



Landbird Monitoring 2019 Annual Report

Channel Islands National Park

Natural Resource Report NPS/MEDN/NRR—2022/2465



ON THE COVER

Vegetation on the Pelican Bay trail, Santa Cruz Island, March 2015 by Linnea Hall, with permission.

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Contents

	Page
Figures.....	iv
Tables.....	v
Appendices.....	vi
Abstract or Executive Summary	vii
Acknowledgments.....	viii
Introduction.....	1
Methods.....	2
Results.....	7
Discussion	31
Recommendations.....	33
Literature Cited	35

Figures

	Page
Figure 1. Landbird monitoring point count stations (red dots) and line transects (red lines) on east Anacapa Island.....	3
Figure 2. Landbird monitoring point count stations (red dots) and line transects (red lines) on Santa Barbara Island.	4
Figure 3. Landbird monitoring point count stations (red dots) on Santa Cruz Island.....	5
Figure 4. Landbird monitoring point count stations (red dots) and line transects (red lines) on San Miguel Island.	5
Figure 5. Landbird monitoring point count stations (red dots) on Santa Rosa Island.....	6
Figure 6. Boxplots for each species detected at point count stations on Anacapa Island in 2019.....	16
Figure 7. Boxplots for each species detected at point count stations on Santa Barbara Island in 2019.....	17
Figure 8. Boxplots for each species detected at point count stations on Santa Cruz Island in 2019.	18
Figure 9. Boxplots for each species detected at point count stations on San Miguel Island in 2019.	19
Figure 10. Boxplots for each species detected at point count stations on Santa Rosa Island in 2019.....	20
Figure 11. Breeding species occurrence from 1993–2019 for Anacapa Island.	23
Figure 12. Breeding species occurrence from 1993–2019 for Santa Barbara Island.....	24
Figure 13. Breeding species occurrence from 2013–2019 for Santa Cruz Island.....	25
Figure 14. Breeding species occurrence from 1993–2019 for San Miguel Island.....	26
Figure 15. Breeding Species occurrence from 1994–2019 for Santa Rosa Island.....	27

Tables

	Page
Table 1. Start and end dates, number of transects, and number of point count sites monitored on each island in 2019.	7
Table 2. Number of individuals of each species counted during bird surveys on all islands in 2019.	8
Table 3. Results from point count sampling at 6 stations on Anacapa Island: number of individuals detected, mean per point count stations and standard error, number of stations where a species was detected, and frequency expressed as a percent of total stations where a species was detected in 2019.	11
Table 4. Results from point count sampling at 24 stations on Santa Barbara Island: number of individuals detected, mean per station and standard error, number of stations where a species was detected, and frequency.	11
Table 5. Results from point count sampling at 118 stations on Santa Cruz Island: number of individuals detected, mean per stations and standard error, number of stations where a species was detected, and frequency.	12
Table 6. Results from point count sampling at 40 stations on San Miguel Island: number of individuals detected, mean per station and standard error, number of stations where a species was detected, and frequency.	13
Table 7. Results from point count sampling at 141 stations on Santa Rosa Island: number of individuals detected, mean per stations and standard error, number of stations where a bird species was detected, and frequency.	14
Table 8. Number of individuals of each species detected on one line transect count in 2019.	15
Table 9. New transient or visiting bird species counted in 2019 (“X”), and other transients and visiting species counted in all other years since monitoring began (“X”), on each of the five northern Channel Islands.	28
Table 10. Summary of anecdotal observations of non-native bird species at five CHIS islands in 2019 reported via eBird.	30

Appendices

	Page
Appendix A.....	37
Appendix B.....	39
Appendix C.....	49

Executive Summary

The National Park Service (NPS) began monitoring landbirds at Channel Islands National Park in 1993 as part of its long-term inventory and monitoring program. The park's landbird monitoring later became part of the NPS Inventory and Monitoring Division's Mediterranean Coast Network long-term monitoring programs. Consequently, landbird monitoring has been conducted during every breeding season since 1993. In this report, we summarize data collected during the 2019 breeding season.

Landbird monitoring was conducted between 1 March and 27 June 2019. Using distance-based sampling methods in a standardized protocol, birds were counted on 332 of 348 permanent point count stations across the Channel Islands monitored for landbirds. These surveys were conducted at 29 of 33 points on Santa Barbara Island, 8 of 8 on East Anacapa Island, 112 of 112 on Santa Cruz Island, 40 of 40 on San Miguel Island, and 145 of 145 on Santa Rosa Island.

Sixty-one bird species were counted from points and transects across all the islands in 2019. Thirty-six of these species breed in Channel Islands National Park. Parkwide, the 10 most detected breeding landbirds in 2019 were, in descending order: Spotted Towhee, Song Sparrow, Orange-crowned Warbler, Bewick's Wren, Western Meadowlark, Horned Lark, House Finch, Pacific-slope Flycatcher, Island Scrub-Jay, and Common Raven (scientific names in Table 2). Across all five islands, five transient or visiting bird species were newly counted in 2019, for a total of 63 such species counted since NPS monitoring began on the islands.

Notable findings from 2019 include the first documentation of a Short-eared Owl on San Miguel Island, and Common Raven was a new transient species counted on SBI.

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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 starting in 2001 as a result of a program review in 2000 (McEachern 2000, Coonan et al. 2011a). 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 2019.

The objectives of the landbird monitoring program (van Riper III et al. 1988, Coonan et al. 2011a) 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 2019. 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

Landbird monitoring at CHIS was conducted using distance-based sampling methods (Buckland et al. 2017). Monitoring on Santa Barbara, Anacapa, Santa Rosa, and San Miguel occurred at established line transects (van Riper et al. 1998) and randomly placed point count sites called “stations” (Coonan et al. 2011a) as per protocol review recommendations proposed in 2000. Monitoring on Santa Cruz Island was conducted at 100 systematically placed point count stations established by R. C. Klinger of The Nature Conservancy in 1991 (Klinger 1998), and at 12 stations on East Santa Cruz Island that were established by CHIS staff in 2013 using the same method. Point count stations on Santa Cruz Island were selected using a two-step process. First, access points to the stations were designated every ½ mile (0.8 km) along major roads and trails. Next, the stations were established at a random compass bearing and random distance (within 150 m) from each designated access point. An additional 8 stations were established by NPS in the Prisoner’s Harbor wetland restoration area in 2015.

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 not conducted during high winds (wind strength on the Beaufort scale sustained at 4 or greater) or heavy rain. Observations were made by sight, and sound, of either perched or flying birds, and included horizontal distances in meters from the observer to the bird. 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 et al. 2011a).

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 seven observers conducted landbird monitoring in 2019 (Appendix B).

The methodology used in 2019 followed Coonan et al. (2011a), except for the fog modification that was adopted in 2015 and repeated again during the 2016–2019 seasons: the minimum visibility distance necessary to conduct monitoring was reduced from 400 m to 150 m.

Data were entered into the CHIS Landbird Database by L. Hall and P. Larramendy, and then 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).

Landbird monitoring point count stations and line transects are presented in Figures 1–5.

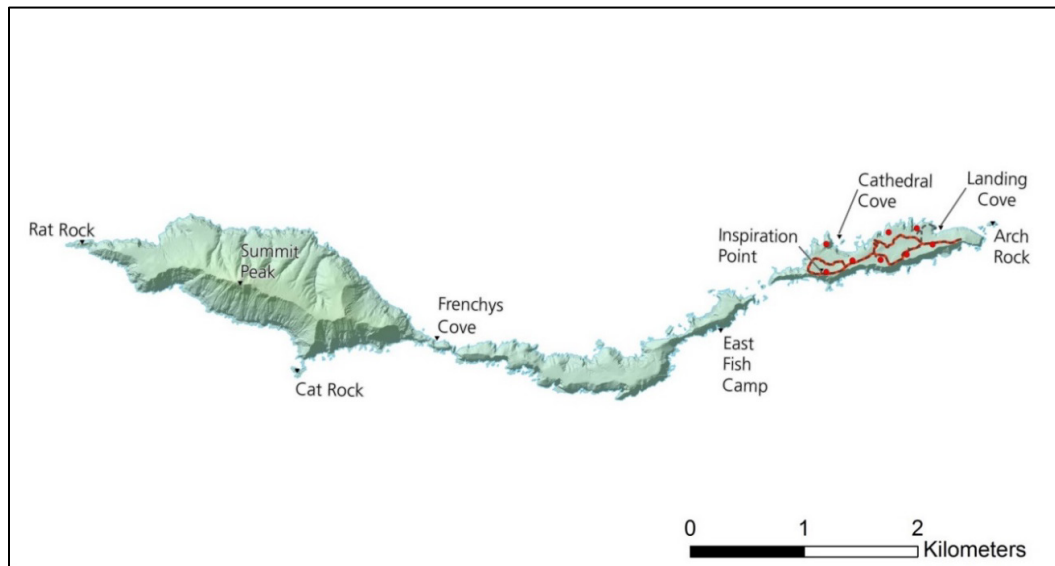


Figure 1. Landbird monitoring point count stations (red dots) and line transects (red lines) on east Anacapa Island.

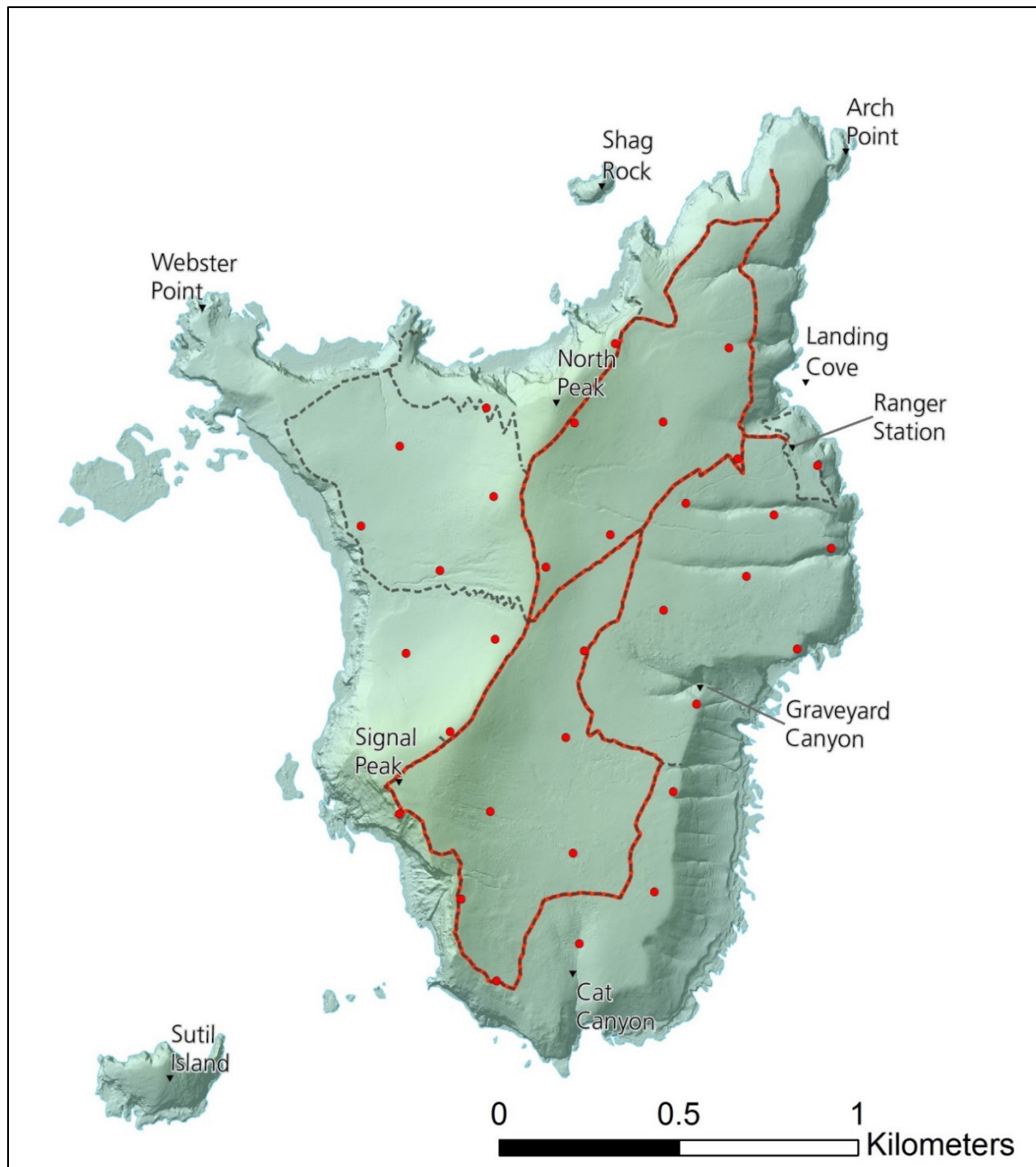


Figure 2. Landbird monitoring point count stations (red dots) and line transects (red lines) on Santa Barbara Island.

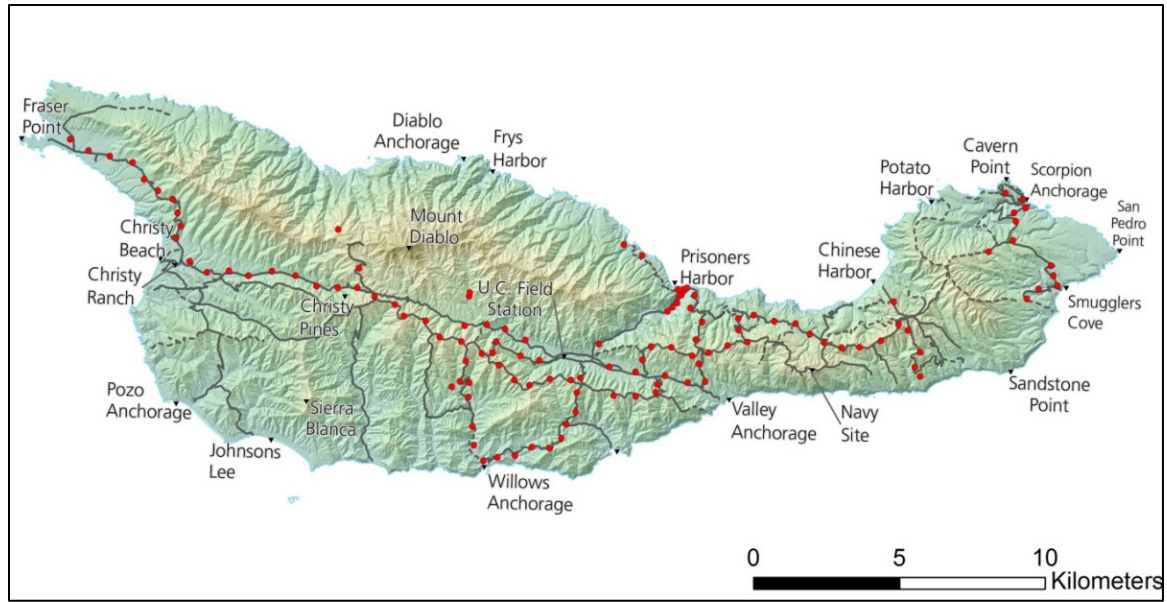


Figure 3. Landbird monitoring point count stations (red dots) on Santa Cruz Island.

