Point Blue Conservation Science

Bird Monitoring in the Presidio of San Francisco:

Results from Winters 2020-21 & 2021-22 and Summers 2021 & 2022

Two-year Progress Report to the Presidio Trust

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Introduction and Background

The Presidio of San Francisco is a mix of developed and undeveloped lands managed by The Presidio Trust (the Trust) and the National Park Service (NPS). Originally a U.S. Army base, the park was transferred to the NPS and became a National Historic Landmark District in 1994. Presently it is managed for its cultural, natural, scenic, and recreational resources, and sites within the park are also assessed for the potential impact of management activities to plants and animals.

The Presidio Trust Management Plan (Presidio Trust 2002) states that the Presidio must remain a refuge for native plant communities and associated wildlife species, and habitat restoration activities have been occurring at various sites throughout the Presidio since 1996. Monitoring is an important component of successful restoration and for informing future restoration efforts (Block et al. 2001, Gardali et al. 2006). Biologists from Point Blue Conservation Science (Point Blue; formerly PRBO) have been surveying birds in the Presidio in collaboration with the Presidio Trust since 1999. Many of the surveys take place in areas before and after restoration activities have occurred in order to gather site-specific data on the bird use of areas slated for restoration, to track changes in both individual species and the avian community as a whole following restoration activities, and to inform future restoration efforts

In 2013, avian monitoring protocols were solidified by Point Blue and the Trust in *The Avian Monitoring Program for the Presidio of San Francisco* and later revised (Humple and Gardali 2015). The goal of the monitoring program is to evaluate changes in the bird communities (occurrence, abundance and diversity) at two spatial scales: in the Presidio at specific sites where habitat changes are being implemented and at the level of the entire Presidio. The two-pronged approach to meeting this goal includes (1) monitoring site-specific avian response to habitat change (e.g., ecological restoration, reforestation, landscaping), with current emphasis on restoration; and (2) long-term assessment of Presidio-wide avian diversity and abundance. This is done through both point count and area search survey methods (see below for more information about the survey methods used).

Since 2013, reporting by Point Blue has used a habitat-appropriate focal species approach to evaluate changes over time; all species are surveyed and recorded, and are included in community indices, whereas additional summaries focus on a suite of select species. The list of habitat-specific avian focal species (Appendix A) was developed by Point Blue in 2013 for a draft Presidio wildlife management guidelines document generated by the Presidio Trust and for the Avian Monitoring Program (Humple and Gardali 2015). This list was peer reviewed by Presidio Trust staff and local birders with expertise regarding Presidio avifauna. This is the fifth report since the formal implementation of the focal species concept in 2013 (also see Cormier et al. 2014, Dettling et al. 2016, Dettling and Humple 2018, Allen et al. 2020). Additionally, *The Avian Monitoring Program for the Presidio of San Francisco* (Humple and Gardali 2015) identifies components to be included in each annual progress report, which are included herein.

In this two-year progress report, we present results from bird surveys conducted during the winters (December to February) of 2020-21 and 2021-22 and during the breeding seasons (“summers”,

May/June) of 2021 and 2022. Results are presented for sites that were surveyed in at least one of the aforementioned seasons (see Humple and Gardali 2015 for comprehensive list of all sites historically surveyed through summer 2015; and Dettling et al. 2016, Dettling and Humple 2018, and Allen et al. 2020 for sites surveyed prior to the two years included herein). We present results for three categories of surveys: 1) area search surveys to evaluate site-specific bird response to habitat change at 11 standard sites where restoration activities either have occurred or are ongoing; 2) area search surveys to evaluate site-specific bird response to habitat change at three San Francisco International Airport (SFO) mitigation sites where restoration activities either have occurred or are ongoing; and 3) point count surveys to assess the Presidio-wide landbird community.

We take a similar approach to the last three two-year reports on these activities (Dettling et al. 2016, Dettling et al. 2018, and Allen et al. 2020), per the reporting structure outlined in the Avian Monitoring Program (Humple and Gardali 2015), by summarizing results for the two years this report covers and commenting on longer-term patterns observed for Presidio-wide point counts and for any restoration plot that contained more than three years of survey data for a given season (i.e. winter or summer). Additionally, in 2021 Point Blue produced a blog in collaboration with The Trust for which we conducted a separate meta-analysis looking across multiple Presidio restoration plots, and that blog (*Ecological Restoration Works for Urban Birds in San Francisco's Presidio*; Gardali 2021*)* is included as an Appendix to this report, both because of the relevant nature of the findings, and because while outside of the standard monitoring and reporting for this monitoring program, it fell within that two-year period.

Study Sites and Field Methods

All surveys were conducted by Point Blue biologists trained in the survey methods as well as the identification of birds in the region by sight, song, and call.

Area Search. We used the area search method (Ralph et al. 1993) to determine relative bird abundance for each focal species (number of individual birds detected) and overall species richness (total number of species detected) at each of 11 standard restoration sites and 3 SFO mitigation restoration sites surveyed during the two-year period covered in this report (Figure 1, Tables 1-2). At each restoration site, data are collected before and after restoration, whenever possible. Since 2011, Point Blue and the Trust have applied a more rigorous monitoring strategy in which sites are now monitored approximately one year prior to restoration (-1) as well as 1, 3, 5, and 10 years following restoration (Humple and Gardali 2015). Restoration sites surveyed during the two-year period covered in this report fall anywhere within this timeframe (see Tables 1 and 2). Monitoring and restoration metadata are maintained jointly by the Trust and Point Blue staff and contain additional information on each of these sites and projected future efforts.

During area search surveys, observers walked throughout each plot to search for birds. Individual birds of all species were counted by detection with their detection type hierarchically recorded (e.g., song, visual, or call). Notes on behavior, especially in relation to breeding observations (e.g., food or nest

material carried, nest found), were recorded. Surveys were not conducted during periods of inclement weather, which can reduce bird activity and detectability. Surveys were completed within four hours of sunrise. Our protocol does not involve surveying each plot for an equal and standardized amount of time because plot size and vegetation density varied considerably among sites – due to restoration project size – and because the objective was not to compare sites to one another but to themselves across time. Instead, biologists in this study conducted non-time-constrained area search surveys, spending as much time per survey as they deemed necessary to thoroughly and efficiently assess the bird community composition (Humple and Gardali 2015).

Our current protocol is to survey the same site during a winter and the subsequent summer (Humple and Gardali 2015); historically, this was not necessarily the practice. Sites were surveyed three times during winter (December to February) and two times during the summer (May to June). Surveys are repeated one extra time in winter due to the higher variability in numbers (e.g., flocking) and lower auditory detectability in winter compared to the breeding season when birds are singing more frequently, while the smaller number of visits in summer is deemed sufficient to assess bird abundance and species richness during the time of year when increased territorial behavior reduces variability in detectability.

Some historic survey years were dropped from this report for a few sites due to surveys in those years not following standardized protocols. These sites are Fill Site 1 (2004), Landfill 2 (2004), Baker Beach Housing 2 and 4 (2007), and Dragonfly Creek Phase 2 (2007, 2008); see also Results section.

***Point Count*.** We used the point count method to assess Presidio-wide trends for the overall landbird community and for individual species. We surveyed 27 point count stations during the winter of 2021-22 and the 2022 breeding season (Table 3). Points were originally established in 1999 (points 1-24) and 2001 (points 25-27; Gardali 2002) and were surveyed intermittently through 2013, with the protocol since then being to survey them every three years (Humple and Gardali 2015). Survey sites were not chosen at random but were instead targeted to cover general habitat types: coastal/dune scrub; Monterey cypress, eucalyptus, and riparian woodland. Since 2001, each station has been surveyed three times during the winter and two times during the breeding season during each year of survey (see *Area Search* section above for rationale); during the 1999 breeding season, point counts were conducted three times, so for this analysis, data from the third visit were dropped for better comparison among years because birds are often less active and vocal (leading to decreased detectability) later in the season.

All point count surveys started within 30 minutes of local sunrise and were completed by 4 hours after sunrise and were conducted following standardized point count protocols during a 5-minute survey at each point (Ralph et al 1993, 1995, as described in Humple and Gardali 2015). Historically, slightly different protocols variants related to distance were used: either a Fixed Radius method or one of a few Variable Circular Plot (VCP) point count methods. The Fixed Radius method was used in 1999, where each bird was classified as being less than 50 m or greater than 50 m from the observer. For the VCP

method, the distance to each bird is estimated to the nearest "distance band" from the observer. In 2001, the VCP method was used with distance bands every 10 m out to 100 m; in 2002 through the winter of 2005-06, we used slightly broader VCP distance bands with 10m bands out to 50 m, 50-75 m, 75-100 m, and greater than 100 m. Since winter 2006-07, we have used 10 m bands out to 30 m, 30-50 m, 50-100 m, and greater than 100 m, which is the standardized protocol we are now using in the Presidio and other monitoring sites in the region, including elsewhere within the Golden Gate National Recreation Area (GGNRA; Gardali et al. 2010). We were able to compare all years of this study by lumping all detections within 50 m of the observer into one distance band (0-50 m), which is possible across all protocols, and using that distance band for analyses.

All data and detailed site boundary information can be accessed at the Point Blue-hosted California Avian Data Center (CADC), where the data are maintained by Point Blue, by those who have been provided with password-protected CADC accounts (http://data.prbo.org/cadc2/). In addition, since 2015 Presidio Trust has been housing duplicate copies of these data in a joint Presidio Trust / GGNRA online data repository (replaced annually, via exports from CADC provided by Point Blue, as new data are added and modifications to historic data made); visualizations and data summaries in this version are easily accessed by Trust staff for internal needs.

Table 1. Area search plots at Standard sites surveyed by Point Blue Conservation Science in the Presidio during winter 2020-21 through summer 2022, with the number of visits per season.

			Number of visits per season			
Plot / Project Name[1]	**Point Blue Plot Code**	**Year since restoration[2]**	**Winter 2020-21**	**Summer 2021**	**Winter 2021-22**	**Summer 2022**
Baker Beach Housing 2 + 4	BBHO_2 + BBHO_4	10			3	2
Baker Beach Housing 3	BBHO_3	10	3	2		
Dragonfly Creek Phase 2	DRAGON_2	10	3	2		
Fill Site 1	FILLS1_1	10			3	2
Landfill 2	LAAR2	10			3	2
Nike Facility Phase 1	NIFA	10			3	2
Park Dunes	PADU_1	10			3	2
Eastern Tributary Below Paul Goode	PAGO_1	5	3	2		
Rob Hill Forest Understory Diversification 4	ROHI_4	1	3	2		
Lessingia 1, Wherry Corridor West	WHCO_1	10			3	2

[1]Point Blue "Plot" Name is commensurate with Presidio Trust "Project" name.

[2] indicates what survey year since restoration this report period covers for each site.

Table 2. Area search plots at SFO Mitigation sites surveyed by Point Blue Conservation Science in the Presidio during winter 2020-21 through summer 2022, with the number of visits per season.

			Number of visits per season			
Plot / Project Name[1]	**Point Blue Plot Code**	**Year since restoration[2]**	**Winter 2020-21**	**Summer 2021**	**Winter 2021-22**	**Summer 2022**
Quartermaster Reach 1	QMR_1	1			3	2
Quartermaster Reach 2	QMR_2	1			3	2
MacArthur Meadow	THMAM_1	5			3	2

[1]Point Blue "Plot" Name is commensurate with Presidio Trust "Project" name.

[2] indicates what survey year since restoration this report period covers for each site.

Table 3. Point count survey effort by Point Blue Conservation Science in the Presidio by season across all years, including the number of points surveyed and the number of visits conducted each season.

	Summer							**Winter**					
Year/Survey Season	**1999**	**2001**	**2002**	**2013**	**2016**	**2019**	**2022**	**2005-06**	**2006-07**	**2012-13**	**2015-16**	**2018-19**	**2021-22**
# Visits	3[1]	2	2	2	2	2	2	3	3	3	3	3	3
# Points	24[2]	27	27	27	27	27	27	27	27	27	27	27	27

[1]Third visit dropped from analysis in this report so that effort was comparable among years.

[2]Points 25-27 added in 2001.

Figure 1. Presidio area search plots at Standard sites (yellow polygons) and SFO Mitigation sites (orange polygons) surveyed by Point Blue Conservation Science in winter 2020-21 through summer 2022.

Figure 2. Presidio point count locations surveyed by Point Blue Conservation Science in winter 2021-22 and summer 2022.

Analysis and Organization of Results

Area Search. For each area search plot, we compile a list of all species detected during summer and winter seasons for the two-year reporting period and calculate the average abundance (number of detections per visit) of each species for each season. Average abundance is informative for determining the number of individuals using a particular site but can be skewed by a large flock detected on only one visit. Together with abundance, the number of visits in which a species was detected provides some indication of species use of the site throughout the season.

In addition, if an area search plot was surveyed for more than three years in the same season (summer versus winter), we make comparisons among years for that season. We evaluate average abundance over time of all habitat-appropriate focal species for which there were detections in more than one year (Appendix A; Humple and Gardali 2015). In this report, this applies to 11 of the 14 sites monitored during this period: Baker Beach Housing 2, 3, and 4 (both season), Dragonfly Creek Phase 2 (both seasons), Fill Site 1 (both seasons), Landfill 2 (both seasons), Nike Facility (both seasons), Park Dunes (both seasons), Eastern Tributary Below Paul Goode (both seasons), MacArthur Meadow (both seasons), and Lessingia 1 Wherry Corridor West (both seasons). Of the above, MacArthur Meadow is an SFO-Mitigation Site, and the rest are Standard (Non-SFO-Mitigation) Sites.

In area search data analyses, we account for two very similar species of hummingbirds in this region not often identifiable from each other, Rufous and Allen's (both migrants in the genus Selasphorus). Although a common breeding species in the Presidio, we do not plot abundance for Allen's Hummingbird, due to most individuals being inseparable from Rufous Hummingbird, a transient migrant. When identification was not confirmed, we list them as "Allen's/Rufous Hummingbird" in species lists. For counts of total species detected in a given season, if both Allen's Hummingbird and Allen's/Rufous Hummingbird are listed, we only count that as one species, since it's possible that they were all Allen's. Therefore, in the results tables, when both are presented, they should be examined in concert.

Any detection of juvenile birds on an area search plot are removed for analysis purposes.

Results for each site surveyed by the area search method are reported in two stand-alone sections, *Results (Part I): Area Search Surveys for Standard Site Monitoring*, and *Results (Part II): Area Search Surveys for SFO Mitigation Monitoring*.

For each site, we include at least the following for the two-year period covered in this report:

1) all species detected at each site during summer and winter surveys;
2) the average abundance of each species across all visits within a season;
3) the number of visits within a season in which each species was detected;
4) a map of the plot; and
5) associated metadata for each site, including a site description that includes at least the generalized habitat categories of the Avian Monitoring Program for the Presidio (Humple and

Gardali 2015), history of restoration and avian monitoring, and plot size. Within the metadata, we include the approximate dates of the restoration, as interpreted from the Trust's monitoring history spreadsheet (the Trust has more detailed information), and the prior years and seasons in which bird surveys have been conducted.

Lastly, if the area search plot had more than three years of data for a given season (i.e. winter or summer), we provide the following:

6) graphs of average abundance for the focal species described above over time, organized by season and alphabetically by species.

Scientific names for species reported on area search surveys can be found in Appendix B and C.

Point Count. For point count surveys, we calculate species richness (defined as the average number of species detected within 50 m of the observer, per point, per visit) for summer and winter seasons and make comparisons among years. In this analysis, we chose to include all species that were detected within 50 m of the survey station. Therefore, we present richness of all species regardless of habitat preference, breeding status, or migratory status.

We present individual species abundance for all species (not just focal species), but we exclude all waterbirds (e.g., ducks, herons, coots, grebes), shorebirds, owls, and other species not well-sampled with the point count method such as non-territorial species, flocking species in summer (flocking species in winter are included), and species with very large territories (e.g., swallows, ravens, crows, raptors). For summer surveys, we also exclude non-breeding migratory species (e.g., Ruby-crowned Kinglets, Fox Sparrows). These exclusions restricted our analyses to the species for which point count analyses are intended. For each species we calculated the average number of individuals detected within 50 m of the observer (per point, per visit). This gave us one per-point abundance value for each species during each year of the study. We plot this abundance value over time for a suite of focal species (Appendix A) determined in the *Avian Monitoring Program for the Presidio* (Humple and Gardali 2015). With six (winter) and seven (summer) years of data, we are able to conduct a trend analysis for some of the focal species. We plot the trend lines and report the associated p-value to assess the statistical significance of the trend. We used Program R (R Core Team 2016) to run a log-linear model to assess any trends. The analysis method we used was not applicable for species that had a year where there were zero detections, so we do not report trends for those species.

Results of the point count analyses are reported in Results (Part III): Point Count Surveys to Assess Presidio-wide Landbird Community. Included are 1) plots of species richness for each season; 2) plots for individual species abundance across years for any of the focal species that were detected across more than a single year for a given season (winter vs. summer); and 3) trend line plots for applicable individual focal species for each season. Appendix B contains a list of all species (common and scientific names) detected during point count surveys in the Presidio for all years (1999 to 2019). Average abundance for all species for which the point count method is appropriate are in Appendix D (summer) and Appendix E (winter).

Additional meta-analysis. While outside the scope of this report and the summaries and analyses conducted for it, during the same two-year, Point Blue conducted a meta-analysis looking across multiple long-term Presidio restoration plots. A blog summarizing these results was produced in collaboration with the Presidio Trust and is included here in Appendix F: *Ecological Restoration Works for Urban Birds in San Francisco's Presidio* (Gardali 2021).

Future Considerations

The strength of this monitoring program is that long-term data will be generated as we continue to collect bird population data. Long-term monitoring is a critical tool for assessing bird population trends and habitat use over time. Additionally, it can be used to compare local to broadscale trends allowing land managers to assess how their lands are functioning in relation to lands around them (Dettling et al 2021). As we enter the United Nations Decade on Ecosystem Restoration, ecologists are increasingly noting the importance of post-restoration, long-term monitoring programs to inform and guide restoration efforts (Cooke et al. 2019; Lindenmayer 2020).

In the fall of 2021 in collaboration with the Trust, Point Blue performed a meta-analysis on population trends of birds utilizing a subset of the area search plots in the Presidio using data from the winter and summer seasons of 2010-2021, which were then summarized in a Point Blue blog published in October 2021. Given the small sample sizes of individual species at some of the smaller plots, data was combined for 16 plots in order to tell a broader Presidio-wide story about the restoration. The plots included in the analysis were categorized as either riparian or coastal scrub habitat and had been monitored for multiple years post-restoration. Overall, we found that most species showed stable or increasing population trends, with increasing trends for 8 of the 16 species assessed. The conclusion in the blog was that urban restoration was shown to benefit birds, and that restoration in the Presidio is a good investment (Gardali 2021). The results of the meta-analysis are not included in the results of this report; however the blog is included in Appendix F (Gardali 2021) and also available at https://www.pointblue.org/science_blog/ecological-restoration-works-for-urban-birds-in-san-franciscos-presidio/.

Currently 11 of the 14 area search sites surveyed during the study period of this report and included in the results herein contained more than three years of data for a given season and were appropriate for comparing data from multiple seasons. This number will continue to grow as the sites with more recent restoration develop over time, even as monitoring begins or continues for not-yet-initiated or younger restoration sites, respectively, which will inherently produce a subset for which we cannot compare yet across years. For 9 of the 14 area search sites, the survey conducted during the study period of this report marked 10 years post restoration. While The Avian Monitoring Program for the Presidio (Humple and Gardali 2015) only calls for area search monitoring to take place up to 10 years post restoration, the Presidio Trust has recently considered extending the monitoring of some sites from 15 to 20 years post restoration, and we recommend that be carefully evaluated prior to shelving the avian monitoring at these and other older sites. If monitoring continues at these sites along with the Presidio-wide point counts (which currently have six years of summer data and seven years of winter data) the Trust and

Point Blue will have an increased capacity to examine long-term patterns in overall landbird community changes, Presidio-wide and single-site population trends, and single-site trends in focal species abundance, as outlined in the Avian Monitoring Plan for the Presidio (Humple and Gardali 2015). In future years, there will also be additional opportunities to compare bird response to habitat change with vegetation change over time (per Jongsomjit and Humple 2015) as more sites mature and are monitored for longer-term. We also recommend revisiting the meta-analysis that was done for the blog (Gardli 2021) in the near future, and at that time also consider if any additional elements should be considered (e.g., including/comparing to Presidio-wide point count analyses).

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Results (Part I):

Area Search Surveys for Standard Site Monitoring

Baker Beach Housing 2 + 4

Avian area search codes: BBHO_2, BBHO_4 (2 plots combined)

Presidio Trust Project Name [and Site/Subsite Names]: BB Housing 2, BB Housing 4 (Incl. Habitat/Real Estate) [Southwest Dunes/Baker Beach Housing 2]

Site Description: Scrub + Designed Landscape (The site is apartments and parking areas with interspersed patches of coastal dune scrub (restored), some trees, and native landscaping)

Year of restoration: Restored approximately fall 2005 to spring 2009 and fall 2012 to spring 2013.

Table 4 only includes data collected during the two-year period of this report, whereas the figures that follow are for all survey years.

Year(s) of bird survey: [summer 2007 – surveyed but not standardized and therefore not included herein]; summer 2010 [albeit somewhat of a 'year 0', when we don't traditionally survey], 2012, 2015, 2017, 2022; winter 2010-11 [albeit somewhat of a 'year 0', when we don't traditionally survey], 2011-12, 2014-15, 2016-17, 2021-22.

Plot size (ha): 4.75 (BBHO_2) + 2.13 (BBHO_4)

Figure 3. Map of Baker Beach Housing 2 + 4 area search boundaries.

Table 4. Area search survey results at Baker Beach Housing 2 + 4 surveyed by Point Blue Conservation Science in the Presidio during winter 2021-22 through summer 2022.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
Anna's Hummingbird	4	11	10	8.33	3	13	10	11.5	2
Barn Swallow	0	0	0	0.00	0	7	7	7	2
Bewick's Wren	0	1	1	0.67	2	1	5	3	2
Black Phoebe	1	1	2	1.33	3	0	4	2	1
Brown-headed Cowbird	0	0	0	0.00	0	0	5	2.5	1
Bushtit	1	0	4	1.67	2	9	12	10.5	2
California Scrub-Jay	0	0	0	0.00	0	1	3	2	2
California Towhee	2	0	3	1.67	2	0	0	0	0
Chestnut-backed Chickadee	0	0	0	0.00	0	0	4	2	1
Common Raven	0	1	0	0.33	1	0	2	1	1
Dark-eyed Junco	0	0	1	0.33	1	2	3	2.5	2
European Starling	0	0	2	0.67	1	0	0	0	0
Fox Sparrow	8	9	5	7.33	3	0	0	0	0
Golden-crowned Sparrow	6	2	3	3.67	3	0	0	0	0
Hermit Thrush	1	1	0	0.67	2	0	0	0	0
Hooded Oriole	0	0	0	0.00	0	2	0	1	1
House Finch	2	0	16	6.00	2	19	20	19.5	2
House Wren	1	1	0	0.67	2	0	0	0	0
Lesser Goldfinch	0	0	1	0.33	1	0	0	0	0
Lincoln's Sparrow	1	0	0	0.33	1	0	0	0	0
Mourning Dove	0	0	3	1.00	1	1	1	1	2
Purple Finch	0	1	0	0.33	1	0	0	0	0
Pygmy Nuthatch	2	0	1	1.00	2	3	0	1.5	1
Red-tailed Hawk	0	0	0	0.00	0	0	1	0.5	1
Ruby-crowned Kinglet	7	2	3	4.00	3	0	0	0	0
Say's Phoebe	0	1	0	0.33	1	0	0	0	0
Song Sparrow	0	2	0	0.67	1	0	0	0	0
Spotted Towhee	0	0	1	0.33	1	0	3	1.5	1
Steller's Jay	0	0	0	0.00	0	0	1	0.5	1
Townsend's Warbler	1	2	1	1.33	3	0	0	0	0
Violet-green Swallow	0	0	0	0.00	0	1	0	0.5	1
Western Bluebird	0	1	0	0.33	1	2	2	2	2
White-crowned Sparrow	27	23	23	24.33	3	21	41	31	2
Yellow-rumped Warbler	1	1	3	1.67	3	0	0	0	0
Total Individuals	**65**	**60**	**83**	**69.33**		**82**	**124**	**103**	
				26 species				**20 species**	

Baker Beach Housing 2 and 4 are in scrub and designed landscape habitat so we used the Scrub and Designed Landscape Focal Species (breeding, winter, and year-round; see Appendix A) from *The Avian Monitoring Program for the Presidio* (Humple and Gardali 2015) to assess changes to the bird community since restoration activities began. Figures 4 and 5 show abundance values (average number of individuals per visit) for each season for scrub and designed landscape focal species present on the plot.

The summer 2021 and winter 2020-21 surveys marked survey year 10 since restoration at Baker Beach Housing 2 and 4.

During summer surveys, there were no detections of California Quail (extirpated), Wrentit, and Song Sparrow, and only one year with detections of Bewick's Wren (in 2022) and Spotted Towhee (in 2022) so we do not plot abundance values for these focal species. For winter surveys, there were no detections of California Quail so we do not plot abundance values for this focal species.

Apparent trends in abundance should be interpreted with caution since we do not perform statistical trend analysis on these data and because some species have few detections per visit. We do comment on the general trends shown by the plots for the five years of survey data.

Most of the focal species on this area search plot show a lot of inter-annual variability in abundance; however, nearly all the focal species appear to show a stable or increasing trend in abundance. Dark-eyed Junco show a decreasing trend in abundance in the winter. Most notably, Anna's Hummingbird, House Finch, and White-crowned Sparrow have been detected in increasingly higher numbers during summer surveys since 2010 compared to the other focal species. Bewick's Wren were absent from the plot for the first several years of surveys (in 2010-2015) but began appearing in winter surveys in 2016-17 and again in higher numbers in 2021-22. Additionally, Bewick's Wren were detected for the first time during summer surveys in 2022.

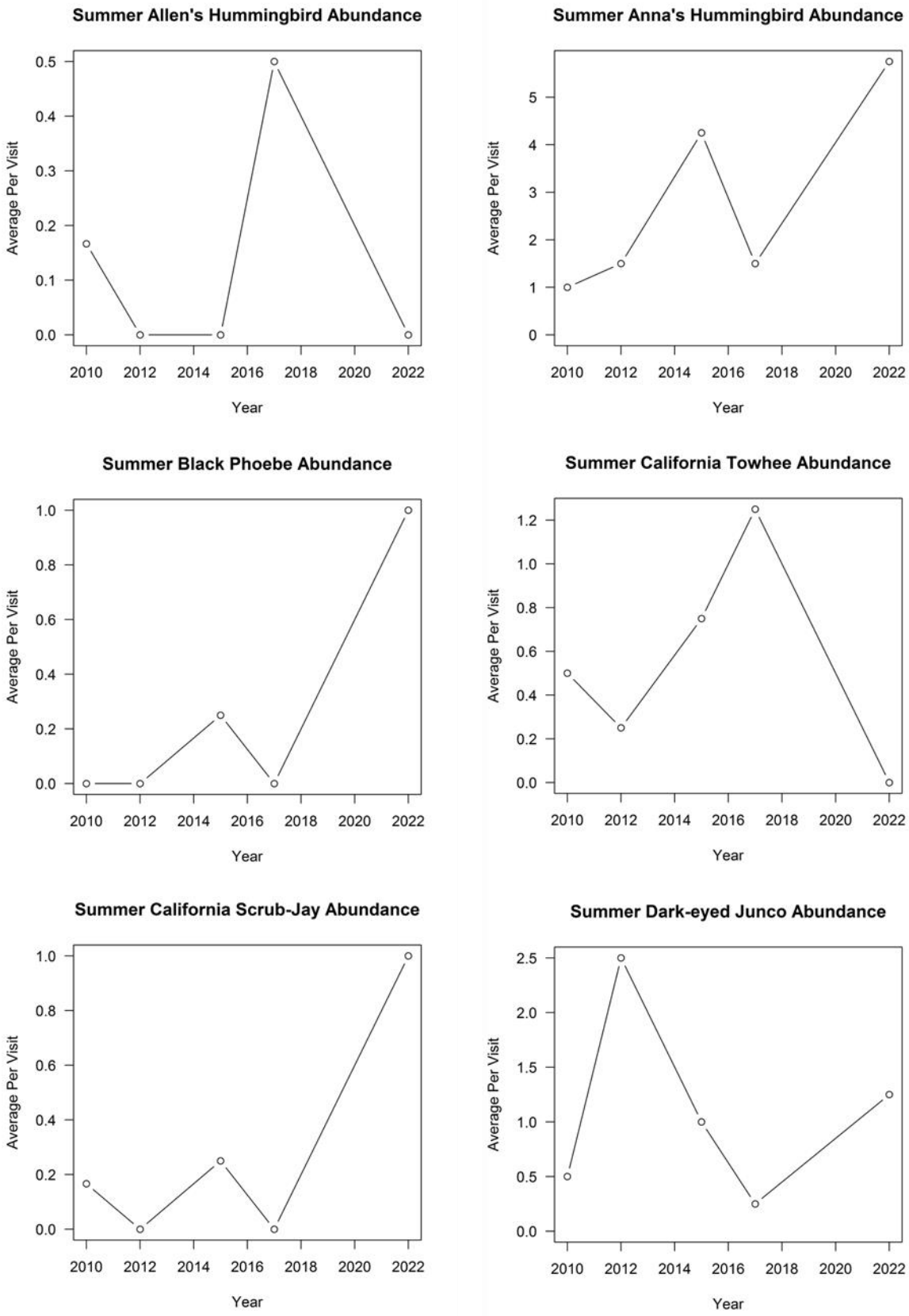

Figure 4. Average number of individuals of each focal species detected per visit, per year at Baker Beach Housing 2 and 4 in summer.

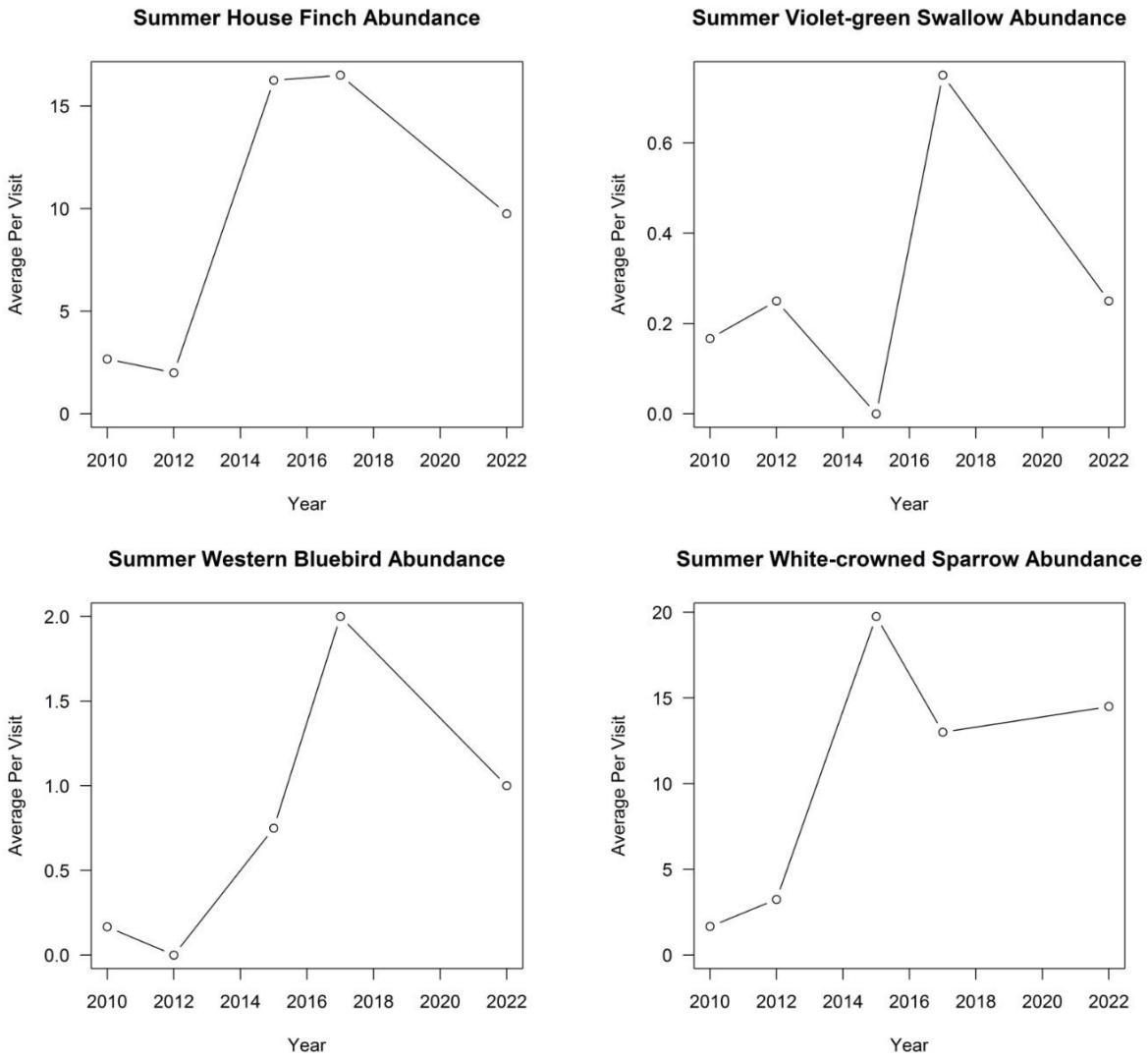

Figure 4 (continued). Average number of individuals of each focal species detected per visit, per year at Baker Beach Housing 2 and 4 in summer.

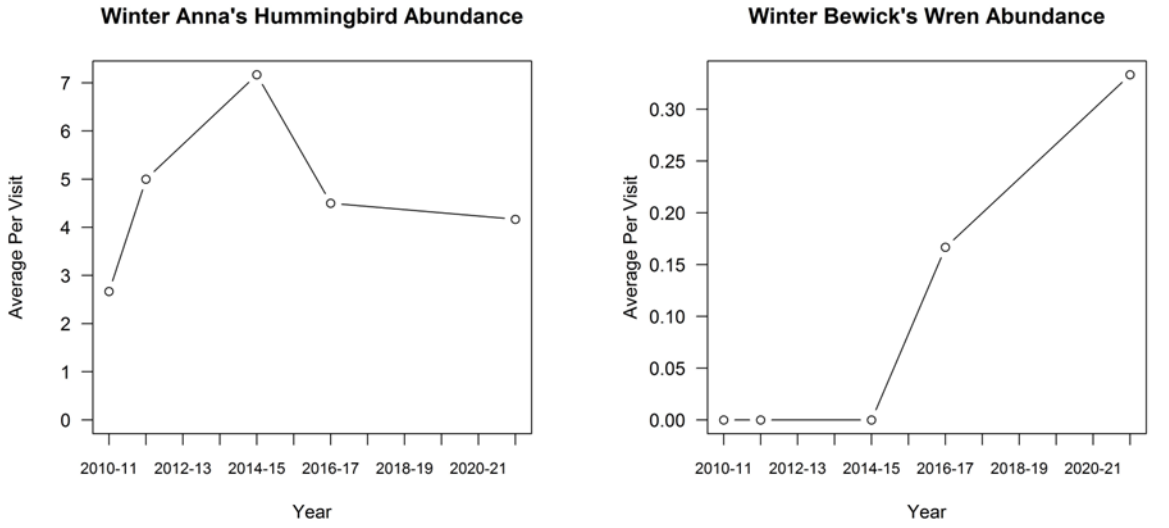

Figure 5. Average number of individuals of each focal species detected per visit, per year at Baker Beach Housing 2 and 4 in winter.

