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Gulf Coast Network Breeding Bird Monitoring Report

2011 and 2012 Results from Palo Alto Battlefield National Historical Park

Natural Resource Data Series NPS/PAAL/NRDS—2013/486

ON THE COVER
Northern mocking bird on a trail sign at Palo Alto Battlefield National Historical Park
Photograph by: Rolando Garza

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Contents

Page

Figures iii

Tables iii

Acknowledgments iv

Introduction 1

Methods 2

Results 4

Discussion 8

Literature Cited 9

Figures

Page

Figure 1. Survey locations within the boundary of Palo Alto National Historical Park 3

Tables

Page

Table 1. Bird species and number detected during a single visit per year to each of 29 randomly located survey locations (n=58) on Palo Alto Battlefield National Historical Park (PAAL) 4

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 detected and during breeding season (May-June) 2011 and 2012 6

Table 3. Estimate, lower (lcl), and upper (ucl) confidence limit for effective detection radius (EDR) of 11 commonly detected bird species during breeding season (May-June) 2011 and 2012 7

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Introduction

In 2011, the Gulf Coast Inventory and Monitoring Network (GULN) of the National Park Service implemented the first year of their long-term landbird monitoring protocol on Palo Alto Battlefield National Historical Park (PAAL) (Twedt 2010). Dan Twedt, of the USGS Patuxent Wildlife Research Center, developed a protocol building on existing peer reviewed methods for monitoring birds on each park in the GULN. This report provides a summary of 2011 and 2012 breeding bird monitoring efforts on PAAL, including: (1) a summary of the monitoring protocol, (2) a summary of point count results, and (3) a summary of birds detected.

The GULN is located in portions of six states, spanning from Brownsville, Texas, to Pensacola, Florida, and north to Nashville, Tennessee. The network includes eight National Park Service (NPS) units: Big Thicket National Preserve (BITH), Gulf Islands National Seashore (GUIS), Jean Lafitte National Historical Park and Preserve (JELA), Natchez Trace Parkway (NATR), Palo Alto Battlefield National Historical Park (PAAL), Padre Island National Seashore (PAIS), San Antonio Missions National Historical Park (SAAN), and Vicksburg National Military Park (VICK).

Landbird monitoring contributes to the vital signs monitoring program that has been developed by the GULN (Segura et al. 2007). Breeding landbirds ranked highly among all of the potential vital signs evaluated by the GULN. Key reasons for monitoring landbirds at PAAL are that landbirds (1) come under the legal mandate related to the Endangered Species Act and Migratory Bird Treaty Act; and (2) are potential indicators of the effects of local and regional changes in ecosystems because of their rapid metabolism and high ecological position in most food webs. Gulf Coast Network parks serve as important habitat for breeding, residence, migratory, and non-breeding (winter) bird species. These species are an important attraction for many visitors to Palo Alto National Battlefield (PAAL). In addition, comparable regional and national datasets exist for landbird monitoring adjacent to several GULN parks.

Areas surrounding the Gulf Coast are important habitat for many wildlife species. However, due to high rates of development and urbanization in coastal regions, these habitats are rapidly declining. As a result, public lands are increasing in importance as primary habitat for many species utilizing this dwindling habitat. Due to the semi-tropical climate, south Texas is home to a large and diverse avifauna, which changes dramatically with the seasons.

This report focuses on the birds utilizing PAAL during the breeding seasons of 2011 and 2012 and provides an overview of the methodology and implementation of yearly field surveys. Results presented in this report are limited to general information about bird species presence, abundance, and detection.

Methods

Methods employed at PAAL to monitor breeding birds utilize a random location 10 minute point count with time and distance variables. Random points were derived using Hawth's Analysis Tool (Ver. 3.27) within ArcMap 9.2 GIS to select 60 survey points (separated by ≥250 m). Point count locations were selected to ensure coverage of both existing federal ownership of PAAL and the proposed expansion of park boundaries. However, locations outside of the existing park boundaries will not be surveyed until those location are incorporated into PAAL. Consequently, the 29 points included within the present boundary of the park are currently being sampled (Figure 1).