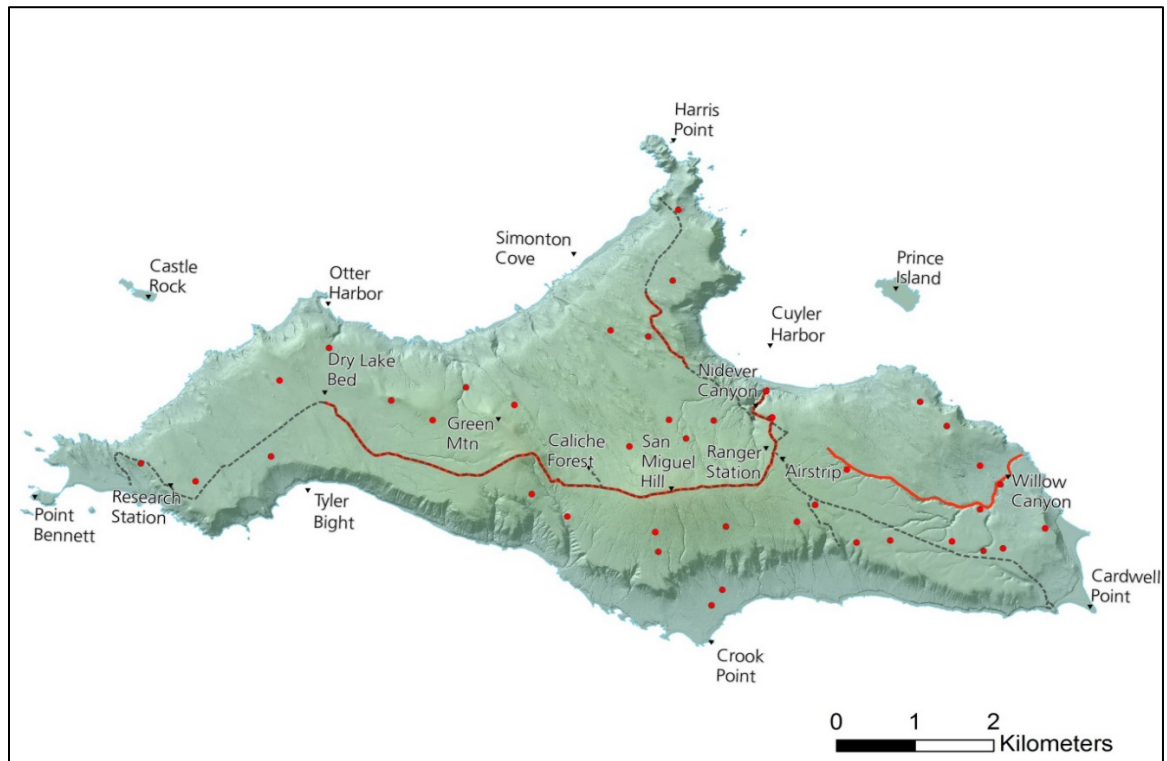


Figure 4. Landbird monitoring point count stations (red dots) and line transects (red lines) on San Miguel Island.

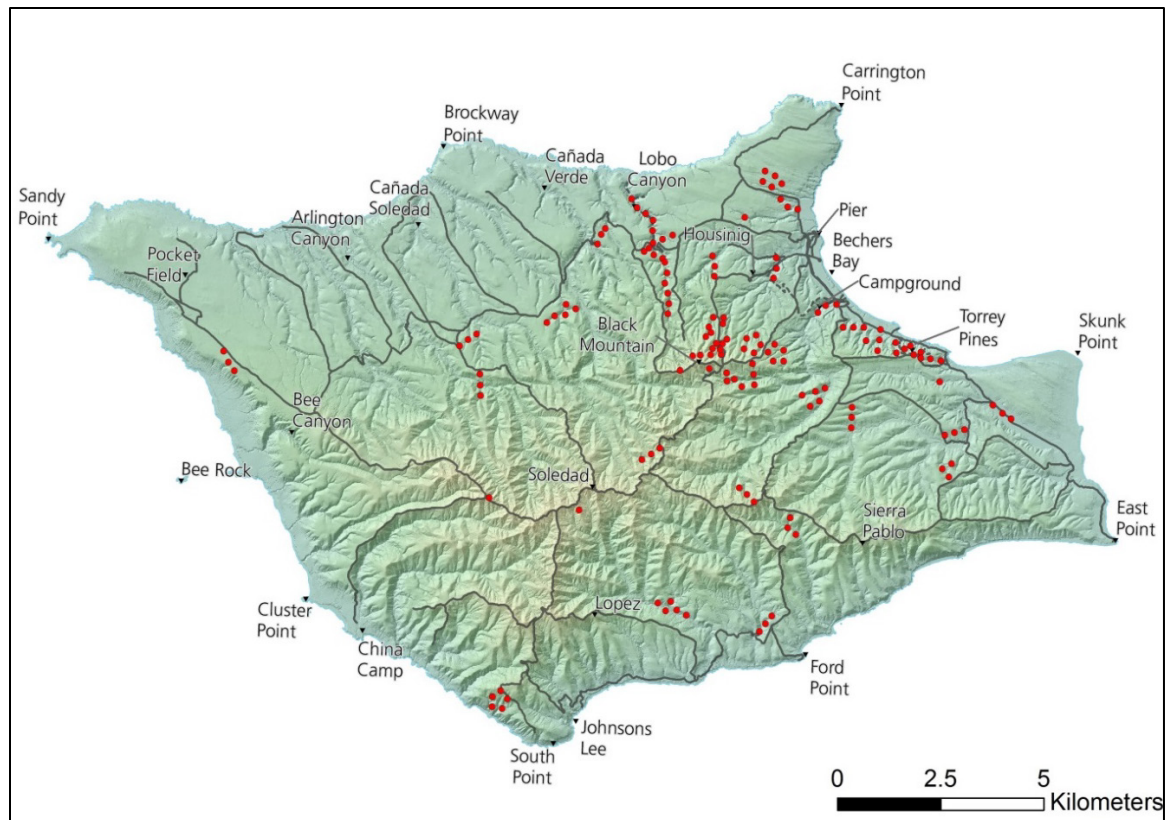


Figure 5. Landbird monitoring point count stations (red dots) on Santa Rosa Island.

Results

Monitoring was conducted between 1 March and 27 June 2019 (Table 1). We surveyed birds on 1 of 9 permanent line transects (1 of 3 on Santa Barbara Island, 0 of 1 on East Anacapa Island, and 0 of 5 on San Miguel Island). These transects were not sampled partially because of gull activity on two of them (i.e., on Santa Barbara and Anacapa islands), and because of error (i.e., on San Miguel Island, where the observer did not realize that the transects needed to be counted). For point counts, 332 of 348 permanent point count sites (95%) were sampled in 2019 (i.e., 24 of 33 points on Santa Barbara, 8 of 8 on Anacapa, 118 of 120 on Santa Cruz, 40 of 40 on San Miguel, and 141 of 145 on Santa Rosa). Nine points on Santa Barbara Island were not counted due to gull and pelican activity; these points and the transect were also not counted in 2016–2018 to avoid disturbing breeding California Brown Pelicans (*Pelecanus occidentalis*) and Western Gulls (*Larus occidentalis*). Other points were not counted due to logistical issues and/or poor weather conditions. Also, on Santa Rosa, the evacuation of one observer left all remaining counts to the other (P. Larramendy), who counted as many as possible, but because of fog was unable to complete the final four points.

On Santa Cruz Island, we conducted a seventh year of monitoring monitored and visited all 120 sites.

Table 1. Start and end dates, number of transects, and number of point count sites monitored on each island in 2019.

Island	Start Date	End Date	# Transects	# Point Counts
Anacapa	03/28/2019	04/06/2019	1	8
Santa Barbara	03/22/2019	03/27/2019	1	24
Santa Cruz	04/03/2019	06/14/2019	0	120
San Miguel	04/14/2019	04/29/2019	0	40
Santa Rosa	05/20/2019	06/01/2019	0	141

The number of individuals of each species that were detected on all islands in 2019 are presented in Table 2. 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.

Sixty-one bird species were counted from points and transects across all of the islands in 2019 (Table 2). Thirty-six of these are breeding species on the island (Table 2, Appendix A). Parkwide, the 10 most commonly detected breeding landbirds in 2019 were, in descending order: Spotted Towhee (scientific names given in Table 2 and Appendix B), Song Sparrow, Orange-crowned Warbler, Bewick’s Wren, Western Meadowlark, Horned Lark, House Finch, Pacific-slope Flycatcher, Island Scrub-Jay, and Common Raven (Table 2).

Table 2. Number of individuals of each species counted during bird surveys on all islands in 2019. 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>	68	–	–	35	–	33
Allen's Hummingbird	<i>Selasphorus sasin</i>	74	–	–	4	4	66
Anna's Hummingbird	<i>Calypte anna</i>	42	–	–	15	–	27
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	44	–	–	44	–	–
Bald Eagle	<i>Haliaeetus leucocephalus</i>	1	–	–	–	–	1
Barn Owl	<i>Tyto alba</i>	1	–	–	–	–	1
Barn Swallow	<i>Hirundo rustica</i>	64	–	–	54	–	10
Bewick's Wren	<i>Thryomanes bewickii</i>	339	–	–	115	–	224
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	4	–	–	4	–	–
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	22	–	–	22	–	–
Black Phoebe	<i>Sayornis nigricans</i>	4	–	–	3	–	1
Bushtit	<i>Psaltirparus minimus</i>	20	–	–	5	–	15
California Quail	<i>Callipepla californica</i>	74	–	–	46	–	28
Chipping Sparrow	<i>Spizella passerina</i>	115	–	–	26	–	89
Cooper's Hawk	<i>Accipiter cooperii</i>	1	–	–	1	–	–
Common Raven	<i>Corvus corax</i>	133	–	1	38	32	62
Common Yellowthroat	<i>Geothlypis trichas</i>	2	–	–	2	–	–
Dark-eyed Junco	<i>Junco hyemalis</i>	2	–	–	2	–	–
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	2	–	–	2	–	–
European Starling	<i>Sturnus vulgaris</i>	8	–	–	4	–	4
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	1	–	1	–	–	–
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	8	–	–	2	2	4
Hermit Thrush	<i>Catharus guttatus</i>	2	–	–	2	–	–
House Finch	<i>Carpodacus mexicanus</i>	226	–	4	78	–	144

Table 2 (continued). Number of individuals of each species counted during bird surveys on all islands in 2019. 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
Horned Lark	<i>Eremophila alpestris</i>	246	–	148	2	37	59
Hooded Oriole	<i>Icterus cucullatus</i>	3	–	–	3	–	–
Hutton's Vireo	<i>Vireo huttoni</i>	47	–	–	29	–	18
Island Scrub-Jay	<i>Apelocoma insularis</i>	151	–	–	151	–	–
Lawrence's Goldfinch	<i>Carduelis lawrencei</i>	2	–	–	–	–	2
Lazuli Bunting	<i>Passerina amoena</i>	10	–	–	7	3	–
Lesser Goldfinch	<i>Carduelis psaltria</i>	57	–	–	13	–	44
Loggerhead Shrike	<i>Lanius ludovicianus</i>	18	–	–	6	–	12
Mallard	<i>Anas platyrhynchos</i>	10	–	–	10	–	–
Mourning Dove	<i>Zenaida macroura</i>	22	–	–	14	–	8
Northern Flicker	<i>Colaptes auratus</i>	63	–	–	63	–	–
Northern Harrier	<i>Circus cyaneus</i>	1	–	–	–	1	–
Northern Mockingbird	<i>Mimus polyglottos</i>	24	–	–	14	–	10
Orange-crowned Warbler	<i>Vermivora celata</i>	355	–	4	108	43	200
Osprey	<i>Pandion haliaetus</i>	2	–	–	2	–	–
Peregrine Falcon	<i>Falco peregrinus</i>	3	–	–	–	–	3
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	158	–	–	29	–	129
Ruby-crowned Kinglet	<i>Regulus calendula</i>	3	–	–	3	–	–
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	41	–	–	41	–	–
Rock Wren	<i>Salpinctes obsoletus</i>	3	–	1	–	1	1
Red-tailed Hawk	<i>Buteo jamaicensis</i>	15	–	–	3	–	12
Savannah Sparrow	<i>Passerculus sandwichensis</i>	2	–	1	1	–	–
Short-eared Owl	<i>Asio flammeus</i>	1	–	–	–	1	–
Song Sparrow	<i>Melospiza melodia</i>	626	7	–	133	99	387

Table 2 (continued). Number of individuals of each species counted during bird surveys on all islands in 2019. 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
Spotted Towhee	<i>Pipilo maculatus</i>	870	–	–	380	–	490
Sharp-shinned Hawk	<i>Accipiter striatus</i>	2	–	–	2	–	–
Swainson's Thrush	<i>Catharus ustulatus</i>	2	–	–	–	–	2
Townsend's Warbler	<i>Dendroica townsendi</i>	2	–	–	2	–	–
Virginia Rail	<i>Rallus limicola</i>	2	–	–	–	–	2
Warbling Vireo	<i>Vireo gilvus</i>	1	–	–	–	–	1
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	29	4	25	–	–	–
Western Kingbird	<i>Tyrannus verticalis</i>	1	–	–	1	–	–
Western Meadowlark	<i>Sturnella neglecta</i>	336	1	33	42	54	206
Western Tanager	<i>Piranga ludoviciana</i>	2	–	–	2	–	–
Wilson's Warbler	<i>Wilsonia pusilla</i>	4	–	–	1	–	3
White-throated Swift	<i>Aeronautes saxatalis</i>	2	–	–	2	–	–
Yellow-rumped Warbler	<i>Dendroica coronata</i>	27	–	1	25	1	–
Total Number of Species per Island (Richness)			3	10	49	12	34

Song Sparrow was the only species detected at >50% of point count stations on Anacapa Island in 2019 (Table 3); Horned Lark and Western Meadowlark were the only species detected at >50% of count stations on Santa Barbara Island (Table 4); Bewick's Wren, Island Scrub Jay, and Spotted Towhee were detected at >50% of count stations on Santa Cruz Island (Table 5); Orange-crowned Warbler, Song Sparrow, and Western Meadowlark were detected at >50% of stations on San Miguel Island (Table 6); and Bewick's Wren, Orange-crowned Warbler, Pacific-Slope Flycatcher, Song Sparrow, Spotted Towhee, and Western Meadowlark were detected at >50% of count stations on Santa Rosa Island (Table 7).

Table 3. Results from point count sampling at 6 stations on Anacapa Island: number of individuals detected, mean per point count stations and standard error, number of stations where a species was detected, and frequency expressed as a percent of total stations where a species was detected in 2019.

Species	Common Name	# Detected	Mean per Stn	S.E.	# Sites Detected	% Stns
SOSP	Song Sparrow	7	1.17	0.37	4	66.7
WEME	Western Meadowlark	1	0.17	0.18	1	16.7
WCSP	White-crowned Sparrow	4	0.67	0.53	2	33.3

Table 4. Results from point count sampling at 24 stations on Santa Barbara Island: number of individuals detected, mean per station and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected in 2019).

Species	Common Name	# Detected	Mean per Stn	S.E.	# Sites Detected	% Stns
GCSP	Golden-crowned Sparrow	1	0.04	0.04	1	4.2
HOLA	Horned Lark	112	4.67	0.46	24	100.0
HOFI	House Finch	4	0.17	0.10	3	12.5
OCWA	Orange-crowned Warbler	4	0.17	0.08	4	16.7
ROWR	Rock Wren	1	0.04	0.04	1	4.2
SAVS	Savannah Sparrow	1	0.04	0.04	1	4.2
WEME	Western Meadowlark	24	1.00	0.26	12	50.0
WCSP	White-crowned Sparrow	25	1.04	0.39	9	37.5
YRWA	Yellow-rumped Warbler	1	0.04	0.04	1	4.2

Table 5. Results from point count sampling at 118 stations on Santa Cruz Island: number of individuals detected, mean per stations and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected in 2019).

Species	Common Name	# Detected	Mean per Stn	S.E.	# Sites Detected	% Stns
ACWO	Acorn Woodpecker	35	0.30	0.07	18	15.3
ALHU	Allen's Hummingbird	4	0.03	0.02	4	3.4
ANHU	Anna's Hummingbird	15	0.13	0.04	13	11.0
ATFL	Ash-throated Flycatcher	44	0.37	0.05	41	34.7
BARS	Barn Swallow	54	0.46	0.15	13	11.0
BEWR	Bewick's Wren	114	0.97	0.08	82	69.5
BHGR	Black-headed Grosbeak	22	0.19	0.04	3	16.1
BLPH	Black Phoebe	3	0.03	0.01	19	2.5
BGGN	Blue-gray Gnatcatcher	4	0.03	0.02	4	3.4
BUSH	Bushtit	2	0.02	0.02	2	0.8
CAQU	California Quail	46	0.39	0.06	35	29.7
CHSP	Chipping Sparrow	26	0.22	0.05	17	14.4
CORA	Common Raven	38	0.32	0.08	21	17.8
COYE	Common Yellowthroat	2	0.02	0.01	2	1.7
COHA	Cooper's Hawk	1	0.01	0.01	1	0.8
DEJU	Dark-eyed Junco	2	0.02	0.02	1	0.8
ECDO	Eurasian Collared Dove	2	0.02	0.01	2	1.7
EUST	European Starling	4	0.03	0.02	2	1.7
GRSP	Grasshopper Sparrow	2	0.02	0.01	2	1.7
HETH	Hermit Thrush	2	0.02	0.01	2	1.7
HOOR	Hooded Oriole	3	0.03	0.02	2	1.7
HOLA	Horned Lark	2	0.02	0.02	1	0.8
HOFI	House Finch	76	0.64	0.10	43	35.6
HUVI	Hutton's Vireo	29	0.25	0.05	24	20.3
ISJA	Island Scrub-Jay	150	1.27	0.10	77	65.3
LAZB	Lazuli Bunting	7	0.06	0.03	5	4.2
LEGO	Lesser Goldfinch	13	0.11	0.06	5	4.2
LOSH	Loggerhead Shrike	6	0.05	0.02	5	4.2
MALL	Mallard	10	0.08	0.07	2	1.7
MODO	Mourning Dove	14	0.12	0.04	11	9.3
NOFL	Northern Flicker	63	0.53	0.07	50	42.4
NOMO	Northern Mockingbird	14	0.12	0.05	8	6.8
OCWA	Orange-crowned Warbler	107	0.91	0.11	56	47.5
OSPR	Osprey	2	0.02	0.01	2	1.7
PSFL	Pacific-slope Flycatcher	28	0.24	0.04	26	22.0

Table 5 (continued). Results from point count sampling at 118 stations on Santa Cruz Island: number of individuals detected, mean per stations and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected in 2019).

