



Landbird Monitoring 2017 Annual Report

Channel Islands National Park

Natural Resource Data Series NPS/MEDN/NRDS—2018/1190



ON THE COVER

Nest and eggs of a Western Meadowlark (*Sturnella neglecta*) on Santa Rosa Island
(Photograph by Peter Larramendy)

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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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Executive Summary

The National Park Service (NPS) began monitoring landbirds at Channel Islands National Park in 1993 as part of its long-term ecological monitoring program for the park, which also became part of the NPS Inventory and Monitoring Program's Mediterranean Coast Network. In 2017, landbird monitoring at Channel Islands National Park was conducted in collaboration with the Western Foundation of Vertebrate Zoology. Data were collected using distance-based sampling methods on established line transects and point count sites per protocol review recommendations proposed in 2000.

The objectives of the landbird monitoring program are to 1) determine long-term trends in species composition, distribution, and abundance of native and non-native landbird species in selected areas of Channel Islands National Park, and 2) improve our understanding of breeding bird – habitat relationships and the effects of management actions, such as alien plant and animal control on bird populations by correlating changes in landbird species composition, distribution, and abundance with changes in specific habitat variables.

This report provides simple summaries of raw observational data collected using distance-based sampling methods for landbird monitoring in 2017 between 1 March and 27 May at line transects and point counts.

Fifty-seven landbird species were counted across all islands in 2017. Parkwide, the 10 most commonly detected landbirds in 2017 were, in descending order, Spotted Towhee, Song Sparrow, Western Meadowlark, Orange-crowned Warbler, Bewick's Wren, Horned Lark, House Finch, Common Raven, Island Scrub-Jay, and White-crowned Sparrow. Non-native and invasive birds were counted on only two of the five islands: Brown-headed Cowbird and European Starling on Santa Rosa, and European Starling on Santa Cruz. Results tables show 1) individual counts by species for each island, 2) frequency of detection for each species across sites on each island, 3) new transient or visiting bird species counted in 2017 and all other years since monitoring began, and 4) patterns of species detections, identifying those not counted in the last 10 or more years.

Introduction

Channel Islands National Park (CHIS) comprises 5 of the 8 Channel Islands that lie off the coast of southern California. The park islands range in size from <300 hectares (Anacapa and Santa Barbara Islands) to >20,000 hectares (Santa Rosa and Santa Cruz Islands). Fifty-four terrestrial bird species (not including exclusively marine species; hereafter “landbird species”) have been confirmed as breeding regularly or occasionally on the park islands (Appendix A; Collins and Jones 2015).

The National Park Service (NPS) began monitoring landbirds at CHIS in 1993 as part of its long-term Inventory and Monitoring program for the park (Davis et al. 1994), which also became part of the NPS Inventory and Monitoring Program’s Mediterranean Coast Network (MEDN; Cameron et al. 2005). Data were originally collected on line transects (van Riper III et al. 1988), until the program shifted primarily to the point count method as a result of a program review in 2000 (McEachern 2000, Coonan, Dye and Fancy (2011)). Prior to 2016, monitoring was conducted by experienced CHIS staff, partners, interns, and volunteers. Because of a loss of institutional knowledge due to a reduction in staffing and retirement of key personnel, the park partnered with the Western Foundation of Vertebrate Zoology to coordinate and conduct the landbird monitoring in 2016 and 2017.

The objectives of the landbird monitoring program (van Riper III et al. 1988, Coonan, Dye and Fancy (2011)) are as follows:

- 1) Determine long-term trends in species composition, distribution, and abundance of native and non-native landbird species in selected areas of Channel Islands National Park.
- 2) Improve our understanding of breeding bird–habitat relationships and the effects of management actions such as alien plant and animal control on bird populations by correlating changes in landbird species composition, distribution, and abundance with changes in specific habitat variables.

In this report, we summarize data collected during landbird monitoring in 2017. We present simple summaries of raw observational data. A more complete analysis using techniques to address differences in detection rates among species, habitats, and observers will be provided in a future trend report.

Methods

In 2017, landbird monitoring at Channel Islands National Park was conducted on established line transects (van Riper III et al. 1998) and established point count sites, commonly called ‘stations’ (Coonan, Dye and Fancy (2011) as per protocol review recommendations proposed in 2000. During the transition from transect to point count monitoring, both observation methods are conducted so that data from both monitoring methods can be meaningfully compared in the future.

Monitoring was conducted between 1 March and 27 May 2017 (see tour of duty dates summarized in Table 1). For point counts, sampling occurred in the morning, beginning as soon as it is light enough to see a distance of a least 150 meters and ending no later than 4 hours after official sunrise. Counts were not conducted during high winds (wind strength on the Beaufort scale is sustained at 4 or greater) or heavy rain. Observations are by sight, either perched or in flight, or sound and include horizontal distance in meters between the bird and observer (center point).

Table 1. Start and end dates, number of transects, and number of point count sites monitored on each island in 2017.

Island	Start Date	End Date	# Transects	# Points Counts
Anacapa	03/15/2017	03/20/2017	1	8
Santa Barbara	03/01/2017	03/08/2017	3	22
Santa Cruz	03/10/2017	03/13/2017	0	12
Santa Cruz	03/14/2017	03/20/2017	0	45
Santa Cruz	03/16/2017	03/16/2017	0	1
Santa Cruz	03/26/2017	03/29/2017	0	24
Santa Cruz	03/29/2017	03/30/2017	0	3
Santa Cruz	04/19/2017	04/21/2017	0	15
Santa Cruz	04/09/2017	04/13/2017	0	16
Santa Cruz	05/11/2017	05/11/2017	0	4
Santa Cruz	05/19/2017	05/21/2017	0	8
San Miguel	03/28/2017	04/04/2017	2	12
San Miguel	04/11/2017	04/18/2017	2	28
Santa Rosa	04/12/2017	04/14/2017	0	20
Santa Rosa	05/19/2017	05/27/2017	0	124

Methods for line transects each transect is walked at a moderately slow pace and for all birds seen or heard, the observer recorded the perpendicular distance between the transect midline and the bird.

The length of each transect varies among and within islands. For complete description of methods and SOPs see Landbird Monitoring Protocol for Channel Islands National Park – Version 2.0 (Coonan, Dye, and Fancy 2011).

Using distance-based sampling methods (Buckland et al. 2001), we surveyed birds on 8 of 9 permanent line transects (89%) (3 of 3 on Santa Barbara Island, 1 of 1 on East Anacapa Island, and 4 of 5 on San Miguel Island), and at 332 of 348 permanent point count sites (96%) (22 of 34 on Santa Barbara, 8 of 8 on Anacapa, 118 of 120 on Santa Cruz, 40 of 40 on San Miguel, and 144 of 146 on Santa Rosa).

On Santa Cruz Island we conducted a fifth year of monitoring, at 100 non-random point count sites along trails/roads established by R. C. Klinger of The Nature Conservancy in 1993, and at 12 point count sites the park established in 2014 using the same method as Klinger (1998) on East Santa Cruz Island. Access points to the plots were spaced ½ mile apart along the major roads and trails on the island. A random compass bearing and distance (within 150 meters) to the plot were selected at these access points. In addition, L. Laughrin counted 8 point count stations in the Prisoner's Harbor wetland restoration area.

On transects, observers estimated the perpendicular distance from the transect midline to each bird detected. Similarly, on point counts, observers estimated the radial distance from the point to each bird detected. Counts were conducted for 10 minutes at each point count site. Observations began at sunrise and continued until four hours after sunrise. A total of 4 observers conducted landbird monitoring in 2017 (Appendix B).

The methodology used in 2017 followed Coonan, Dye and Fancy (2011), except for the following modification that was adopted in 2015 and repeated again this year:

- The minimum visibility distance necessary to conduct monitoring was reduced from 400 m to 150 m. This was a matter of practicality; fog can often restrict visibility, but not necessarily detectability. Most birds are detected at distances <150 m. This change allowed more point counts and transects to be monitored when fog was heavy.

Twelve points on Santa Barbara Island were not counted in 2017 to avoid disturbance to breeding Brown Pelicans (*Pelecanus occidentalis*) and Western Gulls (*Larus occidentalis*).

Two point counts were not conducted on Santa Rosa Island in 2017 because of an oversight; observers thought that the points had been counted, and the error was not caught until after the season ended.

Data were entered into the CHIS Landbird Database by P. Larramendy and L. Hall, and were quality-checked and verified for errors by MEDN Data Manager L. Lee, and L. Hall and P. Larramendy. Validation queries were run to highlight field values that were not consistent with expected results (i.e., out-of-range values). These values were double-checked against field datasheets and discrepancies were corrected as appropriate and/or noted in the database. Through the quality assurance/quality control process, one observer from 2012 who could not be identified from their

initials had observations that were inconsistent with all other data collected, thus their records were removed from further analysis.

All data collected in 2017 were verified, validated, and checked to ensure they were error-free to the greatest extent possible. Data summaries were then generated using an automated report run in Program R.

Landbird monitoring point count sites and line transects are presented in Figures 1-5.

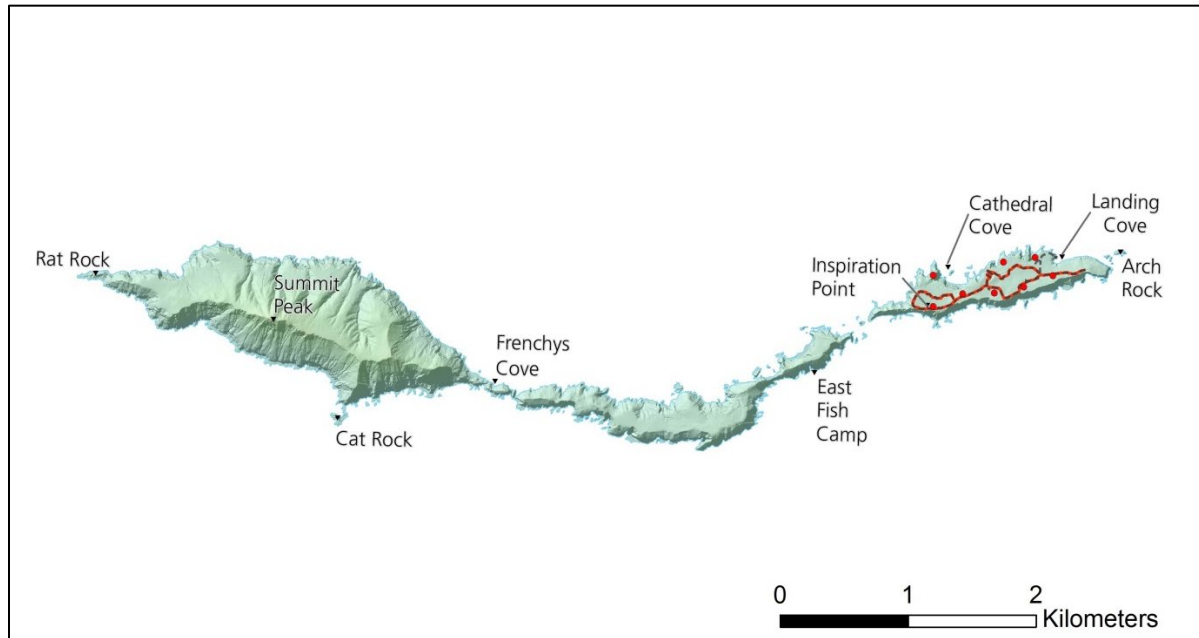


Figure 1. Landbird monitoring point count sites and line transects on Anacapa Island. Red dots indicate point count site and red lines indicate transects.

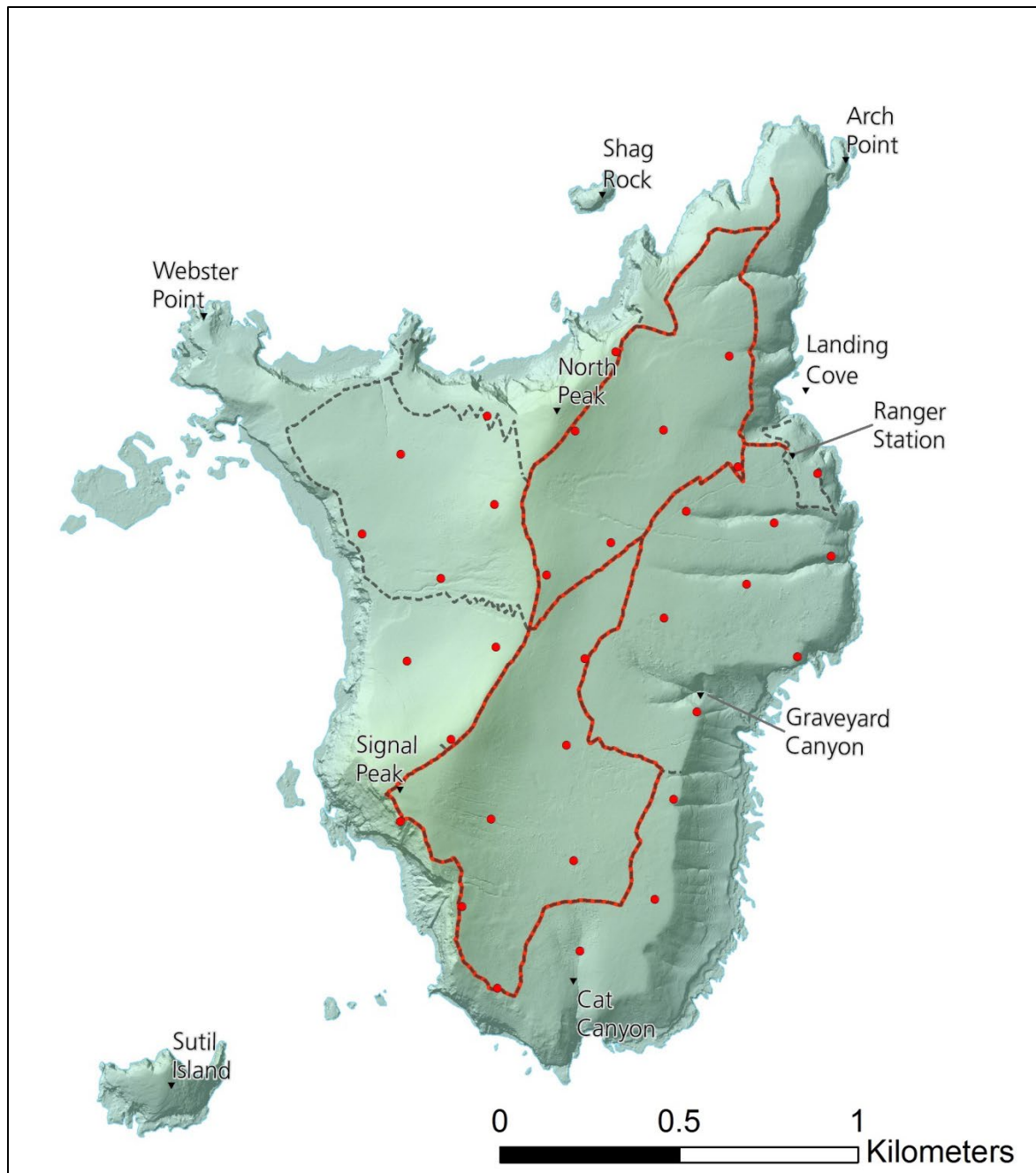


Figure 2. Landbird monitoring point count sites and line transects on Santa Barbara Island. Red dots indicate point count site and red lines indicate transects.

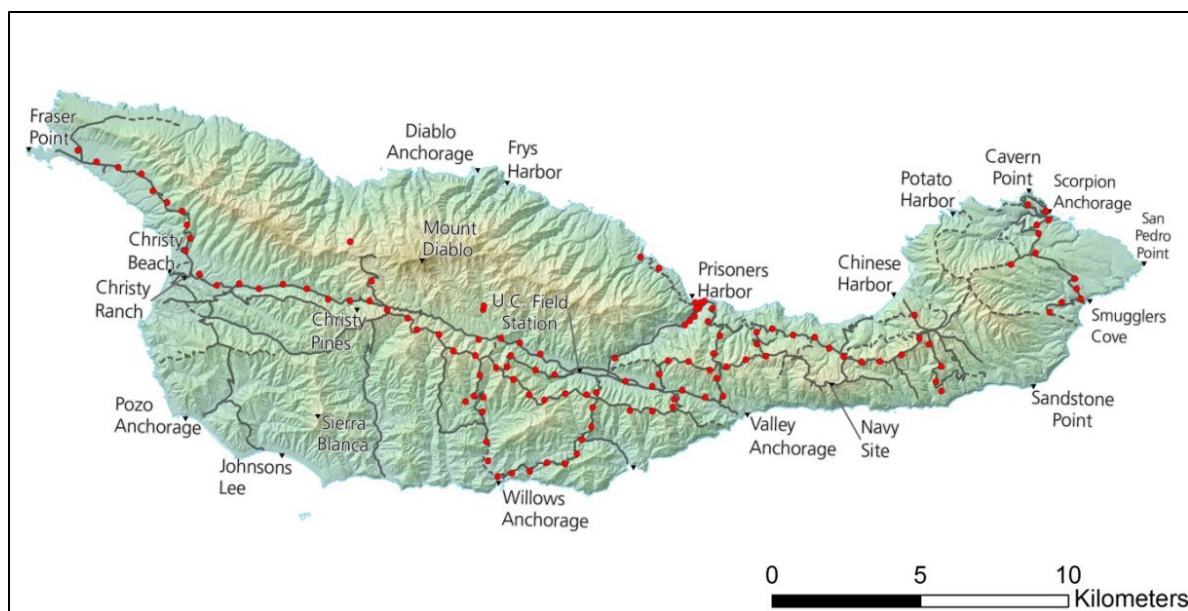


Figure 3. Landbird monitoring point count sites on Santa Cruz Island. Red dots indicate point count site.

