



Landbird Monitoring 2018 Annual Report

Channel Islands National Park (revised August 2020)

Natural Resource Report NPS/MEDN/NRR—2020/2165



ON THE COVER

San Miguel Island looking toward Harris Point (P. LARRAMENDY)

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Contents

	Page
Figures.....	v
Tables.....	vi
Appendices.....	vi
Executive Summary.....	vii
Acknowledgments.....	viii
Introduction.....	1
Methods.....	2
Results.....	8
Bird Species Occurrence in 2018	8
Anacapa Island Point Counts.....	13
Santa Barbara Island Point Counts.....	13
Santa Cruz Island Point Counts.....	14
San Miguel Island Point Counts.....	16
Santa Rosa Island Point Counts.....	17
Line Transects—All Islands	18
Nonnative and Invasive Bird Species.....	19
Bird Species Occurrence in 2018 Compared to All Years of Monitoring.....	20
Patterns in Bird Species Occurrence over Time.....	26
Anacapa Island	26
Santa Barbara Island.....	30
Santa Cruz Island.....	32
San Miguel Island.....	34
Santa Rosa Island	36
All Islands.....	38
Discussion	40
Recommendations.....	42

Contents (continued)

	Page
Literature Cited	44

Figures

	Page
Figure 1. Landbird monitoring point count stations (red dots) and line transects (red lines) on east Anacapa Island, Channel Islands National Park.	4
Figure 2. Landbird monitoring point count stations (red dots) and line transects (red lines) on Santa Barbara Island, Channel Islands National Park.	5
Figure 3. Landbird monitoring point count stations (red dots) on Santa Cruz Island, Channel Islands National Park.	6
Figure 4. Landbird monitoring point count stations (red dots) and line transects (red lines) on San Miguel Island, Channel Islands National Park.	6
Figure 5. Landbird monitoring point count stations (red dots) on Santa Rosa Island, Channel Islands National Park.	7
Figure 6. Boxplots of the mean number of birds per station for each species detected at point count stations on Anacapa Island in 2018.	21
Figure 7. Boxplots of the mean number of birds per station for each species detected at point count stations on Santa Barbara Island in 2018.	22
Figure 8. Boxplots of the mean number of birds per station for each species detected at point count stations on Santa Cruz Island in 2018.	23
Figure 9. Boxplots of the mean number of birds per station for each species detected at point count stations on San Miguel Island in 2018.	24
Figure 10. Boxplots of the mean number of birds per station for each species detected at point count stations on Santa Rosa Island in 2018.	25
Figure 11. Breeding bird species occurrence from 1993 to 2018 for Anacapa Island.	27
Figure 12. Breeding bird species occurrence from 1993 to 2018 for Santa Barbara Island.	31
Figure 13. Breeding bird species occurrence from 2013 to 2018 for Santa Cruz Island.	33
Figure 14. Breeding bird species occurrence from 1993 to 2018 for San Miguel Island.	35
Figure 15. Breeding bird species occurrence from 1993 to 2018 for Santa Rosa Island.	37

Tables

	Page
Table 1. Start and end dates, number of transects, and number of point count sites for landbird monitoring on each island in 2018.....	2
Table 2. Number of individuals of each species counted during bird surveys on all islands in 2018.	9
Table 3. Results from point count sampling of landbirds in 2018 at 8 stations on Anacapa Island.....	13
Table 4. Results from point count sampling of landbirds in 2018 at 33 stations on Santa Barbara Island	13
Table 5. Results from point count sampling of landbirds in 2018 at 118 stations on Santa Cruz Island.....	14
Table 6. Results from point count sampling of landbirds in 2018 at 40 stations on San Miguel Island	16
Table 7. Results from point count sampling of landbirds in 2018 at 145 stations on Santa Rosa Island.....	17
Table 8. Number of individuals of each species detected on line transects in 2018.	19
Table 9. New transient or visiting bird species counted in 2018 (“N”), and other transients and visiting species counted in all other years since monitoring began (“X”), on each of the 5 northern Channel Islands.	28
Table 10. Patterns of bird species detections on San Miguel (SMI), Santa Rosa (SRI), Anacapa (ACI) and Santa Barbara (SBI) islands at point counts and line transects.....	38

Appendices

	Page
Appendix A. Resident Breeder Species List.....	46
Appendix B. 2018 Landbird Monitoring Site Observers.....	48
Appendix C. Cowbirds and Nonnative Landbirds	61

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 2018, 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 nonnative 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 2018 between 7 March and 12 June at line transects and point counts.

Seventy-two landbird species were counted across all islands in 2018. Parkwide, the 10 most commonly detected landbirds in 2018 were, in descending order, Song Sparrow (scientific names given in Table 2), Spotted Towhee, Western Meadowlark, Orange-crowned Warbler, Horned Lark, Bewick's Wren, House Finch, Common Raven, White-crowned Sparrow, and Island Scrub-Jay. Nonnative and invasive birds were counted on only 2 of the 5 islands in 2018: Eurasian-collared Dove and European Starling were counted on both Santa Rosa and Santa Cruz islands. 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 2018 and all other years since monitoring began, and 4) patterns of species detections, identifying those not counted in the last 10 or more years.

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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 (hereafter “landbird species”), not including exclusively marine 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 (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 from 2016 to 2018.

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 nonnative 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 2018. 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 2018, landbird monitoring at CHIS was conducted in 2 ways: on established line transects (van Riper et al. 1998) and established point count sites called “stations” (Coonan, Dye, and Fancy 2011). These methods were protocol review recommendations proposed in 2000. Monitoring was conducted once per season at each site between 7 March and 12 June 2018 (Table 1) by 8 observers (Appendix B).

Table 1. Start and end dates, number of transects, and number of point count sites for landbird monitoring on each island in 2018.

Island	Start Date	End Date	# Transects	# Point Counts
Anacapa	03/14/2018	03/16/2018	1	8
Santa Barbara	03/07/2018	03/14/2018	4	21
Santa Cruz	03/23/2018	03/27/2018	0	25
Santa Cruz	04/03/2018	04/03/2018	0	5
Santa Cruz	04/08/2018	04/10/2018	0	8
Santa Cruz	04/09/2018	04/25/2018	0	30
Santa Cruz	04/23/2018	04/29/2018	0	20
Santa Cruz	05/02/2018	05/02/2018	0	3
Santa Cruz*	05/09/2018	05/10/2018	0	8
Santa Cruz	05/15/2018	05/18/2018	0	27
Santa Cruz	05/16/2018	05/17/2018	0	2
San Miguel	04/10/2018	04/17/2018	0	19
San Miguel	04/17/2018	04/24/2018	3	17
San Miguel	05/01/2018	05/08/2018	1	2
San Miguel	06/12/2018	06/12/2018	1	2
Santa Rosa	04/24/2018	05/01/2018	0	9
Santa Rosa	04/03/2018	04/10/2018	0	68
Santa Rosa	05/22/2018	05/29/2018	0	27
Santa Rosa	05/08/2018	05/15/2018	0	41

* Duplicate surveys of Prisoner's Harbor points

For point counts, sampling occurred in the morning, beginning as soon as it was light enough to see a distance of at least 150 meters and ending no later than 4 hours after official sunrise. Counts were conducted for 10 minutes at each site and were not conducted during high winds (wind strength on the Beaufort scale is sustained at 4 or greater) or heavy rain. Observations were made by sight and

sound, of either perched or flying birds, and observers estimated the radial distance in meters from the point to each bird detected.

For transect counts, each transect was 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 varied among and within islands. For a complete description of methods and Standard Operating Procedures see the *Landbird Monitoring Protocol for Channel Islands National Park – Version 2.0* (Coonan, Dye, and Fancy 2011).

The methodology used in 2018 followed Coonan, Dye, and Fancy (2011), except for the fog modification that was adopted in 2015 and repeated again during the 2016–2018 seasons: the minimum visibility distance necessary to conduct monitoring was reduced from 400 m to 150 m.

Using distance-based sampling methods (Buckland et al. 2015), we surveyed birds on 10 of 11 permanent line transects (91%) (4 of 4 on Santa Barbara Island, 1 of 1 on East Anacapa Island, and 5 of 6 on San Miguel Island), and at 334 of 347 permanent point count sites (96%) (21 of 33 on Santa Barbara Island, 8 of 8 on Anacapa Island, 120 of 120 on Santa Cruz Island, 40 of 40 on San Miguel Island, and 145 of 146 on Santa Rosa Island). Twelve points on Santa Barbara Island, and a transect on San Miguel Island were not counted again in 2018 (as in 2016 and 2017) to avoid disturbance to breeding California Brown Pelicans (*Pelecanus occidentalis*) and Western Gulls (*Larus occidentalis*). One point count was not conducted on Santa Rosa Island in 2018 because of poor weather.

On Santa Cruz Island, we conducted a sixth year of monitoring at 100 non-random point count sites established by R. C. Klinger of The Nature Conservancy in 1991 along trails and roads, and at 12 point count stations on the eastern side of Santa Cruz Island that the park established in 2014 using the same method as Klinger (1998). Access points to the stations were spaced ½ mile (0.8 km) apart along the major roads and trails on the island. A random compass bearing and distance (within 150 meters) to the station were selected from these access points. An additional 8 points that were established in the Prisoner’s Harbor wetland restoration area in 2015 also were counted in 2018.

Data were entered into the CHIS Landbird Database by P. Larramendy, and were quality-checked and verified for errors by MEDN Data Manager L. Lee, P. Larramendy, and L. Hall. 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.

Data summaries were generated using an automated report run in Program R (R Core Team 2013).

Figures 1–5 show the location of landbird monitoring point count stations and line transects.

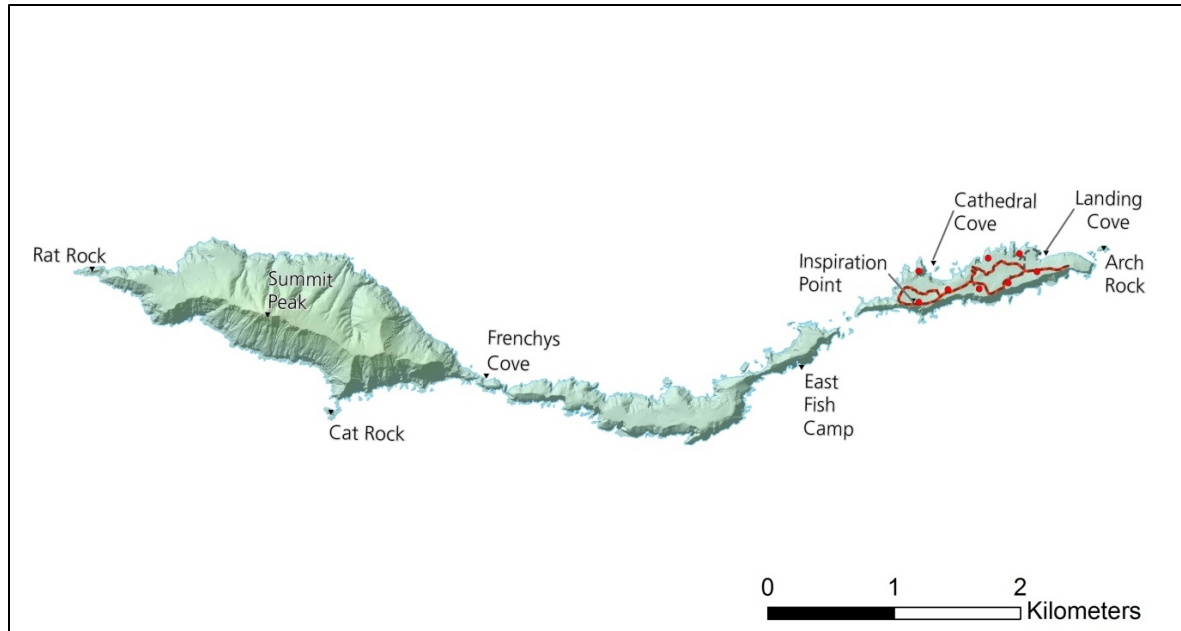


Figure 1. Landbird monitoring point count stations (red dots) and line transects (red lines) on east Anacapa Island, Channel Islands National Park.

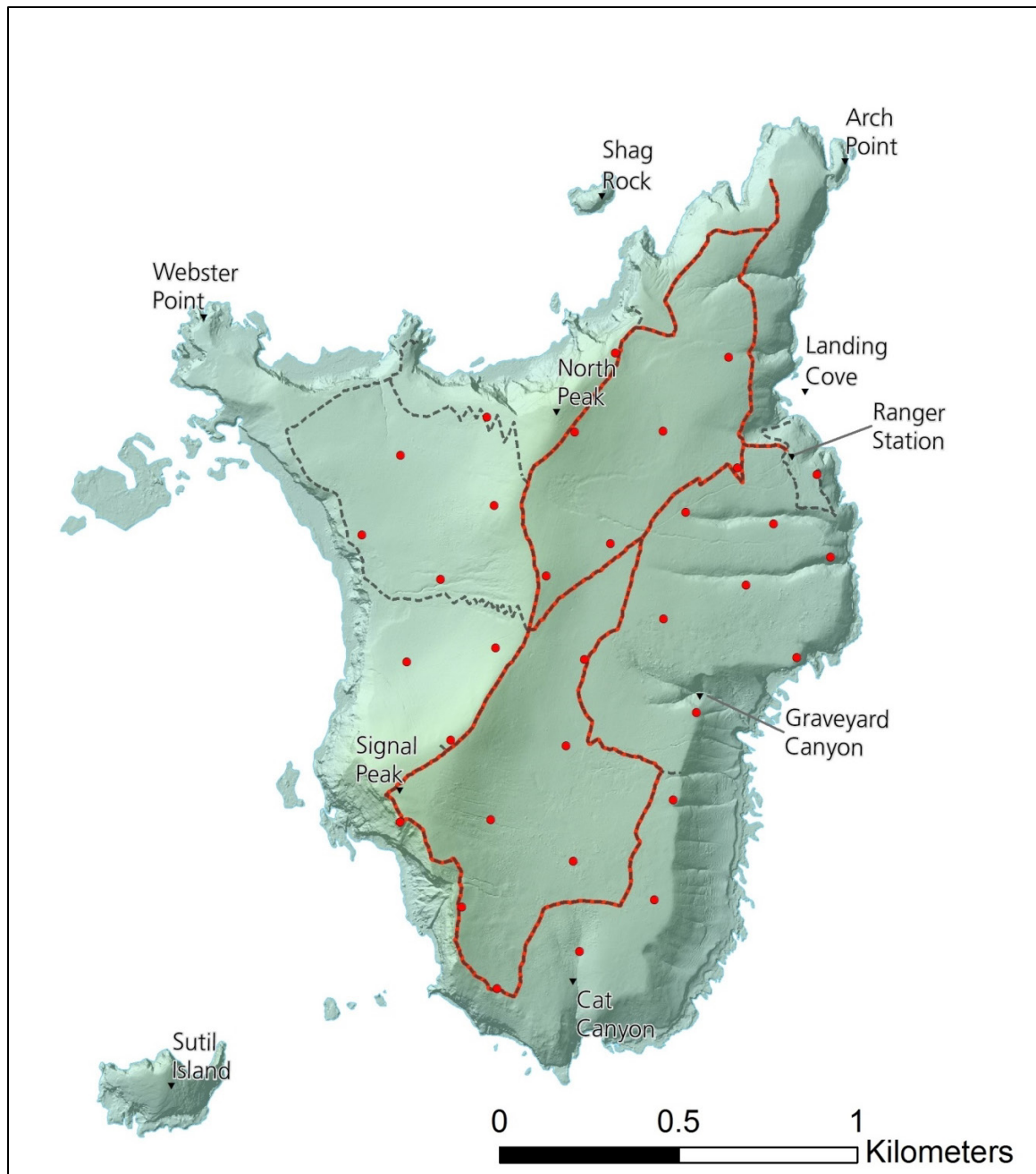


Figure 2. Landbird monitoring point count stations (red dots) and line transects (red lines) on Santa Barbara Island, Channel Islands National Park.

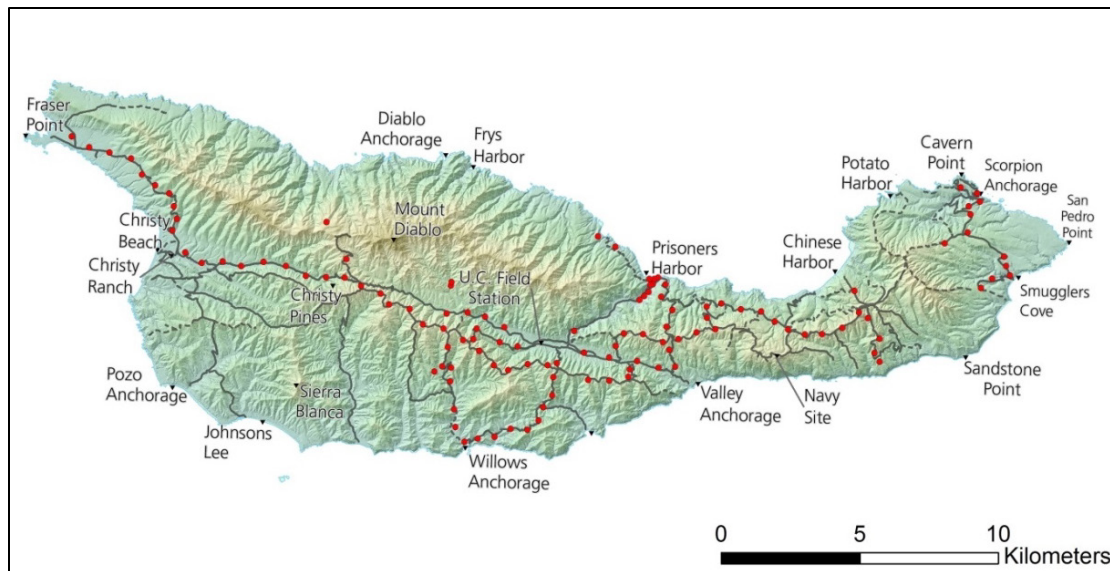


Figure 3. Landbird monitoring point count stations (red dots) on Santa Cruz Island, Channel Islands National Park.