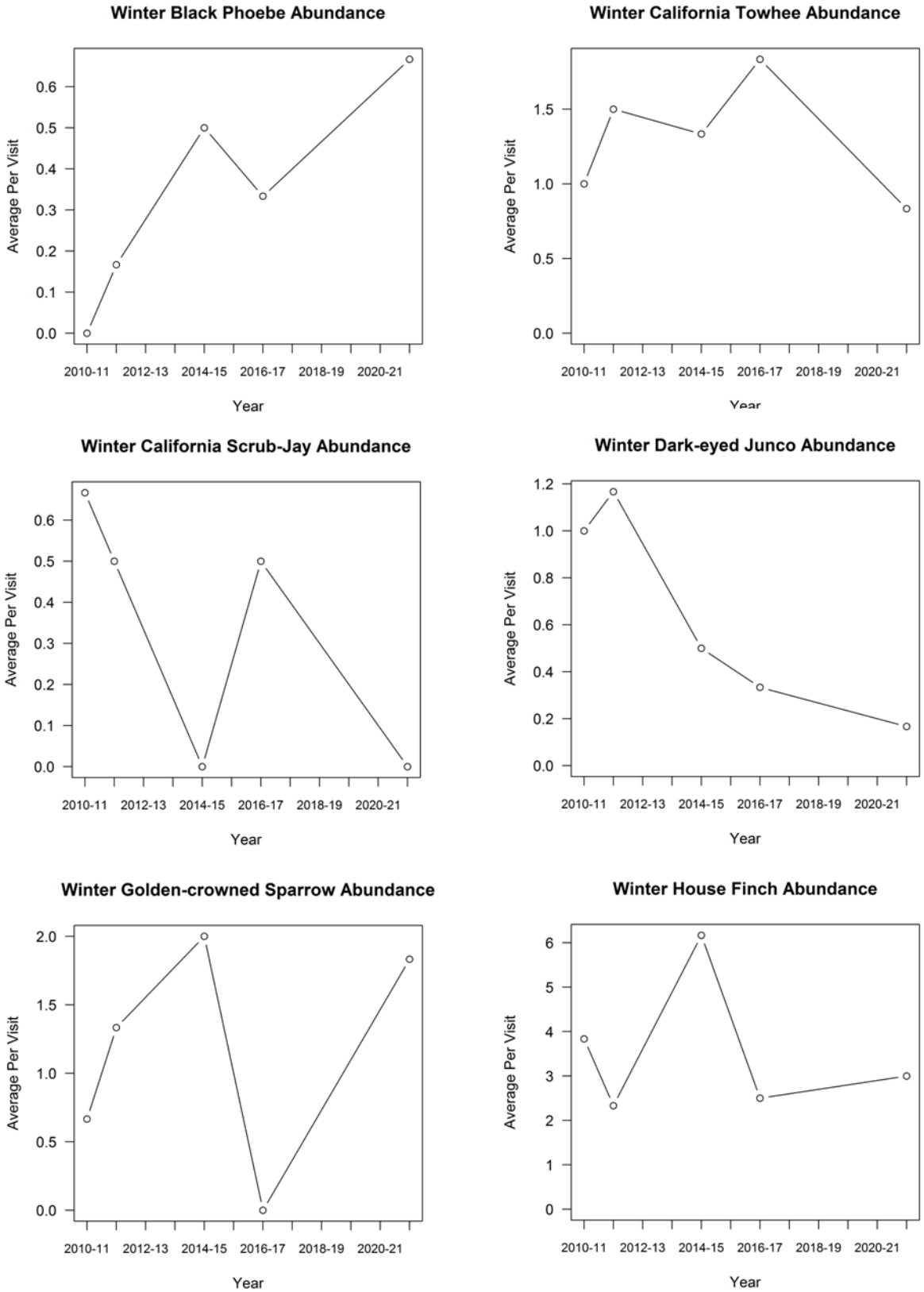

Figure 5 (continued). Average number of individuals of each focal species detected per visit, per year at Baker Beach Housing 2 and 4 in winter.

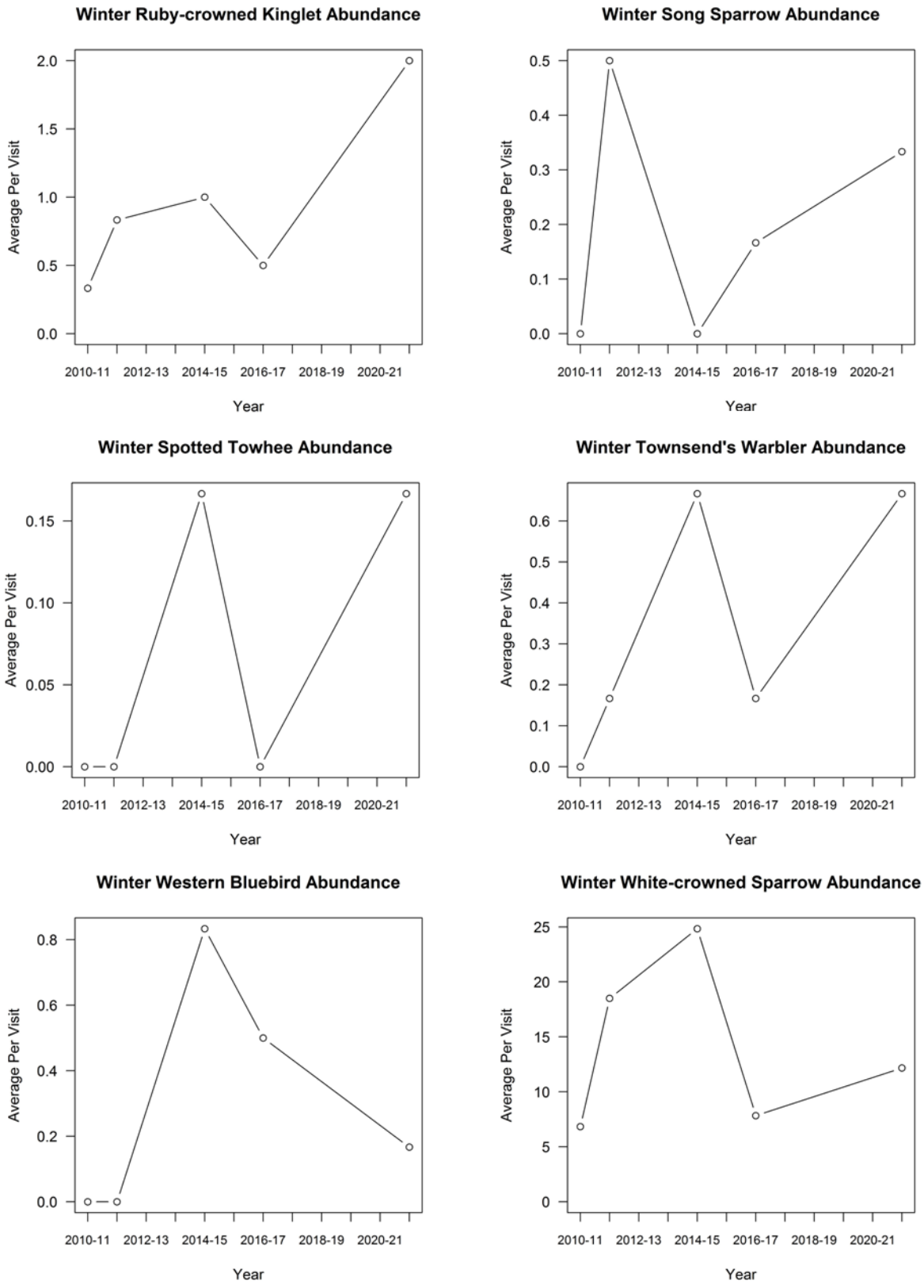

Figure 5 (continued). Average number of individuals of each focal species detected per visit, per year at Baker Beach Housing 2 and 4 in winter.

Baker Beach Housing 3

Avian area search code: BBHO_3

Presidio Trust Project Name [and Site/Subsite Names]: BB Housing 3 (Incl. Real Estate) [Southwest Dunes/Baker Beach Housing]

Site Description: Scrub + Designed Landscape (The site is apartments and parking areas with interspersed patches of coastal dune scrub (restored), some trees, and native landscaping)

Year of restoration: Restored approximately fall 2005 to spring 2009 and fall 2012 to spring 2013

Year(s) of bird survey: summer 2010, 2012, 2014, 2016, 2021; winter 2010-11, 2011-12, 2013-14, 2015-16, 2020-21.
Table 5 only includes data collected during the two-year period of this report, whereas the figures that follow are for all survey years.

Plot size (ha): 2.52

Figure 6. Map of Baker Beach Housing 3 area search boundary.

Table 5. Area search survey results at Baker Beach Housing 3 surveyed by Point Blue Conservation Science in the Presidio during winter 2020-21 through summer 2021.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
Allen's/Rufous Hummingbird	0	0	0	0.00	0	2	0	1	1
American Crow	2	0	0	0.67	1	0	0	0	0
Anna's Hummingbird	5	4	5	4.67	3	4	2	3	2
Barn Swallow	0	0	0	0.00	0	0	4	2	1
Bewick's Wren	0	1	0	0.33	1	0	0	0	0
Black Phoebe	0	0	1	0.33	1	0	1	0.5	1
Brown-headed Cowbird	0	0	0	0.00	0	1	0	0.5	1
Bushtit	0	0	0	0.00	0	0	9	4.5	1
California Scrub-Jay	1	0	0	0.33	1	0	0	0	0
California Towhee	4	4	0	2.67	2	1	0	0.5	1
Dark-eyed Junco	3	1	3	2.33	3	0	2	1	1
European Starling	0	0	1	0.33	1	1	0	0.5	1
Fox Sparrow	6	3	7	5.33	3	0	0	0	0
Golden-crowned Sparrow	9	3	4	5.33	3	0	0	0	0
Hairy Woodpecker	0	0	1	0.33	1	0	1	0.5	1
Hermit Thrush	0	1	1	0.67	2	0	0	0	0
Hooded Oriole	0	0	0	0.00	0	1	0	0.5	1
House Finch	9	8	10	9.00	3	16	8	12	2
Mourning Dove	7	2	0	3.00	2	0	1	0.5	1
Northern Mockingbird	1	1	0	0.67	2	0	0	0	0
Pygmy Nuthatch	0	0	0	0.00	0	0	2	1	1
Ruby-crowned Kinglet	4	2	2	2.67	3	0	0	0	0
Song Sparrow	2	0	1	1.00	2	1	1	1	2
Spotted Towhee	0	0	0	0.00	0	2	1	1.5	2
Townsend's Warbler	0	1	1	0.67	2	0	0	0	0
Violet-green Swallow	0	0	0	0.00	0	0	4	2	1
Western Bluebird	0	0	1	0.33	1	0	2	1	1
White-crowned Sparrow	33	24	22	26.33	3	21	12	16.5	2
Yellow-rumped Warbler	7	2	10	6.33	3	0	0	0	0
Total Individuals	**93**	**57**	**70**	**73.33**		**50**	**50**	**50**	
				21 species				**19 species**	

Baker Beach Housing 3 is in scrub and designed landscape habitat so we used the Scrub and Designed Landscape Focal Species (breeding, winter, and year-round; see Appendix A) from *The Avian Monitoring Program for the Presidio* (Humple and Gardali 2015) to assess changes to the bird community since restoration activities began. Figures 7 and 8 show abundance values (average number of individuals per visit) for each season for scrub and designed landscape focal species present on the plot.

The summer 2021 and winter 2020-21 surveys marked survey year 10 since restoration at Baker Beach Housing 3.

During summer surveys, there were no detections of Allen's Hummingbirds, Bewick's Wren, California Quail (extirpated), and Wrentit and only one year with detections of Song Sparrow (in 2021), Spotted Towhee (in 2021) so we do not plot abundance values for these focal species. For winter surveys, there were no detections of Spotted Towhee and only one year with detections of Bewick's Wren (in 2020-21), so we do not plot abundance values for these focal species.

Apparent trends in abundance should be interpreted with caution since we do not perform statistical trend analysis on these data and because some species have few detections per visit. We do comment on the general trends shown by the plots for the five years of survey data.

Many of the focal species on this area search plot show a lot of inter-annual variability in abundance; however, nearly all the focal species appear to show a stable or increasing trend in abundance in both summer and winter. For summer surveys, Anna's Hummingbird, Black Phoebe, House Finch, Violet-green Swallow, and White-crowned Sparrows show a steady increase in abundance since 2010. Black Phoebe were not detected in summer or winter 2010-11 but have been detected every survey year since. House Finch and White-crowned Sparrow were detected in higher numbers than any other focal species during both summer and winter surveys of 2020-21. The increase in abundance of House Finch and White-crowned Sparrow, in addition to the detection of Song Sparrow and Spotted Towhee (summer) and Bewick's Wren (winter) for the first time since surveys began, may be driven by the maturation of the scrub habitat, though further monitoring is necessary to determine if this trend will continue.

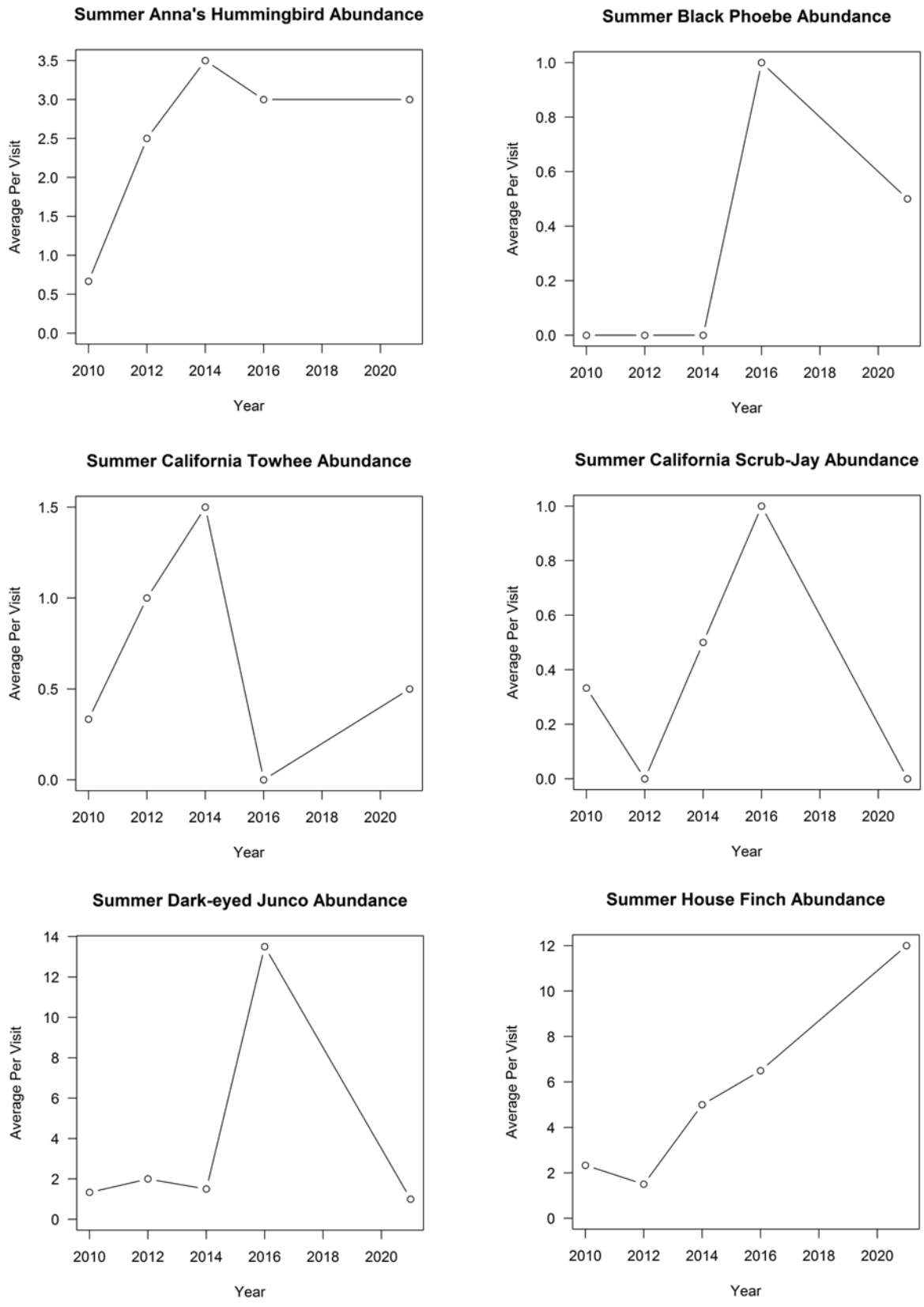

Figure 7. Average number of individuals of each focal species detected per visit, per year at Baker Beach Housing 3 in summer.

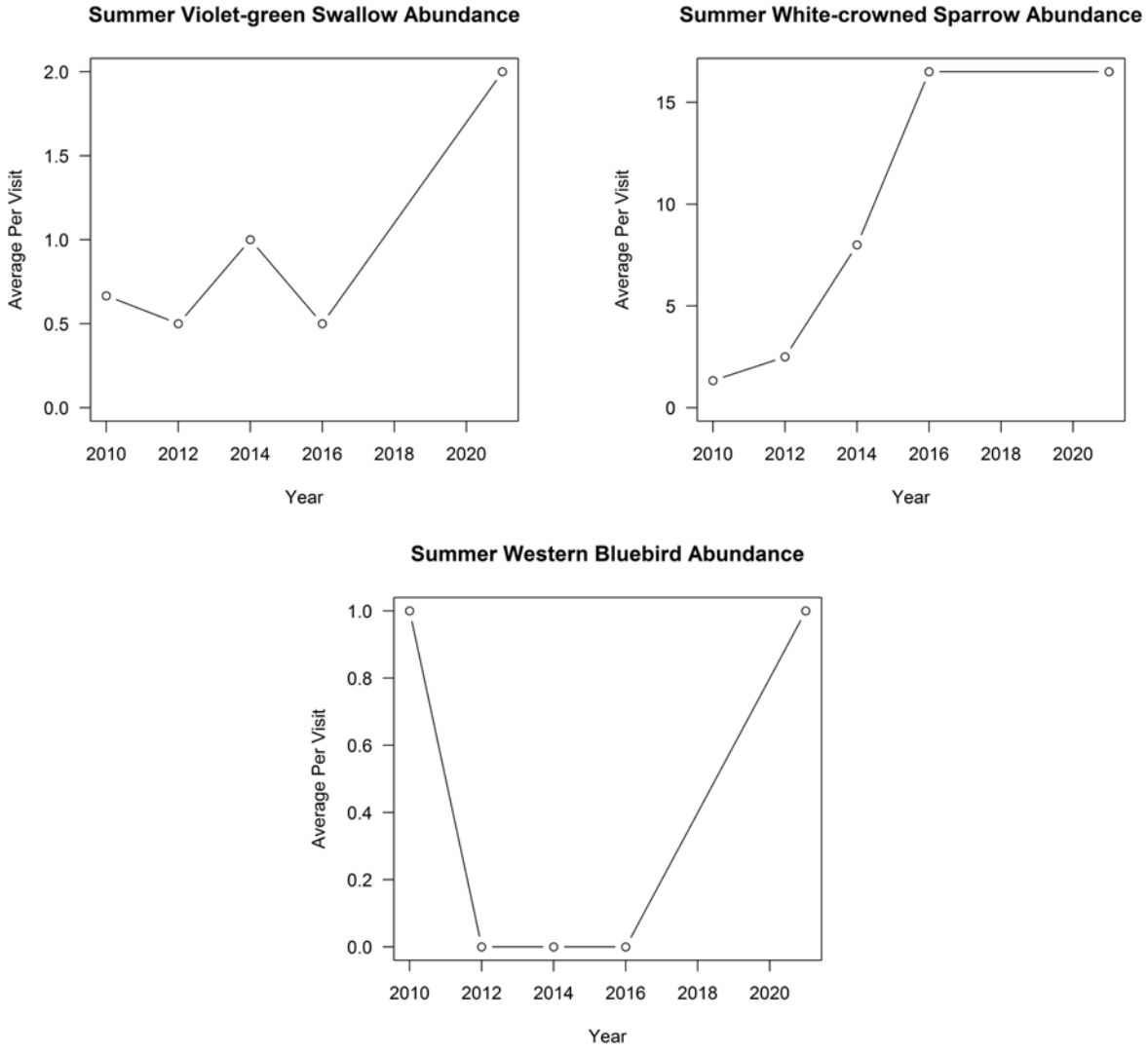

Figure 7 (continued). Average number of individuals of each focal species detected per visit, per year at Baker Beach Housing 3 in summer.

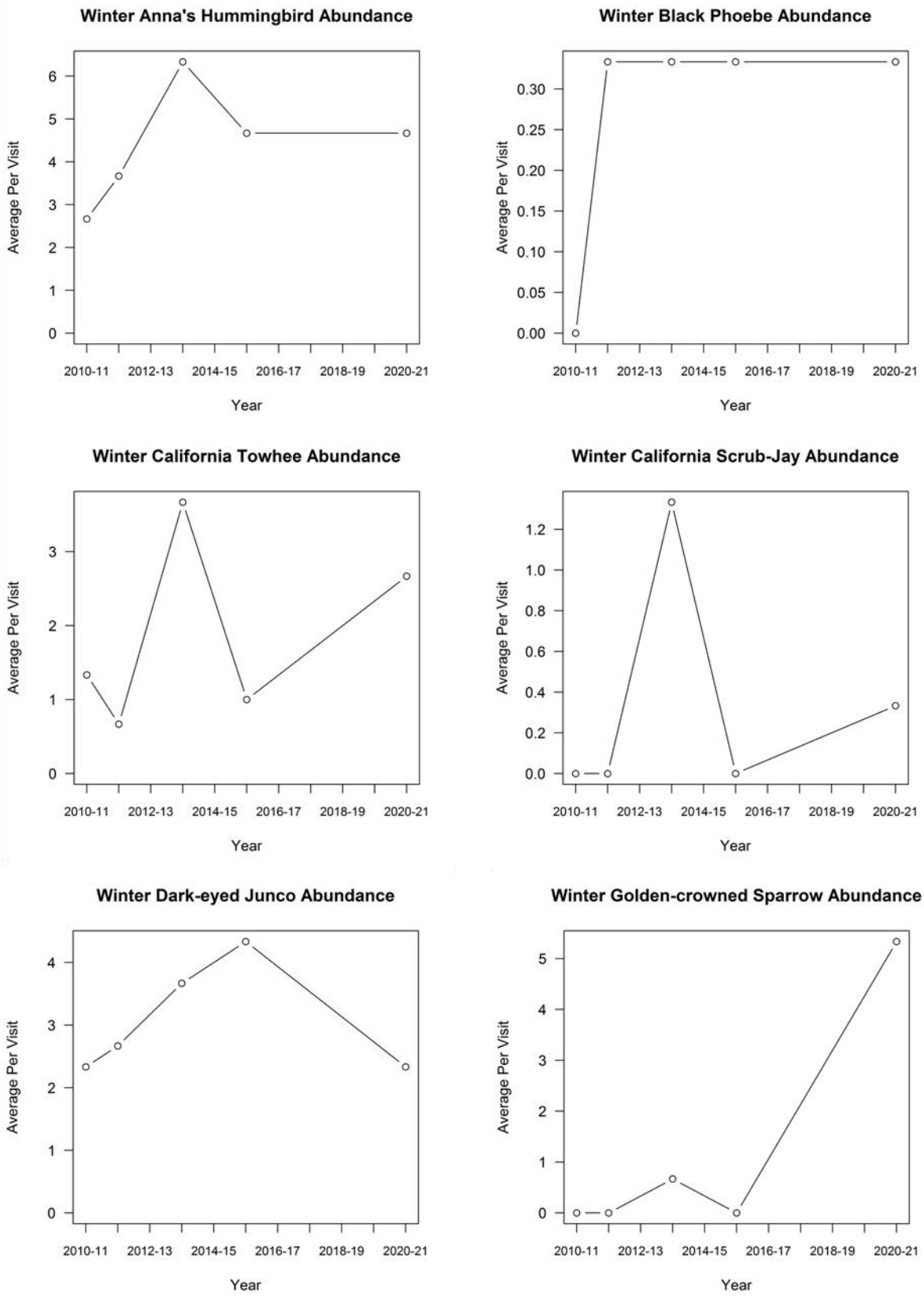

Figure 8. Average number of individuals of each focal species detected per visit, per year at Baker Beach Housing 3 in winter.

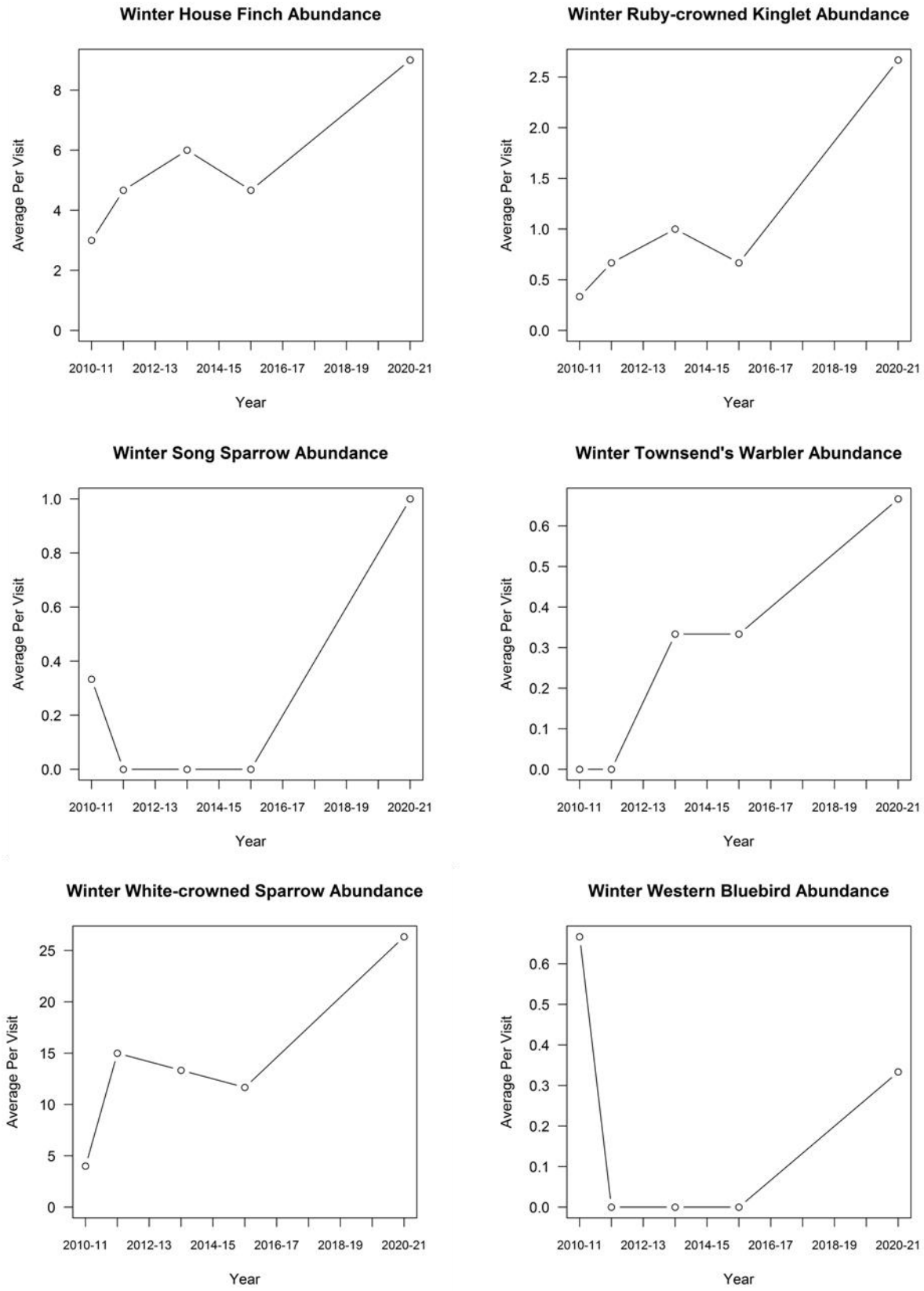

Figure 8 (continued). Average number of individuals of each focal species detected per visit, per year at Baker Beach Housing 3 in winter.

Dragonfly Creek Phase 2

Avian area search code: DRAGON_2

Presidio Trust Project Name [and Site/Subsite Names]: DFC Phase 2 [Dragonfly Creek/Lower Dragonfly Creek]

Site Description: Riparian (with some historic/eucalyptus forest on the southern edge)

Year of restoration: Restored fall 2011 through spring 2012

Year(s) of bird survey: [summer 2007 and winter 2007-08 – surveyed but not standardized and therefore not included herein]; summer 2010, 2013, 2016, 2021; winter 2010-11, 2012-13, 2015-16, 2020-21.

Table 6 only includes data collected during the two-year period of this report, whereas the figures that follow are for all survey years.

Plot size (ha): 0.97

Figure 9. Map of Dragonfly Creek Phase 2 area search boundary.

Table 6. Area search survey results at Dragonfly Creek Phase 2 surveyed by Point Blue Conservation Science in the Presidio during winter 2020-21 through summer 2021.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
Allen's/Rufous Hummingbird	0	0	2	0.67	1	1	1	1	2
American Crow	0	1	0	0.33	1	0	0	0	0
American Robin	5	9	1	5.00	3	1	1	1	2
Anna's Hummingbird	3	4	5	4.00	3	2	0	1	1
Black Phoebe	0	1	0	0.33	1	0	1	0.5	1
California Scrub-Jay	0	0	0	0.00	0	1	1	1	2
Chestnut-backed Chickadee	2	0	2	1.33	2	5	1	3	2
Dark-eyed Junco	0	0	0	0.00	0	1	1	1	2
Fox Sparrow	2	1	3	2.00	3	0	0	0	0
Golden-crowned Sparrow	18	3	3	8.00	3	0	0	0	0
Hairy Woodpecker	1	0	0	0.33	1	0	0	0	0
Hermit Thrush	3	2	1	2.00	3	0	0	0	0
House Finch	0	0	1	0.33	1	0	0	0	0
Pacific Wren	0	1	1	0.67	2	0	0	0	0
Purple Finch	0	0	0	0.00	0	0	1	0.5	1
Pygmy Nuthatch	0	0	3	1.00	1	1	1	1	2
Ruby-crowned Kinglet	2	3	7	4.00	3	0	0	0	0
Song Sparrow	1	1	2	1.33	3	4	4	4	2
Steller's Jay	0	0	0	0.00	0	0	1	0.5	1
Swainson's Thrush	0	0	0	0.00	0	1	0	0.5	1
Townsend's Warbler	0	1	1	0.67	2	0	0	0	0
White-crowned Sparrow	0	0	3	1.00	1	0	0	0	0
Wilson's Warbler	0	0	0	0.00	0	0	1	0.5	1
Yellow-rumped Warbler	2	3	6	3.67	3	0	0	0	0
Total Individuals	**39**	**30**	**41**	**36.67**		**17**	**14**	**15.5**	
				18 species				**13 species**	

Dragonfly Creek Phase 2 is in riparian habitat so we used the Riparian Focal Species (breeding, winter, and year-round; see Appendix A) from *The Avian Monitoring Program for the Presidio* (Humple and Gardali 2015) to assess changes to the bird community since restoration activities began. Figures 10 and 11 show abundance values (average number of individuals per visit) for each season for riparian focal species present on the plot.

The summer 2021 and winter 2020-21 surveys marked survey year 10 since restoration at Dragonfly Creek Phase 2.

During summer surveys, there were no detections of Common Yellowthroat, and Spotted Towhee and only one year with detections of California Scrub-Jay (in 2021), Downy Woodpecker (in 2016) and

Swainson's Thrush (in 2021) so we do not plot abundance values for these focal species. For winter surveys, there were no detections of California Scrub-Jay, Common Yellowthroat, Downy Woodpecker, Spotted Towhee and only one year with detections of Black Phoebe (in 2020-21), Golden-crowned Sparrow (in 2020-21), and Townsend's Warbler (in 2020-21), so we do not plot abundance values for these focal species.

Apparent trends in abundance should be interpreted with caution since we do not perform statistical trend analysis on these data and because some species have few detections per visit. We do comment on the general trends shown by the plots for the four years of survey data.

There may have been a discrepancy over the years in how the boundary of Dragonfly Creek Phase 2 was interpreted. In early surveys it is suspected that surveyors followed the boundaries of the actual riparian habitat and not the GPS polygon. In our more recent surveys, GPS units have been used to follow the outline of the polygon, which happens to include a portion of eucalyptus forest. This may indicate a mismatch of the intended boundaries and the GPS boundaries of this plot. There may also be some differences in the species detected over the years that can be attributed to this survey area discrepancy because slightly different species are likely to use the riparian and the eucalyptus forest habitats.

Many of the focal species on this area search plot show a lot of inter-annual variability in abundance. For these species we will continue to collect data and watch for future trends. Anna's Hummingbird appear to have decreasing abundance in the summer although they appear to be increasing in abundance in the winter. Chestnut-backed Chickadee appear to be increasing in abundance in both summer and winter. Ruby-crowned Kinglet also appear to be increasing in abundance in the winter. While many riparian focal species have not been detected at Dragonfly Creek Phase 2, several species were detected for the first time in 2020 and 2021 surveys – Black Phoebe, Golden-crowned Sparrow, and Townsend's Warbler (in winter 2020-21) and California Scrub-Jay and Swainson's Thrush (in summer 2021) – which may suggest that the riparian restoration is maturing and becoming more suitable for these species, however further monitoring is needed.

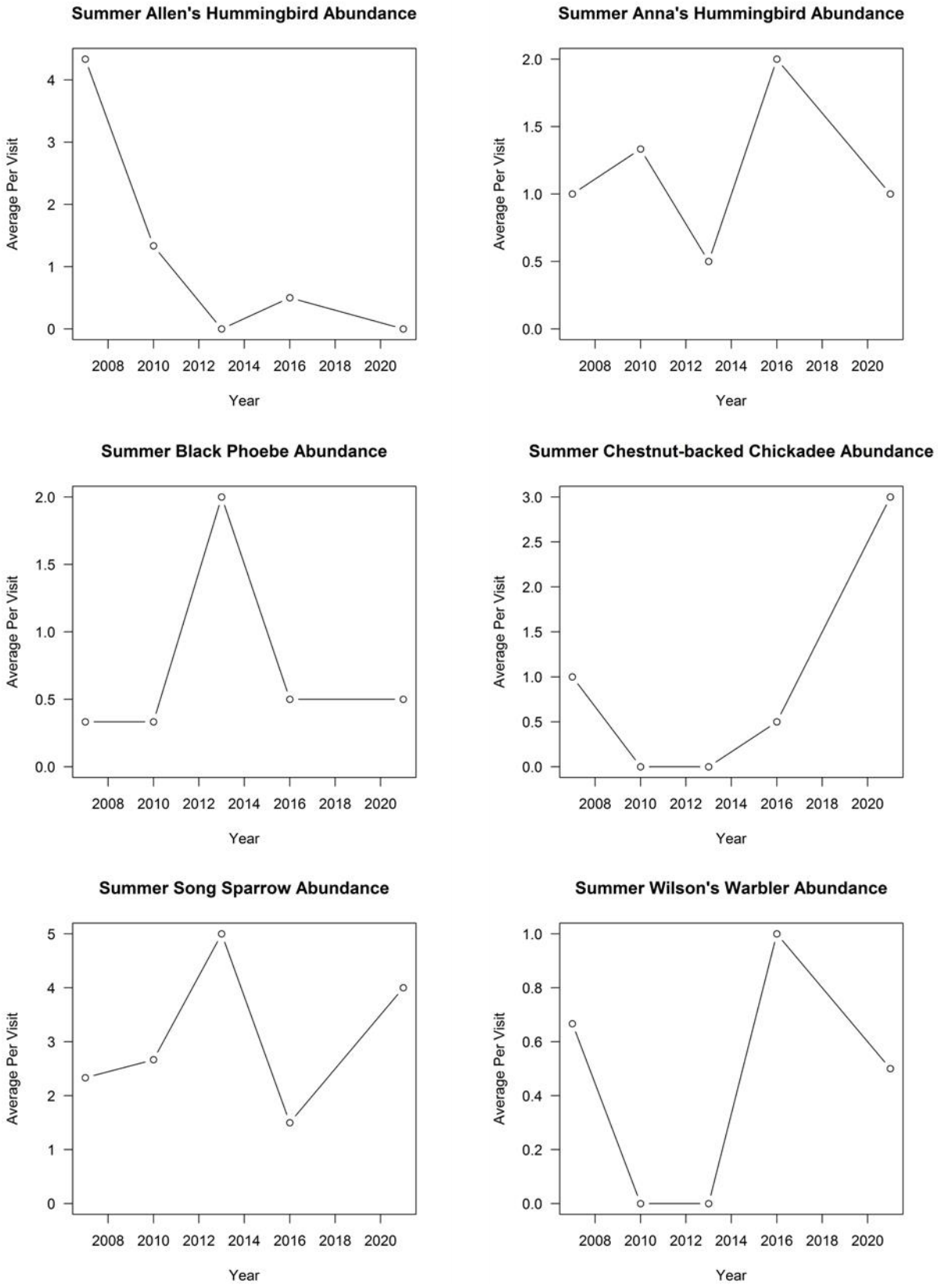

Figure 10. Average number of individuals of each focal species detected per visit, per year at Dragonfly Creek Phase 2 in summer.