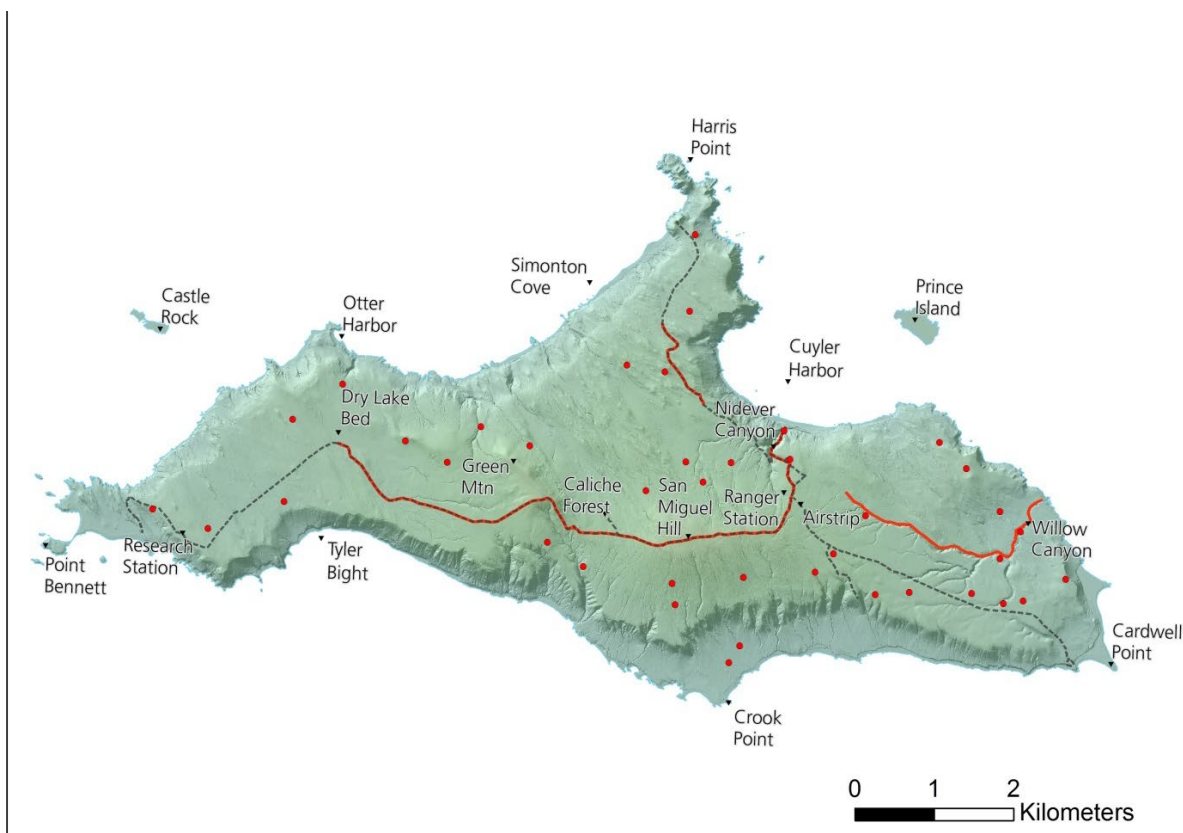


Figure 4. Landbird monitoring point count sites and line transects on San Miguel Island. Red dots indicate point count site and red lines indicate transects.

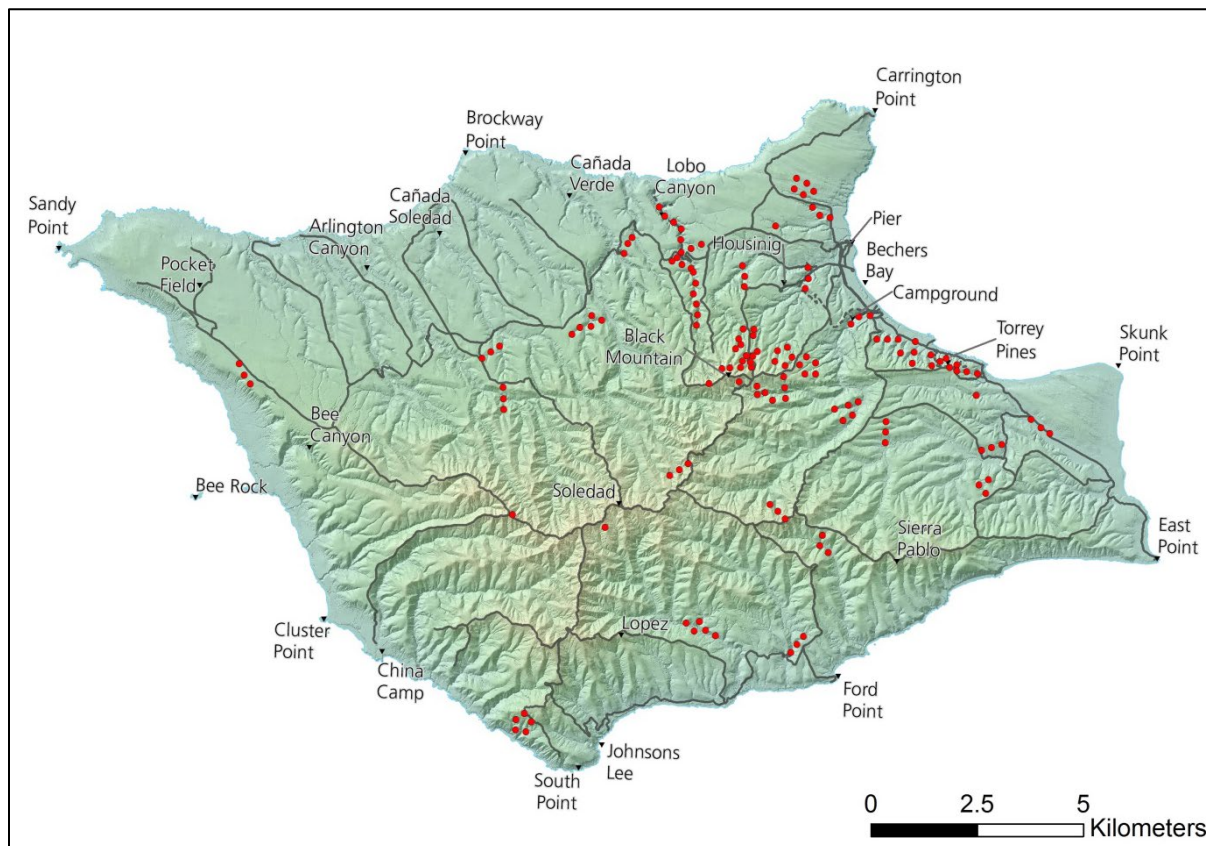


Figure 5. Landbird monitoring point count sites on Santa Rosa Island. Red dots indicate point count site and red lines indicate transects.

Results

The numbers of individuals of each species that were detected on all islands in 2017 are presented in Table 2. Indices of abundance on point counts (number of birds counted and mean number of birds per station) are presented for Anacapa Island (Table 3), Santa Barbara Island (Table 4), Santa Cruz Island (Table 5), San Miguel Island (Table 6), and Santa Rosa Island (Table 7). An index of abundance on transects is presented in Table 8.

Fifty-seven landbird species were counted on points or transects across all of the islands in 2017 (Table 2). Parkwide, the 10 most commonly detected landbirds in 2017 were, in descending order, Spotted Towhee (scientific names given in Table 2), Song Sparrow, Western Meadowlark, Orange-crowned Warbler, Bewick's Wren, Horned Lark, House Finch, Common Raven, Island Scrub-Jay, and White-crowned Sparrow (Table 2).

Table 2. Number of individuals of each species detected during bird surveys on all islands in 2017. Data include detections on both line transects and point counts, and do not include birds observed before or after the counts.

Common Name	Scientific Name	Total # Detected	Anacapa	Santa Barbara	Santa Cruz	San Miguel	Santa Rosa
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	72	–	–	54	–	18
Allen's Hummingbird	<i>Selasphorus sasin</i>	81	–	–	15	11	55
American Kestrel	<i>Falco sparverius</i>	5	–	4	1	–	–
American Robin	<i>Turdus migratorius</i>	9	–	–	9	–	–
Anna's Hummingbird	<i>Calypte anna</i>	45	–	–	23	–	22
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	11	–	–	11	–	–
Bald Eagle	<i>Haliaeetus leucocephalus</i>	1	–	–	1	–	–
Barn Swallow	<i>Hirundo rustica</i>	36	–	–	29	–	5
Bewick's Wren	<i>Thryomanes bewickii</i>	287	4	–	95	–	188
Black Phoebe	<i>Sayornis nigricans</i>	9	–	–	6	–	3
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	7	–	–	7	–	–
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	7	–	–	7	–	–
Brown-headed Cowbird	<i>Molothrus ater</i>	1	–	–	–	–	1
Bushtit	<i>Psaltiriparus minimus</i>	16	–	–	8	–	8
California Quail	<i>Callipepla californica</i>	75	–	–	39	–	36
Chipping Sparrow	<i>Spizella passerina</i>	93	–	–	11	–	82
Common Raven	<i>Corvus corax</i>	208	–	–	69	62	77
Common Yellowthroat	<i>Geothlypis trichas</i>	2	–	–	1	–	1
European Starling	<i>Sturnus vulgaris</i>	5	–	–	4	–	1

Table 2 (continued). Number of individuals of each species detected during bird surveys on all islands in 2017. Data include detections on both line transects and point counts, and do not include birds observed before or after the counts.

Common Name	Scientific Name	Total # Detected	Anacapa	Santa Barbara	Santa Cruz	San Miguel	Santa Rosa
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	30	2	9	17	2	–
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	13	–	–	6	–	7
Hermit Thrush	<i>Catharus guttatus</i>	18	–	–	18	–	–
Hooded Oriole	<i>Icterus cucullatus</i>	1	–	–	1	–	–
Horned Lark	<i>Eremophila alpestris</i>	232	–	117	4	64	47
House Finch	<i>Haemorhous mexicanus</i>	228	–	2	52	31	143
House Wren	<i>Troglodytes aedon</i>	1	–	1	–	–	–
Hutton's Vireo	<i>Vireo huttoni</i>	51	–	–	29	–	22
Island Scrub-Jay	<i>Aphelocoma insularis</i>	135	–	–	135	–	–
Lawrence's Goldfinch	<i>Spinus lawrencei</i>	8	–	–	–	3	5
Lesser Goldfinch	<i>Spinus psaltria</i>	87	–	–	28	–	59
Loggerhead Shrike	<i>Lanius ludovicianus</i>	28	–	–	3	–	25
Mallard	<i>Anas platyrhynchos</i>	3	–	–	3	–	–
Mourning Dove	<i>Zenaida macroura</i>	20	–	–	12	–	8
Northern Flicker	<i>Colaptes auratus</i>	66	–	–	66	–	–
Northern Harrier	<i>Circus hudsonius</i>	3	–	–	1	2	–
Northern Mockingbird	<i>Mimus polyglottos</i>	25	–	–	11	–	14
Orange-crowned Warbler	<i>Oreothlypis celata</i>	319	3	9	67	91	149
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	110	–	–	19	–	91

Table 2 (continued). Number of individuals of each species detected during bird surveys on all islands in 2017. Data include detections on both line transects and point counts, and do not include birds observed before or after the counts.

Common Name	Scientific Name	Total # Detected	Anacapa	Santa Barbara	Santa Cruz	San Miguel	Santa Rosa
Peregrine Falcon	<i>Falco peregrinus</i>	5	1	–	2	–	2
Red Crossbill	<i>Loxia curvirostra</i>	9	–	–	–	–	9
Red-tailed Hawk	<i>Buteo jamaicensis</i>	8	–	–	4	1	3
Rock Wren	<i>Salpinctes obsoletus</i>	19	2	3	–	6	8
Ruby-crowned Kinglet	<i>Regulus calendula</i>	3	–	–	3	–	–
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	37	–	–	37	–	–
Savannah Sparrow	<i>Passerculus sandwichensis</i>	7	–	2	4	–	1
Say's Phoebe	<i>Sayornis saya</i>	3	–	1	2	–	–
Sharp-shinned Hawk	<i>Accipiter striatus</i>	1	–	–	1	–	–
Song Sparrow	<i>Melospiza melodia</i>	634	3	–	113	160	358
Spotted Towhee	<i>Pipilo maculatus</i>	724	–	–	224	–	500
Virginia Rail	<i>Rallus limicola</i>	3	–	–	–	–	3
Western Meadowlark	<i>Sturnella neglecta</i>	400	–	49	76	85	190
Western Tanager	<i>Piranga ludoviciana</i>	1	–	–	–	–	1
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	119	14	45	29	31	–
White-throated Swift	<i>Aeronautes saxatalis</i>	2	–	–	1	–	1
Wilson's Warbler	<i>Cardellina pusilla</i>	2	–	–	–	–	2
Yellow Warbler	<i>Setophaga petechia</i>	3	–	–	1	–	2
Yellow-rumped Warbler	<i>Setophaga coronata</i>	16	–	1	14	1	–

Table 3. Anacapa Island point count sampling results: number of individuals detected, mean per point count site and standard error, number of sites where a species was detected and frequency expressed as a percent of total sites where a species was detected in 2017 (8 total sites).

Species	Common Name	# Detected	Mean per Site	S.E.	# Site Detected	% Site
BEWR	Bewick's Wren	4	0.50	0.19	4	50.0
GCSP	Golden-crowned Sparrow	2	0.25	0.25	1	12.5
OCWA	Orange-crowned Warbler	3	0.38	0.18	3	37.5
PEFA	Peregrine Falcon	1	0.12	0.12	1	12.5
ROWR	Rock Wren	2	0.25	0.16	2	25.0
SOSP	Song Sparrow	3	0.38	0.18	3	37.5
WCSP	White-crowned Sparrow	14	1.75	0.75	5	62.5

Table 4. Santa Barbara Island point count sampling results: number of individuals detected, mean per site and standard error, number of sites where a species was detected and frequency (percent sites where bird species was detected in 2017) (22 total sites).

Species	Common Name	# Detected	Mean per Site	S.E.	# Site Detected	% Site
AMKE	American Kestrel	4	0.18	0.13	4	18.1
GCSP	Golden-crowned Sparrow	9	0.41	0.17	6	27.3
HOLA	Horned Lark	117	5.32	0.49	22	100.0
HOFI	House Finch	2	0.09	0.06	2	9.1
HOWR	House Wren	1	0.05	0.05	1	4.5
OCWA	Orange-crowned Warbler	9	0.41	0.23	5	22.7
ROWR	Rock Wren	3	0.14	0.10	2	9.1
SAVS	Savannah Sparrow	2	0.09	0.06	2	9.1
SAPH	Say's Phoebe	1	0.05	0.05	1	4.5
WEME	Western Meadowlark	49	2.23	0.53	13	59.1
WCSP	White-crowned Sparrow	45	2.05	0.53	13	59.1
YRWA	Yellow-rumped Warbler	1	0.05	0.05	1	4.5

Table 5. Santa Cruz Island point count sampling results: number of individuals detected, mean per site and standard error, number of sites where a species was detected and frequency (percent sites where bird species was detected in 2017) (118 total site).