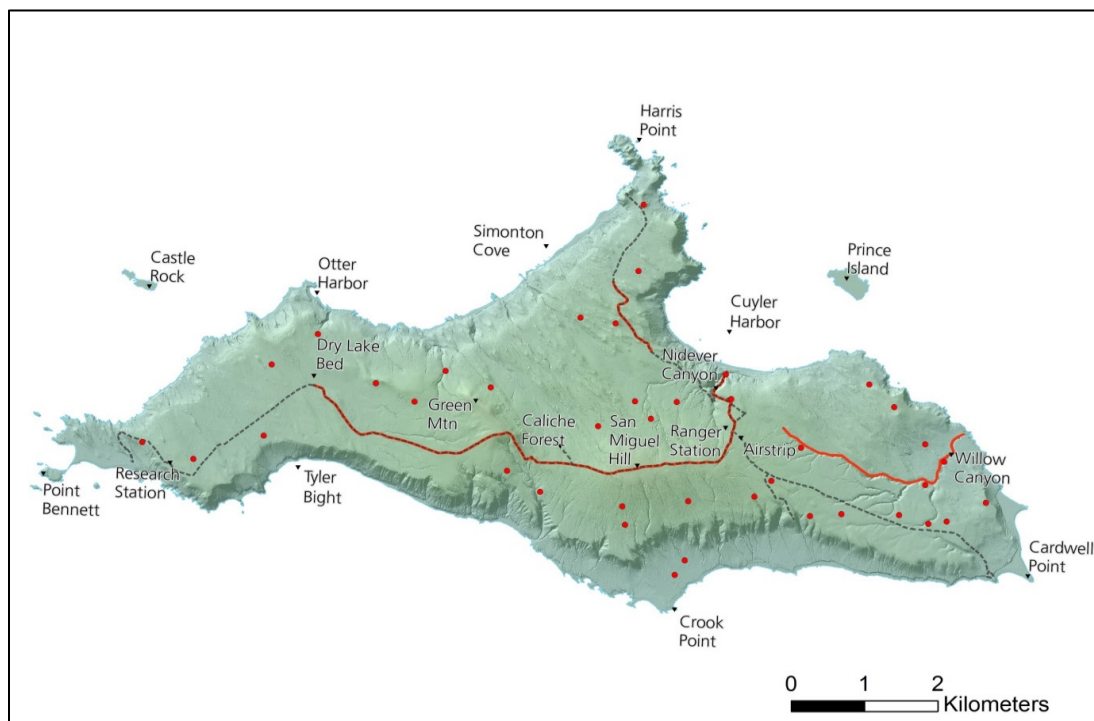


Figure 4. Landbird monitoring point count stations (red dots) and line transects (red lines) on San Miguel Island, Channel Islands National Park.

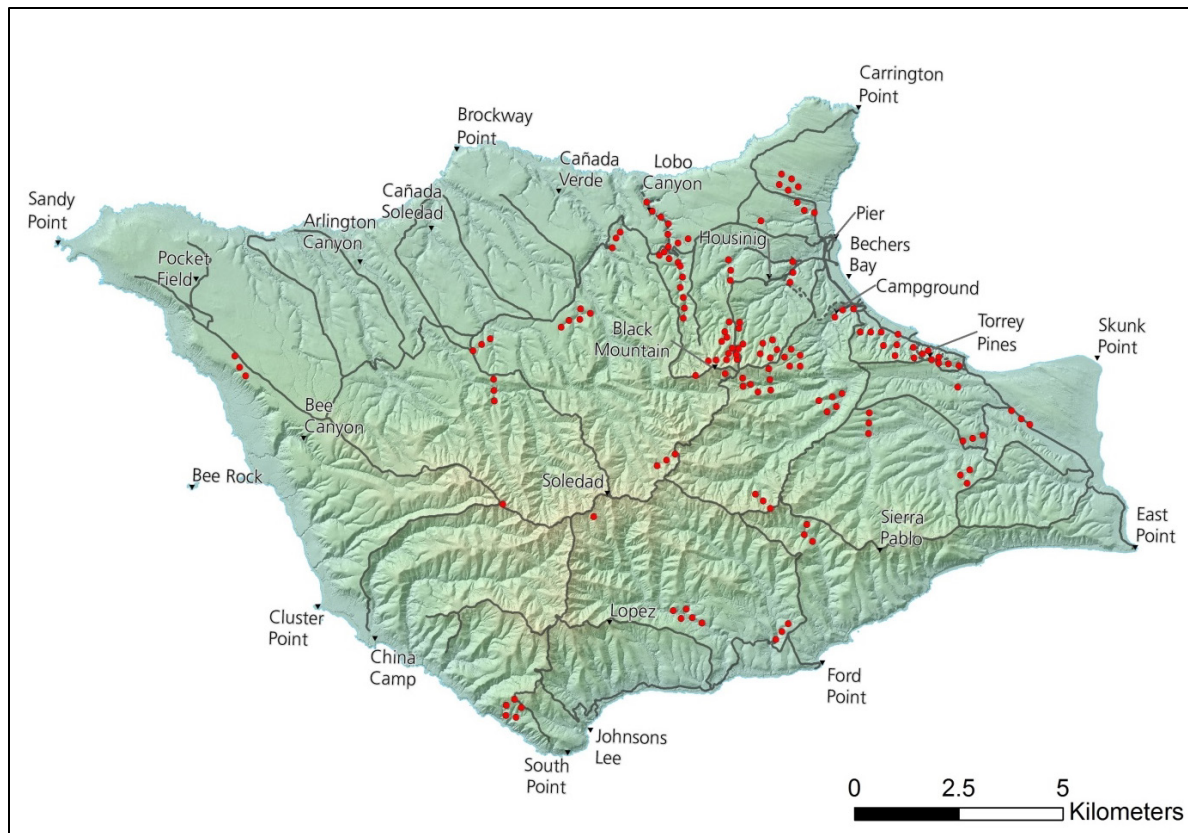


Figure 5. Landbird monitoring point count stations (red dots) on Santa Rosa Island, Channel Islands National Park.

Results

Bird Species Occurrence in 2018

Table 2 presents the number of individuals of each species detected on all islands in 2018. Indices of abundance on point counts (number of birds counted and mean number of birds per station) are presented by island in Tables 3–7. An index of abundance on transects is presented in Table 8.

Seventy-two bird species were counted from points and transects across all of the islands in 2018 (Table 2). Sixty-four of these were landbird species; 49 of these were breeding species on the island (Table 2, Appendix A). Parkwide, the 10 most commonly detected breeding landbirds in 2018 were, in descending order: Song Sparrow (scientific names given in Table 2), Spotted Towhee, Western Meadowlark, Orange-crowned Warbler, Horned Lark, Bewick's Wren, House Finch, Common Raven, White-crowned Sparrow, and Island Scrub-Jay (Table 2).

Table 2. Number of individuals of each species counted during bird surveys on all islands in 2018. 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 Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	60	—	—	35	—	25
Arctic Loon	<i>Gavia artica</i>	1	—	—	1	—	—
Allen's Hummingbird	<i>Selasphorus sasin</i>	81	—	—	11	25	45
American Goldfinch	<i>Carduelis tristis</i>	16	—	—	16	—	—
American Kestrel	<i>Falco sparverius</i>	2	—	1	1	—	—
American Robin	<i>Turdus migratorius</i>	4	—	—	1	—	3
Anna's Hummingbird	<i>Calypte anna</i>	38	—	—	8	3	27
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	12	—	—	12	—	—
Bald Eagle	<i>Haliaeetus leucocephalus</i>	3	—	—	3	—	—
Barn Swallow	<i>Hirundo rustica</i>	43	1	—	39	1	2
Bewick's Wren	<i>Thryomanes bewickii</i>	378	3	—	93	6	276
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	7	—	—	7	—	—
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	7	—	—	7	—	—
Black Phoebe	<i>Sayornis nigricans</i>	9	1	—	4	1	3
Brown Pelican	<i>Pelecanus occidentalis</i>	5	—	—	5	—	—
Bushtit	<i>Psaltiriparus minimus</i>	17	—	—	7	—	10
Cassin's Auklet	<i>Ptychoramphus aleuticus</i>	1	—	—	—	—	1
California Gull	<i>Larus californicus</i>	138	—	—	138	—	—
California Quail	<i>Callipepla californica</i>	60	—	—	28	—	32

Table 2 (continued). Number of individuals of each species counted during bird surveys on all islands in 2018. 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 Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Chipping Sparrow	<i>Spizella passerina</i>	94	–	–	20	–	74
Cooper's Hawk	<i>Accipiter cooperii</i>	2	–	–	2	–	–
Common Raven	<i>Corvus corax</i>	240	4	–	55	109	72
Common Yellowthroat	<i>Geothlypis trichas</i>	2	–	–	2	–	–
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	3	–	–	3	–	–
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	3	–	–	1	–	2
European Starling	<i>Sturnus vulgaris</i>	28	–	1	20	–	7
Fox Sparrow	<i>Passerella iliaca</i>	1	–	–	1	–	–
Great Blue Heron	<i>Ardea herodias</i>	1	–	–	1	–	–
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	9	–	3	2	4	–
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	17	–	–	–	11	6
Heermann's Gull	<i>Larus heermanni</i>	5	–	–	5	–	–
Hermit Thrush	<i>Catharus guttatus</i>	9	–	–	7	–	2
House Finch	<i>Carpodacus mexicanus</i>	359	2	8	134	58	157
Horned Lark	<i>Eremophila alpestris</i>	425	–	235	4	132	54
House Wren	<i>Troglodytes aedon</i>	2	–	1	1	–	–
Hutton's Vireo	<i>Vireo huttoni</i>	42	–	–	27	–	15
Island Scrub-Jay	<i>Aphelocoma insularis</i>	139	–	–	139	–	–
Lawrence's Goldfinch	<i>Carduelis lawrencei</i>	14	–	–	–	–	14

Table 2 (continued). Number of individuals of each species counted during bird surveys on all islands in 2018. 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 Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Lazuli Bunting	<i>Passerina amoena</i>	1	–	–	–	1	–
Lesser Goldfinch	<i>Carduelis psaltria</i>	101	–	–	28	–	73
Loggerhead Shrike	<i>Lanius ludovicianus</i>	31	–	–	11	–	20
Mourning Dove	<i>Zenaida macroura</i>	19	–	–	15	–	4
Northern Flicker	<i>Colaptes auratus</i>	84	–	–	84	–	–
Northern Harrier	<i>Circus cyaneus</i>	3	–	2	–	–	1
Northern Mockingbird	<i>Mimus polyglottos</i>	24	–	1	2	1	20
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	1	–	–	1	–	–
Orange-crowned Warbler	<i>Vermivora celata</i>	492	–	1	83	174	234
Osprey	<i>Pandion haliaetus</i>	1	1	–	–	–	–
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	1	–	–	1	–	–
Peregrine Falcon	<i>Falco peregrinus</i>	9	4	5	–	–	–
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	89	–	–	24	–	65
Purple Finch	<i>Carpodacus purpureus</i>	1	–	–	1	–	–
Ruby-crowned Kinglet	<i>Regulus calendula</i>	9	–	1	2	–	6
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	24	–	–	24	–	–
Rock Wren	<i>Salpinctes obsoletus</i>	21	–	4	1	11	5
Red-tailed Hawk	<i>Buteo jamaicensis</i>	9	–	–	6	–	3
Say's Phoebe	<i>Sayornis saya</i>	11	1	6	4	–	–

Table 2 (continued). Number of individuals of each species counted during bird surveys on all islands in 2018. 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 Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Savannah Sparrow	<i>Passerculus sandwichensis</i>	21	3	10	–	8	–
Song Sparrow	<i>Melospiza melodia</i>	832	12	–	99	381	340
Spotted Dove	<i>Streptopelia chinensis</i>	2	–	–	1	–	1
Spotted Towhee	<i>Pipilo maculatus</i>	658	–	–	246	–	412
Vesper Sparrow	<i>Pooecetes gramineus</i>	1	–	1	–	–	–
Violet-green Swallow	<i>Tachycineta thalassina</i>	1	–	–	1	–	–
Virginia Rail	<i>Rallus limicola</i>	1	–	–	1	–	–
Warbling Vireo	<i>Vireo gilvus</i>	1	–	–	–	–	1
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	240	59	134	17	14	16
Western Bluebird	<i>Sialia mexicana</i>	1	–	–	1	–	–
Western Gull	<i>Larus occidentalis</i>	96	–	–	96	–	–
Western Meadowlark	<i>Sturnella neglecta</i>	530	2	48	71	144	265
Wilson's Warbler	<i>Wilsonia pusilla</i>	8	–	1	1	6	–
White-throated Swift	<i>Aeronautes saxatalis</i>	3	–	–	1	–	2
Yellow-rumped Warbler	<i>Dendroica coronata</i>	9	–	–	2	4	3
TOTAL # SPECIES:	–	72	12	18	62	20	38

Anacapa Island Point Counts

No species were detected at >50% of point count stations on Anacapa Island in 2018 (Table 3).

Table 3. Results from point count sampling of landbirds in 2018 at 8 stations on Anacapa Island: number of individuals detected, mean number of birds per station and standard error, number of stations where a species was detected, and frequency (percent of total stations where a species was detected).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Stns Where Detected	% Stns Where Detected
BARS	Barn Swallow	1	0.12	0.18	1	12.5
BEWR	Bewick's Wren	1	0.12	0.18	1	12.5
BLPH	Black Phoebe	1	0.12	0.18	1	12.5
CORA	Common Raven	2	0.25	0.35	1	12.5
HOFI	House Finch	2	0.25	0.35	1	12.5
PEFA	Peregrine Falcon	1	0.12	0.18	1	12.5
SAPH	Say's Phoebe	1	0.12	0.18	1	12.5
SOSP	Song Sparrow	4	0.50	0.41	2	25.0
WCSP	White-crowned Sparrow	8	1.00	0.76	3	37.5

Santa Barbara Island Point Counts

Horned Lark was the only species that occurred at >50% of count stations on Santa Barbara Island (Table 4).

Table 4. Results from point count sampling of landbirds in 2018 at 33 stations on Santa Barbara Island: number of individuals detected, mean number of birds per station and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Stns Where Detected	% Stns Where Detected
AMKE	American Kestrel	1	0.03	0.04	1	3.0
GCSP	Golden-crowned Sparrow	3	0.09	0.06	3	9.1
HOLA	Horned Lark	161	4.88	1.15	21	63.6
HOFI	House Finch	2	0.06	0.07	1	3.0
HOWR	House Wren	1	0.03	0.04	1	3.0
NOHA	Northern Harrier	2	0.06	0.05	2	6.1
NOMO	Northern Mockingbird	1	0.03	0.04	1	3.0
OCWA	Orange-crowned Warbler	1	0.03	0.04	1	3.0
PEFA	Peregrine Falcon	5	0.15	0.07	5	15.2

Table 4 (continued). Results from point count sampling of landbirds in 2018 at 33 stations on Santa Barbara Island: number of individuals detected, mean number of birds per station and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Stns Where Detected	% Stns Where Detected
ROWR	Rock Wren	1	0.03	0.04	1	3.0
SAVS	Savannah Sparrow	5	0.15	0.07	5	15.2
SAPH	Say's Phoebe	3	0.09	0.06	3	9.1
WEME	Western Meadowlark	15	0.45	0.20	7	21.2
WCSP	White-crowned Sparrow	60	1.82	0.94	11	33.3

Santa Cruz Island Point Counts

Spotted Towhee, Island Scrub Jay, Northern Flicker, and Bewick's Wren occurred at >50% of count stations on Santa Cruz Island (Table 5).

