Golden-cheeked Warbler Range-wide Survey
2018 Permit Report
Permit #Mueller-2018

Prepared for

City of Austin

Prepared by

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Project Background

This report summarizes results of surveys by U.S. Fish and Wildlife Service and American Bird Conservancy of golden-cheeked warblers (hereafter warbler) on lands managed by the city of Austin in spring 2018. The objectives of this project are to (1) delineate potential warbler habitat throughout the breeding range using multispectral imagery, (2) develop a fine-grain species distribution model using avian point count surveys throughout potential habitat, and (3) quantify population estimates for the entire species and all areas of conservation interest. The general approach of this project is to extend the methods of Sesnie et al. (2016) from Balcones Canyonlands National Wildlife Refuge to additional accessible lands throughout the 35-county primary breeding range in the Edwards Plateau and Cross Timbers ecoregions. Woody canopy cover will be classified as juniper, non-juniper, or none from aerial color-infrared imagery at a 1-m^2 resolution. Point count surveys for warblers were conducted in spring 2018. A suite of potential predictors of detectability and density will be evaluated. The resultant density model will be used to map predicted warbler densities across the breeding range and to estimate the total population size as well as population sizes for smaller areas of conservation interest.

Methods

We conducted point count surveys for warblers from 26 March 2018 to 5 May 2018. We sampled points in the morning, from 15 minutes before sunrise to 4 hours after sunrise. We did not conduct surveys during high winds (>12 miles per hour), rain, or if fog reduced visibility to ≤100 m. If these conditions were encountered, we waited until the weather improved or canceled the sampling for the day and rescheduled. When approaching the sampling location, we noted if any warblers within 100 m of the survey point were flushed, flew away, or retreated. We then recorded field conditions of wind speed, cloud cover, and any natural or anthropogenic noise that may have affected detectability. We also examined aerial imagery (NAIP 2016) of the 100-m radius around the survey point to evaluate if any changes had occurred between the time the imagery was captured and the survey was conducted. After we recorded field conditions, we began a 5-minute survey, recording detections of all singing male warblers, distance and bearing to singing warblers at initial detection, and time (minute:second) at the initial detection. We

estimated distances to the nearest 1 m. We used laser rangefinders (Nikon Prostaff) to estimate distances where possible and walked out to warblers within 100 m if still singing at the end of the survey to obtain distances using a GPS (Garmin GPSMap 64s); we measured bearings to the nearest degree using a compass (Silva Ranger). We did not record visual detections of warblers that were unaccompanied by song or other detections that were unaccompanied by song (e.g. chips) to avoid erroneously recording female warblers. This is important because the detectability of female warblers is much different than singing males, and singing males are the only population segment that has high detectability.

Summary

Under scientific study permit number *Mueller-2018*, we were permitted access to City of Austin Balcones Canyonlands Preserve (BCP) properties and Water Quality Protection Lands (WQPL) for the purpose of conducting point county surveys for warblers. We surveyed 198 points (Table 1) from 12 April 2018 to 5 May 2018. Three points (840, 841, and 1282) were sampled twice. We detected 85 singing male warblers at 69 points (Tables 1 and 2).

Point placement and survey intensity varied on a site-by-site basis and should not be viewed as a representation of the population present at that site. We have provided maps of all points surveyed and locations of warblers (Figures 1–8). We clipped warbler locations to City of Austin boundaries so that warblers detected from City of Austin lands, but occurring outside of property boundaries, are not displayed.

Crew leaders on this project were Joshua Harris and Bryan Baird who coordinated access and oversaw compliance with established protocols and procedures.

Balcones Canyonlands Preserve Summary by Macrosite

Barton Creek

We sampled the Barton Creek macrosite on 24–26 April and 28 April 2018. We sampled a total of 24 points and detected 8 singing male warblers (Table 1; Figure 1).

Bull Creek

We sampled the Bull Creek macrosite on 16–20 April, 2 May, and 5 May 2018. We sampled a total of 61 points and detected 37 singing male warblers (Table 1; Figure 2).

Cypress Creek

We sampled the Cypress Creek macrosite on 6 April 2018. We sampled a total of 8 points and detected 1 singing male warbler (Table 1; Figure 3).

