2014 Balcones Canyonlands National Wildlife Refuge
Golden-cheeked Warbler (*Setophaga chrysoparia*)
And
Black-capped Vireo (*Vireo atricapilla*)
Annual Monitoring Report

Male Golden-cheeked Warbler

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INTRODUCTION

This report summarizes the results of the Balcones Canyonlands National Wildlife Refuge (BCNWR) 2014 golden-cheeked warbler (*Setophaga chrysoparia*) (GCWA) and black-capped vireo (*Vireo atricapilla*) (BCVI) endangered species monitoring program. This report only includes activities conducted by Refuge staff and volunteers. Additional monitoring and research activities for the BCVI and GCWA were conducted by Marisa Martinez with Texas A&M University (TAMU), for the BCVI by Lauren Seckel with Washington State University, and for the GCWA by Frank Thompson and Jennifer Reidy with the University of Missouri. These activities are reported separately by the specific researcher and are not included in this report.

In 2014, the primary surveyors on staff were: Refuge Biologist Scott Rowin, Zone Biologist Jim Mueller, and volunteer John Harrington. All volunteers and staff received adequate training prior to surveying.

BACKGROUND

Species and Refuge Information

The GCWA is a neotropical migrant passerine that breeds only in central Texas where mature oak-juniper (*Quercus spp. - Juniperus ashei*) habitat occurs (Ladd and Gass 1999). Due to accelerating loss of breeding habitat over the past several decades, this species was listed as federally endangered by the U.S. Fish and Wildlife Service in 1990 (USFWS 1990).

The BCVI is also an endangered, neotropical migrant that breeds in portions of Oklahoma, Texas, and Mexico (Grzybowski 1989). This species was listed by the U.S. Fish and Wildlife Service in 1987. Major threats to the species' survival are habitat loss, habitat fragmentation, and parasitism by brown-headed cowbirds.

The Balcones Canyonlands National Wildlife Refuge was established in 1992 in part to promote the recovery of these species. The Refuge is located at the corners of Travis, Williamson, and Burnet Counties, Texas, and currently consists of approximately 24,440 acres (including conservation easements), with an anticipated future goal of having 46,000 acres. Of the acres currently or soon to be included within the Refuge, approximately 18,728 acres have been identified in the Draft Refuge Habitat Management Plan as areas to be managed for the warbler, some of which are currently not occupied, and approximately 1,873 acres are identified for the vireo, some of which are also not occupied. Additionally, approximately 142 acres within the Refuge have been identified as areas that may be managed for either or both species. The remaining

acreage is typically identified and managed as grassland, savannah, riparian habitat, or facilities.

Current and Historical Surveys

Since 1998 monitoring of the golden-cheeked warbler population on BCNWR has been part of a standardized, regional program between BCNWR and Balcones Canyonlands Preserve (BCP) in Travis County with objectives that tied into the Recovery Plan for the species. The protocol was to map male GCWA territories within several 100-acre plots over 10 weeks based on ≥60 hours of surveys (Balcones Canyonlands Preserve Land Management Plan, 2007, unpublished). Some plots were located in "prime" habitat, in which 75% of the plot had >70% canopy cover, and others in "transitional" habitats that were expected to mature into prime habitat. On BCNWR, 5 plots were established, 3 in prime and 2 in transitional habitats. Population and productivity trends were to be tracked on these 100-acre plots by collecting information on territory density, territory location, pairing success, breeding success, and productivity.

At the time of development it was believed population and productivity estimates for the BCNWR could be derived by extrapolating results from the five 100-acre plots and other short-term monitoring plots to similar habitats throughout the refuge. However, survey efforts on BCNWR over time have been sporadic and inconsistent due to lack of sufficient personnel and other priorities, and as a result population and productivity data are limited. The latest population estimate for the Refuge was at least 810 golden-cheeked warbler territories (Sexton 2009). This estimate was derived by utilizing these survey results and professional judgment, but may not be a valid estimate of the GCWA population on BCNWR for the reasons identified above. Past monitoring efforts also do not provide sufficient information for evaluating success of management activities. Because of this Refuge staff reevaluated its GCWA monitoring program and began a new monitoring approach beginning in 2012. Beginning in 2012 BCNWR would conduct occupancy surveys across the entire refuge (including conservation easements) approximately every five years followed by productivity surveys in the interim four years (beginning in 2013). It is believed this would provide sufficient information to allow for needed management decisions and would allow for trends in occupancy and productivity to be monitored over time. See 2012 and 2013 annual reports for information related to those surveys.

Unfortunately, due to insufficient funding in 2014 BCNWR was not able to hire seasonal staff to assist with continuing the productivity study. Recognizing this would likely be an issue, the productivity survey protocols were designed to allow for sporadic surveys from one year to the next and still allow for monitoring of trends.

