



BIRD POPULATION AND VEGETATION TRENDS AT THE LAS VEGAS WASH, 2005–2023



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(SNWA Contract No. 01-3631-19100-046-0508)

Annual Report, 20 June 2024

Contents

Abstract	2
Acknowledgments	3
Introduction	3
Methods	4
Study Area	4
Bird Data and Analyses	4
Data Collection Methods	4
Data Analysis	5
Vegetation Measurements	7
Data Collection	7
Data Analysis	8
Results	8
Species List	8
Species Richness and Total Abundance	9
Species-Specific Abundances	11
Overall Abundance Patterns	11
Breeding Season Species Abundances in Relation to Regional Abundances	12
Non-Breeding Season Species Abundances	13
Trends in Species Abundances	13
Vegetation Measurements	14
Tree Cover	14
Other Cover Types	15
Perennial Plant Height and Vertical Structure	15
Horizontal Perennial Plant Structure	15
Discussion	16
Recommendations	18
Literature Cited	19
Figures	22
Tables	44

Cover photo: Las Vegas Wash #14, 26 May 2023. Photo by Ned Bohman.

Abstract

Great Basin Bird Observatory completed the 15th year of bird surveys and vegetation assessments along the Las Vegas Wash (Wash) in 2023, as part of research and monitoring associated with ongoing stabilization and enhancement projects on the channel designed to prevent erosion and increase native habitat. Bird surveys were completed approximately every two weeks throughout the year using 29 (later amended to 31) permanently established survey points. Once a year, in the fall, vegetation assessments were conducted at each survey point.

A total of 252 bird species have been recorded, constituting over 50% of the total bird species richness recorded in Nevada. Of these, 66 are conservation priority species according to conservation rankings by regional bird initiatives. Average species richness and total abundance were significantly higher over the most recent nine years of Wash surveys relative to the early project period. Species-specific trends were mixed, with seven species showing significant declines and nine showing significant increases over the study period. Several of the declining birds are associated with riparian shrubs, including non-native shrubs, while many of the species with increasing trends are marsh- or water-dependent.

As weir construction along the Wash has increased the availability of open water and wetland habitats, the bird community has changed substantially in response, showing increased species richness and abundance. Over the last two years, however, richness and abundance have declined in the late phase of the project. Some of these changes may be a response to habitat changes, such as loss of tree cover, but many of these changes more likely reflect regional patterns of persisting drought and other climate events.

Tree cover has declined over the course of the project and was particularly low over the past two seasons. In part, this may result from direct removal for maintenance, but other factors, including post-flood loss of trees, and potential deterioration and/or mortality from drought stress and regional screwbean mesquite mortality, may also play a role. Given that repeated clearing of vegetation from the channel is required to ensure the weirs and channel function as designed, we recommend proactive measures to increase riparian shrub and tree habitats, including increasing shrub density in proximity to water.

Acknowledgments

This study was funded by the Southern Nevada Water Authority through a grant from the Bureau of Reclamation. Thanks to all of our field surveyors of the Nevada Bird Count program who participated in the surveys, particularly David Henderson, Dorothy Crowe, Kelly Colegrove, and Ned Bohman. Many thanks to Debbie Van Dooremolen of the Southern Nevada Water Authority for project administration, coordination, and support. We also thank Debbie, Jason Eckberg, Keiba Crear, and the members of the Research and Environmental Monitoring Study Team for reviewing this document and the Las Vegas Wash Coordination Committee for their support of this project.

Introduction

The Las Vegas Wash (Wash) is the primary drainage of the Las Vegas Valley Hydrographic Basin and is located in the southeastern portion of Las Vegas Valley. The Wash extends approximately 20 km, flowing through the Clark County Wetlands Park (Figure 1) and terminating in Las Vegas Bay of Lake Mead. While the Wash was historically ephemeral, it has become a perennial riverine and wetland complex due to drainage of treated wastewater and urban runoff, as well as a shallow groundwater table. From the increasing Las Vegas Valley discharge, the Wash began to degrade through channel downcutting, which led in 1998 to the formation of the Las Vegas Wash Coordination Committee (LVWCC), a stakeholder group that includes local, state, and federal agencies; citizens; businesses; a university; and environmental groups. The LVWCC developed the Las Vegas Wash Comprehensive Adaptive Management Plan that recommended measures to halt channel degradation, restore riparian and wetland habitats, and conduct wildlife monitoring (LVWCC 2000). In 2000, implementation of this plan began, which included installing weirs and bank protection to halt erosion, and extensive vegetation improvements through tamarisk (*Tamarix ramosissima*) control, revegetation with native woodland species, and other plantings. The plan also led to the creation and implementation of the Las Vegas Wash Wildlife Management Plan, which contains 31 recommended actions designed to conserve native species, protect and enhance their habitats, and increase community awareness of these resources (Shanahan et al. 2008). Capital construction on the Wash concluded in June 2022, and the LVWCC began implementing the Las Vegas Wash Long-Term Operating Plan (LVWCC 2020).

In 2005, the San Bernardino County Museum, in conjunction with the Southern Nevada Water Authority (SNWA; the lead agency of the LVWCC), began point count bird surveys along an 8.7-km reach of the Wash (Braden et al. 2007, 2009). The purpose of these bird surveys was to (1) inventory bird populations and bird habitat parameters to provide a baseline dataset, (2) set up a long-term monitoring program that is designed to document the benefits of project activities, and (3) assist in the adaptive management process by providing valuable insight on which activities are effective and in what time frame. The museum conducted four years of surveys which are summarized in Braden et al. (2009). Our report summarizes 15 years of surveys: the four years conducted by the museum, and the 11 years conducted by the Great Basin Bird Observatory (GBBO; 2009–2011 and 2014–2023, respectively), for which we analyzed all

data to characterize bird community structure, population trends, and vegetation trends. Treatment effects through the 17th year of the project were reported in GBBO (2023b).

Methods

Study Area

The study area encompasses 8.7 km of the Wash from the Upper Diversion Weir to just downstream of the Powerline Crossing Weir (Figure 1). Twenty-nine points were established in 2005, and later additions and a deletion yielded 31 points by the end of 2006. The survey points were arranged along both sides of the Wash (Figure 1) at evenly spaced intervals to monitor the bird community and vegetation where channel modification and revegetation had occurred or would occur, as well as in areas where project activities were unlikely to occur (Braden et al. 2007), providing a broad cross-section of the different habitat types found at the Wash. The site's upland vegetation falls into the Mojave scrub landcover type, which is dominated by creosote bush (*Larrea tridentata*). Common reed (*Phragmites australis*) is extensive in riparian and wetland areas, with native, non-native, and hybrid genotypes present. Early in the project, the riparian area was dominated by the invasive, non-native tamarisk, but due to vegetation treatments, this cover type has significantly declined. Native vegetation includes Goodding's willow (*Salix gooddingii*), sandbar willow (*S. exigua*), seep willow (*Baccharis salicifolia*), Fremont cottonwood (*Populus fremontii*), honey and screwbean mesquite (*Prosopis glandulosa* and *P. pubescens*), arrowweed (*Pluchea sericea*), cattail (*Typha domingensis*), and bulrush (*Schoenoplectus* spp.). Mesquites have now become the most abundant tree along the Wash (GBBO 2018).

Active channel stabilization and revegetation activities occurred along the length of the study area throughout the study period. By the end of the first year, nine weirs and 30 ha of revegetation had been installed. At the end of Year 6, 12 weirs and 113 ha of revegetation were in place. As of fall 2022, all 21 planned weirs were constructed and nearly 250 ha had been revegetated.

Bird Data and Analyses

Data Collection Methods

Birds were surveyed using standardized five-minute point counts (Ralph and Scott 1981). Initially, 26 survey points were established; three more were added over the next few months, totaling 31 by the end of the second year. Subsequently, all 31 points were surveyed or attempted to be surveyed each year, with some points skipped on some surveys due to active construction. Some survey points had to be permanently replaced due to post-construction accessibility and safety over the course of the project (Table 1). Replacement points were located as close as was safely possible to the original location, typically less than 50 m from their original location. In 2018 (Year 13), one survey point (#17) was removed from the survey rotation for safety reasons,

and a new survey point (#34) was subsequently added to the survey schedule. This new point sampled a newly planted riparian revegetation site next to the recently completed Tropicana Weir.

Each survey point was visited approximately every two weeks, with all survey points typically visited over a two-day period. The order in which points were sampled was rotated among survey visits. Surveys were conducted from sunrise to approximately five hours post-sunrise to capture the period of greatest bird activity and vocalization frequency. In 2023, a survey schedule miscommunication resulted in the omission of one of the three scheduled January surveys and the addition of a survey in March.

Nesting evidence was collected from 2009 onward using standard breeding bird atlas methods (e.g., Floyd et al. 2007), which consider breeding to be confirmed if active nests, dependent young, food/nest material/fecal sac carrying, or nest building are observed. For more details on the point count protocol, see Braden et al. (2007).

Twenty-six surveys have been conducted per year, with one exception: during Year 15 (2019–2020), only 23 surveys were completed because of state-required coronavirus measures during late March through early May 2020 (Table 1). The survey year typically ran from mid-February through January for the first phase of the study, while for the nine most recent years of surveys, the survey year ran from September through August.

The majority of this report covers the first six years between 12 February 2005 and 31 January 2011, and the nine years between 5 September 2014 and 30 August 2023. The few seventh-year surveys conducted in 2011 (1 February through 24 April) were not included in most of our analyses, but they were included in the comprehensive species list.

Data Analysis

Species List

A comprehensive species list of all birds recorded at the Wash was generated based on all visits between 12 February 2005 and 30 August 2023, including all survey points (the total of which typically varied among years), all detection distances, and all birds detected incidentally outside of formal surveys. The list also includes “flyover” sightings (e.g., Red-tailed Hawks flying high overhead) of birds that were in the Wash area but may not have been closely tied to the vegetation present at the survey point. This species list was generated to characterize the bird community of the Wash as comprehensively as possible, and because no quantitative comparisons are necessary to do that, all survey results and incidental and flyover detections were included regardless of survey effort.

Species Richness and Abundance

Unlike our approach for the comprehensive species list, species richness and abundance patterns were analyzed using standardized comparisons that included only bird detections that occurred within a 100 m radius of each survey point. Flyovers were also excluded even if they occurred

directly above a survey point, because these birds were generally not assumed to actively use the surveyed area. Limiting the sample to detections within 100 m of the point allowed us to compare bird abundances among survey points and treatment areas, but it precluded analyses for species with a primarily aerial lifestyle, such as swallows, swifts, and nighthawks. For these species, a separate analysis that includes flyovers would be necessary, if determining their trends and habitat associations is desired.

We included survey data from all survey points for which data were available, which varied slightly over the first few years of the project. Although species richness (i.e., the number of species detected) can be sensitive to survey effort, we considered the variation to be minor, particularly given that the added and deleted survey points were representative of the rest of the study area in terms of habitat types and species composition present.

To be able to compare the Wash data to other regional abundance data (see below), we used the standardized estimate of density of the number of bird detections per 40 ha, converted from the fixed radius of 100 m around each point (3.14 ha). We then plotted the number of bird species and the number of bird detections per 40 ha by survey visit in order to illustrate temporal variation in species richness and abundance. Hatch-year birds were excluded from analyses of breeding season data. We analyzed abundance by survey visit using Analysis of Variance (ANOVA) by stage of project: early (Years 1–6) and late (Years 10–18). For all statistical analysis results in this report, $P < 0.05$ was used as the significance level, unless otherwise noted.

Species richness and abundance were also examined for the breeding and non-breeding seasons. In previous analyses (Braden et al. 2009), the breeding season was defined as the period between 15 March through 31 August to encompass the breeding of the majority of both year-round resident and migrant species. In this report, we used the same definitions to retain consistency with previous analyses. This time period overlaps with spring and early fall migration of several mid- and long-distance migrants, so some non-breeding birds are included in the breeding season estimates. The non-breeding season was defined as 1 October through 31 January to include overwintering birds but exclude nesting of most resident species. Average species richness and estimated density per survey were calculated for these seasons. Transitional periods covering the dates not included in either the breeding or non-breeding seasons were also included in the results, where appropriate.