North Lake Austin

We sampled the North Lake Austin macrosite on 13, 19, 20, 29, 30 April and 5 May 2018. We sampled a total of 55 points and detected 28 singing male warblers (Table 1; Figure 4).

South Lake Austin

We sampled the South Lake Austin macrosite on 1–3 May 2018. We sampled a total of 19 points and detected 7 singing male warblers (Table 1; Figure 5).

West Austin

We sampled the West Austin macrosite on 12, 17, 20 and 5 May 2018. We sampled a total of 4 points and detected 1 singing male warbler (Table 1; Figure 6).

Water Quality Protection Lands Summary

We sampled Water Quality Protection Lands on 19, 20 April and 1, 3, 5 May 2018. We sampled a total of 27 points and detected 3 singing male warblers (Table 1; Figures 7 and 8).

Literature Cited

Sesnie, S.E., Mueller, J.M., Lehnen, S.E., Rowin, S.M., Reidy, J.L., Thompson III, F.R. 2016. Airborne laser altimetry and multispectral imagery for modeling golden-cheeked warbler (*Setophaga chrysoparia*) density. Ecosphere 7 (3): e01220. 10.1002/ecs2.1220

Tables and Figures

Table 1. Total points sampled and total singing male golden-cheeked warblers detected on City of Austin Balcones Canyonlands Preserve lands during United States Fish and Wildlife Service range-wide golden-cheeked warbler survey, 12 April – 5 May 2018.

Macrosite	Points Sampled	GCWA Detected
Barton Creek	24	8
Bull Creek	61	37
Cypress Creek	8	1
North Lake Austin	55	28
South Lake Austin	19	7
Water Quality Protection Lands	27	3
West Austin	4	1
Total	198	85

Table 2. Locations of singing male golden-cheeked warbler detections (n = 85) on City of Austin Balcones Canyonlands Preserve (BCP) and Water Quality Protection Lands during (WQPL) United States Fish and Wildlife Service range-wide golden-cheeked warbler survey, 12 April – 5 May 2018.

Land Type	Macrosite	Point Number	Distance	Bearing
BCP	Barton Creek	1204	124	258
		1205	78	333
		1211	45	353
		1216	104	340
		1217	128	267
		1223	54	331
			56	296
		1230	117	7
	Bull Creek	794	18	308
			44	312
		795	95	4
		796	25	7
		797	120	115
			95	0
		803	22	159
		805	46	1
		826	43	346
		827	48	160
		828	17	354
		850	138	18
		853	53	136
			69	294
			41	66
		857	29	22
		859	31	37
		860	58	344
		861	30	110
		864	108	246
			60	50
		865	84	342
		874	86	249
			29	337
		876	34	212
		877	52	146
		879	39	40
		881	26	104

Table 2. Continued.

Land Type	Macrosite	Point Number	Distance	Bearing
BCP (continued)	Bull Creek (continued)	947	39	92
		948	45	358
		966	149	234
		967	92	84
			68	112
		970	103	248
			89	42
		972	13	244
			87	296
	Cypress Creek	705	35	354
	North Lake Austin	810	36	177
		811	102	276
		814	69	314
		821	95	225
		822	84	117
			92	279
		831	110	82
		833	39	156
		836	43	71
		839	45	244
		840	78	254
		841	33	295
			29	2
			51	224
		842	37	278
		1071	53	38
		1072	68	282
			11	338
		1085	47	88
		1267	61	198
		1269	81	186
		1270	107	100
		1273	93	124
			110	180
		1274	91	146
		1276	120	254
		1277	121	224
		1280	68	44

Table 2. Continued.

