepared for USFWS by George Veni & Associates (April 1991), as updated periodically.

2. Calculation of the total certificates needed for karst habitat mitigation will be provided by the Permit Holders based on the George Veni maps using a simplified approach as follows:

   a. In Zone 1 ("Areas known to contain endangered cave species") and Zone 2 ("Areas that probably contain endangered cave species"), one certificate covers 100 acres of karst mitigation area, i.e. the Participation Fee is $55 per acre of Zone 1 or 2 karst habitat.

   b. In Zone 3 and 4 ("Areas that do not or probably do not contain endangered caves species"), no certificates are required.

3. Participation Fees calculated under the methodology described in item 2 are payable in increments of one acre.

VIII. Proposed Roles of Anticipated Participants in the Shared Vision

A. USFWS/Department of the Interior Role

1. Process individual 10(a) permit applications, including alternative review of mitigation requirements for landowners not wishing to utilize the simplified approach under the regional 10(a) permit.

2. Expedite compliance with National Environmental Policy Act requirements.

3. Purchase and maintain the Balcones Canyonlands National Wildlife Refuge.

4. Implement a small lot owner expedited process.

5. Enforcement of compliance with individual 10(a) permits and the regional 10(a) permit. Responsible for ensuring that individuals obtain appropriate and sufficient mitigation under the Endangered Species Act.

6. USFWS will, through a contractual arrangement with the permit holders, administer the issuance and redemption of the Certificates. USFWS shall be obligated to sell Certificates subject only to the conditions of the section 10(a) permit.

B. City of Austin Role

1. Permit Holder and Managing Partner.

2. Maintain preserves in Barton Creek and South Lake Austin macrosites and other City lands contributed to preserves.

3. Enter into formal agreements with other Permit Holders and Managing Partners to assure success of the Plan and to administer required programs including the acquisition and management of land to complete the preserves.

4. Report on a timely basis to USFWS (to be specified in the terms of the permit) on status of development approvals, assessments and payment of Participation Fees within the regional 10(a) permit boundary. (This requirement would apply to all Permit Holders.)

C. Travis County Role

1. Permit Holder and Managing Partner.

2. Maintain current County parkland identified as preserves.

3. As a Permit Holder and Managing Partner, enter into formal agreements to assure success of the Plan and/or administer required programs including the acquisition and management of land to complete the preserves.

D. Texas Parks & Wildlife Department Role (TPWD)

1. It is hoped that TPWD will participate in this Plan's implementation. The parties will enter into appropriate interlocal agreements, as TPWD's participation develops.

E. Lower Colorado River Authority Role

1. As a Managing Partner, enter into a formal agreement with the Permit Holders to manage its preserve lands for the public and environmental benefit in accordance with the requirements of the regional 10(a) permit.

SPECIES OF CONCERN

SCIENTIFIC NAME	COMMON NAME
Federally-listed Endangered Species:	
Vireo atricapillus	Black-capped Vireo
Dendroica chrysoparia	Golden-cheeked Warbler
Tartarocreagris texana	Tooth Cave pseudoscorpion
Neoleptoneta myopica	Tooth Cave spider
Texella reddelli	Bee Creek Cave harvestman
Texella reyesi	Bone Cave Harvestman
Rhadine persephone	Tooth Cave ground beetle
Texamaurops reddelli	Kretschmarr Cave mold beetle
Category 2 Review Species:	
Eurycea sosorum	Barton Springs Salamander
Eurycea N. S.	Jollyville Plateau Salamander
Eurycea neotenes	Texas Salamander
Stygobromus balconis	Amphipod
Stygobromus bifurcatus	Amphipod
Philadelphus ernestii	Canyon Mock-orange
Streptanthus bracteatus	Bracted twistflower
Croton alabamensis	Texabama croton
Other Species of Concern:	
Sphalloplana mohri	Flatworm
Phreatodrobia punctata	Snail
Phreatodrobia nugax nugax	Snail
Stygopyrgus bartonensis	Snail
Candona sp. nr. *stagnalis*	Ostracod
Caecidotea reddelli	Isopod
Trichoniscinae N. S.	Isopod
Miktoniscus N. S.	Isopod
Cicurina wartoni	Spider
Cicurina ellioti	Spider
Cicurina bandida	Spider
Cicurina reddelli	Spider
Cicurina reyesi	Spider
Cicurina cueva	Spider
Cicurina travisae	Spider
Neoleptoneta cocinna	Spider
Neoleptoneta devia	Spider
Eidmannella reclusa	Spider
Aphrastochthonius N. S.	Pseudoscorpion
Tartarocreagris comanche	New Comanche Trail Cave harvestman
Tartarocreagris reddelli	Pseudoscorpion
Tartarocreagris N. S. 2	Pseudoscorpion
Tartarocreagris N. S. 3	Pseudoscorpion
Texella N. S. 2	Harvestman
Speodesmus N. S.	Millepede
Rhadine s. subterranea	Ground Beetle
Rhadine s. mitchelli	Ground Beetle
Rhadine austinica	Ground Beetle

Endangered Karst Invertebrate Locations in Travis County, Texas. Cave numbers correspond to numbers in Figure 1 and Figures 3-8. TARTEX = *Tartarocreagris texana* pseudoscorpion, TEXRED = *Texella reddelli* harvestman, TEXREY = *Texella reyesi* harvestman, NEOMYO = *Neoleptoneta myopica* spider, RHAPER = *Rhadine persephona* beetle, TMPRD = *Texamaurops reddelli* beetle, BATTEX = *Batrisodes texanus* beetle. X = present, P = tentative identification. COA = City of Austin.

	CAVE NAME	PRESERVE STATUS	KARST FAUNA REGION	TARTEX	TEXRED	TEXREY	NEOMYO	RHAPER	TMPRD	BATTEX
1	Broken Arrow Cave	COA	Cedar Park					X		
2	Rolling Rock Cave	TPWD	Cedar Park					X		
3	McNeil Bat Cave		McNeil/Round Rock			X				
4	Weldon Cave		McNeil/Round Rock			X				
5	Fossil Garden Cave		McNeil/Round Rock			X				
6	No Rent Cave		McNeil/Round Rock			X				
7	Beer Bottle Cave	Not Protected	McNeil/Round Rock			X				
8	Hole-In-The-Road		McNeil/Round Rock			X				
9	Cold Cave	Protected by Owner	McNeil/Round Rock			X				
10	Fossil Cave	COA	McNeil/Round Rock			X				
11	McDonald Cave		Jollyville Plateau			X				
12	Stovepipe Cave	Individual Preserve	Jollyville Plateau	P		P	P	X	X	
13	Amber Cave		Jollyville Plateau	X					X	
14	Kretschmarr Double Pit		Jollyville Plateau	P	P			P		
15	Kretschmarr Cave		Jollyville Plateau					X	X	
16	Gallifer Cave		Jollyville Plateau			X	P	P		
17	North Root Cave		Jollyville Plateau					X		
18	Root Cave		Jollyville Plateau			X		X		
19	Tooth Cave		Jollyville Plateau	X		X	X	X	X	
20	Tardus Hole (Kretschmarr Fluted Sink)		Jollyville Plateau					X		
21	New Comanche Trail Cave		Jollyville Plateau			X	X			
22	Spider Cave	COA	Jollyville Plateau			P		P		
23	Beard Ranch Cave		Jollyville Plateau			X				
24	Jester Estates Cave	Protected by owner	Jollyville Plateau		X					
25	Cotterell Cave	COA	Central Austin			X				
26	West Rim Cave		Central Austin			X				
27	Bee Creek Cave	Owner Cooperation	Rollingwood		X					
28	Bandit Cave	Owner Cooperation	Rollingwood		P					
29	Cave Y	COA	Rollingwood		P					
30	Lamm Cave	Semi-protected	Jollyville					X		
31	Jest John Cave	COA	Jollyville		X					
32	Little Bee Creek Cave	COA	Rollingwood		X					
33	Millipede Cave		McNeil/Round Rock			X				
34	Japygid Cave	Protected by Owner	Jollyville					X	P	
35	Jollyville Plateau Cave	Protected by Owner	Jollyville			X		X		
36	Eluvial Cave	Protected by Owner	Jollyville			X				
37	Disbelievers Cave	Protected by Owner	Jollyville					X		
38	M.W.A. Cave	Protected by Owner	Jollyville	P		X		X	P	
39	Puzzle Pits Cave	Not Protected	Jollyville					X		
KNOWN				2	4	20	2	14	2	
POSSIBLE				3	3	2	2	3	2	

SPECIES OF CONCERN

KARST SPECIES OF CONCERN:	CAVE
FLATWORMS	
Sphalloplana mohri	SPANISH WELLS CAVE
(The Spanish Wells Cave population was described a *S. kutscheri* and some specialists still consider this a distinct species from *S. mohri*.)	
SNAILS	
Phreatodrobia punctata	BARTON SPRINGS
Phreatodrobia nugax nugax	BARTON SPRINGS, Salamander Cave (D)
Stygopyrgus bartonensis	BARTON SPRINGS
OSTRACODS	
Candona sp. nr. *stagnalis*	CAVE X, Salamander Cave (D)
AMPHIPODS	
Stygobromus balconis	IRELAND'S CAVE, WEIRLPOOL CAVE
Stygobromus bifurcatus	
ISOPODS	
Caecidotea reddelli	BUDA BOULDER SPRING, CAVE X, JACK'S JOINT
Trichoniscinae N. S.	Austin Caverns (D), BANDIT CAVE
Miktoniscus N. S.	CAVE X
SPIDERS	
Cicurina bandida (#1)	BANDIT CAVE, IRELAND'S CAVE
Cicurina cueva (#4)	CAVE X, FLINT RIDGE CAVE
Cicurina ellioti (#5)	COTTERELL CAVE, FOSSIL GARDEN CAVE, GALLIFER CAVE, NO RENT CAVE?, WELDON CAVE?, (9 caves in Williamson County)
Cicurina reddelli (#3)	COTTERELL CAVE
Cicurina reyesi (#6)	AIRMAN'S CAVE
Cicurina travisae (#7)	AMBER CAVE, BROKEN ARROW CAVE, KRETSCHMARR CAVE, MCDONALD CAVE, ROOT CAVE, SPIDER CAVE, STOVEPIPE CAVE?, TOOTH CAVE, Pisarowicz Cave (D), Salamander Cave (D), (1 in Williamson County)
Cicurina wartoni (#9)	PICKLE PIT
Neoleptoneta cocinna	LOST GOLD CAVE, STARK'S NORTH CAVE
Neoleptoneta devia	MCDONALD CAVE
Eidmannella reclusa	TOOTH CAVE, GALLIFER CAVE?, KRETSCHMARR CAVE?, STOVEPIPE CAVE?
PSEUDOSCORPIONS	
Aphrastochthonius N. S.	STOVEPIPE CAVE
Tartarocreagris comanche	NEW COMANCHE TRAIL CAVE
Tartarocreagris reddelli	MCDONALD CAVE, (1 or 2 in Williamson County)
Tartarocreagris intermedia (#2)	AIRMAN'S CAVE, Five Pocket Cave?
Tartarocreagris N. S. 3	(Balcones Canyonlands NWR)
HARVESTMEN	
Texella spinoperca (#2)	AIRMAN'S CAVE
MILLIPEDES	
Speodesmus N. S.	BANDIT CAVE, CAVE X, GET DOWN CAVE, GOAT CAVE, PENNIE'S CAVE, PIPELINE CAVE, SLAUGHTER CREEK CAVE, WHIRLPOOL CAVE?, Beckett's Cave (D), (1 cave in Hays County)

GROUND BEETLES

Rhadine s. subterranea	COTTERELL CAVE, FOSSIL CAVE, FOSSIL GARDEN CAVE, NO RENT CAVE, MCNEIL BAT CAVE, WELDON CAVE, Jollyville Jewel Cave, Millipede Cave, (17 caves in Williamson County)
Rhadine s. mitchelli	AMBER CAVE, KRETSCHMARR CAVE, TOOTH CAVE (13 Caves in Williamson County)
Rhadine austinica	AIRMAN'S CAVE, ARROW CAVE, BANDIT CAVE, BEE CREEK CAVE, BLOWING SINK, CAVE Y, CAVE X, DISTRICT PARK CAVE, FLINT RIDGE CAVE, GET DOWN CAVE, IRELAND'S CAVE, LOST GOLD CAVE, LOST OASIS CAVE, MAPLE RUN CAVE, MIDNIGHT CAVE, PENNIE'S CAVE, WHIRLPOOL CAVE, Serendipity Cave, Spyglass Cave, Sunset Valley Cave, Beckett's Cave (D), Broken Straw Cave, Five Pocket Cave, Grassy Cove Cave (D),

(D) = Destroyed
Caves with all CAPITALS are those identified for protection.
? = Positive identification not made.

BALCONES CANYONLANDS CONSERVATION PLAN
Shared Vision Funding Assumptions
July 18, 1995

LAND ACQUISITION

o City of Austin has issued General Obligation Bonds totaling $25.7 million to acquire 9,016 acres in addition to 2,562 acres of lands previously held by the City to contribute to the BCCP preserve system. The new land acquisition program was funded by 1992 BCCP bond authority of $22.0 million and a portion of 1992 Barton Creek Wilderness Park bond authority of $3.7 million. The City will complete all its' land acquisition with the 1992 bond authorities by the end of 1994-95. The timing of the City's bond sales and true interest costs were as follows:

1992-93	$ 8,970,000 at 6.1737%
1993-94	$ 3,350,000 at 4.7863%
1994-95	$13,380,000 at 5.8597%

Debt service for these bonds will be funded by $46,692,372 in property tax revenue.

The City will acquire 2,817 acres through use of available participation certificate revenue from the private sector (see below).

The City will acquire a conservation easement from the Texas Nature Conservancy (TNC) of 3,802 acres out of the 4,023 acres of the Uplands/Sweetwater Ranch tracts. These will be managed by the at a cost of $43,000 per year, based on an agreement with Freeport McMoran Properties, as a part of the BCCP preserve system. The estimated value of these tracts is $7,764,390.

o Travis County will manage 507 acres of its current lands as a part of the BCCP preserve system, and acquire and manage an additional 6,818 acres of land and karst areas through the use of tax benefit financing (4,000 acres) and participation certificate revenue (2,818 acres) from the private sector (see below).

o Lower Colorado Authority (LCRA) will manage 2,717 acres of its lands in Travis County as a part of the BCCP preserve system.

o Institutional/non-profit groups such as Travis Audobon Society, the TNC, the University of Texas, two Municipal Utility Districts (MUDs) and the Village of Sunset Valley will manage 5,992 acres as a part of the BCCP preserve system.

o The private sector will fund the balance of the BCCP preserve system by purchase of Participation Certificates at $5,500 per acre mitigated (5,635 acres). (For purposes of the Plan, the cost of all prospective land acquisition using private or public sector funding assume a land acquisition cost of $5,500 per acre, until the BCCP preserve system is complete.)

OPERATIONS AND MAINTENANCE (O&M) REQUIREMENTS

General Assumptions: Land management costs for all participants are indexed at rate of 4.0% per year through 2013, and 3.0% per year through 2023. Current dollar land management costs for all Plan participants, unless otherwise stated, is at a current cost of $25.00 per acre.

- **Austin** will provide land management, at a current cost of $35.00 per acre, primarily in the South Lake Austin and Barton Creek macrosites and on land owned by the City prior to 1992 in the other macrosites.

- **Plan Administration** will be provided by Austin and Travis County, at current participation levels through 1995-96, and then will be reduced to $170,000 per year in 1996-97 dollars thereafter.

- **Travis County** will provide land management at a current cost of $35.00 per acre, on its existing tracts, 4,000 acres of land acquired with tax benefit financing, and 2,818 acres land acquired with participation certificate funding from the private sector.

- **LCRA** will land manage an existing 2,717 acres in Travis County.

- **General In-kind Services** for land management on the balance of the unmanaged acreage would be provided by other parties at a current cost of $25.00 per acre. Other land managers may be able to collect user fees to offset a portion of their land management expenses.

OPERATIONS AND MAINTENANCE (O&M) FUNDING

- **Austin Drainage Utility Revenue** is 2.00 percent of drainage fee revenues dedicated to fund BCCP O&M (see pro forma for annual levels). This fee revenue is based on the existing service area (currently Austin city limits), for water quality benefits of the BCCP to the Drainage Utility. An annual 2.0 percent service area growth rate is assumed and the revenue generated over 30 years is $12,483,103 through 2023. Monthly incremental impact and total charges, at the 2.00 percent level, on the following representative bills at current rates is estimated to be:

	Increment	Total Bill
Residential	$0.08	$ 3.90
Convenience Store	$0.21	$ 10.51
Large Grocery Store	$2.47	$126.16

- Austin General Fund Support will continue at current levels through 1995-96 and then be reduced to the level discussed under Plan Administration. Total funding is $4,418,900 through 2023.

- Travis County General Fund Support will continue at current levels through 1995-96 and then be reduced to the level discussed under Plan Administration. Total funding is $4,009,000 through 2023.

- LCRA in-kind land management contributions, through 2023, are valued at $3,436,438.

- Travis County land management contributions are based on available tax benefit funding and timing of land acquisition accomplished by the County. Funding would be $9,665,357 on up to 7,325 acres through 2023.

- Austin Water & Wastewater in-kind land management contributions, through 2023, are valued at $321,416.

- General In-Kind land management contributions from other parties, on up to 7,024 acres are valued at $8,252,496 under the Plan. These parties would be able to collect user fees to offset some or all of their land management costs.

- Texas Nature Conservancy through the Uplands/Sweetwater Ranch agreements provide $1,247,000 of land management through 2023.

- Participation Certificate Contingency of $100 per acre, from the $5,500 Participation Fee is reserved as a contingency related to the small landowner option and for unanticipated expenses related to preserve system land management. (None of this funding is assumed to be used for O&M Requirements.)

- Interest Income on the working capital balance provided by Austin Drainage Utility revenue and the $100 portion of the Certificates is invested at an annual rate of 5.0% and provides income of $1,486,235 under the Plan.

It should be noted that, no assumption is made in the pro forma for the value of land management by entities included in the preserve system acreage as Travis Audobon Society, University of Texas, two municipal utility districts and Sunset Valley with combined contributions totaling 1,194 acres. This value would probably be in the range of $1.5 million, at a current cost of $25 per acre.

OTHER ASSUMPTIONS

- The BCCP Preserve System totals 30,428 acres and is managed by the various parties on a year-to-year basis as set forth on the BCCP

Preserve System Acreage provided with the pro forma.

- o The BCCP Preserve System is fully acquired by the end of 2012-13.
- o The Preserve System acquisition, of the remaining 9,635 acres, is in the following general order of Preserve Management Macrosites:

  - Bull Creek/North Lake Austin
  - Cypress Creek
  - South Lake Austin/Barton Creek

  These priorities impact the amount of O&M requirements from the two primary land managers (Travis County and Austin), and would change if the priorities were different. (i. e. The faster land is acquired the higher the total plan cost for O&M through 2023, since O&M costs are not incurred until the land is acquired.)

- o Land development assumptions and related mitigation acreage are documented on a year-to-year basis at the bottom of the pro forma.
- o Providers of Land Management and Preserve Land are summarized and detailed by macrosite at completion of the full preserve system as an attachment.

BALCONES CANYONLANDS CONSERVATION PLAN
Funding Summary 1992-2023
(July 18, 1995)

REQUIREMENTS:	
Land Acquisition (Public)	
City of Austin	$ 25,700,000
Travis County	30,000,000
City of Austin Debt Service Interest	20,992,372
Land Acquisition (Private Sector)	38,754,990
Preserve System Operations & Maintenance	44,481,639
TOTAL REQUIREMENTS	$159,929,001
SOURCES OF FUNDS:	
Property Tax Revenue	$ 46,692,372
Travis County Tax Benefit Funding *	30,000,000
Land Acquisition (Private Participation) *	38,754,990
Austin Drainage Utility (Land Management)	12,483,103
Austin General Fund Support	4,418,900
Travis County General Fund Support	4,009,000
LCRA Land Management	3,436,438
Travis County Land Management*	9,665,357
Austin Water & Wastewater Land Management	321,416
General In-Kind Services (Land Management)	8,252,496
Texas Nature Conservancy (Uplands/Sweetwater)	1,247,000
Participation Fee Contingency ($100 per Acre)	573,900
Interest Income	1,486,235
SUB-TOTAL SOURCES OF FUNDS	$161,341,207
Less: Working Capital Balance	(358)
Contingency Reserve (Participation Fees)	(1,411,848)
TOTAL SOURCES OF FUNDS	$159,929,001

* Assumes collection of $5,500 per acre of habitat mitigated on 5,739 acres, in conjunction with Travis County Tax Benefit funding of $30,000,000 for land acquisition, land improvements and karst acquisition, would complete the preserve system by the end of FY 2013 and fund a contingency reserve of $1,411,848. It should be noted that $7,764,390 of private participation is related to the estimated value of the 4,023 acre Uplands and Sweetwater Tracts.

Travis County purchases 6,818 acres of the remaining land to be acquired (9,635 acres), funded through tax benefit financing (4,000 acres) and participation fees from the private sector (2,818 acres). The County manages all this land plus its own 507 acres.

The City manages 7,685 acres throughout the Plan, and 7,025 acres are managed through the use of General In-Kind Services.

	Actual 1992-93	Actual 1993-94	Projected 1994-95	Projected 1995-96	Projected 1996-97	Projected 1997-98	Projected 1998-99	Projected 1999-2000	Projected 2000-01	Projected 2001-02	Projected 2002-03
LAND ACQUISITION											
Sources of Funds											
City of Austin Land Proceeds ($25.7 Million)	$1,370,000	$1,250,000	$11,200,000	$	$	$	$	$	$	$	$
Travis County Tax Benefit Funding ($20 Million)	$	$	$	$	$221,000	$600,500	$902,500	$1,113,000	$1,375,500	$2,221,000	$2,766,500
Private Sector Land Contributions ($5,500/Acre)	$	$	$1,764,200	$783,000	$1,215,000	$1,050,000	$1,574,000	$1,574,000	$1,574,000	$1,574,000	$1,574,000
Total Sources of Funds	$1,370,000	$1,250,000	$12,964,200	$783,000	$1,446,000	$2,021,500	$2,476,500	$2,687,000	$2,949,500	$3,795,000	$4,340,500
EXPENDITURES											
City of Austin Land Acquisition	$1,370,000	$1,250,000	$11,200,000	$	$	$	$	$	$	$	$
Travis County Preserve Acquisition ($20 Million)	$	$	$	$	$221,000	$600,500	$902,500	$1,113,000	$1,375,500	$2,221,000	$2,766,500
Private Sector Land Acquisition ($5,500/Acre)	$	$	$1,764,200	$783,000	$1,215,000	$1,050,000	$1,574,000	$1,574,000	$1,574,000	$1,574,000	$1,574,000
Total Expenditures	$1,370,000	$1,250,000	$12,964,200	$783,000	$1,446,000	$2,021,500	$2,476,500	$2,687,000	$2,949,500	$3,795,000	$4,340,500
DEBT SERVICE PERIOD											
City of Austin Property Tax	$57,200	$223,227	$1,883,874	$1,788,787	$1,815,919	$1,787,952	$1,867,883	$2,388,789	$2,448,811	$2,558,882	$2,677,901
City of Austin Debt Service	$57,200	$223,227	$1,883,874	$1,788,787	$1,815,919	$1,787,952	$1,867,883	$2,388,789	$2,448,811	$2,558,882	$2,677,901
OPERATIONS AND MAINTENANCE	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Beginning Balance	$	$	$	$70,895	$134,613	$216,978	$301,678	$280,150	$478,941	$564,528	$648,551
Sources of Funds											
Drainage Utility Fee Revenue @ 2.5%	$	$	$282,765	$229,223	$236,020	$243,160	$250,611	$257,912	$264,152	$271,025	$278,063
Austin General Fund Support	$100,000	$121,500	$181,000	$121,000	$85,000	$88,000	$92,000	$96,000	$100,000	$104,000	$108,000
Travis County General Fund Support	$	$	$50,000	$64,000	$85,000	$88,000	$92,000	$96,000	$100,000	$104,000	$108,000
LCRA Land Management Contribution	$	$	$	$70,642	$73,458	$76,406	$79,463	$82,641	$85,947	$89,385	$92,960
Travis County Land Management Contribution	$	$	$	$	$21,700	$38,340	$63,204	$61,863	$83,712	$111,523	$144,353
Austin W & WW Land Management Contribution	$	$	$6,220	$6,470	$6,728	$7,000	$7,280	$7,580	$7,883	$8,198	$8,526
General In-Kind Services	$	$	$	$111,250	$118,006	$127,171	$136,700	$146,906	$157,892	$168,726	$180,757
Texas Nature Conservancy (Sylvania/Sweetwater Ranch)	$	$	$63,000	$63,000	$63,000	$63,000	$63,000	$63,000	$63,000	$63,000	$63,000
Participation Certificate Contingency @ $100 per Acre	$	$	$	$14,500	$22,500	$27,000	$31,000	$31,000	$31,000	$31,000	$31,000
Interest Income @ 5.0% (Working Capital)	$	$	$	$3,565	$6,721	$10,804	$15,074	$19,589	$23,902	$28,222	$32,678
Total Sources of Funds	$100,000	$121,500	$522,575	$774,245	$788,252	$840,878	$883,728	$940,521	$987,987	$1,059,551	$1,128,577
Operations and Maintenance Requirement											
Plan Administration & Implementation	$100,000	$121,500	$140,125	$205,225	$179,000	$176,000	$184,000	$192,000	$200,000	$208,000	$216,000
Habitat Land Management											
City of Austin ($25.00 per Acre)	$	$	$282,765	$223,225	$264,125	$285,552	$307,374	$313,969	$322,656	$345,754	$353,585
Lower Colorado River Authority ($25.00 per Acre)	$	$	$	$70,642	$73,458	$76,406	$79,463	$82,641	$85,947	$89,385	$92,960
Travis County ($25.00 per Acre)	$	$	$	$	$21,700	$38,340	$63,204	$61,863	$83,712	$111,523	$144,353
Austin W & WW Utility ($25.00 per Acre)	$	$	$6,220	$6,470	$6,728	$7,000	$7,280	$7,580	$7,883	$8,198	$8,526
Texas Nature Conservancy (Sylvania/Sweetwater Ranch)	$	$	$63,000	$63,000	$63,000	$63,000	$63,000	$63,000	$63,000	$63,000	$63,000
General In-Kind Services ($25.00 per Acre)	$	$	$	$111,250	$118,006	$127,171	$136,700	$146,906	$157,892	$168,726	$180,757
Total Operations and Maintenance Requirement	$100,000	$121,500	$492,900	$703,530	$727,017	$755,470	$801,021	$852,779	$918,090	$974,523	$1,040,221
Working Capital Balance	$	$	$70,895	$134,613	$216,978	$301,678	$280,150	$478,941	$564,528	$648,551	$736,907
No. of Acres Developed Contributing to RCP Funds	$	$	$	950	1,322	1,227	1,122	1,022	1,000	1,022	1,122
Private Average Mitigation under Sec. 10(a) Permit	$	$	$	145	225	270	219	313	319	322	322
Private Average Added to Preserve System (CUMULATIVE)	$	$	$	142	363	628	921	1,237	1,541	1,811	2,150

$ NOTES: Private land acquisition in 1994-95 includes $1,764,200 for 4,222 acres of the Sylvania and Sweetwater tracts, along with a $43,500 annual O&M cost contribution.
Assumes that the $1,500 special provision options will produce an average mitigation contribution of $5,500 per acre.
$100 of the Participation fee is reserved as a contingency related to the special provision options and for unanticipated expenses related to preserve system land management.
Participation certificate revenue for land acquisition is split 50/50 between the City and the County.

Travis County Tax Benefit Funding assumes the availability of $20,000,000 over 20 years, of which $22,000,000 is for acquisition of 4,000 acres of preserve land, $2,000,000 is for system improvements, primarily fencing and trails, related to the preserve land, and $6,000,000 for acquisition of karst.

	Projected 2003-04	Projected 2004-05	Projected 2005-06	Projected 2006-07	Projected 2007-08	Projected 2008-09	Projected 2009-10	Projected 2010-11	Projected 2011-12	Projected 2012-13	20 Year Total
LAND ACQUISITION											
Sources of Funds											
City of Austin Land Proceeds ($25.7 Million)	0	0	0	0	0	0	0	0	0	0	25,700,000
Travis County Tax Benefit Funding ($30 Million)	3,195,500	3,525,500	4,848,000	4,098,000	4,081,000	0	0	0	0	0	30,000,000
Private Sector Land Contributions ($5,500/Acre)	1,976,400	1,976,400	1,976,400	1,976,400	1,976,400	1,976,400	1,976,400	1,976,400	1,976,400	1,977,800	38,754,250
Total Sources of Funds	5,171,900	5,511,900	6,824,400	6,074,400	6,057,400	1,976,400	1,976,400	1,976,400	1,976,400	1,977,800	94,454,250
REQUIREMENTS											
City of Austin Land Acquisition	0	0	0	0	0	0	0	0	0	0	25,700,000
Travis County Preserve Acquisition ($30 Million)	3,195,500	3,525,500	4,848,000	4,098,000	4,081,000	0	0	0	0	0	30,000,000
Private Sector Land Acquisitions ($5,500/Acre)	1,976,400	1,976,400	1,976,400	1,976,400	1,976,400	1,976,400	1,976,400	1,976,400	1,976,400	1,977,800	38,754,250
Total Requirements	5,171,900	5,511,900	6,824,400	6,074,400	6,057,400	1,976,400	1,976,400	1,976,400	1,976,400	1,977,800	94,454,250
DEBT SERVICE FUNDING											
City of Austin Property Tax	2,418,304	2,319,996	2,342,983	2,795,878	2,896,573	2,772,929	2,863,447	2,570,348	2,659,570	1,866,189	45,199,595
City of Austin Debt Service	2,418,304	2,319,996	2,342,983	2,795,878	2,896,573	2,772,929	2,863,447	2,570,348	2,659,570	1,866,189	45,199,595
OPERATIONS AND MAINTENANCE	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	20 Year Total
Beginning Balance	732,357	832,379	930,799	1,027,965	1,120,828	1,210,853	1,297,209	1,378,576	1,455,129	1,526,146	N.A.
Sources of Funds											
Drainage Utility Fee Revenue @ 2.2%	386,441	394,170	402,053	410,094	418,296	426,662	435,195	443,899	452,777	461,832	7,325,928
General Fund Support	112,900	116,000	121,000	126,000	131,000	136,000	141,000	147,000	153,000	159,000	2,535,000
County General Fund Support	112,900	116,000	122,000	126,000	131,000	136,000	141,000	147,000	153,000	159,000	2,125,000
Land Management Contribution	96,878	100,546	104,567	108,750	113,100	117,624	122,329	127,222	132,311	137,604	1,811,543
Travis County Land Management Contribution	184,553	222,229	287,113	317,129	328,564	363,142	388,128	414,563	442,150	471,926	3,537,255
Austin W & WW Land Management Contribution	8,867	9,222	9,591	9,974	10,373	10,788	11,220	11,669	12,135	12,621	172,392
General In-Kind Services	202,156	217,157	233,035	249,835	257,314	275,385	294,490	314,653	336,020	355,775	3,553,537
Texas Nature Conservancy (Pylands/Sweetwater Ranch)	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	817,000
Participation Certificate Contingency @ $100 per Acre	36,600	36,600	36,600	36,600	36,600	36,600	36,600	36,600	36,600	36,600	572,900
Interest Income @ 5.0% (Working Capital)	36,615	41,518	45,540	51,253	56,021	60,545	64,860	68,544	72,756	76,257	715,796
Total Sources of Funds	1,218,310	1,306,533	1,404,099	1,478,777	1,536,213	1,605,746	1,677,824	1,754,586	1,834,960	1,902,515	23,904,451
Operations and Maintenance Requirement											
Plan Administration and Implementation	226,000	232,900	242,900	252,900	262,900	272,900	282,900	294,900	306,900	318,900	4,807,300
Habitat Land Management											
City of Austin ($35.00 per Acre)	350,585	373,968	388,577	404,484	420,663	437,650	454,985	473,185	492,116	561,801	7,147,729
Lower Colorado River Authority ($25.00 per Acre)	96,878	100,546	104,567	108,750	113,100	117,624	122,329	127,222	132,311	137,604	1,811,543
Travis County ($35.00 per Acre)	184,553	222,229	287,113	317,129	328,564	363,142	388,128	414,563	442,150	471,926	3,537,255
Austin W & WW Utility ($35.00 per Acre)	8,867	9,222	9,591	9,974	10,373	10,788	11,220	11,669	12,135	12,621	172,392
Texas Nature Conservancy (Pylands/Sweetwater Ranch)	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	817,000
General In-Kind Services ($25.00 per Acre)	202,156	217,157	233,035	249,835	257,314	275,385	294,490	314,653	336,020	355,775	3,553,537
Total Operations and Maintenance Requirement	1,118,039	1,208,112	1,308,233	1,385,164	1,445,955	1,518,638	1,596,158	1,678,328	1,764,943	1,900,727	22,377,516
Working Capital Balance	832,379	930,799	1,027,965	1,120,828	1,210,853	1,297,209	1,378,576	1,455,129	1,526,146	1,528,535	N.A.
No. of Acres Developed Contributing to RCCP Funds	1,964	1,964	1,964	1,964	1,964	1,964	1,964	1,964	1,964	1,155	25,656
Private Acreage Mitigated under Sec. 10(a) Permit	364	366	364	366	366	364	366	364	366	255	5,728
Private Acreage Added to Preserve System (CUMULATIVE)	2,518	2,869	3,228	3,588	3,947	4,306	4,666	5,025	5,384	5,625	N.A.

NOTES: Private land acquisition in 1994-95 includes $7,764,280 for 4,023 acres of the Pylands and Sweetwater tracts, along with a $43,000 annual DMS cash contribution.
Assumes that the $1,500 special provision options will produce an average mitigation contribution of $5,500 per acre.
$100 of the Participation Fee is reserved as a contingency related to the special provision options and for unanticipated expenses related to preserve system land management.
Participation certificate revenue for land acquisition is split 50/50 between the City and the County.

Travis County Tax Benefit Funding assumes the availability of $30,000,000 over 20 years, of which $22,000,000 is for acquisition of 4,000 acres of preserve land, $2,000,000 is for system improvements, primarily fencing and trails, related to the preserve land, and $6,000,000 for acquisition of karst.