Since the Refuge did not have sufficient staff, it decided to focus its efforts on assisting Jennifer Reidy with her ongoing study to evaluate the effects of prescribed burning on GCWAs. This study consists of six 100-acre paired study plots, three of which had prescribed burns conducted in February 2013. The remaining three plots were controls. Baseline surveys were conducted in 2012 and initial effects after the prescribed burn were evaluated in 2013. Since this study may not be continued into the future (lack of funding) and since a full year had lapsed since the prescribed burn, Refuge staff felt it was important to collect as good of data as possible on this study. To do that we had to assure all/most GCWAs within the study plots were color banded so that specific individuals could be monitored with minimal bias. In an effort to facilitate the collection of good quality data, Refuge staff focused their efforts on color banding within these plots.

With respect to the BCVI, the Refuge historically monitored discrete segments of the Refuge's vireo population utilizing presence/absence protocols. Since 2009 considerable help in monitoring the Refuge's BCVI population has occurred through several Universities. Over the past several years the Refuge has relied heavily on these Universities and has obtained good data on BCVI populations and productivity. However, in 2014 four sites (Gainer, Eckhardt NE, the smashed portion of Eckhardt NW, and Webster) were not surveyed by these Universities. Refuge staff felt it was important to collect data within these areas to help understand level of utilization within sites that had received recent management actions. To facilitate this, Refuge staff conducted minimal level enumeration surveys (2 surveys each) at each of these sites. Additionally, casual observations of vireos in new locations were noted.

OBJECTIVES

GCWA

The primary objective of the 2014 golden-cheeked warbler survey effort was to color band as many GCWAs as possible within the six (3 treatment and 3 control) 100-acre study plots. Follow-up monitoring of these color-banded GCWAs was conducted by staff hired by Frank Thompson and Jennifer Reidy. Results of their monitoring effort are reported separately in their report.

BCVI

An enumeration survey is a quick survey of all observed BCVIs in a given area. The objective for this type of survey is to provide a rough estimate of the total number of territorial male vireos within a given area. This methodology provides information on distribution of the species over a large area but does not meet the minimum standards

of a presence/absence survey (USFWS 2010). This type of survey effort allows the surveyor to cover larger areas, but the results are far less accurate than those obtained with other methods. Surveyors attempted to sort out individual BCVIs to increase the accuracy of the count. However, significantly less time is spent on enumeration surveys per acre than presence/absence surveys and therefore only provides a rough estimate of distribution.

Casual Observations

Casual observations of GCWA and BCVI males were made during other surveys and/or field work. These are strictly casual in nature and no data (except BCVI location data) is provided in this report. All observation data for GCWAs and BCVIs are included in the GIS files.

METHODS

Study Sites

Color banding of GCWAs occurred within six 100-acre study plots. These study plots were chosen in 2012 to include three pairs of 100-acre plots that each included approximately 100 acres of GCWA habitat, were spatially distributed across the Refuge, and contained a representative sample of the various habitat types/conditions found on the Refuge. These sites along with a 100-meter buffer are shown in Figure 1

Enumeration surveys for BCVIs occurred at four sites. These sites were chosen because they were not included as sites to be surveyed by TAMU or the University of Washington. Three of these sites, Eckhardt NE and NW, and Gainer had previous mechanical and prescribed fire work to enhance the sites as vireo habitat. The fourth site (Webster) includes an area that structurally has habitat similar to other areas where vireos are found and was therefore included to determine whether or not it was occupied. These sites are shown on Figures 2-5.

Additionally, several casual observations were made for BCVIs and GCWAs across the Refuge.

Survey Dates

Color banding began on March 20, 2014 and continued until mid-April. BCVI surveys began on April 17, 2014 and continued until May 15, 2014. Casual observations occurred throughout the field season.

Survey Procedures

No standardized GCWA surveys were conducted this year by Refuge staff. Rather, Refuge staff focused their efforts on color banding GCWAs as part of a larger study (see above). We set up 6-meter mist nets within the territory of each unbanded male located within each of the six 100-acre study plots. Banding occurred within the 100-meter buffer, but was focused primarily within the 100-acre plot. Once located, we attempted to lure the male into the net by playing recorded GCWA songs. We determined the age and gender of each individual captured using criteria established by Fort Hood. We affixed 3 colored bands and 1 USGS-issued metal band to the legs of individuals we caught using color combinations issued by Fort Hood.

Protocols for BCVI enumeration surveys generally follow standardized presence/absence surveys, but with the exception of fewer hours spent at a site. Enumeration surveys consist of a minimum of two visits where the surveyor traverses a given area listening for male vireos calling. Routes taken are typically left up to the surveyor to determine, which are often determined by following singing male. Unlike presence/absence surveys, call back recordings are frequently used to elicit a response, thereby increasing the probability of detecting vireos. Counter-singing, movement of individuals, and distance from observations are used to distinguish individual males. BCVI observations were recorded with a Garmin GPSMap 62st and were later transcribed on field maps and entered into ArcGIS.

RESULTS

Color Banding

We banded a total of 28 golden-cheeked warbler males in 2014 (Table 1). For unknown reasons, this year GCWAs were much more difficult to entice into the net than previous years. It is not know why this was the case, but interestingly other individuals color banding GCWAs outside the Refuge noted the same thing. Male GCWAs seemed far less territorial than previous years and therefore were often less responsive to the playback recordings. Territory and productivity data associated with these banded GCWAs are provided in Jennifer Reidy's annual report.

