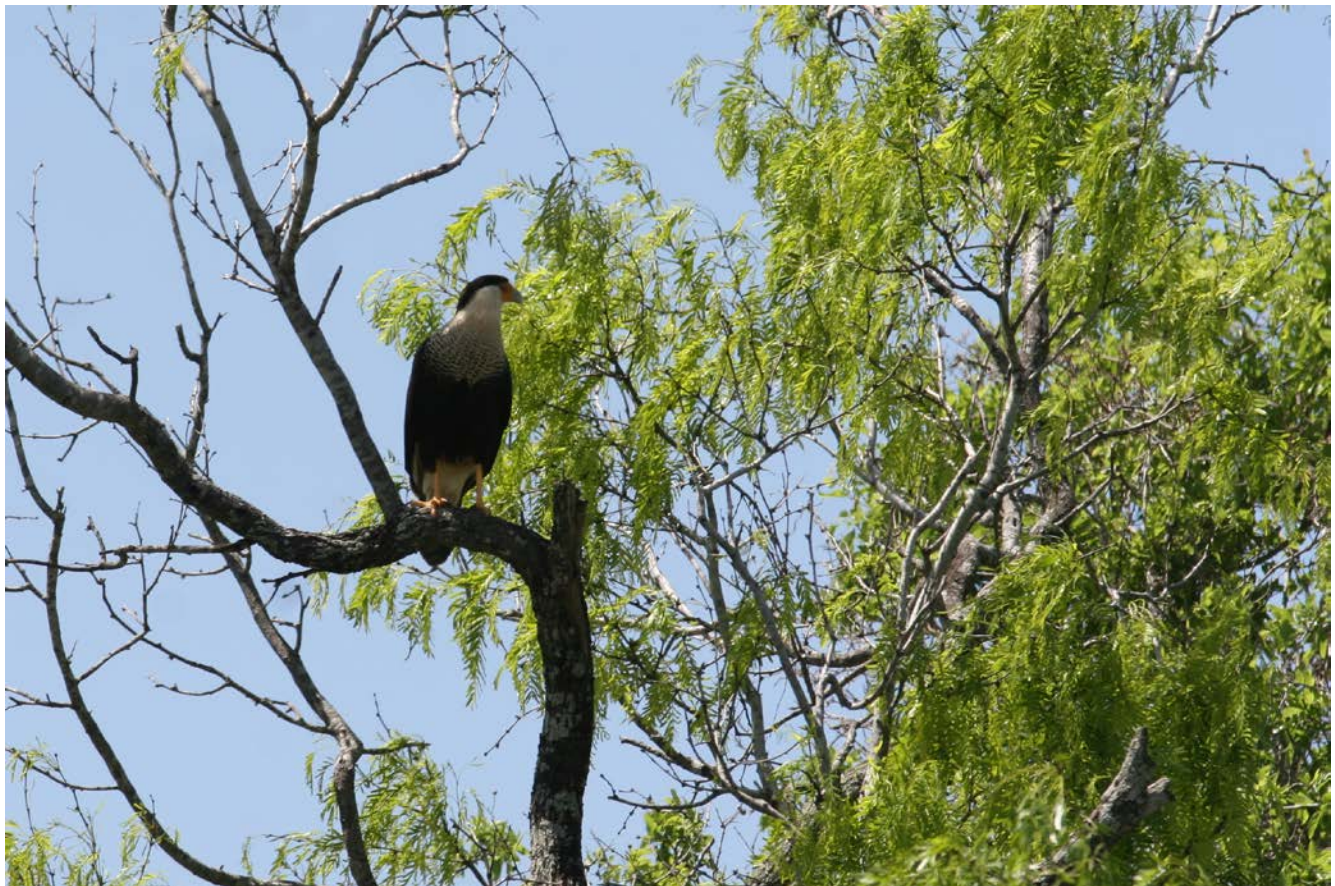




Wintering and Breeding Bird Monitoring Data Analysis 2010-2013

San Antonio Missions National Historical Park

Natural Resource Data Series NPS/GULN/NRDS—2013/556



ON THE COVER

Crested Caracara, *Caracara cheriway*

Photograph by: William Finney, NPS/GULN

Wintering and Breeding Bird Monitoring Data Summary 2010-2013

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The Natural Resource Data Series is intended for the timely release of basic data sets and data summaries. Care has been taken to assure accuracy of raw data values, but a thorough analysis and interpretation of the data has not been completed. Consequently, the initial analyses of data in this report are provisional and subject to change.

All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner.

Data in this report were collected and analyzed using methods based on established, peer-reviewed protocols and were analyzed and interpreted within the guidelines of the protocols.

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Introduction

Following guidance issued within the Avian Inventory and Monitoring in National Parks of the Gulf Coast Network: Gulf Coast Network Avian Monitoring Plan, 40 point locations were established and monitored within San Antonio Missions National Historical Park. During three breeding seasons (May – Jun) and winters (Dec – Feb) between 2010 and 2013, birds were monitored at 20 or 30 of these point locations via time-distance point counts (breeding) or area searches (winter). To ensure data from all 40 random locations were included in analyses, monitoring data from two consecutive years were combined. As a result, some points were monitored twice during the period of analysis. Even so, I have treated each survey as an independent monitoring event, thereby assuming each visit to be equally representative of the bird community for the entirety of San Antonio Missions National Historical Park. When translating avian densities to park-wide populations, I used an area of 334 ha to represent San Antonio Missions National Historical Park including the Rancho de las Cabras unit.

Methods

Winter Area Searches

A total of 90 area searches for birds were conducted at 40 point locations in San Antonio Missions National Historical Park during winters of 2010-11, 2011-12, and 2012-13. Each winter 30 point locations were surveyed (Fig. 1). During each 20 minute survey period at a location, the first detection of each bird was recorded within 2-minute intervals and distances were categorically recorded as within 50 m of plot center, >50 m from plot center, or as a fly-over not ‘actively using’ the plot location.

A total of 6418 individuals of 100 species were detected, with 1820 individual of 76 species detected within 50 m of plot center (Table 1). An average of 71.3 (SE = 7.3) individuals and 14.6 (SE = 0.5) species were detected at surveyed locations with 20.2 (SE = 2.2) individuals and 7.0 (SE = 0.4) species detected within 50 m of plot center. Detections within 50 m of plot center were used to estimate park-wide species-specific bird populations.

I combined data from 60 point counts from 2 consecutive winters (i.e., 2010-2012 and 2011-2013) to estimate detection probabilities, densities, and thereby species populations within Park boundaries. Park-wide population estimates were obtained for 25 species for both time periods (Tables 2 & 3). In addition, population estimates for 7 other species were obtained for one of the two time periods; 3 species during 2010-2012 (Table 2) and 4 species during 2011-2013 (Table 3). Finally, when data from all 90 counts were combined, there were sufficient detections to estimate the winter populations of 3 additional species (Table 4). Sixty-five other species were either detected only beyond the 50-m radii search areas or were rarely detected within the search areas such that their populations could not be estimated (Table 1). The estimated populations of common species within San Antonio Missions National Historical Park during winter summed to approximately 8,000 birds, regardless of time period (Tables 2, 3, & 4). American Goldfinch and Yellow-rumped Warbler were the most abundant species during winter within the San Antonio Missions National Historical Park.