Species	Common Name	# Detected	Mean per Stn	S.E.	# Sites Detected	% Stns
RTHA	Red-tailed Hawk	3	0.03	0.02	2	1.7
RCKI	Ruby-crowned Kinglet	3	0.03	0.01	3	2.5
RCSP	Rufous-crowned Sparrow	41	0.35	0.06	29	24.6
SAVS	Savannah Sparrow	1	0.01	0.01	1	0.8
SSHA	Sharp-shinned Hawk	2	0.02	0.01	2	1.7
SOSP	Song Sparrow	133	1.13	0.15	53	44.9
SPTO	Spotted Towhee	377	3.19	0.15	114	96.6
TOWA	Townsend's Warbler	2	0.02	0.01	2	1.7
WEKI	Western Kingbird	1	0.01	0.01	1	0.8
WEME	Western Meadowlark	42	0.36	0.08	22	18.6
WETA	Western Tanager	2	0.02	0.01	2	1.7
WTSW	White-throated Swift	2	0.02	0.01	2	1.7
WIWA	Wilson's Warbler	1	0.01	0.01	1	0.8
YRWA	Yellow-rumped Warbler	25	0.21	0.12	4	3.4

Table 6. Results from point count sampling at 40 stations on San Miguel Island: number of individuals detected, mean per station and standard error, number of stations where a species was detected, and frequency (percent of stations where a bird species was detected in 2019).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Sites Detected	% Stns
ALHU	Allen's Hummingbird	4	0.10	0.08	2	5.0
CORA	Common Raven	32	0.80	0.27	11	27.5
GRSP	Grasshopper Sparrow	2	0.05	0.03	2	5.0
HOLA	Horned Lark	37	0.92	0.29	13	32.5
LAZB	Lazuli Bunting	3	0.08	0.08	1	2.5
NOHA	Northern Harrier	1	0.02	0.02	1	2.5
OCWA	Orange-crowned Warbler	43	1.07	0.21	21	52.5
ROWR	Rock Wren	1	0.02	0.02	1	2.5
SEOW	Short-eared Owl	1	0.02	0.02	1	2.5
SOSP	Song Sparrow	99	2.48	0.25	36	90.0
WEME	Western Meadowlark	54	1.35	0.19	28	70.0
YRWA	Yellow-rumped Warbler	1	0.02	0.02	1	2.5

Table 7. Results from point count sampling at 141 stations on Santa Rosa Island: number of individuals detected, mean per stations and standard error, number of stations where a bird species was detected, and frequency (percent of stations where a bird species was detected in 2019).

Species	Common Name	#Detected	Mean per Stn	S.E.	# Sites Detected	% Stns
ACWO	Acorn Woodpecker	33	0.23	0.05	22	15.6
ALHU	Allen's Hummingbird	66	0.47	0.06	52	36.9
ANHU	Anna's Hummingbird	27	0.19	0.04	23	16.3
BAEA	Bald Eagle	1	0.01	0.01	1	0.7
BAOW	Barn Owl	1	0.01	0.01	1	0.7
BARS	Barn Swallow	10	0.07	0.03	6	4.3
BEWR	Bewick's Wren	224	1.59	0.12	100	70.9
BLPH	Black Phoebe	1	0.01	0.01	1	0.7
BUSH	Bushtit	15	0.11	0.05	5	3.5
CAQU	California Quail	28	0.20	0.05	20	14.2
CHSP	Chipping Sparrow	89	0.63	0.09	48	34.0
CORA	Common Raven	62	0.44	0.10	30	21.3
EUST	European Starling	4	0.03	0.02	2	1.4
GRSP	Grasshopper Sparrow	4	0.03	0.02	3	2.1
HOLA	Horned Lark	59	0.42	0.12	23	16.3
HOFI	House Finch	144	1.02	0.13	63	44.7
HUVI	Hutton's Vireo	18	0.13	0.03	15	10.6
LAGO	Lawrence's Goldfinch	2	0.01	0.01	1	0.7
LEGO	Lesser Goldfinch	44	0.31	0.06	25	17.7
LOSH	Loggerhead Shrike	12	0.09	0.03	10	7.1
MODO	Mourning Dove	8	0.06	0.03	6	4.3
NOMO	Northern Mockingbird	10	0.07	0.02	9	6.4
OCWA	Orange-crowned Warbler	200	1.42	0.13	93	66.0
PSFL	Pacific-slope Flycatcher	129	0.91	0.10	74	52.5
PEFA	Peregrine Falcon	3	0.02	0.02	2	1.4
RTHA	Red-tailed Hawk	12	0.09	0.03	8	5.7
ROWR	Rock Wren	1	0.01	0.01	1	0.7
SOSP	Song Sparrow	387	2.74	0.20	112	79.4
SPTO	Spotted Towhee	490	3.48	0.17	131	92.9
SWTH	Swainson's Thrush	2	0.01	0.01	2	1.4
VIRA	Virginia Rail	2	0.01	0.01	2	1.4
WAVI	Warbling Vireo	1	0.01	0.01	1	0.7
WEME	Western Meadowlark	206	1.46	0.12	95	67.4
WIWA	Wilson's Warbler	3	0.02	0.01	3	2.1

The only transect count conducted in 2019 was the Signal Peak Loop (SGNL) transect on Santa Barbara Island (Table 8), where Horned Lark was the most commonly detected bird.

Table 8. Number of individuals of each species detected on one line transect count in 2019. Dash (–) in cell indicates “Not Surveyed”. Island Codes: AN=Anacapa Island, SB=Santa Barbara Island, SM=San Miguel Island. Transect Codes: TRLS=trails, ARCH=Arch Point, SGNL=Signal, HRRS=Harris Point, LKBD=Lakebed, NDVR=Nidever, SMHL=San Miguel Hill, WLLW=Willow.

Species	ANI- TRLS	SBI- ARCH	SBI- CNYN	SBI- ELSL	SBI- SGNL	SMI- HRRS	SMI- LKBD	SMI- NDVR	SMI- SMHL	SMI- WLLW
Common Raven	–	–	–	–	1	–	–	–	–	–
Horned Lark	–	–	–	–	36	–	–	–	–	–
Western Meadowlark	–	–	–	–	9	–	–	–	–	–

Figures 6–10 summarize the mean number of birds per point count station on each island in 2019 compared to the mean number of birds per point count station across all years of sampling. Based on counts falling below the first quartile, there were decreased numbers of the following species in 2019: Bewick’s Wren, House Finch, and Orange-crowned Warbler on Anacapa Island (Figure 6); Orange-crowned Warbler and Western Meadowlark on Santa Barbara Island (Figure 7); Bewick’s Wren, Bushtit, Common Raven, Lesser Goldfinch, Northern Flicker, Western Meadowlark, and White-crowned Sparrow on Santa Cruz Island (Figure 8); Allen’s Hummingbird, Common Raven, Horned Lark, House Finch, Orange-crowned Warbler, Song Sparrow, and Western Meadowlark on San Miguel Island (Figure 9); and none on Santa Rosa Island (Figure 10).

Bird species with increased detections (above the third quartile) in 2019 were: Song Sparrow on Anacapa Island (Figure 6); none on Santa Barbara Island (Figure 7); Ash-throated Flycatcher, Barn Swallow, Black-headed Grosbeak, Island Scrub-Jay, Pacific-slope Flycatcher, Spotted Towhee, and Yellow-rumped Warbler (a wintering species) on Santa Cruz Island (Figure 8); none on San Miguel Island (Figure 9); and Acorn Woodpecker, Horned Lark, Song Sparrow, and Spotted Towhee on Santa Rosa Island (Figure 10).

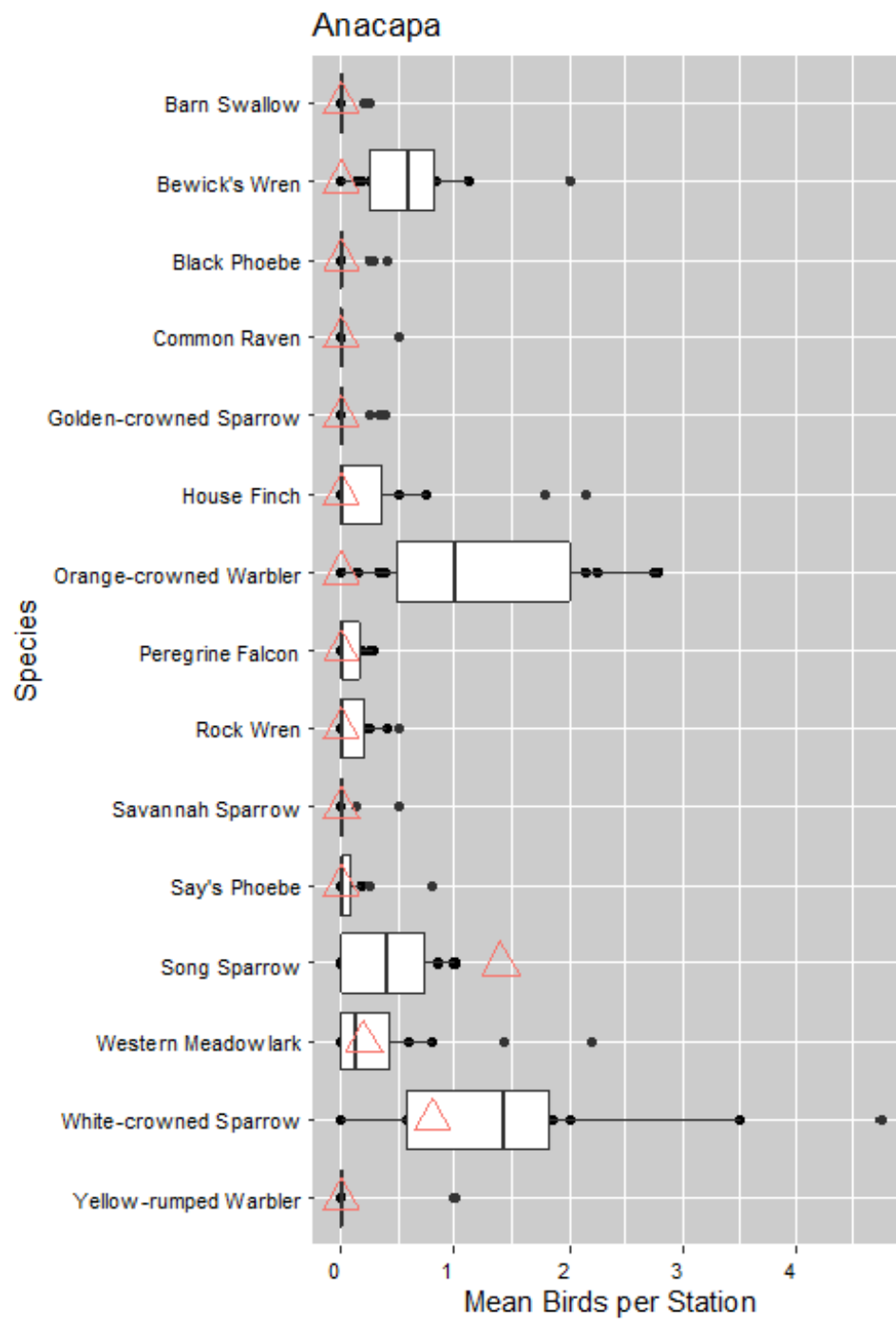


Figure 6. Boxplots for each species detected at point count stations on Anacapa Island in 2019. Box plots display the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum for 1993–2019. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Triangles represent the mean value for 2019.

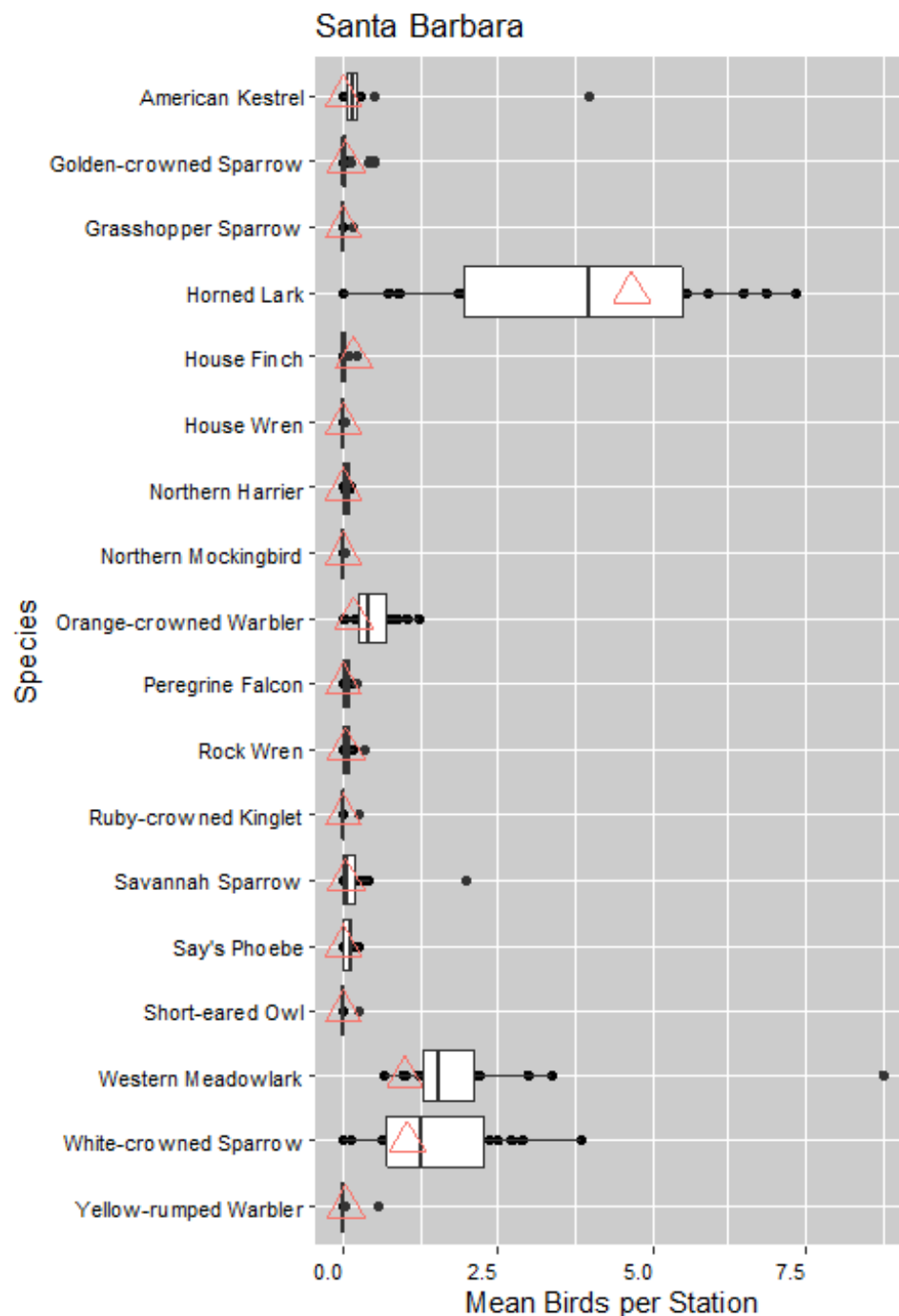


Figure 7. Boxplots for each species detected at point count stations on Santa Barbara Island in 2019. Box plots display the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum for 1993–2019. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Triangles represent the mean value for 2019.