Enumeration Surveys

Enumeration survey results are identified on Figures 2-5. Based upon results from the enumeration surveys it is estimated a minimum of 19 territorial males were present on the southern portion of the Gainer track where past management actions (smash and burn) have created vireo habitat. A minimum of six territorial males (3 at each site) were also within the management areas of Eckhardt NE and NW. A single BCVI nest

with eggs was found on Eckhardt NE, but the nest was later abandoned. Female vireos were frequently seen at all sites.

Casual Observations

Casual observations identified at least one territorial male on the SE portion of Mullen, 2-3 territorial males on the SE corner of Johnson, and three territorial males on the northern portion of Gainer (Figures 6- 8). Casual observations of GCWA males were made while conducting other field work, but were strictly casual in nature and no data is provided on them in this report. This data however is provided in the GIS files.

Newly identified locations for BCVIs included the SE corner of Johnson (Figure 7) and the SW corner of Mullen (Figure 6).

LITERATURE CITED

Balcones Canyonlands Preserve. 2007. Land management plan, Tier IIA-7, golden-cheeked warbler management. City of Austin and Travis County, Austin, Texas.

Grzybowski, J.A. 1989. Interim report: black-capped vireo investigations: population and nesting ecology. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

Ladd, C., and L. Gass. 1999. Golden-cheeked warbler (*Dendroica chrysoparia*). In The Birds of North America, No. 181 (A. Poole and F. Gill, eds). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D. C.

Sexton, C. 2009. Memo to the file, A New Estimate of the Golden-cheeked Warbler Population on Balcones NWR, March 5, 2009.

U.S. Fish and Wildlife Service. 1990. Endangered and threatened wildlife and plants; emergency rule to list the golden-cheeked warbler as endangered. Federal Register 55(87):18844-18845.

U.S. Fish and Wildlife Service. 2010. USFWS Section 10(a)(1)(A) Permit Requirements for Conducting Presence/Absence Surveys and Habitat Assessments for Golden-cheeked Warblers, Updated January 13, 2010.

Table 1: Summary data for 28 color banded GCWAs in 2014 on BCNWR.

Location	DATE BANDED	Band #	COLOR COMBO	EASTING	NORTHING	SEX	AGE
PON	3/20/2014	2670-40951	BL/PI:WH/SI	593922	3378795	M	ASY
PON	3/21/2014	2670-40952	BL/YE:BK/SI	594142	3378667	M	ASY
PON	3/24/2014	2670-40953	DB/YE:RD/SI	593994	3378719	M	AHY
POS	3/25/2014	2670-40954	DG/SI:WH/DG	594027	3377351	M	SY
POS	3/25/2014	2670-40955	GR/SI:BK/WH	594704	3377628	M	ASY
PON	3/28/2014	2670-40956	NB/GR:YE/SI	594075	3378496	M	ASY
PON	3/28/2014	2670-40957	PI/SI:NB/RD	594480	3378878	F	AHY
PON	3/31/2014	2670-40958	YE/SI:OR/WH	594321	3378793	M	SY
POS	4/7/2014	2670-40959	PI/WH:DB/SI	594382	3378028	M	AHY
RON	4/8/2014	2670-40960	WH/YE:DG/SI	593243	3384142	M	SY
RON	4/9/2014	2670-40961	PI/SI:NB/GR	592850	3384595	M	SY
ROS	4/9/2014	2670-40963	OR/SI:NB/WH	593394	3383189	M	SY
POS	3/17/2014	2670-40966	BL/SI:NB/WH	594028	3377917	M	ASY
PON	3/18/2014	2670-40967	BL/SI:YE/BK	594521	3378441	M	ASY
PON	3/18/2014	2670-40968	BL/WH:PI/SI	594522	3378441	M	ASY
POS	3/19/2014	2670-40969	GR/SI:PI/RD	594535	3377983	M	ASY
POS	3/19/2014	2670-40970	NB/SI:OR/RD	594584	3378070	M	ASY
PON	3/21/2014	2670-40971	WH/DB:WH/SI	594623	3378798	M	ASY
PON	3/24/2014	2670-40972	YE/SI:OR/GR	594630	3378315	M	ASY
PON	3/24/2014	2670-40973	YE/WH:DB/SI	594307	3378577	M	SY
POS	3/25/2014	2670-40974	YE/SI:YE/BL	594426	3377759	M	ASY
PON	3/27/2014	2670-40975	YE/YE:BK/SI	594695	3378467	M	SY
PON	4/7/2014	2670-40976	DB/SI:WH/BK	594320	3378300	M	SY
ROS	4/8/2014	2670-40977	GR/SI:RD/OR	593448	3383143	F	AHY
ROS	4/8/2014	2670-40978	MV/SI:WH/PI	592908	3383378	M	SY
ROS	4/8/2014	2670-40979	NB/BK:PI/SI	593162	3383704	M	SY
ROS	4/8/2014	2670-40980	RD/GR:GR/SI	593464	3383632	M	SY
POS	4/15/2014	2670-40981	BK/SI:PI/RD	594278	3377371	M	SY

Figure 1: Location of the six study plots where GCWA color banding occurred in 2014 on BCNWR. Yellow interior polygon is the 100-acre plot and yellow exterior polygon is a 100-meter buffer.

