Section 6 (Texas Traditional) Report Review

Attachment to letter dated DEC 2 0 2005

Project Title: Census and Monitoring of Black-capped Vireo in Texas

Final or Interim Report? Final

Job #: WER 61 **Grant #:** E- 15

Reviewer Station: Arlington ESFO, Austin ESFO

Lead station was contacted and concurs with the following comments:
☒ Yes ☐ No ☐ Not applicable (reviewer is from lead station)

Interim Report (check one):	**Final Report** (check one):
☐ is acceptable as is	☐ is acceptable as is
☐ is acceptable as is, but comments below need to be addressed in the next report	☒ is acceptable, but needs minor revision (see comments below)
☐ needs revision (see comments below)	☐ needs major revision (see comments below)

Comments:

We appreciate the considerable amount of effort the Principal Investigator devoted to this project. This report includes a lot of valuable information on black-capped vireos (BCVI). Following are comments that should be addressed prior to finalizing this report.

1. It is not clear if Segment Objectives (Approaches from the original proposal) four and five were completed. Please clarify.

2. The 2000 interim report states Dolan Falls Ranch Preserve and Big Bend National Park surveys and monitoring were being conducted outside the scope of this project, but the data would be "made available for the final report." Big Bend National Park's data were submitted; however, there is no information on Dolan Falls Ranch Preserve. It would be helpful to include this data, if possible.

3. Both Dinosaur Valley State Park and Fossil Rim Wildlife Center were surveyed during the first two seasons of the study. We understand they were discontinued due to a lack of BCVIs and/or access issues. However, we would appreciate receiving any data collected, including negative results, on BCVI territories, sightings, nesting activities, and survey conditions and effort.

4. Segment Objective 11 is to determine management recommendations for monitoring sites and their associated recovery units. While some recommendations were made for some of the sites, a

comprehensive discussion about management in each of the recovery units was not included. We would appreciate receiving this information. Rather than discussing each site, which would include repetition among sites with similar habitat, management recommendations for each BCVI habitat type used during this study may be more helpful.

5. Under Results and Discussions, the report states roadside surveys were conducted and BCVIs were located. Please include maps of the survey routes and BCVI sightings.

6. The report states an increase in predation and decrease in nest success occurred on the Dobbs Mountain Ranch after habitat destruction activities. While no dates are given, the report shows nest success dropped from 75 to 12.5 percent between 2002 and 2003. Is this when the clearing activity occurred? If not, please let us know when the activity did occur.

7. Section D, Approach, of the report states every identifiable BCVI territory was delineated on USGS 7.5' topographic maps. It also appears some territories and sightings were delineated on aerial photography. However, territory maps for all surveys were not included in the final report. Please submit maps of BCVI sightings and territories not included with the final report; and, if possible, we would appreciate copies of any GIS files on sightings, territories, and property boundaries.

8. Do the numbers of fledges reported in tables 7 through 13, include cowbird fledges? Also, was cowbird egg or nestling removal accounted for in determining productivity? It would be helpful to know when cowbird control was conducted either on or adjacent to each property before and during this study.

Project Title: Census and Monitoring of Black-capped Vireo in Texas

Final or Interim Report? Final

Job #: WER61 Grant #: E-15

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Comments:

We appreciate the considerable amount of effort the Principal Investigator devoted to this project. This report includes a lot of valuable information on black-capped vireos (BCVI). Following are comments that should be addressed prior to finalizing this report.

1. It is not clear if Segment Objectives (Approaches from the original proposal) four and five were completed. Please clarify.

Segment objectives 4 and 5:

4. Where access is not obtainable, determine to what extent habitat may be observed from public roadways. Estimate extent of habitat and determine census protocol to best estimate population status; Yrs 1-3.

5. Revisit locations of Black-capped Vireo habitat observed during roadside surveys that were not found to be occupied. Re-survey to confirm status. If vireos are observed, implement steps 2 - 4; Yrs 1-3.

Response:
Segment objectives 4 and 5 were essentially contingencies in the event that not enough accessible study sites could be found in each recovery unit. Enough accessible sites were found. Therefore, "over the fence" roadside monitoring was not necessary.

2. The 2000 interim report states Dolan Falls Ranch Preserve and Big Bend National Park surveys and monitoring were being conducted outside the scope of this project, but that data would be "made available for the final report." Big Bend National Park's data were submitted; however, there is no information on Dolan Falls Ranch Preserve. It would be helpful to include this data, if possible.

Response:
Big Bend National Park was incorporated into the scope of this project as a permanent study site. However, the level of effort in monitoring the BCVI population at Big Bend National Park was not as practicable as other sites so a thorough yearly census was conducted only. However, incidental observations of nests, fledglings, parasitism, etc. provided valuable data none-the-less. BCVI observations made by park personnel and visitors were also noted in the yearly reports.

Yearly monitoring at Dolan Falls Ranch Preserve was discontinued due to lack of funds. However, useful data on Dolan Falls Ranch Preserve can be found in:

Farquhar, C. C., and J. P. Maresh. 1996. Population biology and habitat characterization of Black-capped Vireos at Dolan Falls Ranch Preserve, Val Verde County, Texas. Year One Final Report. Endangered Resources Branch, Texas Parks and Wildlife Department. Austin, Texas.

Farquhar, C. C., and J. P. Maresh. 1998. Population biology and habitat characterization of Black-capped Vireos at Dolan Falls Ranch Preserve, Val Verde County, Texas. Year Two Final Report. Endangered Resources Branch, Texas Parks and Wildlife Department. Austin, Texas.

Farquhar, C. C. 2000. Population biology and habitat characterization of Black-capped Vireos at Dolan Falls Ranch Preserve, Val Verde County, Texas. Years Three and Four Final Report. Endangered Resources Branch, Texas Parks and Wildlife Department. Austin, Texas.

3. Both Dinosaur Valley State Park and Fossil Rim Wildlife Center were surveyed during the first two years of the study. We understand they were discontinued due to a lack of BCVIs and/or access issues. However, we would appreciate receiving any data collected, including negative results, on BCVI territories, sightings, nesting activities, and survey condition and effort.

Response:
The following report should have been included with the stack of yearly site reports from each study site. If not, a copy can be made available.

Pinkston, Jane, John Maresh and Ned Wright. 2002. Population Monitoring for Black-capped Vireo (Vireo atricapillus) at Fossil Rim Wildlife Center, Dinosaur Valley State Park and Adjacent Private Property in Somervell County, Texas. (2001 Filed Season). Texas Parks and Wildlife. Austin, TX.

4. Segment Objective 11 is to determine management recommendations for monitoring sites and their associated recovery units. While some recommendations were made for some of the site, a comprehensive discussion about management in each of the recovery units was not included. We would appreciate receiving this information. Rather than discussing each site, which would include repetition among sites with similar habitat, management recommendations for each BCVI habitat type used during this study may be more helpful.

Segment objective 11:

11. Determine management recommendations for specific monitoring sites and their respective recovery units; Yrs 4-5

Response:
Management recommendations for recovery units are indeed lacking. There are some suggestions as to what recovery unit boundaries should be, based on habitat similarities, but no comprehensive management recommendations. An addendum to this final report would be required to present management recommendations for recovery units. However, due to the time commitment required to do this and the employment circumstances of the Principal Investigator, that addendum will not be forthcoming with these responses. Management recommendations by recovery unit based on the findings of this report as well as more current data may be delivered at a future time.

5. Under Results and Discussions, the report states roadside surveys were conducted and BCVIs were located. Please include maps of the survey routes and BCVI sightings.

Response:
Maps of survey routes and BCVI sightings may be found in:

Maresh, J. P., G. A Rowell, and K. O'Neal. 1999. Roadside Survey For Black-Capped Vireo Habitat On The Edward's Plateau. Final Report for U.S. Fish and Wildlife Service Endangered Species Program, Section 6, Texas Grant E- 1 -9, Project No. 75. Texas Parks and Wildlife Department, Austin, Texas.

Maresh, J. P. and G. A. Rowell. 2000. Roadside Survey for Black-capped Vireo in Western and Central Texas. Final Report for U.S. Fish and Wildlife Service Endangered Species Program, Section 6, Texas Grant E-1-10, Project No. 89. Texas Parks and Wildlife Department, Austin, Texas.

All occurrences of BCVI from these 2 studies were mapped and entered into the Texas Parks and Wildlife Biological and Conservation Data System (TxBCD). Results, both positive and negative, from the re-surveying of routes, or segments of routes, during the current study were used to update Element Occurrence Records (EORs) in the TxBCD at least through the 2003 field season. Additional observations of BCVI from informal roadside surveys were also entered into the TxBCD.

6. The report states an increase in predation and decrease in nest success occurred in the Dobbs Mountain Ranch after habitat destruction activities. While no dates are given, the report shows nest success dropped from 75 to 12.5 percent between 2002 and 2003. Is this when the clearing activity occurred? If not, please let us know when the activity did occur.

Response:
Yes, the clearing took place sometime during the winter of 2002/03 as is discussed in:

Maresh, J. 2003. Census and Monitoring of Black-capped Vireo at Dobbs Mountain Ranch Edwards County, Texas (Year Three- 2002 Field Season). March 2003. Report to Dobbs Run Ranch, LLC.

This report was included with the stack of yearly reports from each study site.

7. Section D, Approach, of the report states every identifiable BCVI territory was delineated on USGS 7.5' topographic maps. It also appears some territories and sightings were delineated on aerial photography. However, territory maps for all surveys were not included in the final report. Please submit maps of BCVI sightings and territories not included with the final report; and, if possible, we would appreciate copies of any GIS files on sightings, territories, and property boundaries.

Response:
Territory maps are included in each of the yearly reports from each study site. GIS files from most of the sites are still available and will be submitted on CD. However, it will take some time to locate and organize these files.

8. Do the numbers of fledges reported in tables 7 through 13, include cowbird fledges? Also, was cowbird egg or nestling removal accounted for in determining productivity? It would be helpful to know when cowbird control was conducted either on or adjacent to each property before and during this study.

Response:
No, numbers of fledges reported in tables 7 through 13 do not include cowbird fledglings. Cowbird egg and nestling removal was not part of the approach to this project. However, some removal of cowbird eggs or nestlings did rarely take place at some sites as discussed in: Section E: Results and Discussion; Brown-headed Cowbird Parasitism and Other Threats. Generally, these removals were not accounted for in determining productivity; however, most nests that had cowbird eggs or nestlings removed were subsequently abandoned. The exception to this was the 2002 Field Season at Quail Ridge Ranch; also discussed in Section E: Results and Discussion; Brown-headed Cowbird Parasitism and Other Threats. The cowbird control efforts are further discussed in:

Bailey, J.W. and J. Maresh. 2002. Census and Monitoring of the Black-capped Vireo at Quail Ridge Ranch, Somervell County, Texas (Year Three – 2002 Field Season). Texas Parks & Wildlife Department. Austin, Texas.

This report should have been included with the stack of yearly reports from each study site.

The history of cowbird control efforts on or near study sites before and during study period is as follows:

Big Bend National Park- Minimal cowbird trapping occurred around the horse remuda in the mid-90s. Exact dates and duration are unknown.

Camp Barkeley- No known cowbird control effort anywhere in region.

Camp Bowie- No known cowbird control effort anywhere in region.

Chandler Independence Creek Preserve- No known cowbird control effort anywhere in region.

Dobbs Mountain- Several years of cowbird trapping took place on adjacent Kickapoo Cavern State Park prior to study period with 2 (+?) traps and cowbird trapping was continuous (in season) on adjacent Dobbs Run Ranch with 1 fixed and 1 mobile trap.

Garnett Preserve- No known cowbird control effort anywhere in region.

Quail Ridge Ranch- No known cowbird control effort except during 2002 Field Season as discussed above.

Walnut Creek Ranch- No known cowbird control effort anywhere in region.

TABLE 2. Current Black-capped Vireo population (number of known males) by county and recovery unit. (Recovery units from *Black-capped Vireo Recovery Plan* (USFWS 1991)).

Recovery Unit 1		**Recovery Unit 2**		**Recovery Unit 3**		**Recovery Unit 4**		**Recovery Unit 5**		**Recovery Unit 6**	
North-Central Texas		*Lampasas Cut Plains*		*Southeast Edwards Plateau*		*Concho Valley*		*Stockton Plateau*		*Trans-Pecos*	
Archer		Bell	1,500	Bandera	17	Coke	11	Crockett	2	Brewster	16
Callahan	2	Bosque	1	Bexar	34	Concho		Terrell	86	Culberson	
Clay		Brown		Blanco	14	Irion		Val Verde	161	El Paso	
Collin		Burnet	57	Comal		Nolan	3		249	Hudspeth	
Comanche		Coleman	6	Edwards	225	Runnels	2			Jeff Davis	
Cooke		Coryell	3,500	Gillespie		Sterling				Loving	
Dallas		Hamilton		Hays	2	Taylor	7			Pecos	
Denton		Hill		Kendall		Tom Green	4			Presidio	
Eastland		Lampasas		Kerr	437		27			Reeves	
Ellis		McLennan		Kimble	35					Ward	
Erath		Mills		Kinney	115					Winkler	
Fannin		Somervell	20	Llano	1						16
Grayson		Travis	45	Mason	80						
Hill		Williamson	33	McCulloch	2						
Hood			5,162	Medina							
Hunt				Menard	8						
Jack				Real	100						
Johnson				San Saba	11						
Kaufman				Schleicher							
Montague				Sutton	1						
Palo Pinto	1			Uvalde	2						
Parker					1,084						
Rockwall											
Shackleford											
Stephens											
Tarrant											
Throckmorton											
Wise											
Young											
	3										

TABLE 3. Current Black-capped Vireo population (number of known males) by county and recovery unit. (Recovery units from *Black-capped Vireo Population and Habitat Viability Assessment Report* (USFWS 1996)).

Recovery Unit 1		**Recovery Unit 2**		**Recovery Unit 3**		**Recovery Unit 4**	
North-Central Texas		*Southeast Edwards Plateau*		*Concho Valley*		*Southwest and Trans-Pecos*	
Archer		Bandera	17	Coke	11	Brewster	16
Bell	1,500	Bexar	34	Concho		Crockett	2
Bosque	1	Blanco	14	Irion		Culberson	
Brown		Comal		Nolan	3	El Paso	
Burnet	57	Edwards	225	Runnels	2	Hudspeth	
Callahan	2	Gillespie		Sterling		Jeff Davis	
Clay		Hays	2	Taylor	7	Loving	
Coleman	6	Kendall		Tom Green	4	Pecos	
Collin		Kerr	437		**27**	Presidio	
Comanche		Kimble	35			Reeves	
Cooke		Kinney	115			Terrell	86
Coryell	3,500	Llano	1			Val Verde	161
Dallas		Mason	80			Ward	
Denton		McCulloch	2			Winkler	
Eastland		Medina					**265**
Ellis		Menard	8				
Erath		Real	100				
Fannin		San Saba	11				
Grayson		Schleicher					
Hamilton		Sutton	1				
Hill		Uvalde	2				
Hood			**1,084**				
Hunt							
Jack							
Johnson							
Kaufman							
Lampasas							
McLennan							
Mills							
Montague							
Palo Pinto	1						
Parker							
Rockwall							
Shackleford							
Somervell	20						
Stephens							
Tarrant							
Throckmorton							
Travis	45						
Williamson	33						
Wise							
Young							
	5,165						

FINAL REPORT

As Required by

THE ENDANGERED SPECIES PROGRAM

TEXAS

Grant No. E - 15

Endangered and Threatened Species Conservation

Project WER 61:

Census and Monitoring of Black-capped Vireo in Texas

Prepared by:

John Maresh

TEXAS PARKS & WILDLIFE

Robert Cook
Executive Director

Ron George
Program Director, Wildlife Science,
Research and Diversity

Mike Berger
Division Director, Wildlife

12 May, 2005

FINAL REPORT

STATE: Texas **GRANT NUMBER:** E - 15

GRANT TITLE: Endangered and Threatened Species Conservation

REPORTING PERIOD: 1 September 2001 to 31 August 2005

STATE PROJECT NUMBER: WER61

PROJECT TITLE: Census and Monitoring of Black-capped Vireo in Texas

OBJECTIVE(S):

1. To determine current population status and distribution in Texas recovery units 1, 4, 5, and 6 and clarify population status in several counties in recovery units 2 and 3.
2. To monitor status and breeding productivity of these populations.
3. To determine threats from cowbird *(Molothrus* spp.) parasitism and identify other threats.
4. To determine differences in habitat structure and composition and habitat use between different recovery units.

Significant Deviations:

The contracts for this project were extended one year to complete the preparation of the final report.

The following Segment Objectives (from Approach in Project Statement) were constrained or prohibited from completion as follows:

Census *item 3*: **Where access is obtained, use standardized census procedures to determine vireo abundance. (Bibby, *et al.*, 1992); report results annually; Yrs 1-5.**

Due to logistical and technical constraints standardized abundance estimates were not performed. Instead, opportunistic sampling efforts from monitoring populations offered an impression of the abundance at each site. Local population sizes were thus estimated from nest monitoring and observation of free-living individuals.

Monitoring *item 9*: **Select 2 sites (1 public, 1 private) from each recovery unit; Yr 1.**

This item called for the establishment of 2 monitoring sites (1 public, 1 private) in each of Recovery Units 1, 4, 5 and 6 from the *Black-capped Vireo Recovery Plan* (USFWS 1991). Due to a number of conditions, including lack of suitable habitat in certain recovery units, it was decided that a more representative monitoring project could be performed using the recovery units from the *Black-capped Vireo Population and Habitat Viability Assessment Report* (USFWS 1996). Throughout this report, recovery units from both the recovery plan and PHVA are

considered and results are presented separately for each. The number of monitoring sites by recovery unit (both sets) and distinction of ownership are as follows:

Black-capped Vireo Recovery Plan:	*Black-capped Vireo Population and Habitat Viability Assessment Report:*
Recovery Unit 1. North-Central Texas-	**Recovery Unit 1.** North-Central Texas-
1 private	2 private, 1 public
Recovery Unit 2. Lampasas Cut Plains-	**Recovery Unit 2.** Southeast Edwards Plateau-
1 private, 1 public	1 private
Recovery Unit 3. Southeast Edwards Plateau-	**Recovery Unit 3.** Concho Valley-
1 private	1 private, 1 public
Recovery Unit 4. Concho Valley-	**Recovery Unit 4.** Southwest and Trans-Pecos:
1 private, 1 public	1 private, 1 public
Recovery Unit 5. Stockton Plateau-	
1 private	
Recovery Unit 6. Trans-Pecos-	
1 public	

Monitoring *item 10:* **Implement monitoring on selected sites. Monitor sites annually for population status, breeding status, breeding success, cowbird parasitism, predation, and other threats. Determine parameters of breeding biology such as territory size and density. Identify principle vegetative components of breeding territories and characterize nest sites; Yrs 1-5.**

All established sites were monitored annually and sites were monitored with approximately equal effort between years. However, the amount of effort devoted to individual sites varied and researcher time was allocated according to factors such as the size of the Black-capped Vireo population at a given site and the areal extent of the site. All sites were visited repeatedly over the period of the breeding season except for Big Bend National Park, which was visited only once per season in an 8-10 day stint.

Monitoring of all sites in the Year 4 (2003) breeding season was truncated due to the elimination in July 2003, by the conducting agency (Texas Parks & Wildlife Department), of the position held by the Principal Investigator. In October 2003, administration of the project was moved to Environmental Defense, Inc. As a result of this break in continuity, valuable late season site visits were delayed or canceled and therefore monitoring was incomplete on a number of sites. Also, on several properties, nest site vegetation characterizations were not fully completed because numerous nests were lost or unidentifiable due to weathering during the delay. Nest site vegetation characterizations were conducted on most nests found except where noted above and at Camp Barkeley and Chandler Independence Creek Preserve in 2004 due the employment conditions of the Principal Investigator, as well as the loss of nest sites at Chandler due to flooding.

Summary Of Progress:

Please see Attachment A.

Location: Montague, Somervell, Brown, Edwards, Taylor, Coke, Brewster, Terrell Counties, Texas.

Cost:

Total $66,500.90
Federal $35,475.00

Prepared by: Craig Farquhar **Date:** May 12, 2005

Approved by: **Date:** April 9, 2005
Neil (Nick) E. Carter

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Significant Deviations

Standardized census procedures as called for by Segment Objective 3 were not implemented since it was possible to exhaustively survey all sites.

Segment Objective 9 called for the establishment of 2 monitoring sites (1 public, 1 private) in each of Recovery Units 1, 4, 5 and 6 from the *Black-capped Vireo Recovery Plan*. Due to a number of conditions, including lack of suitable habitat in certain recovery units, it was decided that a more representative monitoring project could be performed using the recovery units from the *Black-capped Vireo Population and Habitat Viability Assessment Report*. Throughout this report, recovery units from both the recovery plan and PHVA are considered and results are presented separately for each. The number of monitoring sites by recovery unit (both sets) and distinction of ownership are as follows:

Black-capped Vireo Recovery Plan:

Recovery Unit 1. North-Central Texas-
1 private
Recovery Unit 2. Lampasas Cut Plains-
1 private, 1 public
Recovery Unit 3. Southeast Edwards Plateau-
1 private
Recovery Unit 4. Concho Valley-
1 private, 1 public
Recovery Unit 5. Stockton Plateau-
1 private
Recovery Unit 6. Trans-Pecos-
1 public

Black-capped Vireo Population and Habitat Viability Assessment Report:

Recovery Unit 1. North-Central Texas-
2 private, 1 public
Recovery Unit 2. Southeast Edwards Plateau-
1 private
Recovery Unit 3. Concho Valley-
1 private, 1 public
Recovery Unit 4. Southwest and Trans-Pecos:
1 private, 1 public

All established sites were monitored annually as per Segment Objective 10. Sites were monitored with approximately equal effort between years. However, the amount of effort devoted to individual sites varied and researcher time was allocated according to factors such as the size of the Black-capped Vireo population at a given site and the areal extent of the site. All sites were visited repeatedly over the period of the breeding season except for Big Bend National Park, which was visited only once per season in an 8-10 day stint.

Monitoring of all sites in the Year 4 (2003) breeding season was truncated due to the elimination in July 2003, by the conducting agency (Texas Parks & Wildlife Department), of the position held by the Principal Investigator. In October 2003 administration of the project was moved to Environmental Defense, Inc. As a result of this break in continuity, valuable late season site visits were delayed or canceled and therefore monitoring was incomplete on a number of sites. Also, on several properties, nest site vegetation characterizations were not fully completed because numerous nests were lost or unidentifiable due to weathering during the delay.

Nest site vegetation characterizations were conducted on most nests found except where noted above and at Camp Barkeley and Chandler Independence Creek Preserve in 2004 due the employment conditions of the Principal Investigator, as well as the loss of nest sites at Chandler due to flooding.

A. Need

The Black-capped Vireo *(Vireo atricapilla*; BCVI) is federally listed as endangered (U.S. Fish & Wildlife Service 1991). Data concerning the distribution and population status of the Black-capped Vireo are variable and incomplete in several parts of the species' range. The *Black-capped Vireo Population and Habitat Viability Assessment Report* (PHVA) (U.S. Fish & Wildlife Service 1996) identified 13 Texas counties as needing further study and an additional 7 counties as needing confirmation of the presence and status of vireos. The PHVA further identified Texas recovery units 1, 4, 5, and 6 as needing clarification of the status of vireos.

B. Background

Systematic roadside transect surveys conducted from 1996-1998 throughout the vireo's known range in Texas helped clarify the species' distribution (Maresh *et al.* 1999; Maresh and Rowell 2000). The surveys also confirmed the presence of Black-capped Vireos in 7 counties identified by the PHVA as either needing confirmation or further study.

However, detailed population estimates do not exist for most counties or recovery units. Furthermore, knowledge of the species' breeding biology, habitat use, and threats is lacking for large sections of its range. Detailed knowledge of population distribution and breeding status is needed for long-term recovery efforts (U.S. Fish & Wildlife Service 1991).

Areas of occupied Black-capped Vireo habitat located during the roadside surveys provided an opportunity for more complete census surveys. Newly identified habitat sites provide the opportunity to monitor breeding status, habitat requirements, threats, and other aspects of the vireo's ecology throughout its range.

C. Objectives

1. To determine current population status and distribution in Texas recovery units 1, 4, 5, and 6 and clarify population status in several counties in recovery units 2 and 3.
2. To monitor status and breeding productivity of these populations.
3. To determine threats from cowbird *(Molothrus* spp.) parasitism and identify other threats.
4. To determine differences in habitat structure and composition and habitat use between different recovery units.