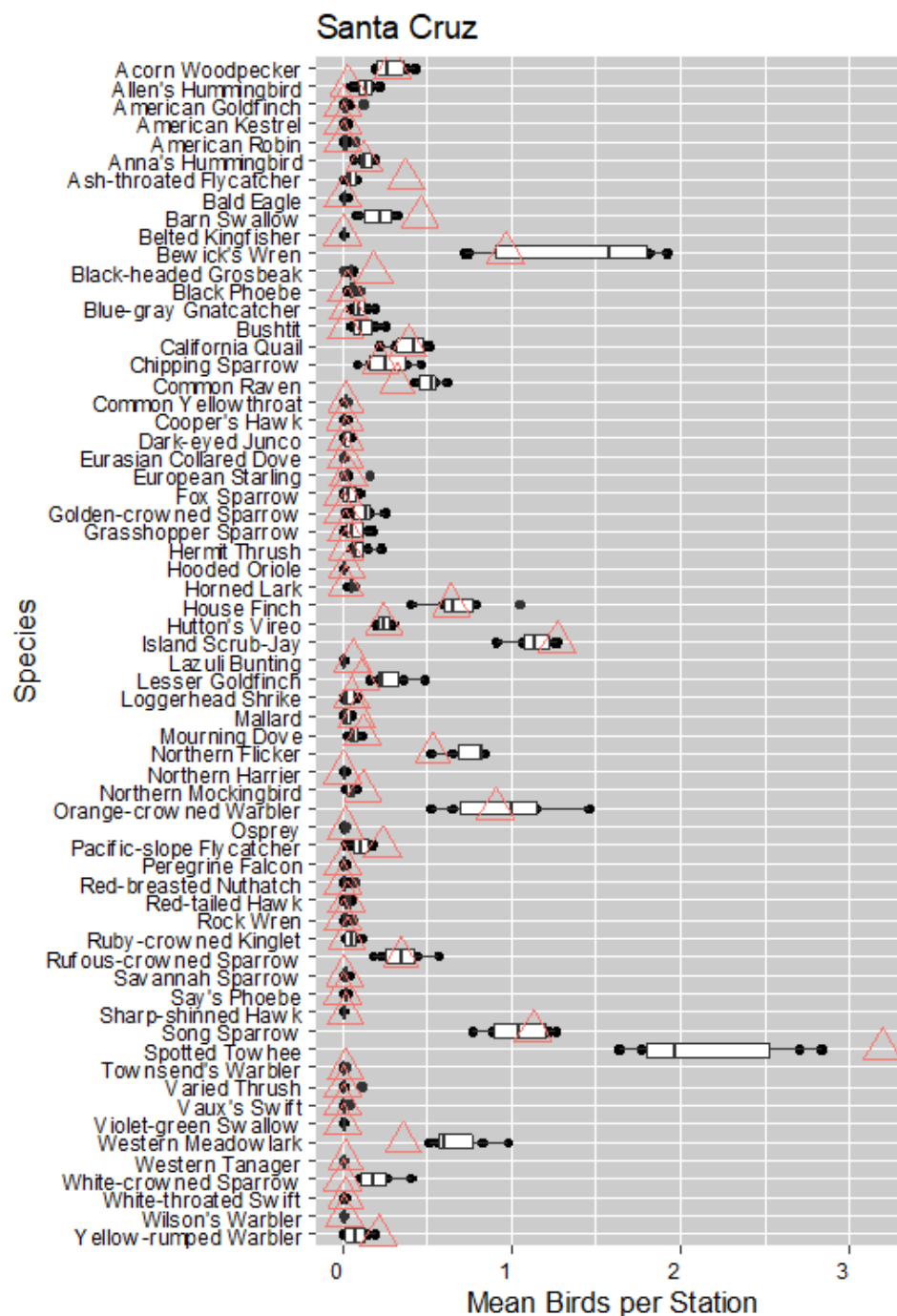


Figure 8. Boxplots for each species detected at point count stations on Santa Cruz Island in 2019. Box plots display the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum for 2013–2019. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Triangles represent the mean value for 2019.

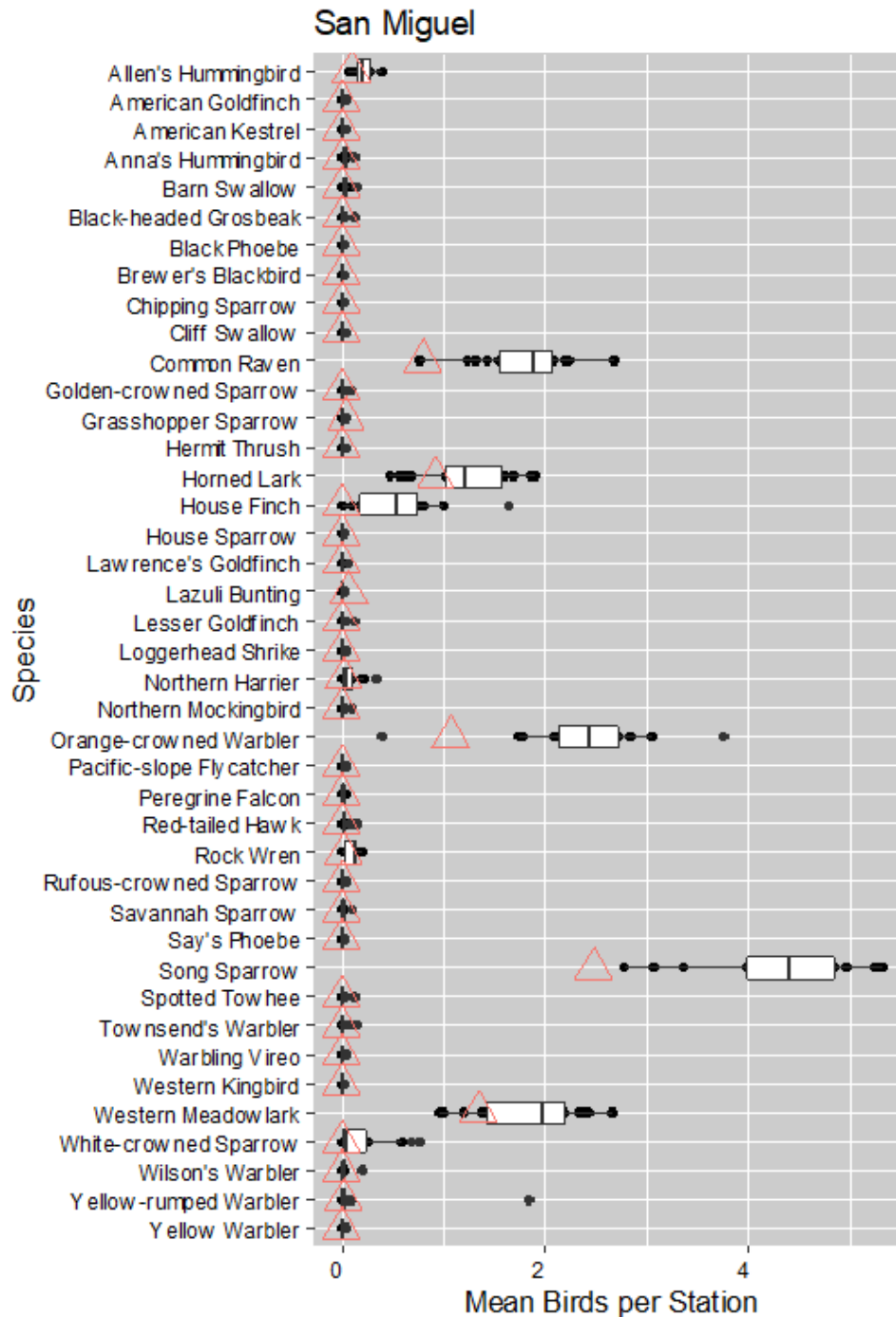


Figure 9. Boxplots for each species detected at point count stations on San Miguel Island in 2019. Box plots display the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum for 1993–2019. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Triangles represent the mean value for 2019.

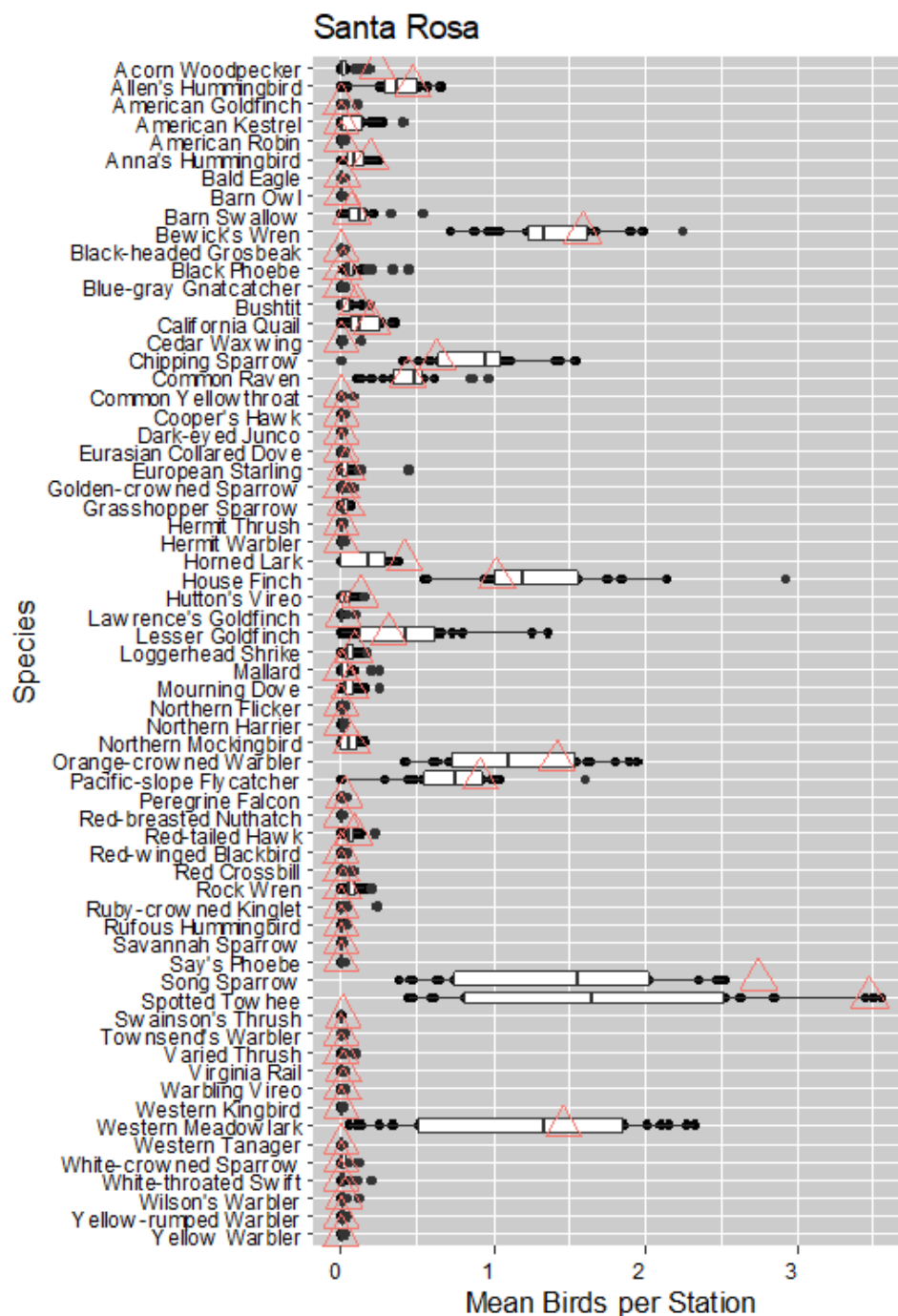


Figure 10. Boxplots for each species detected at point count stations on Santa Rosa Island in 2019. Box plots display the distribution of data based on the five number summary: minimum, first quartile, median, third quartile, and maximum for 1994–2019. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Triangles represent the mean value for 2019.

The species richness graphics in 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 winking in and out 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 Santa Rosa vs. San Miguel). 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:

- **Anacapa Island** (Figure 11): 26 landbird species have been counted on Anacapa since 1993; 3 were counted in 2019 (Table 2). The highest number of Song Sparrow since 1993 were counted in 2019. Species that are more common species on this island, including Bewick’s Wren, Orange-crowned Warbler, House Finch, Peregrine Falcon, and Rock Wren, were not counted in 2019. No new transient species were detected in 2019; six transient or visiting species (defined as above) have been counted on the island overall since 1993 (Table 9).
- **Santa Barbara Island** (Figure 12): 48 landbird species have been counted on this island since 1993; 10 were counted in 2019 (Table 2). Western Meadowlarks were at the lower range of their abundance in 2019. Common species on this island, specifically American Kestrel, Northern Harrier, and Say’s Phoebe, were not counted in 2019. Common Raven was a new transient species counted in 2019 on SBI; 21 transient or visiting species have been counted on the island since 1993 (Table 9).
- **Santa Cruz Island** (Figure 13): 73 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 2019 (Table 2). American Kestrels, commonly observed on this island, were not counted in 2019. Fox Sparrows and House Wrens also were not counted again in 2019. Two new transient/visiting species were counted in 2019: Western Kingbird and Lazuli Bunting, and four other transients that have been detected before were also detected again in 2019 (Wilson’s Warbler, Western Tanager, Townsend’s Warbler, Osprey) (Table 9). Seventeen transient or visiting species have been counted on this island since 2013 (Table 9).
- **San Miguel Island** (Figure 14): 69 landbird species have been counted on this island since 1993; 12 were counted in 2019 (Table 2). The following species were not counted in 2019: Anna’s Hummingbird, Barn Swallow, Bewick’s Wren, House Finch, Golden-crowned and White-crowned sparrows, Peregrine Falcon (or in 2018), Red-tailed Hawk (or in 2018), and Savannah Sparrow. Lazuli Bunting were counted again in 2019, and a Short-eared Owl was counted for the first time on the islands in 2019. Thirty-two transient or visiting species have been counted on the island since 1993 (Table 9).

- **Santa Rosa Island** (Figure 15): 75 landbird species have been counted on this island since 1994; 34 were detected in 2019 (Table 2). Common species not counted in 2019 included Eurasian Collared Dove, Northern Harrier, and White-throated Swift. Barn Owls were counted for only the second time in 2019, and Swainson's Thrush was a new transient species observed in 2019. Twenty transient or visiting species have been counted on the island since 1994 (Table 9).
 - Anecdotal breeding observations on Santa Rosa Island from 19 May to 1 June 2019 included: Song Sparrow and Spotted Towhee family groups near the Ironwood Trees (*Lyonothamnus floribundus* ssp. *aspleniifolius*) in upper Cherry Canyon; Bushtit family group across the island; Hutton's Vireo family groups in Windmill Canyon and upper Cherry Canyon; Loggerhead Shrike pairs in Quemada Canyon, Carrington Point, and near points 126–130; Red-tailed Hawk nests in Quemada Canyon (with two nestlings on 26 May) and in Water Canyon (with one nestling and an addled egg on 31 May); a Common Raven nest in Lobo Canyon with two nestlings (on 23 May, between points 81 and 82); Horned Lark fledglings at Pocket Field on 25 May; Orange-crowned Warbler family fledglings in Windmill Canyon (20 May).
 - Non-breeding observations of resident birds included Virginia Rail in La Jolla Vieja Canyon (25 May) and Quemada Canyon (26 May); Barn Swallow in Verde Canyon (22 May) and Lobo Canyon (at the mouth on 23 May); two Rock Wren between points 28 and 30 (on 21 May); a Black Phoebe in Quemada Canyon (26 May); and several Chipping Sparrows in Cherry Canyon (20 May).
 - Anecdotal migrant bird observations included: a Wilson's Warbler in Cherry Canyon and one in Arlington Canyon; Lawrence's Goldfinch in Windmill Canyon (20 May) and upper Lobo Canyon (23 May); a Warbling Vireo in Windmill Canyon (20 May); a Townsend's Warbler in Lobo Canyon (23 May); and a Western Tanager in at the main ranch (24 May).
 - Non-breeding raptor observations included: a Bald Eagle (wing tag not seen) near the maintenance shed (21 May), near the Old Ranch (wing tag #99; 27 May), and a second-year bird by point 15 (22 May); an Osprey seen with a fish near the Old Ranch (27 May); a Barn Owl observed at point 142 near Carrington Point (28 May) and in Lobo Canyon (23 May); and a Red-tailed Hawk between points 106 and 110 (21 May).
 - Lastly, at least 20 individual Grasshopper Sparrows were noted singing on at least five count days at various locations with grassland cover on Santa Rosa, but they were not counted often at points.

Across all five islands, five transient or visiting bird species were newly counted in 2019, for a total of 63 such species counted since NPS monitoring began on the islands (Table 9).