Table 5. Results from point count sampling of landbirds in 2018 at 118 stations on Santa Cruz Island: number of individuals detected, mean number of birds per station and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Stns Where Detected	% Stns Where Detected
ACWO	Acorn Woodpecker	37	0.29	0.08	16	12.5
ALHU	Allen's Hummingbird	12	0.09	0.03	10	7.8
AMGO	American Goldfinch	16	0.12	0.06	7	5.5
AMKE	American Kestrel	1	0.01	0.01	1	0.8
AMRO	American Robin	1	0.01	0.01	1	0.8
ANHU	Anna's Hummingbird	9	0.07	0.03	8	6.2
ATFL	Ash-throated Flycatcher	12	0.09	0.03	11	8.6
BAEA	Bald Eagle	3	0.02	0.01	4	2.3
BARS	Barn Swallow	39	0.30	0.11	12	9.4
BEWR	Bewick's Wren	94	0.73	0.07	68	53.1
BHGR	Black-headed Grosbeak	7	0.05	0.02	6	4.7
BLPH	Black Phoebe	5	0.04	0.02	4	3.1
BGGN	Blue-gray Gnatcatcher	7	0.05	0.02	6	4.7
BUSH	Bushtit	7	0.05	0.03	4	3.1

Table 5 (continued). Results from point count sampling of landbirds in 2018 at 118 stations on Santa Cruz Island: number of individuals detected, mean number of birds per station and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Stns Where Detected	% Stns Where Detected
CAQU	California Quail	28	0.22	0.05	24	18.0
CHSP	Chipping Sparrow	20	0.16	0.05	11	8.6
CORA	Common Raven	55	0.43	0.08	35	23.4
COYE	Common Yellowthroat	2	0.02	0.01	2	1.6
COHA	Cooper's Hawk	2	0.02	0.01	2	1.6
ECDO	Eurasian Collared Dove	1	0.01	0.01	1	0.8
EUST	European Starling	20	0.16	0.16	1	0.8
FOSP	Fox Sparrow	1	0.01	0.01	1	0.8
GCSP	Golden-crowned Sparrow	2	0.02	0.01	2	1.6
HETH	Hermit Thrush	7	0.05	0.02	7	5.5
HOLA	Horned Lark	4	0.03	0.02	3	2.3
HOFI	House Finch	137	1.07	0.26	44	34.4
HOWR	House Wren	1	0.01	0.01	1	0.8
HUVI	Hutton's Vireo	27	0.21	0.04	25	19.5
ISJA	Island Scrub-Jay	144	1.12	0.11	75	58.6
LEGO	Lesser Goldfinch	31	0.24	0.08	12	9.4
LOSH	Loggerhead Shrike	11	0.09	0.04	7	5.5
MODO	Mourning Dove	15	0.12	0.03	13	10.2
NOFL	Northern Flicker	87	0.68	0.07	68	53.1
NOMO	Northern Mockingbird	2	0.02	0.01	2	1.6
OCWA	Orange-crowned Warbler	86	0.67	0.09	49	38.3
PSFL	Pacific-slope Flycatcher	23	0.18	0.04	21	16.4
RTHA	Red-tailed Hawk	6	0.05	0.02	7	3.9
ROWR	Rock Wren	1	0.01	0.01	1	0.8
RCKI	Ruby-crowned Kinglet	2	0.02	0.01	2	1.6
RCSP	Rufous-crowned Sparrow	24	0.19	0.06	15	11.7
SAPH	Say's Phoebe	4	0.03	0.02	4	3.1
SOSP	Song Sparrow	104	0.81	0.10	58	45.3

Table 5 (continued). Results from point count sampling of landbirds in 2018 at 118 stations on Santa Cruz Island: number of individuals detected, mean number of birds per station and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Stns Where Detected	% Stns Where Detected
SPTO	Spotted Towhee	253	1.98	0.13	109	85.2
VGSW	Violet-green Swallow	1	0.01	0.01	1	0.8
VIRA	Virginia Rail	1	0.01	0.01	1	0.8
WEME	Western Meadowlark	71	0.55	0.15	22	17.2
WCSP	White-crowned Sparrow	17	0.13	0.05	9	7.0
WTSW	White-throated Swift	1	0.01	0.01	1	0.8
WIWA	Wilson's Warbler	1	0.01	0.01	1	0.8
YRWA	Yellow-rumped Warbler	2	0.02	0.01	2	1.6

San Miguel Island Point Counts

Song Sparrow, Orange-crowned Warbler, Common Raven, Western Meadowlark, and Horned Lark occurred at >50% of stations on San Miguel Island (Table 6).

Table 6. Results from point count sampling of landbirds in 2018 at 40 stations on San Miguel Island: number of individuals detected, mean number of birds per station and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Stns Where Detected	% Stns Where Detected
ALHU	Allen's Hummingbird	11	0.28	0.11	7	17.5
ANHU	Anna's Hummingbird	2	0.05	0.05	1	2.5
BEWR	Bewick's Wren	1	0.02	0.02	1	2.5
BLPH	Black Phoebe	1	0.02	0.02	1	2.5
CORA	Common Raven	75	1.88	0.28	30	75.0
GRSP	Grasshopper Sparrow	1	0.02	0.02	1	2.5
HOLA	Horned Lark	45	1.12	0.21	20	50.0
HOFI	House Finch	32	0.80	0.23	13	32.5
NOMO	Northern Mockingbird	1	0.02	0.02	1	2.5
OCWA	Orange-crowned Warbler	85	2.12	0.28	31	77.5
ROWR	Rock Wren	6	0.15	0.06	6	15.0

Table 6 (continued). Results from point count sampling of landbirds in 2018 at 40 stations on San Miguel Island: number of individuals detected, mean number of birds per station and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Stns Where Detected	% Stns Where Detected
SAVS	Savannah Sparrow	4	0.10	0.08	2	5.0
SOSP	Song Sparrow	165	4.12	0.37	39	97.5
WEME	Western Meadowlark	93	2.33	0.32	27	67.5
WCSP	White-crowned Sparrow	10	0.25	0.10	7	17.5
YRWA	Yellow-rumped Warbler	4	0.10	0.06	3	7.5

Santa Rosa Island Point Counts

Spotted Towhee, Bewick's Wren, Orange-crowned Warbler, Song Sparrow, Western Meadowlark, and House Finch occurred at >50% of count stations on Santa Rosa Island (Table 7).

Table 7. Results from point count sampling of landbirds in 2018 at 145 stations on Santa Rosa Island: number of individuals detected, mean number of birds per station and standard error, number of stations where a bird species was detected, and frequency (percent of stations where a bird species was detected).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Stns Where Detected	% Stns Where Detected
ACWO	Acorn Woodpecker	25	0.17	0.05	16	11.0
ALHU	Allen's Hummingbird	45	0.31	0.05	34	23.4
AMRO	American Robin	3	0.02	0.01	3	2.1
ANHU	Anna's Hummingbird	27	0.19	0.04	24	16.6
BARS	Barn Swallow	2	0.01	0.01	4	2.8
BEWR	Bewick's Wren	276	1.90	0.12	119	82.1
BLPH	Black Phoebe	3	0.02	0.01	3	2.1
BUSH	Bushtit	10	0.07	0.03	5	3.4
CAQU	California Quail	32	0.22	0.06	16	11.0
CHSP	Chipping Sparrow	74	0.51	0.07	47	32.4
CORA	Common Raven	72	0.50	0.08	65	29.0
ECDO	Eurasian Collared Dove	2	0.01	0.01	2	1.4
EUST	European Starling	7	0.05	0.02	4	2.8
GRSP	Grasshopper Sparrow	6	0.04	0.02	6	4.1

Table 7 (continued). Results from point count sampling of landbirds in 2018 at 145 stations on Santa Rosa Island: number of individuals detected, mean number of birds per station and standard error, number of stations where a bird species was detected, and frequency (percent of stations where a bird species was detected).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Stns Where Detected	% Stns Where Detected
HETH	Hermit Thrush	2	0.01	0.01	1	0.7
HOLA	Horned Lark	54	0.37	0.10	27	17.9
HOFI	House Finch	157	1.08	0.11	87	53.8
HUVI	Hutton's Vireo	15	0.10	0.03	15	10.3
LAGO	Lawrence's Goldfinch	14	0.10	0.04	8	4.8
LEGO	Lesser Goldfinch	73	0.50	0.08	36	24.1
LOSH	Loggerhead Shrike	20	0.14	0.03	16	11.0
MODO	Mourning Dove	4	0.03	0.01	4	2.8
NOHA	Northern Harrier	1	0.01	0.01	1	0.7
NOMO	Northern Mockingbird	20	0.14	0.04	15	10.3
OCWA	Orange-crowned Warbler	234	1.61	0.11	108	74.5
PSFL	Pacific-slope Flycatcher	65	0.45	0.07	38	26.2
RTHA	Red-tailed Hawk	3	0.02	0.01	5	2.1
ROWR	Rock Wren	5	0.03	0.02	4	2.8
RCKI	Ruby-crowned Kinglet	6	0.04	0.02	6	4.1
SOSP	Song Sparrow	341	2.35	0.18	114	78.6
SPTO	Spotted Towhee	412	2.84	0.17	134	92.4
WAVI	Warbling Vireo	1	0.01	0.01	1	0.7
WEME	Western Meadowlark	265	1.83	0.13	114	78.6
WCSP	White-crowned Sparrow	16	0.11	0.05	8	5.5
WTSW	White-throated Swift	2	0.01	0.01	2	1.4
YRWA	Yellow-rumped Warbler	3	0.02	0.01	3	2.1

Line Transects—All Islands

On the transect counts on Anacapa Island (Table 8), White-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, Western Meadowlark, and Horned Lark were most commonly detected.

Table 8. Number of individuals of each species detected on line transects in 2018. Column headers start with a 2-letter island code (AN = Anacapa Island, SB = Santa Barbara Island, SM = San Miguel Island) followed by a 4-letter transect code (TRLS = trails, ARCH = Arch Point, SGNL = Signal, HRRS = Harris Point, LKBD = Lakebed, NDVR = Nidever, SMHL = San Miguel Hill, WLLW = Willow).

Species	AN- TRLS	SB- ARCH	SB- CNYN	SB- ELSL	SB- SGNL	SM- HRRS	SM- LKBD	SM- NDVR	SM- SMHL	SM- WLLW
Allen's Hummingbird	–	–	–	–	–	1	–	2	3	8
Anna's Hummingbird	–	–	–	–	–	–	–	1	–	–
Barn Swallow	–	–	–	–	–	–	–	–	1	–
Bewick's Wren	2	–	–	–	–	–	–	2	–	3
Common Raven	2	–	–	–	–	8	7	2	12	5
European Starling	–	1	–	–	–	–	–	–	–	–
Golden-crowned Sparrow	–	–	–	–	–	1	1	1	–	1
Grasshopper Sparrow	–	–	–	–	–	–	10	–	–	–
House Finch	–	3	–	–	3	7	2	–	11	6
Horned Lark	–	30	–	–	44	–	64	–	24	1
Lazuli Bunting	–	–	–	–	–	–	1	–	–	–
Orange-crowned Warbler	–	–	–	–	–	25	7	14	13	30
Osprey	1	–	–	–	–	–	–	–	–	–
Peregrine Falcon	3	–	–	–	–	–	–	–	–	–
Ruby-crowned Kinglet	–	1	–	–	–	–	–	–	–	–
Rock Wren	–	1	–	–	2	–	1	1	2	1
Say's Phoebe	–	2	–	–	1	–	–	–	–	–
Savannah Sparrow	3	2	–	–	3	–	–	–	–	4
Song Sparrow	8	–	–	–	–	32	80	17	57	32
Vesper Sparrow	–	–	–	–	1	–	–	–	–	–
White-crowned Sparrow	51	56	–	–	18	–	–	–	–	4
Western Meadowlark	2	27	–	–	6	1	32	3	8	7
Wilson's Warbler	–	1	–	–	–	–	5	–	–	1

Nonnative and Invasive Bird Species

Nonnative and invasive birds were counted on only 2 of the 5 islands in 2018: Eurasian-collared Dove and European Starling were counted on both Santa Rosa and Santa Cruz islands. 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, and included a new nonnative species on East Anacapa Island in 2018: Scaly-breasted Munia (*Lonchura punctulata*). Anecdotal sightings of nonnative species in 2018 were

summarized by Paul Collins and are presented in Appendix C (P. Collins, Santa Barbara Museum of Natural History, unpubl. data).

Bird Species Occurrence in 2018 Compared to All Years of Monitoring

Figures 6–10 summarize the mean number of birds per point count station on each island in 2018 compared to the mean number of birds per point count station across all years of sampling. We had fewer observations of the following species in 2018: Orange-crowned Warbler on Anacapa Island (Figure 6); Western Meadowlark on Santa Barbara Island (Figure 7); Anna’s Hummingbird, Bewick’s Wren, California Quail, Northern Flicker, Orange-crowned Warbler, Rufous-crowned Sparrow, Song Sparrow, and Yellow-rumped Warbler on Santa Cruz Island (Figure 8); Orange-crowned Warbler on San Miguel Island (Figure 9); and Chipping Sparrow, House Finch, and Pacific-slope Flycatcher on Santa Rosa Island (Figure 10).

Bird species with increased detections in 2018 were: Song Sparrow, Common Raven, and House Finch on Anacapa Island (Figure 6); Horned Lark and White-crowned Sparrow on Santa Barbara Island (Figure 7); American Goldfinch, European Starling, House Finch, and Pacific-slope Flycatcher on Santa Cruz Island (Figure 8); House Finch, Western Meadowlark, and White-crowned Sparrow on San Miguel Island (Figure 9); and Acorn Woodpecker, Bewick’s Wren, California Quail, Horned Lark, Lawrence’s Goldfinch, Lesser Goldfinch, Loggerhead Shrike, Orange-crowned Warbler, Song Sparrow, and Spotted Towhee on Santa Rosa Island (Figure 10).

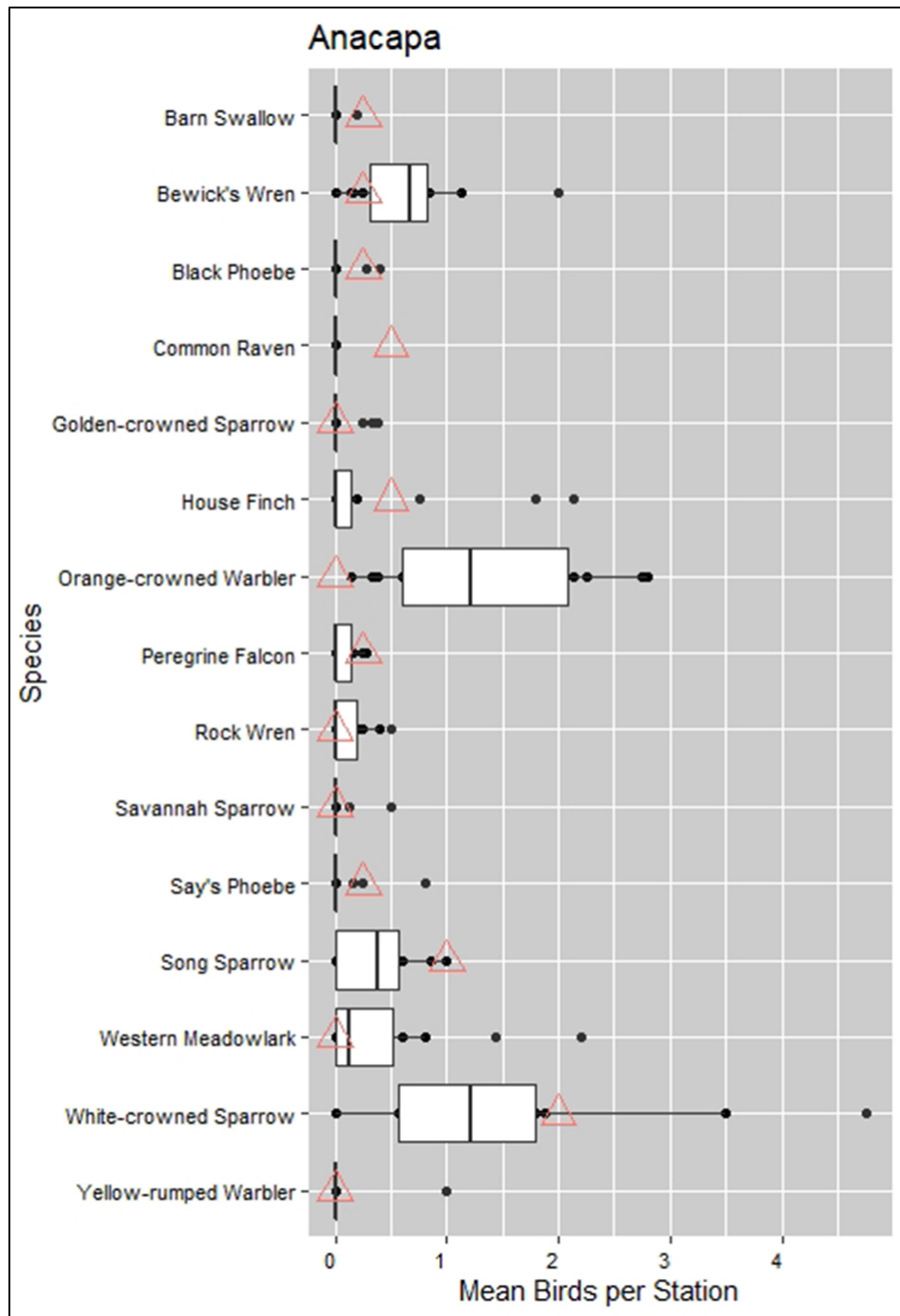


Figure 6. Boxplots of the mean number of birds per station for each species detected at point count stations on Anacapa Island in 2018. Box plots display the distribution of data based on the 5 number summary: minimum, first quartile, median, third quartile, and maximum for 1993–2018. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Triangles represent the mean value for 2018.