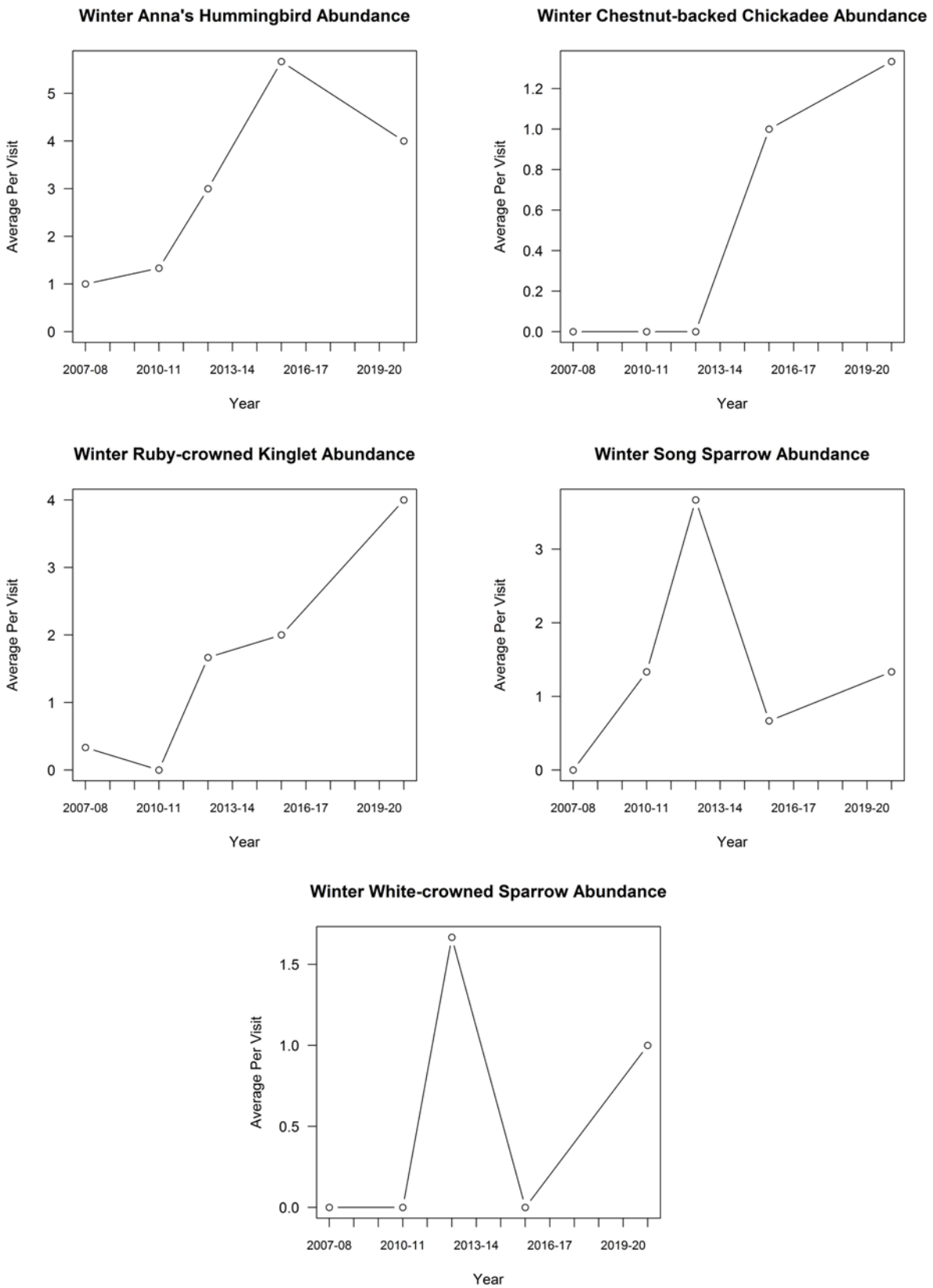

Figure 11. Average number of individuals of each focal species detected per visit, per year at Dragonfly Creek Phase 2 in winter.

Fill Site 1

Avian area search code: FILLS1_1

Presidio Trust Project Name [and Site/Subsite Names]: FS1 + Extension [Tennessee Hollow/Fill Site 1]

Site Description: Scrub and designed landscape (with the southeast portion of the plot converted to turf athletic field in 2015-17)

Year of restoration: Restored approximately fall 2011 to spring 2012

Year(s) of bird survey: [summer 2004 – surveyed but not standardized and therefore not included herein]; summer 2011, 2013, 2015, 2017, 2022; winter 2012-13, 2014-15, 2016-17, 2021-22.

Table 7 only includes data collected during the two-year period of this report, whereas the figures that follow are for all survey years.

Plot size (ha): 1.22

Figure 12. Map of Fill Site 1 area search boundary.

Table 7. Area search survey results at Fill Site 1 surveyed by Point Blue Conservation Science in the Presidio during winter 2021-22 through summer 2022.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
Allen's Hummingbird	0	0	0	0.00	0	3	6	4.5	2
Allen's/Rufous Hummingbird	0	0	2	0.67	1	0	0	0	0
American Robin	0	0	0	0.00	0	0	1	0.5	1
Anna's Hummingbird	6	6	7	6.33	3	5	4	4.5	2
Black Phoebe	1	0	0	0.33	1	0	0	0	0
Bushtit	0	0	2	0.67	1	2	3	2.5	2
California Scrub-Jay	2	0	1	1.00	2	0	1	0.5	1
Chestnut-backed Chickadee	0	1	0	0.33	1	1	0	0.5	1
Cooper's Hawk	0	1	0	0.33	1	0	0	0	0
Dark-eyed Junco	1	0	0	0.33	1	0	0	0	0
Fox Sparrow	4	4	3	3.67	3	0	0	0	0
Golden-crowned Sparrow	4	12	2	6.00	3	0	0	0	0
Hermit Thrush	0	1	0	0.33	1	0	0	0	0
House Finch	0	0	0	0.00	0	2	3	2.5	2
Hutton's Vireo	1	0	0	0.33	1	0	0	0	0
Mourning Dove	0	0	0	0.00	0	1	0	0.5	1
Nuttall's Woodpecker	0	0	0	0.00	0	1	0	0.5	1
Orange-crowned Warbler	1	0	1	0.67	2	1	0	0.5	1
Purple Finch	3	0	0	1.00	1	1	1	1	2
Ruby-crowned Kinglet	3	3	3	3.00	3	0	0	0	0
Song Sparrow	4	3	4	3.67	3	7	9	8	2
Townsend's Warbler	0	1	0	0.33	1	0	0	0	0
Western Tanager	0	0	0	0.00	0	1	0	0.5	1
White-crowned Sparrow	4	7	3	4.67	3	2	3	2.5	2
Yellow-rumped Warbler	1	1	0	0.67	2	0	0	0	0
Total Individuals	**35**	**40**	**28**	**34.33**		**27**	**31**	**29**	
				19 species				**14 species**	

Fill Site 1 is in scrub and designed landscape habitat so we used the Scrub and Designed Landscape Focal Species (breeding, winter, and year-round; see Appendix A) from *The Avian Monitoring Program for the Presidio* (Humple and Gardali 2015) to assess changes to the bird community since restoration activities began. Figures 13 and 14 show abundance values (average number of individuals per visit) for each season for scrub and designed landscape focal species present on the plot. In addition to scrub and designed habitat, from 2015-2017 the southeast portion of the plot was converted from a gravel parking lot into a turf athletic field. This did impact the vegetation around the edges of the field, with both vegetation being removed and some new plantings added.

The summer 2022 and winter 2021-22 surveys marked survey year 10 since restoration at Fill Site 1.

During summer surveys, there were no detections of Bewick's Wren, California Quail (extirpated), Dark-eyed Junco, Spotted Towhee, Violet-green Swallow, Western Bluebird, and Wrentit so we do not plot abundance values for these focal species. For winter surveys, there were no detections of Spotted Towhee and Western Bluebird and only one year with detections of California Scrub-Jay (in 2021-22), House Finch (in 2013-14), Townsend's Warbler (in 2021-22) so we do not plot abundance values for these focal species.

Apparent trends in abundance should be interpreted with caution since we do not perform statistical trend analysis on these data and because some species have few detections per visit. We do comment on the general trends shown by the plots for the five (summer) and four (winter) years of survey data.

Many of the focal species on this area search plot show a lot of inter-annual variability in abundance. Several species – Allen's Hummingbird (in summer), Anna's Hummingbird (in summer and winter), California Scrub-Jay (in summer), Golden-crowned Sparrow (in winter), Ruby-crowned Kinglet (in winter) and Song Sparrow (in summer and winter) – appear to have increasing abundance since restoration. Black Phoebe (in summer), California Towhee (in summer), and Dark-eyed Junco (in winter) were initially detected before or during restoration activities but have not been detected or detected in small numbers since 2014-15 surveys. The latter two species forage in more open areas that may be more prevalent prior to or early on in restoration.

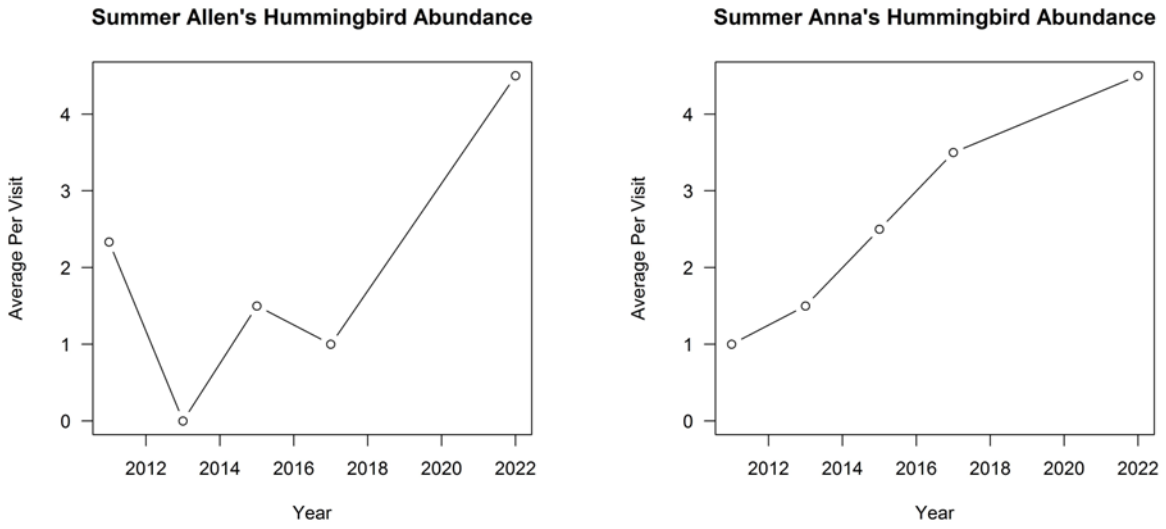

Figure 13. Average number of individuals of each focal species detected per visit, per year at Fill Site 1 in summer.

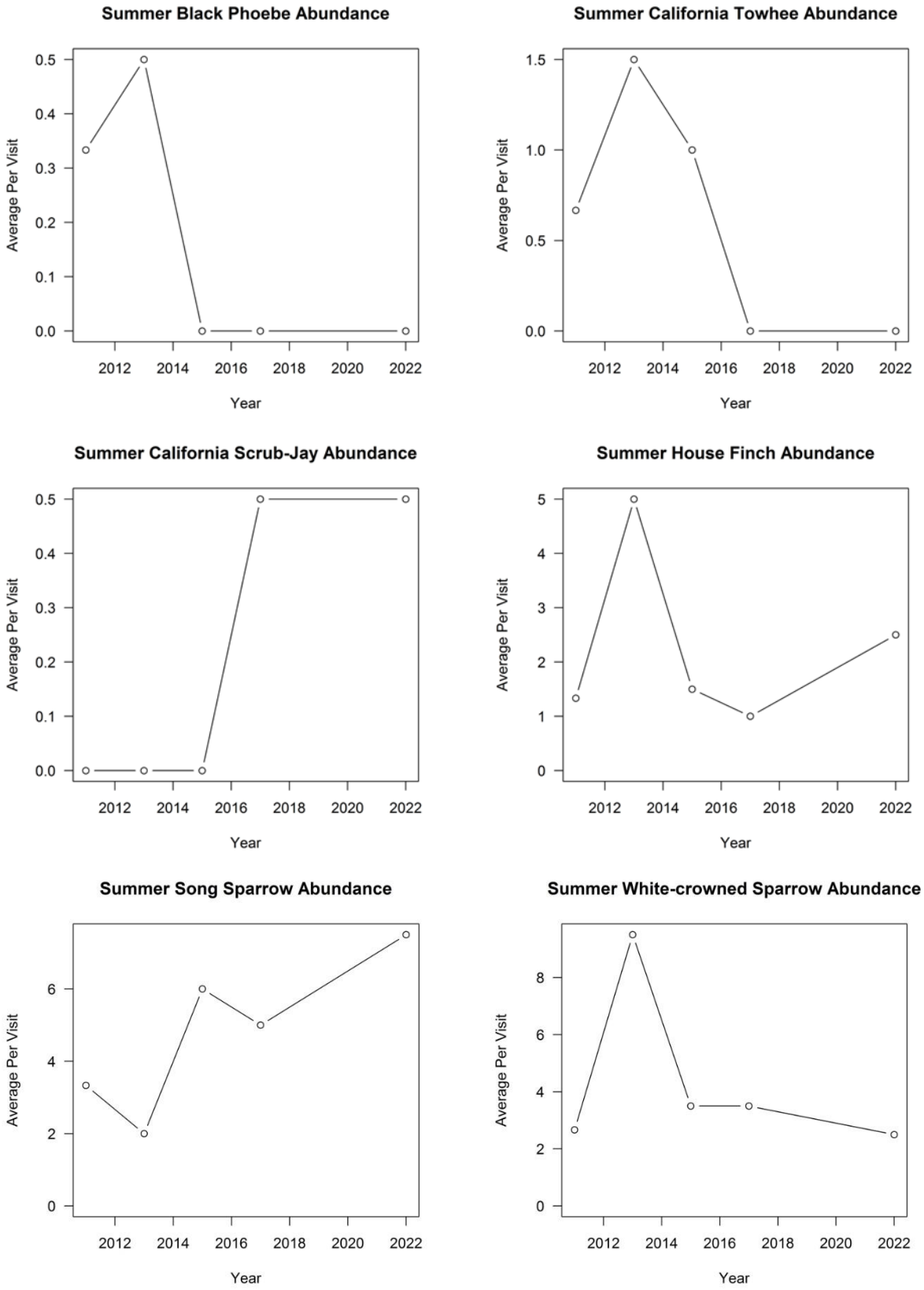

Figure 13 (continued). Average number of individuals of each focal species detected per visit, per year at Fill Site 1 in summer.

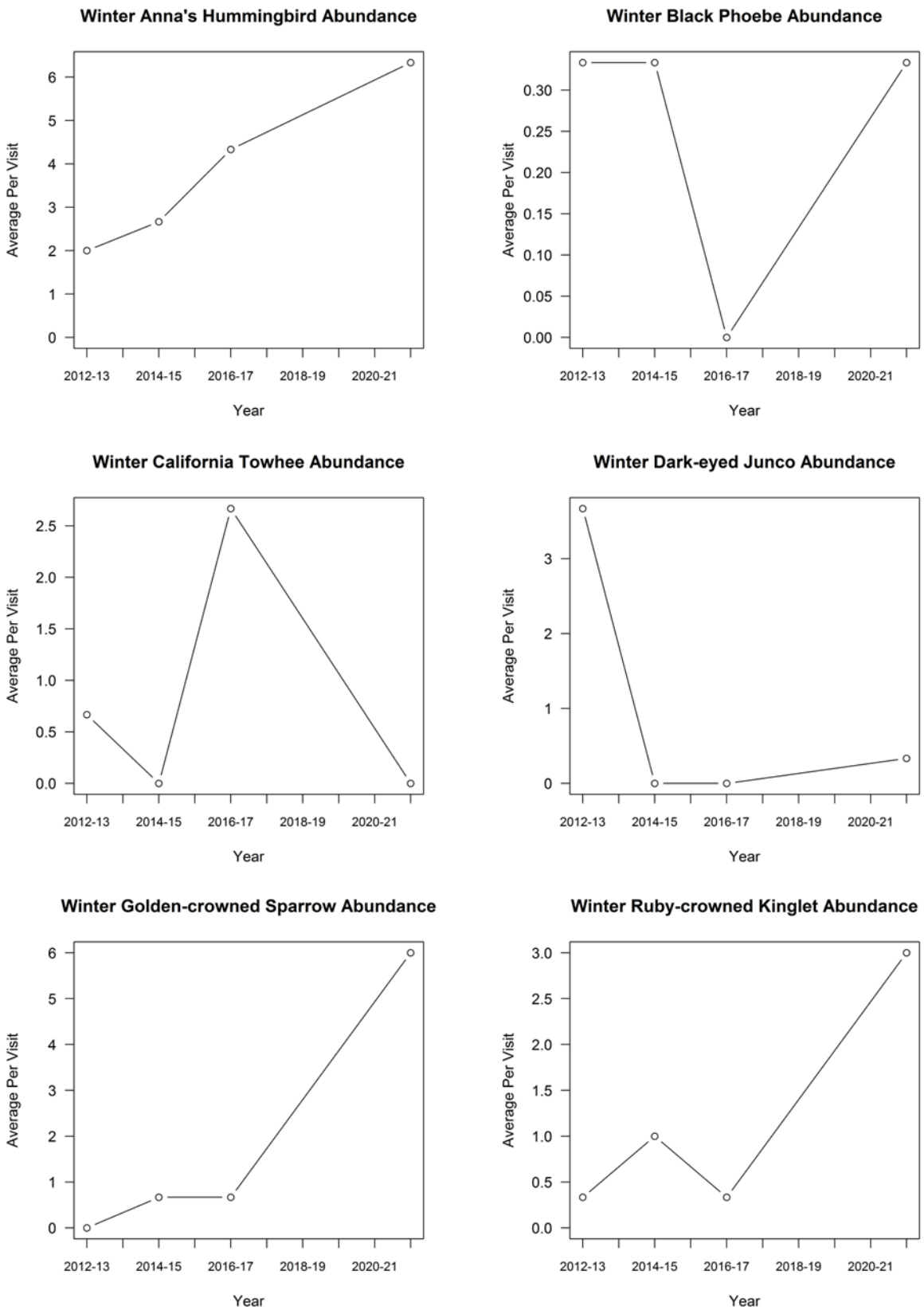

Figure 14. Average number of individuals of each focal species detected per visit, per year at Fill Site 1 in winter.

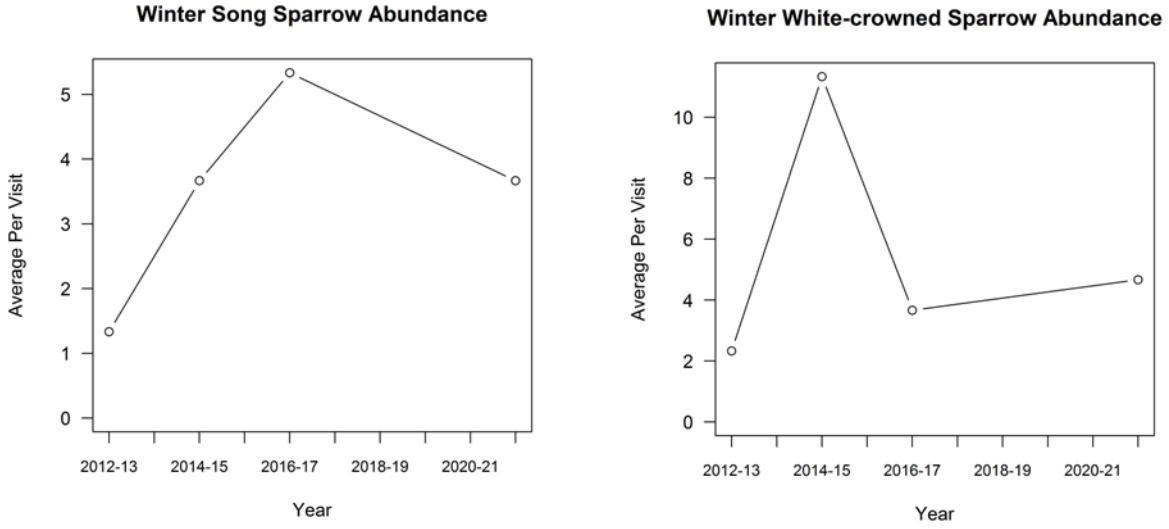

Figure 14 (continued). Average number of individuals of each focal species detected per visit, per year at Fill Site 1 in winter.

Landfill 2

Avian area search code: LAAR2

Presidio Trust Project Name [and Site/Subsite Names]: Landfill 2 [Tennessee Hollow/Landfill 2]

Site Description: Scrub and Historic Forest (planting) and Wetland (small pond)

Year of restoration: Restored approximately fall 2011 to spring 2012.

Year(s) of bird survey: [summer 2004 – surveyed but not standardized and therefore not included herein]; summer 2011, 2013, 2015, 2017, 2022; winter 2012-13, 2014-15, 2016-17, 2021-22.

Table 8 only includes data collected during the two-year period of this report, whereas the figures that follow are for all survey years.

Plot size (ha): 1.11

Figure 15. Map of Landfill 2 area search boundary.

Table 8. Area search survey results at Landfill 2 surveyed by Point Blue Conservation Science in the Presidio during winter 2021-22 through summer 2022.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
Allen's Hummingbird	0	0	0	0.00	0	2	4	3	2
Allen's/Rufous Hummingbird	0	0	1	0.33	1	0	0	0	0
American Robin	1	0	1	0.67	2	2	1	1.5	2
Anna's Hummingbird	3	7	6	5.33	3	5	5	5	2
Bewick's Wren	1	0	0	0.33	1	0	0	0	0
Black-headed Grosbeak	0	0	0	0.00	0	1	0	0.5	1
Bushtit	0	0	0	0.00	0	2	0	1	1
California Towhee	0	0	2	0.67	1	0	1	0.5	1
Cedar Waxwing	0	0	0	0.00	0	2	0	1	1
Chestnut-backed Chickadee	0	0	0	0.00	0	1	1	1	2
Dark-eyed Junco	1	2	1	1.33	3	2	15	8.5	2
Downy Woodpecker	0	0	0	0.00	0	1	1	1	2
Fox Sparrow	1	1	0	0.67	2	0	0	0	0
Golden-crowned Sparrow	0	0	1	0.33	1	0	0	0	0
Hermit Thrush	1	0	1	0.67	2	0	0	0	0
House Finch	0	0	1	0.33	1	4	5	4.5	2
Mourning Dove	0	0	0	0.00	0	0	1	0.5	1
Northern Flicker	0	1	0	0.33	1	0	0	0	0
Purple Finch	0	0	0	0.00	0	0	3	1.5	1
Pygmy Nuthatch	0	0	0	0.00	0	0	2	1	1
Red-shouldered Hawk	0	1	0	0.33	1	0	0	0	0
Ruby-crowned Kinglet	1	2	0	1.00	2	0	0	0	0
Song Sparrow	2	4	5	3.67	3	8	11	9.5	2
White-crowned Sparrow	0	0	3	1.00	1	1	7	4	2
Wilson's Warbler	0	0	0	0.00	0	5	3	4	2
Yellow-rumped Warbler	6	4	0	3.33	2	0	0	0	0
Total Individuals	**17**	**22**	**22**	**20.33**		**36**	**60**	**48**	
				16 species				**17 species**	

Landfill 2 is in scrub, historic forest, and wetland habitat so we used the Scrub, Historic Forest, and Wetland Focal Species (breeding, winter, and year-round; see Appendix A) from *The Avian Monitoring Program for the Presidio* (Humple and Gardali 2015) to assess changes to the bird community since restoration activities began. Figures 16 and 17 show abundance values (average number of individuals per visit) for each season for scrub, historic forest, and wetland focal species present on the plot.

The summer 2022 and winter 2021-22 surveys marked survey year 10 since restoration at Landfill 2.

During summer surveys, there were no detections of American Coot, Bewick's Wren, California Quail (extirpated), California Scrub-Jay, Common Raven, Common Yellowthroat, Hairy Woodpecker, Olive-sided Flycatcher, Red-shouldered Hawk, Pied-billed Grebe, Spotted Towhee, Western Bluebird, Wrentit, and only one year with detections of Downy Woodpecker (in 2022), Pygmy Nuthatch (in 2022), and Violet-green Swallow (in 2017) so we do not plot abundance values for these focal species. For winter surveys, there were no detections of American Coot, California Scrub-Jay, Common Raven, Common Yellowthroat, Downy Woodpecker, Hairy Woodpecker, Pacific Wren, Pied-billed Grebe, Spotted Towhee, Western Bluebird and only one year with detections of Bewick's Wren (in 2021-22), Black Phoebe (in 2016-17), Chestnut-backed Chickadee (in 2014-15), Red-shouldered Hawk (in 2021-22) so we do not plot abundance values for these focal species.

Apparent trends in abundance should be interpreted with caution since we do not perform statistical trend analysis on these data and because some species have few detections per visit. We do comment on the general trends shown by the plots for the five (summer) and four (winter) years of survey data.

Many of the focal species on this area search plot show a lot of inter-annual variability in abundance. For these species we will continue to collect data and watch for future trends. The following species show initial signs of a trend in abundance. Allen's Hummingbird (summer), Anna's Hummingbird (summer and winter), Dark-eyed Junco (summer and winter), Song Sparrow (summer), and Wilson's Warbler (summer) appear to be increasing while White-crowned Sparrow (winter) appear to be decreasing. There are a few summer species that showed an initial increase in the second year of summer surveys in 2012 after restoration had concluded, and then a decrease in abundance in subsequent years. These include Black Phoebe, Pacific Wren, and White-crowned Sparrow. White-crowned Sparrow and Black Phoebe often forage in more open areas that may be more prevalent early on in restoration which could explain their initial increase in abundance. There is a similar pattern for several species in the winter as well, however we are cautious to comment on those trends because there are only four years of winter survey data.

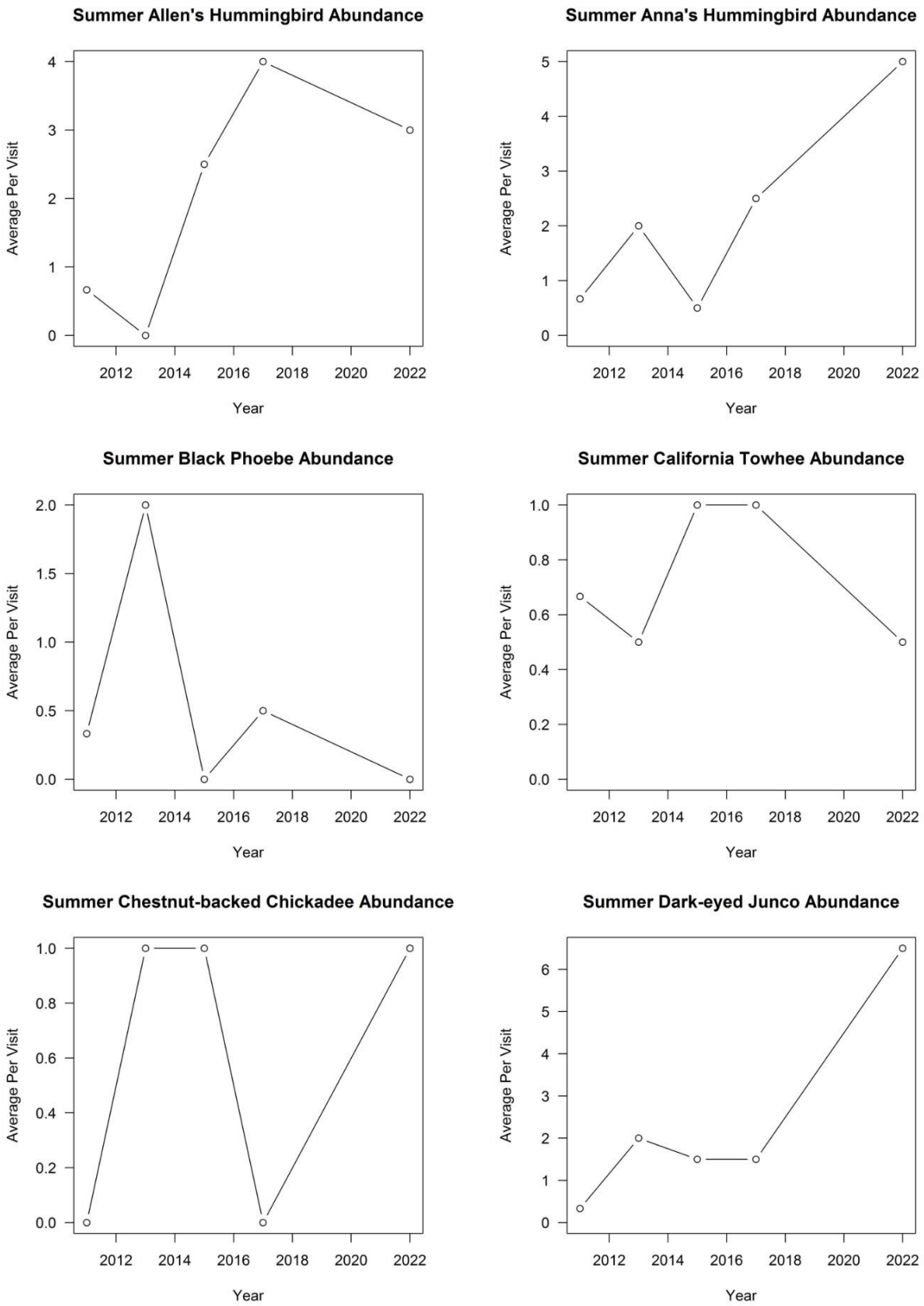

Figure 16. Average number of individuals of each focal species detected per visit, per year at Landfill 2 in summer.

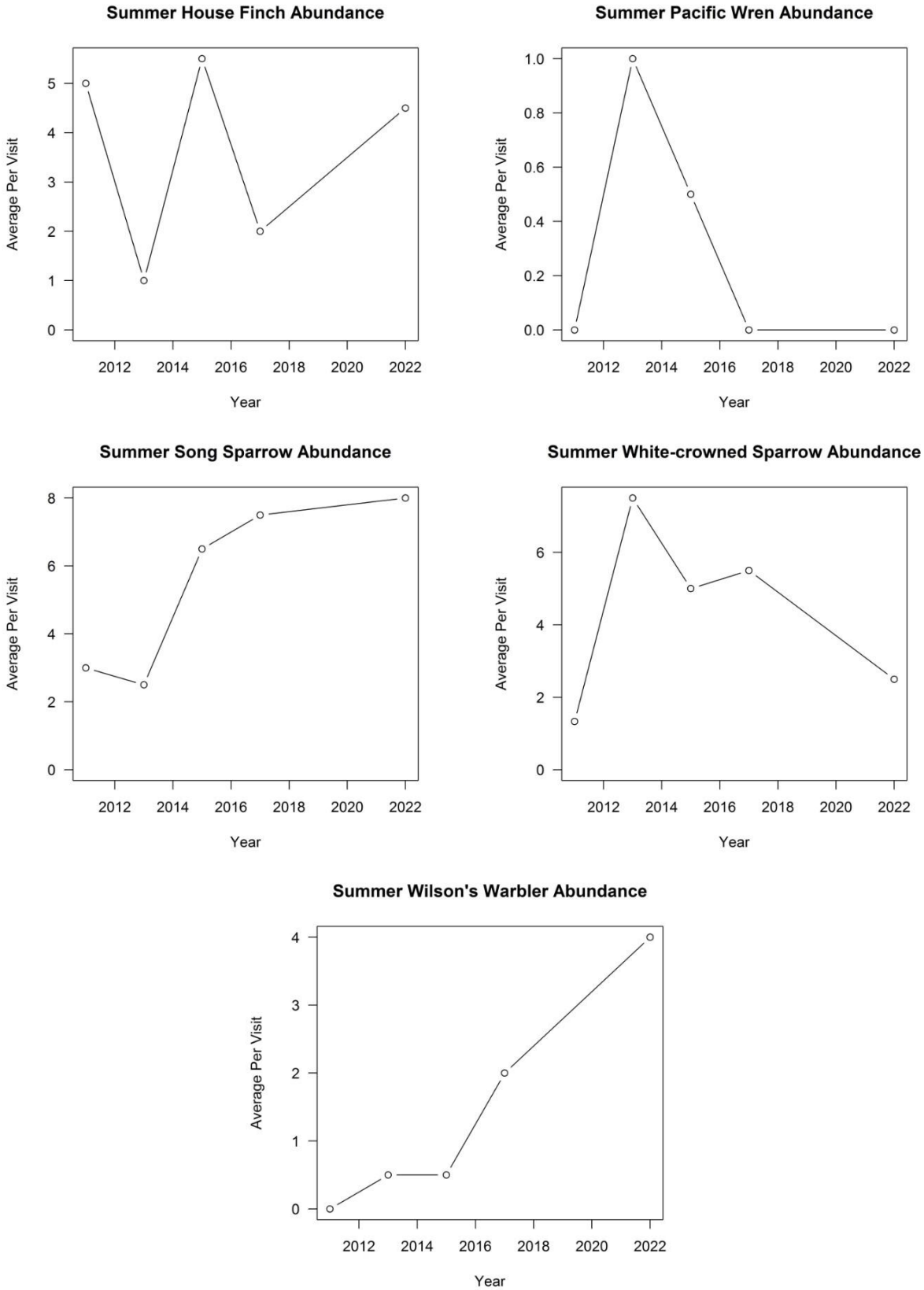

Figure 16 (continued). Average number of individuals of each focal species detected per visit, per year at Landfill 2 in summer.

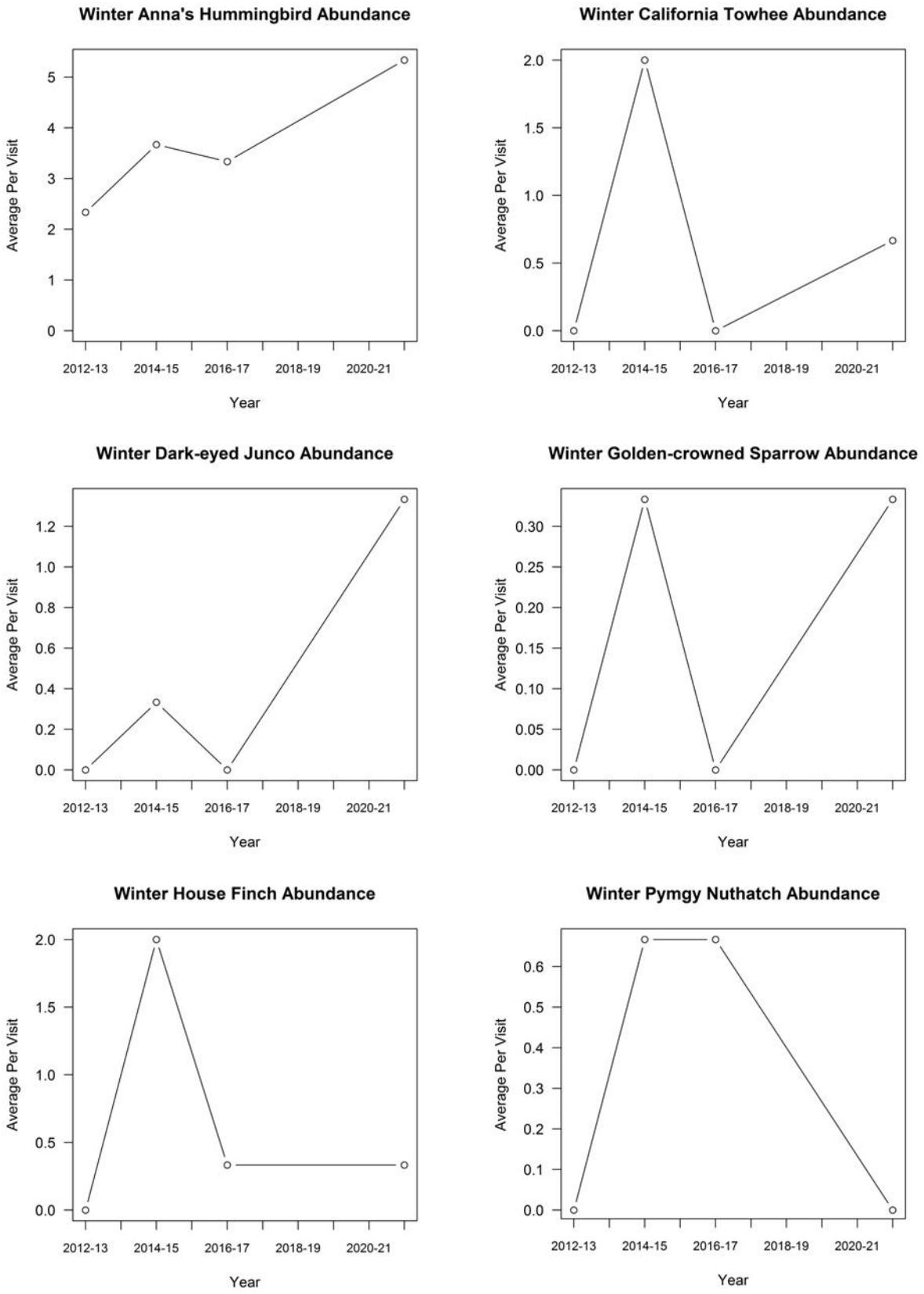

Figure 17. Average number of individuals of each focal species detected per visit, per year at Landfill 2 in winter.

