Wheless Preserve

Golden-cheeked Warbler Territory Mapping Report

Spring 2016

Prepared for

LCRA
ENERGY • WATER • COMMUNITY SERVICES

Natural Resource Conservation

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1.0 INTRODUCTION

The Lower Colorado River Authority (LCRA) owns and manages the 2,317-acre Wheless Preserve, which is part of the larger Balcones Canyonlands Preserve (BCP) system. The BCP is a system of preserves associated with the Balcones Canyonlands Conservation Plan (BCCP), a regional habitat conservation plan in which LCRA is a Managing Partner. The Wheless Preserve is bordered on the west side by Lime Creek Road, north of the Village of Volente, in northwestern Travis County, Texas (see **Figure 1.0** in **Appendix A**). Around the remainder of the Wheless Preserve boundary are additional preserve lands owned and/or managed by Travis Audubon Society, Travis County, City of Austin, The Nature Conservancy, and private landowners. The Wheless Preserve contains approximately 1,715 acres of suitable habitat for the endangered golden-cheeked warbler (GCWA, *Setophaga chrysoparia*), of which 1,400 acres are considered high-quality habitat.

The purpose of this report is to present the results of 2016 GCWA territory mapping within a portion of the Wheless Preserve. The survey methods followed the U.S. Fish and Wildlife Service's (USFWS) recommended minimum procedures for determining the presence/absence of GCWAs (USFWS 2010), as outlined in LCRA's Federal Fish and Wildlife Permit (Permit No. TE800900-0), unless otherwise stated. In addition, GCWA territory-level mapping was conducted according to the *Land Management Plan Protocol for Conducting Territory Mapping on BCP Lands (Appendix A – 100-acre Plot Protocol for Field Season 2002 and Beyond)* (BCCP 2007).

Section 2.0 of this report describes the two survey plots. Section 3.0 describes the methods used to perform the 2016 surveys and territory mapping, and Section 4.0 presents the results of the territory mapping.

2.0 DESCRIPTION OF SURVEY AREAS

2.1 Prime Plot

The Prime Plot is approximately 93.2 acres (per ArcGIS estimate of boundary shapefile provided to Blanton & Associates, Inc. (B&A) by LCRA) (**Figures 1.0** and **2.0**). Topography of the Prime Plot is highly variable due to a portion of the plot being bisected by Long Hollow Creek, a spring-fed stream that flows north to south along the west side of the Prime Plot. An unnamed tributary to Long Hollow Creek also flows north to south through the center of the Prime Plot, intersecting Long Hollow Creek near the southern end of the plot. These two streams have created small canyons that are separated by a narrow ridge. East of the unnamed tributary, the Prime Plot extends to the western edge of a relatively flat plateau that separates the Long Hollow Creek watershed from the Cypress Creek watershed. Multiple ephemeral streams contribute to the Long Hollow Creek watershed, creating numerous smaller draws and drainages. Elevations within the Prime Plot range from approximately 780 feet above mean sea level (msl) to approximately 950 feet above msl. Representative Photographs of the Prime Plot are found in **Appendix B** and a list of birds observed is found in **Appendix C**.

Vegetation/habitat within the Prime Plot largely conforms to a mature forest community structure (Diamond et al. 1987), with a relatively open understory, a high degree of species overlap (interspersion), and canopy cover ranging from 50 to 90 percent. The groundcover is largely exposed rock and leaf litter, with a low-diversity of sparse herbaceous plants. However, some portions of the Prime Plot support less-mature

woodlands, largely on southwest-facing slopes, that are dominated primarily by shorter-statured Ashe juniper (*Juniperus ashei*), Texas red oak (*Quercus buckleyi*), and plateau live oak (*Quercus fusiformis*). These areas are characteristically more open (greater interstitial space between plants), thereby creating less interspersion of plants or plant species.

Dominant canopy species within suitable GCWA habitat of the Prime Plot include Ashe juniper, Texas red oak, plateau live oak, Durand oak (*Quercus sinuata*), cedar elm (*Ulmus crassifolia*), Arizona walnut (*Juglans major*), Escarpment black cherry (*Prunus serotina* var. *eximia*), Texas ash (*Fraxinus texensis*), sycamore (*Platanus occidentalis*), and sugarberry (*Celtis laevigata*). Common midstory and understory species include Ashe juniper, plateau live oak, Texas red oak, Texas mountain laurel (*Sophora secundiflora*), Texas redbud (*Cercis canadensis* var. *texensis*), evergreen sumac (*Rhus virens*), Lindheimer's silktassel (*Garrya ovata* ssp. *lindheimeri*), Texas persimmon (*Diospyros texana*), agarito (*Berberis trifoliolata*), Texas kidneywood (*Eysenhardtia texana*), Roosevelt weed (*Baccharis neglecta*), elbow-bush (*Forestiera angustifolia*), and Mexican buckeye (*Ungnadia speciosa*). Other common understory species include cedar sage (*Salvia roemeriana*), frostweed (*Verbesina virginica*), greenbriar (*Smilax bona-nox*), mustang grape (*Vitis mustangensis*), and other various grasses and forbs.

2.2 Transitional Plot

The topography of the Transitional Plot (approximately 128.6 acres, per ArcGIS estimate of boundary shapefile provided by LCRA) is also highly variable, with two primary ridges (one north and one south) and two associated valleys. The Transitional Plot is bisected by a primary tributary of Long Hollow Creek (**Figures 1.0** and **3.0**). This stream forms a shallow canyon that rises to the north and south. South of the unnamed tributary, the Transitional Plot is moderately sloping with eastern-facing topography. Multiple ephemeral streams occur in the Transitional Plot, creating numerous small topographic depressions and swales. Elevations within the Transitional Plot range from approximately 840 feet above msl to 900 feet above msl. Representative Photographs of the Transitional Plot are found in **Appendix B** and a list of birds observed is found in **Appendix C**.

Vegetation/habitat on the ridge tops is largely scattered mature Texas red oak and mature Ashe juniper, with a moderate degree of interspersion. The habitat generally conforms to a semi-mature woodland community structure (Diamond et al. 1987), with a relatively high degree of open interstitial space. The ridge-top communities do not support a significant understory community. The groundcover is largely exposed rock and leaf litter, with a low-diversity of sparse herbaceous plants. Side slopes are droughty with thin calcareous soil over shallow, exposed limestone. Vegetation consists of dense, low-statured Ashe juniper with very little diversity or interstitial space. Valleys contain dry ephemeral watersheds, and the associated vegetation is largely consistent with the ridge tops, but with greater understory development, higher diversity, greater interspersion, and greater canopy cover. Estimated canopy cover within the Transitional Plot varies from 30 percent to 90 percent.

Dominant canopy species within suitable GCWA habitat of the Transitional Plot include Ashe juniper, plateau live oak, Texas ash, and sugarberry. Common midstory and understory species include Ashe juniper, plateau live oak, Texas mountain laurel, Texas redbud, evergreen sumac, agarito, Texas kidneywood, Roosevelt weed, elbow-bush, and Texas persimmon. Other understory species include cedar

sage, frostweed, greenbriar, mustang grape, Texas pricklypear (*Opuntia engelmannii* var. *lindheimeri*), and other various grasses and forbs.

3.0 METHODS

Surveys began on March 25, 2016 and were completed on May 17, 2016 (**Table 1**). Observations began no earlier than one-half hour after official sunrise, when temperatures were above 55 degrees Fahrenheit, wind speeds were below 15 miles per hour (mph), and with no or light precipitation. Two biologists surveyed each plot for at least three hours, or one biologist surveyed each plot for at least six hours. The Transitional Plot was surveyed three times, and the Prime Plot was surveyed 10 times. Surveyors used spot-mapping techniques consistent with the USFWS protocol for GCWA presence/absence (USFWS 2010), International Bird Census Committee (IBCC 1970), and Bibby et al. (2003).

During each visit, surveyors walked slowly through the survey area and listened for GCWAs. If a GCWA was observed, surveyors recorded the location of the bird on a paper field map and with an Ashtec Global Positioning System (GPS) receiver. The GPS location recorded was the actual or estimated location of the bird. Observers also noted other observations, including vocalization (call or song type), time of observation, sex, presence of bands, and presence of juveniles. Contemporary contacts of multiple birds (counter-singing) were noted on the field maps and notebooks. No audio tapes were used during this survey.

