

Final
Species and Habitat Distributions of Black-Capped
Vireos and Golden-Cheeked Warblers, 2009
Breeding/Nesting Season



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Camp Stanley Storage Activity
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ACRONYMS AND ABBREVIATIONS

AOU	American Ornithological Union
AR	Army Regulation
BCVI	Black-capped vireo (<i>Vireo atricapilla</i>)
BHCO	Brown-headed cowbird (<i>Molothrus ater</i>)
CSSA	Camp Stanley Storage Activity
DoD	Department of Defense
ESA	Endangered Species Act
GCWA	Golden-cheeked warbler (<i>Dendrocia chrysoparia</i>)
GPS	Global positioning system
INRMP	Integrated Natural Resources Management Plan
MBTA	Migratory Bird Treaty Act
mph	miles per hour
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
Parsons	Parsons Infrastructure and Technology Group Inc.
PBO	Programmatic Biological Opinion
TAC	Texas Administrative Code
TPWD	Texas Parks and Wildlife Department
TPW	Texas Parks and Wildlife
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

SECTION 1 INTRODUCTION

1.1 PURPOSE AND NEED

In accordance with conditions set forth in the Camp Stanley Storage Activity (CSSA) Programmatic Biological Opinion (PBO) (USFWS 2007), CSSA conducts biennial enumeration surveys (occurring every two years) for two special status bird species. This document reports the results of surveys at CSSA conducted by Parsons Infrastructure and Technology Group, Inc. (Parsons) for the black-capped vireo (*Vireo atricapilla*) and golden-cheeked warbler (*Dendrocia chrysoparia*). The purpose of the surveys was to document distribution of species and habitat of these endangered species at CSSA. Results of this report will be distributed to the U.S. Fish and Wildlife Service (USFWS) Austin Ecological Services Field Office for consideration in various ongoing assessments of recovery status for the golden-cheeked warbler and the black-capped vireo. In addition, results will be distributed to the Texas Parks and Wildlife Department (TPWD) for updating the TPWD-administered Natural Diversity Database. Specific regulatory frameworks and site conditions that support the need for biennial enumeration surveys are discussed below.

1.1.1 Regulatory Framework

1.1.1.1 Endangered Species Act

Passed in 1973 and reauthorized in 1988, the Endangered Species Act (ESA) regulates a wide range of activities affecting plants and animals designated as endangered or threatened. By definition, an endangered species is an animal or plant listed by regulation as being in danger of extinction. A threatened species is any animal or plant that is likely to become endangered within the near future. A species must be listed in the Federal Register as endangered or threatened for the provisions of the Act to apply.

The ESA prohibits the following activities involving endangered species:

- Importing into or exporting from the United States.
- Taking (includes harassing, harming, pursuing, hunting, shooting, wounding, trapping, killing, capturing, or collecting) within the United States and its territorial seas.
- Taking on the high seas.
- Possessing, selling, delivering, carrying, transporting, or shipping any such species unlawfully taken within the United States or on the high seas.
- Delivering, receiving, carrying, transporting, or shipping in interstate or foreign commerce in the course of a commercial activity.
- Selling or offering for sale in interstate or foreign commerce.

The black-capped vireo was listed as a Federal endangered species October 6, 1987 (52 FR 37420 – 37423). The golden-cheeked warbler was listed as a Federal endangered species on December 12, 1990 (55 FR 53153 53160). There are no critical habitat designations for the black-capped vireo or golden-cheeked warbler.

1.1.1.2 Army Regulation 200-3

The biennial surveys are in compliance with Chapter 11 of Army Regulation (AR) 200-3, *Environmental Quality - Natural Resources – Land, Forest, and Wildlife Management*, which implements requirements of the ESA within the Army, as well as fulfilling compliance commitments specified in the CSSA Integrated Natural Resource Management Plan (INRMP) (CSSA 2007) and reporting requirements set forth in the Programmatic Biological Opinion for CSSA operations, maintenance activities, and natural resource management program elements (USFWS 2007).

1.1.1.3 5-year Status Reviews

As mandated by the ESA, the listing statuses for the black-capped vireo and golden-cheeked warbler were assessed under five year reviews (USFWS 2007). The review for the black-capped vireo stated that many of the recovery criteria have been met as outlined in the black-capped vireo recovery plan (USFWS 1991) and recommended the downlisting of the black-capped vireo from “endangered” to “threatened.” As of the date of this report, the endangered listing status for the black-capped vireo remains in place. As for the golden-cheeked warbler, no status change recommendations were included in this species’ status review.

1.1.1.4 State Laws and Regulations

In 1973, the Texas legislature authorized the TPWD to establish a list of endangered animals in the state. Endangered species are those species that the Executive Director of the TPWD has named as being “threatened with statewide extinction.” Threatened species are those species that the TPWD Commission has determined are likely to become endangered in the future. Laws and regulations pertaining to endangered or threatened animal species are contained in Chapters 67 and 68 of the Texas Parks and Wildlife (TPW) Code and Sections 65.171 – 65.176 of Title 31 of the Texas Administrative Code (TAC).

The State of Texas considers the black-capped vireo as a threatened species under the authority of TAC Title 31. Under the same authority, the State of Texas considers the golden-cheeked warbler as endangered.

1.1.1.5 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 implemented the 1916 convention between the U.S. and Great Britain for the protection of birds migrating between the U.S. and Canada. Similar conventions between the U.S. and Mexico (1936), Japan (1972) and the former U.S.S.R (1976) further expanded the scope of international protection of migratory birds. Each new treaty has been incorporated into the MBTA as an amendment and the provisions of the new treaty are implemented domestically. These four treaties and their enabling legislation, the MBTA, established Federal responsibilities for the protection of nearly all species of migratory birds, their eggs, and nests.

Incidental take of migratory birds during Department of Defense (DoD) military readiness activities is addressed by a regulation promulgated by the Secretary of the Interior and published in the Federal Register on February 28, 2007. Under this regulatory framework, an activity conducted at CSSA for military readiness training would be considered an adverse effect if, over a reasonable period of time, the activity diminishes the capacity for a migratory

bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem. In total, 836 species of birds are protected by the MBTA, 58 of which are currently hunted legally as game birds.

1.1.2 Site Conditions

CSSA is within the current range for both the black-capped vireo and golden-cheeked warbler, and suitable habitat occurs within the CSSA boundary. As discussed in Section 3 of this report, suitable habitat for the black-capped vireo was occupied in 2005, although negative determinations of presence were reported in 2007 and in 2009. Management and surveys continue for this species because of possible displacement from intense development activities on adjacent properties to the west of the facility and also because of confirmed nesting activity on Camp Bullis. Habitat at CSSA is considered occupied by the golden-cheeked warbler, with sightings in 2005, 2007, and 2009. Various factors that may have affected bird populations at CSSA are discussed in Section 4.2 of this report.

1.2 RESULTS SUMMARY

Surveys conducted in 2005 confirmed the presence of both the golden-cheeked warbler and the black-capped vireo at CSSA (CSSA 2005). Subsequent surveys in 2007 did not detect any black-capped vireos; however, surveyors detected 18 individual golden-cheeked warblers occupying an estimated 14 golden-cheeked warbler territories. Survey results for 2009 are summarized below (detailed findings are discussed in Section 3).

Fifteen golden-cheeked warblers were detected in habitat areas that are typical of the species. Some of these detections were mated pairs, formulating an estimated total of 13 golden-cheeked warbler territories.

No black-capped vireo detections occurred at CSSA during the 2009 surveys, although suitable habitat is found at various locations in the East Pasture, North Pasture, and Inner Cantonment.

1.3 PROJECT LOCATION

The surveys were conducted at CSSA, Boerne, Texas (Figure 1.1 – Project Location). CSSA is located in northern Bexar County (Camp Bullis and Van Raab U.S. Geological Survey [USGS] Quadrangles). The installation occupies 4,004 acres, bounded to the north by Dietz-Elkhorn/Old County Road, to the west by Ralph Fair Road, and to the south and east by Camp Bullis Military Training Reservation. Directions to the facility follow:

- From Austin:
South on Interstate 35S for 62 miles, West on Loop 1604W for 17.5 miles, West on Interstate 10W/US87 for 15 miles. Exit 550 Ralph Fair Road.
- From San Antonio:
North on Interstate 10W/US87 for 20 miles. Exit 550 Ralph Fair Road.

The installation is typical of the Balcones Canyon lands portion of the Edwards Plateau, encompassing a complex of karst features including: limestone hills, drainages, valleys, intermittent streams, springs, and karst cave features. Elevations range between approximately 1,200 feet to 1,400 feet above mean sea level.

1.4 BLACK-CAPPED VIREO SPECIES DESCRIPTION

1.4.1 Species Description and Regulatory Status

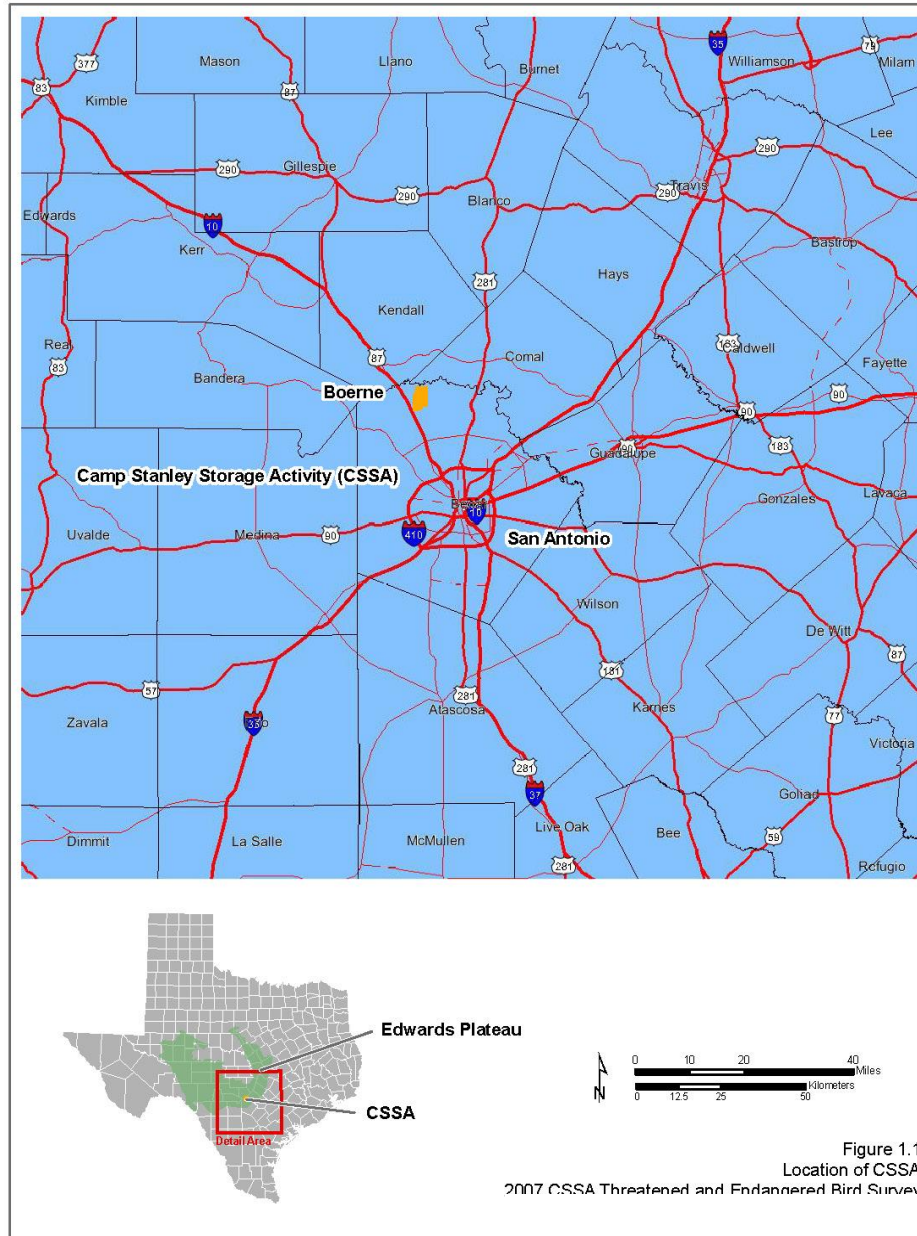
The black-capped vireo is a small (3.9 to 4.7 inches [10 to 12 cm]), insect-eating, migratory songbird of the Vireonidae family. Mature males are olive green above and white below with faint greenish-yellow flanks. The crown and upper half of the head is black with a partial white eye-ring. The iris is brownish-red and the bill black. The plumage of the female is duller than the male. Females have a dark slate gray head.