Species	Common Name	# Detected	Mean per Site	S.E.	# Site Detected	% Site
ACWO	Acorn Woodpecker	54	0.42	0.09	25	19.5
ALHU	Allen's Hummingbird	15	0.12	0.04	11	8.6
AMKE	American Kestrel	1	0.01	0.01	1	0.8
AMRO	American Robin	9	0.07	0.05	4	3.1
ANHU	Anna's Hummingbird	23	0.18	0.04	19	14.8
ATFL	Ash-throated Flycatcher	11	0.09	0.02	11	8.6
BAEA	Bald Eagle	1	0.01	0.01	1	0.8
BARS	Barn Swallow	29	0.23	0.11	6	4.7
BEWR	Bewick's Wren	95	0.74	0.07	72	56.2
BHGR	Black-headed Grosbeak	7	0.05	0.02	5	4.7
BLPH	Black Phoebe	6	0.05	0.02	6	3.9
BGGN	Blue-gray Gnatcatcher	7	0.05	0.02	77	5.5
BUSH	Bushtit	8	0.06	0.04	4	3.1
CAQU	California Quail	39	0.30	0.07	27	21.1
CHSP	Chipping Sparrow	11	0.09	0.03	9	7.0
CORA	Common Raven	69	0.54	0.08	43	32.8
COYE	Common Yellowthroat	1	0.01	0.01	1	0.8
EUST	European Starling	4	0.03	0.03	1	0.8
GCSP	Golden-crowned Sparrow	17	0.13	0.06	7	5.5
GRSP	Grasshopper Sparrow	6	0.05	0.03	2	1.6
HETH	Hermit Thrush	18	0.14	0.04	13	10.2
HOOR	Hooded Oriole	1	0.01	0.01	1	0.8
HOLA	Horned Lark	4	0.03	0.02	2	1.6
HOFI	House Finch	52	0.41	0.08	30	23.4
HUVI	Hutton's Vireo	29	0.23	0.04	25	19.5
ISJA	Island Scrub-Jay	135	1.05	0.09	76	59.4
LEGO	Lesser Goldfinch	28	0.22	0.07	13	10.2
LOSH	Loggerhead Shrike	3	0.02	0.02	2	1.6

Table 5 (continued). Santa Cruz Island point count sampling results: number of individuals detected, mean per site and standard error, number of sites where a species was detected and frequency (percent sites where bird species was detected in 2017) (118 total site).

Species	Common Name	# Detected	Mean per Site	S.E.	# Site Detected	% Site
MALL	Mallard	3	0.02	0.02	1	0.8
MODO	Mourning Dove	12	0.09	0.03	11	8.6
NOFL	Northern Flicker	66	0.52	0.07	51	39.8
NOHA	Northern Harrier	1	0.01	0.01	1	0.8
NOMO	Northern Mockingbird	11	0.09	0.03	10	7.8
OCWA	Orange-crowned Warbler	67	0.52	0.07	47	36.7
PSFL	Pacific-slope Flycatcher	19	0.15	0.03	18	14.8
PEFA	Peregrine Falcon	2	0.02	0.01	2	1.6
RTHA	Red-tailed Hawk	4	0.03	0.02	4	3.1
RCKI	Ruby-crowned Kinglet	3	0.02	0.01	3	2.3
RCSP	Rufous-crowned Sparrow	37	0.29	0.05	30	23.4
SAVS	Savannah Sparrow	4	0.03	0.02	2	1.6
SAPH	Say's Phoebe	2	0.02	0.01	2	1.6
SSHA	Sharp-shinned Hawk	1	0.01	0.01	1	0.8
SOSP	Song Sparrow	113	0.88	0.11	50	39.1
SPTO	Spotted Towhee	224	1.75	0.11	104	81.2
WEME	Western Meadowlark	76	0.59	0.14	23	18.0
WCSP	White-crowned Sparrow	29	0.23	0.08	10	7.8
WTSW	White-throated Swift	1	0.01	0.01	1	0.8
YRWA	Yellow-rumped Warbler	14	0.11	0.08	1	1.6
YEWA	Yellow Warbler	1	0.01	0.01	2	0.8

Table 6. San Miguel Island point count results: number of individuals detected, mean per site and standard error, number of sites where a species was detected, and frequency (percent sites where a bird species was detected in 2017) (40 total sites).

Species	Common Name	# Detected	Mean per Site	S.E.	# Site Detected	% Site
ALHU	Allen's Hummingbird	11	0.28	0.10	8	20.0
BARS	Barn Swallow	2	0.05	0.05	1	2.5
CORA	Common Raven	62	1.55	0.24	29	70.0
GCSP	Golden-crowned Sparrow	2	0.05	0.05	1	2.5
HOLA	Horned Lark	64	1.60	0.29	27	67.5
HOFI	House Finch	31	0.78	0.19	15	37.5
LAGO	Lawrence's Goldfinch	3	0.08	0.06	2	5.0
NOHA	Northern Harrier	2	0.05	0.03	2	5.0
OCWA	Orange-crowned Warbler	91	2.27	0.31	32	80.0
RTHA	Red-tailed Hawk	1	0.02	0.02	1	2.5
ROWR	Rock Wren	6	0.15	0.06	6	15.0
SOSP	Song Sparrow	160	4.00	0.31	39	97.5
WEME	Western Meadowlark	85	2.12	0.27	29	72.5
WCSP	White-crowned Sparrow	31	0.78	0.21	13	32.5
YRWA	Yellow-rumped Warbler	1	0.02	0.02	1	2.5

Species that occurred at $\geq 50\%$ of point count sites were Bewick's Wren and White-crowned Sparrow on Anacapa Island (Table 3); Horned Lark, Western Meadowlark, and White-crowned Sparrow on Santa Barbara Island (Table 4); Spotted Towhee, Bewick's Wren, and Island Scrub-Jay on Santa Cruz Island (Table 5); Song Sparrow, Orange-crowned Warbler, Western Meadowlark, Common Raven, and Horned Lark on San Miguel Island (Table 6); and Spotted Towhee, Song Sparrow, Bewick's Wren, Orange-crowned Warbler and Western Meadowlark on Santa Rosa Island (Table 7).

Table 7. Santa Rosa Island point count results: number of individuals detected, mean per site and standard error, number of sites where a bird species was detected, and frequency (percent sites where a bird species was detected in 2017) (144 sites).

Species	Common Name	# Detected	Mean per Site	S.E.	# Site Detected	% Site
ACWO	Acorn Woodpecker	18	0.12	0.03	16	11.1
ALHU	Allen's Hummingbird	55	0.38	0.06	38	27.1
ANHU	Anna's Hummingbird	23	0.16	0.03	21	14.6

Table 7 (continued). Santa Rosa Island point count results: number of individuals detected, mean per site and standard error, number of sites where a bird species was detected, and frequency (percent sites where a bird species was detected in 2017) (144 sites).

Species	Common Name	# Detected	Mean per Site	S.E.	# Site Detected	% Site
BARS	Barn Swallow	5	0.03	0.02	4	2.1
BEWR	Bewick's Wren	188	1.31	0.11	93	65.3
BLPH	Black Phoebe	3	0.02	0.01	3	2.1
BHCO	Brown-headed Cowbird	1	0.01	0.01	1	0.7
BUSH	Bushtit	8	0.06	0.04	4	2.8
CAQU	California Quail	36	0.25	0.06	22	15.3
CHSP	Chipping Sparrow	82	0.57	0.09	45	31.2
CORA	Common Raven	77	0.53	0.21	41	22.2
COYE	Common Yellowthroat	1	0.01	0.01	1	0.7
EUST	European Starling	1	0.01	0.01	1	0.7
GRSP	Grasshopper Sparrow	7	0.05	0.02	4	2.8
HOLA	Horned Lark	47	0.33	0.08	25	15.3
HOFI	House Finch	143	0.99	0.15	59	38.9
HUVI	Hutton's Vireo	22	0.15	0.03	19	13.2
LAGO	Lawrence's Goldfinch	5	0.03	0.02	3	2.1
LEGO	Lesser Goldfinch	59	0.41	0.11	25	18.1
LOSH	Loggerhead Shrike	25	0.17	0.04	20	13.2
MODO	Mourning Dove	8	0.06	0.03	5	3.5
NOMO	Northern Mockingbird	14	0.10	0.03	10	6.9
OCWA	Orange-crowned Warbler	149	1.03	0.09	88	60.4
PSFL	Pacific-slope Flycatcher	91	0.63	0.07	60	42.4
PEFA	Peregrine Falcon	2	0.01	0.01	2	1.4
RTHA	Red-tailed Hawk	3	0.02	0.01	3	2.1
RECR	Red Crossbill	9	0.06	0.05	4	2.1
ROWR	Rock Wren	8	0.06	0.02	7	4.9
SAVS	Savannah Sparrow	1	0.01	0.01	1	0.7
SOSP	Song Sparrow	358	2.49	0.22	104	72.2
SPTO	Spotted Towhee	500	3.47	0.18	132	91.0

Table 7 (continued). Santa Rosa Island point count results: number of individuals detected, mean per site and standard error, number of sites where a bird species was detected, and frequency (percent sites where a bird species was detected in 2017) (144 sites).

Species	Common Name	# Detected	Mean per Site	S.E.	# Site Detected	% Site
VIRA	Virginia Rail	3	0.02	0.02	2	1.4
WEME	Western Meadowlark	190	1.32	0.14	88	59.7
WETA	Western Tanager	1	0.01	0.01	1	0.7
WTSW	White-throated Swift	1	0.01	0.01	1	0.7
WIWA	Wilson's Warbler	2	0.01	0.01	2	1.4
YEWA	Yellow Warbler	2	0.01	0.01	1	0.7

On the transect counts on the East Anacapa Island (Table 8), White-crowned and Golden-crowned sparrows were the most commonly detected birds. On Santa Barbara Island, White-crowned Sparrow and Horned Lark were most commonly detected. On San Miguel Island, Song Sparrow, Orange-crowned Warbler, White-crowned Sparrow, Western Meadowlark, and Horned Lark were most commonly detected.

Table 8. Number of individuals of each species detected on line transects in 2017. Column headers start with a two-letter island code (AN=Anacapa Island, SB=Santa Barbara Island, SM=San Miguel Island), followed by a four-letter transect code (TRLS=trails, ARCH=Arch Point, CNYN=Canyon, SGNL=Signal, LKBD=Lakebed, NDVR=Nidever, SMHL=San Miguel Hill, WLLW=Willow).

Species	AN- TRLS	SB- ARCH	SB- CNYN	SB- SGNL	SM- LKBD	SM- NDVR	SM- SMHL	SM- WLLW
Allen's Hummingbird	—	—	—	—	—	1	—	14
American Kestrel	—	—	3	—	—	—	—	—
Bewick's Wren	2	—	—	—	—	2	—	—
Black-headed Grosbeak	—	—	—	—	—	—	—	1
Bullock's Oriole	—	—	—	—	—	—	—	1
Common Raven	—	—	—	—	8	1	—	4
Golden-crowned Sparrow	8	4	7	3	—	5	—	22
Grasshopper Sparrow	—	—	—	—	4	—	—	—
Hermit Thrush	—	—	—	—	—	—	—	5
House Finch	—	—	—	—	1	—	—	6
Horned Lark	—	28	6	52	21	1	10	1

Table 8 (continued). Number of individuals of each species detected on line transects in 2017. Column headers start with a two-letter island code (AN=Anacapa Island, SB=Santa Barbara Island, SM=San Miguel Island), followed by a four-letter transect code (TRLS=trails, ARCH=Arch Point, CNYN=Canyon, SGNL=Signal, LKBD=Lakebed, NDVR=Nidever, SMHL=San Miguel Hill, WLLW=Willow).

Species	AN- TRLS	SB- ARCH	SB- CNYN	SB- SGNL	SM- LKBD	SM- NDVR	SM- SMHL	SM- WLLW
Hooded Oriole	1	–	–	–	–	–	–	–
Lawrence's Goldfinch	–	–	–	–	–	–	–	2
Lesser Goldfinch	–	–	–	2	–	–	–	–
Lincoln's Sparrow	–	–	–	–	–	–	–	2
Northern Harrier	–	–	–	1	1	–	–	–
Orange-crowned Warbler	3	–	4	–	12	7	4	36
Peregrine Falcon	2	–	–	2	–	1	–	–
Rock Wren	–	–	1	–	–	1	–	–
Say's Phoebe	–	–	2	–	–	–	–	–
Savannah Sparrow	–	1	–	2	–	–	–	–
Song Sparrow	4	–	–	–	26	14	16	30
White-crowned Sparrow	31	29	45	22	2	8	–	36
Western Meadowlark	–	1	7	8	29	2	12	5
Yellow-rumped Warbler	–	–	1	–	–	–	–	4

Figures 6-10 summarize the mean number of birds detected per point count site and species detected on each island in 2017 compared to the mean number of birds detected per point count site in all years of sampling. We made few observations of the following species in 2017: Orange-crowned Warbler on Anacapa Island (Figure 6); Bewick's Wren, California Quail, Chipping Sparrow, House Finch, Island Scrub-Jay, Blue-gray Gnatcatcher, Bushtit, Northern Flicker, Orange-crowned Warbler, Rufous-crowned Sparrow, Song Sparrow, and Spotted Towhee on Santa Cruz Island (Figure 8); and American Kestrel, Black Phoebe, Chipping Sparrow, and House Finch on Santa Rosa Island (Figure 10).

Bird species exhibiting increased detections in 2017 were: Golden-crowned Sparrow on Anacapa Island (Figure 6); Horned Lark, Western Meadowlark, and White-crowned Sparrow on Santa Barbara Island (Figure 7); Acorn Woodpecker, American Robin, and Ash-throated Flycatcher on Santa Cruz Island (Figure 8); House Finch, Horned Lark, and White-crowned Sparrow on San Miguel Island (Figure 9); and Horned Lark, Loggerhead Shrike, Song Sparrow, and Spotted Towhee on Santa Rosa Island (Figure 10).

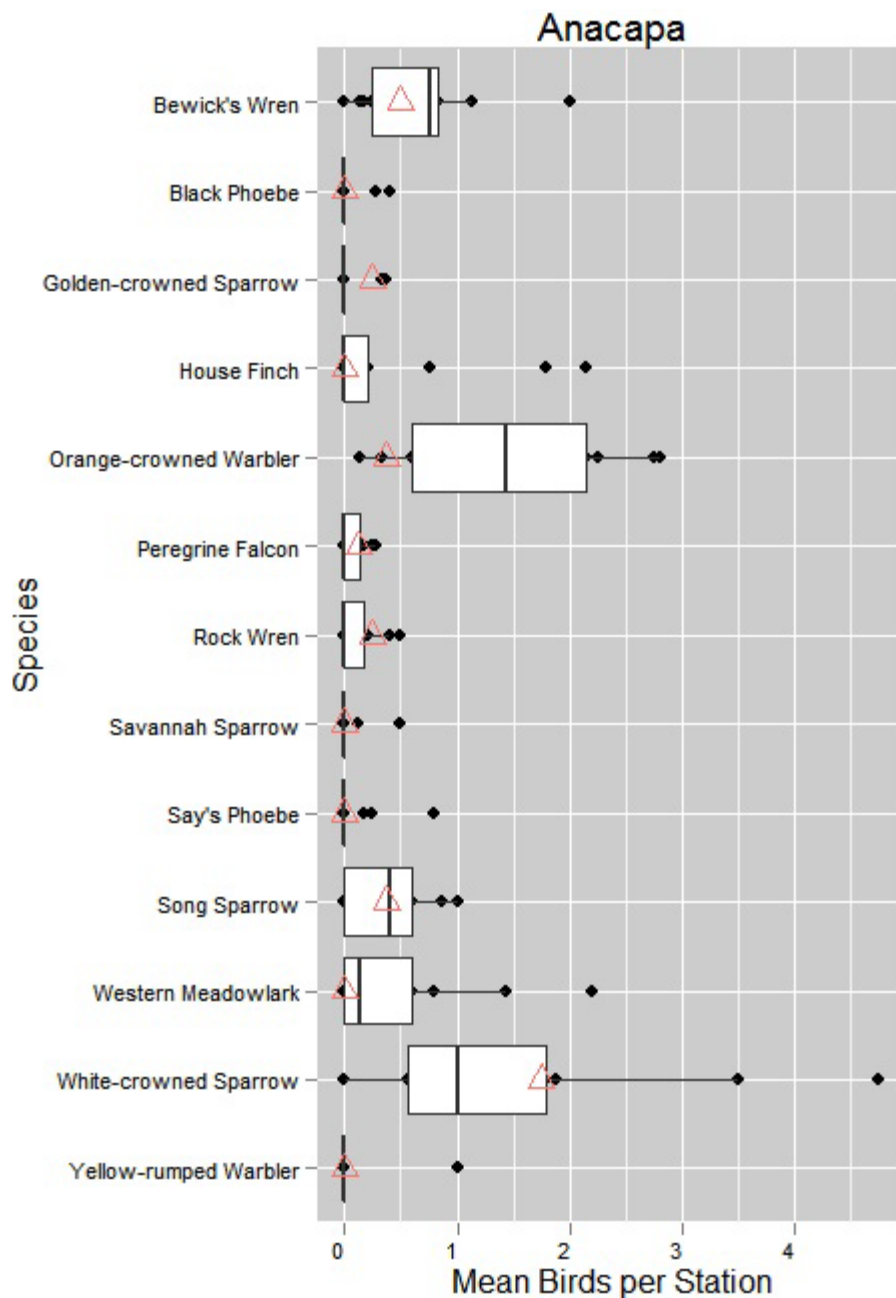


Figure 6. Boxplots for each species detected on Anacapa Island. Box plots display the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum for all years. Boxes represents the third and first quartile and vertical lines represents the median. Dots are counts outside the first and third quartile range. Triangles represents the mean value for 2017.