After completion of the field surveys, all GCWA locations were mapped using ArcGIS 10.3.1 in NAD 1983 Texas State Plane Coordinate System. An area was considered a potential territory if a male and female were present, if a male or female and juveniles were present, if counter-singing was observed from a neighboring male, if there were repeated observations in the same area, if there were sequential movements of an individual male, or if one male was observed singing in an area where no other birds were observed (Bibby et al. 2000). Some areas identified as a territory met multiple criteria.

Reproductive success metrics were determined as follows:

1. Territory density: number of territories per 100 acres (edge territories counting as 0.5 territory);
2. Calculation of edge territories: each territory that straddles plot boundary counted as a half territory (i.e., 0.5 territory) (Verner 1985); and
3. Productivity measures (Anders 2000) - calculated for full territories ONLY, as follows:
    a. Pairing success: pairing success of male GCWA determined by observing one or more of the following conditions: a territorial male associating with a female, the nest of a territorial male, and/or a male tending ≥1 fledgling. Pairing success rate = number of territories determined to have pairing success / total number of full territories;
    b. Breeding success: breeding success rate = number of territories that successfully fledged at least one young / total number of full territories;
    c. Estimated brood size: average brood size per successful pair (based on “breeding success”); and
    d. Productivity = sum of the highest number of fledglings recorded at any one time for each full territory / total number of full territories.

Table 1. Survey Dates, Times, and Weather Conditions for GCWA Surveys

Date	Time				Temperature (°F)		Wind Direction		Wind Speed (mph)		Cloud Cover (%)		Surveyor	Comments
	Sunrise	Start	End	Total Hrs	Start	End	Start	End	Start	End	Start	End		
Prime Plot														
3/25/16	7:28	10:46	1:49	3:03	56	70	S	S	0-4	0-3	0	10	B. Doggett	North half of prime plot
3/25/16	7:28	10:46	1:49	3:03	56	70	S	S	0-4	0-3	0	10	R. Phillips	South half of prime plot
4/4/2016	7:16	9:31	12:32	3:01	69	80	S	S	0-2	0-2	0	0	B. Doggett	North half of prime plot
4/4/2016	7:16	9:31	12:32	3:01	69	80	S	S	0-2	0-2	0	0	G.Casares	South half of prime plot
4/8/2016	7:11	10:11	1:13	3:02	74	79	SW	SW	0-3	0-3	30	70	R. Phillips	South half of prime plot
4/8/2016	7:11	10:11	1:27	3:16	74	79	NE	NE	0-3	0-3	30	70	B. Doggett	North half of prime plot
4/14/2016	7:04	9:01	12:33	3:32	57	70	NW	NW	0-2	0-4	100	50	B.Doggett	South half of prime plot
4/14/2016	7:04	9:01	12:33	3:32	57	70	NW	NW	0-2	0-4	100	50	C. Ladd	North half of prime plot
5/5/2016	6:44	8:28	11:54	3:26	62	83	NW	NE	0-2	0-3	10	20	B. Doggett	South half of prime plot
5/5/2016	6:44	8:28	11:54	3:26	62	83	NW	NE	0-2	0-3	10	20	C. Ladd	North half of prime plot
5/6/2016	6:43	8:42	11:55	3:13	65	80	SE	SE	0-2	0-2	5	0	B. Doggett	South half of prime plot
5/6/2016	6:43	8:42	11:55	3:13	65	80	SE	SE	0-2	0-2	5	0	N. Wallisch	North half of prime plot
5/10/2016	6:40	7:53	1:58	6:05	73	91	S	SE	0-2	0-3	100	10	B. Doggett	All prime plot
5/13/2016	6:38	10:58	2:13	3:15	81	84	NE	SW	0-3	0-2	50	60	B. Doggett	South half of prime plot
5/13/2016	6:38	10:58	2:08	3:10	81	84	NE	SW	0-3	0-2	50	60	N. Wallisch	North half of prime plot
5/14/2016	6:37	7:10	1:10	6:00	74	83	SE	SE	0-5	0-5	70	100	J. Schindler	All of prime plot; light drizzle in the afternoon
5/17/2016	6:36	8:10	2:35	6:25	68	80	SE	SE	1-6	4-10	100	40	N. Wallisch	All of prime plot
Prime Plot Total Time:				*63:43:00*										
Transitional Plot														
4/4/2016	7:16	12:37	3:42	3:05	80	82	S	S	0-2	0-2	0	0	B. Doggett	North half of transitional plot
4/4/2014	7:16	12:38	3:42	3:04	80	82	S	S	0-2	0-2	0	0	G. Casares	South half of transitional plot
5/6/2016	6:43	12:14	3:23	3:09	82	84	SE	SE	0-2	0-2	0	0	B. Doggett	North half of transitional plot
5/6/2016	6:43	12:15	3:22	3:07	82	84	SE	SE	0-4	0-4	0	0	N. Wallisch	South half of transitional plot
5/16/2016	6:36	8:50	2:53	6:03	68	78	SE	E	0-2	0-5	100	80	N. Wallisch	All of transitional plot
Transitional Plot Total Time:				*18:28:00*										

4.0 RESULTS

4.1 Prime Plot

GCWA were observed at 77 points in the Prime Plot, including 67 observations of a male, nine observations of a female, and one observation of juveniles (**Figures 2.0** through **2.10**). No banded birds were observed during the surveys. All observation data are included in **Table 2**.

Figure 2.0 shows the survey results of the Prime Plot survey for the entire season (10 visits), **Figures 2.1** through **2.10** show the results by day (March 25, 2016 through May 17, 2016). Four full territories (labeled B, C, D, and E) were observed, and females were observed in all four (**Figure 2.0**). Additionally, a pair of juveniles was observed on May 14 with the male in territory C.

Three edge territories were also identified (A, F, and G) (**Figure 2.0**). Females were seen in territories A and F. No juveniles were noted in any of the edge territories.

Territory density in the Prime Plot was estimated at 5.9 / 100 acres. This calculation was based on four full territories and three edge territories in 93.2 acres.

The pairing success rate in the Prime Plot was 100 percent (four out of the four full territories). The breeding success rate was estimated at 25 percent, based on one of the four full territories in which juveniles were detected (territory C). The average brood size was two, again based on the observations on territory C. The productivity was estimated at 0.5, based on the two juveniles observed in four full territories.

4.2 Transitional Plot

GCWA were observed at 10 points in the Transitional Plot, including nine observations of a male and one observation of a female (**Figure 3.0**). No banded birds were observed during the surveys. All observation data are included in **Table 3**.

Figure 3.0 shows the results of the Transitional Plot survey for the entire season (three visits). One full territory was identified (A). No females or juveniles were seen in the full territory.

4.3 Additional Avian Observations

Fifty-two (52) avian species were observed. A list of birds observed is found in **Appendix C.** One other federally listed endangered bird species, the black-capped vireo (*Vireo atricapilla),* was observed during surveys on May 6 and May 13, 2016. It was observed on both occasions in the same general area along the property boundary in the northeastern part of the Prime Plot. **Figure 4.0** shows the locations of the two observations. The vegetation on the adjacent property is similar to the vegetation in the Prime Plot, and while it is slightly younger and more open than in the Prime Plot, it does not appear to be optimal breeding habitat for the black-capped vireo. The individual observed was a male.