The black-capped vireo was listed as a Federal endangered species October 6, 1987 (52 FR 37420 – 37423); it is also state-listed as endangered (TAC 65.171 – 65.176). There is no critical habitat designated for this species.

1.4.2 Life History and Ecology

Black-capped vireos arrive in Texas from mid-March to mid-April, while those in Oklahoma arrive approximately 10 days later. They nest from Oklahoma south through central Texas to the Edwards Plateau, then south to the northern portion of Mexico (Figure 1.2). Vegetation species in breeding habitat can be variable across the breeding range; however, the low to mid successional vegetation structure across the breeding range is generally consistent. The shrub vegetation is mostly deciduous and generally extends from the ground to about six feet above ground and covers about 30 to 60% of the total area. Open grassland separates the clumps of shrubs. In the eastern portion of the vireo's range, the shrub layer is often combined with an open, sparse to moderate tree canopy. Perch trees intermixed within a shrubland may be important for territorial defense by males, as they have been observed foraging in higher perch trees than females (Houston, unpublished thesis, 2008). Black-capped vireos may live for more than five years, and usually return year after year to the same general area. Migration to their wintering grounds on Mexico's western coast begins in July, and they are gone from Texas by mid-September (USFWS 1991, Wilkins 2006, USFWS 2007).

Figure 1.1 Location of CSSA



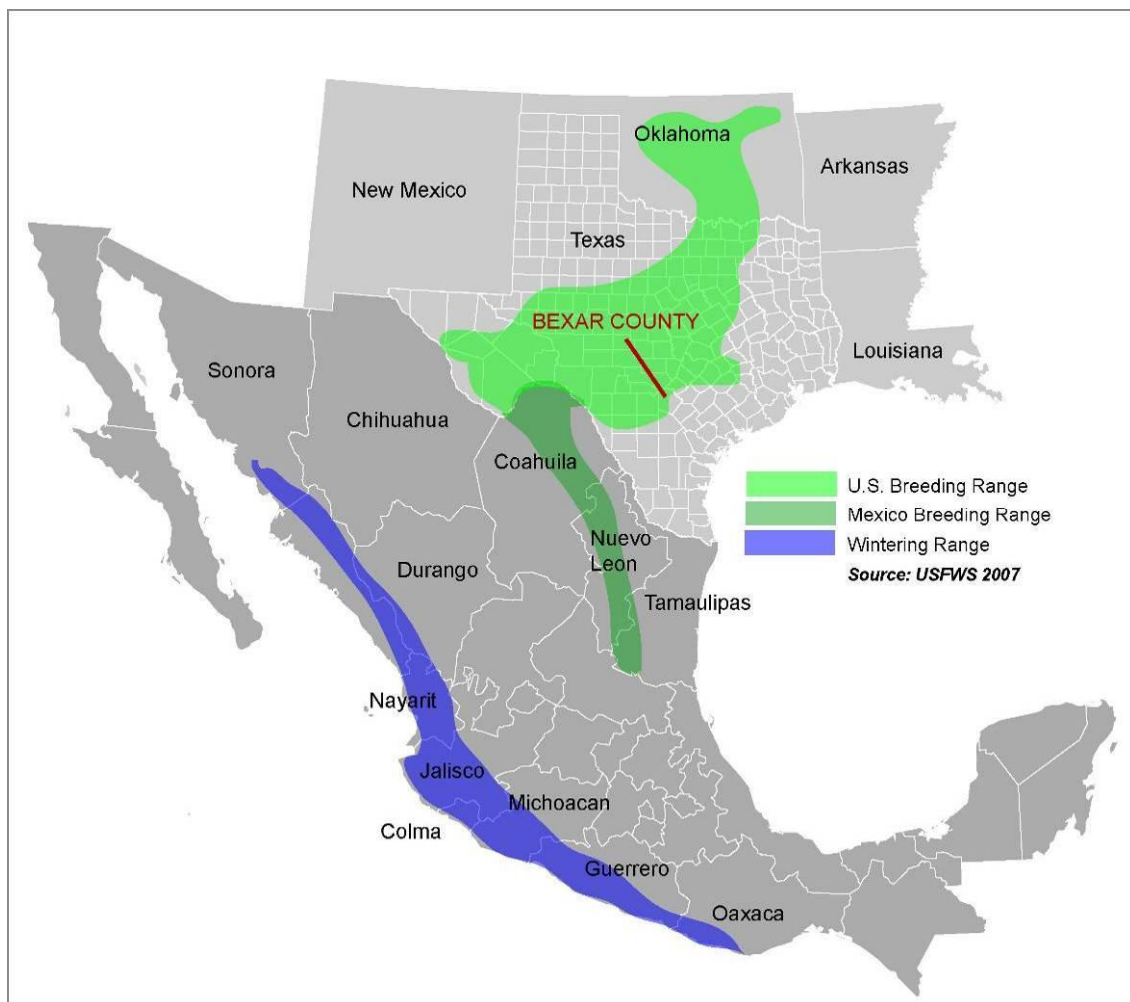
1.4.3 Population Status and Distribution

At the time of listing, the population status of black-capped vireos was largely established from survey efforts that yielded a known population of 191 pairs (Marshall *et al.* 1985).

Extrapolating from their surveys, Marshall *et al.* (1985) estimated that there were more than 20 pairs of black-capped vireos in Oklahoma, 188 to 374 pairs in Texas, and 48 to 131 pairs in Mexico. By 1996, about 1,803 males were reported in the U.S. (USFWS 2007); by 2005, the known U.S. population was 5,996 males (Wilkins *et al.* 2006). Including the breeding range in Mexico, the current known population is at 6,269 (USFWS 2007).

To date, about 75% of the known population in the breeding range is found on four well-surveyed areas – Fort Hood Military Reservation (Texas), Kerr Wildlife Management Area (Texas), Wichita Mountains Wildlife Refuge (Oklahoma), and Fort Sill Military Reservation (Oklahoma). Together, these facilities cover approximately 162,000 hectares (400,000 acres)–an area representing only 1% of the total area of rangeland in the Texas/Oklahoma range of the species. The remaining 25% of the known population is the product of documented occurrences from at least 52 other properties, many of which are on private lands with only recent survey access (USFWS 2007).

Figure 1.2 Breeding and Wintering Range of Black-Capped Vireos



1.4.4 Threats

At the time of listing, the identified major threats to the black-capped vireo included habitat loss through land use conversion, grazing and browsing by domestic and wild herbivores, and brood parasitism by brown-headed cowbirds. The threat of vegetation succession, originally considered minor, appears to have been underestimated at the time of listing, although the extent of the effects on the black-capped vireo is not known. While the relative importance of individual threats appears to have changed since listing, these remain the primary threats to the species (Wilkins *et al.* 2006).

1.5 GOLDEN-CHEEKED WARBLER SPECIES DESCRIPTION

1.5.1 Species Description and Regulatory Status

The Golden-cheeked Warbler is a small (4.5 to 5 inches [11.4 – 12.7 cm] long), insectivorous, migratory songbird of the Parulidae family. Adult males have black on the crown, nape, back, throat, and upper breast. The wings are black with two white wing bars. The cheeks are a bright golden-yellow with a black eyeline. The underparts are white streaked with black on the flanks. Adult females are similar to males, but duller; the crown and back are olive-green with some black streaking; the throat is pale and upper breast streaked with black (Oberholser 1974, Farrand 1983, Curson *et al.* 1994).

The Golden-cheeked Warbler was listed on December 12, 1990 (55 FR 53153 – 53160), and is state-listed as endangered (TAC 65.171 – 65.176). There is no critical habitat designated for this species.

1.5.2 Life History and Ecology

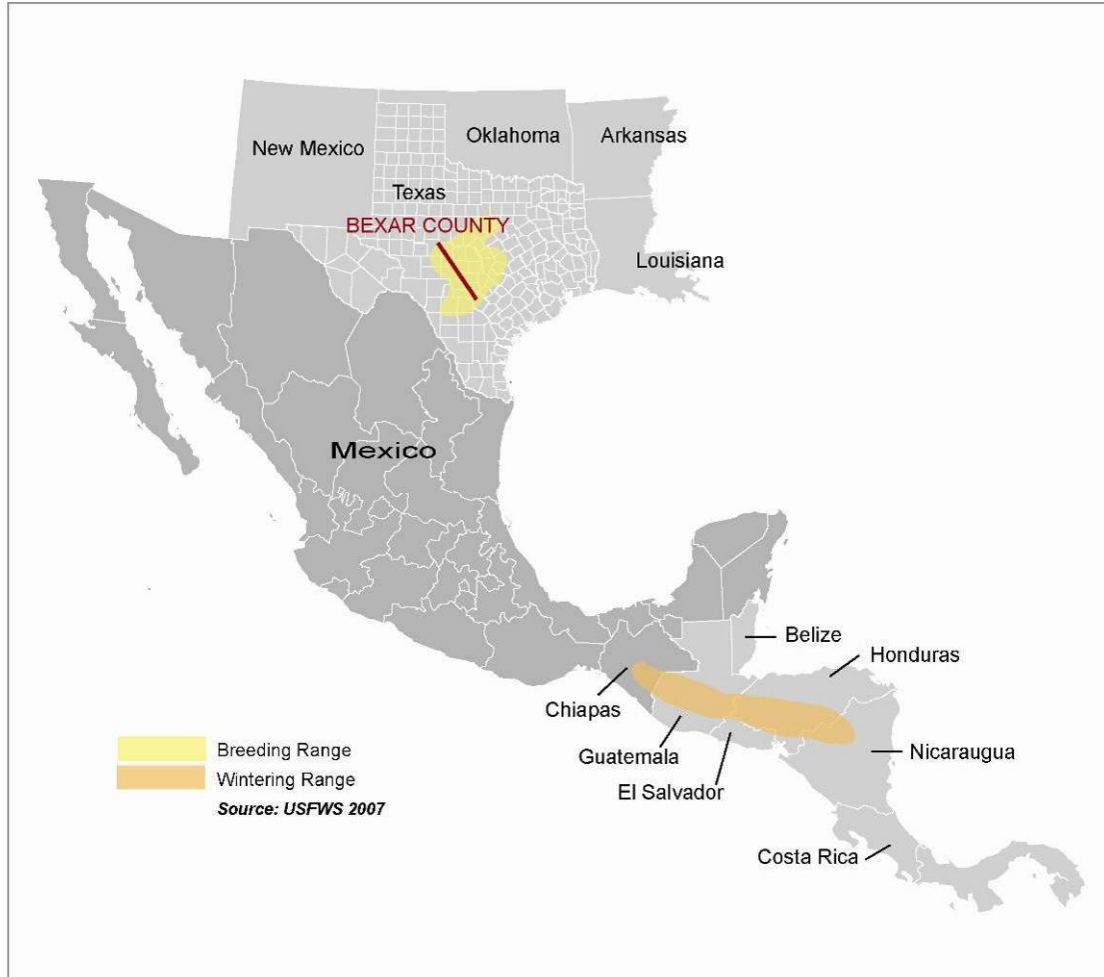
Wahl *et al.* (1990) characterized Golden-cheeked Warbler breeding habitat as closed-canopy Ashe juniper-oak woodlands. Although the species composition of woody vegetation varies greatly within suitable warbler breeding habitat, Ashe juniper is typically (often, but not always) the dominant species and occurs at all sites inhabited by nesting Golden-cheeked Warblers. Ladd (1985), for example, found that the most common trees at ten sites occupied by Golden-cheeked Warblers (in order of frequency of occurrence or “relative dominance”) were Ashe juniper, Texas oak, scaly bark oak, cedar elm, Plateau live oak, little walnut, hackberry, and Texas ash. Ashe juniper comprised 10% to 83% of total trees at 27 sites scattered throughout the breeding distribution of the Golden-cheeked Warbler (Ladd 1985, Wahl *et al.* 1990).