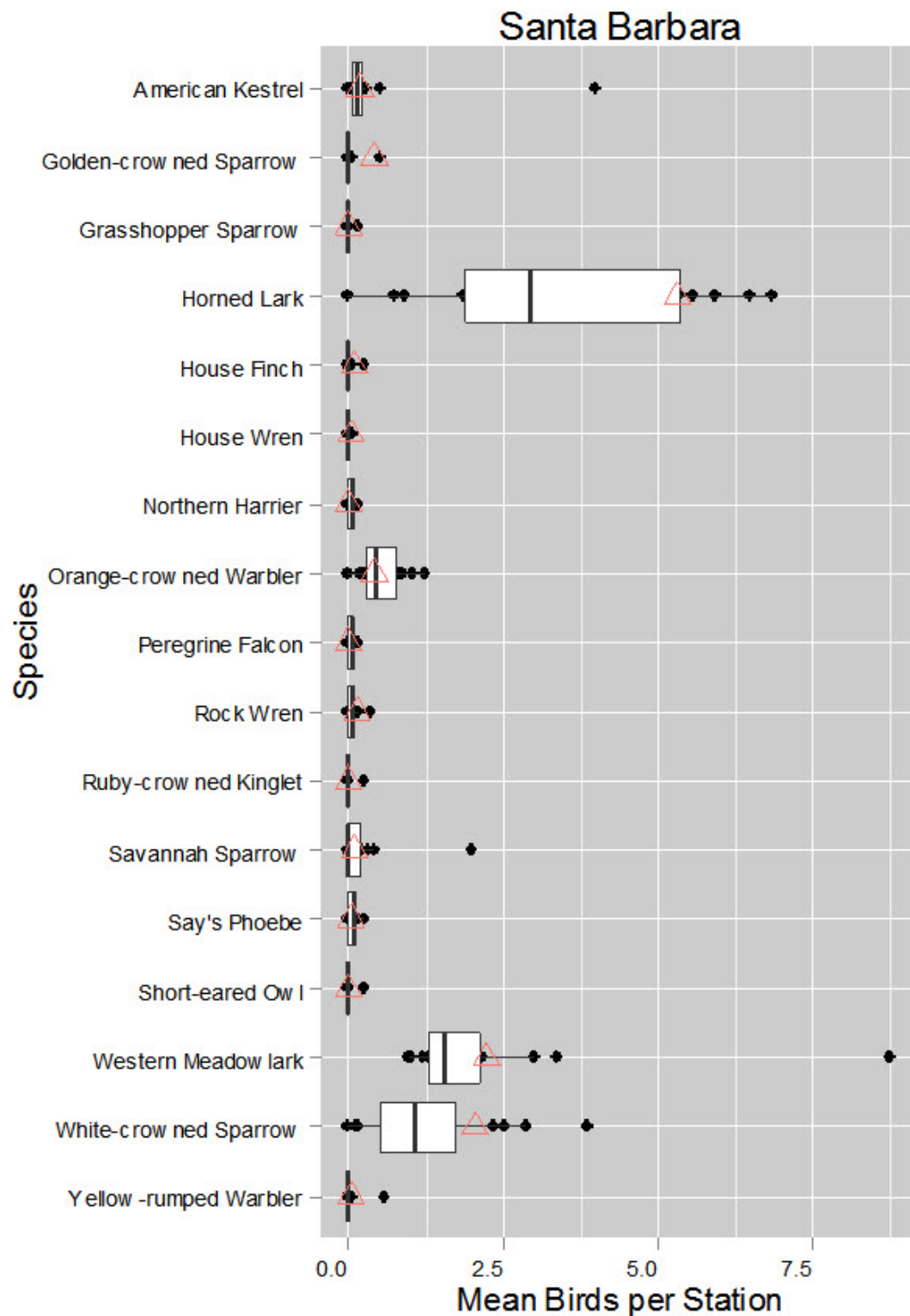


Figure 7. Boxplots for each species detected on Santa Barbara Island. Box plots display the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum for all years. Boxes represents the third and first quartile and vertical lines represents the median. Dots are counts outside the first and third quartile range. Triangles represents the mean value for 2017.

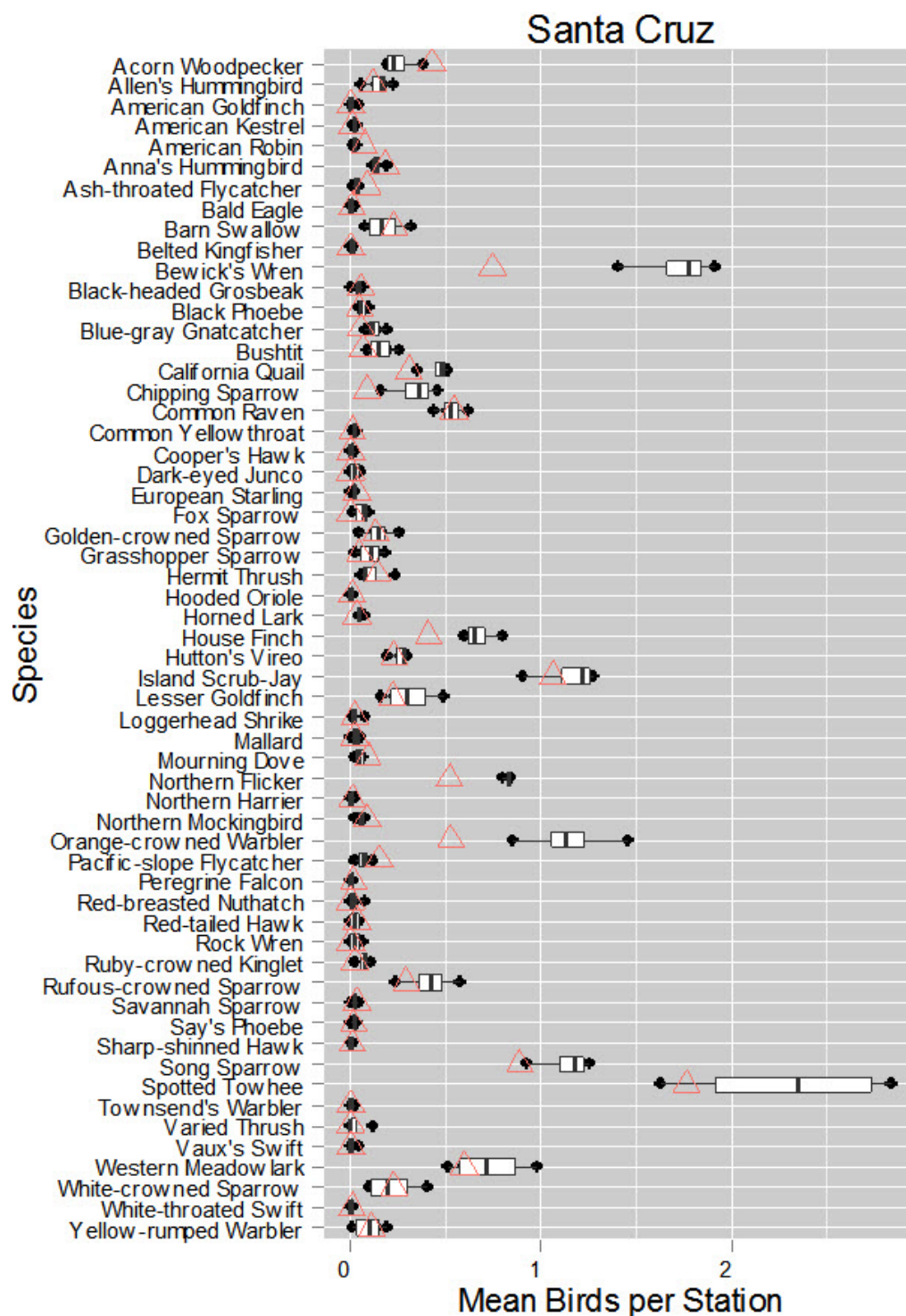


Figure 8. Boxplots for each species detected on Santa Cruz Island. Box plots display the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum for all years. Boxes represents the third and first quartile and vertical lines represents the median. Dots are counts outside the first and third quartile range. Triangles represents the mean value for 2017.

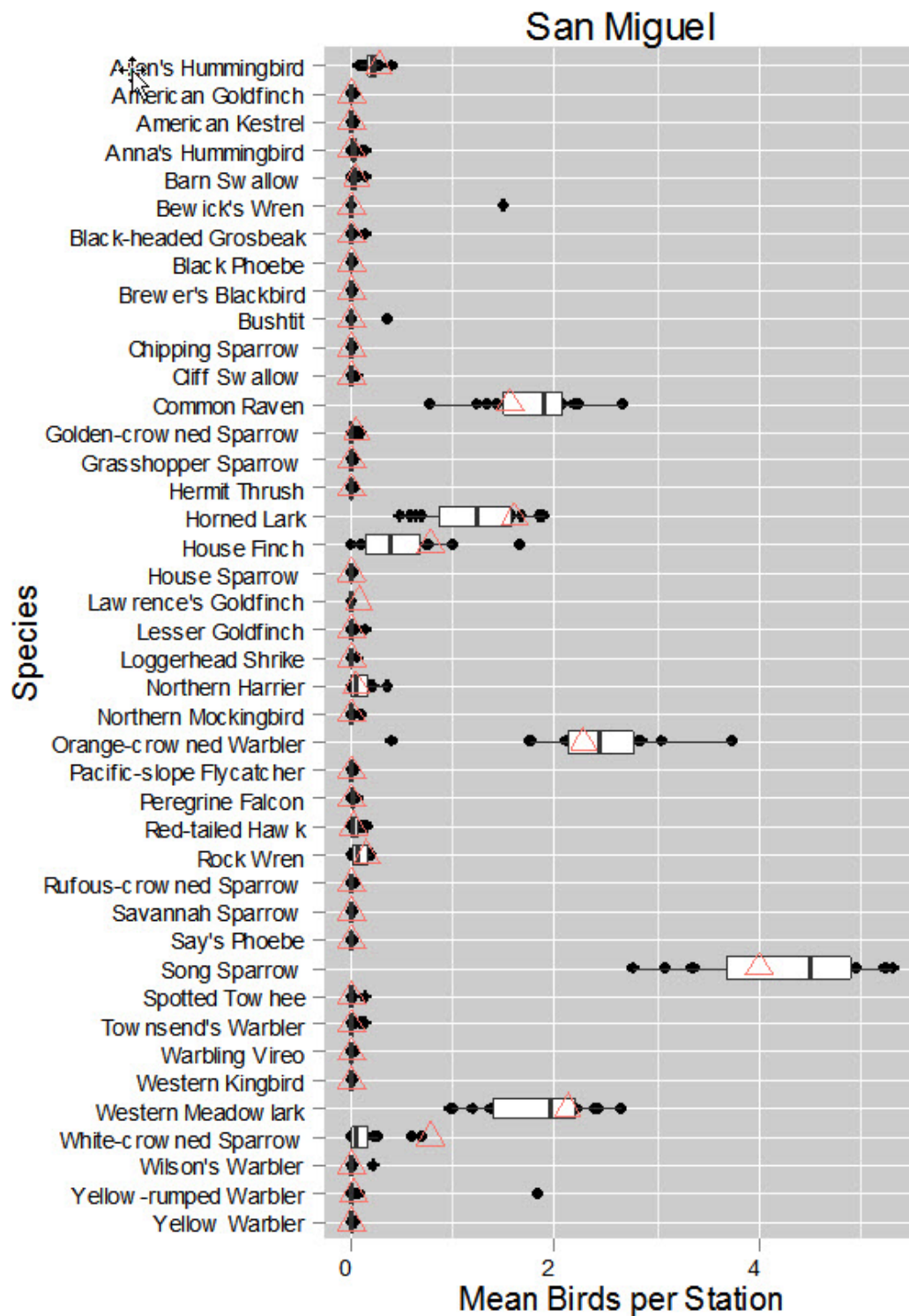


Figure 9. Boxplots for each species detected on San Miguel Island. Box plots display the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum for all years. Boxes represents the third and first quartile and vertical lines represents the median. Dots are counts outside the first and third quartile range. Triangles represents the mean value for 2017.

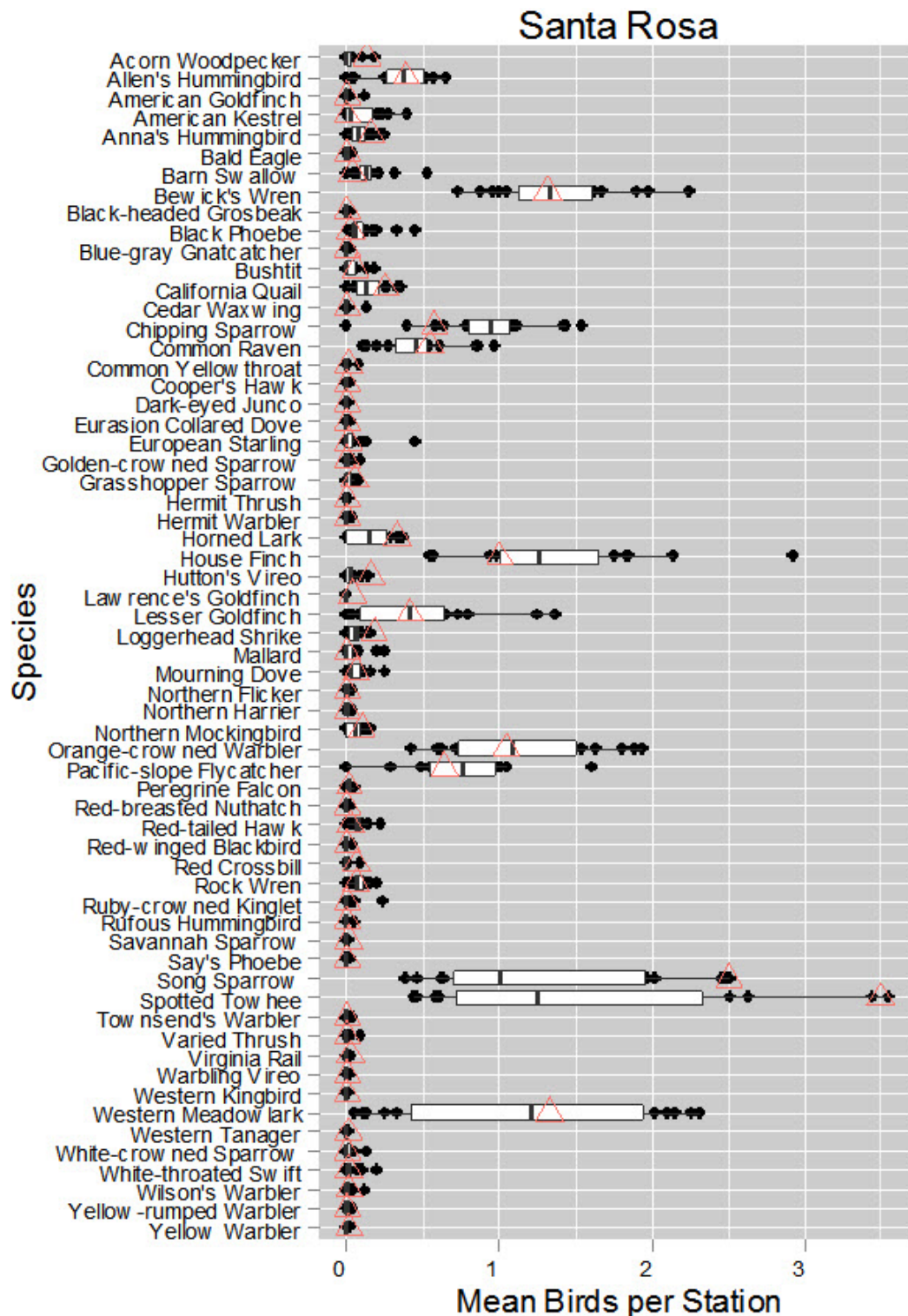


Figure 10. Boxplots for each species detected on Santa Rosa Island. Box plots display the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum for all years. Boxes represents the third and first quartile and vertical lines represents the median. Dots are counts outside the first and third quartile range. Triangles represents the mean value for 2017.

The species richness graphics in Figures 11-15 summarize patterns of species occurrences on each island since 1993 for San Miguel, Santa Barbara, and Anacapa islands, since 1994 for Santa Rosa Island, and since 2013 for Santa Cruz Island. This particular analysis includes data from both line transects and point counts, but does not include incidental observations of species that occurred outside of line transects or 10-minute point counts (e.g., species observed while en route to or from point count sites are not included). These graphs can be used to determine whether species are appearing on or are disappearing from our counts on the islands. Also, in the following summaries, and in Table 9, “transient or visiting” species are defined as native species that have been recorded only once or twice during point counts or transects on an island, do not breed on the islands, and occur either as transients or winter/spring visitors. These records were compared to the records summarized by Collins and Jones (2015), and are equivalent to their “transient” and “visitor” nomenclature. Birds that may be regular breeders on one island might also be classified as a transient non-breeding species on another (e.g., Spotted Towhee on San Miguel vs Santa Rosa). For purposes of this report the definition of transient or visitor does not include non-native bird species or native invasive species (i.e., Brown-headed Cowbird).

