



Landbird Monitoring 2020 Annual Report

Channel Islands National Park

Natural Resource Report NPS/MEDN/NRR—2023/2583



ON THE COVER

Overlook from Santa Rosa Island with Santa Cruz Island in the horizon.

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Executive Summary

The National Park Service (NPS) began monitoring landbirds at Channel Islands National Park in 1993 as part of its long-term 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 in the park during every breeding season since 1993. In this report, we summarize data collected during the 2020 breeding season.

Landbird monitoring was conducted between 1 April and 30 June 2020. Using distance-based sampling methods in a standardized protocol, birds were counted on 7 of 10 permanent line transects (70%) (2 of 3 on Santa Barbara Island, 1 of 1 on East Anacapa Island, and 4 of 5 on San Miguel Island). Two transects were not sampled in 2020 because of nesting California Brown Pelicans (*Pelecanus occidentalis*) on Santa Barbara Island (i.e., Canyons Transect) and reduced person hours and unfavorable winds on San Miguel Island (i.e., San Miguel Hill Transect). For point counts, 225 of 338 (67%) permanent stations were counted (i.e., 30 of 33 points on Santa Barbara Island, 8 of 8 on East Anacapa Island, 100 of 112 on Santa Cruz Island, 40 of 40 on San Miguel Island, and 47 of 145 on Santa Rosa Island). The 8 Prisoners' Cove points were not counted in 2020. Three points were not counted on Santa Barbara Island due to nesting pelicans: these points and the transect were also not counted in 2016–2019 to avoid disturbing breeding pelicans. Other points (i.e., on east Santa Cruz Island and Santa Rosa Island) were not counted due in large part to the global COVID-19 pandemic. Traveling to and from the park was only granted to essential NPS staff for the majority of the landbird season.

Fifty-one bird species were counted from points and transects across all of the islands in 2020; 39 of these are breeding species on the island. Parkwide, the 10 most commonly detected breeding landbirds in 2020 were, in descending order: Horned Lark, Spotted Towhee, Song Sparrow, White-crowned Sparrow, Western Meadowlark, Orange-crowned Warbler, Bewick's Wren, Island Scrub-Jay, House Finch, and Common Raven.

On East Anacapa Island, 26 landbird species have been counted since 1993; 5 species were counted in 2020. No new transient species were detected in 2020; 10 transient or visiting species (nonbreeding, native species recorded only once or twice during surveys) have been counted on the island overall since 1993.

On Santa Barbara Island, 49 landbird species have been counted since 1993; 15 species were counted in 2020. The highest number of Horned Lark since 1993 were counted in 2020 ($n = 451$). Warbling Vireo was a new transient species counted in 2020 on Santa Barbara; 30 transient or visiting species have been counted on the island since 1993.

On Santa Cruz Island, 74 landbird species have been counted since 2013; 34 species were counted in 2020. Bullock's Oriole was a new transient species counted in 2020 on Santa Cruz; 21 transient or visiting species have been counted on this island since 2013.

On San Miguel Island, 69 landbird species have been counted since 1993; 14 were counted in 2020. No transient species were counted in 2020; 34 transient or visiting species have been counted on the island since 1993.

On Santa Rosa Island, 75 landbird species have been counted since 1994; 26 were detected in 2020. Rose-breasted Grosbeak was a new transient species counted in 2020 on Santa Rosa Island; 30 transient or visiting species have been counted on the island since 1994.

Across all the 5 islands, 3 transient or visiting bird species were newly counted in 2020, for a total of 77 such species counted since NPS monitoring began on the islands.

Nonnative and invasive birds were counted on only 1 of the 5 islands in 2020: 4 European Starlings on Santa Rosa Island. However, anecdotal sightings of nonnative species occurred much more frequently (i.e., outside of the point and transect counts), and were made on all islands except Anacapa in 2020. The highest numbers of nonnative 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 detections 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 Islands.

In 2020, despite the COVID-19 pandemic, 67% of all points and 77% of all transects were counted among the 5 islands. Santa Rosa received the lightest sampling of points (32%), due to the difficulty of getting observers onto the island. Even with diminished sampling, species richness (number of species) values fell in predictable patterns: richness was greatest on the larger islands (75 on Santa Rosa, 73 on Santa Cruz) and least on the smallest islands (26 on Anacapa, 48 on Santa Barbara).

We continue to recommend that nonnative invasive species, such as European Starlings on Santa Rosa Island, be removed before their numbers become harder to manage. Also, because Distance analyses assist statistically with evaluations of trends, we continue to recommend that a trend analysis using program DISTANCE, or newer hierarchical distance analyses, 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).

Acknowledgments

Data were gathered by author P. Larramendy on Santa Rosa Island, as well as by Stacy Baker of Channel Islands National Park (San Miguel and Santa Rosa Islands), Jim Howard of California Institute of Environmental Studies (Santa Barbara and East Anacapa Islands), and Lyndal Laughrin of UC Reserve (Santa Cruz Island). NPS staff were instrumental in getting observers on, off, and around the islands safely. The UC Reserve on Santa Cruz Island provided lodging, and L. Laughrin assisted with all logistics on this island. Island Packers provided additional transportation on and off island. The California Institute for Environmental Studies and the Western Foundation of Vertebrate Zoology generously provided additional logistical and technical support. Stacey Ostermann-Kelm provided critical review of an earlier draft of this report. Thanks to all!

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). The park’s landbird monitoring later became part of the NPS Inventory and Monitoring Division’s Mediterranean Coast Network (MEDN) long-term monitoring programs (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. 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 2020.

The objectives of the landbird monitoring program (van Riper III et al. 1988; Coonan et al. 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 2020. 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 2020, landbird monitoring at CHIS was conducted on established line transects (van Riper et al. 1998) and point count sites called “stations” (Coonan et al. 2011) as per protocol review recommendations proposed in 2000. A total of 4 observers conducted landbird monitoring in 2020 (Appendix B).

For point counts, sampling occurred in the morning, beginning as soon as it was light enough to see a distance of at least 150 m and ending no later than 4 hours after official sunrise. Counts were conducted for 10 minutes at each point count site. Counts 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 included horizontal distances in meters from the observer to the bird.

For transect counts, each transect was walked at a moderately slow pace; for all birds seen or heard, the observer recorded the perpendicular distance between the transect midline and the bird. Observations began at sunrise and continued until four hours after sunrise. The length of each transect varied among and within islands.

The methodology used in 2020 followed Coonan et al. (2011), except for the fog modification that was adopted in 2015 and repeated again during the 2016–2020 seasons: the minimum visibility distance necessary to conduct monitoring was reduced from 400 m to 150 m. 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. 2011).

On Santa Cruz Island, we conducted a 7th 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 (Klinger 1998). Access points to the stations were spaced 0.8 km (0.5 mi) apart along the major roads and trails on the island. A random compass bearing and distance (within 150 m) to the station were selected from these access points. The 8 Prisoners’ Cove points were not counted in 2020.

Data were entered into the CHIS Landbird Database by L. Lee and NPS interns, 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 2020).

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

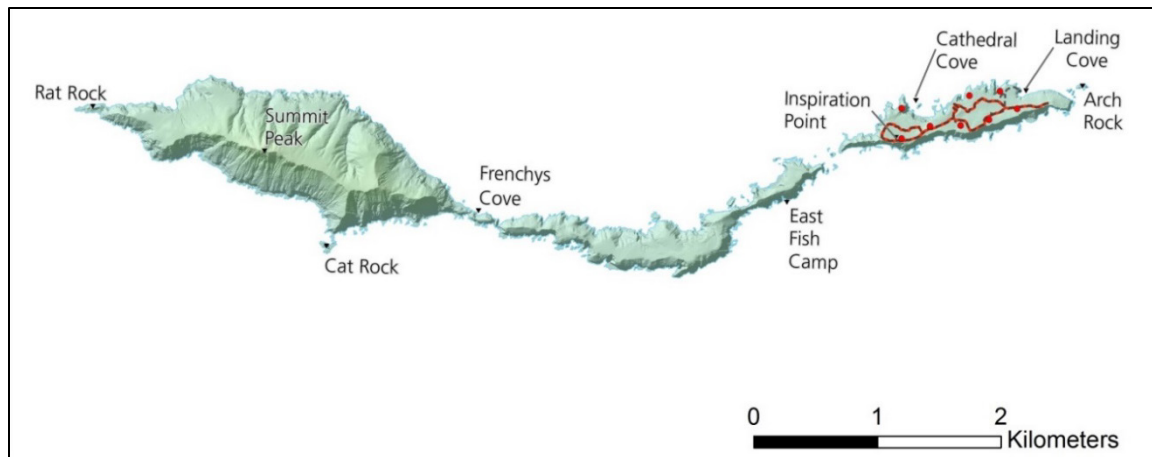


Figure 1. Landbird monitoring point count stations (red dots) and line transects (red lines) on East Anacapa Island, Channel Islands National Park.

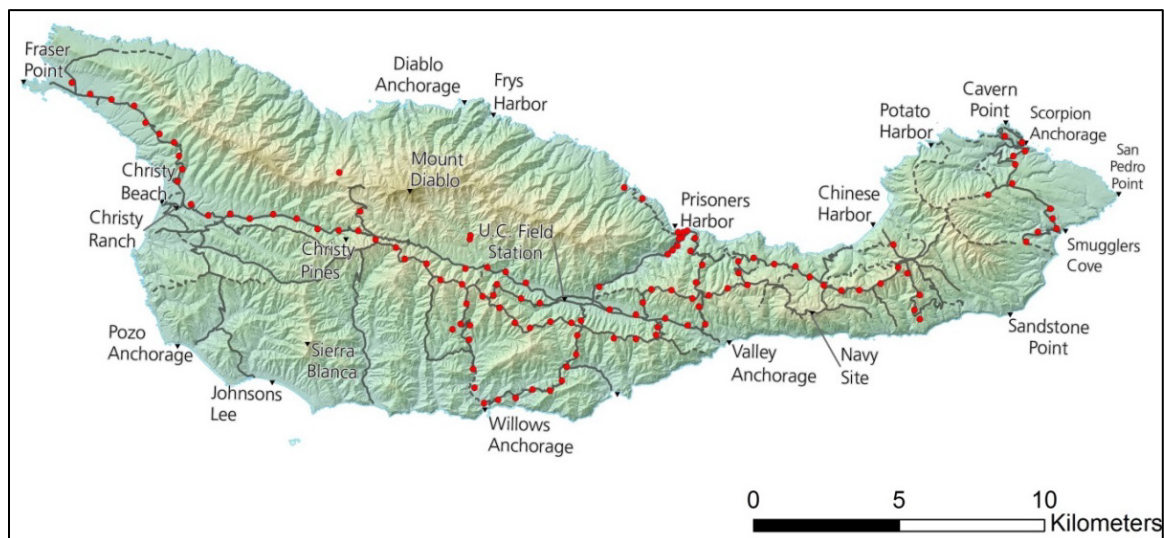


Figure 2. Landbird monitoring point count stations (red dots) on Santa Cruz Island, Channel Islands National Park.