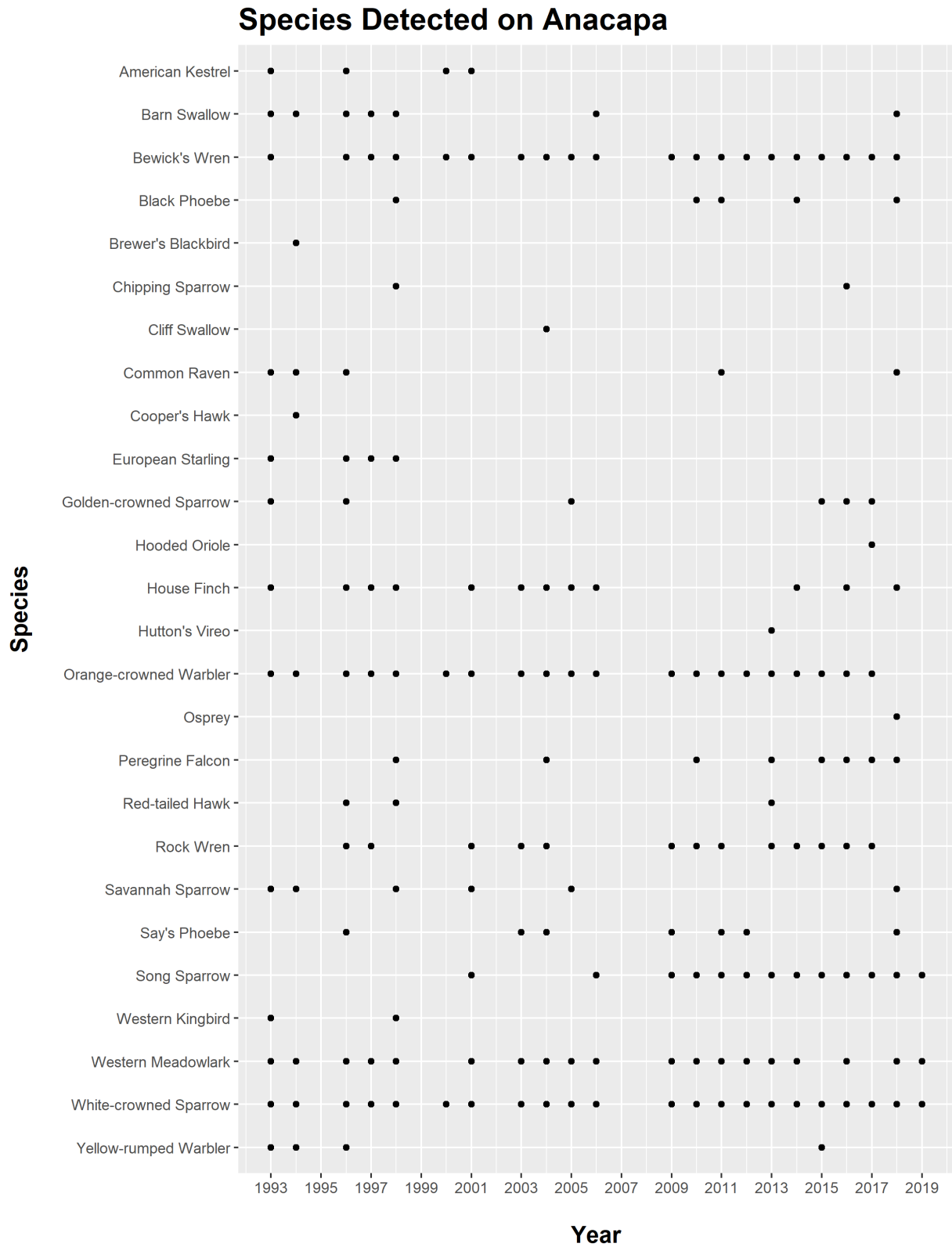


Figure 11. Breeding species occurrence from 1993–2019 for Anacapa Island. A dot indicates that the species was detected on a line transect or point count during that year.

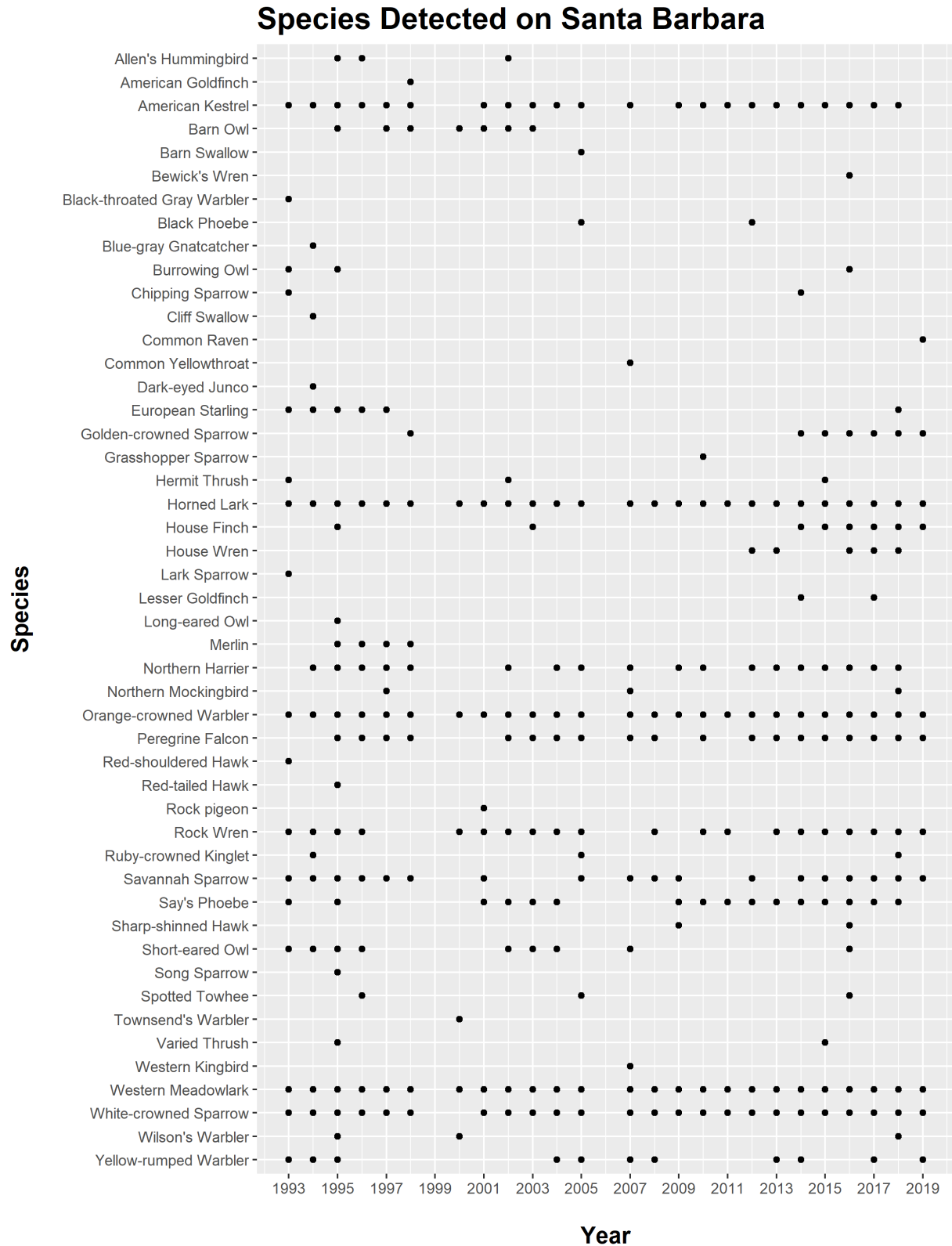


Figure 12. Breeding species occurrence from 1993–2019 for Santa Barbara Island. A dot indicates that the species was detected on a line transect or point count during that year.

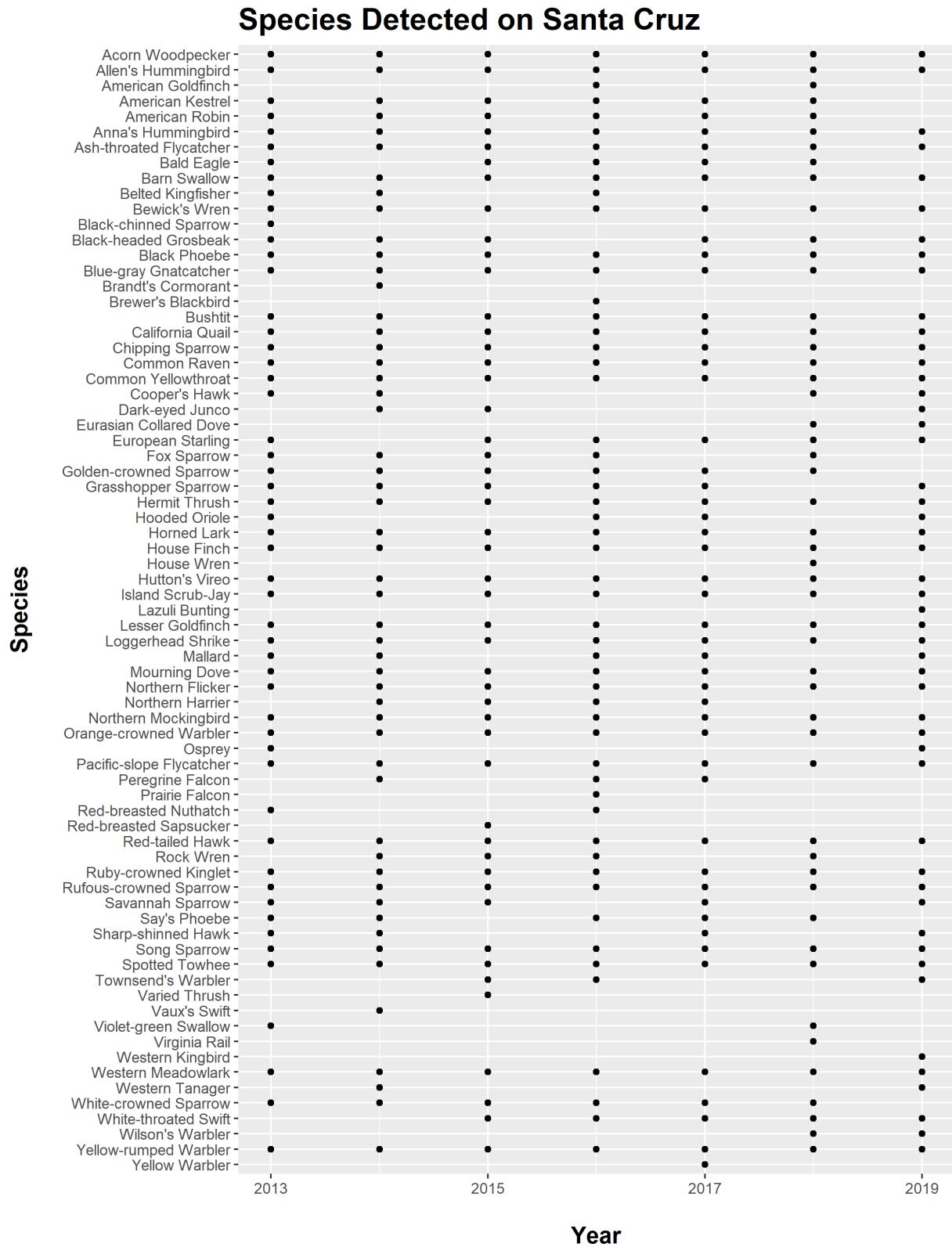


Figure 13. Breeding species occurrence from 2013–2019 for Santa Cruz Island. A dot indicates that the species was detected on point count during that year. Line transects were not conducted.

Species Detected on San Miguel

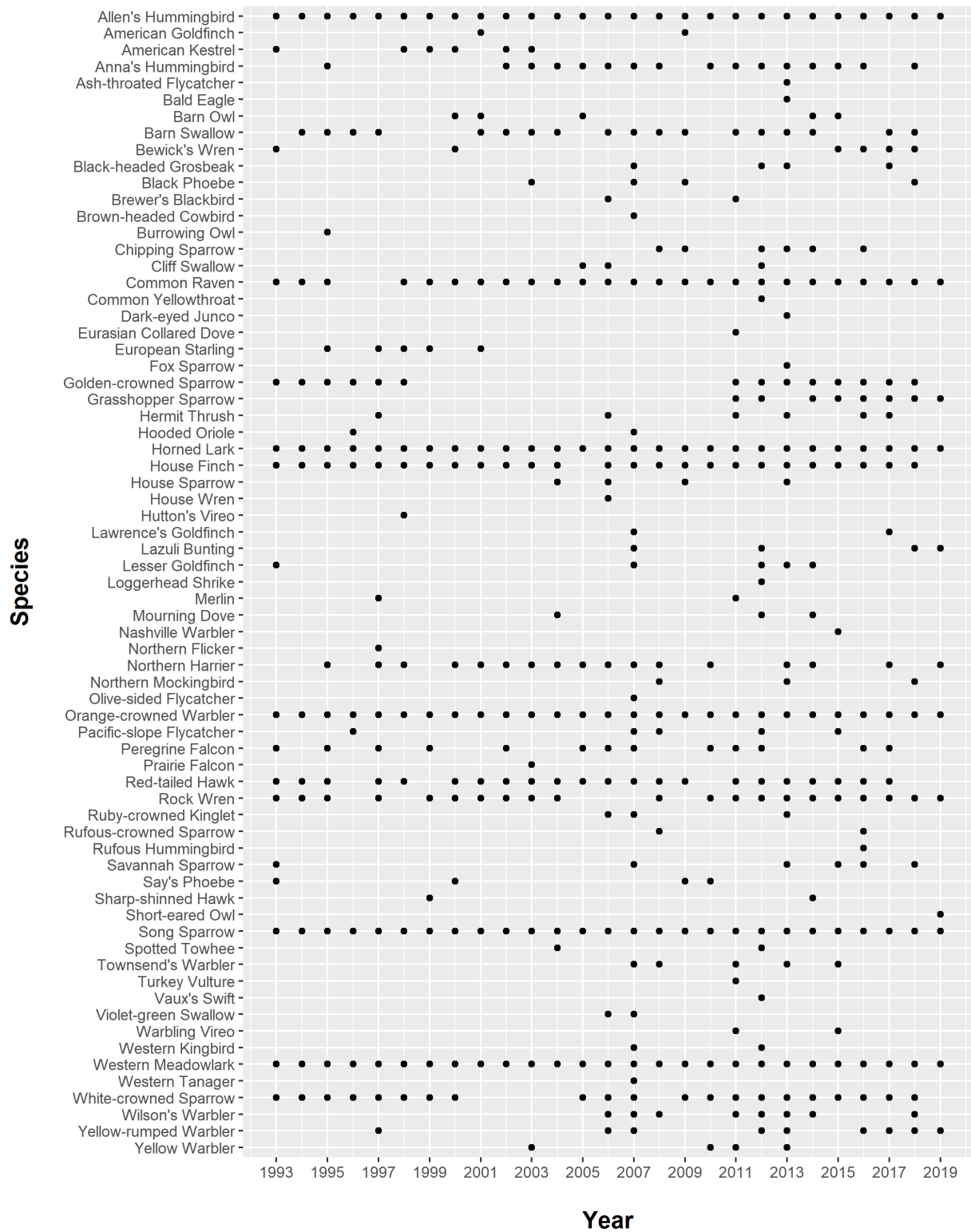


Figure 14. Breeding species occurrence from 1993–2019 for San Miguel Island. A dot indicates that the species was detected on a line transect or point count during that year.