(Segment Objectives are given in Attachment A. **Project Statement)**

D. Approach

During Year 1 of this study, access to numerous properties in several recovery units was obtained. Most sites were visited to assess availability of BCVI habitat and to determine presence or absence of BCVI. If the presence of vireos was confirmed, the site was considered for possible inclusion in this study. Where repeated access and monitoring activities were agreeable with the land owner/land manager, more thorough surveys were conducted and a color-marking program to individually identify BCVI was implemented. A total of 8 sites was selected for monitoring. These sites are distributed across the recovery units (but see **Significant Deviations**) and their descriptions are given in: Attachment B. **Site Descriptions**.

All sites included in this study except where noted (see **Significant Deviations**) were visited repeatedly throughout the BCVI nesting season in Years 2-5. All areas of known or potential habitat were thoroughly surveyed for a complete site census (see **Significant Deviations**). All sites were monitored for population status, breeding status, and cowbird parasitism, predation, and other threats. All BCVI encountered were followed to determine sex, age, breeding status (paired or unpaired) and banding status. Band color combinations were identified on all individuals seen to be color-marked. Every identifiable territory was delineated on enlarged copies of USGS 7.5'

topographic maps. All BCVI that utilized the site for all or part of their territories were monitored. Birds on adjacent properties that were seen to interact with territory holders on the monitored sites were also noted.

Nests, when found, were inspected for contents and monitored for parasitism, predation, and productivity. Vegetation characterizations of most nest sites found were conducted using a modified BBIRD protocol (Martin, *et al.* 1997; Grzybowski, *et al.* 1994).

Banding and color-marking was carried out with targeted mist-netting of BCVI. In the target mist-netting operations, singing male BCVI were located and a 6- or 9-meter mist net was set up within the bird's territory. Playbacks of BCVI song or "shrad" and Eastern Screech-Owl (*Otis asio*) calls were used to lure the BCVI into the nets. If, after 20 minutes, efforts were unsuccessful, playbacks were discontinued and mist nets were removed. A maximum of three banding attempts was conducted in each territory. Captured birds were fitted with 1 aluminum FWS leg band and 2 or 3 plastic colored leg bands. All birds were released in less than 5 minutes. Banding and color-marking of BCVI was carried-out under permit number 22365-F (U.S. Department of Interior, Bird Banding Lab 1999).

E. Results and Discussion

Current Population Status and Distribution in Texas Recovery Units

Several BCVI populations that were either unknown or of uncertain status were identified in years 1 and 2 of this study and were censused and monitored in years 2 through 5. Additional roadside surveys also confirmed annual occupation of suitable habitat by BCVI at a number of locations. All occurrences of BCVI were mapped and entered into the Texas Parks and Wildlife Biological and Conservation Data System (Texas BCD) current through the 2003 field season. A compilation of recent population data from the Texas BCD and other sources was given in the *Biological Assessment for 2002 Farm Bill Conservation Programs in Texas* (U.S. Department of Agriculture 2004). Occurrence data from the past six years (1998-2004) were included. Occurrence data without confirmation after 1998 were regarded as not current. I regard these data as the most current and comprehensive available. Data from that biological assessment are re-presented here with population data given by county and recovery unit. **Table 1** lists the 54 counties given in the PHVA with known or suspected occurrences of BCVI plus 2 counties (Callahan and Montague) not listed in the PHVA but known to have had recent records of BCVI. The population or status listed in the PHVA is given in the first column followed by current known population or status. **Table 2** uses the recovery units given in the *Black-capped Vireo Recovery Plan* to list current county data by recovery unit and recovery unit totals. **Table 3** gives current county data by recovery unit using the recovery units suggested in the PHVA.

TABLE 1. Black-capped Vireo population (number of known males) by county from *Black-capped Vireo Population and Habitat Viability Assessment Report* (USFWS 1996) and *Biological Assessment for 2002 Farm Bill Conservation Programs in Texas* (USDA 2004).

County	PHVA	Recent*
Bandera	48	17
Bell **	150	>1,500
Bexar	16	34
Blanco	6	14
Bosque	1	1
Brewster	16	16
Brown	Need confirmation	
Burnet	47	68
Callahan	X	2
Coke	32	11
Colman	Need confirmation	6
Comal	Need confirmation	
Comanche	Need confirmation	
Concho	Need confirmation	
Coryell **	150	>3,500
Crockett	9	2
Dallas	Recently extirpated	
Edwards	67	225
Erath	1	
Gillespie	1	
Hamilton	1	
Hays	1	2
Hood	Need confirmation	
Irion	18	
Johnson	Need confirmation	
Kendall	1	
Kerr	602	437
Kimble	26	35

County	PHVA	Recent*
Kinney	105	115
Lampasas	1	
Llano	Need confirmation	1
Mason	2	80
McCulloch	Need confirmation	2
Medina	Need confirmation	
Menard	Need confirmation	8
Mills	2	
Montague	X	Recently extirpated
Nolan	1	3
Palo Pinto	1	1
Parker	Need confirmation	
Pecos	3	
Real	23	100
Runnels	5	2
San Saba	22	11
Schleicher	Need confirmation	
Somervell	3	20
Stephens	1	
Sterling	1	
Sutton	1	1
Taylor	1	7
Terrell	8	86
Tom Green	13	4
Travis	60	47
Uvalde	4	2
Val Verde	173	161
Williamson	13	10

* Data confirmed since 1998 (USDA 2004)
** D. Cimprich pers. comm. 2004

TABLE 2. Current Black-capped Vireo population (number of known males) by county and recovery unit. (Recovery units from *Black-capped Vireo Recovery Plan* (USFWS 1991)).

Recovery Unit 1		Recovery Unit 2		Recovery Unit 3		Recovery Unit 4		Recovery Unit 5		Recovery Unit 6	
North-Central Texas		*Lampasas Cut Plains*		*Southeast Edwards Plateau*		*Concho Valley*		*Stockton Plateau*		*Trans-Pecos*	
Archer		Bell	1,500	Bandera	17	Coke	11	Crockett	2	Brewster	16
Callahan	2	Bosque	1	Bexar	34	Concho		Terrell	86	Culberson	
Clay		Brown		Blanco	14	Irion		Val Verde	161	El Paso	
Collin		Burnet	57	Comal		Nolan	3		249	Hudspeth	
Comanche		Coleman	6	Edwards	225	Runnels	2			Jeff Davis	
Cooke		Coryell	3,500	Gillespie		Sterling				Loving	
Dallas		Hamilton		Hays	2	Taylor	7			Pecos	
Denton		Hill		Kendall		Tom Green	4			Presidio	
Eastland		Lampasas		Kimble	35		27			Reeves	
Ellis		McLennan		Kinney	115					Ward	
Erath		Mills		Llano	1					Winkler	
Fannin		Somervell	20	Mason	80						16
Grayson		Travis	45	McCulloch	2						
Hill		Williamson	33	Medina							
Hood			5,162	Menard	8						
Hunt				Real	100						
Jack				San Saba	11						
Johnson				Schleicher							
Kaufman				Sutton	1						
Montague				Uvalde	2						
Palo Pinto	1				647						
Parker											
Rockwall											
Shackleford											
Stephens											
Tarrant											
Throckmorton											
Wise											
Young											
	3										

TABLE 3. Current Black-capped Vireo population (number of known males) by county and recovery unit. (Recovery units from *Black-capped Vireo Population and Habitat Viability Assessment Report* (USFWS 1996)).

Recovery Unit 1 *North-Central Texas*	
Archer	
Bell	1,500
Bosque	1
Brown	
Burnet	57
Callahan	2
Clay	
Coleman	6
Collin	
Comanche	
Cooke	
Coryell	3,500
Dallas	
Denton	
Eastland	
Ellis	
Erath	
Fannin	
Grayson	
Hamilton	
Hill	
Hood	
Hunt	
Jack	
Johnson	
Kaufman	
Lampasas	
McLennan	
Mills	
Montague	
Palo Pinto	1
Parker	
Rockwall	
Shackleford	
Somervell	20
Stephens	
Tarrant	
Throckmorton	
Travis	45
Williamson	33
Wise	
Young	
	5,165

Recovery Unit 2 *Southeast Edwards Plateau*	
Bandera	17
Bexar	34
Blanco	14
Comal	
Edwards	225
Gillespie	
Hays	2
Kendall	
Kimble	35
Kinney	115
Llano	1
Mason	80
McCulloch	2
Medina	
Menard	8
Real	100
San Saba	11
Schleicher	
Sutton	1
Uvalde	2
	647

Recovery Unit 3 *Concho Valley*	
Coke	11
Concho	
Irion	
Nolan	3
Runnels	2
Sterling	
Taylor	7
Tom Green	4
	27

Recovery Unit 4 *Southwest and Trans-Pecos*	
Brewster	16
Crockett	2
Culberson	
El Paso	
Hudspeth	
Jeff Davis	
Loving	
Pecos	
Presidio	
Reeves	
Terrell	86
Val Verde	161
Ward	
Winkler	
	265

Status and Productivity at Monitoring Sites

All monitoring sites included in this study had the presence of BCVI confirmed in at least 2 years of the study. **Table 4** gives the number of BCVI recorded at each site by year.

TABLE 4. Number of BCVI recorded at each site by year.

	Big Bend National Park				Camp Barkeley				Camp Bowie				Chandler Independence Creek Reserve			
	M	F	HY	Total	M	F	HY	Total	M	F	HY	Total	M	F	HY	Total
2001	7	3	0	10	3	3	2	5	1	0	0	1	27	17	12-14	56-58
2002	9	5	3	17	0	0	0	0	1	1	0	2	23	15	9-11	47-49
2003	14	5	2-3	21-22	3	2	1-2	5-6	0	0	0	0	26	18	22-25	66-69
2004	15-17	8	5-6	28-31	6	6	5	17	0	0	0	0	24	19	26-39	69-82

	Dobbs Mountain				Garnett Preserve				Quail Ridge Ranch				Walnut Creek Ranch			
	M	F	HY	Total	M	F	HY	Total	M	F	HY	Total	M	F	HY	Total
2001	9	7	13-14	29-30	1	1	0	2	16	15	6-7	37-38	4	2	2	8
2002	7	5	8-9	20-21	0	0	0	0	17	16	41	74	2	2	0	4
2003	17	14	16-21	47-52	1	0	0	1	16	16	15	47	2	1	0	3
2004	18	15	10-13	43-46	0	0	0	0	15	13	10	38	0	0	0	0

M = adult male, F = adult female, HY = hatch-year

TABLE 5. Final number of male BCVI at monitoring sites by recovery units.

	Recovery Units (Recovery Plan)					
	1 *North-Central Texas*	2 *Lampasas Cut Plains*	3 *Southeast Edwards Plateau*	4 *Concho Valley*	5 *Stockton Plateau*	6 *Trans-Pecos*
Big Bend NP						16
Camp Barkley				6		
Camp Bowie		0				
Chandler Ind. Creek					24	
Dobbs Mountain			18			
Garnett Preserve	0					
Quail Ridge Ranch		15				
Walnut Creek Ranch				0		
Total % Rec. Unit total (from USDA 2004)	**0** **(0.0%)**	**15** **(0.3%)**	**18** **(2.8%)**	**6** **(22.2%)**	**24** **(9.6%)**	**16** **(100.0%)**

	Recovery Units (PHVA)			
	1 *North-Central Texas*	2 *Southeast Edwards Plateau*	3 *Concho Valley*	4 *Southwest and Trans-Pecos*
Big Bend NP				16
Camp Barkley			6	
Camp Bowie	0			
Chandler Ind. Creek				24
Dobbs Mountain		18		
Garnett Preserve	0			
Quail Ridge Ranch	15			
Walnut Creek Ranch			0	
Total % Rec. Unit total (from USDA 2004)	**15** **(0.3%)**	**18** **(2.8%)**	**6** **(22.2%)**	**40** **(15.1%)**

TABLE 6. Final number of male BCVI at monitoring sites by county and as percentage of current county population (USDA 2004).

County	Recent	Study Site	% County Population
Brewster (Big Bend NP)	16	16	100 %
Brown (Camp Bowie)	0	0	-
Coke (Walnut Creek Ranch)	11	0	-
Edwards (Dobbs Mountain)	225	18	8 %
Montague (Garnett Preserve)	0	0	-
Somervell (Quail Ridge Ranch)	20	15	75 %
Taylor (Camp Barkeley)	7	6	86 %
Terrell (Chandler Ind. Creek)	86	24	28 %

All sites except Camp Bowie contained breeding territories. To be considered occupied by a breeding pair, a territory must have met one or more of the following criteria: 1) repeated observations of both adult male and female BCVI, 2) an adult vireo attending a fledging vireo or cowbird, or 3) the presence of an active nest. All sites except Camp Bowie and the Garnett Preserve exhibited productivity in at least 1 year, although productivity had been recorded on the Garnett Preserve in at least 1 year prior to this study (H. Garnett pers. com.)

In early reports on the monitoring of these properties (*e.g.* Maresh 2002), productivity was calculated by dividing the number of fledglings observed by the number of confirmed nesting attempts. The number of confirmed nesting attempts was the total of all nests found (whether outcomes were known or unknown) plus 1 for each family group observed when no nest was located. This method of calculating productivity has a number of drawbacks. One is the fact that second brood nests (those nests initiated after successfully rearing chicks from the first nest) are known to have low success rates (Grzybowski 1995). Also, multiple failed nests in a given territory can dilute the total, especially since late-season nests tend to be more conspicuous and easier to find (J. Maresh, Unpubl. data). Cimprich (2002) used the mean number of 10-11 day old nestlings observed per territory as a measure of productivity and did not include the number of fledglings observed from territories where no nest was found in his calculation of BCVI productivity on Fort Hood. Prior reports from Fort Hood used both measures (DeBoer and Koloszar 2001), but Cimprich argues that fledgling counts are negatively biased due to the difficulty in accurately observing the number of fledged Black-capped Vireos from a given territory (Cimprich 2002). Although I agree that using the number of 10-11 day old nestlings exclusively would give a more accurate measure of productivity, it is not practical unless most nests are found and frequently monitored in a given population. Time and personnel constraints in the current study did not allow for the frequent nest monitoring necessary to establish timing of nest stage or outcome in most cases. Therefore, productivity estimates for most sites in this project will have to rely almost exclusively on fledgling observations.

In this study I follow DeBoer and Kolaszar (2001), and estimate productivity by dividing the total number of fledglings observed by the total number of territories

monitored and occupied by a breeding pair. This method can be applied to all years of monitoring at each site except for Big Bend National Park (BBNP) where distance and terrain made repeat monitoring visits impractical. This method still includes the negative bias from the probable undercount of fledged vireos. However, in most cases I have reported fledgling numbers as a range (*e.g.*16-21) with the lower number being the absolute, minimum number of fledglings physically seen or heard and the higher number being the number of "suspected" fledglings. The more subjective higher numbers were based on a number of factors including knowing the number of older (8-11 days) nestlings that "should" have fledged, adult behavioral clues such as food carrying, aggressive scolding, or "distraction" displays (*i.e.* leading an observer away from nest or young (pers. obs.)), or hearing juvenile "peeping" calls without being able to locate the individual making the calls, therefore being unable to rule out the similar juvenile calls of co-occurring species such as Blue-gray Gnatcatcher (*Polioptila caerulea*). It is still possible, perhaps even likely, that the higher, *estimated* number still represents an undercount. All that being said, this method of calculating the minimum productivity, even with built-in negative bias, is a useful relative index if applied in the same way to each season's data, assuming approximately equal effort across the seasons. Productivity estimates are given in following tables using both the "old" and "new" methods of calculation.

TABLE 7. Black-capped Vireo productivity at Big Bend National Park, 2001-2004 using 2 methods of calculation.

Year	Breeding territories*	Fledglings	Nests monitored	Family groups w/no nest found	# fledges/ confirmed nesting attempt**	# fledges/ breeding territory
2001	3	0	1	0	**0.00**	**0.00**
2002	4	3-4	2	2	**0.75-1.00**	**0.75-1.00**
2003	7	2-3	2	2	**0.50-075**	**0.29-0.43**
2004	11	5-6	3	2	**1.00-1.20**	**0.45-0.55**

*Breeding territories = BCV territories with 1 or more of the following: 1) repeated observations of adult male and adult female, 2) adult BCV attending BCV or cowbird fledgling, or 3) an active nest. (Note: Not all territories "delineated" meet these criteria).

**Confirmed nesting attempt = total number of nests plus 1 for each family group observed when no nest was found.

TABLE 8. Black-capped Vireo productivity at Camp Barkeley, 2001-2004 using 2 methods of calculation.

Year	breeding territories*	fledglings	Nests monitored	family groups w/o nests	# fledges/ confirmed nesting attempt**	# fledges/ breeding territory
2001	2	2	2	0	**1.00**	**1.00**
2002	0	0	0	0	**NA**	**NA**
2003	3	1-2	0	1	**1.00-2.00**	**0.33-0.67**
2004	6	5-6	3	0	**1.67-2.00**	**0.83-1.00**

*Breeding territories = BCV territories with 1 or more of the following: 1) repeated observations of adult male and adult female, 2) adult BCV attending BCV or cowbird fledgling, or 3) an active nest. (Note: Not all territories "delineated" meet these criteria).

**Confirmed nesting attempt = total number of nests plus 1 for each family group observed when no nest was found.

TABLE 9. Black-capped Vireo productivity at Chandler Independence Creek Preserve, 2001-2004 using 2 methods of calculation.

Year	Breeding territories*	Fledglings	Nests monitored	Family groups w/no nest found	# fledges/ confirmed nesting attempt**	# fledges/ breeding territory
2001	17	12-14	9	6	**0.80-0.93**	**0.71-1.21**
2002	19	16-20	8	8	**1.00-1.25**	**0.84-1.05**
2003	19	23-28	10	10	**1.15-1.40**	**1.21-1.47**
2004	23	23-41	19	9	**0.82-1.46**	**1.00-1.78**

*Breeding territories = BCV territories with 1 or more of the following: 1) repeated observations of adult male and adult female, 2) adult BCV attending BCV or cowbird fledgling, or 3) an active nest. (Note: Not all territories "delineated" meet these criteria).

**Confirmed nesting attempt = total number of nests plus 1 for each family group observed when no nest was found.

TABLE 10. Black-capped Vireo productivity at Dobbs Mountain Ranch, 2001-2004 using 2 methods of calculation.

Year	breeding territories*	fledglings	Nests monitored	family groups w/o nests	# fledges/ confirmed nesting attempt**	# fledges/ breeding territory
2001	7	13-14	3	2	**2.60-2.80**	**1.86-2.00**
2002	7	14-17	4	3	**2.00-2.43**	**2.00-2.43**
2003	15	16-21	8	7	**1.07-1.40**	**1.07-1.40**
2004	14	10-14	6	6	**0.83-1.17**	**0.71-1.00**

*Breeding territories = BCV territories with 1 or more of the following: 1) repeated observations of adult male and adult female, 2) adult BCV attending BCV or cowbird fledgling, or 3) an active nest. (Note: Not all territories "delineated" meet these criteria).

**Confirmed nesting attempt = total number of nests plus 1 for each family group observed when no nest was found.

TABLE 11. Black-capped Vireo productivity at Garnett Preserve, 2001-2004 using 2 methods of calculation.

Year	Breeding territories*	Fledglings	Nests monitored	Family groups w/no nest found	# fledges/ confirmed nesting attempt**	# fledges/ breeding territory
2001	1	0	0	0	**0.00**	**0.00**
2002	0	0	0	0	**NA**	**NA**
2003	0	0	0	0	**NA**	**NA**
2004	0	0	0	0	**NA**	**NA**

*Breeding territories = BCV territories with 1 or more of the following: 1) repeated observations of adult male and adult female, 2) adult BCV attending BCV or cowbird fledgling, or 3) an active nest. (Note: Not all territories "delineated" meet these criteria).

**Confirmed nesting attempt = total number of nests plus 1 for each family group observed when no nest was found.

TABLE 12. Black-capped Vireo productivity at Quail Ridge Ranch, 2001-2004 using 2 methods of calculation.

Year	Breeding territories*	Fledglings	Nests monitored	Family groups w/no nest found	# fledges/ confirmed nesting attempt**	# fledges/ breeding territory
2001	15	6-7	21	3	**0.25-0.29**	**0.40-0.47**
2002	15	41	26	4	**1.37**	**2.73**
2003	16	19	20	1	**0.90**	**1.19**
2004	14	10	23	0	**0.43**	**0.71**

*Breeding territories = BCV territories with 1 or more of the following: 1) repeated observations of adult male and adult female, 2) adult BCV attending BCV or cowbird fledgling, or 3) an active nest. (Note: Not all territories "delineated" meet these criteria).

**Confirmed nesting attempt = total number of nests plus 1 for each family group observed when no nest was found.

TABLE 13. Black-capped Vireo productivity at Walnut Creek Ranch, 2001-2004 using 2 methods of calculation.

Year	Breeding territories*	Fledglings	Nests monitored	Family groups w/no nest found	# fledges/ confirmed nesting attempt**	# fledges/ breeding territory
2001	2	2	3	0	**0.67**	**1.00**
2002	2	0	1	0	**0.00**	**0.00**
2003	1	0	1	0	**0.00**	**0.00**
2004	0	0	0	0	**NA**	**NA**

*Breeding territories = BCV territories with 1 or more of the following: 1) repeated observations of adult male and adult female, 2) adult BCV attending BCV or cowbird fledgling, or 3) an active nest. (Note: Not all territories "delineated" meet these criteria).

**Confirmed nesting attempt = total number of nests plus 1 for each family group observed when no nest was found.

Brown-headed Cowbird Parasitism and Other Threats

Brown-headed Cowbirds (*Molothrus ater*; BHCO) are obligate brood parasites and have been shown to have serious impacts on Black-capped Vireo productivity (USFWS 1991, Grzybowski 1995). Nest parasitism by Brown-headed Cowbirds was observed on all sites except for Big Bend National Park and Dobbs Mountain although BBNP has records of parasitism from earlier surveys (Peck and Barlow 2000) and one instance of an adult BCVI pair feeding a cowbird fledgling was observed during this study. Aggressive cowbird control has been shown to dramatically reduce parasitism rates on the BCVI and Golden-cheeked Warbler (*Dendroica chrysoparia*) populations on Fort Hood (Summers and Norman 2003). Most sites included in this study had no active cowbird control program either on site or at nearby locations and cowbird control was not part of the approach to this study. However, opportunistic control methods such as pulling cowbird eggs or nestlings from BCVI nests or eliminating cowbirds incidentally caught in mist nets were occasionally practiced, albeit rarely. Some sites did, however, employ cowbird control as part of an overall management plan. Dobbs Run Ranch, sister property of the Dobbs Mountain site has run cowbird traps for a number of years and adjacent Kickapoo Cavern State Park formerly operated a number of traps as well (E. Smith pers. com.). Big Bend National Park also operated traps for a few years prior to this study (Peck and Barlow 1998). Quail Ridge Ranch implemented an aggressive cowbird removal program in year 3 of this study. This included shooting cowbirds on territory and removing all BHCO eggs and nestlings found in vireo nests (Bailey and Maresh 2002). The result was a dramatic increase in BCVI productivity, going from 0.40-0.47 BCVI fledglings produced per breeding territory in year 2 to 2.73 fledglings per territory in year 3. In years 4 and 5 of this study, only opportunistic removal of BHCO eggs and nestlings was practiced. It is interesting to note that the increased productivity did not lead to denser occupation of available habitat or expansion of territories into areas of more marginal habitat in subsequent years. Also, parasitism rates rapidly rebounded without continuation of aggressive control.

Nest depredation was observed on all sites where nests were monitored except Camp Barkeley, which had a relatively small sample size and less intensive monitoring effort than other sites. However, a nest videography study performed at Camp Barkeley in 1999 recorded 2 of 3 BCVI nests monitored being depredated by Western Scrub-Jay (*Aphelocoma coerulescens*) (Marcus, *et al.* 1999). Western Scrub-Jays, which have also been shown to be important nest predators on Fort Hood (Stake 2000), are common at Camp Barkeley, Dobbs Mountain and Walnut Creek Ranch. I witnessed a scrub-jay raiding the nest of a Northern Mockingbird (*Mimus polyglottos*) pair on Kickapoo Cavern State Park, taking 4 nestlings 1 at a time despite vigorous defense efforts by the adult mockingbirds. I also had frequent observations of BCVI and other species vigorously scolding or mobbing scrub-jays at the above sites. Western Scrub-Jays were not observed at Garnett Preserve or Quail Ridge Ranch and were very rare to absent during the breeding season at Chandler Independence Creek Preserve and Big Bend National Park. However, Big Bend hosts a large population of Mexican Jay (*Aphelocoma ultramarina*) whose habitat somewhat overlaps that of the vireo. BCVI were observed harassing a presumed Mexican Jay as part of a mixed flock mob. Mexican Jays are suspected of occasionally taking eggs of other species and are likely to be at least opportunistic predators at BCVI nests although there is no direct evidence (Brown 1994; J. Brown pers. com.).