Land Type	Macrosite	Point Number	Distance	Bearing
BCP (continued)	South Lake Austin	914	83	124
		916	80	149
		921	31	199
		923	43	216
		924	65	111
		925	35	335
		941	82	358
	West Austin	1283	63	140
WQPL	Water Quality Protection Lands	936	47	92
			64	178
		1347	38	340

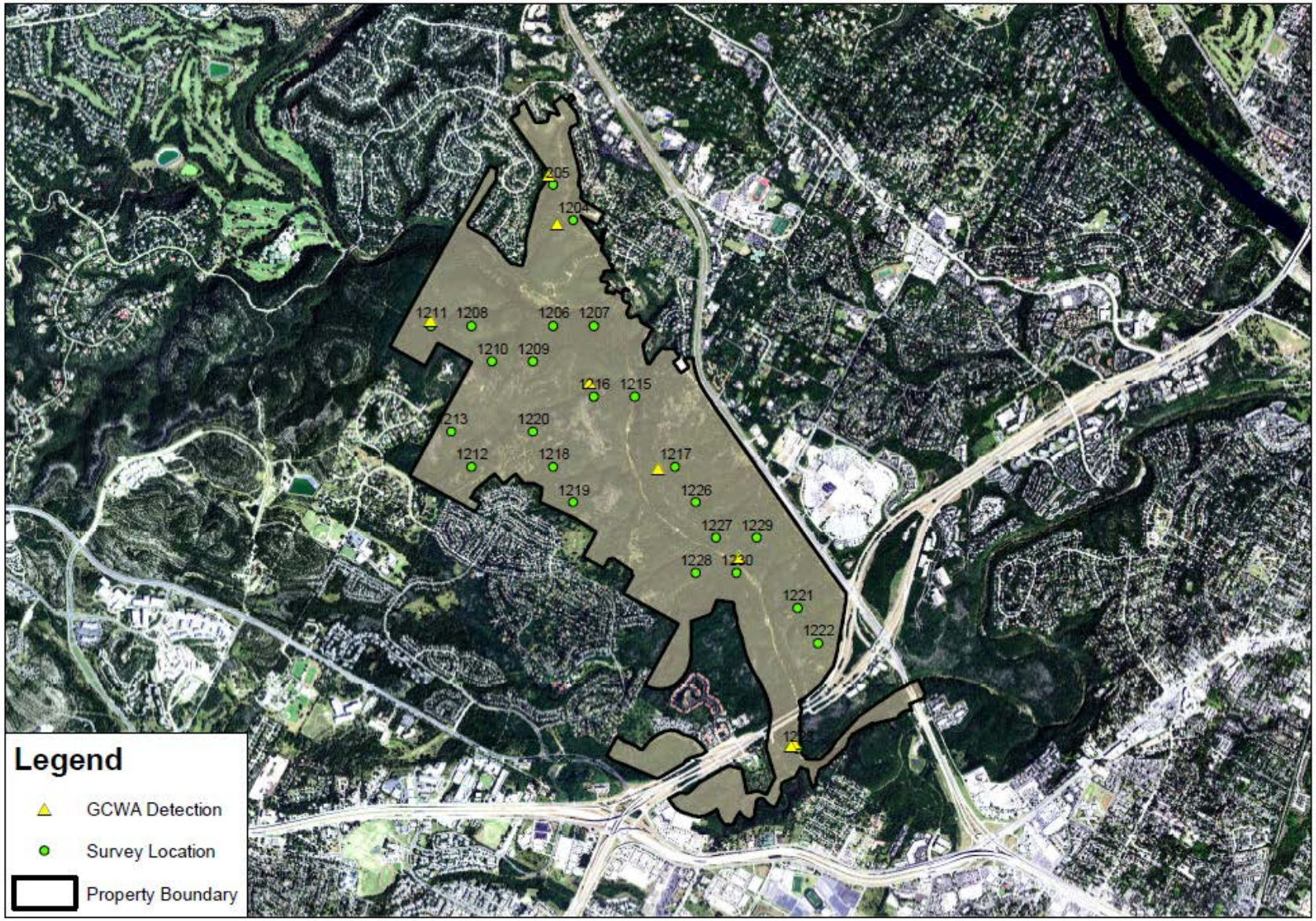

Figure 1. Sampling locations and singing male golden-cheeked warblers (GCWA) detected on City of Austin's Barton Creek macrosite during United States Fish and Wildlife Service range-wide surveys 12 April 2018 – 5 May 2018.