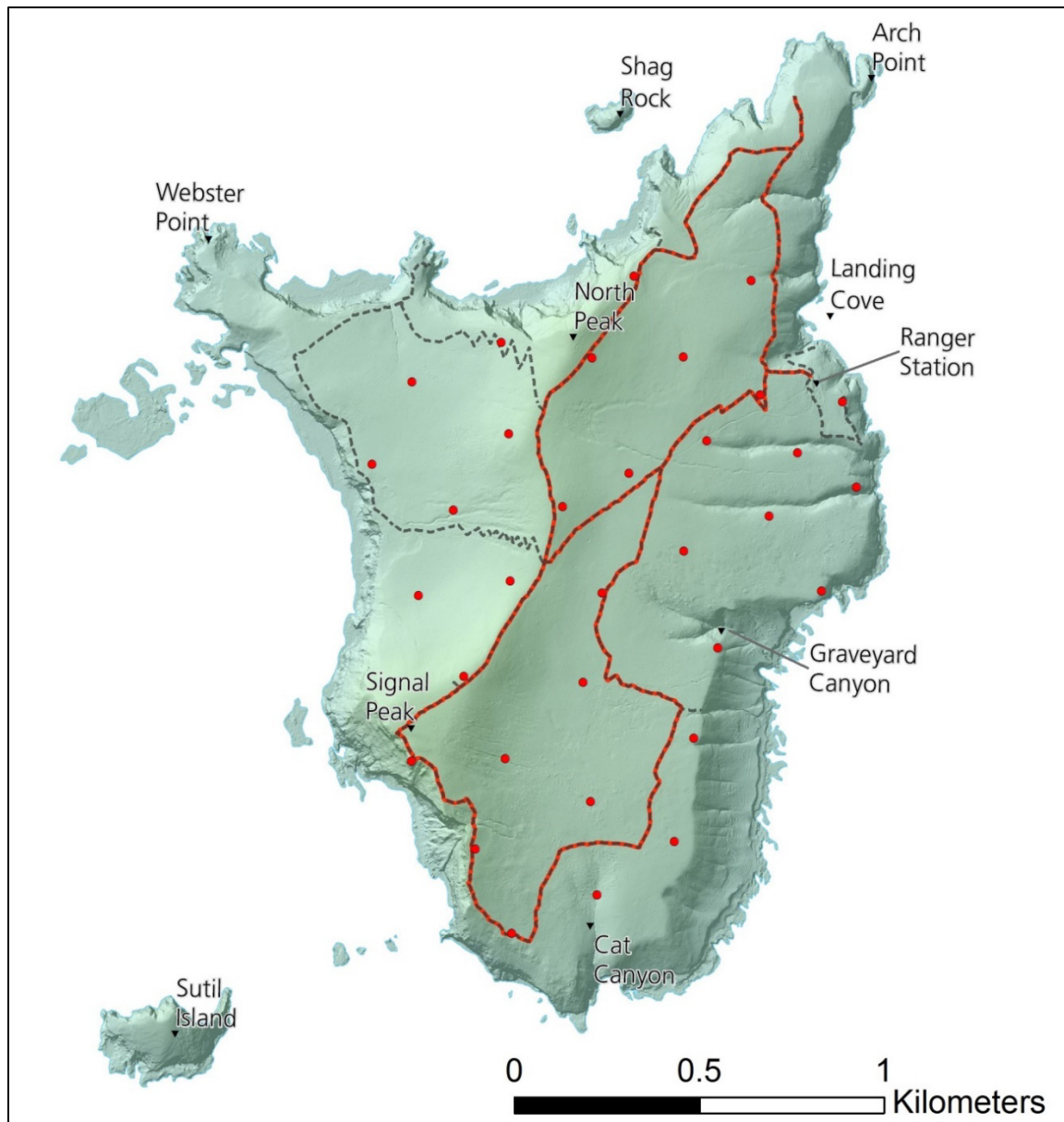


Figure 3. Landbird monitoring point count stations (red dots) and line transects (red lines) on Santa Barbara Island, Channel Islands National Park.

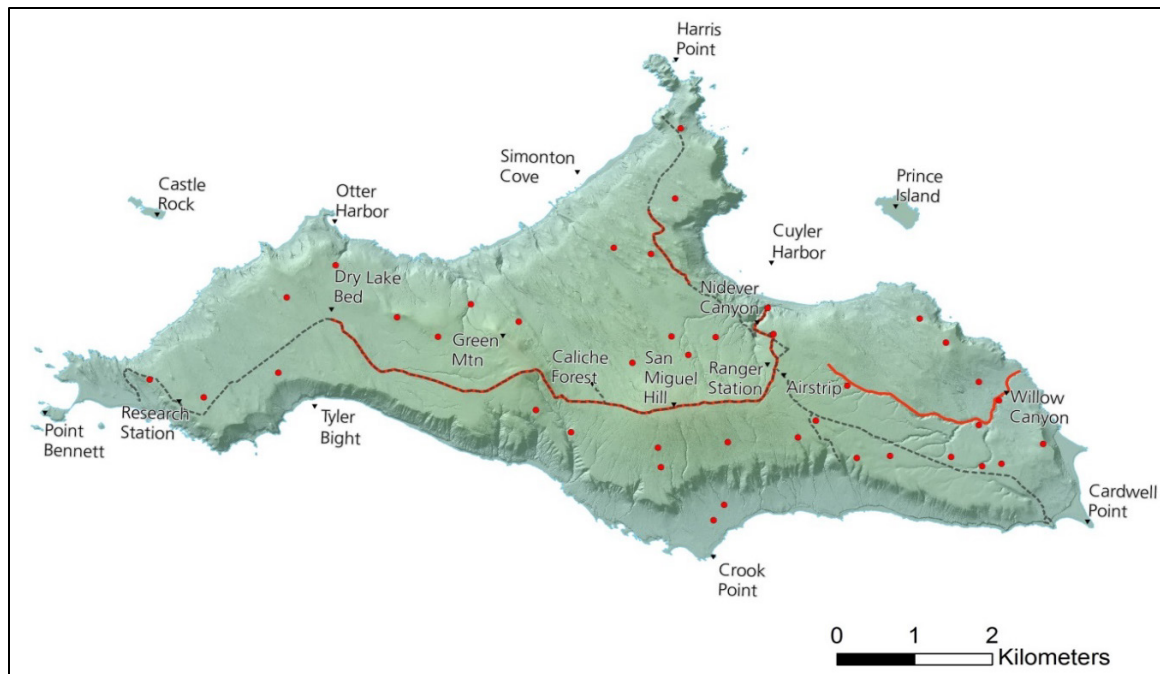


Figure 4. Landbird monitoring point count stations (red dots) and line transects (red lines) on San Miguel Island, Channel Islands National Park.

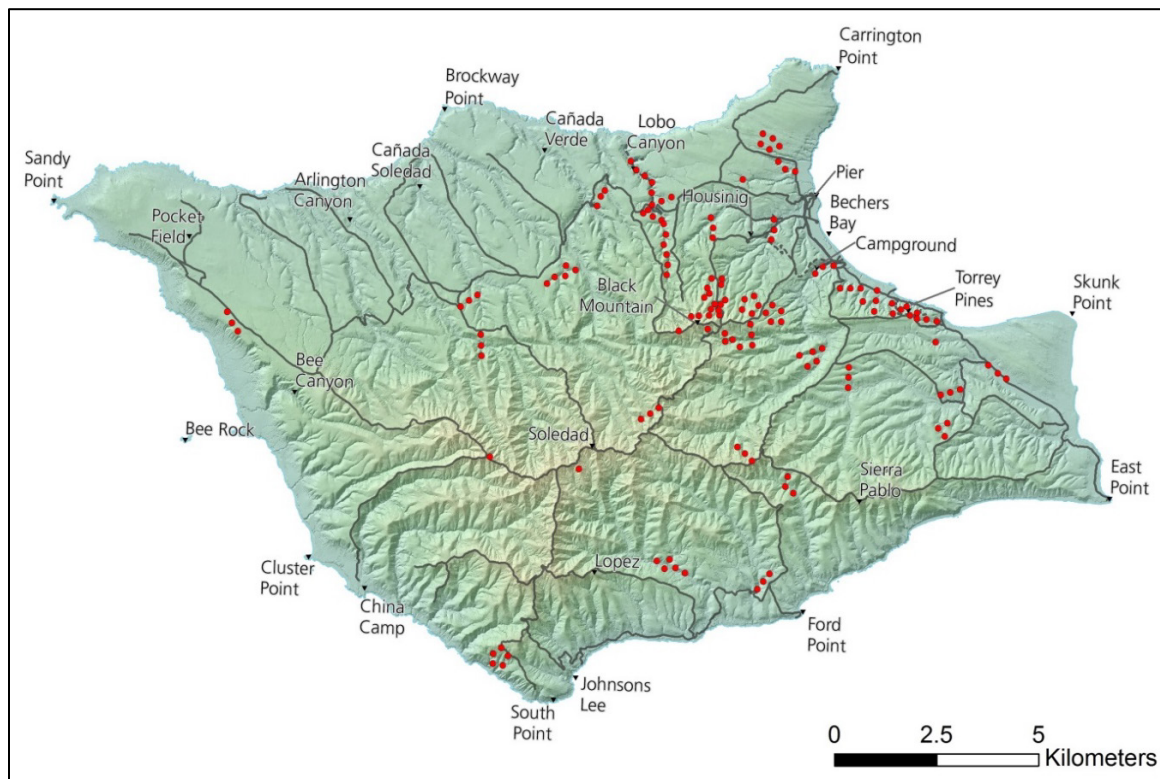


Figure 5. Landbird monitoring point count stations (red dots) on Santa Rosa Island, Channel Islands National Park.

Results

Monitoring was conducted between 1 April and 30 June 2020 (Table 1). Using distance-based sampling methods (Buckland et al. 2015), we surveyed birds on 7 of 9 permanent line transects (77%) (2 of 3 on Santa Barbara Island, 1 of 1 on East Anacapa Island, and 4 of 5 on San Miguel Island). Two transects were not sampled this season partially because of nesting California Brown Pelicans (*Pelecanus occidentalis*) on Santa Barbara Island (i.e., Canyons Transect) and reduced person hours and unfavorable winds on San Miguel (i.e., San Miguel Hill Transect). For point counts, 225 of 338 permanent point count sites (67%) were sampled in 2020 (i.e., 30 of 33 points on Santa Barbara, 8 of 8 on Anacapa, 100 of 120 on Santa Cruz, 40 of 40 on San Miguel, and 47 of 145 on Santa Rosa). Three points were not counted on Santa Barbara Island due to nesting California Brown Pelicans: these points and the transect were also not counted in 2016–2019 to avoid disturbing breeding pelicans. Other points (i.e., on east Santa Cruz Island and Santa Rosa Island) were not counted due in large part to the global COVID-19 pandemic. Traveling to and from the park was only granted to essential NPS staff for the majority of the landbird season.

Table 1. Start and end dates, number of transects, and number of point count stations (sites) monitored on each island in 2020, Channel Islands National Park.

Island	Start Date	End Date	# Transects	# Point Counts
Anacapa	05/01/2020	05/31/2020	1	8
San Miguel	04/01/2020	05/31/2020	4	40
Santa Barbara	04/01/2020	05/31/2020	2	30
Santa Cruz	04/19/2020	05/31/2020	0	100
Santa Rosa	05/01/2020	06/30/2020	0	47

Bird Species Occurrence in 2020

The numbers of individuals of each species that were detected on all islands in 2020 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 results tables, as well as an index of abundance on transects.

Fifty-one bird species were counted from points and transects across all islands in 2020 (Table 2). Thirty-nine of these are breeding species on the island (Table 2, Appendix A). Parkwide, the 10 most commonly detected breeding landbirds in 2020 were, in descending order: Horned Lark, Spotted Towhee, Song Sparrow, White-crowned Sparrow, Western Meadowlark, Orange-crowned Warbler, Bewick's Wren, Island Scrub-Jay, House Finch, and Common Raven (Table 2; scientific names given in Table 2 and Appendix A).

Table 2. Number of individuals of each species counted during bird counts on all islands in 2020, Channel Islands National Park. Data include detections on both line transects and point counts, and do not include birds observed before or after the counts. Seabirds and shorebirds detected during the counts are also included in this table.

Common Name	Scientific Name	Total # Detected	East Anacapa Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	23	–	–	20	–	3
Allen's Hummingbird	<i>Selasphorus sasin</i>	25	–	–	6	4	15
American Kestrel	<i>Falco sparverius</i>	1	–	–	1	–	–
Anna's Hummingbird	<i>Calypte anna</i>	10	–	–	5	–	5
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	33	–	–	33	–	–
Barn Owl	<i>Tyto alba</i>	2	–	2	–	–	–
Barn Swallow	<i>Hirundo rustica</i>	6	–	–	–	–	6
Belted Kingfisher	<i>Ceryle alcyon</i>	1	–	–	1	–	–
Bewick's Wren	<i>Thryomanes bewickii</i>	167	4	–	101	1	61
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	15	–	–	15	–	–
Black Oystercatcher	<i>Haematopus bachmani</i>	2	–	–	–	2	–
Black Phoebe	<i>Sayornis nigricans</i>	1	–	1	–	–	–
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	8	–	–	8	–	–
Bullock's Oriole	<i>Icterus bullockii</i>	1	–	–	1	–	–
Bushtit	<i>Psaltirparus minimus</i>	4	–	–	2	–	2
California Quail	<i>Callipepla californica</i>	41	–	–	30	–	11
Chipping Sparrow	<i>Spizella passerina</i>	46	–	–	14	–	32
Common Raven	<i>Corvus corax</i>	73	–	–	36	20	17
Common Yellowthroat	<i>Geothlypis trichas</i>	1	–	–	1	–	–
European Starling	<i>Sturnus vulgaris</i>	4	–	–	–	–	4
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	12	–	6	6	–	–
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	1	–	–	–	–	1

*Total number of species includes shorebirds and seabirds.