Notable findings on each island were:

- 1) Anacapa Island (Figure 11): 25 landbird species have been counted on Anacapa since 1993; 8 were counted in 2017. Five additional species were observed anecdotally -- Savannah Sparrow, Barn Swallow, Common Raven, Eurasian Collared Dove, and Western Meadowlark -- bringing the total to 13 species observed in 2017. European Starling was last counted in 1998, American Kestrel was last counted in 2001, Savannah Sparrow was last counted in 2005, and Barn Swallow was last counted in 2006. Song Sparrows seem to be more common since 2009, and Peregrine Falcons seem to be more common since 2015. Western Meadowlark was not counted on the island in 2017. Hooded Oriole was a new transient species counted in 2017; five transient or visiting species (defined as above) have been counted on the island overall since 1993 (Table 9).
- 2) Santa Barbara Island (Figure 12): 46 landbird species have been counted on this island since 1993; 15 were counted in 2017. Hermit Thrush, Eurasian Collared Dove, and Brown-headed Cowbird were observed anecdotally, bringing the species total to 18 for 2017. European Starling was last counted in 1997, Merlin in 1998, Allen’s Hummingbird in 2002, and Barn Owl in 2003. Golden-crowned Sparrow and House Finch seem to have been increasing on our counts since 2014. Lesser Goldfinch and Yellow-rumped Warbler (Audubon’s) were counted again in 2017. No transient or visiting species were counted on the island in 2017; 19 such species have been counted on the island since 1993 (Table 9). Red-shouldered Hawk counted in 1994 represents a new record compared to Collins and Jones (2015).
- 3) Santa Cruz Island (Figure 13): 66 landbird species have been counted on this island since 2013, when monitoring by NPS Channel Islands staff and volunteers began. Forty-nine species were counted in 2017. Three species were observed anecdotally -- Eurasian Collared Dove, Brown-headed Cowbird, and House Sparrow -- bringing the species total to 52 for 2017. Sharp-shinned Hawk was counted again in 2017 after a gap in years; no Fox Sparrows or Rock Wrens were counted in 2017. Yellow Warbler was a new transient species counted in 2017; 12 transient or visiting species have been counted on this island since 2013 (Table 9).

- 4) San Miguel Island (Figure 14): 69 landbird species have been counted on this island since 1993; 20 were counted in 2017. Nine species were observed anecdotally -- American Pipit, Anna's Hummingbird, Brewer's Blackbird, Brown-headed Cowbird, Bullock's Oriole, Fox Sparrow, Lincoln's Sparrow, Merlin, and Ruby-crowned Kinglet -- bringing the 2017 species total to 29. Grasshopper Sparrows have only been counted since 2011 (Table 10). European Starling was last counted in 2001, American Kestrel was last counted in 2003, Eurasian Collared Doves have not been counted since one observation in 2011, and House Sparrows were only counted from 2004 to 2013. Northern Harrier and Black-headed Grosbeak were counted again in 2017 after a gap in years. Lawrence's Goldfinch was observed for the second time on the island in 2017. Chipping Sparrow, Lesser Goldfinch, Rufous Hummingbird, Rufous-crowned Sparrow, and Savannah Sparrow were not counted in 2017. Anna's Hummingbird has been more commonly detected since 2002, but was not counted in 2017. No new transient or visiting species were counted on the island in 2017; 31 such species have been counted on the island since 1993 (Table 9). Bushtit counted on San Miguel in 2012 represent a new record of occurrence on this island compared with Collins and Jones (2015), as do Lark Bunting (*Calamospiza melanocorys*) counted in 2007 and 2012, and Rufous-crowned Sparrow counted in 2008 and 2016 (Figure 14). A male Bewick's Wren was observed anecdotally on 2 April 2017 carrying plant material on San Miguel; there are no confirmed records of this species nesting on this island.
- 5) Santa Rosa Island (Figure 15): 72 landbird species have been detected on this island since 1994; 37 were detected in 2017. Seven species were observed anecdotally -- Ash-throated Flycatcher, Cedar Waxwing, Eurasian Collared-Dove, Warbling Vireo, Nashville Warbler, Vesper Sparrow, and an aberrantly-colored juvenile Song Sparrow (with white wings) -- bringing the 2017 species total to 44. Fourteen species have been counted only since 2006 (Table 10), including Acorn Woodpecker and Grasshopper Sparrow (since 2006), Bushtit (since 2009). Brown-headed Cowbird was counted for the first time in 2017. American Kestrel was last counted in 2006, and Northern Harrier in 2013. Virginia Rail was counted again in 2017 after a gap since 2015. Common Yellowthroat, Red Crossbill, Savannah Sparrow, Western Tanager, and Yellow Warbler were counted again in 2017 (Table 9). Lawrence's Goldfinches, a new transient counted in 2017, were confirmed breeding in Lobo Canyon in May 2017 (in Lobo Canyon; adults seen feeding 2 young fledglings). Nineteen transient or visiting species have been counted on the island since 1994 (Table 9).

Across all five islands, three transient or visiting bird species were newly counted in 2017, for a total of 57 such species counted since NPS monitoring began on each island (Table 9).

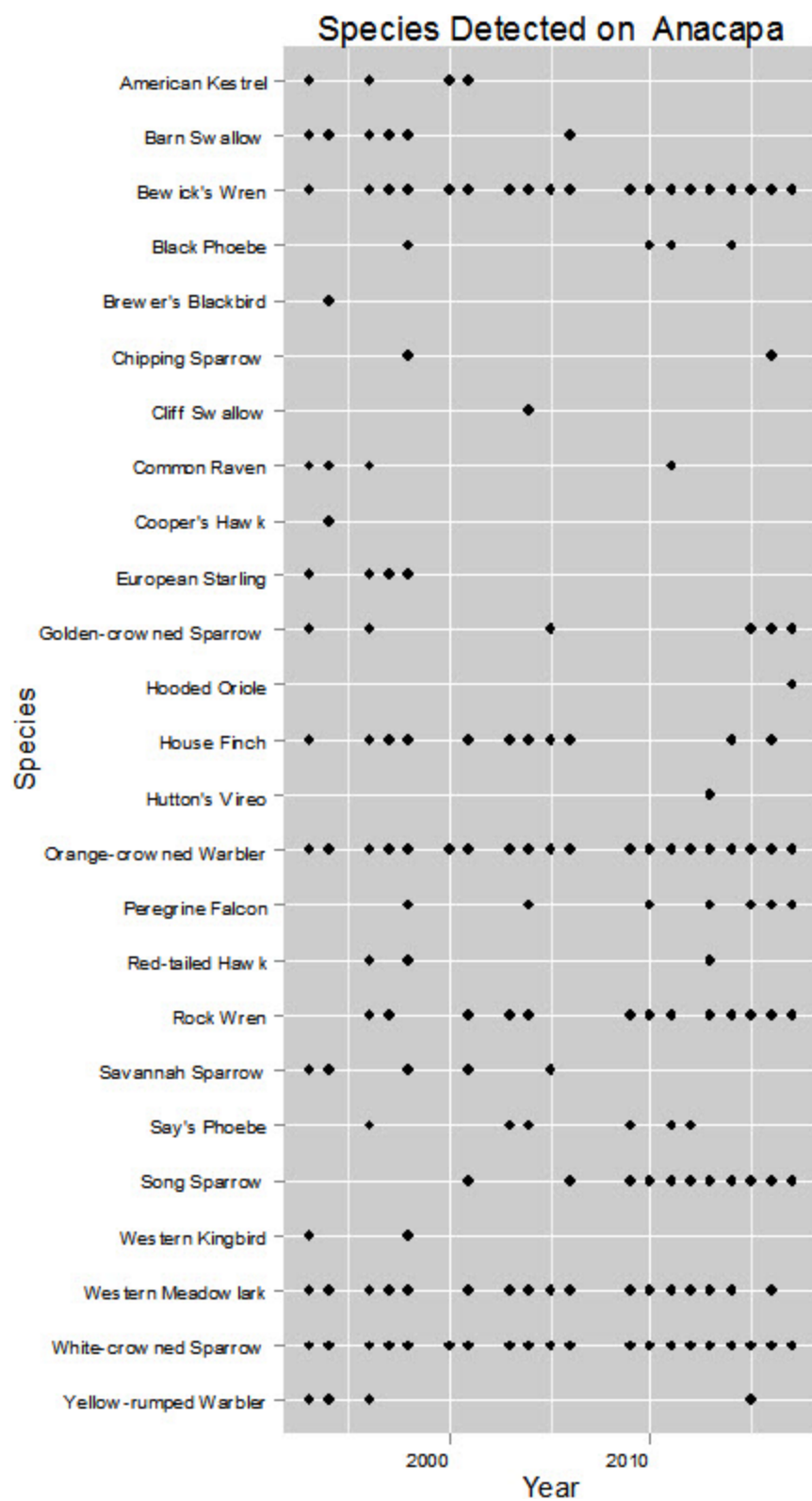


Figure 11. Species occurrence from 1993 –2017 for Anacapa Island. A dot indicates that the species was detected on a line transect or point count during that year.

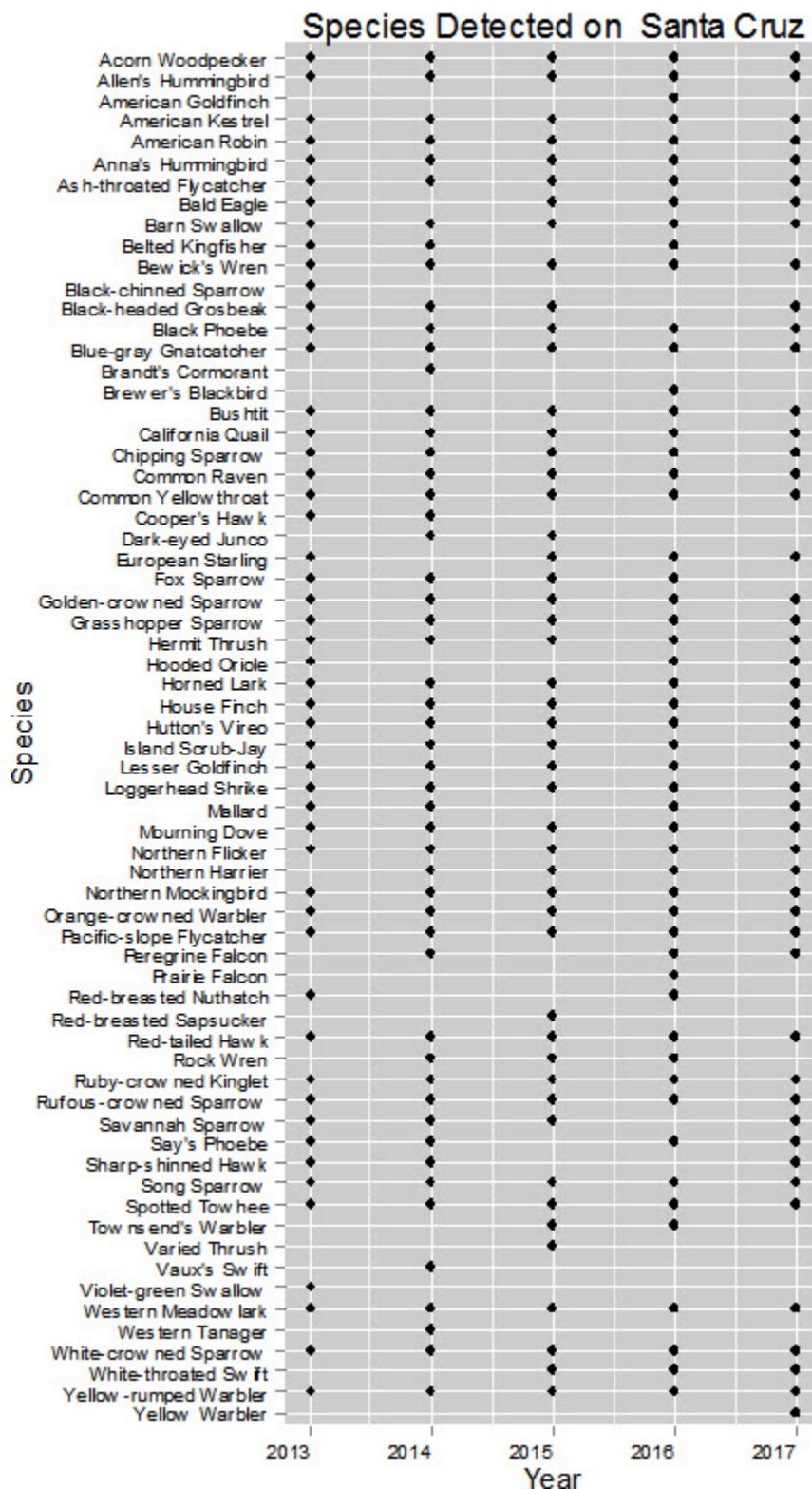


Figure 13. Species occurrence from 1993 to 2017 for Santa Cruz Island. A dot indicates that the species was detected on a line transect or point count during that year.

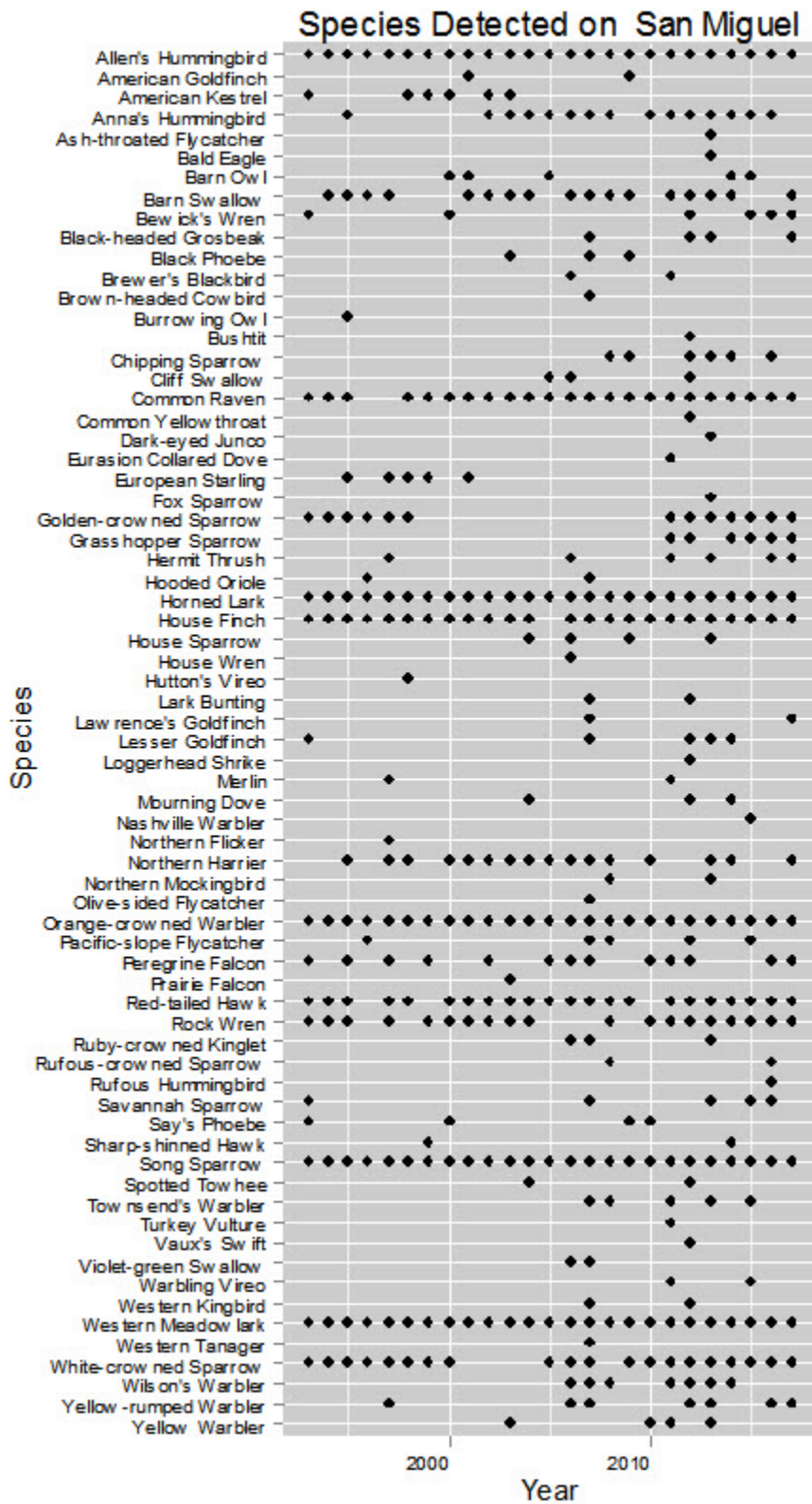


Figure 14. Species occurrence from 1993 to 2017 for San Miguel Island. A dot indicates that the species was detected on a line transect or point count during that year.