Point Counts for Breeding Birds

During summers (May-June) 80 point locations were surveyed for breeding birds using 10-minute duration point counts: 2010 (n = 20), 2011 (n = 30), and 2012 (n = 30). During each point count survey, the first detection of each bird was recorded within 1-minute intervals and distances were categorically recorded within 4 distance categories (0-25 m, >25-50 m, >50-100 m, >100 m) or as a fly-over not 'actively using' the plot location.

During counts, 1746 individuals of 89 species were detected (Table 5). An average of 25.8 (SE = 1.4) individuals and 12.2 (SE = 0.5) species were detected at surveyed locations (n = 80). As fewer points were surveyed in 2010, only 390 individuals of 51 species were detected, compared to 706 and 650 individuals of 71 and 60 species, respectively during 2011 and 2012.

Sufficient detections were obtained to estimate detection probability and density for 19 species during 2010-11 (Table 6) and 21 species during 2011-12 (Table 7). However, most point estimates of density were associated with large variances ($CV > 67\%$), hence confidence intervals surrounding population estimates were wide. I was able to estimate bounds on density and population for 6 additional species during 2010-11 (Table 6) and 8 additional species during 2011-12 (Table 7), but a point estimate of detection probability was not estimated for these species – so the point estimate for these species for their park-wide populations was based on mean detection probability for those species that had a valid estimate of detection probability. Park-wide population estimates for the mostly commonly detected breeding birds was circa 7000 individuals, but wide confidence intervals indicated population could range from just over 2000 to 29,000 birds! When data from all 3 survey years were combined, I estimated the park-wide population of 33 commonly detected species was circa 9000 birds (Table 8).

Effective detection radii, with confidence limits, were estimated for 33 commonly detected species (Table 9). Those species for which an effective detection radius was estimated for each time period had similar detection distances for each time period (Table 9).

Results

Population estimates of birds during winter at San Antonio Missions National Historical Park had relatively small associated variances. Even so, many of these population estimates were based on small number of detections ($n < 30$). Readers ought to be suspect of the reliability of estimates that are based on few detections. Several more years of monitoring with relatively consistent winter populations and associated variances are needed before I would consider these winter population estimates to be reliable.

Population estimates of breeding birds were obtained for several species during both time periods of analysis (Tables 6 & 7). However, no consistent trend in breeding population change was discernible among species. Considering the marked uncertainty associated with most of these reported population estimates, and the comparison of only 2 time periods that shared data collected in 2011, this lack of trend information was expected.

Notably two species, Brown-headed Cowbird and Cave Swallow, did have marked change in their estimated populations between time periods. However, one of the assumptions of the analysis employed is that each bird detection is assumed to be independent. This assumption is likely violated for colonial nesting species such as swallows. Similarly, non-territorial species like cowbirds are likely not independent in their detection, as they are often detected in small flocks during the breeding season. Therefore, population estimates for these species should be viewed with caution. As with population estimates of winter birds, many population estimates of breeding birds were based on a small number of detections. As such, these population estimates of breeding birds should be viewed with caution until additional data collected in future years confirms the validity of these population estimates.

Table 1. Bird species and number detected during 90 area-search survey visits to 40 randomly located survey locations on San Antonio Missions National Historical Park (SAAN) during winters of 2010-11 ($n = 30$ visits), 2011-12 ($n = 30$ visits), and 2012-13 ($n = 30$ visits). ALL detections includes birds detected at any distance from plot center (including flyovers), whereas 50-M RADIUS includes only birds ≤ 50 m from plot center when first detected.

Alpha code	Common name	ALL		50-M RADIUS	
		Number points	Number individuals	Number points	Number individuals
AMCO	American Coot	1	1	-	-
AMCR	American Crow	43	101	2	5
AMGO	American Goldfinch	37	283	18	182
AMKE	American Kestrel	4	4	1	1
AMPI	American Pipit	7	64	-	-
AMRO	American Robin	2	2	-	-
BADO	Barred Owl	1	1	-	-
BBWD	Black-bellied Whistling-Duck	2	44	-	-
BCTI	Black-crested Titmouse	42	76	15	25
BEWR	Bewick's Wren	8	11	5	7

Alpha code	Common name	ALL		50-M RADIUS	
		Number points	Number individuals	Number points	Number individuals
BGGN	Blue-gray Gnatcatcher	6	9	5	8
BHCO	Brown-headed Cowbird	2	102	-	-
BHVI	Blue-headed Vireo	3	3	2	2
BLJA	Blue Jay	34	98	10	21
BLVU	Black Vulture	36	196	9	38
BROC	Bronzed Cowbird	1	1	1	1
BUFF	Bufflehead	1	2	-	-
CACH	Carolina Chickadee	20	37	13	27
CARW	Carolina Wren	71	251	39	66
CASW	Cave Swallow	3	10	1	4
CEDW	Cedar Waxwing	4	74	-	-
CHSP	Chipping Sparrow	2	42	2	42
COGD	Common Ground-Dove	2	2	2	2
COGR	Common Grackle	1	12	1	12
COHA	Cooper's Hawk	2	2	-	-
CRCA	Crested Caracara	9	11	4	5
DCCO	Double-crested Cormorant	9	19	-	-
DOWO	Downy Woodpecker	2	2	1	1
EABL	Eastern Bluebird	12	29	4	13
EAME	Eastern Meadowlark	7	78	4	29
EAPH	Eastern Phoebe	37	49	28	35
EATO	Eastern Towhee	1	1	-	-
EGGO	Egyptian Goose	1	2	1	2
EUCD	Eurasian Collared-Dove	1	1	-	-
EUST	European Starling	34	561	12	58
GADW	Gadwall	9	47	1	2
GBHE	Great Blue Heron	9	9	4	4
GFWO	Golden-fronted Woodpecker	69	108	24	30
GHDO	Gray-headed Dove	1	1	1	1
GHOW	Great Horned Owl	1	1	-	-
GKIN	Green Kingfisher	1	1	-	-
GREG	Great Egret	14	24	1	1
GRYE	Greater Yellowlegs	4	4	-	-
GTGR	Great-tailed Grackle	48	854	13	48
GWFG	Greater White-fronted Goose	1	100	-	-
HETH	Hermit Thrush	34	64	29	48
HOFI	House Finch	21	48	15	33
HOSP	House Sparrow	13	113	5	78
HOWR	House Wren	9	12	6	9
INDO	Inca Dove	6	55	5	32
KILL	Killdeer	12	37	5	13