BALCONES CANYONLANDS CONSERVATION PLAN FEE FORECA

	Projected 2013-14	Projected 2014-15	Projected 2015-16	Projected 2016-17	Projected 2017-18	Projected 2018-19	Projected 2019-20	Projected 2020-21	Projected 2021-22	Projected 2022-23	30 Year Total
LAND ACQUISITION											
Sources of Funds											
City of Austin Land Proceeds ($25.7 Million)	0	0	0	0	0	0	0	0	0	0	25,700,000
Travis County Tax Benefit Funding ($30 Million)	0	0	0	0	0	0	0	0	0	0	30,000,000
Private-Sector Land Contributions ($5,600/Acre)	0	0	0	0	0	0	0	0	0	0	28,754,350
Total Sources of Funds	0	0	0	0	0	0	0	0	0	0	84,454,350
REQUIREMENTS											
City of Austin Land Acquisition	0	0	0	0	0	0	0	0	0	0	25,700,000
Travis County Preserve Acquisition ($30 Million)	0	0	0	0	0	0	0	0	0	0	30,000,000
Private Sector Land Acquisitions ($5,500/Acre)	0	0	0	0	0	0	0	0	0	0	28,754,350
Total Requirements	0	0	0	0	0	0	0	0	0	0	84,454,350
DEBT SERVICE FUNDING											
City of Austin Property Tax	1,032,677	0	0	0	0	0	0	0	0	0	46,892,372
City of Austin Debt Service	1,032,677	0	0	0	0	0	0	0	0	0	46,892,372
OPERATIONS AND MAINTENANCE	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	30 Year Total
Beginning Balance	1,526,535	1,547,196	1,562,877	1,571,822	1,573,628	1,568,853	1,556,189	1,534,364	1,504,088	1,463,861	N.A.
Sources of Funds											
Drainage Utility Fee Revenue @ 2.0%	477,063	480,030	490,100	499,302	508,900	520,298	530,500	541,110	551,832	562,771	12,683,183
Austin General Fund Support	164,000	168,000	174,000	179,000	184,000	190,000	196,000	202,000	208,000	214,000	4,612,000
Travis County General Fund Support	164,000	168,000	174,000	179,000	184,000	190,000	196,000	202,000	208,000	214,000	4,612,000
LCRA Land Management Contribution	141,732	145,584	150,363	154,874	159,520	164,306	169,225	174,312	179,541	184,928	3,986,438
Travis County Land Management Contribution	499,258	514,035	530,127	546,630	562,118	579,253	596,661	614,561	632,998	651,988	9,985,257
Austin W & WW Land Management Contribution	12,999	13,389	13,791	14,205	14,631	15,070	15,522	15,988	16,467	16,961	321,116
General In-Kind Services	381,196	392,540	404,316	416,445	428,939	441,807	455,061	468,713	482,774	497,258	8,252,196
Texas Nature Conservancy (Pylonia/Sweetwater Ranch)	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	1,247,000
Participation Certificate Contingency @ $200 per Acre	0	0	0	0	0	0	0	0	0	0	533,900
Interest Income @ 5.0% (Working Capital)	76,347	77,369	78,104	78,581	78,672	78,425	77,805	76,718	75,224	73,193	1,666,225
Total Sources of Funds	1,953,613	2,005,448	2,057,801	2,111,908	2,165,972	2,221,959	2,278,795	2,338,432	2,397,836	2,458,298	45,892,345
Operations and Maintenance Requirement											
Plan Administration and Implementation	325,000	338,000	348,000	358,000	368,000	380,000	392,000	404,000	416,000	428,000	8,267,000
Habitat Land Management											
City of Austin ($35.00 per Acre)	527,155	542,379	559,254	576,837	593,318	611,117	629,451	648,334	667,784	687,818	13,151,532
Lower Colorado River Authority ($25.00 per Acre)	141,732	145,584	150,363	154,874	159,520	164,306	169,225	174,312	179,541	184,928	3,986,438
Travis County ($25.00 per Acre)	499,258	514,035	530,127	546,630	562,118	579,253	596,661	614,561	632,998	651,988	9,985,257
Austin W & WW Utility ($25.00 per Acre)	12,999	13,389	13,791	14,205	14,631	15,070	15,522	15,988	16,467	16,961	321,116
Texas Nature Conservancy (Pylonia/Sweetwater Ranch)	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	1,247,000
General In-Kind Services ($25.00 per Acre)	381,196	392,540	404,316	416,445	428,939	441,807	455,061	468,713	482,774	497,258	8,252,196
Total Operations and Maintenance Requirement	1,933,352	1,990,568	2,048,854	2,108,581	2,169,818	2,234,563	2,300,920	2,368,908	2,438,565	2,509,952	44,411,639
Working Capital Balance	1,547,196	1,562,877	1,571,822	1,573,628	1,568,853	1,556,189	1,534,364	1,504,088	1,463,861	1,412,207	N.A.
No. of Acres Developed Contributing to BCCP Funds	0	0	0	0	0	0	0	0	0	0	25,966
Private Acreage Mitigated under Sec. 10(a) Permit	0	0	0	0	0	0	0	0	0	0	5,729
Private Acreage Added to Preserve System (CUMULATIVE)	5,825	5,825	5,825	5,825	5,825	5,825	5,825	5,825	5,825	5,825	

* NOTES: Private land acquisition in 1994-95 includes $7,764,350 for 4,823 acres of the Pylonia and Sweetwater tracts, along with a $43,000 annual O&M cash contribution.
Assumes that the $1,500 special provision options will produce an average mitigation contribution of $5,500 per acre.
$200 of the Participation fee is reserved as a contingency related to the special provision options and for unanticipated expenses related to preserve system land management.
Participation certificate revenue for land acquisition is split 50/50 between the City and the County.

Travis County Tax Benefit Funding assumes the availability of $30,000,000 over 20 years, of which $22,000,000 is for acquisition of 4,900 acres of preserve land, $2,000,000 is for system improvements, primarily fencing and trails, related to the preserve land, and $6,000,000 for acquisition of karst.

BCCP PRESERVE SYSTEM ACREAGE SUMMARY	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-[illegible]
Austin	0	0	1,507	1,507	1,507	1,507	1,507	1,507	1,507	1,507	1,507
Austin Water and Wastewater Utility	0	0	178	178	178	178	178	178	178	178	178
Lower Colorado River Authority	0	0	0	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717
Travis County	0	0	0	578	731	966	1,293	1,704	2,197	2,771	3,426
General In-Kind Services	0	0	4,208	4,279	4,390	4,522	4,674	4,827	4,979	5,131	5,283
Other Managed Acreage	0	0	5,677	5,677	5,677	5,677	5,677	5,677	5,677	5,677	5,677
GRAND TOTAL BCCP PRESERVE SYSTEM ACREAGE	0	0	17,570	20,936	21,199	21,567	22,047	22,609	23,254	23,981	24,788

BCCP PRESERVE SYSTEM ACREAGE SUMMARY	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Austin	1,507	1,507	1,507	1,507	1,507	1,507	1,507	1,507	1,507	1,507
Austin Water and Wastewater Utility	178	178	178	178	178	178	178	178	178	178
Lower Colorado River Authority	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717
Travis County	4,187	5,027	5,943	6,301	6,480	6,660	6,840	7,019	7,199	7,325
General In-Kind Services	5,463	5,642	5,822	6,002	6,181	6,361	6,541	6,720	6,900	7,025
Other Managed Acreage	5,677	5,677	5,677	5,677	5,677	5,677	5,677	5,677	5,677	5,677
GRAND TOTAL BCCP PRESERVE SYSTEM ACREAGE	25,729	26,749	27,844	28,382	28,741	29,100	29,460	29,819	30,178	30,428

BCCP PRESERVE SYSTEM ACREAGE SUMMARY	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Austin	1,507	1,507	1,507	1,507	1,507	1,507	1,507	1,507	1,507	1,507
Austin Water and Wastewater Utility	178	178	178	178	178	178	178	178	178	178
Lower Colorado River Authority	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717
Travis County	7,325	7,325	7,325	7,325	7,325	7,325	7,325	7,325	7,325	7,325
General In-Kind Services	7,025	7,025	7,025	7,025	7,025	7,025	7,025	7,025	7,025	7,025
Other Managed Acreage	5,677	5,677	5,677	5,677	5,677	5,677	5,677	5,677	5,677	5,677
GRAND TOTAL BCCP PRESERVE SYSTEM ACREAGE	30,428	30,428	30,428	30,428	30,428	30,428	30,428	30,428	30,428	30,428

USES OF TRAVIS COUNTY TAX BENEFIT REVENUE FOR BCCP-Management of 7,325 Acres @ $35/Acre

YEAR	Travis County Tax Benefit Revenue*	Travis County BCCP Land / O&M Contribution: Land Acquisition	NEW Land Management	In-Kind Land Management	Total County Contribution	ANNUAL AVAILABLE BALANCE	Contribution As A % of Revenue
1	255,482	231,000	3,955	17,745	252,700	2,782	98.91%
2	599,079	566,500	11,885	18,455	596,839	5,022	99.17%
3	1,004,746	962,500	24,001	19,193	1,005,693	4,074	99.60%
4	1,480,796	1,419,000	41,122	19,961	1,480,083	4,787	99.68%
5	1,956,845	1,875,500	62,953	20,759	1,959,212	2,420	99.88%
6	2,432,894	2,321,000	89,914	21,589	2,432,503	2,811	99.88%
7	2,908,843	2,766,500	122,540	22,453	2,911,493	161	99.99%
8	3,384,042	3,195,500	161,202	23,351	3,380,052	4,150	99.88%
9	3,864,042	3,635,500	207,934	24,286	3,867,719	473	99.99%
10	4,337,091	4,048,000	261,857	25,256	4,335,113	2,451	99.94%
11	4,813,140	4,498,000	290,853	26,267	4,815,120	471	99.99%
12	5,264,805	4,481,000	312,186	27,318	4,820,504	444,772	91.55%
13	5,264,805	0	334,732	28,410	363,142	5,346,435	6.90%
14	5,264,805	0	358,582	29,547	388,129	4,876,676	7.37%
15	5,264,805	0	383,835	30,729	414,563	4,850,242	7.87%
16	5,264,805	0	410,503	31,958	442,460	4,822,345	8.40%
17	5,264,805	0	438,690	33,236	471,926	4,792,879	8.96%
18	5,264,805	0	464,793	34,566	499,359	4,765,446	9.48%
19	5,264,805	0	478,737	35,948	514,685	4,750,120	9.78%
20	5,264,805	0	493,099	37,027	530,127	4,734,678	10.07%
21	5,264,805	0	507,892	38,137	546,030	4,718,775	10.37%
22	5,264,805	0	523,129	39,281	562,410	4,702,395	10.68%
23	5,264,805	0	538,823	40,460	579,283	4,685,522	11.00%
24	5,264,805	0	554,988	41,674	596,661	4,668,144	11.33%
25	5,264,805	0	571,637	42,924	614,561	4,650,244	11.67%
26	5,264,805	0	588,786	44,212	632,998	4,631,807	12.02%
27	5,264,805	0	606,450	45,538	651,988	4,612,817	12.38%
TOTALS	111,273,880	30,000,000	8,845,077	820,280	39,665,356		35.65%

* SOURCE: Travis County Planning and Budget Office

BALCONES CANYONLANDS CONSERVATION PLAN

Acreage Documentation at Full Preserve System

BALCONES CANYONLANDS CONSERVATION PLAN -- ACREAGE DOCUMENTATION at FULL PRESERVE SYSTEM

TOTAL BCCP PRESERVE SYSTEM SUMMARY

Preserve Land Provider	Preserve Land Managers										GRAND TOTAL Providers
	Austin	Austn MM	LCRA	County	General	Txs Ntr Cn	Audubon	Unv Texas	MUDs	Snst Vlly	
City of Austin											
Previously Owned	2,384	178	0	0	0	0	0	0	0	0	2,562
Newly Acquired	3,348	0	0	0	4,159	0	0	0	0	0	7,507
Future Acquisitions	466	0	0	0	1,043	0	0	0	0	0	1,509
Grand Total Austin	6,198	178	0	0	5,202	0	0	0	0	0	11,578
Lwr Colrdo Rvr Athrty	0	0	2,717	0	0	0	0	0	0	0	2,717
Travis County	0	0	0	507	0	0	0	0	0	0	507
TNC / PHF	0	0	0	0	315	4,183	0	0	0	0	4,498
Audubon Society	0	0	0	0	0	0	680	0	0	0	680
UT/Paisano Ranch	0	0	0	0	0	0	0	244	0	0	244
Cnty Tax Bnft Funding	0	0	0	4,000	0	0	0	0	0	0	4,000
Cnty Prtcptn Crtfcts	0	0	0	2,818	0	0	0	0	0	0	2,818
Sunset Valley	0	0	0	0	0	0	0	0	0	15	15
Muncpal Utlty Dstrcts	0	0	0	0	0	0	0	0	555	0	555
City Prtcptn Crtfcts	1,309	0	0	0	1,507	0	0	0	0	0	2,816
GRAND TOTAL Managers	7,507	178	2,717	7,325	7,024	4,183	680	244	555	15	30,428

PARTICIPATION FEE CALCULATIONS UNDER THE BALCONES CANYONLANDS CONSERVATION PLAN

The attached figures offer a schematic representation of the maps of Golden-cheeked Warbler habitat which will be used for determination of fees under the Shared Vision of the Balcones Canyonlands Conservation Plan, along with examples of development projects in and near such habitat. Each figure is accompanied by a description of its examples and how the Participation Fees would be calculated. *Important Note:* These examples are all presumed to be within the jurisdiction of a BCCP Permit Holder.

Figure 1 sets the backdrop by showing how warbler habitat is represented in later examples. This figure also indicates the basic Participation Fee structure in each zone. The original reference which will be used for warbler habitat determinations is: "Golden-cheeked Warbler Habitat Analysis" prepared for the U.S. Fish & Wildlife Service by DLS Associates (June 1993) as updated periodically.

Figures 2 and 3 show the simplest possible property configurations (assumed to be all developed). The representations of development shown here are obviously very simplistic. They indicate how the arithmetic works for calculation of Participation Fees for various situations.

In **Figure 4**, some of the complexity of the land development process is added. This set of six examples shows development projects (each is assumed to be a single parcel under one ownership or control) which may be all within or partially within habitat. They also represent variations on whether the parcel will remain an unsubdivided single lot (examples J and M) or will undergo subdivision into two or more lots. Examples K and N indicate configurations which attempt to subdivide out the acreage to be developed while leaving blocks of habitat in undeveloped lots. In practice, the undeveloped portions of all these examples might be land which is constrained by floodplains, water quality buffers, steep slopes, or other environmental requirements in the land development code of a local jurisdiction. They may also be partially a matter of choice by the landowner/developer with respect to the desired configuration of the development. Notice that for <u>any</u> development configuration, off-site indirect impacts will not be included in the calculation of Participation Fees by the simplified approach in the Shared Vision methodology.

In **Figures 5a and 5b**, a more realistic but still simplified portrait of a hypothetical development is shown. Notice that the warbler habitat cuts across the boundaries of lots, steep slopes, water quality zones, etc. The simplified approach towards Participation Fees as crafted in the Shared Vision must, by its very design, ignore much of the complexity in such a configuration. The simplicity, timeliness, and cost savings implicit in the simplified approach comes at a cost of a lack of subtlety to respond to such environmental and regulatory complexity. To landowners who may seek an advantage in examining such detail, the pathway of negotiating an individual 10(a) permit is always available.

Pedernales River Macrosite

Preserve Land Provider	Preserve Land Managers										GRAND TOTAL
City of Austin	Austin	Austn WWW	LCRA	County	General	Txs Ntr Cn	Audubon	Unv Texas	MUDs	Snst Vlly	Providers
Previously Owned	0	0	0	0	0	0	0	0	0	0	0
Newly Acquired											
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total Newly Acquired	0	0	0	0	0	0	0	0	0	0	0
Future Acquisitions											
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total Future Acqstns	0	0	0	0	0	0	0	0	0	0	0
Grand Total Austin	0	0	0	0	0	0	0	0	0	0	0
Lwr Colrdo Rvr Athrty	0	0	29	0	0	0	0	0	0	0	29
Travis County	0	0	0	230	0	0	0	0	0	0	230
TNC / PWF	0	0	0	0	0	0	0	0	0	0	0
Audubon Society	0	0	0	0	0	0	0	0	0	0	0
UT/Paisano Ranch	0	0	0	0	0	0	0	0	0	0	0
Cnty Tax Bnft Funding	0	0	0	0	0	0	0	0	0	0	0
Cnty Prtcptn Crtfcts	0	0	0	0	0	0	0	0	0	0	0
Sunset Valley	0	0	0	0	0	0	0	0	0	0	0
Muncpal Utlty Dstrcts	0	0	0	0	0	0	0	0	0	0	0
City Prtcptn Crtfcts	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL Managers	0	0	29	230	0	0	0	0	0	0	259

Barton Creek Macrosite

Preserve Land Provider	Preserve Land Managers										GRAND TOTAL
City of Austin	Austin	Austn WWW	LCRA	County	General	Txs Ntr Cn	Audubon	Unv Texas	MUDs	Snst Vlly	Providers
Previously Owned	813	0	0	0	0	0	0	0	0	0	813
Newly Acquired											
Gaines Ranch	764	0	0	0	0	0	0	0	0	0	764
Senna Hills	35	0	0	0	0	0	0	0	0	0	35
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total Newly Acquired	799	0	0	0	0	0	0	0	0	0	799
Future Acquisitions											
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total Future Acqstns	0	0	0	0	0	0	0	0	0	0	0
Grand Total Austin	1,612	0	0	0	0	0	0	0	0	0	1,612
Lwr Colrdo Rvr Athrty	0	0	0	0	0	0	0	0	0	0	0
Travis County	0	0	0	0	0	0	0	0	0	0	0
TNC / PHF	0	0	0	0	0	4,023	0	0	0	0	4,023
Audubon Society	0	0	0	0	0	0	0	0	0	0	0
UT/Paisano Ranch	0	0	0	0	0	0	0	244	0	0	244
Cnty Tax Bnft Funding	0	0	0	0	0	0	0	0	0	0	0
Cnty Prtcptn Crtfcts	0	0	0	0	0	0	0	0	0	0	0
Sunset Valley	0	0	0	0	0	0	0	0	0	15	15
Muncpal Utlity Dstrcts	0	0	0	0	0	0	0	0	0	0	0
City Prtcptn Crtfcts	0	0	0	0	436	0	0	0	0	0	436
GRAND TOTAL Managers	1,612	0	0	0	436	4,023	0	244	0	15	6,330

South Lake Austin Macrosite

Preserve Land Provider	Preserve Land Managers										GRAND TOTAL
City of Austin	Austin	Austn HHH	LCRA	County	General	Txa Ntr Cn	Audubon	Unv Texas	Hills	Snst Vlly	Providers
Previously Owned	115	0	0	0	0	0	0	0	0	0	115
Newly Acquired											
Reicher Ranch	820	0	0	0	0	0	0	0	0	0	820
Double J&T Ranch	1,729	0	0	0	0	0	0	0	0	0	1,729
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total Newly Acquired	2,549	0	0	0	0	0	0	0	0	0	2,549
Future Acquisitions											
Bohls Ranch	466	0	0	0	0	0	0	0	0	0	466
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total Future Acqstns	466	0	0	0	0	0	0	0	0	0	466
Grand Total Austin	3,130	0	0	0	0	0	0	0	0	0	3,130
Lwr Colrdo Rvr Athrty	0	0	0	0	0	0	0	0	0	0	0
Travis County	0	0	0	0	0	0	0	0	0	0	0
TNC / PWF	0	0	0	0	0	0	0	0	0	0	0
Audubon Society	0	0	0	0	0	0	0	0	0	0	0
UT/Paisano Ranch	0	0	0	0	0	0	0	0	0	0	0
Cnty Tax Bnft Funding	0	0	0	0	0	0	0	0	0	0	0
Cnty Prtcptn Crtfcts	0	0	0	826	0	0	0	0	0	0	826
Sunset Valley	0	0	0	0	0	0	0	0	0	0	0
Muncpal Utlty Dstrcts	0	0	0	0	0	0	0	0	147	0	147
City Prtcptn Crtfcts	0	0	0	0	388	0	0	0	0	0	388
GRAND TOTAL Managers	3,130	0	0	826	388	0	0	0	147	0	4,491

SOUTH RIVER MANAGEMENT AREA SUMMARY

Preserve Land Provider	Preserve Land Managers										GRAND TOTAL
City of Austin	Austin	Austn W&W	LCRA	County	General	Txs Ntr Cn	Audubon	Unv Texas	MUDs	Snst Vlly	Providers
Previously Owned	928	0	0	0	0	0	0	0	0	0	928
Newly Acquired	3,348	0	0	0	0	0	0	0	0	0	3,348
Future Acquisitions	466	0	0	0	0	0	0	0	0	0	466
Grand Total Austin	4,742	0	0	0	0	0	0	0	0	0	4,742
Lwr Colrdo Rvr Athrty	0	0	29	0	0	0	0	0	0	0	29
Travis County	0	0	0	230	0	0	0	0	0	0	230
TNC / PWF	0	0	0	0	0	4,023	0	0	0	0	4,023
Audubon Society	0	0	0	0	0	0	0	0	0	0	0
UT/Paisano Ranch	0	0	0	0	0	0	0	244	0	0	244
Cnty Tax Bnft Funding	0	0	0	0	0	0	0	0	0	0	0
Cnty Prtcptn Crtfcts	0	0	0	826	0	0	0	0	0	0	826
Sunset Valley	0	0	0	0	0	0	0	0	0	15	15
Muncpal Utlty Dstrcts	0	0	0	0	0	0	0	0	147	0	147
City Prtcptn Crtfcts	0	0	0	0	824	0	0	0	0	0	824
GRAND TOTAL Managers	4,742	0	29	1,056	824	4,023	0	244	147	15	11,080

West Austin Macrosite

Preserve Land Provider	Preserve Land Managers										GRAND TOTAL
City of Austin	Austin	Austn WWW	LCRA	County	General	Txs Ntr Cn	Audubon	Unv Texas	HUDs	Snst Vlly	Providers
Previously Owned	215	40	0	0	0	0	0	0	0	0	255
Newly Acquired											
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total Newly Acquired	0	0	0	0	0	0	0	0	0	0	0
Future Acquisitions											
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total Future Acqstns	0	0	0	0	0	0	0	0	0	0	0
Grand Total Austin	215	40	0	0	0	0	0	0	0	0	255
Lwr Colrdo Rvr Athrty	0	0	0	0	0	0	0	0	0	0	0
Travis County	0	0	0	227	0	0	0	0	0	0	227
THC / PHF	0	0	0	0	0	0	0	0	0	0	0
Audubon Society	0	0	0	0	0	0	0	0	0	0	0
UT/Paisano Ranch	0	0	0	0	0	0	0	0	0	0	0
Cnty Tax Bnft Funding	0	0	0	0	0	0	0	0	0	0	0
Cnty Prtcptn Crtfcts	0	0	0	0	0	0	0	0	0	0	0
Sunset Valley	0	0	0	0	0	0	0	0	0	0	0
Muncpal Utlty Dstrcts	0	0	0	0	0	0	0	0	0	0	0
City Prtcptn Crtfcts	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL Managers	215	40	0	227	0	0	0	0	0	0	482

BALCONES CANYONLANDS CONSERVATION PLAN -- ACREAGE DOCUMENTATION at FULL PRESERVE SYSTEM

North Lake Austin Macrosite

Preserve Land Provider	Preserve Land Managers											GRAND TOTAL Providers
	Austin	Austn MM	LCRA	County	General	Txs Ntr Cn	Audubon	Unv Texas	MUDs	Snst Vlly		
City of Austin												
Previously Owned	950	0	0	0	0	0	0	0	0	0		950
Newly Acquired												
Park West	0	0	0	0	468	0	0	0	0	0		468
Coldwater Canyon	0	0	0	0	427	0	0	0	0	0		427
Cortana	0	0	0	0	1,752	0	0	0	0	0		1,752
Total Newly Acquired	0	0	0	0	0	0	0	0	0	0		0
Future Acquisitions					2,647							2,647
Long Canyon	0	0	0	0	450	0	0	0	0	0		450
	0	0	0	0	0	0	0	0	0	0		0
	0	0	0	0	0	0	0	0	0	0		0
Total Future Acqstns	0	0	0	0	450	0	0	0	0	0		450
Grand Total Austin	950	0	0	0	3,097	0	0	0	0	0		4,047
Lwr Colrdo Rvr Athrty	0	0	0	0	0	0	0	0	0	0		0
Travis County	0	0	0	0	0	0	0	0	0	0		0
TNC / PWF	0	0	0	0	0	0	0	0	0	0		0
Audubon Society	0	0	0	0	0	0	0	0	0	0		0
UT/Paisano Ranch	0	0	0	0	0	0	0	0	0	0		0
Cnty Tax Bnft Funding	0	0	0	0	0	0	0	0	0	0		0
Cnty Prtcptn Crtfcts	0	0	0	387	0	0	0	0	0	0		387
Sunset Valley	0	0	0	0	0	0	0	0	0	0		0
Muncpal Utlty Dstrcts	0	0	0	0	0	0	0	0	0	0		0
City Prtcptn Crtfcts	0	0	0	0	0	0	0	0	0	0		0
GRAND TOTAL Managers	950	0	0	387	683	0	0	0	0	0		683
					3,780	0	0	0	0	0		5,117

Cypress Creek Macrosite

Preserve Land Provider	Preserve Land Managers										GRAND TOTAL
City of Austin	Austin	Austn WWW	LCRA	County	General	Txs Ntr Cn	Audubon	Unv Texas	MUDs	Snst Vlly	Providers
Previously Owned	0	0	0	0	0	0	0	0	0	0	0
Newly Acquired											
Lime Creek	0	0	0	0	494	0	0	0	0	0	494
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total Newly Acquired	0	0	0	0	494	0	0	0	0	0	494
Future Acquisitions											
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
Total Future Acqstns	0	0	0	0	0	0	0	0	0	0	0
Grand Total Austin	0	0	0	0	494	0	0	0	0	0	494
Lwr Colrdo Rvr Athrty	0	0	2,688	0	0	0	0	0	0	0	2,688
Travis County	0	0	0	50	0	0	0	0	0	0	50
TNC / PWF	0	0	0	0	100	160	0	0	0	0	260
Audubon Society	0	0	0	0	0	0	680	0	0	0	680
UT/Paisano Ranch	0	0	0	0	0	0	0	0	0	0	0
Cnty Tax Bnft Funding	0	0	0	1,480	0	0	0	0	0	0	1,480
Cnty Prtcptn Crtfcts	0	0	0	1,150	0	0	0	0	0	0	1,150
Sunset Valley	0	0	0	0	0	0	0	0	0	0	0
Muncpal_Utlty. Datrcts	0	0	0	0	0	0	0	0	0	0	0
City Prtcptn Crtfcts	1,309	0	0	0	0	0	0	0	0	0	1,309
GRAND TOTAL Managers	1,309	0	2,688	2,680	594	160	680	0	0	0	8,111

BALCONES CANYONLANDS CONSERVATION PLAN -- ACREAGE DOCUMENTATION of FULL PRESERVE SYSTEM

Bull Creek Macrosite

Preserve Land Provider	Preserve Land Managers										GRAND TOTAL
	Austin	Austin WWM	LCRA	County	General	Tex Ntr Co	Audubon	Univ Texas	HUDs	Cust Vlly	Providers
City of Austin											
Previously Owned	291	138	0	0	0	0	0	0	0	0	429
Newly Acquired											
Forest Ridge	0	0	0	0	410	0	0	0	0	0	410
Hanka	0	0	0	0	88	0	0	0	0	0	88
Jester	0	0	0	0	133	0	0	0	0	0	133
Canyon Creek	0	0	0	0	236	0	0	0	0	0	236
Franklin Federal	0	0	0	0	151	0	0	0	0	0	151
Total Newly Acquired	0	0	0	0	1,018	0	0	0	0	0	1,018
Future Acquisitions											
TCB Jester	0	0	0	0	320	0	0	0	0	0	320
Other to be Acquired	0	0	0	0	273	0	0	0	0	0	273
Total Future Acqstns	0	0	0	0	593	0	0	0	0	0	593
Grand Total Austin	291	138	0	0	1,611	0	0	0	0	0	2,040
Lwr Colrdo Rvr Athrty	0	0	0	0	0	0	0	0	0	0	0
Travis County	0	0	0	0	0	0	0	0	0	0	0
TNC / PWF	0	0	0	0	215	0	0	0	0	0	215
Audubon Society	0	0	0	0	0	0	0	0	0	0	0
UT/Paisano Ranch	0	0	0	0	0	0	0	0	0	0	0
Cnty Tax Bnft Funding	0	0	0	2,520	0	0	0	0	0	0	2,520
Cnty Prtcptn Crtfcts	0	0	0	455	0	0	0	0	0	0	455
Sunset Valley	0	0	0	0	0	0	0	0	0	0	0
Municpal Utlty Dstrcts	0	0	0	0	0	0	0	0	408	0	408
City Prtcptn Crtfcts	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL Managers	291	138	0	2,975	1,826	0	0	0	408	0	5,638

BALCONES CANYONLANDS CONSERVATION PLAN -- ACREAGE DOCUMENTATION at FULL PRESERVE SYSTEM

NORTH RIVER MANAGEMENT AREA SUMMARY

Preserve Land Provider	Preserve Land Managers										GRAND TOTAL Providers
	Austin	Austn M&H	LCRA	County	General	Txs Ntr Cn	Audubon	Unv Texas	HUDs	Snst Vlly	
City of Austin											
Previously Owned	1,456	178	0	0	0	0	0	0	0	0	1,634
Newly Acquired	0	0	0	0	4,159	0	0	0	0	0	4,159
Future Acquisitions	0	0	0	0	1,043	0	0	0	0	0	1,043
Grand Total Austin	1,456	178	0	0	5,202	0	0	0	0	0	6,836
Lwr Colrdo Rvr Athrty	0	0	2,688	0	0	0	0	0	0	0	2,688
Travis County	0	0	0	277	0	0	0	0	0	0	277
TNC / PHF	0	0	0	0	315	160	0	0	0	0	475
Audubon Society	0	0	0	0	0	0	680	0	0	0	680
UT/Paisano Ranch	0	0	0	0	0	0	0	0	0	0	0
Cnty Tax Bnft Funding	0	0	0	4,000	0	0	0	0	0	0	4,000
Cnty Prtcptn Crtfcts	0	0	0	1,992	0	0	0	0	0	0	1,992
Sunset Valley	0	0	0	0	0	0	0	0	0	0	0
Muncpal Utlty Dstrcts	0	0	0	0	0	0	0	0	408	0	408
City Prtcptn Crtfcts	1,309	0	0	0	683	0	0	0	0	0	1,992
GRAND TOTAL Managers	2,765	178	2,688	6,269	6,200	160	680	0	408	0	19,348

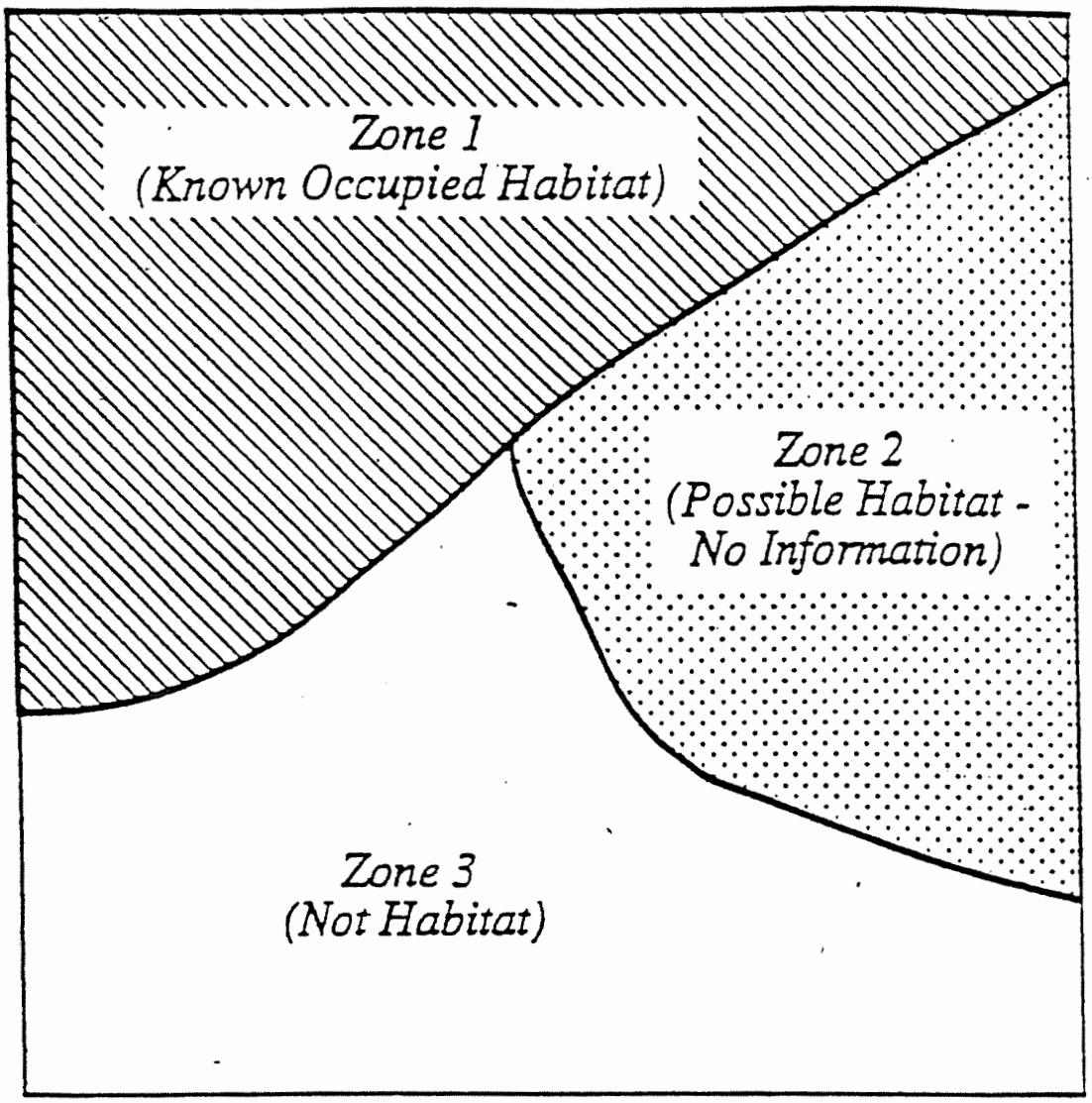


Figure 1. Description of Warbler Habitat Zones

Zone 1 - Known Occupied Habitat. – Determined from actual sightings.
Participation Fee is **$5,500 per acre.**

Zone 2 - Possible habitat (based on vegetation characteristics) but no information available from actual field surveys.
Particpation Fee is $5,500 per 2 acres, or **$2,750 per acre.**

Zone 3 - Not Occupied Warbler Habitat (based on land use, vegetation characteristics, and/or actual field surveys).
No Participation Fees required.

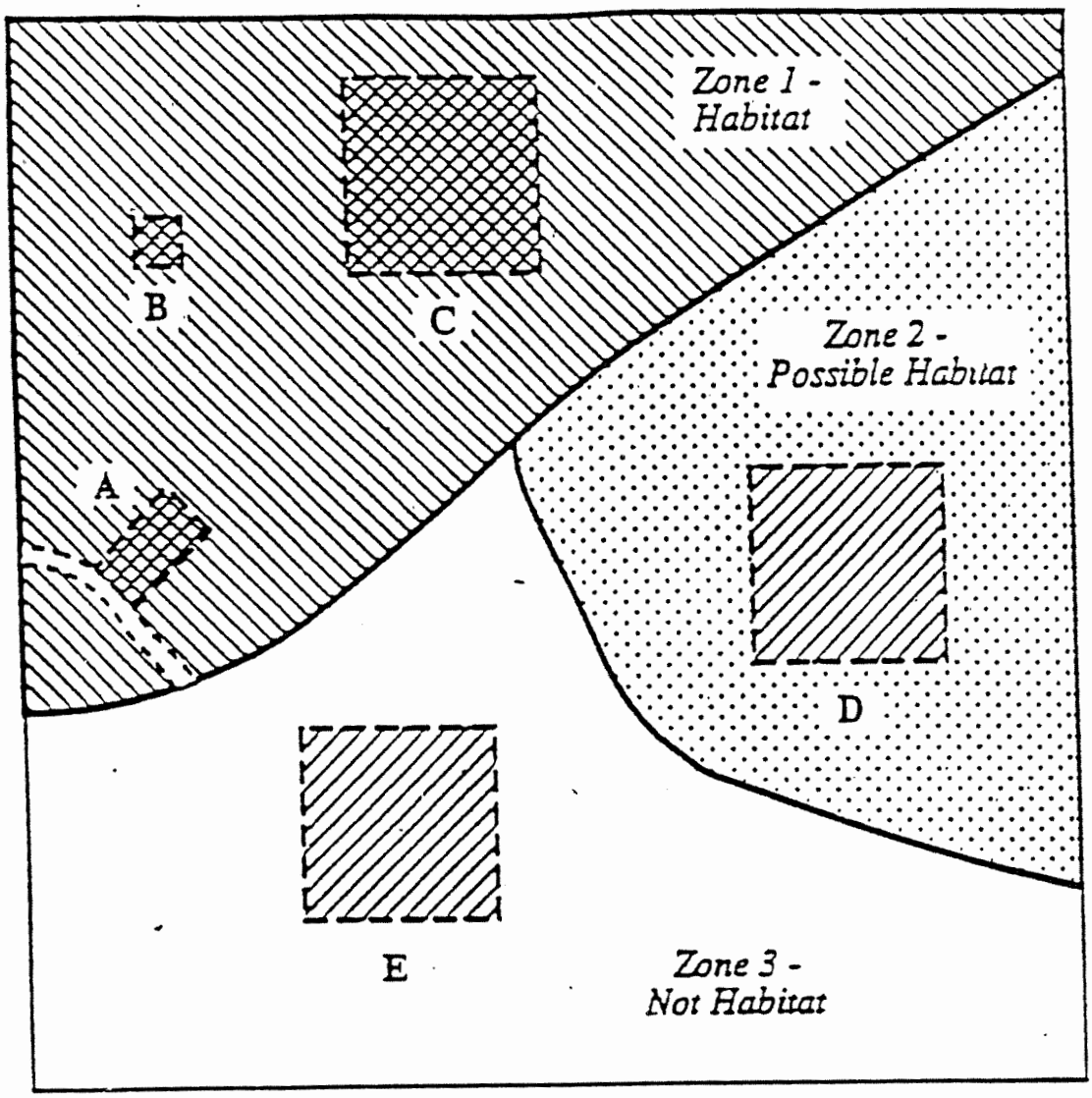


Figure 2. Simple Examples

Property A: Pre-existing lot (before 5/4/90) up to 20 acres, in habitat; proposed for only one single-family home. Fee: **$1,500***.