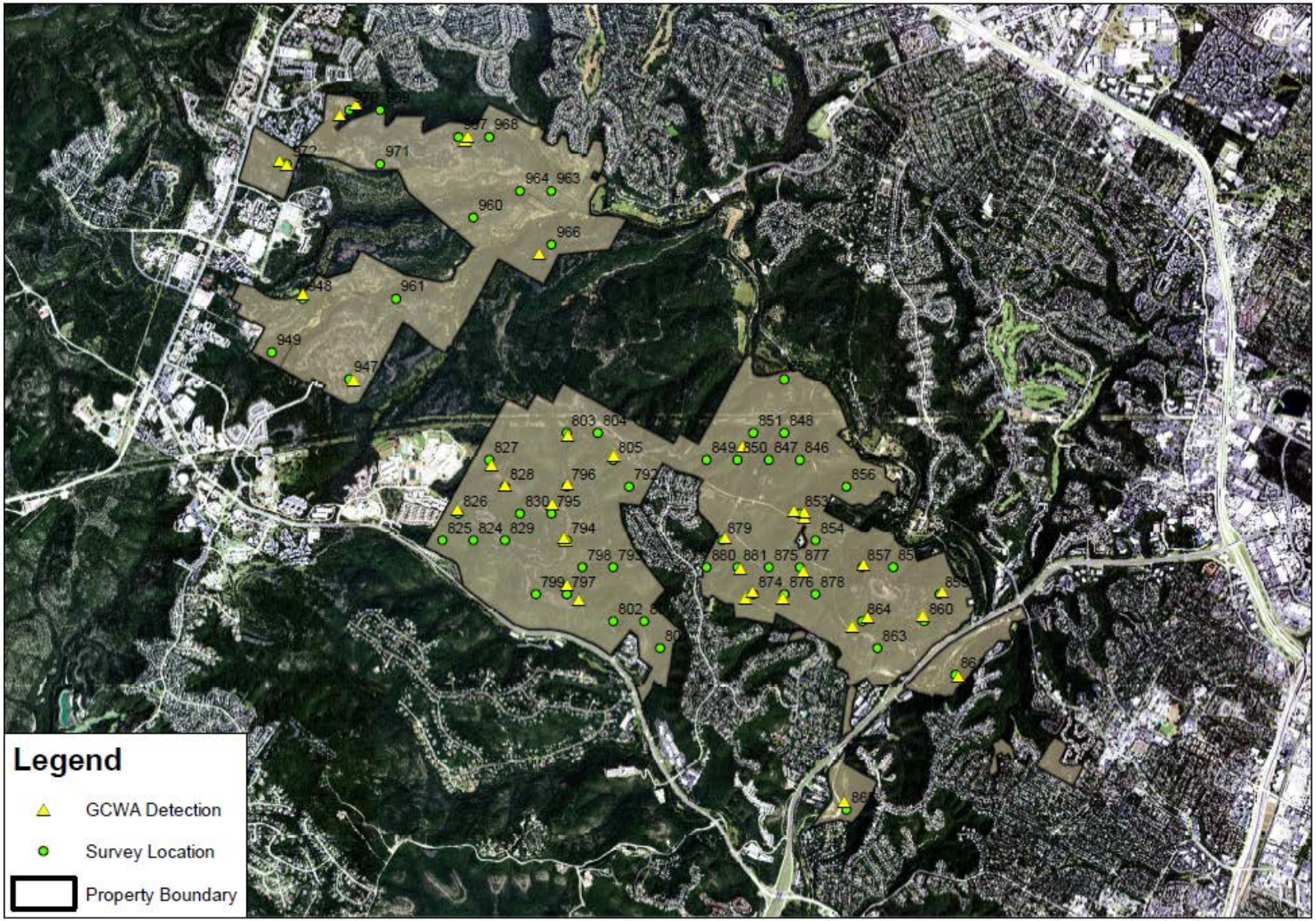

Figure 2. Sampling locations and singing male golden-cheeked warblers (GCWA) detected on City of Austin's Bull Creek macrosite during United States Fish and Wildlife Service range-wide surveys 12 April 2018 – 5 May 2018.