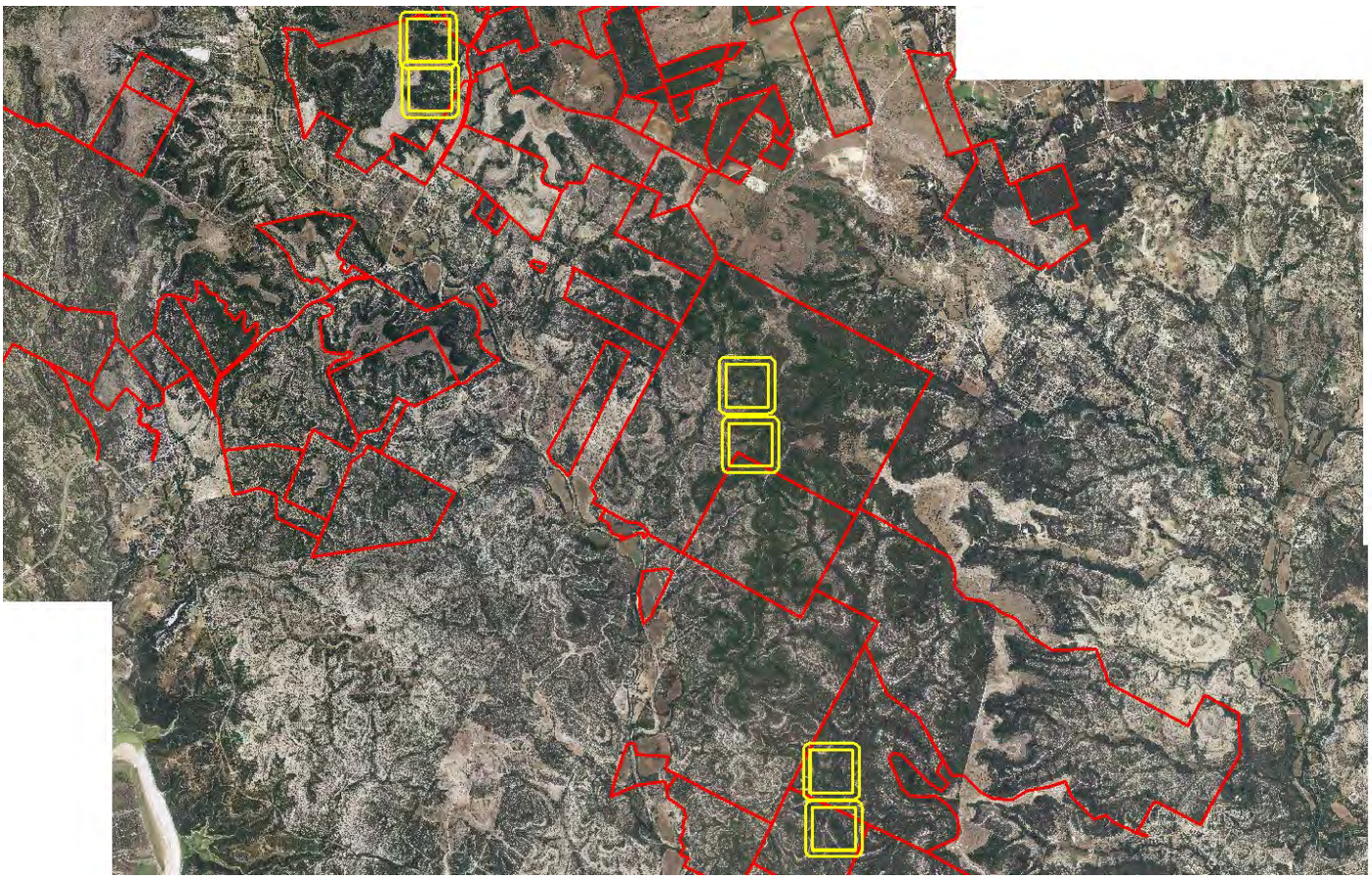

Figure 2: 2014 BCVI Enumeration Surveys on Eckhardt NE. Colored points represent observations of different male BCVI.