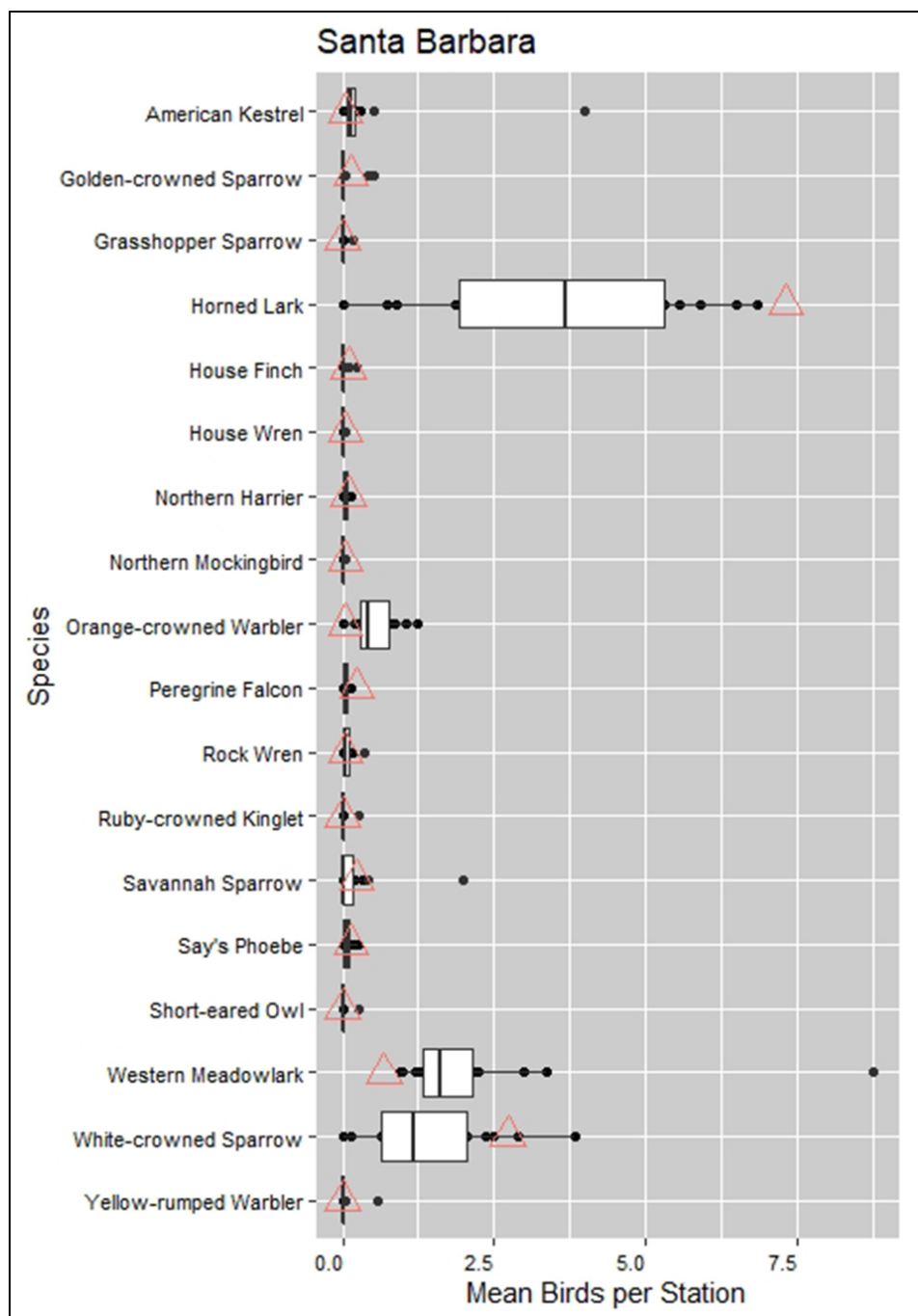


Figure 7. Boxplots of the mean number of birds per station for each species detected at point count stations on Santa Barbara Island in 2018. Box plots display the distribution of data based on the 5 number summary: minimum, first quartile, median, third quartile, and maximum for 1993–2018. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Triangles represent the mean value for 2018.

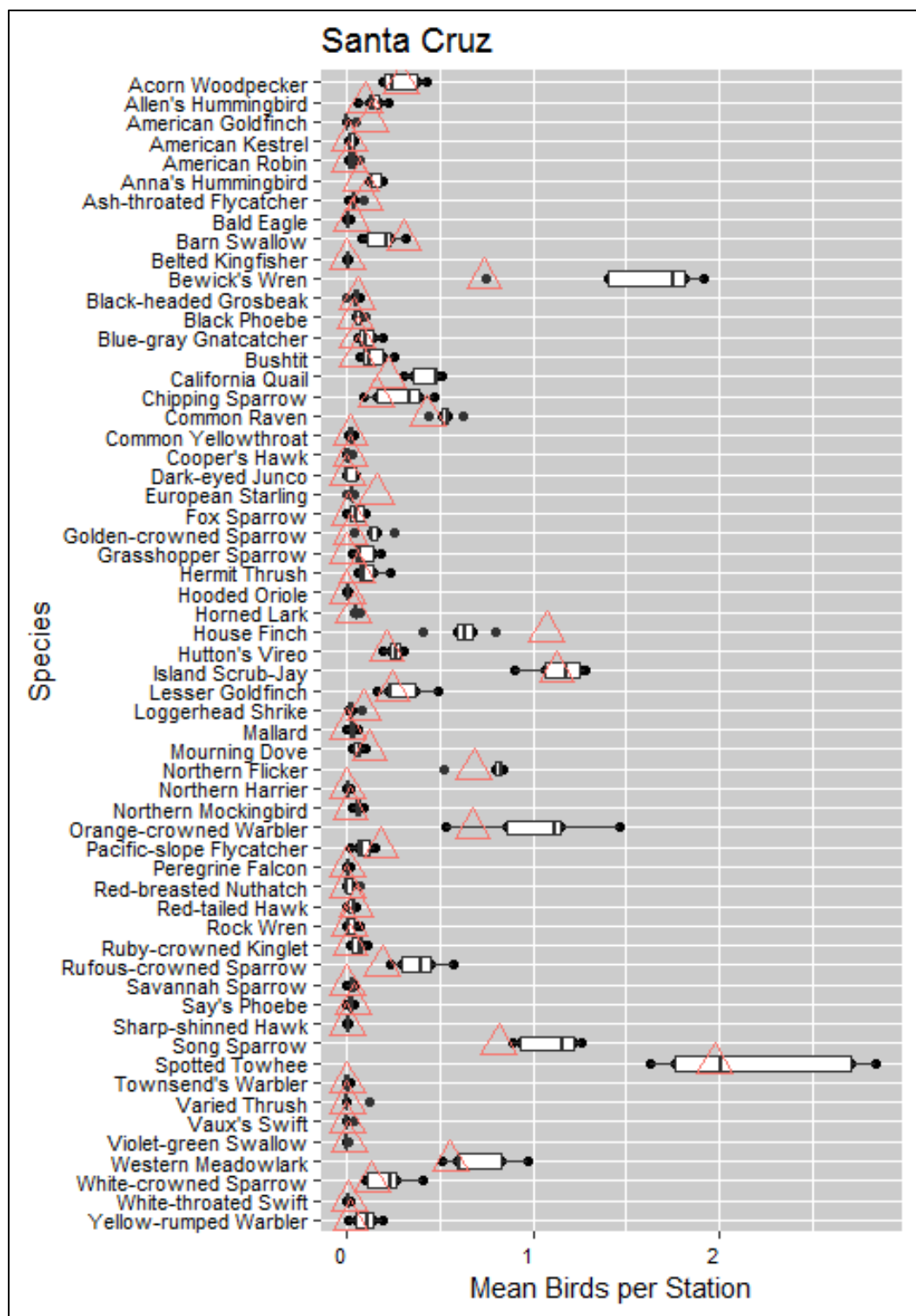


Figure 8. Boxplots of the mean number of birds per station for each species detected at point count stations on Santa Cruz Island in 2018. Box plots display the distribution of data based on the 5 number summary: minimum, first quartile, median, third quartile, and maximum for 2013–2018. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Triangles represent the mean value for 2018.

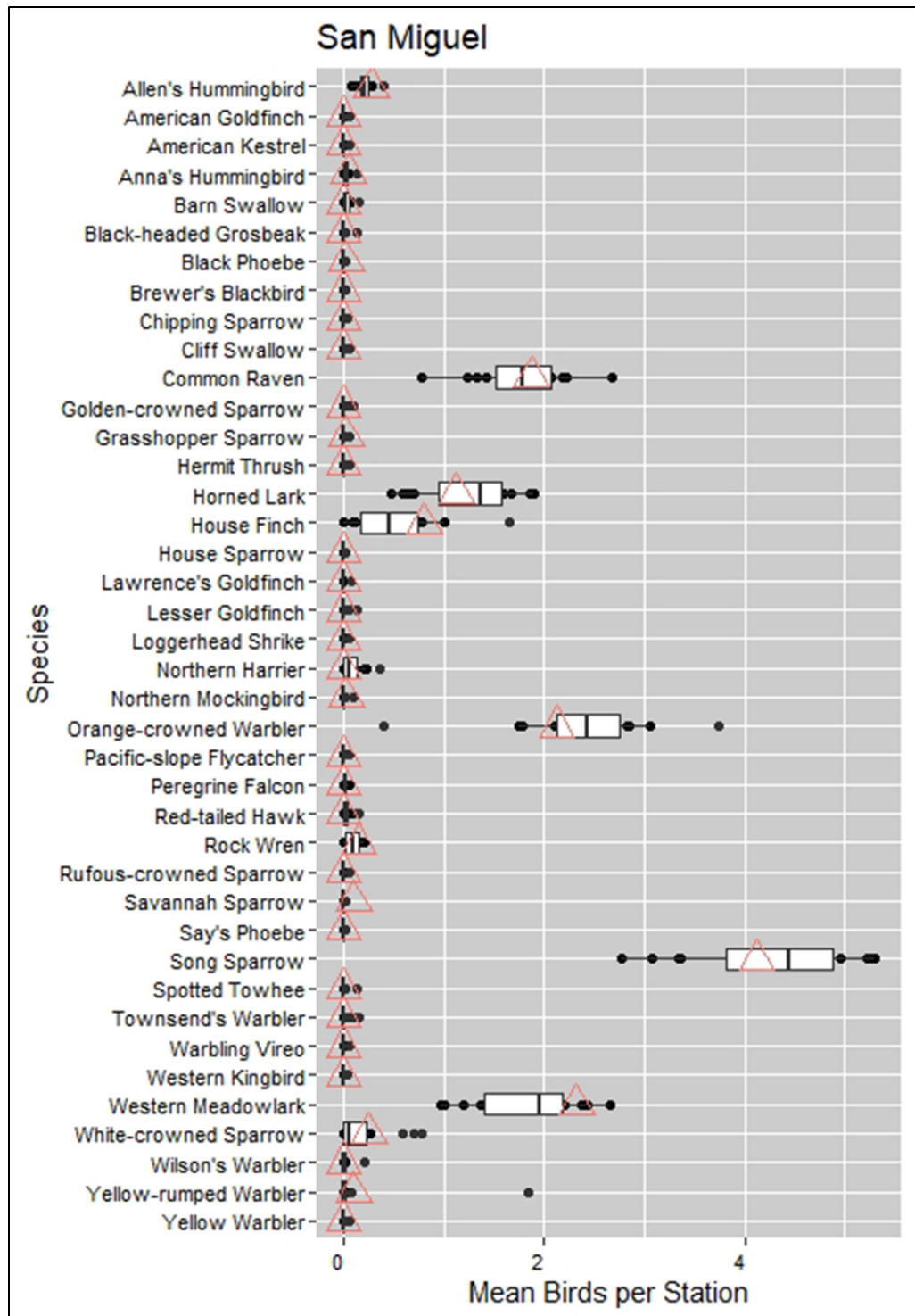


Figure 9. Boxplots of the mean number of birds per station for each species detected at point count stations on San Miguel Island in 2018. Box plots display the distribution of data based on the 5 number summary: minimum, first quartile, median, third quartile, and maximum for 1993–2018. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Triangles represent the mean value for 2018.

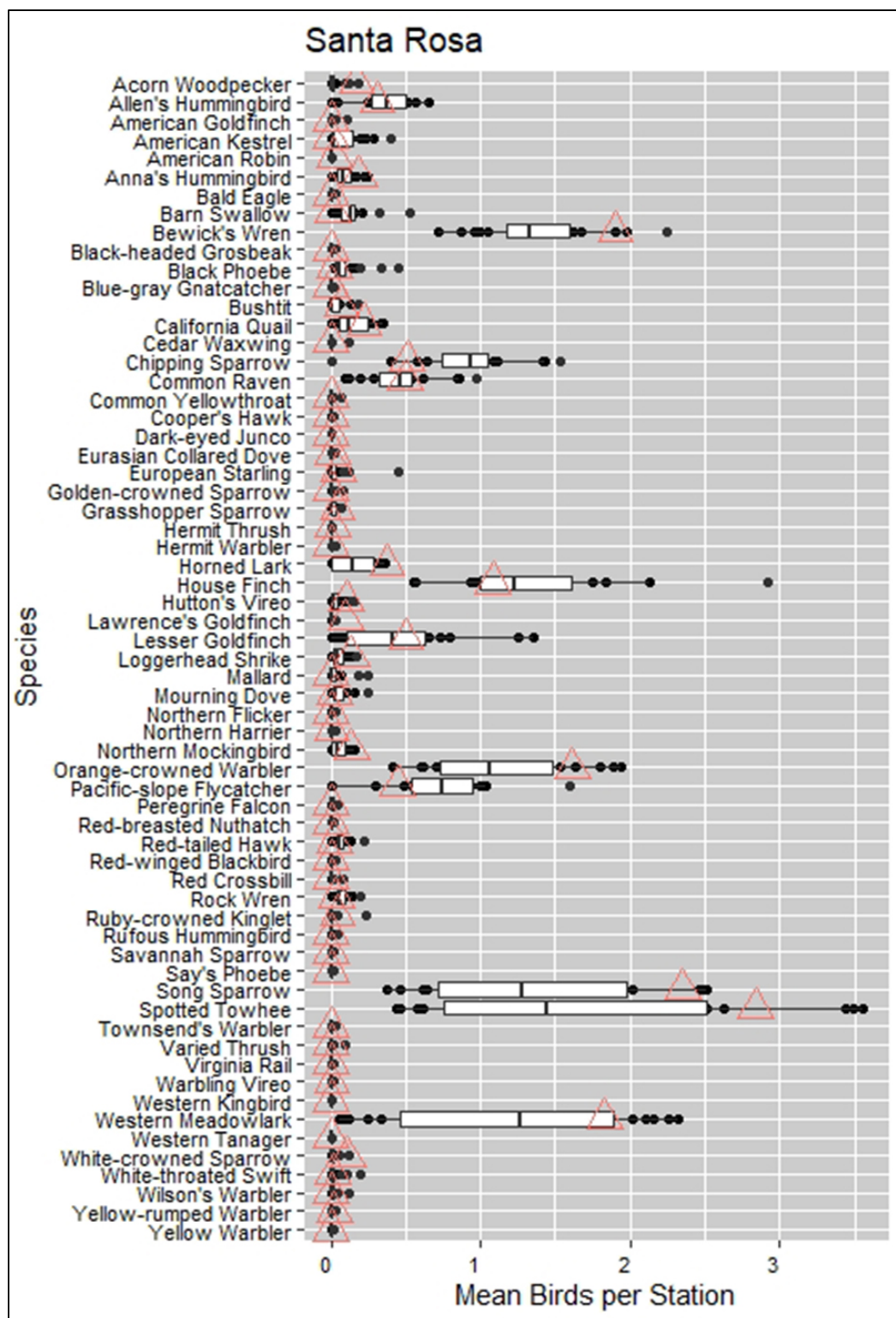


Figure 10. Boxplots of the mean number of birds per station for each species detected at point count stations on Santa Rosa Island in 2018. Box plots display the distribution of data based on the 5 number summary: minimum, first quartile, median, third quartile, and maximum for 1993–2018. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Triangles represent the mean value for 2018.

Patterns in Bird Species Occurrence over Time

Figures 11–15 summarize patterns of species occurrences since 1993 for San Miguel, Santa Barbara, and Anacapa islands; since 1994 for Santa Rosa Island; and since 2013 for Santa Cruz Island. This 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 the point counts. 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 1 island might also be classified as a transient non-breeding species on another (e.g., Spotted Towhee on Santa Rosa Island vs. San Miguel Island). For purposes of this report, the definition of transient or visitor does not include nonnative bird species or native invasive species (i.e., Brown-headed Cowbird).

Notable findings on each island follow:

Anacapa Island

Since 1993, 25 landbird species have been counted on Anacapa (Figure 11); 12 were counted in 2018. Six additional species were observed anecdotally—Red-tailed Hawk, Rufous/Allen’s Hummingbird, Rock Wren, Hermit Thrush, Orange-crowned Warbler, and Yellow-rumped Warbler—bringing the total to 18 species observed in 2018. European Starling was last counted in 1998, and American Kestrel was last counted in 2001. Song Sparrow seems to be more common since 2009, and Peregrine Falcon seems to be more common since 2015. Osprey was a new transient species counted in 2018; 6 transient or visiting species (defined as above) have been counted on the island overall since 1993 (Table 9).