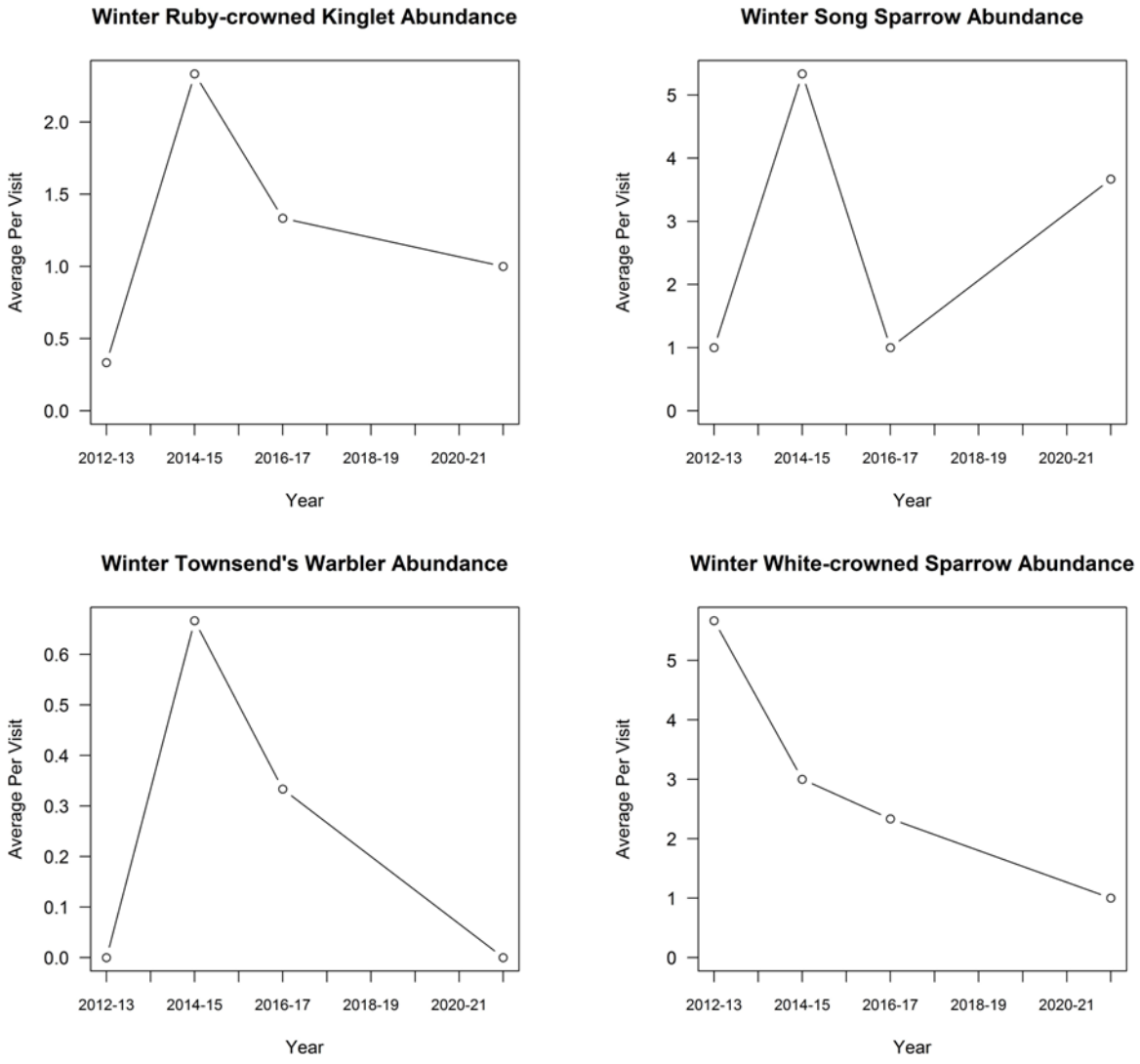

Figure 17 (continued). Average number of individuals of each focal species detected per visit, per year at Landfill 2 in winter.

Nike Facility Phase 1

Avian area search code: NIFA

Presidio Trust Project Name [and Site/Subsite Names]: Nike Facility Phase 1 [Presidio Hills/Nike Facility]

Site Description: Scrub, Riparian and Historic Forest (mix of coastal scrub, bare ground, and forest; conifers and arroyo willows present). (Through 2022, southern end of the site maintained as a parking/staging area; mostly bare ground with sections along the perimeter of scrub and forest)

Year of restoration: Restored approximately fall 2009 to spring 2010.

Year(s) of bird survey: summer 2011, 2013, 2015, 2017, 2022; winter 2012-13, 2014-15, 2016-17, 2021-22.

Table 9 only includes data collected during the two-year period of this report, whereas the figures that follow are for all survey years.

Plot size (ha): 2.68

Figure 18. Map of Nike Facility Phase 1 area search boundary.

Table 9. Area search survey results at Nike Facility Phase 1 surveyed by Point Blue Conservation Science in the Presidio during winter 2021-22 through summer 2022.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
Allen's Hummingbird	0	0	0	0.00	0	1	2	1.5	2
Allen's/Rufous Hummingbird	0	0	1	0.33	1	0	0	0	0
American Robin	2	0	0	0.67	1	1	1	1	2
Anna's Hummingbird	4	5	6	5.00	3	3	4	3.5	2
Barn Swallow	0	0	0	0.00	0	0	4	2	1
Bewick's Wren	1	2	1	1.33	3	3	4	3.5	2
Black Phoebe	1	1	1	1.00	3	0	0	0	0
Brown-headed Cowbird	0	0	0	0.00	0	0	1	0.5	1
Bushtit	0	0	0	0.00	0	3	13	8	2
California Scrub-Jay	0	5	2	2.33	2	0	1	0.5	1
Cedar Waxwing	0	0	0	0.00	0	20	0	10	1
Chestnut-backed Chickadee	3	0	0	1.00	1	2	0	1	1
Dark-eyed Junco	4	1	4	3.00	3	1	2	1.5	2
Downy Woodpecker	1	0	0	0.33	1	0	0	0	0
European Starling	2	0	5	2.33	2	2	0	1	1
Fox Sparrow	2	2	1	1.67	3	0	0	0	0
Golden-crowned Sparrow	0	2	0	0.67	1	0	0	0	0
Hairy Woodpecker	1	0	0	0.33	1	1	0	0.5	1
Hermit Thrush	0	1	1	0.67	2	0	0	0	0
House Finch	0	1	0	0.33	1	0	5	2.5	1
Lesser Goldfinch	0	0	2	0.67	1	2	0	1	1
Mourning Dove	0	0	3	1.00	1	0	2	1	1
Northern Mockingbird	0	0	0	0.00	0	0	1	0.5	1
Purple Finch	0	0	0	0.00	0	0	1	0.5	1
Pygmy Nuthatch	0	0	2	0.67	1	0	2	1	1
Ruby-crowned Kinglet	3	1	3	2.33	3	0	0	0	0
Song Sparrow	1	2	0	1.00	2	2	0	1	1
Spotted Towhee	0	1	2	1.00	2	1	3	2	2
Steller's Jay	1	1	1	1.00	3	0	0	0	0
Townsend's Warbler	1	1	0	0.67	2	0	0	0	0
White-crowned Sparrow	0	7	2	3.00	2	1	1	1	2
Wilson's Warbler	0	0	0	0.00	0	1	0	0.5	1
Yellow-rumped Warbler	1	5	1	2.33	3	0	0	0	0
Total Individuals	**28**	**38**	**38**	**34.67**		**44**	**47**	**45.5**	
				25 species				**23 species**	

Nike Facility Phase 1 is in scrub, riparian, and historic forest habitat so we used the Scrub, Riparian, and Historic Forest Focal Species (breeding, winter, and year-round; see Appendix A) from *The Avian Monitoring Program for the Presidio* (Humple and Gardali 2015) to assess changes to the bird community since restoration activities began. Figures 19 and 20 show abundance values (average number of individuals per visit) for each season for scrub, riparian, and historic focal species present on the plot.

The summer 2022 and winter 2021-22 surveys marked survey year 10 since restoration at Nike Facility Phase 1.

During summer surveys, there were no detections of California Quail (extirpated), Common Yellowthroat, Pacific Wren, Swainson's Thrush, Violet-green Swallow, Western Bluebird, and Wrentit and only one year with detections of Black Phoebe (in 2011), California Towhee (in 2015), Common Raven (in 2011), Downy Woodpecker (in 2015), Hairy Woodpecker (in 2022), Olive-sided Flycatcher (in 2015), and Wilson's Warbler (in 2022) so we do not plot abundance values for these focal species. For winter surveys, there were no detections of Common Yellowthroat, and Western Bluebird and only one year with detections of Chestnut-backed Chickadee (in 2021-22), Common Raven (in 2012-13), Downy Woodpecker (in 2021-22), Hairy Woodpecker (in 2021-22), and Pacific Wren (in 2012-13) so we do not plot abundance values for these focal species.

Apparent trends in abundance should be interpreted with caution since we do not perform statistical trend analysis on these data and because some species have few detections per visit. We do comment on the general trends shown by the plots for the five (summer) and four (winter) years of survey data.

Most of the focal species on this area search plot show a lot of inter-annual variability in abundance. For these species we will continue to collect data and watch for future trends. The following species show initial signs of a trend in abundance. Bewick's Wren (summer) and Spotted Towhee (summer and winter) appear to be increasing while Ruby-crowned Kinglet (winter), Song Sparrow (summer and winter), and White-crowned Sparrow (summer) appear to be decreasing.

While there are some sections of Nike Facility that have been noticeably restored to scrub and historic forest, much of the plot is still covered by bare ground. This may explain why many of the focal species have not been detected or only detected in a single year.

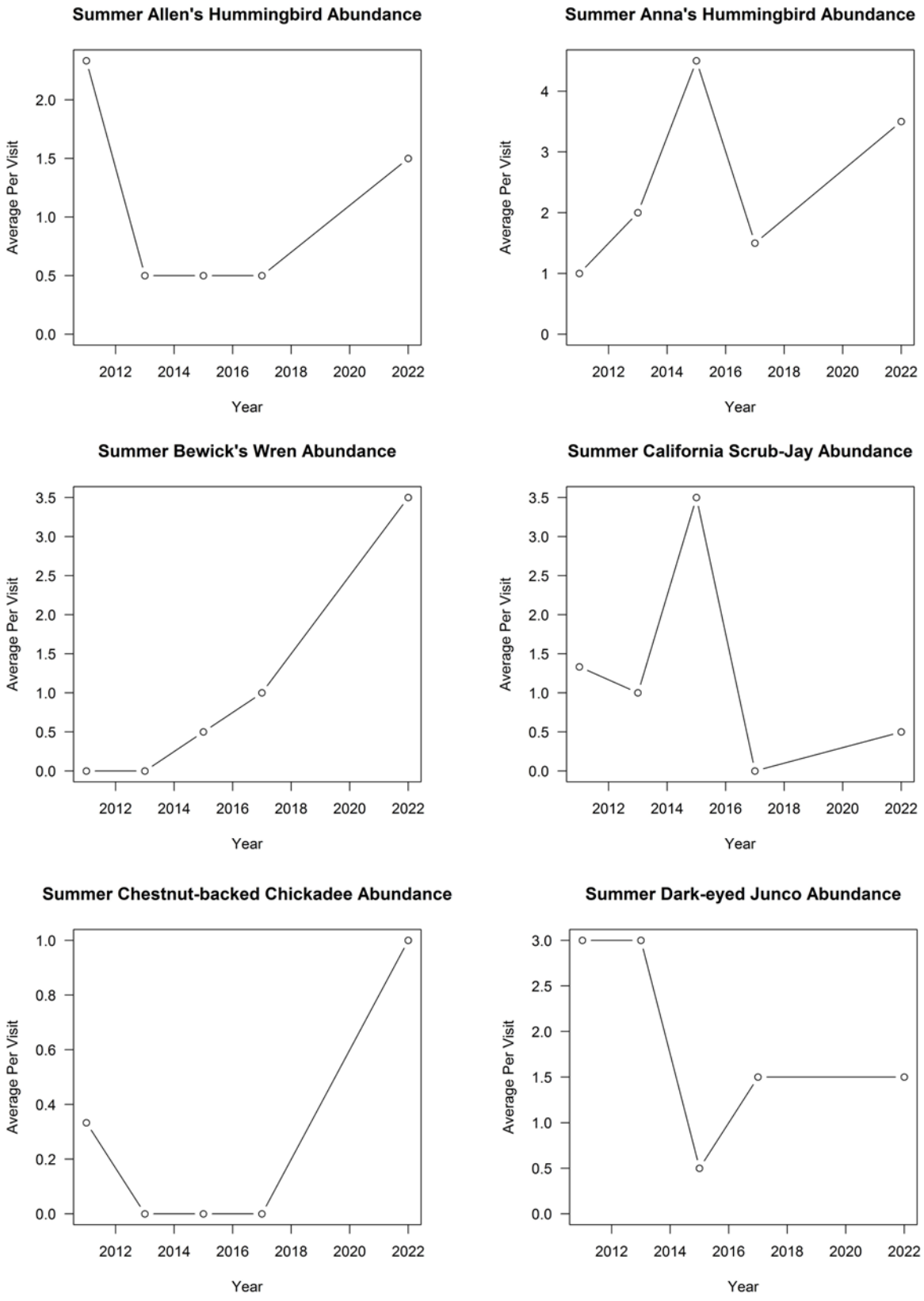

Figure 19. Average number of individuals of each focal species detected per visit, per year at Nike Facility Phase 1 in summer.

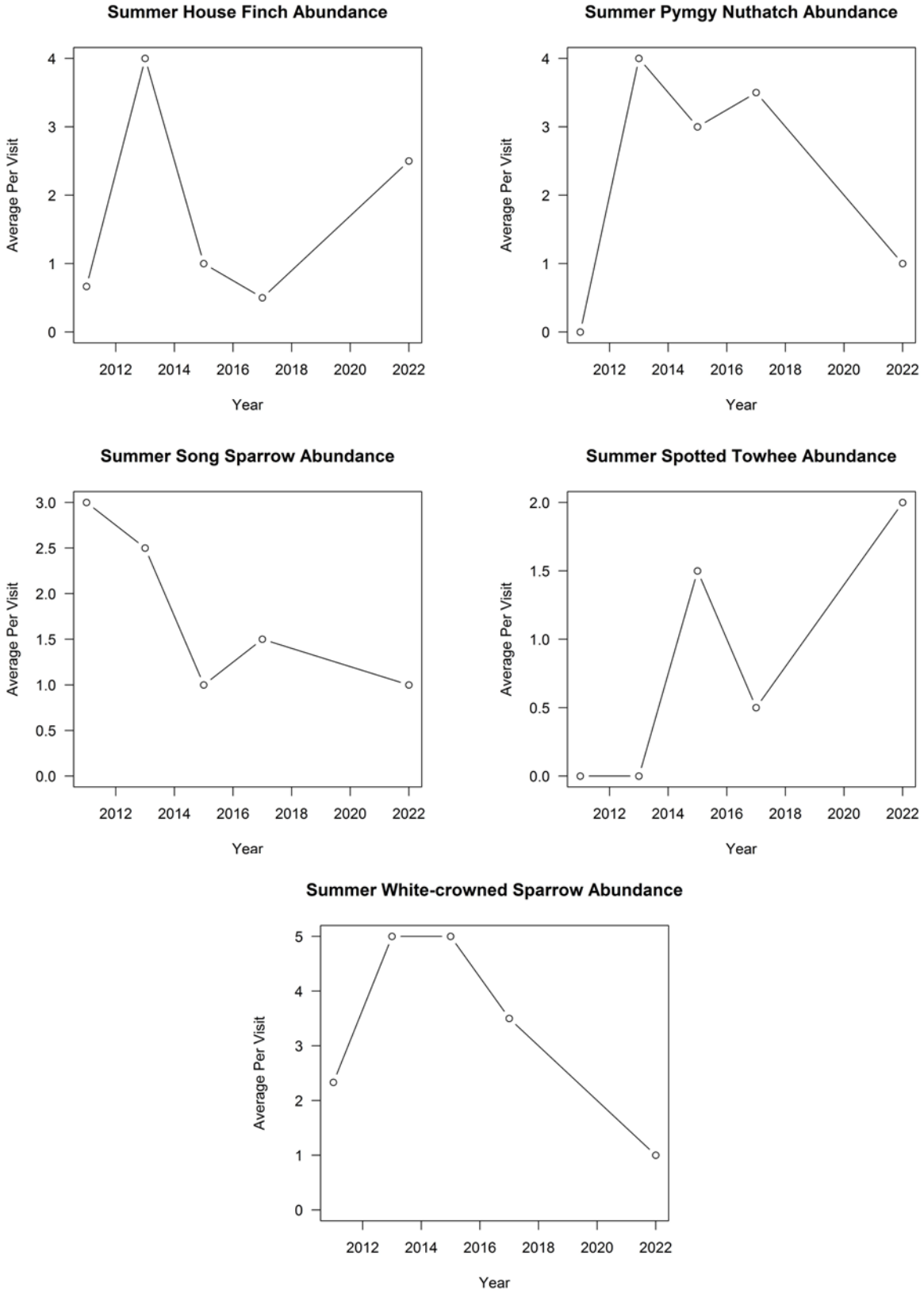

Figure 19 (continued). Average number of individuals of each focal species detected per visit, per year at Nike Facility Phase 1 in summer.

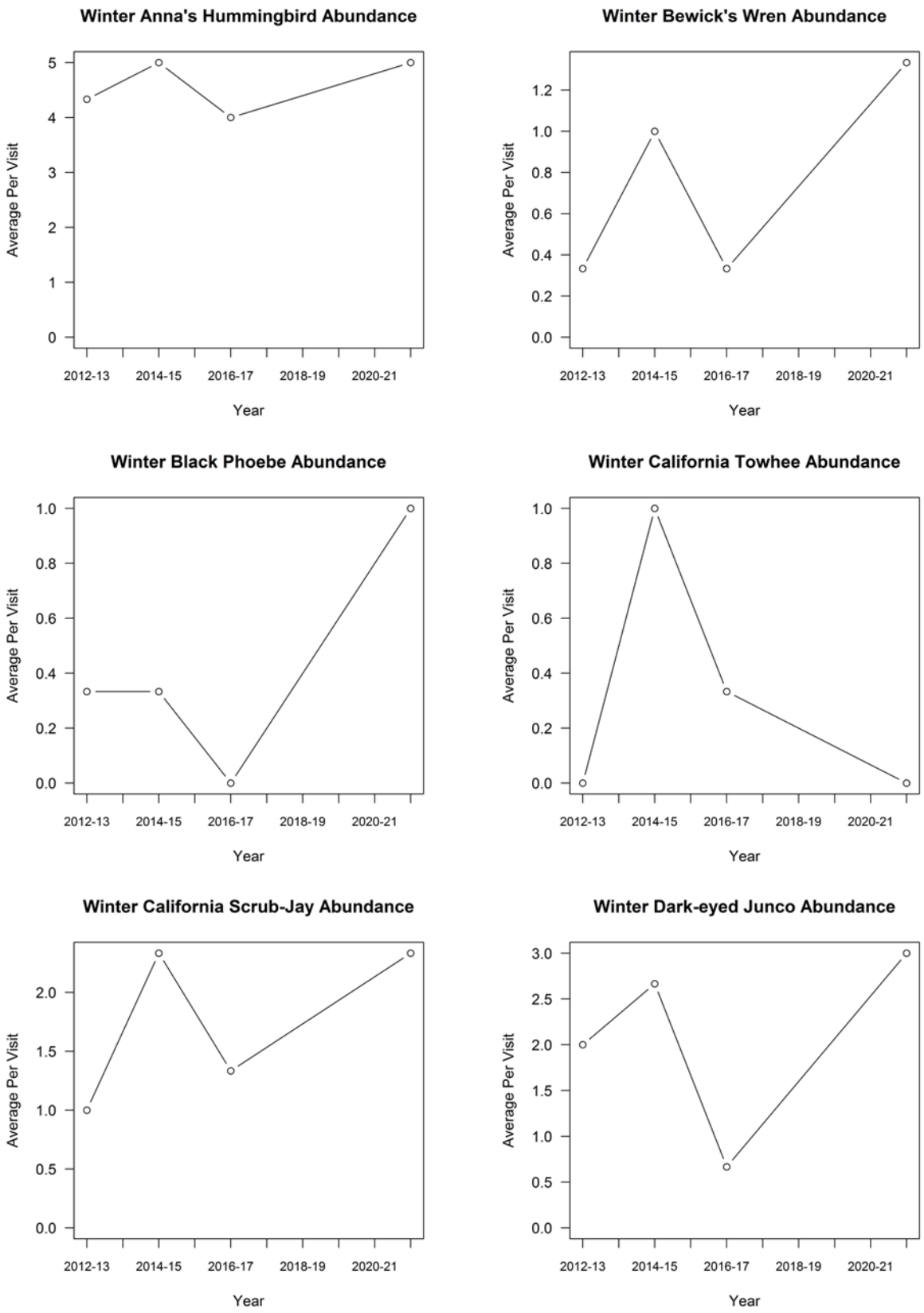

Figure 20. Average number of individuals of each focal species detected per visit, per year at Nike Facility Phase 1 in winter.

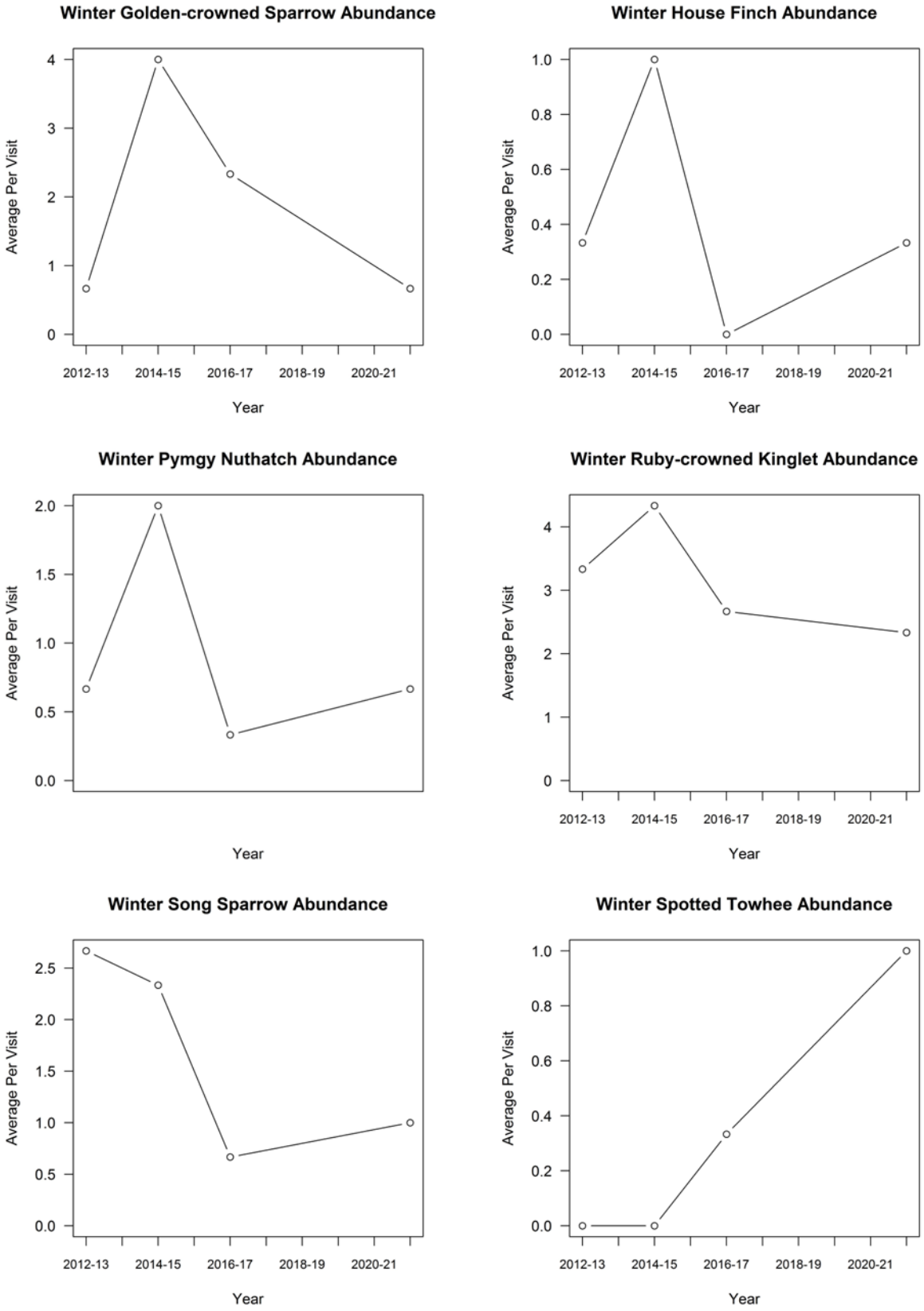

Figure 20 (continued). Average number of individuals of each focal species detected per visit, per year at Nike Facility Phase 1 in winter.

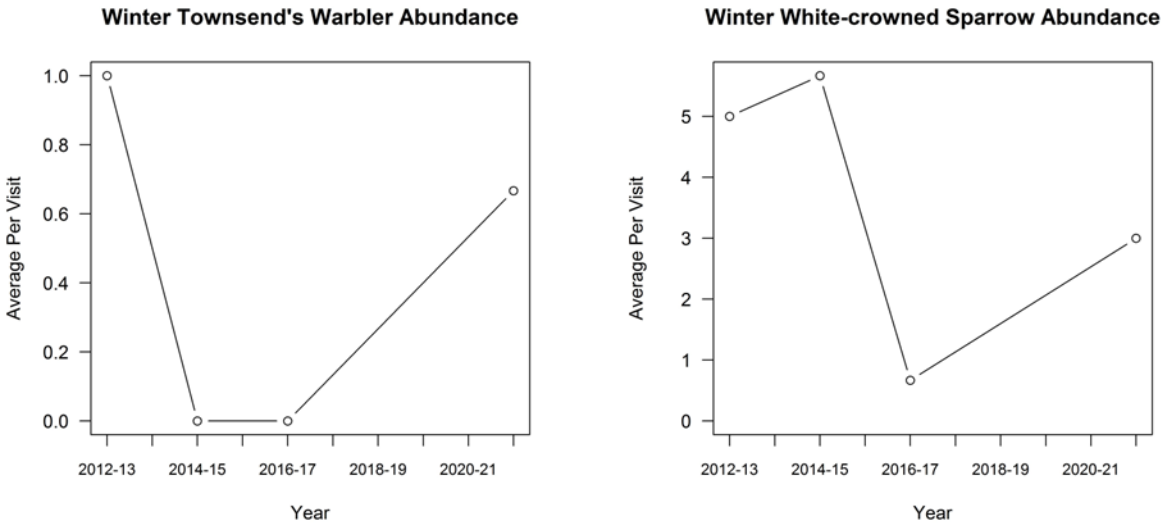

Figure 20 (continued). Average number of individuals of each focal species detected per visit, per year at Nike Facility Phase 1 in winter.

Park Dunes

Avian area search code: PADU_1

Presidio Trust Project Name [and Site/Subsite Names]: Park Dunes [Mountain Lake/Park Dunes]

Site Description: Scrub (coastal scrub)

Year of restoration: Restored approximately fall 2011 to spring 2012

Year(s) of bird survey: summer 2013, 2015, 2017, 2022; winter 2012-13, 2014-15, 2016-17, 2021-22.

Table 10 only includes data collected during the two-year period of this report, whereas the figures that follow are for all survey years.

Plot size (ha): 0.17

Figure 21. Map of Landfill 2 area search boundary.

Table 10. Area search survey results at Park Dunes surveyed by Point Blue Conservation Science in the Presidio during winter 2021-22 through summer 2022.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
American Robin	1	0	0	0.33	1	1	1	1	2
Anna's Hummingbird	1	1	0	0.67	2	2	1	1.5	2
Bushtit	0	0	0	0.00	0	2	3	2.5	2
California Scrub-Jay	2	0	0	0.67	1	0	0	0	0
California Towhee	0	0	0	0.00	0	0	2	1	1
House Finch	0	0	0	0.00	0	0	2	1	1
Mourning Dove	0	0	1	0.33	1	0	1	0.5	1
Red-shouldered Hawk	0	1	0	0.33	1	0	0	0	0
Steller's Jay	0	0	0	0.00	0	1	0	0.5	1
Townsend's Warbler	0	0	1	0.33	1	0	0	0	0
White-crowned Sparrow	0	2	0	0.67	1	1	0	0.5	1
Total Individuals	**4**	**4**	**2**	**3.33**		**7**	**10**	**8.5**	
				7 species				**8 species**	

Park Dunes is in scrub habitat so we used the Scrub Focal Species (breeding, winter, and year-round; see Appendix A) from *The Avian Monitoring Program for the Presidio* (Humple and Gardali 2015) to assess changes to the bird community since restoration activities began. Figures 22 and 23 show abundance values (average number of individuals per visit) for each season for scrub focal species present on plot.

The summer 2022 and winter 2021-22 surveys marked survey year 10 since restoration at Park Dunes.

During summer surveys, there were no detections of Allen's Hummingbird, Bewick's Wren, California Quail (extirpated), Spotted Towhee, Song Sparrow, and Wrentit so we do not plot abundance values for these focal species. For winter surveys, there were no detections of Bewick's Wren, California Towhee, House Finch, and Song Sparrow and only one year with detections of Spotted Towhee (in 2012-13), so we do not plot abundance values for these focal species.

Apparent trends in abundance should be interpreted with caution since we do not perform statistical trend analysis on these data and because some species have few detections per visit. We do comment on the general trends shown by the plots for the four years of survey data.

The focal species on this area search plot show a lot of inter-annual variability in abundance. This may be in large part due to the small size of the plot. The presence or absence of a species during a particular survey has an element of luck involved and therefore may not be indicative of overall trends in the species utilizing the plot. We will continue to collect data and watch for future trends. California Towhee (which appear to be increasing in the summer) are the only focal species that show initial signs of a trend in abundance.

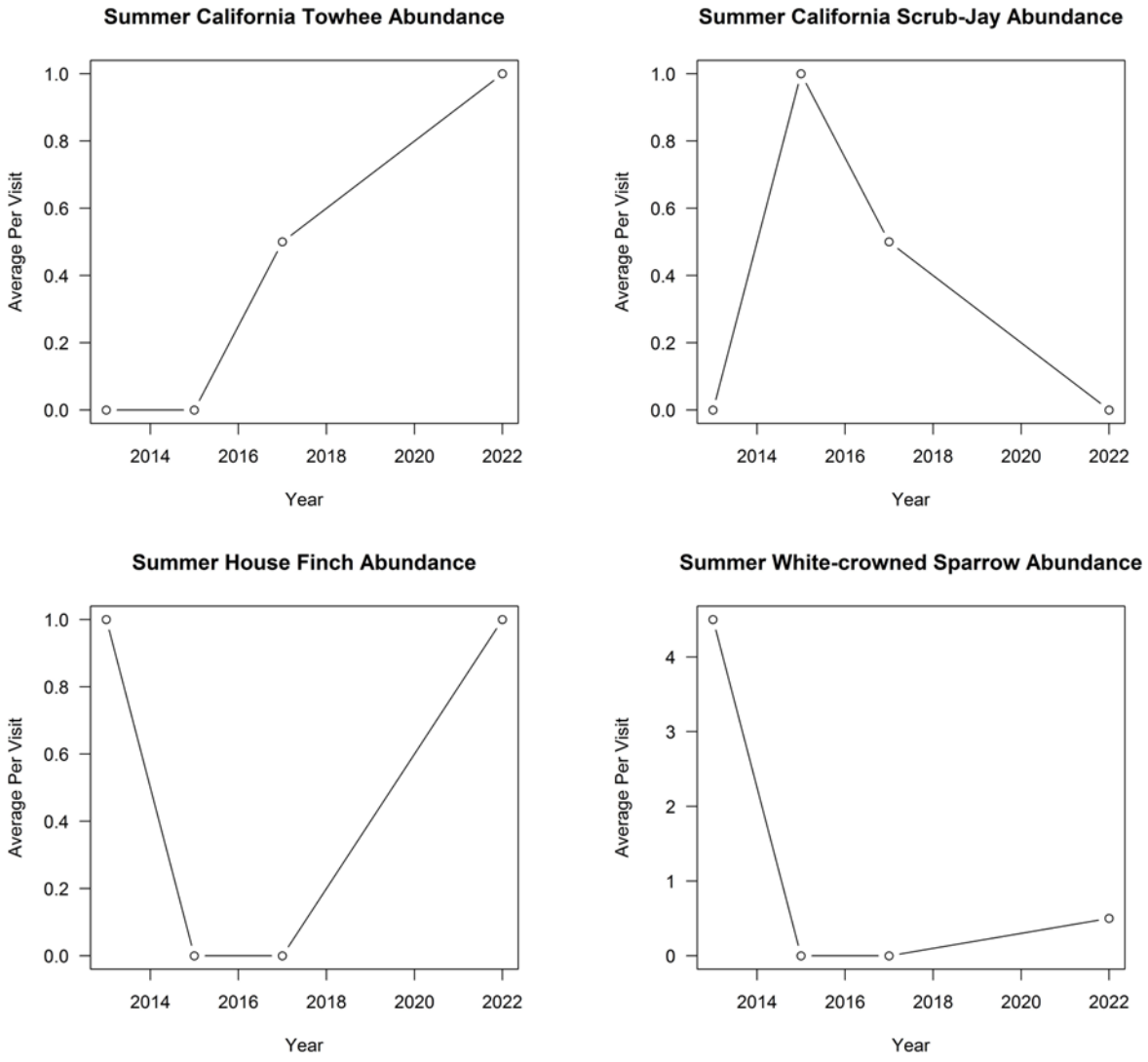

Figure 22. Average number of individuals of each focal species detected per visit, per year at Park Dunes in summer.

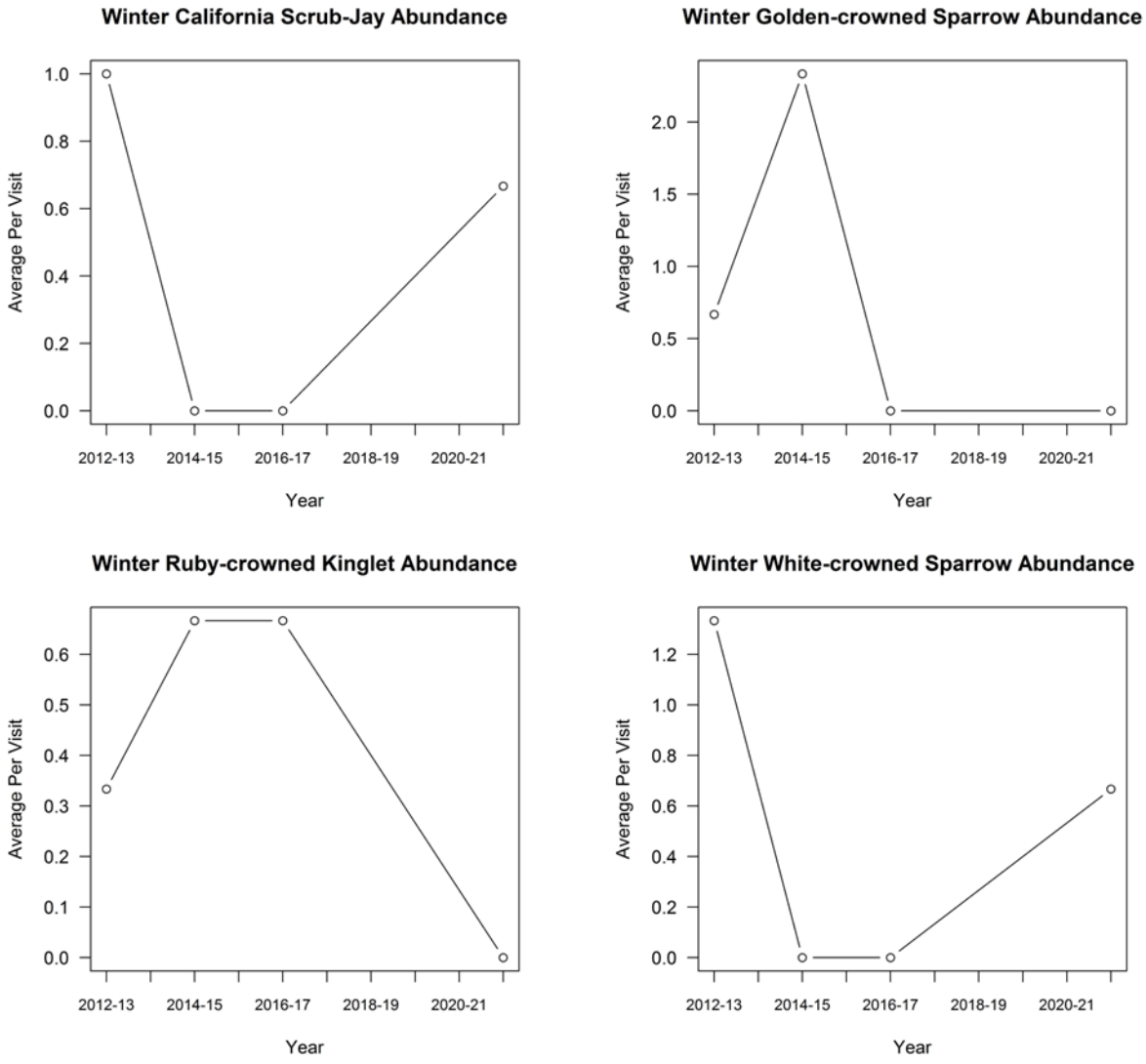

Figure 23. Average number of individuals of each focal species detected per visit, per year at Park Dunes in winter.