Table 2 (continued). Number of individuals of each species counted during bird counts on all islands in 2020, Channel Islands National Park. Data include detections on both line transects and point counts, and do not include birds observed before or after the counts. Seabirds and shorebirds detected during the counts are also included in this table.

Common Name	Scientific Name	Total # Detected	East Anacapa Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Horned Lark	<i>Eremophila alpestris</i>	528	–	451	1	44	32
House Finch	<i>Carpodacus mexicanus</i>	94	10	16	34	2	34
Hutton's Vireo	<i>Vireo huttoni</i>	10	–	–	8	–	2
Island Scrub-Jay	<i>Aphelocoma insularis</i>	146	–	–	146	–	–
Lazuli Bunting	<i>Passerina amoena</i>	1	–	–	1	–	–
Lesser Goldfinch	<i>Carduelis psaltria</i>	11	–	–	4	–	7
Loggerhead Shrike	<i>Lanius ludovicianus</i>	6	–	–	–	–	6
Mourning Dove	<i>Zenaida macroura</i>	18	–	–	15	–	3
Northern Flicker	<i>Colaptes auratus</i>	39	–	–	39	–	–
Northern Harrier	<i>Circus cyaneus</i>	16	–	14	1	1	–
Northern Mockingbird	<i>Mimus polyglottos</i>	8	–	–	–	–	8
Orange-crowned Warbler	<i>Vermivora celata</i>	185	–	7	48	67	63
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	39	–	–	13	–	26
Peregrine Falcon	<i>Falco peregrinus</i>	8	1	4	–	3	–
Red-tailed Hawk	<i>Buteo jamaicensis</i>	5	–	–	3	1	1
Rock Wren	<i>Salpinctes obsoletus</i>	10	2	3	–	3	2
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	1	–	–	–	–	1
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	26	–	–	26	–	–
Savannah Sparrow	<i>Passerculus sandwichensis</i>	9	–	9	–	–	–
Short-tailed Albatross	<i>Diomedea albatrus</i>	5	–	–	5	–	–
Song Sparrow	<i>Melospiza melodia</i>	414	62	–	79	155	118
Spotted Towhee	<i>Pipilo maculatus</i>	422	–	–	291	1	130

*Total number of species includes shorebirds and seabirds.

Table 2 (continued). Number of individuals of each species counted during bird counts on all islands in 2020, Channel Islands National Park. Data include detections on both line transects and point counts, and do not include birds observed before or after the counts. Seabirds and shorebirds detected during the counts are also included in this table.

Common Name	Scientific Name	Total # Detected	East Anacapa Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Townsend's Warbler	<i>Dendroica townsendi</i>	1	–	1	–	–	–
Varied Thrush	<i>Zoothera naevia</i>	2	–	–	2	–	–
Warbling Vireo	<i>Vireo gilvus</i>	1	–	1	–	–	–
Western Meadowlark	<i>Sturnella neglecta</i>	216	–	54	22	72	68
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	249	–	238	7	4	–
Willet	<i>Catoptrophorus semipalmatus</i>	54	–	–	–	54	–
Yellow-rumped Warbler	<i>Dendroica coronata</i>	6	–	6	–	–	–
Total Number of Species across Islands (Richness):	All species	51	5	15	35*	16*	26

*Total number of species includes shorebirds and seabirds.

East Anacapa Island Point Counts

Song Sparrow was the only species detected at >50% of point count stations on East Anacapa Island in 2020 (Table 3, % Stns Where Detected).

Table 3. Results from point count sampling in 2020 at 8 stations on East Anacapa Island: number of individuals detected, mean number of birds per point count station and standard error, number of stations where a species was detected, and frequency (percent of total stations where a bird species was detected in 2020).

Species	Common Name	# Detected	# Stns Where Detected	% Stns Where Detected
BEWR	Bewick's Wren	2	2	25.0
PEFA	Peregrine Falcon	1	1	12.5
SOSP	Song Sparrow	27	7	87.5

Santa Barbara Island Point Counts

Horned Lark, Western Meadowlark, and White-crowned Sparrow were the only species detected at >50% of count stations on Santa Barbara Island (Table 4).

Table 4. Results from point count sampling in 2020 at 30 stations on Santa Barbara Island: number of individuals detected, mean number of birds per point count station and standard error, number of stations where a species was detected, and frequency (percent of total stations where a bird species was detected in 2020).

Species	Common Name	# Detected	# Stns Where Detected	% Stns Where Detected
BANO	Barn Owl	2	1	3.3
HOLA	Horned Lark	251	30	100.0
HOFI	House Finch	10	3	10.0
NOHA	Northern Harrier	12	6	20.0
OCWA	Orange-crowned Warbler	2	2	6.7
PEFA	Peregrine Falcon	4	3	10.0
ROWR	Rock Wren	3	2	6.7
SAVS	Savannah Sparrow	8	3	10.0
TOWA	Townsend's Warbler	1	1	3.3
WEME	Western Meadowlark	35	15	50.0
WCSP	White-crowned Sparrow	115	25	83.3
YRWA	Yellow-rumped Warbler	1	1	3.3

Santa Cruz Island Point Counts

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

Table 5. Results from point count sampling in 2020 at 100 stations on Santa Cruz Island: number of individual landbirds detected (not including seabirds or shorebirds), mean number of birds per point count station and standard error, number of stations where a species was detected, and frequency (percent of total stations where a bird species was detected in 2020).

Species	Common Name	# Detected	# Stns Where Detected	% Stns Where Detected
ACWO	Acorn Woodpecker	20	10	10
ALHU	Allen's Hummingbird	6	6	6
AMKE	American Kestrel	1	1	1
ANHU	Anna's Hummingbird	5	4	4
ATFL	Ash-throated Flycatcher	33	26	26
BEKI	Belted Kingfisher	1	1	1
BEWR	Bewick's Wren	101	68	68
BHGR	Black-headed Grosbeak	15	15	15
BGGN	Blue-gray Gnatcatcher	8	7	7
BUOR	Bullock's Oriole	1	1	1
BUSH	Bushtit	2	1	1
CAQU	California Quail	30	20	20
CHSP	Chipping Sparrow	14	12	12
CORA	Common Raven	36	20	20
COYE	Common Yellowthroat	1	1	1
GCSP	Golden-crowned Sparrow	6	4	4
HOLA	Horned Lark	1	1	1
HOFI	House Finch	34	20	20
HUVI	Hutton's Vireo	8	6	6
ISJA	Island Scrub-Jay	146	69	69
LAZB	Lazuli Bunting	1	1	1
LEGO	Lesser Goldfinch	4	4	4
MODO	Mourning Dove	15	11	11
NOFL	Northern Flicker	39	38	38
OCWA	Orange-crowned Warbler	48	38	38
PSFL	Pacific-slope Flycatcher	13	11	11
RTHA	Red-tailed Hawk	3	3	3
RCSP	Rufous-crowned Sparrow	26	22	22

Table 5 (continued). Results from point count sampling in 2020 at 100 stations on Santa Cruz Island: number of individual landbirds detected (not including seabirds or shorebirds), mean number of birds per point count station and standard error, number of stations where a species was detected, and frequency (percent of total stations where a bird species was detected in 2020).

Species	Common Name	# Detected	# Stns Where Detected	% Stns Where Detected
SOSP	Song Sparrow	79	39	39
SPTO	Spotted Towhee	291	98	98
VATH	Varied Thrush	2	2	2
WEME	Western Meadowlark	22	11	11
WCSP	White-crowned Sparrow	7	2	2

San Miguel Island Point Counts

Orange-crowned Warbler, Song Sparrow, and Western Meadowlark were detected at >50% of stations on San Miguel Island (Table 6).

Table 6. Results from point count sampling in 2020 at 40 stations on San Miguel Island: number of individual landbirds detected (not including seabirds or shorebirds), mean number of birds per point count station and standard error, number of stations where a species was detected, and frequency (percent of total stations where a bird species was detected in 2020).

Species	Common Name	# Detected	# Stns Where Detected	% Stns Where Detected
ALHU	Allen's Hummingbird	4	2	5.0
BEWR	Bewick's Wren	1	1	2.5
CORA	Common Raven	17	11	27.5
HOLA	Horned Lark	44	14	35
NOHA	Northern Harrier	1	1	2.5
OCWA	Orange-crowned Warbler	58	25	62.5
ROWR	Rock Wren	3	3	7.5
SOSP	Song Sparrow	136	39	97.5
SPTO	Spotted Towhee	1	1	2.5
WEME	Western Meadowlark	71	29	72.5
WCSP	White-crowned Sparrow	4	3	7.5

Santa Rosa Island Point Counts

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

Table 7. Results from point count sampling in 2020 at 47 stations on Santa Rosa Island: number of individuals detected, mean number of birds per point count station and standard error, number of stations where a bird species was detected, and frequency (percent of total stations where a bird species was detected in 2020).

Species	Common Name	# Detected	# Stns Where Detected	% Stns Where Detected
ACWO	Acorn Woodpecker	3	2	4.3
ALHU	Allen's Hummingbird	15	12	25.5
ANHU	Anna's Hummingbird	5	4	8.5
BARS	Barn Swallow	6	4	8.5
BEWR	Bewick's Wren	61	30	63.8
BUSH	Bushtit	2	1	2.1
CAQU	California Quail	11	8	17.0
CHSP	Chipping Sparrow	32	21	44.7
CORA	Common Raven	17	12	25.5
EUST	European Starling	4	2	4.3
GRSP	Grasshopper Sparrow	1	1	2.1
HOLA	Horned Lark	32	11	23.4
HOFI	House Finch	34	14	29.8
HUVI	Hutton's Vireo	2	2	4.3
LEGO	Lesser Goldfinch	7	4	8.5
LOSH	Loggerhead Shrike	6	6	12.8
MODO	Mourning Dove	3	3	6.4
NOMO	Northern Mockingbird	8	7	14.9
OCWA	Orange-crowned Warbler	63	33	70.2
PSFL	Pacific-slope Flycatcher	26	14	29.8
RTHA	Red-tailed Hawk	1	1	2.1
ROWR	Rock Wren	2	2	4.3
RBGR	Rose-breasted Grosbeak	1	1	2.1
SOSP	Song Sparrow	118	36	76.6
SPTO	Spotted Towhee	130	46	97.9
WEME	Western Meadowlark	68	35	74.5

Line Transects—All Islands

On Santa Barbara Island, we conducted the Arch Point (ARCH) and Signal Peak Loop (SGNL) transects in 2020 (Table 8). White-crowned Sparrow ($n = 130$) was the most commonly detected bird on ARCH and Horned Lark ($n = 131$) was the most commonly detected bird on SGNL. On East Anacapa Island, Song Sparrow ($n = 35$) was the most commonly detected bird on the Trails Transect. On San Miguel Island, 4 out of 5 transects were surveyed. Song Sparrow ($n = 140$) was the most commonly detected bird on all 4 transects (Table 8).

Table 8. Number of individuals of each species detected on the 7 line transects that were surveyed in 2020. Island codes: AN=East 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, WLLW=Willow.