Brown-headed Cowbirds have been recorded parasitizing Black-capped Vireo nests at Fort Hood (Stake 2000). Arcese, *et al.* (1996) suggest that cowbirds will sabotage potential hosts' nests when the nests are discovered too late in the nesting cycle to parasitize, thus forcing re-nesting and creating another opportunity for the cowbird. However, video data from Fort Hood show that cowbird visits to BCVI nests with nestlings do not usually result with the removal of an entire brood and generally do not cause nest failure or abandonment even when a nestling is removed.

The predation impacts of Brown-headed Cowbirds on BCVI demography at monitored sites are unclear. At Chandler Independence Creek Preserve (CICP), the

overall parasitism rate for all nests monitored in all years (n=46) was 45.7%. However, the parasitism rate for nests initiated before 1 May (n=16) was 18.8% while the parasitism rate for nests initiated after 1 May (n=30) was 60.0%. While Brown-headed Cowbirds are probably year-round residents at CICP (J. Karges pers. com.) they are conspicuously absent in very early April and seem to re-appear after the first week of that month (J. Maresh, Unpubl. data). So there appears to be a turnover of the over-wintering population and the breeding population of BHCO at this site. The lag time between when the vireos arrive and initiate nesting and when the cowbirds arrive and establish territories may give the vireos a head start. It seems that if the BCVI nests are too far along (nestling stage) they are not likely to be parasitized at CICP. However, there was circumstantial evidence that in at least one instance cowbirds caused nest failure and forced re-nesting by removing an entire brood of four BCVI nestlings.

Black-capped Vireos were observed shradding a Broadbanded Copperhead (*Agkistrodon contortrix laticinctus*) at Camp Barkeley and a Western Coachwhip (*Masticophis flagellum testaceus*) at Walnut Creek Ranch as well as a number of unidentified snake species at various sites. I had no direct observations of reptilian or mammalian predation.

Habitat destruction occurred on the Dobbs Mountain site when highway right-of-way was cleared to install a new aboveground utility line. The clearing took place in the winter months and the actual acreage cleared was small but contained perhaps the best and most heavily utilized habitat in the area. All traditional territories were re-occupied subsequent to the clearing but it is interesting to note the dramatic increase in predation and decrease in nest success. A major flood event occurred on Independence Creek in late July 2004. Substantial areas of occupied BCVI habitat may have been lost to the scouring effect of the water (J. Karges pers. com.).

All the threats listed above may cause BCVI nest failure or abandonment at many or all stages of the nesting cycle. Mayfield (1975) suggests determining the probability of failure of any given nest by examining the failure rate of a sample of

nests during a particular exposure period. This could, in theory, be done with as few as two observations per nest within the sample. If a failure-causing event occurred between the two observations, the event would be assumed to have occurred at the mid-point of the period days between observations (Mayfield 1975). However, due to the constraints mentioned in Status and Productivity at Monitoring Sites above, most active nests found at all but one or two of the monitored sites had at most 2 observations. Frequently these observations were made within either a very short interval (1-3 days) or very long interval (14-21 days) giving either very few exposure days or, more importantly, a high degree of uncertainty as to when a failure-causing event may have occurred. Often, a second observation was not made until after the final stage of nesting (fledging) and, barring obvious signs of predation or parasitism (nest failure), or the detection of fledglings (nest success), outcome could not be determined one way or another. Therefore, I determined the nest data provided by this project was insufficient to yield meaningful results using the Mayfield method of analysis.

Rates of parasitism, predation, abandonment and nest success are given in the following tables. Nest success rates given are the percentage of all nests with a known outcome that were confirmed to have fledged one or more BCVI young.

TABLE 14. Black-capped Vireo nest success at Big Bend National Park, 2001-2004.

Year	# of nests monitored	# nests parasitized (%)	# nests depredated (%)	# nests abandoned for unknown reasons	# nests outcome unknown	# of successful nests	% nest success
2001	1	0	0	0	1	UNK	UNK
2002	2	0	1 (50.0%)	0	1	UNK	UNK
2003	2	0	0	0	2	UNK	UNK
2004	3	0	0	0	0	UNK	UNK

TABLE 15. Black-capped Vireo nest success at Camp Barkeley, 2001-2004.

Year	# of nests monitored	# nests parasitized (%)	# nests depredated (%)	# nests abandoned for unknown reasons	# nests outcome unknown	# of successful nests	% nest success
2001	2	1 (50%)	0	0	1	0	0%
2002	0	0	0	0	0	0	NA
2003	0	0	0	0	0	0	NA
2004	3	0	0	0	1	2	66.7%

TABLE 16. Black-capped Vireo nest success at Chandler Independence Creek Preserve, 2001-2004.

Year	# of nests monitored	# nests parasitized (%)	# nests depredated (%)	# nests abandoned for unknown reasons	# nests outcome unknown	# of successful nests	% nest success
2001	9	5 (55.6)	3 (33.3%)	1 (11.1%)	0	0	0%
2002	8	2 (25.0%)	3 (37.5%)	0	1	2	25.0%
2003	10	8 (80.0%)	2 (20.0%)	0	0	2	20.0%
2004	19	6 (31.6%)	2 (10.5%)	2 (10.5%)	4	4	21.1%

TABLE 17. Black-capped Vireo nest success at Dobbs Mountain Ranch, 2001-2004.

Year	# of nests monitored	# nests parasitized (%)	# nests depredated (%)	# nests abandoned for unknown reasons	# nests outcome unknown	# of successful nests	% nest success
2001	3	0	0	0	0	3	100%
2002	4	0	1 (25.0%)	0	0	3	75%
2003	8	0	5 (62.5%)	0	2	1	12.5%
2004	6	0	3 (50.0%)	3	0	0	0%

TABLE 18. Black-capped Vireo nest success at Garnett Preserve Ranch, 2001-2004.

Year	# of nests monitored	# nests parasitized (%)	# nests depredated (%)	# nests abandoned for unknown reasons	# nests outcome unknown	# of successful nests	% nest success
2001	0	0	0	0	0	0	NA
2002	0	0	0	0	0	0	NA
2003	0	0	0	0	0	0	NA
2004	0	0	0	0	0	0	NA

TABLE 19. Black-capped Vireo nest success at Quail Ridge Ranch, 2001-2004.

Year	# of nests monitored	# nests parasitized (%)	# nests depredated (%)	# nests abandoned for unknown reasons	# nests outcome unknown	# of successful nests	% nest success
2001	21	19 (90.5%)	9 (43.0%)	2 (10%)	0	2	10%
2002	26	9 (34.6%)	9 (34.6%)	2 (7.7%)	0	12	57.1%
2003	20	11 (55.0%)	8 (40.0%)	0	0	6	30.0%
2004	23	14 (60.9%)	6 (26.1%)	1 (4.3%)	0	5	21.7%

TABLE 20. Black-capped Vireo nest success at Walnut Creek Ranch, 2001-2004.

Year	# of nests monitored	# nests parasitized (%)	# nests depredated (%)	# nests abandoned for unknown reasons	# nests outcome unknown	# of successful nests	% nest success
2001	3	1 (33.3%)	1 (33.3%)	0	0	1	33.3%
2002	1	0	0	1	0	0	0.0%
2003	1	0	0	1	0	0	0.0%
2004	0	0	0	0	0	0	NA

Habitat Structure, Composition and Use Between Recovery Units

Detailed analysis of quantitative vegetation data was not performed. However, broad qualitative generalizations can be made from observations at the various monitoring sites. First, Black-capped Vireo habitat is quite variable in structure and composition across its distribution in Texas. In degree of openness, BCVI territories ranged from >90% open (Garnett Preserve) to >90% closed canopy (Chandler Independence Creek Preserve). Several sites (CICP, Walnut Creek Ranch, Dobbs Mountain) had territories with canopies >6 meters in height. CICP provided the most aberrations to what might be thought of as "typical" BCVI habitat with territories in open understory Live Oak (*Quercus fusiformis*) parks, walnut/willow/baccharis (*Juglans microcarpa/Chilopsis linearis/Baccharis* sp). dominated gravel bars and mesquite (*Prosopis glandulosa*) and/or salt cedar (*Tamarix* sp.) dominated old-fields. The one commonality in these and virtually all territories encountered was the presence of a foliage "skirt"; not unlike Grzybowski, *et al.*'s (1994) description of a foliage "apron" growing to ground level beneath relatively widely spaced patches of shrubs or trees. While the low-growing shin oak (*Q. sinuata* var. *breviloba*)/mixed deciduous mottes typical of the more northerly and easterly sites like Camp Barkeley, Camp Bowie and Quail Ridge Ranch indeed exhibited dense vegetation virtually throughout a given patch, in settings that differed, such as taller (sometimes much taller), closed canopy, open understory-ed live oak mottes or mesquite patches, there is always a girdle of vegetation from 0-2 meters in height either from down-reaching branches or a thick shrub component coming up at the edges. Thusly, the components of a dispersed shinnery are replicated with dense canopy for foraging and cover, "open patches" underneath and dense, low-growing vegetation for nest sites.

Black-capped Vireo habitat seems to be much more static in the western portions of the range. Farquhar and Maresh (1996) found vegetation in areas of occupied Black-capped Vireo habitat in Southwest Texas to generally remain in a state favorable to BCVI due to edaphic factors and the xeric conditions of the region. I believe this applies as well to the northwestern portion of the range in the Concho Valley and Callahan Divide regions. BCVI have been monitored at Camp Barkeley

since 1994 and the configuration of territories (when occupied) has shown little change. Visually, the habitat looks as good today as it did 10 years ago. After dwindling to a population of zero or nearly so in 2002, BCVI have vigorously re-colonized the traditional territories. I believe the brief extirpation was drought-related and not habitat dependent. A habitat restoration project was initiated on Camp Barkeley in 1996 where patches of mature Texas oak (*Quercus buckleyi*) and juniper (*Juniperus* spp.) were hand-cut to a height of 1 meter or less (Ettel, *et al.* 1998). The manipulated area hosted a BCVI territory for the first time in 2004. Vegetation in areas of BCVI habitat on Walnut Creek Ranch appears to be mostly at climax conditions as well as do areas of roadside habitat elsewhere in Coke and Tom Green Counties (Maresh and Rowell 2000; Pinkston, *et al.* 2002). Dobbs Mountain and Chandler Independence Creek Preserve are typical of the southwestern settings described from Kickapoo Cavern State Park and Dolan Falls Ranch Preserve, respectively (Farquhar and Maresh 1996; Lockwood 2001). BCVI habitat at Big Bend National Park is very reminiscent of the pre-montane thorn-scrub settings found in northern Nuevo Leon, Mexico where BCVI occur (J. Maresh, Unpubl. data).

Departure timing seems to vary between sites. On sites with small populations and/or sparsely occupied or underutilized habitat such as Camp Barkeley, Walnut Creek Ranch, and Big Bend National Park, BCVI seem to disperse off-territory or perhaps depart for migration by mid-August, sometimes being completely absent by mid-July. On the other hand, sites with larger populations and more densely packed territories such as Quail Ridge Ranch, Chandler Independence Creek Preserve and Dobbs Mountain, there is a strong resurgence of singing and territoriality from late August through mid-September. On these sites, multiple males can be heard counter-singing or seen vigorously defending territory boundaries well into the second week of September. Females are also often seen on territory and young of the year are occasionally present as well. Identification of color-marked individuals confirms territory ownership and interaction between established neighbors rather than random encounters of irregularly distributed birds.

Departure *en masse* from these sites seems to occur over a 2 or 3 day period somewhere around 14 September but exact timing probably varies between sites and between seasons. Further study in this area is needed.

Land use changes can impact Black-capped Vireo habitat. The Dobbs Mountain property was heavily utilized for grazing livestock, primarily goats, for many years previous to its current ownership and vegetation at this site was severely impacted (Maresh 2004a). In the first 2 years of monitoring at this site, BCVI territories were almost exclusively limited to the periphery of the property. Along the eastern fenceline and right-of-way of RM 674 and to a lesser extent along the southern fenceline with Kickapoo Cavern State Park there were well-developed stands of shrubland that were not subjected to the grazing pressures of the interior. These stands differed both structurally and compositionally. The browse line was virtually absent on the right-of-way side of the fenceline so there was much more foliage in the 0 to 2 m height range. Large Ashe junipers (*Juniperus ashei*) and live oaks dominated the canopy while a number of shrub species such as evergreen sumac (*Rhus virens*) and netleaf forestiera (*Forestiera reticulata*), which were scarce or absent from the interior, could be found on the margins (Maresh 2003). All nests found and all productivity observed in the first years was from these areas. However, as the site recovered, there was more vegetation in the 0-2 m height range as the browse line diminished and ground cover increased as grass, forbs and woody species began to re-establish themselves in some of the open areas. This "filling-in" process was predicted in early reports and the number of breeding territories utilizing the interior portion of this property increased substantially from only 1 in year 2 to 7 in year 5 (Maresh 2003; Maresh 2004a).

Walnut Creek Ranch continues livestock grazing on several thousand acres, virtually all of which is potential BCVI habitat. However, BCVI have almost exclusively used areas of habitat that are in sections of long-term or permanent rest.

Black-capped Vireo surveys on the Oasis and Cañon Ranch portions of Independence Creek Preserve have shown steady increases in the number of birds counted since grazing operations were discontinued in 2000 with 12 males counted in 2001, 22 in 2002 and 60 counted in 2004. However, survey methods and effort were not equal through the years (Karges 2002; L. Elliott pers. com.).

F. Conclusions and Recommendations

Current Population Status and Distribution in Texas Recovery Units

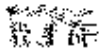
Data from this study and other current sources (summarized in **Tables 2 & 3**) suggest the following about the population and distribution of Black-capped Vireo in Texas recovery units: In **Recovery Unit 1- North-Central Texas**, small, isolated patches of suitable habitat at least occasionally host breeding populations of BCVI. These populations can be as small as a single pair and are prone to extirpation or "blinking out". There are almost certainly a number of unidentified areas of habitat that support BCVI throughout the region. Probably none harbor more than a few to several pair, but further data is needed. Still, the overall population of the recovery unit is not likely very large. **Recovery Unit 2- Lampasas Cut Plains** of course contains the bulging Fort Hood population. Also in Recovery Unit 2 is the Balcones Canyonlands National Wildlife Refuge with a stable or slowly increasing BCVI population. Areas of western Travis County have shown small increases after near extirpation. This study documented a sizable and apparently stable breeding population in Somervell County. Coleman County, with its elements of the Callahan Divide, holds pockets of occupied habitat as well. This recovery unit is certainly the most intensely studied and documented observations are likely a fair representation of the actual population. A number of counties in **Recovery Unit 3- Southeast Edwards Plateau** have newly documented populations of BCVI. Data from the Central Mineral Uplift region suggest a substantial number of BCVI, but little is known about the stability of these populations. The southern edge of the plateau persists in hosting vireos including in Bexar County despite habitat loss and fragmentation due to suburban and exurban development. Edwards, Kinney and Real Counties have substantial numbers of birds and this study suggests that the population in southwestern Edwards County is stable to slightly increasing. Current surveys are lacking from some counties in the recovery unit, but overall, the available data probably provide an accurate representation of the actual distribution and population of BCVI here. **Recovery Unit 4- Concho Valley** remains a large data gap due to lack of access to large areas of potential habitat. Access to areas

in the Concho Valley proper, as well as parts of the Callahan Divide, is needed to accurately assess the population of this recovery unit. Recent investigations in parts of **Recovery Unit 5- Stockton Plateau** make the current knowledge of BCVI distribution and population fairly accurate and up-to-date. However, certain portions of the unit, such as the Howard Draw area, lack recent information. Big Bend National Park in **Recovery Unit 6- Trans-Pecos** represents the sum of current knowledge of BCVI in this region. Other small populations have not been recently surveyed, but would likely increase the overall population of the recovery unit slightly.

The combining of **Recovery Units 1 & 2** and **5 & 6**, as suggested in the PHVA, would streamline the discussion of recovery efforts. Making recovery unit boundaries conform to county boundaries, also suggested in the PHVA, also makes things tidier but has the disadvantage of being ecologically artificial. Data from this study as well as other recent observations lead me to offer the following additional suggestions: First, I suggest the deletion of a number of counties from consideration unless a history of nesting Black-capped Vireos or a reasonable expectation of finding suitable breeding habitat can be demonstrated. These include counties on the eastern edge of **Recovery Unit 1** (Ellis, Fannin, Hunt, Kaufman, Navarro and Rockwall) and at the western end of **Recovery Unit 6** (Crane, Culberson, El Paso, Hudspeth, Jeff Davis, Loving, Presidio, Reeves, Ward, and Winkler). This would further streamline the discussion of recovery efforts. Second, based on ecological affinities, I recommend attaching Callahan, Coleman, McCulloch, and Schleicher Counties to the Concho Valley recovery unit and use "Concho Valley and Callahan Divide" when referring to these counties. Likewise, I recommend moving Edwards, Kinney and Sutton Counties into the Southwest and Trans-Pecos recovery unit because habitat found in those counties, except for eastern Edwards County, shows similarities to habitat found in the southwestern counties. Counties lying along the middle Colorado River including Blanco, Burnet, Lampasas, Llano, Mills, San Saba, Travis and Williamson are more problematic in that they share similarities with both North-Central Texas and the Edwards Plateau. Perhaps a separate recovery unit should be considered for this area. Whatever the configuration, a consistent definition of recovery units with the flexibility to change as data and knowledge are added is needed to further recovery planning and focus recovery efforts.

Status and Productivity at Monitoring Sites

Population and productivity data from all sites are summarized in **Tables 4-13**. While monitoring efforts were not equal between sites due to various factors such as differences in sizes of the properties monitored and differences in size of BCVI populations, survey and monitoring efforts were approximately equal between years for each site. Since it was possible to exhaustively census all sites, standardized sampling techniques were not employed (see **Significant Deviations**). Therefore, data in **Tables 4-6** represent a reasonably accurate count of the actual number of Black-capped Vireos at a given site in a given year. However, with only 4 years of census data, statistical trends cannot be discerned and only generalized observations can be stated. Following are my summary conclusions about the population status of each monitoring site and their representation of and relationship to their respective recovery units. The recovery units from the *Recovery Plan* are given followed by those from the PHVA in parenthesis ( ).



Big Bend National Park, Recovery Unit 6-Trans-Pecos (Recovery Unit 4-Southwest and Trans-Pecos): Population showing slow but steady increases, rebounding from severe regional drought. Population is approaching levels seen in pre-drought surveys and, given continued favorable conditions, should continue to grow and occupy ample available habitat. Habitat is protected and threats from parasitism and predation appear to be low to moderate. The greatest threat is the possibility of catastrophic wildland fire, which could remove large areas of habitat that would be slow to recover. BBNP is the only location within **Recovery Unit 6** with recent survey data and therefore represents the entire current known population. Other locations in the region with records of breeding BCVI may well continue to hold small numbers of birds but lack current data. Habitat similarities and geographic setting suggests that the Big Bend population may have more in common with the BCVI populations strung along the Sierra Madre Oriental across the Mexican states of Coahuila, Nuevo Leon and Tamaulipas than with those of Central or Southwest Texas.

Camp Barkeley, Recovery Unit 4-Concho Valley (Recovery Unit 3-Concho Valley): Population has been highly variable. BCVI were extirpated or at least not detected during numerous visits in 2002 but had rebounded to 6 pair by 2004. Severe drought conditions preceded the population decline and more favorable climatic conditions accompanied the rebound. Camp Barkeley lies along the Callahan Divide, which bears a topographic resemblance to the Concho Valley region but is not part of the valley proper. Camp Barkeley is probably representative of small pockets of suitable habitat that are likely scattered along/throughout the Callahan Divide. Although threats from parasitism and predation appear to be low or moderate, these pockets of habitat likely act frequently as population sinks that are prone to intermittent extirpation or "blinking-off" and "blinking-on" depending on local or regional conditions but these areas can at least occasionally produce replacement or even source populations in a given year or period of years. However, a better understanding of dispersal dynamics is required to speculate whether inter- or intra-regional movements perpetuate these source and sink patterns.

Camp Bowie, Recovery Unit 2-Lampasas Cut Plains (Recovery Unit 1-North-Central Texas): No breeding activity documented. The relatively large area of visually highly suitable habitat was seen being investigated by BCVI, but no territories were ever established. Although the habitat setting is somewhat similar to areas further east on the Lampasas Cut Plains, the vegetation is atypical of Brown County and surrounding counties and no significant BCVI populations are known from this vicinity. It is unknown whether this isolation or other factors have prevented this habitat from being colonized.

Chandler Independence Creek Preserve, Recovery Unit 5-Stockton Plateau (Recovery Unit 4-Southwest and Trans-Pecos): Population appears to be stable. Surveys on CICP and adjacent properties added significantly to the knowledge of the status of BCVI in this region. CICP hosts a highly concentrated population of BCVI in an unusual variety of habitats associated with Independence Creek and the Pecos River. Surprisingly, BCVI seem to avoid use of relatively moist and wooded side

canyons that are not immediately along the watercourses at CICP even though they are found at some distances away from riparian zones in similar settings elsewhere in Southwest Texas. Threats from parasitism and, to a lesser degree predation, appear to be somewhat sinusoidal, being very low early in the season and being high later in the season. Flash flooding, as occurred in late summer of 2003 and again to a much greater extent in late summer 2004, appears to be the most significant threat to the habitat. The amount of habitat lost in the 2004 event has yet to be thoroughly documented. The reaction to a significantly altered landscape by returning vireos would be interesting to document.

Dobbs Mountain, Recovery Unit 3-Southeast Edwards Plateau (Recovery Unit 2-Southeast Edwards Plateau): Population increasing. BCVI have rapidly colonized degraded habitat upon elimination of grazing animals. Dobbs Mountain is adjacent to 2 large protected areas with large and apparently stable BCVI populations. These adjacent populations most likely supplement local production as source of colonizers. No cowbird parasitism was observed on Dobbs Mountain. Western Scrub-Jays are likely the most significant predators. Although on the southern edge of the Edwards Plateau, western Edwards County has areas of habitat that are similar to the more xeric Southwest Texas region. However, patches of taller and moister juniper/pinyon/oak woodlands are also utilized by BCVI and these patches have been colonized by Golden-cheeked Warblers as well.

Garnett Preserve, Recovery Unit 1-North-Central Texas (Recovery Unit 1- North-Central Texas): BCVI recently extirpated. A single breeding pair had consistently occupied a very small patch of suitable habitat for a number of years. Other small to medium sized patches of habitat probably occur in far North-Central Texas, but occupation by BCVI may be irregular and these patches would be highly prone to extirpation. Threats in this region are not well known but certainly even small amounts of habitat loss or alteration would impact local populations.

Quail Ridge Ranch, Recovery Unit 2- Lampasas Cut Plains (Recovery Unit 1- North-Central Texas): Population stable. Number of breeding pairs, areas of habitat occupied and territory configuration have remained more-or-less consistent from year to year despite dramatic fluctuations in productivity due to levels of effort toward cowbird control. Brown-headed Cowbird parasitism was seen at very high rates. This was not surprising as the geographical setting of Quail Ridge provides an ideal setting for cowbirds with a shrub-covered ridge surrounded by mostly open pastureland and within sight of a large dairy farm. Cowbirds have the added amenity of a utility line running the length of the ridge, providing a perfect vantage point from which to observe BCVI and other breeding species. The re-growth shinnery habitat on the bulldozed ridge top at Quail Ridge is fairly similar to other settings found on the Lampasas Cut Plains, especially in the vicinity of Fort Hood. Other small populations are known from Somervell and surrounding counties and more likely exist. Further, there are opportunities to create suitable habitat through management activities. However, the shin oak and other woody vegetation is fairly fast growing and would likely need regular maintenance to remain suitable for BCVI. Areas in the vicinity of Chalk Mountain that hold mature ashe junipers will likely harbor Golden-cheeked Warblers as well, so the warbler should be considered carefully while planning management activities in this region.

Walnut Creek Ranch, Recovery Unit 4- Concho Valley (Recovery Unit 3- Concho Valley): BCVI recently extirpated. Observed breeding activity was almost exclusively limited to un-grazed pastures while large areas of visually suitable habitat containing livestock was barely utilized by BCVI. High parasitism rates and low observed productivity indicate that this area is likely a BCVI sink. A few other locations of visually similar habitat in the Concho Valley were consistently occupied during brief but regular roadside surveys. However, little is known about the productivity or site-specific threats of these areas. The known BCVI population in this recovery unit is small but very large areas of potential habitat have yet to be accessed and surveyed. The area-wide brush control efforts in the North Concho watershed have likely removed patches of occupied habitat and remain a major threat in areas of potential habitat.