Species-Specific Abundances

For each species, estimated bird density (birds per 40 ha) was calculated for each year overall, and for its breeding and non-breeding seasons. Relative abundance (proportion of total bird abundance contributed by a species) was calculated for the same periods, but only for species representing at least 1% of the total abundance in one or more periods. We also compared changes in relative abundance between project phases, limiting species to those with at least 1% of the total abundance in either the early or late period, and differing by at least 1 percentage point.

We also report species frequency, which represents the percentage of Wash survey points at which the species was detected at any point during a year. This metric provides a measure of

how widespread a species is within the study area. Partway through Year 13, one point was dropped and another point was added; this resulted in 32 points used for the frequency calculations for that year, rather than the usual 31 (past point changes have either been close to changes in survey-year, or have been relatively minor shifts in location to accommodate construction).

Breeding season abundances from the Wash surveys were also compared to data collected as a part of GBBO's Nevada Bird Count (NBC) in other Clark County lowland riparian areas. This was done to provide a reference point for the estimated densities at the Wash from regional data collected in similar habitat types. The NBC data were collected on 190 survey visits of 46 transects, generating surveys on approximately 1,900 point-visits (since each transect typically consists of 10 points) in roughly the same period (2005–2014) as the early and intermediate Wash surveys (7,853 point-visits). Both datasets included only detections from within 100 m of the survey point for the purpose of comparisons. However, NBC data were collected over a 10-minute survey period per point, rather than the five-minute period used at the Wash. Further, the breeding season periods differed in that the Wash data were for the period between 15 March through 31 August, with surveys evenly distributed throughout that time period, while the NBC data were collected from mid-April through June, with most surveys occurring in May and early June. Regardless of these differences in methods, we consider the regional comparisons of estimates of breeding densities reported here informative for most breeding landbird species. No similar datasets were available for the non-breeding season, preventing us from making regional comparisons for that period.

Finally, to determine whether population trends over time were significant, we performed negative-binomial regression analyses for count data, using year as a predictor and number of points per visit as an exposure variable. The 20 species for which we performed population analyses were all abundant along the Wash, with estimated densities of at least one detection per 40 ha; represented conservation priority or indicator species for the project (see earlier GBBO reports); and comprised a balanced mix of species representing different seasonal bird use of the Wash.

Vegetation Measurements

Data Collection

Vegetation data were collected at each bird survey point along the Wash during each fall in 2005–2010 and in 2014–2022, using a vegetation protocol developed by Braden et al. (2009). Three 100 m vegetation transects were laid out radially, at 120° angles from the point. (Some points were unable to have all three transects, given their proximity to the Wash.) Data were collected every 2 m along each transect at the distances of 20–40 m and 50–70 m from the survey point. Along each of these six 20 m segments, plant species occurrence, height, and vertical structure were recorded at 2 m intervals, yielding 60 sampling stations per point. Using an 11–15 m survey rod, perennial plant height was measured to within 0.1 m; any vegetation exceeding the height of the survey rod was estimated to within 0.5 m. Perennial plant structure was measured as the number of vegetation contacts at 1 m vertical intervals along the survey rod.

Data Analysis

Percent cover type composition was calculated for each survey point, using averages from the point's vegetation transects, and also transects across the Wash, using averages from the 26 points surveyed consistently over the study period. Cover types included in the analyses were categorized as trees, shrubs, grasses, forbs, cattails, and *Phragmites*. Because some vegetation transects ended in the channel, emergent vegetation may be underestimated overall due to its naturally-clustered distribution along the banks. ANOVA was used to investigate vegetation cover type differences among years; where significant differences were found, unpaired two-sample t-tests were conducted to compare means of the early (2005–2010) and late (2014–2022) stages of the project. While bird data collected for this report extended through August 2023, the vegetation data analyzed for the most recent project year were collected in the fall of 2022.

Percent cover of live trees by species was also calculated for each survey point and across the Wash. The species included in this analysis were those most frequently recorded on the surveys: Fremont cottonwood, honey mesquite, screwbean mesquite, Goodding's willow, sandbar willow, and tamarisk.

Perennial vegetation height for each point was calculated as the average perennial height of the 60 sampling stations and was analyzed for differences among years using the point as the sample unit. Vertical structural diversity was assessed by plotting the mean number of contacts vegetation made with the survey rod against the height categories 0–2 m, 2–4 m, 4–6 m, 6–8 m, and 8–10 m. These data were also analyzed for between-year differences and, if significant, between-stage differences.

Horizontal perennial heterogeneity was evaluated using the Hill (1973) proportional diversity measure $[1/\sum p_i^2]$, where p_i is the proportion of vegetation-rod hits at each of the six vegetation-transect segments at a survey point. The horizontal diversity measure was calculated for each point over the 15 years of data collected, with values increasing as vegetation becomes more evenly distributed.

Results

Species List

Between 12 February 2005 and 30 August 2023, 252 bird species were observed during survey visits to the Wash (Table 2). In the 18th year of the project (2022–2023), five species were detected for the first time: Iceland Gull, Lewis's Woodpecker, Ridgway's Rail, Woodhouse's Scrub-Jay, and Yellow-billed Cuckoo (all scientific names in Table 2). Ninety-three species that had been detected at least once during previous years' surveys were not found in 2022–2023, including such species as Long-billed Dowitcher, Horned Lark, Pine Siskin, Western Sandpiper, Western Flycatcher, European Starling, Wilson's Snipe, and Dusky Flycatcher.

Of the 252 species observed during the 15 years of surveys, 206 were recorded during the breeding season (15 March – 31 August), and 186 were recorded during the non-breeding season (1 October – 31 January). While most species were recorded during at least one of the transitional seasons (204), only a small number of species (15) were detected exclusively during these periods, suggesting that most migrants actually passed through during the breeding or non-breeding seasons.

Sixty-six species recorded at the Wash are conservation priorities according to the Nevada Comprehensive Bird Conservation Plan (GBBO 2010), the Clark County Multiple Species Habitat Conservation Plan (Clark County 2000), the Lower Colorado River Multi-Species Conservation Program (LCRMSCP 2004), the Nevada Wildlife Action Plan (Nevada Department of Wildlife 2012), and/or the Partners in Flight Landbird Conservation Plan (Rosenberg et al. 2016; Table 2). Forty-three of the priority species were recorded during the non-breeding season, and 54 were recorded during the breeding season. Fifty-four priority species were detected during the transitional periods, but only five of these were detected exclusively in the transitional seasons. Three conservation priority species were newly recorded on the Wash in 2022–2023: Yellow-billed Cuckoo, Ridgway’s Rail, and Lewis’s Woodpecker. The cuckoo and the rail are federally listed under the Endangered Species Act.

One new species was confirmed as a breeder in 2022–2023, the Common Raven, resulting in a total of 50 species confirmed to be nesting at the Wash based on breeding evidence gathered in 2009–2023. Eleven conservation priority species were confirmed to nest at the Wash. The full list of birds confirmed as breeders is as follows (conservation priority species in bold):

Abert’s Towhee	Cooper’s Hawk	Mallard
American Avocet	Costa’s Hummingbird	Mourning Dove
American Coot	Crissal Thrasher	Neotropic Cormorant
American Kestrel	Double-crested Cormorant	Northern Harrier
Anna’s Hummingbird	Gambel’s Quail	Northern Mockingbird
Bell’s Vireo	Great Blue Heron	Northern Rough-winged Swallow
Bewick’s Wren	Greater Roadrunner	Red-shouldered Hawk
Black Phoebe	Great-tailed Grackle	Red-tailed Hawk
Black-chinned Hummingbird	Green Heron	Red-winged Blackbird
Black-crowned Night-Heron	Hooded Oriole	Say’s Phoebe
Black-tailed Gnatcatcher	House Finch	Song Sparrow
Blue Grosbeak	Indigo Bunting	Verdin
Brown-headed Cowbird	Killdeer	Western Kingbird
Canada Goose	Least Bittern	Yellow Warbler
Common Gallinule	Loggerhead Shrike	Yellow-breasted Chat
Common Raven	Long-eared Owl	Yellow-headed Blackbird
Common Yellowthroat	Lucy’s Warbler	

Species Richness and Total Abundance

Species richness varied seasonally throughout the study period. Over the whole study period, it was lowest in June and peaked during September, likely due to migration and juvenile dispersal (Figure 2). However, richness patterns changed over the course of the project. During the first six

years, richness typically was lowest during the non-breeding season/winter transition, with a second dip during June, and it was highest during August and September (late breeding season and fall transition), with a second, lower, peak around May. Over the nine most recent years of the study, the lowest species richness was in June/July, with the peak in August/September continued as in previous years, but then after a small dip, richness increased again and remained high over much of December through April (Figure 2, Table 3).

Species richness was similar among the first six years, showing only a slight overall increase, but it was significantly higher in Years 10–18 compared to previous years, averaging 12 more species per survey (ANOVA, $R^2 = 0.49$; $P < 0.001$; Figure 3, Table 3). In all months, richness during the late phase was higher than during the early phase; however, the largest increases were detected in January through April (range: 14.9–18.4 more species), while the smallest was in July (5.0).

Total bird abundance (bird detections per 40 ha) also varied seasonally, and the pattern changed over time (Figure 4). Across the life of the project, total abundance was lowest in May through September, particularly in August, and highest during November through February, peaking in the latter month. During the first six project years, overall abundance showed a peak in the breeding season (May–July), as well as a larger peak during the early non-breeding season (October–December; Figure 4). Total abundance was the lowest in either February/March or August/September, generally corresponding with the winter and fall transitional periods (Table 4). In contrast, over the most recent nine survey years, the lowest abundances were recorded in the breeding season and fall transition (particularly May through September), and the highest abundances were found in the non-breeding and winter transitional seasons (particularly December through March; Figure 4, Table 4). Interestingly, the pattern of highest and lowest abundances has been much more stable over the most recent nine years, relative to the first six years.

Total bird abundance also increased over the project. The average number of birds detected over the most recent nine years was 97 birds per 40 ha greater than that detected over the first six years of the project ($R^2 = 0.25$; $P < 0.001$; Figure 5, Table 4). The largest increases in abundance between the early and late stages of the project were observed during the non-breeding season and the winter transition (December through March; Table 4).

In Year 17 and, to a lesser extent, Year 18, richness and abundance were lower relative to the rest of the late phase. Mean richness per survey, for example, averaged 42.7 in Years 17 and 18, compared to 46.3 in Years 10–16 (range: 44.8–47.3).

In Year 17, the total birds detected reached a low point relative to the rest of the late phase. Mean detections for this year were lower than the late-phase mean in every month except July, and were depressed for several months spanning the non-breeding season and fall and winter transitional periods. In Year 18, detections rebounded, though overall numbers were still at their second-lowest point of the late phase of the project. Mean detections were lower than the late-phase mean in every month except March and November; however, the bulk of the difference was driven by fewer detections in January 2023.

Species-Specific Abundances

Overall Abundance Patterns

Over the entire study period, the 10 species with the greatest absolute abundances were American Coot, Yellow-rumped Warbler, Mallard, Red-winged Blackbird, Gadwall, Abert's Towhee, Gambel's Quail, American Wigeon, White-crowned Sparrow, and Great-tailed Grackle (Table 5). In the nine most recent survey years, waterbird abundances increased dramatically relative to the first six years, particularly American Coot, American Wigeon, Gadwall, and Mallard (Tables 5 and 6a–b). For example, the average estimated density of American Coots over the past nine years of surveys was 6.0 times their estimated density from the first six years of the project. Mallard, Gadwall, and American Wigeon also showed substantial increases, increasing by factors of 3, 10, and 50, respectively. Abundances of these waterbirds peaked in Years 11–13 (2015–2018), and since then they have been detected in lower numbers, particularly in 2021–2022. However, detections remain substantially higher than during the early phase of the project.