Property B: 5-acre development, all in habitat. Fee: **5 acres x $5,500 = $27,500.**

Property C: 100-acre development, all habitat. Fee: **100 acres x $5,500 = $550,000.**

Property D: 100-acre development, all in Zone 2. Fee: **(100 acres ÷ 2) x $5,500 = $275,000.**

Property E: 100-acre development, no habitat. No participation fee required.

* *Under the USFWS small lot owner provisions, the fee will be $1500.*

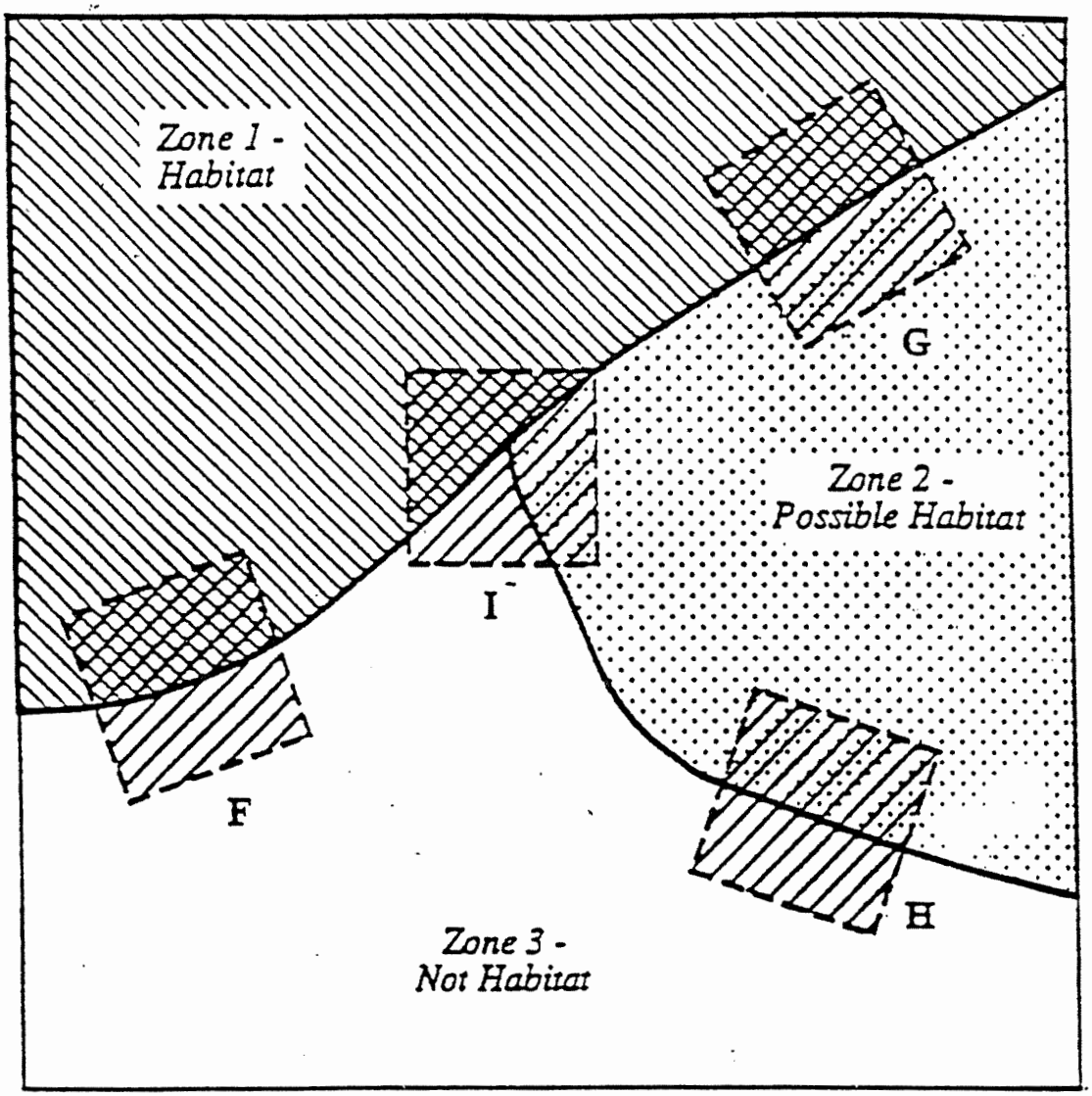


Figure 3. Projects Which Overlap Two or More Zones

Property F: 100-acre development proposal; 50 acres in habitat, 50 acres not in habitat. Fee: (50 acres x $5,500) + zero = $275,000.

Property G: 100-acre development proposal; 50 acres in habitat, 50 acres in possible habitat. Fee: (50 acres x $5,500) + (25 acres x $5,500) = $412,500.

Property H: 100-acre development proposal; 50 acres in possible habitat, 50 acres not in habitat. Fee: (25 acres x $5,500) + zero = $137,500.

Property I: 100-acre development proposal; one third of project in each zone. Fee: (33-1/3 acres x $5,500) + (16-2/3 acres x $5,500) = $275,000.

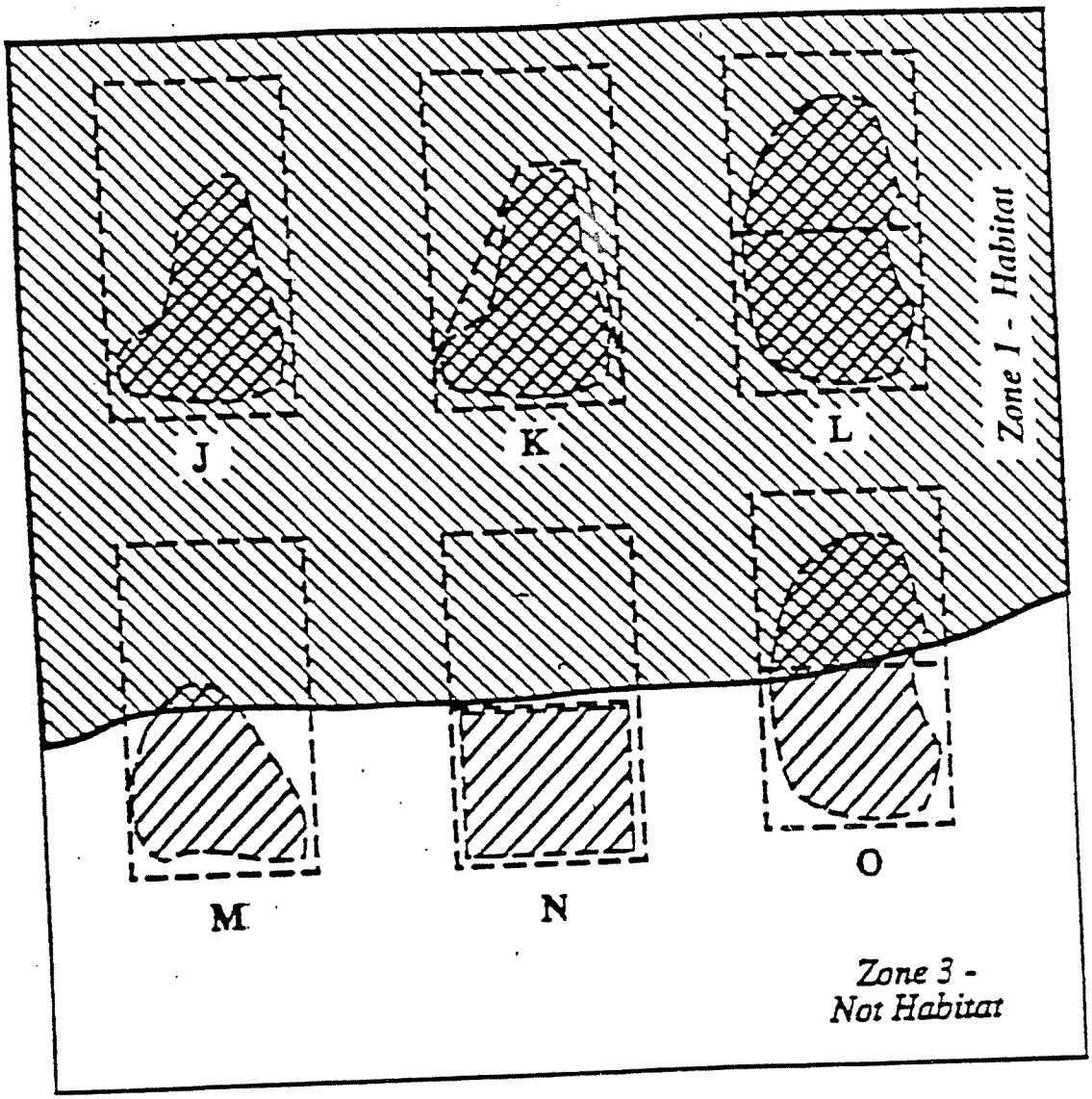


Figure 4. Leaving Undeveloped Areas; Subdividing a Parcel

For ease of comparison, all of these examples represent 100-acre parcels (development proposals). All examples except J and M involve subdividing the parcel into multiple lots (shown here simply as two lots). The area of development (e.g., limits of construction or development envelope) is shown as hatching from lower left to upper right; actual development within habitat is therefore cross-hatched.

Development proposals J, K and L would each pay: 100 acres x $5,500 = $550,000:

Property J: An unsubdivided, single legal lot, all in habitat, but only 50 acres of actual development.

Property K: Entire parcel is within habitat including all proposed development, but undisturbed areas proposed to be planted as permanent open space, etc.

Property L: Entire parcel is within habitat including all proposed development; development approval for individual sections may occur simultaneously or may be phased.

Development proposals M, N and O would each pay: 50 acres x $5,500 = $275,000:

Property M: An unsubdivided, single legal lot, only 50 acres of which is within habitat; all but 10 acres of the development is designed to be outside of habitat.

Property N: Half of parcel is within habitat but all proposed development is outside of habitat, undisturbed areas proposed to be planted as permanent open space, etc.

Property O: Parcel subdivided into multiple lots, 50 acres of habitat; development occurring both within and outside of habitat, perhaps phased as in example L.

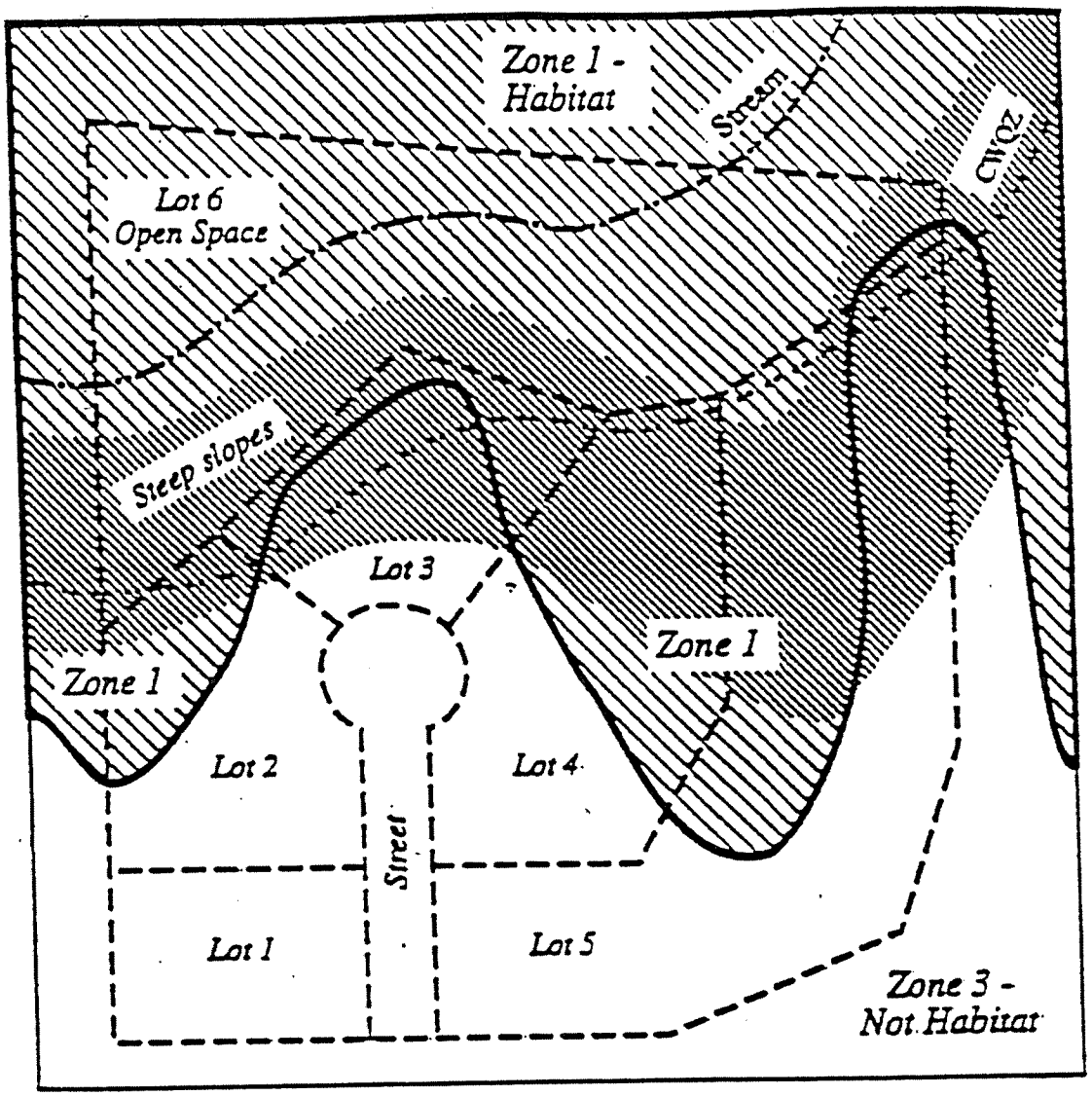


Figure 5a. "Real World" Example

In this example, a small residential subdivision is being planned with a single street and a total of six lots, five of which will have homes; the sixth lot will be planted as permanent open space. The property is traversed by a stream which has a Critical Water Quality Zone (CWQZ; perhaps 200 feet wide) as defined in the City of Austin Land Development Code. Steep slopes are present adjacent to the creek and within portions of five lots. The developer has designed the subdivision to include a buildable area for each house. To reach a particular residential market and at the same time comply with various aspects of the City's code, four of the five residential lots have been layed out to encompass some area of steep slopes and small portions of the CWQZ.

Warbler habitat (Zone 1) covers much of the northern half of the property, including almost all of the floodplain and much of the steep slopes. Lot 6 has been designed to include the waterway and much of the CWQZ; Lot 6 also contains some of the steep slopes and a significant portion of the warbler habitat on the property. Nonetheless, small to moderate portions of residential lots 2-5 also contain warbler habitat. The following figure indicates the portion of this project which would be subject to Participation Fees under the regional 10(a) permit.

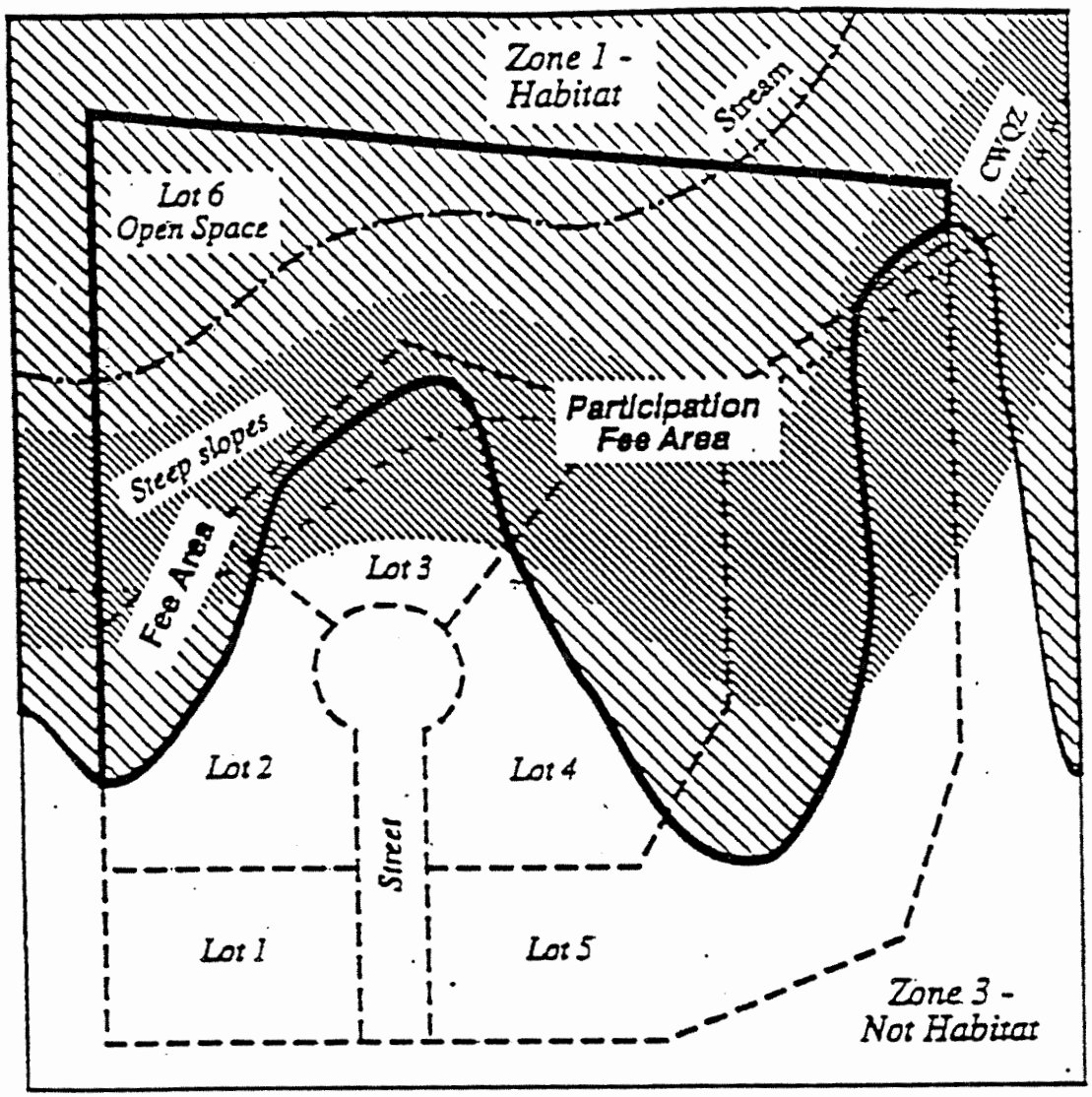


Figure 5b. Participation Fee Area for "Real World" Example

The Participation Fee area in this example is shown in the heavy black outlined area. It is calculated from the overlap of the development proposal with known warbler habitat (Zone 1), irrespective of floodplains, steep slopes, or the proposed status of the individual lots.

An exception to this Participation Fee area calculation may occur if the open space lot or lots (e.g. lot 6 in this example) are proposed to be deeded to a Permit Holder for permanent public use. Such lots might be designated for parkland or preserve purposes, fire stations, schools, etc., but are accepted at the sole discretion of the public entity. In such cases, the areas deeded to the Permit Holder may be removed from calculation of Participation Fees. This exception derives from the fact that the Permit Holders, by virtue of their other contributions to the BCCP, are mitigated for public projects.

LEGAL AUTHORITY

There is a wide range of existing constitutional and statutory powers vested in local and state units of government which clearly enables the participating entities to adopt and implement the Balcones Canyonlands Conservation Plan (BCCP). The City of Austin as a home-rule city may exercise any power authorized by its charter as long as it is not inconsistent with the constitution and general laws of the state (Tex. Const. art. XI, sec. 5; Tex. Local govt. Code sec. 51.072). The primary authority of Travis County to adopt and enforce the BCCP is found in Parks and Wildlife Code Section 83.006. This section provides a framework for a regional plan and empowers cities within their extra-territorial jurisdiction and counties to adopt and enforce a plan.

Municipalities and counties have broad constitutional and statutory authority to issue bonds and levy taxes for the purposes of acquiring and maintaining parklands. Local Government Code Section 331 authorizes municipalities and counties to issue bonds and levy taxes to acquire and maintain parkland and to enter into agreements with Texas Parks and Wildlife Department for land management.

The Texas Interlocal Cooperation Act authorizes multi-agency agreements among political subdivisions to allow assignment of financial, management, and enforcement responsibilities.

APPENDIX "B"

INFRASTRUCTURE PLANNING

Revised March, 1996

INFRASTRUCTURE PLANNING

I. Introduction

While the issuance of the Section 10(a) permit will provide a broad grant of authority to allow habitat conversions throughout the BCCP conservation area, there are nevertheless many public infrastructure projects and activities which must continue to operate and be expanded, in some cases inside or along the boundaries of designated preserves. To the extent possible, it is advantageous to all parties concerned to specify all likely CIP (Capital Improvements Program) construction, service extensions, routine operations and maintenance work, and the geographical extent of those operations, in and adjacent to preserves. Any opportunity for mitigating the impacts of infrastructure on species of concern should be planned and pursued. This section of the plan contains detailed definitions, guidelines, and tables which relate to the designation, construction, operation, and maintenance of utility and infrastructure corridors in or adjacent to the BCCP preserve system.

The intent of designing infrastructure corridors is to assure that new utility facilities and corridors that have the potential to impact designated habitat preserves adversely will be routed within specified "infrastructure corridors" which define the placement or alignment of utility facilities in the immediate vicinity of the preserves. Examples of facilities which will be constructed at specific site locations include water and wastewater treatment plants, pump stations, and substations. Examples of facilities which will be constructed along infrastructure corridors include easements and right-of-ways (ROWs) for roads and electric, gas, telephone, cable, water and wastewater transmission and distribution lines. Such easements and right-of-ways are limited to the legitimate needs of that utility or service provider and should not be transferred or used for non-utility purposes.

The principal objective is to provide future community services and facilities in a manner consistent with the objectives of habitat conservation, i.e., in a manner which minimizes habitat conversions and fragmentation. A second objective is to reduce the overall economic cost of providing public services to the area. Planning in advance for future infrastructure needs and delimiting the number and location of infrastructure corridors in and adjacent to preserve areas will aid in accomplishing these objectives.

Ultimate decisions on the locations, construction, operation, and maintenance of utilities within infrastructure corridors must remain with the responsible service provider or agency, after consultation with the BCCP Coordinating Committee. Access for repair and maintenance of facilities will be allowed, with reasonable restrictions to ensure plan compatibility.

Conflict Resolution Process.

Service providers and the Coordinating Committee Secretary shall negotiate mutually agreeable procedures, schedules and decisions to provide for the design, construction, operation and maintenance of facilities while attempting to minimize impacts on the BCCP preserves. If any issue cannot be satisfactorily resolved between these parties, then either the Coordinating Committee Secretary or any of the service providers may place the issue on the agenda of the BCCP Coordinating Committee for resolution and/or direction.

Any other party with an interest in the outcome of the procedures, schedules or decisions may, on their own initiative, request the BCCP Coordinating Committee to place a related item on their agenda.

II. Designation of Infrastructure Corridors

Infrastructure corridors are located within habitat preserves to provide for the essential and continuing public needs for utilities and roadways. New facilities will be routed outside of the habitat preserves, except as provided for by the plan. Where facilities cross habitat preserves or enter the preserves to serve customers, the guidelines of this section (including guidelines for new construction, operation and maintenance) will prevail. The Preserve Land Management Plans and the Land Management Guidelines shall accomodate corridors for existing and added facilities and designated new or expanded corridors. Changing conditions over the life of this permit may require the addition or realignment of corridors. In that event, the modification procedures of the BCCP and Interlocal Agreement will be followed. The Coordinating Committee shall approve expansions of existing corridors and construction of planned corridors before construction begins.

Definitions

The Coordinating Committee Secretary, within the context of the BCCP, is the entity responsible for meeting the 10(a) permit conditions with respect to preserve management; or an entity delegated those responsibilities by the Coordinating Committee Secretary.

Utility provider, service provider, and public and private utility, all within the appropriate context, refer to agencies or public companies that provide and maintain roadway, electric, water, wastewater, gas, cable TV, and/or communication facilities. These include those utilities which are associated with the Permit Holders/Managing Partners and are therefore automatically covered by the permit and those utilities which are not associated with the Permit Holders/Managing Partners and are therefore not covered by the permit.

The utilities associated with the Permit Holders/Managing Partners include the following: the Lower Colorado River Authority, City of Austin Electric Utility, Pedernales Electric Cooperative, City of Austin Water and Wastewater Utility, Travis County Transportation and Natural Resources Department, City of Austin Public Works and Transportation Department, and City of Austin Drainage Utility.

Other utilities which are not currently associated with the Permit Holders/Managing Partners include, but not limited to, the following: Travis County Water Control and Improvement District #17, Lost Creek Municipal Utility District, Texas Department of Transportation, Southwestern Bell Telephone Company, Southern Union Gas Company, and Austin CableVision, a division of Time Warner Cable, a division of Time Warner Entertainment Company, L.P. Consequently, references to utilities and services are also intended to include the facilities constructed by or maintained by any of the companies or agencies named above, for specific utility purposes.

Types of Corridors

1. Primary: Existing corridors that already have utility or roadway structures within them and that should receive the major share of new structure development and service activity in the future. There are two sub-types of primary corridors:

A. Those corridors of critical importance into which considerable new activity will be channeled. These corridors may be widened up to the maximum width specified. Additional preserve acreage was included in the final total 30,428 acres of the BCCP preserves in order to mitigate (at a ratio of 5:1) in advance for the potential widening of existing corridors within the preserves by those utilities associated with the Permit Holders/Managing Partners. But the anticipated loss of preserve due to this future expansion will need to be offset by those service providers undertaking the action who are not associated with the Permit Holders/Managing Partners. Compensation for impacts on the preserve will be negotiated between the Coordinating Committee Secretary and the utility and may take the form of impact assessments, annual licensing agreements, and/or Utility Participation Certificates. Also, compensation will be required by certain COA utilities which have not specifically dedicated land within the preserves.

B. Major corridors of high importance, which may need at some time in the future to be widened in whole or in part. Widening may take place both by those utilities associated with the Permit Holders/Managing Partners and by those utilities not associated with the Permit Holders/Managing Partners, according to the conditions described above in paragraph 1.A.

2. Secondary: Existing corridors that already have utility or roadway structures within them and for which no widening is to occur. There are two sub-types of secondary corridors.

A. Corridors that should not receive additional development that would contribute to loss of habitat outside of the corridor.

B. Corridors that should be phased out if and when possible.

3. Planned: Corridors in which facilities have not yet been constructed. These have been reduced to a limited number and are listed individually in Table 1 ("BCCP Planned Corridors"). Additional preserve acreage was included in the final total 30,428 acres of the BCCP preserves in order to mitigate (at a ratio of 5:1) in advance for the potential future use of planned corridors within the preserves by those utilities associated with the Permit Holders/Managing Partners. However, any anticipated future loss of habitat will need to be offset by those service providers undertaking the action who are not associated with the Permit Holders/Managing Partners. Compensation for impacts on the preserve will be negotiated between the Coordinating Committee Secretary and the utility and may take the form of impact assessments, annual licensing agreements, and/or Utility Participation Certificates. Also, compensation will be required by certain COA utilities which have not specifically dedicated land within the preserves.

Existing Facilities

An inventory of existing facilities reveals that several hundred already cross or intrude in the area designated for purchase and/or dedication of habitat preserve. However, some providers did not participate and not all records were located. Furthermore, at the time these guidelines were formulated, the precise boundaries of the habitat preserves were unknown.

Unless otherwise designated, all existing easements, rights-of-way and sites of all existing facilities shall be designated as Secondary A type infrastructure corridors, whether or not they are located or shown on maps prior to BCCP approval. However, existing service lines (feeds) to individual structures shall be designated as Secondary B type corridors. The Coordinating Committee Secretary shall recognize the rights that accompany the existing easements, rights-of-way (ROW) and sites, subject to the new construction and operation and maintenance (O&M) guidelines in this section.

For the purposes of the BCCP application documents, no attempt has been made to document the precise locations or characteristics of existing facilities and their corridors. This will be done in the Preserve Land Management Plans.

As individual properties are acquired and/or dedicated for habitat, the existing infrastructure easements, ROW and sites shall be precisely located (previous survey documents may be adequate). As the Preserve Management Plans are created for each preserve unit, these plans shall document the existing easements, ROW and sites, and show each of them as infrastructure corridors.

Opportunities will be sought in the future to eliminate the existing corridors that are no longer needed. However, the corridor designation of existing easements, ROW and sites can be removed only with the consent of all service providers owning an interest in the easement, ROW or facilities.

Replacement facilities and new facilities may be placed in existing corridors in accordance with the guidelines for new construction and O&M, and in compliance with the restrictions associated with the type of corridor. Any utility provider may negotiate an agreement with the owner of the easement or ROW to share the use of such easement or ROW, subject to the new construction and O&M guidelines in this section.

Roadway Corridors

Table 2 ("BCCP Roadway Corridors") lists the public roadways that cross or border the designated preserve areas, and it lists the corridor type that each is designated. For Primary type corridors, the table also provides the maximum widths anticipated to be needed for future expansion (or alteration) of the existing corridors. The Primary type corridors usually provide for the travel needs of broader areas. In virtually all roadway corridors, other service providers are involved. In some cases, these corridors bordering designated habitat face difficult space and alignment constraints.

In some cases, a negotiated realignment of a portion of the roadway corridor may be necessary to overcome constraints. In such cases, the corridor realignment shall be negotiated between the preserve landowner, the service provider seeking the realignment, the Coordinating Committee Secretary, and the Coordinating Committee. The acquisition of new easements and ROW shall be negotiated between the preserve landowner and the service provider seeking the easements or ROW.

Electric Corridors

Electric transmission corridors contain higher voltage electrical lines, the purpose of which is to transport electricity around the system to various substation locations. Transformers at the substation locations "step down" the voltage to a distribution voltage level.

Distribution lines are routed to the individual commercial and residential customers to provide service. Electric distribution corridors do not contain transmission lines.

Transmission lines have wider easement requirements and clearances from the ground and other objects due to the higher voltages and design code requirements. These lines can be built with steel mono-pole structures, steel lattice towers, or wood poles. These lines are typically accessed for purposes of routine maintenance or emergency situations such as storm-related outages.

Distribution lines are typically seen as the smaller wood structures built parallel to roadways, and which also have telephone and cable service lines attached. Distribution lines are sometimes laid underground.

Electric transmission lines shall be designated as Primary B type corridors. Distribution lines will be designated as Secondary A type corridors, unless located within roadways of higher designation or transmission line corridors.

Planned Corridors

The need for a limited number of new corridors is anticipated. Planned corridors should be restricted to the absolute minimum required to insure public safety and essential service. Every effort will be made by the service providers to design these new corridors so that the impact on habitat will be minimized. Table 1 provides summary information on each planned corridor. These corridors shall be incorporated in the Preserve Land Management Plans. The preserve landowner shall allow for the acquisition of easements for approved corridors. The planning and implementation of the new corridors shall be negotiated between the preserve landowner, the service provider or designated entity seeking the easements, the Coordinating Committee Secretary and the Coordinating Committee.

Special Use Tracts

A few tracts within the designated acquisition areas must be distinguished from the preserve tracts. Most of these sites contain some habitat for species of concern. Consequently, separate management plans will be developed for each individual tract to accomodate its special uses and to protect the species of concern.

1. Zilker Park and the Lower Barton Creek Greenbelt from Gus Fruh District Park at the horseshoe bend to Town Lake. This area is heavily congested with existing facilities and there will probably be a need for an unknown number of new facilities in the future. The park is heavily used for public recreational activities and contains numerous paved roads and parking lots. More access and parking may be added. The Fish and Wildlife Service gave no credit for Zilker Park as habitat preserve, nor has it been included in the tally of City of Austin preserve acreages. While Barton Springs pool does contain a species of concern, other management strategies shall be employed rather than habitat management of the park. The Lower Barton Creek Greenbelt from Gus Fruh District Part to Zilker Park has been included in the tally of City of Austin preserve acreages. Consequently, this section of the Greenbelt is to be designated a special BCCP recreational area with an individual management plan to be implemented by the City of Austin.

2. The L.C.R.A. Mansfield Dam Resource Area and County Recreational Area. Some portions of this tract resemble Zilker Park with respect to facilities and public recreational use, existing and future. No habitat credit was given for this acreage, nor was it included in the tally of LCRA preserve acreages.

3. Sandy Creek Park, McGregor (Hippie Hollow) Park, and Tom Hughes Park. These three Travis County/LCRA parks are also existing well-used recreational areas. No habitat credit was given for their acreages, nor were they included in the tally of LCRA preserve acreages..

4. The Water Treatment Plant No. 4 site. This 240.4-acre tract was purchased with utility revenue bond funds and reserved for the City's next major water treatment plant, a facility that will be critical to serving the future needs of Austin and to utilizing Austin's full state-appropriated water rights. The site is to contain a proposed City of Austin fire/EMS station, and the Lake Travis electric substation, the latter of which will be required for reliable service to the water treatment plant. In addition, a regional stormwater detention pond may be located on the site rather than downstream in the preserve. The Fish and Wildlife Service did not give habitat credit for the acreage of the site to be occupied by public facilities. An individual site management plan shall be developed for this tract that benefits the preserve while providing the public functions noted above. The property will be managed by the City of Austin, and those portions shown on the site plan to be used intensively for public facilities shall be removed from the area designated for preserve acquisition.

5. The isolated area within the designated preserve that comprises the portion of the Ullrich Water Treatment Plant site north of Red Bud Trail, and associated electrical facilities (including a substation), as well as an adjacent tract owned by the University of Texas near Tom Miller Dam. Once again, no habitat credit was given for this land. It is too small and isolated for effective management by the preserve authority. Although most of the Ullrich WTP site will be used for future facility expansion, the sloped areas near Bee Creek will be managed by the City to protect the areas of occurrence of species of concern. The site management plan shall retain this area (estimated to be about 24 acres) in the designated preserve system. The remainder of the two properties are to be removed from the area designated for preserve acquisition.

6. The Forest Ridge Water Reservoir and Pump Station Site is fenced and used exclusively for its water system functions. These facilities are critical today in providing water service to portions of NWA and NWB pressure zones. This 2.2-acre site is to be removed from the area designated for preserve acquisition.

7. The approximately 2-acre site for the WTP #4 raw water intake gate shaft facilities is to be removed from the area designated for preserve acquisition. A temporary construction easement of up to four acres will be needed adjacent to this site. The temporary easement can be used for habitat both before and after plant construction.

8. The Travis County Water Control and Improvement District (WCID) #17 water reservoir and pump station site, which will include the proposed Travis County Rural Fire Prevention District (RFPD) #5 fire station, is to be removed from the area designated for preserve acquisition.

9. If the small Guildford Cove Reservoir and pump station site is found to be within the area designated for preserve acquisition, then it also is to be removed from this designation.

10. The Uplands Water Treatment Plant site is currently about three and a half acres in size. It is proposed to be purchased by LCRA along with an additional five acres to accomodate plant expansion. This 8 1/2 acre site is also to be removed from the area designated for preserve acquisition.

Access Routes. Not all sections of infrastructure corridors can be accessed by routes within the corridors themselves. Some corridors and sites require access routes outside the corridors. The Preserve Land Management Plans and the Coordinating Committee Secretary shall allow access

routes to new and existing corridors, for utility employees and designated contractors, although alternative alignments of similar serviceability may be negotiated to replace existing routes in accordance with the guidelines for new construction and O&M. Access routes that lie outside infrastructure corridors shall be designated as Secondary B type corridors.

Preserve Land Management Plans will identify access routes to utility facilities and easements. Applicabale security precautions along private access routes may be necessary to ensure that unauthorized public access to preserve lands from such routes is not facilitated. Changes in access needs for utility activities should be negotiated with the Coordinating Committee Secretary. Utilities shall not allow non-utility related activities within their easements or access routes that might threaten preserve integrity.

III. Guidelines for New Construction in Approved Corridors

The purpose of these guidelines is to ensure that construction activity in approved infrastructure corridors will be conducted in the most environmentally sound, time saving and cost effective means possible. Coordinating Committee Secretary review and approval for construction activity within these approved corridors will be required (unless it is pre-approved by the Coordinating Committee Secretary).

Accidental Disturbance of Habitat

During project implementation, there may be times when habitat of species of concern is accidentally disturbed. Accidental disturbance shall mean the following:

1. Damaging, destroying, or removal of active nesting habitat;

2. Exposure of any significant karst features during excavation which have potential to be cave invertebrate habitat not yet designated by the Coordinating Committee Secretary.

In the event of such disturbance, the activity shall stop and the Coordinating Committee Secretary shall be notified within 24 hours of the disturbance. Construction cannot be reinitiated until written approval has been received by the Coordinating Committee Secretary.