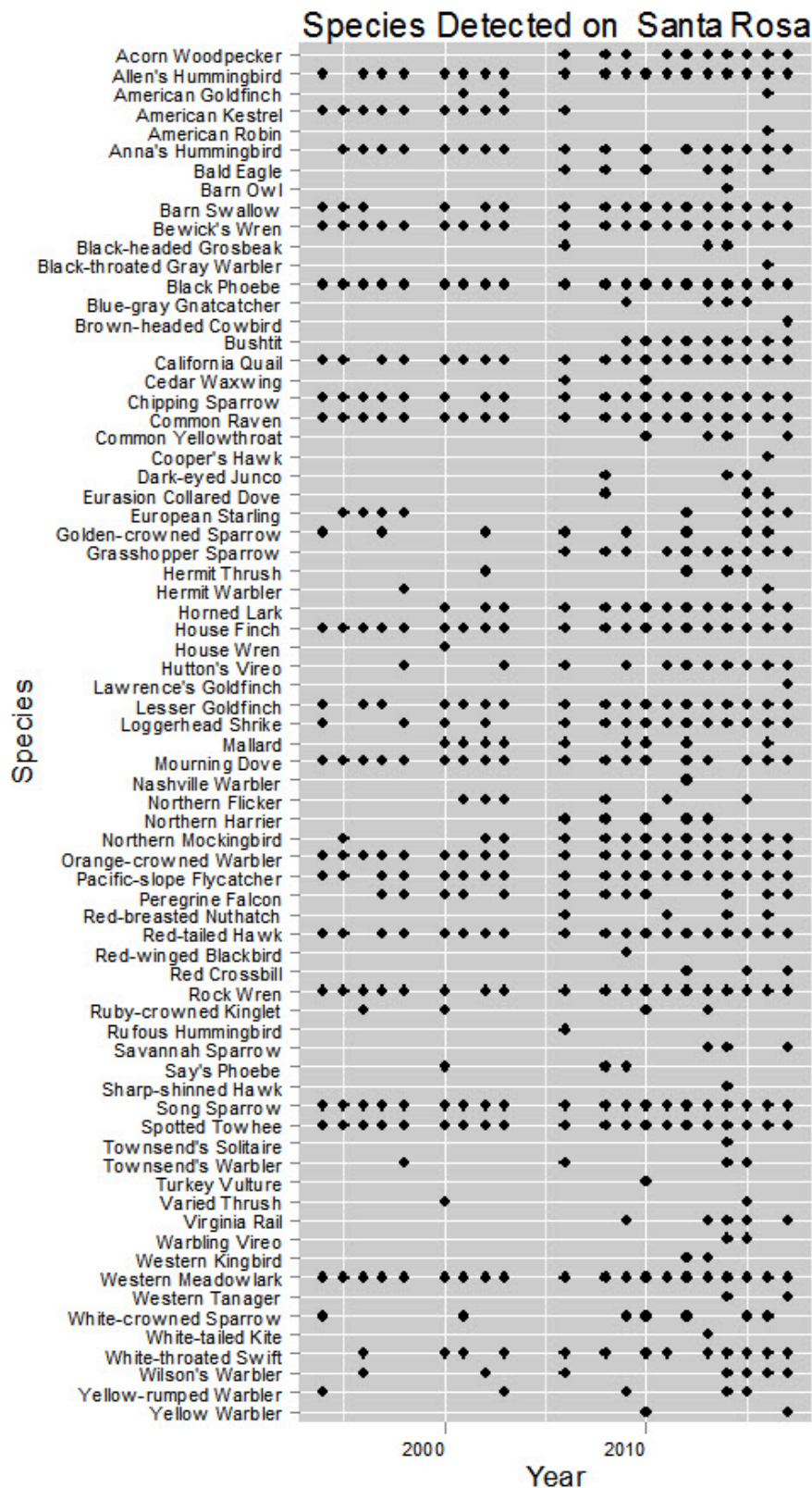


Figure 15. Species occurrence from 1993 to 2017 for Santa Rosa Island. A dot indicates that the species was detected on a line transect or point count during that year.

Table 9. New transient or visiting bird species counted in 2017 (bold “**X**”), and other transients and visiting species counted in all other years since monitoring began (unbold “X”), on each of the five northern Channel Islands. “Transient or visiting” species are native species that have been recorded only once or twice during point counts or transects and do not breed on the islands. AN=Anacapa Island, SB=Santa Barbara Island, SC=Santa Cruz Island, SM=San Miguel Island, SR=Santa Rosa Island.

Species	AN	SB	SC	SM	SR
American Goldfinch	–	X	X	X	–
American Robin	–	–	–	–	X
Ash-throated Flycatcher	–	–	–	X	–
Bald Eagle	–	–	–	X	–
Barn Swallow	–	X	–	–	–
Bewick's Wren	–	X	–	–	–
Black-chinned Sparrow	–	–	X	–	–
Black-throated Gray Warbler	–	–	–	–	X
Blue-gray Gnatcatcher	–	X	–	–	–
Brewer's Blackbird	–	–	X	X	–
Burrowing Owl	–	–	–	X	–
Bushtit	–	–	–	X	–
Cedar Waxwing	–	–	–	–	X
Cliff Swallow	X	X	–	–	–
Common Yellowthroat	–	X	–	X	–
Cooper's Hawk	–	–	X	–	X
Dark-eyed (Oregon) Junco	–	X	X	X	–
Fox Sparrow	–	–	–	X	–
Grasshopper Sparrow	–	X	–	–	–
Hermit Warbler	–	–	–	–	X
Hooded Oriole	X ¹	–	–	X	–
House Wren	–	–	–	X	X
Hutton's Vireo	X	–	–	X	–
Lark Bunting	–	–	–	X	–
Lark Sparrow	–	X	–	–	–
Lawrence's Goldfinch	–	–	–	X	X ¹
Lesser Goldfinch	–	X	–	–	–

¹ New transient or visiting bird species counted in 2017.

Table 9 (continued). New transient or visiting bird species counted in 2017 (bold “X”), and other transients and visiting species counted in all other years since monitoring began (unbold “X”), on each of the five northern Channel Islands. “Transient or visiting” species are native species that have been recorded only once or twice during point counts or transects and do not breed on the islands. AN=Anacapa Island, SB=Santa Barbara Island, SC=Santa Cruz Island, SM=San Miguel Island, SR=Santa Rosa Island.

Species	AN	SB	SC	SM	SR
Loggerhead Shrike	–	–	–	X	–
Long-eared Owl	–	X	–	–	–
Merlin	–	–	–	X	–
Nashville Warbler	–	–	–	X	X
Northern Flicker	–	–	–	X	–
Northern Mockingbird	–	X	–	X	–
Olive-sided Flycatcher	–	–	–	X	–
Prairie Falcon	–	–	X	X	–
Red-breasted Sapsucker	–	–	X	–	–
Red-shouldered Hawk	–	X	–	–	–
Red-winged Blackbird	–	–	–	–	X
Ruby-crowned Kinglet	–	X	–	–	–
Rufous Hummingbird	–	–	–	X	X
Rufous-crowned Sparrow	–	–	–	X	–
Sharp-shinned Hawk	–	X	–	X	X
Song Sparrow	–	X	–	–	–
Spotted Towhee	–	–	–	X	–
Townsend’s Solitaire	–	–	–	–	X
Townsend’s Warbler	–	–	X	–	–
Turkey Vulture	–	–	–	X	X
Varied Thrush	–	X	X	–	X
Vaux’s Swift	–	–	–	X	–
Violet-green Swallow	–	–	X	X	–
Warbling Vireo	–	–	–	X	X
Western Kingbird	X	X	–	X	X
Western Tanager	–	–	X	X	X

¹ New transient or visiting bird species counted in 2017.

Table 9 (continued). New transient or visiting bird species counted in 2017 (bold “X”), and other transients and visiting species counted in all other years since monitoring began (unbold “X”), on each of the five northern Channel Islands. “Transient or visiting” species are native species that have been recorded only once or twice during point counts or transects and do not breed on the islands. AN=Anacapa Island, SB=Santa Barbara Island, SC=Santa Cruz Island, SM=San Miguel Island, SR=Santa Rosa Island.

Species	AN	SB	SC	SM	SR
White-tailed Kite	–	–	–	–	X
Wilson’s Warbler	–	X	–	–	–
Yellow-rumped Warbler (Audubon’s)	X	–	–	–	–
Yellow Warbler	–	–	X ¹	–	X
No. of transients/visiting species on each island:	5	19	12	31	19

¹ New transient or visiting bird species counted in 2017.

Table 10. Sixteen new species counted since 2006 and the year in which they were first observed on San Miguel (SMI) and Santa Rosa (SRI) islands.

Species	SMI	SRI
Acorn Woodpecker	–	2006
Bald Eagle	–	2006
Black-headed Grosbeak	–	2006
Blue-gray Gnatcatcher	–	2006
Bushtit	–	2009
Common Yellowthroat	–	2010
Dark-eyed Junco	–	2008
Eurasian Collared Dove	–	2008
Grasshopper Sparrow	2011	2006
Northern Harrier	–	2006
Red-breasted Nuthatch	–	2006
Savannah Sparrow	–	2013
Townsend’s Warbler	2007	–
Virginia Rail	–	2009
Wilson’s Warbler	2006	–
Yellow Warbler	–	2010

Non-native and invasive birds were counted on only two of the five islands: Brown-headed Cowbird and European Starling on Santa Rosa, and European Starling on Santa Cruz. However, anecdotal sightings of such species (i.e., outside of the point and transect counts) were made on all or a majority of the islands. Anecdotal sightings of such species in 2017 were summarized by Paul Collins and are presented in Appendix C (P. Collins, Santa Barbara Museum of Natural History, unpubl. data). Other anecdotal observations in 2017 were: one Eurasian Collared-Dove observed on Anacapa Island (3/18/17, P. Larramendy), and Eurasian Collared-Doves observed on Santa Barbara, Santa Cruz, and Santa Rosa. Brown-headed Cowbirds were observed anecdotally on all islands except Anacapa; European Starlings were observed anecdotally on Santa Cruz and Santa Rosa; and House Sparrows were observed anecdotally on Santa Cruz only.

Five species have not been counted on several of the islands in the past 10 or more years (Table 11): Allen’s Hummingbird (on Santa Barbara Island), American Kestrel, Barn Owl, Barn Swallow, and European Starling. Conversely, 17 species have been counted on several of the islands during 70% or more of all the years of the monitoring project (Table 11), including Allen’s Hummingbird on San Miguel Island, American Kestrel (on Santa Barbara Island), and Orange-crowned Warbler and Western Meadowlark on Anacapa, Santa Barbara, San Miguel, and Santa Rosa islands.

Table 11. Patterns of species detections on San Miguel, Santa Rosa, Anacapa and Santa Barbara islands. Santa Cruz Island is not included because of limited data. Data do not include transients or anecdotal observations. “X” = species detected. “X+” = the frequency of observations in the past 10 years compared with previous years is increasing. “X–” = the frequency of observations in the past 10 years compared with previous years is decreasing.

Species	Not Counted in last 10 or more years				Counted in at least 70% of all years			
	SMI	SRI	AI	SBI	SMI	SRI	AI	SBI
Allen’s Hummingbird	–	–	–	X	X	–	–	–
American Kestrel	X	X	X		–	–	–	X
Barn Owl	–	–		X	–	–	–	–
Barn Swallow	–	–	X		–	–	–	–
Bewick’s Wren	–	–	–	–	–	X	X	–
Black Phoebe	–	–	–	–	–	X–	–	–
Common Raven	–	–	–	–	X	X	–	–
European Starling	X	–	X	–	–	–	–	–
Horned Lark	–	–	–	–	X+	–	–	X+
House Finch	–	–	–	–	X	X–	–	–
Northern Harrier	–	–	–	–	–	–	–	X

Table 11 (continued). Patterns of species detections on San Miguel, Santa Rosa, Anacapa and Santa Barbara islands. Santa Cruz Island is not included because of limited data. Data do not include transients or anecdotal observations. “X” = species detected. “X+” = the frequency of observations in the past 10 years compared with previous years is increasing. “X–” = the frequency of observations in the past 10 years compared with previous years is decreasing.

Species	Not Counted in last 10 or more years				Counted in at least 70% of all years			
	SMI	SRI	AI	SBI	SMI	SRI	AI	SBI
Orange-Crowned Warbler	–	–	–	–	X	X	X–	X
Peregrine Falcon	–	–	–	–	–	–	–	X
Red-tailed Hawk	–	–	–	–	X	–	–	–
Rock Wren	–	–	–	–	X	–	–	X
Savannah Sparrow	–	–	–	–		–	–	X
Song Sparrow	–	–	–	–	X	X+	–	–
Spotted Towhee	–	–	–	–	–	X+	–	–
Western Meadowlark	–	–	–	–	X	X	X	X+
White-Crowned Sparrow	–	–	–	–	X	–	X	X
Total	5 species				17 species			

Discussion

Fourteen bird species were detected on one or more of the five islands we monitored in 2017 (Orange-crowned Warbler, Bewick's Wren, California Quail, Chipping Sparrow, House Finch [on Santa Cruz and Santa Rosa islands], Island Scrub-Jay, Blue-gray Gnatcatcher, Bushtit, Northern Flicker, Rufous-crowned Sparrow, Song Sparrow [on Santa Cruz Island], Spotted Towhee [on Santa Cruz Island], American Kestrel, Black Phoebe). Eleven bird species exhibited increased detections in 2017 on one or more of the five islands (Golden-crowned Sparrow, Horned Lark, Western Meadowlark, White-crowned Sparrow, Acorn Woodpecker, American Robin, Ash-throated Flycatcher, House Finch [on San Miguel Island], Loggerhead Shrike, Song Sparrow [on Santa Rosa Island], and Spotted Towhee [on Santa Rosa Island]). The other species did not appear to exhibit marked or dramatic changes in abundances in 2017. Most of these results are very similar to those found in an evaluation of long-term monitoring data on the islands (Coonan and Dye 2016), and are continuations of either increasing or decreasing trends in species' densities seen in these analyses. These 2017 results must be interpreted with caution, however, since the present evaluation only relied on a simple assessment of graphed detections (which are an index of abundance). Trends in bird numbers are better revealed by analyses of densities, such as through distance analyses (e.g., Coonan and Dye 2016, Coonan, Klinger, and Dye (2011), to account for differences in detection rates.

Santa Rosa has added 14 new species (annually or irregularly) since 2006 (Table 10). This represents a significant percentage of the overall richness for the island (19% of 72 total species counted) since the monitoring began, and may have been promoted through removal of non-native feral animals and ensuing vegetative recovery. On San Miguel Island, Grasshopper Sparrow is a new species, and has been counted regularly since 2011 (Table 10). Analyses of the relationships between vegetative changes over the past two decades and bird species distribution, density, and richness would be extremely informative, and could be accomplished using GIS and multivariate statistical models.

Some species have not been counted over the past 10 or more years, despite being resident breeders on the islands for the past 10 years (as recorded in Collins and Jones 2015, and based on anecdotal observations by Park staff and researchers). These species include American Kestrel on San Miguel, Santa Rosa, and Anacapa islands; Chipping Sparrow and Barn Swallow on Anacapa; and Allen's Hummingbird and Barn Owl on Santa Barbara Island. For most of these resident breeding species, the counting methodology represents the most likely factor in the decreased counts, i.e., the point count technique, conducted between dawn and four hours after, is designed primarily to count singing passerines and not to monitor diurnal birds of prey, nocturnal birds, swifts, some swallows, or hummingbirds or other species that do not vocalize regularly (Ralph et al. 1995). However, it is questionable why Chipping Sparrows have not been counted more recently on Anacapa Island when they are the perfect target for the point count technique.

A declining trend in American Kestrel populations has been found across much of North America. Many causes for the decline have been hypothesized including predation, pathogens, and pesticides but no clear factors have emerged to explain the decline (McClure et al. 2017). Paprocki et al. (2014)

also examined the latitudinal center of abundance for the winter distributions of six western North American raptor species, including American Kestrel, using Christmas Bird Counts from 1975-2011. All six raptors had significant poleward shifts in their wintering distributions over time. This may be part of a broader geographic trend of species distribution shifting poleward in response to global climate change (Paprocki et al. 2014). The Park's current practice for evaluating avian monitoring data assumes that changes in local populations reflect local habitat conditions; however, processes that drive local distribution and population trends may occur across a large regional scale in the case of American Kestrel. Thus, since our counting methodology does not adequately monitor any of the diurnal or nocturnal raptor species on the Channel Islands, the issue begs the addition of sampling techniques to evaluate the broader trends in American Kestrel populations and distributions, as well as those of other birds of prey using the islands.

In 2017, each observer was skilled in bird vocalization and sight identification and also island logistics. As a result of the observers' unique qualifications, this year's data collection was efficient and the authors' confidence in detection accuracy is high. However, it is important to note that inter-observer differences, environmental factors (i.e., variability in wind speeds and fog density), and only one count (replicate) per season on each point and transect affects the accuracy of estimates of species' density. These factors are significant challenges to any monitoring program, and should be evaluated carefully and thoroughly to minimize misrepresentation of trends in density.

In 2017 author P. Larramendy removed metal stakes from the field that were used initially to mark the point count locations. The decision to remove stakes was made because vegetation has grown significantly since many of them were first set, and so they are virtually impossible to find or get close to when counting because of obstruction. However, significant advances in GPS technology have also been made since the stakes were first placed, so the ease of finding the points using hand-held GPS units has improved, and accuracy is usually to 3-5 m.