While waterbirds have increased during the late project period, several species associated with riparian shrub/tree habitats declined from the early project period, particularly Song Sparrow, Bewick's Wren, Lucy's Warbler, and Yellow-breasted Chat. Interestingly, Brown-headed Cowbirds appear to have similarly declined.

The species with the highest absolute abundances also had the highest relative abundances (Tables 7 and 8a–b), and the shifts in waterbirds and riparian shrub birds were apparent here as well. American Coots increased from approximately 2% to 15% of the total bird abundance between the first and most recent year's surveys. Abert's Towhees, on the other hand, declined from approximately 12% to 4% of the total bird abundance over the same period (Table 7). Of the species comprising at least 1% of the bird community in either the early or late project periods, the species with the greatest increases in relative abundance were primarily waterbirds and wetland associates (American Coot, American Wigeon, Gadwall, Great-tailed Grackle, and Mallard), but also Gambel's Quail, which is primarily associated with shrubs. The species with the greatest decreases in relative abundance were riparian shrub/tree species (Abert's Towhee, Bewick's Wren, Lucy's Warbler, and Song Sparrow), but also Brown-headed Cowbird and Marsh Wren.

While wetland and waterbird species were among the most abundant, they were not the most widespread along the Wash, as measured by the percentage of total survey points with detections (frequency of occurrence). Over the course of the project period, Yellow-rumped Warbler, Abert's Towhee, Verdin, Black Phoebe, White-crowned Sparrow, Black-tailed Gnatcatcher, Common Yellowthroat, Song Sparrow, Orange-crowned Warbler, Red-winged Blackbird, and Ruby-crowned Kinglet had the highest frequencies of occurrence along the Wash (Table 9).

Given the expansion of wetland habitats over the project period, it is unsurprising that many of the species with the largest absolute increases in frequency between the first six years and the most recent nine years were wetland associates, including American Wigeon, Great-tailed Grackle, Great Blue Heron, Common Gallinule, Sora, Canada Goose, White-faced Ibis, Lesser

Scaup, Northern Pintail, Bufflehead, Osprey, and Mallard. Other species whose distribution across the Wash increased greatly included Anna's Hummingbird, Northern Mockingbird, Gambel's Quail, Greater Roadrunner, Western Kingbird, Western Meadowlark, Costa's Hummingbird, and Lincoln's Sparrow. Though not among the species with the largest absolute increases, Red-shouldered Hawk showed the largest relative increase in frequency of all species.

Species with the largest absolute decreases in frequency included Mourning Dove, Yellow-breasted Chat, Lucy's Warbler, Blue-gray Gnatcatcher, White-winged Dove, Brown-headed Cowbird, Dark-eyed Junco, and Bewick's Wren. Other species with large relative decreases in frequency between the two periods include Bushtit, Chipping Sparrow, and Phainopepla.

Results for the project's 15th year (2019–2020) were affected by the lack of surveys during the early breeding season, when surveys were shut down due to the coronavirus pandemic, particularly impacting the detection of spring migrants stopping over at the Wash. For example, frequencies appear particularly low in Year 15 for Western Wood-Pewee, Wilson's Warbler, and Yellow Warbler.

Breeding Season Species Abundances in Relation to Regional Abundances

During the breeding season, the 10 most abundant species at the Wash over the course of the study were Red-winged Blackbird, Great-tailed Grackle, Abert's Towhee, Common Yellowthroat, American Coot, Gambel's Quail, Song Sparrow, Verdin, Black-tailed Gnatcatcher, and Mallard (Tables 6a and 10).

Breeding season species abundance patterns between the early and late phases of the project were similar to the overall results discussed above. Of the 16 species with at least a 2 birds per 40 ha difference in detections between the early and late project periods, eight species showed increases. Most of these species use wetland and marsh habitats (American Coot, Great-tailed Grackle, Red-winged Blackbird, Mallard, American Wigeon, and Gadwall), but Gambel's Quail and Verdin, both shrub/tree associated, also showed increases. The eight species showing apparent declines were Song Sparrow, Brown-headed Cowbird, Abert's Towhee, Lucy's Warbler, Bewick's Wren, Yellow-breasted Chat, Marsh Wren, and Mourning Dove. Most of these use woody riparian habitats, though cowbirds and Mourning Doves are generalists, and Marsh Wrens use emergent vegetation.

In comparison, the 10 most abundant species recorded during 10 years of NBC surveys within Clark County lowland riparian areas included Gambel's Quail, Abert's Towhee, Lucy's Warbler, Mourning Dove, Brown-headed Cowbird, Yellow Warbler, Verdin, House Finch, Red-winged Blackbird, and Song Sparrow (Table 10). Five of the 10 most abundant species in the NBC were also among the 10 most abundant for the Wash, and of the 50 most abundant species at the Wash, 32 (64%) were also in the 50 most abundant species in the NBC surveys (Table 10), indicating broad similarities between the Wash and other, often longer-established, riparian areas of the region.

Differences in bird abundance between the Wash and other riparian areas were found for some species associated with wetland, disturbed, and riparian and riparian/upland interface habitats,

however. Red-winged Blackbird, Great-tailed Grackle, American Coot, Common Yellowthroat, Mallard, Song Sparrow, Black-tailed Gnatcatcher, Marsh Wren, Verdin, Abert's Towhee, American Wigeon, and Gadwall were all detected in greater numbers along the Wash than in regional riparian areas. Fewer species were found in notably greater numbers in regional riparian areas than along the Wash, and among them were Phainopepla, House Finch, Lucy's Warbler, and Black-throated Sparrow (Table 10). While habitat patches containing mesquite have increased in number and developed in structure over the course of the project due to restoration action, significant patches are still fairly rare, and mistletoe infestations are still lower than in longer-established mesquite stands (GBBO pers. obs.), thus species such as Phainopepla, that are known to respond to these infestations, may be rarer. House Finches in Clark County's riparian areas are often found nesting in stems large enough to support natural cavities, as well as in palm trees. Lucy's Warblers also require larger stems that can support cavities, and these are not yet well-distributed along the Wash. The prevalence of Black-throated Sparrows in the NBC sample likely results from a greater number of narrow riparian areas and subsequent inclusion of upland shrub habitats.

Non-Breeding Season Species Abundances

During the non-breeding season, the 10 most abundant species at the Wash over the entire study period included American Coot, Yellow-rumped Warbler, White-crowned Sparrow, Gadwall, Mallard, American Wigeon, Marsh Wren, Abert's Towhee, American Pipit, and Red-winged Blackbird (Table 6b). No similar datasets were known from elsewhere, preventing us from making regional comparisons. The most abundant birds of the non-breeding season were a mix of year-round residents (e.g., Abert's Towhee, Red-winged Blackbird), migrants and wintering species of the Mojave Desert (e.g., Yellow-rumped Warbler, White-crowned Sparrow, American Pipit), and wetland/aquatic species (e.g., American Coot, Gadwall, Mallard, Marsh Wren, American Wigeon).

The change in composition of this list in recent years relative to the earliest years of the project continues to be striking, as waterfowl have become increasingly abundant. Over the first six years of the project, the 10 most abundant species were Abert's Towhee, Song Sparrow, Yellow-rumped Warbler, Red-winged Blackbird, Marsh Wren, Bewick's Wren, White-crowned Sparrow, American Coot, Common Yellowthroat, and Black-tailed Gnatcatcher. In the most recent nine years of the project, the 10 most abundant species were American Coot, Yellow-rumped Warbler, Gadwall, Mallard, American Wigeon, White-crowned Sparrow, Marsh Wren, Gambel's Quail, American Pipit, and Red-winged Blackbird. Species no longer as prominent within the community are mostly riparian songbirds, such as Song Sparrow and Bewick's Wren, whereas waterbirds and birds of open areas, such as Gadwall, American Wigeon, Mallard, and American Pipit, are now more dominant members of the Wash bird community.

Trends in Species Abundances

We examined trends in abundance for 20 focal species of the Wash over the 18-year project period (Figures 6a–e, Table 11). Nine species showed significant increases: American Coot, Yellow-rumped Warbler, Mallard, Gadwall, Gambel's Quail, Verdin, Black-tailed Gnatcatcher, Orange-crowned Warbler, and Crissal Thrasher. These species are associated with open water

(e.g., American Coot, Mallard, Gadwall), and drier or more open habitat types than cottonwood/willow woodlands (e.g., Black-tailed Gnatcatcher, Verdin, Gambel's Quail, Crissal Thrasher). Orange-crowned Warbler migration and overwintering habitat use is variable, with western individuals primarily associated with riparian corridors (e.g., cottonwood, willow, and tamarisk) and shrubby woodland habitats (Gilbert et al. 2010). Yellow-rumped Warbler migration and overwintering habitat use is also variable; while it generally avoids arid habitats, it is found in marshes, shrublands, and open forest (Hunt and Flaspohler 1998).

Seven of the species showed significant declines in abundance along the Wash: Abert's Towhee, Song Sparrow, Marsh Wren, Bewick's Wren, Black Phoebe, Lucy's Warbler, and Yellow-breasted Chat. These species tend to be found in dense riparian shrub habitats (e.g., Abert's Towhee, Song Sparrow, Bewick's Wren, Yellow-breasted Chat), and in woodlands mature enough to provide nest cavities or cavity-like substrates (Lucy's Warbler and Bewick's Wren). Marsh Wren tends to occur in emergent vegetation, while Black Phoebe habitat use varies, but the species requires close proximity to water (Wolf 1997).

The riparian-associated species likely responded to the initial reduction of such vegetation due to tamarisk removal; as sites recover from this disturbance and revegetated stands mature, these species may increase in abundance. However, the declines in Song Sparrow, Bewick's Wren, Lucy's Warbler, and Yellow-breasted Chat detections may warrant greater focus in future restoration planning.

Encouragingly, while Ruby-crowned Kinglet showed a significantly decreasing trend in detections through the 2018–2019 survey year, that is no longer the case. However, Red-winged Blackbird showed a significantly increasing trend in detections through the 2021–2022 survey year, but with the inclusion of the most recent year of data, the difference is no longer significant. Late-phase mean detections remain greater than the early-phase mean, but detections over the past six years are lower than the peak in Years 10–12. Common Yellowthroat and American Pipit have shown no significant change over the study period.

Vegetation Measurements

Tree Cover

Based on our measurements, overall tree cover declined significantly over the 18-year period, from 32% in the early phase to 15% in the late phase of the project ($P < 0.001$; Figure 7, Table 12). Tamarisk cover also declined significantly, from 25% in the early phase to 3% in the late phase ($P < 0.001$; Figure 8, Table 12). Native riparian tree cover (e.g., Fremont cottonwood, Goodding's willow, and sandbar willow) was statistically similar among years both collectively and individually (Figures 9–12, Table 12). Mesquite tree cover was also statistically similar among years (Figure 13, Table 12).

The proportion of overall tree cover provided by native riparian species (not including mesquites) significantly differed over the project period, but the difference between the early-stage mean and the late-stage mean was not significant ($P = 0.202$; Figure 14, Table 12). The

proportion of total tree cover provided by mesquites did not significantly differ over the project period ($P < 0.080$; Figure 15, Table 12).

The most recent two years of data collection have led to substantially different results for tree cover. For example, native riparian tree cover values were the two lowest recorded over the course of the project (1.0–1.5%). Mesquite cover values were also the two lowest recorded over the late stage of the project (2.5–2.9%). It is possible that some combination of vegetation loss and removal, deterioration due to drought, and screwbean mesquite deterioration due to regional screwbean mortality have played a role in these changes.