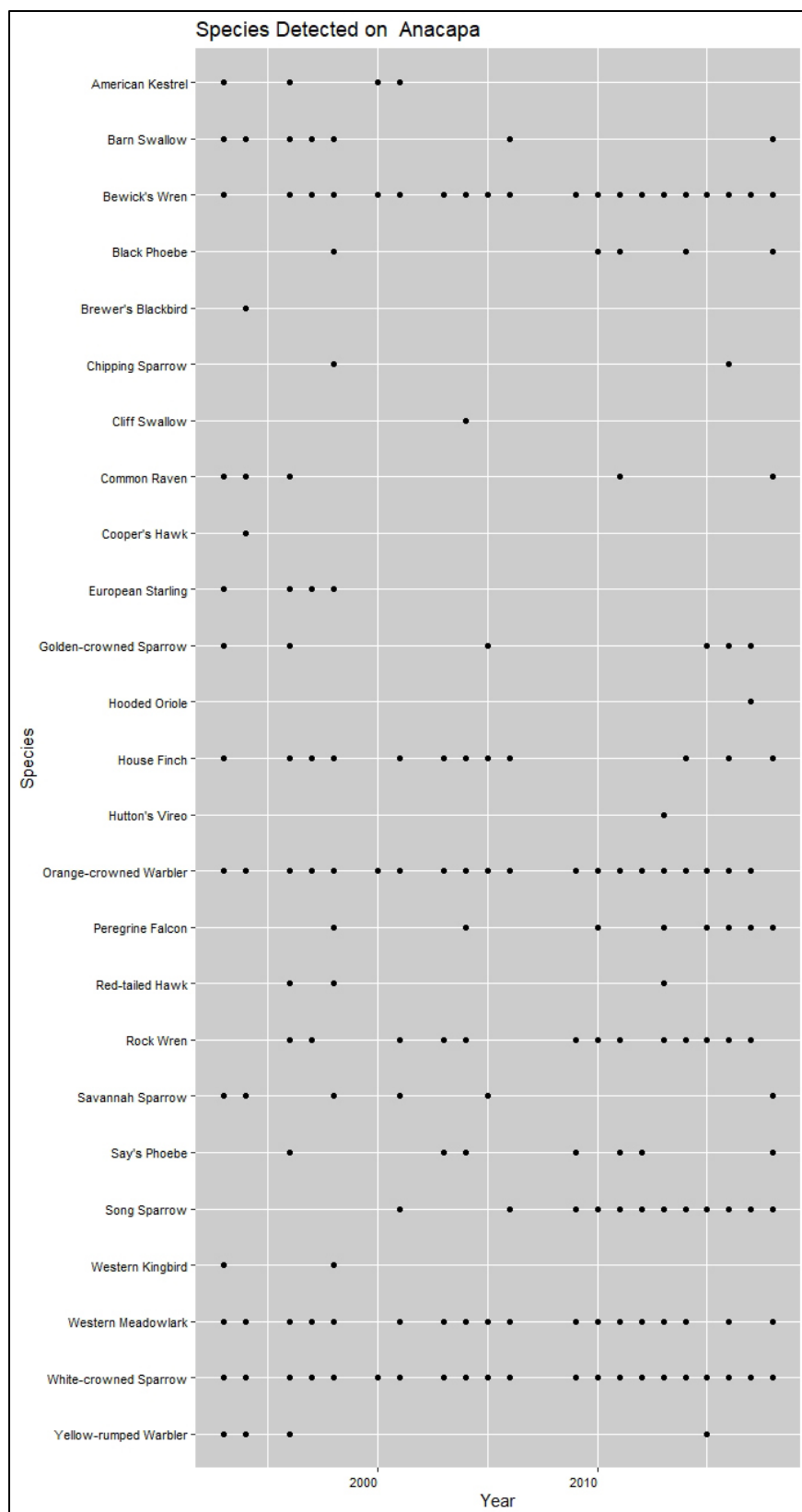


Figure 11. Breeding bird species occurrence from 1993 to 2018 for Anacapa Island. A dot indicates that the species was detected on a line transect or point count during that year.

Table 9. New transient or visiting bird species counted in 2018 (“**N**”), and other transients and visiting species counted in all other years since monitoring began (“X”), on each of the 5 northern Channel Islands. “Transient or visiting” species are defined here as native species that have been recorded only once or twice during point counts or transects and do not breed on the islands.

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	–	–	X	–
House Wren	–	–	N ¹	X	–
Hutton's Vireo	X	–	–	X	–
Lark Sparrow	–	X	–	–	–
Lawrence's Goldfinch	–	–	–	X	X
Lazuli Bunting	–	–	–	N ¹	–
Lesser Goldfinch	–	X	–	–	–

¹ New transient or visiting bird species counted in 2018.

Table 9 (continued). New transient or visiting bird species counted in 2018 (“**N**”), and other transients and visiting species counted in all other years since monitoring began (“X”), on each of the 5 northern Channel Islands. “Transient or visiting” species are defined here as native species that have been recorded only once or twice during point counts or transects and do not breed on the islands.

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	–
Osprey	N ¹	–	–	–	–
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	–
Vesper Sparrow	–	N ¹	–	–	–
Violet-green Swallow	–	–	X	X	–
Warbling Vireo	–	–	–	X	X
Western Kingbird	X	X	–	X	X

¹ New transient or visiting bird species counted in 2018.

Table 9 (continued). New transient or visiting bird species counted in 2018 (“**N**”), and other transients and visiting species counted in all other years since monitoring began (“X”), on each of the 5 northern Channel Islands. “Transient or visiting” species are defined here as native species that have been recorded only once or twice during point counts or transects and do not breed on the islands.

Western Tanager	–	–	X	X	X
White-tailed Kite	–	–	–	–	X
Wilson’s Warbler	–	X	–	–	–
Yellow-rumped Warbler (Audubon’s)	X	–	–	–	–
Yellow Warbler	–	–	N ¹	–	X
No. of transients/visiting species on each island in 2018:	6	20	13	31	18

¹ New transient or visiting bird species counted in 2018.

Santa Barbara Island

Since 1993, 47 landbird species have been counted on this island (Figure 12); 18 were counted in 2018. Barn Owl, Burrowing Owl, Lincoln’s Sparrow, Sage Thrasher, and Yellow-rumped Warbler were observed anecdotally, bringing the species total to 23 for 2018. Merlin was last counted 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. European Starling was counted again in 2018. Vesper Sparrow was a new transient species counted in 2018; 20 transient or visiting species have been counted on the island since 1993 (Table 9). A Red-shouldered Hawk counted in 1994 represents a new record for the 5 northern Channel Islands (Collins and Jones 2015).

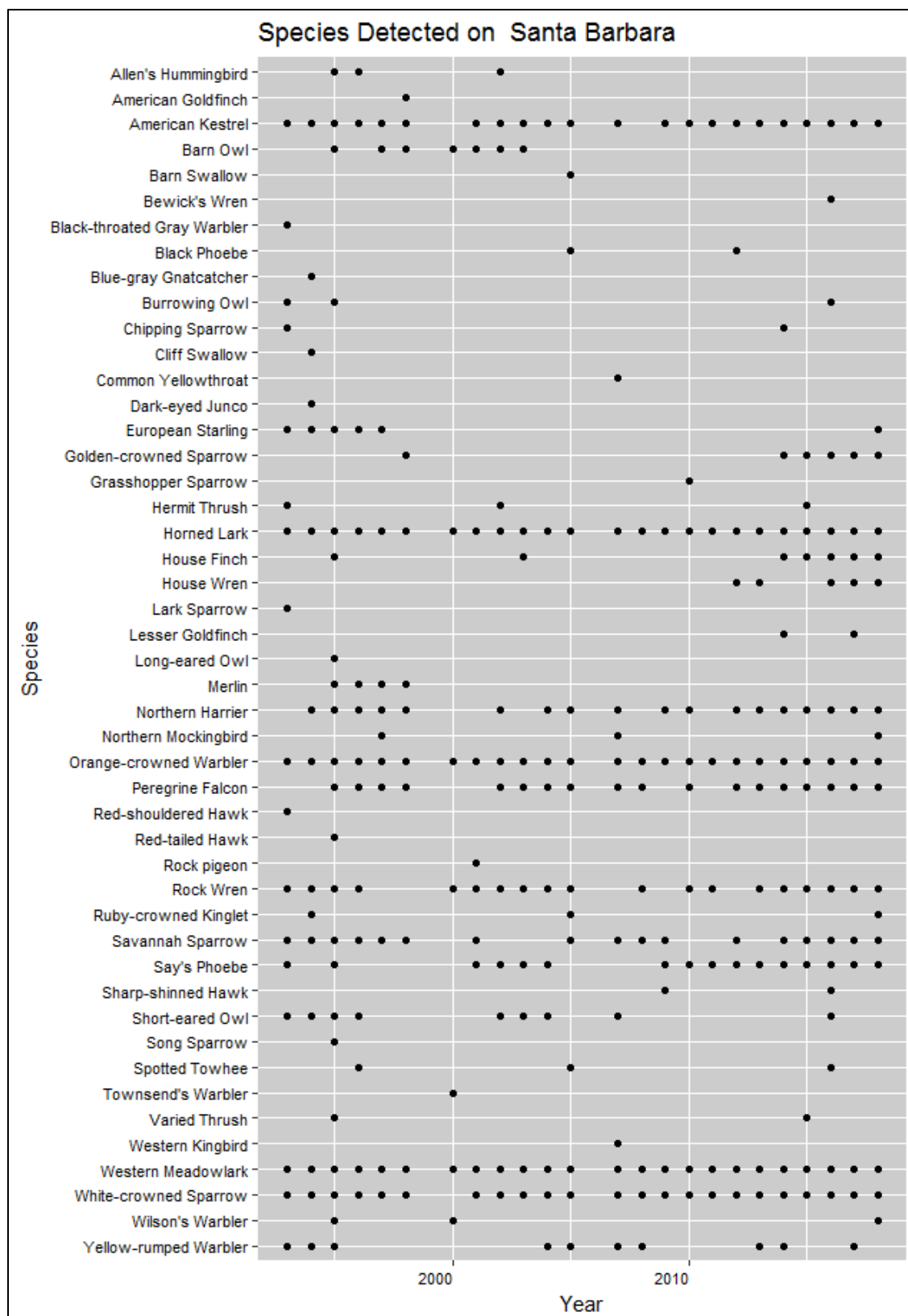


Figure 12. Breeding bird species occurrence from 1993 to 2018 for Santa Barbara Island. A dot indicates that the species was detected on a line transect or point count during that year.

Santa Cruz Island

Since 2013, 70 landbird species have been counted on this island (Figure 13), when monitoring by NPS Channel Islands staff and volunteers began. Sixty-two species were counted in 2018. Two species were observed anecdotally—Brown-headed Cowbird and House Sparrow—bringing the species total to 64 for 2018. House Wren and Yellow Warbler were new transient species counted in 2018; 13 transient or visiting species have been counted on this island since 2013 (Table 9).

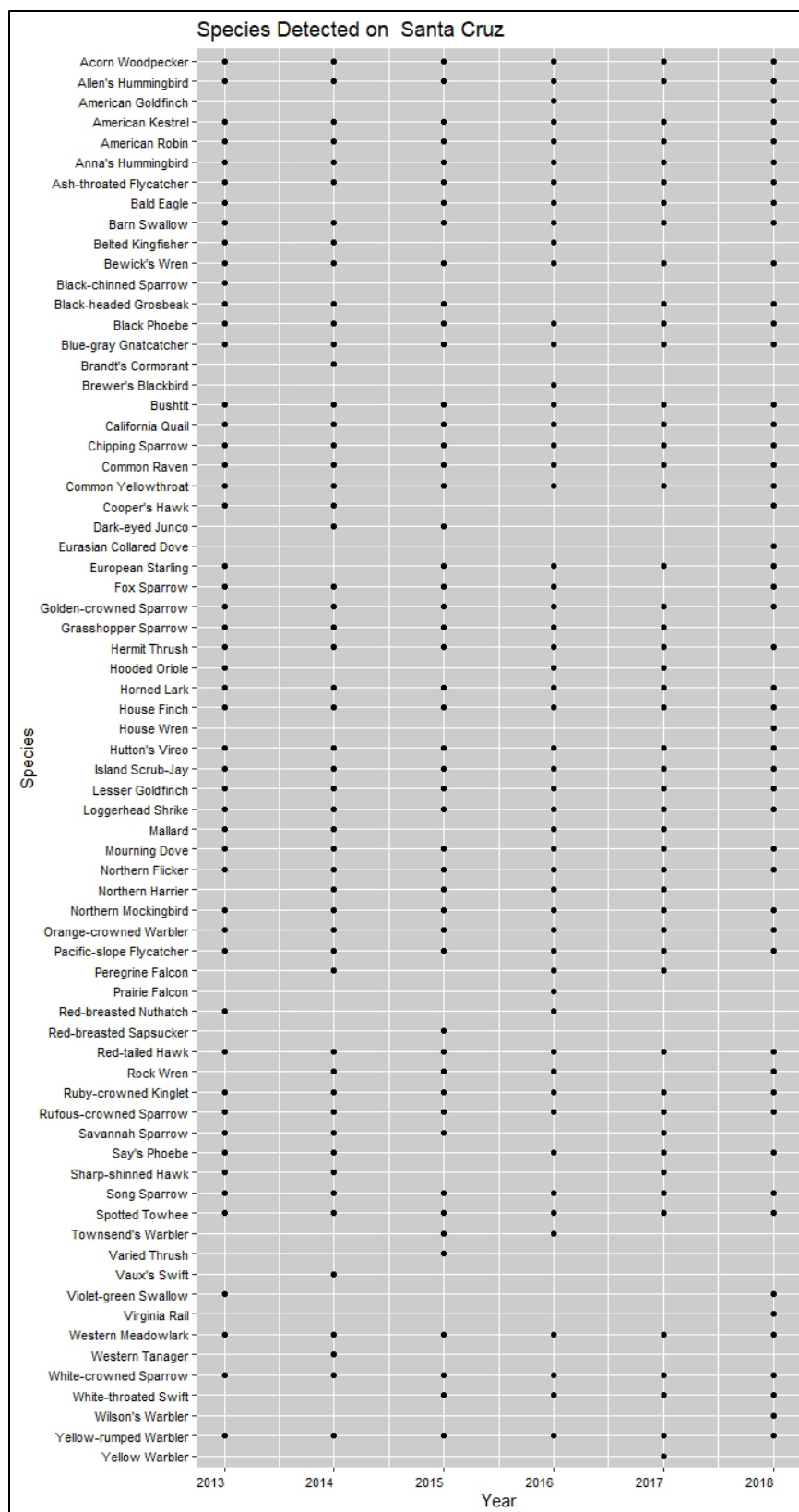


Figure 13. Breeding bird species occurrence from 2013 to 2018 for Santa Cruz Island. A dot indicates that the species was detected on point counts during that year.

San Miguel Island

Since 1993, 67 landbird species have been counted on this island (Figure 14); 20 were counted in 2018. Twelve species were observed anecdotally—American Pipit, Black-throated Gray Warbler, Brewer’s Blackbird, Bald Eagle, Merlin, Fox Sparrow, Lazuli Bunting, Loggerhead Shrike, Red-tailed Hawk, Townsend’s Warbler, Warbling Vireo, and Western Tanager —bringing the 2018 species total to 32. Grasshopper Sparrow has only been counted since 2011, European Starling was last counted in 2001, American Kestrel was last counted in 2003, Eurasian Collared Dove has not been counted on surveys since 1 observation in 2011, (although 1 was observed at the ranger station on SMI in April 2017; L. Shaskey, pers. obs.) and House Sparrow was only counted from 2004 to 2013. Lawrence’s Goldfinch was observed anecdotally for the second time on the island in 2018. Chipping Sparrow, Lesser Goldfinch, Rufous Hummingbird, and Rufous-crowned Sparrow were not counted in 2018. A Loggerhead Shrike was incidentally observed foraging on lizards in 2018, while the species was last counted during surveys in 2012. A Lazuli Bunting was observed as a new transient or visiting species on the island in 2018; 31 new transient or visiting species have been counted on the island since 1993 (Table 9). Bushtit counted on San Miguel in 2012 represents a new record of occurrence on this island compared with Collins and Jones (2015), as does a Rufous-crowned Sparrow counted in 2008 and 2016. For the second year, Bewick’s Wren has been observed anecdotally displaying breeding behavior. For example, on 17 April 2018, a possible pair was seen in Willow Canyon singing and carrying nesting material near suitable nesting habitat. In 2017, a male Bewick’s Wren was observed anecdotally on 2 April carrying plant material on San Miguel. There are no confirmed records of this species nesting on this island per Collins and Jones (2015), but these two observations strongly indicate that the species is now breeding on the island.