Species	AN-TRLS	SB-ARCH	SB-SGNL	SM-HRRS	SM-LKBD	SM-NDVR	SM-WLLW
Allen's Hummingbird	–	–	–	–	–	1	14
Bewick's Wren	2	–	–	–	–	–	5
Black Phoebe	–	1	–	–	–	–	–
Common Raven	–	–	–	3	4	1	3
Golden-crowned Sparrow	–	6	–	–	–	–	–
Horned Lark	–	100	131	–	34	12	1
House Finch	10	4	3	–	–	–	2
Northern Harrier	–	2	–	–	–	–	–
Orange-crowned Warbler	–	4	1	9	21	19	21
Red-tailed Hawk	–	–	–	–	–	–	1
Rock Wren	2	–	–	–	–	–	–
Savannah Sparrow	–	1	–	–	–	–	–
Song Sparrow	35	–	–	19	61	20	40
Warbling Vireo	–	1	–	–	–	–	–
Western Meadowlark	–	13	6	1	47	16	2
White-crowned Sparrow	–	130	1	–	–	–	–
Yellow-rumped Warbler	–	5	–	–	–	–	–

Nonnative and Invasive Bird Species

Nonnative and invasive birds were counted on only 1 of the 5 islands in 2020: 4 European Starlings on Santa Rosa Island (Table 2). However, anecdotal sightings of nonnative species occurred much more frequently (i.e., outside of the point and transect counts), and were made on all islands except Anacapa (Table 9; e-Bird reports, accessed 23 June 2021). The highest numbers of nonnative species detections occurred on Santa Cruz Island, with 33 detections of Eurasian Collared Dove (*Streptopelia decaocto*) (primarily at the Main Ranch area in the Central Valley), 15 detections of Brown-headed Cowbird (*Molothrus ater*) (primarily at Scorpion Harbor), and 15 detections of European Starling (primarily at the Main Ranch and Scorpion Harbor). House Sparrows (*Passer domesticus*) were observed fewer times, but they were observed on all islands except Anacapa; Brown-headed Cowbirds occurred on all islands except Anacapa and San Miguel; and Rock Pigeons (*Columba livia*) occurred on Santa Barbara and Santa Cruz Islands (Table 9).

Table 9. Summary of anecdotal observations of nonnative bird species on the surveyed islands in 2020 (from eBird reports accessed 23 June 2021), Channel Islands National Park.

Species	East Anacapa Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Brown-headed Cowbird	0	3	15	0	3
Eurasian Collared 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
Totals:	0	12	74	3	20

Bird Species Occurrence in 2020 Compared to All Years of Monitoring

Figures 6–10 summarize the mean number of birds per point count station on each island in 2020 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 2020: Bewick’s Wren, Orange-crowned Warbler, Western Meadowlark, and White-crowned Sparrow (a wintering species) on East Anacapa Island (Figure 6); American Kestrel, Orange-crowned Warbler, Say’s Phoebe, and Western Meadowlark on Santa Barbara Island (Figure 7); Acorn Woodpecker, Allen’s Hummingbird, Anna’s Hummingbird, Barn Swallow, Black Phoebe, Bushtit, California Quail, Chipping Sparrow, Common Raven, Grasshopper Sparrow, Hermit Thrush (a wintering species), Horned Lark, House Finch, Hutton’s Vireo, Lesser Goldfinch, Loggerhead Shrike, Northern Flicker, Northern Mockingbird, Orange-crowned Warbler, Ruby-crowned Kinglet (a wintering species), Rufous-crowned Sparrow, Song Sparrow, Western Meadowlark, White-crowned Sparrow, and Yellow-rumped Warbler (a wintering species) on Santa Cruz Island (Figure 8); Allen’s Hummingbird, Common Raven, House Finch, Orange-crowned Warbler, and Song Sparrow on San Miguel Island (Figure 9); and Allen’s Hummingbird, Chipping Sparrow, Common

Raven, House Finch, Lesser Goldfinch, Pacific-slope Flycatcher, and Red-tailed Hawk on Santa Rosa Island (Figure 10).

Bird species with increased detections (above the third quartile) in 2020 were: Song Sparrow on East Anacapa Island (Figure 6); Horned Lark, House Finch, Northern Harrier (a wintering species), Peregrine Falcon, Savannah Sparrow (a wintering species), and White-crowned Sparrow (a wintering species) on Santa Barbara Island (Figure 7); Ash-throated Flycatcher, Black-headed Grosbeak, Island Scrub-Jay, and Spotted Towhee on Santa Cruz Island (Figure 8); none on San Miguel Island (Figure 9); and California Quail, European Starling (a nonnative species), Horned Lark, Loggerhead Shrike, Northern Mockingbird, Song Sparrow, and Spotted Towhee on Santa Rosa Island (Figure 10).

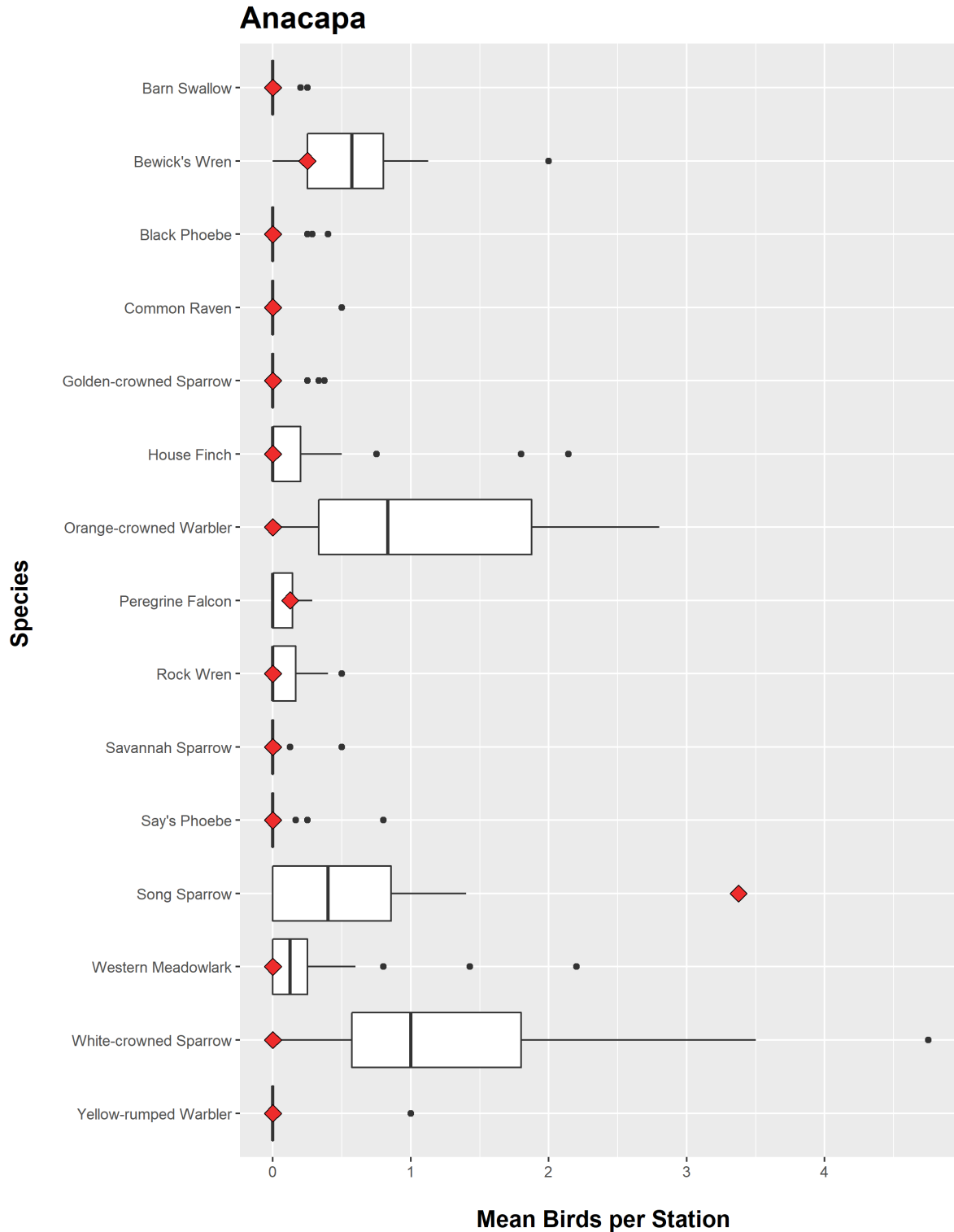


Figure 6. Boxplots for landbird species at point count stations on East Anacapa Island in 2020. Box plots display the distribution of data based on the 5 number summary: minimum, first quartile, median, third quartile, and maximum for 2001–2020. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Diamonds represent the mean value for 2020.

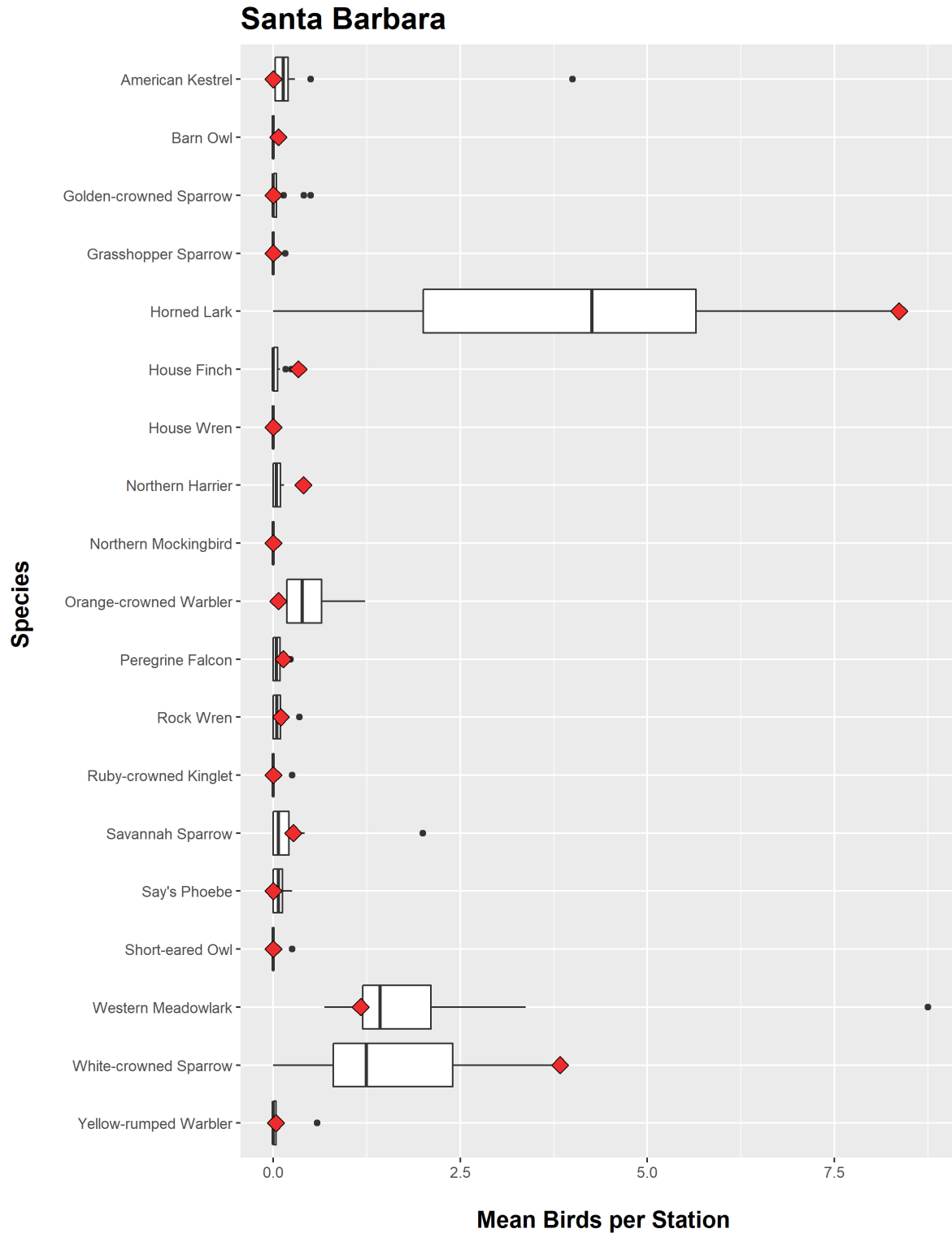


Figure 7. Boxplots for landbird species at point count stations on Santa Barbara Island in 2020. Box plots display the distribution of data based on the 5 number summary: minimum, first quartile, median, third quartile, and maximum for 1995–2020. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Diamonds represent the mean value for 2020.