Brown-headed Cowbird Parasitism and Other Threats

Rates of parasitism and predation for all monitored sites with breeding BCVI are given in **Tables 14-20**. Although Brown-headed Cowbird parasitism was observed on all sites except Dobbs Mountain, it remains unclear as to what role parasitism plays in the status of local populations. Data from this study are insufficient for firm statistical analysis and provide the basis only for a speculative discussion of the observations.

The history of BCVI occupation of Quail Ridge Ranch and the cowbird control efforts there provide an interesting case study. The number of breeding pairs at Quail Ridge remained steady throughout the monitoring period. The oak shinneries resulting from the bulldozing of the ridgetop were initially thought to have attracted vireos with "new" habitat. However, it was observed early on that almost all the territories were partially, if not entirely, on the un-manipulated slopes of the ridge, suggesting that BCVI were already present and may have simply expanded into the newly available habitat. With no local cowbird control being practiced, parasitism was observed to be very high (>90%) and nest success very low (<10%) during the first year of monitoring with very low productivity resulting. It is unknown if the baseline levels of parasitism prior to the habitat manipulation were equally high or if parasitism rates increased in response to the increasing usage of the expanded habitat by BCVI and other species. When very aggressive cowbird control efforts were implemented the next year, parasitism decreased markedly and productivity increased by some 600%. However, the number and configuration of territories did not significantly change in the following years suggesting that the available habitat is maximally occupied. With only "passive" control efforts (removal of BHCO eggs and nestlings) over the next 2 years, parasitism rates rebounded and productivity correspondingly dipped. Several sites in this study with no local cowbird control efforts have shown various trends: from declining (Walnut Creek Ranch) to stable (Chandler Independence Creek Preserve) to increasing (Big Bend National Park and Camp Barkeley). The possibility that vireo populations can fluctuate, or hold steady, independent of "background" parasitism pressure represents a major knowledge gap and should be investigated. The complete lack of any observed parasitism events at Dobbs Mountain may suggest that small scale but long-term

control efforts can reduce parasitism rates, at least locally. But with no baseline data before cowbird trapping began in the area, the affect of suppressed parasitism rates on the overall population is unknown. It is also interesting to note that although the numbers of cowbirds removed from year to year fluctuated, observations of cowbirds in BCVI habitat were rare in all years of monitoring at Dobbs Mountain.

The increase seen in the BCVI population on Dobbs Mountain as a discrete property probably had more to do with post-goating habitat improvements and a ready "source" from the contiguous population on adjacent properties rather than increased productivity. In fact, productivity declined in each year of monitoring at Dobbs Mountain. On Walnut Creek Ranch, vireos almost only used habitat in un-grazed pastures, virtually ignoring visually suitable habitat elsewhere.

Predation was also observed on all sites where active nests were monitored. Generally, nest predation rates were low to moderate and more-or-less steady between years at most sites. An exception being at Dobbs Mountain, which saw a marked increase in predation that coincided with the clearing on the right-of-way, which removed the best and densest habitat from the heart of number of territories. Western Scrub-Jays are probably the most menacing predator on sites that have them. Red imported fire ants (*Solenopsis invicta*) probably pose less of a threat in the drier and cooler portions of the vireo's range and no direct evidence of red imported fire ant predation was observed in this study.

The short-term threat of direct habitat destruction or modification at most sites is generally not a concern. With the exception of the right-of-way clearing mentioned above, only small and localized areas of habitat modification occurred for various reasons. Wildfire and flash flooding pose a threat to some areas as mentioned in the above discussion of specific monitoring sites as do brush control efforts and livestock grazing.

Observations made in this study point-up some serious gaps in our understanding of Black-capped Vireo ecology and what role parasitism, predation and dispersal play in the status of local and regional populations. A better understanding of cowbird ecology is needed as well. For instance, Chandler Independence Creek Preserve consistently had moderate to high rates of parasitism yet also consistently had

among the highest productivity levels of monitored sites. I suspect that the timing of the breeding cycles of these two species plays an important role in this region. Also, it is not clear if cowbird parasitism pressure changes across time. Farquhar, *et al.* (in prep.) found that cowbird numbers and, correspondingly, parasitism rates increased across sampled habitat types as shrub diversity and host species richness and diversity of those habitats increased. However, lag time between host availability and cowbird recruitment is unknown. Also, it is not clear if cowbirds increase at a simple geometric rate or if it is something greater, perhaps approaching exponential growth limited only by the carrying capacity of the host species' habitat. The impact of parasitism and predation pressures on the seasonal fecundity of BCVI populations is likewise poorly understood. Mayfield's (1975) method treats parasitism and predation as discreet, failure-causing events and only describes the probability of any nest failing or succeeding. Pease and Gryzbowski (1995) recognized that parasitism and predation events do not occur in isolation and that the probability of nest failure may not reflect actual fecundity. They expanded Mayfield's method to take into account such variables as length of breeding season and a species ability to re-nest in response to parasitism or predation pressure and derived a model for estimating overall seasonal fecundity. A detailed dataset from a sample of BCVI populations from different regions would need to be run through such a model to determine regional differences in response to parasitism and predation pressure. Further, a much better understanding of dispersal mechanisms and patterns as well as source-sink dynamics is also required before a determination of the sustainability of any given population.

Habitat Structure, Composition and Use Between Recovery Units

Summary statistics of several parameters measured at nest sites following the modified BBIRD protocol (Martin, *et al.* 1997) are presented in **ATTACHMENT C. NEST SITE VEGETATION CHARACTHERISTICS**. These data as well as other observations made during this study suggest several differences between recovery units. First, with Black-capped Vireos being observed in a wide range of settings, the

composition and structure of suitable habitat are probably more variable than previously thought. Black-capped Vireos may be more adaptable and less particular about such things as plant species composition, height, or openness of habitat patches. Rather, the observed common attribute of all BCVI territories was the presence of foliage in the 0-2 meter height range somewhere within the territory, frequently on the periphery. Conditions suitable for creating and maintaining this foliage skirt vary by site and region. Further analysis of the more detailed data collected at nest sites in this study should yield useful insights when performed. Second, the seral stage in which suitable BCVI habitat is found also varies widely. Several examples of shrublands in long-term mid-successional stages or even fully mature shrub- and woodlands that support breeding BCVI have been given. Generally speaking, the western and southwestern portions of the Texas distribution, represented by Recovery Units 4: Concho Valley, 5: Stockton Plateau and 6: Trans-Pecos and the western part of Recovery Unit 3: Southeast Edwards Plateau, are more likely to hold these long-term or indefinitely suitable areas of habitat. Management guidelines should take this into account. Further, in those portions of the distribution that require retarding succession in order to maintain BCVI habitat, careful consideration should be made of other avian species, especially the Golden-cheeked Warbler. Third, the abundance and seasonal distribution of Brown-headed Cowbirds across the vireo's range is uneven. Differences in vireo habitat structure and use between recovery units can reasonably be expected to be reflected with differences in cowbird habitats. Seasonal timings and cowbird habitat use and availability in the different recovery units are not well understood. A better understanding of the relationships between cowbirds, hosts and habitats would be useful in determining the necessity and likely long-term effectiveness of cowbird control efforts in the various recovery units.

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Attachment A.

Project WER61: Census and Monitoring of Black-capped Vireo in Texas

PROJECT STATEMENT

A. Need:

The Black-capped Vireo *(Vireo atricapillus)* is federally listed as endangered (U.S. Fish & Wildlife Service, 1991). Data concerning the distribution and population status of the Black-capped Vireo are variable and incomplete in several parts of the species' range. The *Black-capped Vireo Population and Habitat Viability Assessment Report* (PHVA) (U.S. Fish & Wildlife Service, 1996) identified 13 Texas counties as needing further study and an additional 7 counties as needing confirmation of the presence and status of vireos. The PHVA further identified Texas recovery units 1, 4, 5, and 6 as needing clarification of the status of vireos.

Systematic roadside transect surveys conducted from 1996-1998 throughout the vireo's known range in Texas have helped clarify the species' distribution (Maresh *et al.,* 1999; Maresh and Rowell, in prep.). The surveys have also confirmed the presence of Black-capped Vireos in 7 counties identified by the PHVA as either needing confirmation or further study.

However, detailed population estimates do not exist for most counties or recovery units. Furthermore, knowledge of the species' breeding biology, habitat use, and threats is lacking for large sections of its range. Detailed knowledge of population distribution and breeding status is needed for long-term recovery efforts.

Areas of occupied Black-capped Vireo habitat located during the roadside surveys provide an opportunity for more complete census surveys. Newly identified habitat sites provide the opportunity to monitor breeding status, habitat requirements, threats, and other aspects of the vireo's ecology throughout its range.

B. Objectives:

5. To determine current population status and distribution in Texas recovery units 1, 4, 5, and 6 and clarify population status in several counties in recovery units 2 and 3.
6. To monitor status and breeding productivity of these populations.
7. To determine threats from cowbird *(Molothrus* spp.) parasitism and identify other threats.
8. To determine differences in habitat structure and composition and habitat use between different recovery units.

C. Approach:

Census

1. Revisit locations of occupied Black-capped Vireo habitat identified during roadside surveys in Bosque, Coleman, Comanche, and Somervell Counties in recovery unit 2, Edwards, Kimble, Mason, McCulloch, Medina, and Sutton Counties in recovery unit 3, Coke, Runnels, Taylor, and Tom Green Counties in recovery unit 4, and Crockett and Val Verde Counties in recovery unit 5; Yr 1.

2. Determine ownership (public or private) of properties containing habitat and identify all nearby public lands. Seek access to properties from landowners/managers. Where private landowners will permit access on their property, obtain written permission allowing access, research and release of information. Yrs 1, 2.

3. Where access is obtained, use standardized census procedures to determine vireo abundance. (Bibby, *et al.,* 1992); report results annually; Yrs 1-5.

4. Where access is not obtainable, determine to what extent habitat may be observed from public roadways. Estimate extent of habitat and determine census protocol to best estimate population status; Yrs 1-3.

5. Revisit locations of Black-capped Vireo habitat observed during roadside surveys that were not found to be occupied. Re-survey to confirm status. If vireos are observed, implement steps 2 - 4; Yrs 1-3.

6. In areas where no occupied habitat was observed during roadside surveys *(i.e.,* recovery units land 6), survey locations of known or historic occurrence *(e.g.,* Big Bend National Park and Nature Conservancy properties in recovery unit 6; Possum Kingdom State Park and Dallas Nature Center in recovery unit 1); Yrs 1-3.

7. Write annual report including results from segment objectives.

Monitoring

8. Identify accessible properties that are representative of recovery units 1, 4, 5, and 6; Yr 1.

9. Select 2 sites (1 public, 1 private) from each recovery unit; Yr 1.

10. Implement monitoring on selected sites. Monitor sites annually for population status, breeding status, breeding success, cowbird parasitism, predation, and other threats. Determine parameters of breeding biology such as territory size and density. Identify principle vegetative components of breeding territories and characterize nest sites; Yrs 1-5.

11. Determine management recommendations for specific monitoring sites and their respective recovery units; Yrs 4-5.

12. Provide analysis of recovery units within context of Recovery Plan recommendations; Yr5.

13. Write annual report to include monitoring data for each year;

14. Prepare and submit final report to U.S Fish & Wildlife Service. Yr 5.

D. Expected Results:

1. Clarification of Black-capped Vireo population status and distribution in recovery units 1, 4, 5, and 6 and select counties in recovery units 2 and 3.

2. Knowledge of habitat requirements and habitat use in recovery units 1, 4, 5, and 6.

3. Knowledge of cowbird parasitism and other threats in recovery units 1, 4, 5, and 6.

4. Review of habitat management techniques and management recommendations for recovery units 1, 4, 5, and 6.

E. Location:

Central and Western Texas

F. Costs (Federal Share):

E-1-12	FY99	$24,000	Seg. Objs.	1 - 9
E-1-13	FY00	$35,475		2 – 6, 9
E-1-14	FY01	$35,475		3 – 6, 9
E-1-15	FY02	$35,475		3, 9 - 10
E-1-16	FY03	$35,475		3, 9 - 12

G. Literature Cited:

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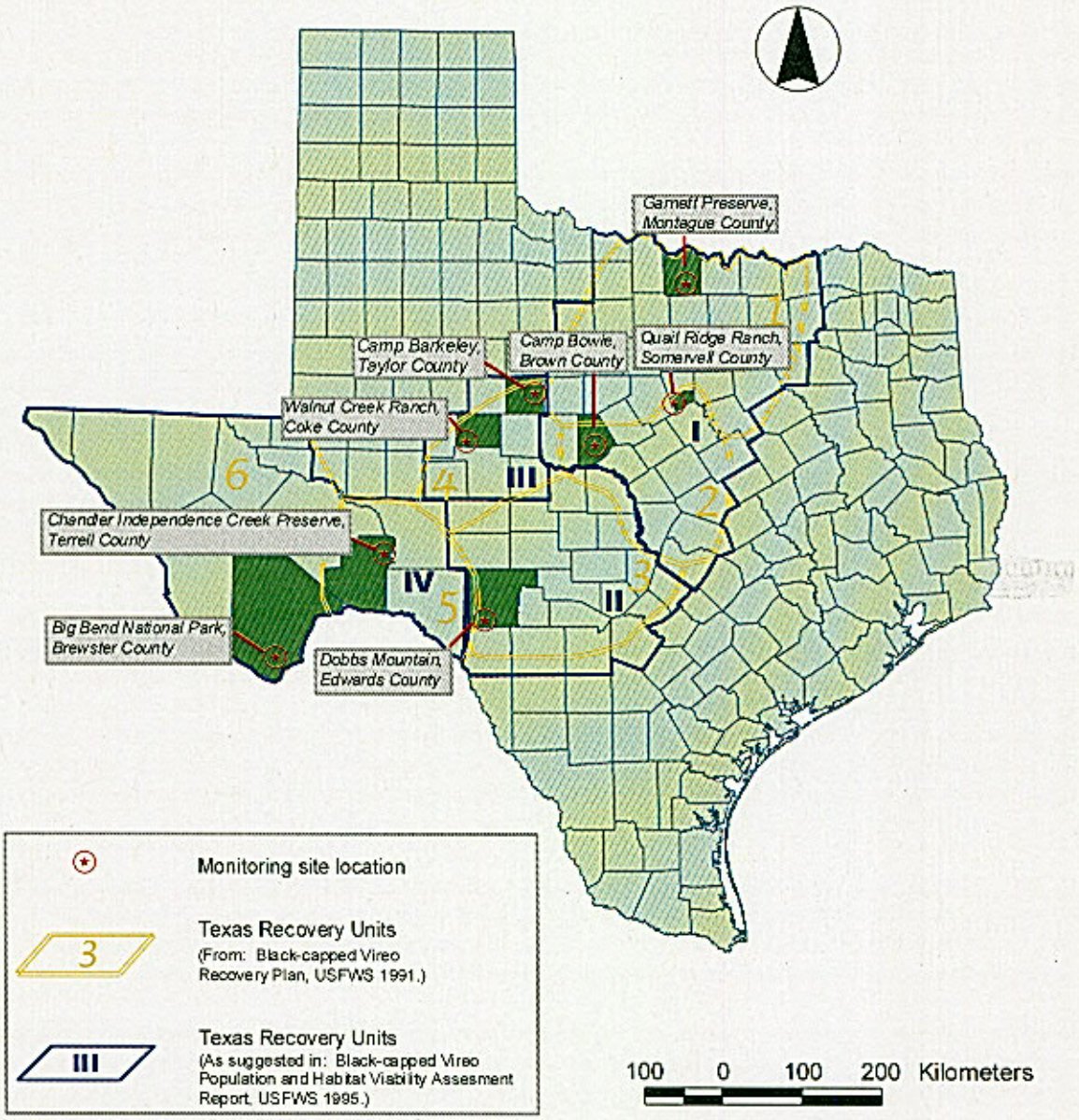
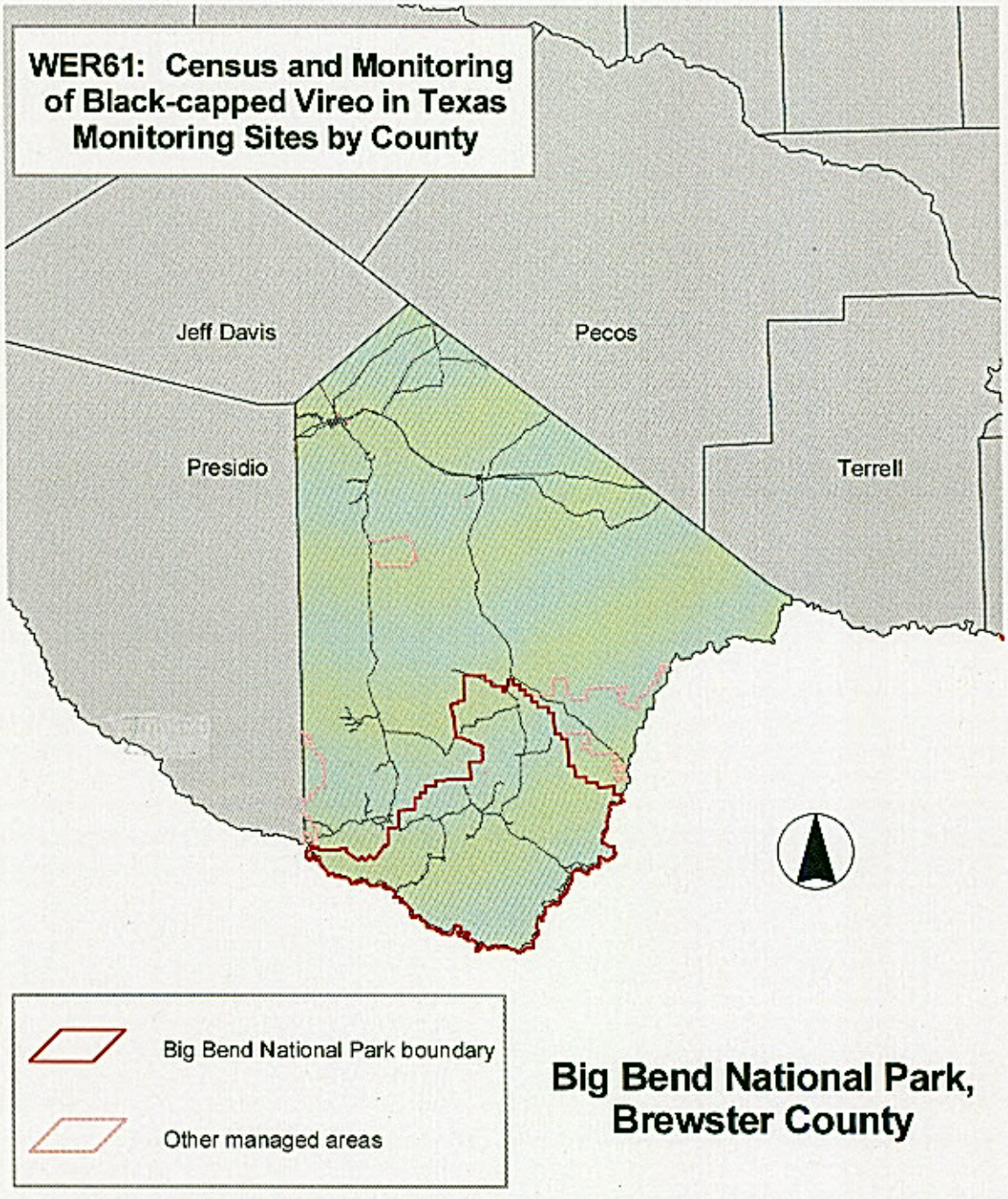
ATTACHMENT B. SITE DESCRIPTIONS

Recovery Units are from the *Black-capped Vireo Recovery Plan* (USFWS 1991) with the Recovery Units as suggested in the *Black-capped Vireo Population and Habitat Viability Assessment Report* (U.S. Fish & Wildlife Service 1996) given in parenthesis.

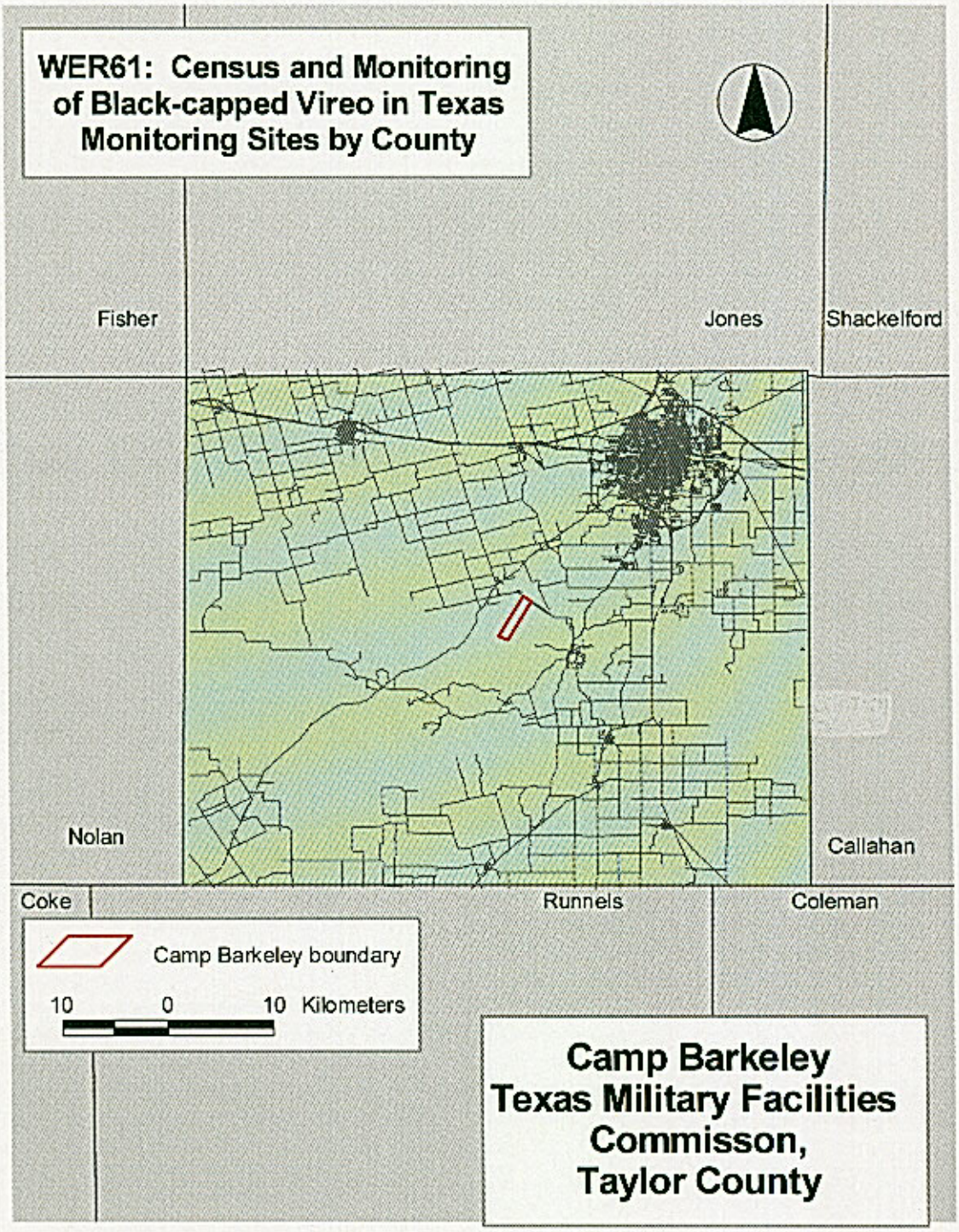
WER61: Census and Monitoring of Black-capped Vireo in Texas
Monitoring Sites by Recovery Unit




WER61: Census and Monitoring of Black-capped Vireo in Texas Monitoring Sites by County
Jeff Davis
Pecos
Presidio
Terrell
Big Bend National Park boundary
Other managed areas
Big Bend National Park, Brewster County
50
0
50 Kilometers

Big Bend National Park,
Brewster County
(public; U.S. Department of Interior, National Park Service)
Recovery Unit 6 (4) Trans-Pecos (Southwest and Trans-Pecos)

Black-capped Vireo habitat is patchily distributed around and within the Chisos Mountains of Big Bend and is usually found in canyons and drainages at mid-elevations from about 4000 – 5600 feet (1220 - 1710 meters) (Maresh 2004b). In general terms, the habitat can be thought of as the zone of deciduous shrublands lying in the transition between the lower-elevation desert scrub and the higher pinyon-oak-juniper woodlands. This shrubland zone is composed of species representative of both the higher (*e.g.* Juniper (*Juniperus* spp.); pinyon pine (*Pinus cembroides*)) and lower (*e.g.* sotol (*Dasylirion* spp); lechuguilla (*Agave* lechuguilla)) elevations, but is characterized by a number of woody shrubs that are scarce or absent in other settings elsewhere in the park These include Mexican buckeye (*Ungnadia speciosa*), evergreen sumac (*Rhus virens*), elbowbush (*Forestiera pubescens*), and agarita (*Berberis trifoliolata*) among others. Of course, there are rarely neat lines between the transition zones and fingers of shrubland habitat can be found along small drainages or gullies sticking into the desert scrub or on more xeric upland slopes between heavily wooded, moist canyons. Micro-geographical and abiotic factors such as slope, slope aspect, soils, frequency of flash flooding, *etc.*, also certainly influence the distribution of suitable habitat.