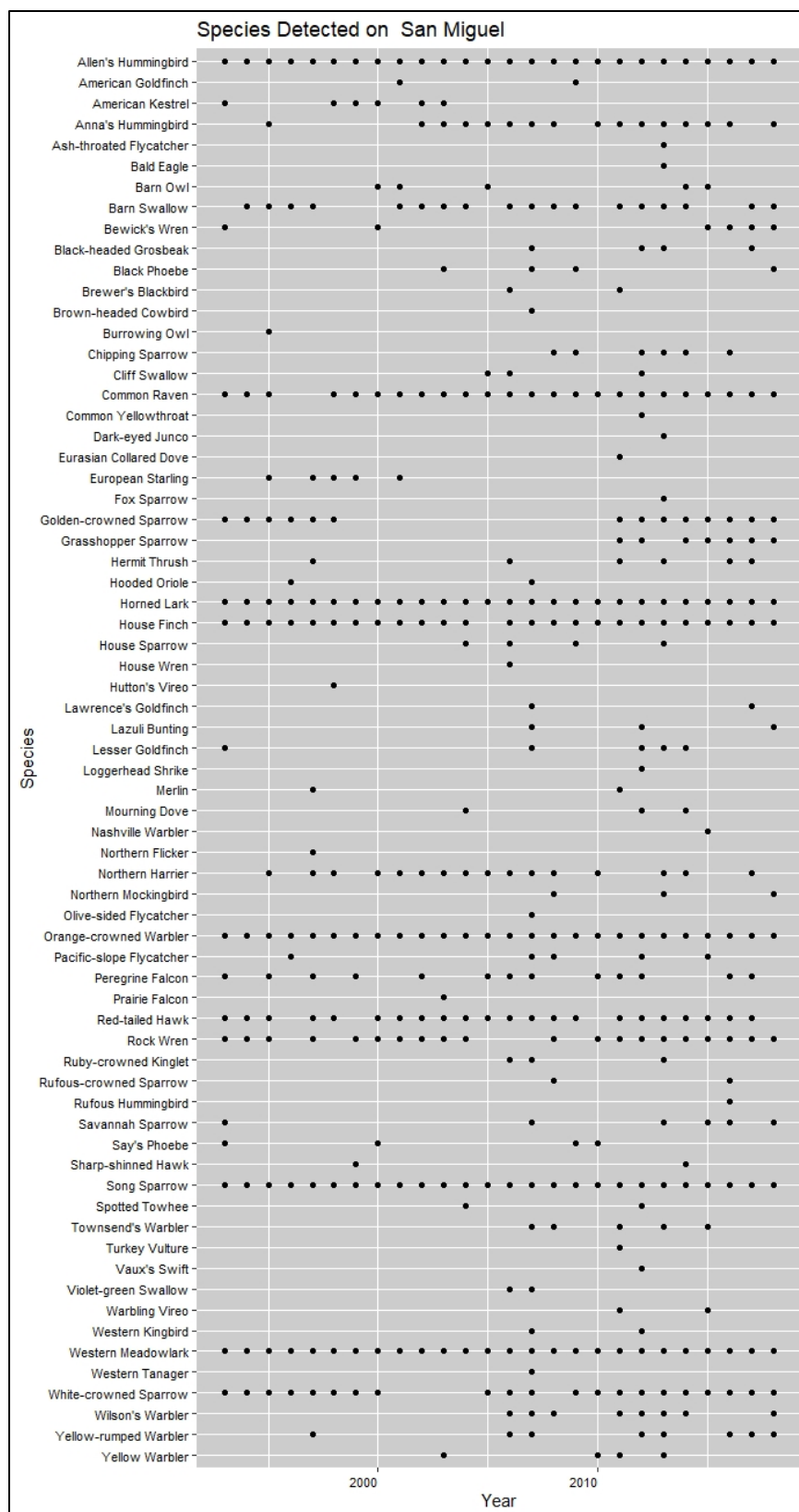


Figure 14. Breeding bird species occurrence from 1993 to 2018 for San Miguel Island. A dot indicates that the species was detected on a line transect or point count during that year.

Santa Rosa Island

Since 1994, 72 landbird species have been detected on this island (Figure 15); 38 were detected in 2018. Two species were observed anecdotally—Western Tanager and Hooded Oriole—bringing the 2018 species total to 40. Acorn Woodpecker and Grasshopper Sparrow have only been counted since 2006, Bushtit since 2009, and Warbling Vireo since 2014. Brown-headed Cowbird was counted for the first time in 2017. Lawrence’s Goldfinch was counted again for a second time as a transient species in 2018 (after a first count in 2017), but no observations of breeding were made in 2018. However, large flocks of Lawrence’s Goldfinch (20 individuals) were seen anecdotally in 2018 (April–May). American Kestrel was last counted in 2006. European Starling was recorded for the first time at point count stations in the interior of the island, at upper Windmill and upper Cherry Canyon (and European Starling has been recorded at point count stations near the ranch area during previous seasons). No new transient species were observed in 2018; 18 transient or visiting species have been counted on the island since 1994 (Table 9).

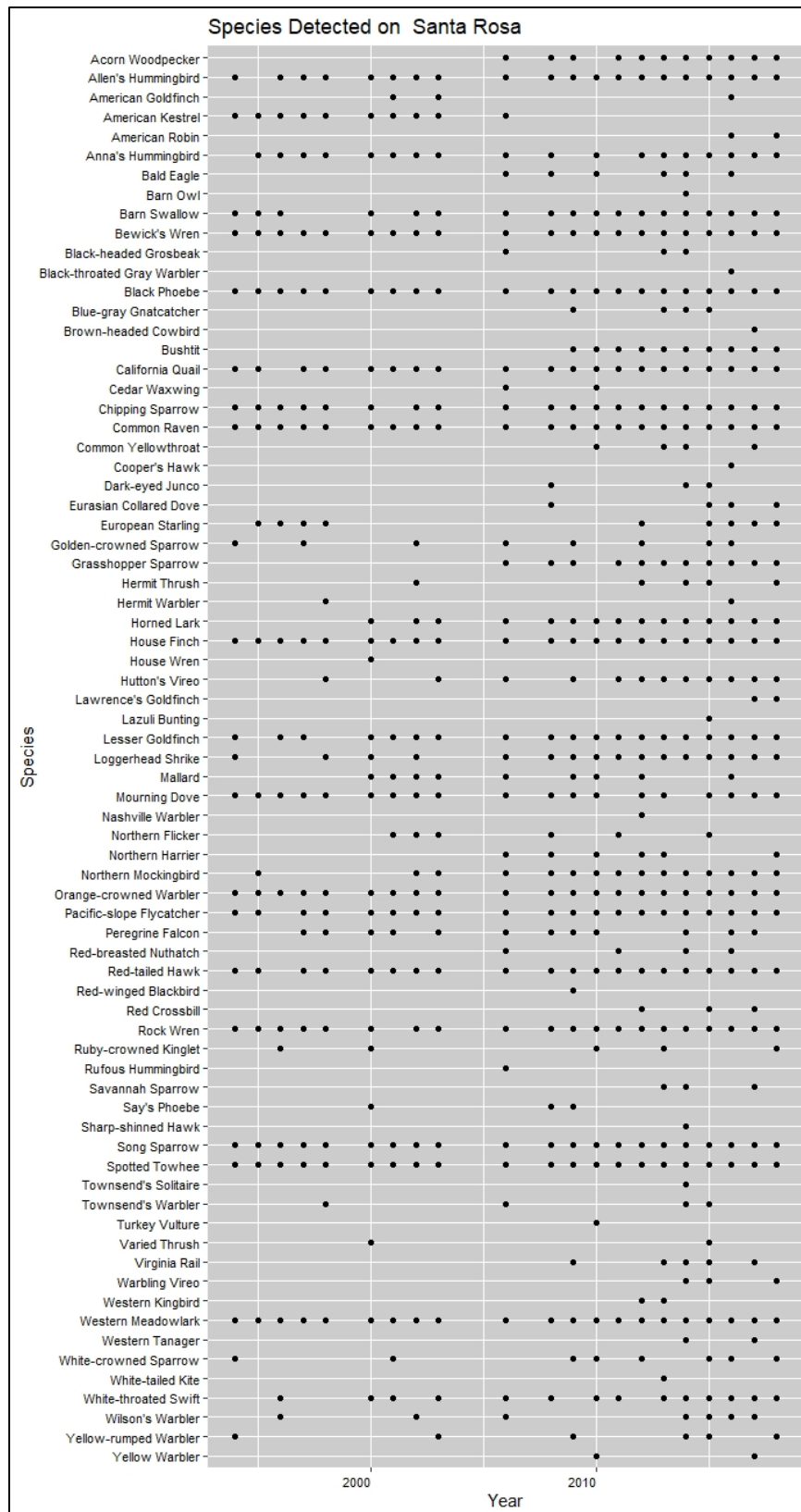


Figure 15. Breeding bird species occurrence from 1993 to 2018 for Santa Rosa Island. A dot indicates that the species was detected on point counts during that year.

All Islands

Across all 5 islands, 5 transient or visiting bird species were newly counted in 2018, for a total of 57 such species counted since NPS monitoring began on the islands (Table 9).

Four bird species have not been counted during point counts or line transects on several of the islands in the past 10 or more years (Table 10): Allen's Hummingbird (on Santa Barbara Island), American Kestrel (on Anacapa, San Miguel, and Santa Rosa islands), Barn Owl (on Santa Barbara Island), and European Starling (on Anacapa and San Miguel islands). Conversely, 17 species have been counted on several of the islands for 70% or more of all the years of the monitoring project (Table 10).

Table 10. Patterns of bird species detections on San Miguel (SMI), Santa Rosa (SRI), Anacapa (ACI) and Santa Barbara (SBI) islands at point counts and line transects. Santa Cruz Island is not included because of limited data (6 years). Data do not include transients or anecdotal observations.

Species	Not counted in last 10 or more years				Counted in >70% of all years of monitoring			
	SMI	SRI	ACI	SBI	SMI	SRI	ACI	SBI
Allen's Hummingbird	–	–	–	X	X	–	–	–
Anna's Hummingbird	–	–	–	–	X	X	–	–
American Kestrel	X	X	X	–	–	–	–	X
Barn Owl	–	–	–	X	–	–	–	–
Barn Swallow	–	–	–	–	–	–	–	–
Bewick's Wren	–	–	–	–	–	X	X	–
Black Phoebe	–	–	–	–	–	X	–	–
Common Raven	–	–	–	–	X	X	–	–
European Starling	X	–	X	–	–	–	–	–
Horned Lark	–	–	–	–	X	X	–	X
House Finch	–	–	–	–	X	X	X	–
Northern Harrier	–	–	–	–	–	–	–	X
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	–	–

Table 10 (continued). Patterns of bird species detections on San Miguel (SMI), Santa Rosa (SRI), Anacapa (ACI) and Santa Barbara (SBI) islands at point counts and line transects. Santa Cruz Island is not included because of limited data (6 years). Data do not include transients or anecdotal observations.

Species	Not counted in last 10 or more years				Counted in >70% of all years of monitoring			
	SMI	SRI	ACI	SBI	SMI	SRI	ACI	SBI
Western Meadowlark	–	–	–	–	X	X	X	X
White-Crowned Sparrow	–	–	–	–	X	–	X	X
Total	4 species				18 species			

Discussion

Across all 72 terrestrial bird species counted on the northern Channel Islands in 2018 (Table 2), island specificity was greatly evident. For example, only 3 species (House Finch, White-crowned Sparrow, and Western Meadowlark) were counted on all 5 of the islands in 2018, whereas 9 species were detected among 4 islands each, 5 species were detected among 3 islands each, 24 species were detected among 2 islands each, and 16 species were detected on only 1 island each. As would be predicted by island biogeography, and has been observed for the 25 years of the monitoring program, species richness (number of species) was greatest on the larger islands (Santa Rosa—72 species, Santa Cruz—69 species) and least on the smallest island (Anacapa—26 species). Seventeen bird species exhibited notably increased detections in 2018 on at least 1 of the 5 islands, and 12 exhibited notably decreased detections on at least 1 of the 5 islands. Most of these results are very similar to those found in an evaluation of long-term island bird monitoring data through 2015 (Coonan and Dye 2016), and are continuations of the either increasing or decreasing trends seen in these analyses. However, the indices of abundance summarized in this 2018 report must be interpreted with caution, since our evaluation relies on a simple assessment of graphed detections (which are an index of abundance), rather than a rigorous statistical analysis of densities. Trends in bird numbers are best revealed by distance analyses (e.g., Coonan and Dye 2016, Coonan, Klinger, and Dye 2011), or general linear models, which can account for differences in detection rates of bird species.

European Starling was once abundant and a self-introduced breeder across Santa Rosa during the ranching era; however, Coonan, Klinger, and Dye (2011) reported the species declining across all of Channel Islands National Park and not recorded during surveys. In 2018, starlings were recorded for the first time since 2000 at point count stations, and they were at stations more in the interior of Santa Rosa, in upper Cherry Canyon. Starlings on the island have generally been observed in the vicinity of the ranch; however, in 2015 they also were observed in small canyons west of the Torrey Pines (P. Larramendy, pers. obs.), where Acorn Woodpeckers also nest. This is a concern since both are cavity nesting species. Analyses of the relationship between vegetative changes over the past 2 decades and bird species' distributions, densities, and richness would be extremely informative, and could be accomplished using GIS and multivariate statistical models to help inform about any potential issues with European Starlings, among other species.

Some species have not been counted at point counts or line transects over the past 10 or more years on particular islands, despite being resident breeders there—and observed anecdotally every year—for the past 10 years (as recorded in Collins and Jones 2015). These species include the American Kestrel on San Miguel, Santa Rosa, and Anacapa islands, and the Allen's Hummingbird and Barn Owl on Santa Barbara Island. For these resident breeding species, the counting methodology represents the most likely factor in the decreased counts. Specifically, the point count technique, conducted between dawn and 4 hours after, is designed primarily to count singing passerines and not to monitor diurnal birds of prey, nocturnal birds, swifts, swallows, hummingbirds, or other species that do not vocalize regularly (Ralph et al. 1995).

In 2018, each observer was skilled at identifying bird species by vocalizations and by sight. As a result of the observers' qualifications, the authors' confidence in detection accuracy was high. However, it is important to note that inter-observer differences, environmental factors (i.e., variability in wind speeds and fog density), and only 1 count (replicate) per season on each point and transect affects the accuracy of estimates of species' numbers. These factors are significant challenges to any monitoring program, and should be evaluated carefully and thoroughly to minimize misrepresentation of trends in density.

In 2018, P. Larramendy continued to remove metal stakes from the field that initially marked the point count locations, primarily at Santa Barbara Island. 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. With the use of GPS, marker stakes are no longer necessary, and installations are not permitted in proposed wilderness areas.

Recommendations

In 2016, Hall et al. (2017) noted that on Santa Rosa Island, the annual grassland plant community appears to be under-sampled, given the distribution of sample points. Under-sampling of grassland bird species such as Grasshopper Sparrow, Horned Lark, Western Meadowlark, and Loggerhead Shrike may result in an inaccurate assessment of these species' trends on the island. Thus, we continue to recommend that the vegetation type for each sampling point be updated with the classification from the most recent vegetation map, or a field visit. Once vegetation types are updated, the allocation of sampling points by vegetation type (or other strata) should be evaluated.

In addition, conducting only 1 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 results 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 a season (Schmidt et al. 2013). The Mediterranean Coast Inventory and Monitoring Network and Channel Islands National Park are planning a protocol review in 2021–2022 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.

We continue to recommend that nonnative invasive species such as the European Starling on Santa Rosa Island be removed before its numbers become harder to manage. European Starlings are cavity nesters and pose a threat to nesting Acorn Woodpeckers by blocking and guarding nesting cavities. The Acorn Woodpecker, once considered a possible breeder on Santa Rosa, was documented in 2015 nesting for the first time on the island at Upper Cherry Canyon (Coonan and Dye 2016). The locations where starlings were recorded in 2018 are near the documented nesting locations for Acorn Woodpeckers, so the need for starling management is now even more pressing.

Also, because Distance analyses assist statistically with evaluations of trends, we continue to recommend that a trend analysis using program DISTANCE (Buckland et al. 2015), or newer N-Mixture Models, 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).

We further 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 tertiary 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 landbird monitoring on Anacapa and Santa Barbara islands is also warranted, because the presence of breeding gulls is interfering with some aspects of monitoring there. As noted herein, on Santa Barbara Island, 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 Island, the number of nesting gulls on the island is sizable, and their nesting behavior is starting to be more aggressive. As discussed in prior reports, constant vocalizing by gulls makes it difficult to hear vocalizations by passerines during monitoring, and the locations of the points currently 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 Island are less likely to react. Thus, we recommend using only transects to monitor non-gull species on east Anacapa Island, and discontinuing the use of the point count stations. For the same reasons, we recommend discontinuing the use of the 12 point count stations on Santa Barbara Island. However, if it is desirable to monitor the size of the gull populations on these islands, the points (or a subset) could be used specifically to monitor gull numbers. The San Miguel Hill transect on San Miguel Island also is frequently not counted due to the presence of nesting gulls, so its continued utility also is questionable.

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Appendix A. Resident Breeder Species List

List of 54 terrestrial avian species confirmed nesting on at least 1 of the 5 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.

Table A1. List of nesting terrestrial avian species.

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>Zenaidura 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

Table A1 (continued). List of nesting terrestrial avian species.