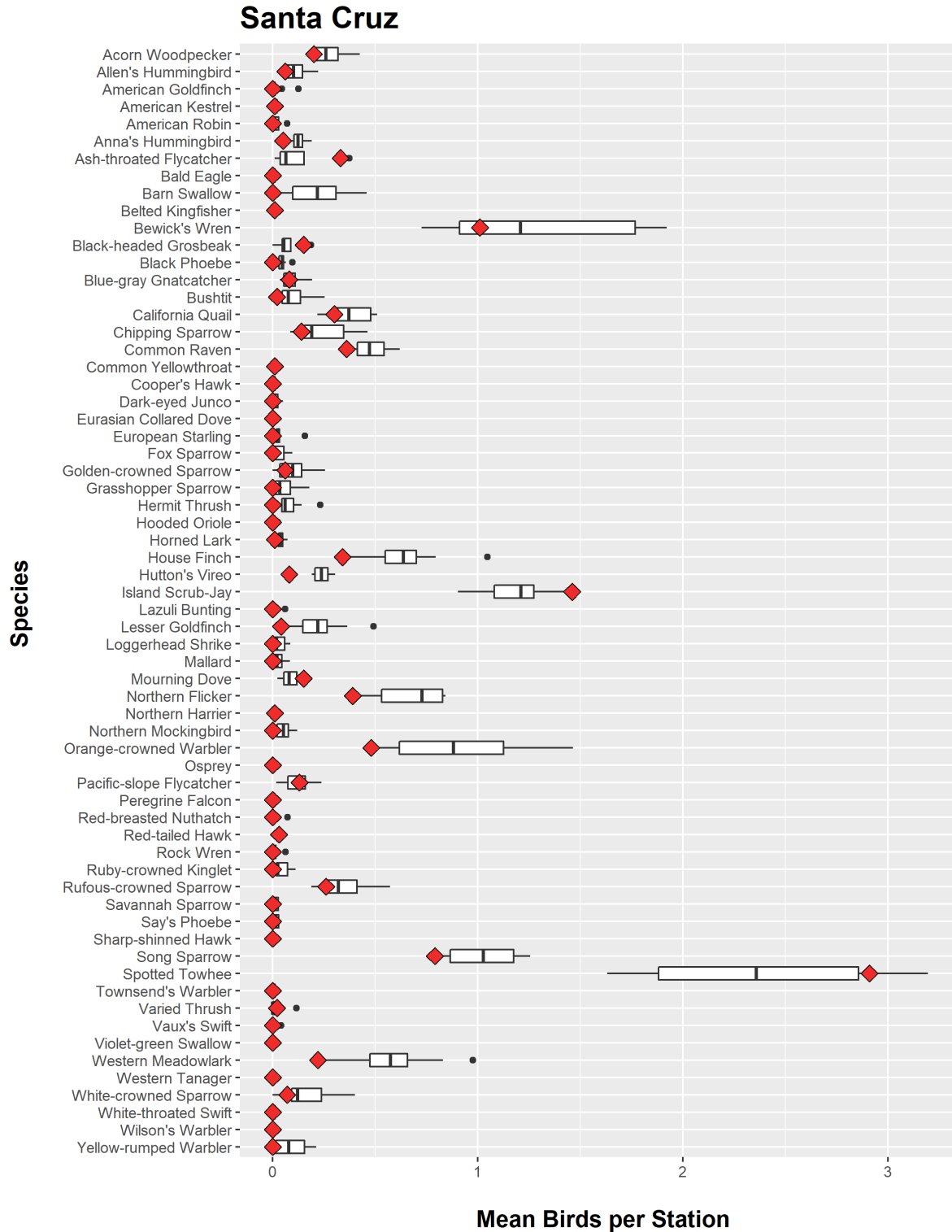


Figure 8. Boxplots for landbird species at point count stations on Santa Cruz Island in 2020. Box plots display the distribution of data based on the 5 number summary: minimum, first quartile, median, third quartile, and maximum for 2013–2020. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Diamonds represent the mean value for 2020.



Figure 9. Boxplots for landbird species at point count stations on San Miguel Island in 2020. Box plots display the distribution of data based on the 5 number summary: minimum, first quartile, median, third quartile, and maximum for 2002–2020. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Diamonds represent the mean value for 2020.

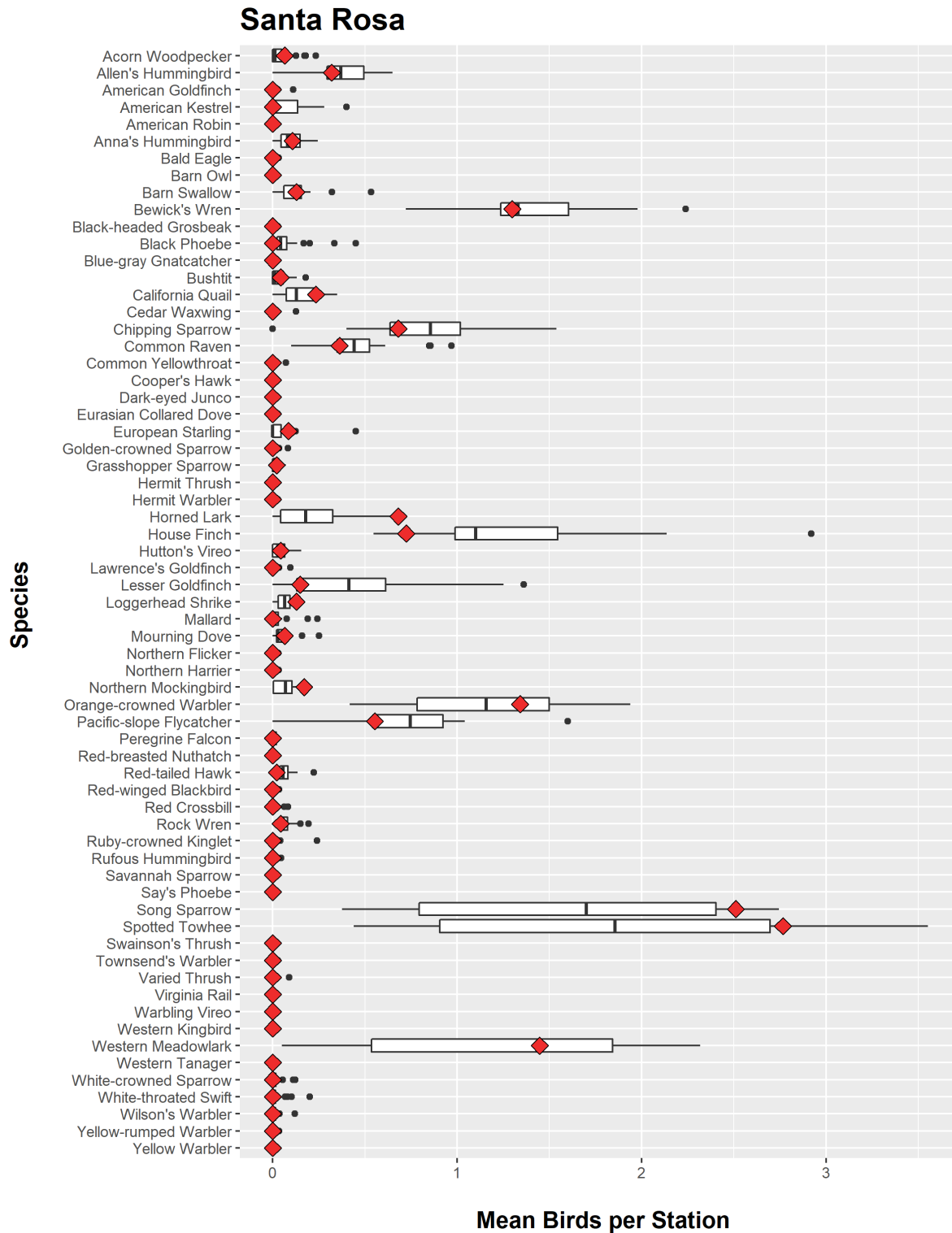


Figure 10. Boxplots for landbird species at point count stations on Santa Rosa Island in 2020. Box plots display the distribution of data based on the 5 number summary: minimum, first quartile, median, third quartile, and maximum for 1994–2020. Boxes represent the third and first quartile and vertical lines represent the median. Dots are counts outside the first and third quartile range. Diamonds represent the mean value for 2020.

Patterns in Bird Species Occurrence Over Time

The species richness graphics in Figures 11–15 summarize patterns of species occurrences since 1993 for San Miguel, Santa Barbara, and East 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 10, “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 vs. San Miguel). 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.

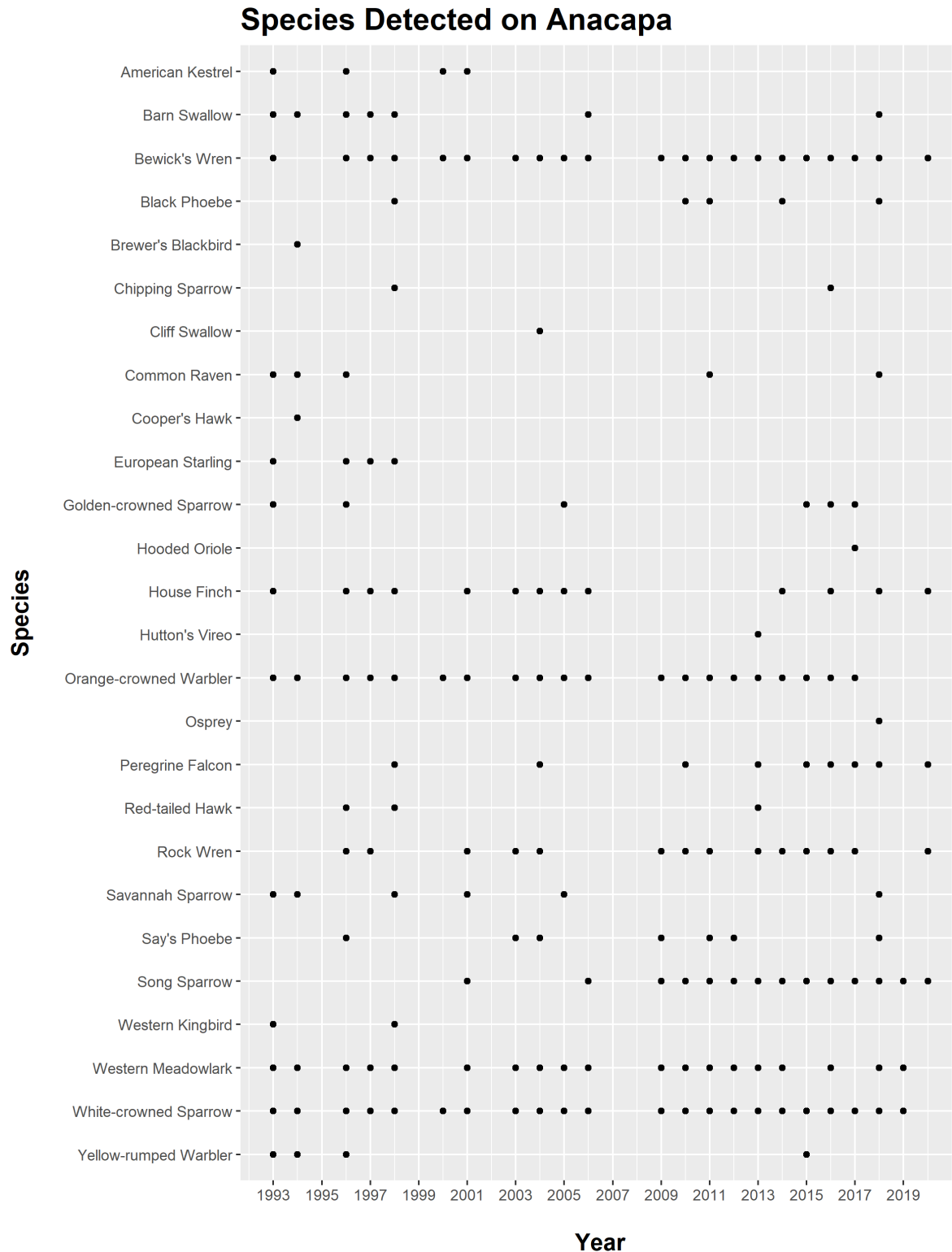


Figure 11. Landbird species occurrence from 1993 to 2020 for East Anacapa Island. A dot indicates that the species was detected on a line transect or point count during that year.