Alpha code	Common name	ALL		50-M RADIUS	
		Number points	Number individuals	Number points	Number individuals
LBDO	Long-billed Dowitcher	2	4	1	1
LBHE	Little Blue Heron	2	2	1	1
LBTH	Long-billed Thrasher	5	6	2	2
LBWO	Ladder-backed Woodpecker	45	66	20	26
LEGO	Lesser Goldfinch	9	35	6	24
LESA	Least Sandpiper	6	101	-	-
LEYE	Lesser Yellowlegs	1	2	-	-
LISP	Lincoln's Sparrow	15	24	13	21
LOSH	Loggerhead Shrike	6	7	2	2
MALL	Mallard	7	24	-	-
MODO	Mourning Dove	27	180	16	48
NECO	Neotropic Cormorant	13	22	-	-
NOCA	Northern Cardinal	72	261	59	136
NOFL	Northern Flicker	23	32	8	9
NOHA	Northern Harrier	2	2	1	1
NOMO	Northern Mockingbird	64	197	44	83
NSHO	Northern Shoveler	1	4	-	-
OCWA	Orange-crowned Warbler	21	31	20	28
OSPR	Osprey	2	2	-	-
OVEN	Ovenbird	1	1	1	1
PBGR	Pied-billed Grebe	3	6	1	1
RCKI	Ruby-crowned Kinglet	41	74	32	53
ROPI	Rock Pigeon	13	46	3	18
RSHA	Red-shouldered Hawk	42	65	14	18
RTHA	Red-tailed Hawk	10	11	3	3
RWBL	Red-winged Blackbird	18	526	4	60
SAVS	Savannah Sparrow	9	121	8	58
SCJU	Dark-eyed Junco	1	15	1	15
SNEG	Snowy Egret	7	12	1	1
SOSP	Song Sparrow	2	2	1	1
SPPI	Sprague's Pipit	1	1	1	1
SPSA	Spotted Sandpiper	5	6	2	2
SPTO	Spotted Towhee	11	16	9	11
SSHA	Sharp-shinned Hawk	4	4	3	3
STFL	Scissor-tailed Flycatcher	1	1	1	1
TUVU	Turkey Vulture	19	47	2	7
VEFL	Vermilion Flycatcher	1	1	-	-
VERD	Verdin	2	2	1	1
VESP	Vesper Sparrow	5	17	3	10
WCSP	White-crowned Sparrow	4	80	1	5
WEME	Western Meadowlark	3	42	1	1

Alpha code	Common name	ALL		50-M RADIUS	
		Number points	Number individuals	Number points	Number individuals
WEVI	White-eyed Vireo	13	15	7	9
WITU	Wild Turkey	1	1	1	1
WIWR	Winter Wren	2	2	1	1
WTDO	White-tipped Dove	2	2	-	-
WTSP	White-throated Sparrow	3	21	3	21
WWDO	White-winged Dove	27	393	10	56
YBSA	Yellow-bellied Sapsucker	1	1	1	1
YRWA	Yellow-rumped Warbler	40	226	34	193
		100 spp.	<u>6418</u>	76 spp.	<u>1820</u>

Table 2. Estimate (standard error [SE] and lower [lcl] and upper [ucl] confidence limit) of detection probability (p), density (D) and estimated population (N) of commonly detected bird species during winters (Dec-Feb) 2010-11 and 2011-12 within the 334 ha currently constituting San Antonio Missions National Historical Park (SAAN), based on temporal removal model (2-minute intervals) of detections from 60 area search plots of 50 m radius.

Species ^a	n	p	Detection probability			Density (birds / ha)				Park population		
			SE	lcl	ucl ^b	D	lcl	ucl	%CV	N	lcl	ucl
AMGO	169	0.95718	0.01307	0.93157	0.98278	3.74674	3.64911	3.84974	17.74	1251	1219	1286
BCTI	20	1.00000	0.03892	0.92371	1.07629	0.42441	0.39433	0.45947	17.41	142	142 ^c	153
BLJA	13	0.97457	0.04737	0.88173	1.06741	0.28307	0.25845	0.31287	17.52	95	92 ^c	104
BLVU	10	0.98794	0.05446	0.88119	1.09469	0.21480	0.19385	0.24082	17.43	72	71 ^c	80
CACH	17	0.90022	0.04222	0.81747	0.98297	0.40074	0.36700	0.44130	19.34	134	123	147
CARW	50	0.83643	0.02706	0.78339	0.88946	1.26853	1.19289	1.35441	22.88	424	398	452
EABL	12	0.91885	0.04950	0.82183	1.01588	0.27714	0.25067	0.30986	18.66	93	85 ^c	103
EAPH	26	0.96305	0.03335	0.89769	1.02841	0.57291	0.53650	0.61462	17.66	191	184 ^c	205
EUST	28	0.76415	0.04235	0.68114	0.84717	0.77756	0.70137	0.87233	29.33	260	234	291
GFWO	24	0.87939	0.03640	0.80805	0.95074	0.57915	0.53569	0.63028	20.28	193	179	211
GTGR	35	1.00000	0.02942	0.94233	1.05767	0.74272	0.70223	0.78818	17.41	248	248 ^c	263
HETH	39	0.93894	0.02722	0.88559	0.99229	0.88143	0.83404	0.93453	18.10	294	279	312
HOFI	27	0.98106	0.03299	0.91640	1.04571	0.58402	0.54791	0.62523	17.47	195	191 ^c	209
HOSP	23	0.85139	0.03882	0.77530	0.92748	0.57327	0.52624	0.62953	21.87	191	176	210
LBWO	18	0.84256	0.04458	0.75517	0.92994	0.45335	0.41075	0.50581	22.45	151	137	169
LEGO	12	1.00000	0.05025	0.90151	1.09849	0.25465	0.23182	0.28247	17.41	85	85 ^c	94
LISP	11	0.92559	0.05151	0.82464	1.02654	0.25219	0.22739	0.28307	18.46	84	78 ^c	95
MODO	36	0.99832	0.02896	0.94155	1.05509	0.76523	0.72406	0.81137	17.41	256	255 ^c	271
NOCA	63	0.87049	0.01872	0.83380	0.90719	1.53580	1.47367	1.60339	17.07	513	492	536
NOMO	93	0.92037	0.02158	0.87807	0.96268	2.14426	2.05003	2.24757	22.62	716	685	751
OCWA	18	1.00000	0.04103	0.91958	1.08042	0.38197	0.35354	0.41537	17.41	128	128 ^c	139
RCKI	44	1.00000	0.02624	0.94857	1.05143	0.93371	0.88804	0.98434	17.41	312	312 ^c	329
RSHA	9	0.95662	0.05661	0.84566	1.06758	0.19965	0.17890	0.22584	17.75	67	64 ^c	75
RWBL	60	0.95394	0.02192	0.91098	0.99690	1.33472	1.27720	1.39767	17.80	446	427	467
SAVS	36	0.76827	0.03699	0.69577	0.84078	0.99436	0.90862	1.09798	28.89	332	303	367

Species ^a	n	p	Detection probability			Density (birds / ha)				Park population		
			SE	lcl	ucl ^b	D	lcl	ucl	%CV	N	lcl	ucl
SPTO	9	0.84256	0.06305	0.71898	0.96613	0.22667	0.19768	0.26563	22.45	76	66	89
WTSP	18	0.88925	0.04152	0.80788	0.97062	0.42954	0.39353	0.47281	19.81	143	131	158
YRWA	116	0.95910	0.01577	0.92818	0.99002	2.56656	2.48641	2.65206	17.71	857	830	886
										7,949	7,614	8,452

^aCommon name associated with species alpha code listed in Table 1.

^bMaximum possible detection probability = 1.0

^cLower confidence limit based on maximum detection probability = 1.0

Table 3. Estimate (standard error [SE] and lower [lcl] and upper [ucl] confidence limit) of detection probability (p), density (D) and estimated population (N) of commonly detected bird species during winters (Dec-Feb) 2011-12 and 2012-13 within the 334 ha currently constituting San Antonio Missions National Historical Park (SAAN), based on temporal removal model (2-minute intervals) of detections from 60 area search plots of 50 m radius.