WER61: Census and Monitoring of Black-capped Vireo in Texas Monitoring Sites by County
Fisher
Jones
Shackelford
Nolan
Callahan
Coke
Runnels
Coleman
Camp Barkeley boundary
10 0 10 Kilometers
Camp Barkeley
Texas Military Facilities
Commisson,
Taylor County

Camp Barkeley,
Taylor County
(public; Texas Military Facilities Commission)
Recovery Unit 4 (3) Concho Valley (Concho Valley)

Camp Barkeley occupies 454.5 ha (1049 ac) in central Taylor County about 15 miles southwest of Abilene. Although situated within the Rolling Plains natural region much of the camp lies on moderate slopes of the Callahan Divide, a mesa-like outlier of the Edwards Plateau natural region. Elevation ranges from about 591m to about 731.5m (1940 -2400 feet) (Ettel and Maresh 2000).

The resistant caps of the Callahan Divide mesas are composed of Cretaceous limestones and claystones of the Edwards Limestone, Comanche Peak Limestone, and Walnut Formation. Slopes within the camp are underlain by Antlers Sand, which consists of interbedded sandstones and claystones. Permian rocks of the Clear Fork Group underlie level to gently sloping areas at the foot of the hills. This formation consists mainly of mudstone, limestone, dolomite, and siltstone.

Soils of Camp Barkeley are of the Tarrant-Tobosa general soil association. Soils in this group are very shallow to deep, calcareous, cobbly clays.

A sideoats grama grassland occurs on the Permian plain from the northern perimeter fence south to the Cretaceous limestone escarpment. The most conspicuous plant species in this grassland is honey mesquite (*Prosopis glandulosa*), shrubs or trees of which are 8 to 10 feet tall and provide 25 to 50 percent cover. In other areas mesquite is more scattered, and extensive rounded mounds of smaller shrubs such as littleleaf sumac (*Rhus microphylla*) and lotebush (*Ziziphus obtusifolius*) are conspicuous. Many of these shrub mounds are over 10 feet in diameter in the longer dimension. The shrub elbow-bush (*Forestiera pubescens*) is also common in small-to-large thickets in some areas. Ashe juniper (*Juniperus ashei*) and wolfberry (*Lycium berlandieri*) are also common, usually found as scattered individuals. Woody succulents such as narrowleaf yucca (*Yucca constricta*) and pricklypear (*Opuntia* sp.) are also important. Patches of shortgrasses such as buffalograss (*Buchloe dactyloides*) provide openings among the shrubs, particularly in drier sites, but Texas wintergrass or speargrass (*Stipa leucotricha*) is the most common cool-season grass overall. A large number of forb species is present.

Mixed evergreen/deciduous woodlands are found virtually all over the Edwards Limestone mesa in the southern two-thirds of Camp Barkeley. Under different conditions, e.g. more frequent fire, it is possible that two types, a woodland and a short to midgrass grassland, might have been readily recognized. The current vegetation blends across this spectrum, but some distinctions merit discussion.

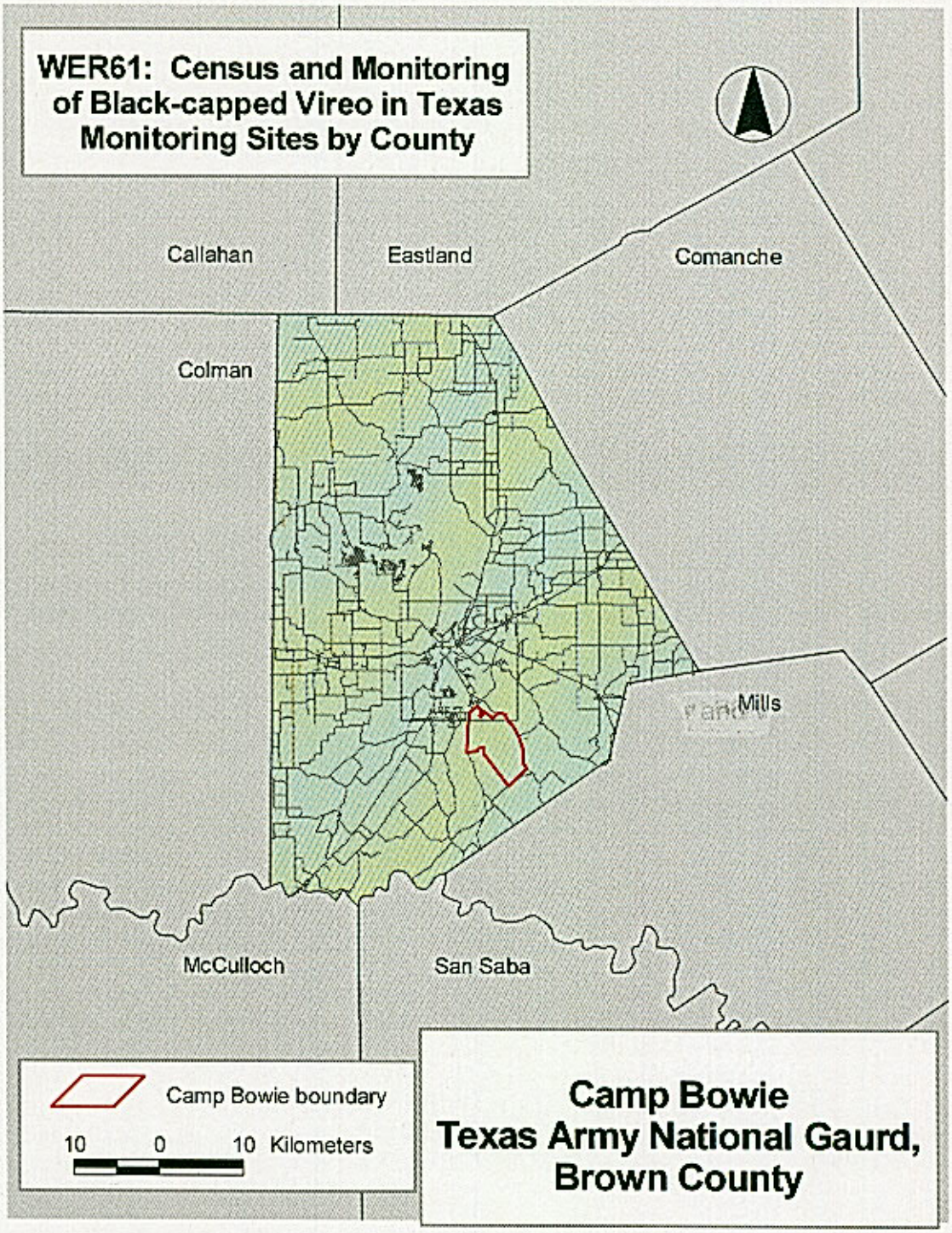
The most conspicuous woody species throughout is Ashe juniper, which is mixed with redberry juniper (*Juniperus pinchotii*) on lower slopes. On steep slopes Texas or Spanish oak (*Quercus buckleyi*) is nearly of equal importance, along with scalybark shin oak (*Quercus sinuata* var. *breviloba*) and smaller trees and shrubs such as Texas

redbud (*Cercis canadensis* var. *texensis*), various sumacs (*Rhus lanceolata, R. microphylla, R. trilobata*), and an occasional inland ceanothus (*Ceanothus herbaceus*). Mohr's shin oak (*Quercus mohriana*) becomes common upslope, forming low (3 to 6 feet in height) thickets in some parts of the flat mesa top. The dryness of these slopes may account for the sparse cover and paucity of herbaceous species found in the ground layer.

Although low, dense woodlands of juniper, Mohr's shin oak, scalybark shin oak, and various sumacs are found all over the flat to rolling mesa top, they are punctuated by grassland openings dominated for the most part by shortgrasses. Hairy tridens (*Erioneuron pilosum*), threeawn, Texas grama (*Bouteloua rigidiseta*), and buffalograss are among the common grasses, with the ever-present speargrass also important. Shallow clays, local poorly drained flats, and limestone outcrops provide a number of microhabitats utilized by many of the forb species common in Edwards Plateau uplands.

A rather narrow and poorly developed deciduous woodland lies along the intermittent drainage at the south end of the camp, on deep well-drained calcareous loams on alluvial terraces. The largest trees are Arizona walnut (*Juglans major*), some of which reach 30 feet in height and exceed 2 feet in diameter. The most common woody species, both in the low canopy and in the shrub layer, is probably western soapberry (*Sapindus saponaria* var. *drummondii*). Hackberry (*Celtis reticulata*) is frequent, and the occasional American elm (*Ulmus americana*) is conspicuous. Gum bumelia (*Bumelia lanuginosa*) is a common small tree, particularly along margins. Elements of slope woodlands, such as juniper and various *Quercus* species, are also present.

Patches of midgrass grassland in which little bluestem (*Schizachyrium scoparium*) may be the most important species can be found on somewhat eroded sandy to clayey loams on footslopes on both the northern and southern sides of the camp's central mesa. These grasslands are punctuated with scattered shrubs, and perennial forbs such as Barbara's buttons (*Marshallia caespitosa*), Texas queen's delight (*Stillingia texana*), and blazingstar (*Liatris punctata*) are locally common.


WER61: Census and Monitoring of Black-capped Vireo in Texas Monitoring Sites by County
Callahan
Eastland
Comanche
Colman
Mills
McCulloch
San Saba
Camp Bowie boundary
10 0 10 Kilometers
Camp Bowie
Texas Army National Gaurd,
Brown County

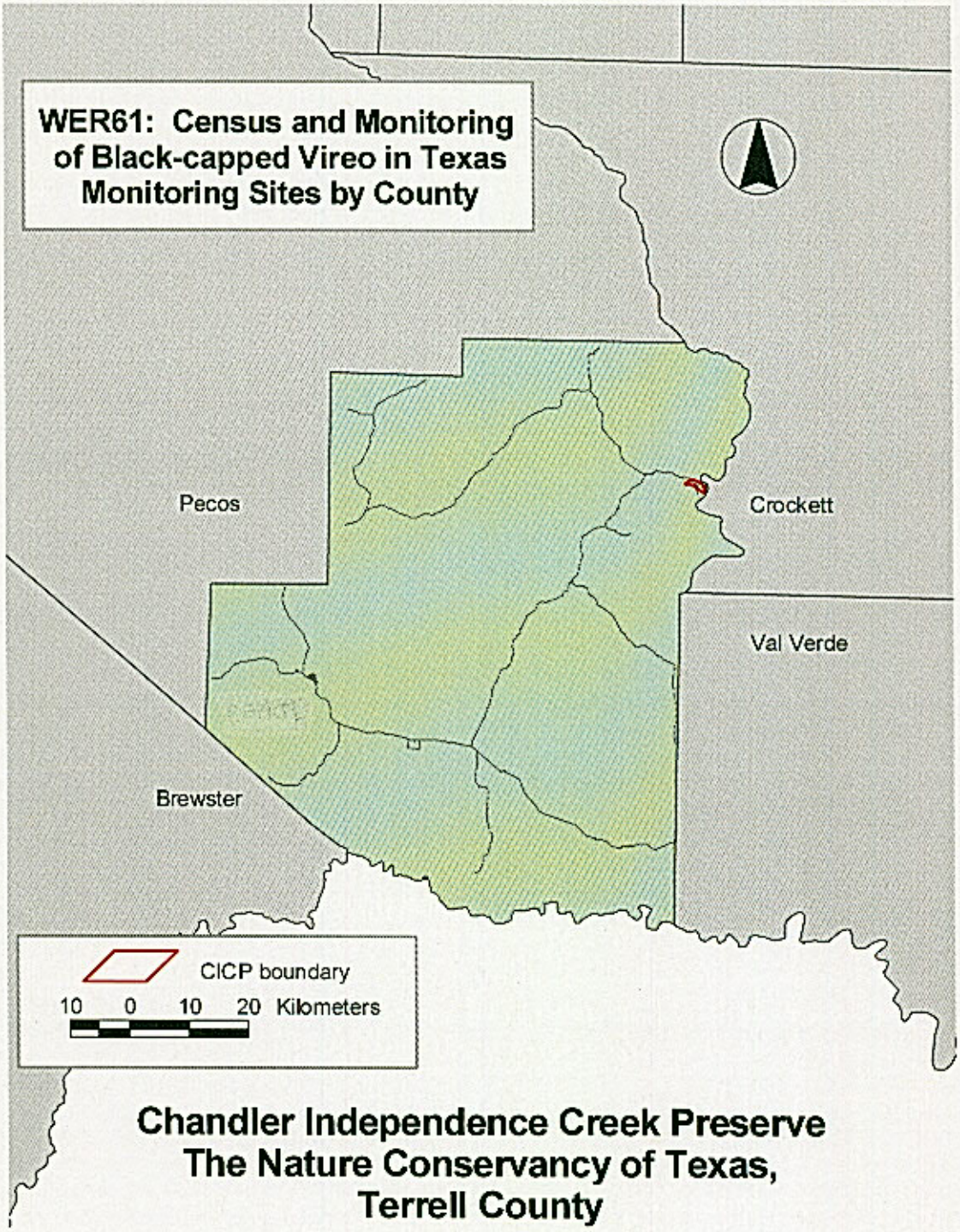
Camp Bowie,
Brown County
(public; Texas Army National Guard)
Recovery Unit 2 (1) Lampasas Cut Plains (North-Central Texas)

Camp Bowie is an approximately 3751 ha (9,269 ac) Texas Army National Guard and United States Army facility located about three miles southeast of Brownwood, Texas (Druid Environmental 2001). About 90-95 acres of BCVI habitat was identified at Camp Bowie on limestone and adjacent sandstone outcrops of the Travis Peak formation. Habitat areas were generally associated with plateau tops and the upper reaches of side slopes where outcrops of limestone were in evidence.

Vegetation of potential habitat areas was primarily shrubs with shin oak (*Quercus sinuata* var. *breviloba*) as the most important species. Other shrub and small tree species noted in habitat and consistent with BCVI habitat across the range in Texas were, perhaps in order of decreasing observed importance at the site, elbow-bush (*Forestiera pubescens*), skunkbush sumac (*Rhus aromatica*), flameleaf sumac (*Rhus lanceolata*), Ashe juniper, redbud (*Celtis canadensis*), live oak (*Quercus virginiana*) post oak (*Quercus stellata*) and Texas oak (*Quercus buckleyi*).

In identified potential BCVI habitat, shrub height ranged from 2-12 feet with much structural height diversity resulting from variation in shrub and tree age classes. In addition, since potential habitat areas had not evidently been recently grazed or browsed by domestic livestock, fairly well-developed early to mid-succession herbaceous vegetation occurred between and around the shrub and tree component of the habitat.

One small area, about 14 acres located in the north central portion of Camp Bowie was rejected as BCVI habitat. This area had vegetation structure similar to the habitat areas noted above. However, the dominant plant species was live oak (*Quercus virginiana*) with mesquite (*Prosopsis glandulosa*) as perhaps the most common species after live oak. Shin oak, and the other plant species usually noted as comprising a vegetation substrate for the BCVI were not encountered, or were a visually very small component of the site's vegetation. In addition, though several patches of "running" live oak amounting to about five acres of the total 14 acres were present with foliage to ground level, the balance of the woody vegetation had a distinctive browse line.

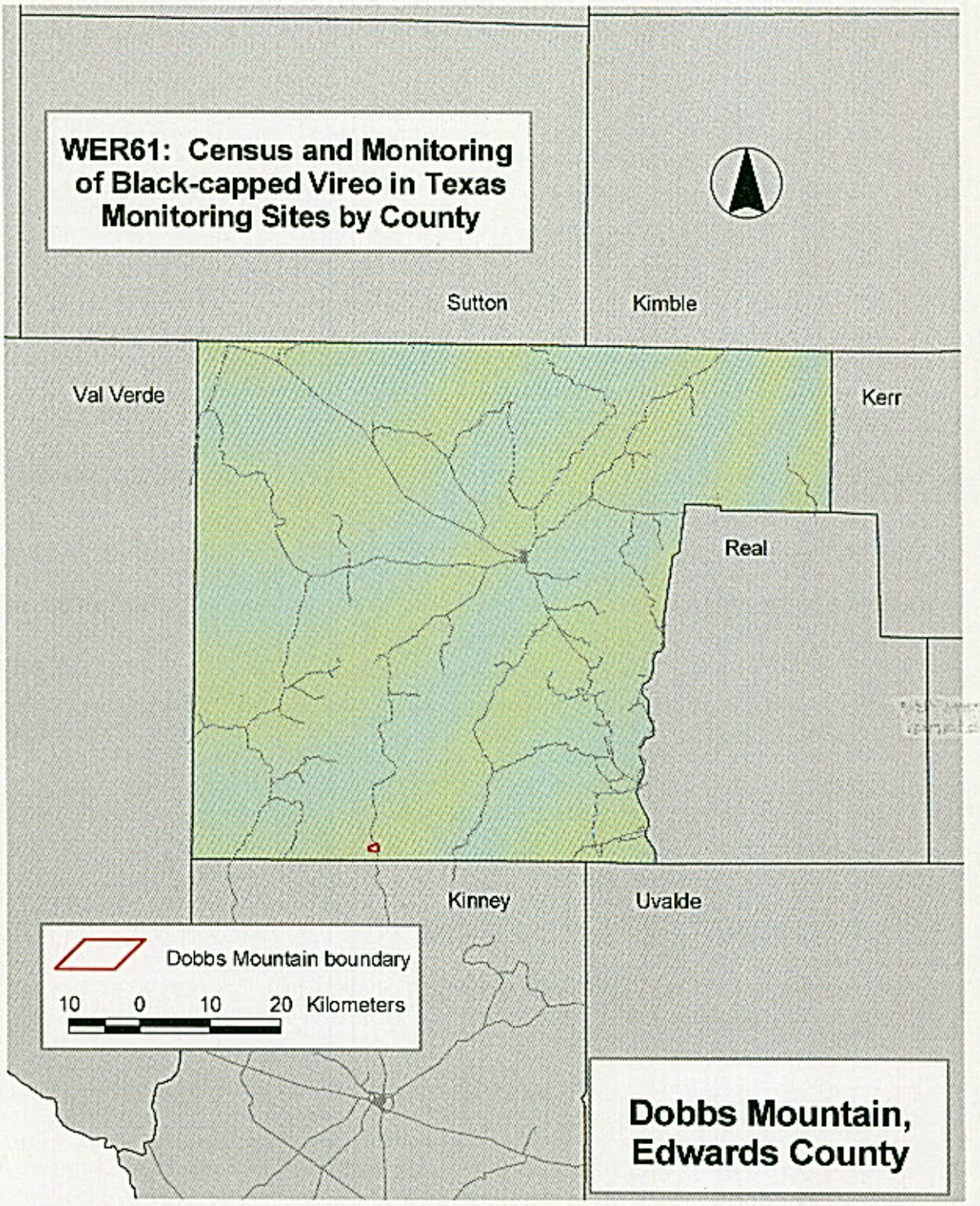


Chandler Independence Creek Preserve
The Nature Conservancy of Texas,
Terrell County

Chandler Independence Creek Preserve,
Terrell County
(private; individual and The Nature Conservancy of Texas)
Recovery Unit 5 (4) Stockton Plateau (Southwest and Trans-Pecos)

Independence Creek Preserve is a 7,989 ha (19,740 ac) preserve located in northeastern Terrell County, Texas approximately 22 miles south of the town of Sheffield. The preserve encompasses both sides of Independence Creek from Ranch-to-Market 349 to its mouth at the Pecos River approximately 11 km (7 mi) east. The preserve is managed by The Nature Conservancy of Texas' Lower Pecos office. The portion of the preserve under study in this investigation consists of the 284 ha (702 ac) Chandler Ranch portion of the much larger Independence Creek Preserve. This area is the privately held property of the Chandler family and is managed under conditions of a conservation easement owned by TNCT. For the purposes of this study, this area is referred to as "Chandler Independence Creek Preserve" or "CICP" (Maresh 2004c).

CICP includes the mouth of Independence Creek at the Pecos River and the final 2.7 km (1.7 mi) of the creek. By lying at the ecotone between the Edwards Plateau and Chihuahuan Desert ecoregions and by being at the confluence of 2 perennial streams in the generally very xeric Trans-Pecos region, CICP hosts a surprising variety of plant communities. Carr (2001) describes the vegetation of the preserve as being most typically like that of the Edwards Plateau with some elements of the Chihuahuan Desert and Tamaulipan Thornscrub ecoregions present but generally sparse to rare. Occupied Black-capped Vireo habitat is found in a number of vegetative settings on the preserve including stream banks, gravel bars, and alluvial terraces. However, a surprising variety of land-use activities have also affected CICP and occupied vireo habitat can also be found in settings such as mesquite old-fields and overgrown golf course ponds.

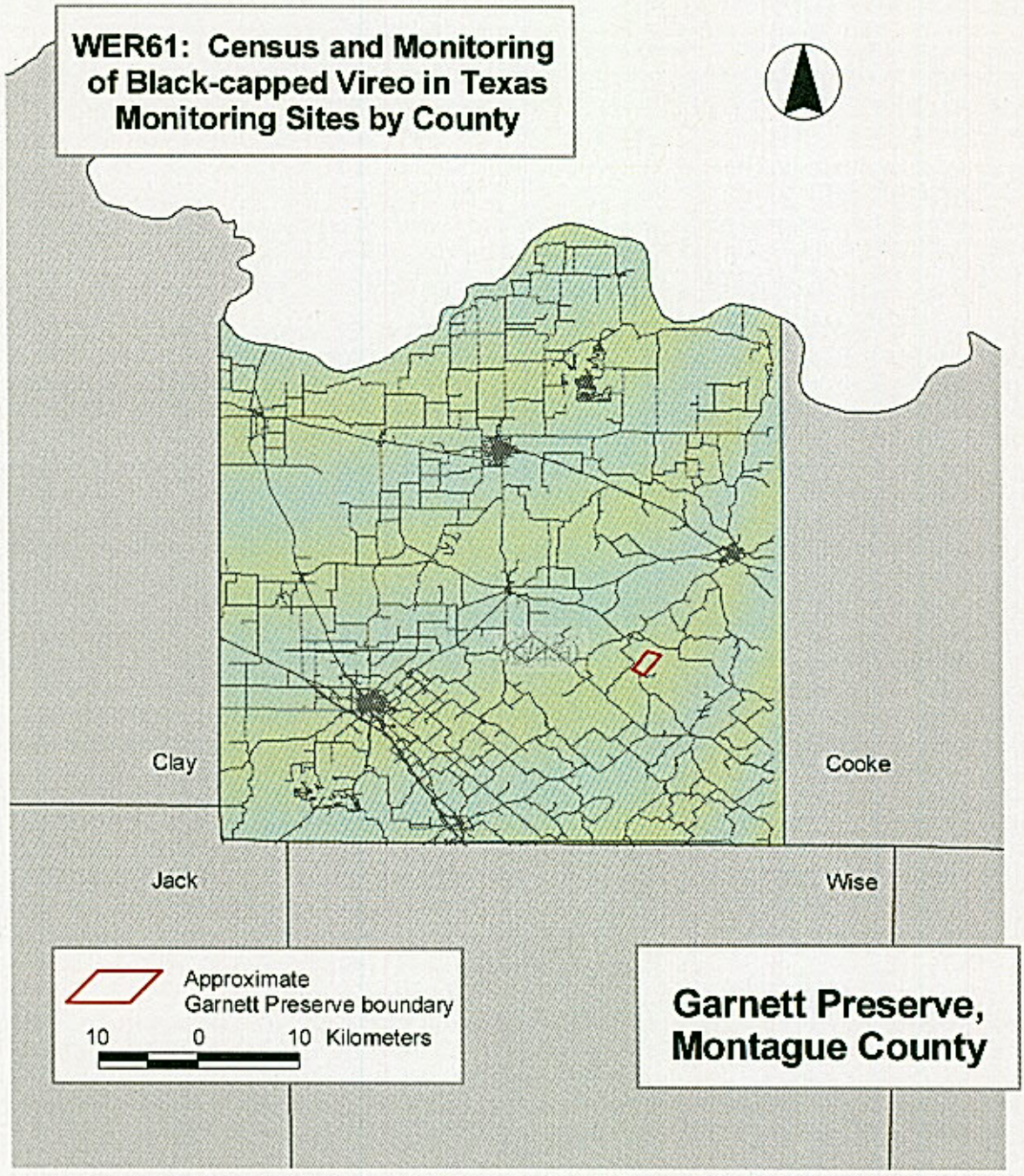

WER61: Census and Monitoring of Black-capped Vireo in Texas Monitoring Sites by County
Sutton
Kimble
Val Verde
Kerr
Real
Kinney
Uvalde
Dobbs Mountain boundary
10 0 10 20 Kilometers
Dobbs Mountain, Edwards County

Dobbs Mountain,
Edwards County
(private; individual)
Recovery Unit 3 (2) Southeast Edwards Plateau (Southeast Edwards Plateau)

Dobbs Mountain Ranch is a 106.6 ha (263.25 ac) privately held property in south-central Edwards County. The ranch lies near the southwestern edge of the Edwards Plateau Ecoregion approximately 23 miles (37 Km) north of Brackettville, Texas and 2.5 miles (4 Km) west of the West Nueces River. DMR borders Kickapoo Cavern State Park (KCSP) to the south and Dobbs Run Ranch (DRR) across Ranch-to-Market 674 to the east. The ranch has been under its current ownership for just under 5 years (Maresh 2004a).