Other Cover Types

Besides tree cover, five other cover types were evaluated for changes at the Wash over the 18-year study period, including shrubs, forbs, grasses, *Phragmites*, and cattails (Figures 16–20, Table 12). Overall shrub cover increased significantly from 17% in the early stage of the project to 26% in the late stage ($P < 0.001$). This increase was driven primarily by upland shrubs such as four-wing saltbush (*Atriplex canescens*), which increased from 16% early in the project to 24% late in the project ($P < 0.001$). Riparian shrub cover stayed statistically similar over the project period.

Forb cover declined over the study period from 4% to 1% between the early and late project phases ($P < 0.001$; Figure 17, Table 12). Grass cover significantly differed among years (Figure 18), declining from 2% to 1% cover between phases of the project ($P = 0.033$). *Phragmites* cover was statistically similar among years. Cattail cover declined from 1% to 0% between phases ($P = 0.001$; Figures 19–20, Table 12).

Perennial Plant Height and Vertical Structure

Mean perennial plant height was statistically similar among years (Figure 21, Table 12). Overall perennial plant structure differed among years (Figure 22, Table 12), with the number of foliage hits on the survey rod decreasing from a mean of 431 rod hits in the early phase of the project to 263 hits in the late stage ($P < 0.001$). When analyzed by height interval, significant differences among years were observed in the 0–2 m, 2–4 m, and 4–6 m height intervals (Figures 23–25, Table 12). The mean number of rod hits in the 0–2 m height interval differed among years, and was significantly lower in the late stage of the project (averaging 277 hits early vs. 203 late; $P < 0.001$). In the 2–4 m height interval, mean rod hits decreased from 104 in the early phase to 37 in the late phase ($P < 0.001$). Similarly, in the 4–6 m height interval, mean rod hits decreased from 37 early in the project to 12 late in the project ($P < 0.001$). There were, however, no significant differences among years in the 6–8 m and 8–10 m height intervals over the study period (Figures 26–27, Table 12).

Horizontal Perennial Plant Structure

Horizontal structure of perennials was evaluated using a proportional plant diversity measure based on rod hits by stems along the vegetation transect line. The horizontal heterogeneity index

declined significantly, from a mean of 3.2 hits early in the project to 2.7 hits late in the project ($P < 0.001$; Figure 28, Table 12).

Discussion

As discussed in previous reports (GBBO 2011a, 2011b, 2018, 2019a, 2020, 2022, 2023a), the bird community of the Wash is particularly diverse, featuring more than 50% of all bird species recorded in Nevada and providing habitat for 66 conservation priority species, 11 of which were confirmed to breed on the site.

The Wash's bird community shifts seasonally throughout the year, with bird species richness at its lowest in June and peaking during September. Species richness patterns changed over the course of the project, with the peaks in richness not only higher relative to the early phase of the project, but also shifting to the transitional periods and non-breeding season. Peak richness occurred in Year 11, though numbers stayed similarly high through Year 16. In Year 17, however, richness declined, though it was still higher than that found in the early stage of the project. Numbers recovered slightly in Year 18 but were still the second lowest richness of the late phase. This illustrates the importance of (1) year-round monitoring when monitoring the effectiveness of restoration projects, as many of the benefits to birds may lie in the reliable availability of high-quality migration stopover and wintering habitat rather than in adding breeding season support, and (2) long-term datasets that can capture these changes.

Seasonal patterns of bird abundance also changed dramatically over the course of the project, though abundance remained highest during the non-breeding season. Total bird abundance was also significantly higher later in the project, relative to the early phase. In the early project phase, high winter numbers were mostly due to landbird contributions (e.g., large flocks of wintering American Pipits in October/November), while in the late phase, they were mostly driven by overwintering waterbirds. Total abundance followed a similar overall pattern as richness over the past two years. Numbers reached their low relative to the rest of the late phase in Year 17, primarily due to a broad depression of numbers detected in the non-breeding season and transitional periods. Detections rebounded in Year 18 but were still at their second-lowest point of the late phase, primarily because of low numbers in January.

Though the Wash was historically ephemeral, establishing permanent flows and stabilizing its channel have created an environment that is similar to natural perennial streams, while also creating significant open water and marsh habitat types due to multiple impoundments. With the vegetation shifting overall to native shrub and tree cover types (due to extensive active and passive revegetation), the main microhabitat types that appear to be still in recovery and may need active promotion include riparian-obligate shrubs, cavity-producing trees, and mistletoe-infested mesquite.

Overall, species richness and total abundance have been significantly greater over the past nine years, relative to the early phase of the project. However, we previously noted that in Year 14 (2018–2019), the numbers of birds had decreased primarily due to declines in the number of

birds recorded during the non-breeding season, but these subsequently rebounded. We speculated at that time that possible changes in water levels elsewhere in the region could have resulted in shifts in local use by waterbirds (GBBO 2023a).

In Year 17, the Wash experienced larger declines in abundance, again driven by greatly reduced numbers of overwintering waterbirds, along with smaller reductions in other species, but unlike in Year 14, we also experienced a decline in species richness, to the lowest level recorded during the current project phase. Both abundance and richness rebounded in Year 18 but were still the second-lowest values in the late stage of the project.

We suspect that these declines in abundance and richness are a result of the particularly deep and prolonged regional drought that peaked in 2021. During southern Nevada breeding season surveys for the NBC and desert thrasher projects in 2021, we observed reduced territoriality and breeding behavior in all upland habitats. It is also likely that regional changes in water levels elsewhere could have resulted in reduced breeding and shifts in migration and wintering areas, and indeed, that was observed in northern California and Oregon (Cart 2021). For instance, in their online dataset maintained since 2008, December waterfowl numbers in the Sacramento National Wildlife Refuge Complex reached their low in 2022 (USFWS 2023).

In addition, mass die-off events occurred across the western United States during fall migration 2020, with several in southern Nevada (Yang et al. 2021), and subsequent analysis indicated that drought may particularly affect birds that are younger, insectivorous, and migratory (Stanek et al. 2022).

Tree cover has declined over the course of the project, with particularly low values recorded over the most recent two years of data collection. Some of this reduction is likely related to the in-channel clearing associated with weir maintenance, but this reduction was also seen with mesquites, which are typically not found in areas that impact weir performance. The reduction may then reflect a combination of factors including tree removal for maintenance, tree loss from post-flood channel changes, and potentially tree deterioration and mortality from drought stress and regional screwbean mortality. We expect that this loss of tree cover has negatively affected some members of the bird community; however, the scale of the past two years' declines in bird richness and abundance likely reflects regional patterns.

The recent declines notwithstanding, overall, the past nine years have experienced increases in species richness and total abundance relative to the early phase of the project, and these were particularly associated with birds of aquatic and wetland habitat types, such as American Coot, Mallard, and Gadwall. The replacement of dry tamarisk with upland shrubs and mesquites has also resulted in significant increases in several species, including Black-tailed Gnatcatcher, Verdin, Gambel's Quail, and Crissal Thrasher.

Several species requiring denser riparian shrub habitats and larger stems have declined over the course of the project. We attribute most of these longer-term declines to the initial responses of these species to vegetation removal. Active revegetation is ongoing, but it takes time to grow a dense riparian shrub layer and trees of sufficient stem diameter to support cavities.

Recommendations

Several currently or recently declining species are responding positively in areas where vegetation is maturing (GBBO 2023b). Other species likely require increasing riparian shrub density and allowing those stands to mature, particularly adjacent to water.

Further, declines in tree cover have been recorded over the past two years of data collection, due to some combination of causes, including vegetation loss via direct removal for management and post-flood channel movement; and potential deterioration and/or mortality from drought, regional screwbean mesquite mortality, and other factors.

Given the need for repeated vegetation clearing to maintain stabilization facilities, and declining detections in riparian shrub species, including steep declines in Lucy's Warbler and Yellow-breasted Chats, we recommend proactive steps be taken to

- (a) protect and create habitats outside of the weir impact zone;
- (b) identify and take advantage of opportunities to expand low elevation floodplain areas;
- (c) establish dense riparian shrub habitats outside of the channel impact zone, and, where possible, increase these habitats adjacent to water;
- (d) establish additional mesquite habitats; and
- (e) protect larger-stemmed woodlands for cavity-nesting species.

Screwbean mesquites are an important component of native bird habitats along the Wash. However, until more information on the causes of regional screwbean mortality has been found, and ways to maintain screwbean mesquite health have been determined, we recommend focusing mesquite restoration efforts on increasing the honey mesquite component along the Wash.

SNWA is transitioning the point count study to a biennial frequency, and monitoring will be paused until spring 2025. We suggest that SNWA use this time to determine which restoration and vegetation management strategies might best benefit the diversity of birds and the overall contribution of the Wash to bird conservation. For instance, if open water and wetland habitats are the most likely outcomes of future management, then a strategy could be to make these areas as suitable as possible for the greatest diversity of birds. If there is a priority to protect existing, and establish additional, native woodlands (e.g., willows, cottonwoods, and mesquites), then SNWA may benefit from the above recommendations (a–e). Future findings of avian point count surveys will help determine if actions lead to increases in associated birds. GBBO is available to help review potential strategies, as well as discuss particular restoration sites, as in the past (GBBO 2019b).

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Figures

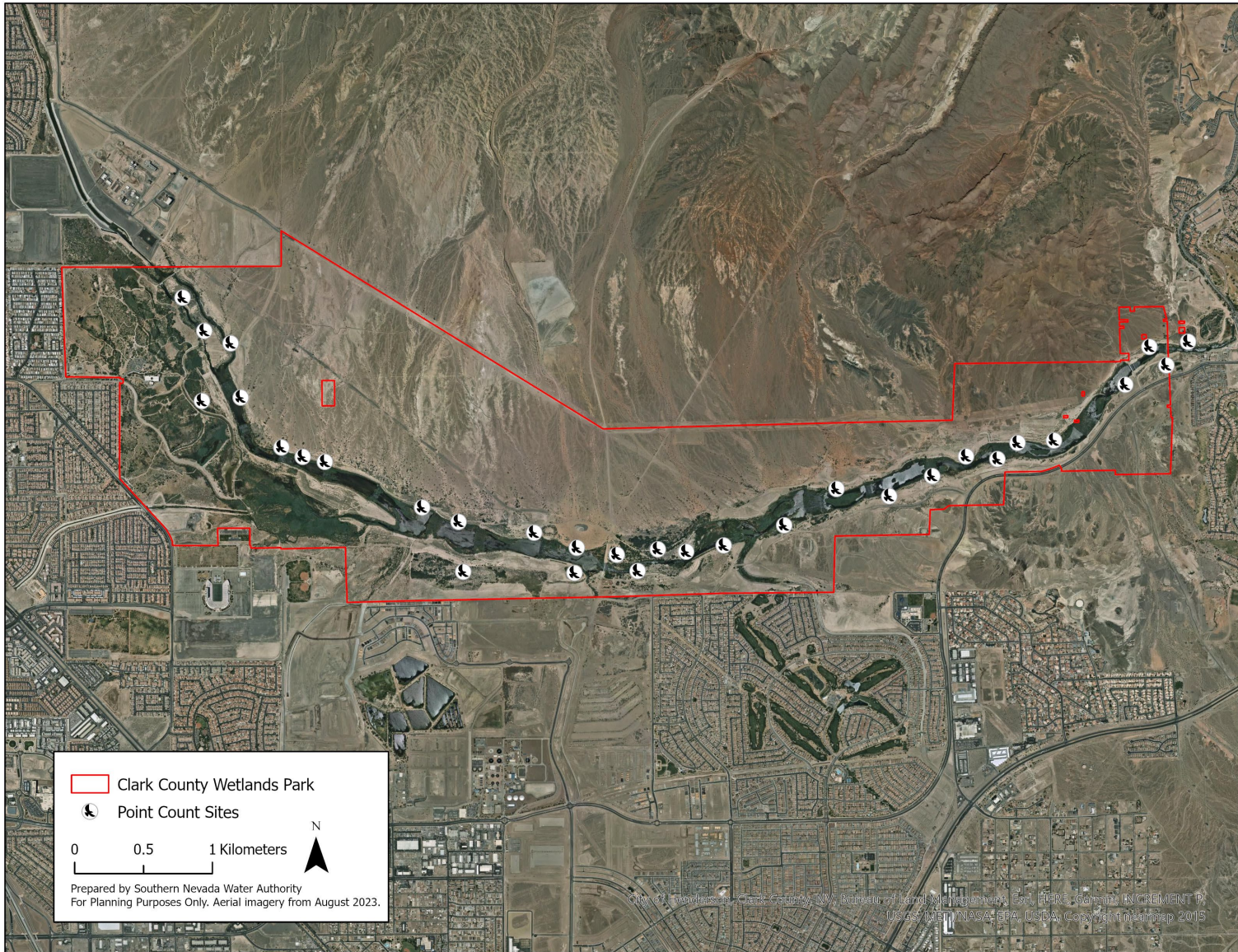


Figure 1. Distribution of points across Las Vegas Wash. Map courtesy of Southern Nevada Water Authority.