Preliminary Engineering and Surveying

During the preliminary phase of a project it may be necessary to obtain data from the field in order to begin the design process. To obtain this data, it may be necessary to survey the proposed construction site and or corridors, obtain soil borings, dig test holes or use other means of acquiring information necessary to begin design and conduct environmental impact or other studies. Such activities have the potential of disturbing species of concern within their designated habitat areas within the corridors.

Notice shall consist of written communication with the Coordinating Committee Secretary at least three (3) working days in advance of the proposed activities during the nesting season (March 1 to September 1).

Any drilling, boring and digging within areas designated as potential cave invertebrate habitat shall be defined as minor construction.

Design

The design phase of a project is one of the most critical components in making a project successful. Proper planning is essential on any construction project in order to have a minimal effect on species of concern or their habitat. Therefore, the following guidelines have been developed to ensure accurate exchange of information and proper coordination during the design process, thus resulting in a comprehensive environmental review during the design phase prior to construction.

A. Minor Construction

Minor construction shall be defined as construction that will only require disturbance of an area no more than 3,000 square feet. If the proposed construction meets this criteria, the following will be required:

1. Construction plans or a sketch outlining the proposed construction activity shall be submitted to the Coordinating Committee Secretary ten (10) working days prior to construction.

2. The Coordinating Committee Secretary shall have five (5) working days from receipt of the construction plans submitted by the governmental agency or utility to approve, disapprove, or approve with modifications.

3. If the submitting utility provider or governmental agency has a proposed disturbance exceeding 3,000 square feet that may be considered minor, a written request may be submitted to the Coordinating Committee Secretary. The Coordinating Committee Secretary shall grant or deny the request within ten (10) working days of receipt. If the request is denied, major construction guidelines shall apply.

B. Major Construction

Major construction shall be defined as construction that requires the disturbance of an area greater than 3,000 square feet. If the proposed construction meets this criteria, the following will be required:

1. The Austin Area Utility Coordinating Council (AAUCC) has been established in the Austin area to foster an open exchange of information among private and public utilities, governmental agencies and construction related organizations and to promote cooperation among said groups. Construction plans shall be submitted to the Coordinating Committee Secretary and the AAUCC sixty (60) calendar days prior to the proposed construction activity. The AAUCC shall have no authority to approve or disapprove the proposed construction, but shall serve as a coordinating body between governmental entities and utility companies sharing corridors.

2. The Coordinating Committee Secretary shall have thirty (30) calendar days from receipt of the construction plans submitted by the governmental agency or utility to approve, disapprove, or approve with modifications.

3. The approval of construction plans by the Coordinating Committee Secretary does not relieve the engineer from the responsibility of securing approvals required by federal, state and local laws and ordinances.

Construction

In order to ensure the protection of the endangered species and habitat, the following guidelines have been established and require strict compliance during the construction phase:

A. Notification. Prior to any construction activity defined as major construction within the preserve corridor, the party responsible for construction shall conduct a pre-construction conference with all parties affected by and involved in the construction of the project. The Coordinating Committee Secretary or their representative shall be notified in writing five (5) working days in advance of the meeting. The conference will be held to discuss detailed information concerning the project to ensure maximum protection of the species and preserve.

B. Limits of Construction. Construction activity shall be confined to the areas designated as approved infrastructure corridors. The use of areas other than approved corridors for staging areas and access roads, shall require prior approval of the Coordinating Committee Secretary and/or USFWS.

C. Timing of Construction. Construction activity may occur during the nesting season (between March 1 and September 1) only with the approval of the Coordinating Committee Secretary, and only if site clearing to remove potential nest sites of endangered species has occurred prior to the nesting season. No nests of endangered species will be allowed to be disturbed once they become occupied during nesting season. The Coordinating Committee Secretary shall allow the continuation of construction activities for major projects that cannot be started and completed outside of the nesting season, and for which the costs of starting and stopping construction are excessive.

D. Erosion, Sedimentation Controls and Surface/Ground Water Quality Protection Systems. Erosion and sedimentation controls and water quality protection system items if required, shall meet guidelines established by the responsible governmental authority, and be installed prior to starting construction. Prior to adoption of guidelines by the responsible governmental authority such installation shall be made in accordance with the rules and regulations of the City of Austin, LCRA, Travis County or Texas Department of Transportation, whichever may apply. The erosion and sedimentation controls and water quality protection systems shall be maintained until revegetation is established and restoration is accepted by the Coordinating Committee Secretary.

E. Location of Facilities Within Approved Corridors. New construction of facilities will only be allowed at locations shown on the approved construction plans. If there is the possibility that a change in the vertical or horizontal location of facilities might have an impact on the endangered species habitat, the change shall require prior notification of the Coordinating Committee Secretary. The Coordinating Committee Secretary shall respond within three (3) working days.

F. Storage of Materials. Any hazardous chemicals and or materials shall be contained in a safe place with the person or entity performing the work taking whatever precautions are necessary to reduce the risk of such materials being accidentally released into the environment. In all cases, the use of these products shall be minimized and there shall be compliance with all laws and ordinances concerning the storage and use of these materials. The person or entity performing the work shall have an emergency response plan in place in case a spill should occur.

G. Restoration. Restoration will require revegetation of all disturbed areas using native grasses, forbs, and shrubs to ensure compatibility with the surrounding habitat, as detailed in the approved construction plans. All disturbed areas shall be monitored until revegetation is established and restoration is accepted by the Coordinating Committee Secretary.

H. Final Acceptance. When all construction activity is complete, the party responsible for the construction activity shall notify all entities affected by the construction, including the Coordinating Committee Secretary for final acceptance of restoration. The Coordinating Committee Secretary shall have 2 weeks from notification to give written final acceptance of restoration or define what additional measures are necessary to obtain final acceptance of restoration.

IV. Guidelines for the Operation and Maintenance of Facilities Within BCCP Preserves

The Coordinating Committee Secretary shall be notified of any planned maintenance within preserves by the various service providers or their contractors. The notification shall contain a brief description of planned work and approximate dates the work will be performed.

Some maintenance activities are required by Federal, State, County, or City laws and ordinances. The Coordinating Committee Secretary must make provisions that enable the service providers to abide by these legal requirements. The Coordinating Committee Secretary and the service providers will seek resolution of any conflicts associated with maintenance of the preserves and legally required facility maintenance activities.

Pre-Approved Maintenance

Service providers shall work with the Coordinating Committee Secretary to define and secure pre-approval for operation and maintenance activities that may occur within a given corridor. Where such maintenance activities are repetitive, mutually agreeable schedules shall be established, and notification shall not be required for every entry.
Problems identified during pre-approved operation and maintenance activity shall be scheduled with the Coordinating Committee Secretary for repair. Structural, facility, or equipment problems that threaten reliability or safety must be handled immediately. See "EMERGENCY MAINTENANCE."

Emergency Maintenance

For the purposes of this section, an emergency shall involve an existing condition of, or imminent threat to, public health, safety, property damage, or loss of service.

The various service providers may need to perform emergency maintenance within the preserves due to such conditions as equipment failure, pending equipment failure, storm damage, downed tree removal, culvert clean-out, emergency facility repair and maintenance, or other circumstances beyond the service provider's control. The equipment used during the emergency can vary widely and is dependent upon the circumstances surrounding the emergency. Work done under these circumstances may impact species of concern; however, it shall be done in such manner as to minimize disruption.

Efforts shall be made to contact the Coordinating Committee Secretary for advice and guidance during emergency maintenance work. However, the service providers must and will move quickly to eliminate the emergency condition. Written notification describing the emergency maintenance work done shall be sent to the Coordinating Committee Secretary within five (5) working days after any such work is completed.

Scheduled Maintenance

The Coordinating Committee Secretary shall be notified in advance of any maintenance activities not covered under "Pre-Approved Maintenance" and "Emergency Maintenance." The planned work and schedule shall be submitted in writing to the Coordinating Committee Secretary for review and comment, and the work shall proceed under the terms negotiated between Coordinating Committee Secretary and service providers. This type of scheduled work could consist of major facility replacement, repair and maintenance, installation of cross and driveway culverts, grading and re-shaping of ditches, and clearing of right-of-way.

Maintenance of Corridors

1. Access to all facilities shall be established and maintained. As the management plan for each preserve tract is developed, the Coordinating Committee Secretary shall work closely with the service providers to designate specific access routes to all structures and facilities, consolidating access routes where possible and minimizing impact on the species of concern.

   The access routes may require some clearing at the time access is needed. The maximum width of these access routes shall be twenty feet (20'), except that they may be wider in any curve to allow for clearance of truck booms.

2. Existing cleared areas near structure sites shall be used where possible to reduce clearing requirements. Existing low-lying vegetation at structure sites shall be preserved to the maximum extent possible. If needed, additional clearing at structure sites shall be limited. Service providers shall work closely with the Coordinating Committee Secretary whenever manipulation of vegetation is required to ensure minimal impact on species of concern.

3. Clearing and trimming along the corridors shall be limited to the following:

   a. Minimum clearing for surveying purposes (typically a four foot [4'] line of sight).

   b. Mechanical removal or trimming of vegetation detrimental to the operation and maintenance of facilities. Chemicals for vegetation control may be used only within the guidelines approved by the Coordinating Committee Secretary. Requests to use chemicals may be approved on a case-by-case basis.

   c. Removal of all fast growing trees -- such as Chinese Tallow, Chinaberry, Cottonwood, Mulberry, and Hackberry trees — directly under electric transmission line conductors, and trimming of tree limbs to provide at least twenty (20') feet of clearance from transmission conductors.

   d. Trimming of trees or limbs to provide at least six feet (6') of clearance from electric distribution conductors for span lengths up to two hundred feet (200'). If span

lengths exceed two hundred feet (200'), an additional one foot (1') of clearance will be required for each one hundred fifty feet (150') length.

e. Clearing and trimming guidelines for roadway rights-of- way are stated in the Travis County Roadway Clear Zone Criteria (Table 3).

4. All trees and limbs cleared from the corridors shall be shredded, chipped, or hauled from the site. With the approval of the Coordinating Committee Secretary, trees and limbs or shredded mulch cleared from a corridor may be left in piles outside the corridor for use in remediation projects. Special handling for oak trees exhibiting oak wilt mya be necessary.

5. Sedimentation control measures will be installed and maintained in accordance with guidelines established by the Coordinating Committee Secretary. Prior to adoption of uniform guidelines by the Coordinating Committee Secretary, such installation shall be made in accordance with the rules and regulations of the City of Austin, LCRA, Travis County or Texas Department of Transportation, whichever may apply.

6. All excavated materials requiring disposal shall be removed from the corridor to an approved dump or fill area.

7. Any cleared land areas shall be re-vegetated with native grasses, forbs, and/or shrubs to re-stabilize vegetative cover within the approved time period.

8. The Coordinating Committee Secretary and the service providers may develop and agree to clearing guidelines on a site-by-site basis that may modify and/or supplement the guidelines stated in this section.

TABLE 1. BCCP PLANNED CORRIDORS

No.	MacroSite & USGS Quad	Primary User	Description
2	Lake Travis Bee Cave Quad	COA Electric*	This corridor is established to provide 12.47 KV overhead electric feeder ties with existing electric distribution facilites. These feeder ties are necessary to provide new electric service to property adjacent to the preserve. In addition, these corridors are necessary due to the limited availability of feeder tie routes due to the development of the BCCP. The BCCP, as proposed, creates limits for electric line extensions and isolates existing feeders and substations, reducing the reliability of the distribution system without the corridors. Corridor width -- 15 feet.
3	Lake Travis Bee Cave Quad	COA Electric	Same as #2 above.
5	S. Lake Austin Bee Cave Quad	COA Electric	Proposed 138 KV transmission circuit from the Lakeway substation to the Trading Post substation appears to run near or alongside a habitat area. This circuit would integrate proposed substations and provide increased overall system reliability by completing a loop in the COA electric transmission and substation system. Will probably require 100-ft. wide ROW, none of which is to actually be inside the habitat preserve.
7	N. Lake Austin Bee Cave Quad	COA Electric	Same as #2 above.
9	Barton Creek Bee Cave Quad	COA Electric	Same as #2 above.
10	Barton Creek Bee Cave & Austin W. Quads	COA Electric	Same as #2 above.
16	Barton Creek Austin W. Quad	COA Electric	This distribution line will be utilized to tie existing 12.47 KV overhead feeders to ensure the reliability of the electric distribution system in the area and to prevent extended outages. 15-ft. width.
21	Barton Creek Austin W. Quad	COA Electric	Same as #16 above.
22	Barton Creek Austin W. Quad	COA Electric	Same as #16 above.
27	N. Lake Austin Austin W. Quad	COA Electric	This distribution line, with the others listed here, will provide ties between existing 12.47 KV overhead electric feeders. The Electric Utility has attempted to complete a number of these ties in the past. Property owners have been reluctant to grant easements due to development plans being unresolved or the property potentially going on the market. Routes along City Park Road and other roads have met with resistance from residents of the area due to the scenic views from the road. The route of this specific facility is expected to be along an existing road and telephone lines. 15-ft. width.

No.	MacroSite & USGS Quad	Primary User	Description
31	N. Lake Austin Austin W. Quad	COA Electric	This distribution line will provide a tie between existing 12.47 KV overhead electric feeders.
33	N. Lake Austin Jollyville Quad	COA Electric	Same as #31 above.
38	Cypress Creek Jollyville & Mansfield Quads	COA Water/WW	Intake tunnel shafts for WTP #4 raw water supply.
41	Cypress Crk & Bull Creek Jollyville Quad	COA Water/WW	Raw water tunnel -- gate shaft to WTP #4.
43	Bull Creek Jollyville Quad	COA Electric	Proposed transmission line to connect the Lake Travis substation to the existing transmission system. Two separate transmission corridors provide required reliability for the treatment plant. ROW widths of up to 50 feet may be required.
44	Bull Creek Jollyville Quad	COA Electric	Same as #43 above except that it parallels the existing River Place Blvd. Directly ties together the River Place and Lake Travis substations.
46	Bull Creek Jollyville Quad	COA Water/WW	Route of a 48-in. water main from WTP #4 to the existing 48-in. Forest Ridge NWA main. This was anticipated to be open cut construction. Minimum 25-ft. width.
51	Bull Creek Jollyville Quad	COA Electric	Necessary to provide a route for 12.47 KV overhead distribution feeders from the new Angus Valley substation to areas near Forest Ridge.
54	Bull Creek Jollyville Quad	COA Water/WW	Route of a very large transmission main from WTP #4 to the NWA pressure zone. The route through the habitat preserve is to be tunnelled.
101A	Barton Creek Bee Cave Quad	COA Electric	Proposed 138-KV transmission circuit from the existing Patton Substation to the proposed Hwy 71 and Trading Post Substations. This circuit would integrate proposed substations and provide increased overall system reliability by completing a loop in the City electric transmission and substation system. 50 feet of additional easement parallel to Hwy 71 ROW will be required.
119	Cypress Creek Jollyville & Mansfield Quads	Cedar Park Water/WW	This is a proposed expansion of an existing corridor. A raw water intake main from Lake Travis to the City of Cedar Park is within a 30 ft.-wide easement. The proposal is to expand the easement another 25 feet (to 55 feet total) and place a second raw water intake line within it.

* Electric corridors listed here may be used by other service providers, such as Southwestern Bell and Austin CableVision.

TABLE 2 BCCP ROADWAY CORRIDORS

NO.	CORRIDOR DESCRIPTION	DESIGNATION	EXISTING R.O.W.	MAX WIDTH NEEDED
101*	SH 71 (W)** RM620 - US290 (W)	Primary A	120-180 (MAD4)	350
102	RM 2244 (Bee Cave Rd.)/SH45 SH71(W) - 1 mile east (SH45) 1 mile east - Crystal Creek Dr.*** Crystal Creek Dr. - Barton Cr. Bl.***	Primary B	130-200 (MAD4) 200-250 (MAD4) 155-400 (MAD4)	450 450 450
103	Southwest Parkway SH45 - SH71 (W) SH71 (W) - Wm. Cannon	Secondary A	--- 150 (MAD6)	
104	Travis Cook Rd/Barton Creek Blvd. S.W. Pkwy - Lost Creek Blvd.	Primary A	60 - 80 (MNR2)	120
105	Old Bee Cave Rd/Arterial #12 Hwy 71 - S.W. Parkway	Secondary A	60 (MNR2)	
106	Catholic Diocese (private drive)	Secondary A	?	
107	Intersection Modifications at SH71/RM 2244/SH45	Primary A	?	500
108	Loop 360 US 290 (W) - Walsh Tarlton Walsh Tarlton - Westlake FM 2244 - Lake Austin RM 2222 - US 183	Primary A	240-450 (MAD4) 240-325 (MAD4) 290-630 (MAD4) 250-635 (MAD4)	500 450 680 685
109	Loop 1 (MoPac Blvd) - US 290(W) - Loop 360	Primary B	540-1200 (PKY4)	(Add. 100)
110	Lost Creek Blvd. Loop 360 - Travis Cook Rd.	Primary B	80 (MNR2)	110
111	City Park Road City Park - RM 2222	Secondary A	(70MNR2)	

BCCP ROADWAY CORRIDORS

NO.	CORRIDOR DESCRIPTION	DESIGNATION	EXISTING R.O.W.	MAX WIDTH NEEDED
112	RM 2222 **	Primary A		
	Riverplace Blvd. - Tumbleweed		100-180 (MAU4)	400
	Tumbleweed - Jester Blvd.		100-240 (MAU4)	400
113	Spicewood Springs Road	Primary B		
	Loop 360 - Old Lampasas Trail		70 (MNR2)	120
114	RM620/SH 45	Primary A		
	SH 71 (W) - Debba Ln.		120-250 (MAD4)	300
	Debba Ln. - Quinlan Park Rd.		120-250 (MAU2)	300
	Quinlan Park Rd. - RM 2222 (SH45)**		100-250 (MAU2)	450
	RM 2222 - US 183(SH45)***		100-150 (MAD4)	450
115	Commanche Trail	Secondary A		
	RM 620 - Oasis Bluff		50 (MAU2)	
	Oasis Bluff - Terminus		50 (MAU2)	
116	Bullick Hollow Road	Secondary A		
	RM 620 - Oasis Bluff		50 (MNR2)	
	Oasis Bluff - FM 2769		50 (MNR2)	
118	RM2769 (Volente Rd.)	Primary B		
	Anderson Mill Rd. - RM620		100-120 (MNR2)	
121	Lime Creek Road	Secondary A		
	Volente - Bullick Hollow Rd.		80 (MNR2)	
	Bullick Hollow Rd. - RM 620		100-120 (MNR2)	
124	Oasis Bluff	Secondary A		
	Commanche Trail - Bullick Hollow		30'	
125	Four Points Drive	Secondary A	100	
NA	All other dedicated public roadways that may cross or infringe on designated preserve, including Greenshores Drive, Oak Shores Drive, Pearce Road, Murfin Road, Kollmeyer Drive, Two Coves Drive, Westcliff Place., etc.	Secondary A	---	

KEY TO ROADWAY CLASSIFICATIONS:

FWY	Freeway
PKY	Parkway
EXP	Expressway
MAD****	Major Arterial - Divided
MAU	Major Arterial - Undivided
MNR	Minor
COL	Primary Collector

NOTES:

* Need additional utility easement for electric transmission facilities: 50 feet in addition to widths listed along this section of State Highway 71.

** SH71, RM 620 and RM2222 are to be mitigated at a 5 acre to 1 acre ratio where preserves abutt the roadways on both sides.

*** No offsets or mitigation necessary for the "lobed" preserve acquisition areas east of Creeks Edge Parkway.

**** A "MAD" designates a roadway divided either by a raised median, flush center left turn lane, or a central drainage ditch. The choice of one or the other is to be made in the roadway design and construction process.

TABLE 3

TRAVIS COUNTY ROADWAY CLEAR ZONE CRITERIA

	DESIGN SPEED	CLEAR ZONE WIDTH
With roadside drainage (Rural section)	45 MPH or greater 40 MPH or less	30' min.* 16' min.*
With curb & gutter (Urban section)	ALL	6' min.**
Access roads within County-owned or leased property (parks, detention center, etc.)	ALL	6' desirable

* May be reduced to an absolute minimum of 10' when the average daily traffic volume is less than 750. May also be reduced in limited cases consistent with AASHTO criteria.

** Trees may be planted in the center of medians measuring at least 14' face-of-curb to face-of-curb if the trees do not restrict vehicle sight lines.

NOTES:

1. The clear zone is the area adjacent to the roadway that allows an errant vehicle to recover without striking an unyielding object. It is measured from the edge of the traveled lane (typically the outside edge line or face-of-curb).

2. Trees growing to a diameter of 6" or less at maturity are considered YIELDING OBJECTS; trees growing to a diameter of greater than 6" at maturity are considered UNYIELDING OBJECTS.

3. Unyielding trees may remain in the clear zone if protected with guardrail installed consistent with accepted engineering practice. This typically requires a minimum of 2' from the tree to the back of the guardrail. Yielding trees typically should be set back a minimum of 3' from the edge of the traveled lane.

4. Vertical clearance from roadway surface to overhanging tree branches shall be a minimum of 14'6" on arterial roadways. Lesser clearances are acceptable on lower classes of roadways.

APPENDIX "C"

COMMENTS ON DRAFT EIS/HCP

BALCONES CANYONLANDS CONSERVATION PLAN:
DRAFT ENVIRONMENTAL IMPACT STATEMENT COMMENTS

The following individuals offered comments on the draft EIS or general support or opposition to the Plan:

Mr. Roger Baker
Mr. Frank Belanger
Mr. Steve Beers, Sierra Club: Austin Regional Group
Ms. Ramona Blodgett
Ms. Nan Bracken
Mr. Robert Brandes
Mr. William Bunch, SOS Legal Defense Fund
Mr. Robert Carnes, Capitol Area Builders Association
Mr. Thomas Combs
Ms. Dorothy Combs
Mr. Alan Glen, the Real Estate Council of Austin
Mr. Tod Grubbs
Ms. Cynthia Hestand
Mr. Russ Hyer, National Wildlife Federation
Mr. Burgess Jackson
Ms. Sharon Jenkins
Mr. Tim Jones
Mr. Mel Jordan
Mr. Thomas Kam
Mr. John Kelly, Travis Audubon Society
Ms. Susan Lefler
Ms. Floy Lilley
Ms. Melody Lytle
Mr. Ray Mathews, Texas Organization for Endangered Species
Ms. Amy McElhenney, the Real Estate Council of Austin
Ms. Beth Morian
Mr. Bill Pohl
Ms. Margaret Rector
Mr. Eric Samson
Mr. Phil Savoy
Mr. Robert Singleton
Mr. Craig Smith, Save Barton Creek Association
Ms. Karen Strot
Mr. Bryan Sybert
Ms. Pam Thompson
Mr. Charles Tischler
UT Society for Conservation Biology
Mr. George Veni
Ms. Joanne Yancey, Southwestern Bell Telephone

COMMENTS RELATING TO FUNDING AND COST

COMMENT:

Trying to finance the Plan to a large extent on development fees will result in financial failure and thus failure to complete the preserves. That failure will result in favoritism to early certificate users (i.e., certain developers) and a bad situation for almost everyone else. Certain developers will get their certificates quickly and clear their land. When the Plan unravels, it will be too late to stop them but their competitors will be thwarted by the lack of a viable incidental take permit.

RESPONSE:

The USFWS does not agree that depending on development funds for the acquisition of the last approximately 9,500 acres will result in failure. If developers participate in the BCCP, funds will become available for acquisition of additional lands and as long as this process continues, the goal of the BCCP will be attained.

The BCCP is not expected to fail; however, if the BCCP fails, there would be no favoritism to a developer who may have already met all the requirements of the issued permit. This is because there are no criteria or ranking factors for the purchase of Participation Certificates nor will there be a limited number of certificates issued at any one period. Any person may purchase a certificate and be included in the BCCP.

Additionally, if the BCCP permit were to fail, a developer could obtain an incidental take permit on their own. However, as you indicated, the BCCP would be .."a viable incidental take permit" and when it is in force all parties can participate under its umbrella.

COMMENT:

The Shared Vision of the BCCP indicated that mitigation fees were for acquisition only. It now appears that certificate fees are going to operation and maintenance of the preserves. This is a shift in the economic burden to the private sector.

RESPONSE:

The pro forma in Exhibit A of Appendix A shows a contingency of $100 of the $5,500 fee is set aside for possible shortfalls in the small landowner and agricultural categories. Operation and maintenance is an integral component of preserve acquisition. The taxes redirected into the Plan by Travis County will also be used for operation and maintenance.

COMMENT:

The cheap land has already been obtained. The remaining lands will be more expensive.

RESPONSE:

That is correct. However, the $5,500 per acre fee is not based on the cost of the cheap land.

COMMENT:

Please show the backup material for justifying the cost of the Mitigation or Participation Certificates along with the annual proposed cost to acquire the Certificates over the Plan's projected acquisition period.

RESPONSE:

That information is provided in Exhibit A of Appendix A of the draft and final EIS/HCP.

COMMENT:

The BCCP should not be put into place without first successfully addressing its fatal flaw - financing. The USFWS should undertake an independent financial analysis of the cost of acquiring the remaining lands. This should be done with qualified, independent appraisers.

RESPONSE:

A critical component of incidental take permits is financing. However, all the funds do not have to be present at the time of permit issuance. The HCP can identify methods for collecting funds as a part of its permit. The USFWS is satisfied with the funding projections prepared by the applicants.

One important criterium for issuance of an incidental take permit is that the mitigation occurs prior to "take" of the species. The Plan currently has acquired approximately 21,000 acres and has established a process for acquisition of the remaining approximately 9,000 acres. Incidental take permits that cover large areas, such as the BCCP, and even some smaller permits have HCP's that propose phased mitigation for situations when all mitigation funds are not available at initiation. In these permits, funds are collected from development activities that proceed under the permit. This is the case for the BCCP. The USFWS believes there is adequate mitigation and funding at this time to allow the permit to proceed.

COMMENT:

The financial integrity - acquisition costs, operations and maintenance costs, etc. - of the BCCP has been questioned throughout its formative years. On 10 April, 1995, the full membership of the last of the three committees, that worked on and drafted the BCCP signed a letter that stated, "In spite of our recommendation, we share a concern about the financial viability of the plan." In view of the widespread concerns from these and many other interested parties over the financial viability of the BCCP, what is the justification for USFWS to approve this Plan? If the BCCP falters what is USFWS's position? Proposed solution?

RESPONSE:

The BCCP meets the issuance criteria of an incidental take permit. The fact that all the money is not available prior to permit issuance is not the primary determining factor for issuance.

One significant criteria for issuance of an incidental take permit is that the mitigation is guaranteed prior to "take" of the species. The Plan currently has a significant amount of land acquired for mitigation of incidental take. Large area permits, such as the BCCP, and even some smaller permits have phased mitigation for situations when all mitigation funds are not available up front. In these permits, funds are collected from development activities that proceed under the permit. This is the case for the BCCP and the USFWS believes that there is adequate mitigation at this time to allow the permit to proceed.

If unforeseen events occur, the USFWS and the permittees would review the cause and recommend ways to get the process back on track. The goal would be to accomplish this without suspending or revoking the permit. Developers that purchased Participation Certificates that completely covered their development would be allowed to complete, without any additional requirements, their project under the issued permit.

COMMENT:

There is much skepticism regarding the validity of the estimated acquisition price of the remaining 9,940 acres. Please provide the backup data used to verify the costs of acquiring the remaining preserve acreage. Was the accuracy of this data verified? If so, how?

RESPONSE:

The backup data regarding land acquisition costs and projected costs is included in Exhibit A of Appendix A of the draft and final EIS/HCP. Additionally, prices paid by the City for preserve lands within the South Lake Austin preserve average $3,897 per acre excluding the RTC purchases. In the Bull Creek preserve, a 292 acre tract was purchased for $5,400 per acre and one 236 acre tract was purchased for $12,712 per acre. The price difference is based upon highest and

best use development potential and utilities available to the latter tract. All tracts within the proposed preserves do not have the same development potential and utilities. Therefore, the actual sale price will vary.

The $5,500 per acre fee for Participation Certificates is reasonable and based on actual comparable sales for property at the time of the calculation. Comparable sales will change with the ever changing real estate market. As the market changes, the land acquisition costs will change and the per acre fee for the Participation Certificates may change accordingly.

The acquisition of land by the City of Austin and Travis County will continue to be based on the current fair market appraised, as determined by an independent fee appraiser, value taking into consideration comparable sales, utilities, access, location, and other factors at the time of the acquisition. The estimated projection of $5,500 per acre is based on these factors, current economic conditions, comparison of documentation from other property values and is the current cost of Participation Certificates in the BCCP.

COMMENT:

The acquisition timeline is theoretically projected out for possibly twenty years. Please provide the backup data and verification showing the per acre and total acquisition cost projections for this or any other timelines used.

RESPONSE:

These projections can be found in Exhibit A of Appendix A.

COMMENT:

Please provide data showing the acquisition price if all of the remaining acreage could be acquired today. What is today's acquisition price of the yet unacquired preserves? Please provide the backup data used.

RESPONSE:

These projections can be found in Exhibit A of Appendix A.

COMMENT:

How does the 4,023 acre Sweetwater and Uplands tracts figure into the acquisition calculations? Also, is it used in the preserve $5,500/acre acquisition calculations?

RESPONSE:

The Uplands and Sweetwater tracts reduce the amount of remaining acreage to be acquired for the completion of the preserves. The cost of these tracts was not used in the calculation of the cost of the Participation Certificates.

Fairness and concern for all property owners in Travis County has been a concern of this Plan since the formation of the first committee in 1988. However, the attempts of various groups over the past 7 years has not resulted in a revenue source that would allow the acquisition of the subject lands in a shorter period of time. The Permit applicants and the USFWS are concerned about this issue and intend to continue to investigate additional funding sources.

COMMENT:

The Plan is financially flawed and preserve acquisition is impossible.

RESPONSE:

We believe the Plan and the proposed funding is sound. The funding is not available at the rate all parties prefer. Almost 21,000 acres of the preserve lands are already acquired and we believe that it is possible for the permit holders to acquire the remaining approximately 9,000 acres to complete the preserve system.

COMMENT:

As the BCCP Plan is written, the cost of implementation will fall on a group of individual landowners with results intended to benefit the public at large. This concept has been rejected in a vote on the BCCP by the Travis County voters. The vote against the BCCP also made clear that the residents of this county do not believe they should be made to pay for the cost of such a plan.

RESPONSE:

The cost of implementation of the BCCP will fall on all residents of Travis County. City of Austin voters passed two bond items that were used to acquire significant acres that count towards the approximately 30,500 acres required for the BCCP permit. Additionally, the City and Travis County have indicated that the majority of the operation and maintenance costs will be obtained from other sources. Travis County will be redirecting a portion of taxes from development that occurred as a result of the Plan back into the Plan.

The voters of Travis County voted on a bond package to purchase lands for the BCCP. They did not vote on the concept or goals of the BCCP. The majority of the voters within Travis County reside in Austin and had already passed bond items that totaled approximately $42 million for purchase of lands. Discussions with voters after the bond election indicated that some individuals voted against the package because they did not want TPWD to manage the preserves, Barton Creek Properties to be able to build, and/or additional taxes. It is far too simple to state the bond election failed because the citizens did not support the BCCP.

The developers assist in paying for the preserves by purchasing Participation Certificates and they will benefit because the BCCP streamlines the process for and reduces the cost of complying with the requirements of the Endangered

Species Act. The citizens of Travis County will benefit from the BCCP by the presence of large areas of open space, reduced air and water pollution, and possible recreation opportunities.

COMMENT:

The funding for the operation and management of the preserve lands is not adequately described in the draft EIS.

RESPONSE:

The funding for operation and maintenance will come from the entity that owns the property or the City of Austin and Travis County. This has been clarified in the final EIS/HCP.

COMMENT:

The current fee for the participation certificates is $5,500 per acre, several times that amount will likely be needed and the acquisition cost will likely increase over time as a result of inflation and rising land values.

RESPONSE:

Participation Certificates are for compliance with the BCCP permit for activities outside of the preserve boundaries. The current fee for participation certificates was based on the cost of tracts of land purchased by the City of Austin in the preserve areas. The Plan includes discussion that the cost of the participation certificates will be indexed periodically to reflect the cost of preserve acquisition.

COMMENT:

The cost for the small developer will be such that they cannot afford the $5,500 per acre participation certificate and the cost for the large developer will surely be less if they participate on their own. This will likely result in the Plan not collecting adequate funds to complete the preserves.

RESPONSE:

Participation in the Plan is voluntary and the cost per development cannot be determined until it is specifically evaluated. The benefits of the Plan to all participants is that it shortens the time necessary to comply with the Endangered Species Act; thus, participation reduces the delay between the time a development is proposed and the start of construction. This reduces the cost of lawyers, realtors, interest charges, and consultants, all of which are not required for the participation in the Plan. Additionally, miscellaneous real estate, and operation and maintenance costs are not required for participation in the Plan, whereas they would be part of the cost for the developer to obtain authorization under the Act on their own. Overall, Participation Certificates for the Plan will be less for the developer than obtaining individual authorization under the Act on their own. A

small landowner provision is included in the Plan to reduce the cost for low impact activities.

COMMENT:

The projected cost of the proposed preserve lands is not based on reality, fact or appraisals. A survey of landowners within the proposed preserve resulted in an asking price of $28,646 per acre as opposed to the $5,500 per acre proposed by this plan.

RESPONSE:

The City of Austin, as part of the Barton Creek Wilderness Park, acquired several tracts that were less than 100 acres in size and in excess of $60,000 per acre. However, the average price for this 955.32 acre project was $18,335 per acre.

The prices paid by the City for preserve lands within the South Lake Austin preserve average $3,897 per acre, excluding the RTC purchases. In the Bull Creek preserve a 292 acre tract was purchased for $5,400 per acre and one 236 acre tract was purchased for $12,712 per acre. The price difference is based upon development rights and utilities available to the later tract.

Any tract that the City of Austin has or will acquire is appraised on its own individual merits, using comparable sales for the subject tract. An appraisal provides the specific details of a property and reflects the maximum that can be legally developed on the subject tract and absorbed into the market.

The acquisition of land by the City is based on the current fair market appraised value, taking into consideration comparable sales, utilities, access, location, and other factors at the time of the acquisition. What the land owner desired for the property, as was indicated in your survey, was not considered. The estimated projection of $5,500 per acre is based on these factors, in addition to current economic conditions, and comparison of documentation from other property values. Thus it is the current cost of Participation Certificates in the BCCP. This cost estimate is not, nor has it ever represented, the projected per acre cost in twenty years.

MISCELLANEOUS COMMENTS

COMMENT:

How high/low does FWS rate the BCCP's chances of success?

RESPONSE:

The USFWS believes that the BCCP will be a successful incidental take permit with total preserve acquisition resulting within the life of the permit.

COMMENT:

The conditions imposed by the Plan will render my land worthless and unmarketable.

RESPONSE:

This process was developed to assist small and large landowner/developers. The Plan reduces the number of steps to be negotiated and the time involved. The Plan provides a known commodity to a developer, who has consistently requested a known cost or process so they could proceed. Based upon discussions with developers on projects throughout Travis County, this Plan will assist the development process on property outside of the proposed preserves.

COMMENT:

The privatized alternative did not receive a detailed evaluation and a more detailed evaluation would be constructive.

RESPONSE:

The privatized alternative did not receive more detailed discussion because the proponents of that alternative did not provide any more details. The use of conservation easements and other means to lower preserve acquisition and management costs are part of the preferred BCCP alternative.

COMMENT:

The HCP/DEIS contradicts itself in the summary chart and text with reference to surface and groundwater supplies. The chart indicates that significant adverse impacts are likely outside of the preserve areas and subsequent reference to a letter indicates that water quality will be protected by local ordinances. Additionally, the document does not address the impacts of a change in local ordinances and impact of activities outside the authority of local ordinances. Therefore, the NEPA requirements of analyzing environmental impacts is not met.

RESPONSE:

The analysis in the document adequately addresses the environmental impacts of the Plan. The document presented an analysis of the water quality impacts based on local, regional and state requirements. This analysis considered the recent legal actions regarding the SOS ordinance.

The contradictions identified in the draft EIS/HCP have been corrected to identify the impacts that are expected.

COMMENT:

The HCP/DEIS presents more of a conceptual framework for developing an actual HCP and an environmental impact analysis and does not provide sufficient specificity for actually determining what is allowed and what is prohibited.

RESPONSE:

The HCP/DEIS identified the alternatives that were reviewed, the species that would be taken, the preserves that would be established and the funding sources to complete the Plan. That is what is required for an HCP. NEPA requires the evaluation of the impacts of the action, issuance of an incidental take permit, on the areas that would not be allowed to proceed without the proposed action. The final HCP/DEIS has been modified to improve the clarity of the specific actions called for as part of Alternative 2 and 3.