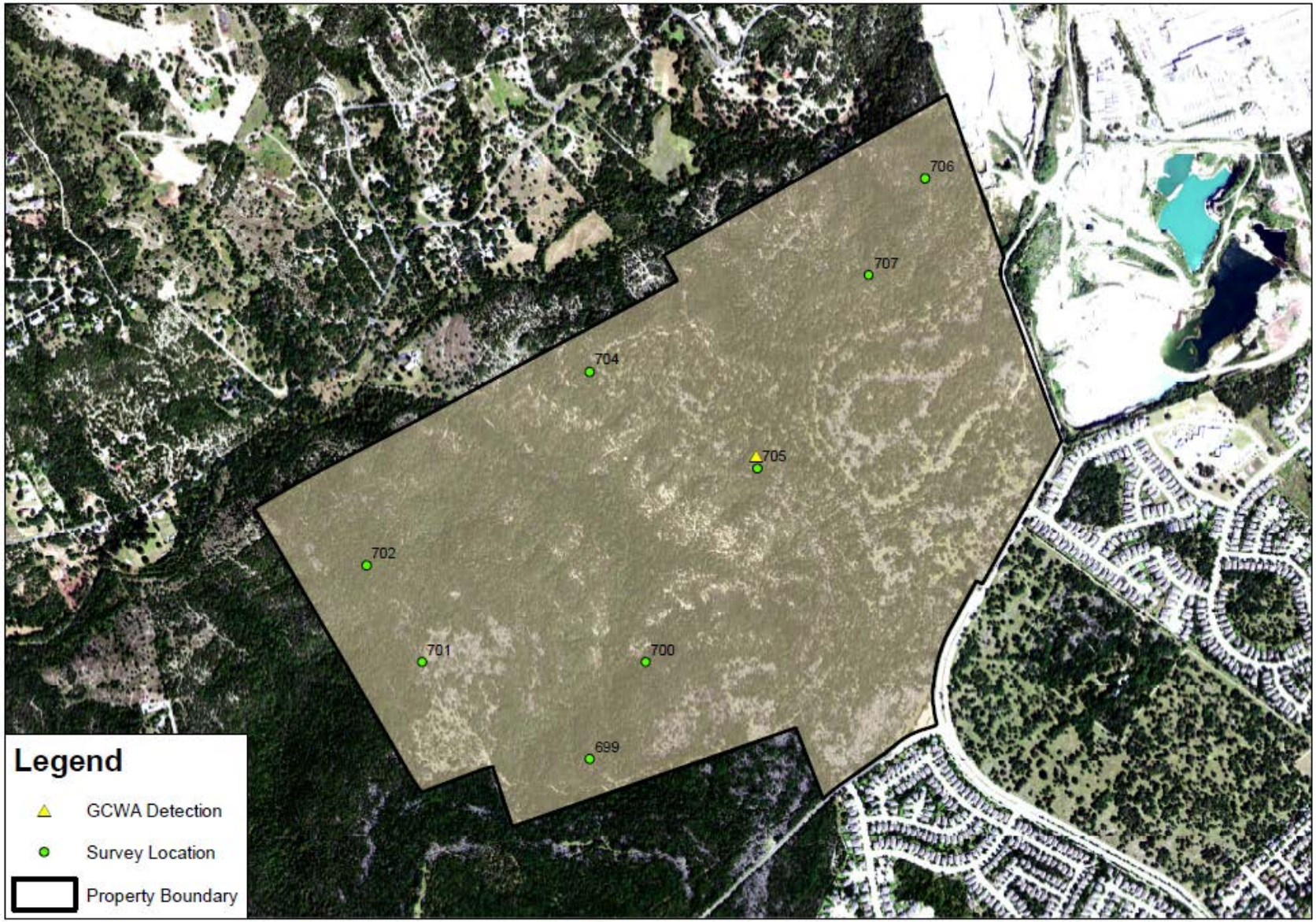

Figure 3. Sampling locations and singing male golden-cheeked warblers (GCWA) detected on City of Austin's Cypress Creek macrosite during United States Fish and Wildlife Service range-wide surveys 12 April 2018 – 5 May 2018.