Kroll (1980) studied winter habitat of the Golden-cheeked Warbler in Honduras. At the study site, elevation about 1,500 m, pines (*Pinus oocarpa*) dominated the overstory. Oaks, particularly *Quercus oleoides*, comprised 63%, and sweetgum (*Liquidambar styraciflua*) another 21% of total understory trees and shrubs at this site. Other collection localities and observation sites on the migration corridor and winter range have also been pine-oak woodlands (Land 1962, Braun *et al.* 1986). Rappole *et al.* (2000) found that wintering warblers occupy ‘humid lower montane oak pine forest’ habitat. Within these habitats, the principle canopy tree was *Pinus oocarpa* and the principle mid-story tree species were from the group of elliptical-leaved oak species know as ‘encino’ oaks.

1.5.3 Population Status and Distribution

The Golden-cheeked Warbler breeding range is closely associated with the Edwards Plateau, Lampasas Cut-plain, and Llano Uplift regions of central Texas. Breeding is known to occur presently in 25 central Texas counties; distribution within those counties is patchy and localized (Ladd and Gass 1999). Golden-cheeked Warblers winter in the highlands of southern Mexico (Chiapas) and Central America. From July to October, Golden-cheeked Warblers migrate southward through the coniferous-oak woodlands of the Sierra Madre Oriental of Coahuila, Nuevo Leon, Tamaulipas, Queretaro, Veracruz, and Chiapas (Perrigo *et al.* 1990). Records indicate that Golden-cheeked Warblers winter between 1,500 and 2,600 meters (5,000 and 8,550 feet) in the pine-oak woodlands of the Sierra de las Minas of Guatemala, in the highlands of Honduras, El Salvador, and northern Nicaragua, and in the Sierra Madre of Chiapas, Mexico (Land 1962, Pulich 1976, Braun *et al.* 1986, Rappole *et al.* 2000).

Figure 1.3 Breeding and Wintering Range of Golden-cheeked Warblers



1.5.4 Threats

Habitat loss and fragmentation is the primary threat and reason for declines of Golden-cheek Warblers (USFWS 1991). Destruction of oak-juniper woodlands through land clearing

and disease is a major limiting factor. Encroaching urban/suburban development near Golden-cheeked Warbler habitat has been shown to increase threats such as nest parasitism by brown-headed cowbirds and nest predation by rat snakes, Western Scrub-Jays, Eastern fox squirrels, and other predators (Coldren 1998, Engels 1995, Sperry 2007, Reidy et al. 2008).

SECTION 2 METHODS

2.1 SURVEY METHODS

The USFWS established procedures for determining presence/absence of golden-cheeked warblers and black-capped vireos (USFWS 2002). These protocols formed the basis for the survey method used at CSSA.

2.1.1 Survey Season Schedule

Six visits were conducted at the installation. The first visit involved habitat analysis and golden-cheeked warbler surveys. Table 2.1 shows the calendar for the 2009 survey season.

Table 2.1 Schedule for the 2009 Golden-cheeked Warbler and Black-capped Vireo Survey Season

Site Visit Number	Date	Purpose
1	13 April 2009	GCWA survey, Habitat Analysis
2	20 April 2009	GCWA survey
3	11 May 2009	GCWA, BCVI survey
4	25 May 2009	GCWA, BCVI survey
5	15 June 2009	BCVI survey
6	6 July 2009	BCVI survey

2.1.2 Potential and Core Habitat Determination

Determinations of potential habitat were based on previous habitat mapping (Parsons 2005), aerial photography (Parsons 2002), sighting location information of golden-cheeked warblers and black-capped vireos on Camp Bullis, and field observations.

Factors that were considered in identifying potential suitable habitat were:

- Vegetation characteristics, such as species type, vertical canopy structure and height, and succession state;
- Management activity;
- Degree of habitat continuity;
- Topographic considerations, such as slope and aspect.

Core habitat was determined after the survey results were compiled. A buffer of 200 meters around each bird detection was mapped. Core habitat buffers expire after 3 years, but new detections of golden-cheeked warblers and black-capped vireos on subsequent surveys will add to core habitat areas. The practice of mapping core habitat was borrowed from other DoD lands with golden-cheeked warbler and black-capped vireo management programs, including Camp Bullis and Fort Hood Military Reservation.

2.1.3 Meandering Transect Establishment and Survey Duration

Meandering transects were walked in potential habitat areas, and were sufficient to meet the minimum 4-hours per 100-acre requirement. Transects were adjusted throughout the survey season to increase the likelihood of a black-capped vireo or golden-cheeked warbler detection. Figure 2.1 is a map of survey transects. Survey time for each surveyor was set at a minimum of 4 hours per 100 acres of suitable habitat.

2.1.4 Survey Start and End Times

Surveys began approximately 30 minutes before sunrise, and terminated by 1:00 PM. Table 2.2 lists sunrise times and start times for each survey date.

Table 2.2 Sunrise and Survey Start Times and Maximum Survey Duration

Survey Date	Sunrise Time	Survey Start Time	Maximum Survey Duration (Hours)
13 April 2009	0633	0600	7:00
20 April 2009	0721	0700	6:00
11 May 2009	0709	0630	6:30
25 May 2009	0651	0630	6:30
15 June 2009	0643	0615	6:45
6 July 2009	0636	0600	7:00

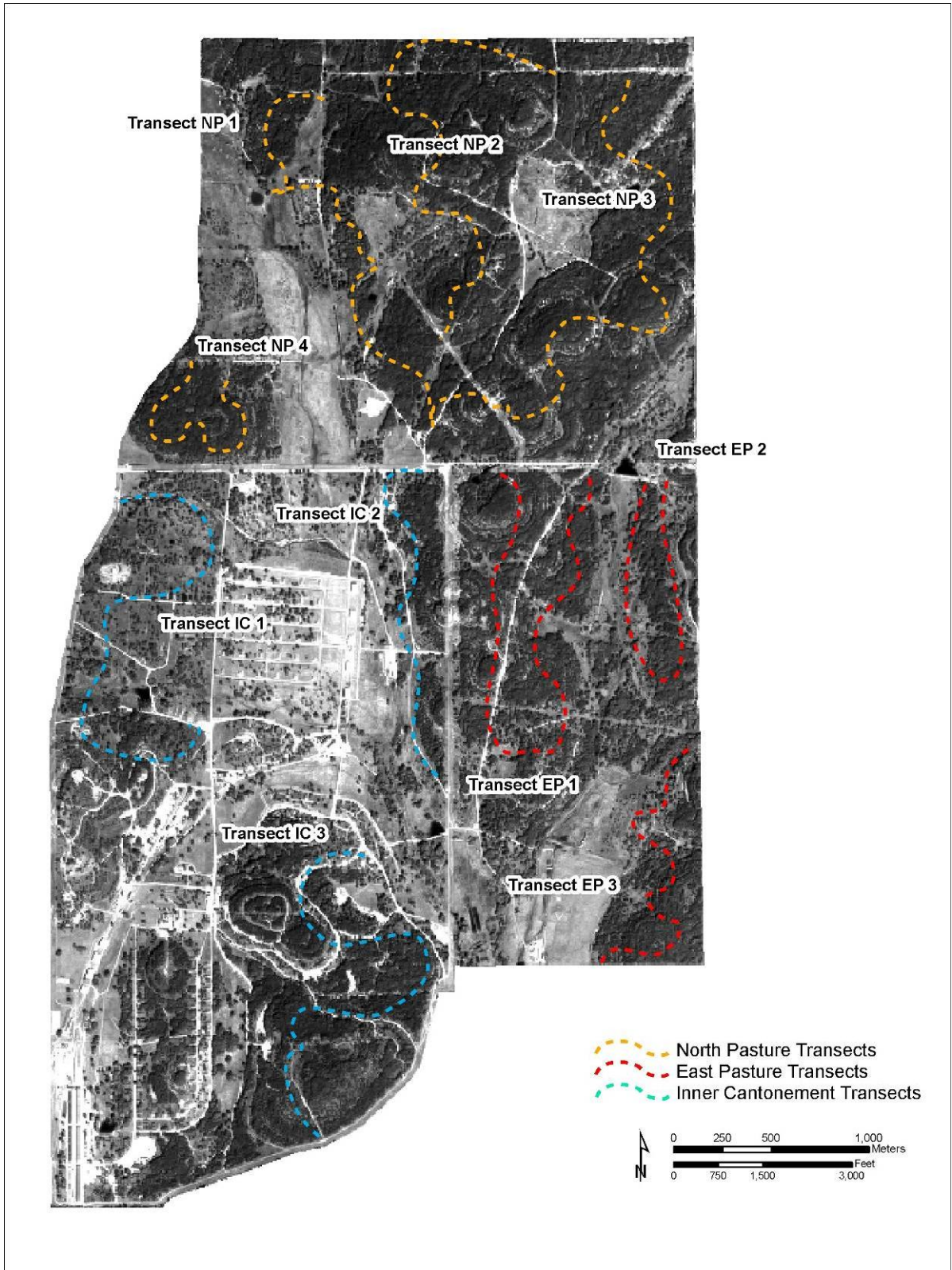
2.1.5 Weather Condition Requirements

Weather conditions strongly influence songbird vocalizations and flight activity (Robbins 1981). Therefore, weather conditions were assessed prior to a survey day to maximize the likelihood of black-capped vireo or golden-cheeked warbler detections. To maximize potential detections, surveys were conducted only if certain weather conditions were present. These weather conditions included:

- Less than 25 percent chance of rain for the survey time period on a given survey day, based on weather forecasts; and
- Wind speeds under 12 miles per hour (mph).

Regional weather patterns in Central Texas are highly variable in spring and summer months. Three survey days were cancelled and rescheduled with CSSA for the following Monday. This decision was made by 5:00 am, and was based on forecast information from the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) and phone conversations with CSSA security personnel.