COMMENT:

Does the permit authorize complete disregard for endangered species by persons who live and work in the development that is authorized?

RESPONSE:

The permit covers incidental take associated with grading, clearing, or earth moving activities necessary for residential, commercial, or industrial construction and infrastructure projects as well as the indirect impacts, such as noise, predation, and harassment, that result from the occupancy of these structures. This permit does not authorize individuals to kill or collect the federally-listed species for the purpose of sale or possession. Participants may not clear during the nesting season unless a current season survey indicates no nesting within 300 feet of the proposed clearing.

COMMENT:

Will the Plan be dependent on the Balcones Canyonlands National Wildlife Refuge? What will happen to the Plan if the refuge is not completed.

RESPONSE:

The BCCP and the refuge are separate actions needed to protect federally-listed species in Travis County. They are dependent upon each other to accomplish this

task. If the refuge does not complete the proposed land acquisition, the BCCP permit and Travis County will not be impacted; but, the USFWS will have to initiate some program to aid in the protection of the resources in the Post Oak Ridge area.

COMMENT:

Because most landowners were not involved in the preparation of this plan, they will likely be unwilling to sell their land. The preserves will likely face serious fragmentation due to in-holdings and bisection by roadways and corridors.

RESPONSE:

Whether or not each landowner sat on one or all of the various committees does not mean their concerns were not taken into consideration. The BCCP process has included the landowners or their elected representatives since it began in 1988. Additionally, the process has always been open for comments and recommendations from all residents.

Statements have been made that elected representatives did not actually represent the individual that owned small parcels. The USFWS recognizes those concerns but cannot agree that landowners were left out of the development of the BCCP.

Current information indicates that a number of the landowners want to keep their land as it is and others want to sell. The fact that a landowner does not want to sell does not mean the preserve is or will be fragmented with respect to vegetation structure. Multiple ownership within a preserve block may make management operations more difficult but it does not negate the goal of limited fragmentation.

COMMENT:

Landowners are suspicious of the motivations of Plan proponents. Frequently heard is that USFWS is desperate for a success story to aid re-authorization of the ESA.

RESPONSE:

There may be some landowners suspicious of the motivations of the Plan proponents. However, many landowners have expressed their support for the Plan through a City of Austin bond election, through support expressed at public meetings, and through informal conversations.

Success of the BCCP will not likely have an impact on the re-authorization of the Endangered Species Act. The Act will be re-authorized based on a much broader picture than a single permit in Texas.

The drive for the success of the BCCP comes from the applicants' desire to protect the natural resources of Travis County and the USFWS's mission to conserve the fish and wildlife and their habitats for the continuing benefit of the American people. The BCCP will fully comply with our mission.

COMMENT:

While the BCCP effort is laudable in its goal of providing suitable habitat and relief to the property owner, it has fallen short.

RESPONSE:

The BCCP provides an excellent example of the cooperation between developing entities and concerned citizens to protect the natural resources of the area while allowing development to continue.

COMMENT:

"It is our opinion that the cost of program implementation is a vital element of the BCCP Plan and EIS. Under Section 4(b)(2), Fish & Wildlife is charged with making economic impact assessments:

(2) The Secretary shall designate critical habitat, and make revisions thereto, under subsection (a)(3) on the basis of the best scientific data available and after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat...

To restate the point, under the proposed BCCP, the cost of compliance is in many instances greater than or equal to the cost of the land. It poses a burden that, under the U.S. Constitution, would be considered to be a take, and as such should be excluded by the Secretary under Section 4(b)(2)."

RESPONSE:

There is no relationship between the designation of critical habitat, as discussed in section 4(b)(2) of the ESA, and the preserves that are identified in the BCCP. However, the proposed preserves of the BCCP are the best habitat in Travis County and in the range of the golden-cheeked warbler.

Your statement that the cost of the mitigation exceeds the cost of the land and therefore "would be considered a take," has not been the case in the section 10(a)(1)(B) permits previously issued in Travis County, Texas. The Service has worked with a number of applicants and come to agreement as to mitigation

required for issuance of a permit. The BCCP is a process that will eliminate several costs associated with obtaining an individual section 10(a)(1)(B) permit.

COMMENT:

The plan appears to only benefit the developers, the City of Austin, and Travis County.

RESPONSE:

The BCCP benefits all the citizens of Travis County and the country by finding common ground to allow development to proceed while considering and protecting the natural resources of the area.

COMMENT:

Federal money is being used now to destroy habitat.

RESPONSE:

Federal money is being used to protect the federally-listed species in accordance with the requirements of the Endangered Species Act and the species' recovery plans.

COMMENT:

The Plan is based on politics and development, not biology.

RESPONSE:

The Plan was initially based on biology and then adjusted by the permit holders as a result of economics, politics and development needs.

COMMENT:

If a new species is found within the permit area, the plan appears to say it is covered with respect to the Endangered Species Act.

RESPONSE:

The Plan does not cover newly discovered species. However, it does cover the species identified in the list in Chapter 2, section C. 3. of the final EIS/HCP.

COMMENT:

Does this Plan give the City of Austin any control on lands outside of their ETJ?

RESPONSE:

This Plan does not alter the land use controls that the City of Austin is authorized by the State of Texas.

COMMENT:

There is no support in this community to spend the kind of money to acquire the land, there is no support from Washington, and the State of Texas is not offering any money.

RESPONSE:

The community, through the City of Austin, and the Federal government are putting a significant amount of money into this Plan. The City of Austin voters approved two bond items that have authorized the expenditure of approximately $42 million dollars for lands that contribute to this Plan. The Federal government has acquired approximately 13,000 of 46,000 acres that will benefit this Plan. To date, the State of Texas has not dedicated funds for acquisition or management of the proposed preserves in this Plan.

COMMENT:

The ESA will almost certainly be changed by legislation and/or pending Supreme Court decisions. Is it necessary to go forward now, when such changes might severely alter any such plan? After seven years or more, why not wait a little longer?

RESPONSE:

Re-authorization of the Endangered Species Act was due in 1992 and has not taken place at this time. Additionally, there is no guarantee when re-authorization will occur or whether the Act will be changed when it does occur. Landowners in Travis County have asked for a means in which they could proceed with development while still protecting the resources of the area. At this time, the applicants want to proceed and the USFWS concurs.

COMMENT:

Do I have to go to the USFWS or get a permit from the BCCP to run my ranch?

RESPONSE:

Continuation of current ranching practices does not require authorization from the BCCP or the USFWS.

COMMENT:

The USFWS should stipulate that mitigation requirements for non-federal parties under section 7 consultations will not exceed the requirements of this Plan.

RESPONSE:

The USFWS has indicated that if activities within Travis County that must obtain section 7 authorization under the Act comply with the provisions of the issued BCCP permit, there would be no additional obligations in reference to compliance with the Act.

COMMENT:

The comment period of 30 days should be extended because of the complexity of the activity and the document.

RESPONSE:

The draft EIS comment period was for 60 days. We believe that was an adequate period for this activity and is more than what is required for NEPA reviews. Additionally, this activity has undergone continuous public review since 1990 when the initial Biological Advisory Team report was released and the scoping process began.

COMMENT:

The proposed and preferred actions fail to meet the minimum requirements of the Endangered Species Act. It will not prevent significant reduction in the likelihood of survival and recovery of the endangered species or of the proposed - endangered Barton Springs salamander. It would constitute an illegal jeopardy of the survival of the golden-cheeked warbler.

RESPONSE:

The preferred option, the option required for permit issuance, meets the issuance requirements of section 10(a)(1)(B) of the Endangered Species Act. The recovery plan for the warbler identifies the need to protect enough habitat within recovery unit that includes Travis County to support "sufficient breeding habitat .... to ensure the continued existence of at least one viable, self-sustaining population." The habitat that is identified for protection under the BCCP in conjunction with the lands proposed for acquisition by the USFWS would protect adequate lands to accomplish this goal necessary for recovery of the warbler.

Take of the Barton Springs salamander is not covered by this permit.

COMMENT:

Alternatives to improve this Plan and result in lower costs include: (1) identifying which infrastructure projects should be scrapped as "jeopardy causing" and identifying the cost savings; (2) identifying the lowered land costs that result when assumed public subsidies are withdrawn; (3) identifying lower costs associated with buying conservation easements rather than limiting preserve acquisition to purchase fee simple interests; and (4) evaluating the option of the City and County amassing as much preserve lands as are currently proposed while still requiring all non-city/county activities to secure their own mitigation lands.

RESPONSE:

The USFWS has not identified any infrastructure projects that would result in jeopardy to any of the federally-listed species. Therefore, there are no possible savings from this option.

The option of withdrawing public subsidies is not viable nor in the purview of this NEPA review.

The Plan currently has the option of acquiring conservation easements rather than fee simple acquisitions, However, conservation easements that call for the establishment of a mature forested community and no livestock generally cost as much as fee simple purchases.

The acquisition of the preserves without providing the citizens of Travis County a method to comply with the Endangered Species Act was rejected by the permittees.

COMMENT:

The more that is known about the site specific edge effects, the more they might be avoided. Research should address how this might be prevented.

RESPONSE:

We concur and research within the BCCP boundaries and other portions of the range of the GCW will be pursued, as funding becomes available, to address the issue.

COMMENT:

If the goal of the Plan is to prevent the future listing of the bracketed twistflower, this Plan does not accomplish that.

RESPONSE:

We concur; the Plan may have to provide additional mitigation for the bracketed twistflower if it is listed in the future.

COMMENT:

What is Fish & Wildlife Service's permitting policy in the targeted acquisition areas? Will FWS issue any permits - 10(a) or otherwise - in the targeted acquisition areas? What types of land usage or development, if any, will be allowed? What development densities will be allowed, if any?

RESPONSE:

The Service's permitting policy within the proposed preserves is the same as that for the areas of Travis County prior to issuance of any incidental take permit. Those policies are stated under section 10(a)(1)(B) of the Endangered Species Act and Title 50 Code of Federal Regulations Part 13.21 Issuance of permits.

The determination as to whether or not permits will be issued at what density and for what land use will be determined when a development activity is proposed. Currently, all permit applications are reviewed with respect to their impact on

previously issued permits and lands proposed for mitigation. This will be the same for applications for development of lands proposed as preserves under the BCCP.

Will the Service issue permits within the boundaries of the proposed preserves? That is not possible to answer at this time. It will depend on the activity, location, density, size and other factors that may be present at the time of the analysis.

COMMENT:

Are all the Species of Concern listed on pages 3-19 to 3-25 covered by the BCCP permit? If not, which are and which aren't?

RESPONSE:

The species of concern identified in Chapter 2, section C.3. of the final EIS/HCP are covered by this permit. The species identified in Table 6 are those that were considered for inclusion. The applicants determined that no aquatic species would be covered by this plan and that the majority of the other species rarely occur in this area or are so common they are not likely to be listed over the life of this permit.

COMMENT:

Is the LCRA mitigating for "take" caused by its wholesale customers' service area that occurs outside of the Travis County BCCP permit area? Are they mitigating through the BCCP permit for areas outside of Travis county?

RESPONSE:

LCRA is mitigating through the BCCP for their wholesale customers for activities that fall within Travis County only.

COMMENTS RELATING TO MITIGATION

COMMENT:

Is the BCCP a 30 year or permanent preserve system?

RESPONSE:

The BCCP incidental take permit allows for the incidental take of the subject federally listed species for a period of 30 years. The permit is renewable by the applicants and this term can be extended. The mitigation for that incidental take is permanent because the take of the species is permanent.

The acquisition and management of the proposed preserves as indicated in the Plan will result in Travis County protecting the adequately covered species with regard to compliance with the Act.

COMMENT:

The issue of "certainty" is of paramount importance to the entire Travis County community. The 11 August 1994 "No Surprises" U.S. Fish and Wildlife Service's letter stated that "It is also recognized that circumstances and information may change over time and that the original plan might need to be revised" and "Moreover, the Services shall not seek any other form of additional mitigation from an HCP permittee except under extraordinary circumstances." In view of the forgoing just how do the participants in the plan have any "certainty." What are and who defines "extraordinary circumstances?"

RESPONSE:

The "No Surprises" policy of the U. S. Fish and Wildlife Service indicates that: In negotiating "unforeseen circumstances" provisions for HCP's, the Fish and Wildlife Service and National Marine Fisheries Service (Services) shall not require the commitment of additional land or financial compensation beyond the level of mitigation which was otherwise adequately provided for a species under the terms of a properly functioning HCP. Moreover, the Services shall not seek any other form of additional mitigation from an HCP permittee except under extraordinary circumstances.

Under the "No Surprises" policy, extraordinary circumstances is determined as follows:

> The USFWS shall have the burden of demonstrating that such extraordinary circumstances exist, using the best scientific and commercial data available. USFWS findings must be clearly documented and based upon reliable technical information regarding the status and habitat requirements of the affected species.
>
> In deciding whether any extraordinary circumstances exist which might warrant requiring additional mitigation from an HCP permittee, the USFWS shall consider, but not be limited to the following factors:
>
> - the size of the current range of the affected species
> - the percentage of range adversely affected by the HCP
> - the percentage of range covered by the HCP
> - the ecological significance of that portion of the range affected by an HCP
> - the level of knowledge about the affected species and the degree of specificity of the species' conservation program under the HCP

- whether the HCP was originally designed to provide an overall net benefit to the affected species and contained measurable criteria for assessing the biological success of the HCP
- whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

The USFWS has stated that the species listed under the preferred alternative would be adequately covered by this HCP and that no additional mitigation would be required if all of the proposed preserve sites and karst features are acquired and managed.

COMMENT:

According to a City of Austin working document, landowners in Travis County have already lost the development use of 66,000 acres of "undevelopable land" or approximately 100 square miles of land through existing ordinances, regulations, etc. A large portion of these lands is suitable habitat such as draws, canyons, water setbacks, steep slopes, etc. Why are affected landowners not given mitigation credit for this acreage, much of which will or does support endangered species?

RESPONSE:

The majority of these lands do not provide a benefit to the species of concern. Some of these lands could provide benefits to plant species, the black-capped vireo (if the area were managed for that species) and may provide benefits to some karst species. However, because the warbler is adversely impacted by development that surrounds a relatively small or narrow patch of habitat, these areas would not provide any benefit to the golden-cheeked warbler. Additionally, there is no assurance that the ordinances that currently restrict development in these areas would remain in place. Therefore, because of the lack of assurance and the limited value of these areas, they were not included in the mitigation credit calculation.

COMMENT:

The Plan needs to be more quantitative in its definition of "take" and "mitigation". This will help in estimating the effects of the management practices on populations of the neotropical migrants.

RESPONSE:

The Plan adequately identifies "take" in acres of habitat and mitigation in acres by macrosite.

COMMENT:

The importance of protecting larger and less fragmented areas of warbler habitat within Travis County is recognized by the Service in rejecting the out-of-county mitigation alternative, yet it is ignored in establishing permit requirements.

RESPONSE:

The rejection of habitat protection outside of Travis County was not based on protecting of larger and less fragmented areas. It was based on the fact that the elimination of the Travis County population of the vireo and warbler would result in range and genetic constriction of the distribution of federally endangered species and that could not be supported by the USFWS.

COMMENT:

The Biological Advisory Team recommended far more than the 36,000 acres identified on page 2-30 and so much of the BAT's recommendations have been ignored that it is inaccurate to say the BAT's report is the "basic guide" for the Plan, page 1-10.

RESPONSE:

The BAT made 4 recommendations with reference to the golden-cheeked warbler:

1. The viable population size of the warbler is at least 500 to 1,000 breeding pairs;
2. each preserve should be contiguous and unfragmented;
3. less than five percent of the area of any preserve should be within 100 meters of the preserve boundary; and,
4. at least two viable warbler populations should be protected.

The BAT indicated that they had identified adequate habitat for supporting a viable warbler population around the Bull Creek watershed and the south Post Oak Ridge area. The preserves proposed by the Plan include approximately 5,600 acres in the Bull Creek watershed and approximately 8,100 acres in the Cypress Creek watershed. The USFWS is acquiring approximately 25,000 acres in the south Post Oak Ridge area. These units are relatively unfragmented and form large blocks. Using on average, between 15 and 30 pairs per 250 acres identified by the BAT, density of 22 warbler per 250 acres the Bull Creek and the Cypress Creek preserves would support approximately 1,200 breeding pairs of warblers. The area being purchased by the USFWS would support approximately 2,000 breeding pairs. Either of these areas would individually provide enough habitat for one viable population of warblers. Additionally, the Plan proposes to establish a 4,000 acre preserve at Barton Creek, 4,500 acre preserve in the South Lake Austin macrosite and a 5,000 acre preserve in the North Lake Austin macrosite. These preserves could support a maximum of approximately 1,100 breeding pairs of warblers.

The recommendation by the BAT that less than five percent of the area of the preserve be within 100 meters of the edge of the habitat was based on the requirements of the eastern wood warblers. This information was a general planning guideline and does not appear to be supported by the information gathered by DLS Associates in the Bull Creek watershed. Their work around the 3M Austin Center and the City of Austin wastewater treatment plant 4 site, indicates that warblers effectively use the edges of mature forested tracts along undeveloped and developed areas provided the mature forest tract is large.

We believe that the guidelines developed by the BAT are incorporated in the current Plan.

COMMENT:

The BAT recommended against fragmentation of preserves and that is allowed under the proposed and preferred alternatives.

RESPONSE:

The goal of the Plan is to establish a preserve system that has the least amount of fragmentation to benefit the federally-listed species as well as the ecosystem in the area. The preserve boundaries were established to minimize fragmentation. The base that existed in the area did not allow the establishment of a preserve system that was in complete agreement with the recommendations of the BAT. However, since the BAT indicated that the Plan should protect habitat that would support two viable populations and we believe the proposed preserves will accomplish that, the Plan is in compliance with the recommendations of the BAT.

COMMENT:

Another fairness issue remains in the perpetual responsibility for maintenance. Mitigation expense becomes a perpetual expense of affected landowners. Even nonprofit corporations only have thirty year windows.

RESPONSE:

The destruction of warbler habitat is permanent and the mitigation must also be permanent. This is true for all section 10(a)(1)(B) incidental take permits. The current maintenance contracts are for 30-year periods but the mitigation must be in perpetuity. After the 30-year period, additional arrangements must be made to manage the properties.

COMMENT:

After the permit expires will the County be freed of ESA requirements?

RESPONSE:

After the permit requirements are met, Travis County will not be required to do anything additional to have fully complied with the requirements of the Act.

However, the Plan does not cover aquatic species and additional requirements may be necessary to cover those species. Additionally, the permit is issued to cover incidental take that occurs only while the permit is in force. Therefore, the permit would have to be extended if all of the habitat proposed to be taken over 30 years has not occurred. This extension would not require additional mitigation or public review; only a letter from the permittees requesting the permit be extended.

COMMENT:

The Plan should set forth a point at which mitigation requirements permanently cease for all covered species.

RESPONSE:

The Plan specifically identifies the total amount of mitigation required for the species, identified in Chapter 2 section C.3. of the final EIS/HCP, to be completely covered for all development in Travis County. However, it does not set a specific point in time when that would be accomplished because: (1) preserve acquisition is based on collection of participation funds from future development which cannot be accurately projected and (2) management of the preserve land must be in perpetuity.

The USFWS guarantees that they will not request additional mitigation for the species, identified in Chapter 2 section C.3. of the final EIS/HCP, covered in the BCCP should the listing status of any of those species change in the future and the actions proposed by the BCCP are completed.

COMMENT:

Why did the BCCP disregard the option of purchasing habitat in other, more rural areas where property values are a fraction of those in and around Austin. It should be noted that such habitat is as good or better than Austin area properties and the rural development opportunities are limited. Furthermore, the question of who denied the alternative to acquire habitat outside of Travis County and on what authority has not been established.

RESPONSE:

The lands within Travis County have been and are currently considered the best blocks of warbler habitat in its entire range. The Regional Director from the Albuquerque Regional Office of the USFWS indicated that the destruction of all the warbler habitat within Travis County would not be in compliance with the provisions of the Endangered Species Act. Therefore, the alternative to acquire preserve lands outside of Travis County was eliminated.

COMMENT:

How will this promote protection of endangered species?

RESPONSE:

This Plan will establish dedicated preserves for the federally-listed species covered. These preserves meet the requirements identified in the species' recovery plans and therefore, meet the goal of species protection and movement towards recovery.

COMMENT:

As much land as possible should be set aside with consideration to development.

RESPONSE:

This Plan is setting aside as much land as possible while taking into consideration the biological requirements of the species, total cost and current development.

COMMENT:

The Plan gives up too much habitat, it will not save the species; scientists must say what is necessary to save the species.

RESPONSE:

The USFWS and scientists in TPWD and private industry reviewed and approved the recovery plans for the listed species included in this Plan. The recovery plans identify what the scientists believe is necessary for the federally-listed species to be removed from the endangered species list. This Plan fully complies with those recovery plans.

COMMENT:

The Plan should call for no net loss of habitat and vigorously enforce the Endangered Species Act.

RESPONSE:

The Endangered Species Act does not call for "no net loss" of habitat and allows, under section 7 and section 10(a)(1)(B) the incidental take of federally-listed species if that take does not jeopardize the continued existence of the species. We believe this Plan fully complies with the requirements and intent of the Act.

COMMENT:

The Plan does not offer adequate protection for all 30 species of concern.

RESPONSE:

We believe the Plan provides adequate protection for the species of concern if all the actions identified in the issued permit are accomplished.

COMMENTS RELATING TO PRESERVES

COMMENT:

Because of the "Public Access" provisions of the plan, what is the justification for allowing lands purchased with private funds, i.e. Participation Certificates, for Endangered Species preserves to be used for public recreation facilities?

RESPONSE:

The primary purpose of the acquisition of the preserve lands for the BCCP is the conservation of the natural resources of Travis County. This goal was supported by the citizens of Austin with their passage of bond items that totaled $42 million to be used to acquire tracts of undeveloped land in Travis County. In addition, Travis County will be redirecting a portion of taxes from BCCP development back into the Plan.

The proposed preserves for the BCCP are not currently proposed for general public use. However, if adequate funds become available, these lands could be open to limited public use.

The BCCP is a voluntary program developed to assist the residents of Travis County in their conservation of natural resources and continued economic development. If a developer does not support the goals and ideals of this program, they are not required to participate.

COMMENT:

How does FWS know that public access at any time to endangered species preserves does not threaten the survival of the species?

RESPONSE:

The impact of human activities on various species has been studied throughout the United States. These studies and observations by biologists, with respect to the species of concern, give a general idea about the direct impact of human activity on a species.

Additionally, recreation impact to soil and vegetation has been studied in State and National Parks and various wildlife management areas. These provide information on the indirect impacts of human activities on a species.

If there are no specific studies on a species of concern, the above information is analyzed to recommend activities that are compatible and not compatible in a species preserve. The recreation activities that directly impact a species would be prohibited when that species is in the area and may be allowed when that

species has migrated to another location. Generally, activities that indirectly cause adverse impacts to a species would not be allowed at any time because it could prevent a species from using the area when it returns.

COMMENT:

There are lands to be managed in accordance with preserve system requirements owned by certain entities (LCRA, The Nature Conservancy, some private landowners, etc.) that will also be designated as part of the preserve system. Will these lands be managed in perpetuity as preserves or will they revert unencumbered or otherwise to their fee owners at the end of the permit period or at some other time? Are they part of a permanent preserve system or not?

RESPONSE:

All the preserve lands that are established as a result of an incidental take permit must be managed in perpetuity. Some of the current land management agreements are for a period of 30 years, but the land must be set aside as a preserve and managed in perpetuity.

COMMENT:

If some of the preserve lands revert unencumbered back to the fee owners at some point in time, why is there no mechanism in the plan for the Participation Certificate entities to also receive either the lands they acquired on behalf of the BCCP or recovery of their Participation Certificate fees?

RESPONSE:

Preserve lands do not revert unencumbered to fee owners at some point in time.

COMMENT:

The Bull Creek macrosite is too small and fragmented to accomplish its principal task of providing a viable preserve for the warbler.

RESPONSE:

The Bull Creek macrosite in and of itself does not have to provide a viable population of 500 to 1,000 breeding pairs of warblers. The Bull Creek site in conjunction with the other macrosites must provide enough habitat to support a viable population of warblers. The proposed preserves will accomplish that.

COMMENT:

The "edge" of a preserve is the area around its boundary where the population density of the target species is zero. This area extends to the point where "edge" effects can no longer be measured. The first 320 meters or so is a "dead zone" for the Bull Creek macrosite, where no breeding is expected to occur. Nearly half of the Bull Creek macrosite will not support any warblers at all, and another quarter will be chronically stressed.

RESPONSE:

There are several subdivisions around Travis County that have warblers within 320 meters of the development. Jester Estates is an example within the Bull Creek macrosite. This subdivision is more than 10 years old and the warblers are nesting and foraging up to the back yards of the houses.

If the warbler cannot tolerate an urbanized edge, it would be reasonable to assume that the warbler would discontinue the use of the area immediately or by the next generation of warblers after the fragmentation occurred. The warbler has a life span of less than 10 years and warblers are still using this area.

Other examples of the warbler using up to the edge of urban fragmentation include the Westlake Hills area, Long Canyon, Lost Creek Estates, and Glen Lake Estates.

Another type of fragmentation in the Bull Creek macrosite relates to the conversion of the mature oak/juniper forest to an oak savannah. The City of Austin purchased land in the area of the intersection of RR 620 and RR 2222 for the construction of Water Treatment Plant 4. This land was cleared more than 10 years ago and a natural vegetation community edge was created in warbler habitat. The edge of this property supports nesting warblers and their territories range into this vegetation community.

With respect to fragmentation by natural vegetation communities, there are reports of the warbler using blocks of mature forested communities as small as 20 acres and canyons less than 300 meters wide.

Based on these examples, the edge effects that have been reported and the edge assumptions used in the creation of models are not identifying the controlling factors to the use of an area by the warbler. The above examples indicate that warblers do use the edge of a mature forested community. However, examples in Travis County also indicate the warblers do not use small blocks of mature forested areas totally surrounded by urbanization, such as Westlake Hills and the eastern portion of Jester Estates. The big question that has not been answered in this case is: how small of a block of habitat will the warbler occupy in an urban area?

Fragmentation does impact the warbler, to what extent and for what reason is not understood. The warbler sighting information in Travis County, seems to indicate that urban fragmentation has a negative impact while fragmentation as a result of a native vegetation community does not. The BCCP is proposing to protect the highest quality and largest blocks of warbler habitat with the least urban fragmentation possible in Travis County.

OMMENT:

We support the management guideline that the overriding influence in all decisions regarding management of the preserve lands will be the welfare of the target species. However, there should be some flexibility in what constitutes a target species.

RESPONSE:

The target species will not change unless there is a thorough review by the Service, applicants, and the citizens of Travis County.

COMMENT:

There is no clear definition of preserve acquisition schedule or areas, nor how the acquisition is to function.

RESPONSE:

The USFWS has prioritized the importance of the identified macrosites. As acquisition funds become available, the lands within the high priority macrosites would be reviewed for the tract that has the highest degree of need for acquisition. This would be determined by habitat quality, willing seller, threats to the site and other factors at the time of the purchase.

COMMENT:

The Plan provides for preserve management but the Plan is vague on coordination and development of the plans.

RESPONSE:

The original management guidelines for the proposed preserves was drafted by the Texas Parks and Wildlife Department, and finalized by the applicants, to provide a basis for all management plans for the various preserve tracts. These plans will be reviewed by the Service, Coordinating Committee. A specific element of the review by the Service will be compliance with the terms of the incidental take permit and the recovery of the species. The management plans will be approved by the Coordinating Committee Secretary.

COMMENT:

The proposed preserve along Barton Creek is so finely dissected that it is unlikely to protect or preserve any actual or potential GCW habitat.

RESPONSE:

We concur and that acreage is not considered part of the 30,500 acres of preserve lands.

COMMENT:

The corridor along RR 620 should be a priority because it will create an amount of unsuitable habitat within the bounds of the proposed preserve units that are considered the most important for the GCW. Additionally, protecting this area will protect a large portion of the BCV habitat.

RESPONSE:

Development already exists along the RR 620 corridor between the Bull Creek and Cypress Creek macrosites. The acquisition of the undeveloped tracts in this corridor would be expensive and not significantly reduce the impacts of urbanization in the proposed preserve units. The BCV habitat adjacent to this area is currently proposed for acquisition.

COMMENT:

The areas to be included in the Preserve have changed since the date when the original maps were prepared by the City staff and used by the infrastructure planning group. As a result, the original maps of the infrastructure corridors no longer accurately reflect the preserve lands. The preparation of accurate maps of the preserve lands showing the infrastructure corridors is essential to all the utilities who will be required to determine when operations will be on preserve lands. Copies of the preserve/corridor maps should be made available to the utilities to insure that they will have a clear picture of the extent of the preserve lands.

RESPONSE:

The areas to be included in the preserve have not changed. Existing detailed maps of the "BCCP Existing Facilities" and "BCCP Planned Corridors and Special Use Tracts" (revised: September 1, 1993) should be used by utility providers as the basis for project planning and review purposes. These maps will be available through the Coordinating Committee Secretary.

COMMENT:

A scientific panel should be established with the authority to make such decisions as to which land is habitat and which properties are most important to pursue for the preserve system.

RESPONSE:

The USFWS has identified an acquisition priority for the macrosites within the proposed preserves. As acquisition funds become available the lands within the high priority preserves would be reviewed for the tract that has the highest degree of need for acquisition. This would be determined by habitat quality, willing seller, threats to the site, and other factors occurring at the time of the purchase.

COMMENT:

There is insufficient discussion regarding the proposed management actions for the preserves.

RESPONSE:

The management guidelines must be followed in establishing the site specific management plans. These guideline were reviewed in 1993 when first released by TPWD and again in the draft EIS. We believe the discussion and review was adequate.

COMMENT:

The Service should consider the cost and efficacy of constructing a 10-foot high deer-proof fence around subdivisions to restrict human access to designated points. Additionally, annual blue jay extirpation campaigns should be undertaken prior to warbler breeding seasons.

RESPONSE:

The management guidelines identify the need to undertake deer control programs. However, with the cost of deer-proof fencing and limited availability of funds, the requirement to construct such fencing is not recommended. If specific sites are identified to have significant deer browse problems, deer-proof fencing would be a potential tool to use.

There are no current plans to incorporate blue jay control programs. If future information indicates this is a necessary management action, the program could be implemented.

COMMENT:

In order to clarify the rules that will apply when utilities are working in areas that are not yet purchased but are planned to be purchased as part of the Preserve, we also recommend that Appendix B state that the Infrastructure Planning Appendix will be controlled both for presently owned preserve land and for land that is planned to become part of the preserve in the future.

RESPONSE:

Any infrastructure activity on land within the proposed preserve boundaries should rely on the detailed maps for identification of existing and planned corridors.

COMMENT:

The HCP/DEIS states that it does "not allow for significant inholdings" and that must be addressed in the Plan.

RESPONSE:

We do not find the identified phrase in the draft EIS. The draft EIS indicates that inholdings must be minimized to the maximum extent practicable. Some subdivisions exist adjacent to and projecting into some of the proposed preserve lands and that fact can not be altered. Those developments can not be eliminated and the area restored to pre-existing conditions.

COMMENT:

The DEIS should include a detailed analysis of the impact of this plan on the preserve owners.

RESPONSE:

Additional restrictions are not placed on the proposed preserve lands as a result of this action. Those property owners may proceed with obtaining authorization under the Endangered Species Act individually, keep their land in family ownership, or sell their land to the BCCP or other buyer at fair market prices. The action of issuing this permit does not alter those options which are the same as those in place, prior to the issuance of such a permit.

COMMENT:

Landowners within the proposed preserves feel they would be better off without the Plan. Without the Plan they believe that they may be able to realize some use or value for their land. Once the Plan is started, these landowners are trapped in the process because the integrity of the preserve must be maintained or the issued permit is jeopardized.

RESPONSE:

The landowners in the proposed preserves are not being asked to wait for up to 20 years for their property to be purchased. The Plan does not provide any restrictions that prohibits those landowners from selling their property at any time. The Plan indicates that at the projected rate of revenue collection, it would take approximately 20 years for the Plan to have enough money to purchase all the preserve lands at a fair market price. Not all of the landowners currently want to sell or develop their land, therefore this action does not currently impact those landowners nor do their plans impact the BCCP.

COMMENT:

The land acquired for preserves should be preserves. If the lands are to be public parks, then the public should acquire them rather than private citizens acquiring them.

RESPONSE:

The lands acquired for the preserves, whether by the use of public or private funds, will be preserves. However, some public use of preserves may be

compatible with the primary purpose of species conservation. There will be no differentiation on the proposed preserve land as to the source for the acquisition funds.

The Plan will not encourage recreational use of the preserve sites. However, the Plan has identified possible passive/low intensity recreational activities that would be consistent with the goals of the permit, if adequate funding is available. Land management plans will discuss public use of the preserves.

COMMENT:

There has not been sufficient analysis of the economic and social impacts on the people who are within the designated preserve system.

RESPONSE:

Additional restrictions are not placed on the proposed preserve lands as a result of this action. Those property owners may proceed with obtaining authorization under the Endangered Species Act individually, keep their land in family ownership, or sell their land to the BCCP or other buyer at fair market prices. The action of issuing this permit does not alter those options which are the same as those in place, prior to the issuance of such a permit.

COMMENT:

The permit acquisition time-line is too long. What will mitigate impacts to landowners within the proposed preserves over the 20 year acquisition period? All efforts should be made to reduce this time to a 5 - to 10 - year period.

What is the justification for asking landowners in the proposed preserve acquisition areas to possibly wait for up to twenty years for their property to be purchased? Was fairness a consideration?

RESPONSE:

The permit applicants and the USFWS agree. Should development and associated funding occur at a rate that is faster than that assumed for the Plan, preserve acquisition will occur over a shorter period of time. Acquisition priorities will take into consideration opportunity and availability and will try to accommodate landowner needs.

The landowners in the proposed preserves are not being asked to wait for up to 20 years for their property to be purchased. The Plan does not provide any restrictions that prohibit those landowners from selling their property at any time. The Plan indicates that at the projected rate of revenue collection, it would take approximately 20 years for the Plan to have enough money to purchase all the preserve lands at a fair market price.

The private property owners within the proposed preserves are not prohibited from selling their land, keeping their land, or applying for their own incidental take permit.

COMMENTS RELATING TO AQUATIC SPECIES

COMMENT:

The draft EIS is vague as to how the aquatic species are to be addressed. What impact will listing the Barton Springs salamander have on the Plan?

The permit should not be finalized until the issue of inclusion or exclusion of aquatic species is resolved. If aquatic species are initially excluded from the Plan, assurance should be given that they will not be included without public review of the proposal.

The Barton Springs salamander should be included in the Plan.

RESPONSE:

The permit applicants have determined that the Barton Springs salamander and other aquatic species would not be included in the permit at this time. There is no requirement under the Act that every listed or proposed species in an area be included in an incidental take permit. A discussion is included in the final EIS/HCP in case there is a decision to include them in the future. If these species are to be included, this would require public discussion and approval by the Permit applicants.

Because the aquatic species are not included and the Barton Springs salamander is a proposed species, the USFWS must consider effects to proposed species from their activities (issuance of an incidental take permit). Therefore, the final EIS/HCP states that properties within the Barton Springs drainage area of Travis County should obtain guidance with respect to avoiding the impacts of their activity on water quality as it relates to the Barton Springs salamander.

COMMENTS RELATING TO WARBLERS, VIREOS, AND KARST

COMMENT:

The Plan allows 55 percent of the known BCV population in Travis County to be taken. This is unacceptably high.

RESPONSE:

The location and number of the vireos in Travis County changes from year-to-year. The calculation of take under this Plan was based on acreage surrounding known vireo sightings. These take areas currently contain one or two pairs existing in small habitat units and are not the clusters of vireos that are considered more important by the Plan. The known cluster of nesting vireos, containing approximately 75 percent of the vireos known outside of the National Wildlife Refuge, is currently proposed for protection under the Plan.

COMMENT:

Are the proposed preserve lands for the karst invertebrates large enough to include the surface and sub-surface drainage basins of the caves known to contain the species?

RESPONSE:

The preserves for the karst invertebrates will be determined by a hydrogeologic survey of the surface and sub-surface drainage area of the cave in which they are found. If there has not been a hydrogeologic delineation, Participation Certificates cannot be issued for the area within 0.25 miles of the cave opening. The final EIS/HCP has been modified to clarify these conditions.

COMMENT:

Will areas outside the preserve lands still require evaluations of their caves, fauna, and the potential impacts on them? New species of concern are still being discovered outside the preserve lands, will the USFWS's ability to protect those areas be hampered by lack of research due to this Plan?