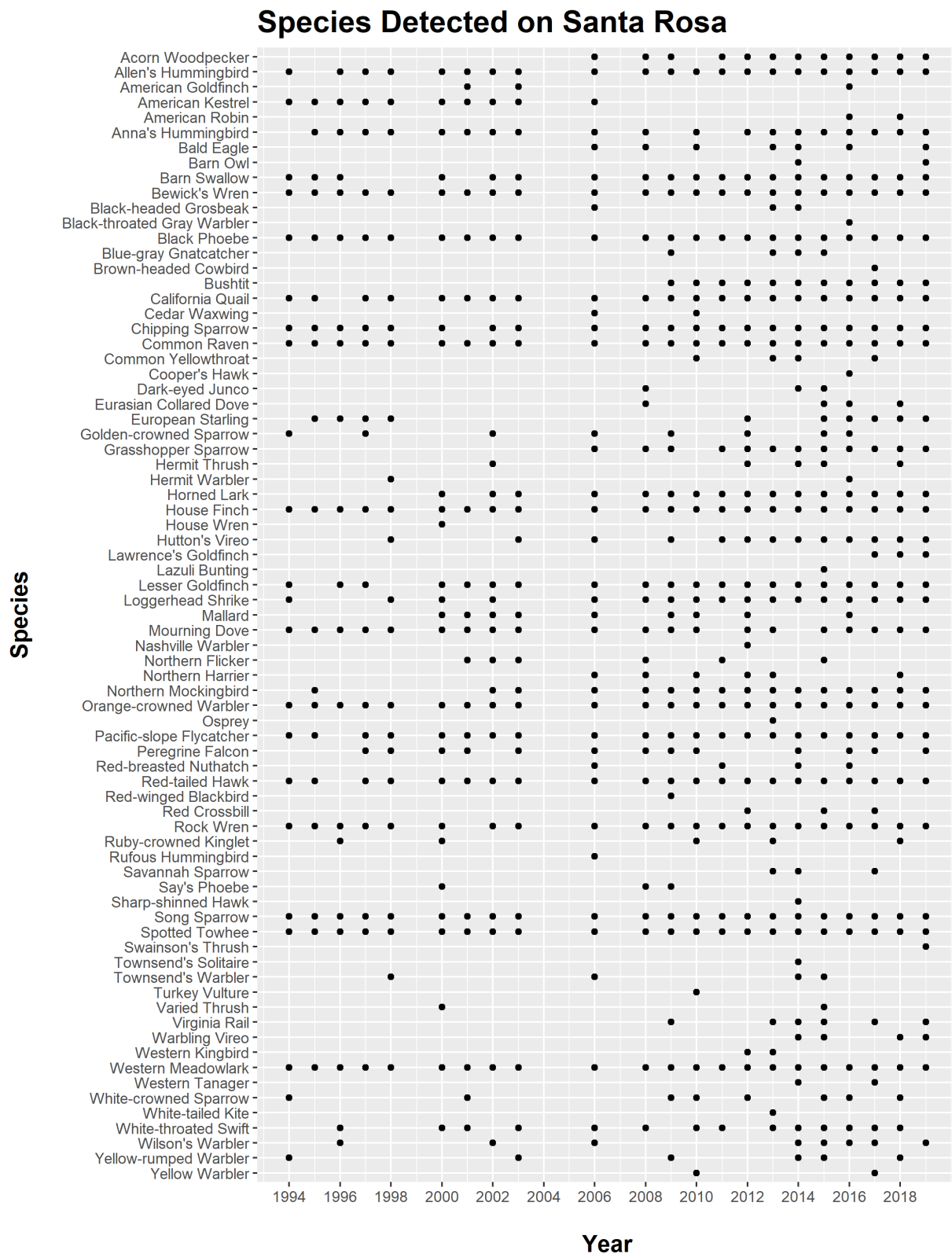


Figure 15. Breeding Species occurrence from 1994–2019 for Santa Rosa Island. A dot indicates that the species was detected on point count during that year.

Table 9. New transient or visiting bird species counted in 2019 (“XX”), and other transients and visiting species counted in all other years since monitoring began (“X”), on each of the five 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	ANI	SBI	SCI	SMI	SRI
American Goldfinch	–	X	X	X	–
American Robin	–	–	–	–	X
Ash-throated Flycatcher	–	–	–	X	–
Bald Eagle	–	–	–	X	–
Barn Owl	–	–	–	–	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 Raven	–	XX	–	–	–
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	–	–	X	X	–
Hutton's Vireo	X	–	–	X	–
Lark Sparrow	–	X	–	–	–
Lawrence's Goldfinch	–	–	–	X	X
Lazuli Bunting	–	–	XX	X	–
Lesser Goldfinch	–	X	–	–	–
Loggerhead Shrike	–	–	–	X	–
Long-eared Owl	–	X	–	–	–
Merlin	–	–	–	X	–
Nashville Warbler	–	–	–	X	X
Northern Flicker	–	–	–	X	–

Table 9 (continued). New transient or visiting bird species counted in 2019 (“XX”), and other transients and visiting species counted in all other years since monitoring began (“X”), on each of the five 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	ANI	SBI	SCI	SMI	SRI
Northern Mockingbird	–	X	–	X	–
Olive-sided Flycatcher	–	–	–	X	–
Osprey	X	–	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
Short-eared Owl	–	–	–	XX	–
Song Sparrow	–	X	–	–	–
Spotted Towhee	–	–	–	X	–
Swainson’s Thrush	–	–	–	–	XX
Townsend’s Solitaire	–	–	–	–	X
Townsend’s Warbler	–	–	X	–	–
Turkey Vulture	–	–	–	X	X
Varied Thrush	–	X	X	–	X
Vaux’s Swift	–	–	–	X	–
Vesper Sparrow	–	X	–	–	–
Violet-green Swallow	–	–	X	X	–
Warbling Vireo	–	–	–	X	X
Western Kingbird	X	X	XX	X	X
Western Tanager	–	–	X	X	X
White-tailed Kite	–	–	–	–	X
Wilson’s Warbler	–	X	X	–	–
Yellow-rumped Warbler (Audubon’s)	X	–	–	–	–
Yellow Warbler	–	–	X	–	X
No. of transients/visiting species on each island since counting started	6	21	17	32	20
No. of new transients/visiting species on each island in 2019	0	1	2	1	1

Non-native and invasive birds were counted on two of the five islands in 2019: Santa Cruz (two Eurasian Collared Dove and two European Starling) and Santa Rosa (two starlings on Santa Rosa) (Table 2). However, anecdotal sightings of non-native species occurred much more frequently (i.e., outside of the point and transect counts), and were made on all islands except Anacapa (Appendix C and Table 10; P. Collins, e-Bird reports). The highest numbers of non-native species detections occurred on Santa Cruz Island, with 33 detections of Eurasian Collared Dove (primarily at the Main Ranch area in the Central Valley), 15 detections of Brown-headed Cowbird (primarily at Scorpion Harbor), and 15 of European Starling (primarily at the Main Ranch and Scorpion Harbor). House Sparrows were observed fewer times, but on all islands except Anacapa; cowbirds occurred on all islands except Anacapa and San Miguel; and Rock Pigeon occurred on Santa Barbara and Santa Cruz (Table 10, Appendix C).

Table 10. Summary of anecdotal observations of non-native bird species at five CHIS islands in 2019 reported via eBird. Detailed data are provided in Appendix C.

Species	Anacapa	Santa Barbara	Santa Cruz	San Miguel	Santa Rosa
Brown-headed Cowbird	0	3	15	0	3
Eurasian Collard Dove	0	4	33	0	7
European Starling	0	0	15	0	5
House Sparrow	0	3	5	3	3
Rock Pigeon	0	2	2	0	0
Total	0	12	74	3	20

Discussion

The 61 terrestrial bird species counted on the northern Channel Islands in 2019 (Table 2) showed island specificity and variability. For example, one species (Western Meadowlark) was counted on all five of the islands in 2019, four species were detected on four islands, five species were detected on three islands, 20 species were detected on two islands, and 26 species were detected on only one island. As would be predicted by island biogeography, and has been observed over the 27 years of the monitoring program, species richness (number of species) was greatest on the larger islands (75 species counted on Santa Rosa, 73 on Santa Cruz), and least on the smallest island (26 species on Anacapa). Eleven bird species exhibited notably increased detections in 2019 on at least one of the five islands, and 11 exhibited notably decreased detections on at least one of the five 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 either increasing or decreasing trends seen in these analyses. However, the following species declined dramatically or over multiple seasons and/or multiple islands, and warrant watching in the future: Bewick's Wren on Anacapa and Santa Cruz islands; Song Sparrow on San Miguel Island; Western Meadowlark on Santa Barbara, Santa Cruz, and San Miguel islands; Orange-crowned Warbler on Anacapa and Santa Barbara islands; and House Finch on Anacapa and San Miguel islands. These declines may represent real occurrences in the field, but as was noted in the 2018 report, the indices of abundance summarized in this report must be interpreted with caution, since our evaluation relies on a simple assessment of 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 et al. 2011b), or general linear models, which can account for differences in detection rates of bird species.

European Starlings were once abundant and a self-introduced breeder across Santa Rosa during the height of the ranching era, however Coonan et al. (2011b) reported that the species was declining across all CHIS because it was no longer recorded during counts. In both 2018 and 2019, starlings were counted for the first times since the year 2000, and worryingly, the observations were located in the interior of Santa Rosa, in upper Cherry Canyon. Starlings on the island have generally been observed in the vicinity of the ranch, but in 2015, and again in 2019, they also were observed anecdotally in small canyons west of the Torrey Pines (P. Larramendy pers. obs.), where Acorn Woodpeckers nest. This is a concern, since both species nest in cavities, and are known to compete for nest sites.

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 (Collins and Jones 2015). These species include American Kestrel on San Miguel, Santa Rosa, and Anacapa islands; and 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, 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, swallows, hummingbirds, or other species that do not vocalize regularly

(Ralph et al. 1995). Determination of the population sizes of these species would require different techniques.

Similar to counts in 2016–2018, each observer in 2019 was skilled at identifying bird species by vocalizations and by sight. As a result of the observers' qualifications, we have high confidence in the detection accuracy. 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' numbers. These factors are significant challenges to any monitoring program and should be evaluated carefully to minimize misrepresentation of trends in density. In addition, unfortunately in 2019 a majority of the transects were not counted, due to observer error, logistical difficulty, and the impact to the project from the evacuation of one of the observers off of Santa Rosa Island. Not only was all of this unfortunate, but it impacted our ability to fully assess the trends in bird numbers on these islands.

Recommendations

In 2016, Hall et al. (2016) 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. For example, in 2019, anecdotal observations of Grasshopper Sparrows occurred in at least three grassland locations across the island with at least 20 individuals observed, but only four sparrows were actually counted among 141 points. 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 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 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 in a season (Schmidt et al. 2013). MEDN I&M and CHIS are planning a protocol review in 2021 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 non-native invasive species such as European Starlings on Santa Rosa Island be removed before their numbers become harder to manage. Acorn Woodpeckers, once considered a possible breeder on Santa Rosa, were 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 2018–2019 are near the documented nesting locations for Acorn Woodpeckers, so the need for starling management is now even more pressing.

Also, we continue to recommend that a trend analysis using program DISTANCE (Buckland et al. 2017), 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 warranted, because the presence of breeding gulls is interfering with some aspects of monitoring. As noted herein, on Santa Barbara Island, nine points were not counted for the past few years 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 becoming increasingly aggressive. Near constant vocalizing by gulls makes it difficult to hear vocalizations by passerines during monitoring, and the locations of the points are within the gulls' territories, which causes them to increase 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 non-gull species on East Anacapa, and discontinuing the use of the point count stations. In addition, we recommend discontinuing the use of the nine point count stations and two transects on Santa Barbara Island that are impacted by gulls. However, if it is desirable to monitor the size of the gull populations on these islands, the points (or a sub-set) could be used specifically to monitor gull numbers.

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Appendix A.

Table A-1. List of 54 terrestrial avian species confirmed nesting 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
<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

Table A-1 (continued). List of 54 terrestrial avian species confirmed nesting 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>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 passerina</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.

Table B-1. 2019 Landbird Monitoring Site Observers.

Island	Site	Point Count or Line Transect	Survey Date	Observer
Anacapa Island	AE01	PC	3/28/2019	Todd_Nick
Anacapa Island	AE02	PC	3/28/2019	Todd_Nick
Anacapa Island	AE03	PC	3/28/2019	Todd_Nick
Anacapa Island	AE04	PC	3/28/2019	Todd_Nick
Anacapa Island	AE05	PC	3/28/2019	Todd_Nick
Anacapa Island	AE06	PC	3/28/2019	Todd_Nick
Anacapa Island	AE07	PC	4/6/2019	Howard_Jim
Anacapa Island	AE08	PC	4/6/2019	Howard_Jim
San Miguel Island	SM01	PC	4/20/2019	Stiles_Mike
San Miguel Island	SM02	PC	4/20/2019	Stiles_Mike
San Miguel Island	SM03	PC	4/28/2019	Baker_Stacy
San Miguel Island	SM04	PC	4/18/2019	Stiles_Mike
San Miguel Island	SM05	PC	4/17/2019	Stiles_Mike
San Miguel Island	SM06	PC	4/17/2019	Stiles_Mike
San Miguel Island	SM07	PC	4/17/2019	Stiles_Mike
San Miguel Island	SM08	PC	4/17/2019	Stiles_Mike
San Miguel Island	SM09	PC	4/14/2019	Baker_Stacy
San Miguel Island	SM10	PC	4/14/2019	Baker_Stacy
San Miguel Island	SM11	PC	4/14/2019	Baker_Stacy
San Miguel Island	SM12	PC	4/14/2019	Baker_Stacy
San Miguel Island	SM13	PC	4/20/2019	Stiles_Mike
San Miguel Island	SM14	PC	4/29/2019	Baker_Stacy
San Miguel Island	SM15	PC	4/27/2019	Baker_Stacy
San Miguel Island	SM16	PC	4/27/2019	Baker_Stacy
San Miguel Island	SM17	PC	4/20/2019	Stiles_Mike
San Miguel Island	SM18	PC	4/20/2019	Stiles_Mike
San Miguel Island	SM19	PC	4/29/2019	Baker_Stacy
San Miguel Island	SM20	PC	4/18/2019	Stiles_Mike
San Miguel Island	SM21	PC	4/18/2019	Stiles_Mike
San Miguel Island	SM22	PC	4/18/2019	Stiles_Mike
San Miguel Island	SM23	PC	4/23/2019	Stiles_Mike
San Miguel Island	SM24	PC	4/23/2019	Stiles_Mike
San Miguel Island	SM25	PC	4/23/2019	Stiles_Mike
San Miguel Island	SM26	PC	4/18/2019	Stiles_Mike

Table B-1 (continued). 2019 Landbird Monitoring Site Observers.

Island	Site	Point Count or Line Transect	Survey Date	Observer
San Miguel Island	SM27	PC	4/23/2019	Stiles_Mike
San Miguel Island	SM28	PC	4/23/2019	Stiles_Mike
San Miguel Island	SM29	PC	4/23/2019	Stiles_Mike
San Miguel Island	SM30	PC	4/18/2019	Stiles_Mike
San Miguel Island	SM31	PC	4/27/2019	Baker_Stacy
San Miguel Island	SM32	PC	4/27/2019	Baker_Stacy
San Miguel Island	SM33	PC	4/27/2019	Baker_Stacy
San Miguel Island	SM34	PC	4/27/2019	Baker_Stacy
San Miguel Island	SM35	PC	4/28/2019	Baker_Stacy
San Miguel Island	SM36	PC	4/28/2019	Baker_Stacy
San Miguel Island	SM37	PC	4/28/2019	Baker_Stacy
San Miguel Island	SM38	PC	4/28/2019	Baker_Stacy
San Miguel Island	SM39	PC	4/28/2019	Baker_Stacy
San Miguel Island	SM40	PC	4/28/2019	Baker_Stacy
Santa Barbara Island	SB01	PC	3/26/2019	Searcy_Adam_J
Santa Barbara Island	SB03	PC	3/24/2019	Searcy_Adam_J
Santa Barbara Island	SB04	PC	3/26/2019	Searcy_Adam_J
Santa Barbara Island	SB05	PC	3/26/2019	Searcy_Adam_J
Santa Barbara Island	SB06	PC	3/24/2019	Searcy_Adam_J
Santa Barbara Island	SB07	PC	3/24/2019	Searcy_Adam_J
Santa Barbara Island	SB08	PC	3/26/2019	Searcy_Adam_J
Santa Barbara Island	SB09	PC	3/27/2019	Searcy_Adam_J
Santa Barbara Island	SB10	PC	3/24/2019	Searcy_Adam_J
Santa Barbara Island	SB13	PC	3/25/2019	Searcy_Adam_J
Santa Barbara Island	SB14	PC	3/27/2019	Searcy_Adam_J
Santa Barbara Island	SB15	PC	3/25/2019	Searcy_Adam_J
Santa Barbara Island	SB16	PC	3/22/2019	Searcy_Adam_J
Santa Barbara Island	SB18	PC	3/22/2019	Searcy_Adam_J
Santa Barbara Island	SB21	PC	3/23/2019	Searcy_Adam_J
Santa Barbara Island	SB22	PC	3/22/2019	Searcy_Adam_J
Santa Barbara Island	SB23	PC	3/25/2019	Searcy_Adam_J
Santa Barbara Island	SB24	PC	3/23/2019	Searcy_Adam_J
Santa Barbara Island	SB26	PC	3/25/2019	Searcy_Adam_J
Santa Barbara Island	SB27	PC	3/23/2019	Searcy_Adam_J
Santa Barbara Island	SB29	PC	3/25/2019	Searcy_Adam_J
Santa Barbara Island	SB31	PC	3/23/2019	Searcy_Adam_J

Table B-1 (continued). 2019 Landbird Monitoring Site Observers.