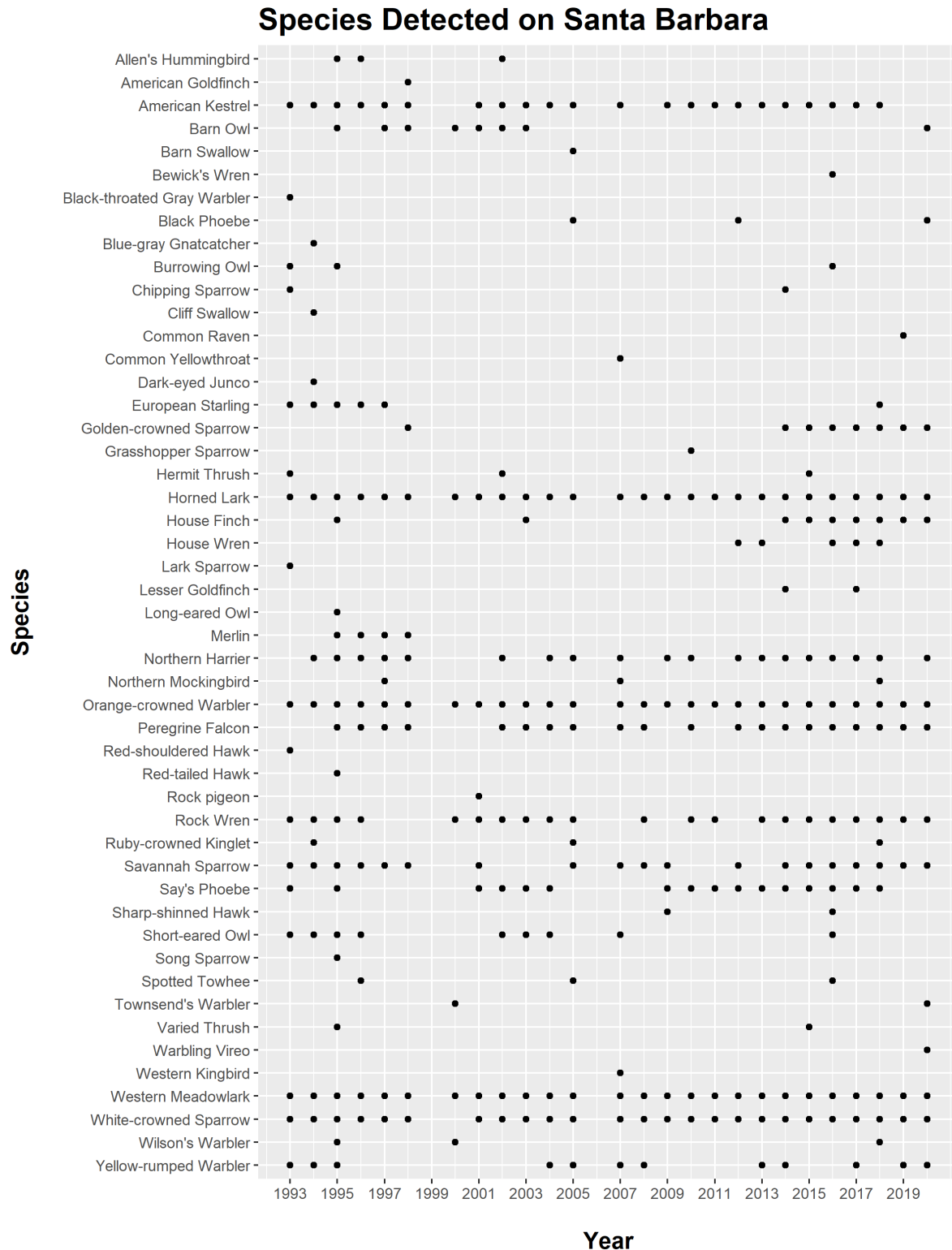


Figure 12. Landbird species occurrence from 1993 to 2020 for Santa Barbara Island. A dot indicates that the species was detected on a line transect or point count during that year (anecdotal sightings are not included).



Figure 13. Landbird species occurrence from 2013 to 2020 for Santa Cruz Island. A dot indicates that the species was detected on a line transect or point count during that year (anecdotal sightings are not included).

Species Detected on San Miguel



Figure 14. Landbird species occurrence from 1993 to 2020 for San Miguel Island. A dot indicates that the species was detected on a line transect or point count during that year (anecdotal sightings are not included).

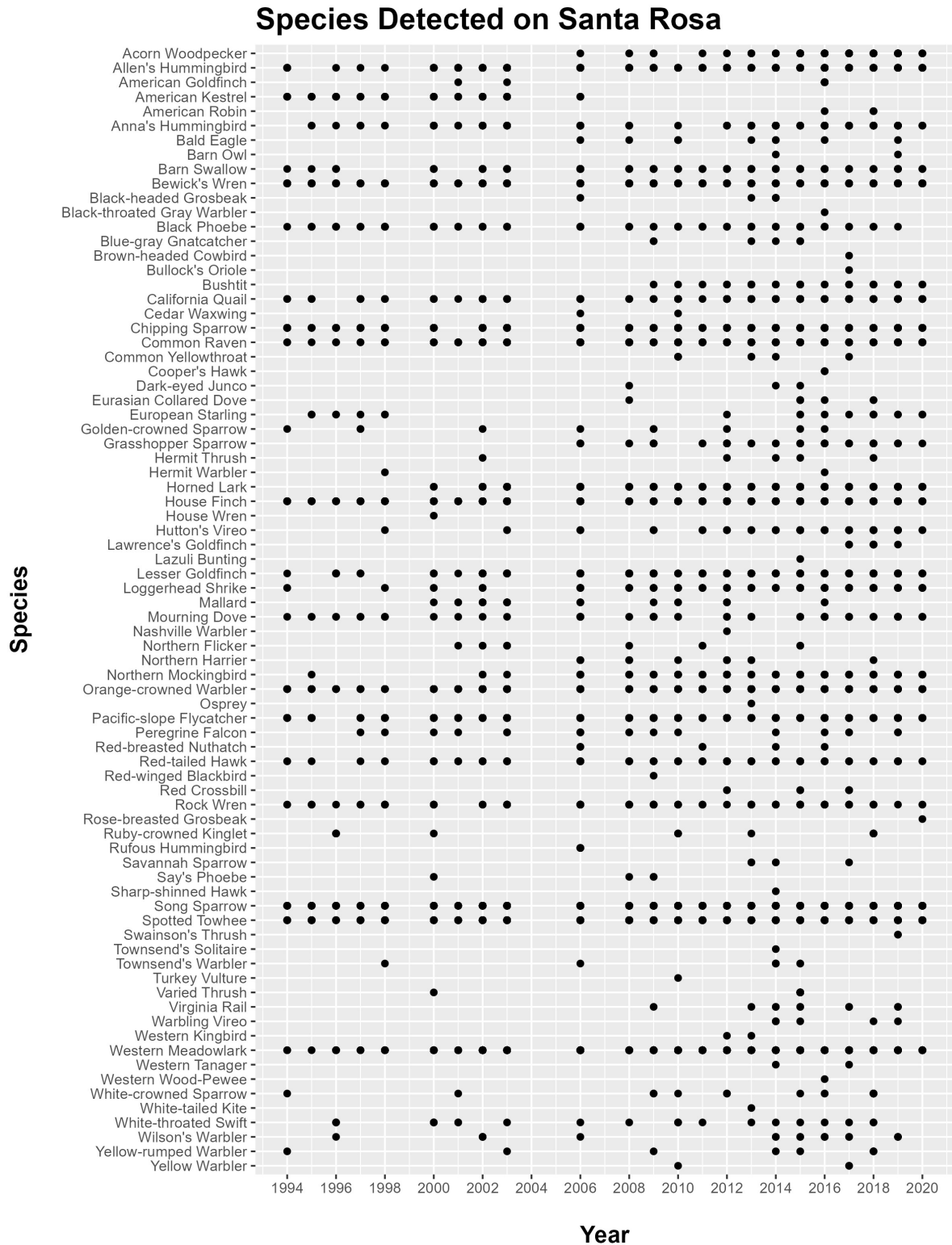


Figure 15. Landbird species occurrence from 1994 to 2020 for Santa Rosa Island. A dot indicates that the species was detected on a line transect or point count during that year.

Table 10. New transient or visiting bird species counted or anecdotally seen in 2020 (“A,” also in red font), 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 three or less times during the history of monitoring and do not breed on the island.

Species	East Anacapa Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Allen’s Hummingbird	–	X	–	–	–
American Goldfinch	–	X	X	X	X
American Robin	–	–	–	–	X
Ash-throated Flycatcher	–	–	–	X	–
Bald Eagle	–	–	–	X	–
Barn Owl	–	–	–	–	X
Barn Swallow	–	X	–	–	–
Bewick’s Wren	–	X	–	–	–
Black Phoebe	–	X	–	–	–
Black-chinned Sparrow	–	–	X	–	–
Black-headed Grosbeak	–	–	–	–	X
Black-throated Gray Warbler	–	–	–	–	X
Blue-gray Gnatcatcher	–	X	–	–	–
Brewer’s Blackbird	X	–	X	X	–
Bullock’s Oriole	–	–	A ¹	–	–
Burrowing Owl	–	–	–	X	–
Bushtit	–	–	–	X	–
Cedar Waxwing	–	–	–	–	X
Chipping Sparrow	X	X	–	–	–
Cliff Swallow	X	X	–	–	–
Common Raven	–	X	–	–	–
Common Yellowthroat	–	X	–	X	–
Cooper’s Hawk	X	–	X	–	X
Dark-eyed (Oregon) Junco	–	X	X	X	X
Fox Sparrow	–	–	–	X	–
Grasshopper Sparrow	–	X	–	–	–
Hermit Thrush	–	X	–	–	–
Hermit Warbler	–	–	–	–	X
Hooded Oriole	X	–	X	X	–
House Wren	–	–	X	X	X
Hutton’s Vireo	X	–	–	X	–

¹ New transient or visiting bird species counted in 2020.

Table 10 (continued). New transient or visiting bird species counted or anecdotally seen in 2020 (“**A**,” also in red font), 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 three or less times during the history of monitoring and do not breed on the island.

Species	East Anacapa Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Lark Bunting	–	–	X	–	–
Lark Sparrow	–	X	–	–	–
Lawrence’s Goldfinch	–	–	–	X	X
Lazuli Bunting	–	–	X	X	X
Lesser Goldfinch	–	X	–	–	–
Loggerhead Shrike	–	–	–	X	–
Long-eared Owl	–	X	–	–	–
Merlin	–	–	–	X	–
Mourning Dove	–	–	–	X	–
Nashville Warbler	–	–	–	X	X
Northern Flicker	–	–	–	X	–
Northern Mockingbird	–	X	–	X	–
Olive-sided Flycatcher	–	–	–	X	–
Osprey	X	–	X	–	X
Prairie Falcon	–	–	X	X	
Red Crossbill	–	–		–	X
Red-breasted Sapsucker	–	–	X	–	–
Red-shouldered Hawk	–	X	–	–	–
Red-tailed Hawk	X	X	–	–	–
Red-winged Blackbird	–	–	–	–	X
Rock Pigeon	–	X	–	–	–
Rose-breasted Grosbeak	–	–	–	–	A¹
Ruby-crowned Kinglet	–	X	–	X	–
Rufous Hummingbird	–	–	–	X	X
Rufous-crowned Sparrow	–	–	–	X	–
Savannah Sparrow	–	–	–	–	X
Say’s Phoebe	–	–	–	–	X
Sharp-shinned Hawk	–	X	–	X	X
Short-eared Owl	–	–	–	X	–
Song Sparrow	–	X	–	–	–
Spotted Towhee	–	X	–	X	–

¹ New transient or visiting bird species counted in 2020.