Recommendations

In 2016 we noted that on Santa Rosa Island, annual grassland plant community appears to be under-sampled, given the distribution of sample points. Under-sampling of grassland species such as Grasshopper Sparrows, Horned Larks, Western Meadow Larks, and Loggerhead Shrike may result in an inaccurate assessment of these species' trends on the island. Thus, we recommend that the vegetation type for each sampling point be updated with the classification from the most recent vegetation map, or a field visit if necessary. Once vegetation types are updated, the allocation of sampling points by vegetation type (or other strata) should be evaluated.

In addition, conducting only one visit per point or transect per year is a limitation of this monitoring program because of weather biases and bird-detection biases inherent in bird sampling. Trends in abundance based on single visit surveys would likely be highly dependent on untestable assumptions about annual variability in survey timing, conditions, and migratory arrival patterns. The subsequent reduction in power would result in longer time periods necessary to detect population trends, increased potential for detecting false trends, and decreased efficacy of passerine conservation programs in general (Schmidt et al. 2013). While some biases in bird detections can be, to a certain extent, addressed through analysis and inclusion of covariates (e.g. temperature, wind speed, observer), ideally multiple counts (visits) at each point or transect would be performed within in a season (Schmidt et al. 2013). We recommend MEDN and the park work with a statistician familiar with avian sampling data to evaluate the current protocol in light of several newly available analytical techniques (e.g., Yuichi et al. 2016) that would improve the accuracy of landbird density and abundance estimates.

Also, because Distance analyses assist statistically with evaluations of trends, the authors recommend that a trend analysis using program DISTANCE should be used after the 2020 season to assess 5-year trends in breeding species' numbers following the 2015 trend analysis conducted by Coonan and Dye (2016).

As discussed above, we also recommend inclusion of techniques to monitor avian birds of prey on the islands. These new strategies could include counting at a select number of the point count sites after 10 in the morning, or conducting new point counts from roadways, to sample a wider area of the island in a given sampling period (Fuller and Mosher 1981). In addition, evening and night surveys in the winter or early spring when owls are still responsive to playback would be an adequate method for monitoring their populations (Fuller and Mosher 1981).

Reevaluation of the landbird monitoring on Anacapa and Santa Barbara islands is also warranted, because the presence of breeding gulls is interfering with some aspects of the work. As noted above, on Santa Barbara, 12 points have not been counted for the past few years of monitoring because of the presence of loud, breeding Brown Pelicans and Western Gulls. On Anacapa, the number of nesting gulls on the island is sizable, and their nesting behavior is starting to be more aggressive. As discussed above, constant vocalizing by gulls makes it difficult to pick up auditory vocalizations by passerines during monitoring. Also, having point-counts and a transect on Anacapa is a concern for double-counting, and the way the point counts are currently set make an observer venture into the

gulls' territories, thereby increasing their vocalizations and warning flights. Conversely, when humans stay on trails the gulls on Anacapa are less likely to react. Thus, we recommend using only transects to monitor birds on East Anacapa, and discontinuing the use of the point count sites.

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Appendix A. Resident Breeder Species List

This appendix lists terrestrial avian species confirmed nesting currently on at least one of the five northern Channel Islands monitored in this study (Anacapa, Santa Barbara, Santa Cruz, San Miguel, and Santa Rosa). Data on nesting status from Collins and Jones (2015). List does not include exclusively marine species since these are not monitored in this landbird program, and does not include species only suspected of breeding on an island.

Scientific Name	Common Name
<i>Anas platyrhynchos</i>	Mallard
<i>Callipepla californica</i>	California Quail
<i>Haliaeetus leucocephalus</i>	Bald Eagle
<i>Circus hudsonius</i>	Northern Harrier
<i>Accipiter cooperii</i>	Cooper's Hawk
<i>Buteo jamaicensis</i>	Red-tailed Hawk
<i>Rallus limicola</i>	Virginia Rail
<i>Fulica Americana</i>	American Coot
<i>Charadrius vociferous</i>	Killdeer
<i>Columba livia</i>	Rock Pigeon
<i>Zenaida macroura</i>	Mourning Dove
<i>Tyto alba</i>	Barn Owl
<i>Asio flammeus</i>	Short-eared Owl
<i>Aegolius acadicus</i>	Northern Saw-whet Owl
<i>Aeronautes saxatalis</i>	White-throated Swift
<i>Calypte anna</i>	Anna's Hummingbird
<i>Selasphorus sasin</i>	Allen's Hummingbird
<i>Melanerpes formicivorus</i>	Acorn Woodpecker
<i>Colaptes auratus</i>	Northern Flicker
<i>Falco sparverius</i>	American Kestrel
<i>Falco peregrinus</i>	Peregrine Falcon
<i>Empidonax difficilis</i>	Pacific-slope Flycatcher
<i>Sayornis nigricans</i>	Black Phoebe
<i>Myiarchus cinerascens</i>	Ash-throated Flycatcher
<i>Lanius ludovicianus</i>	Loggerhead Shrike

Scientific Name	Common Name
<i>Vireo huttoni</i>	Hutton's Vireo
<i>Aphelocoma insularis</i>	Island Scrub-Jay
<i>Corvus corax</i>	Common Raven
<i>Eremophila alpestris</i>	Horned Lark
<i>Tachycineta thalassina</i>	Violet-green Swallow
<i>Hirundo rustica</i>	Barn Swallow
<i>Psaltiriparus minimus</i>	Bushtit
<i>Sitta Canadensis</i>	Red-breasted Nuthatch
<i>Salpinctes obsoletus</i>	Rock Wren
<i>Catherpes mexicanus</i>	Canyon Wren
<i>Thryomanes bewickii</i>	Bewick's Wren
<i>Polioptila caerulea</i>	Blue-gray Gnatcatcher
<i>Turdus migratorius</i>	American Robin
<i>Mimus polyglottos</i>	Northern Mockingbird
<i>Sturnus vulgaris</i>	European Starling
<i>Phainopepla nitens</i>	Phainopepla
<i>Oreothlypis celata</i>	Orange-crowned Warbler
<i>Pipilo maculatus</i>	Spotted Towhee
<i>Aimophila ruficeps</i>	Rufous-crowned Sparrow
<i>Spizella passerine</i>	Chipping Sparrow
<i>Ammodramus savannarum</i>	Grasshopper Sparrow
<i>Melospiza melodia</i>	Song Sparrow
<i>Junco hyemalis</i>	Dark-eyed Junco
<i>Pheucticus melanocephalus</i>	Black-headed Grosbeak
<i>Agelaius phoeniceus</i>	Red-winged Blackbird
<i>Sturnella neglecta</i>	Western Meadowlark
<i>Icterus cucullatus</i>	Hooded Oriole
<i>Haemorhous mexicanus</i>	House Finch
<i>Spinus psaltria</i>	Lesser Goldfinch

Appendix B. 2017 Landbird Monitoring Site Observers

Anacapa Island

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
AE01	PC	3/20/2017	Larramendy_Peter
AE02	PC	3/18/2017	Larramendy_Peter
AE03	PC	3/20/2017	Larramendy_Peter
AE04	PC	3/18/2017	Larramendy_Peter
AE05	PC	3/18/2017	Larramendy_Peter
AE06	PC	3/18/2017	Larramendy_Peter
AE07	PC	3/18/2017	Larramendy_Peter
AE08	PC	3/20/2017	Larramendy_Peter
TRLS	LT	3/19/2017	Larramendy_Peter

San Miguel Island

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
LKBD	LT	4/12/2017	Larramendy_Peter
NDVR	LT	4/4/2017	Larramendy_Peter
SM01	PC	4/4/2017	Larramendy_Peter
SM02	PC	4/4/2017	Larramendy_Peter
SM03	PC	4/12/2017	Larramendy_Peter
SM04	PC	4/13/2017	Larramendy_Peter
SM05	PC	4/16/2017	Larramendy_Peter
SM06	PC	4/16/2017	Larramendy_Peter
SM07	PC	4/16/2017	Larramendy_Peter
SM08	PC	4/16/2017	Larramendy_Peter
SM09	PC	4/16/2017	Larramendy_Peter
SM10	PC	4/16/2017	Larramendy_Peter
SM11	PC	4/16/2017	Larramendy_Peter
SM12	PC	4/16/2017	Larramendy_Peter
SM13	PC	3/29/2017	Larramendy_Peter

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SM14	PC	4/2/2017	Larramendy_Peter
SM15	PC	3/29/2017	Larramendy_Peter
SM16	PC	3/29/2017	Larramendy_Peter
SM17	PC	3/29/2017	Larramendy_Peter
SM18	PC	3/29/2017	Larramendy_Peter
SM19	PC	4/2/2017	Larramendy_Peter
SM20	PC	4/13/2017	Larramendy_Peter
SM21	PC	4/1/2017	Larramendy_Peter
SM22	PC	4/1/2017	Larramendy_Peter
SM23	PC	4/13/2017	Larramendy_Peter
SM24	PC	4/13/2017	Larramendy_Peter
SM25	PC	4/13/2017	Larramendy_Peter
SM26	PC	4/13/2017	Larramendy_Peter
SM27	PC	4/13/2017	Larramendy_Peter
SM28	PC	4/13/2017	Larramendy_Peter
SM29	PC	4/13/2017	Larramendy_Peter
SM30	PC	4/4/2017	Larramendy_Peter
SM31	PC	4/15/2017	Larramendy_Peter
SM32	PC	4/15/2017	Larramendy_Peter
SM33	PC	4/15/2017	Larramendy_Peter
SM34	PC	4/15/2017	Larramendy_Peter
SM35	PC	4/15/2017	Larramendy_Peter
SM36	PC	4/15/2017	Larramendy_Peter
SM37	PC	4/15/2017	Larramendy_Peter
SM38	PC	4/12/2017	Larramendy_Peter
SM39	PC	4/12/2017	Larramendy_Peter
SM40	PC	4/12/2017	Larramendy_Peter
SMHL	LT	4/19/2017	Larramendy_Peter
WLLW	LT	4/1/2017	Larramendy_Peter

Santa Barbara Island

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
ARCH	LT	3/7/2017	Larramendy_Peter
CNYN	LT	3/8/2017	Larramendy_Peter
SB01	PC	3/4/2017	Larramendy_Peter
SB02	PC	3/4/2017	Larramendy_Peter
SB04	PC	3/4/2017	Larramendy_Peter
SB05	PC	3/5/2017	Larramendy_Peter
SB07	PC	3/4/2017	Larramendy_Peter
SB08	PC	3/4/2017	Larramendy_Peter
SB09	PC	3/5/2017	Larramendy_Peter
SB13	PC	3/4/2017	Larramendy_Peter
SB14	PC	3/5/2017	Larramendy_Peter
SB15	PC	3/4/2017	Larramendy_Peter
SB16	PC	3/8/2017	Larramendy_Peter
SB18	PC	3/4/2017	Larramendy_Peter
SB21	PC	3/8/2017	Larramendy_Peter
SB22	PC	3/8/2017	Larramendy_Peter
SB23	PC	3/4/2017	Larramendy_Peter
SB25	PC	3/2/2017	Larramendy_Peter
SB26	PC	3/4/2017	Larramendy_Peter
SB27	PC	3/2/2017	Larramendy_Peter
SB29	PC	3/2/2017	Larramendy_Peter
SB30	PC	3/2/2017	Larramendy_Peter
SB31	PC	3/2/2017	Larramendy_Peter
SB33	PC	3/2/2017	Larramendy_Peter
SGNL	LT	3/7/2017	Larramendy_Peter

Santa Cruz Island

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC001	PC	5/11/2017	Laughrin_Lyndal
SC002	PC	5/11/2017	Laughrin_Lyndal
SC003	PC	5/11/2017	Laughrin_Lyndal
SC004	PC	5/11/2017	Laughrin_Lyndal
SC005	PC	3/20/2017	Laughrin_Lyndal
SC006	PC	3/20/2017	Laughrin_Lyndal
SC007	PC	3/20/2017	Laughrin_Lyndal
SC008	PC	3/20/2017	Laughrin_Lyndal
SC009	PC	3/20/2017	Larramendy_Peter
SC010	PC	3/20/2017	Larramendy_Peter
SC011	PC	3/20/2017	Larramendy_Peter
SC012	PC	3/20/2017	Larramendy_Peter
SC013	PC	3/20/2017	Larramendy_Peter
SC014	PC	3/20/2017	Larramendy_Peter
SC015	PC	3/26/2017	Laughrin_Lyndal
SC016	PC	3/26/2017	Laughrin_Lyndal
SC017	PC	3/26/2017	Laughrin_Lyndal
SC018	PC	3/26/2017	Laughrin_Lyndal
SC019	PC	3/26/2017	Laughrin_Lyndal
SC020	PC	3/26/2017	Laughrin_Lyndal
SC021	PC	3/18/2017	Laughrin_Lyndal
SC022	PC	3/18/2017	Laughrin_Lyndal
SC023	PC	4/9/2017	Laughrin_Lyndal
SC024	PC	4/9/2017	Laughrin_Lyndal
SC025	PC	4/10/2017	Laughrin_Lyndal
SC026	PC	3/19/2017	Laughrin_Lyndal
SC027	PC	3/19/2017	Laughrin_Lyndal
SC028	PC	3/19/2017	Laughrin_Lyndal
SC029	PC	3/19/2017	Laughrin_Lyndal
SC030	PC	3/19/2017	Laughrin_Lyndal

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC031	PC	3/19/2017	Laughrin_Lyndal
SC032	PC	3/19/2017	Laughrin_Lyndal
SC033	PC	3/19/2017	Laughrin_Lyndal
SC034	PC	3/19/2017	Larramendy_Peter
SC035	PC	3/19/2017	Larramendy_Peter
SC036	PC	3/19/2017	Larramendy_Peter
SC037	PC	3/19/2017	Larramendy_Peter
SC038	PC	3/19/2017	Todd_Nick
SC039	PC	4/19/2017	Laughrin_Lyndal
SC040	PC	4/19/2017	Laughrin_Lyndal
SC041	PC	4/19/2017	Laughrin_Lyndal
SC042	PC	3/28/2017	Laughrin_Lyndal
SC043	PC	3/28/2017	Laughrin_Lyndal
SC044	PC	3/28/2017	Laughrin_Lyndal
SC045	PC	4/19/2017	Laughrin_Lyndal
SC046	PC	3/28/2017	Laughrin_Lyndal
SC047	PC	3/28/2017	Laughrin_Lyndal
SC048	PC	3/28/2017	Laughrin_Lyndal
SC049	PC	4/20/2017	Laughrin_Lyndal
SC050	PC	4/20/2017	Laughrin_Lyndal
SC051	PC	4/20/2017	Laughrin_Lyndal
SC052	PC	4/20/2017	Laughrin_Lyndal
SC053	PC	4/20/2017	Laughrin_Lyndal
SC054	PC	4/20/2017	Laughrin_Lyndal
SC055	PC	4/20/2017	Laughrin_Lyndal
SC056	PC	4/20/2017	Laughrin_Lyndal
SC057	PC	3/16/2017	Laughrin_Lyndal
SC058	PC	3/16/2017	Laughrin_Lyndal
SC059	PC	3/16/2017	Laughrin_Lyndal
SC060	PC	3/16/2017	Laughrin_Lyndal
SC061	PC	3/16/2017	Laughrin_Lyndal

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC062	PC	3/16/2017	Laughrin_Lyndal
SC063	PC	3/16/2017	Laughrin_Lyndal
SC064	PC	3/16/2017	Laughrin_Lyndal
SC065	PC	3/16/2017	Laughrin_Lyndal
SC066	PC	3/16/2017	Laughrin_Lyndal
SC067	PC	3/30/2017	Laughrin_Lyndal
SC068	PC	3/30/2017	Laughrin_Lyndal
SC069	PC	4/10/2017	Laughrin_Lyndal
SC070	PC	4/10/2017	Laughrin_Lyndal
SC071	PC	3/29/2017	Laughrin_Lyndal
SC072	PC	3/29/2017	Laughrin_Lyndal
SC073	PC	3/29/2017	Laughrin_Lyndal
SC074	PC	4/10/2017	Laughrin_Lyndal
SC075	PC	3/17/2017	Laughrin_Lyndal
SC076	PC	3/17/2017	Laughrin_Lyndal
SC077	PC	3/17/2017	Laughrin_Lyndal
SC078	PC	3/17/2017	Laughrin_Lyndal
SC079	PC	3/26/2017	Laughrin_Lyndal
SC080	PC	3/26/2017	Laughrin_Lyndal
SC081	PC	3/27/2017	Laughrin_Lyndal
SC082	PC	3/27/2017	Laughrin_Lyndal
SC083	PC	3/27/2017	Laughrin_Lyndal
SC084	PC	3/27/2017	Laughrin_Lyndal
SC085	PC	3/15/2017	Laughrin_Lyndal
SC086	PC	3/15/2017	Laughrin_Lyndal
SC087	PC	3/15/2017	Laughrin_Lyndal
SC088	PC	3/15/2017	Laughrin_Lyndal
SC089	PC	3/29/2017	Laughrin_Lyndal
SC090	PC	3/29/2017	Laughrin_Lyndal
SC091	PC	3/29/2017	Laughrin_Lyndal
SC092	PC	3/29/2017	Laughrin_Lyndal