Island	Site	Point Count or Line Transect	Survey Date	Observer
Santa Barbara Island	SB32	PC	3/23/2019	Searcy_Adam_J
Santa Barbara Island	SB33	PC	3/25/2019	Searcy_Adam_J
Santa Barbara Island	SGNL	PC	3/22/2019	Searcy_Adam_J
Santa Cruz Island	SC001	PC	5/31/2019	Todd_Nick
Santa Cruz Island	SC002	PC	5/31/2019	Todd_Nick
Santa Cruz Island	SC003	PC	5/31/2019	Todd_Nick
Santa Cruz Island	SC004	PC	6/9/2019	Laughrin_Lyndal
Santa Cruz Island	SC005	PC	6/1/2019	Todd_Nick
Santa Cruz Island	SC006	PC	6/9/2019	Laughrin_Lyndal
Santa Cruz Island	SC007	PC	6/8/2019	Laughrin_Lyndal
Santa Cruz Island	SC008	PC	6/9/2019	Laughrin_Lyndal
Santa Cruz Island	SC008	PC	6/1/2019	Todd_Nick
Santa Cruz Island	SC009	PC	5/11/2019	Todd_Nick
Santa Cruz Island	SC010	PC	5/11/2019	Todd_Nick
Santa Cruz Island	SC011	PC	5/11/2019	Todd_Nick
Santa Cruz Island	SC012	PC	5/11/2019	Todd_Nick
Santa Cruz Island	SC013	PC	5/11/2019	Todd_Nick
Santa Cruz Island	SC014	PC	5/11/2019	Todd_Nick
Santa Cruz Island	SC015	PC	5/11/2019	Todd_Nick
Santa Cruz Island	SC016	PC	5/18/2019	Laughrin_Lyndal
Santa Cruz Island	SC017	PC	5/18/2019	Laughrin_Lyndal
Santa Cruz Island	SC018	PC	5/18/2019	Laughrin_Lyndal
Santa Cruz Island	SC019	PC	6/2/2019	Laughrin_Lyndal
Santa Cruz Island	SC020	PC	5/27/2019	Laughrin_Lyndal
Santa Cruz Island	SC021	PC	5/27/2019	Laughrin_Lyndal
Santa Cruz Island	SC022	PC	5/27/2019	Laughrin_Lyndal
Santa Cruz Island	SC023	PC	5/13/2019	Todd_Nick
Santa Cruz Island	SC024	PC	5/13/2019	Todd_Nick
Santa Cruz Island	SC025	PC	6/2/2019	Laughrin_Lyndal
Santa Cruz Island	SC026	PC	5/15/2019	Laughrin_Lyndal
Santa Cruz Island	SC027	PC	6/1/2019	Laughrin_Lyndal
Santa Cruz Island	SC028	PC	6/1/2019	Laughrin_Lyndal
Santa Cruz Island	SC029	PC	6/1/2019	Laughrin_Lyndal
Santa Cruz Island	SC030	PC	6/1/2019	Laughrin_Lyndal
Santa Cruz Island	SC031	PC	6/1/2019	Laughrin_Lyndal
Santa Cruz Island	SC031	PC	5/30/2019	Todd_Nick

Table B-1 (continued). 2019 Landbird Monitoring Site Observers.

Island	Site	Point Count or Line Transect	Survey Date	Observer
Santa Cruz Island	SC032	PC	5/30/2019	Todd_Nick
Santa Cruz Island	SC033	PC	5/30/2019	Todd_Nick
Santa Cruz Island	SC034	PC	5/30/2019	Todd_Nick
Santa Cruz Island	SC035	PC	5/30/2019	Todd_Nick
Santa Cruz Island	SC036	PC	5/30/2019	Todd_Nick
Santa Cruz Island	SC037	PC	5/30/2019	Todd_Nick
Santa Cruz Island	SC038	PC	5/30/2019	Laughrin_Lyndal
Santa Cruz Island	SC039	PC	5/30/2019	Laughrin_Lyndal
Santa Cruz Island	SC040	PC	5/30/2019	Laughrin_Lyndal
Santa Cruz Island	SC041	PC	5/30/2019	Laughrin_Lyndal
Santa Cruz Island	SC042	PC	5/26/2019	Laughrin_Lyndal
Santa Cruz Island	SC043	PC	5/26/2019	Laughrin_Lyndal
Santa Cruz Island	SC044	PC	5/26/2019	Laughrin_Lyndal
Santa Cruz Island	SC045	PC	5/26/2019	Laughrin_Lyndal
Santa Cruz Island	SC046	PC	5/26/2019	Laughrin_Lyndal
Santa Cruz Island	SC047	PC	5/26/2019	Laughrin_Lyndal
Santa Cruz Island	SC048	PC	5/10/2019	Todd_Nick
Santa Cruz Island	SC049	PC	5/10/2019	Todd_Nick
Santa Cruz Island	SC050	PC	5/10/2019	Todd_Nick
Santa Cruz Island	SC051	PC	5/10/2019	Todd_Nick
Santa Cruz Island	SC052	PC	5/10/2019	Todd_Nick
Santa Cruz Island	SC053	PC	5/12/2019	Todd_Nick
Santa Cruz Island	SC054	PC	5/12/2019	Todd_Nick
Santa Cruz Island	SC055	PC	5/12/2019	Todd_Nick
Santa Cruz Island	SC056	PC	5/12/2019	Todd_Nick
Santa Cruz Island	SC057	PC	5/12/2019	Todd_Nick
Santa Cruz Island	SC058	PC	5/12/2019	Todd_Nick
Santa Cruz Island	SC059	PC	5/12/2019	Todd_Nick
Santa Cruz Island	SC060	PC	5/12/2019	Todd_Nick
Santa Cruz Island	SC061	PC	5/29/2019	Laughrin_Lyndal
Santa Cruz Island	SC062	PC	5/29/2019	Laughrin_Lyndal
Santa Cruz Island	SC063	PC	5/29/2019	Laughrin_Lyndal
Santa Cruz Island	SC064	PC	5/29/2019	Laughrin_Lyndal
Santa Cruz Island	SC065	PC	5/29/2019	Laughrin_Lyndal
Santa Cruz Island	SC066	PC	5/29/2019	Laughrin_Lyndal
Santa Cruz Island	SC067	PC	5/28/2019	Laughrin_Lyndal

Table B-1 (continued). 2019 Landbird Monitoring Site Observers.

Island	Site	Point Count or Line Transect	Survey Date	Observer
Santa Cruz Island	SC068	PC	5/28/2019	Laughrin_Lyndal
Santa Cruz Island	SC069	PC	5/13/2019	Todd_Nick
Santa Cruz Island	SC070	PC	5/31/2019	Laughrin_Lyndal
Santa Cruz Island	SC071	PC	5/31/2019	Laughrin_Lyndal
Santa Cruz Island	SC072	PC	5/31/2019	Laughrin_Lyndal
Santa Cruz Island	SC073	PC	5/31/2019	Laughrin_Lyndal
Santa Cruz Island	SC074	PC	5/13/2019	Todd_Nick
Santa Cruz Island	SC075	PC	5/13/2019	Todd_Nick
Santa Cruz Island	SC076	PC	5/13/2019	Todd_Nick
Santa Cruz Island	SC077	PC	5/18/2019	Laughrin_Lyndal
Santa Cruz Island	SC078	PC	5/18/2019	Laughrin_Lyndal
Santa Cruz Island	SC079	PC	5/18/2019	Laughrin_Lyndal
Santa Cruz Island	SC080	PC	5/18/2019	Laughrin_Lyndal
Santa Cruz Island	SC081	PC	5/10/2019	Todd_Nick
Santa Cruz Island	SC082	PC	5/10/2019	Todd_Nick
Santa Cruz Island	SC083	PC	5/10/2019	Todd_Nick
Santa Cruz Island	SC084	PC	5/10/2019	Todd_Nick
Santa Cruz Island	SC085	PC	5/15/2019	Laughrin_Lyndal
Santa Cruz Island	SC086	PC	5/15/2019	Laughrin_Lyndal
Santa Cruz Island	SC087	PC	5/15/2019	Laughrin_Lyndal
Santa Cruz Island	SC088	PC	5/15/2019	Laughrin_Lyndal
Santa Cruz Island	SC089	PC	5/15/2019	Laughrin_Lyndal
Santa Cruz Island	SC090	PC	5/15/2019	Laughrin_Lyndal
Santa Cruz Island	SC091	PC	5/15/2019	Laughrin_Lyndal
Santa Cruz Island	SC092	PC	5/15/2019	Laughrin_Lyndal
Santa Cruz Island	SC093	PC	5/15/2019	Laughrin_Lyndal
Santa Cruz Island	SC094	PC	5/30/2019	Laughrin_Lyndal
Santa Cruz Island	SC095	PC	5/30/2019	Laughrin_Lyndal
Santa Cruz Island	SC096	PC	5/31/2019	Laughrin_Lyndal
Santa Cruz Island	SC097	PC	5/31/2019	Laughrin_Lyndal
Santa Cruz Island	SC098	PC	6/1/2019	Todd_Nick
Santa Cruz Island	SC099	PC	6/1/2019	Todd_Nick
Santa Cruz Island	SC100	PC	6/1/2019	Todd_Nick
Santa Cruz Island	SC109	PC	6/13/2019	Larramendy_Peter
Santa Cruz Island	SC110	PC	6/13/2019	Larramendy_Peter
Santa Cruz Island	SC111	PC	6/13/2019	Larramendy_Peter

Table B-1 (continued). 2019 Landbird Monitoring Site Observers.

Island	Site	Point Count or Line Transect	Survey Date	Observer
Santa Cruz Island	SC112	PC	6/13/2019	Larramendy_Peter
Santa Cruz Island	SC113	PC	6/13/2019	Larramendy_Peter
Santa Cruz Island	SC114	PC	6/13/2019	Larramendy_Peter
Santa Cruz Island	SC115	PC	6/13/2019	Larramendy_Peter
Santa Cruz Island	SC116	PC	6/14/2019	Larramendy_Peter
Santa Cruz Island	SC117	PC	6/14/2019	Larramendy_Peter
Santa Cruz Island	SC118	PC	6/14/2019	Larramendy_Peter
Santa Cruz Island	SC119	PC	6/14/2019	Larramendy_Peter
Santa Cruz Island	SC120	PC	6/14/2019	Larramendy_Peter
Santa Cruz Island	SCP1	PC	5/5/2019	Laughrin_Lyndal
Santa Cruz Island	SCP2	PC	5/6/2019	Laughrin_Lyndal
Santa Cruz Island	SCP3	PC	4/4/2019	Laughrin_Lyndal
Santa Cruz Island	SCP4	PC	4/3/2019	Laughrin_Lyndal
Santa Cruz Island	SCP5	PC	4/3/2019	Laughrin_Lyndal
Santa Cruz Island	SCP6	PC	4/4/2019	Laughrin_Lyndal
Santa Cruz Island	SCP7	PC	4/4/2019	Laughrin_Lyndal
Santa Cruz Island	SCP8	PC	4/3/2019	Laughrin_Lyndal
Santa Rosa Island	SR001	PC	5/23/2019	Stiles_Mike
Santa Rosa Island	SR002	PC	5/23/2019	Stiles_Mike
Santa Rosa Island	SR003	PC	5/23/2019	Stiles_Mike
Santa Rosa Island	SR004	PC	5/20/2019	Stiles_Mike
Santa Rosa Island	SR005	PC	5/20/2019	Stiles_Mike
Santa Rosa Island	SR006	PC	5/20/2019	Stiles_Mike
Santa Rosa Island	SR007	PC	5/25/2019	Larramendy_Peter
Santa Rosa Island	SR008	PC	5/25/2019	Larramendy_Peter
Santa Rosa Island	SR009	PC	5/25/2019	Larramendy_Peter
Santa Rosa Island	SR010	PC	5/23/2019	Larramendy_Peter
Santa Rosa Island	SR011	PC	5/28/2019	Larramendy_Peter
Santa Rosa Island	SR012	PC	5/28/2019	Larramendy_Peter
Santa Rosa Island	SR013	PC	5/22/2019	Larramendy_Peter
Santa Rosa Island	SR014	PC	5/22/2019	Larramendy_Peter
Santa Rosa Island	SR015	PC	5/22/2019	Larramendy_Peter
Santa Rosa Island	SR016	PC	5/20/2019	Stiles_Mike
Santa Rosa Island	SR017	PC	5/20/2019	Stiles_Mike
Santa Rosa Island	SR018	PC	5/20/2019	Stiles_Mike
Santa Rosa Island	SR019	PC	5/27/2019	Larramendy_Peter

Table B-1 (continued). 2019 Landbird Monitoring Site Observers.

Island	Site	Point Count or Line Transect	Survey Date	Observer
Santa Rosa Island	SR020	PC	5/27/2019	Larramendy_Peter
Santa Rosa Island	SR021	PC	5/27/2019	Larramendy_Peter
Santa Rosa Island	SR022	PC	5/22/2019	Stiles_Mike
Santa Rosa Island	SR023	PC	5/22/2019	Stiles_Mike
Santa Rosa Island	SR024	PC	5/22/2019	Stiles_Mike
Santa Rosa Island	SR025	PC	5/22/2019	Stiles_Mike
Santa Rosa Island	SR026	PC	5/22/2019	Stiles_Mike
Santa Rosa Island	SR027	PC	5/22/2019	Stiles_Mike
Santa Rosa Island	SR028	PC	5/21/2019	Larramendy_Peter
Santa Rosa Island	SR029	PC	5/21/2019	Larramendy_Peter
Santa Rosa Island	SR030	PC	5/21/2019	Larramendy_Peter
Santa Rosa Island	SR031	PC	5/31/2019	Larramendy_Peter
Santa Rosa Island	SR032	PC	5/31/2019	Larramendy_Peter
Santa Rosa Island	SR033	PC	5/31/2019	Larramendy_Peter
Santa Rosa Island	SR037	PC	5/31/2019	Larramendy_Peter
Santa Rosa Island	SR038	PC	5/31/2019	Larramendy_Peter
Santa Rosa Island	SR039	PC	5/31/2019	Larramendy_Peter
Santa Rosa Island	SR040	PC	5/28/2019	Stiles_Mike
Santa Rosa Island	SR041	PC	5/30/2019	Larramendy_Peter
Santa Rosa Island	SR042	PC	5/30/2019	Larramendy_Peter
Santa Rosa Island	SR043	PC	5/26/2019	Stiles_Mike
Santa Rosa Island	SR044	PC	5/26/2019	Stiles_Mike
Santa Rosa Island	SR045	PC	5/26/2019	Stiles_Mike
Santa Rosa Island	SR046	PC	5/20/2019	Larramendy_Peter
Santa Rosa Island	SR047	PC	5/20/2019	Larramendy_Peter
Santa Rosa Island	SR048	PC	5/20/2019	Larramendy_Peter
Santa Rosa Island	SR049	PC	5/26/2019	Larramendy_Peter
Santa Rosa Island	SR050	PC	5/26/2019	Larramendy_Peter
Santa Rosa Island	SR051	PC	5/26/2019	Larramendy_Peter
Santa Rosa Island	SR052	PC	5/27/2019	Stiles_Mike
Santa Rosa Island	SR053	PC	5/27/2019	Stiles_Mike
Santa Rosa Island	SR054	PC	5/27/2019	Stiles_Mike
Santa Rosa Island	SR055	PC	5/24/2019	Stiles_Mike
Santa Rosa Island	SR056	PC	5/24/2019	Stiles_Mike
Santa Rosa Island	SR057	PC	5/24/2019	Stiles_Mike
Santa Rosa Island	SR058	PC	5/24/2019	Stiles_Mike

Table B-1 (continued). 2019 Landbird Monitoring Site Observers.

Island	Site	Point Count or Line Transect	Survey Date	Observer
Santa Rosa Island	SR059	PC	5/24/2019	Stiles_Mike
Santa Rosa Island	SR060	PC	5/24/2019	Stiles_Mike
Santa Rosa Island	SR061	PC	5/29/2019	Stiles_Mike
Santa Rosa Island	SR062	PC	5/29/2019	Stiles_Mike
Santa Rosa Island	SR063	PC	5/27/2019	Stiles_Mike
Santa Rosa Island	SR064	PC	5/27/2019	Stiles_Mike
Santa Rosa Island	SR065	PC	5/29/2019	Larramendy_Peter
Santa Rosa Island	SR066	PC	5/29/2019	Larramendy_Peter
Santa Rosa Island	SR067	PC	5/27/2019	Stiles_Mike
Santa Rosa Island	SR068	PC	5/29/2019	Larramendy_Peter
Santa Rosa Island	SR069	PC	5/27/2019	Larramendy_Peter
Santa Rosa Island	SR070	PC	5/27/2019	Larramendy_Peter
Santa Rosa Island	SR071	PC	5/27/2019	Larramendy_Peter
Santa Rosa Island	SR072	PC	5/27/2019	Larramendy_Peter
Santa Rosa Island	SR073	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR074	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR075	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR076	PC	5/26/2019	Larramendy_Peter
Santa Rosa Island	SR077	PC	5/26/2019	Larramendy_Peter
Santa Rosa Island	SR078	PC	5/26/2019	Larramendy_Peter
Santa Rosa Island	SR079	PC	5/23/2019	Stiles_Mike
Santa Rosa Island	SR080	PC	5/23/2019	Larramendy_Peter
Santa Rosa Island	SR082	PC	5/23/2019	Larramendy_Peter
Santa Rosa Island	SR083	PC	5/23/2019	Stiles_Mike
Santa Rosa Island	SR084	PC	5/23/2019	Stiles_Mike
Santa Rosa Island	SR085	PC	5/23/2019	Stiles_Mike
Santa Rosa Island	SR086	PC	5/20/2019	Larramendy_Peter
Santa Rosa Island	SR087	PC	5/20/2019	Larramendy_Peter
Santa Rosa Island	SR088	PC	5/20/2019	Larramendy_Peter
Santa Rosa Island	SR089	PC	5/23/2019	Larramendy_Peter
Santa Rosa Island	SR090	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR091	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR092	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR093	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR094	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR095	PC	5/24/2019	Larramendy_Peter

Table B-1 (continued). 2019 Landbird Monitoring Site Observers.