Species ^a	n	Detection probability				Density (birds / ha)				Park population		
		p	SE	lcl	ucl ^b	D	lcl	ucl	%CV	N	lcl	ucl
AMGO	162	0.97551	0.01342	0.94920	1.00182	3.52405	3.43150	3.62173	17.5	1,177	1,148 ^c	1,210
BCTI	14	1.00000	0.04652	0.90882	1.09118	0.29709	0.27226	0.32690	17.4	99	99 ^c	109
BLJA	18	0.85178	0.04385	0.76583	0.93774	0.44844	0.40733	0.49877	21.8	150	136	167
BLVU	32	0.93005	0.03014	0.87098	0.98911	0.73014	0.68653	0.77965	18.3	244	229	260
CACH	16	0.93973	0.04249	0.85644	1.02301	0.36131	0.33189	0.39644	18.1	121	113 ^c	132
CARW	32	0.85653	0.03263	0.79258	0.92048	0.79281	0.73773	0.85678	21.5	265	246	286
EABL	13	0.89251	0.04867	0.79712	0.98790	0.30909	0.27925	0.34608	19.7	103	93	116
EAPH	26	0.96074	0.03333	0.89541	1.02607	0.57428	0.53772	0.61618	17.7	192	184 ^c	206
EUST	52	0.76270	0.03118	0.70158	0.82383	1.44679	1.33945	1.57284	29.5	483	447	525
GFWO	16	0.92415	0.04274	0.84039	1.00792	0.36740	0.33686	0.40402	18.5	123	113 ^c	135
GTGR	38	1.00000	0.02824	0.94465	1.05535	0.80639	0.76409	0.85363	17.4	269	269 ^c	285
HETH	36	0.95327	0.02830	0.89780	1.00873	0.80140	0.75733	0.85090	17.8	268	255 ^c	284
HOFI	11	0.94252	0.05122	0.84213	1.04290	0.24766	0.22383	0.27719	18.0	83	78 ^c	93
HOSP	78	0.81115	0.02281	0.76645	0.85585	2.04058	1.93400	2.15959	24.8	682	646	721
INDO	32	0.84894	0.03305	0.78416	0.91373	0.79989	0.74318	0.86598	22.0	267	248	289
KILL	11	0.79734	0.06259	0.67466	0.92003	0.29276	0.25372	0.34599	26.0	98	85	116
LBWO	13	0.97918	0.04749	0.88611	1.07225	0.28173	0.25728	0.31133	17.5	94	92 ^c	104
LEGO	12	1.00000	0.05025	0.90151	1.09849	0.25465	0.23182	0.28247	17.4	85	85 ^c	94
LISP	11	0.90804	0.05211	0.80590	1.01019	0.25707	0.23107	0.28965	19.0	86	78 ^c	97
MODO	22	0.93129	0.03633	0.86008	1.00249	0.50130	0.46569	0.54280	18.3	167	156 ^c	181
NOCA	70	0.88264	0.02122	0.84104	0.92424	1.68296	1.60721	1.76620	20.1	562	537	590
NOMO	60	0.93044	0.02201	0.88731	0.97357	1.36843	1.30781	1.43495	18.3	457	437	479
OCWA	21	1.00000	0.03799	0.92555	1.07445	0.44563	0.41476	0.48148	17.4	149	149 ^c	161
RCKI	27	1.00000	0.03350	0.93434	1.06566	0.57296	0.53766	0.61322	17.4	191	191 ^c	205
ROPI	18	0.64802	0.06885	0.51308	0.78296	0.58945	0.48786	0.74447	45.1	197	163	249

Species ^a	n	Detection probability				Density (birds / ha)				Park population		
		p	SE	lcl	ucl ^b	D	lcl	ucl	%CV	N	lcl	ucl
RSHA	11	0.95357	0.05119	0.85324	1.05391	0.24479	0.22149	0.27358	17.8	82	78 ^c	91
SAVS	33	0.78372	0.03727	0.71067	0.85678	0.89353	0.81734	0.98538	27.3	298	273	329
WWDO	52	1.00000	0.02414	0.95269	1.04731	1.10347	1.05363	1.15827	17.4	369	369 ^c	387
YRWA	130	0.93450	0.01493	0.90525	0.96376	2.95203	2.86241	3.04745	18.2	986	956	1,018
										8,346	7,956	8,919

^aCommon name associated with species alpha code listed in Table 1.

^bMaximum possible detection probability = 1.0

^cLower confidence limit based on maximum detection probability = 1.0

Table 4. Estimate (standard error [SE] and lower [lcl] and upper [ucl] confidence limit) of detection probability (p), density (D) and estimated population (N) of commonly detected bird species during winters (Dec-Feb) 2010-2011, 2011-12 and 2012-13 within the 334 ha currently constituting San Antonio Missions National Historical Park (SAAN), based on temporal removal model (2-minute intervals) of detections from 90 area search plots of 50 m radius.

Species ^a	n	Detection probability				Density (birds / ha)				Park population		
		p	SE	lcl	ucl ^b	D	lcl	ucl	%CV	N	lcl	ucl
AMGO	182	0.95809	0.01259	0.93341	0.98277	2.68739	2.61990	2.75845	17.7	898	875	921
BCTI	25	1.00000	0.03481	0.93177	1.06824	0.35368	0.33108	0.37958	17.4	118	118 ^c	127
BLJA	21	0.88870	0.03846	0.81331	0.96408	0.33430	0.30816	0.36528	19.8	112	103	122
BLVU	38	0.93811	0.02758	0.88405	0.99217	0.57306	0.54183	0.60810	18.1	191	181	203
CACH	27	0.89054	0.03385	0.82420	0.95688	0.42892	0.39919	0.46345	19.7	143	133	155
CARW	66	0.86415	0.02244	0.82017	0.90813	1.08049	1.02816	1.13844	21.1	361	343	380
EABL	13	0.90295	0.04815	0.80857	0.99733	0.20368	0.18441	0.22746	19.2	68	62	76
EAPH	35	0.94410	0.02871	0.88784	1.00037	0.52446	0.49497	0.55770	18.0	175	165 ^c	186
EUST	58	0.74820	0.03056	0.68830	0.80810	1.09668	1.01539	1.19211	31.1	366	339	398
GFWO	30	0.89463	0.03197	0.83198	0.95728	0.47440	0.44336	0.51013	19.6	158	148	170
GTGR	48	1.00000	0.02513	0.95076	1.04924	0.67906	0.64719	0.71423	17.4	227	227 ^c	239
HETH	48	0.94356	0.02452	0.89551	0.99161	0.71968	0.68481	0.75830	18.0	240	229	253
HOFI	33	0.96452	0.02961	0.90648	1.02256	0.48403	0.45655	0.51502	17.6	162	156 ^c	172
HOSP	78	0.81115	0.02281	0.76645	0.85585	1.36039	1.28933	1.43973	24.8	454	431	481
HOWR	9	1.00000	0.05802	0.88628	1.11373	0.12732	0.11432	0.14366	17.4	43	43 ^c	48
INDO	32	0.84894	0.03305	0.78416	0.91373	0.53326	0.49545	0.57732	22.0	178	165	193
KILL	13	0.78643	0.05902	0.67076	0.90210	0.23386	0.20387	0.27419	27.1	78	68	92
LBWO	26	0.92049	0.03360	0.85464	0.98634	0.39960	0.37292	0.43038	18.6	133	125	144
LEGO	24	1.00000	0.03553	0.93036	1.06964	0.33953	0.31743	0.36495	17.4	113	113 ^c	122
LISP	21	0.89852	0.03805	0.82394	0.97310	0.33064	0.30530	0.36057	19.4	110	102	120
MODO	48	0.98369	0.02478	0.93512	1.03227	0.69032	0.65783	0.72618	17.5	231	227 ^c	243
NOCA	136	0.87001	0.01549	0.83964	0.90038	2.21149	2.13689	2.29147	20.8	739	714	765
NOFL	9	0.87737	0.05960	0.76055	0.99420	0.14512	0.12807	0.16741	20.4	48	43	56
NOMO	83	0.91589	0.01886	0.87892	0.95285	1.28205	1.23231	1.33596	18.8	428	412	446
OCWA	28	1.00000	0.03290	0.93552	1.06448	0.39612	0.37212	0.42342	17.4	132	132 ^c	141