Eastern Tributary Below Paul Goode

Avian area search code: PAGO_1

Presidio Trust Project Name [and Site/Subsite Names]: East Trib (Below Paul Goode Field) [Tennessee Hollow/Eastern Tributary]

Site Description: Riparian (spring and stream with willows and some exotic trees)

Year of restoration: 2015

Year(s) of bird survey: summer 2015, 2017, 2019, 2021; winter 2014-15, 2016-17, 2018-19, 2020-21.

Table 11 only includes data collected during the two-year period of this report, whereas the figures that follow are for all survey years.

Plot size (ha): 1.22

Figure 24. Map of Eastern Tributary Below Paul Goode area search boundary.

Table 11. Area search survey results at Eastern Tributary Below Paul Goode surveyed by Point Blue Conservation Science in the Presidio during winter 2020-21 through summer 2021.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
Allen's/Rufous Hummingbird	0	0	0	0.00	0	1	0	0.5	1
American Robin	0	0	2	0.67	1	5	2	3.5	2
Anna's Hummingbird	4	3	5	4.00	3	2	2	2	2
Black Phoebe	1	1	0	0.67	2	0	1	0.5	1
Brown-headed Cowbird	0	0	0	0.00	0	1	0	0.5	1
Bushtit	0	0	2	0.67	1	2	5	3.5	2
California Scrub-Jay	0	0	1	0.33	1	0	1	0.5	1
California Towhee	0	0	0	0.00	0	1	0	0.5	1
Chestnut-backed Chickadee	0	0	0	0.00	0	2	2	2	2
Fox Sparrow	4	3	4	3.67	3	0	0	0	0
Golden-crowned Sparrow	4	1	10	5.00	3	0	0	0	0
Hairy Woodpecker	0	0	0	0.00	0	1	0	0.5	1
Hermit Thrush	1	1	1	1.00	3	0	0	0	0
Hooded Oriole	0	0	0	0.00	0	1	1	1	2
House Finch	0	0	2	0.67	1	3	5	4	2
Hutton's Vireo	0	1	0	0.33	1	0	0	0	0
Lesser Goldfinch	0	0	0	0.00	0	2	1	1.5	2
Mourning Dove	0	1	3	1.33	2	1	0	0.5	1
Nuttall's Woodpecker	0	0	0	0.00	0	1	0	0.5	1
Pine Siskin	0	0	0	0.00	0	2	0	1	1
Purple Finch	0	0	0	0.00	0	1	1	1	2
Ruby-crowned Kinglet	3	4	3	3.33	3	0	0	0	0
Song Sparrow	6	4	3	4.33	3	9	8	8.5	2
Swainson's Thrush	0	0	0	0.00	0	2	0	1	1
White-crowned Sparrow	9	8	5	7.33	3	2	1	1.5	2
Wilson's Warbler	0	0	0	0.00	0	2	3	2.5	2
Yellow-rumped Warbler	2	3	1	2.00	3	0	0	0	0
Total Individuals	**34**	**30**	**42**	**35.33**		**41**	**33**	**37**	
				15 species				**21 species**	

Eastern Tributary Below Paul Goode is in riparian habitat so we used the Riparian Focal Species (breeding, winter, and year-round; see Appendix A) from *The Avian Monitoring Program for the Presidio* (Humple and Gardali 2015) to assess changes to the bird community since restoration activities began. Figures 25 and 26 show abundance values (average number of individuals per visit) for each season for riparian focal species present on the plot.

The summer 2021 and winter 2020-21 surveys marked survey year 5 since restoration at Eastern Tributary Below Paul Goode.

During summer surveys, there were no detections of Common Yellowthroat and Spotted Towhee and only one year with detections of Downy Woodpecker (in 2017), so we do not plot abundance values for these focal species. For winter surveys, there were no detections of Common Yellowthroat and only one year with detections of Downy Woodpecker (in 2014-15), Spotted Towhee (in 2018-19), so we do not plot abundance values for these focal species.

Apparent trends in abundance should be interpreted with caution since we do not perform statistical trend analysis on these data and because some species have few detections per visit. We do comment on the general trends shown by the plots for the four years of survey data.

Many of the focal species on this area search plot show a lot of inter-annual variability in abundance. For these species we will continue to collect data and watch for future trends. The following species show initial signs of a trend in abundance. Anna's Hummingbird (summer), California Scrub-Jay (winter) Chestnut-backed Chickadee (summer), Golden-crowned Sparrow (winter), Song Sparrow (summer and winter) and Wilson's Warbler (summer) appear to be increasing while Allen's Hummingbird (summer) and Chestnut-backed Chickadee (winter) appear to be decreasing.

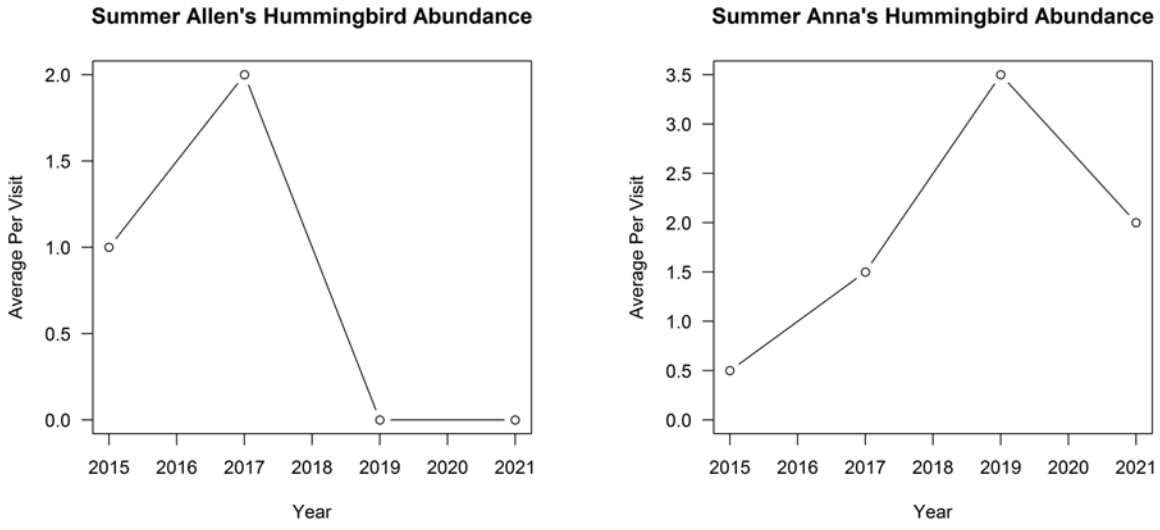

Figure 25. Average number of individuals of each focal species detected per visit, per year at Eastern Tributary Below Paul Goode in summer.

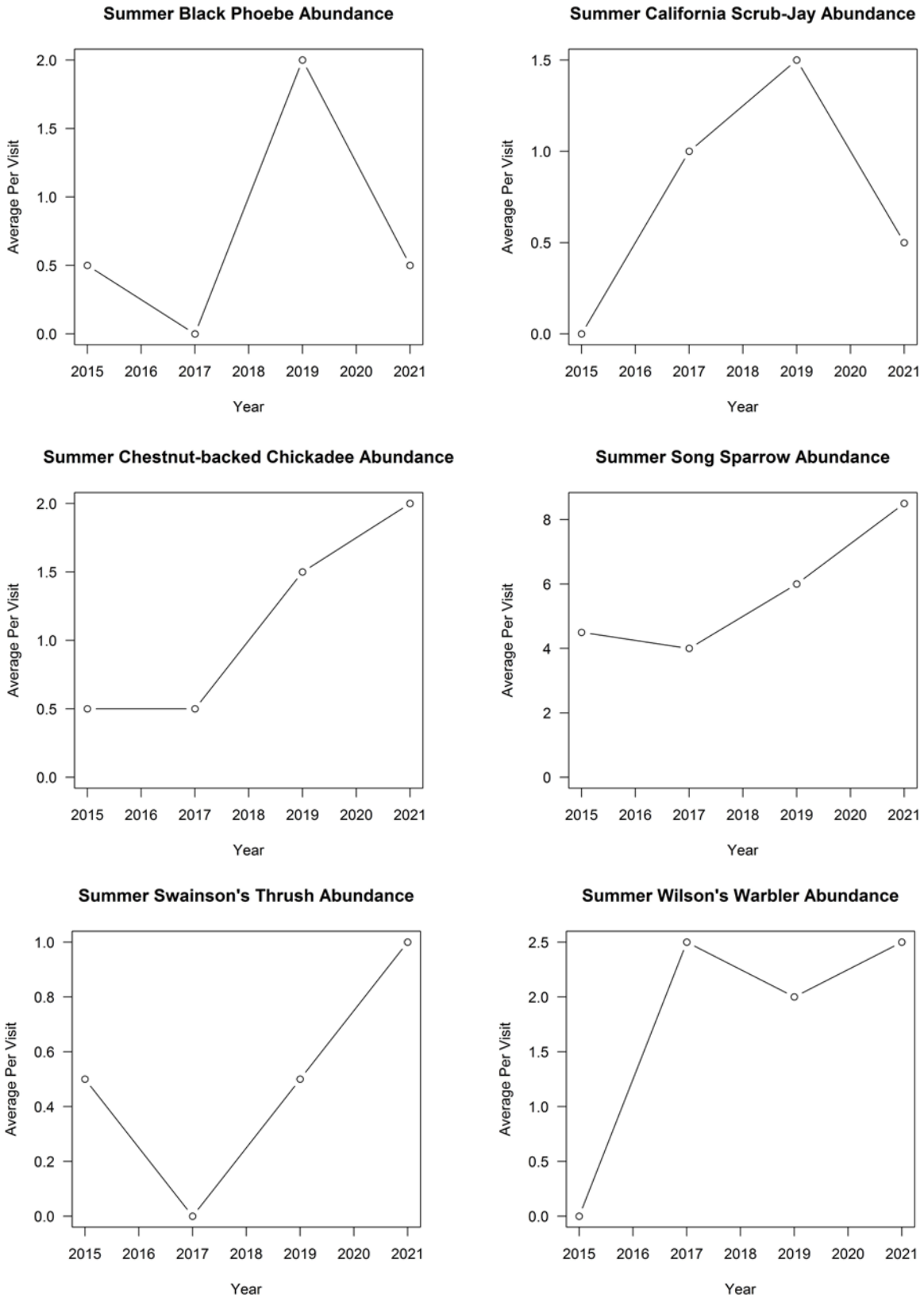

Figure 25 (continued). Average number of individuals of each focal species detected per visit, per year at Eastern Tributary Below Paul Goode in summer.

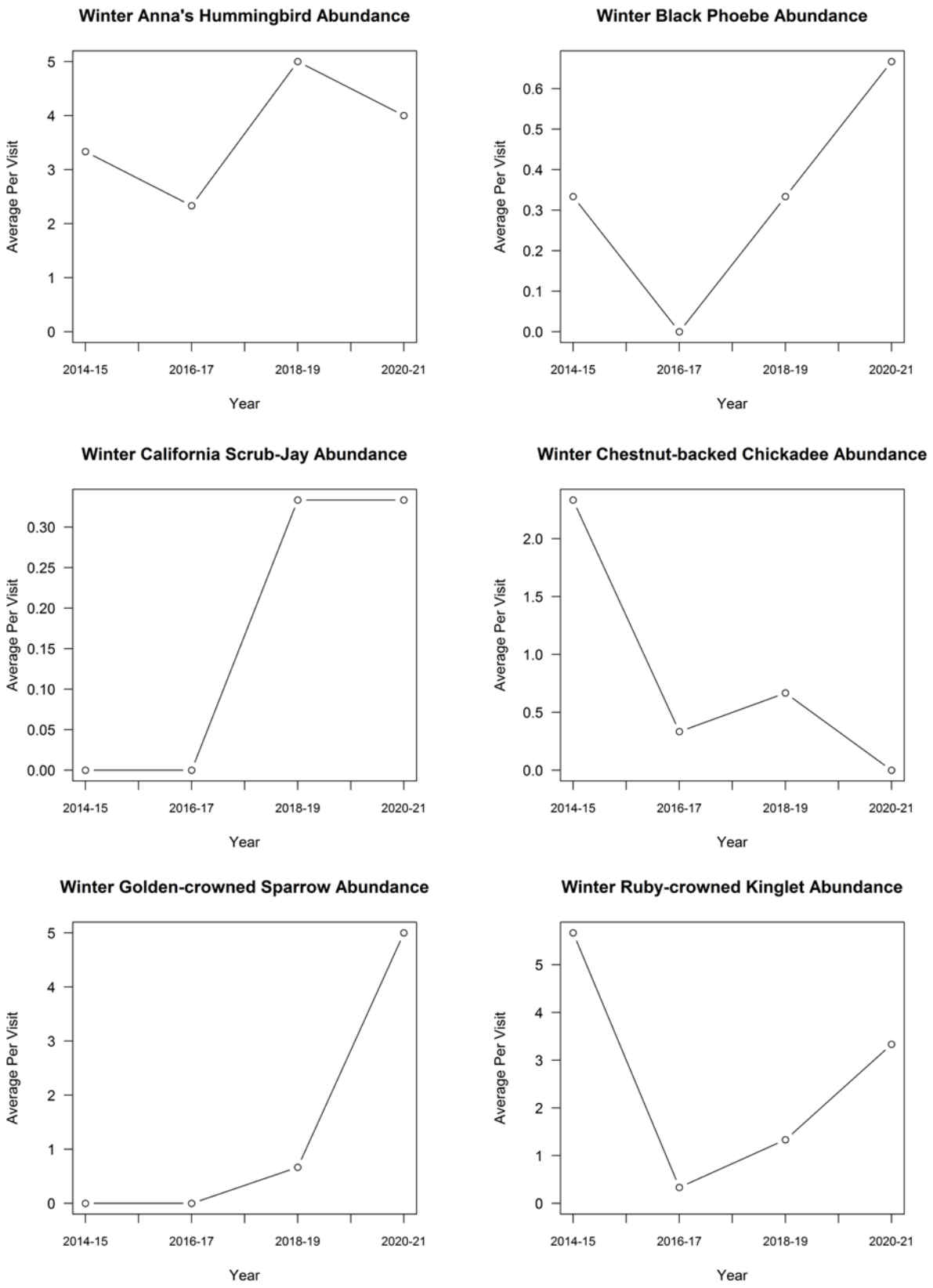

Figure 26. Average number of individuals of each focal species detected per visit, per year at Eastern Tributary Below Paul Goode in winter.

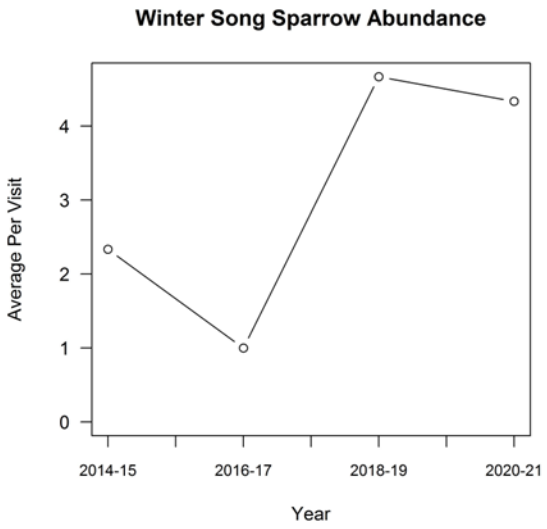

Figure 26 (continued). Average number of individuals of each focal species detected per visit, per year at Eastern Tributary Below Paul Goode in winter.

Rob Hill Forest Understory Diversification 4

Avian area search code: ROHI_4

Presidio Trust Project Name [and Site/Subsite Names]: Rob Hill Forest Understory Diversification 4 [Rob Hill, Rob Hill 4]

Site Description: Historic Forest (eucalyptus)

Year of restoration: Restoration started in 2019

Year(s) of bird survey: summer 2019, 2021; winter 2018-19, 2020-21
Table 12 only includes data collected during the two-year period of this report. Rob Hill 4 does not yet have enough years of data to include further analysis on focal species abundance.

Plot size (ha): 0.76

Figure 27. Map of Rob Hill Forest Understory Diversification 4 area search boundary.

Table 12. Area search survey results at Rob Hill Forest Understory Diversification 4 surveyed by Point Blue Conservation Science in the Presidio during winter 2020-21 through summer 2021.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
American Robin	0	0	0	0.00	0	0	1	0.5	1
Anna's Hummingbird	2	2	1	1.67	3	0	0	0	0
Black Phoebe	0	0	0	0.00	0	1	0	0.5	1
Chestnut-backed Chickadee	0	0	0	0.00	0	1	1	1	2
Dark-eyed Junco	1	0	5	2.00	2	4	2	3	2
Great Horned Owl	1	0	0	0.33	1	0	0	0	0
House Finch	0	0	0	0.00	0	5	1	3	2
Mourning Dove	0	0	0	0.00	0	0	3	1.5	1
Nuttall's Woodpecker	0	0	0	0.00	0	0	1	0.5	1
Purple Finch	0	0	0	0.00	0	0	1	0.5	1
Pygmy Nuthatch	0	0	0	0.00	0	2	2	2	2
Song Sparrow	0	0	1	0.33	1	5	1	3	2
Steller's Jay	0	0	0	0.00	0	0	2	1	1
Swainson's Thrush	0	0	0	0.00	0	1	0	0.5	1
Total Individuals	**4**	**2**	**7**	**4.33**		**19**	**15**	**17**	
				4 species				**12 species**	

Lessingia 1, Wherry Corridor West

Avian area search code: WHCO_1

Presidio Trust Project Name [and Site/Subsite Names]: Lessingia 1, Wherry Corridor West [Southwest Bunes/Wherry Corridor]

Site Description: Scrub and Historic Forest (coastal scrub with a few large trees)

Year of restoration: Restored approximately fall 2011 to spring 2012

Year(s) of bird survey: summer 2013, 2015, 2017, 2022; winter 2012-13, 2014-15, 2016-17, 2021-22.

Table 13 only includes data collected during the two-year period of this report, whereas the figures that follow are for all survey years.

Plot size (ha): 1.45

Figure 28. Map of Lessingia 1, Wherry Corridor West area search boundary.

Table 13. Area search survey results at Lessingia 1, Wherry Corridor West surveyed by Point Blue Conservation Science in the Presidio during winter 2021-22 through summer 2022.

	Winter					Summer			
	Visit				Number of	Visit			Number
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**of Visits**
Allen's Hummingbird	0	0	0	0.00	0	0	5	2.5	1
Allen's/Rufous Hummingbird	0	0	2	0.67	1	0	0	0	0
American Kestrel	0	1	0	0.33	1	0	0	0	0
American Robin	1	0	0	0.33	1	0	0	0	0
Anna's Hummingbird	3	4	3	3.33	3	2	3	2.5	2
Barn Swallow	0	0	0	0.00	0	1	0	0.5	1
Bewick's Wren	1	2	0	1.00	2	1	2	1.5	2
Bushtit	11	0	0	3.67	1	0	0	0	0
California Scrub-Jay	2	1	2	1.67	3	0	3	1.5	1
California Towhee	3	0	0	1.00	1	0	0	0	0
Chestnut-backed Chickadee	1	0	0	0.33	1	0	2	1	1
Dark-eyed Junco	0	0	0	0.00	0	0	1	0.5	1
Downy Woodpecker	1	0	0	0.33	1	0	0	0	0
European Starling	0	0	0	0.00	0	1	0	0.5	1
Fox Sparrow	1	2	1	1.33	3	0	0	0	0
Golden-crowned Sparrow	7	0	7	4.67	2	0	0	0	0
Hermit Thrush	1	1	1	1.00	3	0	0	0	0
House Finch	1	0	0	0.33	1	1	1	1	2
Hutton's Vireo	1	0	0	0.33	1	0	0	0	0
Mourning Dove	2	1	3	2.00	3	3	2	2.5	2
Northern Mockingbird	1	1	1	1.00	3	1	1	1	2
Orange-crowned Warbler	1	0	0	0.33	1	0	0	0	0
Purple Finch	1	0	0	0.33	1	0	0	0	0
Ruby-crowned Kinglet	4	0	1	1.67	2	0	0	0	0
Song Sparrow	1	0	2	1.00	2	2	0	1	1
Spotted Towhee	2	1	2	1.67	3	2	1	1.5	2
Townsend's Warbler	3	0	0	1.00	1	0	0	0	0
White-crowned Sparrow	16	1	4	7.00	3	5	6	5.5	2
Yellow-rumped Warbler	3	0	1	1.33	2	0	0	0	0
Total Individuals	**68**	**15**	**30**	**37.67**		**19**	**27**	**23**	
				21 species				**14 species**	

Lessingia 1, Wherry Corridor West is in scrub and designed landscape habitat so we used the Scrub and Designed Landscape Focal Species (breeding, winter, and year-round; see Appendix A) from *The Avian Monitoring Program for the Presidio* (Humple and Gardali 2015) to assess changes to the bird community since restoration activities began. Figures 29 and 30 show abundance values (average number of individuals per visit) for each season for scrub and designed landscape focal species present on the plot.

The summer 2022 and winter 2021-22 surveys marked survey year 10 since restoration at Lessingia 1, Wherry Corridor West.

During summer surveys, there were no detections of California Towhee, Common Raven, Hairy Woodpecker, Pacific Wren, Red-shouldered Hawk, Violet-green Swallow, and Western Bluebird and only one year with detections of Chestnut-backed Chickadee (in 2022), Downy Woodpecker (in 2015), Olive-sided Flycatcher (in 2015) so we do not plot abundance values for these focal species. For winter surveys, there were no detections of Common Raven, Pacific Wren, Red-shouldered Hawk, and Western Bluebird and only one year with detections of Downy Woodpecker (in 2021-22), Hairy Woodpecker (in 2016-17) so we do not plot abundance values for these focal species.

Apparent trends in abundance should be interpreted with caution since we do not perform statistical trend analysis on these data and because some species have few detections per visit. We do comment on the general trends shown by the plots for the four years of survey data.

Many of the focal species on this area search plot show a lot of inter-annual variability in abundance. For these species we will continue to collect data and watch for future trends. The following species show initial signs of a trend in abundance. Allen's Hummingbird (summer), Bewick's Wren (summer and winter), Spotted Towhee (summer and winter), Golden-crowned Sparrow (winter), Townsend's Warbler (winter), White-crowned Sparrow (winter) appear to be increasing while Chestnut-backed Chickadee (winter), House Finch (summer), Pygmy Nuthatch (summer), and Song Sparrow (summer and winter) appear to be decreasing.

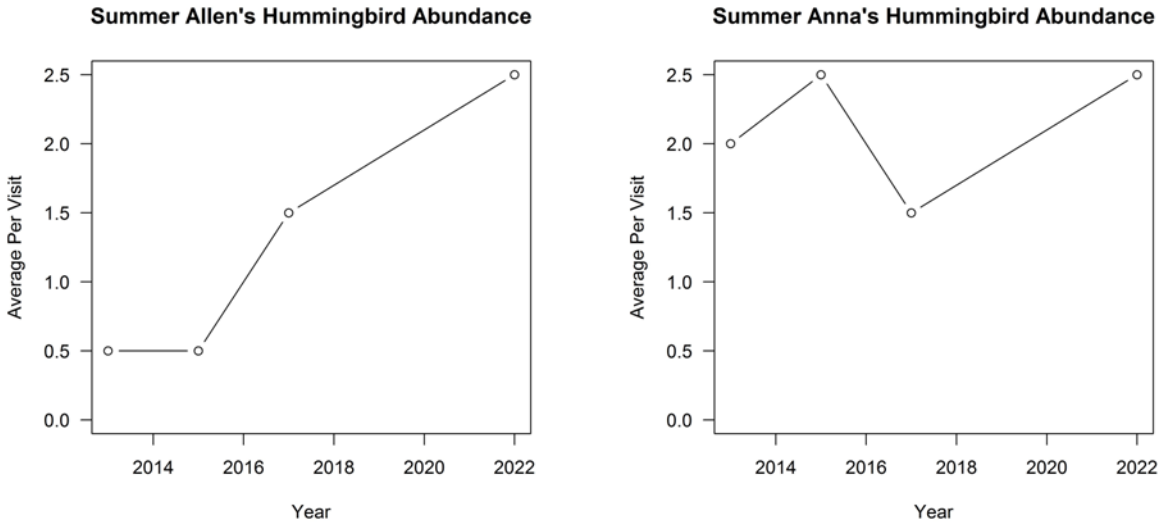

Figure 29. Average number of individuals of each focal species detected per visit, per year at Lessingia 1, Wherry Corridor West in summer.

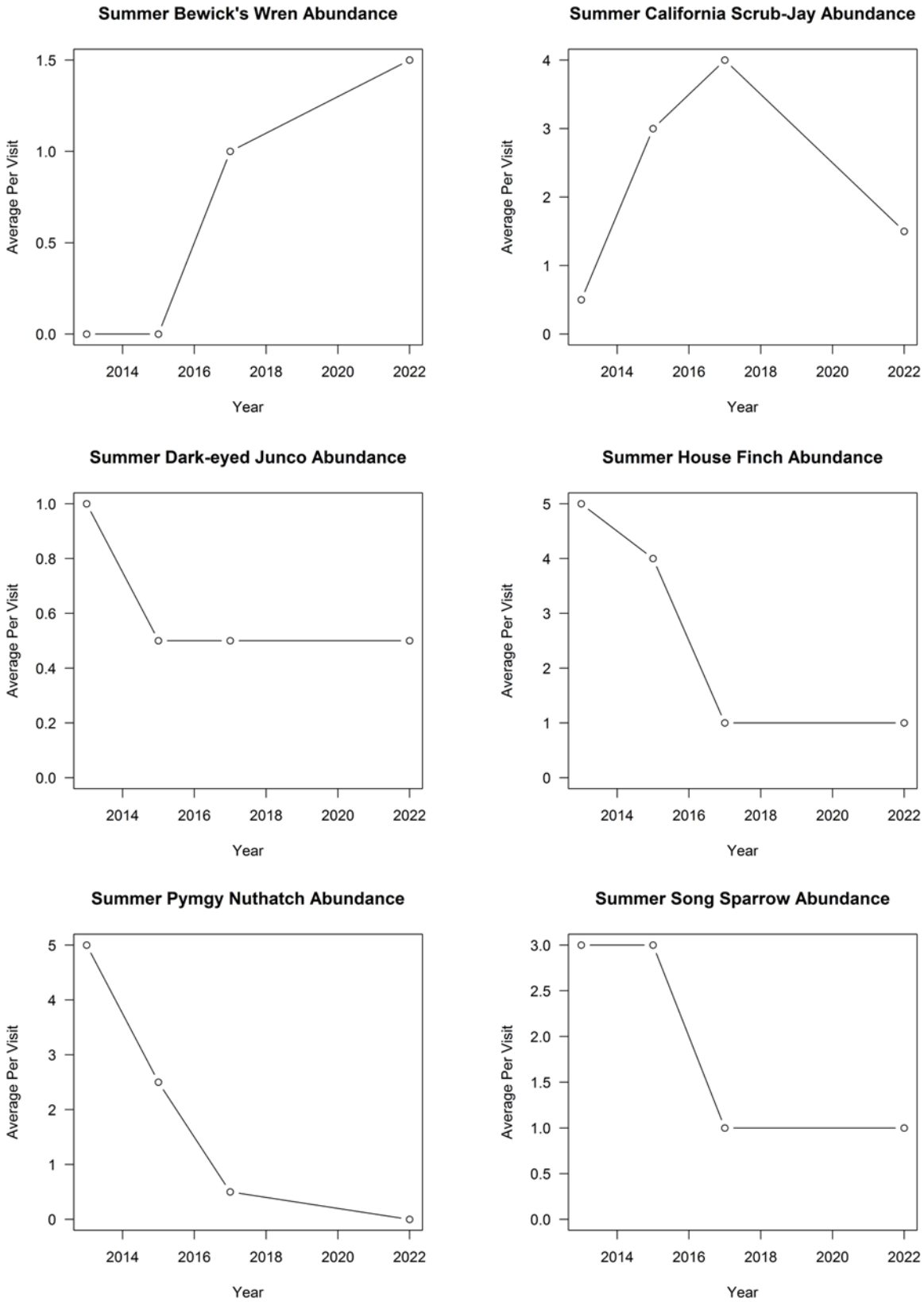

Figure 29 (continued). Average number of individuals of each focal species detected per visit, per year at Lessingia 1, Wherry Corridor West in summer.

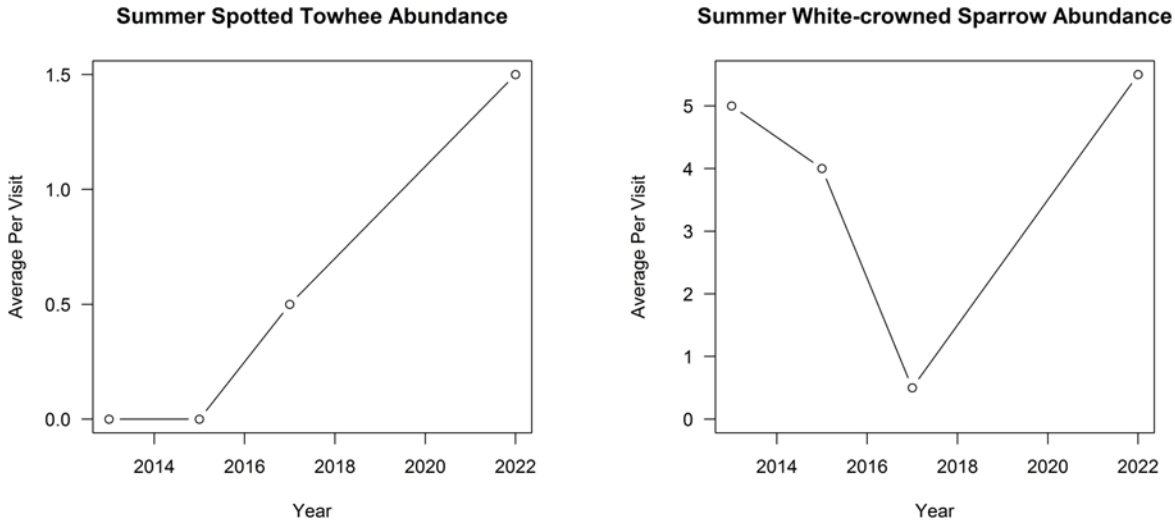

Figure 29 (continued). Average number of individuals of each focal species detected per visit, per year at Lessingia 1, Wherry Corridor West in summer.

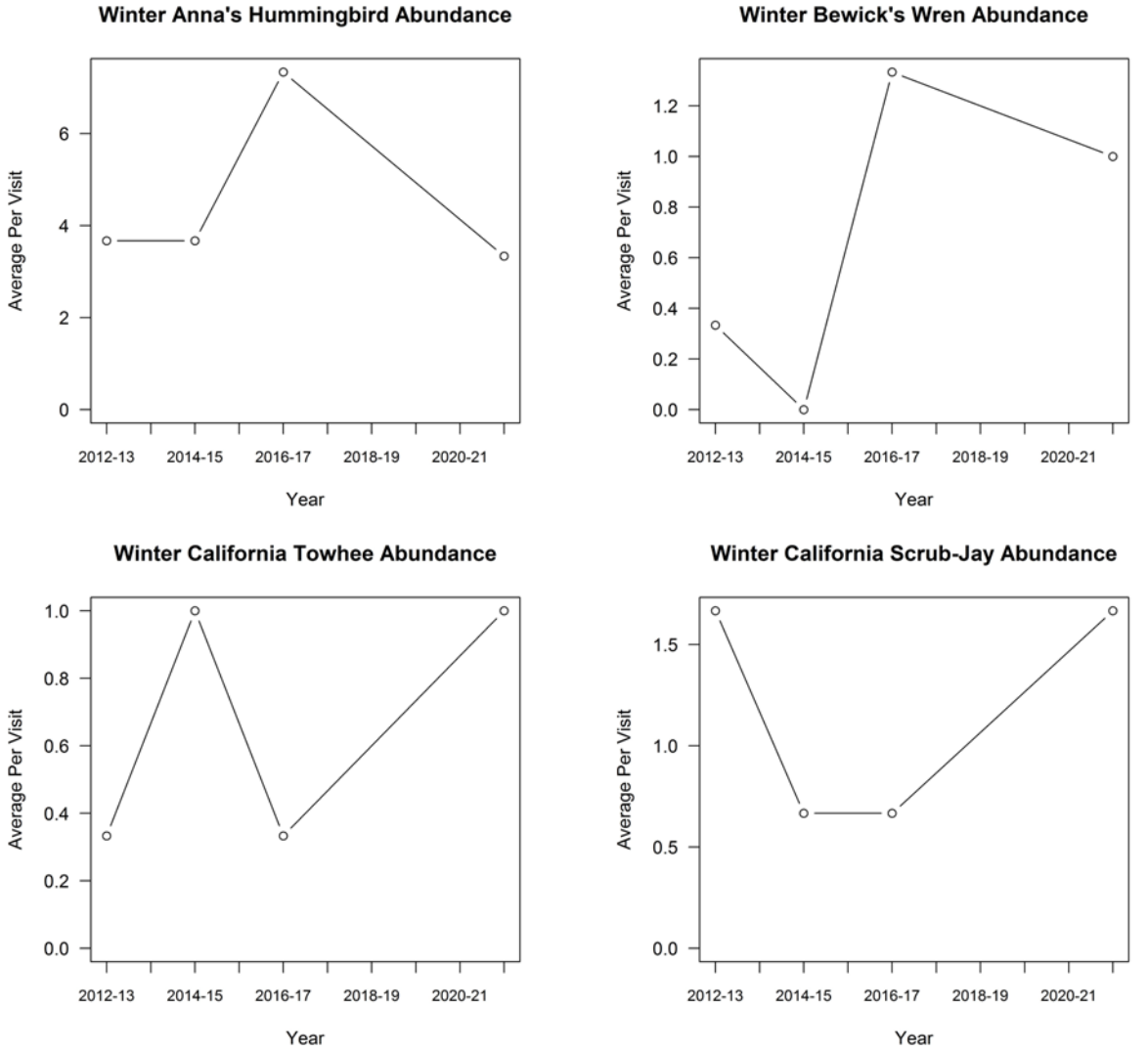

Figure 30. Average number of individuals of each focal species detected per visit, per year at Lessingia 1, Wherry Corridor West in winter.

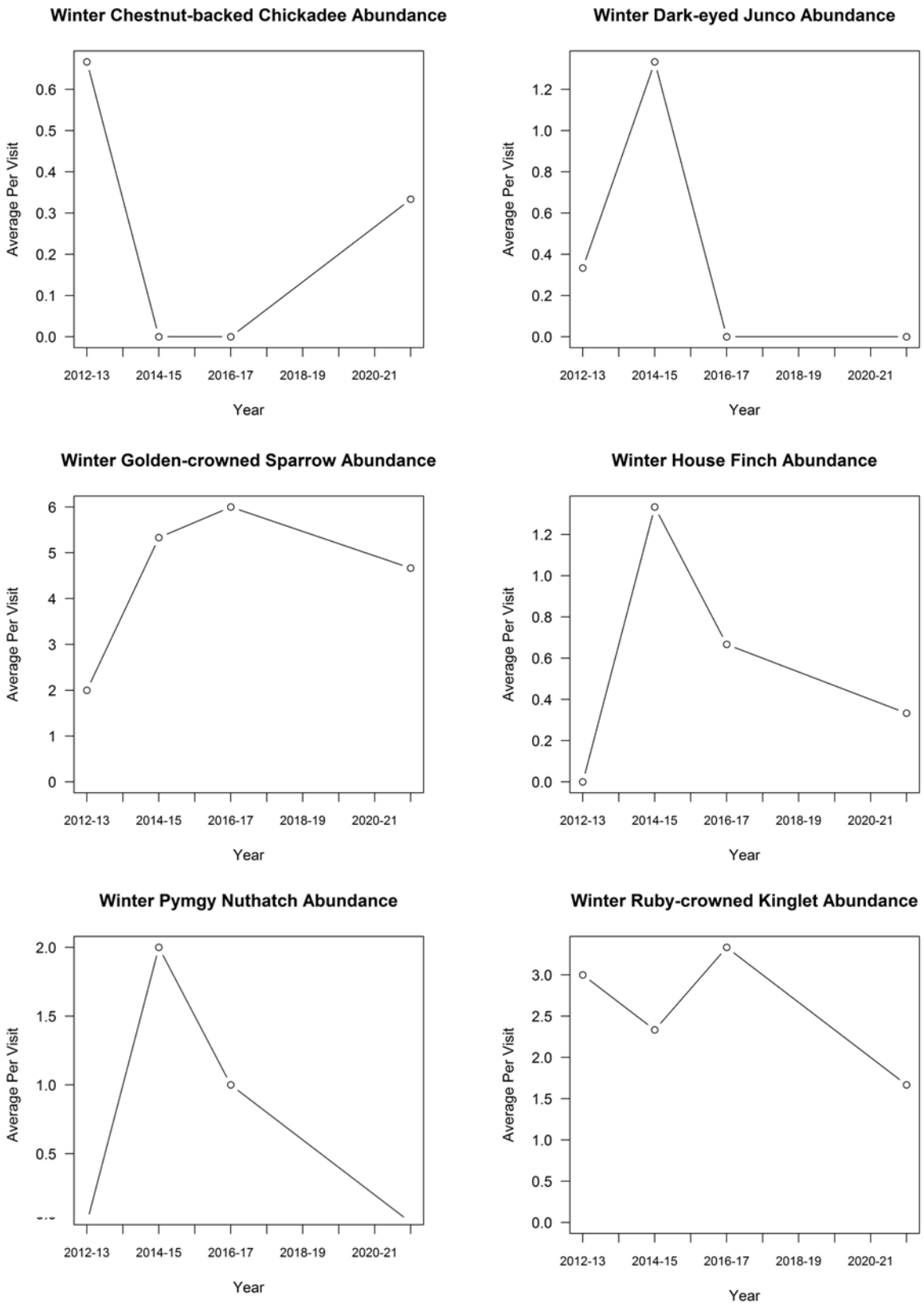

Figure 30 (continued). Average number of individuals of each focal species detected per visit, per year at Lessingia 1, Wherry Corridor West in winter.