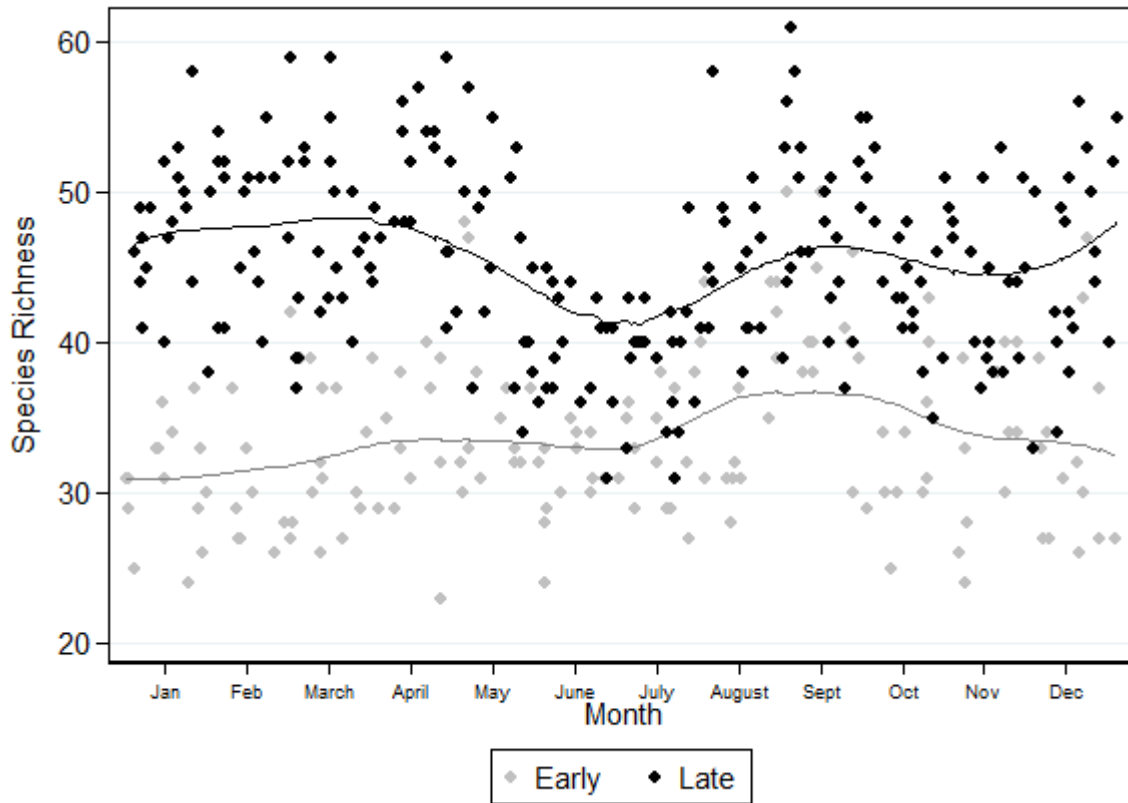


Figure 2. Seasonal bird richness per survey visit from 387 surveys of the Las Vegas Wash (2005–2023), by stage of project: Early (Years 1–6) and Late (Years 10–18). Curves represent LOWESS smoothed fits for variation in richness among survey visits.

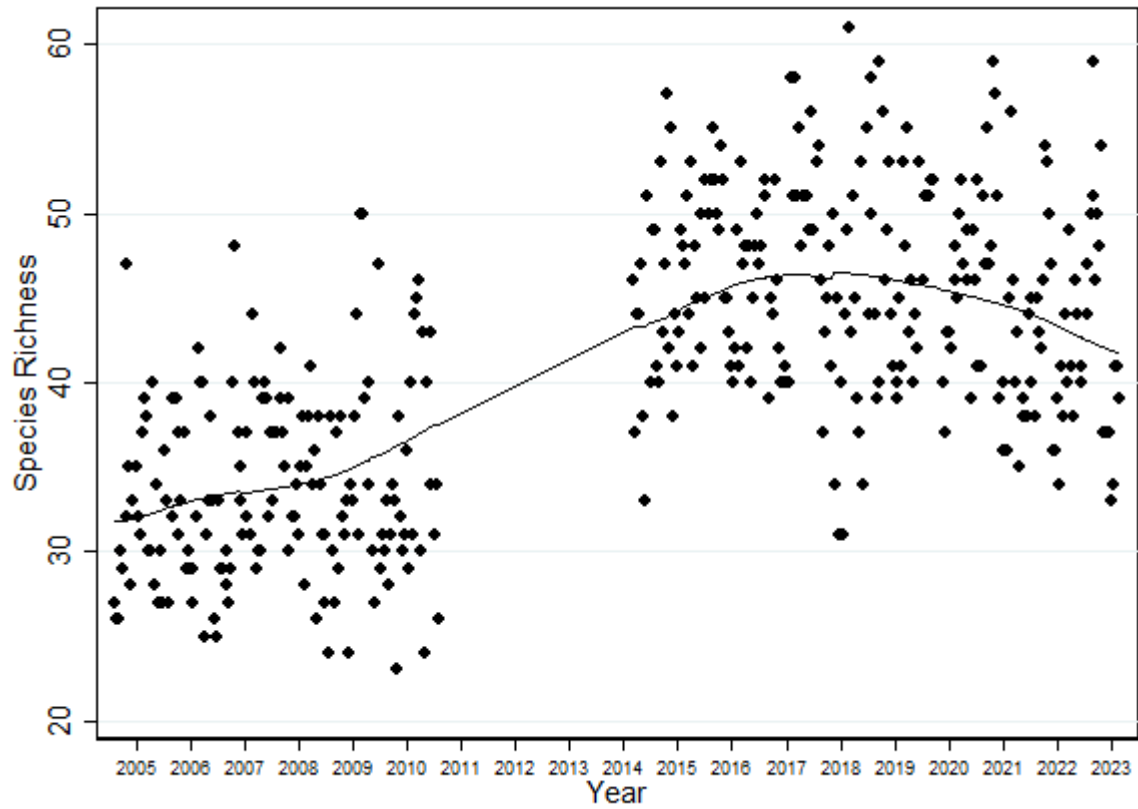


Figure 3. Trend in species richness from 387 surveys of the Las Vegas Wash (2005–2023). Curve represents a LOWESS smoothed fit for variation in richness among survey visits.

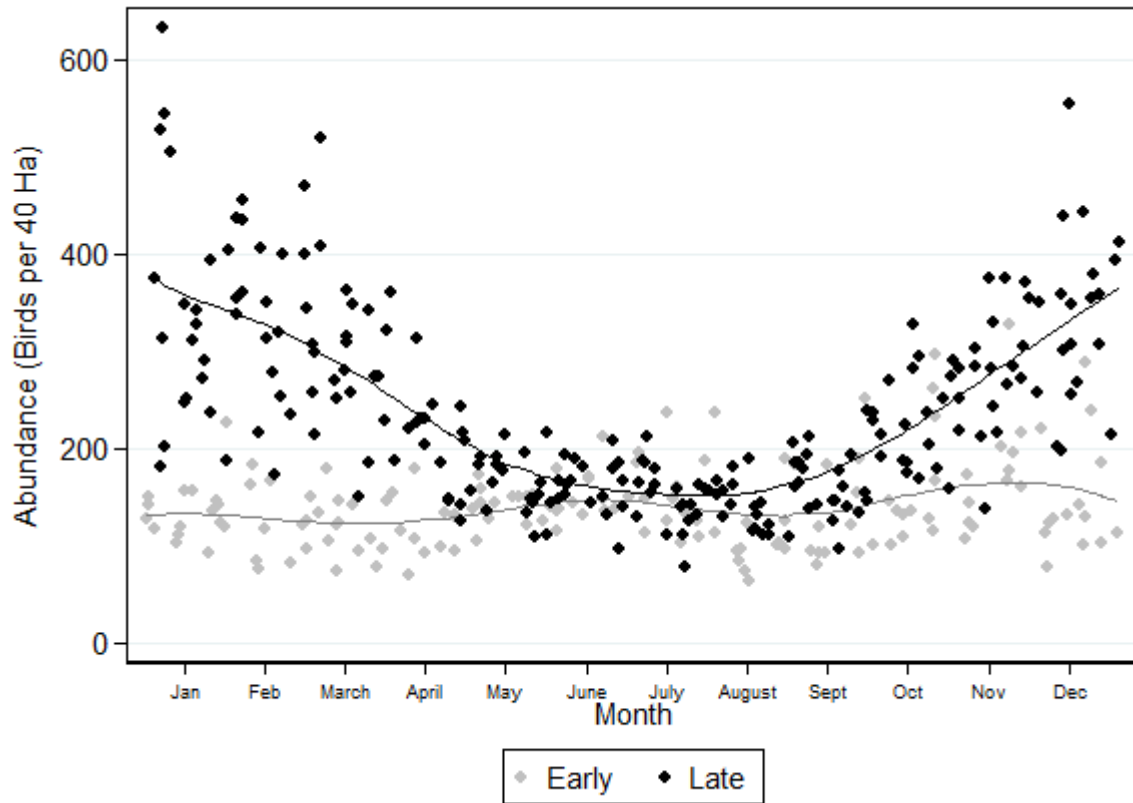


Figure 4. Seasonal total bird abundance per survey visit from 387 surveys of the Las Vegas Wash (2005–2023), by stage of project: Early (Years 1–6) and Late (Years 10–18). Curves represent LOWESS smoothed fits for variation in abundance among survey visits.