Table 10 (continued). New transient or visiting bird species counted or anecdotally seen in 2020 (“**A**,” also in red font), 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 three or less times during the history of monitoring and do not breed on the island.

Species	East Anacapa Island	Santa Barbara Island	Santa Cruz Island	San Miguel Island	Santa Rosa Island
Swainson’s Thrush	–	–	–	–	X
Townsend’s Solitaire	–	–	–	–	X
Townsend’s Warbler	–	X	X	–	–
Turkey Vulture	–	–	–	X	X
Varied Thrush	–	X	X	–	X
Vaux’s Swift	–	–	X	X	–
Vesper Sparrow	–	X	–	–	–
Violet-green Swallow	–	–	X	X	–
Warbling Vireo	–	A¹	–	X	X
Western Kingbird	X	X	X	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	10	30	21	34	30
No. of new transients/visiting species on each island in 2020	0	1	1	0	1

¹ New transient or visiting bird species counted in 2020.

East Anacapa Island

Since 1993, 26 landbird species have been counted on East Anacapa Island (Figure 11); 5 species were counted in 2020 (Table 2). The highest number of Song Sparrow since 1993 was counted in 2020 ($n = 62$), a 188% increase from 2019 on point count stations. A common species on the island, Orange-crowned Warbler has not been counted for 3 consecutive years (2018–2020), including the 2020 monitoring season. No new transient species were detected in 2020; 10 transient or visiting species (defined as above) have been counted on the island overall since 1993 (Table 10).

Santa Barbara Island

Since 1993, 49 landbird species have been counted on Santa Barbara Island (Figure 12); 15 species were counted in 2020 (Table 2). The highest number of Horned Lark since 1993 was counted in 2020 ($n = 451$). For a second consecutive year, Western Meadowlark was at the lower range (i.e., 25%

quartile) of its abundance at point count stations in 2020. Also, for a second consecutive year, Orange-crowned Warbler has been detected below the 25% quartile of its abundance at point count stations in 2020. Common species on this island, specifically American Kestrel and Say's Phoebe, were not counted in 2020, and no detections of these 2 species were recorded in 2019. Warbling Vireo was a new transient species counted in 2020 on Santa Barbara; 30 transient or visiting species have been counted on the island since 1993 (Table 10).

Santa Cruz Island

A total of 74 landbird species have been counted on this island since 2013, when monitoring by CHIS staff and volunteers began (Figure 13). A total of 34 landbird species were counted in 2020 (Table 2). For a consecutive second year, Ash-throated Flycatcher, Black-headed Grosbeak, and Island Scrub-Jay were counted above the third quartile (i.e., 75%) of their abundance at point count stations in 2020. Common species on this island, specifically Northern Flicker, Orange-crowned Warbler, Song Sparrow, and Western Meadowlark were counted below the first quartile (i.e., 25%) of their abundance in 2020. Furthermore, this is the third consecutive year that Northern Flicker and Western Meadowlark were below the first quartile of their abundance average at point count stations on Santa Cruz Island. Considered uncommon (Collins and Jones 2015), Loggerhead Shrike was not counted in 2020 after being counted in the 2 previous monitoring years. Bullock's Oriole was a new transient species counted in 2020 on Santa Cruz; 21 transient or visiting species have been counted on this island since 2013 (Table 10).

San Miguel Island

Since 1993, 69 landbird species have been counted on San Miguel Island (Figure 14); 14 were counted in 2020 (Table 2). The following species were not counted in 2020: Barn Swallow (nor in 2019), Grasshopper Sparrow. A common species, Orange-crowned Warbler was counted below the first quartile of its abundance average at point count stations in 2020, which is the third consecutive year since the monitoring season in 2018. House Finch was counted on the Willow Canyon transect; the species was not counted in 2019. Lazuli Bunting was not counted in 2020 after being counted in the 2 previous monitoring seasons. No transient species were counted in 2020. Thirty-four transient or visiting species have been counted on the island since 1993 (Table 10).

Santa Rosa Island

Since 1994, 75 landbird species have been counted on Santa Rosa Island (Figure 15); 26 were detected in 2020 (Table 2). Common species, Lesser Goldfinch and Pacific-slope Flycatcher were counted below the first quartile of their abundance averages in 2020. Barn Owl was not counted in 2020 after being counted for only the second time in monitoring season 2019. European Starling (a nonnative species) was counted above the third quartile (i.e., 75%) of its abundance average in 2020. Rose-breasted Grosbeak was a new transient species counted in 2020 on Santa Rosa; 30 transient or visiting species have been counted on the island since 1994 (Table 10).

Anecdotal Observations

Anecdotal breeding observations on Santa Rosa Island from 1 May to 30 June 2020 included: Northern Mockingbird was on nest and nestlings were present in lower Cherry Canyon on 5/26/2020.

Non-breeding observations of resident birds included: 2 Grasshopper Sparrows near Arlington Canyon (22 May), 3 Grasshopper Sparrows walking to Jolla Vieja Canyon (23 May), Virginia Rail (*Rallus limicola*) in La Jolla Vieja Canyon (23 May), and Rock Wrens ($n = 3$) near Johnsons Lee (23 May).

An anecdotal migrant bird observation included 10 Lawrence's Goldfinches (*Spinus lawrencei*) at the junction of Main and Signal Roads (25 May).

All Islands

Across all the surveyed Channel Islands, 3 transient or visiting bird species were newly counted in 2020, for a total of 77 such species counted since NPS monitoring began on the islands (Table 10).

Discussion and Recommendations

In 2020, despite the COVID-19 pandemic, 67% of all points and 77% of all transects were counted among the 5 Channel Islands where landbird monitoring is conducted by the National Park Service. Santa Rosa received the lightest sampling of points (32%), due to the difficulty of getting observers onto the island. The data that were collected showed that across all 49 terrestrial bird species (not counting sea- or shorebirds) counted in 2020, island specificity was evident. For example, no species were detected on all 5 islands, whereas 7 species were detected among 4 islands each, 5 species were detected among 3 islands each, 13 species were detected among 2 islands each, and 26 species were detected on only 1 island each. Even with diminished sampling, species richness (number of species) values over all survey years fell in predictable patterns: richness was greatest on the larger islands (75 on Santa Rosa, 74 on Santa Cruz) and least on the smallest islands (26 on Anacapa, 48 on Santa Barbara).

Fifteen bird species exhibited notably increased detections in 2020 on at least 1 of the 5 islands, and 30 exhibited notably decreased detections on at least 1 of the 5 islands. However, wintering species accounted for 3 of the 15 species with increased detections and 4 of the 30 species with decreased detections in 2020. Apparent declines in detections for species such as Chipping Sparrow, Common Raven, House Finch, and Pacific-slope Flycatcher on Santa Rosa Island may not be accurate since less than one-third of the stations were counted in 2020.

Similar to counts made in 2016–2019, each observer in 2020 was skilled at identifying bird species by vocalizations and by sight. 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 all affect the accuracy of estimates of species' numbers (Schmidt et al. 2013). These factors are significant challenges to any monitoring program and should be evaluated carefully to minimize misrepresentation of trends in density. For example, Song Sparrow numbers on Anacapa were 188% higher in 2020 than in 2019. This may reflect increased seed availability from increased rains in 2018 and 2019 leading to increased successful reproduction and recruitment, or the numbers may be an anomaly or due to observer error. Counts in 2021 will help clarify this finding.

We continue to recommend that nonnative invasive species such as European Starlings on Santa Rosa Island be removed before their numbers become harder to manage. 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 hierarchical distance analyses (Kery and Royle 2020) 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). Other recommendations have been given in prior reports (e.g., Hall et al. 2021) and so will not be reiterated here.

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Appendix A. Landbird species documented nesting at Channel Islands National Park

Table A1. List of 54 terrestrial avian species confirmed to be 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 it does not include species only suspected of breeding on an island.

Common Name	Scientific Name
Acorn Woodpecker	<i>Melanerpes formicivorus</i>
Allen's Hummingbird	<i>Selasphorus sasin</i>
American Coot	<i>Fulica Americana</i>
American Kestrel	<i>Falco sparverius</i>
American Robin	<i>Turdus migratorius</i>
Anna's Hummingbird	<i>Calypte anna</i>
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Barn Owl	<i>Tyto alba</i>
Barn Swallow	<i>Hirundo rustica</i>
Bewick's Wren	<i>Thryomanes bewickii</i>
Black Phoebe	<i>Sayornis nigricans</i>
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>
Bushtit	<i>Psaltiriparus minimus</i>
California Quail	<i>Callipepla californica</i>
Canyon Wren	<i>Catherpes mexicanus</i>
Chipping Sparrow	<i>Spizella passerina</i>
Common Raven	<i>Corvus corax</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
European Starling	<i>Sturnus vulgaris</i>
Grasshopper Sparrow	<i>Ammodramus savannarum</i>
Hooded Oriole	<i>Icterus cucullatus</i>
Horned Lark	<i>Eremophila alpestris</i>
House Finch	<i>Haemorhous mexicanus</i>
Hutton's Vireo	<i>Vireo huttoni</i>
Island Scrub-Jay	<i>Aphelocoma insularis</i>
Killdeer	<i>Charadrius vociferous</i>

Table A1 (continued). List of 54 terrestrial avian species confirmed to be 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 it does not include species only suspected of breeding on an island.

Common Name	Scientific Name
Lesser Goldfinch	<i>Spinus psaltria</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Mallard	<i>Anas platyrhynchos</i>
Mourning Dove	<i>Zenaida macroura</i>
Northern Flicker	<i>Colaptes auratus</i>
Northern Harrier	<i>Circus hudsonius</i>
Northern Mockingbird	<i>Mimus polyglottos</i>
Northern Saw-whet Owl	<i>Aegolius acadicus</i>
Orange-crowned Warbler	<i>Oreothlypis celata</i>
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Phainopepla	<i>Phainopepla nitens</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Rock Pigeon	<i>Columba livia</i>
Rock Wren	<i>Salpinctes obsoletus</i>
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>
Short-eared Owl	<i>Asio flammeus</i>
Song Sparrow	<i>Melospiza melodia</i>
Spotted Towhee	<i>Pipilo maculatus</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
Virginia Rail	<i>Rallus limicola</i>
Western Meadowlark	<i>Sturnella neglecta</i>
White-throated Swift	<i>Aeronautes saxatalis</i>

Appendix B. 2020 Landbird Monitoring Site Observers

Tables B1 through B5 show the sites, type of count performed, dates visited, and observers for each island.