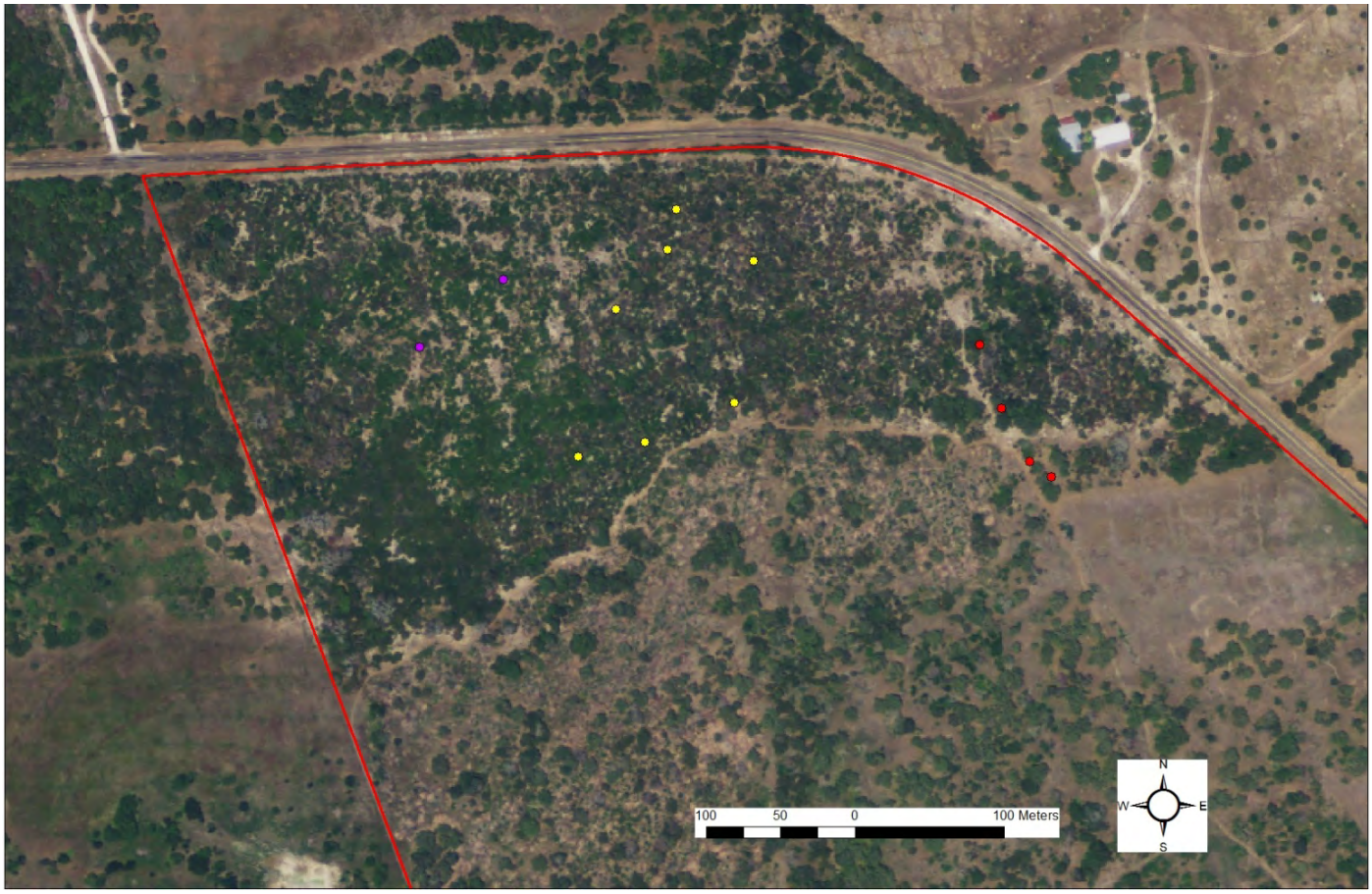

Figure 3: 2014 BCVI Enumeration Surveys on Eckhardt NW. Colored points represent observations of different male BCVI. Question marks are unknown BCVI male observations and were therefore not assigned to a territory.

Figure 4: 2014 BCVI Enumeration Surveys on Gainer South. Colored points represent observations of different male BCVI. Question mark is a location of an unknown GCWA and was not assigned to a territory.

Figure 5: 2014 BCVI Enumeration Surveys on eastern Webster. No BCVI detections were made. Yellow polygon represents area searched.