Species ^a	n	Detection probability				Density (birds / ha)				Park population		
		p	SE	lcl	ucl ^b	D	lcl	ucl	%CV	N	lcl	ucl
RCKI	53	1.00000	0.02391	0.95314	1.04686	0.74980	0.71623	0.78666	17.4	250	250 ^c	263
RSHA	18	0.95662	0.04003	0.87816	1.03508	0.26620	0.24602	0.28998	17.8	89	85 ^c	97
RWBL	60	0.95394	0.02192	0.91098	0.99690	0.88981	0.85147	0.93178	17.8	297	284	311
SPTO	11	0.86578	0.05483	0.75831	0.97324	0.17974	0.15990	0.20522	21.0	60	53	69
WEVI	9	0.90066	0.05800	0.78698	1.01434	0.14137	0.12552	0.16179	19.3	47	43 ^c	54
WTSP	21	0.88870	0.03846	0.81331	0.96408	0.33430	0.30816	0.36528	19.8	112	103	122
WWDO	56	1.00000	0.02326	0.95441	1.04559	0.79224	0.75769	0.83008	17.4	265	265 ^c	277
YRWA	193	1.00000	0.01253	0.97544	1.02456	2.73039	2.66494	2.79913	17.4	912	912 ^c	935
										7,940	7,649	8,381

^aCommon name associated with species alpha code listed in Table 1.

^bMaximum possible detection probability = 1.0

^cLower confidence limit based on maximum detection probability = 1.0

Table 5. Bird species and number detected during 10-minute surveys of 40 randomly located point locations on San Antonio Missions National Historical Park (SAAN) during the breeding season May-June 2010 (n = 20 counts), 2011 (n = 30 counts), and 2012 (n = 30 counts). Birds for which no detection distance was recorded (i.e., FLYOVERS) are not reported in table.

Alpha code	Common name	2010	2011	2012
AMCR	American Crow	5	12	17
ATFL	Ash-throated Flycatcher	-	-	1
BADO	Barred Owl	1	-	1
BARS	Barn Swallow	1	18	5
BBWD	Black-bellied Whistling Duck	-	2	3
BCFL	Brown-crested Flycatcher	1	-	-
BCHU	Black-chinned Hummingbird	1	3	1
BCNH	Black-crowned Night-Heron	-	1	-
BCTI	Black-crested Titmouse	34	19	23
BEWR	Bewick's Wren	3	3	-
BHCO	Brown-headed Cowbird	11	26	11
BHVI	Blue-headed Vireo	-	-	1
BLGR	Blue Grosbeak	-	2	3
BLJA	Blue Jay	2	5	3
BLVU	Black Vulture	-	2	3
BNST	Black-necked Stilt	-	-	1
BUOR	Bullock's Oriole	-	2	2
BWTE	Blue-winged Teal	-	1	-
CACH	Carolina Chickadee	6	3	7
CAEG	Cattle Egret	-	3	2
CARW	Carolina Wren	38	64	76
CASW	Cave Swallow	3	11	11
CHSP	Chipping Sparrow	-	1	-
CHSW	Chimney Swift	-	6	4
CLSW	Cliff Swallow	35	9	18
CONI	Common Nighthawk	1	-	-
CRCA	Crested Caracara	1	-	-
DCCO	Double-crested Cormorant	-	1	-
DICK	Dickcissel	-	1	-
EABL	Eastern Bluebird	1	2	-
EAPH	Eastern Phoebe	1	-	1
EAWP	Eastern Wood-Pewee	-	1	-
EUCD	Eurasian Collared-Dove	-	-	1
EUST	European Starling	22	14	12
FISP	Field Sparrow	2	-	-
GCFL	Great Crested Flycatcher	5	7	11
GFWO	Golden-fronted Woodpecker	7	22	17
GREG	Great Egret	2	8	2

Alpha code	Common name	2010	2011	2012
GRHE	Green Heron	1	1	-
GRRO	Greater Roadrunner	2	-	1
GTGR	Great-tailed Grackle	21	37	27
HOFI	House Finch	1	10	12
HOSP	House Sparrow	3	20	18
INBU	Indigo Bunting	-	1	-
INDO	Inca Dove	-	7	4
KILL	Killdeer	-	3	1
LBHE	Little Blue Heron	-	1	-
LBTH	Long-billed Thrasher	-	2	-
LBWO	Ladder-backed Woodpecker	4	15	12
LEFL	Least Flycatcher	-	-	2
LEGO	Lesser Goldfinch	1	4	5
LENI	Lesser Nighthawk	1	-	-
LOSH	Loggerhead Shrike	-	1	1
MALL	Mallard	5	2	-
MIKI	Mississippi Kite	-	1	-
MODO	Mourning Dove	6	15	10
MOPA	Monk Parakeet	-	1	-
MOWA	Mourning Warbler	-	1	-
NECO	Neotropic Cormorant	1	3	2
NOCA	Northern Cardinal	79	109	115
NOMO	Northern Mockingbird	19	65	63
OLSP	Olive Sparrow	3	4	2
OROR	Orchard Oriole	-	2	-
PABU	Painted Bunting	9	20	20
PESA	Pectoral Sandpiper	-	1	-
PUMA	Purple Martin	1	10	10
PYRR	Pyrrhuloxia	1	-	-
REVI	Red-eyed Vireo	-	1	2
ROPI	Rock Pigeon	-	6	7
RSHA	Red-shouldered Hawk	7	11	1
RTHA	Red-tailed Hawk	1	1	2
RWBL	Red-winged Blackbird	3	6	1
SNEG	Snowy Egret	-	3	2
SPSA	Spotted Sandpiper	-	1	-
STFL	Scissor-tailed Flycatcher	2	20	11
SUTA	Summer Tanager	1	3	9
SWHA	Swainson's Hawk	-	-	1
TUVU	Turkey Vulture	-	6	1
VERD	Verdin	1	-	1
WAVI	Warbling Vireo	-	1	-

Alpha code	Common name	2010	2011	2012
WEKI	Western Kingbird	2	7	5
WEVI	White-eyed Vireo	24	34	27
WITU	Wild Turkey	1	-	-
WIWA	Wilson's Warbler	-	3	-
WTDO	White-tipped Dove	-	1	-
WWDO	White-winged Dove	3	12	22
YBCH	Yellow-breasted Chat	-	-	3
YBCU	Yellow-billed Cuckoo	3	3	11
YCNH	Yellow-crowned Night-Heron	1	2	2
	Individuals detected	390	706	650
	Species detected	51	71	60

Table 6. Estimate (standard error [SE] and lower [lcl] and upper [ucl] confidence limit) of detection probability (p), density (D) and estimated population (N) of commonly detected bird species detected and during breeding season (May-June) 2010 and 2011 within the 334 ha currently constituting San Antonio Missions National Historical Park (SAAN), based on time-distance model (2-minute intervals; 4 detection categories) of detections from 50 (n = 20 counts in 2010 and n = 30 counts in 2011) 10-minute point count surveys of birds.