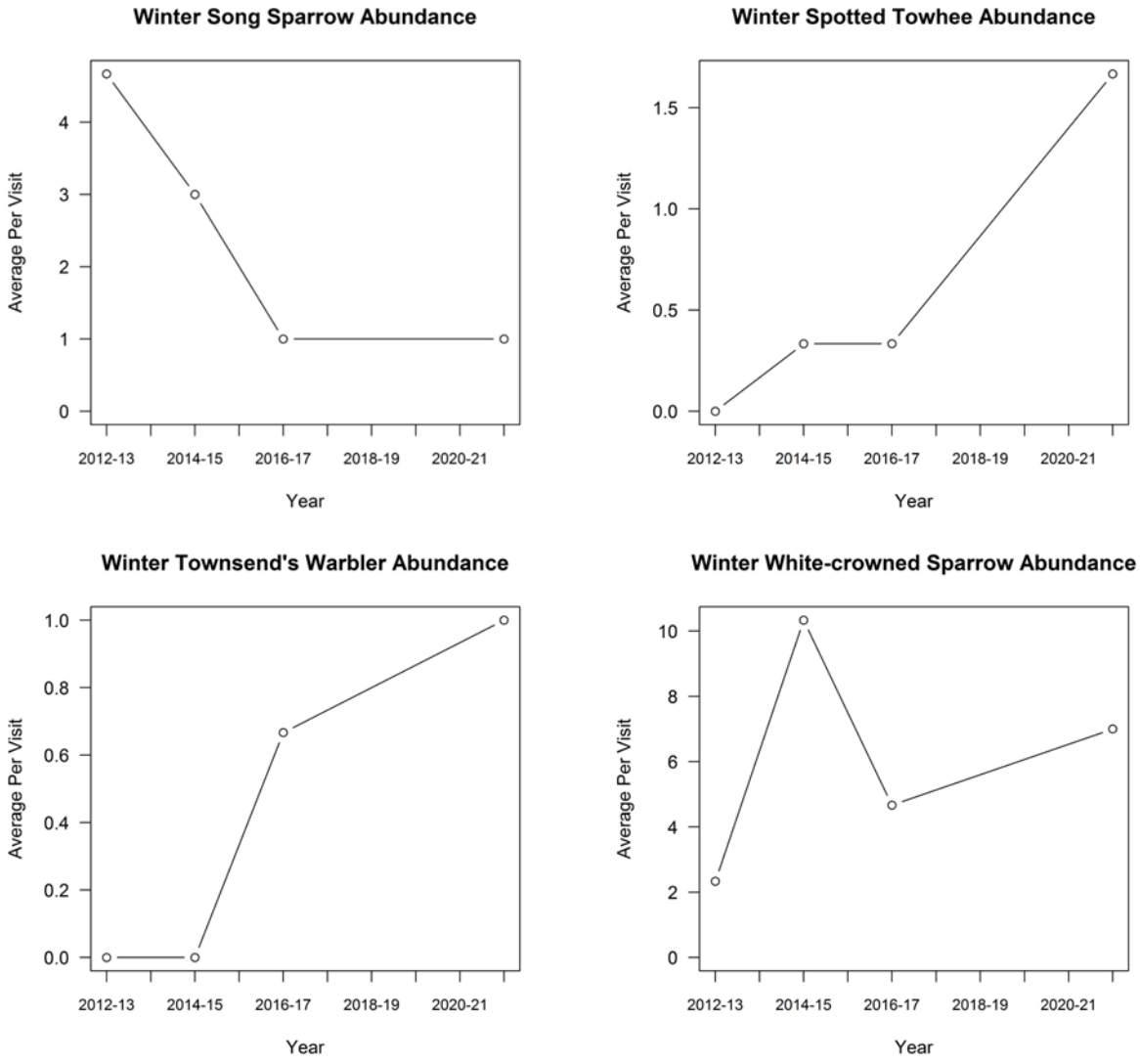

Figure 30 (continued). Average number of individuals of each focal species detected per visit, per year at Lessingia 1, Wherry Corridor West in winter.

Results (Part II):

Area Search Surveys for SFO Mitigation Monitoring

Quartermaster Reach 1

Avian area search code: QMR_1

Presidio Trust Project Name [and Site/Subsite Names]: Quartermaster Reach 1 [Tennessee Hollow/Quartermaster Reach]

Site Description: Wetland, Scrub, and Riparian

Year of restoration: 2021 (possibly beginning in 2019?)

Year(s) of bird survey: summer 2015, 2022; winter 2015-16, 2021-22.
Table 14 only includes data collected during the two-year period of this report. Quartermaster Reach 1 does not yet have enough years of data to include further analysis on focal species abundance.

Plot size (ha): 1.41

Figure 31. Map of Quartermaster Reach 1 area search boundary.

Table 14. Area search survey results at Quartermaster Reach 1 surveyed by Point Blue Conservation Science in the Presidio during winter 2021-22 through summer 2022.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
Anna's Hummingbird	0	0	0	0.00	0	1	0	0.5	1
Black Phoebe	1	0	1	0.67	2	2	2	2	2
Black-crowned Night-Heron	0	0	0	0.00	0	1	0	0.5	1
Bufflehead	0	1	0	0.33	1	0	0	0	0
Canada Goose	0	0	0	0.00	0	8	4	6	2
European Starling	0	4	0	1.33	1	1	0	0.5	1
Fox Sparrow	0	0	1	0.33	1	0	0	0	0
Golden-crowned Sparrow	2	2	0	1.33	2	0	0	0	0
Great Blue Heron	0	0	1	0.33	1	0	2	1	1
House Finch	0	0	0	0.00	0	2	1	1.5	2
House Sparrow	0	0	0	0.00	0	4	3	3.5	2
Killdeer	0	0	2	0.67	1	6	2	4	2
Least Sandpiper	0	0	22	7.33	1	0	0	0	0
Mallard	0	0	3	1.00	1	3	1	2	2
Snowy Egret	0	0	0	0.00	0	2	2	2	2
Song Sparrow	0	0	2	0.67	1	2	4	3	2
White-crowned Sparrow	13	12	3	9.33	3	1	0	0.5	1
Total Individuals	**16**	**19**	**35**	**23.33**		**33**	**21**	**27**	
				11 species				**13 species**	

Quartermaster Reach 2

Avian area search code: QMR_2

Presidio Trust Project Name [and Site/Subsite Names]: Quartermaster Reach 2 [Tennessee Hollow/Quartermaster Reach]

Site Description: Wetland and Scrub

Year of restoration: 2021 (possibly beginning in 2019?)

Year(s) of bird survey: summer 2015, 2022; winter 2015-16, 2021-22.
Table 12 only includes data collected during the two-year period of this report. Quartermaster Reach 2 does not yet have enough years of data to include further analysis on focal species abundance.

Plot size (ha): 1.55

Figure 32. Map of Quartermaster Reach 2 area search boundary.

Table 15. Area search survey results at Quartermaster Reach 2 surveyed by Point Blue Conservation Science in the Presidio during winter 2021-22 through summer 2022.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
American Crow	0	0	0	0.00	0	1	1	1	2
Barn Swallow	0	0	0	0.00	0	0	1	0.5	1
Black Phoebe	1	1	0	0.67	2	0	2	1	1
Bufflehead	0	1	1	0.67	2	0	0	0	0
Common Merganser	0	0	2	0.67	1	0	0	0	0
Double-crested Cormorant	0	0	0	0.00	0	0	1	0.5	1
Great Egret	0	0	1	0.33	1	0	0	0	0
Killdeer	8	15	6	9.67	3	14	3	8.5	2
Least Sandpiper	46	17	8	23.67	3	1	0	0.5	1
Mallard	0	2	3	1.67	2	2	0	1	1
Ring-necked Duck	0	1	0	0.33	1	0	0	0	0
Snowy Egret	0	0	0	0.00	0	0	1	0.5	1
Western Gull	0	0	0	0.00	0	0	1	0.5	1
White-crowned Sparrow	4	0	0	1.33	1	0	0	0	0
Yellow-rumped Warbler	1	0	0	0.33	1	0	0	0	0
Total Individuals	**60**	**37**	**21**	**39.33**		**18**	**10**	**14**	
				10 species				**9 species**	

MacArthur Meadow

Avian area search code: THMAM_1

Presidio Trust Project Name [and Site/Subsite Names]: MacArthur Meadow [Tennessee Hollow / MacArthur Meadow]

Site Description: Scrub (restored) and Wetland (restored)

Year of restoration: 2017

Year(s) of bird survey: summer 2014, 2018, 2020, 2022; winter 2013-14, 2017-18, 2019-20, 2021-22. Table 16 only includes data collected during the two-year period of this report, whereas the figures that follow are for all survey years.

Plot size (ha): 1.57

Figure 33. Map of MacArthur Meadow area search boundary.

Table 16. Area search survey results at MacArthur Meadow surveyed by Point Blue Conservation Science in the Presidio during winter 2021-22 through summer 2022.

	Winter					Summer			
	Visit				Number of	Visit			Number of
Species	**1**	**2**	**3**	**Average**	**Visits**	**1**	**2**	**Average**	**Visits**
Allen's Hummingbird	0	0	0	0.00	0	5	3	4	2
American Robin	0	1	2	1.00	2	1	5	3	2
Anna's Hummingbird	10	7	7	8.00	3	4	1	2.5	2
Black Phoebe	1	1	1	1.00	3	0	0	0	0
Brown-headed Cowbird	0	0	0	0.00	0	0	1	0.5	1
Bushtit	0	0	4	1.33	1	2	0	1	1
California Scrub-Jay	2	0	0	0.67	1	2	0	1	1
California Towhee	0	0	1	0.33	1	2	0	1	1
Chestnut-backed Chickadee	0	0	0	0.00	0	10	0	5	1
Dark-eyed Junco	0	1	0	0.33	1	0	0	0	0
European Starling	0	0	1	0.33	1	0	0	0	0
Fox Sparrow	2	0	0	0.67	1	0	0	0	0
Great Horned Owl	0	0	0	0.00	0	1	0	0.5	1
Hermit Thrush	0	2	0	0.67	1	0	0	0	0
Hooded Oriole	0	0	0	0.00	0	0	2	1	1
House Finch	0	0	0	0.00	0	5	1	3	2
Lesser Goldfinch	0	0	0	0.00	0	3	2	2.5	2
Lincoln's Sparrow	0	1	0	0.33	1	0	0	0	0
Mourning Dove	0	0	0	0.00	0	2	0	1	1
Orange-crowned Warbler	0	0	1	0.33	1	1	0	0.5	1
Purple Finch	0	0	0	0.00	0	0	1	0.5	1
Pygmy Nuthatch	0	0	0	0.00	0	0	1	0.5	1
Ruby-crowned Kinglet	1	0	1	0.67	2	0	0	0	0
Song Sparrow	8	4	9	7.00	3	13	10	11.5	2
White-crowned Sparrow	4	0	4	2.67	2	8	4	6	2
Yellow-rumped Warbler	1	0	1	0.67	2	0	0	0	0
Total Individuals	**29**	**17**	**32**	**26**		**59**	**31**	**45**	
				16 species				**19 species**	

MacArthur Meadow is in scrub and wetland habitat so we used the Scrub and Wetland Focal Species (breeding, winter, and year-round; see Appendix A) from *The Avian Monitoring Program for the Presidio* (Humple and Gardali 2015) to assess changes to the bird community since restoration activities began. Figures 34 and 35 show abundance values (average number of individuals per visit) for each season for scrub and wetland focal species present on the plot.

The summer 2022 and winter 2021-22 surveys marked survey year 5 since restoration MacArthur Meadow.

During summer surveys, there were no detections of American Coot, California Quail (extirpated), Common Yellowthroat, Pied-billed Grebe, Spotted Towhee, and Wrentit and only one year with detections of Bewick's Wren (in 2014), California Scrub-Jay (in 2022), and Violet-green Swallow (in 2014) so we do not plot abundance values for these focal species. For winter surveys, there were no detections of American Coot, Bewick's Wren, Common Yellowthroat, Pied-billed Grebe, and Spotted Towhee and only one year with detections of House Finch (in 2013-14), so we do not plot abundance values for these focal species.

Apparent trends in abundance should be interpreted with caution since we do not perform statistical trend analysis on these data and because some species have few detections per visit. We do comment on the general trends shown by the plots for the four years of survey data.

Most of the focal species on this area search plot show a lot of inter-annual variability in abundance. For these species we will continue to collect data and watch for future trends. The following species show initial signs of a trend in abundance. White-crowned Sparrow (summer) and Song Sparrow (winter) appear to be increasing while California Towhee (winter) and Ruby-crowned Kinglet (winter) appear to be decreasing.

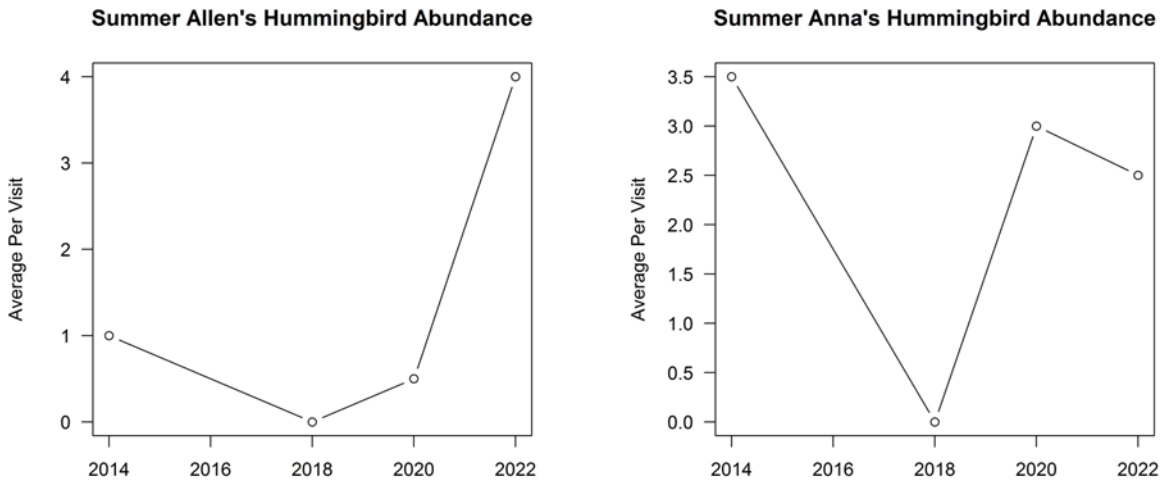

Figure 34. Average number of individuals of each focal species detected per visit, per year at MacArthur Meadow in summer.

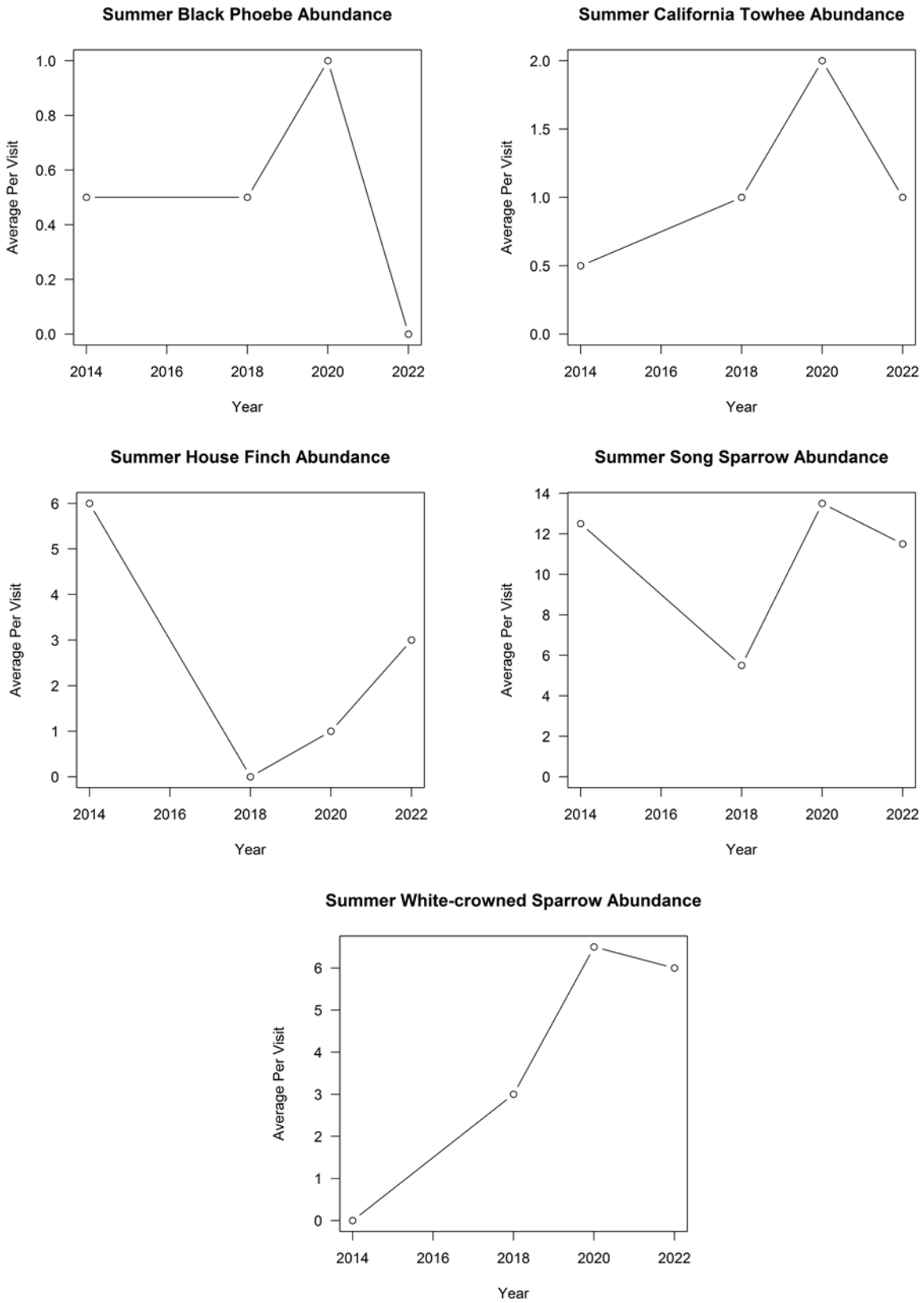

Figure 34 (continued). Average number of individuals of each focal species detected per visit, per year at MacArthur Meadow in summer.

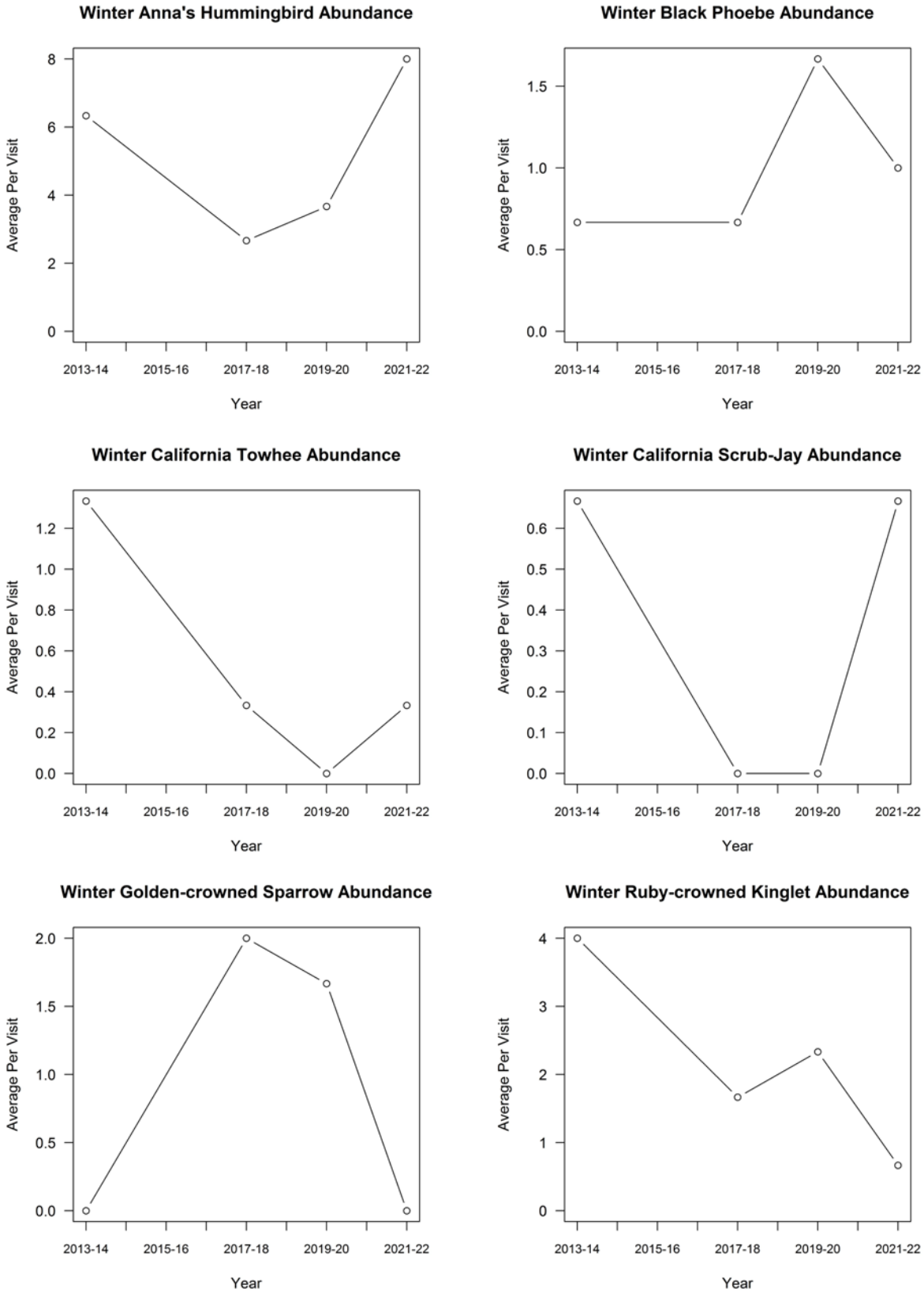

Figure 35. Average number of individuals of each focal species detected per visit, per year at MacArthur Meadow in winter.

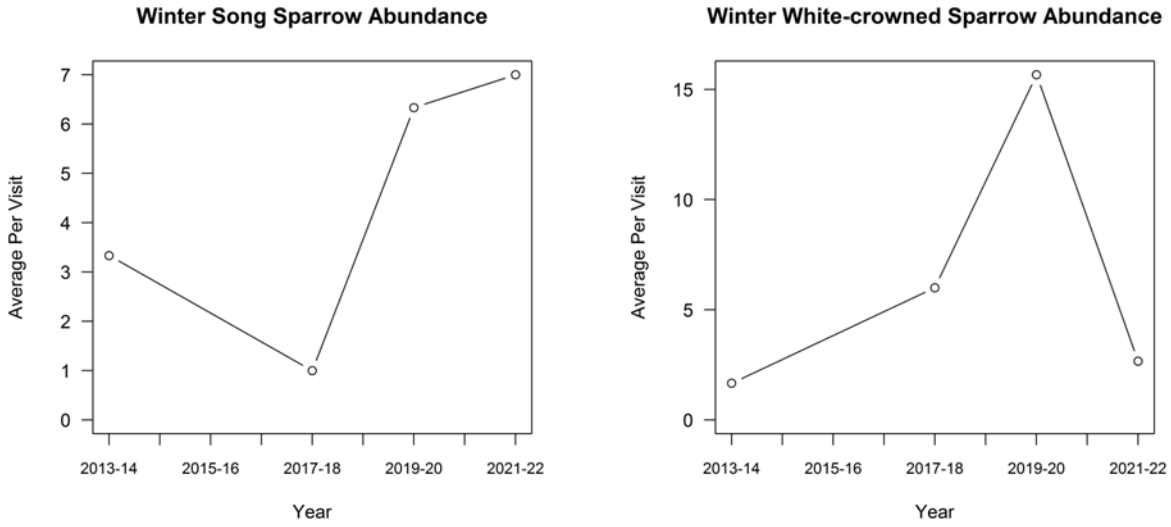

Figure 35 (continued). Average number of individuals of each focal species detected per visit, per year at MacArthur Meadow in winter.

Results (Part III): Point Count Surveys to Assess Presidio Wide Landbird Community

For the first analysis, we calculate species richness – the average number of species detected per visit per point across all 27 point count stations – for each season (Figures 36 and 37). In this calculation, we include all individuals detected within 50 meters of a point count station that were identified to the species level. Therefore, we are presenting richness of all species regardless of habitat preference, taxa, breeding status, or migratory status. This is a broad metric that can indicate large-scale trends across multiple habitat types.

Summer species richness has fluctuated across the 20 years surveyed and there does not appear to be a strong indication of a trend over the years. Winter species richness has fluctuated less than the summer species richness and appears to be relatively stable with no strong indication of a trend over the years. The average species richness per point in 2022 was 4.94 in summer and 5.11 in winter. Winter species richness in 2021-22 was the highest it has been over the last 18 years of winter surveys.

Appendix B contains a list of all species detected during point count surveys in the Presidio. The average number of individuals detected per visit per point during point count surveys is presented for each species for summer (Appendix D) and winter (Appendix E).

During summer surveys from 1999-2022, 25 of 29 Presidio year-round and breeding focal species (Appendix A) were detected. During winter surveys from 2005-06 to 2021-22, 24 of 27 year-round and wintering focal species (Appendix A) were detected. For Presidio focal species that were detected in more than one year of surveys for a given season (21 in summer, 20 in winter, 17 of which were year-round residents that occurred in both seasons, for a total of 24 species overall), we plot the average number of individuals per visit per point by year for summer (Figure 38) and winter (Figure 39).

Using the seven years of summer surveys and six years of winter surveys, we conduct trend analyses for a subset of focal species for which there were detections in each year by season and plot those results. The trend analyses for summer include 11 focal species and are presented in Figure 40. The trend analyses for winter include 15 focal species and are presented in Figure 41. The log slope and a p-value are reported for the trend analysis of each species. The log slope gives an indication of the strength and direction (increasing or decreasing) of the trend. Be aware that the log slope does not indicate the rate at which a species' abundance is changing, but the higher the log slope, the faster the rate of change. We consider a p-value < 0.05 as biologically significant.

Most of the species do not show a significant change in abundance over the years. In summer, 5 of 11 species do not show a significant change in abundance over the years, and in winter, 14 of 15 species do not show a significant change. Exceptions include, for the summer season, Anna's Hummingbird, Dark-eyed Junco, Song Sparrow, Wilson's Warbler increasing and Pacific Wren and Pygmy Nuthatch decreasing; and for the winter, White-crowned Sparrow decreasing. The magnitude of these trends

appear to be small, and should be interpreted with caution as there are only 6-7 individual years' worth of data (albeit across a 23-year span). Obviously long-term trends require long-term data sets, so as we continue to survey, the value of this long-term dataset will increase.

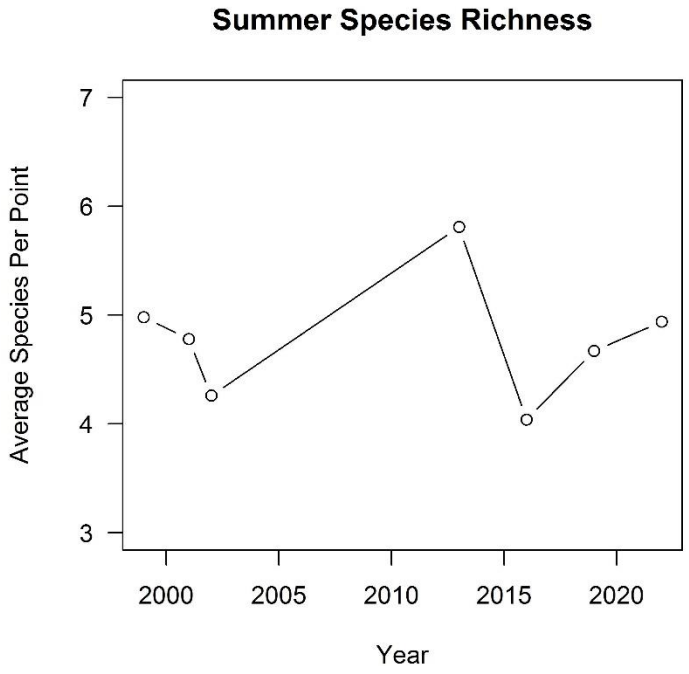

Figure 36. Average number of species per point, per visit during summer point count surveys in the Presidio (1999 to 2022).

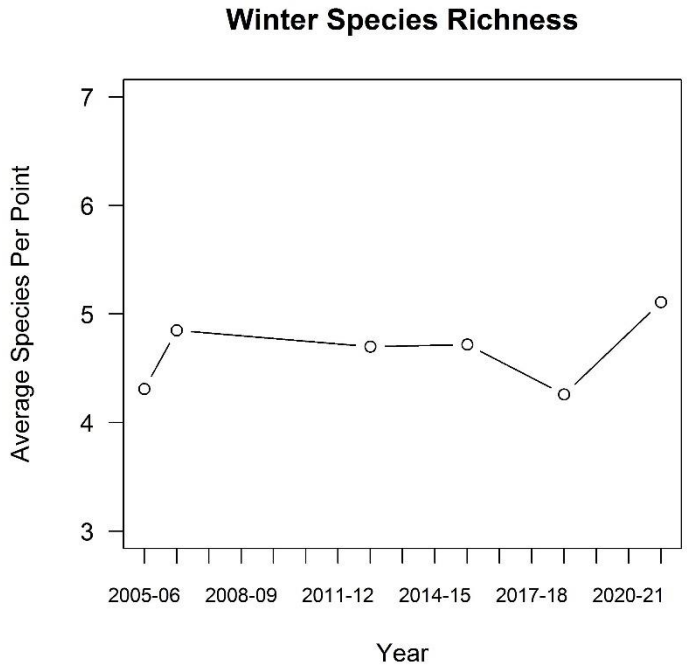

Figure 37. Average number of species per point, per visit during winter point count surveys in the Presidio (2005-06 to 2021-22).

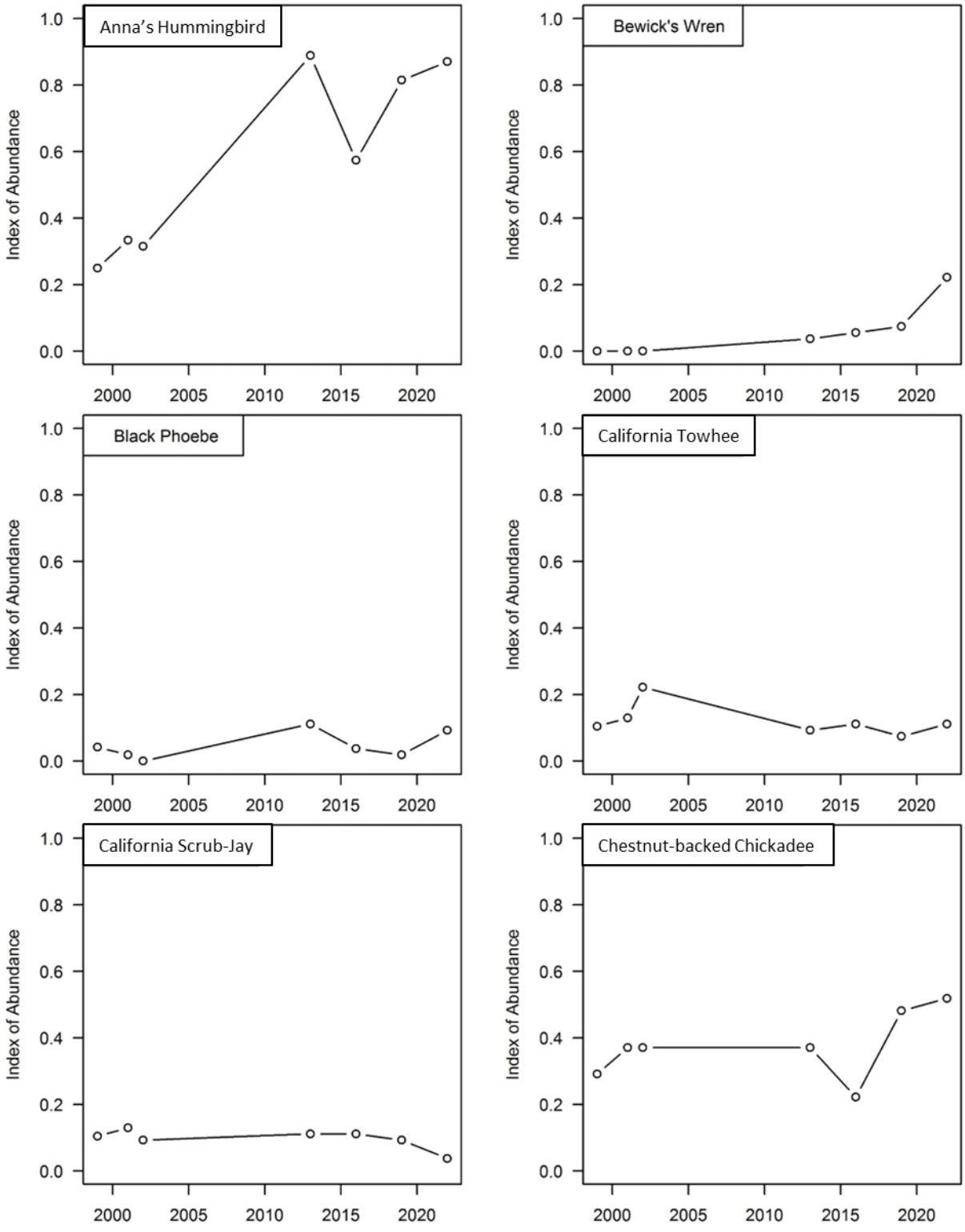

Figure 38. Average number of individuals per point, per visit during summer point count surveys in the Presidio (1999 to 2022), for select Presidio focal species: Anna's Hummingbird, Bewick's Wren, Black Phoebe, California Towhee, California Scrub-Jay, and Chestnut-backed Chickadee.

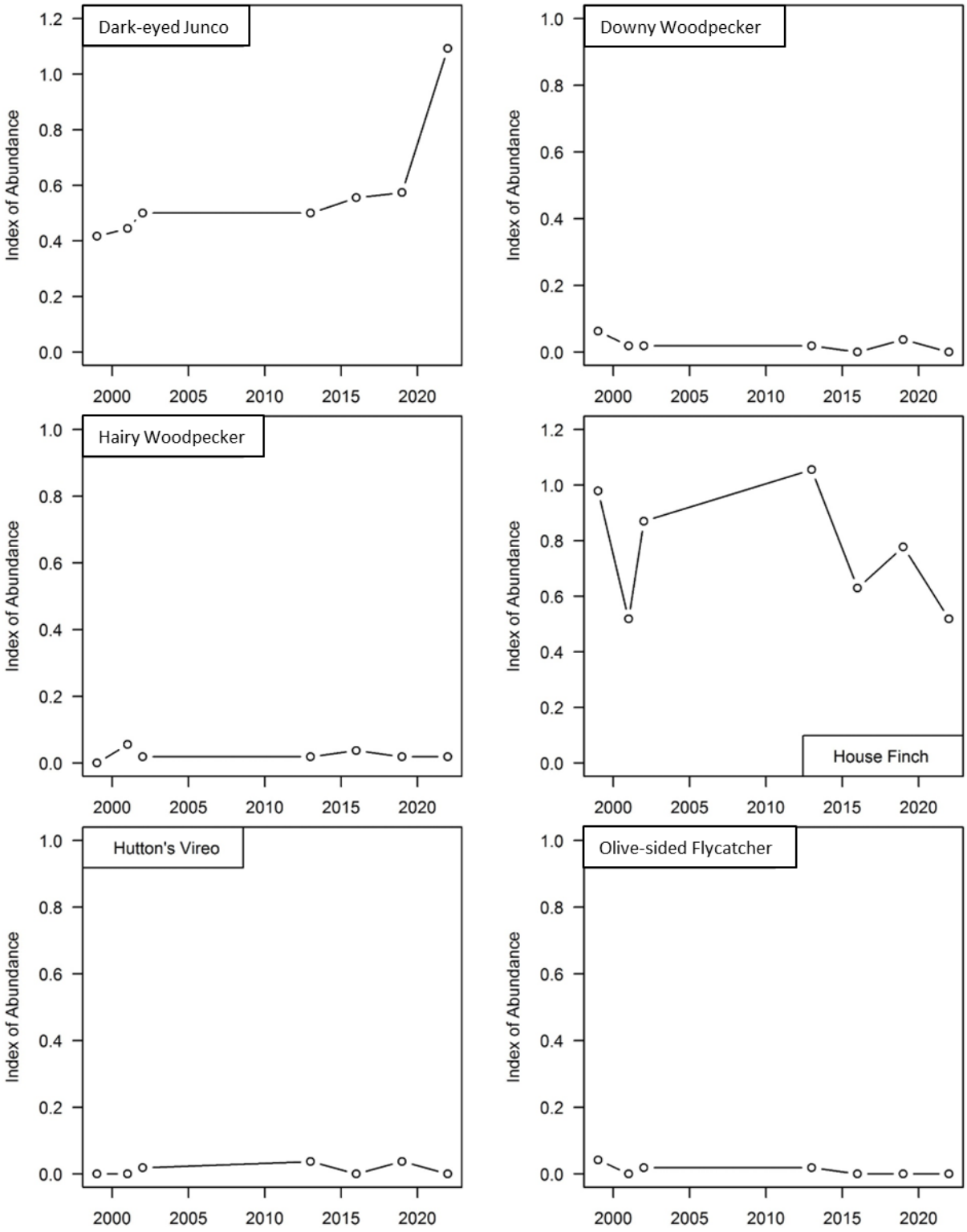

Figure 38 (continued). Average number of individuals per point, per visit during summer point count surveys in the Presidio (1999 to 2022), for select Presidio focal species: Dark-eyed Junco, Downy Woodpecker, Hairy Woodpecker, House Finch, Hutton's Vireo, Olive-sided Flycatcher.