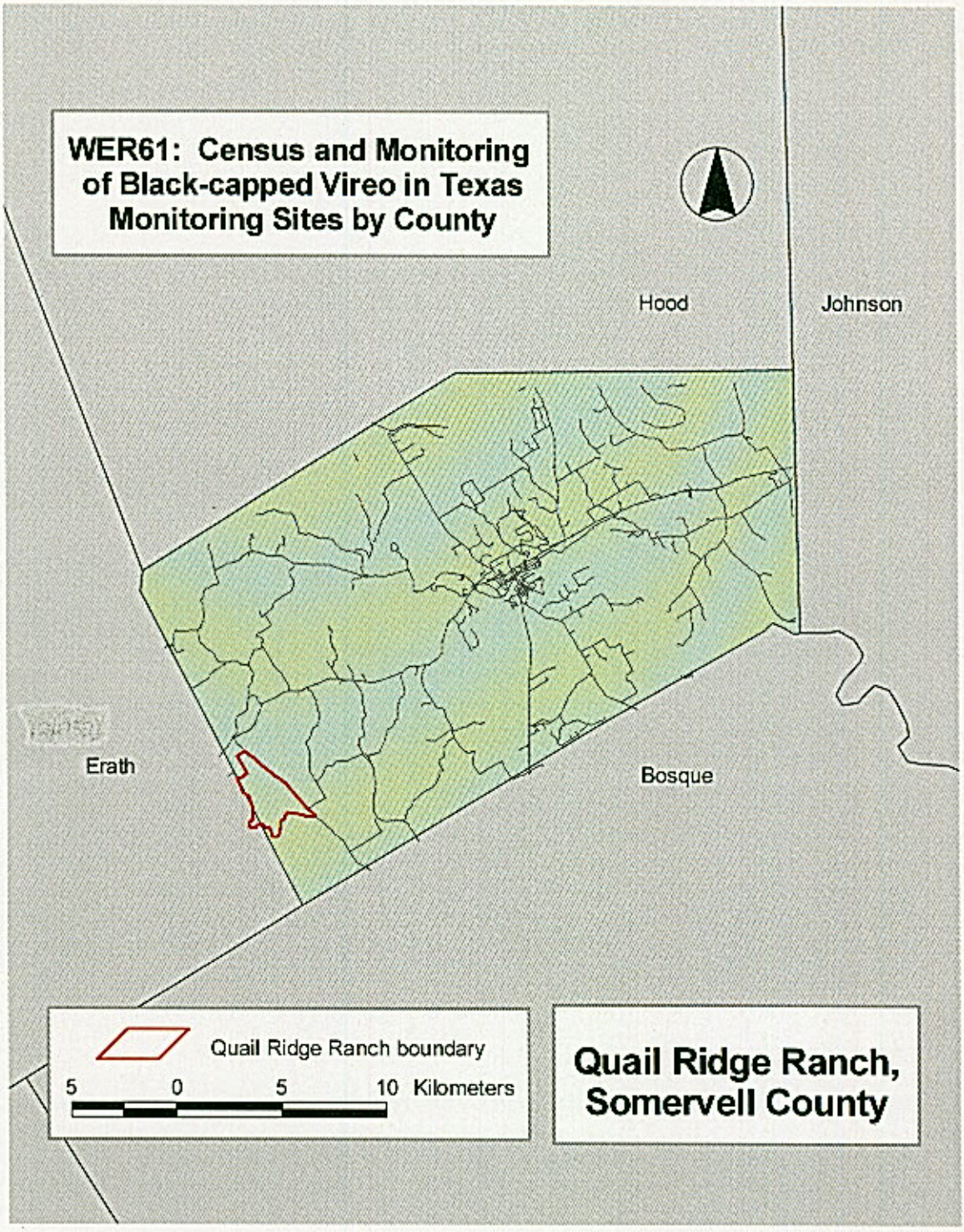
Dobbs Mountain proper, the highest point in the vicinity at 2042 feet (622 m), anchors a ridge of limestone hills arching NE to SW across the north and west portions of the property. The ridge is incised by 2 large drainages and numerous smaller draws and side-canyons. A number of dry washes cut through the rocky terrain below the ridge. Elevation ranges from 2042 feet (622 m) at Dobbs Mountain to just under 1800 feet (549 m) at the SE corner.

DMR was used for the grazing of livestock, primarily goats, for some years previous to the current ownership. It is also evident that most of the property was subjected to bulldozing or "chaining" within recent decades. These practices certainly had major impacts on the landscape. The current vegetation cover is primarily a scrappy, open shrubland dominated by Texas persimmon (*Diospryos texana*), Ashe juniper (*Juniperus asheii*), shin oak (*Quercus sinuata* var. *breviloba*) and agarita (*Berberis trifoliolata*). Other woody shrubs or trees occasionally interspersed include catclaw (*Acacia roemeriana*), toothache tree (*Zanthoxylum hirsutum*), pinyon pine (*Pinus remota*) and mesquite (*Prosopis glandlosa*) among others. Most woody plants are in the 2-4 m height range. Ground cover in the rocky open areas tends to be very sparse with a very shallow or no soil layer. However, native grasses and forbs seem to be taking hold in some areas while introduced or weedy species can be found on the lower flats. There are a few patches of closed canopy woodland interspersed in the shrublands or, more often, on steep slopes or at the head of a canyon or draw. These patches can be dominated by oaks such as Plateau live oak (*Q. fusiformis*) or Vasey oak (*Q. pungens* var. *vaseyana*) but often are more diverse stands with mature trees such as pinyon pines, Texas oaks (*Q. buckleyi*), Plateau live oaks, and Vasey oaks up 7 m or more in height. These areas were obviously spared the blade or the chain but here, too, can be found the evidence of targeted removal of Ashe juniper with a number of large trees lying where they were felled. Along the eastern fenceline and right-of-way of RM 674 and to a lesser extent along the southern fenceline with KCSP can be found well-developed, if linear, stands of shrubland and woodland that were not subjected to the grazing pressures of the interior vegetation. These stands differ both structurally and compositionally. The browse line is reduced or virtually absent on the right-of-way side of the fenceline so there is much more foliage in the 0 to 2 m height range. Large Ashe junipers and Plateau live oaks dominate the canopy while a number of shrub species such as evergreen sumac (*Rhus virens*) and netleaf foresteria (*Foresteria reticulata*), which are scarce or absent from the interior, can be found on the margins.


WER61: Census and Monitoring of Black-capped Vireo in Texas Monitoring Sites by County
Clay
Cooke
Jack
Wise
Approximate Garnett Preserve boundary
10 0 10 Kilometers
Garnett Preserve, Montague County

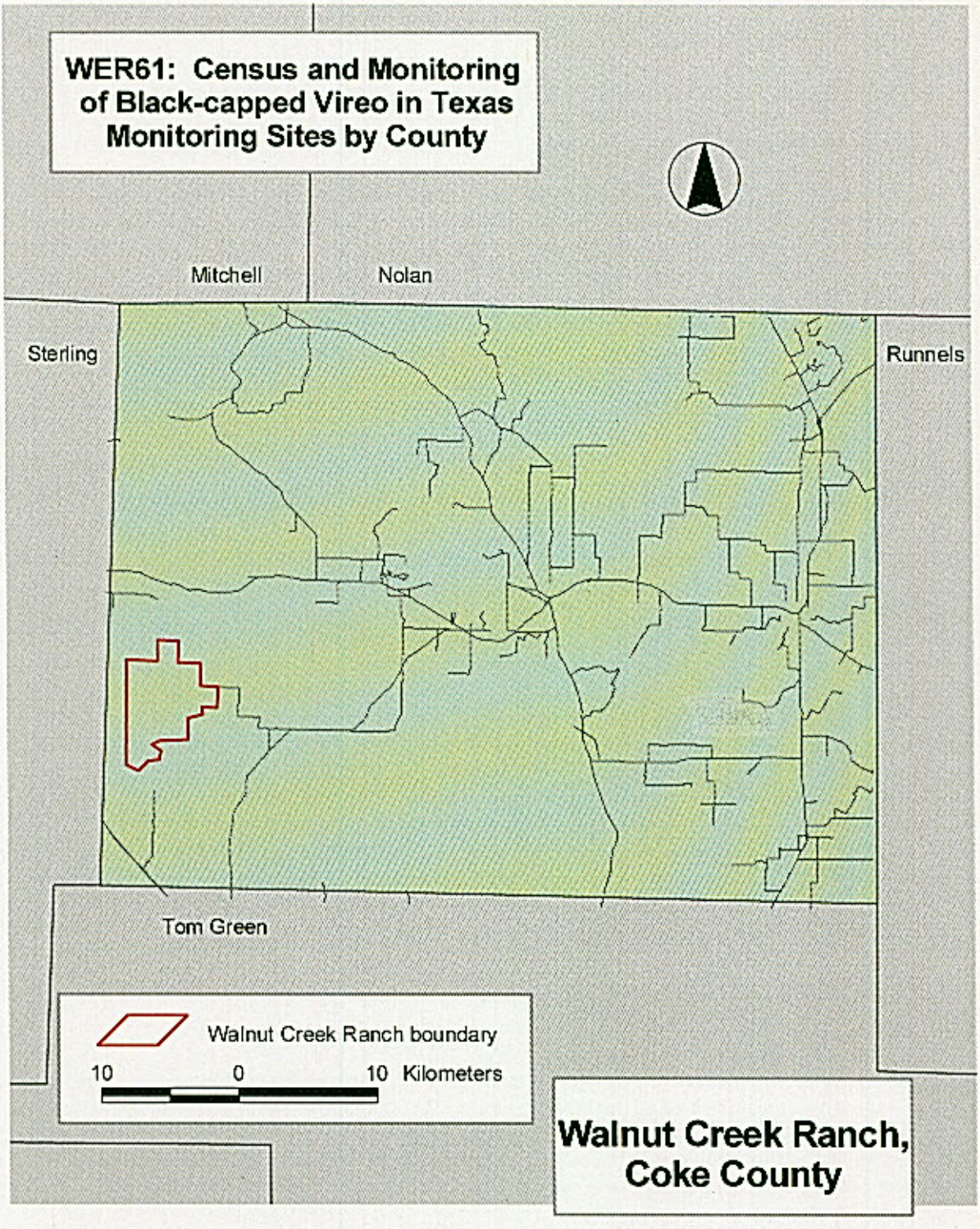
Garnett Preserve,
Montague County
(private; individual)
Recovery Unit 1 (1) North-Central Texas (North-Central Texas)

The Garnett Preserve is a 57.5 ha (142 ac) privately held property in southeast Montague County approximately 10 miles SSW of the town of St Jo. The Preserve lies at the interface of the Fort Worth Prairie and the Western Cross Timbers and is managed as a prairie restoration site (H. Garnett pers com.) The property consists of mixed hardwood riparian bottomlands, areas of open grasslands, and has several low limestone knobs. Patches of low, scrubby vegetation are widely interspersed on the generally open limestone hillsides. These patches consist of a diverse mixture of woody shrubs and small trees including sumac (*Rhus* spp.), rough-leaf dogwood (*Cornus drummundii*), Chickasaw plum (*Prunus angustifolia*), juniper (*Juniperus* spp.) and Texas red oak (*Quercus buckleyi*), among numerous other species. The Black-capped Vireos occupied about 10 acres along these hillsides utilizing these scrubby patches, crossing the broad, grassy, open areas in between them as well as taller stands of trees on the flats below the hills. These taller stands consisted of American elm (*Ulmus americana*), hackberry (*Celtis* spp.) and juniper with a dense covering of grapevines (*Vitis* spp) and greenbriar (*Smilax bona-nox*).


WER61: Census and Monitoring of Black-capped Vireo in Texas Monitoring Sites by County
Hood
Johnson
Erath
Bosque
Quail Ridge Ranch boundary
5 0 5 10 Kilometers
Quail Ridge Ranch, Somervell County

Quail Ridge Ranch,
Somervell County
(private; individual)
Recovery Unit 2 (1) Lampasas Cut Plains (North-Central Texas)

Quail Ridge Ranch is a privately owned property located in southwestern Somervell County approximately 12 miles (19 km) west of the town of Glen Rose. It is comprised of over 1,500 ac (633 ha) of diverse habitats. The landscape has been significantly altered to enhance habitat for wildlife. Habitat enhancement and manipulation efforts have included bulldozing in an effort to decrease the juniper (*Juniperus* spp.) component, creating a series of ponds and wetlands, planting oak (*Quercus* spp.) acorns in an effort to generate the growth of oak shinneries, and planting wildlife food plots. Habitat characteristics on the ranch range from scrub oak shinneries, oak juniper woodlands, riparian woodlands, grasslands, ponds, streams, and rocky slopes. In 1997, approximately 135 acres of dense juniper and overgrown shin oaks (*Quercus sinuata* var. *breviloba*) were bulldozed in effort to stimulate deciduous regrowth, particularly oak shinneries.


WER61: Census and Monitoring of Black-capped Vireo in Texas Monitoring Sites by County
Mitchell
Nolan
Sterling
Runnels
Tom Green
Walnut Creek Ranch boundary
10 0 10 Kilometers
Walnut Creek Ranch, Coke County

Walnut Creek Ranch,
Coke County
(private; individual)
Recovery Unit 4 (3) Concho Valley (Concho Valley)

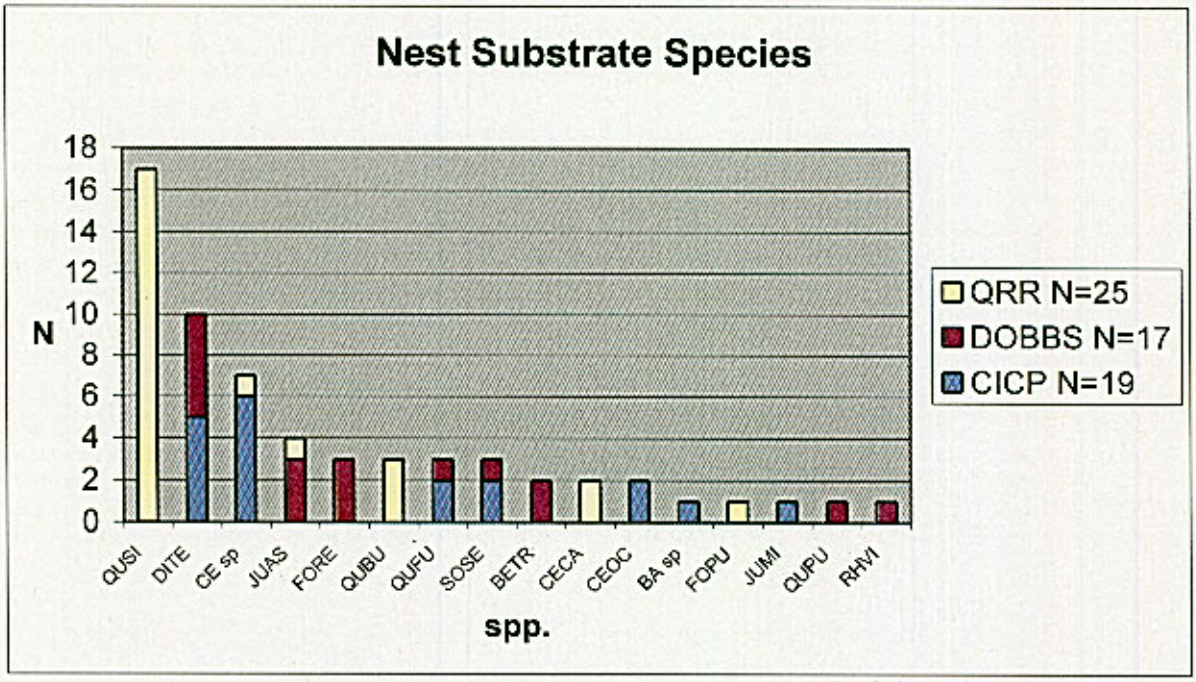
Walnut Creek Ranch is a large privately owned property located on the southwestern edge of Coke County approximately 12 miles (19 km) north of Water Valley, Texas (Maresh 2004d). It comprises 3,624 ha (8,955 ac) of rolling hills that are characterized by upland climax, low growth shrubland and lowland mesquite woodlands. The property also hosts Walnut Creek, an ephemeral tributary of the North Concho River. Most of the property has been heavily grazed and browsed. Livestock numbers have been somewhat reduced in areas and these landscapes are in the process of recovering. In addition, efforts are currently being made to clear large areas mesquite (*Prosopis glandulosa*), juniper (*Juniperus* spp.), and prickly pear cacti (*Opuntia* spp.).

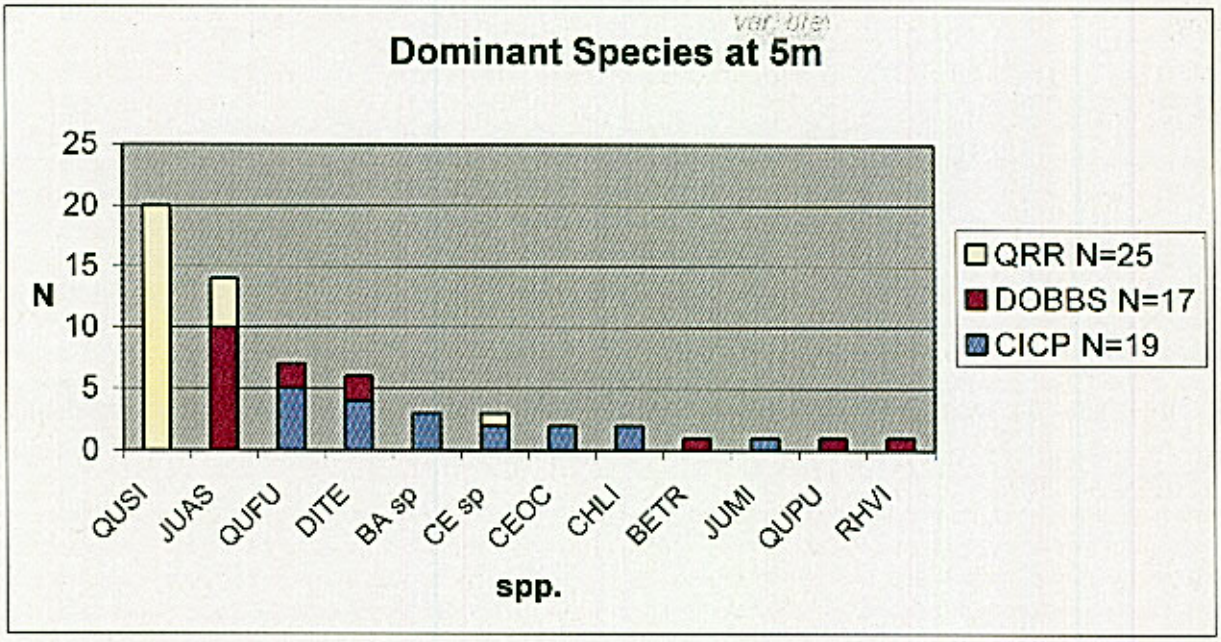
ATTACHMENT C. NEST SITE VEGETATION CHARACTHERISTICS

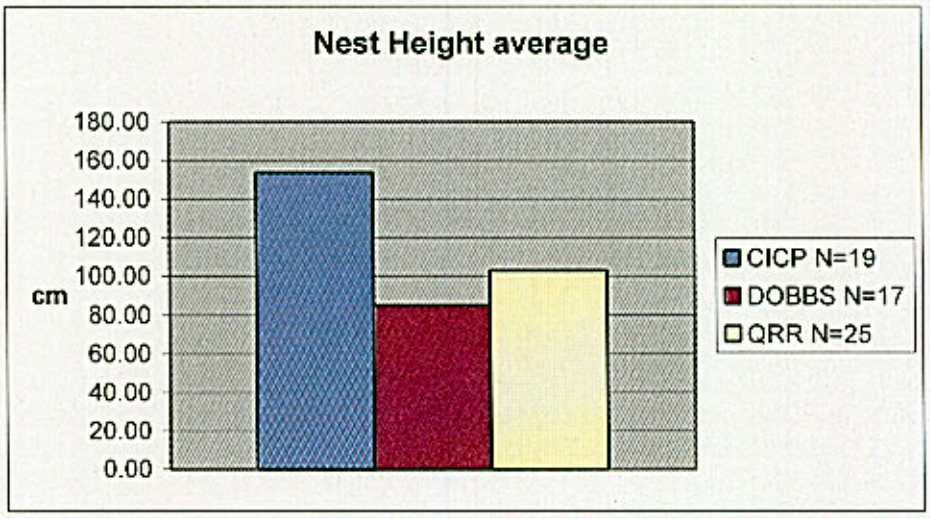
The following charts represent summary statistics of several parameters measured at Black-capped Vireo nest sites on three properties. Where appropriate, CICP = Chandler Independence Creek Preserve, DOBBS = Dobbs Mountain and QRR = Quail Ridge Ranch. "At 5 meters" references measurements taken within a 5-meter radius circle centered on the nest.

