



Gulf Coast Network Winter Bird Monitoring Report

2012 and 2013 Results from Palo Alto Battlefield National Historical Park

Natural Resource Report NPS/GULN/NRR—2015/908



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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Introduction

The Gulf Coast region provides habitat for many resident and migratory wildlife species. However, changes in land use to urbanization, agriculture, and ranching have led to significant declines in the extent of naturally vegetated coastal habitat. Additionally, past land use practices and current land use of adjacent areas has exacerbated encroachment by invasive species and shrubs on remaining coastal grassland habitats. Monitoring of bird populations on public lands in coastal habitats provides useful information for management of these species. The semi-tropical climate of south Texas provides conditions that support a diverse avifauna which includes species that are not found elsewhere within the borders of the United States. Migratory and resident birds are among 19 high-priority vital signs targeted for monitoring within the 8 National Parks of the Gulf Coast Network (GULN) as developed under the Ecological Monitoring Framework of the national vital signs monitoring program. Parks in the Gulf Coast Network provide important breeding, wintering, and migratory stop-over habitats to a wide variety of avian species. In particular, the semi-tropical climate and extant natural habitat of Palo Alto National Battlefield makes the park important for maintaining the diverse avifauna of south Texas and the Gulf Coast Network. In consequence, these avifauna are an attraction for visitors to Palo Alto National Battlefield. This report focuses on the birds utilizing Palo Alto National Battlefield during the winters of 2011-2012 and 2012-2013.

Methods

Within Palo Alto National Battlefield 29 random point locations have been established by NPS personnel (Figure 1) to monitor avifauna within the park boundaries. During January 2012 & 2013, a single survey (1 per year) was conducted at each of these point locations for duration of 20 minutes. During each survey, a 50 m radius area around each point was traversed in concentric circles. All birds detected were identified to species and recorded as being within one of two distance categories: <50 m or >50 m. Birds observed flying, but not actively using the survey area, were recorded in a separate “flyover” category. Detections were also categorized by the time of detection into 10 two-minute intervals. After an individual was detected and recorded, any further detections of the bird were not recorded.

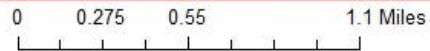
I report the number of individual birds of each species detected for all survey points. Birds detected <50 m from points and time to detection data were analyzed to estimate detection probability using Program SURVIV (<http://www.mbr-pwrc.usgs.gov/software.html#a>) for species with sufficient number of detections. Estimated detection probabilities were used to estimate density and abundance of species at Palo Alto National Battlefield.



Palo Alto Battlefield National Historical Park



Source: Esri, DigitalGlobe, GeoEye, Earthstar, USDA, URS, AeroMap, GeoMapping, AeroGRID, IGN, IGP, Swisstopo, and the GIS User Community



Legend

- ◆ PAAL_birdMonPts_Actual_2011
- ◆ Currently Monitored Bird Points
- Current Park Boundary
- Administrative Park Boundary



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

Results

A total of 745 birds of 41 species were detected at survey locations during 2012 and 2013 (Table 1). When flyovers were excluded, 655 individuals of 37 species were detected. A mean of 11.3 (SE = 0.7) individuals and 5.2 (SE = 0.2) species were detected at each point. Within the 50-m radius area used for estimation of detection probability and densities, 397 individuals of 33 species were detected, with means of 6.8 (SE = 0.6) individuals/point and 3.8 (SE = 0.2) species/point.

Detection probabilities, density estimates and species abundance within Palo Alto National Battlefield were estimated for 10 species (Table 2). Two species has estimates of detection probability with coefficients of variance <24%) and upper confidence limits <1.0. Five additional species had detection probabilities with reasonable variances (CV < 33%) but upper confidence limits in excess of the theoretical maximum (ucl > 1.0). Estimation of confidence levels for densities and abundance in these species was calculated with an upper confidence limit for detection probability of 1.0. The estimated detection probability in three species exhibited wide confidence limits (lcl < 0.1 & ucl > 1.0) and large variance (CV > 40%). These species were associated with low levels of precision and unreasonably high upper confidence limits for the estimates of species density and abundance.

Table 1. Bird species, number of points at which a species was detected, and number individuals detected (n) at 29 randomly selected survey locations at Palo Alto Battlefield National Historic Park during each winter, Jan. – Feb. 2012 and 2013 (N = 58 surveys). All detections (points and n) includes all species detected, including flyovers, while conducting survey. No flyover includes all detections not recorded as flyovers, whereas <50 m includes only individuals (excluding flyovers) detected within 50 m from plot center.