Table 2. Survey Observation Data: Prime Plot

MAP #	Latitude	Longitude	X_Proj	Y_Proj	Date	Observer	Banded	Vocalization	Sex	Precision (feet)	Movement/Counter-singing
001	30.4572	-97.8707	3072425.0437	10138591.0256	3/25/2016	R. Phillips	unknown	A	M	30	
002	30.4618	-97.8678	3073299.8349	10140316.0414	3/25/2016	B. Doggett	unknown	A	M	30	moved to 003 and back again
003	30.4624	-97.8677	3073315.9990	10140518.3732	3/25/2016	B. Doggett	unknown	A	M	90	moved from 002 and back to 002
004	30.4575	-97.8721	3071996.4802	10138696.4638	4/4/2016	G. Casares	unknown	A	M	300	004 - 006 same bird moved from 004 to 005, then to 006
005	30.4580	-97.8717	3072094.0626	10138889.9492	4/4/2016	G. Casares	unknown	A	M	60	004 - 006 same bird moved from 004 to 005, then to 006
006	30.4591	-97.8718	3072054.2522	10139279.0361	4/4/2016	G. Casares	unknown	A	M	30	004 - 006 same bird moved from 004 to 005, then to 006
007	30.4595	-97.8707	3072395.1296	10139454.6464	4/4/2016	B. Doggett	unknown	A	M	150	contemporary contact with 008
008	30.4602	-97.8713	3072222.7539	10139696.3792	4/4/2016	B. Doggett	unknown	A	M	120	contemporary contact with 007
009	30.4609	-97.8740	3071367.2212	10139916.2130	4/8/2016	B. Doggett	unknown	A	M	30	moved to 010
010	30.4609	-97.8730	3071657.0495	10139928.4307	4/8/2016	B. Doggett	unknown	A	M	60	moved from 009
011	30.4599	-97.8717	3072093.6214	10139582.9336	4/8/2016	R. Phillips	unknown	chipping	M	15	moved north
012	30.4611	-97.8709	3072330.6153	10140039.2728	4/8/2016	B. Doggett	unknown	A	M	30	moved back and forth across dry stream bed
013	30.4613	-97.8738	3071421.1237	10140058.9742	4/14/2016	C. Ladd	unknown	B	M	150	possibly same male as 014
014	30.4611	-97.8731	3071626.9596	10139989.3880	4/14/2016	C. Ladd	unknown	chipping	M	30	aggressive encounter with 015, possibly same male as 013
015	30.4610	-97.8731	3071631.5141	10140019.0380	4/14/2016	C. Ladd	unknown	chipping	M	30	aggressive encounter with 016, possibly same male as 018
016	30.4611	-97.8732	3071608.1078	10140021.5520	4/14/2016	C. Ladd	unknown		F	30	
017	30.4611	-97.8732	3071613.9689	10139992.1323	4/14/2016	C. Ladd	unknown		F	30	
018	30.4612	-97.8730	3071675.0352	10140039.1734	4/14/2016	C. Ladd	unknown	B	M	30	possibly same male as 015
019	30.4601	-97.8708	3072369.9585	10139656.2588	4/14/2016	C. Ladd	unknown	chipping	M	30	foraging with female 020
020	30.4600	-97.8705	3072465.2342	10139620.3079	4/14/2016	C. Ladd	unknown	chipping	F	30	foraging with male 019
021	30.4616	-97.8705	3072465.6303	10140201.4718	4/14/2016	C. Ladd	unknown	A	M	30	moved to 022
022	30.4617	-97.8707	3072399.4031	10140248.7335	4/14/2016	C. Ladd	unknown	A	M	30	moved from 021
023	30.4622	-97.8706	3072409.8444	10140431.9321	4/14/2016	C. Ladd	unknown	A	M	30	

Table 2. Survey Observation Data: Prime Plot

MAP #	Latitude	Longitude	X_Proj	Y_Proj	Date	Observer	Banded	Vocalization	Sex	Precision (feet)	Movement/Counter-singing
024	30.4614	-97.8723	3071901.3635	10140120.2497	5/5/2016	C. Ladd	unknown	A	M	30	024 - 027 same bird, moved from 024 to 025, then to 026, then to 027
025	30.4614	-97.8720	3071966.9905	10140135.0915	5/5/2016	C. Ladd	unknown	A	M	30	024 - 027 same bird, moved from 024 to 025, then to 026, then to 027
026	30.4613	-97.8721	3071951.5880	10140072.4718	5/5/2016	C. Ladd	unknown	A	M	30	024 - 027 same bird, moved from 024 to 025, then to 026, then to 027
027	30.4612	-97.8720	3071997.6068	10140047.0922	5/5/2016	C. Ladd	unknown	A	M	30	024 - 027 same bird, moved from 024 to 025, then to 026, then to 027
028	30.4589	-97.8700	3072628.0167	10139227.0213	5/5/2016	B. Doggett	unknown	A	M	180	028 - 030 same bird, moved from 028 to 029 then 030
029	30.4583	-97.8698	3072699.9892	10139019.1447	5/5/2016	B. Doggett	unknown	A	M	180	028 - 030 same bird, moved from 028 to 029 then 030
030	30.4580	-97.8709	3072357.7371	10138889.7224	5/5/2016	B. Doggett	unknown	A	M	180	028 - 030 same bird, moved from 028 to 029 then 030
031	30.4601	-97.8682	3073197.1889	10139661.3712	5/5/2016	C. Ladd	unknown	B	M	30	contemporary contact with 032
032	30.4602	-97.8682	3073183.5284	10139707.6467	5/5/2016	C. Ladd	unknown	B	M	30	paired with female 033, contemporary contact with 031
033	30.4602	-97.8683	3073147.6371	10139722.8115	5/5/2016	C. Ladd	unknown		F	30	paired with male 032
034	30.4604	-97.8687	3073032.9049	10139788.0165	5/5/2016	C. Ladd	unknown	B	M	60	contemporary contact with 035
035	30.4604	-97.8681	3073231.1897	10139786.7442	5/5/2016	C. Ladd	unknown	B	M	30	contemporary contact with 034
036	30.4608	-97.8723	3071892.3952	10139901.0712	5/6/2016	N. Wallisch	unknown		M	90	foraging with female 037
037	30.4608	-97.8722	3071922.3121	10139898.3347	5/6/2016	N. Wallisch	unknown		F	90	foraging with male 036
038	30.4602	-97.8702	3072570.4257	10139716.2078	5/6/2016	N. Wallisch	unknown	B	M	30	
039	30.4582	-97.8707	3072403.5885	10138952.2383	5/6/2016	B. Doggett	unknown	A	M	30	039 - 041 same bird moved from 039 to 040, then to 041
040	30.4580	-97.8713	3072216.3290	10138891.9446	5/6/2016	B. Doggett	unknown	A	M	60	039 - 041 same bird moved from 039 to 040, then to 041
041	30.4585	-97.8710	3072317.4447	10139060.6906	5/6/2016	B. Doggett	unknown	A	M	60	039 - 041 same bird moved from 039 to 040, then to 041

Table 2. Survey Observation Data: Prime Plot

MAP #	Latitude	Longitude	X_Proj	Y_Proj	Date	Observer	Banded	Vocalization	Sex	Precision (feet)	Movement/Counter-singing
042	30.4587	-97.8693	3072840.7244	10139144.8144	5/6/2016	N. Wallisch	unknown		F	90	moved northwest
043	30.4583	-97.8686	3073063.6130	10139019.4573	5/6/2016	N. Wallisch	unknown	B	M	120	moved west
044	30.4618	-97.8678	3073292.3358	10140311.6241	5/10/2016	B. Doggett	unknown	A	M	30	044 - 047 same bird moved to 046
045	30.4613	-97.8672	3073479.8717	10140103.3251	5/10/2016	B. Doggett	unknown	A	M	90	044 - 047 same bird moved from 044 then to 046
046	30.4606	-97.8679	3073283.9593	10139869.3542	5/10/2016	B. Doggett	unknown	A	M	30	044 - 047 same bird moved from 044 then to 047
047	30.4605	-97.8677	3073346.9880	10139835.8355	5/10/2016	B. Doggett	unknown	A	M	30	044 - 047 same bird moved from 046 then back to 044
048	30.4612	-97.8722	3071932.9686	10140035.2324	5/13/2016	N. Wallisch	unknown	A	M	90	paired with female 049
049	30.4613	-97.8721	3071963.6412	10140075.6124	5/13/2016	N. Wallisch	unknown		F	30	paired with male 048
050	30.4595	-97.8713	3072211.6275	10139419.0868	5/13/2016	N. Wallisch	unknown	B	M	60	moved to 051
051	30.4596	-97.8714	3072196.0015	10139456.3285	5/13/2016	N. Wallisch	unknown	B	M	30	moved from 050
052	30.4611	-97.8677	3073334.5459	10140047.9648	5/13/2016	N. Wallisch	unknown	A	M	150	
053	30.4610	-97.8711	3072255.3968	10139987.0314	5/14/2016	J. Schindler	unknown	A	M	30	053 - 056 same bird moved to 054
054	30.4612	-97.8714	3072183.6428	10140053.8329	5/14/2016	J. Schindler	unknown	A	M	60	053 - 056 same bird moved from 053 then to 055
055	30.4610	-97.8716	3072119.4133	10139980.0198	5/14/2016	J. Schindler	unknown	B	M	30	053 - 056 same bird moved from 054 then to 056
056	30.4607	-97.8715	3072138.7654	10139888.7765	5/14/2016	J. Schindler	unknown	B	M	30	053 - 056 same bird moved from 055 then to 057
057	30.4608	-97.8715	3072148.7075	10139891.7453	5/14/2016	J. Schindler	unknown		J(2)	30	paired with male 053 - 056
058	30.4606	-97.8684	3073110.1203	10139869.9108	5/14/2016	J. Schindler	unknown	B/A	M	30	058 - 060 same bird moved to 059, counter-singing with male 062
059	30.4609	-97.8685	3073083.9408	10139956.2732	5/14/2016	J. Schindler	unknown	A	M	30	058 - 060 same bird moved from 058 then to 060
060	30.4611	-97.8688	3073000.6291	10140046.8262	5/14/2016	J. Schindler	unknown	A	M	60	058 - 060 same bird moved from 059
061	30.4603	-97.8686	3073066.7855	10139736.0506	5/14/2016	J. Schindler	unknown		F	30	paired with male 062