Figure 2.1 Locations of Bird Survey Transects



2.1.6 Field Data Recording

A field form was completed for each black-capped vireo and golden-cheeked warbler detection. Field forms are included in Attachment A. At each detection of golden-cheeked warblers and black-capped vireos, the following data were collected:

- Weather conditions (wind speed, temperature, precipitation, cloud cover);
- Habitat characterizations (vegetation, vertical habitat structure including species and canopy heights, slope and aspect of the topography);
- Global positioning system (GPS) location of the observer, plus distance and bearing to the detection (UTM NAD83 Zone 14N coordinate system);
- Sex of the observed bird (if possible); and,
- Behavioral characteristics pertaining to breeding status or defense of territory;

Additional data collected in the field included:

- Non-target bird observations to update the existing bird inventory for CSSA (Parsons 2005, 2007). Each surveyor kept a running tally list of observed birds without specific location data.
- Signs of predation factors. Because of documented parasitism of black-capped vireo nests throughout Central Texas by brown-headed cowbirds (*Molothrus ater*), cowbird observations were recorded. Other signs of predation from known predators were also recorded, including feline and canine scat.

At the end of each survey day field forms, digital photographs, and GPS data were collected by Parsons staff and all digital data were downloaded to the CSSA Environmental Server for storage and distribution.

2.2 EQUIPMENT LIST

The following items were carried by all survey personnel:

- Binoculars with high quality optics;
- Field notebook, pencil, write in the rain paper;
- Field forms;
- Digital camera;
- GPS unit;
- Compass; and,
- Field safety kit composed of a first aid kit, list of emergency contact numbers, and cell phone.

2.3 SURVEY PERSONNEL

The survey crew consisted of the following members:

- **Taylor Houston**, Survey crew leader / Bird survey task manager – Ten years experience with threatened and endangered species issues on DoD and other federal lands.

- ***Paul Fushille***, Field Biologist – 14 seasons of golden-cheeked warbler and black-capped vireo surveys in Central Texas.
- ***Cynthia Sperry***, Field Biologist – Seven seasons of golden-cheeked warbler and black-capped vireo surveys in Central Texas.

SECTION 3 PREVIOUS SURVEYS

3.1 1992 – 1993 SURVEYS

December 1992, Stewardship Services conducted a habitat evaluation for CSSA. Potential habitat areas were mapped for both the golden-cheeked warbler and black-capped vireo. In the spring and summer survey season of 1993, Stewardship Services detected one male golden-cheeked warbler and a pair of black-capped vireos at CSSA (Stewardship Services 1993).

3.2 USFWS PROTOCOL SURVEYS FOR ESA-LISTED BIRDS

In 2005, CSSA began a survey program for ESA-listed bird species following USFWS survey protocols (USFWS 2005). Results from the initial 2005 survey included 19 individual detections of golden-cheeked warblers distributed in 15 territories. One detection of a black-capped vireo was recorded in 2005 in the East Pasture. In 2007, 18 individual detections for golden-cheeked warblers were recorded. Of these detections, 15 golden-cheeked warblers were detected through both visual sightings and audible calls, while three golden-cheeked warbler detections were through counter singing. Some of these detections were mated pairs, formulating an estimated total of 14 golden-cheeked warbler territories.

3.2.1 Vegetation Community Mapping

Vegetation community types were mapped and characterized during the 2005 surveys. The vegetation communities at CSSA consist of grasslands, woodlands, and savannas. Each vegetation community can be further divided into community types. Seven vegetation community types were mapped during the 2005 survey (Figure 3.3). Table 3.3 lists each vegetation community type with calculated areas. Definitions of vegetation communities are based on classification schemes provided by USFWS (Underwood 2005, personal communication), which are derived from NRCS and Diamond *et al.* (1988). Vegetation community types at Camp Stanley include:

- ***Juniper-Live Oak Woodlands*** Composed of woody species ranging between 3-10 meters, with a canopy closure of 71 – 100%. Ashe juniper dominate with a heavy Live oak component.
- ***Juniper Woodlands*** Composed of woody species ranging between 3-10 meters, with a canopy closure of 71 – 100%. Ashe juniper dominate.
- ***Live Oak-Juniper Woodlands*** Composed of woody species ranging between 3-10 meters, with a canopy closure of 71 – 100%. Live oaks dominate with a heavy Ashe juniper component. Other oaks in addition to persimmon, cedar elms also as components.
- ***Juniper Dominant Shrublands*** Ashe juniper dominates and is under 3 meters high.

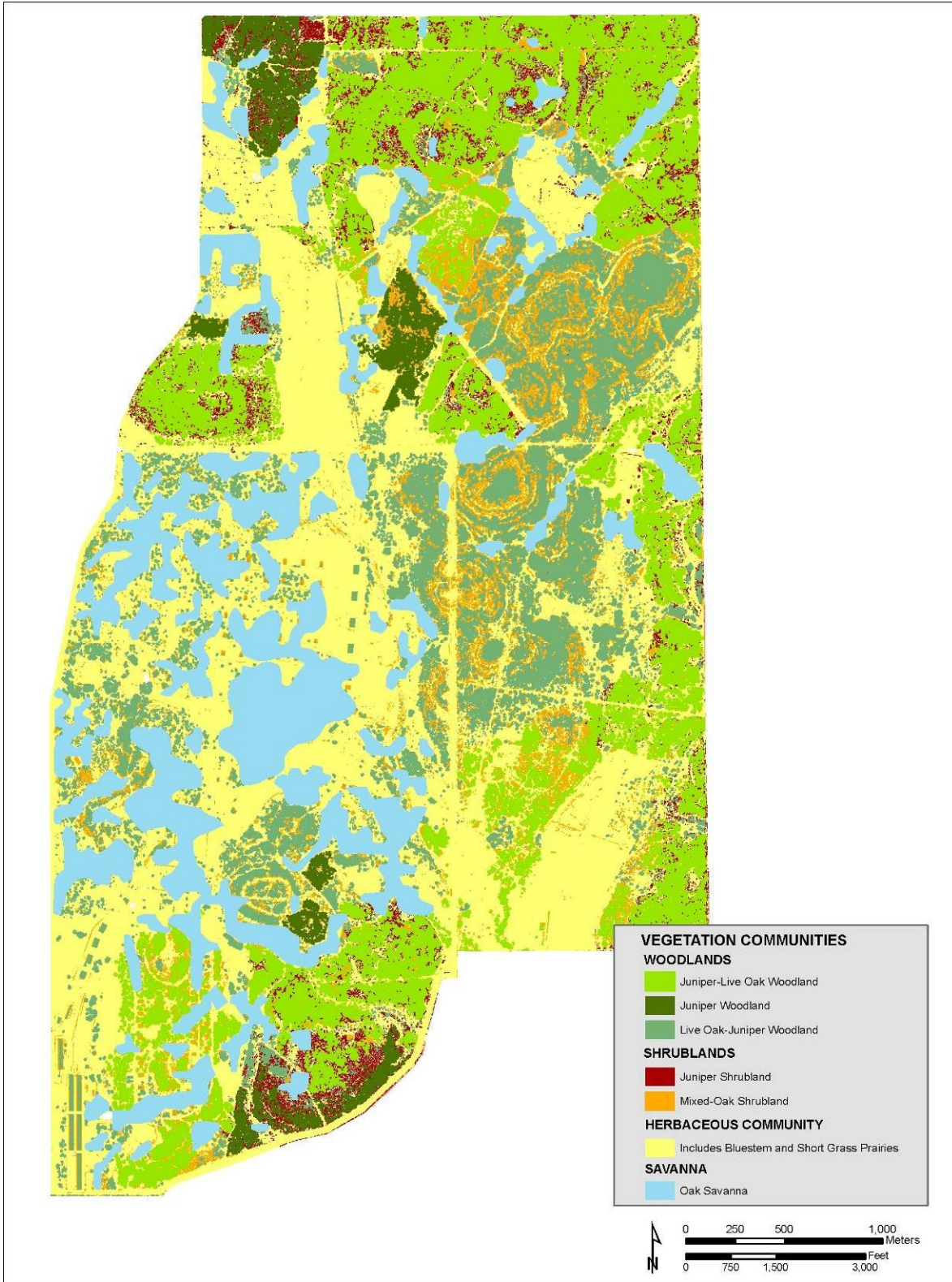
- ***Live Oak Dominant Shrublands*** Live oaks and shin oaks under 3 meters high, with other shrubs and low tree species such as flame-leaf sumac, persimmon, and agarita.
- ***Herbaceous Bluestem and Short Grass Prairie*** Woody species compose less than 25% of ground cover, dominated by herbaceous vegetation.
- ***Mixed Oak Savanna*** Woody species, composed primarily of live oak, shin oak, persimmon, and ashe juniper, form 25 – 50% cover.

Table 3.3 Vegetation Community Types at CSSA

Community	Type	TOTAL Installation		East Pasture		North Pasture		Inner Cantonment	
		Acres	%	Acres	%*	Acres	%*	Acres	%*
Woodlands	Live Oak-Ashe Juniper	693.6	17.3	179.9	4.5	232.8	5.8	280.9	7.0
	Ashe Juniper-Live Oak	821.6	20.5	187.6	4.7	450.1	11.2	183.9	4.6
	Ashe Juniper Dominant	130.4	3.3	40	1.0	87.8	2.2	2.6	0.1
	<i>TOTAL WOODLANDS</i>	<i>1645.6</i>	<i>41.1</i>	<i>407.5</i>	<i>10.2</i>	<i>770.7</i>	<i>19.2</i>	<i>467.4</i>	<i>11.7</i>
Shrublands	Ashe Juniper Dominant	173	4.3	22.1	0.6	107.8	2.7	43.1	1.1
	Live Oak Dominant	312.6	7.8	75.2	1.9	105.4	2.6	132	3.3
	<i>TOTAL SHRUBLANDS</i>	<i>485.6</i>	<i>12.1</i>	<i>97.3</i>	<i>2.4</i>	<i>213.2</i>	<i>5.3</i>	<i>175.1</i>	<i>4.4</i>
Herbaceous	Blue Stem and Short Grass Prairies	600	15.0	172.2	4.3	271.8	6.8	156	3.9
	Periodically Mowed Areas*	600	15.0	78.4	2.0	0	0.0	521.6	13.0
	<i>TOTAL HERBACEOUS</i>	<i>1200</i>	<i>30.0</i>	<i>250.6</i>	<i>6.3</i>	<i>271.8</i>	<i>6.8</i>	<i>677.6</i>	<i>16.9</i>
Savanna	Mixed-Live Oak Savanna	597.2	14.9	32.9	0.8	124.8	3.1	439.5	11.0
Water	Ponds	2.8	0.1	0	0.0	1.2	0.0	1.6	0.0
Urban	Buildings	30.1	0.8	3.2	0.1	0	0.0	26.9	0.7
	Roads**	42.1	1.1	8.6	0.2	28.5	0.7	5	0.1
	<i>TOTAL URBAN</i>	<i>72.2</i>	<i>1.8</i>	<i>11.8</i>	<i>0.3</i>	<i>28.5</i>	<i>0.7</i>	<i>31.9</i>	<i>0.8</i>
<i>TOTAL</i>		<i>4004</i>	<i>100</i>						

*Percent of total installation acreage (4004 acres)

Figure 3.1 Vegetation Community Types at CSSA



3.3 SURVEYS ON CAMP BULLIS

Adjacent to CSSA, Camp Bullis implements a robust survey regime for black-capped vireos and golden-cheeked warblers. Annual surveys are conducted along fixed transects, with point count stations along each transect (Cooksey 2005, personal communication). A small population of golden-cheeked warblers on Camp Bullis decreased between 1991 and 1997, but increased significantly during 1999 and 2000. As of 2001 the population of golden-cheeked warblers was holding at approximately 230 individuals (Fischer and Guilfoyle 2001). The population of black-capped vireos has also increased on Camp Bullis, perhaps due to a range fire that created suitable early successional habitat (Baccus 2005, personal communication).