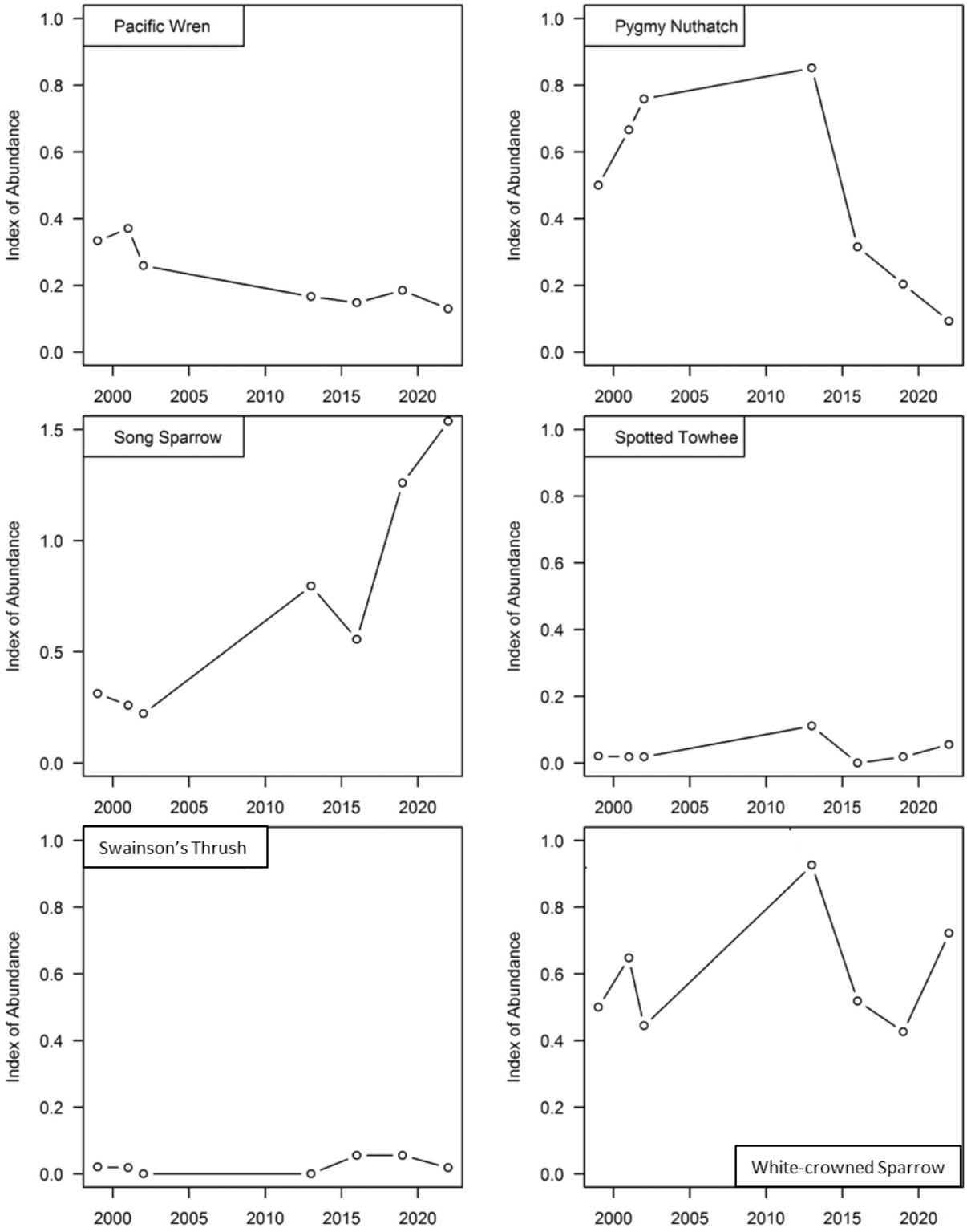

Figure 38 (continued). Average number of individuals per point, per visit during summer point count surveys in the Presidio (1999 to 2022), for select Presidio focal species: Pacific Wren, Pygmy Nuthatch, Song Sparrow, Spotted Towhee, Swainson's Thrush, White-crowned Sparrow.

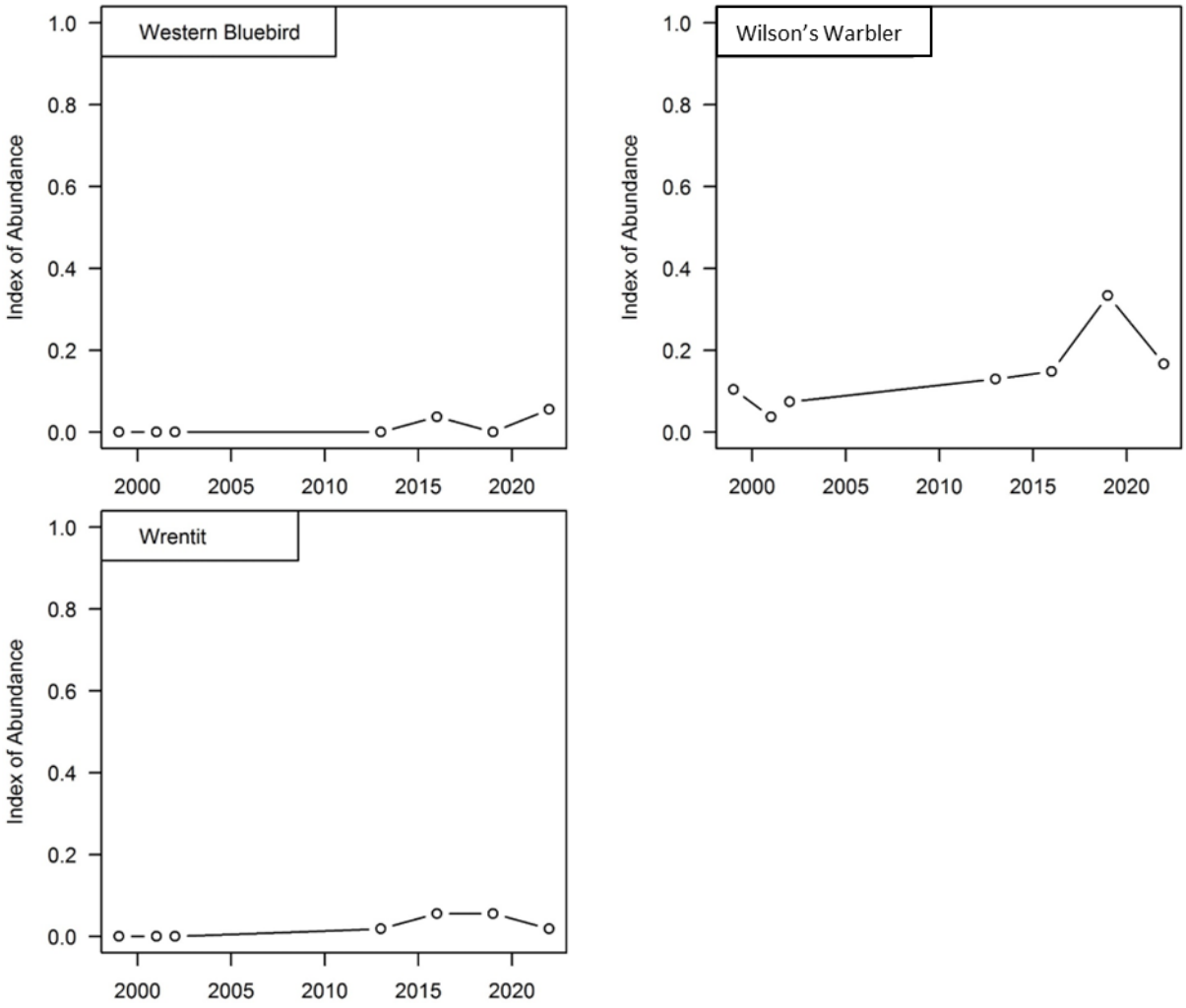

Figure 38 (continued). Average number of individuals per point, per visit during summer point count surveys in the Presidio (1999 to 2022), for select Presidio focal species: Western Bluebird, Wilson's Warbler, Wrentit.

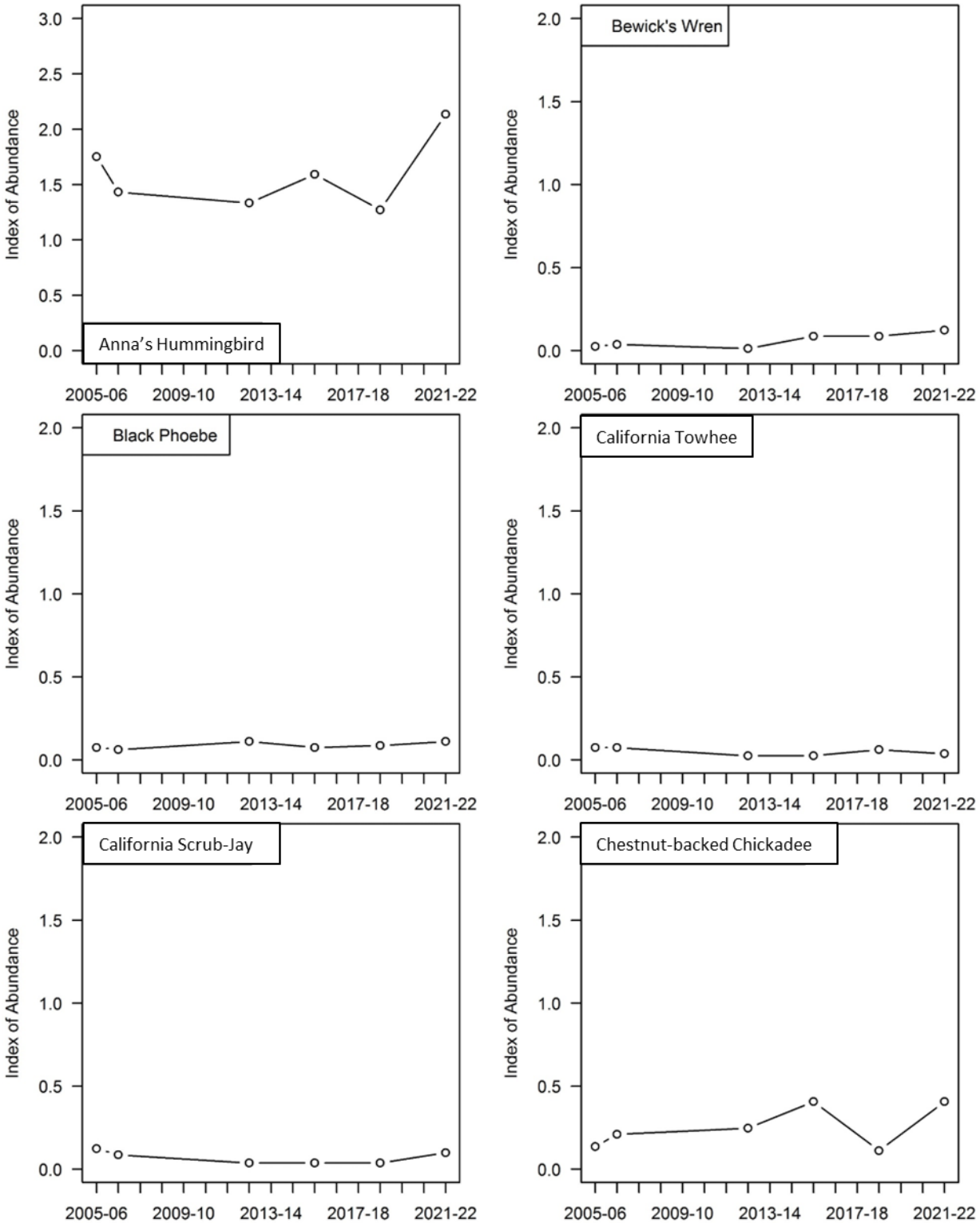

Figure 39. Average number of individuals per point, per visit during winter point count surveys in the Presidio (2005-06 to 2021-22), for select Presidio focal species: Anna's Hummingbird, Bewick's Wren, Black Phoebe, California Towhee, California Scrub-Jay, Chestnut-backed Chickadee.

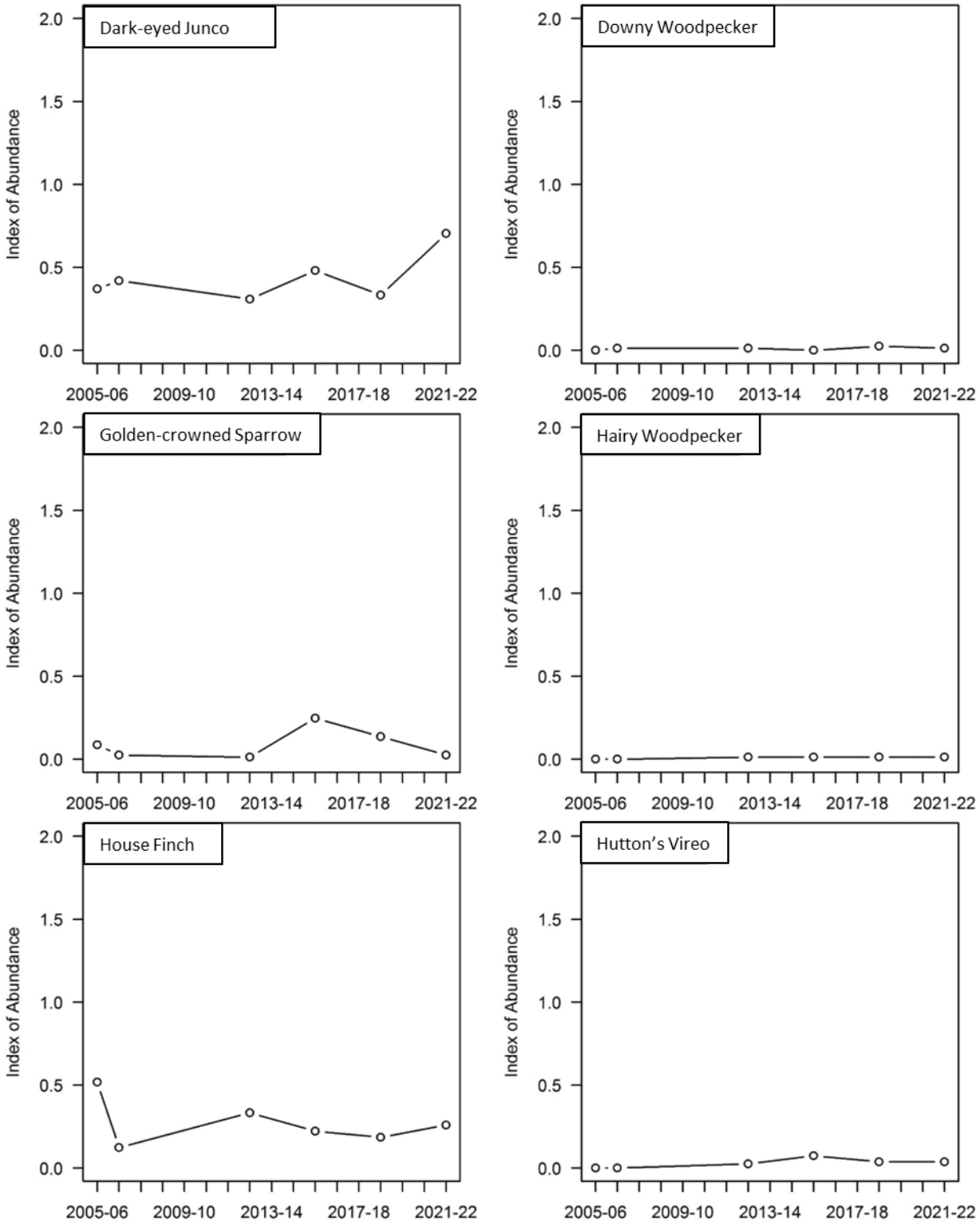

Figure 39 (continued). Average number of individuals per point, per visit during winter point count surveys in the Presidio (2005-06 to 2021-22), for select Presidio focal species: Dark-eyed Junco, Downy Woodpecker, Golden-crowned Sparrow, Hairy Woodpecker, House Finch, Hutton's Vireo.

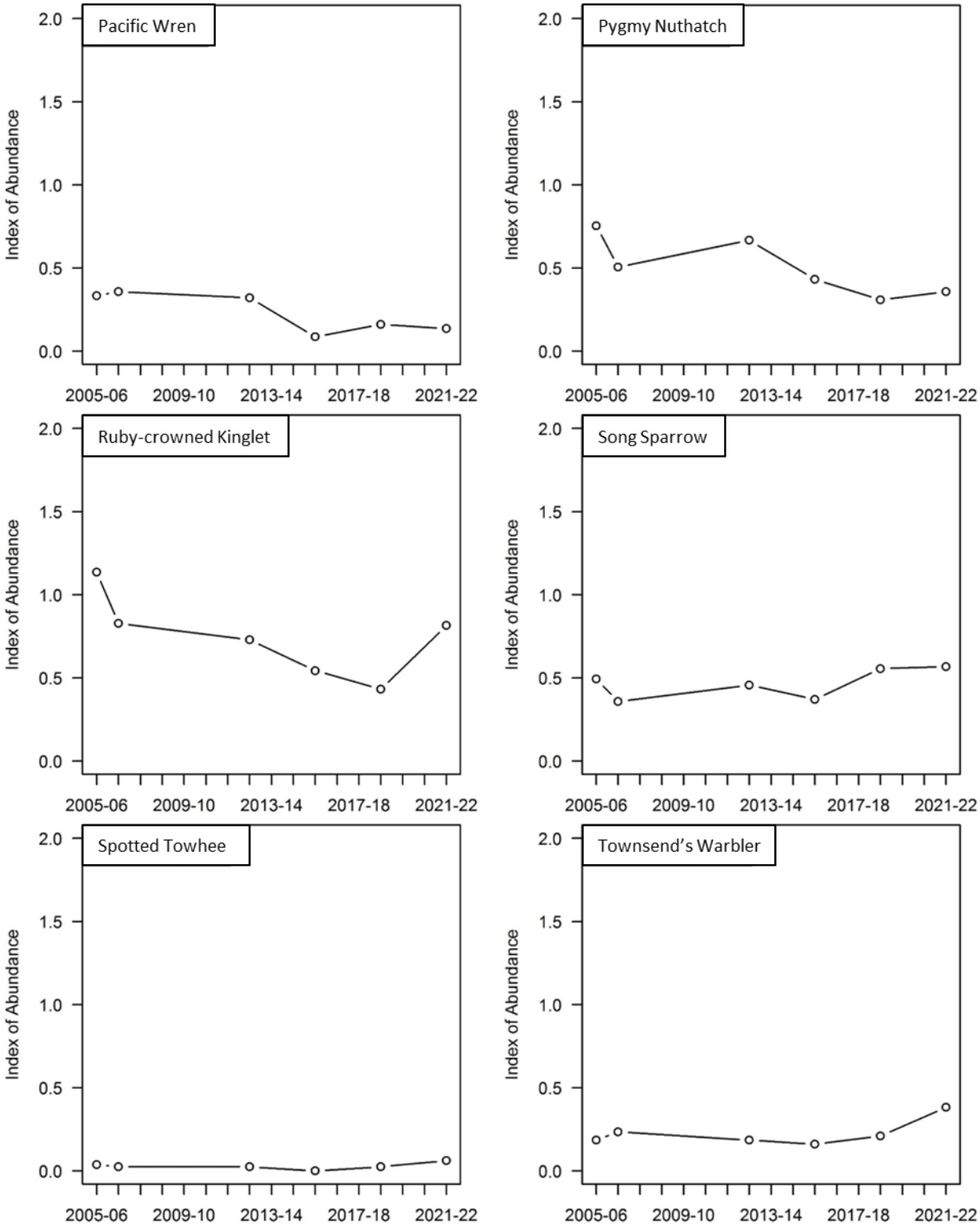

Figure 39 (continued). Average number of individuals per point, per visit during winter point count surveys in the Presidio (2005-06 to 2021-22), for select Presidio focal species: Pacific Wren, Pygmy Nuthatch, Ruby-crowned Kinglet, Song Sparrow, Spotted Towhee, Townsend's Warbler.

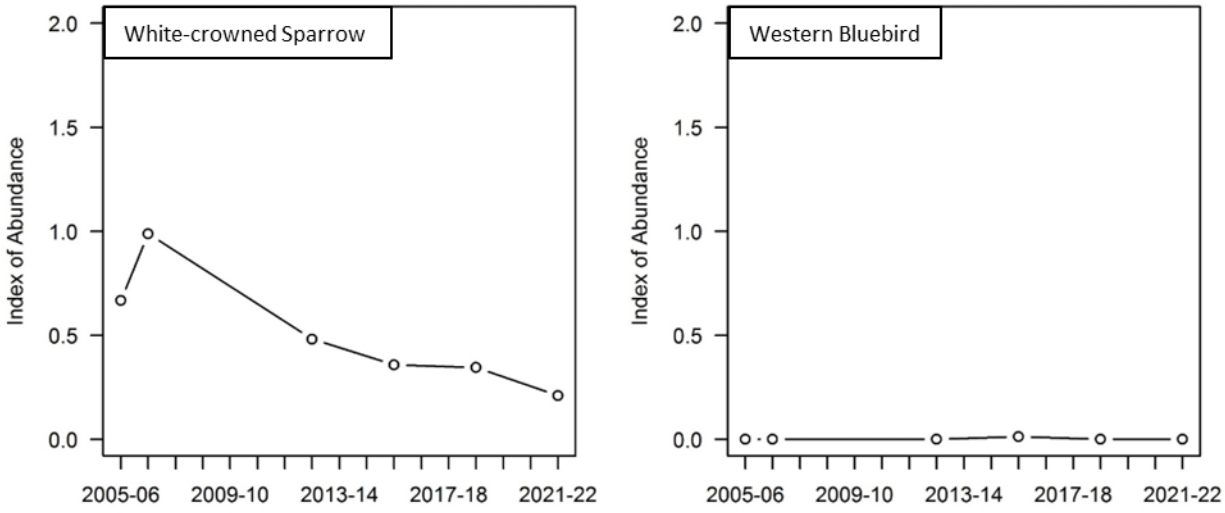

Figure 39 (continued). Average number of individuals per point, per visit during winter point count surveys in the Presidio (2005-06 to 2021-22), for select Presidio focal species: White-crowned Sparrow, Western Bluebird.

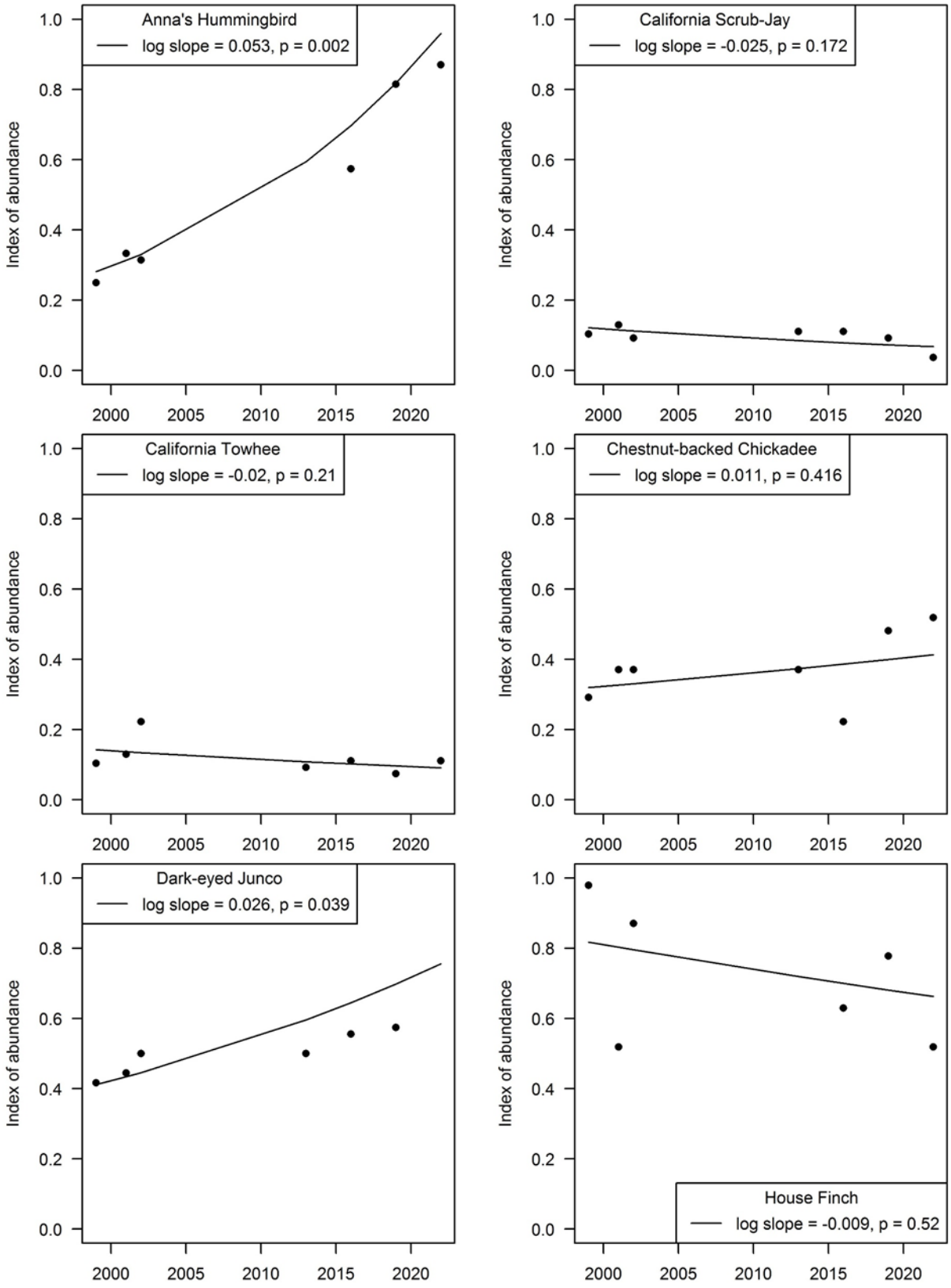

Figure 40. Trend analysis (log-linear model) for the average number of individuals per point, per visit during summer point count surveys in the Presidio (1999 to 2022), for select Presidio focal species: Anna's Hummingbird, California Scrub-Jay, California Towhee, Chestnut-backed Chickadee, Dark-eyed Junco, House finch.

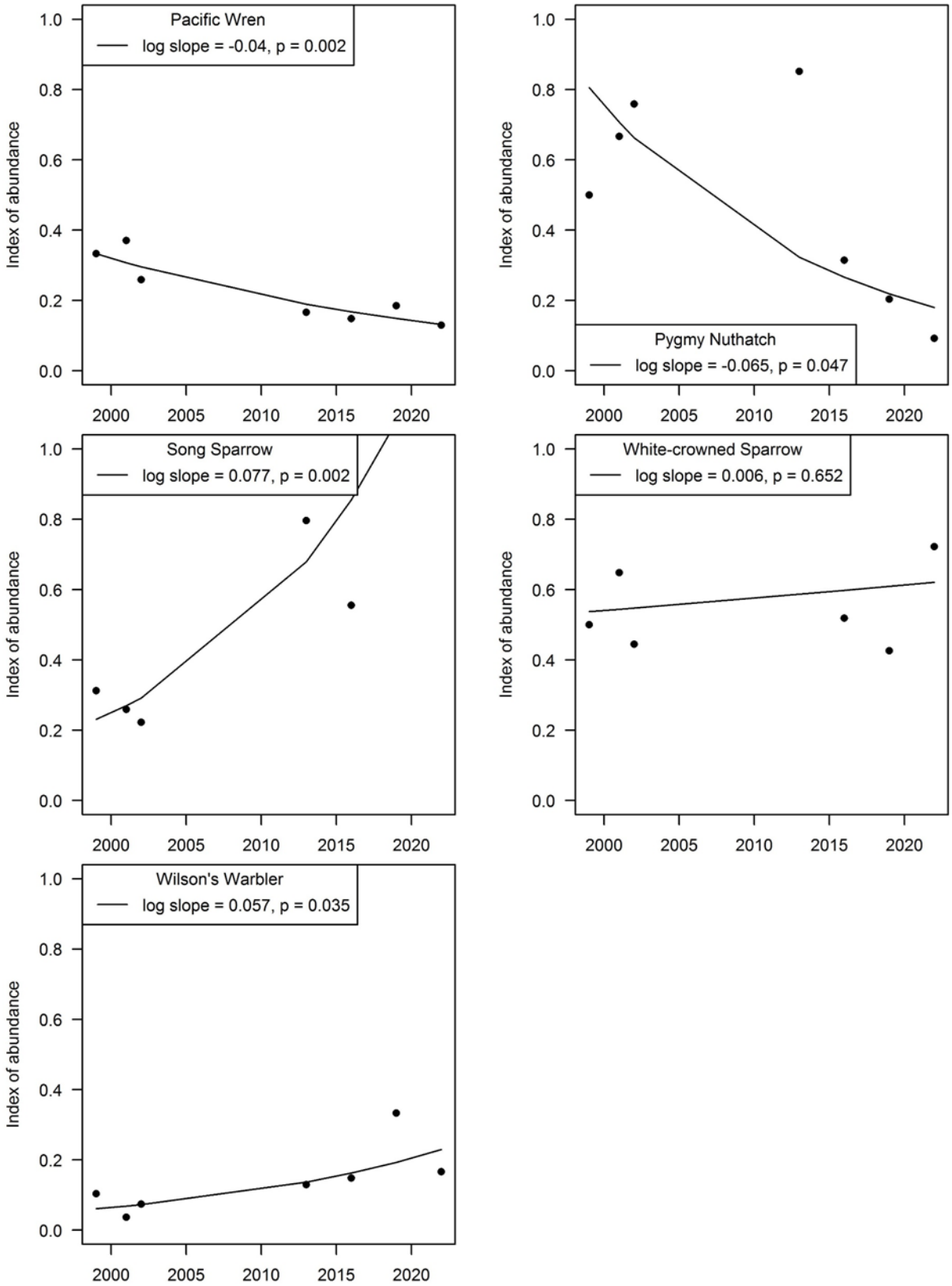

Figure 40 (continued). Trend analysis (log-linear model) for the average number of individuals per point, per visit during summer point count surveys in the Presidio (1999 to 2022), for select Presidio focal species: Pacific Wren, Pygmy Nuthatch, Song Sparrow, White-crowned Sparrow, Wilson's Warbler.

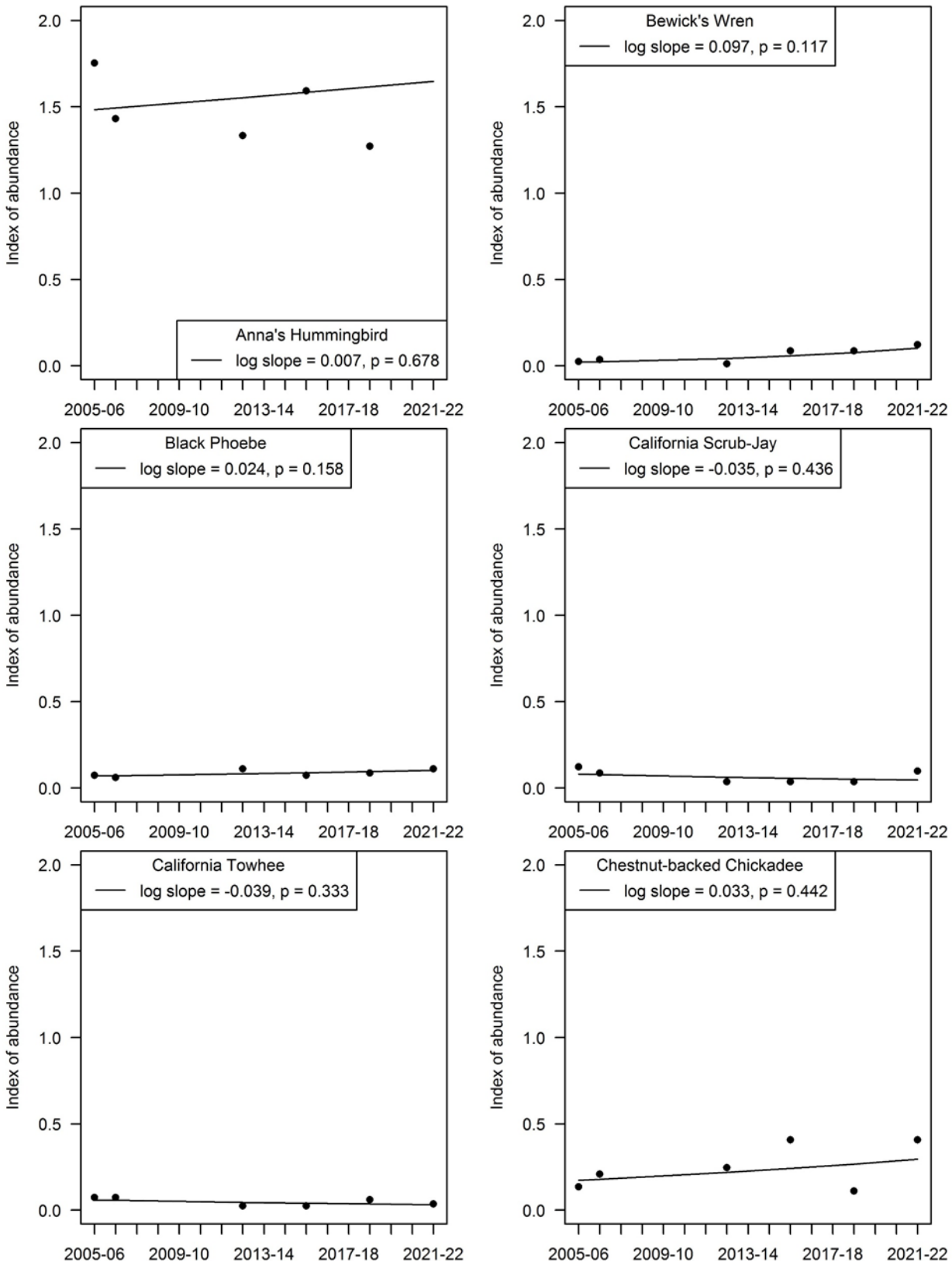

Figure 41. Trend analysis (log-linear model) for the average number of individuals per point, per visit during winter point count surveys in the Presidio (2005-06 to 2021-22), for select Presidio focal species: Anna's Hummingbird, Bewick's Wren, Black Phoebe, California Scrub-Jay, California Towhee, Chestnut-backed Chickadee.