	Species ¹	N	Detection probability			Density (birds / ha)				%CV	Park population		
			P	SE	lcl ²	ucl ³	D	lcl	ucl		N	lcl	ucl
16	AMCR	17	0.32455	0.28909	0.10000	0.89117	0.10145	0.02085	1.01625	89.1	34	7	339
	BARS	19	0.2844 ^a	0.27066	0.10000	0.53048	0.60200	0.20995	3.17425	95.2	201 ^a	70	1,060
	BCTI	53	0.11082	0.17026	0.10000	0.44452	0.66395	0.11171	1.38887	153.6	222	37	464
	BHCO	37	0.09589	0.19038	0.10000	0.46904	5.97780	0.93585	9.00193	198.5	1,997	313	3,007
	CARW	102	0.61662	0.11420	0.39279	0.84046	0.61237	0.36886	1.22503	18.5	205	123	409
	CASW	14	0.14273	0.30470	0.10000	0.73994	1.09067	0.14256	3.34359	213.5	364	48	1,117
	CLSW	11	0.21146	0.33941	0.10000	0.87670	0.53655	0.08524	2.66611	160.5	179	28	890
	EUST	18	0.2844 ^a	0.27875	0.10000	0.54634	0.58150	0.19552	3.13159	98.0	194 ^a	65	1,046
	GCFL	12	0.07888	0.34979	0.10000	0.76446	0.38754	0.02279	1.04718	443.5	129	8	350
	GFWO	29	0.38753	0.21514	0.10000	0.80919	0.25497	0.08531	1.73149	55.5	85	28	578
	GREG	10	0.2844 ^a	0.39131	0.10000	0.76696	0.08655	0.01610	0.99231	137.6	29 ^a	5	331
	GTGR	58	0.2844 ^a	0.15696	0.10000	0.30764	1.34678	0.92066	5.25474	55.2	450 ^a	307	1,755
	HOFI	11	0.43398	0.33088	0.10000	1.00000	0.28997	0.08309	2.65542	76.2	97	28	887
	HOSP	23	0.2844 ^a	0.24936	0.10000	0.48874	0.94692	0.36973	4.63422	87.7	316 ^a	123	1,548
	LBWO	18	0.10426	0.27746	0.10000	0.64809	0.84315	0.09201	1.83878	266.1	282	31	614
	MODO	20	0.2844 ^a	0.26428	0.10000	0.58983	0.38946	0.12309	2.08973	92.9	130 ^a	41	698
	NOCA	188	0.49358	0.08224	0.33238	0.65478	2.05878	1.36918	3.52960	16.7	688	457	1,179
	NOMO	84	0.42186	0.12567	0.17555	0.66816	0.75682	0.38553	2.37574	29.8	253	129	793
	PABU	29	0.49464	0.20933	0.08435	0.90493	0.31851	0.13060	2.81085	42.3	106	44	939
	PUMA	11	0.31949	0.34425	0.10000	0.99422	0.17115	0.03499	1.37456	107.7	57	12	459
	RSHA	18	0.17184	0.28389	0.10000	0.72827	0.21461	0.02976	1.04363	165.2	72	10	349
	STFL	22	0.33434	0.23616	0.10000	0.79720	0.63249	0.19558	3.49524	70.6	211	65	1,167

Species ¹	N	Detection probability				Density (birds / ha)				Park population		
		P	SE	lcl ²	ucl ³	D	lcl	ucl	%CV	N	lcl	ucl
WEKI	9	0.13399	0.38454	0.10000	0.88769	0.46244	0.04369	1.75690	287.0	154	15	587
WEVI	58	0.27870	0.15275	0.10000	0.57809	0.74072	0.27481	2.99295	54.8	247	92	1,000
WWDO	15	0.24911	0.28901	0.10000	0.81556	0.67402	0.14256	3.33558	116.0	225	48	1,114
Totals										6,927	2,134	22,680

¹Common name associated with species alpha code listed in Table 5.

²Minimum lower bound on detection probability arbitrarily set at (p = 0.1).

³Maximum upper bound on detection probability is (p = 1.0).

^aPoint estimate of detection probability was mean for other species during 2010 - 2011 (p = 0.2844) as species specific point estimates were not estimable. Population estimate based on mean detection probability.

Table 7. Estimate (standard error [SE] and lower [lcl] and upper [ucl] confidence limit) of detection probability (p), density (D) and estimated population (N) of commonly detected bird species detected and during breeding season (May-June) 2011 and 2012 within the 334 ha currently constituting San Antonio Missions National Historical Park (SAAN), based on time-distance model (2-minute intervals; 4 detection categories) of detections from 60 (n = 30 counts per year) 10-minute point count surveys of birds.

	Species ¹	N	Detection probability				Density (birds / ha)			%CV	Park population		
			p	SE	lcl ²	ucl ³	D	lcl	ucl		N	lcl	ucl
18	AMCR	28	0.32358	0.22956	0.10000	0.77352	0.10217	0.02491	0.86044	70.9	34	8	287
	BARS	23	0.3294 ^a	0.24666	0.10000	0.48346	0.56722	0.25548	3.18205	74.9	189 ^a	85	1,063
	BCTI	42	0.09567	0.19037	0.10000	0.46879	0.57973	0.07851	1.10374	199.0	194	26	369
	BHCO	37	0.21143	0.18709	0.10000	0.57812	2.43116	0.68542	7.77094	88.5	812	229	2,595
	CACH	10	0.31977	0.35488	0.10000	1.00000	0.18034	0.03737	1.39703	111.0	60	12	467
	CARW	140	0.44765	0.09689	0.25774	0.63756	1.07647	0.64201	2.26719	21.6	360	214	757
	CASW	22	0.08186	0.24703	0.10000	0.56604	3.12278	0.32389	4.70678	301.8	1,043	108	1,572
	CHSW	10	0.38122	0.34844	0.10000	1.00000	0.24089	0.05971	2.09334	91.4	80	20	699
	EUST	26	0.3294 ^a	0.23126	0.10000	0.45328	0.73747	0.35991	3.97324	70.2	246 ^a	120	1,327
	GCFL	18	0.3294 ^a	0.29237	0.10000	0.57305	0.10653	0.03391	0.89011	88.8	36 ^a	11	297
	GFWO	39	0.17449	0.18914	0.10000	0.54519	0.61045	0.14168	1.78852	108.4	204	47	597
	GREG	10	0.3294 ^a	0.38785	0.10000	0.76019	0.08084	0.01822	0.91242	117.7	27 ^a	6	305
	GTGR	64	0.15822	0.14488	0.10000	0.44218	1.87248	0.53913	4.12051	91.6	625	180	1,376
	HOFI	22	0.3294 ^a	0.25167	0.10000	0.49327	0.56909	0.24962	3.24284	76.4	190 ^a	83	1,083
	HOSP	38	0.3294 ^a	0.19162	0.10000	0.37557	0.94447	0.58283	4.57239	58.2	315 ^a	195	1,527
	INDO	11	0.49563	0.33666	0.10000	1.00000	0.11632	0.03663	1.24845	67.9	39	12	417
	LBWO	26	0.3294 ^a	0.23490	0.10000	0.46040	0.41683	0.19767	2.30261	71.3	139 ^a	66	769
	MODO	25	0.16678	0.22796	0.10000	0.61358	1.00809	0.20167	2.86219	136.7	337	67	956
	NOCA	224	0.43124	0.07473	0.28477	0.57770	2.75725	1.84239	4.73166	17.3	921	615	1,580
	NOMO	128	0.23619	0.10268	0.03493	0.43746	1.83746	0.83369	15.27256	43.5	614	278	5,101
	PABU	40	0.61442	0.17839	0.26478	0.96406	0.28039	0.13925	0.91292	29.0	94	47	305
	PUMA	20	0.22706	0.25911	0.10000	0.73492	0.32498	0.06877	1.45214	114.1	109	23	485