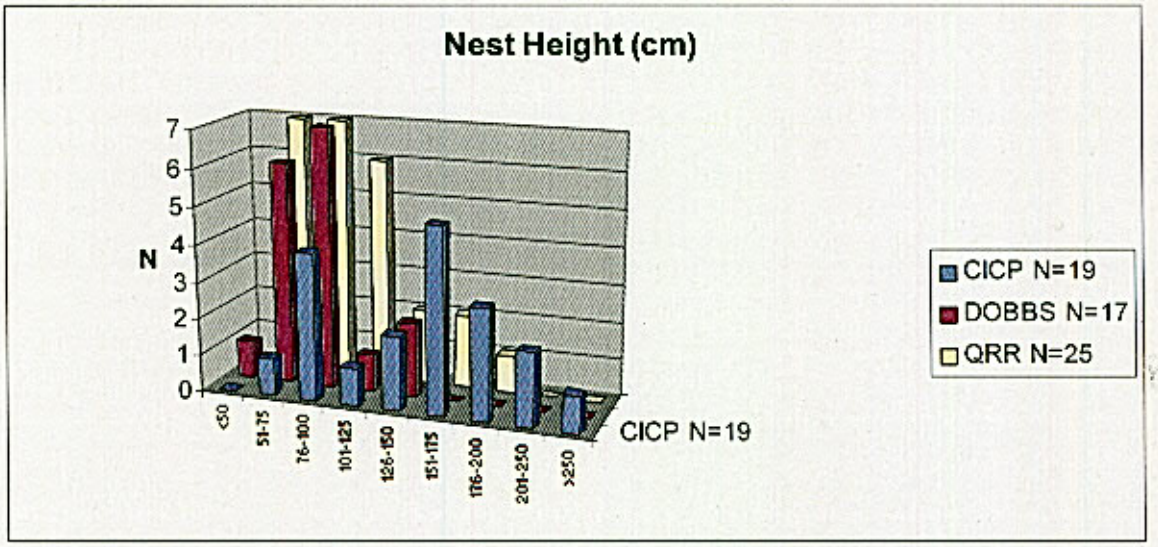
The key to shrub and tree species listed is:

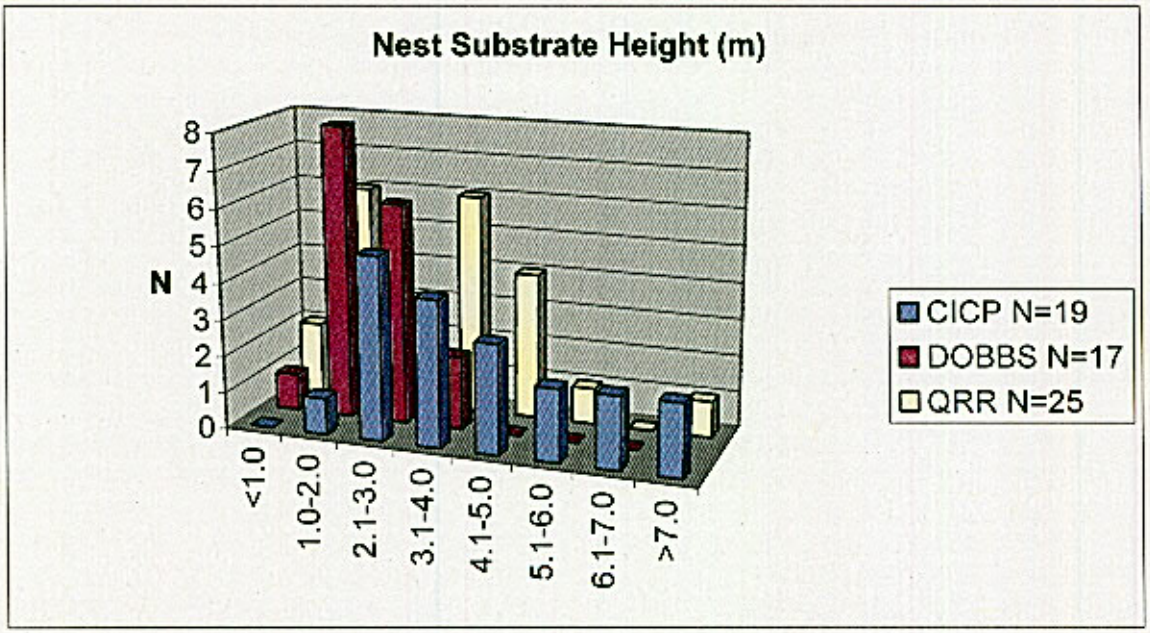
BA sp	*Baccharis* sp.
BETR	*Berberis trifoliolata*
CE sp	*Celtis* sp.
CECA	*Cercis canadensis*
CEOC	*Cephalanthus occidentalis*
CHLI	*Chilopsis linearis*
DITE	*Diospyros texana*
FOPU	*Forestiera pubescens*
FORE	*Forestiera reticulata*
JUAS	*Juniperus ashei*
JUMI	*Juglans microcarpa*
QUBU	*Quercus buckleyi*
QUFU	*Quercus fusiformis*
QUPU	*Quercus pungens* var. *vaseyana*
QUSI	*Quercus sinuata var. breviloba*
RHVI	*Rhus virens*
SOSE	*Sophora secundiflora*

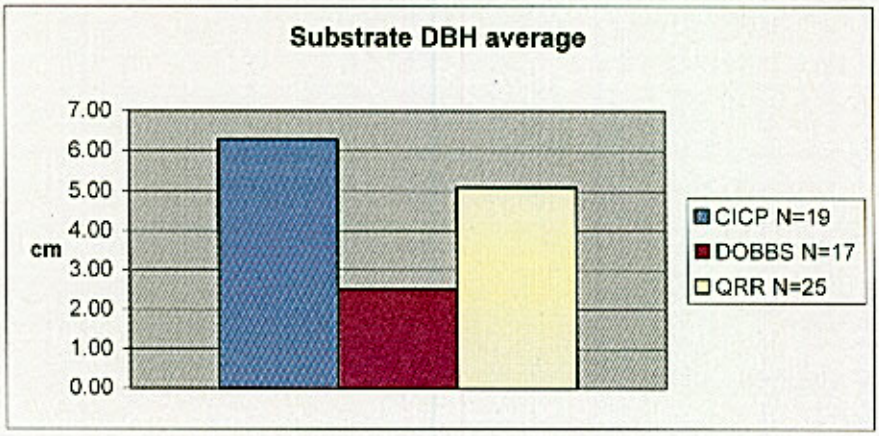

Nest Substrate Species
N
18
16
14
12
10
8
6
4
2
0
QUSI
DITE
CE sp
JUAS
FORE
QUBU
QUFU
SOSE
BETR
CECA
CEOC
BA sp
FOPU
JUMI
QUPU
RHVI
spp.
QRR N=25
DOBBS N=17
CICP N=19

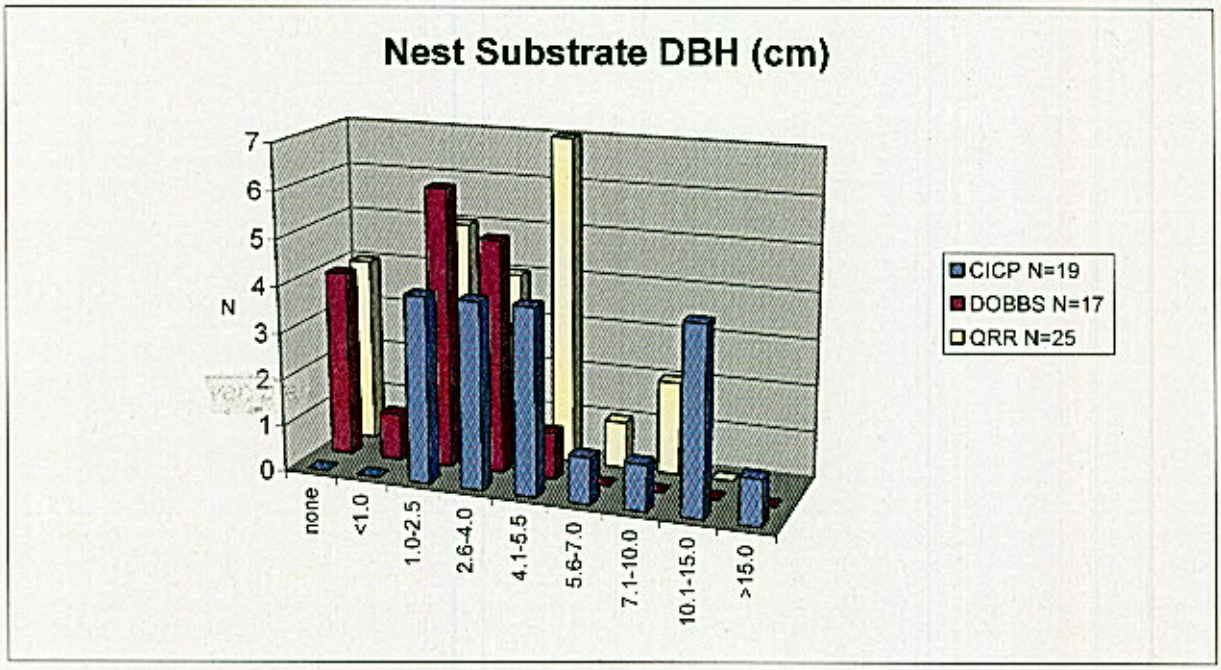

Dominant Species at 5m
N
25
20
15
10
5
0
QUSI
JUAS
QUFU
DITE
BA sp
CE sp
CEOC
CHLI
BETR
JUMI
QUPU
RHVI
spp.
QRR N=25
DOBBS N=17
CICP N=19

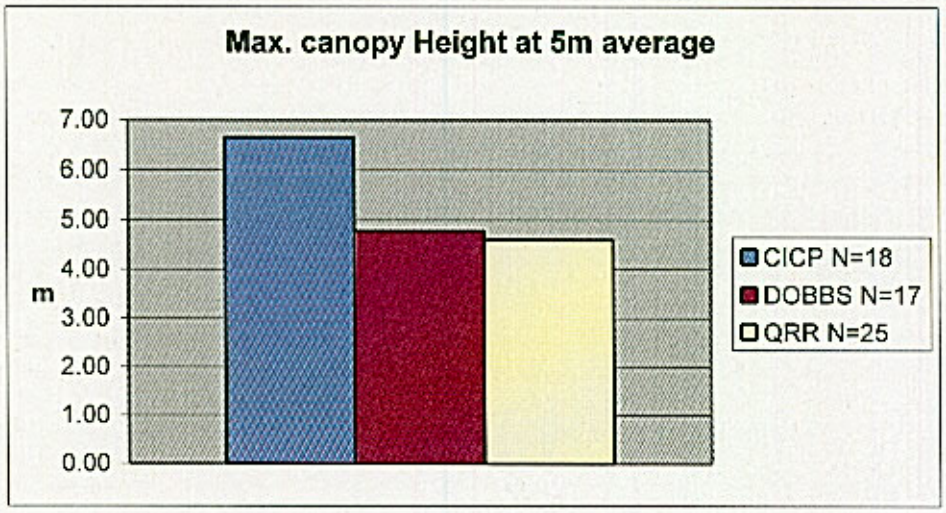

Nest Height average
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
cm
CICP N=19
DOBBS N=17
QRR N=25

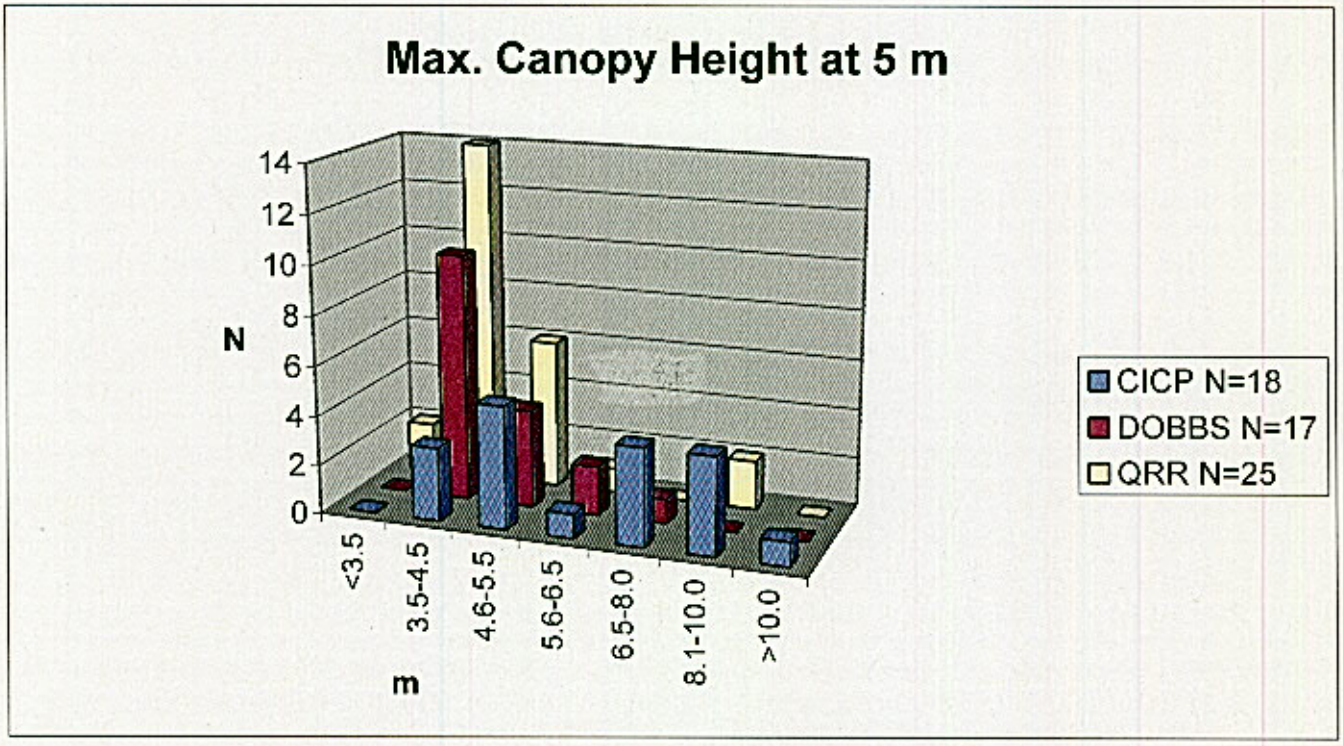

Nest Height (cm)
7
6
5
4
3
2
1
0
N
<50
51-75
76-100
101-125
126-150
151-175
176-200
201-250
>250
CICP N=19
CICP N=19
DOBBS N=17
QRR N=25

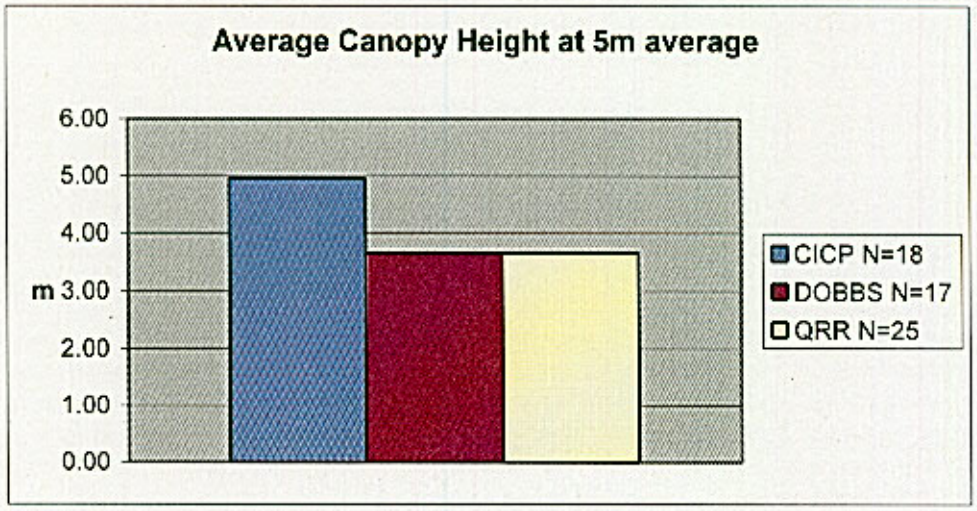

Nest Substrate Height (m)
8
7
6
5
4
3
2
1
0
N
<1.0
1.0-2.0
2.1-3.0
3.1-4.0
4.1-5.0
5.1-6.0
6.1-7.0
>7.0
CICP N=19
DOBBS N=17
QRR N=25

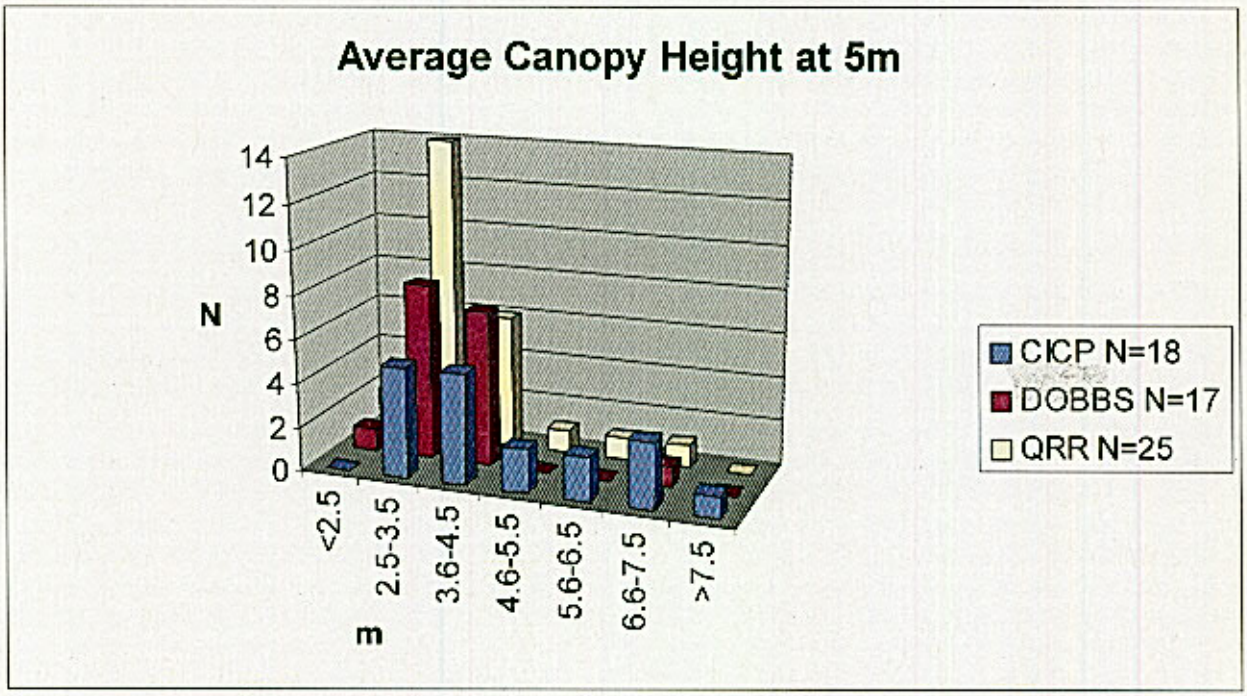

Substrate DBH average
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
cm
CICP N=19
DOBBS N=17
QRR N=25


Nest Substrate DBH (cm)
7
6
5
4
3
2
1
0
N
none
<1.0
1.0-2.5
2.6-4.0
4.1-5.5
5.6-7.0
7.1-10.0
10.1-15.0
>15.0
CICP N=19
DOBBS N=17
QRR N=25


Max. canopy Height at 5m average
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
m
CICP N=18
DOBBS N=17
QRR N=25


Max. Canopy Height at 5 m
14
12
10
8
6
4
2
0
N
<3.5
3.5-4.5
4.6-5.5
5.6-6.5
6.5-8.0
8.1-10.0
>10.0
m
CICP N=18
DOBBS N=17
QRR N=25


Average Canopy Height at 5m average
6.00
5.00
4.00
m 3.00
2.00
1.00
0.00
CICP N=18
DOBBS N=17
QRR N=25


Average Canopy Height at 5m
14
12
10
8
6
4
2
0
N
<2.5
2.5-3.5
3.6-4.5
4.6-5.5
5.6-6.5
6.6-7.5
>7.5
m
CICP N=18
DOBBS N=17
QRR N=25

Appendix

Black-capped Vireo Banding Data and Selected Demographics and Return Rates

CAMP BARKELEY TEXAS ARMY NATIONAL GUARD TRAINING SITE, TAYLOR COUNTY: 32° 19' 40" N, -99° 52' 00" W

1995

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
	6-Apr-95	0A	1880-47602	S//-		BCVI	AHY	M	0	0		59 (flat)	8	E Central		CCF
	11-May-95	>	1880-47654	S//DkG		>	ASY	F		1		54 (flat)	11	NW corner		CCF/JPM
	31-May-95	>	1880-47656	S//DkB		>	SY	M	1	1		59 (flat)	10	E Central	Brownish eye, buffy breast, tapered pp	CCF/JPM
	27-Jun-95	>	1880-47672	S//M		>	ASY	M	0	0		55 (flat)	8	Roadcut	Very little feather wear	CCF/JPM

1996

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
	23-Apr-96	0A	3510-89644	G//S		BCVI	ASY	F				55 (flat)		NW corner (B side)		CCF/JPM
	23-May-96	>	3510-89666	L//S		>	SY	M	3	1		53 (flat)	8	NW corner (B side)		JPM
	30-Jul-96	>	3510-89670	L//W/S		>	HY	U						NE corner		CCF/JPM
	30-Jul-96	>	3510-89671	L/S//W		>	HY	U						Pit		CCF/JPM

1997

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
	2-May-97	0A	3510-89682	Gy/S//Bl		BCVI	SY	M	1	0		56 (flat)	9	NE Corner	Light brown eye, gap in gray band	CCF/JPM

1999

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
	9-Apr-99	0A	2100-45412	Y/S//M/Bk		BCVI	ASY	M	1	0		56	9	Lower SE slope	3RD year	JPM/DBH
	9-Apr-99	>	2100-45413	DkB/R//DkB/S		>	ASY	M	2	0		57	10	West (B) side	4TH year	JPM/DBH
	20-Apr-99	>	2100-45414	M/S//R/M		>	ASY	M	1	0		56	9	NE corner	5TH+ year	JPM/DBH
	14-May-99	>	2100-45421	R/S//DkB/G		>	ASY	M	2	0	2-3	54	7	E Central	4TH year	JPM/DBH
	16-Jul-99	>	2100-45420	Bk/Bk//G/S		>	ASY	M	0	0	2	54	9	Lower SE slope/Pit	Flight feather molt	JPM/DBH

2000

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
	19-Apr-00	0A	2190-65946	S//--		BCVI	AHY	F				54		Pit	Egg in oviduct	DBH/JPM
	20-Apr-00	>	2910-65947	O/S//Bk/P		>	SY	M				55		Pit		DBH/JPM
	13-May-00	>	2190-65951	O/O//W/S		>	ASY	F		4	0	53		E Central		DBH
	28-May-00	>	1770-39402	DkG/G//DkB/S		>	SY	M	1	0	0	56		fire break		JPM
	12-Jun-00	>	2190-65952	DkB/S//R/P		>	SY	F		2		54		E Central		DBH
	26-Jun-00	>	2190-65953	Y/DkG//M/S		>	HY	U			2	54		SE corner (corner canyon)	Aged by eye color, plumage; greater coverts, head, secondaries all moulting!	DBH
	21-Jul-00	>	2190-65954	W/S//R/W		>	HY	U		0	?	54		SE corner (corner canyon)		DBH

2001

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
	31-May-01	0A	1770-34956	Y/S//Bl/O		BCVI	ATY	M	0	0	4	56		E Central	By BJP, NW; DBHeckard Mem. Net Lane	JPM

2003

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
	10-May-03	0	1760-75192	Y/DkG//G/S		BCVI	AHY-PB	F-PB	0	4						JPM

2004

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
	13-Apr-04	0	2280-85923	O/Bl//M/S		BCVI	TY-P	M-C	0	1				SE slope of Corner Canyon	(04-1)	JPM
	20-May-04	0	2280-85928	P/S//P/Y		BCVI	SY-P	M-P	0	1				A-side	(04-2)	JPM
	10-Jul-04	0	2280-85940	_/P//R/S		BCVI	AHY-BP	F-PB	3			55		Pit Sumacs; (Same net as 04-4)	(04-3)	JPM
	>	>	2280-85941	M/DkB//DkG/S		>	AHY-P	M-P	0	0		54		>;(Same net as 04-3)	(04-4); SY or TY?	>

CHANDLER INDEPENDENCE CREEK PRESERVE, TERRELL COUNTY: 30° 27' 08" N, -101° 43' 56" W

2000																
Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
CI1	07-Jun-00	0	1770-34906	G/S//Bk/G	487	BCVI	ASY	M	2	0		55		Central levee	GPS location marked	JPM
CI2	08-Jun-00	0	1770-34907	DkB/Y//R/S	486	BCVI	TY	M	1	0	0	53	8	SE concrete crossing		JPM
CI3	**>**	**R**	**2390-45379**	**DkB/S//O/Bk**	**517**	**>**	**ATY**	**M**	**1**	**0**	**0**	**55**	**9.5**	**NW concrete crossing**	**recap; only 3 rects remaining**	**RD?**
CI4	>	0	1770-34908	S//--		>	ASY	M						SE loop on river	no color bands; stressed	JPM
CI5	**>**	**R**	**2390-45378**	**Y/S//W/R**	**491**	**>**	**ASY**	**M**	**1**	**0**	**0**	**59**		**SE loop**	**recap**	**RD?**
CI6	**>**	**R**	**1920-02792**	**M/Y//Bl/S**	**525**	**>**	**ASY**	**M**	**2**	**0**	**0**	**57**		**E loop on river**	**recap**	**RD?**
CI7	>	>	1770-34910	Bl/Y//DkG/S	529	BCVI	ASY	M	1	0	0	54		NE loop on river		JPM
CI8	15-Jun-00	0	1770-34912	W/DkG//G/S	538	BCVI	ASY	M	1	0	0	53		E loop on road	funky feathers on head	JPM
CI9	16-Jun-00	>	1770-34914	Bl/Bk//DkG/S	532	BCVI	ATY	M	1	0	0	59		Central N levee		>
CI10	>	>	1770-34915	O/S//Y/G	528	>	HY	U				53		Central N levee		>
CI11	>	>	1770-34916	DkG/S//M/G	531	>	AHY	F	3	0				SW county road	**Ross Dawkins' nets**	>
CI12	>	>	1770-34917	DkB/S//Bk/R	540	>	ASY	M	1	0				S of creek;E of loop road gate	>	>
CI13	17-Jun-00	0	1770-34918	Y/S//Bl/O	534	BCVI	AHY	F	0	4	0	54		SW county road	**Ross Dawkins' nets**	>
CI14	>	>	1770-34919	R/W//DkB/S	535	>	HY	U						>	>	>
CI15	>	>	1770-34920	P//M/S	542	BCVI	ASY	M	1	0		55		E Ross' Oaks	>	>