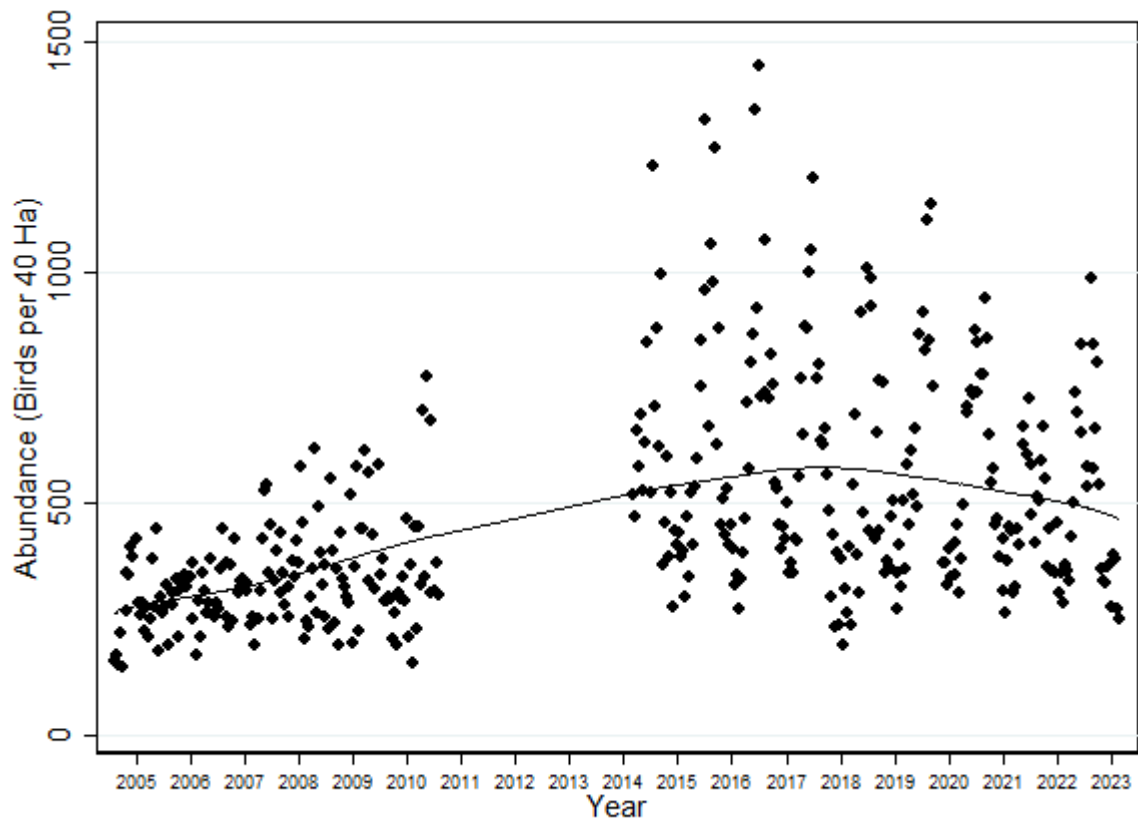


Figure 5. Trend in estimated total bird abundance from 387 surveys of the Las Vegas Wash (2005–2023). Curve represents a LOWESS smoothed fit for variation in abundance among survey visits.

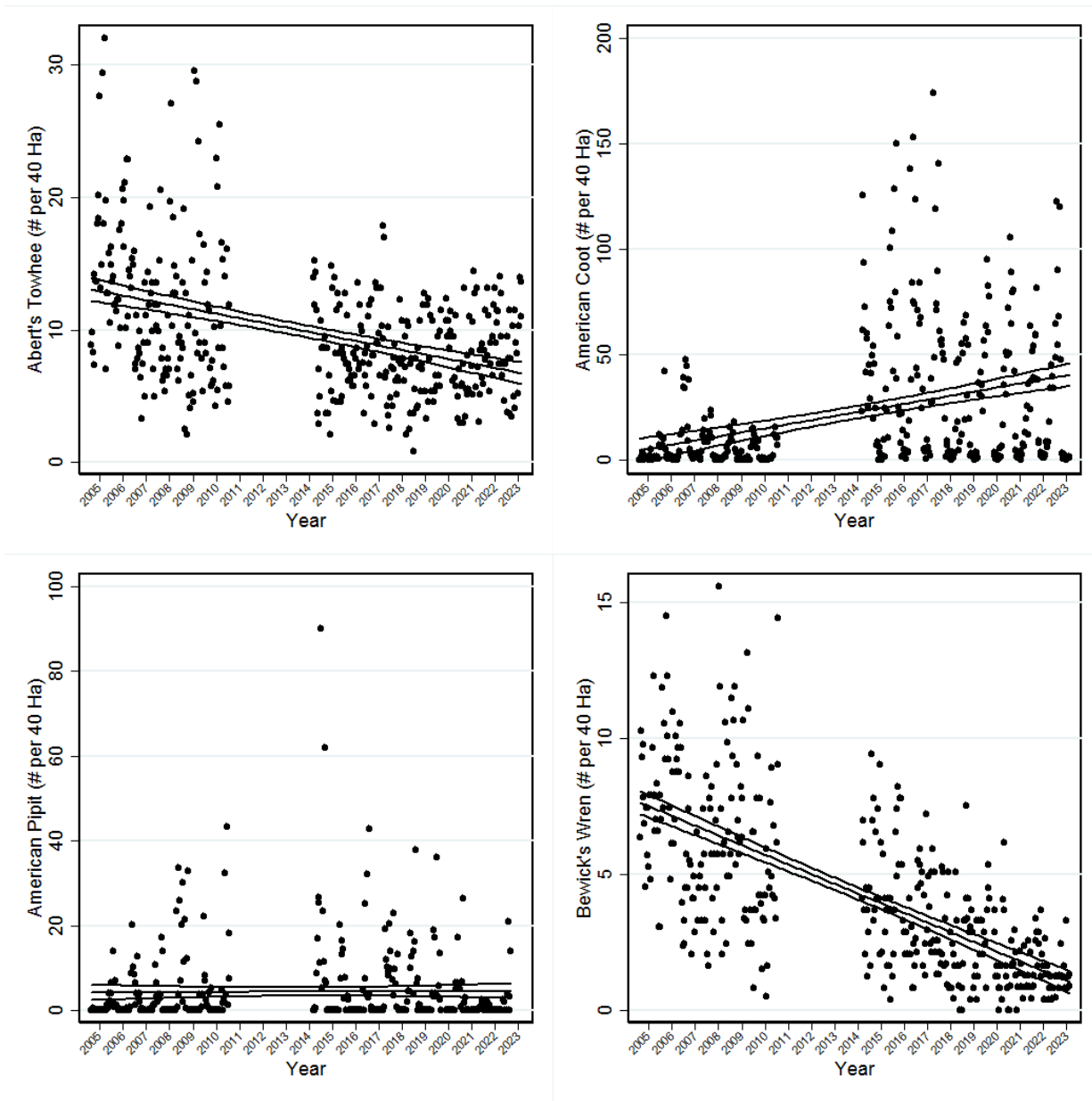


Figure 6a. Population trends of four common species along the Las Vegas Wash, by year (2005–2023). See Table 11 for statistical analysis results.

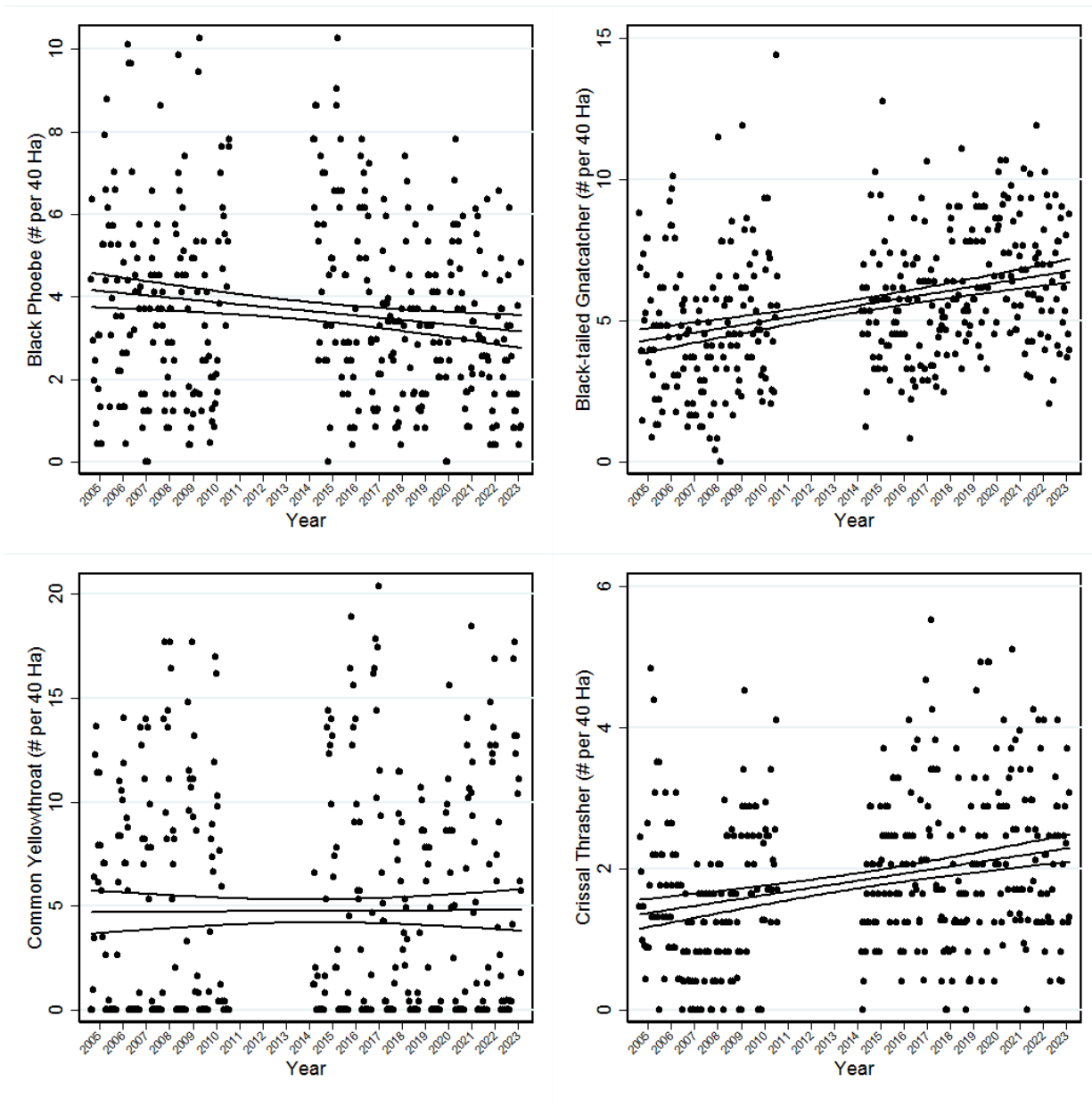


Figure 6b. Population trends of four common species along the Las Vegas Wash, by year (2005–2023). See Table 11 for statistical analysis results.

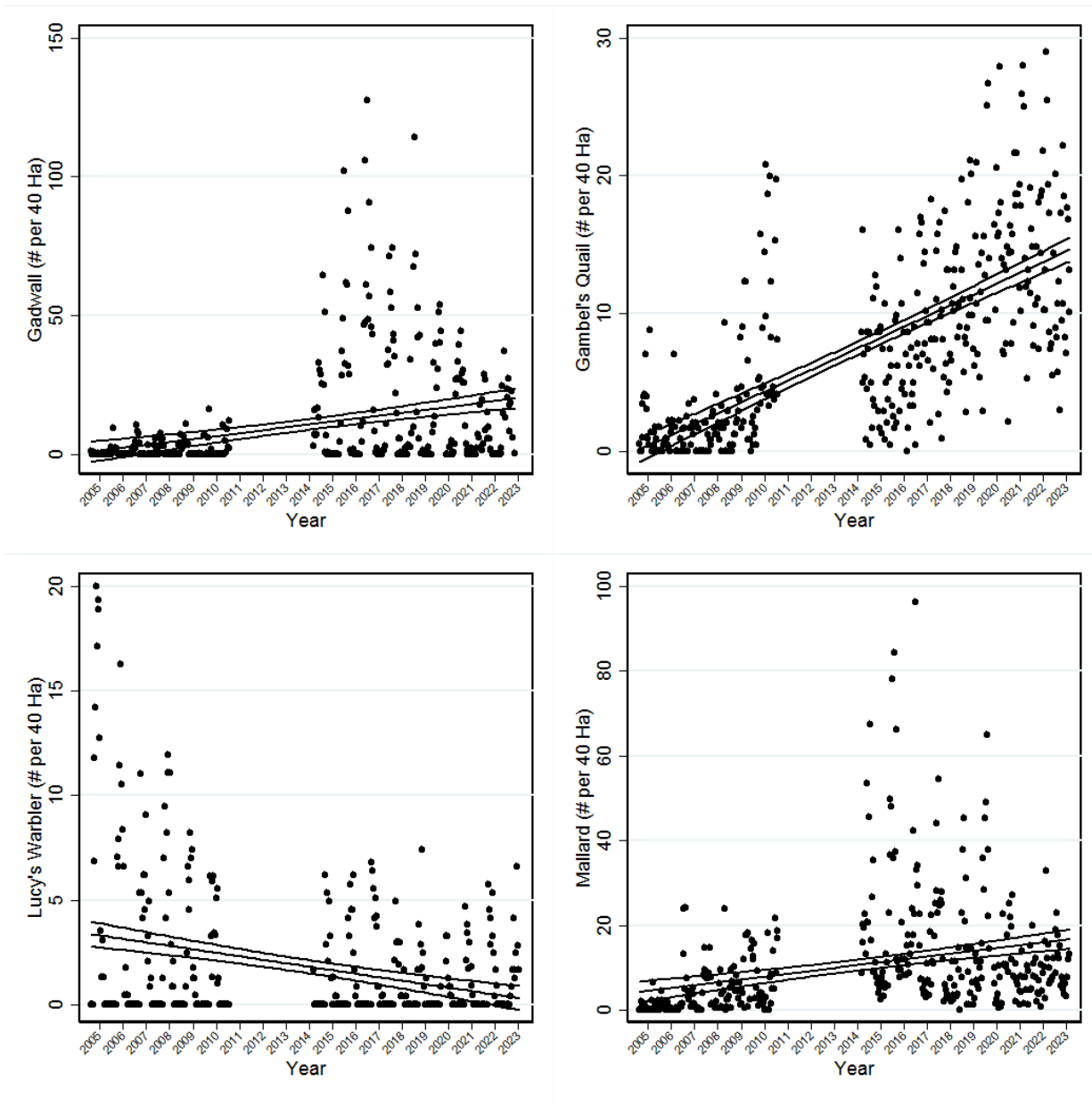


Figure 6c. Population trends of four common species along the Las Vegas Wash, by year (2005–2023). See Table 11 for statistical analysis results.