Species ¹	N	Detection probability				Density (birds / ha)				Park population		
		p	SE	lcl ²	ucl ³	D	lcl	ucl	%CV	N	lcl	ucl
ROPI	13	0.3294 ^a	0.32847	0.10000	0.64380	0.28925	0.08977	2.07637	99.7	97 ^a	30	694
RSHA	12	0.22452	0.34056	0.10000	0.89202	0.12777	0.01865	0.90940	151.7	43	6	304
STFL	31	1.00000	0.12592	0.75320	1.00000	0.17523	0.12634	0.31790	12.6	59	42	106
WEKI	12	0.49842	0.31525	0.10000	1.00000	0.20589	0.06864	1.99824	63.3	69	23	667
WEVI	61	0.34495	0.14728	0.05628	0.63363	0.60842	0.26064	5.07367	42.7	203	87	1,695
WWDO	34	0.23366	0.19280	0.10000	0.61155	1.06665	0.31332	3.78336	82.5	356	105	1,264
YBCU	14	0.25083	0.30256	0.10000	0.84386	0.31665	0.06396	1.66166	120.6	106	21	555
Totals										7,601	2,766	29,219

¹Common name associated with species alpha code listed in Table 5.

²Minimum lower bound on detection probability arbitrarily set at (p = 0.1).

³Maximum upper bound on detection probability is (p = 1.0).

⁴Mean detection probability not estimated (value listed is average detection probability of other 8 species in table).

^aPoint estimate of detection probability was mean for other species during 2011 - 2012 (p = 0.3294) as species specific point estimates were not estimable. Population estimate based on mean detection probability.

Table 8. Estimate (standard error [SE] and lower [lcl] and upper [ucl] confidence limit) of detection probability (p), density (D) and estimated population (N) of commonly detected bird species detected and during breeding season (May-June) 2010, 2011, and 2012 within the 334 ha currently constituting San Antonio Missions National Historical Park (SAAN), based on time-distance model (2-minute intervals; 4 detection categories) of detections from 80 (n = 20 counts in 2010 and n = 30 counts in 2011, and 2012) 10-minute point count surveys of birds.

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Species ¹	n	Detection probability				Density (birds / ha)				Park population		
		p	SE	lcl ²	ucl ³	D	lcl	ucl	%CV	N	lcl	ucl
AMCR	33	0.21163	0.21525	0.10000	0.63352	0.11597	0.02288	0.62064	101.7	39	8	207
BARS	24	0.2778 ^a	0.24086	0.10000	0.47208	0.54567	0.21639	2.57970	86.7	182 ^a	72	862
BCTI	76	0.13983	0.14080	0.10000	0.41579	0.52165	0.12664	1.19104	100.7	174	42	398
BHCO	48	0.08025	0.16706	0.10000	0.40769	4.83887	0.75087	5.75525	208.2	1616	251	1922
BLJA	10	0.28843	0.38118	0.10000	1.00000	0.03551	0.00483	0.67545	132.2	12	2	226
CACH	16	0.2778 ^a	0.28253	0.10000	0.55377	0.31003	0.09887	1.69360	101.7	104 ^a	33	566
CARW	178	0.49166	0.08609	0.32294	0.66039	0.89979	0.57759	1.62742	17.5	301	193	544
CASW	25	0.05672	0.23270	0.10000	0.51280	3.53098	0.28472	3.55610	410.3	1179	95	1188
CLSW	29	0.2778 ^a	0.22091	0.10000	0.43298	0.48915	0.21572	2.19881	79.5	163 ^a	72	734
EUST	30	0.2778 ^a	0.21618	0.10000	0.42371	0.58907	0.26757	2.60403	77.8	197 ^a	89	870
GCFL	23	0.2778 ^a	0.25770	0.10000	0.50508	0.11782	0.03802	0.73282	92.8	39 ^a	13	245
GFWO	46	0.18611	0.17385	0.10000	0.52685	0.50747	0.13291	1.50643	93.4	169	44	503
GREG	12	0.2778 ^a	0.35754	0.10000	0.70078	0.06478	0.01336	0.61762	128.7	22 ^a	4	206
GTGR	85	0.11364	0.12595	0.10000	0.36050	3.03157	0.79285	4.58275	110.8	1013	265	1531
HOFI	23	0.2778 ^a	0.24597	0.10000	0.48211	0.54898	0.21194	2.63339	88.6	183 ^a	71	880
HOSP	41	0.2778 ^a	0.18437	0.10000	0.36137	0.92435	0.51135	3.75536	66.4	309 ^a	171	1254
INDO	11	0.49563	0.33666	0.10000	1.00000	0.08724	0.02748	0.93634	67.9	29	9	313
LBWO	30	0.2778 ^a	0.21906	0.10000	0.42936	0.40277	0.17800	1.82595	78.9	135 ^a	59	610
LEGO	10	0.2778 ^a	0.37372	0.10000	0.73249	0.21289	0.04763	1.51465	134.5	71 ^a	16	506
MODO	30	0.12492	0.21038	0.10000	0.53727	1.11732	0.19459	2.29298	168.4	373	65	766
NOCA	303	0.46482	0.06458	0.33824	0.59141	2.33772	1.66506	3.58443	13.9	781	556	1197
NOMO	147	0.26850	0.09575	0.08082	0.45617	1.30674	0.65072	5.28438	35.7	436	217	1765

Species ¹	n	Detection probability				Density (birds / ha)				Park population		
		p	SE	lcl ²	ucl ³	D	lcl	ucl	%CV	N	lcl	ucl
PABU	49	0.51740	0.16201	0.19986	0.83493	0.29140	0.14227	1.03265	31.3	97	48	345
PUMA	21	0.28715	0.25026	0.10000	0.77766	0.21978	0.05674	1.17096	87.2	73	19	391
ROPI	13	0.2778 ^a	0.32844	0.10000	0.64375	0.25371	0.06733	1.55729	118.2	85 ^a	22	520
RSHA	19	0.06706	0.28113	0.10000	0.61808	0.36126	0.02352	0.66112	419.2	121	8	221
RWBL	10	0.12356	0.40383	0.10000	0.91507	0.04154	0.00224	1.00600	326.8	14	1	336
STFL	33	0.27873	0.19461	0.10000	0.66016	0.63316	0.20553	2.65660	69.8	211	69	887
SUTA	13	1.00000	0.19457	0.61864	1.00000	0.05550	0.03421	0.15094	19.5	19	11	50
WEKI	14	0.32979	0.29608	0.10000	0.91011	0.26185	0.06582	1.69986	89.8	87	22	568
WEVI	85	0.27206	0.12559	0.02590	0.51822	0.78661	0.33476	10.70852	46.2	263	112	3577
WWDO	37	0.15575	0.18778	0.10000	0.52380	1.19642	0.27420	2.85455	120.6	400	92	953
YBCU	17	0.15712	0.28186	0.10000	0.70957	0.35495	0.05339	1.15851	179.4	119	18	387
Totals										9,016	2,769	25,528

¹Common name associated with species alpha code listed in Table 5.