RESPONSE:

Areas outside of the proposed preserve lands will not be required to have surveys for karst invertebrates. However, if surveys are done and new caves, with significant biological diversity, are found, they may be exchanged for less biologically diverse caves on the acquisition list.

COMMENT:

We recommend using spatially explicit population models to examine effects of various land-use alternatives on the GCW and BCV. A useful basic reference on modeling forest-interior bird populations is Temple and Cary (1988).

RESPONSE:

The Service has used Vortex and is currently using Ramas Meta Population software to obtain additional guidance on the size of preserves for a viable population of these birds. The work of Dr. Craig Pease for the BAT used primarily information on forest-interior birds. However, we do not believe that the GCW is a forest-interior species and the use of such species as a guideline could result in incorrect projections with reference to block size and configuration.

COMMENT:

The development within karst areas may cause degradation of water quality to the point that incidental take will occur.

RESPONSE:

The area recommended for protection for each karst feature includes the surface and subsurface hydrogeologic feed area for the subject feature. If such protection is accomplished, that will include all the area that will provide groundwater to the karst feature.

COMMENT:

What constitutes viable populations of the BCV and GCW? Is quantity, quality and spatial structure of habitat tracts in the Plan adequate to maintain such viable populations?

RESPONSE:

A viable population is a population that maintains its vigor and its potential for evolutionary adaptation and that is self-sustaining with minimal demographic or genetic intervention over the long term. It is generally considered that 500-1,000 effectively breeding pairs is a viable population.

Under the Endangered Species Act, the applicant for an incidental take permit is responsible for mitigating the impacts of their development. If there is not a viable population present in the project area, they are not required to mitigate with a viable population. A viable population of the BCV does not exist in Travis County. Therefore, the Plan must only mitigate to off set the impacts of the Plan.

A viable population of GCW does exist in Travis County; to comply with the recovery plan, there must be a viable population in Travis County after

implementation of the Plan. Establishment of preserves totaling approximately 30,500 acres by the BCCP and approximately 46,000 acres for the Balcones Canyonlands National Wildlife Refuge will protect enough acreage and in a configuration that will support at least two viable populations of the GCW.

COMMENT:

The edge effects assumed by the Plan are much smaller than the edge effects as identified by the BAT.

RESPONSE:

We believe the edge effects for large blocks of habitat are not as severe as those projected by the BAT. This is because warblers continue to use the urban edge of large blocks within the proposed preserve units in Travis County. There is no reliable information on the edge effects on the warbler, therefore, this calculation was not done. The information currently available includes significant assumptions and therefore is being used as a general planning tool rather than specific preserve design.

COMMENT:

What will cause the GCW to move into the BCCP preserves when their habitat in the rest of Travis County is destroyed?

RESPONSE:

Generally, species expand to fill the habitat that is available to them. This is evident when a forest area is converted to a grassland and meadowlarks move in or when a grassland becomes a shrubland and white-tailed deer move in. We believe that as the areas of the proposed preserves become mature forested areas, the golden-cheeked warbler will expand into those areas. We do not expect all of the existing individuals to move to the preserves.

COMMENT:

Has anyone seen a recovery plan for the warbler or the karst invertebrates?

RESPONSE:

A recovery plan for the warbler was completed in September 1992, the vireo in September 1991 and for the karst invertebrates in August 1994. All of these recovery plans went through a public review process and were used in evaluation of the final Plan as proposed in the final EIS/HCP. Copies of the recovery plans are available for review from the USFWS.

COMMENT:

The principle recommendations of the Biological Advisory Team were not taken into consideration in the design of the BCCP preserves. Karst zones of high endemism should be preserved, rather than single cave entrances.

All existing vireo localities should be protected until decisions are made on the size and configuration of the preserve system.

RESPONSE:

The principle recommendations of the BAT were taken into consideration in the design of the preserves for this Plan.

The Plan is proposing to preserve karst zones of high endemism rather than single caves. However, there are caves with high species diversity that are not near other karst features. In those cases, the hydrogeologic surface and sub-surface feed areas are to be protected.

The BAT recommends that all known vireo populations should be protected until the size and configuration of the preserve system has been partially met. The size and configuration of the proposed preserves has been identified. The goal of the protection of all vireo locations until the vireos are established in the proposed preserves is not feasible at this time. However, less than 25 percent of all the vireos in Travis County currently exist outside of the proposed preserve boundaries.

COMMENT:

Given the transient nature of black-capped vireo habitat and the need to create more vireo habitat, extensive cooperation with private land owners may be necessary for the recovery of this species.

RESPONSE:

The Service concurs that the private land owner is a vital component in the conservation and recovery of the natural resources of this country. Overall recovery of the vireo is beyond the scope of this permit action. It is the responsibility of the BCCP to mitigate for the impacts of its activities. The USFWS will continue to work with other parties to meet overall recovery objectives.

COMMENT:

The calculation of the area of warbler habitat outside of the BCCP preserves that will be protected by local ordinances is flawed and untenable. Overlap of WPZs and golden-cheeked warbler habitat requires correction.

RESPONSE:

The calculations and discussion on page 4-23 of the DEIS were to identify possible areas that warblers may continue to use following development of areas located outside of the proposed preserves. These were based on the current levels of protection afforded those lands by local ordinances. We agree with your comments that there is a lack of guarantee that these ordinances will remain in

place. As such, WPZ acreage outside of preserve boundaries was not used in calculating the acres required for the BCCP because no blocks of WPZs acres were identified that would benefit the warbler after full development. The text has been revised to reflect this.

COMMENT:

The doctoral dissertation by Mr. Tom Engels indicates the adverse effects of "edge" on warbler presence and reproduction in an area. The accurate estimate of "edge" impacts on preserve lands would show that only small areas at the core of some preserve areas will likely provide actual nesting and feeding areas for the warblers.

RESPONSE:

Dr. Engels' dissertation provides new information on the interaction of the golden-cheeked warbler, a native species, and the blue jay, a species expanding its range into the area. The major goal of the dissertation was to investigate the effects of urban fragmentation on the warbler. He did not identify specific effects of urban fragmentation but he did find that there is a highly significant negative correlation between the presence of the warbler and jay. This dissertation did not provide any information on the adverse effects of "edge", per se, on warbler presence or reproduction nor did it identify the difference in warbler densities within a certain distance of urban development.

Dr. Engels noted that there is habitat fragmentation due to power-line cuts, rivers, ranch roads, and natural breaks in habitat but that no experimental data exists which quantifies their individual effects on the warbler. However, he did note that certain types of urbanization negatively affect the presence of the warbler in otherwise suitable habitat.

While he did not identify a distance from the edge of habitat within which no warblers would be found nor a distance from the edge of habitat that a blue jay could eliminate warbler activity, he identified (a) the number of homes within 500 meters, and (b) the percent of urbanization within 1,000 meters as two of the best predictors of blue jay/warbler presence/absence. However, within these parameters it is most difficult to accurately predict warbler and jay presence for situations with 11-50 homes within 500 meters and 11-30 percent urbanization within 1,000 meters.

Dr. Engels does provide insight into predicting the presence/absence of the blue jay and warbler and that the jay has a negative impact on the warbler. However, his work does not provide information needed for activities such as the BCCP. The BCCP requires information on the size of the buffer zone around a proposed preserve and the types of urban development that would be most compatible with

such a preserve. This information would give us a better opportunity to design a preserve system that has a higher guarantee of success.

COMMENT:

How many pairs of golden-cheeked warblers are allowed to be taken under this permit and how many pairs must be protected to comply with the permit?

RESPONSE:

Site specific information on the number of warblers is not available and instead habitat is used as a measure of the take that is likely to occur. Based on the satellite imagery work done by Denise Shaw, the loss of approximately 26,700 acres of warbler habitat would result in the take of approximately 1,500 to 3,000 pairs of warblers. Using this same information, the proposed preserve lands contain approximately 11,000 acres of warbler habitat that could support approximately 660 to 1,320 pairs of warbler. If the proposed 28,500 acres of preserve to be managed for the warbler is considered, the warblers that could be supported by a completed preserve system would range from approximately 1,700 to 3,400 pairs of warblers.

These calculations cannot be considered in isolation from the quality of the habitat that the Plan protects compared to the quality of the habitat that is being authorized for alteration under this Plan. The habitat that is being protected is considered the highest quality habitat for the warbler throughout its range. Additionally, the BAT identified these areas as the most diverse and valuable within Travis County. The areas that are excluded from protection are the areas fragmented by development and of low value to the species of concern.

The range of pairs of warblers indicated above is based on general information of warbler occupancy densities. Portions of Travis County identified by the satellite imagery as meeting the vegetation signature of warbler habitat do not support warblers. Additionally, the fragmented blocks of habitat in the urban areas of Travis County have warbler densities of from 1 to 2 pairs per 200 acres rather than the 15 to 30 pairs per 250 acres used in the calculations above. Additionally, the densities of warblers within the Bull Creek macrosite has a density of up to 30 birds per 250 acres.

COMMENT:

The only way to understand what the Plan is and to measure whether the Plan is being successfully implemented is to set fixed goals for numbers of nesting pairs protected and specifically identify how compliance will be determined and enforced.

RESPONSE:

We believe analysis of the acres that support the vegetation community required for feeding, breeding, and sheltering the warbler, is a viable alternative for measuring the amount of take likely to occur and the value of the preserves for protecting these species. This information is currently available. Accurately counting all nesting pairs in Travis County would be very labor and cost intensive and would not result in increased protection for the species.

COMMENT:

The DLS maps are not scientifically prepared. Again citing one of our members' major projects, the landowners have paid for and conducted numerous ground surveys over an eight year period for endangered birds. The surveys done by this landowner's consultants have shown limited areas of actual habitat with birds heard or sighted only in areas not planned for development. According to habitat maps in the BCCP plan which were prepared on the basis of aerial photography and infrared analysis, potential habitat was estimated with no regard to whether there are actually birds in place that could be potentially harmed. The result is that a substantial portion of a landowner's property is considered habitat under the BCCP which is based upon a map not substantiated by field studies or true independent verification by the USFWS.

RESPONSE:

Since the specific property was not identified, we cannot respond to the specifics of the comment. All of the maps prepared for the BCCP were based on the best scientific information at the time of preparation.

The only bird species that involved the use of aerial photography for delineation of habitat was the golden-cheeked warbler. The maps prepared by DLS Associates were based on golden-cheeked warbler sightings from 1989 through 1991. Limited information from 1992 and prior to 1989 was used where it was available. Additionally, the delineation of habitat on the aerial photographs identified the areas within Travis County that had a forested cover comparable to areas where the birds had been observed.

The warbler maps were also based on the need for the warblers to use more than just the small area where they were sighted during the presence/absence surveys. Field observations of DLS Associates indicated that the birds would use an area that may range out as much as 2,000 feet from where they were sighted during a presence/absence survey.

Your example considers the 8 year period from 1988 through 1995. Since the DLS Associates maps used data from 1989 through 1991, only the data collected on your property during that time period would be included in the maps. These maps are being used to aid the simplified approach process developed for the

BCCP. They are not being used to determine the "take" of the golden-cheeked warbler.

COMMENT:

TxCABA rejects the so called science and peer review used to list the birds and identify habitat. The implementation of the BCCP in Travis County is clearly a method of controlling urban growth and not an attempt to preserve habitat. Otherwise, why is Travis County the only county out of a 33 county range for the Golden Cheeked Warbler that is being regulated by Fish and Wildlife?

RESPONSE:

The listing of the warbler was based on a status survey conducted by Texas Parks and Wildlife Department and reviewed by scientists around the country. During the listing process, no information was provided that indicated the warbler did not warrant listing.

There have been comments by various parties that data existed that would indicate the warbler did not warrant listing. The USFWS has requested that information from those parties. However, no information has been provided that would support those claims.

The BCCP is an effort by groups and citizens in Travis County to take the natural resources into consideration during the growth process. The BCCP is the method they are using to accomplish that task. It is not a process that is being used to control growth.

All the warbler's habitat, throughout its range, is protected under the Endangered Species Act and alteration of that habitat may require authorization under the Act. The USFWS focuses its attention on the areas where such alteration is occurring; currently that is in the Travis County area. Activities within all counties throughout the range of the warbler are being reviewed by the USFWS as they become known. The major land use in the majority of the 33 counties is farming and ranching which do not usually alter the mature forested areas on their property. Therefore, authorization under the Act would not be required. The major areas that the USFWS is currently spending time in reference to the warbler are Williamson, Travis, Hays, Comal and Bexar counties.

COMMENT:

The original estimates of the acreage need for the warbler was 70,000 to 100,000 acres and now it is whittled down to 30,000 acres. How did this happen?

RESPONSE:

The acreage that will be set aside for the Travis County area will be approximately 56,000 acres within Travis County and another approximately

20,000 acres in adjoining Williamson and Burnet counties. The original acre recommendations included the acreage in Williamson and Burnet counties which are not a part of this permit action.

COMMENT:

It is not communicated very well as to what is and what is not habitat.

RESPONSE:

The draft EIS describes, in Chapter 3, section A.3. of the final EIS/HCP, the habitat components required by each species. That information can be used to determine if such habitat exists on an individual piece of property. Additional information on habitat for the listed species can be found in the species recovery plans which are available from the USFWS and are referenced in the final EIS/HCP.

COMMENT:

If we are not in habitat now, can it change in the future that we are in habitat?

RESPONSE:

The vegetation structure on a piece of property generally changes over time. Depending on land management practices and some other factors, a piece of land that is not currently endangered species habitat may become endangered species habitat and vice versa.

COMMENT:

The report identifies that 2,000 acres is needed for the vireo but only 988 acres are being considered by this Plan. Why are we acquiring only half of the acres needed for this bird?

RESPONSE:

The Plan indicates that there are approximately 2,000 acres of occupied vireo habitat in Travis County. The Plan will manage approximately 2,000 acres for the vireo. Approximately 1,000 of these acres are currently occupied by the vireo and the remaining 1,000 acres will be newly created vireo habitat.

COMMENT:

I do not understand how a plan having no net increase in habitat can be considered as benefiting the species.

RESPONSE:

The Plan establishes specific preserves that will be managed for the species. The protection and management of the large block preserves and the reduction of fragmentation removes threats that contributed to the listing of the species. This provides a benefit to the listed species with respect to requirements of the

Endangered Species Act. This action does not result in protection of all the habitat for all of the individuals throughout the range of the warbler or vireo.

COMMENTS RELATING TO PLAN OPERATION

COMMENT:

What will stop the County or City of Austin from lowering the cost of the participation certificates or changing the rules to make it easier for the developers to build?

RESPONSE:

The cost of the Participation Certificates is a function of the cost of acquiring the remaining preserve lands. The Plan anticipates periodic indexing related to those costs whether they are higher or lower. Additionally, the USFWS will monitor the progress of preserve acquisition and the issuance of certificates. If the issuance of the certificates is not raising adequate funds to keep preserve acquisition ahead of habitat destruction, the incidental take permit could be suspended or revoked.

COMMENT:

Will the rules for the BCCP change in the future?

RESPONSE:

The requirements to comply with the BCCP may change but only if the changes are in compliance with the conditions of the issued permit and approved by the Coordinating Committee and the USFWS.

COMMENT:

The land classification of the DLS golden-cheeked warbler maps is incorrect for portions of Davenport Ranch. Why are land owners not notified of changes in the status of their land?

RESPONSE:

Landowners are notified of the status of their land, with respect to endangered species, when they make a request for such information. The DLS Associates' maps were based on data gathered prior to 1992 and dealt with the biological requirements of the warbler. That information was correct at the time and was available to citizens and consultants to inspect to determine warbler locations and potential locations within Travis County. The maps are currently being updated for use by the BCCP.

COMMENT:

The periodic updates of the DLS and Veni maps could affect the social, environmental, and economic impacts of the Plan. There should be greater certainty regarding the updates and how they will be performed and implemented with regard to impact on private sector costs and Plan financing.

RESPONSE:

The updates of the DLS maps will be conducted when sufficient new biological information is available to justify such an update. The determination as to when such updates are accomplished will be determined by the BCCP Coordinating Committee.

The Veni maps are based on geologic information and updates are not expected to alter the overall boundaries of zones 1 and 2 for which the same fee is charged. Therefore, any update would not result in social, environmental, or financial impacts to the Plan.

The periodic updating of the DLS maps may result in redesignation of warbler zones 1 and 2, the areas that currently support or could support warblers. These updates may not result in new areas being added to the total of these zones but a realignment of the acres within these zones. Therefore, we do not believe this would result in an impact to the social or environmental impacts of the Plan. If a large number of the acres is removed from zones 1 and/or 2 and placed in zone 3, the economics of the Plan could be impacted. However, the Plan has requirements for periodic audits and reviews. These would identify funding issues that would have to be addressed. At this time we do not anticipate the updates of the DLS maps to cause a financial impact to the Plan.

COMMENT:

The "cookbook" approach to fee assessment may have an undesirable side effect. Since the developer must pay fees on the entire tract, not just on land utilized, they are encouraged to develop as densely as possible in order to spread the fees over a broader base. This higher density can have a detrimental effect on traffic, neighborhoods, and water quality.

RESPONSE:

If a developer chooses to purchase a Participation Certificates that is a possible scenario. However, high density development would not likely be the normal situation because of current ordinances and public demand.

COMMENT:

The BCCP should state that all income derived from use of BCCP preserves should go back to the BCCP rather than the owning jurisdiction. If income is

retained by the individual jurisdiction, it would amount to a general tax on the developer participants.

RESPONSE:

All funds collected from the use of the BCCP preserves will only be used to benefit the BCCP.

COMMENT:

Why does the simplified approach to "take" calculation count habitat on a parcel even if that habitat is being left alone? Would this not result in considerably over estimating the "take"?

RESPONSE:

The calculation for the fee to obtain a Participation Certificate is not related to the "take" of a federally-listed species. The data on which the fee is based is the area of habitat within the project boundary. The current form of calculating the fee necessary for participation in the BCCP will most likely result in an under estimate of the amount of direct and indirect "take" that actually occurs in most cases.

COMMENT:

The BCCP Workgroup recommended that condemnation not be used for acquisition of the preserves. However, the DEIS indicates the Plan contemplates its use. This is inappropriate.

RESPONSE:

The use of condemnation is discouraged by the Plan. However, the permit applicants indicated that some landowners have indicated that they would prefer to have their land condemned for purchase. We do not believe it is inappropriate to include condemnation as a land acquisition option of last resort where the entire permit may be in jeopardy.

COMMENT:

Page 2-58(h)(2) of the DEIS requires that proof of Plan participation be posted at the site of vegetation clearing. This statement should be clarified to the effect that the requirement is only for those who have voluntarily elected to participate in the Plan.

RESPONSE:

We do not believe that clarification is necessary since non-participants would not have a Participation Certificate.

COMMENT:

The proposed seasonal restrictions (pages 3-1 to 9-1) on the clearing within warbler or vireo habitat should be avoidable if the owner demonstrates by a current breeding season survey that the area in question is more than 300 feet distant from an occupied territory.

RESPONSE:

We concur and the final EIS/HCP has been modified to reflect this.

COMMENT:

The HCP/DEIS fails to provide a complete description of the activity sought to be authorized: does the permit authorize year-around construction and other noise in and adjacent to preserve areas?

RESPONSE:

Alternative 2 described in Chapter 2 identifies the activities for which the permit is sought. Those are the grading, clearing, or other earth moving activities necessary for residential, commercial, or industrial construction and infrastructure projects. The permit does allow year around construction but does not allow the clearing of vegetation during the breeding season unless current breeding season surveys indicate that the warbler or vireo are not nesting within 300 feet of the proposed clearing activity. The final EIS/HCP has been modified to reflect this.

COMMENT:

Does the permit authorize highway and other infrastructure development at any location?

RESPONSE:

The permit would allow highway and infrastructure construction but does not specify a specific location. The permit does not allow such construction to occur within the boundaries of the proposed preserves except as approved within the existing or planned corridors. Specific utility corridors are designated.

COMMENT:

Are the "management guidelines" for the preserves actual requirements or simply guidelines? The lack of management plans before a permit is issued invites abuse by land managers faced with pressures to allow other land uses.

RESPONSE:

The management guidelines must be followed and the site specific management plans developed in accordance with those guidelines. Management plans must ensure protection for the species addressed in the BCCP. If they do not, it could result in suspension or revocation of the Permit. All management plans must be

approved by the Coordinating Committee and the USFWS and the final EIS/HCP has been revised to reflect that.

COMMENT:

Implementation of the Participation Certificates is not explained and problems exhibited in other regional HCPs in collecting fees have not been considered in formulating this Plan.

RESPONSE:

The final EIS/HCP has been modified to provide more information on the Participation Certificates. The BCCP is not similar to other regional type incidental take permits and the funding mechanisms they employed. The BCCP is a voluntary program rather than mandatory as was the case for the California activity that had funding difficulties.

The Plan has built in audit requirements to monitor the status of habitat clearing, fund collection, and preserve acquisition.

COMMENT:

Recommend that paragraph 5 on page 2-31 be modified as follows:

No activity will be allowed which results in a "take" of an endangered species, or which degrades or in any way harms the environment of the endangered species or other species of concern, or which degrades or in any way harms the preserve, except as may occur in the approved infrastructure corridors identified in the Infrastructure Planning Appendix of the BCCP.

RESPONSE:

In the final EIS/HCP, special condition number 13 in Chapter 2, Section 3 will provide for incidental take within the preserves from activities covered by infrastructure construction projects within existing or planned corridors and approved by the Coordinating Committee Secretary.

COMMENT:

The use of the term "near" in the third full paragraph of page 2-32 needs to be clarified because activities outside the preserves do not require approval of the Coordinating Committee.

RESPONSE:

The term "near" was changed to "within".

COMMENT:

Recommended Changes to Page 2-52 of the EIS.

The second sentence of the third full paragraph and following on page 2-52 of the EIS should read as follows:

The infrastructure guidelines will typically take precedence over the individual land management plans or general land management guidelines. Unless the Plan is modified to identify new infrastructure corridors, the utility will be limited to the existing corridors and the planned corridors currently identified in the Plan. For activities in existing corridors, the utility will comply with the guidelines and requirements contained in the Infrastructure Planning Appendix of the Plan (see Appendix B). For activities in existing corridors where the activity will result in the widening of the corridor, and for activities in Planned Corridors where the activity is the first use of the corridor or involves an expansion of the area then being used in the corridor, the following provisions shall apply:

(1) If the utility provider is one of the seven utilities associated with the Permit Holders/Managing Partners (Lower Colorado River Authority, City of Austin Electric Utility, Pedernales Electric Cooperative, City of Austin Water and Wastewater Utility, Travis County Transportation and Natural Resources Department, City of Austin Public Works and Transportation Department,or the City of Austin Stormwater Management), then that utility may conduct such activities within an existing corridor or a BCCP Planned Corridor provided it complies with the guidelines and requirements for preapproval in the Infrastructure Planning Appendix.

(2) If the utility provider is not one of the seven entities listed in (1), then that utility may conduct such activities within an existing corridor or a BCCP Planned Corridor if it (a) complies with the guidelines and requirements for pre-approval in the Infrastructure Planning Appendix and (b) reaches an agreement with the Coordinating Committee as to whether any amount shall be paid by that utility to the City of Austin based on the acres within the corridor that will be first disturbed by the activities of that utility, and which amount shall not exceed the amount that would be required to purchase Participation Certificates for that same number of acres.

RESPONSE:

The original language in the draft EIS is appropriate. Long-term operational issues for utilities, such as possible plan modifications in the future for new infrastructure corridors, may be addressed by the Coordinating Committee within the limits of the Permit.

COMMENT:

In the last paragraph on page 1 of Appendix B the reference to "the PMA" should be changed to the "the Coordinating Committee Secretary" to be consistent with the change from the original that was made throughout the document.

On page 2 of Table 1 (BCCP Planned Corridors), the description next to item 43 should be changed by inserting the words "Lake Travis" before the word "substation," and the words "Lake Travis" should be removed from the column entitled "Primary User."

RESPONSE:

Suggested changes have been made to Appendix B of the final EIS/HCP.

COMMENT:

To clarify the distinction between the utilities associated with the Permit Holders/Managing Partners and all of the others, the fourth paragraph on page 2 of the Appendix could be rewritten to be more specific. Beginning with the second sentence, we suggest the following change:

These include those utilities which are associated with the Permit Holders/Managing Partners and those utilities which are not. The former group includes (here list the seven named entities that are associated with the permit holders). Of the other utilities which are not associated with the Permit Holders/Managing Partners, the following participated in negotiations among utility providers but are not currently included in the regional Plan: (the remainder as currently written).

RESPONSE:

Distinction between the two groups of utilities has been made in this definition in Appendix B of the final EIS/HCP.

COMMENT:

Paragraph 3. Planned: page 3 of the Appendix, the following language from the original version of the document is no longer appropriate and should be replaced with the following:

Habitat currently existing in the BCCP Planned Corridors will be impacted if these corridors are eventually used to locate infrastructure facilities. Because additional preserve acreage has been included in the BCCP to mitigate in advance for this potential future use, the acquisition of additional preserve acreage will not be required if facilities are located in these corridors. However, if a utility which is not associated with the Permit Holder/Managing Partner wishes to locate a facility in the Planned Corridor and such activity will result in a loss of habitat, then the Coordinating committee may, as part of its approval of that utility's construction plans, determine whether that utility shall pay an amount to the City of Austin based on the number of acres of habitat that will be lost, provided that the amount shall not be greater than the amount that would be required to purchase Participation Certificates for that same number of acres.

RESPONSE:

Appendix B of the final EIS/HCP has been changed to require compensation for new utility project impacts in existing and planned corridors.

COMMENT:

The language on the bottom of page 2 and the top of page 3 of the Appendix, referring to the widening of existing corridors should be revised to eliminate the references in the original version to acquiring replacement acreage. In its place, language could be added to say that activities by the utilities associated with the Permit Holders/Managing Partners that result in a widening of these existing corridors would not require any mitigation, and that activities by the other utilities that resulted in the widening of these corridors would be treated the same as in the case of activities in the planned corridors, that is, those utilities might be required by the Coordinating Committee to pay a fee to the City (in an amount not greater than the amount that would be required to purchase Participation Certificates for the number of acres taken).

RESPONSE:

Appendix B of the final EIS/HCP has been changed to require compensation for new utility project impacts in existing and planned corridors.

COMMENT:

We recommend that language be added in Appendix B to provide guidance regarding how the utilities can submit their required notices to the Coordinating Committee Secretary, including a name and address.

RESPONSE:

During the first two years after Permit issuance, the Coordinating Committee Secretary duties will be handled by the City of Austin. Subsequently, the duties will be rotated between Travis County and the City of Austin.

COMMENT:

Some analysis is necessary regarding the City of Austin's proposal for private management of the preserves.

RESPONSE:

The management guidelines for management of the preserves has been reviewed and the site specific management plans will be reviewed. The fact that the management is carried out by the City of Austin or a private contractor does not change this requirement nor require analysis other than what has been accomplished for the Plan. The USFWS and the public will have an opportunity to review any contract signed for the private management of part of or all of the preserves.

COMMENT:

How will we know if the macrosites are working during the five years before the first review?

RESPONSE:

The Plan will be continuo .y reviewed through participation on the Coordinating Committee. Additionally, there will be quarterly and annual reports of action taken by Permit holders. We are also concerned about habitat fragmentation, but believe this Plan will prevent such fragmentation in the preserve lands.

COMMENT:

Concern over the lack of a formalized management structure and that the management is left in the hands of the preserve owners.

RESPONSE:

The USFWS would prefer a single management entity, as proposed in earlier plans, because it would be easier to coordinate management and research activities, and there would be one contact point for resolution of issues. However, the current proposal that all management plans must follow established management guidelines is an acceptable alternative. Additionally, the USFWS reviews all management plans and will not approve any such plan that does not meet the goal of the issued permit.

COMMENT:

Consider allowing USFWS to demand changes in administration of the Plan if after a time the proposed administration is not adequate.

RESPONSE:

The USFWS has the authority to recommend alteration of permit conditions if the goals of the permit are not being met. If a problem in permit operation or management is identified, the USFWS will work with the permittees to correct the problem.

COMMENT:

The Plan proposes that mitigation only be required on occupied GCW habitat.

RESPONSE:

The Plan uses the maps prepared by DLS Associates for the calculation of the acres that require Participation Certificates. The DLS maps include known warbler areas, possible warbler habitat, and areas that are not warbler habitat. The Plan currently proposes to charge a fee of $5,500 per acre for the known warbler areas and $2,750 per acre for possible warbler habitat.

COMMENT:

Will scientific qualifications be required of the Coordinating Committee Secretary or other committee members?

RESPONSE:

There are no scientific qualifications established for Coordinating Committee members; however, there is a staff of biologists in Travis County and the City of Austin who will provide guidance to the Coordinating Committee. Additionally, the Service will be a party to any decisions made regarding preserve management as part of our responsibility to oversee implementation of the incidental take permit.

COMMENT:

The draft EIS does not provide details on how landowners determine whether their property is inside or outside a preserve, why areas which are clearly not habitat would be assessed impact mitigation fees, or how a plan participant actually realizes the benefits of this plan.

RESPONSE:

The applicants have detailed maps of the proposed preserve boundaries. Property owners may contact Travis County Transportation and Natural Resources Department to determine whether their property is inside or outside of a proposed preserve.

The tracts that contain no habitat would not be assessed a participation fee.

The Plan participant realizes the benefits of the Plan by reduced costs, reduced time in obtaining permits, more open space for clients, and preservation of natural resources. Additionally, areas adjacent to the preserves may have a higher value because of the open space.

COMMENT:

The draft EIS indicates that development in vireo habitat cannot occur until at least 50 percent of the preserves for the vireo is purchased and it also states that this provision is being waived. This needs to be clarified.

RESPONSE:

That provision to protect the vireo habitat until at least 50 percent of the preserves for the vireo was purchased was part of a previous version of the BCCP. The permit applicants requested that provision be changed. The USFWS concurred since the majority of current vireo habitat in Travis County is within the proposed Balcones Canyonlands National Wildlife Refuge or within the bounds of the proposed preserves of the BCCP.

COMMENT:

The BCCP process is supposed to be voluntary, however, parts of the DEIS indicate that this may change given the opinion of the management committee.

RESPONSE:

The voluntary aspects of the BCCP will not change.

COMMENT:

It is clear that the City of Austin will have the legal opportunity to pass additional rules when the plan is approved. These rules must be identified before the plan is approved.

RESPONSE:

Neither the City of Austin nor Travis County will have the authority to pass any rules or regulations as a result of receiving this permit. This permit does not convey any such authority to the permittees.

COMMENT:

The plan "exempts incidental 'take' resulting from any existing, routine ranching and farming practices, as defined by USFWS, which occur in Travis County (but not inside the designated preserve area)." What are the "existing, routine ranching and farming practices, as defined by USFWS?" Will this definition change?

RESPONSE:

The USFWS has not developed a specific definition for "routine ranching and farming practices" but has stated that ongoing farm and ranch activities do not require authorization under the Endangered Species Act. The USFWS does not propose to alter that position with respect to any of the species covered under the BCCP.

COMMENTS RELATING TO POST ISSUANCE

COMMENT:

What will occur if the Plan's financial projections are not realized? Is there a demonstrated future market for mitigation at $5,500+ per acre? Can higher basis property afford mitigation under the BCCP? Have pro forma financial constraints been analyzed from the perspective of the developer applicant?

RESPONSE:

If the Plan's financial projections are not realized then the following are options that may result:

1. The shortfalls in revenue collection would be identified as a problem; options would be investigated to correct the shortfall or the permit would be suspended. The permit would not be re-activated until the problem was corrected.

2. The Permit holders identify the shortfall in revenue collection and identify means of correction by increasing the cost of the Participation Certificates or other means.

A pro forma with respect to the developer has not been performed. We cannot answer your question regarding affordability to the developer. However, developer representatives participated in the development of the BCCP and they supported this current version.

COMMENT:

The BCCP will now become the minimum level or standard for future projects. Those landowners wishing to pursue a 10A are not likely to receive a receptive ear from the Fish & Wildlife Field Office who are likely to force compliance with the BCCP as a minimum level of compliance.

RESPONSE:

The USFWS will review future projects within the range of the warbler the same as similar projects were reviewed in the past. Whether an incidental take permit has been issued does not alter the process for or the calculation of take and recommendation for how to minimize or mitigate that take to the maximum extent practicable for issuance of a permit.

The USFWS currently reviews new permit applications with respect to the impacts on the federally-listed species and any previously issued permit. If the new project affects dedicated mitigation lands, the new project must offset the impacts to the dedicated mitigation lands first, and then provide mitigation for the impacts of the new project. This is because the new project is destroying the value of mitigation established by a previous project. Therefore, after the issuance of the BCCP permit, the calculation of "take" by a new project will not be evaluated any differently than has been done in the past.

COMMENT:

If the BCCP permit must be reviewed in two years for compliance and BCCP falls short, does the plan in effect become a two year plan? In other words, what

happens next? The very fact that we are discussing an unknown increases the risk to a builder or landowner - a result we find objectionable.

RESPONSE:

The suspension and revocation procedures followed by the USFWS are identified in Title 50 of the Code of Federal Regulations Part 13.27 and 13.28. A permit is suspended if: there is non-compliance with permit conditions or laws/regulations governing the activity. The suspension may be for all or part of the privileges and it is suspended until deficiencies are corrected.

A permit is revoked if the permittee: willfully violates laws or regulations; fails to correct suspension deficiencies within 60 days; or meets a criteria that would prevent issuance of permit. Additionally, a permit is revoked if the statute or regulation that authorized issuance of permit is changed or if biological information indicates species jeopardy if take continues.

The USFWS must notify the permittee in writing by certified/registered mail of violation and indicate:

(a) the permit number;
(b) reason's for suspension/revocation;
(c) action's necessary to correct deficiencies;
(d) permittee's right to object.

The permittee has 45 days to respond to the notice before any final action is taken with respect to suspension or revocation. After a decision to suspend or revoke, the permittee has a right to appeal the decision to the Regional Director for a final decision.

The important part of this process is discussion between the USFWS and the permittee to resolve any problems before a permit is suspended or revoked. If a permit is suspended or revoked, it does not affect the take that had occurred prior to that action. All take that complied with the issued permit would be in compliance with provisions of the Act. However, no additional take would be allowed to occur after the suspension or revocation.

NO SURPRISES

ASSURING CERTAINTY FOR PRIVATE LANDOWNERS IN ENDANGERED SPECIES ACT HABITAT CONSERVATION PLANNING

U.S. FISH AND WILDLIFE SERVICE

NATIONAL MARINE FISHERIES SERVICE

AUGUST 11, 1994

"The Committee intends that the Secretary may utilize this provision [on HCPs] to approve conservation plans which provide long-term commitments regarding the conservation of listed as well as unlisted species and long-term assurances to the proponent of the conservation plan that the terms of the plan will be adhered to and that further mitigation requirements will only be imposed in accordance with the terms of the plan. In the event that an unlisted species addressed in an approved conservation plan is subsequently listed pursuant to the Act, no further mitigation requirements should be imposed if the conservation plan addressed the conservation of the species and its habitat as if the species were listed pursuant to the Act.

. . . .

"It is also recognized that circumstances and information may change over time and that the original plan might need to be revised. To address this situation the Committee expects that any plan approved for a long-term permit will contain a procedure by which the parties will deal with unforeseen circumstances."

H. Rep. No. 835, 97th Cong., 2d Sess. 30-31 (1982)
(1982 ESA Amendments Conference Report)

PURPOSE: The purpose of this policy is to provide assurances to non-federal landowners participating in Habitat Conservation Planning (HCP) that no additional land restrictions or financial compensation will be required from an HCP permittee for species adequately covered by a properly functioning HCP in light of unforeseen or extraordinary circumstances.

SUPPLEMENTARY INFORMATION: The HCP process under the Endangered Species Act (ESA) promotes endangered species conservation and habitat protection within the context of land use or development. Where appropriate, HCPs contribute to the long-term conservation of federally listed and unlisted species, while providing predictability and economic stability for non-federal landowners.

Species receive a variety of benefits under a properly functioning HCP. Private financial resources supplement limited federal funding, essential habitat areas are often preserved or managed differently, and comprehensive conservation programs are developed and promptly implemented. Although landowners must ultimately demonstrate that a species has been covered adequately under an HCP, the major benefit from the HCP process from the perspective of the development community or land manager is certainty. In exchange for adherence to long-term conservation commitments, an HCP permittee is provided assurance that development or land use may move forward despite the incidental taking of protected species.

Significant development projects often take many years to complete, therefore adequate assurances must be made to the financial and developmental communities that an HCP permit will remain valid for the life of the project. In authorizing the HCP process, Congress recognized that, within the constraints of the best available scientific information, permits of 30 years or more may be necessary to trigger long-term private sector funding and land use commitments for species conservation. Congress also recognized that circumstances may change over time, generating pressure to reconsider the mitigation commitments in an HCP agreement. Often referred to as "unforeseen" or extraordinary circumstances, Congress intended that additional mitigation requirements not be imposed upon an HCP permittee who has fully implemented his or her conservation commitments except as may be provided for under the terms of the HCP itself.