Table 2. Survey Observation Data: Prime Plot

MAP #	Latitude	Longitude	X_Proj	Y_Proj	Date	Observer	Banded	Vocalization	Sex	Precision (feet)	Movement/Counter-singing
062	30.4603	-97.8686	3073057.5921	10139737.4235	5/14/2016	J. Schindler	unknown	B	M	30	062 - 065 same bird moved to 063, counter-singing with male 058
063	30.4604	-97.8688	3073008.9096	10139786.9096	5/14/2016	J. Schindler	unknown	B	M	60	062 - 065 same bird moved from 062 then to 064
064	30.4603	-97.8688	3073009.3351	10139739.2643	5/14/2016	J. Schindler	unknown	B	M	60	062 - 065 same bird moved from 063 then to 065
065	30.4601	-97.8687	3073039.0783	10139691.1774	5/14/2016	J. Schindler	unknown	B	M	60	062 - 065 same bird moved from 064
066	30.4584	-97.8695	3072805.3538	10139046.1165	5/14/2016	J. Schindler	unknown	A	M	60	moved to 067
067	30.4586	-97.8687	3073035.1552	10139128.6923	5/14/2016	J. Schindler	unknown	A	M	30	moved from 066
068	30.4548	-97.8717	3072133.9979	10137740.5729	5/14/2016	J. Schindler	unknown	A/B	M	90	068 - 071 same bird moved to 069
069	30.4551	-97.8715	3072204.6880	10137850.1791	5/14/2016	J. Schindler	unknown	A	M	90	068 - 071 same bird moved from 068 then to 070
070	30.4556	-97.8712	3072271.0617	10138026.6246	5/14/2016	J. Schindler	unknown	A	M	90	068 - 071 same bird moved from 069 then to 071
071	30.4560	-97.8723	3071940.3409	10138160.4503	5/14/2016	J. Schindler	unknown	A	M	60	068 - 071 same bird moved from 070
072	30.4608	-97.8729	3071696.1369	10139893.7078	5/17/2016	N. Wallisch	unknown	chipping	F	30	paired with male 073
073	30.4607	-97.8729	3071702.8174	10139875.8761	5/17/2016	N. Wallisch	unknown	chipping	M	30	paired with female 072
074	30.4607	-97.8692	3072861.3949	10139890.1632	5/17/2016	N. Wallisch	unknown	A	M	120	
075	30.4604	-97.8680	3073237.1428	10139799.1387	5/17/2016	N. Wallisch	unknown	B	M	30	
076	30.4574	-97.8709	3072354.3113	10138665.1063	5/17/2016	N. Wallisch	unknown	A	M	180	
077	30.4586	-97.8687	3370147.9060	608608.7225	5/17/2016	N. Wallisch	unknown	A	M	90	

Table 3. Survey Observation Data: Transitional Plot

MAP #	Latitude	Longitude	X_Proj	Y_Proj	Date	Observer	Banded	Vocalization	Sex	Precision (feet)	Movement/Counter-singing
001	30.4538	-97.8849	3067995.0016	10137256.6975	4/4/2016	B. Doggett	unknown	A	M	120	moved to 002
002	30.4525	-97.8840	3068285.4328	10136819.6502	4/4/2016	B. Doggett	unknown	A	M	60	moved from 001
003	30.4518	-97.8844	3068136.8099	10136555.9145	4/4/2016	G. Casares	unknown	A	M	120	
004	30.4527	-97.8788	3069914.8264	10136919.5954	4/4/2016	G. Casares	unknown	A	M	150	
005	30.4483	-97.8808	3069310.8594	10135295.4739	4/4/2016	G. Casares	unknown	A	M	60	moved to 006
006	30.4479	-97.8814	3069121.0787	10135154.5101	4/4/2016	G. Casares	unknown	A	M	30	moved from 005
007	30.4519	-97.8836	3068393.3414	10136583.3641	5/6/2016	N. Wallisch	unknown	A	M	120	
008	30.4515	-97.8821	3068890.4716	10136457.3750	5/6/2016	B. Doggett	unknown	A	M	150	
009	30.4520	-97.8832	3068514.6002	10136644.9136	5/16/2016	N. Wallisch	unknown	A	M	210	
010	30.4544	-97.8812	3069135.5907	10137528.3692	5/16/2016	N. Wallisch	unknown		F	30	