SECTION 4 SURVEY RESULTS

4.1 2009 RESULTS

4.1.1 Distributions

Fifteen golden-cheeked warblers were detected in habitat areas that are typical of the species during the 2009 surveys. Thirteen of the detections were singing males defending territories; therefore, 13 golden-cheeked warbler territories were estimated for the 2009 season. No black-capped vireo detections occurred at CSSA during the 2009 surveys, although suitable habitat is found at various locations in the East Pasture, North Pasture, and Inner Cantonment.

Table 4.1 lists each location and provides locations and habitat descriptions. The distribution of these detections is shown on Figure 4.1. Field forms are included as Attachment A.

4.1.2 Habitat

For the purposes of CSSA's natural resource management program, habitat for ESA listed bird species can be classified as either "core habitat" or "potential habitat." Core habitat is defined as a 200-meter buffer centered on an actual bird detection. Potential habitat is defined by vegetation community type and abiotic factors such as slope and canopy structure. The extent of core habitat has been updated based on the distribution of species observed in the 2009 survey season. Core habitat is valid for three years, therefore, areas mapped in 2007 as core habitat are considered valid through 2010 and are included in the 2009 core habitat calculation. Table 4.2 lists the amount and type of habitat (core and potential). Core habitat at CSSA for golden-cheeked warblers and black-capped vireos amounts to 688.8 acres (17.2% of the total installation area).

4.1.3 2009 Observed Birds

An observed bird list for the 2009 survey season was compiled by surveyors. Attachment B lists a total of 75 species observed during the 2009 season. Taxonomic and nomenclature changes are updated through the 50th supplement to the AOU Check-list of North American Birds, 7th Edition (Banks, *et al.* 2007).

Table 4.2 2009 Distribution of Detections

Detection Number	Species	Date	Time	Coordinates*		Weather Conditions	Vegetation Community
				Northing	Easting		
1	GCWA, male	4/13/2009	820	537766	3288770	Moderate south winds gusting at 8mph, 25% cloud cover, 76 degrees (F)	Oak-Juniper Woodland
2	GCWA, male	4/13/2009	829	537925	3288797	Moderate south winds gusting at 8mph, 25% cloud cover, 73 degrees (F)	Oak-Juniper Woodland
3	GCWA, male	4/13/2009	858	538667	3288940	Moderate SE winds gusting at 15mph, 80% cloud cover. 74 degrees (F)	Oak-Juniper Woodland
4	GCWA, male	4/13/2009	925	538567	3288645	Moderate SE winds gusting at 15mph, 80% cloud cover. 76 degrees (F)	Oak-Juniper Woodland
5	GCWA, male	4/13/2009	1055	538490	3288901	Moderate SE winds gusting at 15mph, 80% cloud cover. 71 degrees (F)	Oak-Juniper Woodland
6	GCWA, female	4/13/2009	1055	538397	3286530	Light south winds gusting at 9mph, 100% cloud cover, 77.5 degrees (F)	Oak-Juniper Woodland
7	GCWA, male	4/20/2009	815	536867	3283925	Light north winds gusting at 2mph, 50% cloud cover, 68.5 degrees (F)	Oak-Juniper Woodland
8	GCWA, male	4/20/2009	815	536950	3284071	Light north winds gusting at 2mph, 50% cloud cover, 68.5 degrees (F)	Oak-Juniper Woodland
9	GCWA, male	4/20/2009	1115	537596	3288090	Light NW winds at 4 mph, 25% cloud cover. 71 degrees (F).	Oak-Juniper Woodland
10	GCWA, male	4/20/2009	1245	537368	3288537	Light NW winds at 4 mph, 25% cloud cover. 79 degrees (F).	Oak-Juniper Woodland
11	GCWA, male	5/11/2009	810	538282	3287366	Light NW winds gusting at 10mph. 25% cloud cover. 72 degrees (F)	Oak-Juniper Woodland
12	GCWA, female	5/11/2009	1125	538307	3287536	Light NW winds gusting at 10mph. 25% cloud cover. 87 degrees (F)	Oak-Juniper Woodland
13	GCWA, male	5/25/2009	725	538608	3287581	Light NW winds gusting at 10mph. 25% cloud cover. 79 degrees (F)	Oak-Juniper Woodland
14	GCWA, female	6/15/2009	845	536357	3287255	Light N winds at 3 mph. 50% cloud cover. 82 degrees (F)	Oak-Juniper Woodland
15	GCWA, female	6/15/2009	1000	537288	3288300	Light N winds at 3 mph. 50% cloud cover. 90 degrees (F).	Oak-Juniper Woodland

Table 4.3 Updated Golden-cheeked Warbler and Black-capped Vireo Core and Potential Habitat at CSSA

Species	Habitat Level	TOTAL Installation		East Pasture		North Pasture		Inner Cantonment	
		Acres	%	Acres	%*	Acres	%*	Acres	%*
BCVI	Core	0	0%	0	0	0	0.0	0	0.0
	Potential	109.9	2.7%	43.5	1.1	41.8	1.0	24.6	0.6
GCWA	Core	654.1	16.3%	233.8	5.8	379.5	9.4	135.0	3.4
	Potential	778.1	19.5%	160	4.0	507.4	12.7	110.7	2.8

*Percent of total installation acreage (4004 acres)

Figure 4.1 2009 Survey Results: Endangered Bird Detections

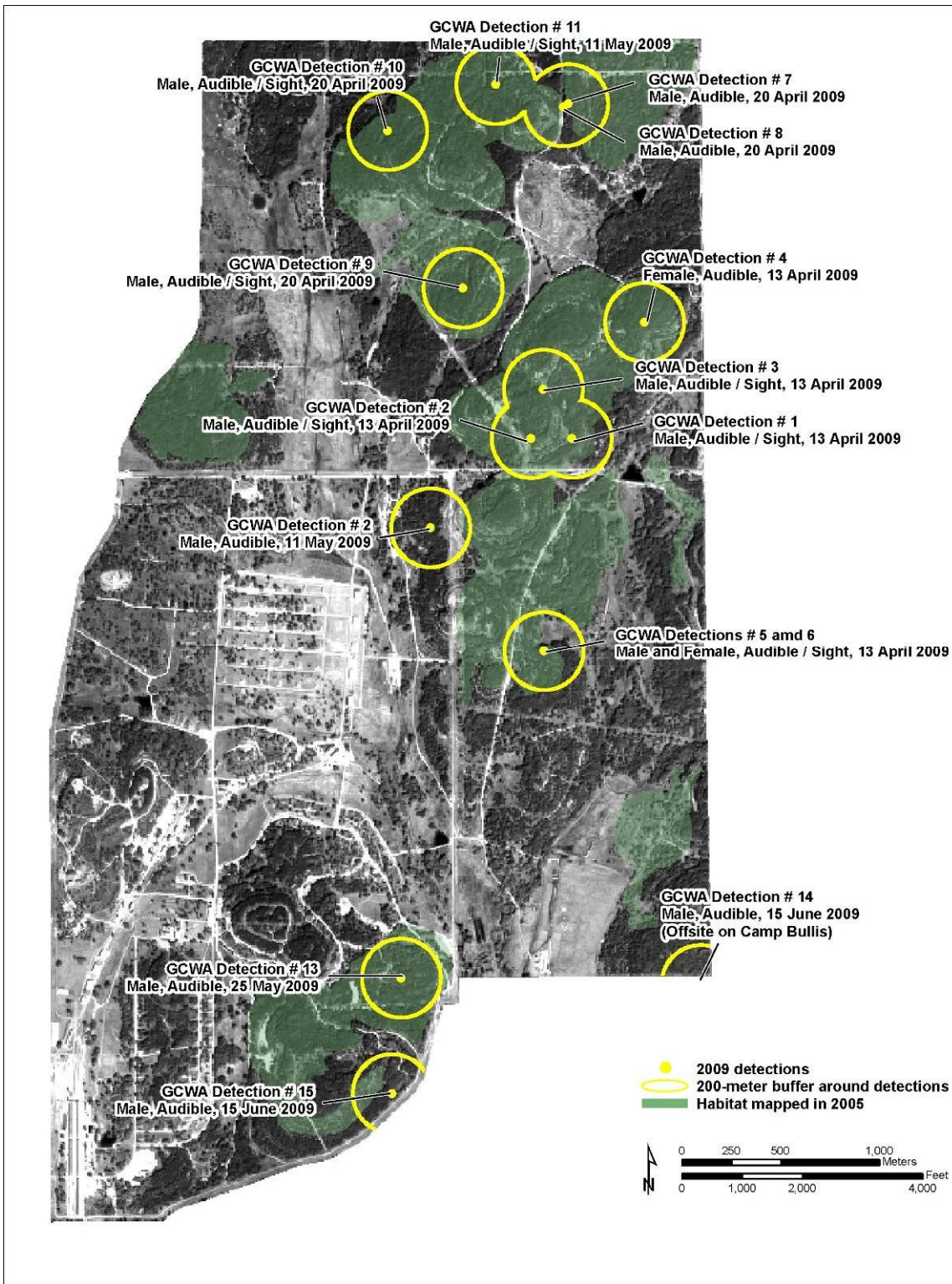
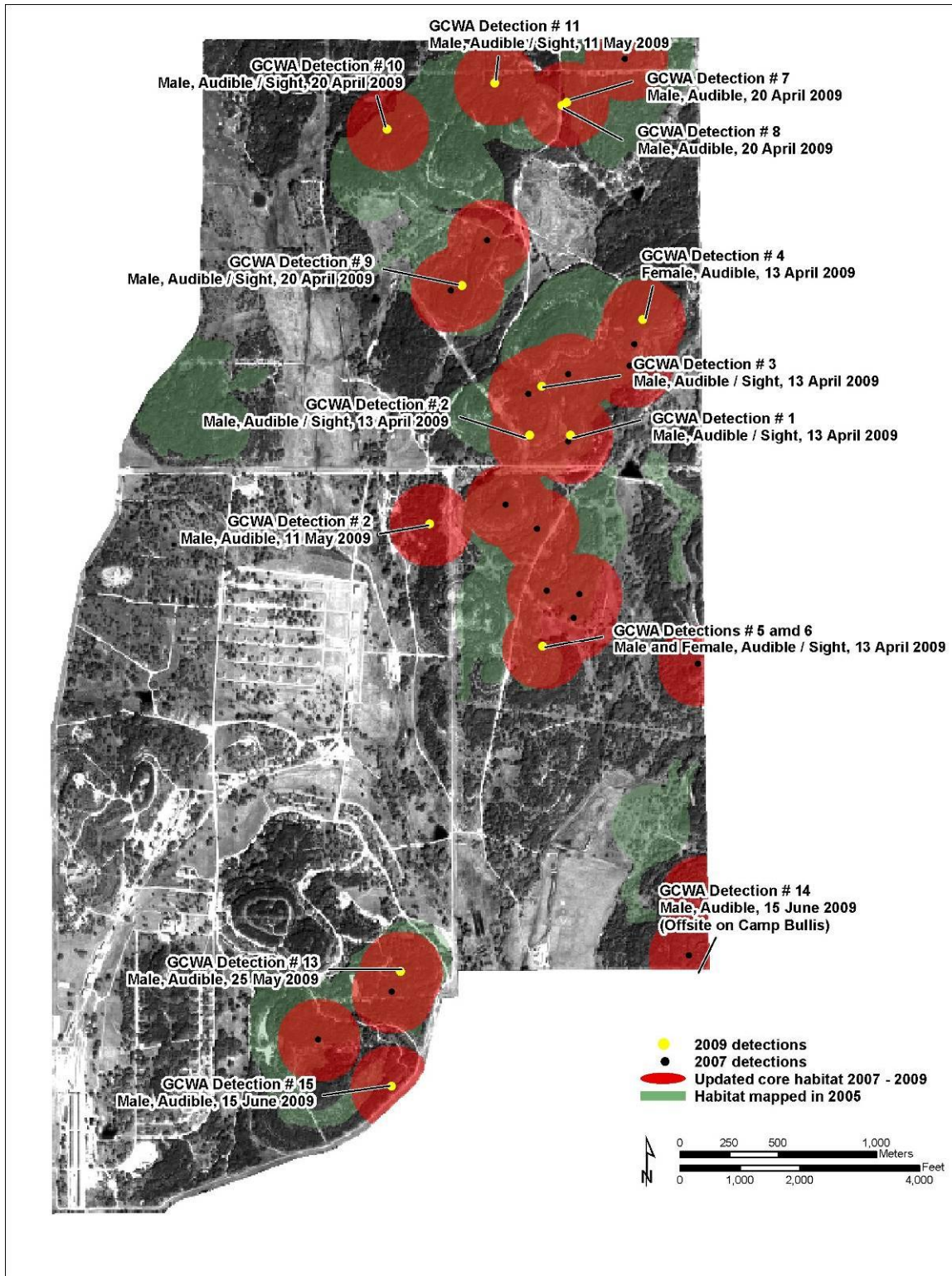