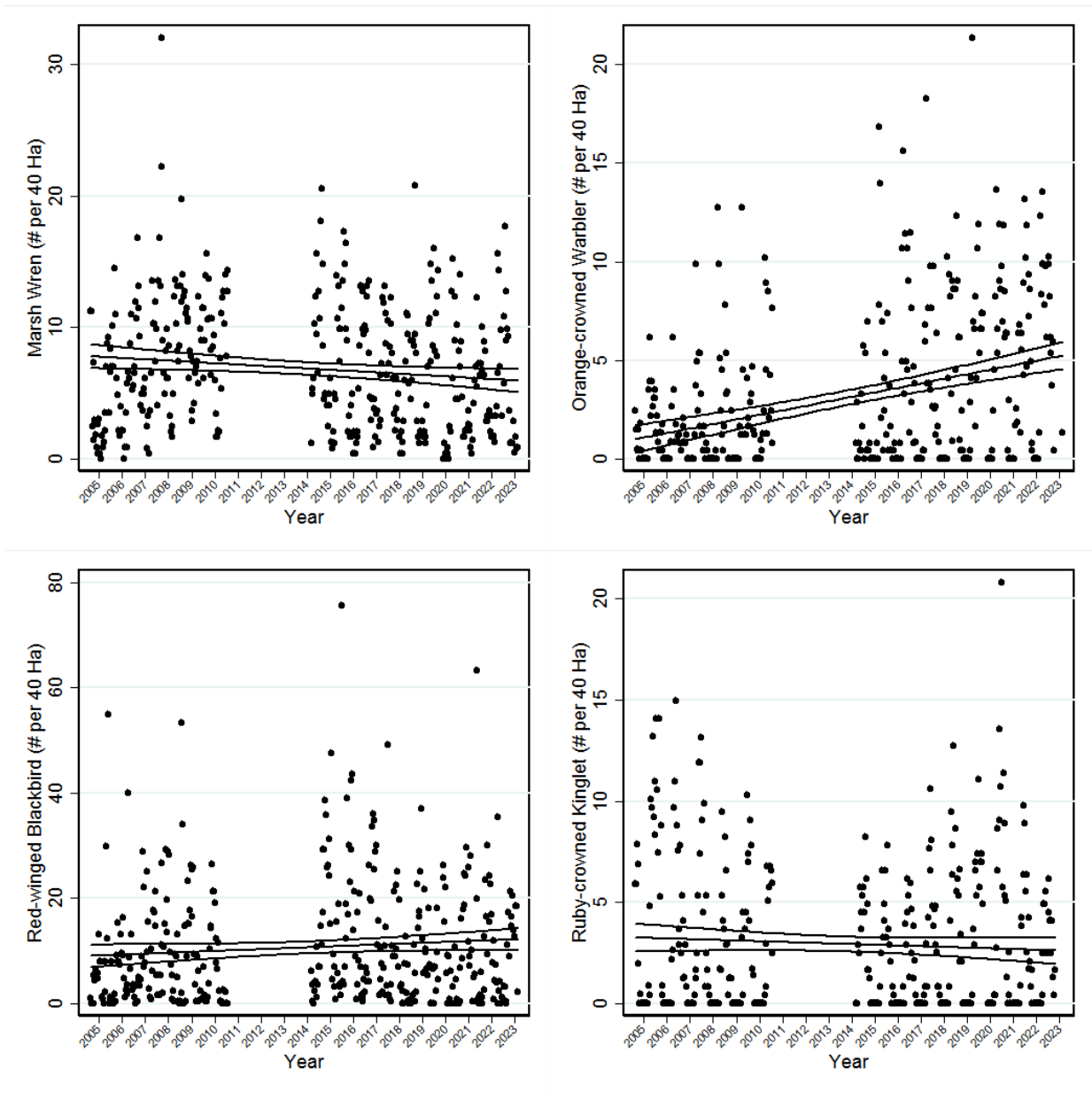


Figure 6d. Population trends of four common species along the Las Vegas Wash, by year (2005–2023). See Table 11 for statistical analysis results.

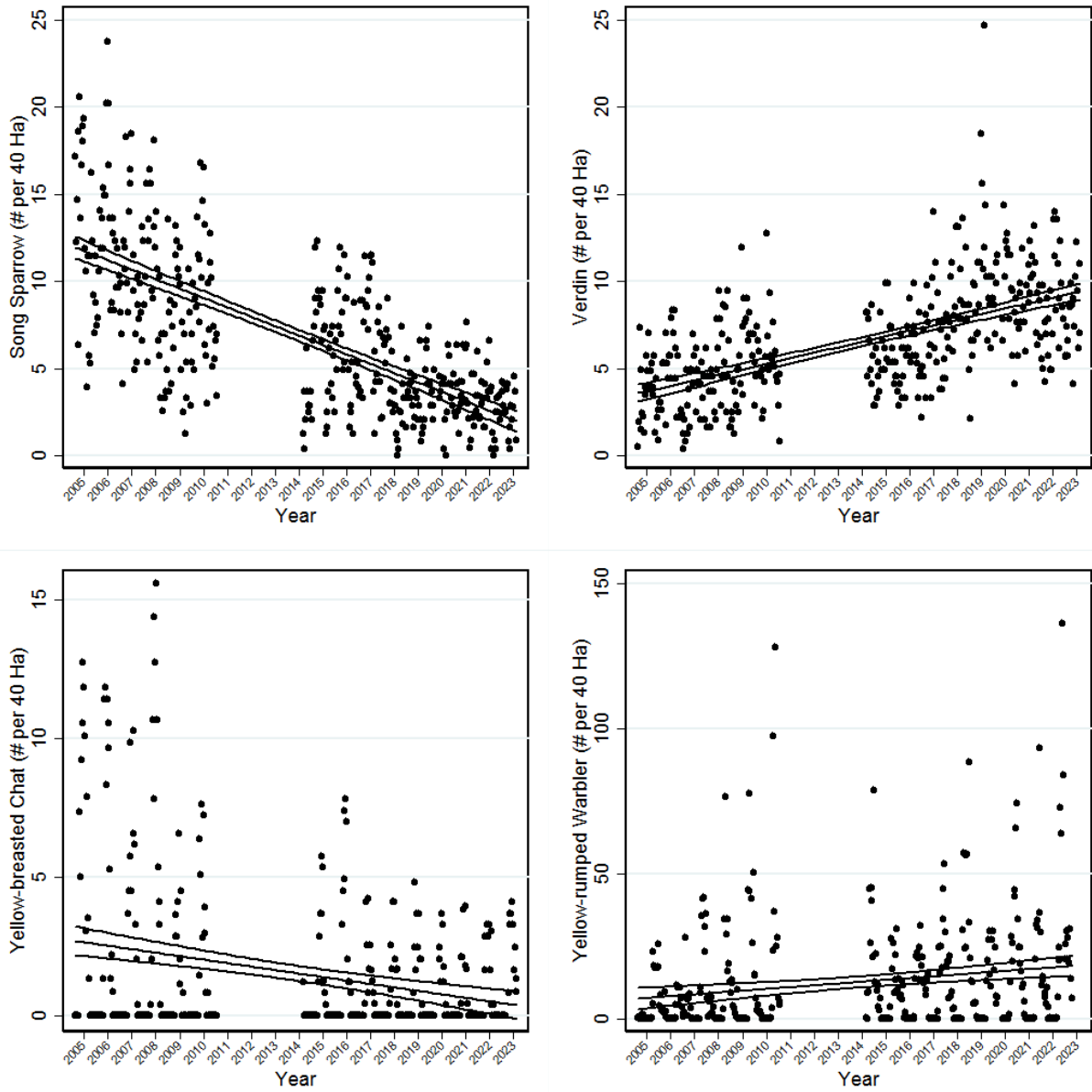


Figure 6e. Population trends of four common species along the Las Vegas Wash, by year (2005–2023). See Table 11 for statistical analysis results.

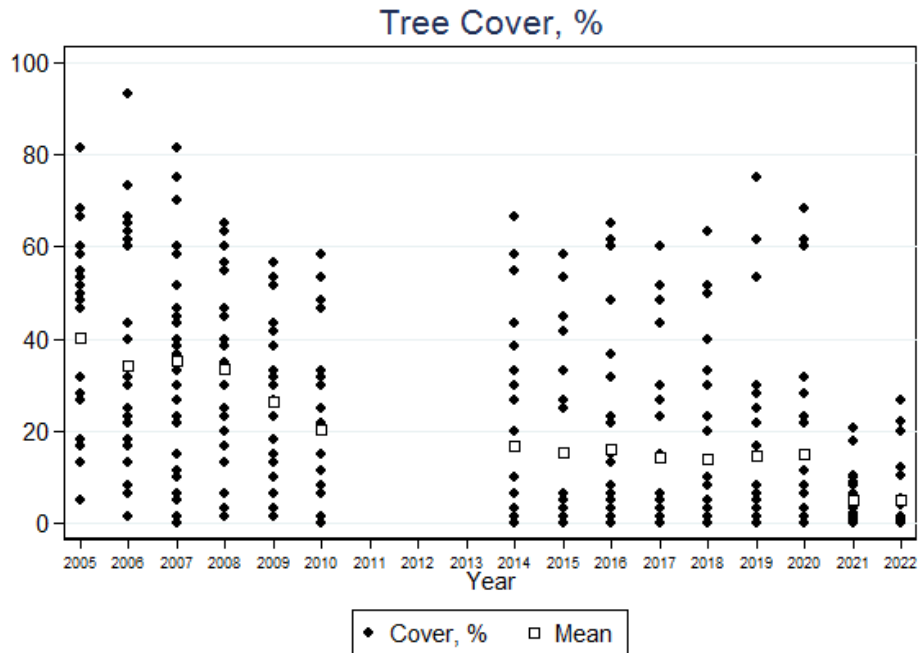


Figure 7. Tree cover (% cover of all trees) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.242$; $P < 0.001$.