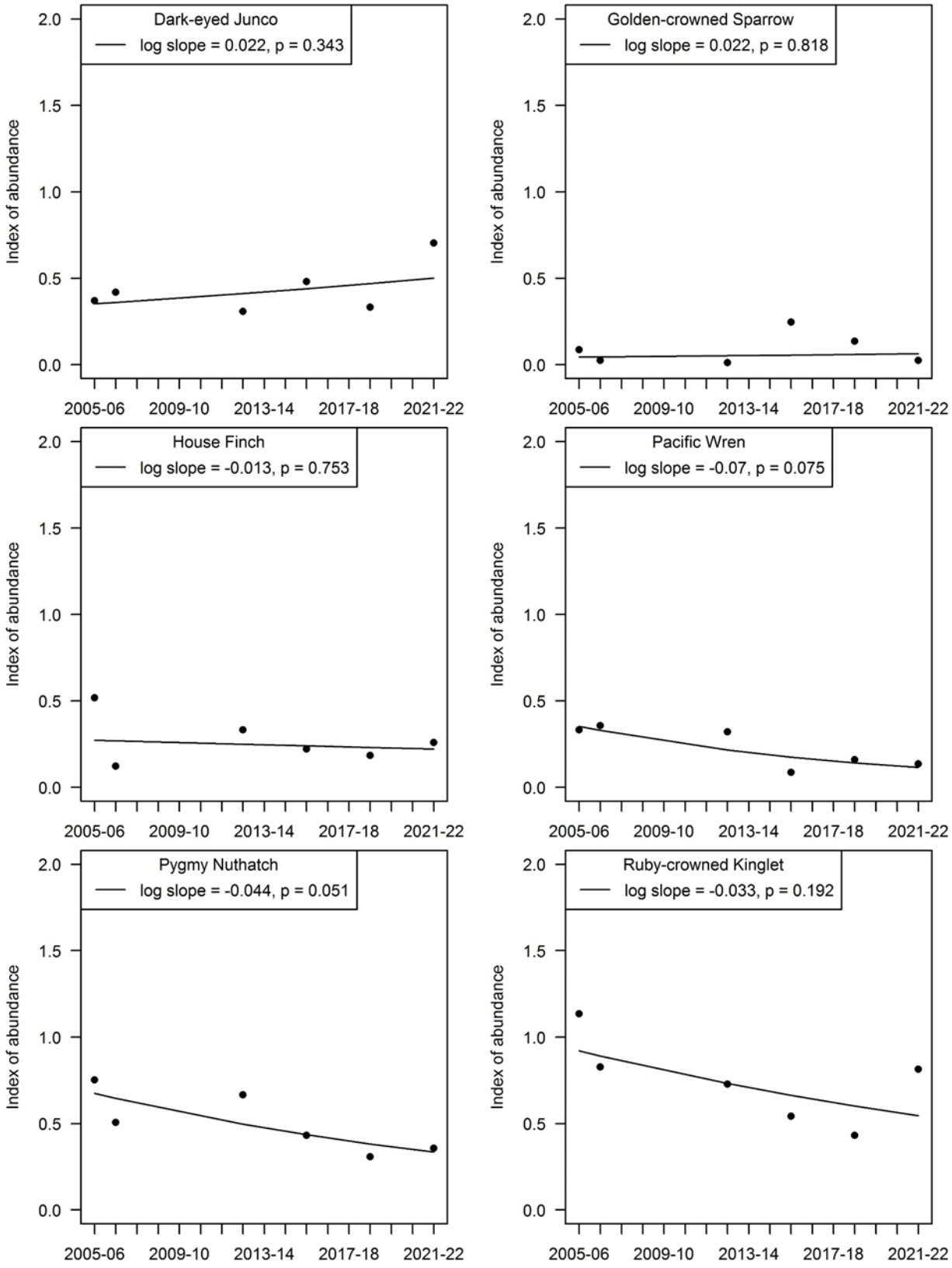

Figure 41 (continued). Trend analysis (log-linear model) for the average number of individuals per point, per visit during winter point count surveys in the Presidio (2005-06 to 2021-22), for select Presidio focal species: Dark-eyed Junco, Golden-crowned Sparrow, House Finch, Pacific Wren, Pygmy Nuthatch, Ruby-crowned Kinglet.

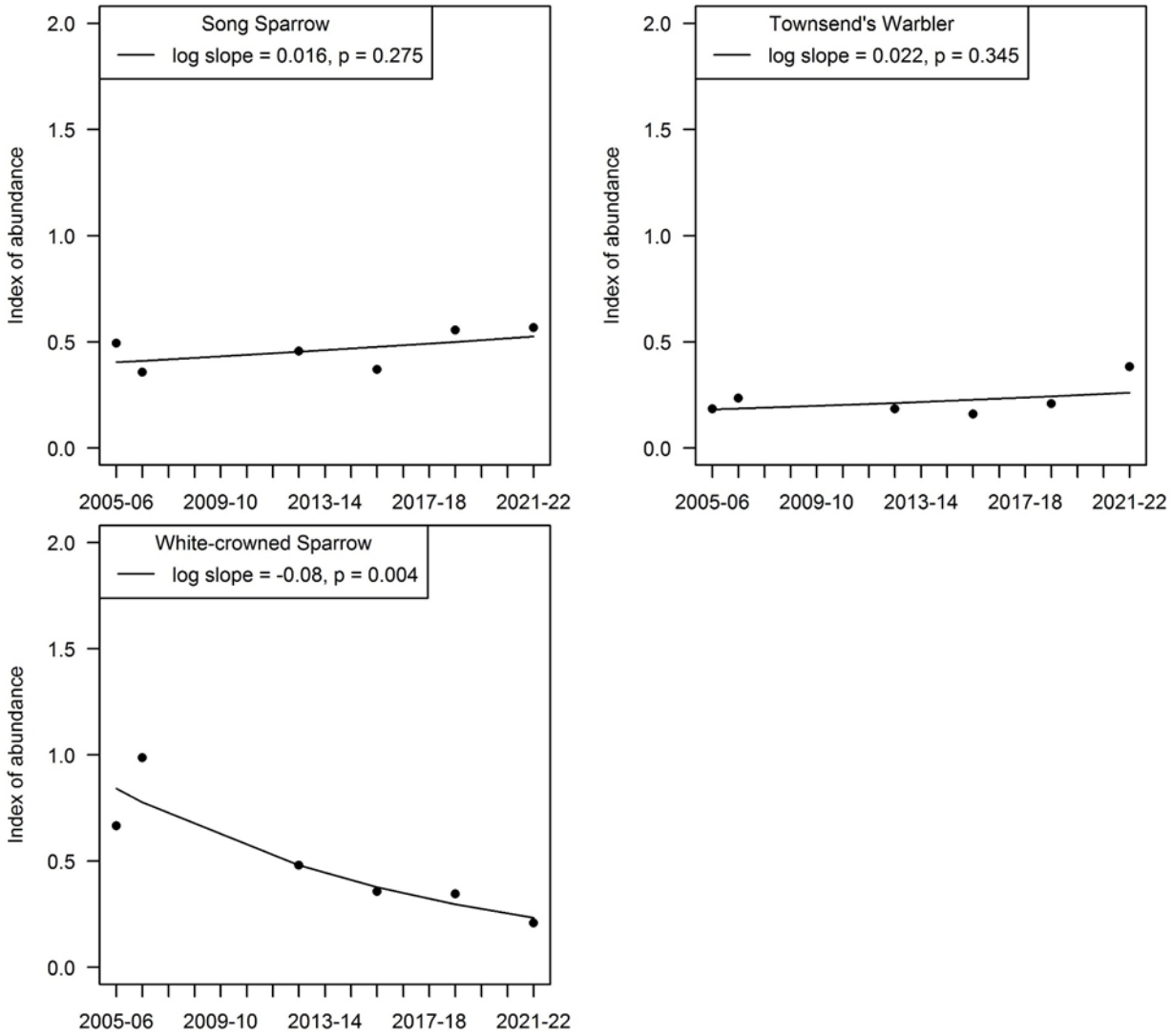

Figure 41 (continued). Trend analysis (log-linear model) for the average number of individuals per point, per visit during winter point count surveys in the Presidio (2005-06 to 2021-22), for select Presidio focal species: Song Sparrow, Townsend's Warbler, White-crowned Sparrow.

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Appendices

Appendix A. Focal species by habitat type in the Presidio (modified from table in Humple and Gardali 2015). Species in taxonomic order according to Sibley 2014. Habitat type codes: HF = Historic Forest; OW = Oak Woodland; RI = Riparian; WE = Wetland; SC = Scrub; GR = Native Grasslands and Serpentine Prairie; DL = Designed Landscapes.

		Focal Species Habitat Type						
Species	**Seasonality**	**HF**	**OW**	**RI**	**WE**	**SC**	**GR**	**DL**
California Quail[1]	Year-round					x		
Pied-billed Grebe	Year-round				x			
Red-shouldered Hawk	Year-round	x						
American Coot	Year-round				x			
Anna's Hummingbird	Year-round	x	x	x				x
Allen's Hummingbird[2]	Breeding	x		x		x		x
Downy Woodpecker	Year-round	x	x	x				
Hairy Woodpecker	Year-round	x	x					
Black Phoebe	Year-round			x	x			x
Olive-sided Flycatcher	Breeding	x						
Hutton's Vireo	Year-round		x					
California Scrub-Jay[4]	Year-round		x	x		x		
Common Raven	Year-round	x						
Violet-green Swallow	Breeding	x			x			x
Chestnut-backed Chickadee	Year-round	x		x				
Pygmy Nuthatch	Year-round	x						
Pacific Wren	Year-round	x						
Bewick's Wren	Year-round					x		
Wrentit	Year-round					x		
Ruby-crowned Kinglet	Wintering	x		x		x		
Western Bluebird	Year-round	x	x				x	x
Swainson's Thrush	Breeding			x				
Common Yellowthroat	Breeding			x	x			
Townsend's Warbler	Wintering	x						x
Wilson's Warbler	Breeding			x				
Spotted Towhee	Year-round			x		x		
California Towhee	Year-round					x		x
Song Sparrow	Year-round			x		x		
Dark-eyed Junco	Year-round	x						x
White-crowned Sparrow[3]	Year-round					x		x
Golden-crowned Sparrow	Wintering			x		x		x
Western Meadowlark	Wintering						x	
House Finch	Year-round	x				x		x

[1] extirpated from Presidio and on watch-list

[2] may need to combine with unidentified *Selasphorus* hummingbirds for analysis due to identification challenge for female/juvenile Allen's vs. Rufous Hummingbird

[3] includes Nuttall's White-crowned Sparrow subspecies during breeding season, and Nuttall's as well as other migrant subspecies (Gambel's and Puget Sound) in winter.

[4] the name was changed from Western Scrub-Jay in 2016. Previous reports have used Western Scrub-Jay

Appendix B. All species detected during point count surveys in the Presidio by season, in all survey years (1999 to 2022).

Common Name	Scientific Name	Summer	Winter
Allen's Hummingbird	*Selasphorus sasin*	x	x
American Crow	*Corvus brachyrhynchos*	x	x
American Goldfinch	*Spinus tristis*	x	x
American Kestrel	*Falco sparverius*		x
American Robin	*Turdus migratorius*	x	x
Anna's Hummingbird	*Calypte anna*	x	x
Ash-throated Flycatcher	*Myiarchus cinerascens*	x	
Band-tailed Pigeon	*Patagioenas fasciata*	x	x
Barn Swallow	*Hirundo rustica*	x	
Bewick's Wren	*Thryomanes bewickii*	x	x
Black Oystercatcher	*Haematopus bachmani*	x	x
Black Phoebe	*Sayornis nigricans*	x	x
Black Turnstone	*Arenaria melanocephala*		x
Black-and-white Warbler	*Mniotilta varia*	x	
Black-crowned Night-Heron	*Nycticorax nycticorax*	x	
Black-headed Grosbeak	*Pheucticus melanocephalus*	x	
Brandt's Cormorant	*Phalacrocorax penicillatus*	x	x
Brant	*Branta bernicla*		x
Brewer's Blackbird	*Euphagus cyanocephalus*	x	x
Brown Creeper	*Certhia americana*	x	x
Brown Pelican	*Pelecanus occidentalis*	x	x
Brown-headed Cowbird	*Molothrus ater*	x	x
Bullock's Oriole	*Icterus bullockii*	x	
Bushtit	*Psaltriparus minimus*	x	x
California Gull	*Larus californicus*		x
California Scrub-Jay	*Aphelocoma californica*	x	x
California Towhee	*Melozone crissalis*	x	x
Canada Goose	*Branta canadensis*		x
Caspian Tern	*Hydroprogne caspia*	x	
Cedar Waxwing	*Bombycilla cedrorum*	x	x
Chestnut-backed Chickadee	*Poecile rufescens*	x	x
Common Raven	*Corvus corax*	x	x
Cooper's Hawk	*Accipiter cooperii*	x	x
Dark-eyed Junco	*Junco hyemalis*	x	x
Double-crested Cormorant	*Phalacrocorax auritus*	x	x
Downy Woodpecker	*Picoides pubescens*	x	x
Eurasian Collared-Dove	*Streptopelia decaocto*	x	x
European Starling	*Sturnus vulgaris*	x	x
Fox Sparrow	*Passerella iliaca*		x
Glaucous-winged Gull	*Larus glaucescens*		x
Golden-crowned Kinglet	*Regulus satrapa*	x	x

Appendix B (continued).

Common Name	Scientific Name	Summer	Winter
Golden-crowned Sparrow	*Zonotrichia atricapilla*		x
Great Blue Heron	*Ardea herodias*	x	
Great Egret	*Ardea alba*	x	
Great Horned Owl	*Bubo virginianus*	x	
Hairy Woodpecker	*Picoides villosus*	x	x
Hermit Thrush	*Catharus guttatus*	x	x
Hooded Oriole	*Icterus cucullatus*	x	
House Finch	*Haemorhous mexicanus*	x	x
House Sparrow	*Passer domesticus*	x	
House Wren	*Troglodytes aedon*	x	x
Hutton's Vireo	*Vireo huttoni*	x	x
Killdeer	*Charadrius vociferus*		x
Lazuli Bunting	*Passerina amoena*	x	
Lesser Goldfinch	*Spinus psaltria*	x	x
Mallard	*Anas platyrhynchos*	x	x
Mew Gull	*Larus canus*		x
Mourning Dove	*Zenaida macroura*	x	x
Nashville Warbler	*Oreothlypis ruficapilla*	x	
Northern Flicker	*Colaptes auratus*	x	x
Northern Mockingbird	*Mimus polyglottos*	x	x
Nuttall's Woodpecker	*Picoides nuttallii*	x	x
Olive-sided Flycatcher	*Contopus cooperi*	x	
Orange-crowned Warbler	*Oreothlypis celata*	x	x
Pacific Loon	*Gavia pacifica*	x	
Pacific Wren	*Troglodytes pacificus*	x	x
Pacific-slope Flycatcher	*Empidonax difficilis*	x	
Pelagic Cormorant	*Phalacrocorax pelagicus*		x
Pigeon Guillemot	*Cepphus columba*	x	
Pine Siskin	*Spinus pinus*	x	x
Purple Finch	*Haemorhous purpureus*	x	x
Pygmy Nuthatch	*Sitta pygmaea*	x	x
Red Crossbill	*Loxia curvirostra*	x	x
Red-breasted Nuthatch	*Sitta canadensis*	x	x
Red-breasted Sapsucker	*Sphyrapicus ruber*		x
Red-masked Parakeet	*Aratinga erythrogenys*	x	x
Red-shouldered Hawk	*Buteo lineatus*	x	x
Red-tailed Hawk	*Buteo jamaicensis*	x	x
Red-throated Loon	*Gavia stellata*		x
Red-winged Blackbird	*Agelaius phoeniceus*	x	
Ring-billed Gull	*Larus delawarensis*		x
Rock Pigeon	*Columba livia*	x	x

Appendix B (continued).

Common Name	Scientific Name	Summer	Winter
Ruby-crowned Kinglet	*Regulus calendula*		x
Say's Phoebe	*Sayornis saya*		x
Sharp-shinned Hawk	*Accipiter striatus*	x	x
Song Sparrow	*Melospiza melodia*	x	x
Spotted Towhee	*Pipilo maculatus*	x	x
Steller's Jay	*Cyanocitta stelleri*	x	x
Surf Scoter	*Melanitta perspicillata*	x	x
Surfbird	*Aphriza virgata*		x
Swainson's Thrush	*Catharus ustulatus*	x	
Townsend's Warbler	*Setophaga townsendi*		x
Tree Swallow	*Tachycineta bicolor*	x	x
Turkey Vulture	*Cathartes aura*	x	
Varied Thrush	*Ixoreus naevius*		x
Violet-green Swallow	*Tachycineta thalassina*	x	
Warbling Vireo	*Vireo gilvus*	x	
Western Bluebird	*Sialia mexicana*	x	x
Western Grebe	*Aechmophorus occidentalis*	x	x
Western Gull	*Larus occidentalis*	x	x
Western Meadowlark	*Sturnella neglecta*		x
Western Tanager	*Piranga ludoviciana*	x	
Western Wood-Pewee	*Contopus sordidulus*	x	
Western/Clarke's Grebe	*Aechmophorus occidentalis/clarkii*		x
Whimbrel	*Numenius phaeopus*	x	
White-crowned Sparrow	*Zonotrichia leucophrys*	x	x
Willet	*Tringa semipalmata*		x
Wilson's Snipe	*Gallinago delicata*		x
Wilson's Warbler	*Cardellina pusilla*	x	
Wrentit	*Chamaea fasciata*	x	x
Yellow Warbler	*Setophaga petechia*	x	
Yellow-rumped Warbler	*Setophaga coronata*	x	x

Appendix C. List of additional species common and scientific names not included in Appendix B (detected on point counts), but that were detected on area search surveys during the report period (winter 2020-21 to summer 2022).

Common Name	Scientific Name
Bufflehead	*Bucephala albeola*
Common Merganser	*Mergus merganser*
Least Sandpiper	*Calidris minutilla*
Lincoln's Sparrow	*Melospiza lincolnii*
Ring-necked Duck	*Aythya collaris*
Snowy Egret	*Egretta thula*

Appendix D. Average number of individuals per visit per point for summer point count surveys in the Presidio. Only species adequately surveyed by point counts are included, including both focal and non-focal species for the Presidio (see methods).

Species	1999	2001	2002	2013	2016	2019	2022
Allen's Hummingbird	0.67	0.76	0.89	0.24	0.17	0.02	0.41
American Goldfinch	0.02	0.04	0.04	0.28	0.00	0.00	0.02
American Robin	0.67	0.85	0.39	0.76	0.52	0.52	0.80
Anna's Hummingbird	0.25	0.33	0.31	0.89	0.57	0.81	0.87
Bewick's Wren	0.00	0.00	0.00	0.04	0.06	0.07	0.22
Brown-headed Cowbird	0.31	0.17	0.22	0.37	0.07	0.04	0.13
Black-headed Grosbeak	0.00	0.00	0.00	0.00	0.00	0.02	0.00
Black Phoebe	0.04	0.02	0.00	0.11	0.04	0.02	0.09
Brewer's Blackbird	0.23	0.04	0.11	0.07	0.00	0.00	0.00
Brown Creeper	0.06	0.15	0.06	0.02	0.02	0.06	0.07
Band-tailed Pigeon	0.00	0.00	0.00	0.02	0.00	0.00	0.00
Bullock's Oriole	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Bushtit	0.15	0.30	0.33	0.13	0.17	0.41	0.57
California Towhee	0.10	0.13	0.22	0.09	0.11	0.07	0.11
California Scrub-Jay	0.10	0.13	0.09	0.11	0.11	0.09	0.04
Chestnut-backed Chickadee	0.29	0.37	0.37	0.37	0.22	0.48	0.52
Cedar Waxwing	0.17	0.00	0.00	0.02	0.02	0.57	0.07
Dark-eyed Junco	0.42	0.44	0.50	0.50	0.56	0.57	1.09
Downy Woodpecker	0.06	0.02	0.02	0.02	0.00	0.04	0.00
Eurasian Collared-Dove	0.00	0.00	0.00	0.00	0.02	0.00	0.00
European Starling	0.15	0.22	0.17	0.17	0.02	0.09	0.02
Golden-crowned Kinglet	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Hairy Woodpecker	0.00	0.06	0.02	0.02	0.04	0.02	0.02
Hermit Thrush	0.00	0.00	0.00	0.00	0.00	0.00	0.04
House Finch	0.98	0.52	0.87	1.06	0.63	0.78	0.52
Hooded Oriole	0.00	0.02	0.02	0.00	0.02	0.00	0.00
House Sparrow	0.04	0.00	0.02	0.00	0.00	0.00	0.00
House Wren	0.00	0.00	0.00	0.09	0.00	0.00	0.00
Hutton's Vireo	0.00	0.00	0.02	0.04	0.00	0.04	0.00

Appendix D (continued).

Species	1999	2001	2002	2013	2016	2019	2022
Lazuli Bunting	0.00	0.00	0.02	0.02	0.00	0.00	0.00
Lesser Goldfinch	0.00	0.00	0.00	0.19	0.02	0.09	0.04
Mourning Dove	0.29	0.19	0.43	0.11	0.09	0.02	0.02
Northern Mockingbird	0.00	0.06	0.02	0.04	0.02	0.02	0.02
Nuttall's Woodpecker	0.00	0.00	0.00	0.02	0.02	0.00	0.04
Orange-crowned Warbler	0.00	0.00	0.00	0.04	0.00	0.00	0.02
Olive-sided Flycatcher	0.04	0.00	0.02	0.02	0.00	0.00	0.00
Pacific Wren	0.33	0.37	0.26	0.17	0.15	0.19	0.13
Pine Siskin	0.02	0.00	0.00	0.13	0.04	0.04	0.02
Pacific-slope Flycatcher	0.00	0.00	0.00	0.02	0.04	0.06	0.04
Purple Finch	0.15	0.06	0.06	0.26	0.04	0.09	0.13
Pygmy Nuthatch	0.50	0.67	0.76	0.85	0.31	0.20	0.09
Red Crossbill	0.00	0.00	0.00	0.00	0.07	0.00	0.00
Song Sparrow	0.31	0.26	0.22	0.80	0.56	1.26	1.54
Spotted Towhee	0.02	0.02	0.02	0.11	0.00	0.02	0.06
Steller's Jay	0.00	0.04	0.00	0.06	0.02	0.06	0.02
Swainson's Thrush	0.02	0.02	0.00	0.00	0.06	0.06	0.02
Warbling Vireo	0.00	0.02	0.00	0.00	0.00	0.02	0.00
White-crowned Sparrow	0.50	0.65	0.44	0.93	0.52	0.43	0.72
Western Bluebird	0.00	0.00	0.00	0.00	0.04	0.00	0.06
Western Tanager	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Wilson's Warbler	0.10	0.04	0.07	0.13	0.15	0.33	0.17
Wrentit	0.00	0.00	0.00	0.02	0.06	0.06	0.02
Yellow Warbler	0.00	0.00	0.00	0.00	0.00	0.02	0.00
Yellow-rumped Warbler	0.00	0.00	0.00	0.02	0.00	0.02	0.00

Appendix E. Average number of individuals per visit per point for winter point count surveys in the Presidio. Only species adequately surveyed by point counts are included, including both focal and non-focal species for the Presidio (see methods).

Species	2005-06	2006-07	2012-13	2015-16	2018-19	2021-22
Allen's Hummingbird	0.02	0.40	0.20	0.15	0.16	0.10
American Goldfinch	0.00	0.10	0.00	0.00	0.00	0.00
American Robin	0.28	0.17	0.14	0.58	0.62	0.07
Anna's Hummingbird	1.75	1.43	1.33	1.59	1.27	2.14
Bewick's Wren	0.02	0.04	0.01	0.09	0.09	0.12
Black Phoebe	0.07	0.06	0.11	0.07	0.09	0.11
Brown Creeper	0.09	0.11	0.07	0.04	0.00	0.05
Band-tailed Pigeon	0.00	0.00	0.00	0.01	0.00	0.01
Bushtit	0.02	0.32	0.17	0.06	0.16	0.35

Appendix E (continued).

Species	2005-06	2006-07	2012-13	2015-16	2018-19	2021-22
California Towhee	0.07	0.07	0.02	0.02	0.06	0.04
California Scrub-Jay	0.12	0.09	0.04	0.04	0.04	0.10
Chestnut-backed Chickadee	0.14	0.21	0.25	0.41	0.11	0.41
Cedar Waxwing	0.06	0.00	0.11	0.06	0.00	0.00
Dark-eyed Junco	0.37	0.42	0.31	0.48	0.33	0.70
Downy Woodpecker	0.00	0.01	0.01	0.00	0.02	0.01
Eurasian Collared-Dove	0.00	0.00	0.00	0.01	0.00	0.00
European Starling	0.05	0.01	0.01	0.02	0.01	0.00
Fox Sparrow	0.09	0.19	0.09	0.22	0.23	0.33
Golden-crowned Kinglet	0.01	0.22	0.06	0.05	0.00	0.05
Golden-crowned Sparrow	0.09	0.02	0.01	0.25	0.14	0.02
Hairy Woodpecker	0.00	0.00	0.01	0.01	0.01	0.01
Hermit Thrush	0.01	0.22	0.02	0.17	0.12	0.15
House Finch	0.52	0.12	0.33	0.22	0.19	0.26
House Wren	0.00	0.00	0.04	0.01	0.05	0.01
Hutton's Vireo	0.00	0.00	0.02	0.07	0.04	0.04
Lesser Goldfinch	0.00	0.00	0.00	0.07	0.05	0.02
Mourning Dove	0.01	0.01	0.07	0.00	0.02	0.00
Northern Flicker	0.02	0.01	0.02	0.05	0.04	0.01
Northern Mockingbird	0.00	0.01	0.01	0.02	0.00	0.00
Nuttall's Woodpecker	0.00	0.00	0.00	0.00	0.00	0.02
Orange-crowned Warbler	0.00	0.01	0.00	0.00	0.00	0.01
Pacific Wren	0.33	0.36	0.32	0.09	0.16	0.14
Pine Siskin	0.00	0.00	0.21	0.14	0.00	0.00
Purple Finch	0.01	0.07	0.05	0.06	0.02	0.00
Pygmy Nuthatch	0.75	0.51	0.67	0.43	0.31	0.36
Ruby-crowned Kinglet	1.14	0.83	0.73	0.54	0.43	0.81
Say's Phoebe	0.01	0.00	0.00	0.00	0.00	0.00
Song Sparrow	0.49	0.36	0.46	0.37	0.56	0.57
Spotted Towhee	0.04	0.02	0.02	0.00	0.02	0.06
Steller's Jay	0.00	0.00	0.02	0.01	0.00	0.02
Townsend's Warbler	0.19	0.23	0.19	0.16	0.21	0.38
Varied Thrush	0.01	0.09	0.01	0.04	0.00	0.00
White-crowned Sparrow	0.67	0.99	0.48	0.36	0.35	0.21
Western Bluebird	0.00	0.00	0.00	0.01	0.00	0.00
Western Meadowlark	0.00	0.19	0.00	0.00	0.00	0.00
Wrentit	0.00	0.00	0.01	0.00	0.04	0.01
Yellow-rumped Warbler	0.79	1.46	0.91	1.26	1.59	1.04

Appendix F. Presidio Blog Post (starts on following page) from 2021 describing overall trends from select area search plots, taken from https://www.pointblue.org/science_blog/ecological-restoration-works-for-urban-birds-in-san-franciscos-presidio/

Ecological restoration works for urban birds in San Francisco's Presidio

October 27, 2021

This blog was written by Tom Gardali with contributions from Point Blue staff Mark Dettling, Kristy Dybala, and Diana Humple and Presidio Trust staff Brett Stevenson, Lewis Stringer, and Jonathan Young

Restoring lost or degraded ecosystems has emerged as one of our most powerful tools to arrest the loss of biodiversity, combat climate change, and improve overall human health and well-being. In fact, the year 2021 marks the start of the United Nations Decade on Ecosystem Restoration, which is a coordinated "global rallying cry to heal our planet," and Point Blue has crafted a declaration of commitments to support the global effort.

While cities and towns have not historically been considered priorities for ecological restoration projects, the UN Decade effort explicitly calls for urban restoration. The Presidio Trust, the National Park Service, and the Golden Gate National Parks Conservancy were visionary in their pursuit of restoration in San Francisco's Presidio, and since 2001 they have restored 78 acres.

Example of a restoration project in San Francisco's Presidio where the pre restoration (1999) was a debris yard and the post restoration (2014) shows young but well established native vegetation.

Some might question the value of doing restoration in urban areas given that cities have been massively transformed, are human dominated, and represent a tiny percent of the Earth's total surface area. However, there are many reasons for prioritizing restoration in urban areas – and the benefits often go beyond the vegetation and wildlife being restored.

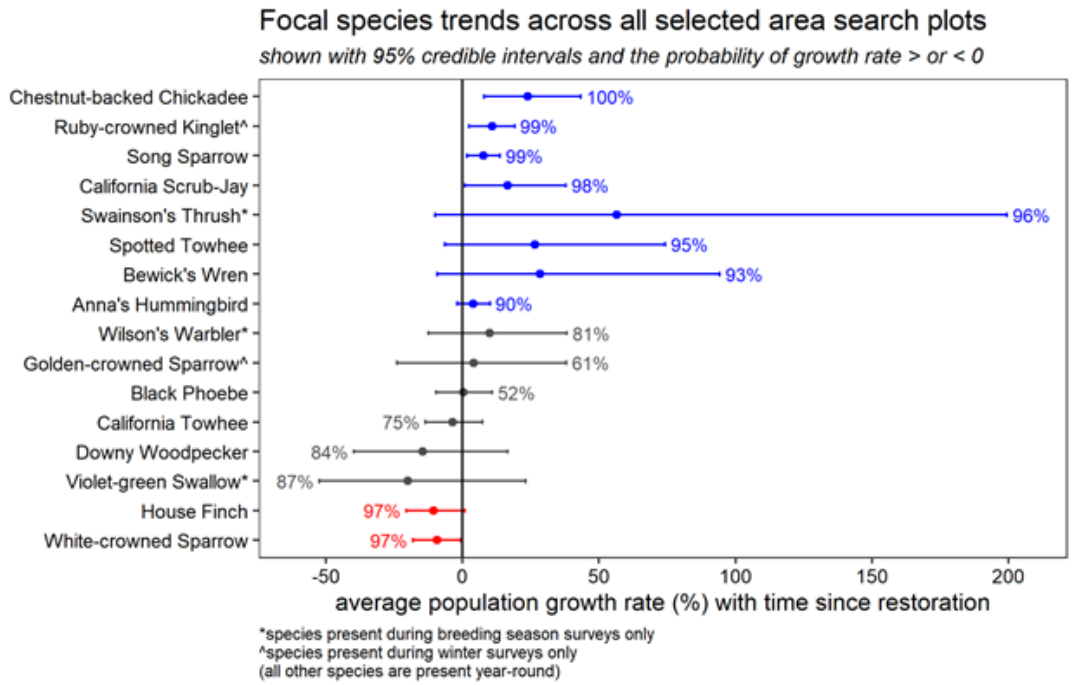
El Polin Spring, SF Presidio, taken six years after the initial ecological restoration and replanting in that area. Presidio Park Stewards volunteers and staff can be seen planting and weeding during a Wednesday program in December of 2015.

For example, ecological restoration is considered a public health intervention because it frequently provides relatively easy access to natural areas which can increase individual and community health – both physical and psychological (see here for example and references therein). Further, the actual act of doing the restoration (e.g., prepping, planting, weeding, watering, etc.) can improve an individual's mind, body, and spirit in ways other activities may not be able to (termed restorative recreation). The restoration work in the Presidio has largely been implemented by volunteers (approximately 160,000 volunteer hours to date) and hence these volunteers may have benefited in mind, body, and spirit.

Despite growing evidence and momentum around the importance of urban restoration for human health, little information exists on wildlife response in urban settings. In close collaboration with the

Presidio Trust, and to provide the Presidio Trust with information they need to assess the effects of their restoration work, Point Blue Conservation Science has studied, and continues to study, bird response to habitat restoration in the Presidio. There are many important reasons for understanding bird response to restoration and these include:

- Birds are declining across North America. A recent analysis shows widespread declines of birds in North America since 1970 resulting in the loss of nearly three billion individuals from a wide variety of species, including those once considered common.
- Birds are recognized as indicators of ecological integrity, with many responding very quickly to changing vegetation following a restoration, so their presence and abundance provides information on the restoration's efficacy.
- Birds provide a wide variety of ecosystem services, including devouring pests, pollinating flowers, dispersing seeds, scavenging carrion, cycling nutrients, and modifying the environment in ways that benefit other species.

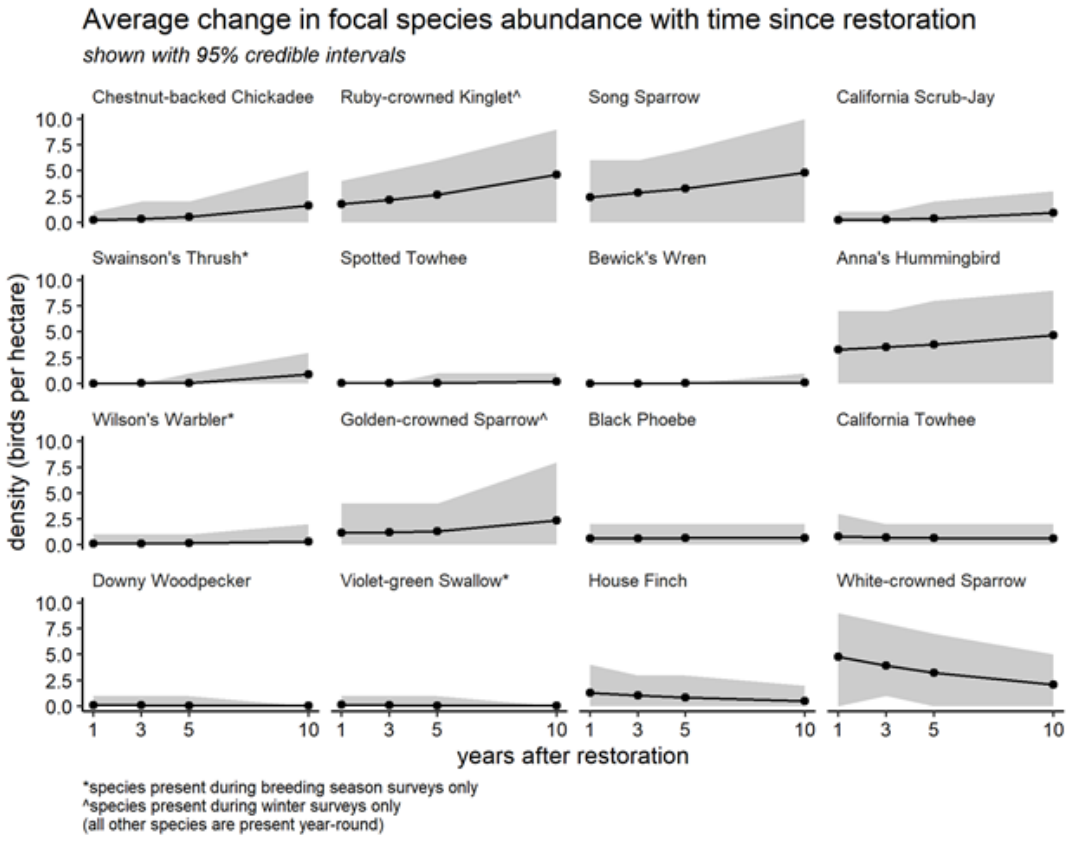


Trends of focal species in 16 restoration plots combined in San Francisco's Presidio. Blue lines indicate a positive population growth rate, gray lines indicate no detectable change, and red indicate negative population growth rate.

- Birds are highly visible with a great deal of public interest attracting many bird watchers to the Presidio and delighting regular visitors and residents. Their songs and behavior (e.g., long distance migration) also inspire great interest. Bird watching can also have significant positive impacts on local to national economies.

We systematically surveyed birds at select Presidio restoration sites from 2010 to 2021 to assess the success of restoration in increasing bird populations. Each site was surveyed during both the breeding and winter seasons starting ~1 year after the restoration was completed and then again at 3, 5 and 10 years post restoration. We focused our analysis on a set of 16 focal species at 16 riparian and coastal scrub restoration sites. The focal species were selected because they rely on riparian and coastal scrub vegetation and their life history characteristics collectively represent different aspects of a healthy system. We analyzed the average change in abundance of each focal species across all 16 restoration sites combined over 10 years post restoration.

Of the 16 focal species examined, fully 80% were increasing or stable; 8 of them were increasing with time since restoration, 5 were stable with no detectable change, and 2 were decreasing.



Average change in focal species abundance in 16 restoration plots combined in San Francisco's Presidio.

Stable or increasing species had a range of life-history characteristics – for example, there were cavity nesters like the Chestnut-backed Chickadee and shrub nesters like the Song Sparrow. The diversity of life-history traits of the increasing and stable groups suggest that the restorations in the Presidio are successful at providing a range of needs for the bird community. It is also important to highlight that stable populations, those with no detectable changes, represent signs of success. We are not sure why House Finch and White-crowned Sparrow declined, but note that White-crowned

Sparrows are declining throughout their range. Additionally, both species tend to favor open weedy habitat during winter when they also flock (versus holding territories), and hence it is possible that restoration resulted in a localized reduction in weedy areas (e.g., a weedy field edge restored to dense riparian forest). More information on the abundance and distribution of these two species Presidio wide could help contextualize these results and determine if special management actions are needed. Understanding long-term population trends, relative to environmental contexts such as restoration, informs adaptive management and guides the ongoing conservation of these urban birds.

Our results clearly show a positive effect of urban restoration on the bird community, and hence results demonstrate that, along with the multiple-benefits related to human health and well-being, habitat restoration in San Francisco's Presidio is a good investment.

For more information about this study, please contact Diana Humple at dhumple@pointblue.org.