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Appendix A

Figures

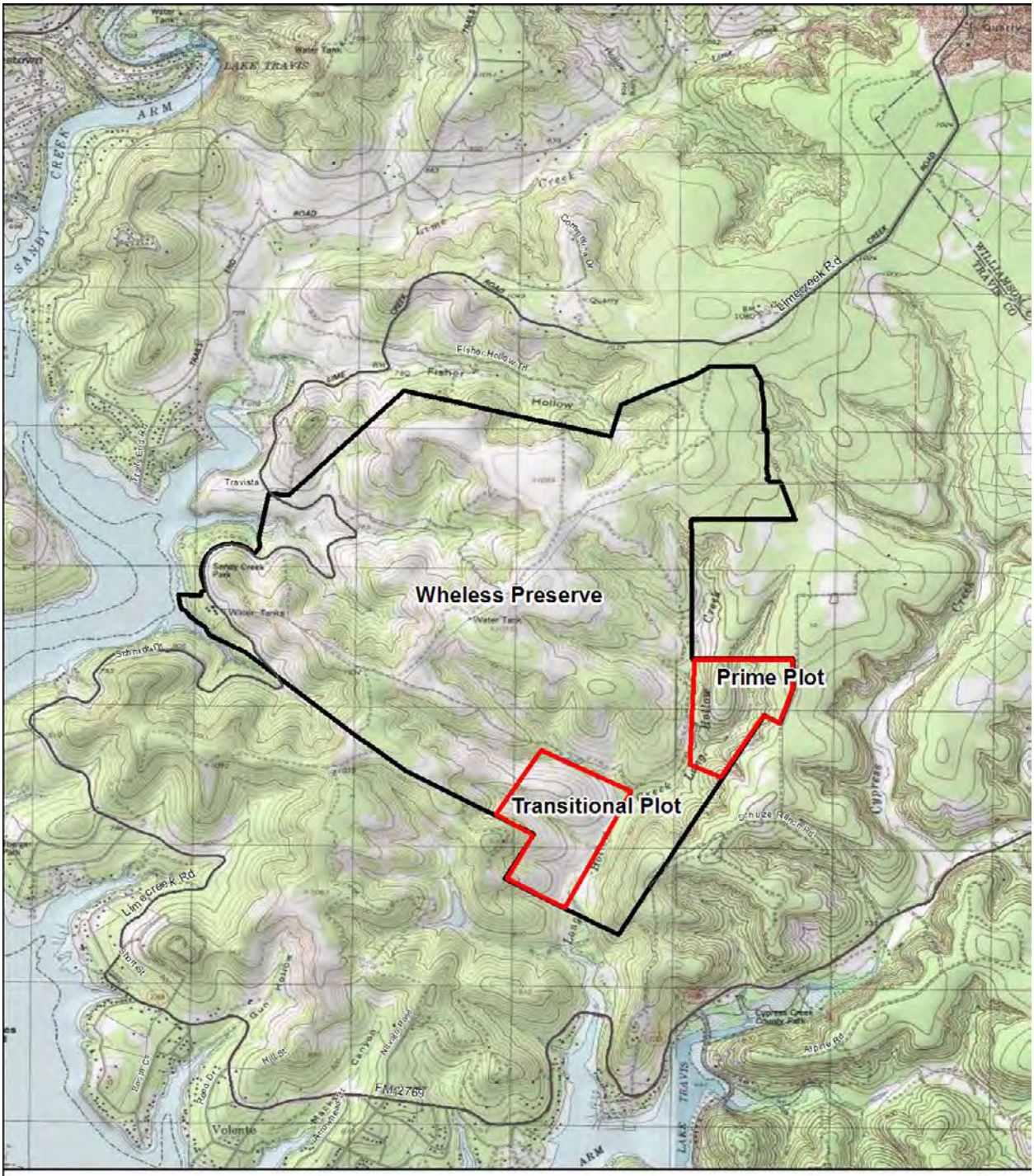


Figure 1.0
Wheless Preserve
GCWA Territory Mapping
Spring 2016
Location Map

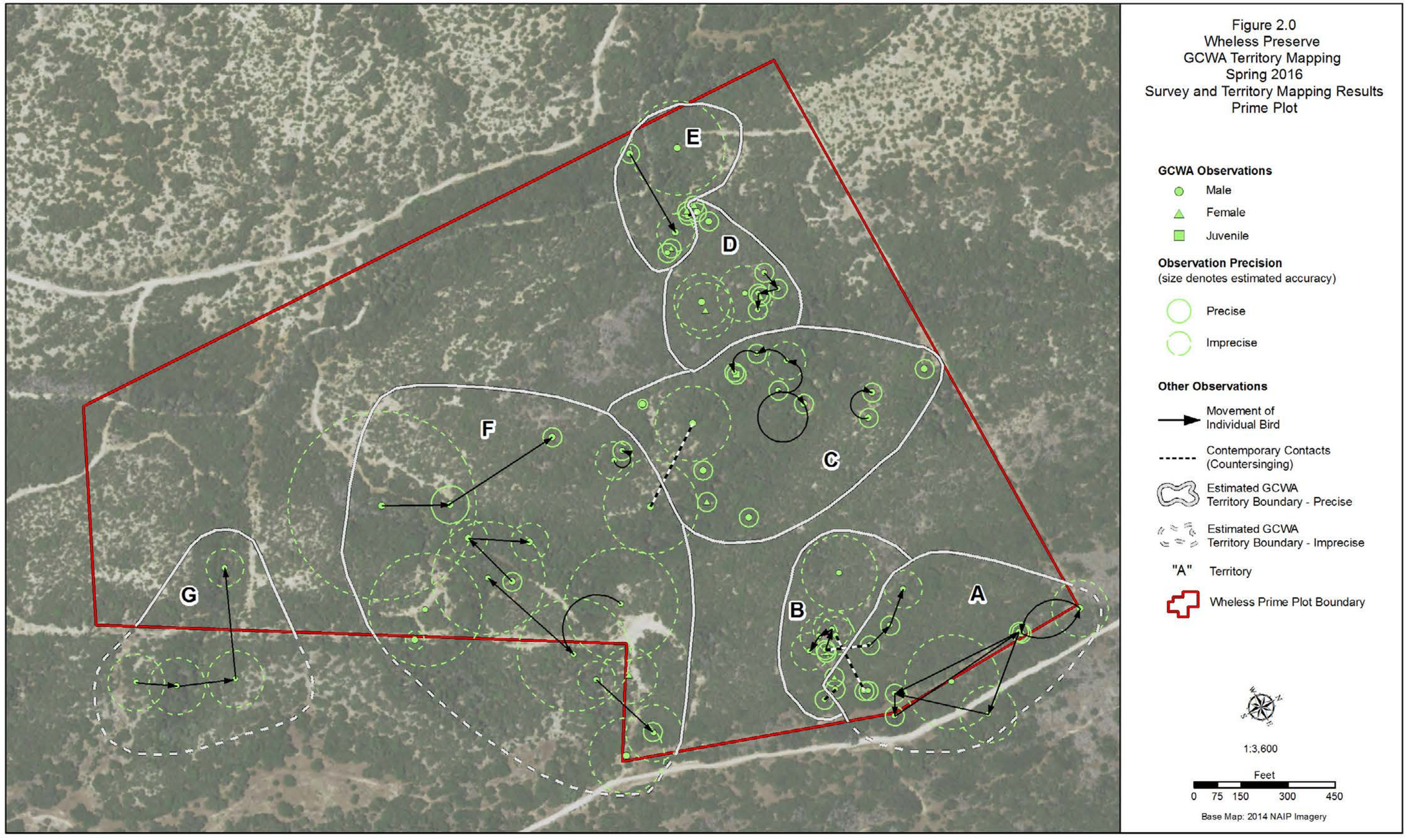

E
D
C
F
G
B
A
Figure 2.0
Wheless Preserve
GCWA Territory Mapping
Spring 2016
Survey and Territory Mapping Results
Prime Plot
GCWA Observations
Male
Female
Juvenile
Observation Precision
(size denotes estimated accuracy)
Precise
Imprecise
Other Observations
Movement of Individual Bird
Contemporary Contacts (Countersinging)
Estimated GCWA Territory Boundary - Precise
Estimated GCWA Territory Boundary - Imprecise
"A" Territory
Wheless Prime Plot Boundary
1:3,600
Feet
0 75 150 300 450
Base Map: 2014 NAIP Imagery



Figure 2.1
Wheless Preserve
GCWA Territory Mapping
Spring 2016
March 25, 2016 Survey Results
Prime Plot

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Prime Plot Boundary

1:3,600

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery



Figure 2.2
Wheless Preserve
GCWA Territory Mapping
Spring 2016
April 4, 2016 Survey Results
Prime Plot

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Prime Plot Boundary

1:3,600

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery



Figure 2.3
Wheless Preserve
GCWA Territory Mapping
Spring 2016
April 8, 2016 Survey Results
Prime Plot

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

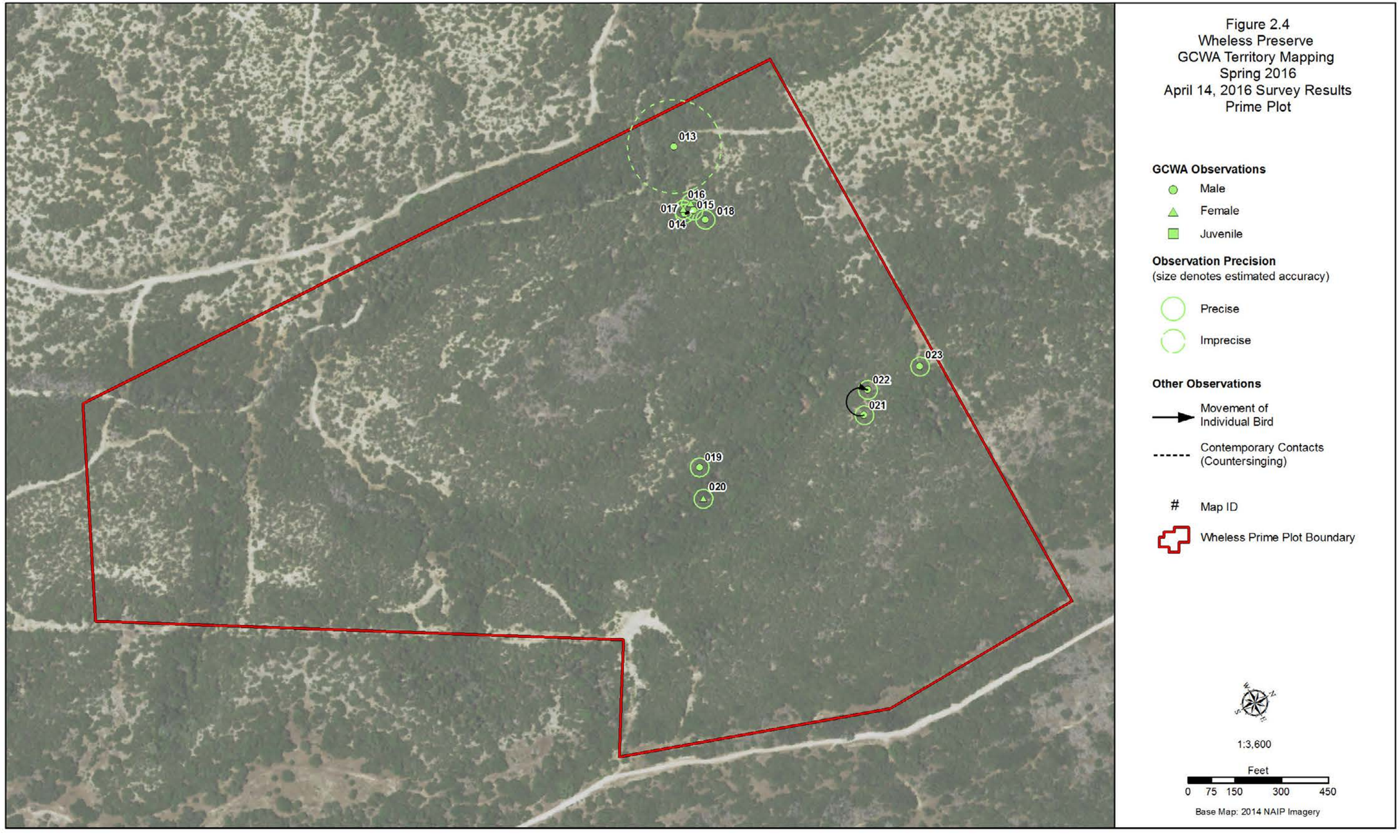
Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Prime Plot Boundary