Figure 4.2 Survey Results: 2009 Updated Core Habitat



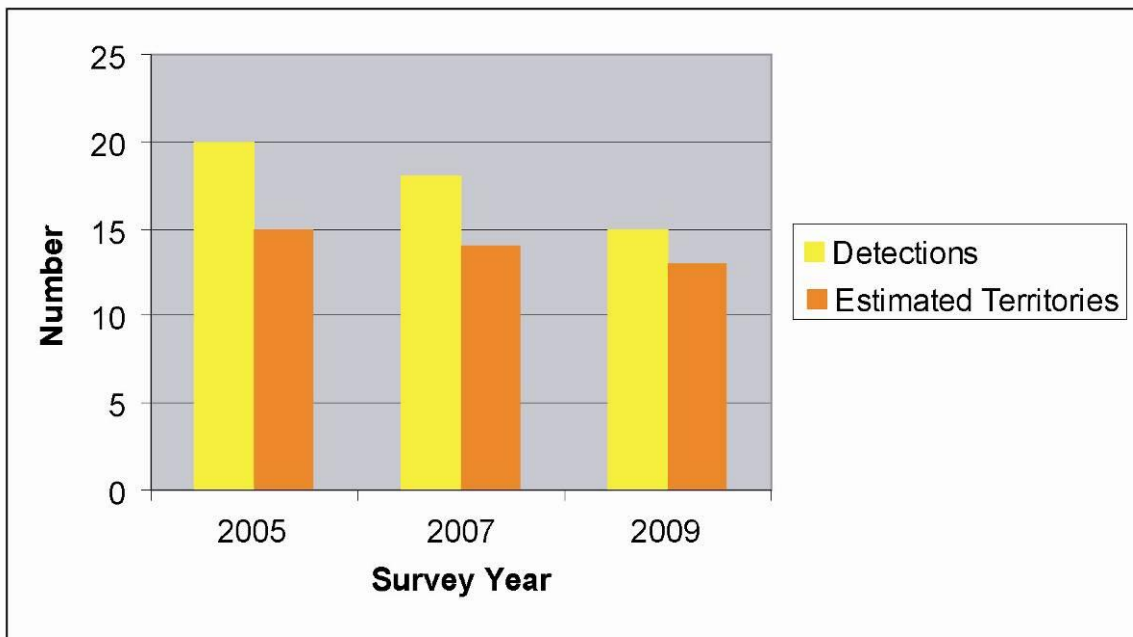
4.2 SYNTHESIS WITH PAST RESULTS

4.2.1 Golden-cheeked Warbler and Black-capped Vireo Enumeration and Territory Comparison, 2005 – 2009

Since 2005, the 2009 enumerated individuals at CSSA have declined from 20 to 15, which represents a 28% difference in observed birds; however, a more accurate index would be the number of territories estimated since 2005 because males and females which may have been paired were counted in the total enumeration surveys. In 2005, 15 territories were estimated at CSSA, compared to the 13 estimated in 2009, this represents a 14% decline between 2005 and 2009.

Factors affecting the CSSA golden-cheeked warbler population segment could include (1) intense and prolonged drought conditions throughout Central Texas, (2) habitat removal and fragmentation on adjacent lands (primarily to the west of Ralph Fair Road), and (3) parasitism primarily by brown-headed cowbirds. Activities at CSSA are unlikely to factor into the apparent decline of golden-cheeked warblers at CSSA because similar declines have been observed throughout conservation lands in Central Texas (Travis County Audubon Society, 2009).

Figure 4.3 Golden-cheeked Warbler Detections and Territories. 2005-2009



4.2.2 Overall Bird Species Richness

Since the initial survey effort in 2005, 116 individual species have been observed. These species are represented by 36 families. Overall avian species richness has apparently declined since 2005, with an initial 90 species observed in 2005, 80 species observed in

2007, and 75 species observed in 2009. This represents a 17% decline in species richness between 2005 and 2009; however, 11 new species were observed in 2009.

Factors affecting the avian biodiversity could include (1) intense and prolonged drought conditions throughout Central Texas, (2) habitat removal and fragmentation on adjacent lands (primarily to the west of Ralph Fair Road), and (3) parasitism primarily by brown-headed cowbirds. Activities at CSSA are unlikely to factor into the apparent decline of avian diversity at CSSA because similar declines have been observed throughout conservation lands in Central Texas (Travis County Audubon Society, 2009) and the small amount of habitat removed as permitted in the CSSA PBO has occurred primarily outside of the breeding season for passerines.

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**ATTACHMENT A
FIELD FORMS**

CSSA 2009 GCWA & BCVI SURVEY

Date	APR 13, 2009
Time	1055
Surveyor Initials	PF
Location	East pasture

Weather Conditions	
Wind Speed	10-12 mph
Direction	N
Temperature	~65°
Cloud Cover	0%
Precipitation	w/a
Comments	

GCWA / BCVI Detection			
Species	GCWA	BCVI	
Detection Type	Audible	Visual	
Sex	Male	Female	Juvenile Unknown
Comments	(A), ♀ nearby w/ chips; no counter		

Vegetation / Habitat Description

Comments	
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Geologic / Topographic Description

Comments	<p>29 42' 10.30"</p> <p>98 36' 19.62"</p>
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CSSA 2009 GCWA & BCVI SURVEY

Date	APR 13 2009
Time	0820
Surveyor Initials	PF, CS
Location	

Weather Conditions	
Wind Speed	8-10 mph
Direction	N
Temperature	~60°
Cloud Cover	0%
Precipitation	n/a
Comments	

GCWA / BCVI Detection			
Species	GCWA x2	BCVI	
Detection Type	Audible	Visual	
Sex	Male	Female	Juvenile Unknown
Comments	(A) + center (A) to South		

Vegetation / Habitat Description	
Comments	

Geologic / Topographic Description	
Comments	29 42' 45.40" 98 36' 14.17"

CSSA 2009 GCWA & BCVI SURVEY

Date	APR 13, 2009
Time	0829
Surveyor Initials	PF, CS
Location	

Weather Conditions	
Wind Speed	8-10 mph
Direction	N
Temperature	~60°
Cloud Cover	0%
Precipitation	n/a
Comments	

GCWA / BCVI Detection			
Species	<input checked="" type="radio"/> GCWA	<input type="radio"/> BCVI	
Detection Type	<input checked="" type="radio"/> Audible	<input checked="" type="radio"/> Visual	
Sex	<input checked="" type="radio"/> Male	<input type="radio"/> Female	<input type="radio"/> Juvenile <input type="radio"/> Unknown
Comments	(A), no counter		

Vegetation / Habitat Description

Comments

Geologic / Topographic Description

Comments

29° 42' 39.89"
98 36 21.93

CSSA 2009 GCWA & BCVI SURVEY

Date	APR 13, 2009
Time	0858
Surveyor Initials	PF, CS
Location	

Weather Conditions	
Wind Speed	
Direction	
Temperature	
Cloud Cover	
Precipitation	
Comments	

GCWA / BCVI Detection			
Species	<input checked="" type="checkbox"/> GCWA	<input type="checkbox"/> BCVI	
Detection Type	<input checked="" type="checkbox"/> Audible	<input checked="" type="checkbox"/> Visual	
Sex	<input checked="" type="checkbox"/> Male	<input type="checkbox"/> Female	<input type="checkbox"/> Juvenile <input type="checkbox"/> Unknown
Comments	(A), no counter; moved down slope to east.		

Vegetation / Habitat Description

Comments	
----------	--

Geologic / Topographic Description

Comments	<p>29° 42' 53.50"</p> <p>98° 36' 19.57"</p>
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CSSA 2009 GCWA & BCVI SURVEY

Date	May 11, 2009
Time	0810
Surveyor Initials	PF
Location	

Weather Conditions	
Wind Speed	
Direction	
Temperature	
Cloud Cover	
Precipitation	
Comments	

GCWA / BCVI Detection			
Species	GCWA	BCVI	
Detection Type	Audible	Visual	
Sex	Male	Female	Juvenile Unknown
Comments	(B), no counter		

Vegetation / Habitat Description	
Comments	

Geologic / Topographic Description	
Comments	<p>29° 43' 43.73"</p> <p>98° 36' 28.34"</p>

CSSA 2009 GCWA & BCVI SURVEY

Date	May 11, 2009
Time	1125
Surveyor Initials	PF
Location	NE corner of Inner Cont.