Scientific Name	Common Name
<i>Lanius ludovicianus</i>	Loggerhead Shrike
<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>Psaltirparus 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. 2018 Landbird Monitoring Site Observers

Table B1. Site observers on Anacapa Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
AE01	PC	3/16/2018	Barrett_Joel
AE02	PC	3/16/2018	Barrett_Joel
AE03	PC	3/16/2018	Barrett_Joel
AE04	PC	3/16/2018	Barrett_Joel
AE05	PC	3/16/2018	Barrett_Joel
AE06	PC	3/16/2018	Barrett_Joel
AE07	PC	3/16/2018	Barrett_Joel
AE08	PC	3/16/2018	Barrett_Joel
TRLS	LT	3/16/2018	Barrett_Joel

Table B2. Site observers on San Miguel Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
HRRS	LT	4/22/2018	Larramendy_Peter
LKBD	LT	5/7/2018	Holderby_Zach
NDVR	LT	4/21/2018	Larramendy_Peter
SM01	PC	4/18/2018	Larramendy_Peter
SM02	PC	4/18/2018	Larramendy_Peter
SM03	PC	4/15/2018	Holderby_Zach
SM04	PC	4/14/2018	Holderby_Zach
SM05	PC	4/22/2018	Larramendy_Peter
SM06	PC	4/22/2018	Larramendy_Peter
SM07	PC	6/12/2018	Holderby_Zach
SM08	PC	6/12/2018	Holderby_Zach
SM09	PC	4/19/2018	Larramendy_Peter
SM10	PC	4/19/2018	Larramendy_Peter
SM11	PC	4/19/2018	Larramendy_Peter
SM12	PC	4/19/2018	Larramendy_Peter
SM13	PC	4/24/2018	Larramendy_Peter
SM14	PC	4/19/2018	Larramendy_Peter
SM15	PC	4/24/2018	Larramendy_Peter
SM16	PC	4/24/2018	Larramendy_Peter
SM17	PC	4/24/2018	Larramendy_Peter
SM18	PC	4/24/2018	Larramendy_Peter
SM19	PC	4/19/2018	Larramendy_Peter
SM20	PC	4/14/2018	Holderby_Zach
SM21	PC	4/14/2018	Holderby_Zach
SM22	PC	4/14/2018	Holderby_Zach
SM23	PC	4/14/2018	Holderby_Zach
SM24	PC	4/14/2018	Holderby_Zach
SM25	PC	4/14/2018	Holderby_Zach
SM26	PC	4/14/2018	Holderby_Zach

Table B2 (continued). Site observers on San Miguel Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SM27	PC	4/14/2018	Holderby_Zach
SM28	PC	4/14/2018	Holderby_Zach
SM29	PC	4/18/2018	Larramendy_Peter
SM30	PC	4/18/2018	Larramendy_Peter
SM31	PC	5/3/2018	Holderby_Zach
SM32	PC	5/3/2018	Holderby_Zach
SM33	PC	4/15/2018	Holderby_Zach
SM34	PC	4/15/2018	Holderby_Zach
SM35	PC	4/15/2018	Holderby_Zach
SM36	PC	4/15/2018	Holderby_Zach
SM37	PC	4/15/2018	Holderby_Zach
SM38	PC	4/15/2018	Holderby_Zach
SM39	PC	4/15/2018	Holderby_Zach
SM40	PC	4/15/2018	Holderby_Zach
SMHL	LT	6/12/2018	Holderby_Zach
WLLW	LT	4/21/2018	Larramendy_Peter

Table B3. Site observers on Santa Barbara Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
ARCH	LT	3/12/2018	Larramendy_Peter
CNYN	LT	3/13/2018	Larramendy_Peter
SB01	PC	3/13/2018	Larramendy_Peter
SB02	PC	3/8/2018	Larramendy_Peter
SB04	PC	3/8/2018	Larramendy_Peter
SB05	PC	3/8/2018	Larramendy_Peter
SB07	PC	3/8/2018	Larramendy_Peter
SB08	PC	3/8/2018	Larramendy_Peter
SB09	PC	3/8/2018	Larramendy_Peter
SB13	PC	3/8/2018	Larramendy_Peter
SB14	PC	3/8/2018	Larramendy_Peter
SB15	PC	3/9/2018	Larramendy_Peter
SB16	PC	3/8/2018	Larramendy_Peter
SB18	PC	3/12/2018	Larramendy_Peter
SB21	PC	3/12/2018	Larramendy_Peter
SB22	PC	3/8/2018	Larramendy_Peter
SB23	PC	3/9/2018	Larramendy_Peter
SB25	PC	3/12/2018	Larramendy_Peter
SB26	PC	3/11/2018	Larramendy_Peter
SB27	PC	3/13/2018	Larramendy_Peter
SB29	PC	3/13/2018	Larramendy_Peter
SB30	PC	3/13/2018	Larramendy_Peter
SB31	PC	3/13/2018	Larramendy_Peter
SB33	PC	3/11/2018	Larramendy_Peter
SGNL	LT	3/11/2018	Larramendy_Peter

Table B4. Site observers on Santa Cruz Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC001	PC	5/18/2018	Todd_Nick
SC002	PC	5/18/2018	Todd_Nick
SC003	PC	5/18/2018	Todd_Nick
SC004	PC	5/18/2018	Todd_Nick
SC005	PC	5/16/2018	Laughrin_Lyndal
SC006	PC	5/16/2018	Laughrin_Lyndal
SC007	PC	5/16/2018	Laughrin_Lyndal
SC008	PC	5/16/2018	Laughrin_Lyndal
SC009	PC	5/16/2018	Laughrin_Lyndal
SC010	PC	5/16/2018	Todd_Nick
SC011	PC	5/16/2018	Todd_Nick
SC012	PC	5/16/2018	Todd_Nick
SC013	PC	5/16/2018	Todd_Nick
SC014	PC	5/16/2018	Todd_Nick
SC015	PC	5/16/2018	Todd_Nick
SC016	PC	5/16/2018	Todd_Nick
SC017	PC	4/27/2018	Laughrin_Lyndal
SC018	PC	4/27/2018	Laughrin_Lyndal
SC019	PC	4/13/2018	Laughrin_Lyndal
SC020	PC	4/13/2018	Laughrin_Lyndal
SC021	PC	4/11/2018	Laughrin_Lyndal
SC022	PC	4/11/2018	Laughrin_Lyndal
SC023	PC	3/27/2018	Todd_Nick
SC024	PC	3/27/2018	Todd_Nick
SC025	PC	3/24/2018	Todd_Nick
SC026	PC	4/14/2018	Laughrin_Lyndal
SC027	PC	4/14/2018	Laughrin_Lyndal
SC028	PC	5/2/2018	Laughrin_Lyndal
SC029	PC	5/2/2018	Laughrin_Lyndal

Table B4 (continued). Site observers on Santa Cruz Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC030	PC	5/2/2018	Laughrin_Lyndal
SC031	PC	5/17/2018	Todd_Nick
SC032	PC	5/17/2018	Todd_Nick
SC033	PC	5/17/2018	Todd_Nick
SC034	PC	5/17/2018	Todd_Nick
SC035	PC	5/17/2018	Todd_Nick
SC036	PC	5/17/2018	Todd_Nick
SC037	PC	5/18/2018	Todd_Nick
SC038	PC	5/17/2018	Laughrin_Lyndal
SC039	PC	5/17/2018	Laughrin_Lyndal
SC040	PC	5/17/2018	Laughrin_Lyndal
SC041	PC	5/17/2018	Laughrin_Lyndal
SC042	PC	4/25/2018	Laughrin_Lyndal
SC043	PC	4/25/2018	Laughrin_Lyndal
SC044	PC	4/25/2018	Laughrin_Lyndal
SC045	PC	4/25/2018	Laughrin_Lyndal
SC046	PC	4/25/2018	Laughrin_Lyndal
SC047	PC	4/25/2018	Laughrin_Lyndal
SC048	PC	3/25/2018	Todd_Nick
SC049	PC	3/25/2018	Todd_Nick
SC050	PC	3/25/2018	Todd_Nick
SC051	PC	3/25/2018	Todd_Nick
SC052	PC	3/26/2018	Todd_Nick
SC053	PC	3/26/2018	Todd_Nick
SC054	PC	3/26/2018	Todd_Nick
SC055	PC	3/26/2018	Todd_Nick
SC056	PC	3/26/2018	Todd_Nick
SC057	PC	3/26/2018	Todd_Nick
SC058	PC	3/26/2018	Todd_Nick

Table B4 (continued). Site observers on Santa Cruz Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC059	PC	3/26/2018	Todd_Nick
SC060	PC	3/26/2018	Todd_Nick
SC061	PC	4/26/2018	Laughrin_Lyndal
SC062	PC	4/26/2018	Laughrin_Lyndal
SC063	PC	4/26/2018	Laughrin_Lyndal
SC064	PC	4/26/2018	Laughrin_Lyndal
SC065	PC	4/26/2018	Laughrin_Lyndal
SC066	PC	4/26/2018	Laughrin_Lyndal
SC067	PC	4/29/2018	Laughrin_Lyndal
SC068	PC	4/29/2018	Laughrin_Lyndal
SC069	PC	3/27/2018	Todd_Nick
SC070	PC	3/27/2018	Todd_Nick
SC071	PC	4/14/2018	Laughrin_Lyndal
SC072	PC	4/14/2018	Laughrin_Lyndal
SC073	PC	4/14/2018	Laughrin_Lyndal
SC074	PC	3/27/2018	Todd_Nick
SC075	PC	4/13/2018	Laughrin_Lyndal
SC076	PC	4/13/2018	Laughrin_Lyndal
SC077	PC	4/27/2018	Laughrin_Lyndal
SC078	PC	4/27/2018	Laughrin_Lyndal
SC079	PC	4/23/2018	Laughrin_Lyndal
SC080	PC	4/23/2018	Laughrin_Lyndal
SC081	PC	3/25/2018	Todd_Nick
SC082	PC	3/25/2018	Todd_Nick
SC083	PC	3/25/2018	Todd_Nick
SC084	PC	3/25/2018	Todd_Nick
SC085	PC	4/3/2018	Laughrin_Lyndal
SC086	PC	4/3/2018	Laughrin_Lyndal
SC087	PC	4/3/2018	Laughrin_Lyndal

Table B4 (continued). Site observers on Santa Cruz Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC088	PC	4/3/2018	Laughrin_Lyndal
SC089	PC	4/9/2018	Laughrin_Lyndal
SC090	PC	4/9/2018	Laughrin_Lyndal
SC091	PC	4/9/2018	Laughrin_Lyndal
SC092	PC	4/9/2018	Laughrin_Lyndal
SC093	PC	4/9/2018	Laughrin_Lyndal
SC094	PC	4/3/2018	Laughrin_Lyndal
SC095	PC	5/17/2018	Laughrin_Lyndal
SC096	PC	4/15/2018	Laughrin_Lyndal
SC097	PC	4/15/2018	Laughrin_Lyndal
SC098	PC	5/16/2018	Laughrin_Lyndal
SC099	PC	3/24/2018	Todd_Nick
SC100	PC	3/24/2018	Todd_Nick
SC109	PC	4/15/2018	Villasenor_Cedrick_E
SC110	PC	4/15/2018	Villasenor_Cedrick_E
SC111	PC	4/15/2018	Villasenor_Cedrick_E
SC112	PC	4/15/2018	Villasenor_Cedrick_E
SC113	PC	4/15/2018	Villasenor_Cedrick_E
SC114	PC	4/15/2018	Villasenor_Cedrick_E
SC115	PC	4/15/2018	Villasenor_Cedrick_E
SC116	PC	4/14/2018	Villasenor_Cedrick_E
SC117	PC	4/14/2018	Villasenor_Cedrick_E
SC118	PC	4/14/2018	Villasenor_Cedrick_E
SC119	PC	4/14/2018	Villasenor_Cedrick_E
SC120	PC	4/14/2018	Villasenor_Cedrick_E

Table B5. Site observers on Santa Rosa Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR001	PC	4/7/2018	Todd_Nick
SR002	PC	4/7/2018	Todd_Nick
SR003	PC	4/7/2018	Todd_Nick
SR004	PC	5/9/2018	Larramendy_Peter
SR005	PC	5/9/2018	Larramendy_Peter
SR006	PC	5/9/2018	Larramendy_Peter
SR007	PC	5/24/2018	Larramendy_Peter
SR008	PC	5/24/2018	Larramendy_Peter
SR009	PC	5/24/2018	Larramendy_Peter
SR010	PC	4/7/2018	Searcy_Adam_J
SR011	PC	4/7/2018	Todd_Nick
SR012	PC	4/7/2018	Todd_Nick
SR013	PC	5/12/2018	Larramendy_Peter
SR014	PC	5/12/2018	Larramendy_Peter
SR015	PC	5/12/2018	Larramendy_Peter
SR016	PC	4/6/2018	Todd_Nick
SR017	PC	4/6/2018	Todd_Nick
SR018	PC	4/6/2018	Todd_Nick
SR019	PC	4/27/2018	Holderby_Zach
SR020	PC	4/27/2018	Holderby_Zach
SR021	PC	4/27/2018	Holderby_Zach
SR022	PC	5/12/2018	Holderby_Zach
SR023	PC	5/12/2018	Holderby_Zach
SR024	PC	5/12/2018	Holderby_Zach
SR025	PC	5/12/2018	Holderby_Zach
SR026	PC	5/12/2018	Larramendy_Peter
SR027	PC	5/12/2018	Holderby_Zach
SR028	PC	4/4/2018	Stiles_Mike
SR029	PC	4/4/2018	Stiles_Mike

Table B5 (continued). Site observers on Santa Rosa Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR030	PC	4/5/2018	Stiles_Mike
SR031	PC	5/14/2018	Holderby_Zach
SR032	PC	5/14/2018	Holderby_Zach
SR033	PC	5/14/2018	Holderby_Zach
SR034	PC	4/9/2018	Todd_Nick
SR035	PC	4/9/2018	Todd_Nick
SR036	PC	4/9/2018	Todd_Nick
SR037	PC	5/23/2018	Larramendy_Peter
SR038	PC	5/23/2018	Larramendy_Peter
SR039	PC	5/23/2018	Larramendy_Peter
SR040	PC	4/4/2018	Searcy_Adam_J
SR041	PC	4/4/2018	Searcy_Adam_J
SR042	PC	4/4/2018	Searcy_Adam_J
SR043	PC	5/23/2018	Larramendy_Peter
SR044	PC	5/23/2018	Larramendy_Peter
SR045	PC	5/23/2018	Larramendy_Peter
SR046	PC	5/9/2018	Larramendy_Peter
SR047	PC	5/9/2018	Larramendy_Peter
SR048	PC	5/9/2018	Larramendy_Peter
SR049	PC	4/5/2018	Stiles_Mike
SR050	PC	4/5/2018	Stiles_Mike
SR051	PC	4/5/2018	Stiles_Mike
SR052	PC	4/5/2018	Todd_Nick
SR053	PC	4/5/2018	Todd_Nick
SR054	PC	4/5/2018	Todd_Nick
SR055	PC	4/26/2018	Holderby_Zach
SR056	PC	4/26/2018	Holderby_Zach
SR057	PC	4/26/2018	Holderby_Zach
SR058	PC	5/13/2018	Larramendy_Peter

Table B5 (continued). Site observers on Santa Rosa Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR059	PC	4/26/2018	Holderby_Zach
SR060	PC	4/26/2018	Holderby_Zach
SR061	PC	4/5/2018	Todd_Nick
SR062	PC	4/6/2018	Searcy_Adam_J
SR063	PC	4/6/2018	Searcy_Adam_J
SR064	PC	4/5/2018	Searcy_Adam_J
SR065	PC	4/9/2018	Searcy_Adam_J
SR066	PC	4/5/2018	Searcy_Adam_J
SR067	PC	4/5/2018	Searcy_Adam_J
SR068	PC	4/5/2018	Searcy_Adam_J
SR069	PC	4/9/2018	Searcy_Adam_J
SR070	PC	4/5/2018	Searcy_Adam_J
SR071	PC	4/5/2018	Searcy_Adam_J
SR072	PC	4/5/2018	Searcy_Adam_J
SR073	PC	5/22/2018	Larramendy_Peter
SR074	PC	5/13/2018	Holderby_Zach
SR075	PC	5/13/2018	Holderby_Zach
SR076	PC	4/5/2018	Stiles_Mike
SR077	PC	4/5/2018	Stiles_Mike
SR078	PC	4/9/2018	Searcy_Adam_J
SR079	PC	4/7/2018	Todd_Nick
SR080	PC	4/7/2018	Searcy_Adam_J
SR081	PC	4/7/2018	Searcy_Adam_J
SR082	PC	4/7/2018	Stiles_Mike
SR083	PC	5/25/2018	Larramendy_Peter
SR084	PC	5/25/2018	Larramendy_Peter
SR085	PC	4/7/2018	Stiles_Mike
SR086	PC	5/11/2018	Larramendy_Peter
SR087	PC	5/11/2018	Larramendy_Peter