1:3,600

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery


013
016
017
015
018
014
023
022
021
019
020
Figure 2.4
Wheless Preserve
GCWA Territory Mapping
Spring 2016
April 14, 2016 Survey Results
Prime Plot
GCWA Observations
Male
Female
Juvenile
Observation Precision
(size denotes estimated accuracy)
Precise
Imprecise
Other Observations
Movement of Individual Bird
Contemporary Contacts (Countersinging)
Map ID
Wheless Prime Plot Boundary
1:3,600
Feet
0 75 150 300 450
Base Map: 2014 NAIP Imagery

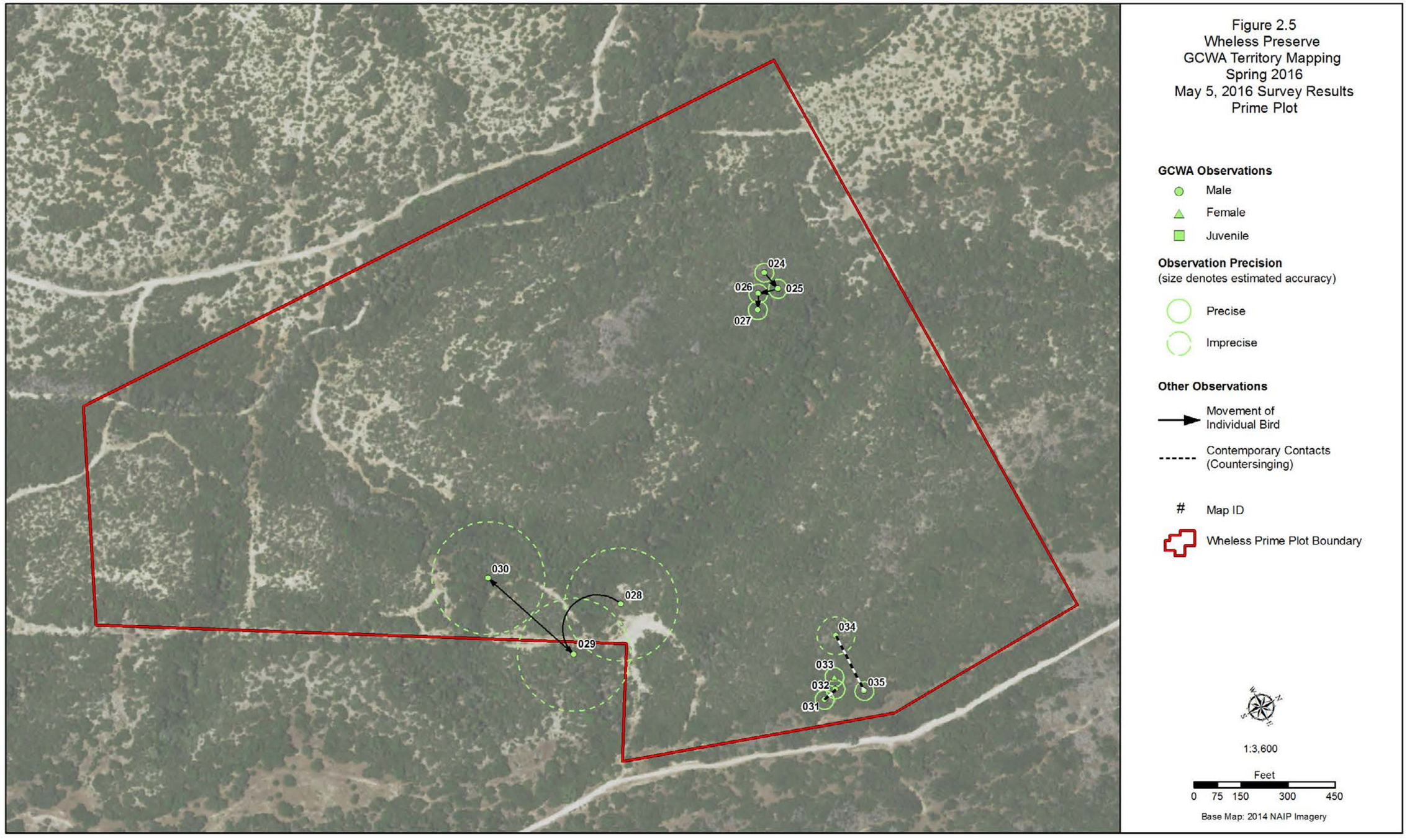


Figure 2.5
Wheless Preserve
GCWA Territory Mapping
Spring 2016
May 5, 2016 Survey Results
Prime Plot

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Prime Plot Boundary

1:3,600

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery

Figure 2.6
Wheless Preserve
GCWA Territory Mapping
Spring 2016
May 6, 2016 Survey Results
Prime Plot

036
037
038
039
040
041
042
043

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Prime Plot Boundary

1:3,600

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery



Figure 2.7
Wheless Preserve
GCWA Territory Mapping
Spring 2016
May 10, 2016 Survey Results
Prime Plot

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Prime Plot Boundary

1:3,600

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery

Figure 2.8
Wheless Preserve
GCWA Territory Mapping
Spring 2016
May 13, 2016 Survey Results
Prime Plot

048
049
050
051
052

GCWA Observations
- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)
- Precise
- Imprecise

Other Observations
- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Prime Plot Boundary