Table B1. Site observers on East Anacapa Island in 2020.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
AE01	PC	5/16/2020	Jim Howard
AE02	PC	5/16/2020	Jim Howard
AE03	PC	5/16/2020	Jim Howard
AE04	PC	5/16/2020	Jim Howard
AE05	PC	5/16/2020	Jim Howard
AE06	PC	5/16/2020	Jim Howard
AE07	PC	5/16/2020	Jim Howard
AE08	PC	5/16/2020	Jim Howard
TRLS	LT	5/17/20	Jim Howard

Table B2. Site observers on San Miguel Island in 2020.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
HRRS	LT	4/29/2020	Stacy Baker (SB)
LKBD	LT	5/28/2020	Stacy Baker
NDVR	LT	5/27/2020	Stacy Baker
SM01	PC	4/26/2020	Stacy Baker
SM02	PC	4/26/2020	Stacy Baker
SM03	PC	5/25/2020	Stacy Baker
SM04	PC	4/28/2020	Stacy Baker
SM05	PC	4/29/2020	Stacy Baker
SM06	PC	4/29/2020	Stacy Baker
SM07	PC	4/29/2020	Stacy Baker
SM08	PC	4/29/2020	Stacy Baker
SM09	PC	4/5/2020	Stacy Baker
SM10	PC	4/5/2020	Stacy Baker
SM11	PC	4/5/2020	Stacy Baker
SM12	PC	4/5/2020	Stacy Baker

Table B2 (continued). Site observers on San Miguel Island in 2020.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SM13	PC	5/26/2020	Stacy Baker
SM14	PC	4/7/2020	Stacy Baker
SM15	PC	5/26/2020	Stacy Baker
SM16	PC	5/26/2020	Stacy Baker
SM17	PC	5/26/2020	Stacy Baker
SM18	PC	5/26/2020	Stacy Baker
SM19	PC	4/7/2020	Stacy Baker
SM20	PC	4/28/2020	Stacy Baker
SM21	PC	4/28/2020	Stacy Baker
SM22	PC	4/28/2020	Stacy Baker
SM23	PC	5/24/2020	Stacy Baker
SM24	PC	5/24/2020	Stacy Baker
SM25	PC	4/20/2020	Stacy Baker
SM26	PC	4/28/2020	Stacy Baker
SM27	PC	4/26/2020	Stacy Baker
SM28	PC	4/26/2020	Stacy Baker
SM29	PC	4/26/2020	Stacy Baker
SM30	PC	4/28/2020	Stacy Baker
SM31	PC	4/6/2020	Stacy Baker
SM32	PC	4/6/2020	Stacy Baker
SM33	PC	4/6/2020	Stacy Baker
SM34	PC	4/6/2020	Stacy Baker
SM35	PC	5/25/2020	Stacy Baker
SM36	PC	5/25/2020	Stacy Baker
SM37	PC	5/25/2020	Stacy Baker
SM38	PC	5/25/2020	Stacy Baker
SM39	PC	5/25/2020	Stacy Baker
SM40	PC	5/25/2020	Stacy Baker
WLLW	LT	5/29/22	Stacy Baker

Table B3. Site observers on Santa Barbara Island in 2020.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
ARCH	LT	4/12/2020	Jim Howard (JAH)
SGNL	LT	5/2/2020	Jim Howard
SB01	PC	4/3/2020	Jim Howard
SB02	PC	4/3/2020	Jim Howard
SB03	PC	4/11/2020	Jim Howard
SB04	PC	4/2/2020	Jim Howard
SB05	PC	4/3/2020	Jim Howard
SB06	PC	4/11/2020	Jim Howard
SB07	PC	4/3/2020	Jim Howard
SB08	PC	4/3/2020	Jim Howard
SB09	PC	4/3/2020	Jim Howard
SB10	PC	4/11/2020	Jim Howard
SB11	PC	4/11/2020	Jim Howard
SB12	PC	4/11/2020	Jim Howard
SB13	PC	5/1/2020	Jim Howard
SB14	PC	4/11/2020	Jim Howard
SB15	PC	4/7/2020	Jim Howard
SB16	PC	4/3/2020	Jim Howard
SB18	PC	4/3/2020	Jim Howard
SB21	PC	4/4/2020	Jim Howard
SB22	PC	4/4/2020	Jim Howard
SB23	PC	4/7/2020	Jim Howard
SB24	PC	4/4/2020	Jim Howard
SB25	PC	4/4/2020	Jim Howard
SB26	PC	4/7/2020	Jim Howard
SB27	PC	4/4/2020	Jim Howard
SB28	PC	4/7/2020	Jim Howard
SB29	PC	4/7/2020	Jim Howard
SB30	PC	4/7/2020	Jim Howard
SB31	PC	4/4/2020	Jim Howard
SB32	PC	4/4/2020	Jim Howard
SB33	PC	4/7/2020	Jim Howard

Table B4. Site observers on Santa Cruz Island in 2020.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC001	PC	5/25/2020	Lyndal Laughrin (LL)
SC002	PC	5/25/2020	Lyndal Laughrin
SC003	PC	5/25/2020	Lyndal Laughrin
SC004	PC	5/25/2020	Lyndal Laughrin
SC005	PC	5/7/2020	Lyndal Laughrin
SC006	PC	5/7/2020	Lyndal Laughrin
SC007	PC	5/7/2020	Lyndal Laughrin
SC008	PC	5/7/2020	Lyndal Laughrin
SC009	PC	5/9/2020	Lyndal Laughrin
SC010	PC	5/9/2020	Lyndal Laughrin
SC011	PC	5/9/2020	Lyndal Laughrin
SC012	PC	5/8/2020	Lyndal Laughrin
SC013	PC	5/8/2020	Lyndal Laughrin
SC014	PC	5/8/2020	Lyndal Laughrin
SC015	PC	5/8/2020	Lyndal Laughrin
SC016	PC	5/6/2020	Lyndal Laughrin
SC017	PC	5/6/2020	Lyndal Laughrin
SC018	PC	4/24/2020	Lyndal Laughrin
SC019	PC	4/20/2020	Lyndal Laughrin
SC020	PC	4/20/2020	Lyndal Laughrin
SC021	PC	4/20/2020	Lyndal Laughrin
SC022	PC	4/20/2020	Lyndal Laughrin
SC023	PC	4/20/2020	Lyndal Laughrin
SC024	PC	4/20/2020	Lyndal Laughrin
SC025	PC	4/24/2020	Lyndal Laughrin
SC026	PC	4/26/2020	Lyndal Laughrin
SC027	PC	4/27/2020	Lyndal Laughrin
SC028	PC	5/30/2020	Lyndal Laughrin
SC029	PC	5/30/2020	Lyndal Laughrin
SC030	PC	5/30/2020	Lyndal Laughrin
SC031	PC	5/30/2020	Lyndal Laughrin
SC032	PC	5/30/2020	Lyndal Laughrin
SC033	PC	5/30/2020	Lyndal Laughrin
SC034	PC	5/22/2020	Lyndal Laughrin
SC035	PC	5/22/2020	Lyndal Laughrin

Table B4 (continued). Site observers on Santa Cruz Island in 2020.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC036	PC	5/22/2020	Lyndal Laughrin
SC037	PC	5/22/2020	Lyndal Laughrin
SC038	PC	5/11/2020	Lyndal Laughrin
SC039	PC	5/11/2020	Lyndal Laughrin
SC040	PC	5/11/2020	Lyndal Laughrin
SC041	PC	4/28/2020	Lyndal Laughrin
SC042	PC	4/19/2020	Lyndal Laughrin
SC043	PC	4/28/2020	Lyndal Laughrin
SC044	PC	4/28/2020	Lyndal Laughrin
SC045	PC	4/28/2020	Lyndal Laughrin
SC046	PC	4/28/2020	Lyndal Laughrin
SC047	PC	4/28/2020	Lyndal Laughrin
SC048	PC	5/23/2020	Lyndal Laughrin
SC049	PC	5/23/2020	Lyndal Laughrin
SC050	PC	5/23/2020	Lyndal Laughrin
SC051	PC	5/23/2020	Lyndal Laughrin
SC052	PC	5/23/2020	Lyndal Laughrin
SC053	PC	5/23/2020	Lyndal Laughrin
SC054	PC	5/23/2020	Lyndal Laughrin
SC055	PC	5/23/2020	Lyndal Laughrin
SC056	PC	5/23/2020	Lyndal Laughrin
SC057	PC	5/31/2020	Lyndal Laughrin
SC058	PC	5/31/2020	Lyndal Laughrin
SC059	PC	5/31/2020	Lyndal Laughrin
SC060	PC	5/31/2020	Lyndal Laughrin
SC061	PC	5/31/2020	Lyndal Laughrin
SC062	PC	5/31/2020	Lyndal Laughrin
SC063	PC	5/31/2020	Lyndal Laughrin
SC064	PC	5/31/2020	Lyndal Laughrin
SC065	PC	5/31/2020	Lyndal Laughrin
SC066	PC	5/31/2020	Lyndal Laughrin
SC067	PC	5/17/2020	Lyndal Laughrin
SC068	PC	5/17/2020	Lyndal Laughrin
SC069	PC	4/20/2020	Lyndal Laughrin
SC070	PC	4/25/2020	Lyndal Laughrin

Table B4 (continued). Site observers on Santa Cruz Island in 2020.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SC071	PC	4/26/2020	Lyndal Laughrin
SC072	PC	4/26/2020	Lyndal Laughrin
SC073	PC	4/26/2020	Lyndal Laughrin
SC074	PC	4/25/2020	Lyndal Laughrin
SC075	PC	4/25/2020	Lyndal Laughrin
SC076	PC	5/9/2020	Lyndal Laughrin
SC077	PC	4/24/2020	Lyndal Laughrin
SC078	PC	4/24/2020	Lyndal Laughrin
SC079	PC	4/24/2020	Lyndal Laughrin
SC080	PC	4/24/2020	Lyndal Laughrin
SC081	PC	4/22/2020	Lyndal Laughrin
SC082	PC	4/22/2020	Lyndal Laughrin
SC083	PC	4/22/2020	Lyndal Laughrin
SC084	PC	4/22/2020	Lyndal Laughrin
SC085	PC	4/19/2020	Lyndal Laughrin
SC086	PC	4/19/2020	Lyndal Laughrin
SC087	PC	4/19/2020	Lyndal Laughrin
SC088	PC	4/19/2020	Lyndal Laughrin
SC089	PC	4/27/2020	Lyndal Laughrin
SC090	PC	4/27/2020	Lyndal Laughrin
SC091	PC	4/27/2020	Lyndal Laughrin
SC092	PC	4/27/2020	Lyndal Laughrin
SC093	PC	4/27/2020	Lyndal Laughrin
SC094	PC	4/19/2020	Lyndal Laughrin
SC095	PC	5/11/2020	Lyndal Laughrin
SC096	PC	4/29/2020	Lyndal Laughrin
SC097	PC	4/29/2020	Lyndal Laughrin
SC098	PC	5/7/2020	Lyndal Laughrin
SC099	PC	5/1/2020	Lyndal Laughrin
SC100	PC	5/1/2020	Lyndal Laughrin

Table B5. Site observers on Santa Rosa Island in 2020.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR001	PC	5/23/2020	Stacy Baker
SR004	PC	5/26/2020	Stacy Baker
SR005	PC	5/26/2020	Stacy Baker
SR006	PC	5/26/2020	Peter Larramendy
SR007	PC	6/5/2020	Stacy Baker
SR008	PC	6/5/2020	Peter Larramendy
SR009	PC	6/5/2020	Peter Larramendy
SR019	PC	5/24/2020	Peter Larramendy
SR020	PC	5/24/2020	Peter Larramendy
SR021	PC	5/24/2020	Stacy Baker
SR022	PC	5/22/2020	Peter Larramendy
SR023	PC	5/22/2020	Stacy Baker
SR024	PC	5/22/2020	Peter Larramendy
SR025	PC	5/22/2020	Stacy Baker
SR026	PC	5/22/2020	Peter Larramendy
SR027	PC	5/22/2020	Peter Larramendy
SR040	PC	6/4/2020	Stacy Baker
SR041	PC	6/4/2020	Peter Larramendy
SR042	PC	6/4/2020	Peter Larramendy
SR049	PC	5/24/2020	Stacy Baker
SR050	PC	5/24/2020	Peter Larramendy
SR051	PC	5/24/2020	Peter Larramendy
SR064	PC	5/24/2020	Peter Larramendy
SR066	PC	5/24/2020	Peter Larramendy
SR067	PC	5/24/2020	Stacy Baker
SR068	PC	5/24/2020	Peter Larramendy
SR069	PC	5/24/2020	Stacy Baker
SR070	PC	5/24/2020	Stacy Baker
SR071	PC	5/24/2020	Stacy Baker
SR072	PC	5/24/2020	Stacy Baker
SR101	PC	5/25/2020	Stacy Baker
SR102	PC	5/25/2020	Peter Larramendy
SR106	PC	5/23/2020	Peter Larramendy
SR107	PC	5/23/2020	Peter Larramendy
SR108	PC	5/23/2020	Stacy Baker

Table B5 (continued). Site observers on Santa Rosa Island in 2020.

Site	Point Count (PC) or Line Transect (LT)	Survey Date	Observer
SR109	PC	5/23/2020	Peter Larramendy
SR110	PC	5/23/2020	Stacy Baker
SR127	PC	5/23/2020	Peter Larramendy
SR128	PC	5/23/2020	Stacy Baker
SR129	PC	5/23/2020	Stacy Baker
SR130	PC	5/23/2020	Stacy Baker
SR137	PC	5/25/2020	Stacy Baker
SR138	PC	5/25/2020	Peter Larramendy
SR139	PC	5/25/2020	Peter Larramendy
SR140	PC	5/25/2020	Stacy Baker
SR141	PC	5/25/2020	Peter Larramendy
SRI142	PC	5/20/2020	Peter Larramendy

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.

NPS 159/191417, November 2023

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