POLICY: In negotiating "unforseen circumstances" provisions for HCPs, the Fish and Wildlife Service and National Marine Fisheries Service (Services) shall not require the commitment of additional land or financial compensation beyond the level of mitigation which was otherwise adequately provided for a species under the terms of a properly functioning HCP. Moreover, the Services shall not seek any other form of additional mitigation from an HCP permittee except under extraordinary circumstances.

A. General Assurances Provided to Landowners

- If additional mitigation measures are subsequently deemed necessary to provide for the conservation of a species that was otherwise adequately covered under the terms of a properly functioning HCP, the primary obligation for such measures shall not rest with the HCP permittee.

- If extraordinary circumstances warrant the requirement of additional mitigation from an HCP permittee who is in compliance with the HCP's obligations, such mitigation shall limit changes to the original terms of the HCP to the maximum extent possible and shall be limited to modifications within Conserved Habitat areas or to the HCP's operating conservation program for the affected species. Additional mitigation requirements shall not involve the payment of additional compensation or apply to parcels of land available for development or land management under the original terms of the HCP without the consent of the HCP permittee. The Services retain the right, as authorized by section 5 of the ESA, to acquire endangered or threatened species habitat by purchase when additional conservation measures are necessary for a listed species included under an HCP.

- The Services shall not seek additional mitigation for a species from an HCP permittee where the terms of a properly functioning HCP agreement were designed to provide an overall net benefit for that particular species and contained measurable criteria for the biological success of the HCP which have been or are being met.

B. Determination of Extraordinary Circumstances.

- The Services shall have the burden of demonstrating that such extraordinary circumstances exist, using the best scientific and commercial data available. The Services findings must be clearly documented and based upon reliable technical information regarding the status and habitat requirements of the affected species.

- In deciding whether any extraordinary circumstances exist which might warrant requiring additional mitigation from an HCP permittee, the Services shall consider, but not be limited to, the following factors:

  - the size of the current range of the affected species
  - the percentage of range adversely affected by the HCP
  - the percentage of range conserved by the HCP
  - the ecological significance of that portion of the range affected by an HCP
  - the level of knowledge about the affected species and the degree of specificity of the species' conservation program under the HCP
  - whether the HCP was originally designed to provide an overall net benefit to the affected species and contained measurable criteria for assessing the biological success of the HCP
  - whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild

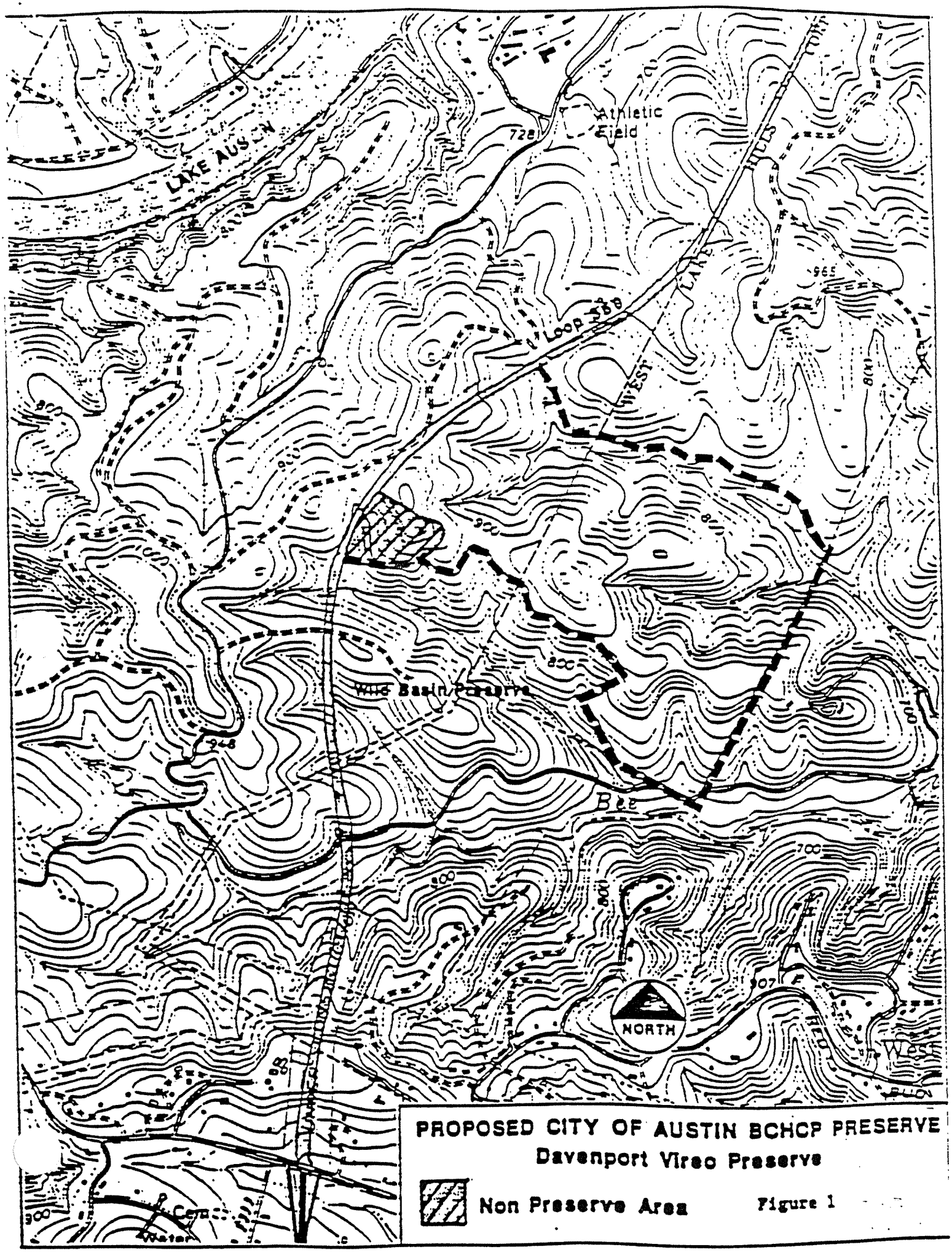
C. ADDITIONAL CONSERVATION AUTHORITY

- Nothing in this policy shall be construed to limit or constrain the Services or any other governmental agency from taking any additional actions at its own cost with respect to the conservation or enhancement of a species which is included under an HCP.

EXHIBIT "B"

Maps of Designated Preserve System Lands

2.562 acres - City of Austin
507 acres - Travis County

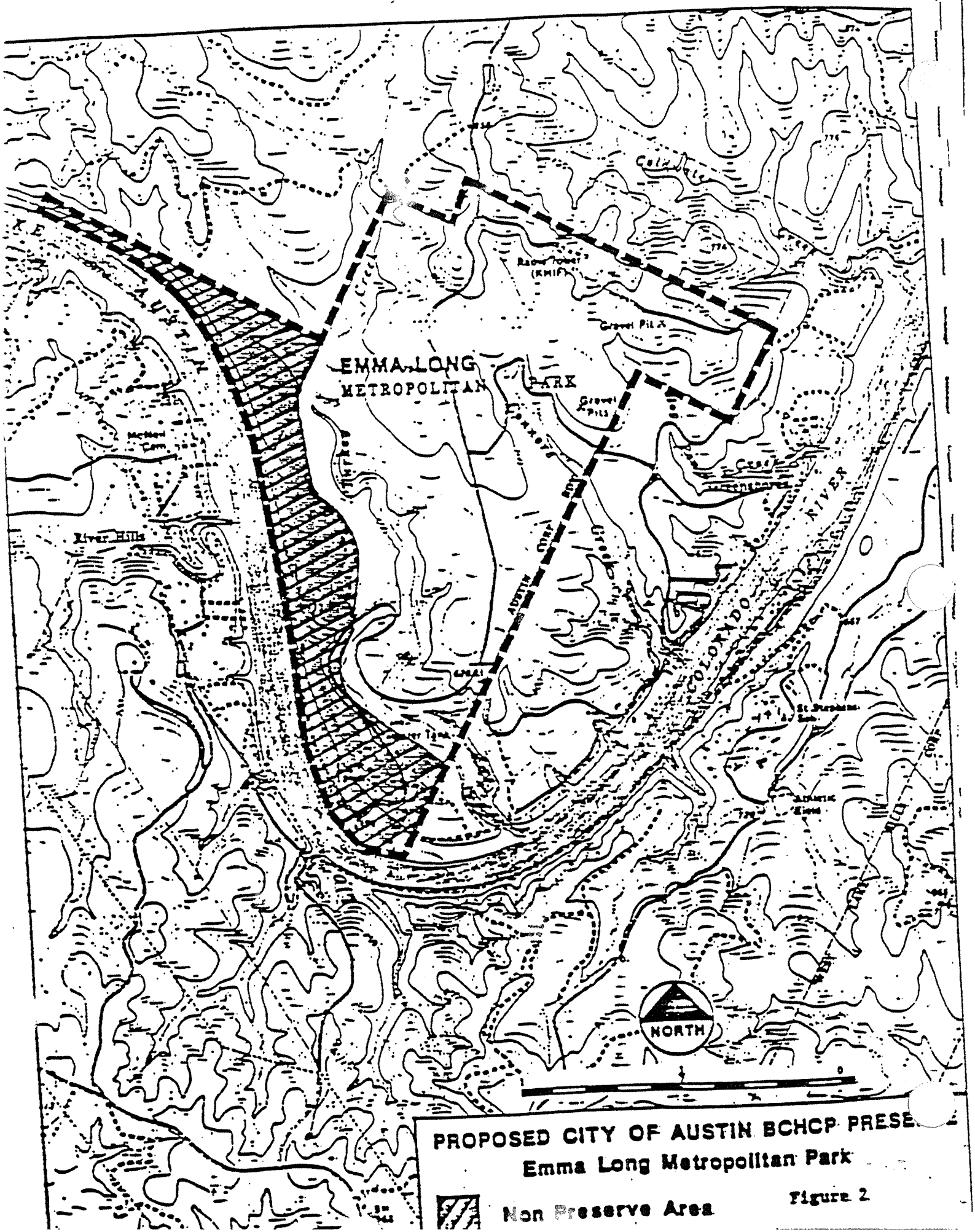


PROPOSED CITY OF AUSTIN BCHCP PRESERVE

Davenport Vireo Preserve

Non Preserve Area

Figure 1

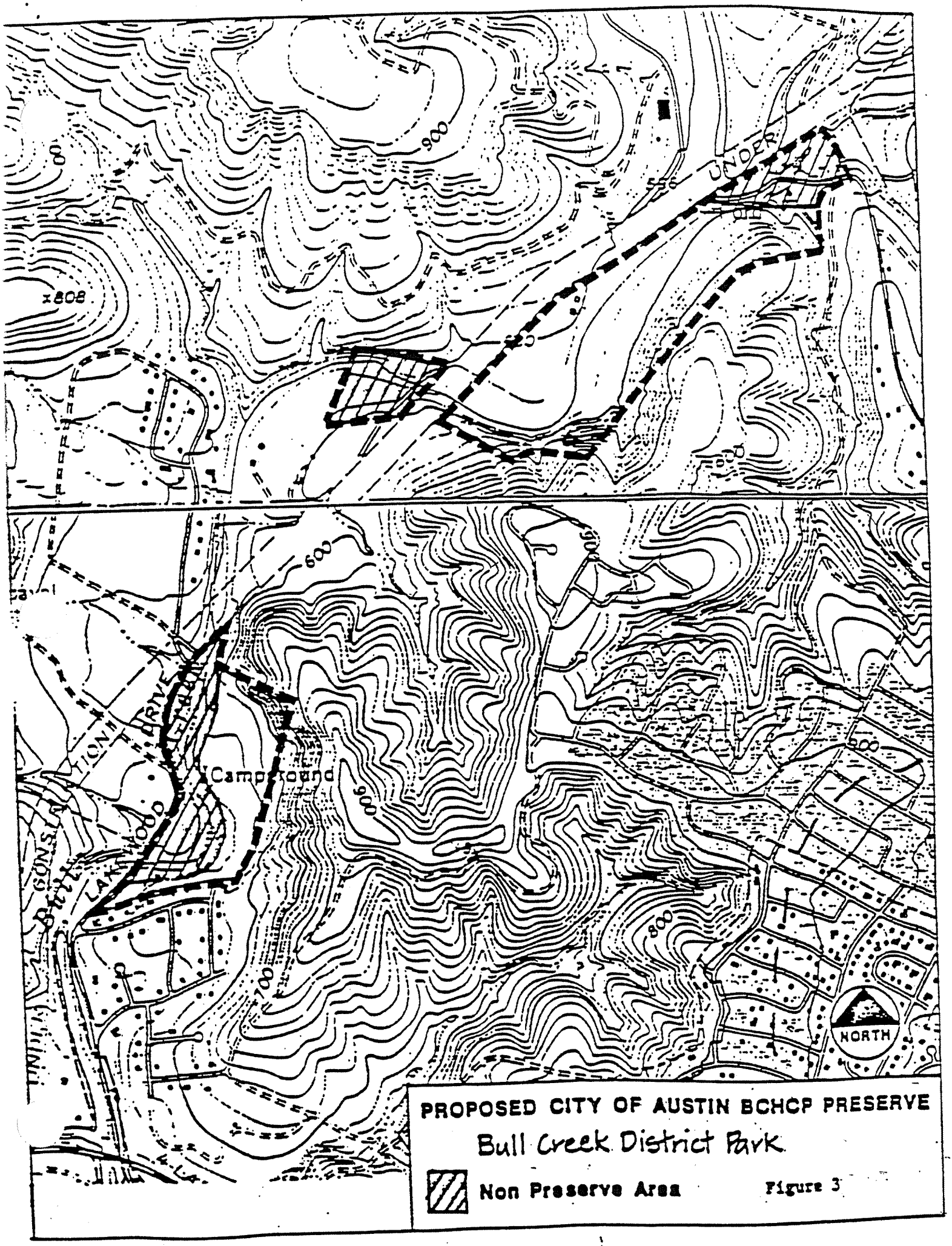


PROPOSED CITY OF AUSTIN BCHCP PRESE

Emma Long Metropolitan Park

Non Preserve Area

Figure 2

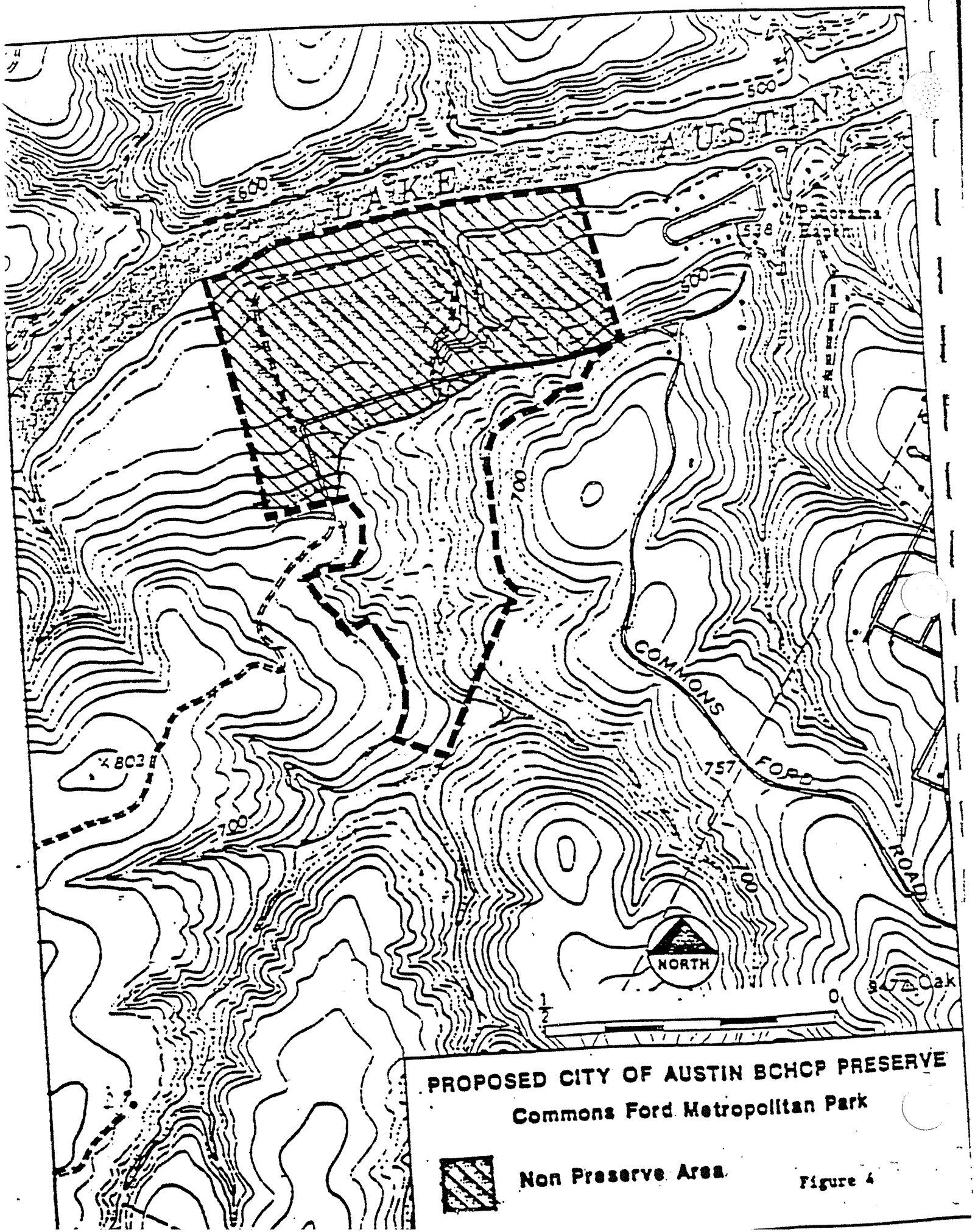


PROPOSED CITY OF AUSTIN BCHCP PRESERVE

Bull Creek District Park

Non Preserve Area

Figure 3

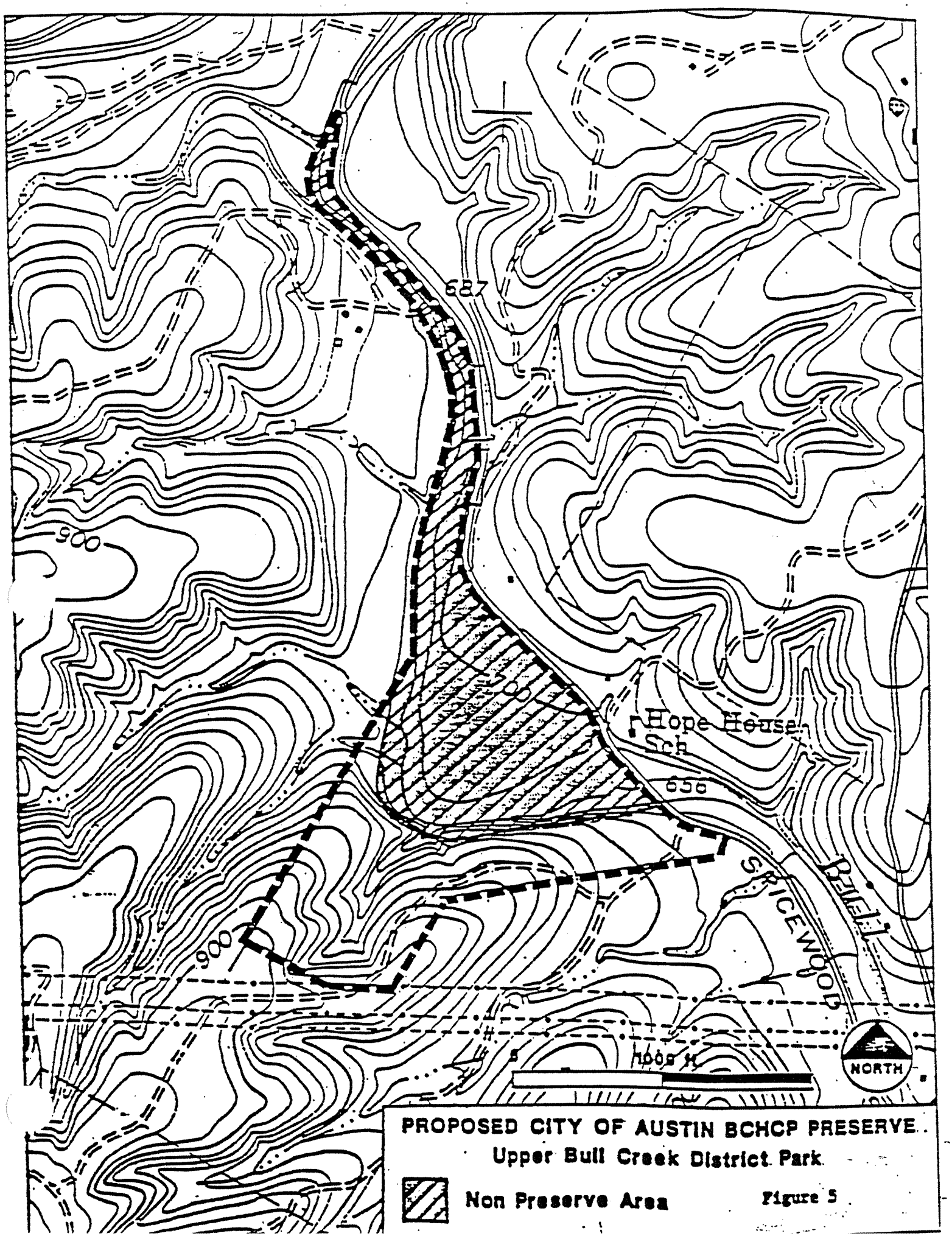


PROPOSED CITY OF AUSTIN BCHCP PRESERVE

Commons Ford Metropolitan Park

Non Preserve Area

Figure 4



PROPOSED CITY OF AUSTIN BCHCP PRESERVE

Upper Bull Creek District Park

Non Preserve Area

Figure 5

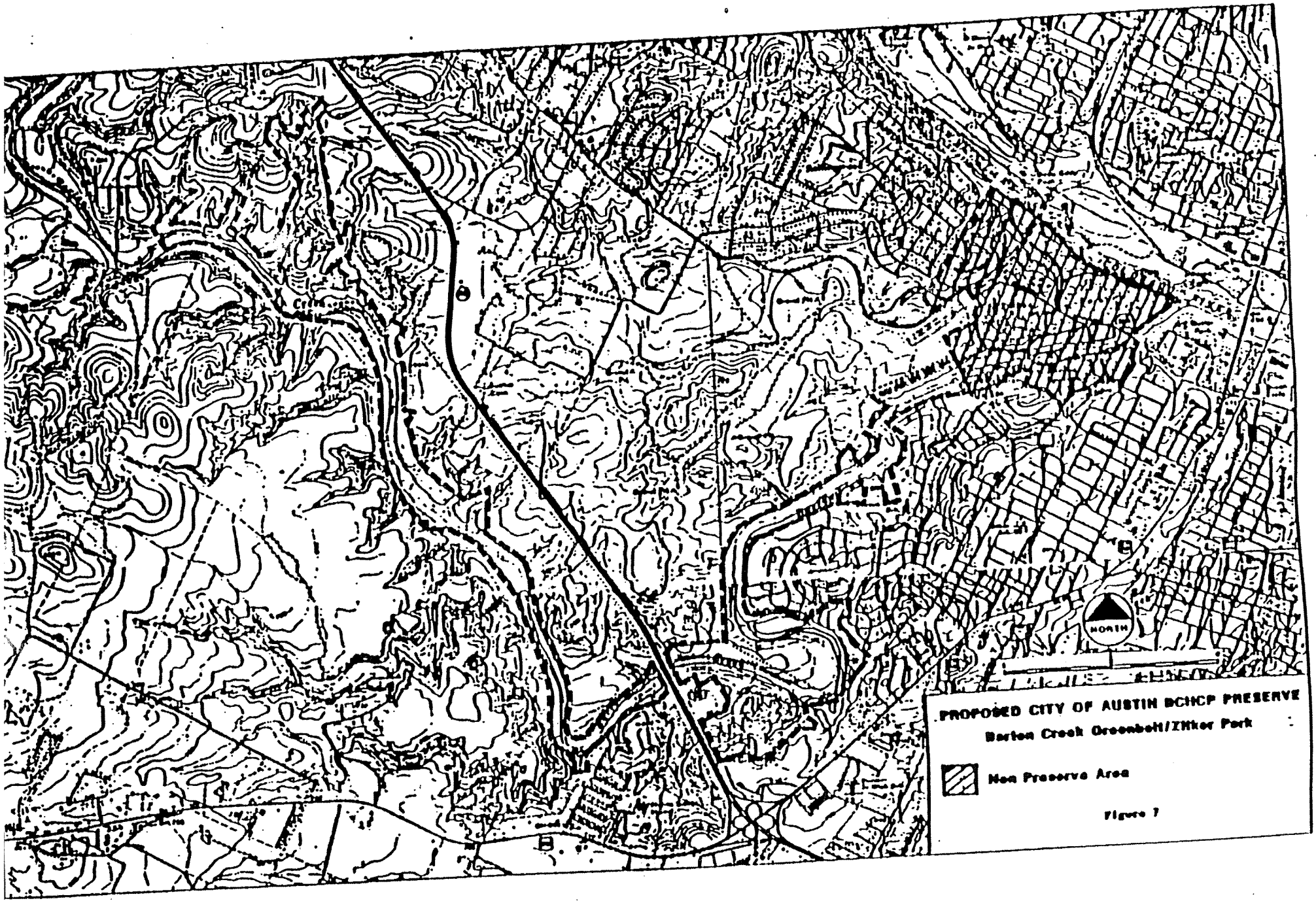
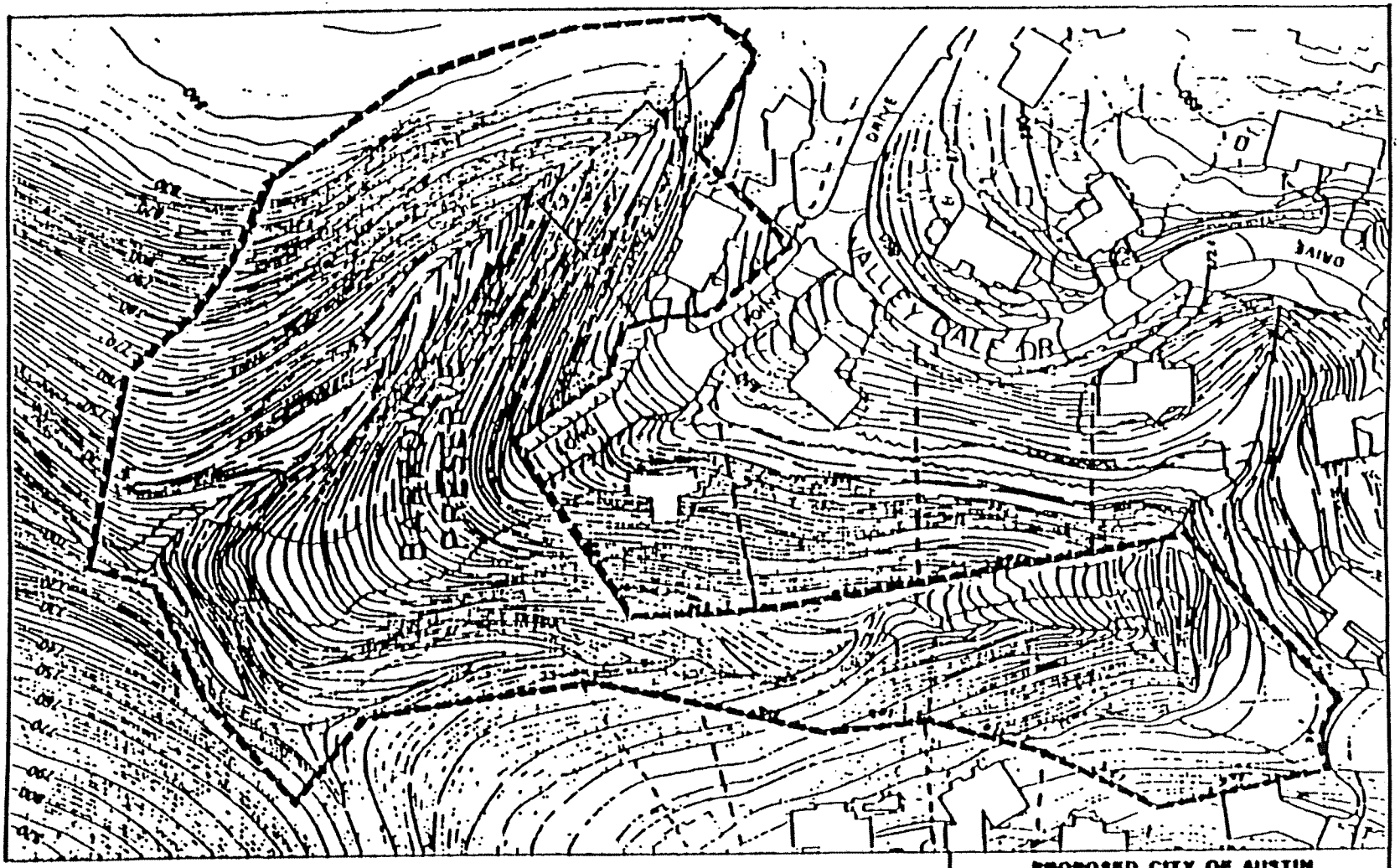
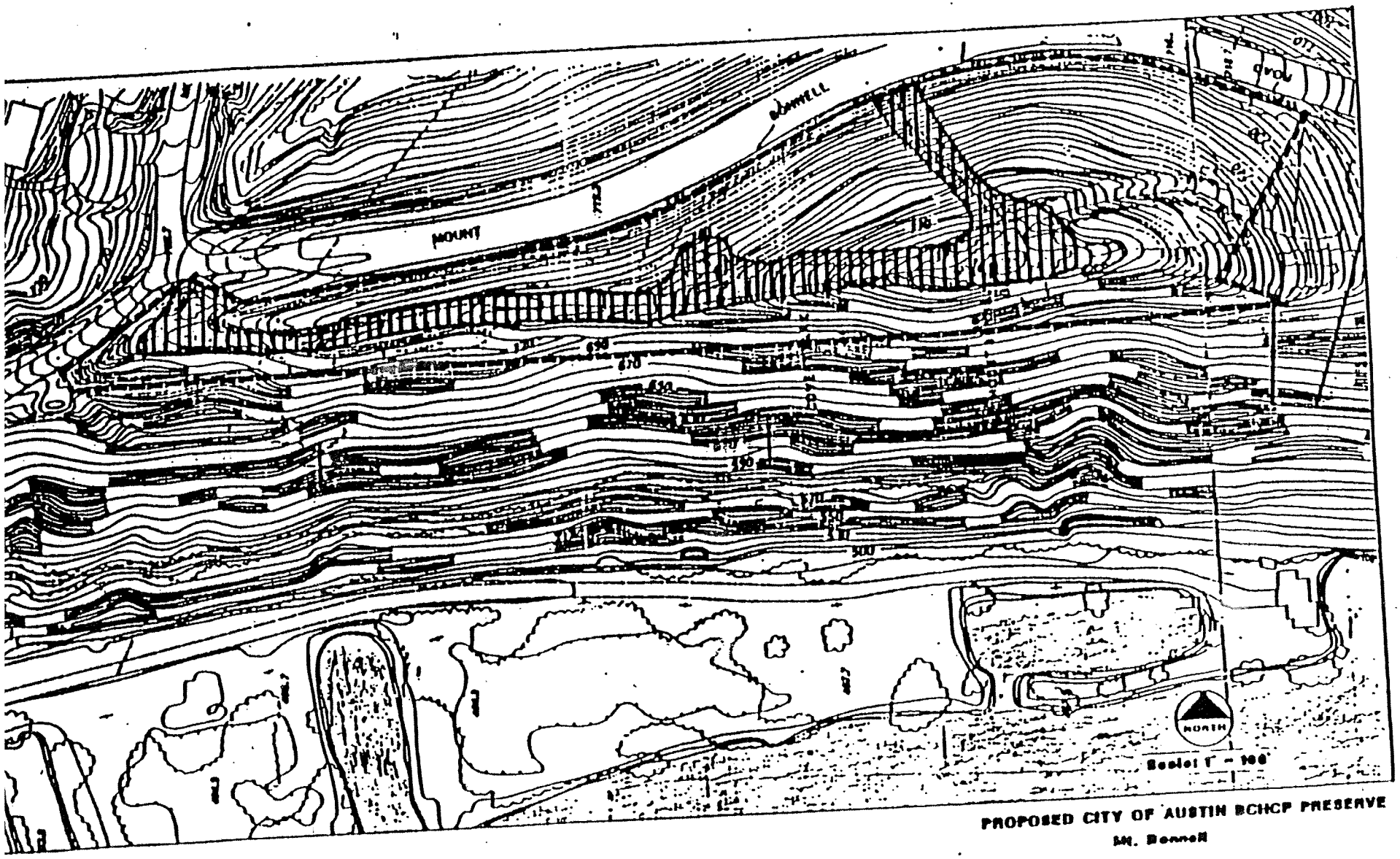

NORTH
PROPOSED CITY OF AUSTIN BCHCP PRESERVE
Barton Creek Greenbelt/Zilker Park
Non Preserve Area