1:3,600

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery

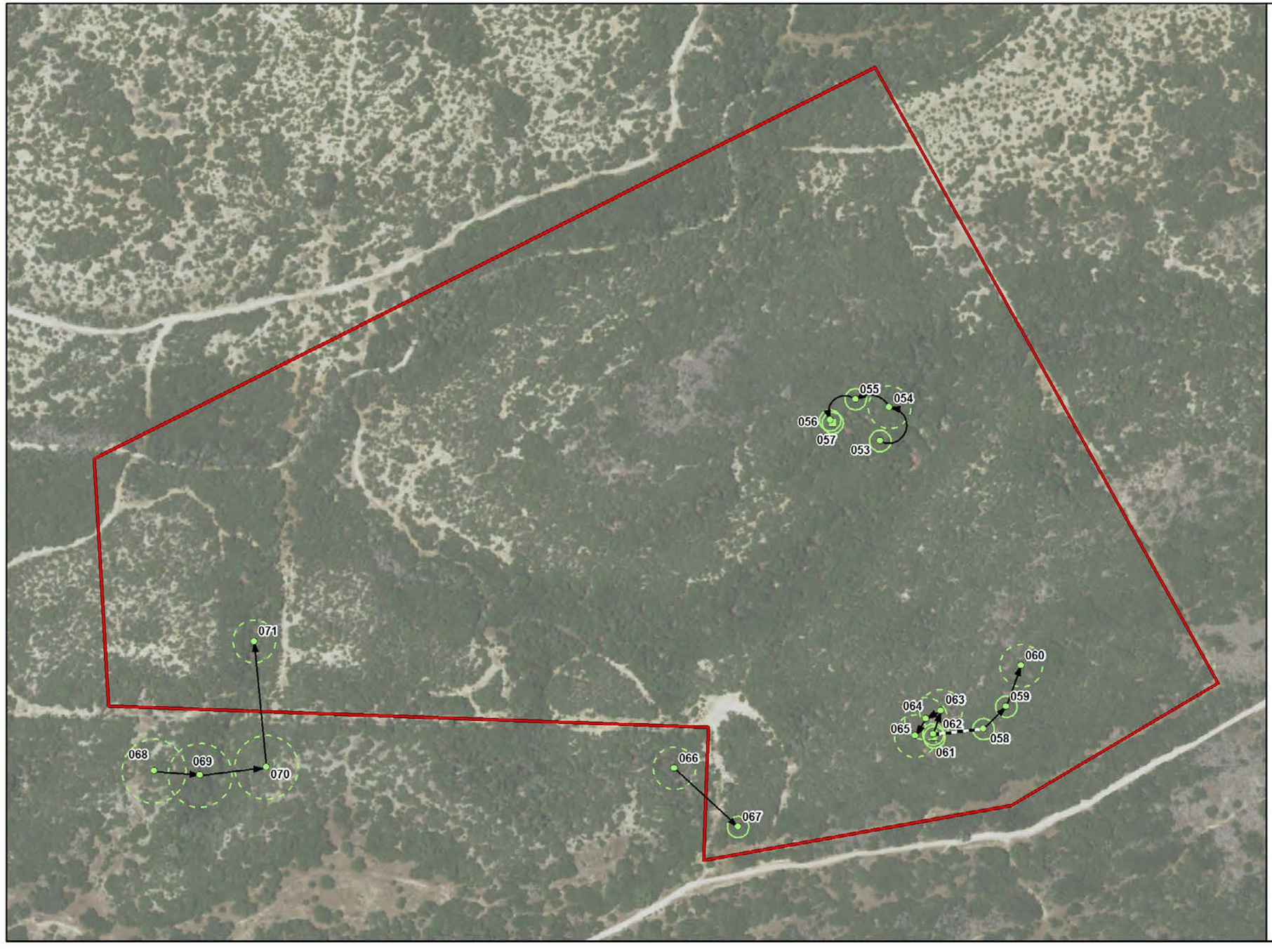


Figure 2.9
Wheless Preserve
GCWA Territory Mapping
Spring 2016
May 14, 2016 Survey Results
Prime Plot

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Prime Plot Boundary

1:3,600

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery



Figure 2.10
Wheless Preserve
GCWA Territory Mapping
Spring 2016
May 17, 2016 Survey Results
Prime Plot

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Prime Plot Boundary

1:3,600

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery

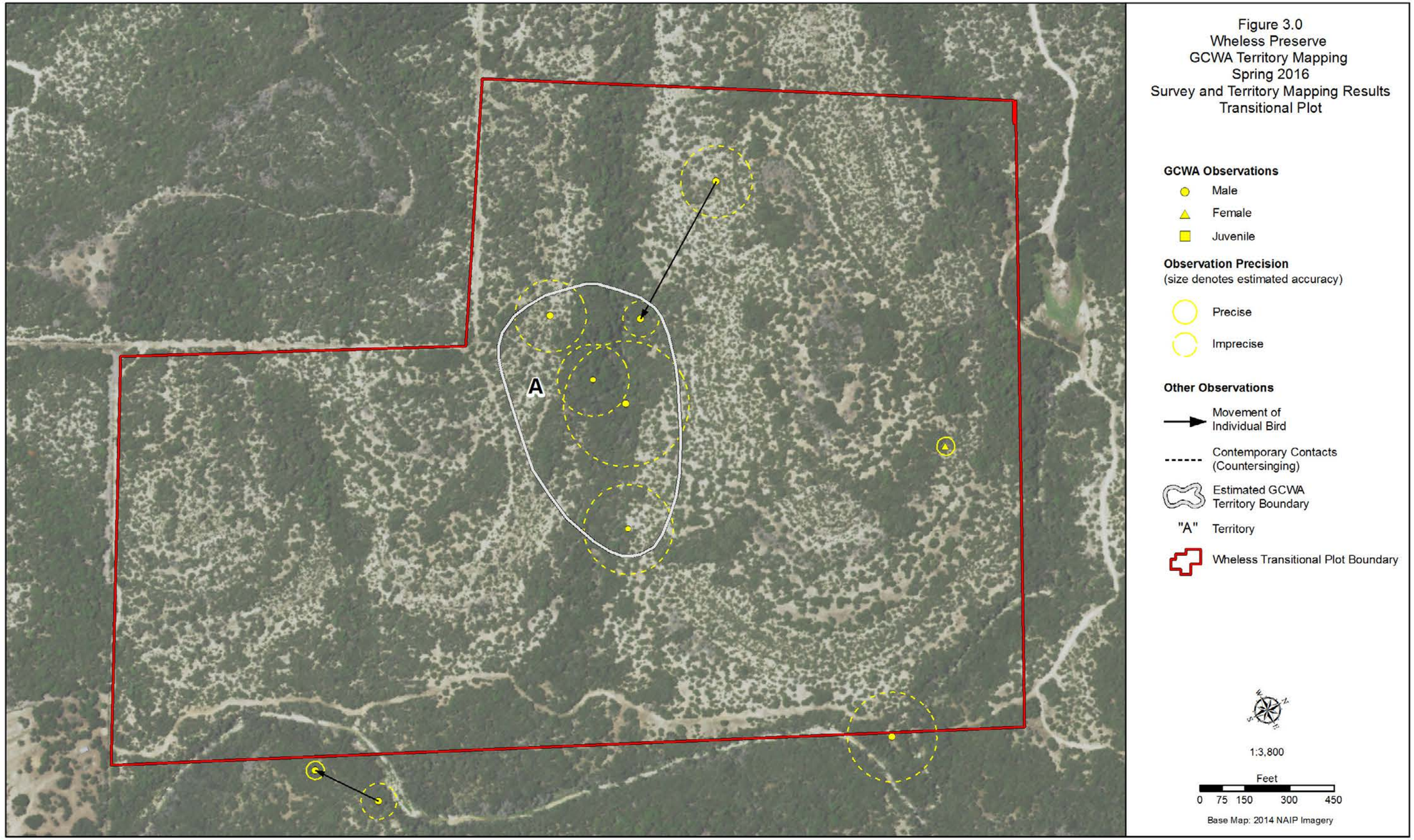

A
Figure 3.0
Wheless Preserve
GCWA Territory Mapping
Spring 2016
Survey and Territory Mapping Results
Transitional Plot
GCWA Observations
Male
Female
Juvenile
Observation Precision
(size denotes estimated accuracy)
Precise
Imprecise
Other Observations
Movement of Individual Bird
Contemporary Contacts (Countersinging)
Estimated GCWA Territory Boundary
"A" Territory
Wheless Transitional Plot Boundary
1:3,800
Feet
0 75 150 300 450
Base Map: 2014 NAIP Imagery



Figure 3.1
Wheless Preserve
GCWA Territory Mapping
Spring 2016
April 4, 2016 Survey Results
Transitional Plot

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Transitional Plot Boundary

1:3,800

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery



Figure 3.2
Wheless Preserve
GCWA Territory Mapping
Spring 2016
May 6, 2016 Survey Results
Transitional Plot

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Transitional Plot Boundary

1:3,800

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery



Figure 3.3
Wheless Preserve
GCWA Territory Mapping
Spring 2016
May 16, 2016 Survey Results
Transitional Plot

GCWA Observations

- Male
- Female
- Juvenile

Observation Precision
(size denotes estimated accuracy)

- Precise
- Imprecise

Other Observations

- Movement of Individual Bird
- Contemporary Contacts (Countersinging)
- # Map ID
- Wheless Transitional Plot Boundary