Weather Conditions	
Wind Speed	
Direction	
Temperature	
Cloud Cover	
Precipitation	
Comments	

GCWA / BCVI Detection			
Species	GCWA	BCVI	
Detection Type	Audible	Visual	
Sex	Male	Female	Juvenile Unknown
Comments	(B), no counter		

Vegetation / Habitat Description	
Comments	

Geologic / Topographic Description	
Comments	29° 42' 30.74" 98 36' 40.92"

CSSA 2009 GCWA & BCVI SURVEY

Date	May 25, 2009
Time	0725
Surveyor Initials	PF, CS
Location	Inner contourment

Weather Conditions	
Wind Speed	
Direction	
Temperature	
Cloud Cover	
Precipitation	
Comments	

GCWA / BCVI Detection			
Species	<u>GCWA</u>	BCVI	
Detection Type	<u>Audible</u>	<u>Visual</u>	
Sex	<u>Male</u>	Female	Juvenile Unknown
Comments	(A) song		

Vegetation / Habitat Description

Comments

Geologic / Topographic Description

Comments

29 40' 57.48"
98 36' 48.53"

CSSA 2009 GCWA & BCVI SURVEY

Date	June 15, 2009
Time	0845
Surveyor Initials	PF, TH
Location	off property (Camp Bullis)

Weather Conditions	
Wind Speed	
Direction	
Temperature	
Cloud Cover	
Precipitation	
Comments	

GCWA / BCVI Detection			
Species	GCWA	BCVI	
Detection Type	Audible	Visual	
Sex	Male	Female	Juvenile Unknown
Comments	(A), no counter		

Vegetation / Habitat Description

Comments	
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Geologic / Topographic Description

Comments	29' 41' 15.27" 98 35' 50.26"
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CSSA 2009 GCWA & BCVI SURVEY

Date	APR 13, 2009
Time	1055
Surveyor Initials	PF
Location	East pasture

Weather Conditions	
Wind Speed	10-12 mph
Direction	N
Temperature	~65°
Cloud Cover	0%
Precipitation	w/a
Comments	

GCWA / BCVI Detection			
Species	<input checked="" type="radio"/> GCWA	<input type="radio"/> BCVI	
Detection Type	<input checked="" type="radio"/> Audible	<input checked="" type="radio"/> Visual	
Sex	<input checked="" type="radio"/> Male	<input checked="" type="radio"/> Female	Juvenile Unknown
Comments	(A), ♀ nearby w/ chips; no counter		

Vegetation / Habitat Description

Comments	
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Geologic / Topographic Description

Comments	29 42' 10.30" 98 36' 19.62"
----------	--------------------------------

CSSA 2009 GCWA & BCVI SURVEY

Date	APR 13 2009
Time	0820
Surveyor Initials	PF, CS
Location	

Weather Conditions	
Wind Speed	8-10 mph
Direction	N
Temperature	~60°
Cloud Cover	0%
Precipitation	n/a
Comments	

GCWA / BCVI Detection			
Species	GCWA x2	BCVI	
Detection Type	Audible	Visual	
Sex	Male	Female	Juvenile Unknown
Comments	(A) + cntr (A) to South		

Vegetation / Habitat Description	
Comments	

Geologic / Topographic Description	
Comments	29 42' 45.40" 98 36' 14.17"

CSSA 2009 GCWA & BCVI SURVEY

Date	APR 13, 2009
Time	0829
Surveyor Initials	PF, CS
Location	

Weather Conditions	
Wind Speed	8-10 mph
Direction	N
Temperature	~60°
Cloud Cover	0%
Precipitation	n/a
Comments	

GCWA / BCVI Detection			
Species	<input checked="" type="radio"/> GCWA	<input type="radio"/> BCVI	
Detection Type	<input checked="" type="radio"/> Audible	<input checked="" type="radio"/> Visual	
Sex	<input checked="" type="radio"/> Male	<input type="radio"/> Female	<input type="radio"/> Juvenile <input type="radio"/> Unknown
Comments	(A), no counter		

Vegetation / Habitat Description

Comments

Geologic / Topographic Description

Comments

29° 42' 39.89"
98 36 21.93

CSSA 2009 GCWA & BCVI SURVEY

Date	APR 13, 2009
Time	0858
Surveyor Initials	PF, CS
Location	

Weather Conditions	
Wind Speed	
Direction	
Temperature	
Cloud Cover	
Precipitation	
Comments	

GCWA / BCVI Detection			
Species	<input checked="" type="checkbox"/> GCWA	<input type="checkbox"/> BCVI	
Detection Type	<input checked="" type="checkbox"/> Audible	<input checked="" type="checkbox"/> Visual	
Sex	<input checked="" type="checkbox"/> Male	<input type="checkbox"/> Female	<input type="checkbox"/> Juvenile <input type="checkbox"/> Unknown
Comments	(A), no counter; moved down slope to east.		

Vegetation / Habitat Description

Comments	
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Geologic / Topographic Description

Comments	<p>29° 42' 53.50"</p> <p>98° 36' 19.57"</p>
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CSSA 2009 GCWA & BCVI SURVEY

Date	May 11, 2009
Time	0810
Surveyor Initials	PF
Location	

Weather Conditions	
Wind Speed	
Direction	
Temperature	
Cloud Cover	
Precipitation	
Comments	

GCWA / BCVI Detection			
Species	GCWA	BCVI	
Detection Type	Audible	Visual	
Sex	Male	Female	Juvenile Unknown
Comments	(B), no counter		

Vegetation / Habitat Description	
Comments	

Geologic / Topographic Description	
Comments	<p>29° 43' 43.73"</p> <p>98° 36' 28.34"</p>

CSSA 2009 GCWA & BCVI SURVEY

Date	May 11, 2009
Time	1125
Surveyor Initials	PF
Location	NE corner of Inner Cont.

Weather Conditions	
Wind Speed	
Direction	
Temperature	
Cloud Cover	
Precipitation	
Comments	

GCWA / BCVI Detection			
Species	GCWA	BCVI	
Detection Type	Audible	Visual	
Sex	Male	Female	Juvenile Unknown
Comments	(B), no counter		

Vegetation / Habitat Description	
Comments	

Geologic / Topographic Description	
Comments	29° 42' 30.74" 98 36' 40.92"

CSSA 2009 GCWA & BCVI SURVEY

Date	May 25, 2009
Time	0725
Surveyor Initials	PF, CS
Location	Inner contourment

Weather Conditions	
Wind Speed	
Direction	
Temperature	
Cloud Cover	
Precipitation	
Comments	

GCWA / BCVI Detection				
Species	<u>GCWA</u>	BCVI		
Detection Type	<u>Audible</u>	<u>Visual</u>		
Sex	<u>Male</u>	Female	Juvenile	Unknown
Comments	(A) song			

Vegetation / Habitat Description

Comments

Geologic / Topographic Description

Comments

29 40' 57.48"
98 36' 48.53"

ATTACHMENT B 2009 UPDATED OBSERVED BIRD LIST

116 species represented by 36 families have been observed at CSSA during the 2005, 2007, and 2009 bird survey seasons. These species, grouped in taxonomic order, are listed in Table B-1. The 2009 survey effort resulted in 75 species observations, 11 of which were new species not previously observed at CSSA. Birds observed in 2009 that have not been observed in previous survey years are indicated in bold. Taxonomic and nomenclatural changes have been updated through the 50th supplement (Auk, 2007) to the AOU *Check-list of North American Birds* (7th ed.).

Table B-1 **Compiled list of birds observed at Camp Stanley Storage Activity Area from Spring/ Summer 2005 - 2009.**

Family	Species Name		Year of Observation		
	Common Name	Scientific Name	2005	2007	2009
Anatidae	Blue-winged Teal	<i>Anas discors</i>			x
	Black-bellied Whistling Duck	<i>Dendrocygna autumnalis</i>	x	x	x
Meleagrididae	Wild Turkey	<i>Meleagris gallopavo</i>	x	x	x
Odontophoridae	Northern Bobwhite	<i>Colinus virginianus</i>	x	x	x
Pelecanidae	American White Pelican	<i>Pelecanus erythrorhynchos</i>		x	
Ardeidae	Great Egret	<i>Ardea alba</i>		x	
	Great Blue Heron	<i>Ardea herodias</i>	x	x	
	Cattle Egret	<i>Bubulcus ibis</i>	x	x	
Cathartidae	Turkey Vulture	<i>Cathartes aura</i>	x	x	x
	Black Vulture	<i>Coragyps atratus</i>	x	x	x
Accipitridae	Cooper's Hawk	<i>Accipiter cooperii</i>	x	x	x
	Sharp-shinned Hawk	<i>Accipiter striatus</i>			x
	Swainson's Hawk	<i>Buteo brachyurus</i>		x	
	Red-tailed Hawk	<i>Buteo jamaicensis</i>	x	x	x
	Red-shouldered Hawk	<i>Buteo lineatus</i>	x	x	x

Family	Species Name		Year of Observation		
	Common Name	Scientific Name	2005	2007	2009
	Broad-winged Hawk	<i>Buteo platypterus</i>		x	x
	Crested Caracara	<i>Caracara cheriway</i>	x	x	
	Northern Harrier	<i>Circus cyaneus</i>	x	x	
	American Kestrel	<i>Falco sparverius</i>		x	
	Mississippi Kite	<i>Ictinia mississippiensis</i>		x	
Charadriidae	Killdeer	<i>Charadrius vociferus</i>	x	x	x
Scolopacidae	Spotted Sandpiper	<i>Actitis macularius</i>	x	x	x
	Semipalmated Sandpiper	<i>Calidris pusilla</i>		x	
Columbidae	Inca Dove	<i>Columbina inca</i>			x
	Common Ground-Dove	<i>Columbina passerina</i>			x
	White-winged Dove	<i>Zenaida asiatica</i>	x	x	x
	Mourning Dove	<i>Zenaida macroura</i>	x	x	x
Cuculidae	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	x	x	x
	Greater Roadrunner	<i>Geococcyx californianus</i>	x	x	x
Strigidae	Great Horned Owl	<i>Bubo virginianus</i>	x		
	Eastern Screech-Owl	<i>Megascops asio</i>	x		
Caprimulgidae	Chuck-will's-widow	<i>Caprimulgus carolinensis</i>		x	
	Common Nighthawk	<i>Chordeiles minor</i>	x	x	
Apodidae	Chimney Swift	<i>Chaetura pelagica</i>	x	x	x
Trochilidae	Black-chinned Hummingbird	<i>Archilochus alexandri</i>	x	x	x
Picidae	Ladder-backed Woodpecker	<i>Picooides scalaris</i>	x	x	x
Tyrannidae	Olive-sided Flycatcher	<i>Contopus cooperi</i>			x
	Eastern Wood-Pewee	<i>Contopus virens</i>	x		
	Least Flycatcher	<i>Empidonax minimus</i>	x		x
	Willow Flycatcher	<i>Empidonax traillii</i>			x
	Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	x	x	x

Family	Species Name		Year of Observation		
	Common Name	Scientific Name	2005	2007	2009
	Great Crested Flycatcher	<i>Myiarchus crinitus</i>	x		
	Vermilion Flycatcher	<i>Pyrocephalus rubinus</i>		x	x
	Eastern Phoebe	<i>Sayornis phoebe</i>	x	x	x
	Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	x	x	x
	Western Kingbird	<i>Tyrannus verticalis</i>	x	x	x
Laniidae	Loggerhead Shrike	<i>Lanius ludovicianus</i>	x		x
Vireonidae	Black-capped Vireo	<i>Vireo atricapilla</i>	x		
	Bell's Vireo	<i>Vireo bellii</i>	x	x	
	White-eyed Vireo	<i>Vireo griseus</i>	x	x	x
	Red-eyed Vireo	<i>Vireo olivaceus</i>			x
	Blue-headed Vireo	<i>Vireo solitarius</i>	x		x
Corvidae	Western Scrub-Jay	<i>Aphelocoma californica</i>	x	x	x
	Common Raven	<i>Corvus corax</i>		x	x
Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>		x	x
	Cave Swallow	<i>Petrochelidon fulva</i>		x	x
	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	x	x	x
	Purple Martin	<i>Progne subis</i>	x	x	x
Paridae	Black-crested Titmouse	<i>Baeolophus atricristatus</i>	x	x	x
	Carolina Chickadee	<i>Poecile carolinensis</i>	x	x	x
Remizidae	Verdin	<i>Auriparus flaviceps</i>		x	
Troglodytidae	Bewick's Wren	<i>Thryomanes bewickii</i>	x	x	x
	Carolina Wren	<i>Thryothorus ludovicianus</i>	x	x	x
	House Wren	<i>Troglodytes aedon</i>	x		
Regulidae	Ruby-crowned Kinglet	<i>Regulus calendula</i>	x	x	x
Sylviidae	Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	x	x	x
Turdidae	Hermit Thrush	<i>Catharus guttatus</i>	x		x