Alpha Code	Common Name	All		No flyover		< 50 m	
		points	n	points	n	points	n
AMKE	American Kestrel	1	1	1	1	1	1
AWPE	American White Pelican	2	38	0	0	0	0
BCTI	Black-crested Titmouse	5	11	5	11	5	11
CACW	Cactus Wren	1	1	1	1	1	1
CARW	Carolina Wren	19	22	19	22	17	18
CBTH	Curve-billed Thrasher	5	5	5	5	4	4
COGD	Common Ground-Dove	1	3	1	3	1	3
COHA	Cooper's Hawk	1	2	1	2	1	2
COKI	Couch's Kingbird	3	3	3	3	3	3
COYE	Common Yellowthroat	11	18	11	18	9	15
CRCA	Crested Caracara	4	8	1	1	0	0
EAME	Eastern Meadowlark	52	175	52	175	45	106
EAPH	Eastern Phoebe	4	5	4	5	3	3

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Alpha Code	Common Name	All		No flyover		< 50 m	
		points	n	points	n	points	n
EAWP	Eastern Wood-Pewee	3	3	3	3	2	2
GFWO	Golden-fronted Woodpecker	3	4	3	4	3	4
GHOW	Great Horned Owl	1	1	1	1	1	1
GKIS	Great Kiskadee	1	1	1	1	1	1
GREJ	Green Jay	1	1	1	1	1	1
GRSP	Grasshopper Sparrow	11	14	11	14	11	14
GTGR	Great-tailed Grackle	11	70	11	69	5	40
HASH	Harris's Hawk	7	13	6	12	3	7
HOWR	House Wren	1	1	1	1	1	1
KILL	Killdeer	2	5	2	5	0	0
LBCU	Long-billed Curlew	8	68	6	64	0	0
LBWO	Ladder-backed Woodpecker	2	2	2	2	1	1
LOSH	Loggerhead Shrike	7	7	7	7	2	2
NOCA	Northern Cardinal	30	39	30	39	15	20
NOHA	Northern Harrier	10	13	5	6	1	1
NOMO	Northern Mockingbird	37	48	37	48	21	24
OCWA	Orange-crowned Warbler	5	8	5	8	5	8
OLSP	Olive Sparrow	7	17	7	17	7	17
RBWO	Red-bellied Woodpecker	1	1	1	1	1	1
RCKI	Ruby-crowned Kinglet	8	14	8	14	7	11
ROSP	Roseate Spoonbill	1	15	0	0	0	0
RTHA	Red-tailed Hawk	1	1	1	1	0	0
SAVS	Savannah Sparrow	36	72	36	72	33	56
TUVU	Turkey Vulture	8	15	0	0	0	0
VERD	Verdin	4	5	4	5	4	5
WEVI	White-eyed Vireo	1	1	1	1	1	1
WTKI	White-tailed Kite	2	2	0	0	0	0
YRWA	Yellow-rumped Warbler	6	12	6	12	6	12

Table 2. Estimated (standard error [SE] and lower [lcl] and upper [ucl] confidence limit) detection probability (p), density (D), and population abundance (N) of bird species detected during winter (Jan) 2012 and 2013 within the 546-ha constituting Palo Alto Battlefield National Historical Park, based on time to detection model (2-minute intervals) of detections from 58 (29 counts per year) 20-minute area search surveys of birds.

Species ^a	n	Detection probability				Density (birds / ha)				Park population		
		p	SE	lcl	ucl ^b	D	lcl	ucl	%CV	N	lcl	ucl
EAME	106	0.7698	0.08	0.61	0.93	3.02	2.50	3.82	10.66	1651	1365	2087
SAVS	56	0.6686	0.16	0.36	0.98	1.84	1.25	3.44	23.78	1004	685	1880
GTGR	40	0.6716	0.19	0.31	1.00 ^b	1.31	0.88	2.87	27.76	714	479	1566
NOCA	20	0.7116	0.23	0.25	1.00 ^b	0.62	0.44	1.73	32.79	337	240	943
GRSP	14	0.9157	0.09	0.74	1.00 ^b	0.34	0.31	0.42	9.87	183	168	227
HASH	7	0.9056	0.14	0.63	1.00 ^b	0.17	0.15	0.24	15.63	93	84	134
VERD	5	0.9214	0.14	0.64	1.00 ^b	0.12	0.11	0.17	15.43	65	60	93
NOMO	24	0.6228	0.27	0.08	1.00 ^b	0.85	0.53	6.22	44.09	462	288	3398
CARW	18	0.6423	0.30	0.05	1.00 ^b	0.62	0.40	7.67	46.93	336	216	4190
BCTI	11	0.6940	0.33	0.04	1.00 ^b	0.35	0.24	5.75	47.93	190	132	3138
Totals										5035	3717	17655

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

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

Discussion

Palo Alto National Battlefield supports a rich and diverse avian community during the winter. The relatively small size of the park (546 ha) and consequently few detections of most species made estimation of abundance using detection probability unreliable for many species.. Estimates of detection probability may be further biased by using multiple detections at the same point in different years with the assumption that the avian community is similar from year to year. While this may be a reasonable assumption, the effect was not fully evaluated.

Although Palo Alto National Battlefield is a comparatively small component of the Gulf Coast Network and the overall conservation strategy for coastal birds, the park supports resident avian species and provides wintering habitat for migratory species. The avian community of Palo Alto National Battlefield is a unique collection of species and serves as an important component of the avifauna in the national park system.

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