²Minimum lower bound on detection probability arbitrarily set at (p = 0.1).

³Maximum upper bound on detection probability is (p = 1.0).

^aPoint estimate of detection probability was mean for other species during 2010 - 2012 (p = 0.2778) as species specific point estimates were not estimable. Population estimate based on mean detection probability.

Table 9. Estimate, lower (lcl), and upper (ucl) confidence limit for effective detection radius (EDR) of commonly detected bird species during breeding seasons (May-June) 2010-11 and 2011-12 within San Antonio Missions National Historical Park (SAAN), based on time-distance model (2-minute intervals; 4 detection categories) of detections from 80 (n = 20 counts in 2010 and n = 30 counts in 2011, and 2012) 10-minute point count surveys of birds.

Alpha code	Period	EDR	lcl	Ucl
AMCR	2010-11	134	74	194
	2011-12	156	94	219
BARS	2010-11	62	44	79
	2011-12	60	44	75
BCTI	2010-11	154	112	196
	2011-12	143	102	185
BHCO	2010-11	46	37	55
	2011-12	45	36	54
BLJA	2010, 11, & 12	145	55	234
CACH	2011-12	71	44	97
CARW	2010-11	101	87	115
	2011-12	93	82	104
CASW	2010-11	54	37	72
	2011-12	48	36	61
CHSW	2011-12	57	36	77
CLSW	2010-11	57	37	77
EUST	2010-11	61	43	79
	2011-12	56	42	69
GCFL	2010-11	113	61	165
	2011-12	122	74	169
GFWO	2010-11	102	74	129
	2011-12	101	77	125
GREG	2010-11	118	57	179
	2011-12	104	55	154
GTGR	2010-11	72	60	84
	2011-12	77	65	89
HOFI	2010-11	56	37	75
	2011-12	58	43	74
HOSP	2010-11	54	40	68
	2011-12	59	48	71
INDO	2011-12	76	49	103
LBWO	2010-11	82	57	107
	2011-12	74	55	93
LEGO	2010, 11, & 12	60	37	84
MODO	2010-11	79	56	101
	2011-12	64	49	80
NOCA	2010-11	82	75	89
	2011-12	75	69	81
NOMO	2010-11	97	82	112
	2011-12	91	80	102
PABU	2010-11	82	63	100
	2011-12	85	69	102
PUMA	2010-11	83	51	116
	2011-12	87	61	113
ROPI	2011-12	63	41	84
RSAH	2010-11	127	75	180

Alpha code	Period	EDR	lcl	Ucl
	2011-12	108	60	157
RWBL	2010, 11, & 12	200	45	355
STFL	2010-11	60	45	75
	2011-12	79	65	93
WEKI	2010-11	69	41	97
	2011-12	60	40	79
WEVI	2010-11	98	80	117
	2011-12	92	76	108
WWDO	2010-11	55	38	72
	2011-12	62	49	75
YBCU	2011-12	71	48	93

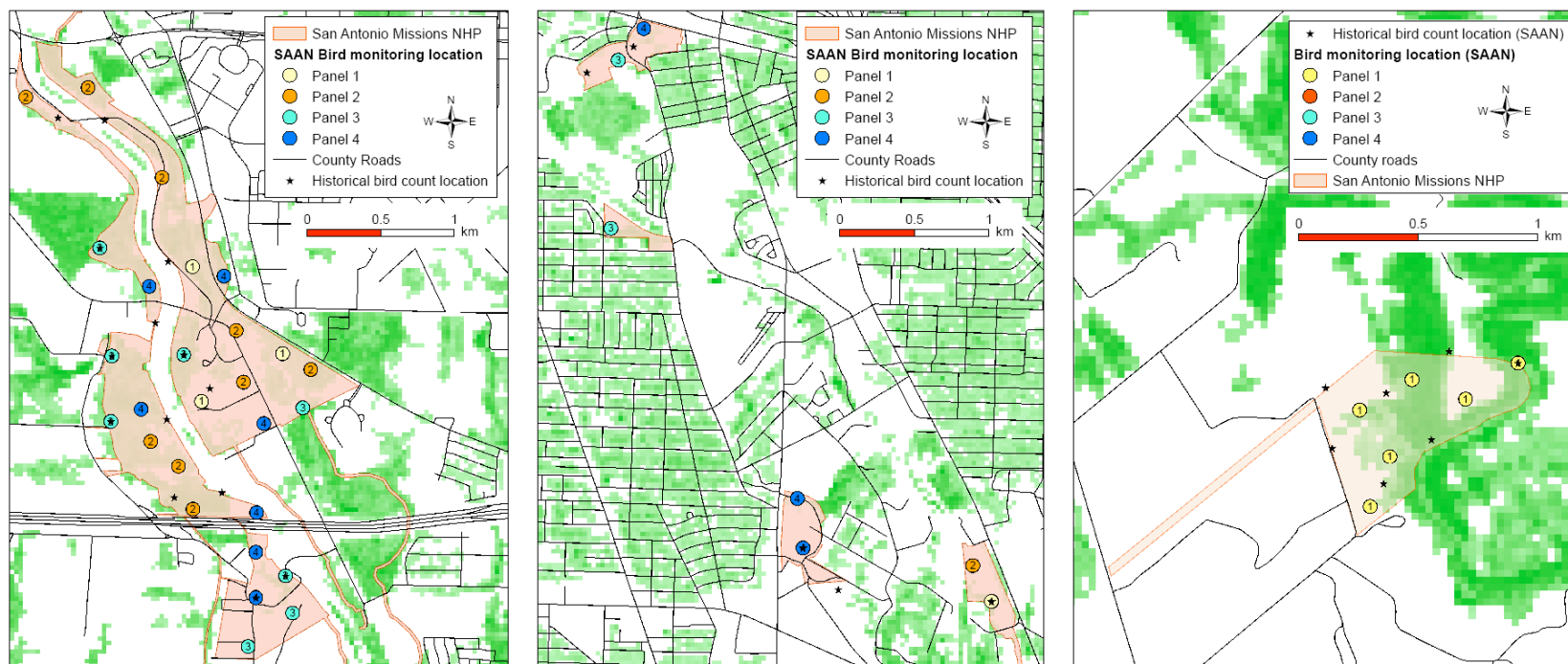


Figure 1. Locations (n=40) surveyed on San Antonio Missions National Historical Park for birds during 3 winters (Dec-Feb: 2010-2011, 2011-2012, 2012-2013) and 3 breeding seasons (May-Jun: 2010, 2011 and 2012).