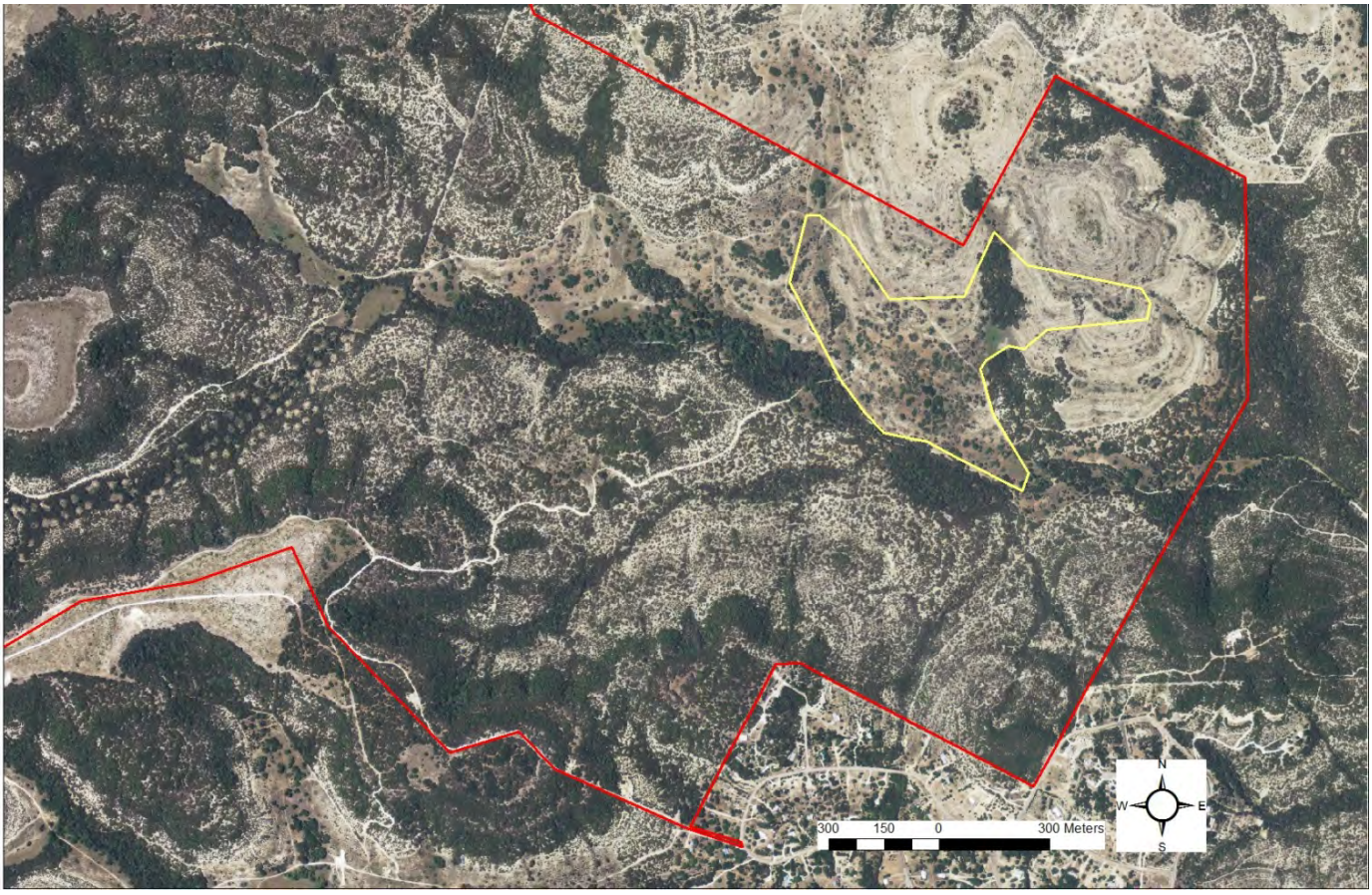

Figure 6: 2014 casual observation of BCVI male on SE Mullen.