Table B5 (continued). Site observers on Santa Rosa Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR088	PC	5/11/2018	Larramendy_Peter
SR089	PC	5/13/2018	Holderby_Zach
SR090	PC	5/13/2018	Holderby_Zach
SR091	PC	5/22/2018	Larramendy_Peter
SR092	PC	5/13/2018	Larramendy_Peter
SR093	PC	5/22/2018	Larramendy_Peter
SR094	PC	5/22/2018	Larramendy_Peter
SR095	PC	5/22/2018	Larramendy_Peter
SR096	PC	5/22/2018	Larramendy_Peter
SR097	PC	5/22/2018	Larramendy_Peter
SR098	PC	5/22/2018	Larramendy_Peter
SR099	PC	5/22/2018	Larramendy_Peter
SR100	PC	5/22/2018	Larramendy_Peter
SR101	PC	5/24/2018	Larramendy_Peter
SR102	PC	4/9/2018	Todd_Nick
SR103	PC	4/26/2018	Holderby_Zach
SR104	PC	5/11/2018	Larramendy_Peter
SR105	PC	5/11/2018	Larramendy_Peter
SR106	PC	4/4/2018	Todd_Nick
SR107	PC	4/4/2018	Todd_Nick
SR108	PC	4/4/2018	Todd_Nick
SR109	PC	4/4/2018	Todd_Nick
SR110	PC	4/4/2018	Todd_Nick
SR111	PC	5/13/2018	Holderby_Zach
SR112	PC	5/13/2018	Holderby_Zach
SR113	PC	5/13/2018	Holderby_Zach
SR114	PC	5/13/2018	Holderby_Zach
SR115	PC	5/13/2018	Holderby_Zach
SR116	PC	5/23/2018	Larramendy_Peter

Table B5 (continued). Site observers on Santa Rosa Island in 2018.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR117	PC	5/23/2018	Larramendy_Peter
SR118	PC	5/23/2018	Larramendy_Peter
SR119	PC	5/23/2018	Larramendy_Peter
SR120	PC	5/23/2018	Larramendy_Peter
SR121	PC	5/12/2018	Larramendy_Peter
SR122	PC	5/12/2018	Larramendy_Peter
SR123	PC	5/12/2018	Larramendy_Peter
SR124	PC	5/12/2018	Larramendy_Peter
SR125	PC	5/12/2018	Larramendy_Peter
SR126	PC	4/9/2018	Stiles_Mike
SR127	PC	4/9/2018	Stiles_Mike
SR128	PC	4/9/2018	Stiles_Mike
SR129	PC	4/9/2018	Stiles_Mike
SR130	PC	4/5/2018	Stiles_Mike
SR131	PC	4/9/2018	Searcy_Adam_J
SR132	PC	4/7/2018	Stiles_Mike
SR133	PC	4/7/2018	Stiles_Mike
SR134	PC	4/7/2018	Stiles_Mike
SR135	PC	4/7/2018	Searcy_Adam_J
SR136	PC	4/7/2018	Searcy_Adam_J
SR137	PC	4/4/2018	Searcy_Adam_J
SR138	PC	4/4/2018	Searcy_Adam_J
SR139	PC	4/4/2018	Searcy_Adam_J
SR140	PC	4/4/2018	Searcy_Adam_J
SR141	PC	4/4/2018	Searcy_Adam_J
SR142	PC	4/4/2018	Searcy_Adam_J
SR143	PC	4/5/2018	Todd_Nick
SR144	PC	5/11/2018	Larramendy_Peter
SR145	PC	5/13/2018	Larramendy_Peter

Appendix C. Cowbirds and Nonnative Landbirds

Anecdotal sightings of nonnative landbirds and brood parasitic cowbirds at Channel Islands National Park in 2018 (P. Collins, Santa Barbara Museum of Natural History, unpubl. data). ACI = Anacapa Island, SBI = Santa Barbara Island, SCI = Santa Cruz Island, SMI = San Miguel Island, SRI = Santa Rosa Island.

Table C1. Anecdotal sightings of nonnative landbirds and brood parasitic cowbirds.

Species	Island	Specific Location	Date	Observer	Count
Brown-headed Cowbird	SBI	Unknown	3-May-18	David Pereksta	1
Brown-headed Cowbird	SCI	Christy Ranch	24-Apr-18	Mark Holmgren, Aaron Kreisberg, Dave Haupt	2
Brown-headed Cowbird	SCI	Scorpion Campground	9-May-18	Aaron Kreisberg	3
Brown-headed Cowbird	SCI	Scorpion Campground	12-Aug-18	Garrett Lau	1
Brown-headed Cowbird	SCI	Scorpion Canyon	22-Aug-18	Ruben Ramos	35
Brown-headed Cowbird	SCI	Scorpion Harbor	9-Sep-18	Brian Johnson	1
Brown-headed Cowbird	SCI	Prisoners Harbor	22-Sep-18	Melissa James	2
Brown-headed Cowbird	SCI	Scorpion Harbor	29-Sep-18	Bryce Robinson	8
Brown-headed Cowbird	SCI	Scorpion Harbor	1-Oct-18	Jonathan Dachenhaus	6
Brown-headed Cowbird	SCI	Scorpion Campground	5-Oct-18	Jacquelynn Lockhart	1
Brown-headed Cowbird	SCI	Potato Harbor	9-Oct-18	Tahiry Langrand	1
Brown-headed Cowbird	SCI	Prisoners Harbor	8-Nov-18	Roger Hedge	1
Brown-headed Cowbird	SMI	Unknown	13-Oct-18	Naresh Satyan, Kurt Leuschner	1
Brown-headed Cowbird	SRI	Cherry Canyon	22-Aug-18	Cathy Bondy	21
Brown-headed Cowbird	SRI	Historic Ranch	3-Sep-18	Nick Lethaby	3
Brown-headed Cowbird	SRI	Historic Ranch	28-Oct-18	Jacquelynn Lockhart	8
Eurasian Collared-Dove	SCI	Main Ranch	1-Jan-18	Graham Chisholm	14
Eurasian Collared-Dove	SCI	Central Valley	1-Jan-18	Jessie Altstatt	18
Eurasian Collared-Dove	SCI	Central Valley	2-Jan-18	Dan Richards	5
Eurasian Collared-Dove	SCI	Main Ranch	2-Jan-18	Ethan Ripperger	8

Table C1 (continued). Anecdotal sightings of nonnative landbirds and brood parasitic cowbirds.

Species	Island	Specific Location	Date	Observer	Count
Eurasian Collared-Dove	SCI	Main Ranch	2-Jan-18	Graham Chisholm	32
Eurasian Collared-Dove	SCI	Central Valley	1-Mar-18	Christopher Tarango, Anna Kennedy	20
Eurasian Collared-Dove	SCI	near Main Ranch	2-Mar-18	Anna Kennedy	1
Eurasian Collared-Dove	SCI	near Main Ranch	13-Mar-18	Anna Kennedy	1
Eurasian Collared-Dove	SCI	Scorpion Campground	16-Mar-18	Anna Kennedy	1
Eurasian Collared-Dove	SCI	Scorpion Campground	31-Mar-18	Jim Howard	1
Eurasian Collared-Dove	SCI	Scorpion Campground	4-Apr-18	Art Drauglis	5
Eurasian Collared-Dove	SCI	Scorpion Harbor	4-Apr-18	Art Drauglis	1
Eurasian Collared-Dove	SCI	Scorpion Harbor	6-Apr-18	Eric Temple	6
Eurasian Collared-Dove	SCI	Scorpion Campground	8-Apr-18	Matt Longabaugh	5
Eurasian Collared-Dove	SCI	Scorpion Campground	9-Apr-18	Domo De Bryl, Gerd Stieler, Cedro De Bryl	4
Eurasian Collared-Dove	SCI	Scorpion Campground	9-Apr-18	Mike Russell	8
Eurasian Collared-Dove	SCI	Scorpion Campground	17-Apr-18	Robert Fisher, D. Bellamy	1
Eurasian Collared-Dove	SCI	N shore East end	18-Apr-18	XplorMor International	1
Eurasian Collared-Dove	SCI	Scorpion Campground	19-Apr-18	Robert Fisher, D. Bellamy	1
Eurasian Collared-Dove	SCI	Canada del Puerto	25-Apr-18	Mark Holmgren, Dave Haupt, Aaron Kreisberg	1
Eurasian Collared-Dove	SCI	Main Ranch	25-Apr-18	Mark Holmgren, Dave Haupt, Aaron Kreisberg	16
Eurasian Collared-Dove	SCI	Recent Burn Area, Central Valley	25-Apr-18	Mark Holmgren, Dave Haupt	2
Eurasian Collared-Dove	SCI	UC Research Station	26-Apr-18	Dave Haupt, Mark Holmgren	1
Eurasian Collared-Dove	SCI	Scorpion Canyon	5-May-18	Linda Windsor	5
Eurasian Collared-Dove	SCI	near Main Ranch	5-May-18	Anna Kennedy, Zena Casteel	5

Table C1 (continued). Anecdotal sightings of nonnative landbirds and brood parasitic cowbirds.

Species	Island	Specific Location	Date	Observer	Count
Eurasian Collared-Dove	SCI	Scorpion Campground	12-May-18	Elaine Tan	1
Eurasian Collared-Dove	SCI	Scorpion Campground	21-May-18	Naomi Goodman	1
Eurasian Collared-Dove	SCI	Main Ranch	5-Jun-18	Gjon Hazard	5
Eurasian Collared-Dove	SCI	Main Ranch	5-Jun-18	Chris McCreedy	6
Eurasian Collared-Dove	SCI	Main Ranch	5-Jun-18	Gjon Hazard	3
Eurasian Collared-Dove	SCI	Central Valley	5-Jun-18	Chris McCreedy	2
Eurasian Collared-Dove	SCI	Scorpion Harbor	5-Jun-18	Noah Frade, Steven Goodman	3
Eurasian Collared-Dove	SCI	Main Ranch	6-Jun-18	Emily Clark	6
Eurasian Collared-Dove	SCI	Main Ranch	6-Jun-18	Tice Supplee	1
Eurasian Collared-Dove	SCI	Main Ranch	6-Jun-18	Chris McCreedy	2
Eurasian Collared-Dove	SCI	Main Ranch	6-Jun-18	Chris McCreedy	6
Eurasian Collared-Dove	SCI	Main Ranch	6-Jun-18	Gjon Hazard	5
Eurasian Collared-Dove	SCI	UC Research Station	6-Jun-18	Gjon Hazard	2
Eurasian Collared-Dove	SCI	UC Research Station	7-Jun-18	Gjon Hazard	1
Eurasian Collared-Dove	SCI	Main Ranch	7-Jun-18	Chris McCreedy	8
Eurasian Collared-Dove	SCI	Main Ranch	7-Jun-18	Gjon Hazard	5
Eurasian Collared-Dove	SCI	Main Ranch	7-Jun-18	Chris McCreedy	5
Eurasian Collared-Dove	SCI	Main Ranch	8-Jun-18	Chris McCreedy	2
Eurasian Collared-Dove	SCI	Prisoners Harbor	17-Jun-18	Nick Lethaby	1
Eurasian Collared-Dove	SCI	Prisoners Harbor	29-Jun-18	Jessie Stuebner, Cal Stuebner	1
Eurasian Collared-Dove	SCI	Scorpion Harbor	29-Jun-18	Kent Fiala	2
Eurasian Collared-Dove	SCI	ant Monitoring Plot E end Central Valley	8-Jul-18	Elaine Tan	1
Eurasian Collared-Dove	SCI	Main Ranch	10-Jul-18	Elaine Tan	5
Eurasian Collared-Dove	SCI	Main Ranch	12-Jul-18	Elaine Tan	4

Table C1 (continued). Anecdotal sightings of nonnative landbirds and brood parasitic cowbirds.

Species	Island	Specific Location	Date	Observer	Count
Eurasian Collared-Dove	SCI	Scorpion Campground	21-Oct-18	Cuyler Stapelman	1
Eurasian Collared-Dove	SRI	Mouth Water Canyon	16-Mar-18	Nathan Melling	3
Eurasian Collared-Dove	SRI	Ranch	31-May-18	Jacquelynn Lockhart	7
Eurasian Collared-Dove	SRI	Cherry Canyon	16-Jun-18	Keri Dearborn	3
Eurasian Collared-Dove	SRI	Historic Ranch	16-Jun-18	Nick Lethaby	4
Eurasian Collared-Dove	SRI	Lobo Canyon	24-Jun-18	Naresh Satyan	10
Eurasian Collared-Dove	SRI	Coast Road	20-Aug-18	Cathy Bondy	1
Eurasian Collared-Dove	SRI	Historic Ranch	26-Aug-18	Sarah Ngo	1
Eurasian Collared-Dove	SRI	Historic Ranch	3-Sep-18	Nick Lethaby	8
Eurasian Collared-Dove	SRI	Historic Ranch	28-Oct-18	Jacquelynn Lockhart	4
European Starling	SCI	Christy Ranch	1-Jan-18	Graham Chisholm, Andrea L. jones	1
European Starling	SCI	Main Ranch	2-Jan-18	Ethan Ripperger	10
European Starling	SCI	Main Ranch	2-Jan-18	Graham Chisholm	1
European Starling	SCI	Christy Ranch	3-Jan-18	Jessie Altstatt	25
European Starling	SCI	Central Valley	1-Mar-18	Christopher Tarango, Anna Kennedy	19
European Starling	SCI	Central Valley	7-Mar-18	Christopher Tarango	30
European Starling	SCI	TNC Cabins	13-Mar-18	Anna Kennedy	2
European Starling	SCI	Scorpion Campground	17-Apr-18	Robert Fisher, D. Bellamy	1
European Starling	SCI	Scorpion Canyon	18-Apr-18	Robert Fisher, D. Bellamy	1
European Starling	SCI	Scorpion Canyon	20-Apr-18	Philip Henson	1
European Starling	SCI	Christy Ranch	24-Apr-18	Mark Holmbren, Aaron Kreisberg, Dave Haupt	6
European Starling	SCI	Main Ranch	25-Apr-18	Mark Holmbren, Aaron Kreisberg, Dave Haupt	18
European Starling	SCI	E end Central Valley, recent burn	25-Apr-18	Mark Holmbren, Dave Haupt	4
European Starling	SCI	near Main Ranch	5-May-18	Anna Kennedy, Zena Casteel	3

Table C1 (continued). Anecdotal sightings of nonnative landbirds and brood parasitic cowbirds.

Species	Island	Specific Location	Date	Observer	Count
European Starling	SCI	Scorpion Campground	5-May-18	Aaron Kreisberg	2
European Starling	SCI	Scorpion Campground	11-May-18	David Pereksta, Gene Revelas	4
European Starling	SCI	Scorpion Campground	15-May-18	Aaron Kreisberg	2
European Starling	SCI	Main Ranch	5-Jun-18	Chris McCreedy	2
European Starling	SCI	Main Ranch	5-Jun-18	Chris McCreedy	22
European Starling	SCI	Main Ranch	5-Jun-18	Gjon Hazard	15
European Starling	SCI	Christy Ranch	6-Jun-18	Gjon Hazard	1
European Starling	SCI	Main Ranch	6-Jun-18	Emily Clark	17
European Starling	SCI	Main Ranch	6-Jun-18	Tice Supplee	8
European Starling	SCI	Main Ranch	6-Jun-18	Chris McCreedy	22
European Starling	SCI	UC Research Station	7-Jun-18	Gjon Hazard	3
European Starling	SCI	Main Ranch	7-Jun-18	Chris McCreedy	59
European Starling	SCI	Main Ranch	7-Jun-18	Chris McCreedy	2
European Starling	SCI	Main Ranch	8-Jun-18	Chris McCreedy	2
European Starling	SCI	Main Ranch	8-Jun-18	Jennie Duberstein	20
European Starling	SCI	Scorpion Campground	9-Jul-18	Logan Searl	<u>3</u>
European Starling	SCI	Scorpion Canyon	16-Jul-18	Elaine Tan	1
European Starling	SCI	Christy Ranch	12-Aug-18	Elaine Tan	6
European Starling	SMI	Unknown	14-Dec-18	Martin Ruane	1
European Starling	SRI	Historic Ranch	3-Apr-18	Adam Searcy	2
European Starling	SRI	Historic Ranch	16-Jun-18	Nick Lethaby	3
European Starling	SRI	Cherry Canyon	16-Jun-18	Keri Dearborn	1
European Starling	SRI	Lobo Canyon	24-Jun-18	Naresh Satyan	2
European Starling	SRI	Historic Ranch	3-Sep-18	Nick Lethaby	13
House Sparrow	SCI	Prisoners Harbor	13-Jan-18	Jeremiah Psiropoulos	8
House Sparrow	SCI	Scorpion Harbor	30-Apr-18	Jennifer Stone	1

Table C1 (continued). Anecdotal sightings of nonnative landbirds and brood parasitic cowbirds.

Species	Island	Specific Location	Date	Observer	Count
House Sparrow	SCI	Scorpion Canyon	5-May-18	Linda Windsor	2
House Sparrow	SCI	Scorpion Campground	16-Oct-18	Dan Ganter	6
House Sparrow	SRI	Historic Ranch	3-Apr-18	Adam Searcy	5
Rock Pigeon	SCI	Main Ranch	25-Apr-18	Mark Holmgren, Dave Haupt, Aaron Kreisberg	1
Rock Pigeon	SCI	Main Ranch	7-Jul-18	Elaine Tan	1
Rock Pigeon	SCI	Prisoners Harbor	18-Aug-18	Linda LeRoy	1
Rock Pigeon	SCI	Prisoners Harbor	22-Sep-18	Melissa James	1
Rock Pigeon	SCI	Scorpion Campground	6-Oct-18	Steve Myers	1
Scaly-breasted Munia	ACI	East Anacapa	14-Nov-18	Adam Searcy	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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U.S. Department of the Interior



Natural Resource Stewardship and Science

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