1:3,800

Feet
0 75 150 300 450

Base Map: 2014 NAIP Imagery

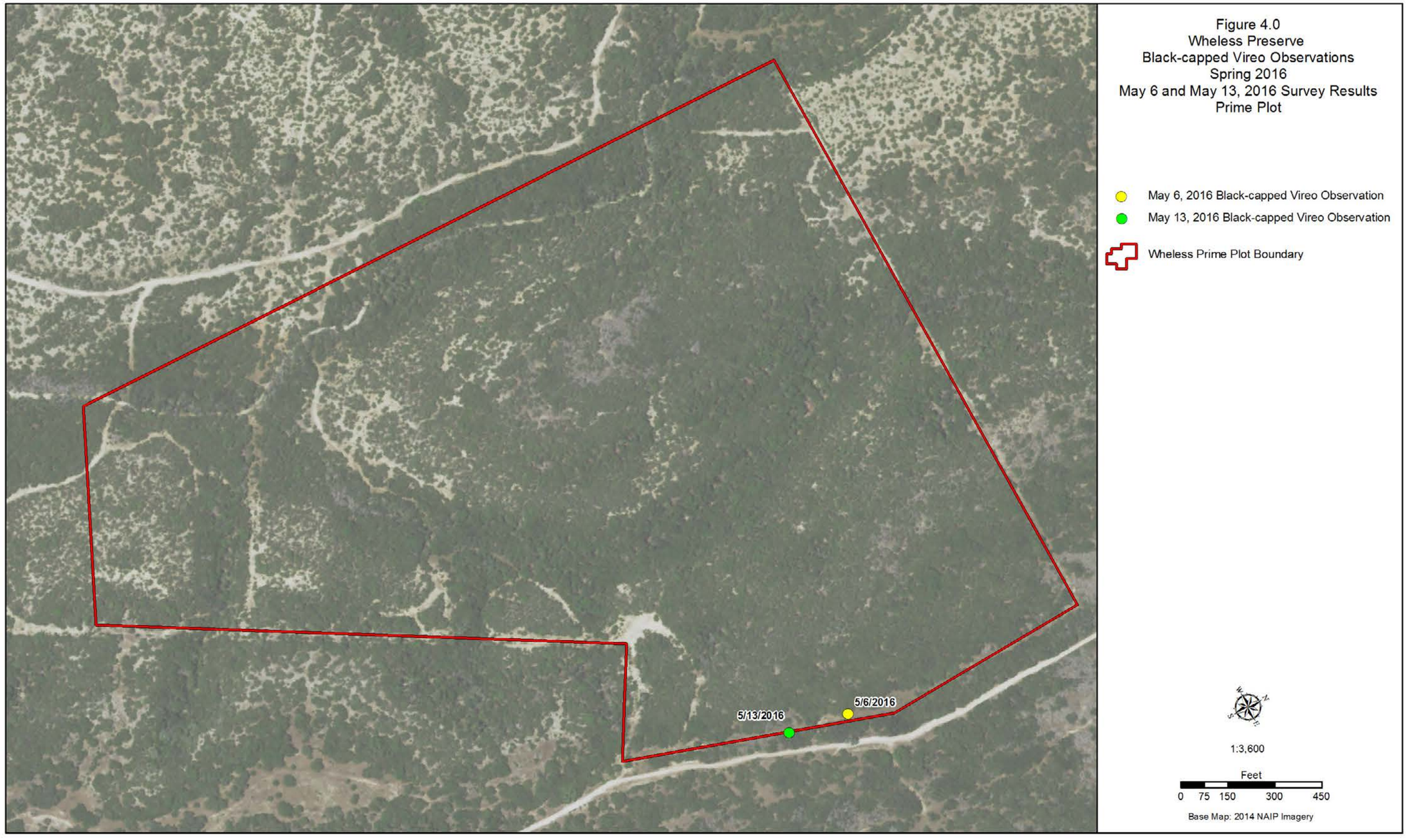


Figure 4.0
Wheless Preserve
Black-capped Vireo Observations
Spring 2016
May 6 and May 13, 2016 Survey Results
Prime Plot

May 6, 2016 Black-capped Vireo Observation

May 13, 2016 Black-capped Vireo Observation

Wheless Prime Plot Boundary

1:3,600

Feet

0 75 150 300 450

Base Map: 2014 NAIP Imagery

Appendix B

Representative Photographs



Photo 1. Overview of habitat, Prime Plot



Photo 2. Overview of habitat, Prime Plot



Photo 3. Typical habitat, Prime Plot



Photo 4. Typical habitat, Prime Plot



Photo 5. Overview of habitat, Transitional Plot



Photo 6. Overview of habitat, Transitional Plot



Photo 7. Typical habitat, Transitional Plot



Photo 8. Typical habitat, Transitional Plot

Appendix C

Birds Observed During the Wheless 2016 Survey of the
Prime and Transitional Plots

Appendix C. Birds Observed During the Wheless Survey of the Prime and Transitional Plots

Common name	*Scientific name*	Prime plot	Transitional plot
Black vulture	*Coragyps atratus*	x	x
Turkey vulture	*Cathartes aura*	x	x
Red-shouldered hawk	*Buteo lineatus*	x	
Red-tailed hawk	*Buteo jamaicensis*	x	
Cooper's hawk	*Accipiter cooperii*	x	
Wild turkey	*Meleagris gallopavo*	x	
White-winged Dove	*Zenaida asiatica*	x	
Mourning dove	*Zenaida macroura*	x	x
Yellow-billed cuckoo	*Coccyzus americanus*	x	x
Greater roadrunner	*Geococcyx californianus*	x	x
Great horned owl	*Bubo virginianus*	x	
Eastern screech-owl	*Megascops asio*	x	
Chimney swift	*Chaetura pelagica*		x
Black-chinned hummingbird	*Archilochus alexandri*	x	
Ruby-throated hummingbird	*Archilochus colubris*	x	
Golden-fronted woodpecker	*Melanerpes aurifrons*	x	
Ladder-backed woodpecker	*Picoides scalaris*	x	x
Eastern phoebe	*Sayornis phoebe*		x
Ash-throated flycatcher	*Myiarchus cinerascens*	x	x
Scissor-tailed flycatcher	*Tyrannus forficatus*	x	
White-eyed vireo	*Vireo griseus*	x	
Black-capped vireo	*Vireo atricapilla*	x	
Yellow-throated vireo	*Vireo flavifrons*	x	
Blue Jay	*Cyanocitta cristata*	x	x
Western scrub-jay	*Aphelocoma californica*	x	x
American crow	*Corvus brachyrhynchos*	x	x
Common raven	*Corvus corax*	x	
Purple martin	*Progne subis*	x	
Carolina chickadee	*Poecile carolinensis*	x	x
Black-crested titmouse	*Baeolophus atricristatus*	x	x
Tufted titmouse	*Baeolophus bicolor*	x	
Carolina wren	*Thryothorus ludovicianus*	x	x
Bewick's wren	*Thryomanes bewickii*	x	x
Ruby-crowned kinglet	*Regulus calendula*	x	
Blue-gray gnatcatcher	*Polioptila caerulea*	x	x
Northern mockingbird	*Mimus polyglottos*	x	x
Cedar waxwing	*Bombycilla cedrorum*	x	x
Yellow-rumped warbler	*Setophaga coronata*	x	
Golden-cheeked warbler	*Setophaga chrysoparia*	x	
Black-and-white warbler	*Mniotilta varia*	x	x
Summer tanager	*Piranga rubra*	x	x
House sparrow	*Passer domesticus*	x	
Rufous-crowned sparrow	*Aimophila ruficeps*	x	
Field Sparrow	*Spizella pusilla*	x	x
Lark sparrow	*Chondestes grammacus*		x
Northern cardinal	*Cardinalis cardinalis*	x	x
Painted bunting	*Passerina ciris*	x	x
Brown-headed cowbird	*Molothrus ater*	x	

Appendix C. Birds Observed During the Wheless Survey of the Prime and Transitional Plots

Common name	*Scientific name*	Prime plot	Transitional plot
Lesser goldfinch	*Carduelis psaltria*	x	x
Chuck-will's-widow	*Antrostomus carolinensis*	x	x
Northern bobwhite	*Colinus virginianus*	x	x

Avian nomenclature and taxonomy follows the American Ornithologists' Union (AOU 1998), as currently supplemented through 2013.