CI16	**>**	**R**	**2190-79309**	**G/S//G/M**	**435**	**>**	**ASY**	**F**		**3**		**54**		**>**	**>;recap**	**RD?**
CI17	>	0	1770-34921	R/S//DkG/W	436	>	TY	M	0	5		53	11	E of dance slab	>	JPM
CI18	>	>	1770-34922	R/DkG//Bk/S	437	>	AHY	F		1		55		S of creek;E of loop road gate	>	>
CI19	>	>	1770-34923	DkG/S//R/P	438	>	ASY	M	0	0		53		E of loop road gate	>	>
CI20	**>**	**R**	**2190-79324**	**R/S//DkB/O**	**440**	**>**	**ASY**	**M**	**1**	**0**		**56**		**S of creek;E of loop road gate**	**>;recap**	**RD?**
CI21	>	0	1770-34924	Y/DkB//O/S	488	>	AHY	F		3		56		E Ross' Oaks	>	JPM
CI22	>	>	1770-34925	Y/P//DkG//S	439	>	ASY	M	1	0		55		E Ross' Oaks	>	>
CI23	>	>	1770-34926	G/S//G/DkB	441	>	AHY	F		4				E Ross' Oaks	>	>
CI24	>	>	1770-34927	DkG/S//Bl/G	442	>	ASY	M	2	0	0	58		E N levee	>	>

2001

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
CI25	06-Apr-01	0	2110-45419	G/DkG//DkB/S	484	BCVI	ASY	M	2	0				River Pasture		JPM
CI26	>	>	2110-45418	Bl/S//O/O	485	>	AHY	F	0	0		56		NE Loop Rd		>
CI27	08-Jun-01	0A	1770-034962	Bl/Y//DkG/S	529	BCVI	SY	M	0	1				Upper Ross' Oaks Draw	Ross Dawkins' nets;w/2nd SY m	JPM
CI28		>	1770-34963	Y/Bk//Bl/S	536	>	>	>	0	0		54		>	>;>	>
CI19	**>**	**R**	**1770-34923**	**DkG/S//R/P**	**438**	**>**	**ATY**	**M**	**1**	**5**		**54**		**Upper Ross' Oaks Draw**	**>;recap**	**>**
CI29	>	0A	1770-34964	R/W//DkB/S	535	>	AHY	F	0	3		55		"Water net"	>;UB06(?) m's mate	>
CI30	>	>	1770-34965	DkB/M//W/S	551	>	HY	U				55		Upper Ross' Oaks side-draw	>;probably 19's offspring, recap later across Co Rd w/34	>

CI12	**>**	**R**	**1770-34923**	**DkB/S//Bk/R**	**540**	**>**	**ASY**	**M**	**1**				**"Water net"**	**>;recap, UB06 nest site??, don't report to banding lab (RD)**	**>**
CI31	>	0A	1770-34966	Y/DkB//Y/S	552	>	HY	U					Upper Ross' Oaks draw near Co Rd.	>;w/32	>
CI32	>	>	1770-34967	M/M//DkB/S	544	>	ATY	M	1	5		56		>;w/31	>
CI33	>	0	1770-34968	Y/Bl//DkG/S	547	>	AHY	F	0	4		54	Slab	>;FF WEAR = 2	>
CI34	>	>	1770-34969	DkG/S//DkG/P	555	>	HY	U	0	0			Between Rd and Ross' Oaks Draw	>:Recap later across CoRd w/30	>
CI35	>	>	1770-34970	R/R//DkG/S	554	>	AHY	F	0	4		55	>	>;FF WEAR = 3	>
CI16	**>**	**R**	**2190-79309**	**G/S//G/M**	**435**	**>**	**AHY**	**F**	**0**	**3**			**Upper Ross' Oaks side-draw**	**>;FF WEAR = 2, w/egg**	**RD?**
CI36	>	0	1770-34971	R/P//DkB/S	571	>	AHY	F	0	2			Ross' Oaks	>	JPM
CI37	>	>	1770-34972	S/-//-/-	-	>	AHY	F	0	3			Upper Ross' Oaks side-draw	>;w/egg, same place as 16	>

2002

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
CI38	04-Apr-02	0	1770-34978	DkG/Bk//M/S	1227	BCVI	ASY	M	0	0				Loop Rd.		JPM
CI39	>	>	1770-24979	DkB/S//DkG/O	1244	>	AHY	F	0	0				>		JPM
CI40	12-Apr-02	0	1770-34980	O/DkB//W/S	1237	BCVI	AHY	F	0	1		51		Loop Rd.	with egg	JPM
CI41	13-Apr-02	0	1770-34981	W/S//P/R	1238	BCVI	AHY	M	2	0		59		Western Oaks		JPM
CI42	>	>	1770-34982	DkG/S//DkB/Bl	1230	>	ASY	M	1	0		55		N. River Area		JPM
CI43	09-May-02	0	1770-34991	Y/S//P/P	1233	BCVI	SY	M	2	0				Ross' Oaks		JPM
CI30	**18-May-02**	**R**	**1770-34965**	**DkB/M//W/S**		**BCVI**	**SY-OP**	**F-BP**	**0**	**3**				**Deep woods; URO**	**Banded in '01 as HY-U; recap @11:50 w/CICP #'s 12 & 45**	**JPM**

CI44	>	0	1770-34994	DkG/S//M/Bl	1256	>	AHY-P	F-BP	0	4		58		In mesquite net by along creek by URO (before water net)	Recap at 13:00 in same net.	JPM
CI12	**>**	**R**	**1770-34917**	**DkB/S//Bk/R**		**>**	**ATY-OP**	**M-PB**	**1**	**0**		**56**		**Side draw net in URO terr.**	**w/CICP #'s 30 & 45; Banded in 2000 as ASY.**	**JPM**
CI45	**>**	**>**	**2390-45259**	**DkG/S//Y/R**	**1242**	**>**	**AHY-P**	**F-PB**	**0**	**4**				**Side draw net in URO terr.**	**w/CICP #'s 12 & 30;recap of RD's band, color bands added.**	**RD**
CI46	>	0	1770-34995	G/P//DkG/S	1240	>	ASY-P	M-P	1	0		53		Shady Oaks fenceline net		JPM
CI47	>	>	1770-34996	W/S//Bk/G	1257	>	AHY-P	F-PB	0	3		54		Shady Oaks fenceline net		JPM
CI48	05-Jun-02	0	1770-35000	Bk/S//G/M	1248	BCVI	ATY-P	M-P	0	0		57		River	Did not fly after release but could not recapture; seen later in season tending Hys.	JPM
CI49	06-Jun-02	0	1760-75145	M/DkG//Bl/S	1249	BCVI	TY-P	M-P	1	5		57		Between levee and creek.		JPM
CI50	07-Jun-02	0	1760-75146	O/DkB//Bl/S	1252	BCVI	ATY-P	M-P	1	0				N Loop Rd cut-off		JPM
CI51	27-Jun-02	0	1760-75160	_/DkG//R/S	1263	BCVI	ASY-P	M-P	1	0				Inner Loop Road		JPM
CI52	28-Jun-02	0	1760-75161	DkB/S//P/DkB	1262	BCVI	AHY-P	F-P	0	4				Central Loop Road		JPM

2003

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
CI53	14-May-03		2280-61660	Y/O//O/S	1582	BCVI	AHY-PB	F-PB	0	4				Ross' Oaks		RD
CI54	>		2280-61661	R/S//Bk/DkG	1585	>	ASY-P	M-P						Mesquite net	4Y?,3Y?	>
CI55	>	0	1760-75193	Bl/M//DkG/S	1586	>	ASY-P	M-CP	2	0				Water net	w/45	JPM

CI45	**>**		**2390-45259**	**DkG/S//Y/R**	**1242**	**>**	**ASY-O**	**F-BP**	**0**	**3**				Water net	**Recapped and color-marked in '02 as AHY;w/55**	**RD**
CI56	15-May-03		2280-61663	DkB/Y//W/S	1589	BCVI	SY-P	M-CP	1					At creek SE of Earth x-ing	w/57	RD
CI57	>		2280-61664	G/S//Bl/DkG	1591	>	AHY-BP	F-BP		3				>	w/56; w/egg	>
CI58	>		2280-61667	O/S//M/Y	1598	>	SY-P	M-CP	1					N-boat ramp		>
CI59	18-May-03	0	1760-75194	G/O//DkG/S	1592	BCVI	AHY-PB	F-PB	0	3		55		N-boat ramp		JPM
CI17	**>**		**1770-34921**	**R/S//DkG/W**	**436**	**>**	**ATY-O**	**M-PC**	**2**	**0**				**>**	**nest w/59; injury or infection of right leg healed between colorbands; photos taken**	**JPM**
CI60	26-Jun-03	0	2280-85901	Bk/W//M/S	1605	BCVI	ASY-P	M-P	0	0				Western oaks		JPM
CI61	27-Jun-03	0	2280-85904	P/Y//Y/S	1606	BCVI	TY-P	M-P	1	1		55		Far West corrals		JPM
CI62	28-Jun-03	0	2280-85906	//S		BCVI	AHY-P	F-PB	0	2				Central Loop Rd.	Ran out of DkG bands and S was already on R-leg. No other combo worked.;Same net as 63, 64and 65.	JPM
CI63	>	>	2280-85907	G/S//-/DkB	1602	>	>	F-PB	0	3				>	Same net as 62, 64 and 65.	>
CI64	>	>	2280-85908	DkB/S//R/DkB	1608	>	HY-EP	U	0	0		54		>	Same net as 62, 63, and 65.	>
CI65	>	>	2280-85909	Bk/S//R/M	1616	>	ASY-P	M-P	1	0				>	Same net as 62, 63, and 64.	>

2004																
Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
CI65	**08-Apr-04**		**2280-85909**	**Bk/S//R/M**		**BCVI**	**ATY-O**	**M-P**	**1**	**0**		**56**		**Boat Ramp**	**Recap; w/66**	**JPM**
CI66	>		2280-85917	DkB/S//Bl/P	1210	>	AHY-P	F-P		3				Boat Ramp	w/65	>
CI67	09-Apr-04	0	2280-85920	M/M//W/S	1208	BCVI	TY-P	M-P	1	0				Corral/Oasis fenceline		JPM
CI68	10-Apr-04	0	2280-85921	W/G//DkG/S	1215	BCVI	TY-P	M-P	0	0				West Water Hazard Levee (across from Clubhouse)		JPM
CI69	05-May-04	0	2280-85926	O/S//DkG/R	1223	BCVI	ASY-P	M-P	1	0				Clubhouse		JPM
CI70	19-May-04	0	2280-85927	Bl/DkB//Bl/S	1276	BCVI	TY-P	M-P	1	0		55		Below 1st Levee		JPM
CI71	15-Jun-04	0	2280-85931	R/S//DkG/G	1268	BCVI	SY-P	M-P	0	0				N-Boat Ramp Road		JPM
CI72	16-Jun-04	0	2280-85934	DkB/O//Y/S	1220	BCVI	SY-P	M-P						Lower Ross' Oaks		JPM
CI73	17-Jun-04	0	2280-85936	Bk/S//O/P	1269	BCVI	ASY-P	M-P	0	0				Lodge Oaks		JPM
CI74	18-Jun-04	0	2280-85937	DkB/S//Bl/R	1274	BCVI	ASY-P	M-P	0	0		56		Inside S-Levee, 'Reservoir Dog'		JPM
CI75	>	>	2280-85938	DkG/Bk//Bk/S	1280	>	ATY-P	M-P	1	0				S-Levee/'River Pasture'		>
CI63	**19-Jun-04**	**R**	**2280-85907**	**G/S//-/DkB**	**1602**	**BCVI**	**ASY-O**	**F-PB**	**0**	**3**				**Central Loop Rd/'One-down-and-over'**		**JPM**
CI76	16-Jul-04	0	2280-85943	DkG/DkB//R/S	1607	BCVI	AHY-BP	F-BP	0	4		55		Inside S-Levee, 'Reservoir Dog'	Same net-site as #74	JPM

DOBBS MOUNTAIN/DOBBS RUN RANCH, EDWARDS COUNTY: 29° 38' 43" N, -100° 25' 09" W; 29° 38' 58" N, -100° 24' 32" W

2000

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
DM1	6-Jun-00	0	1770-34903	Bl/P//Y/S	481	BCVI	ASY	M	2	0	0	56		E fenceline	481 dup. SOME 9 Jun 01	JPM
DM2	>	>	1770-34904	Bl/S//O/O	485	>	ASY	M	1	0	0	52		E fenceline	485 dup. TERR 6 Apr 01	>
DM3	23-Jun-01	0	1770-34929	P/W//R/S	476	BCVI	AHY	F	0	4	0	51		E fenceline	HY in tow	JPM

2001

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
DM4	18-May-01	0	1770-34953	R/S//M/DkG	490	BCVI	ASY	M	1	5				DRR across from S gate		JPM
DM5	19-May-01	0	1770-34954	Bl/Bk//DkG/S	532	BCVI	ATY	M	2	0		55		N gate	532 dup. TERR 16 Jun 01	JPM

2002

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
DM6	29-May-02	0	1770-34997	M/G//Y/S	1243	BCVI	AHY-BP	F-PB	0	4		56		DOBM		JPM
DM7	20-Jun-02	0	1760-75155	R/DkG//W/S	1250	BCVI	ASY-P	M-P	1	0		55		Pink Gate terr.		JPM
DM8	>	>	1760-75156	O/DkG//P/S	1255	>	HY-J	U			0	56		Pink Gate terr.		JPM
DM9	21-Jun-02	0	1760-75157	M/S//W/DkG	1259	BCVI	AHY-P	F-P	0	4	1	53		DOBR		JPM
DM10	>	>	1760-75158	Bl/Bl//M/S	1260	>	HY-J	U	0	0	0			>		JPM
DM11	9-Aug-02	0	1760-75166	M/P//Bk/S	1222	BCVI	HY-JE	U				55		One up from Pink Gate terr on DRR side		JPM

2003

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
DM12	13-Apr-03	0	1760-75171	O/S//DkB/G	1597	BCVI	TY-P	M-P	1	0		55		NE corner	Could be 4Y	JPM
DM13	14-Apr-03	0	1760-75172	P/S//DkB/W	1581	BCVI	ASY-P	M-CP	1	0		58		E fenceline; One-down from one-down from	Some gray in nape	JPM

														Pink Gate		
DM14	5-May-03	0	1760-75190	O/S//Y/Bl	1579	BCVI	SY-P	M-CP	1	0				South Central		JPM
DM15	29-May-03	0	1760-75196	DkB/DkB//DkG/S	1595	BCVI	SY-P	M-P	1	0				S of N-Gate	Same net as 16	JPM
DM16	>	0	1760-75197	Bk/S//R/DkG	1598	>	SY-P	M-P	1	1				>	Same net as 15	>
DM17	30-May-03	0	1760-75198	M/S//Bl/DkG	1600	BCVI	TY-P	M-P	1	0				Between W Saddle Rd and NW corner		JPM
DM18	>	0	1760-75191	R/S//Y/R	1601	>	ATY-P	M-P	0	0				~100m N of S-gate		>
DM19	20-Jun-03	0	1760-75199	DkG/S//O/DkG	1603	BCVI	SY-P	M-P	0	0		55		Central terr.		JPM
2004																
Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
DM20	23-Apr-04	0	2280-85924	_/DkG//DkB/S	1596	BCVI	AHY-P	F-BP	0	3				DRR-side 'one-across'/'45 MPH' sign		JPM
DM21	22-May-04	0	2280-85929	Bl/DkB//W/S	1277	BCVI	TY-P	M-P	1	0				DRR-fenceline Rd @ One-across		JPM
DM22	24-Jun-04	0	2280-85939	W/S//W/DkG	1547	BCVI	SY-P	M-P	0	0		51		Central Territory		JPM
DM23	21-Jul-04	0	2280-85945	DkG/DkG//M/S	1611	BCVI	AHY-PB	F-PB	0	5		52		Pink Gate		JPM
DM24	>	>	2280-85946	R/G//DkG/S	1612	BCVI	HY-PE	U						>	Same net as 23	JPM

QUAIL RIDGE RANCH, SOMERVELL COUNTY: 32° 08' 23" N, -97° 53' 14" W

2001

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
QR1	11-Apr-01	0	2100-45417	DkB/Y//R/S	486	BCVI	ATY-P	M-P	2	0	2	55				JPM
QR2	>	>	1770-34939	G/S//Bk/G	487	>	SY-P	M-CP	2	0	2	56				>
QR3	>	>	1770-34940	M/Y//Bl/S	525	>	TY-P	M-CP	2	0	1	54				>
QR4	13-Apr-01	0	1770-34942	Y/S//W/R	491	BCVI	AHY-P	F-P	0	0	2	56			body molt = 0; ff molt = 0; ff wear = 3	JPM
QR5	01-May-01	0	1770-34944	W/DkG//G/S	538	BCVI	ATY-P	M-P	2	0	4	55				JPM
QR6	>	>	1770-34945	DkG/S//M/G	531	>	AHY-P	F-P	0	4	3	55			w/egg	>
QR7	04-Jun-01	0	1770-34957	O/S//Y/G	528	BCVI	ATY-P	M-P	2	5		56			ff wear = 3	JPM
QR8	09-Jun-01	0	1770-34958	Bl/S//DkB/G	549	BCVI	ATY-P	M-P	0	5	3	56				JPM/JP
QR9	>	>	1770-34960	Bl/P//Y/S	481	>	ATY-P	M-P	2	0	3	55				JPM/JP
QR10	01-Jul-01	0	1770-34959	G/P//Bl/S	1093	BCVI	ASY-P	M-P	0	0	4	56				JPM/JP

2002

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
QR11	24-Apr-02	0	1770-34983	Bl/S//O/W	1231	BCVI	ASY-P	M-P	2	0		56				JPM
QR12	14-May-02	0	1770-34992	Y/Y//P/S	1234	BCVI	ASY-P	M-CP	2	0		55				JPM
QR18	16-May-02	0	1770-34993	G/M//Bk/S	1241	BCVI	AHY-P	F-PB	0	4	0	55				JPM/WB
QR13	11-Jun-02	0	1760-75151	W/S//M/W	1264	BCVI	ASY-P	M-P	2	4		56				JPM/WB
QR14	13-Jun-02	0	1760-75152	R/S//M/DkB	1253	BCVI	SY-P	M-P	3	4		55				JPM/WB
QR15	19-Jun-02	0	1760-75153	DkG/S//O/P	1272	BCVI	ASY-P	F-P		4		55				JPM/WB
QR16	20-Jun-02	0	1760-75148	W/S//M/Bk	1275	BCVI	SY-P	M-P	1	0						JPM/WB
QR17	11-Jul-02	0	1760-75163	DkB/S//Y/R	1265	BCVI	ASY-P	M-CP	2	1		56			TY?	JPM
QR19	19-Jul-02	0	1760-75149	P/S//Bl/DkB	1270	BCVI	ASY-P	F-P		4						JPM/WB
QR20	>	>	1760-75150	W/S//W/R	1271	>	ASY-P	M-P	1	0						JPM/WB

2003

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
QR21	17-Apr-03	0	1760-75173	M/R//O/S	1583	BCVI	SY-P	M-P	1	0		54				JPM
QR22	>	>	1760-75174	R/S//P/R	1588	>	SY-P	M-P	0	0						>

QR23	>	>	1760-75175	Bl/DkB//-/S	1593	>	AHY-P	F-P	0	0		56				>
2004																
Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
QR24	01-Apr-04	0	2280-85913	M/S//Bk/DkB	1206	BCVI	ASY-P	M-P	1	0		56			TY? ATY?	JPM
QR25	02-Apr-04	0	2280-85914	P/DkB//DkG/S	1205	BCVI	ASY-P	M-P	2	0		57			4Y?	JPM
QR26	>	>	2280-85915	Bk/S//Bk/DkG	1204	>	>	M-P	1	0		57			3Y?; Caught w/ #27	>
QR27	>	>	2280-85916	M/S//G/M	1209	>	AHY-P	F-P	0	0					Caught w/ #26	>
QR28	28-Apr-04	0	2280-85925	M/Bk//M/S	1226	BCVI	ASY-P	M-P	1	0						JPM

WALNUT CREEK RANCH, COKE COUNTY: 31° 48' 04" N, -100° 45' 48" W

2000

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
WC1	13-Jul-00	0	1770-34931	//S		BCVI	ASY	F	0	1	0	51		Shelving Rock	WCR #1; not color banded, photos taken	JPM

2001

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
WC2	29-May-01	0	1770-34955	DkB/S//O/Bk	517	BCVI	ATY	M	3	0	4	56		Shelving Rock		JPM

2002

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
WC3	3-May-02	0	1770-34983	DkG/S//Bk/Y	1232	BCVI	SY	M	2	0		55		Shelving Rock		JPM
WC4	31-May-02	0	1770-34999	W/S//-/DkG	1246	BCVI	AHY	F	0	3				House Trap		JPM

2003

Site ID #	Date	Band size	Band number	Color combination	Combo #	Species	Age	Sex	CP	BP	Fat	Wing	Wt. (g)	Location	Comments	Bander
WC5	28-May-03	0	1760-75195	P/DkG//-/S	1594	BCVI	AHY-BP	F-BP		4				upper House Trap		JPM

Bk=black, Bl=blue, DkB=dark blue, DkG=dark green, G=green, Gy=grey, L=lavender, M=mauve, O=orange, P=pink, R=red, S=silver, W=white, Y=yellow

Black-capped Vireos by sex and age at Chandler Independence Creek Preserve, Dobbs Mountain and Quail Ridge Ranch 2001-2004.

CHANDLER INDEPENDENCE CREEK PRESERVE

CICP	2001	2002	2003	2004
Male:				
Total	**26-27**	**27**	**26**	**26**
SY	2-3	3	3	4
AHY	7	12	10	2
ASY	7	4	6	8
TY		2	1	4
ATY	10	3	3	6
4Y				1
A4Y		3	2	1
6Y			1	
Female:				
Total	**17**	**18**	**20**	**23**
SY		1		
AHY	15	17	19	17
ASY	2			6
ATY			1	
Unknown:				
HY	**12-14**	**16-20**	**22-25**	**23-41**
Total				
Individuals	**55-58**	**61-65**	**68-71**	**72-90**

DOBBS MOUNTAIN

Dobbs	2001	2002	2003	2004
Male: Total	9	8	17	17
SY		1	5	4
AHY	2	1	4	2
ASY	5	5	4	3
TY			2	3
ATY	2	1	2	2
4Y				1
A4Y				2
Female: Total	7	6	14	9
AHY	7	5	13	8
ASY			1	
ATY				1
Unknown: HY	13-14	14-17	16-21	10-14
Total Individuals	29-30	28-31	47-52	36-40

QUAIL RIDGE RANCH

QRR	2001	2002	2003	2004
Male: Total	16	17	17	15
SY	1	2	1	
AHY		4	10	6
ASY	15	5	1	4
TY		1	1	2
ATY		5	3	
4Y				1
A4Y			1	2
Female: Total	15	16	10	13
SY				
AHY	15	16	10	13
ASY				
ATY				
Unknown: HY	6-7	41	19	10
Total Individuals	37-38	74	46	38

Return rates for observed color-marked Black-capped Vireos known to have been present in the previous year at Chandler Independence Creek Preserve, Dobbs Mountain and Quail Ridge Ranch, 2001-2004.

	2001	2002	2003	2004
CICP				
Male	50% (n=8)	42% (n=5)	40% (n=6)	47% (n=7)
Female	17% (n=1)	14% (n=1)	29% (n=2)	43% (n=3)
Overall	38% (n=9)	27% (n=6)	36% (n=8)	44% (n=10)
Dobbs				
Male	100% (n=2)	25% (n=1)	50% (n=1)	67% (n=6)
Female	0% (n=0)	NA	50% (n=1)	100% (n=1)
Overall	67% (n=2)	25% (n=1)	29% (n=2)	70% (n=7)
QRR				
Male	NA	75% (n=6)	39% (n=5)	43% (n=3)
Female	NA	50% (n=1)	0% (n=0)	100% (n=1)
Overall	NA	70% (n=7)	31% (n=5)	50% (n=4)