Surveys were conducted between one-half hour before sunrise and four hours after sunrise (~10:00 h) during clement weather (i.e., no rain or high winds). At the first detection of each individual bird, observers recorded species identity, the time within 1-minute intervals (i.e., 0:00-:59 min, 1:00-1:59 min, 2:00-2:59 min, 3:00-3:59 min, 4:00-4:59 min, 5:00-5:59 min, 6:00-6:59 min, 7:00-7:59 min, 8:00-8:59 min, 9:00-9:59 min). Distances were estimated using a laser rangefinder (or other measured distance) within four distance annuli (0 - <25 m, 25 - <50 m, 50 - <100 m, and >100 m). Birds observed at a distance >400 m and birds flying through, but not actively using the observed space, were recorded within a separate "flyover" distance category. Individual birds were recorded only once (at their first detection), not in each time interval within which they were detected (Twedt 2010).

In accordance with the GULN landbird monitoring plan, PAAL is monitored for breeding birds every year between the optimal dates 15 May and 15 June, but if necessary, surveys may be conducted between 1 May and 30 June. In 2011, breeding bird sampling was conducted between 06 June and 13 June and in 2012 between 31 May and 03 June.

Analyses data from 20 classes (5 time intervals and 4 distance annuli) within Program SURVIV (http://www.mbr-pwrc.usgs.gov/software.html#a) were conducted to estimate detection probability and effective detection distance of frequently detected species. These estimates were used to assess regional avian densities. Density estimates were also estimated given the detection probability of each species and the amount of habitat available at PAAL. (Note: estimates, tables, and figures are the product of Daniel Twedt).