Family	Species Name		Year of Observation		
	Common Name	Scientific Name	2005	2007	2009
	Eastern Bluebird	<i>Sialia sialis</i>	x	x	x
	American Robin	<i>Turdus migratorius</i>	x		
Mimidae	Gray Catbird	<i>Dumetella carolinensis</i>	x		
	Northern Mockingbird	<i>Mimus polyglottos</i>	x	x	x
Sturnidae	European Starling	<i>Sturnus vulgaris</i>	x	x	x
Bombycillidae	Cedar Waxwing	<i>Bombycilla cedrorum</i>			
Parulidae	Golden-cheeked Warbler	<i>Dendroica chrysoparia</i>	x	x	x
	Yellow-rumped Warbler	<i>Dendroica coronata</i>	x	x	
	Blackburnian Warbler	<i>Dendroica fusca</i>	x		
	Yellow Warbler	<i>Dendroica petechia</i>	x		x
	Black-throated Green Warbler	<i>Dendroica virens</i>	x	x	
	Common Yellowthroat	<i>Geothlypis trichas</i>	x		
	Yellow-breasted Chat	<i>Icteria virens</i>	x		
	Black-and-white Warbler	<i>Mniotilta varia</i>	x	x	x
	Mourning Warbler	<i>Oporornis philadelphia</i>	x		
	American Redstart	<i>Setophaga ruticilla</i>	x	x	
	Orange-crowned Warbler	<i>Vermivora celata</i>	x	x	x
	Tennessee Warbler	<i>Vermivora peregrina</i>	x		
	Nashville Warbler	<i>Vermivora ruficapilla</i>	x	x	x
	Canada Warbler	<i>Wilsonia canadensis</i>	x		
	Wilson's Warbler	<i>Wilsonia pusilla</i>	x		
Emberizidae	Cassin's Sparrow	<i>Aimophila cassinii</i>	x		
	Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	x	x	x
	Grasshopper Sparrow	<i>Ammodramus savannarum</i>	x	x	x
	Black-throated Sparrow	<i>Amphispiza bilineata</i>			x
	Lark Sparrow	<i>Chondestes grammacus</i>	x	x	x

Family	Species Name		Year of Observation		
	Common Name	Scientific Name	2005	2007	2009
	Lincoln's Sparrow	<i>Melospiza lincolnii</i>	x	x	
	Savanna Sparrow	<i>Passerculus sandwichensis</i>		x	
	Eastern Towhee	<i>Pipilo erythrophthalmus</i>			x
	Spotted Towhee	<i>Pipilo maculatus</i>	x	x	x
	Vesper Sparrow	<i>Poocetes gramineus</i>	x		x
	Clay-colored Sparrow	<i>Spizella pallida</i>	x	x	x
	Chipping Sparrow	<i>Spizella passerina</i>	x	x	x
	Field Sparrow	<i>Spizella pusilla</i>	x	x	
	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>			x
	White-throated Sparrow	<i>Zonotrichia albicollis</i>	x	x	
Cardinalidae	Northern Cardinal	<i>Cardinalis cardinalis</i>	x	x	x
	Blue Grosbeak	<i>Passerina caerulea</i>	x	x	x
	Painted Bunting	<i>Passerina ciris</i>	x	x	x
	Summer Tanager	<i>Piranga rubra</i>	x	x	x
	Dickcissel	<i>Spiza americana</i>		x	
Icteridae	Orchard Oriole	<i>Icterus spurius</i>	x		
	Brown-headed Cowbird	<i>Molothrus ater</i>	x	x	x
	Great-tailed Grackle	<i>Quiscalus mexicanus</i>	x	x	x
	Common Grackle	<i>Quiscalus quiscula</i>	x		
	Eastern Meadowlark	<i>Sturnella neglecta</i>	x		x
Fringillidae	House Finch	<i>Carpodacus mexicanus</i>	x	x	x
	Lesser Goldfinch	<i>Spinus psaltria</i>	x	x	x
Passeridae	House sparrow	<i>Passer domesticus</i>	x	x	x
TOTAL		Total by year	90	80	75
		Total 2005 - 2009	116		

**ATTACHMENT C
PAST SURVEY RESULTS 2005 - 2007**

Table C-1 2005 Golden-cheeked Warbler and Black-capped Vireo Detections

Detection Number	Species	Date	Time	Coordinates*		Weather Conditions	Vegetation Community
				Northing	Easting		
1	GCWA, male	3/28/2005	1025	537766	3288770	Moderate south winds gusting at 8mph, 25% cloud cover, 64 degrees (F)	Oak-Juniper Woodland
2	GCWA, male	3/28/2005	1105	537925	3288797	Moderate south winds gusting at 8mph, 25% cloud cover, 64 degrees (F)	Oak-Juniper Woodland
3	GCWA, male	4/4/2005	0833	538667	3288940	Moderate SE winds gusting at 15mph, 80% cloud cover. 60 degrees (F)	Juniper Woodland
4	GCWA, male	4/4/2005	0835	538567	3288645	Moderate SE winds gusting at 15mph, 80% cloud cover. 60 degrees (F)	Juniper Woodland
5	GCWA, male	4/4/2005	1049	538490	3288901	Moderate SE winds gusting at 15mph, 80% cloud cover. 71 degrees (F)	Oak-Juniper Woodland
6	GCWA, male	4/4/2005	1100	538397	3286530	Light south winds gusting at 9mph, 100% cloud cover, 77.5 degrees (F)	Oak-Juniper Woodland
7	GCWA, male	4/11/2005	1015	536867	3283925	Light north winds gusting at 2mph, 50% cloud cover, 68.5 degrees (F)	Oak-Juniper Woodland
8	GCWA, male	4/11/2005	1045	536950	3284071	Light north winds gusting at 2mph, 50% cloud cover, 68.5 degrees (F)	Oak-Juniper Woodland
9	GCWA, male	4/11/2005	1133	538282	3287366	Light NW winds gusting at 10mph. 25% cloud cover. 72 degrees (F)	Oak-Juniper Shrubland
10	GCWA, female	4/11/2005	1140	538307	3287536	Light NW winds gusting at 10mph. 25% cloud cover. 72 degrees (F)	Oak-Juniper Shrubland
11	GCWA, male	4/11/2005	1150	538608	3287581	Light NW winds gusting at 10mph. 25% cloud cover. 72 degrees (F)	Oak-Juniper Shrubland
12	GCWA, female	5/2/2005	0900	536357	3287255	Light N winds at 3 mph. 50% cloud cover. 71 degrees (F)	Oak Savanna
13	GCWA, female	5/2/2005	1130	537288	3288300	Light N winds at 3mph. 50% cloud cover. 78 degrees (F).	Juniper Woodland
14	GCWA, male	5/2/2005	1200	538102	3287023	Light N winds, 2-5mph. Cloud cover 50%. 72 degrees (F)	Oak-Juniper Woodland
15	GCWA, female	5/2/2005	1200	538161	3287075	Light N winds, 2-5mph. Cloud cover 50%. 72 degrees (F)	Oak-Juniper Woodland
16	GCWA, male	5/9/2005	1230	537941	3286074	Light winds at 3 mph. 50% cloud cover. 80 degrees (F)	Oak-Juniper Woodland
17	BCVI, male	5/9/2005	0940	538716	3285023	Light E winds, 0-5 mph. 100% cloud cover, periodic light rain. 70 degrees (F)	Oak Shrubland
18	GCWA, male	5/23/2005	0930	538234	3286397	Light winds at 2 mph. 25% cloud cover. 77 degrees (F)	Oak-Juniper Woodland
19	GCWA, female	5/23/2005	1200	537404	3284237	Light winds at 2 mph. 25% cloud cover. 80 degrees (F)	Oak-Juniper Woodland
20	GCWA, male	5/23/2005	1200	537501	3284334	Light winds at 2 mph. 25% cloud cover. 80 degrees (F)	Oak-Juniper Woodland

*Coordinate System: UTM Zone 14N / NAD 83

Table C-2 2007 Golden-cheeked Warbler Detections

Detection Number	Species	Date	Time	Coordinates*		Weather Conditions	Vegetation Community
				Northing	Easting		
1	GCWA, male	4/16/2007	0730	3287469.6	538634.7	Moderate south winds gusting at 10mph, 33% cloud cover, 70 degrees (F)	Oak-Juniper Woodland
2	GCWA, male	4/16/2007	0755	3287317.8	538298.5	Moderate south winds gusting at 10mph, 33% cloud cover, 72 degrees (F)	Oak-Juniper Woodland
3	GCWA, male	4/16/2007	0920	3286974.3	538298.5	Moderate SE winds gusting at 15mph, 80% cloud cover. 60 degrees (F)	Juniper Woodland
4	GCWA, male	4/16/2007	0945	3287216.6	538096.0	Moderate SE winds gusting at 15mph, 80% cloud cover. 60 degrees (F)	Juniper Woodland
5	GCWA, male	4/23/2007	0820	3288001.1	537886.3	Moderate SE winds gusting at 15mph, 100% cloud cover. 77 degrees (F)	Oak-Juniper Woodland
6	GCWA, male	4/23/2007	1130	3287744.4	537702.0	Light south winds gusting at 9mph, 100% cloud cover, 85 degrees (F)	Oak-Juniper Woodland
7	GCWA, male	5/7/2007	0900	3286651.8	537980.3	Light north winds gusting at 10mph, 50% cloud cover, 72 degrees (F)	Oak-Juniper Woodland
8	GCWA, male	5/7/2007	0930	3286528.9	538139.4	Light north winds gusting at 10mph, 60% cloud cover, 75.5 degrees (F)	Oak-Juniper Woodland
9	GCWA, male	5/7/2007	1010	3286214.4	538190.0	Light NW winds gusting at 10mph. 80% cloud cover. 82 degrees (F)	Oak-Juniper Shrubland
10	GCWA, female	5/7/2007	1015	3286196.3	538356.3	Light NW winds gusting at 10mph. 80% cloud cover. 82 degrees (F)	Oak-Juniper Shrubland
11	GCWA, male	5/7/2007	1215	3286073.4	538327.4	Light N winds gusting at 5 mph. 60% cloud cover. 86 degrees (F)	Oak-Juniper Shrubland
12	GCWA, female	5/7/2007	1225	3285835.5	538960.1	Light N winds at 5 mph. 60% cloud cover. 89 degrees (F)	Oak Savanna
13	GCWA, female	5/7/2007	1245	3284653.3	538978.2	Light N winds at 6mph. 50% cloud cover. 89 degrees (F).	Juniper Woodland
14	GCWA, male	5/7/2007	1300	3284349.6	538913.1	Light N winds, 6mph. Cloud cover 50%. 90 degrees (F)	Oak-Juniper Woodland
15	GCWA, female	7/16/2007	1020	3283919.0	537024.5	Light N winds, 10mph. Cloud cover 30%. 88 degrees (F)	Oak-Juniper Woodland
16	GCWA, male	7/23/2007	1100	3287361.2	538613.0	Light winds at 6 mph. 60% cloud cover. 92 degrees (F)	Oak-Juniper Woodland
17	GCWA male	7/23/2007	1115	3284164.9	537400.4	Light E winds, 0-5 mph. 100% cloud cover, periodic light rain. 70 degrees (F)	Oak Shrubland
18	GCWA, male	7/23/2007	1150	3288926.0	538587.3	Light winds at 2 mph. 25% cloud cover. 77 degrees (F)	Oak-Juniper Woodland

*Coordinate System: UTM Zone 14N / NAD 83