Island	Site	Point Count or Line Transect	Survey Date	Observer
Santa Rosa Island	SR096	PC	5/24/2019	Larramendy_Peter
Santa Rosa Island	SR097	PC	5/24/2019	Larramendy_Peter
Santa Rosa Island	SR098	PC	5/24/2019	Larramendy_Peter
Santa Rosa Island	SR099	PC	5/24/2019	Larramendy_Peter
Santa Rosa Island	SR100	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR101	PC	5/21/2019	Larramendy_Peter
Santa Rosa Island	SR102	PC	5/21/2019	Stiles_Mike
Santa Rosa Island	SR103	PC	5/24/2019	Stiles_Mike
Santa Rosa Island	SR104	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR105	PC	6/1/2019	Larramendy_Peter
Santa Rosa Island	SR106	PC	5/21/2019	Stiles_Mike
Santa Rosa Island	SR107	PC	5/21/2019	Stiles_Mike
Santa Rosa Island	SR108	PC	5/21/2019	Stiles_Mike
Santa Rosa Island	SR109	PC	5/21/2019	Stiles_Mike
Santa Rosa Island	SR110	PC	5/21/2019	Stiles_Mike
Santa Rosa Island	SR111	PC	5/24/2019	Larramendy_Peter
Santa Rosa Island	SR112	PC	5/24/2019	Larramendy_Peter
Santa Rosa Island	SR113	PC	5/24/2019	Larramendy_Peter
Santa Rosa Island	SR114	PC	5/24/2019	Larramendy_Peter
Santa Rosa Island	SR115	PC	5/24/2019	Larramendy_Peter
Santa Rosa Island	SR116	PC	5/26/2019	Stiles_Mike
Santa Rosa Island	SR117	PC	5/26/2019	Stiles_Mike
Santa Rosa Island	SR118	PC	5/26/2019	Stiles_Mike
Santa Rosa Island	SR119	PC	5/26/2019	Stiles_Mike
Santa Rosa Island	SR120	PC	5/26/2019	Stiles_Mike
Santa Rosa Island	SR121	PC	5/22/2019	Larramendy_Peter
Santa Rosa Island	SR122	PC	5/22/2019	Larramendy_Peter
Santa Rosa Island	SR123	PC	5/22/2019	Larramendy_Peter
Santa Rosa Island	SR124	PC	5/22/2019	Larramendy_Peter
Santa Rosa Island	SR125	PC	5/22/2019	Larramendy_Peter
Santa Rosa Island	SR126	PC	5/25/2019	Stiles_Mike
Santa Rosa Island	SR127	PC	5/25/2019	Stiles_Mike
Santa Rosa Island	SR128	PC	5/25/2019	Stiles_Mike
Santa Rosa Island	SR129	PC	5/25/2019	Stiles_Mike
Santa Rosa Island	SR130	PC	5/25/2019	Stiles_Mike
Santa Rosa Island	SR131	PC	5/27/2019	Larramendy_Peter

Table B-1 (continued). 2019 Landbird Monitoring Site Observers.

Island	Site	Point Count or Line Transect	Survey Date	Observer
Santa Rosa Island	SR132	PC	5/23/2019	Stiles_Mike
Santa Rosa Island	SR133	PC	5/23/2019	Stiles_Mike
Santa Rosa Island	SR134	PC	5/23/2019	Stiles_Mike
Santa Rosa Island	SR135	PC	5/23/2019	Larramendy_Peter
Santa Rosa Island	SR136	PC	5/23/2019	Larramendy_Peter
Santa Rosa Island	SR137	PC	5/30/2019	Larramendy_Peter
Santa Rosa Island	SR138	PC	5/30/2019	Larramendy_Peter
Santa Rosa Island	SR139	PC	5/30/2019	Larramendy_Peter
Santa Rosa Island	SR140	PC	5/30/2019	Larramendy_Peter
Santa Rosa Island	SR141	PC	5/30/2019	Larramendy_Peter
Santa Rosa Island	SR142	PC	5/28/2019	Larramendy_Peter
Santa Rosa Island	SR143	PC	5/27/2019	Stiles_Mike
Santa Rosa Island	SR144	PC	5/20/2019	Larramendy_Peter
Santa Rosa Island	SR145	PC	6/1/2019	Larramendy_Peter

Appendix C.

Table C-1. Anecdotal sightings of non-native landbirds in the northern Channel Islands in 2019 (summarized by P. Collins, Santa Barbara Museum of Natural History, from eBird reports).

Species	Island	Location	Date	Observer	Number
Rock Pigeon	SCI	Main Ranch	15-Apr-19	Joey Negreann	1
Rock Pigeon	SCI	Scorpion Harbor	16-Jun-19	Priya Donti, Anna Ho	1
Rock Pigeon	SBI	Landing Cove	17–21 Jun 2019	Jim Howard	2
Rock Pigeon	SBI	NPS Housing	22-Jun-19	Bernardo Alps, Jeremiah Psiropoulos	2
Eurasian Collared Dove	SCI	Prisoners Habor	2-Jan-19	Nancy Baron	2
Eurasian Collared Dove	SCI	Canada del Puerto	2-Jan-19	Bradley Hacker, David Levasheff	1
Eurasian Collared Dove	SCI	Main Ranch	4-Jan-19	Jessie Altstatt	1
Eurasian Collared Dove	SRI	Historic Ranch area	2-Mar-19	Nathan Melling	3
Eurasian Collared Dove	SRI	Historic Ranch area	20–24 Mar 2019	Zena Casteel,	3
Eurasian Collared Dove	SCI	UC Research Station	12-Apr-19	Joey Negreann	6
Eurasian Collared Dove	SCI	–	14-Apr-19	Robert Hansen	2
Eurasian Collared Dove	SCI	Main Ranch	14-Apr-19	Joey Negreann	6
Eurasian Collared Dove	SCI	Main Ranch	15-Apr-19	Joey Negreann	5
Eurasian Collared Dove	SCI	–	15-Apr-19	Robert Hansen, Jim Murray, Peter Schuyler	2
Eurasian Collared Dove	SCI	–	16-Apr-19	Robert Hansen, Jim Murray, Lisa Stratton, David Dewey	3
Eurasian Collared Dove	SCI	Prisoners Harbor	26-Apr-19	Devon Bradley, Samantha Green	2
Eurasian Collared Dove	SCI	UC Research Station	28-Apr-19	Devon Bradley	2
Eurasian Collared Dove	SCI	Main Ranch	3-May-19	Joey Negreann	1
Eurasian Collared Dove	SCI	Canada del Puerto	4-May-19	Zena Casteel, Joey Negreann, Molly Fitzsimmons	1
Eurasian Collared Dove	SCI	Central Valley	4-May-19	Zena Casteel, Joey Negreann, Molly Fitzsimmons	1
Eurasian Collared Dove	SCI	Christy Canyon	4-May-19	Zena Casteel, Joey Negreann, Molly Fitzsimmons	1
Eurasian Collared Dove	SCI	Portazuela	9-May-19	Joey Negreann	1
Eurasian Collared Dove	SRI	Historic Ranch area	12-May-19	Aaron Kreisberg	2

Table C-1 (continued). Anecdotal sightings of non-native landbirds in the northern Channel Islands in 2019 (summarized by P. Collins, Santa Barbara Museum of Natural History, from eBird reports).

Species	Island	Location	Date	Observer	Number
Eurasian Collared Dove	SCI	N of Christy Ranch	12-May-19	Joey Negreann	1
Eurasian Collared Dove	SBI	Landing Cove	14-May-19	Jim Howard	1
Eurasian Collared Dove	SRI	Historic Ranch area	1-Jun-19	Gary Gray	2
Eurasian Collared Dove	SCI	Scorpion Harbo	16-Jun-19	Anna Ho	1
Eurasian Collared Dove	SCI	Upper Christy Canyon	19-Jun-19	L. Mah	2
Eurasian Collared Dove	SCI	–	19-Jun-19	L. Mah	4
Eurasian Collared Dove	SCI	Main Ranch	20-Jun-19	L. Mah	2
Eurasian Collared Dove	SBI	–	21-Jun-19	Jim Howard	1
Eurasian Collared Dove	SBI	–	22-Jun-19	Bernardo Alps, Carl Mayhugh, Nico Heyning, Jeremiah Psiropoulos	1
Eurasian Collared Dove	SCI	Scorpion Harbor	22-Jun-19	Jimmy Wu	1
Eurasian Collared Dove	SCI	Canada del Medio	26-Jun-19	David Rankin	2
Eurasian Collared Dove	SRI	Historic Ranch area	12-Jul-19	David Diller	1
Eurasian Collared Dove	SRI	Historic Ranch area	12–14 Aug 2019	Cathy Bondy	6-Apr
Eurasian Collared Dove	SRI	Historic Ranch area	24-Aug-19	Mark Detting	1
Eurasian Collared Dove	SCI	Scorpion Campground	156 Sep 2019	Nick Lethaby	1
Eurasian Collared Dove	SCI	TNC Cabins	16-Oct-19	Danielle Aube	2
Eurasian Collared Dove	SCI	–	17-Oct-19	Timothy Guida, Danielle Aube	1
Eurasian Collared Dove	SCI	–	18-Oct-19	Timothy Guida, Angel Ramirez	5
Eurasian Collared Dove	SCI	–	20-Oct-19	Timothy Guida, Danielle Aube	1
Eurasian Collared Dove	SCI	–	21-Oct-19	Timothy Guida	3
Eurasian Collared Dove	SCI	UC Research Station	22-Oct-19	Kevin Brown, Nora Livingston	4-Feb
Eurasian Collared Dove	SCI	UC Research Station	23-Oct-19	Kevin Brown, Nora Livingston	3
Eurasian Collared Dove	SCI	Main Ranch	24-Oct-19	Timothy Guida	2
Eurasian Collared Dove	SCI	Canada Del Puerto	25-Oct-19	Angel Ramirez	4
European Starling	SCI	Christy Ranch	3-Jan-19	Nancy Baron	3
European Starling	SCI	Scorpion Campground	8-Feb-19	Aaron Kreisberg	3
European Starling	SRI	Historic Ranch area	2-Mar-19	Nathan Melling	1
European Starling	SRI	Historic Ranch area	20-Mar-19	Zena Casteel	1
European Starling	SRI	Historic Ranch area	23-Mar-19	Zena Casteel	4

Table C-1 (continued). Anecdotal sightings of non-native landbirds in the northern Channel Islands in 2019 (summarized by P. Collins, Santa Barbara Museum of Natural History, from eBird reports).

Species	Island	Location	Date	Observer	Number
European Starling	SRI	Historic Ranch area	24-Mar-19	Gloria Nikolai	8
European Starling	SCI	Scorpion Harbo	6-Apr-19	Valerie Griffin	1
European Starling	SCI	UC Research Station	12-Apr-19	Joey Negreann	3
European Starling	SCI	–	14-Apr-19	Robert Hansen	3
European Starling	SCI	Main Ranch	15-Apr-19	Joey Negreann	1
European Starling	SCI	–	15-Apr-19	Robert Hansen, Jim Murray, Peter Schuyler,	4
European Starling	SCI	–	16-Apr-19	Robert Hansen, Jim Murray, Lisa Stratton, David Dewey	4
European Starling	SCI	Christy Canyon	4-May-19	Joey Negreann, Molly Fitzsimmons	3
European Starling	SCI	Christy Ranch	4-May-19	Joey Negreann, Molly Fitzsimmons, Zena Casteel	1
European Starling	SCI	Central Valley	4-May-19	Joey Negreann, Molly Fitzsimmons, Zena Casteel	3
European Starling	SCI	Scorpion Campground	14-Jun-19	Aaron Kreisberg	3
European Starling	SCI	Scorpion Harbor	16-Jun-19	Anna Ho, Priya Donti	2
European Starling	SCI	Main Ranch	20-Jun-19	L. Mah	2
European Starling	SCI	–	15-Oct-19	Timothy Guida, Danielle Aube	1
European Starling	SCI	Main Ranch	24-Oct-19	Timothy Guida	1
European Starling	SCI	–	25-Oct-19	Timothy Guida, Danielle Aube	1
European Starling	SRI	Cherry Canyon Trail	5-Dec-19	Bradford Schmonsees	50
House Sparrow	SCI	Sierra Blanca Ridge	3-Jan-19	Nathan Melling, Carol Fields	1
House Sparrow	SCI	Scorpion Canyon	17-Apr-19	Rajan Rao	3
House Sparrow	SCI	Prisoners Harbor	23-May-19	David Swain	5
House Sparrow	SCI	Prisoners Harbor	7-Sep-19	Joe Wing	1
House Sparrow	SCI	Scorpion Canyon	30-Sep-19	Mark Mendelsohn	4
Brown-headed Cowbird	SCI	Christy Ranch	4-May-19	Joey Negreann, Molly Fitzsimmons, Zena Casteel	1
Brown-headed Cowbird	SRI	Historic Ranch Area	1-Jun-19	Gary Gray	2

Table C-1 (continued). Anecdotal sightings of non-native landbirds in the northern Channel Islands in 2019 (summarized by P. Collins, Santa Barbara Museum of Natural History, from eBird reports).

Species	Island	Location	Date	Observer	Number
Brown-headed Cowbird	SRI	Historic Ranch Area	12-Aug-19	Cathy Bondy	5
Brown-headed Cowbird	SRI	Historic Ranch Area	13-Aug-19	Cathy Bondy	2
Brown-headed Cowbird	SCI	Scorpion Canyon	23-Aug-19	Bob French, Arthur Langton	6
Brown-headed Cowbird	SCI	Scorpion Campground	23-Aug-19	Jim Moore, Judy Howell, Kim Moore, Judy Matsuoka	7
Brown-headed Cowbird	SBI	–	24-Aug-19	Mark Stacy	1
Brown-headed Cowbird	SBI	–	24-Aug-19	Bernardo Alps	8
Brown-headed Cowbird	SCI	Scorpion Campground	2-Sep-19	Brendan Crill	12
Brown-headed Cowbird	SMI	–	3-Sep-19	Jim Howard	2
Brown-headed Cowbird	SCI	Scorpion Harbor	3-Sep-19	Aaron Kreisbery	11
Brown-headed Cowbird	SMI	Scorpion Canyon	3-Sep-19	Jerami Prendiville	2
Brown-headed Cowbird	SMI	–	5-Sep-19	Jim Howard	2
Brown-headed Cowbird	SCI	Scorpion Canyon	7-Sep-19	Ben Newhouse	5
Brown-headed Cowbird	SCI	Scorpion Campground	13-Sep-19	Jim Howard	3
Brown-headed Cowbird	SCI	Scorpion Campground	15-Sep-19	Nick Lethaby	4
Brown-headed Cowbird	SCI	Scorpion Campground	25-Sep-19	Matt Yawney, Cameron Codd, Jeremy Yawney	5
Brown-headed Cowbird	SBI	–	12-Oct-19	Nick Lethaby, Cuyler Stapelmann	1
Brown-headed Cowbird	SCI	Scorpion Harbor	17-Oct-19	Aaron Kreisberg	4
Brown-headed Cowbird	SCI	–	23-Oct-19	Josh Sweet, Jill Sweet	2
Brown-headed Cowbird	SCI	Scorpion Campground	26-Oct-19	Alex Haun	4
Brown-headed Cowbird	SCI	Scorpion Campground	27-Oct-19	Dan Richards	1
Brown-headed Cowbird	SCI	Scorpion Canyon	1-Nov-19	Jessy Wilson	3
Brown-headed Cowbird	SCI	Scorpion Harbor	21-Sep-19	Eduardo Jimenez	1

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National Park Service
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