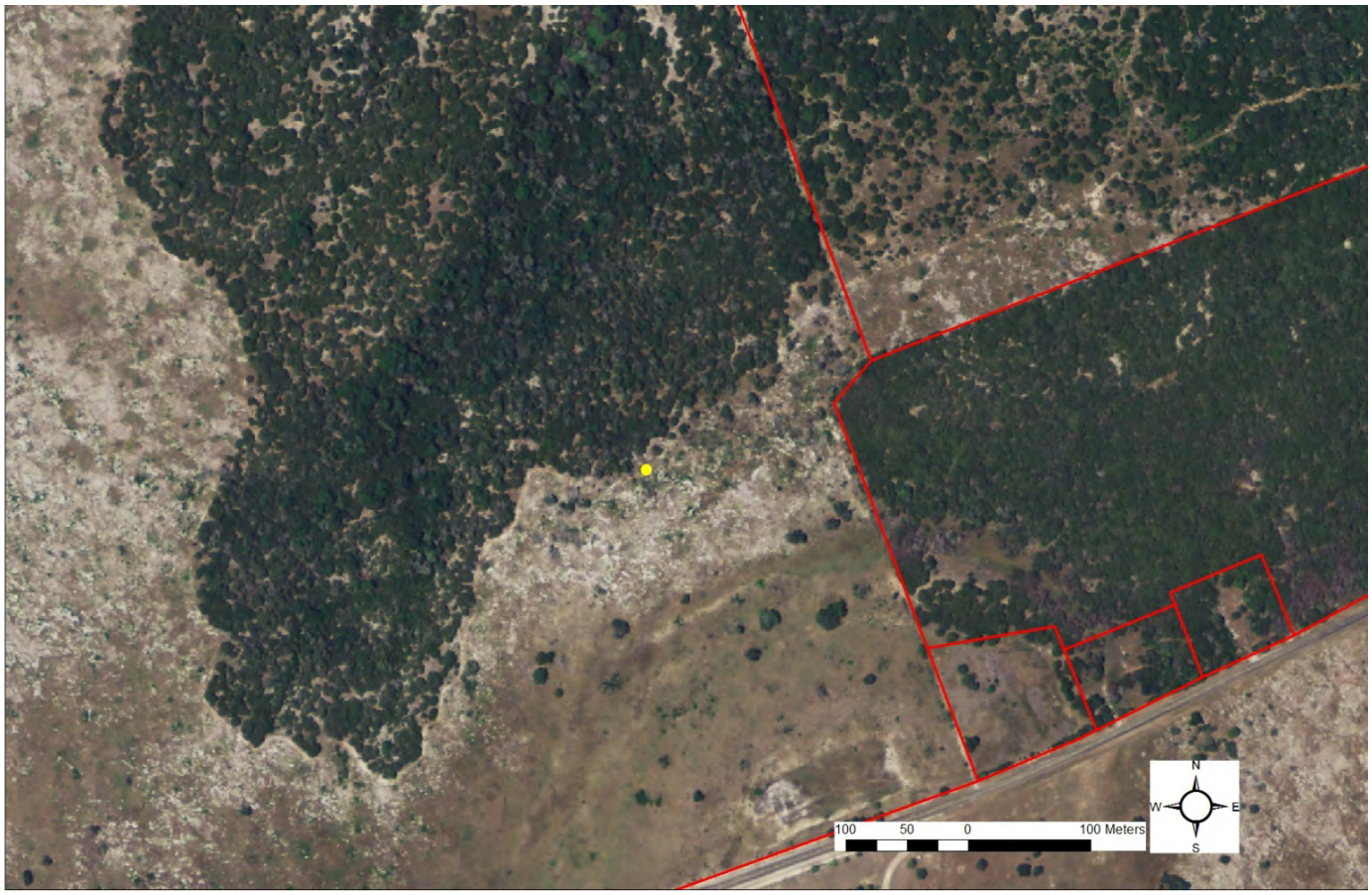

Figure 7: 2014 casual observations of BCVI males on SE Johnson. An estimated three male BCVIs were identified.