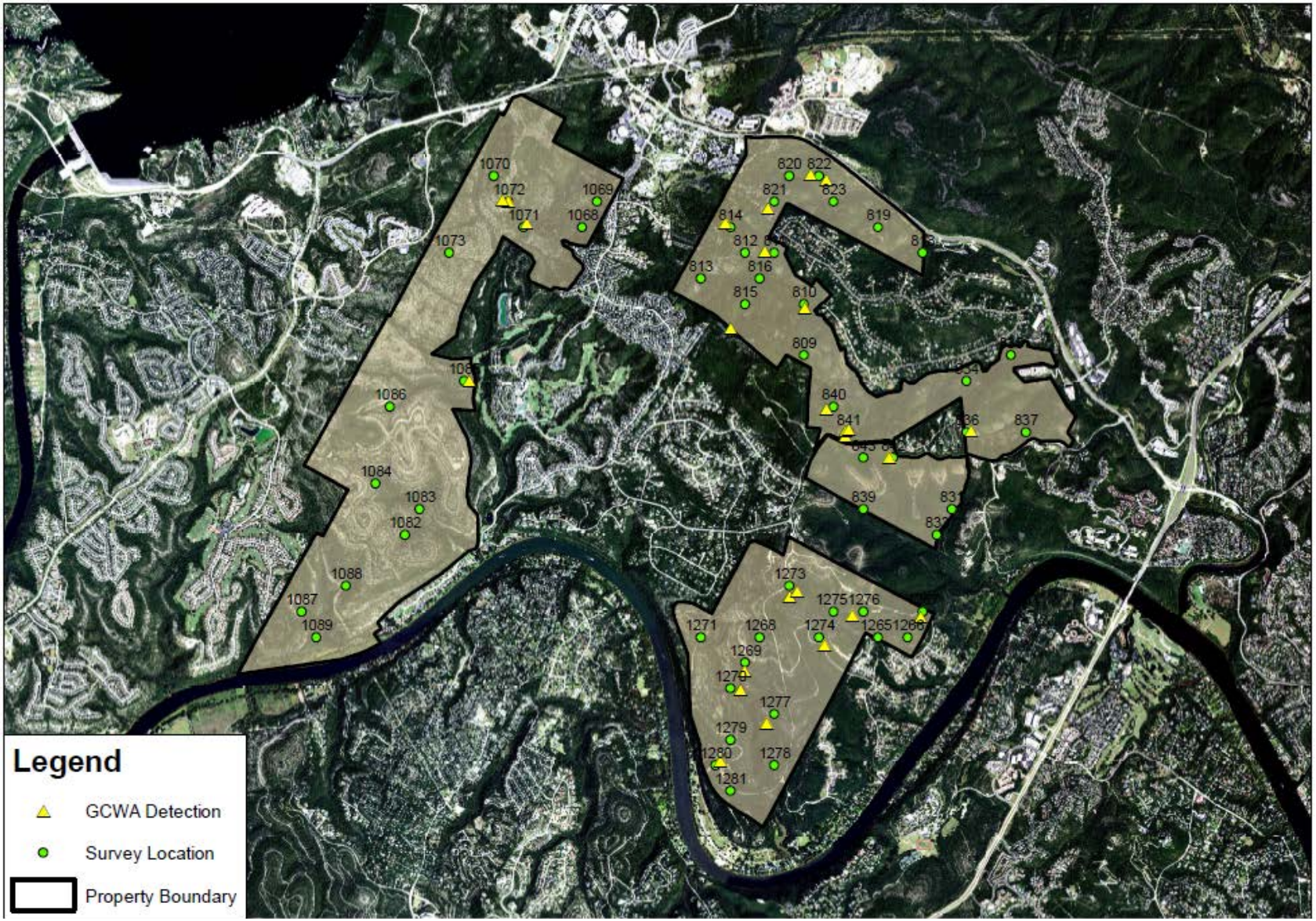

Figure 4. Sampling locations and singing male golden-cheeked warblers (GCWA) detected on City of Austin's North Lake Austin macrosite during United States Fish and Wildlife Service range-wide surveys 12 April 2018 – 5 May 2018.