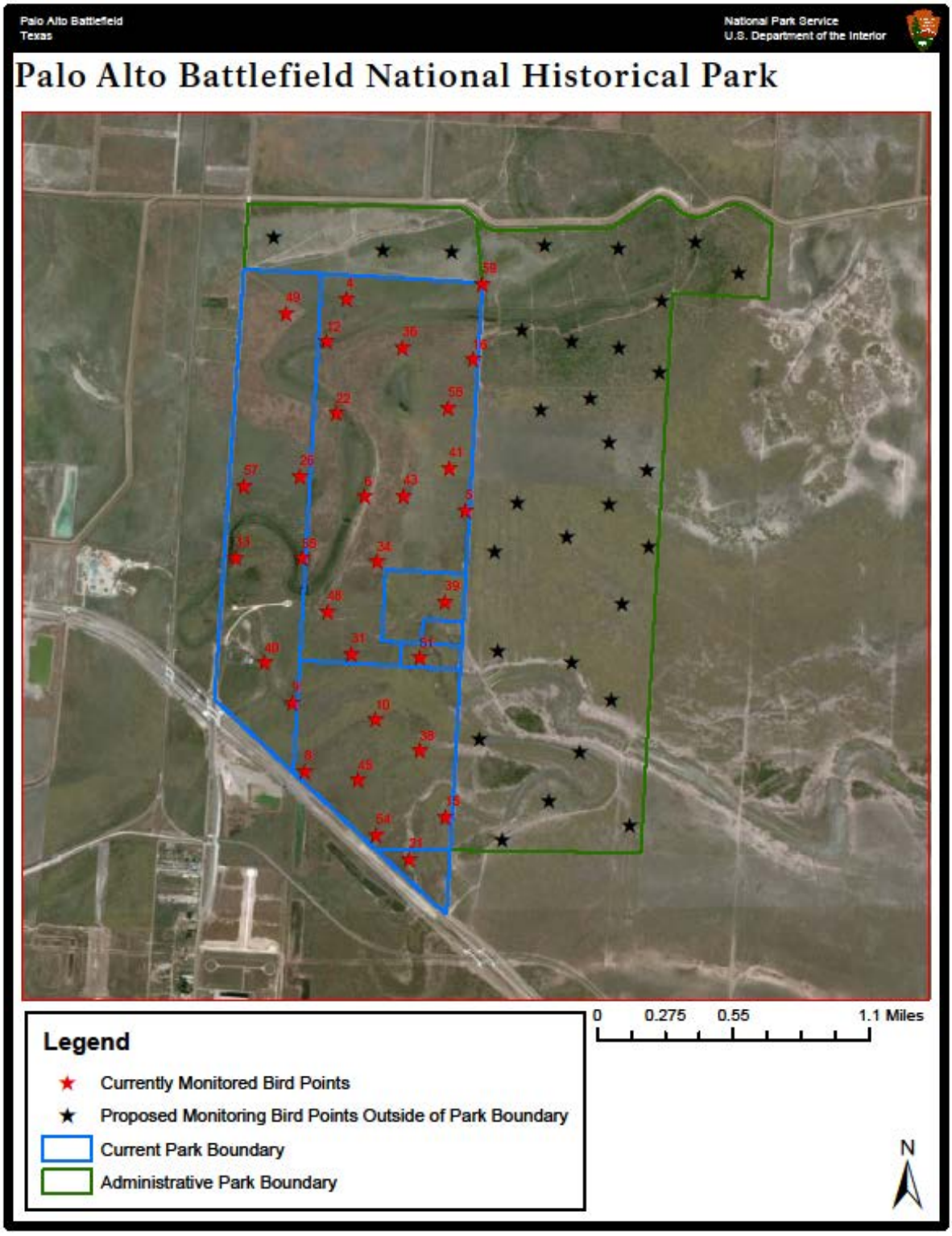

Figure 1. Survey locations within the boundary of Palo Alto National Historical Park.

Results

During counts, 569 individuals of 52 species were recorded. Distance was recorded (i.e., not flyover) for 474 individuals of 45 species (Table 1). An average of 9.8 (SE = 0.5) individuals and 6.4 (SE = 0.3) species were detected at surveyed locations with non-flyover detections accounting for 8.2 (SE = 0.5) individuals and 5.6 (SE = 0.3) species.

The same 29 point locations were surveyed during both breeding seasons (2011 and 2012). Analyses to estimate detection probability, and thereby estimate species populations, were undertaken with the presumption that each survey conducted was independent and a random representation of all possible locations within PAAL - but repeated surveys at the same locations, even in different years, may bias these estimates. A sufficient number of detections ($n \geq 35$) were obtained for 4 species and estimates of detection and density, with reasonable variance (CV < 33%) were calculated for these species (Table 2). For 4 additional species with <20 detections, point estimates of density were associated with large variances (CV > 67%). These species had undefined upper bounds on density and population. Effective detection distances, with confidence limits, were estimated for each of 11 most commonly detected species (Table 3).

Table 1. Bird species and number detected during a single visit per year to each of 29 randomly located survey locations (n=58) on Palo Alto Battlefield National Historical Park (PAAL) during the breeding season May-June, 2011 and 2012. ALL detections (counts and individuals) includes birds detected at any distance from plot center (including flyovers), whereas NOFLY detections includes all detections that were not recorded as flyovers.

		ALL		NOFLY	
AlphaCode	**Common Name**	**Counts**	**Individuals**	**Counts**	**Individuals**
BBWD	Black-bellied Whistling-Duck	3	5	0	0
BCFL	Brown-crested Flycatcher	13	16	13	16
BCTI	Black-crested Titmouse	7	7	7	7
BGGN	Blue-gray Gnatcatcher	1	1	1	1
BHCO	Brown-headed Cowbird	5	9	3	4
BLGR	Blue Grosbeak	6	6	6	6
BLVU	Black Vulture	2	2	0	0
BOSP	Botteri's Sparrow	9	9	9	9
BROC	Bronzed Cowbird	13	25	9	11
BTSP	Black-throated Sparrow	4	5	4	5
CACW	Cactus Wren	2	2	2	2
CARW	Carolina Wren	8	8	8	8
CASP	Cassin's Sparrow	41	72	41	72
CBTH	Curve-billed Thrasher	8	8	8	8
CHSP	Chipping Sparrow	1	1	1	1
COGD	Common Ground-Dove	3	3	2	2
COKI	Couch's Kingbird	1	1	1	1
COPA	Common Pauraque	1	1	1	1

Table 1 (continued). Bird species and number detected during a single visit per year to each of 29 randomly located survey locations (n=58) on Palo Alto Battlefield National Historical Park (PAAL) during the breeding season May-June, 2011 and 2012. ALL detections (counts and individuals) includes birds detected at any distance from plot center (including flyovers), whereas NOFLY detections includes all detections that were not recorded as flyovers.