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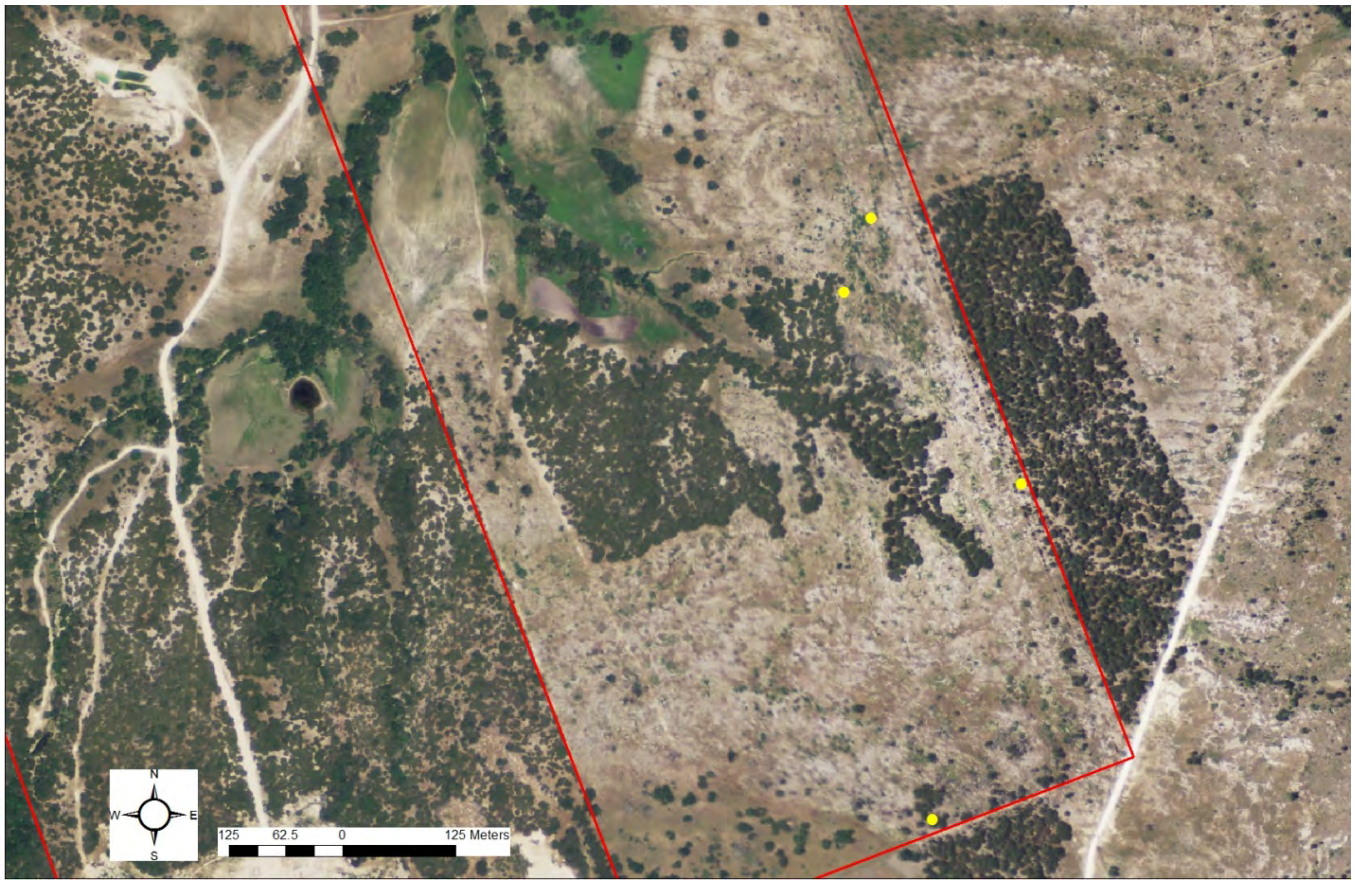
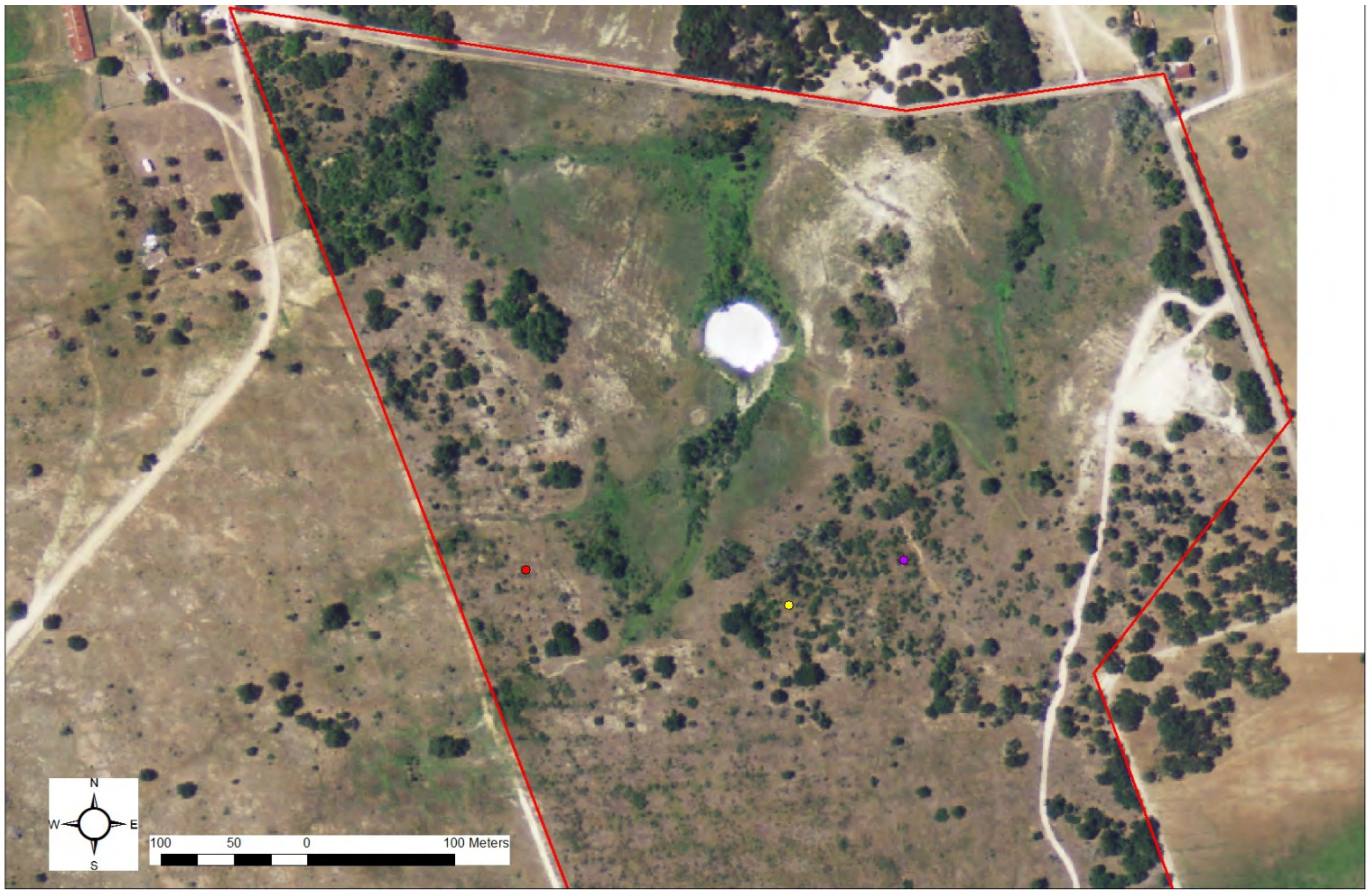
Figure 8: 2014 casual observations of BCVI males on northern Gainer. An estimated three male BCVIs were identified. Each is shown in different colors.