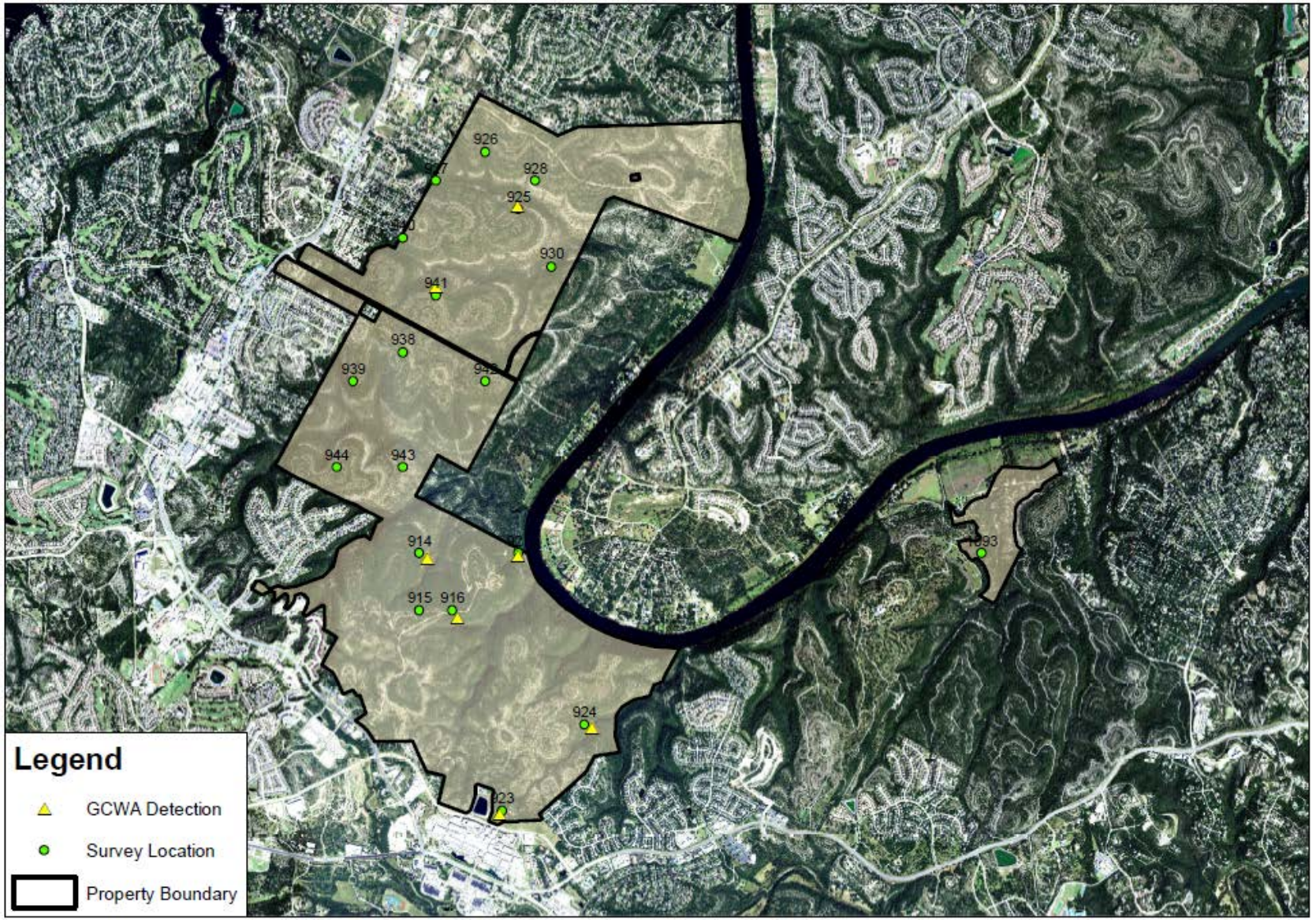

Figure 5. Sampling locations and singing male golden-cheeked warblers (GCWA) detected on City of Austin's South Lake Austin macrosite during United States Fish and Wildlife Service range-wide surveys 12 April 2018 – 5 May 2018.



Figure 6. Sampling locations and singing male golden-cheeked warblers (GCWA) detected on City of Austin's West Austin macrosite during United States Fish and Wildlife Service range-wide surveys 12 April 2018 – 5 May 2018.



Figure 7. Sampling locations and singing male golden-cheeked warblers (GCWA) detected on City of Austin's Water Quality Protection Lands macrosite during United States Fish and Wildlife Service range-wide surveys 12 April 2018 – 5 May 2018.