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC093	PC	3/15/2017	Laughrin_Lyndal
SC094	PC	3/15/2017	Laughrin_Lyndal
SC095	PC	4/19/2017	Laughrin_Lyndal
SC096	PC	4/12/2017	Laughrin_Lyndal
SC097	PC	4/12/2017	Laughrin_Lyndal
SC098	PC	3/20/2017	Laughrin_Lyndal
SC099	PC	4/21/2017	Laughrin_Lyndal
SC100	PC	4/21/2017	Laughrin_Lyndal
SC109	PC	3/11/2017	Larramendy_Peter
SC110	PC	3/11/2017	Larramendy_Peter
SC111	PC	3/11/2017	Larramendy_Peter
SC112	PC	3/11/2017	Larramendy_Peter
SC113	PC	3/13/2017	Larramendy_Peter
SC114	PC	3/13/2017	Larramendy_Peter
SC115	PC	3/13/2017	Larramendy_Peter
SC116	PC	3/12/2017	Larramendy_Peter
SC117	PC	3/12/2017	Larramendy_Peter
SC118	PC	3/12/2017	Larramendy_Peter
SC119	PC	3/12/2017	Larramendy_Peter
SC120	PC	3/12/2017	Larramendy_Peter
SCP1	PC	4/13/2017	Laughrin_Lyndal
SCP2	PC	5/19/2017	Laughrin_Lyndal
SCP3	PC	5/19/2017	Laughrin_Lyndal
SCP4	PC	5/19/2017	Laughrin_Lyndal
SCP5	PC	4/13/2017	Laughrin_Lyndal
SCP6	PC	4/11/2017	Laughrin_Lyndal
SCP7	PC	4/11/2017	Laughrin_Lyndal
SCP8	PC	4/13/2017	Laughrin_Lyndal

Santa Rosa Island

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR001	PC	5/24/2017	Todd_Nick
SR002	PC	5/23/2017	Todd_Nick
SR003	PC	5/23/2017	Todd_Nick
SR004	PC	5/23/2017	Larramendy_Peter
SR005	PC	5/23/2017	Larramendy_Peter
SR006	PC	5/23/2017	Larramendy_Peter
SR007	PC	5/21/2017	Todd_Nick
SR008	PC	5/21/2017	Todd_Nick
SR009	PC	5/21/2017	Todd_Nick
SR010	PC	4/13/2017	Todd_Nick
SR011	PC	5/23/2017	Stiles_Mike
SR012	PC	5/23/2017	Stiles_Mike
SR013	PC	5/23/2017	Todd_Nick
SR014	PC	5/23/2017	Todd_Nick
SR015	PC	5/23/2017	Todd_Nick
SR016	PC	5/26/2017	Todd_Nick
SR017	PC	5/26/2017	Todd_Nick
SR018	PC	5/26/2017	Todd_Nick
SR019	PC	5/26/2017	Larramendy_Peter
SR020	PC	5/26/2017	Larramendy_Peter
SR021	PC	5/26/2017	Larramendy_Peter
SR022	PC	5/25/2017	Larramendy_Peter
SR023	PC	5/25/2017	Larramendy_Peter
SR024	PC	5/25/2017	Larramendy_Peter
SR025	PC	5/25/2017	Larramendy_Peter
SR026	PC	5/25/2017	Larramendy_Peter
SR027	PC	5/25/2017	Larramendy_Peter
SR028	PC	5/27/2017	Larramendy_Peter
SR029	PC	5/27/2017	Larramendy_Peter
SR030	PC	5/27/2017	Larramendy_Peter

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR031	PC	5/27/2017	Larramendy_Peter
SR032	PC	5/27/2017	Larramendy_Peter
SR033	PC	5/27/2017	Larramendy_Peter
SR034	PC	5/21/2017	Todd_Nick
SR035	PC	5/21/2017	Todd_Nick
SR036	PC	5/21/2017	Todd_Nick
SR037	PC	5/27/2017	Larramendy_Peter
SR038	PC	5/27/2017	Larramendy_Peter
SR039	PC	5/27/2017	Larramendy_Peter
SR040	PC	5/23/2017	Stiles_Mike
SR041	PC	5/23/2017	Stiles_Mike
SR042	PC	5/23/2017	Stiles_Mike
SR043	PC	5/24/2017	Larramendy_Peter
SR044	PC	5/24/2017	Larramendy_Peter
SR045	PC	5/24/2017	Larramendy_Peter
SR046	PC	5/23/2017	Larramendy_Peter
SR047	PC	5/23/2017	Larramendy_Peter
SR048	PC	5/23/2017	Larramendy_Peter
SR049	PC	5/26/2017	Larramendy_Peter
SR050	PC	5/26/2017	Larramendy_Peter
SR051	PC	5/26/2017	Larramendy_Peter
SR052	PC	5/24/2017	Todd_Nick
SR053	PC	5/24/2017	Todd_Nick
SR054	PC	5/24/2017	Todd_Nick
SR055	PC	5/22/2017	Larramendy_Peter
SR056	PC	5/22/2017	Larramendy_Peter
SR057	PC	5/22/2017	Larramendy_Peter
SR058	PC	5/22/2017	Larramendy_Peter
SR059	PC	5/22/2017	Larramendy_Peter
SR060	PC	5/22/2017	Larramendy_Peter
SR061	PC	5/24/2017	Todd_Nick

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR064	PC	5/24/2017	Stiles_Mike
SR065	PC	5/24/2017	Stiles_Mike
SR066	PC	5/24/2017	Stiles_Mike
SR067	PC	5/24/2017	Stiles_Mike
SR068	PC	5/24/2017	Stiles_Mike
SR069	PC	5/24/2017	Stiles_Mike
SR070	PC	5/24/2017	Stiles_Mike
SR071	PC	5/24/2017	Stiles_Mike
SR072	PC	5/24/2017	Stiles_Mike
SR073	PC	4/12/2017	Todd_Nick
SR074	PC	5/20/2017	Stiles_Mike
SR075	PC	5/21/2017	Stiles_Mike
SR076	PC	5/26/2017	Larramendy_Peter
SR077	PC	5/26/2017	Larramendy_Peter
SR078	PC	5/26/2017	Larramendy_Peter
SR079	PC	5/23/2017	Todd_Nick
SR080	PC	4/13/2017	Todd_Nick
SR081	PC	4/13/2017	Todd_Nick
SR082	PC	4/13/2017	Todd_Nick
SR083	PC	5/25/2017	Todd_Nick
SR084	PC	5/25/2017	Todd_Nick
SR085	PC	5/25/2017	Todd_Nick
SR086	PC	5/26/2017	Stiles_Mike
SR087	PC	5/26/2017	Stiles_Mike
SR088	PC	4/12/2017	Todd_Nick
SR089	PC	5/21/2017	Stiles_Mike
SR090	PC	5/21/2017	Stiles_Mike
SR091	PC	4/12/2017	Todd_Nick
SR092	PC	4/12/2017	Todd_Nick
SR093	PC	4/12/2017	Todd_Nick
SR094	PC	4/12/2017	Todd_Nick

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR095	PC	5/22/2017	Todd_Nick
SR096	PC	5/22/2017	Todd_Nick
SR097	PC	5/22/2017	Todd_Nick
SR098	PC	5/22/2017	Todd_Nick
SR099	PC	5/22/2017	Todd_Nick
SR100	PC	5/21/2017	Stiles_Mike
SR101	PC	5/21/2017	Todd_Nick
SR102	PC	5/20/2017	Todd_Nick
SR103	PC	5/22/2017	Larramendy_Peter
SR104	PC	5/22/2017	Stiles_Mike
SR105	PC	5/22/2017	Stiles_Mike
SR106	PC	5/20/2017	Todd_Nick
SR107	PC	5/20/2017	Todd_Nick
SR108	PC	5/20/2017	Todd_Nick
SR109	PC	5/20/2017	Todd_Nick
SR110	PC	5/20/2017	Todd_Nick
SR111	PC	5/22/2017	Stiles_Mike
SR112	PC	5/22/2017	Stiles_Mike
SR113	PC	5/22/2017	Stiles_Mike
SR114	PC	5/22/2017	Stiles_Mike
SR115	PC	5/22/2017	Stiles_Mike
SR116	PC	5/24/2017	Larramendy_Peter
SR117	PC	5/24/2017	Larramendy_Peter
SR118	PC	5/24/2017	Larramendy_Peter
SR119	PC	5/24/2017	Larramendy_Peter
SR120	PC	5/24/2017	Larramendy_Peter
SR121	PC	5/25/2017	Stiles_Mike
SR122	PC	5/25/2017	Stiles_Mike
SR123	PC	5/25/2017	Stiles_Mike
SR124	PC	5/25/2017	Stiles_Mike
SR125	PC	5/25/2017	Stiles_Mike

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR126	PC	5/20/2017	Stiles_Mike
SR127	PC	5/20/2017	Stiles_Mike
SR128	PC	5/20/2017	Stiles_Mike
SR129	PC	5/20/2017	Stiles_Mike
SR130	PC	5/20/2017	Stiles_Mike
SR131	PC	5/24/2017	Stiles_Mike
SR132	PC	5/25/2017	Todd_Nick
SR133	PC	5/25/2017	Todd_Nick
SR134	PC	5/25/2017	Todd_Nick
SR135	PC	4/13/2017	Todd_Nick
SR136	PC	4/13/2017	Todd_Nick
SR137	PC	4/14/2017	Todd_Nick
SR138	PC	4/14/2017	Todd_Nick
SR139	PC	4/14/2017	Todd_Nick
SR140	PC	4/14/2017	Todd_Nick
SR141	PC	4/14/2017	Todd_Nick
SR142	PC	5/23/2017	Stiles_Mike
SR143	PC	5/24/2017	Todd_Nick
SR144	PC	4/12/2017	Todd_Nick
SR145	PC	4/12/2017	Todd_Nick

Appendix C. Cowbirds and Non-native Landbirds

This table lists anecdotal sightings of non-native landbirds and brood parasitic cowbirds at Channel Islands National Park in 2017 (P. Collins, Santa Barbara Museum of Natural History, unpubl. data). EACI = East Anacapa Island, SBI = Santa Barbara Island, SCI = Santa Cruz Island, SMI = San Miguel Island, SRI = Santa Rosa Island.

Species	Island	Specific Location	Date	Observer	Number
Brown-headed Cowbird	SBI	Unk?	17-May-16	Jim Howard	3
Brown-headed Cowbird	SCI	Scorpion Harbor	22-Oct-16	Joel Barrett	1
Brown-headed Cowbird	SCI	Prisoners Harbor	29-Apr-17	Gary Davidson	1
Brown-headed Cowbird	SCI	Christy Ranch	20-May-17	James Bailey	1
Brown-headed Cowbird	SCI	Christy Ranch	20-May-17	Jessie Altstatt	3
Brown-headed Cowbird	SCI	Prisoners Harbor	17-Jul-17	Greg Scyphers	1
Brown-headed Cowbird	SCI	Prisoners Harbor	26-Jul-17	Anthony Ciancimino, Logan Kahli	1
Brown-headed Cowbird	SCI	Prisoners Harbor	29-Jul-17	Mary & Ashley Keleher	1
Brown-headed Cowbird	EACI	East Island	1-Aug-17	KoKim	1
Brown-headed Cowbird	SCI	Scorpion Campground	23-Aug-17	Steve Saved	5
Brown-headed Cowbird	SCI	Scorpion Ranch	23-Aug-17	Victor & Ruben Stoll	5
Brown-headed Cowbird	SCI	Scorpion Campground	24-Aug-17	Steve Saved	1
Brown-headed Cowbird	SRI	–	1-Sep-17	Dan Cooper	7
Brown-headed Cowbird	SMI	–	2-Sep-17	Amelia DuVall	3
Brown-headed Cowbird	SRI	–	4-Sep-17	Anonymous eBirder	2
Eurasian Collared-Dove	SBI	Housing area	10-Aug-16	Peter Larramendy	1
Eurasian Collared-Dove	SCI	Scorpion Campground	3-Jan-17	Timo Mitzen, Lindsay Purifoy	1
Eurasian Collared-Dove	SCI	Main Ranch	6-Mar-17	Mike Webster	2
Eurasian Collared-Dove	SCI	Main Ranch	7-Mar-17	Mike Webster	4

Species	Island	Specific Location	Date	Observer	Number
Eurasian Collared-Dove	SCI	Scorpion Harbor	14-Mar-17	Dave Smith	1
Eurasian Collared-Dove	SCI	Main Ranch	17-Mar-17	Chris Funk	5
Eurasian Collared-Dove	SCI		20-Mar-17	Aaron Hulsey	1
Eurasian Collared-Dove	SCI	Smugglers Cove	26-Mar-17	Anonymous eBirder	1
Eurasian Collared-Dove	SCI	–	28-Mar-17	Aaron Hulsey	2
		–	1-Apr-17		
Eurasian Collared-Dove	SCI			Aaron Hulsey	1
Eurasian Collared-Dove	SCI	Montanon Ridge	3-Apr-17	Spencer Klinefetter	1
Eurasian Collared-Dove	SCI	Scorpion Harbor	5-Apr-17	Ryan Seppala	1
Eurasian Collared-Dove	SCI	–	6-Apr-17	Aaron Hulsey	2
Eurasian Collared-Dove	SCI	Prisoners Harbor	18-Apr-17	Graham Montgomery	1
Eurasian Collared-Dove	SBI	–	29-Apr-17	Jim Howard	2
Eurasian Collared-Dove	SBI	Landing Cove	30-Apr-17	Jim Howard	1
Eurasian Collared-Dove	SCI	Christy Ranch	20-May-17	James Bailey	4
Eurasian Collared-Dove	SCI	–	22-May-17	Frank Fogarte	2
Eurasian Collared-Dove	SCI	–	23-May-17	Julia DeMarins	2
Eurasian Collared-Dove	SCI	Scorpion Harbor	10-Jun-17	Brendon Yoder	1
Eurasian Collared-Dove	SCI	Scorpion Campground	22-Jun-17	Care Engstrom	1
Eurasian Collared-Dove	SCI	Scorpion Campground	30-Jul-17	Jeff Miller	3
Eurasian Collared-Dove	SCI	Prisoners Harbor	17-Aug-17	Tanya & Thomas Smythe	3
Eurasian Collared-Dove	SRI	Historic Ranch	1-Sep-17	Dan Cooper	4
Eurasian Collared-Dove	SRI	–	4-Sep-17	Anonymous eBirder	8
Eurasian Collared-Dove	SRI	Historic Ranch	9-Sep-17	Joel Barrett	4
Eurasian Collared-Dove	SRI	Historic Ranch	9-Sep-17	Joel Barrett	2

Species	Island	Specific Location	Date	Observer	Number
European Starling	SCI	Scorpion Campground	8-Oct-16	David LeGros	1
European Starling	SCI	Scorpion Harbor	20-Oct-16	Bradley Hacker	1
European Starling	SCI	Scorpion Campground	21-Oct-16	Bradley Hacker	1
European Starling	SCI	Scorpion Harbor	4-Nov-16	Jim Howard	1
European Starling	SCI	Christy Ranch	2-Jan-17	Kachina Rowland	40
European Starling	SCI	–	2-Jan-17	Aaron Kreisberg	30
European Starling	SCI	Field Station	4-Mar-17	Jessie Altstatt	2
European Starling	SCI	Canada del Puerto Rd	4-Mar-17	Jessie Altstatt	26
European Starling	SCI	Christy Ranch	6-Mar-17	Mike Webster	25
European Starling	SCI	Christy Ranch	8-Mar-17	Mike Webster	6
European Starling	SCI	Christy Ranch	9-Mar-17	Mike Webster	2
European Starling	SCI	Christy Ranch	11-Mar-17	Devon Bradley	1
European Starling	SCI	TNC Cabins	28-Mar-17	Aaron Hulse	20
European Starling	SCI	TNC Cabins	1-Apr-17	Aaron Hulse	2
European Starling	SCI	TNC Cabins	6-Apr-17	Aaron Hulse	2
European Starling	SCI	TNC Cabins	10-Apr-17	Aaron Hulse	3
European Starling	SCI	Prisoners Harbor	18-May-17	John, William & Mark Vanderpool	not recorded
European Starling	SCI	Christy Ranch	20-May-17	Jessie Altstatt	13
European Starling	SCI	–	22-May-17	Frank Fogarty	2
European Starling	SCI	–	23-May-17	Julia DeMarines	2
European Starling	SRI	Historic Ranch	9-Sep-17	Joel Barrett	5
House Sparrow	SCI	Prisoners Harbor	2-Jun-17	Joette Borzik	1
House Sparrow	SCI	Prisoners Harbor	17-Aug-17	Tanya & Thomas Smythe	1
House Sparrow	SCI	Prisoners Harbor	21-Aug-17	Jason Rieger	1
House Sparrow	SCI	Prisoners Harbor	9-Sep-17	Ian Woodfield, Ann Scarfe	1

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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National Park Service
U.S. Department of the Interior



Natural Resource Stewardship and Science

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