		ALL		NOFLY	
AlphaCode	**Common Name**	**Counts**	**Individuals**	**Counts**	**Individuals**
CRCA	Crested Caracara	2	2	2	2
DICK	Dickcissel	1	1	1	1
EAME	Eastern Meadowlark	46	120	46	116
EUST	European Starling	1	1	1	1
GFWO	Golden-fronted Woodpecker	2	2	2	2
GKIS	Great Kiskadee	1	1	1	1
GREG	Great Egret	3	5	0	0
GTGR	Great-tailed Grackle	4	7	3	3
HASH	Harris's Hawk	3	3	2	2
INBU	Indigo Bunting	1	1	1	1
KILL	Killdeer	2	2	1	1
LAGU	Laughing Gull	13	17	0	0
LASP	Lark Sparrow	5	7	5	7
LBTH	Long-billed Thrasher	5	5	5	5
LBWO	Ladder-backed Woodpecker	2	3	2	3
LEGO	Lesser Goldfinch	1	1	1	1
LOSH	Loggerhead Shrike	1	1	1	1
MODO	Mourning Dove	17	32	11	14
MUDU	Muscovy Duck	4	6	0	0
NOBO	Northern Bobwhite	9	9	9	9
NOCA	Northern Cardinal	26	36	26	36
NOMO	Northern Mockingbird	33	40	33	38
OLSP	Olive Sparrow	13	16	13	16
PYRR	Pyrrhuloxia	7	7	7	7
RWBL	Red-winged Blackbird	2	2	1	1
STFL	Scissor-tailed Flycatcher	3	3	3	3
TRHE	Tricolored Heron	1	1	0	0
TRPA	Tropical Parula	4	4	4	4
TUVU	Turkey Vulture	3	5	0	0
VERD	Verdin	18	19	18	19
WEVI	White-eyed Vireo	4	4	4	4
WHIM	Whimbrel	2	21	2	21
WTHA	White-tailed Hawk	2	2	2	2
YBCU	Yellow-billed Cuckoo	2	2	2	2
		58	569	58	474

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 detected and during breeding season (May-June) 2011 and 2012 within the 546 ha currently constituting Palo Alto Battlefield National Historical Park (PAAL), based on time-distance model (2-minute intervals; 4 detection categories) of detections from 58 (29 counts per year) 10-minute point count surveys of birds.

		Detection probability				Density (birds / ha)				Park population		
Species[1]	**n**	**p**	**SE**	**lcl[2]**	**ucl[3]**	**D**	**lcl**	**Ucl**	**%CV**	**N**	**lcl**	**ucl**
CASP	72	0.560002	0.133907	0.297544	0.822459	2.898	1.66571	6.73577	23.91	1,583	909	3,678
EAME	116	0.771169	0.102183	0.570890	0.971448	2.862	1.99415	4.51580	13.25	1,563	1,089	2,466
NOCA	35	0.572073	0.187324	0.204918	0.939228	0.894	0.42926	3.45462	32.74	488	234	1,886
NOMO	38	0.619926	0.179210	0.268674	0.971179	0.904	0.46028	2.82789	28.91	493	251	1,544
BROC	11	0.222263	0.343204	0.100000	0.894942	0.281	0.04550	1.51137	154.41	154	25	~~825~~[4]
MODO	14	0.164146	0.304756	0.100000	0.761467	0.594	0.08696	2.08187	185.66	325	47	~~1,137~~[4]
NOBO	9	0.151950	0.383907	0.100000	0.904408	0.974	0.10303	4.12064	252.65	532	56	~~2,250~~[4]
OLSP	16	0.477232	0.319885	0.100000	1.104210	2.012	0.63164	17.3950	67.03	1,098	345	~~9,498~~[4]
								Totals		6,236	2,956	23,284

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

[2]Lower confidence limit arbitrarily set at (p = 0.1).

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

[4]Upper confidence interval is questionable because the lower limit of detection probability is very low.

Table 3. Estimate, lower (lcl), and upper (ucl) confidence limit for effective detection radius (EDR) of 11 commonly detected bird species during breeding season (May-June) 2011 and 2012 within the 546 ha currently constituting Palo Alto Battlefield National Historical Park (PAAL), based on time-distance model (2-minute intervals; 4 detection categories) of detections from 58 (29 counts per year) 10-minute point count surveys of birds.

Species	EDR	lcl	ucl
CASP	38	33	43
EAME	42	38	47
NOCA	47	38	56
NOMO	47	38	56
BROC	71	45	98
MODO	64	44	85
NOBO	42	25	59
OLSP	23	16	29
VERD	31	23	39
BCFL	41	29	54
BOSP	37	21	54

Discussion

Although PAAL is a relatively small (546 ha) component to the overall conservation strategy for coastal birds, it provides important breeding habitat for many species and supports viable populations of many avian species (Table 2). Despite the relative high species richness in PAAL, the small size of the park and subsequent small avian populations resulted in relatively few species being abundant enough to estimate detection probabilities. However, the birds of the PAAL represent a unique component of the avifauna in the national park system.

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