Figure 7



PROPOSED CITY OF AUSTIN
BCHCP PRESERVE

Figure 8 · Barrow Preserve



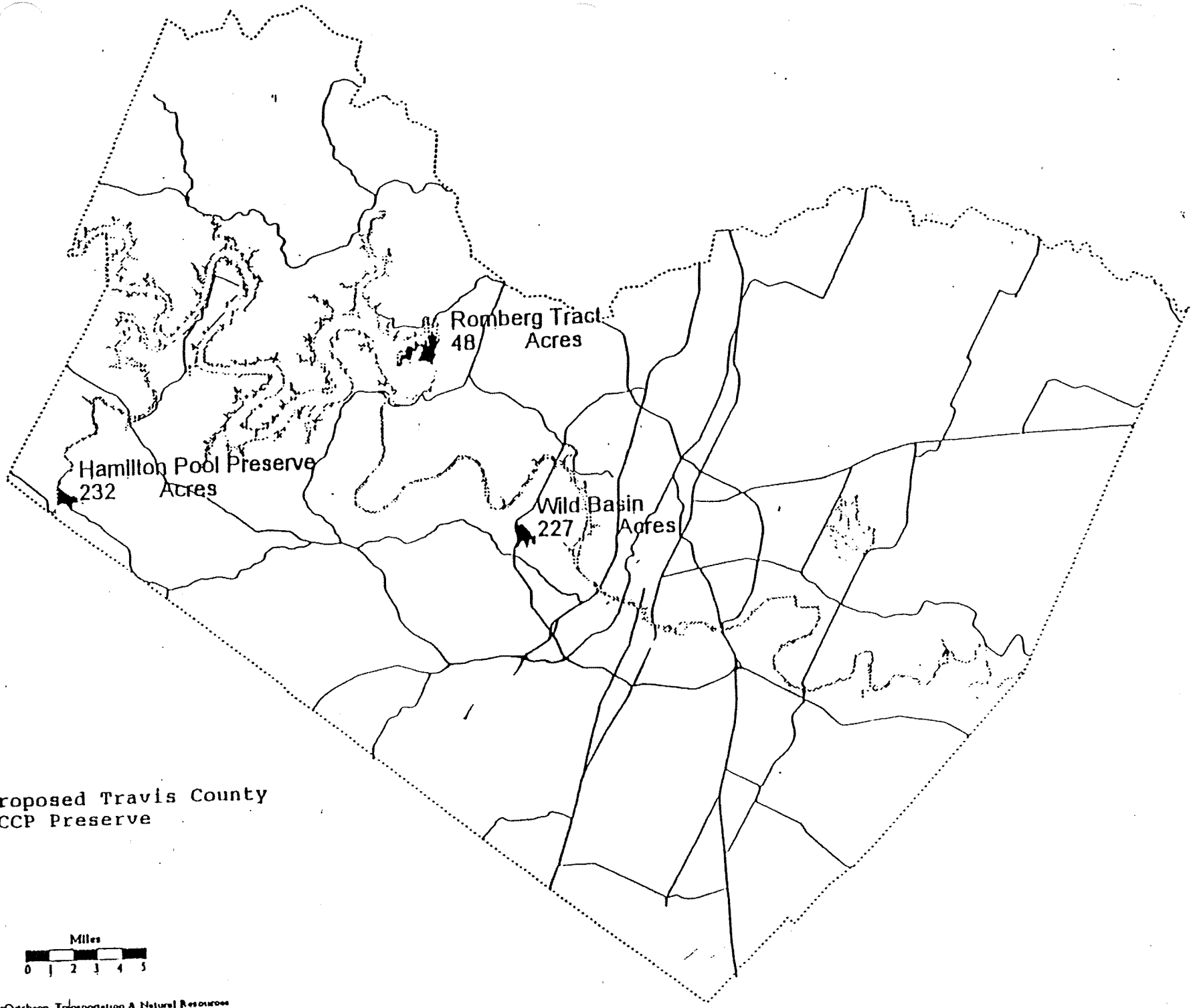
PROPOSED CITY OF AUSTIN BCHCP PRESERVE

Mt. Bonnell

Figure 9

Non Preserve Area

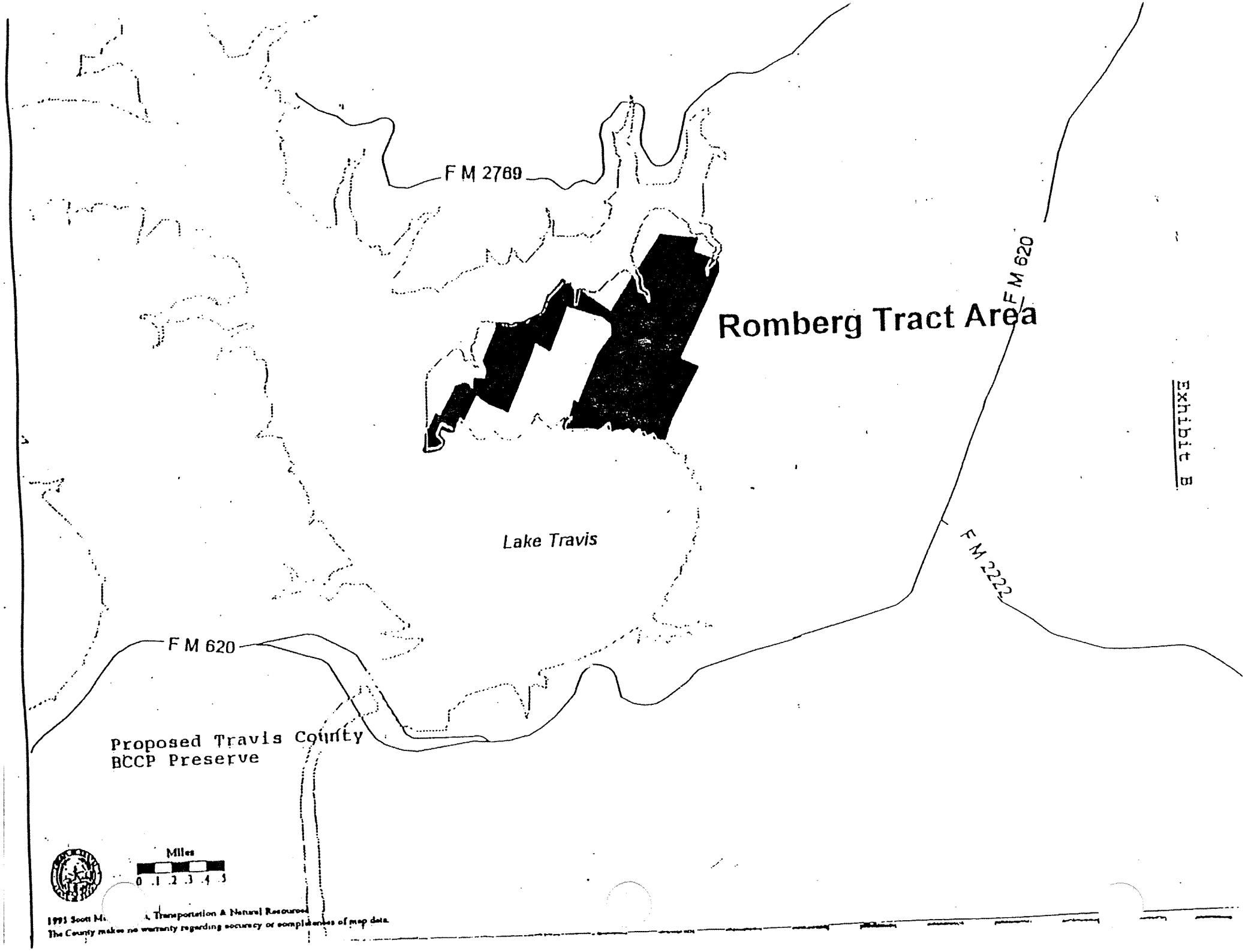
Exhibit B

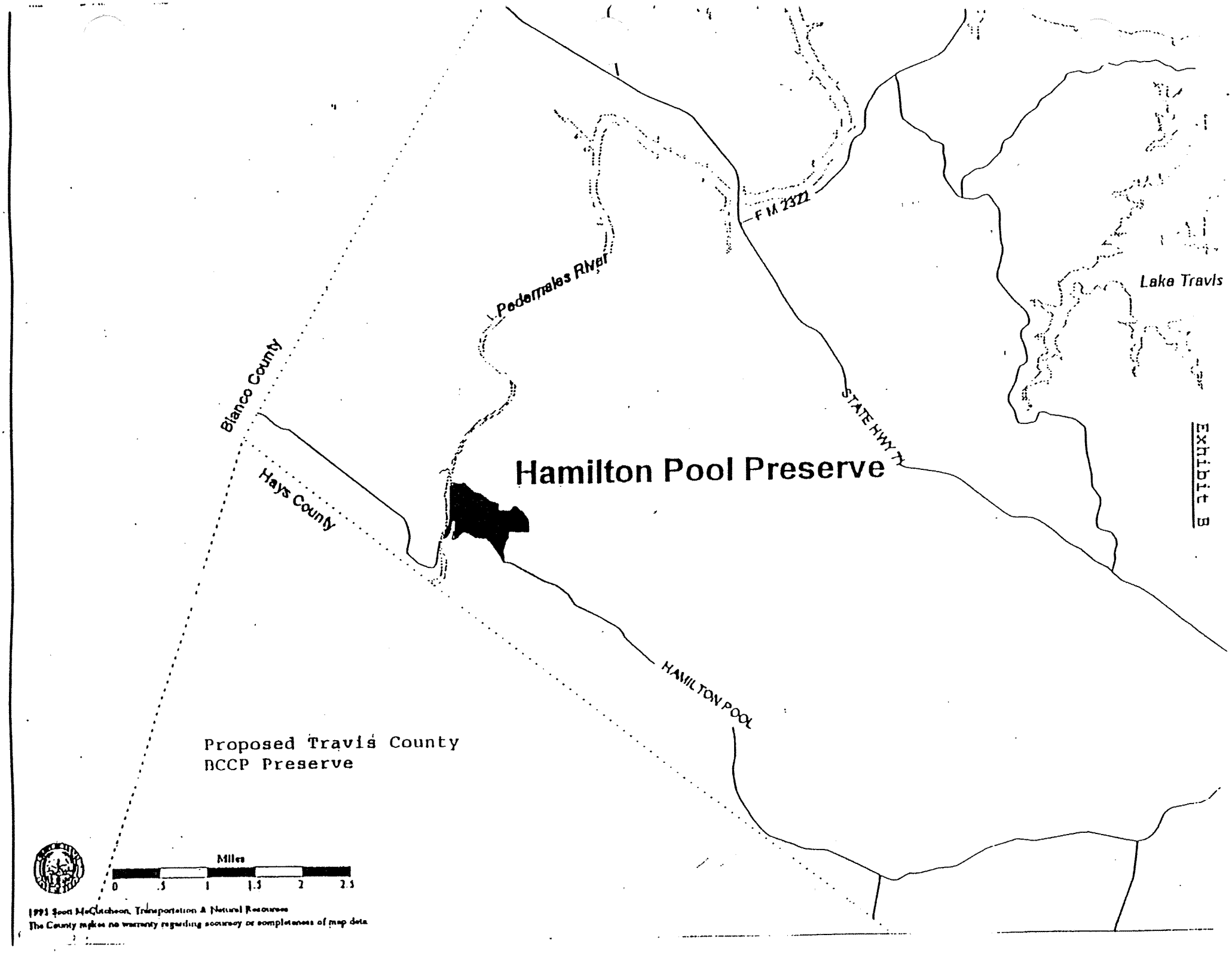


Proposed Travis County
BCCP Preserve

1995 Scott McCutcheon, Transportation & Natural Resources
The County makes no warranty regarding accuracy or completeness of map data

Exhibit B


F M 2769
Romberg Tract Area
F M 620
Lake Travis
F M 2222
F M 620
Proposed Travis County
BCCP Preserve
Miles
0 .1 .2 .3 .4 .5
1995 Scott M
Transportation & Natural Resources
The County makes no warranty regarding accuracy or completeness of map data.


Hamilton Pool Preserve
Pedernales River
Blanco County
Hays County
Lake Travis
STATE HWY 71
FM 2322
HAMILTON POOL
Proposed Travis County
BCCP Preserve
Miles
0
.5
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1.5
2
2.5
1991 Scott McCutcheon, Transportation & Natural Resources
The County makes no warranty regarding accuracy or completeness of map data.

Exhibit B

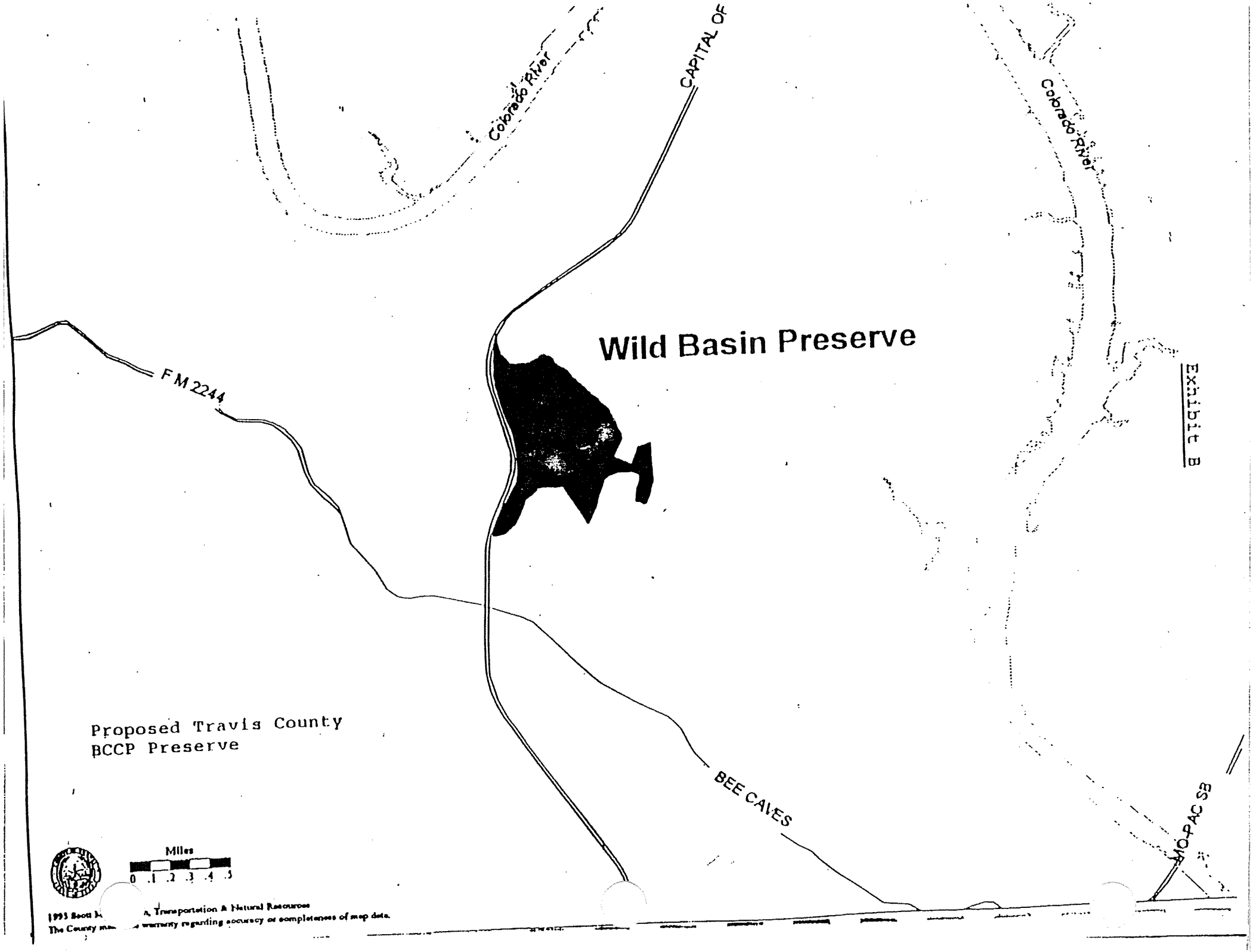
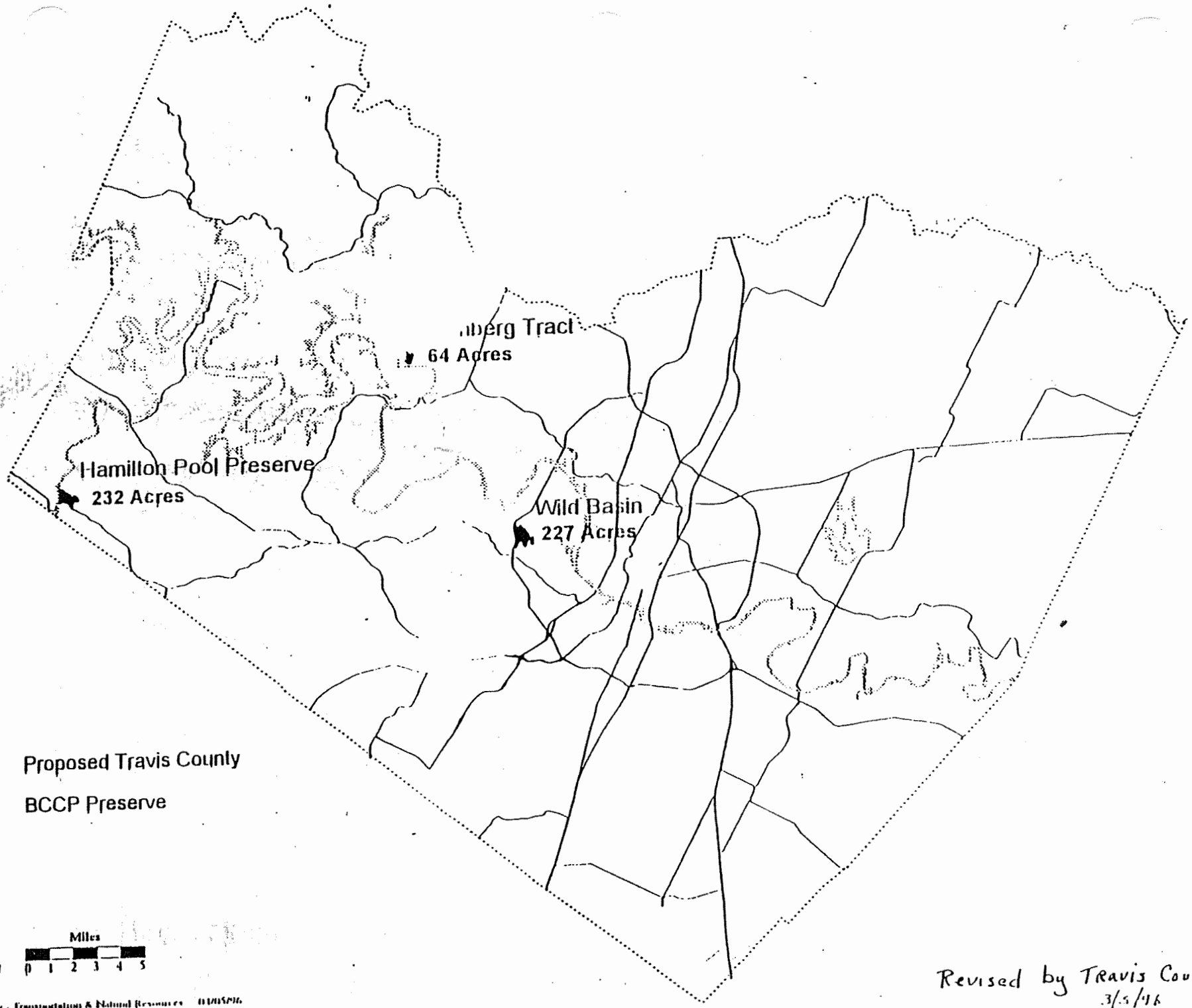

Wild Basin Preserve
Colorado River
CAPITAL OF
Colorado River
FM 2244
BEE CAVES
MOPAC SB
Proposed Travis County
BCCP Preserve
Miles
0 .1 .2 .3 .4 .5
Exhibit B

Exhibit B



Revised by Travis County
3/5/96

Travis County - Transportation & Natural Resources 03/05/96
The County makes no warranty regarding accuracy or completeness of map data

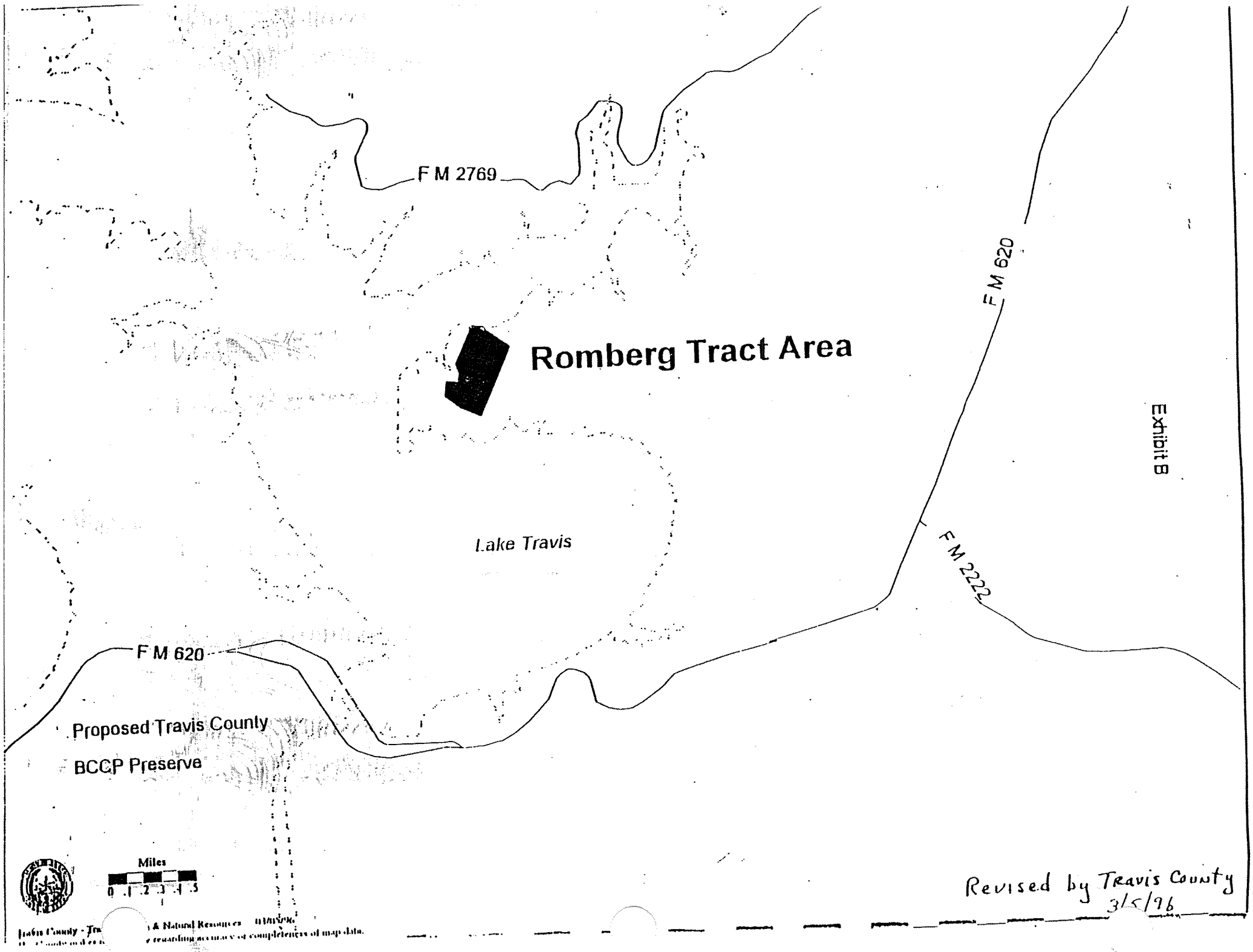

F M 2769
Romberg Tract Area
Lake Travis
F M 620
F M 2222
F M 620
Proposed Travis County
BCCP Preserve
Miles
0 .1 .2 .3 .4 .5
Revised by Travis County
3/5/96

Exhibit B

COPY

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

3-201
(10/86)

FEDERAL FISH AND WILDLIFE PERMIT

2. AUTHORITY-STATUTES

16 USC 1539(a)(1)(A)

REGULATIONS (attached)

50 CFR § 13 & 17

3. NUMBER

PRT-788841

1. PERMITTEE

CITY OF AUSTIN
P.O. BOX 1088
AUSTIN, TEXAS 78767

TRAVIS COUNTY
P.O. BOX 1748
AUSTIN, TEXAS 78767

4. RENEWABLE	5. MAY COPY
XXXX YES	XXXX YES
____ NO	____ NO
6. EFFECTIVE	**7. EXPIRES**
MAY 2, 1996	MAY 2, 2026

8. NAME AND TITLE OF PRINCIPAL OFFICER (if # 1 is a business)

[redacted], [redacted], CITY OF AUSTIN
[redacted], [redacted], TRAVIS COUNTY

9. TYPE OF PERMIT

ENDANGERED SPECIES

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

TRAVIS COUNTY, TEXAS OUTSIDE OF THE PRESERVES IDENTIFIED IN THE HABITAT CONSERVATION PLAN AND FINAL ENVIRONMENTAL IMPACT STATEMENT DATED MARCH 1996

11. CONDITIONS AND AUTHORIZATIONS:

SEE SPECIAL CONDITIONS A THROUGH P ON ATTACHED PAGES 2 THROUGH 11.

12. REPORTING REQUIREMENTS

REPORTS WILL BE PROVIDED TO THE U.S. FISH AND WILDLIFE SERVICE OFFICES APPEARING IN CONDITION G OF THIS PERMIT. REPORTING FORMAT AND CONTENT IS OUTLINED IN CONDITION G OF THIS PERMIT.

ISSUED BY:	TITLE	DATE
Nancy M. Kaufman	REGIONAL DIRECTOR, REGION 2	MAY 2, 1996

ORIGINAL

CITY OF AUSTIN & TRAVIS COUNTY PERMIT PRT-788841

A. If during the tenure of this permit, the amount of incidental take is exceeded, issuance of Participation Certificates must be stopped and the permittees must re-initiate consultation with the USFWS to avoid violation of section 9, Endangered Species Act.

B. Acceptance of this permit serves as evidence that the permittees understand and agree to abide by the terms of this permit and all sections of Title 50 Code of Federal Regulations Parts 13, 17, and 21 (attached) pertinent to issued permits.

C. The authorization granted by this permit is subject to compliance with, and implementation of, the terms and conditions of the Environmental Impact Statement/Habitat Conservation Plan, Biological opinion, and all specific conditions contained in this permit. If there are any discrepancies between the requirements in these documents, the requirements identified in the special conditions of this issued permit take precedence.

D. Upon locating any dead, injured, or sick individuals from the list of animal species covered by this permit, or any other endangered or threatened animal species, permittees are required to contact the U.S. Fish and Wildlife Service's Law Enforcement Office, Austin, Texas (512) 490-0948, for care and disposition instructions. Extreme care should be taken in handling sick or injured individuals to ensure effective and proper treatment. Care should also be taken in handling dead specimens to preserve biological materials in the best possible state for analysis of cause of death. In conjunction with the care of sick or injured endangered/threatened species, or preservation of biological materials from a dead specimen, the permittees and their contractor(s) or subcontractor(s) have the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

E. The validity of this permit is also conditioned upon observance of all relevant international, state, local, or other Federal law.

F. The permittees are authorized to "take" (kill, harm, or harass) the following federally-listed endangered species:

SCIENTIFIC NAME	COMMON NAME
Vireo atricapillus	Black-capped vireo
Dendroica chrysoparia	Golden-cheeked warbler
Tartarocreagris texana	Tooth Cave pseudoscorpion
Neoleptoneta myopica	Tooth Cave spider
Texella reddelli	Bee Creek Cave harvestman
Texella reyesi	Bone Cave harvestman
Rhadine persephone	Tooth Cave ground beetle
Texamaurops reddelli	Kretschmarr Cave mold beetle

Additionally, the permittees would be covered for incidental take of the following species of concern if these species become listed during the life of the permit and the mitigation measures identified in this permit are being performed.

Philadelphus ernestii	Canyon Mock-orange
Croton alabamensis	Texabama croton
Sphalloplana mohri	Flatworm
Candona sp. nr. *stagnalis*	Ostracod
Caecidotea reddelli	Isopod
Trichoniscinae N. S.	Isopod
Miktoniscus N. S.	Isopod
Cicurina wartoni	Spider
C. ellioti	Spider
C. bandida	Spider
C. reddelli	Spider
C. reyesi	Spider
C. cueva	Spider
C. travisae	Spider
Neoleptoneta cocinna	Spider
Neoleptoneta devia	Spider
Eidmannella reclusa	Spider
Aphrastochthonius N. S.	Pseudoscorpion
Tartarocreagris reddelli	Pseudoscorpion
T. intermedia	Pseudoscorpion
T. N. S. 3	Pseudoscorpion
Texella spinoperca	Harvestman
T. comanche	New Comanche Trail Cave harvestman
Speodesmus N. S.	Millepede
Rhadine s. subterranea	Ground beetle
R. s. mitchelli	Ground beetle
R. austinica	Ground beetle

G. An annual report, due June 1 of each year beginning in 1997, is to be provided to the Austin Ecological Services Field Office. This report is to include:

1. a list of all development activities west of the MOPAC Railroad that were permitted by the Permit Holders in the previous 12 months,

2. a list of all tracts for which Participation Certificates were purchased,

3. amount of funds collected for land acquisition,

4. amount of funds expended for land acquisition,

5. amount of funds expended for operations and maintenance.

6. an updated map of the lands dedicated to preserve management,

7. a list of public use and habitat management activities that have been undertaken or completed within the bounds of the preserve units, including the status of land management plans undertaken by the permit holders and managing partners, and

8. a copy of all research or investigation reports that have been prepared within the previous 12 months.

In addition to the above annual requirements, the Permit Holders must provide quarterly updates for the tracts for which Participation Certificates were purchased that include the following information:

1. a general map of each tract location and

2. a tract boundary map that identifies the areas for which the Participation Certificate applies. If a location and/or tract map is not provided to the Permit Holder during the normal permitting process, a street address will meet this requirement.

H. A copy of a recorded Participation Certificate provided by the Permit Holders must be posted at the property site from the time vegetation clearing begins until the construction is completed. For residential development, completed construction is when all roads and utilities are completed to the extent that they meet the applicable acceptance criteria of the City of Austin or Travis County. For commercial, industrial and multi-family developments completed construction is when buildings are suitable for occupancy.

I. The funds collected and expended for this Permit and compliance with the financial requirements of the Permit shall be evaluated by financial audits conducted after the sale of Participation Certificates covering 3,000 fee-paid acres or every five years, whichever comes sooner, until permit expiration. Such audits will be coordinated between the USFWS and the Coordinating Committee. This audit may be part of the permittees audit processes as required by State law and shall not be more frequent than every two years.

J. The funds collected under this Permit will be expended for land or easement acquisition and other preserve system needs in accordance with the following criteria:

1. tracts considered for acquisition will be within or contiguous to the boundaries of the preserve units identified in the issued Permit;

2. expenditure priority should be in the following decreasing order: Bull Creek, Cypress Creek, South Lake Austin, and North Lake Austin; and

3. dispensing of funds from the BCCP Fund account should be accomplished as soon as there are adequate funds to complete a transaction or implement a strategy for acquisition, taking into account opportunity, preserve priority and development threat.

K. The Permit Holders will administer the issuance of the Participation Certificates.

L. Incidental take that may result from the implementation of land management activities within the boundaries of a preserve and contained in a management plan approved by the Coordinating Committee, are covered and authorized under this Permit.

M. Incidental take that may result from the implementation of utility and infrastructure corridor projects approved by the Secretary of the Coordinating Committee and within one of the BCCP-Shared vision approved utility and infrastructure corridors, as provided in the final EIS/HCP, Appendix B, is covered and authorized under this Permit.

N. Incidental take of the Barton Springs salamander is not covered by this Permit. Entities who purchase Participation Certificates for activities within the Travis County portion of the Barton Springs watershed should obtain guidance with respect to avoiding the impacts of their activities on water quality as they relate to the Barton Springs salamander.

O. The incidental take authorization of this permit does not apply to the "take" of any endangered or threatened species outside of the boundary of the permit as identified in the EIS/HCP dated March 1996 or any modifications/amendments to that boundary.

P. The "No Surprises" policy of the U. S. Fish and Wildlife Service provides that additional mitigation, lands or financial compensation shall not be required of the permittees or their successors beyond the level of mitigation provided for in the EIS/HCP. With respect to this permit, the EIS/HCP and supporting documents adequately addressed the species listed in special condition 6 above. To be fully covered by the "No Surprises" policy for a specific species, all of the requirements identified for that species must be met.

GOLDEN-CHEEKED WARBLER:

1. Ensure at least 28,428 acres within the seven identified macrosites will be acquired and managed for the golden-cheeked warbler during the permit duration. Acquisition and management activities through this Permit, other issued incidental take permits, and section 7 consultations where the mitigation activities are within or contiguous to the proposed preserve boundaries, count toward this goal.

2. In conjunction with the managing partners, control human activities to eliminate or mitigate any adverse impacts of human activities to the warbler on these 28,428 acres, for the acreage acquired.

3. No vegetation clearing activities will be accomplished within golden-cheeked warbler habitat, Zones 1 and 2, from March 1 through August 31 to prevent the disturbance of nesting activities unless current breeding season surveys, conducted in accordance with Fish and Wildlife Service protocol, indicate that the warbler is not nesting within 300 feet of the proposed clearing.

4. Develop and implement an approved land management plan, in accordance with the land management guidelines set forth by the Coordinating Committee, for each tract within 12 months after permit issuance or within 12 months of land acquisition whichever is later.

BLACK-CAPPED VIREO

1. Ensure at least 2,000 acres within the seven identified macrosites will be acquired and managed for the black-capped vireo during the permit duration. Acquisition and management activities through this Permit, other issued incidental take permits, and section 7 consultations where the mitigation activities are within or contiguous to the proposed preserve boundaries, count toward this goal.

2. In conjunction with the managing partners, control human activities to eliminate or mitigate any adverse impacts of human activities to the vireo on these 2,000 acres, for the acreage acquired.

3. No vegetation clearing activities will be accomplished within black-capped vireo habitat between March 1 and August 31 to prevent the destruction of an active nest unless current breeding season surveys, conducted in accordance with Fish and Wildlife Service protocol, indicate that the vireo is not nesting within 300 feet of the proposed clearing.

4. Develop and implement an approved land management plan, in accordance with the land management guidelines set forth by the Coordinating Committee, for each tract within 12 months after permit issuance or within 12 months of land acquisition whichever is later.

LISTED KARST INVERTEBRATES

1. Acquire and manage, or implement formal management agreements, as provided in subsection (4) below, adequate to preserve the environmental integrity of the following 35 caves that support federally-listed karst invertebrates:

Amber Cave	Kretschmarr Double Pit
Bandit Cave	Kretschmarr Cave
Beard Ranch Cave	Lamm Cave
Bee Creek Cave	Little Bee Creek Cave
Broken Arrow Cave	M.W.A. Cave
Cave Y	McDonald Cave
Cold Cave	McNeil Bat Cave
Cotterell Cave	New Comanche Trail Cave
Disbelievers Cave	No Rent Cave
Eluvial Cave	North Root Cave
Fossil Cave	Rolling Rock Cave
Fossil Garden Cave	Root Cave
Gallifer Cave	Spider Cave
Hole-In-The-Road	Stovepipe Cave

Japygid Cave	Tardus Hole
Jest John Cave	Tooth Cave
Jester Estates Cave	Weldon Cave
Jollyville Plateau Cave	

2. 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 USFWS 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 USFWS, 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.

3. Where the surface and subsurface hydrogeologic area around a cave identified for protection is not known, the area delineated by the contour level at the bottom of the cave will be managed for cave protection. In the absence of such site specific information, no Participation Certificates are to be awarded within 0.25 miles of the cave entrance until the hydrogeologic areas are properly delineated.

4. Enter into formal management agreement(s) for all caves that are recommended for protection but have yet to be acquired. The management agreement(s) will detail the area to be managed for cave protection, what such management will entail, and who is responsible for the management.

KARST SPECIES OF CONCERN

1. Acquire and manage, or implement formal management agreements, as provided in subsection (4) below, adequate to preserve the environmental integrity of the following 27 caves, in addition to the caves protected for the federally-listed species, that support the karst species of concern:

Adobe Springs Cave	Jack's Joint
Airman's Cave	Lost Oasis Cave
Armadillo Ranch Sink	Lost Gold Cave
Arrow Cave	Maple Run Cave
Blowing Sink	Midnight Cave
Buda Boulder Spring	Moss Pit
Cave X	Pennie Cave
Ceiling Slot Cave	Pickle Pit
District Park Cave	Pipeline Cave

Flint Ridge Cave	Slaughter Creek Cave
Get Down Cave	Spanish Wells Cave
Goat Cave	Stark's North Mine
Ireland's Cave	Talus Spring
Whirlpool Cave	

The caves in which the karst species of concern occur are listed below. To receive the "no surprises" guarantee for the identified species, the caves identified must be protected, as per "1" above.

SPECIES	CAVE
Sphalloplana mohri	Spanish Wells Cave
Candona sp. nr. *stagnalis*	Cave X
Caecidotea reddelli	Buda Boulder Cave, Cave X, Jack's Joint
Trichoniscinae N. S.	Bandit Cave
Miktoniscus N. S.	Cave X
Cicurina wartoni	Pickle Pit
C. ellioti	Cotterell Cave, Fossil Garden Cave, Gallifer Cave, No Rent Cave, Weldon Cave
C. bandida	Bandit Cave, Ireland's Cave
C. reddelli	Cotterell Cave
C. reyesi	Airman's Cave
C. cueva	Cave X, Flint Ridge Cave
C. travisae	Amber Cave, Broken Arrow Cave, Kretschmarr Cave, McDonald Cave, Root Cave, Spider Cave, Stovepipe Cave, Tooth Cave
Neoleptoneta cocinna	Lost Gold & Stark's North Cave
N. devia	McDonald Cave
Eidmannella reclusa	Tooth Cave, Gallifer Cave, Kretschmarr Cave, Stovepipe Cave
Aphrastochthonius N. S.	Stovepipe Cave
Tartarocreagris reddelli	McDonald Cave
T. intermedia	Airman's Cave
T. N. S. 3	BCNWR
Texella spinoperca	Airman's Cave
T. comanche	New Comanche Trail Cave
Speodesmus N. S.	Bandit Cave, Cave X, Get Down Cave, Goat Cave, Pennie Cave, Pipeline Cave, Slaughter Creek Cave, Whirlpool Cave
Rhadine s. subterranea	Cotterell, Fossil, Fossil Garden, No Rent, McNeil Bat, & Weldon Cave
R. s. mitchelli	Amber, Kretschmarr, & Tooth Cave

R. austinica	Airman's, Arrow, Bandit, Bee Creek, Blowing Sink, Cave Y, Cave X, District Park, Flint Ridge, Get Down, Ireland's, Lost Gold, Lost Oasis, Maple Run, Midnight, Pennie, & Whirlpool

2. 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 USFWS 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 USFWS, 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.

3. Where the surface and subsurface hydrogeologic area around a cave identified for protection is not known, the area delineated by the contour level at the bottom of the cave will be managed for cave protection. In the absence of such site specific information, no Participation Certificates are to be awarded within 0.25 miles of the cave entrance until the hydrogeologic areas are properly delineated.

4. Enter into formal management agreement(s) for all caves that are recommended for protection but have yet to be acquired. The management agreement(s) will detail the area to be managed for cave protection, what such management will entail, and who is responsible for the management.

CANYON MOCK-ORANGE

Protect and manage the portions of the known populations found within the preserve boundaries, for the acreage acquired.

TEXABAMA CROTON

Protect and manage the populations at Pace Bend Park.