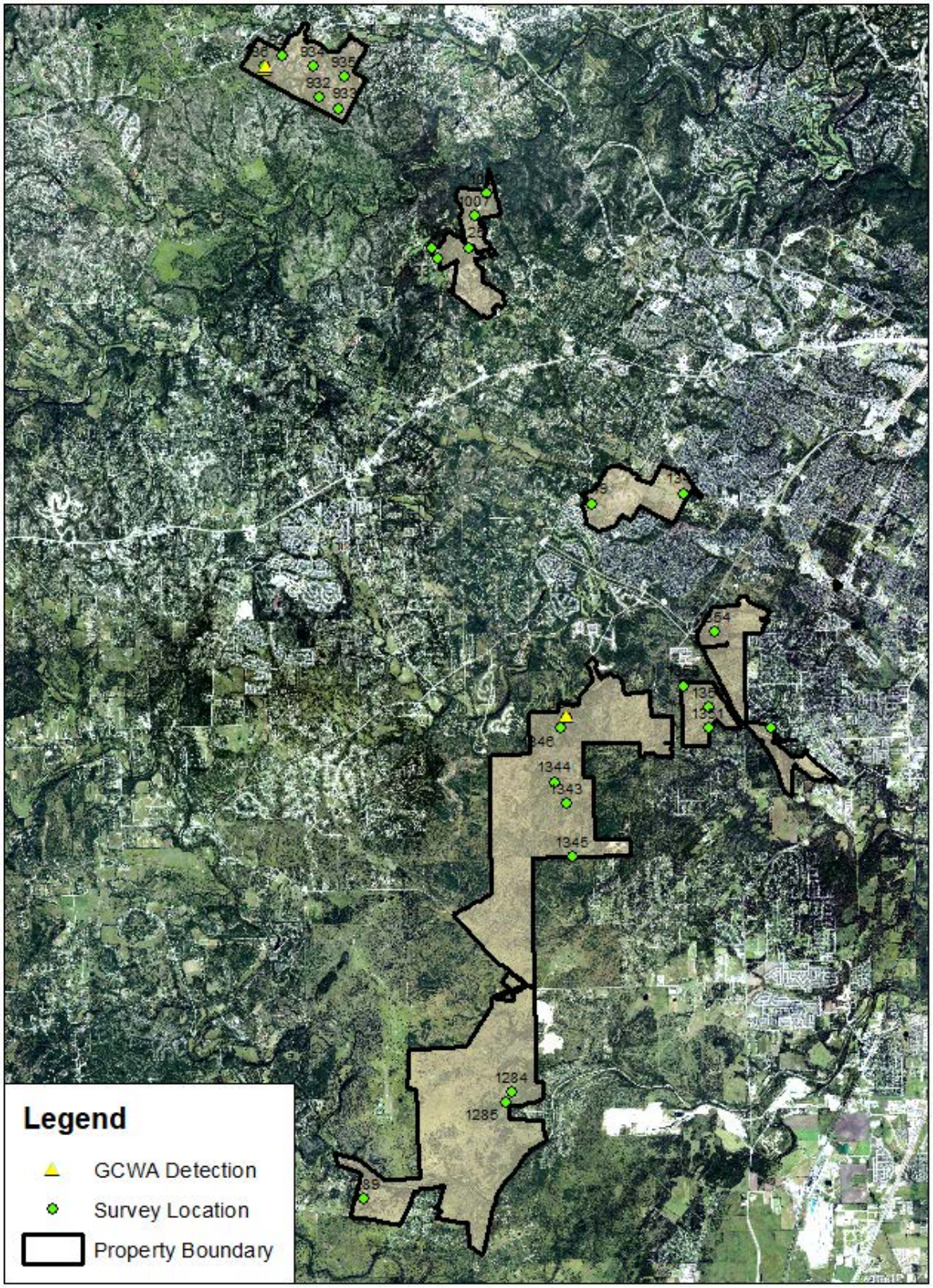

Figure 8. Sampling locations and singing male golden-cheeked warblers (GCWA) detected on City of Austin's Water Quality Protection Lands macrosite during United States Fish and Wildlife Service range-wide surveys 12 April 2018 – 5 May 2018.