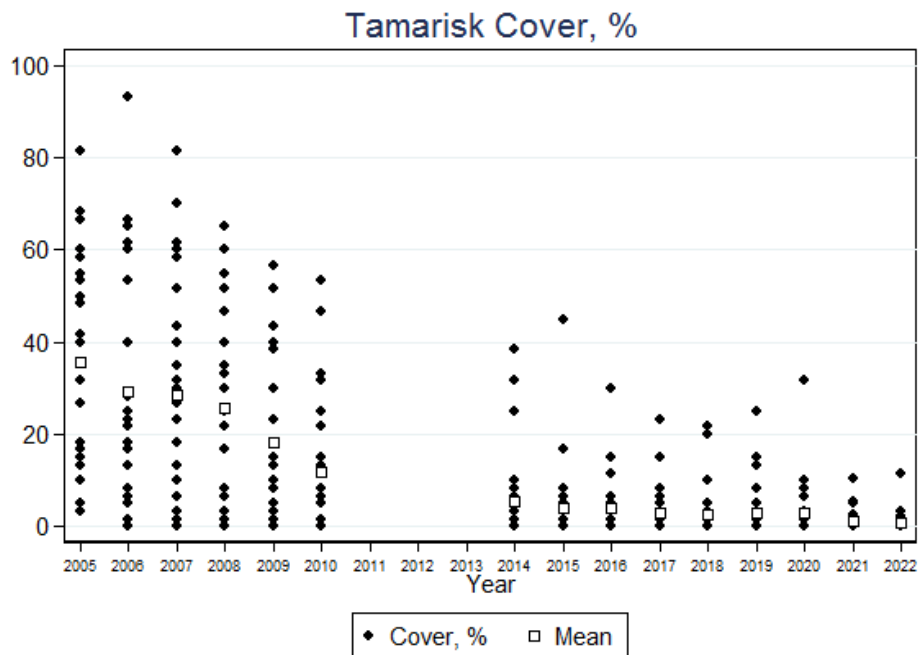


Figure 8. Tamarisk tree cover (%) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.413$; $P < 0.001$.

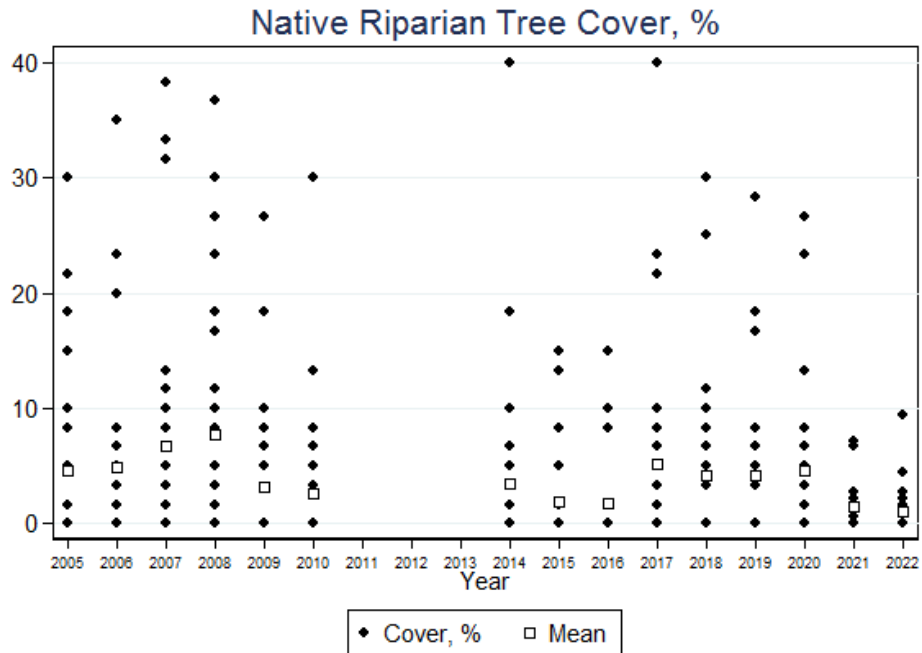


Figure 9. Native riparian tree cover (%) in the Las Vegas Wash by year, 2005–2022. (This does not include mesquites.) $R^2 = 0.059$; $P = 0.059$.

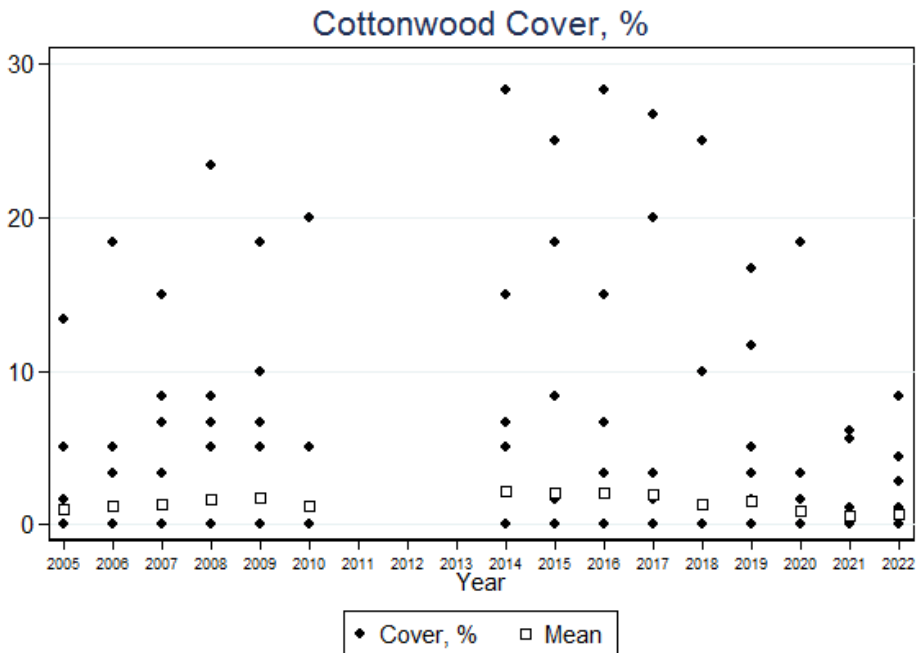


Figure 10. Cottonwood tree cover (%) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.012$; $P = 0.990$.

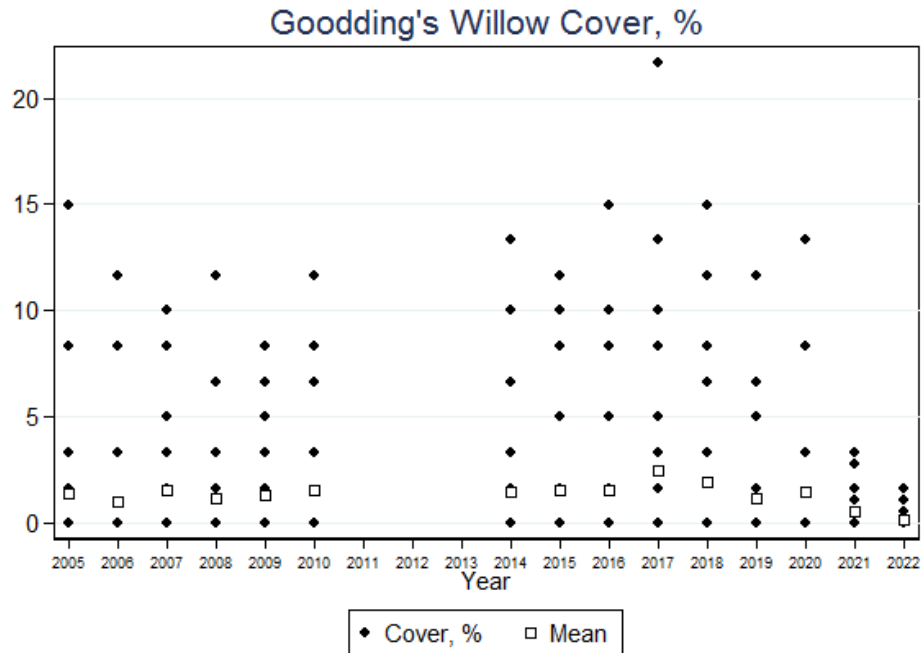


Figure 11. Goodding’s willow tree cover (%) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.038$; $P = 0.393$.

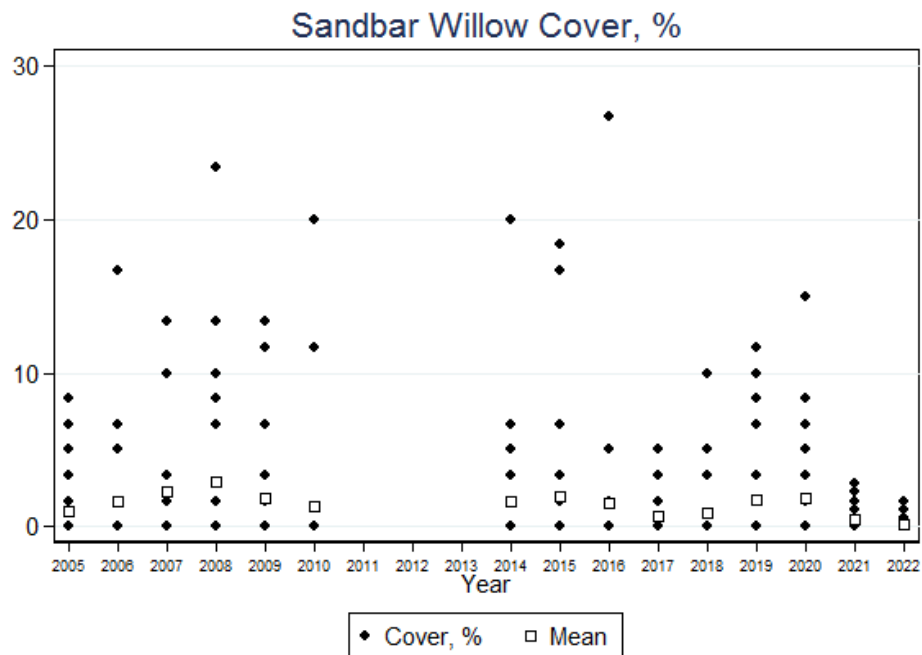


Figure 12. Sandbar willow cover (%) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.035$; $P = 0.495$.

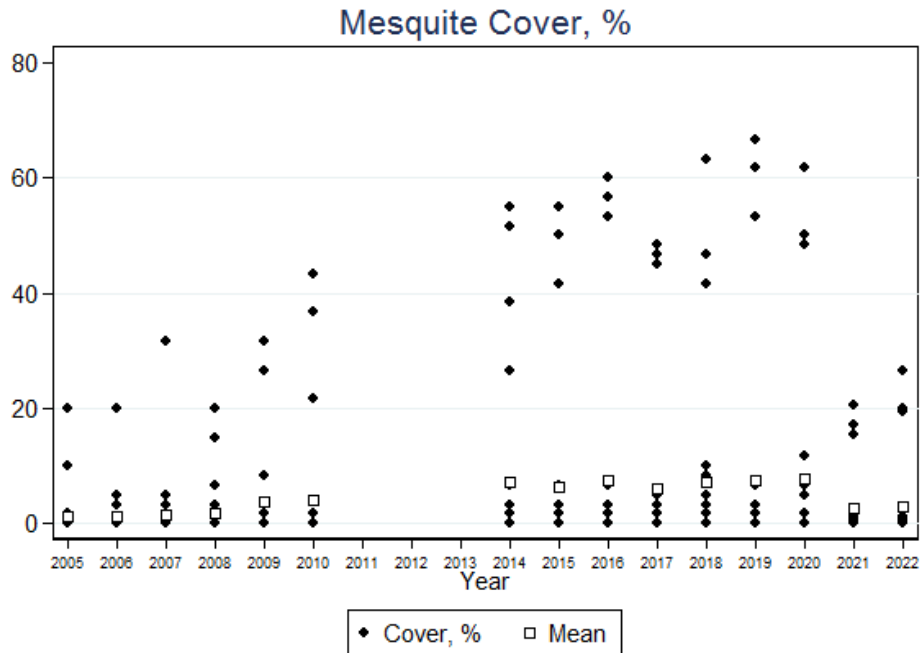


Figure 13. Mesquite tree cover (%) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.038$; $P = 0.392$.

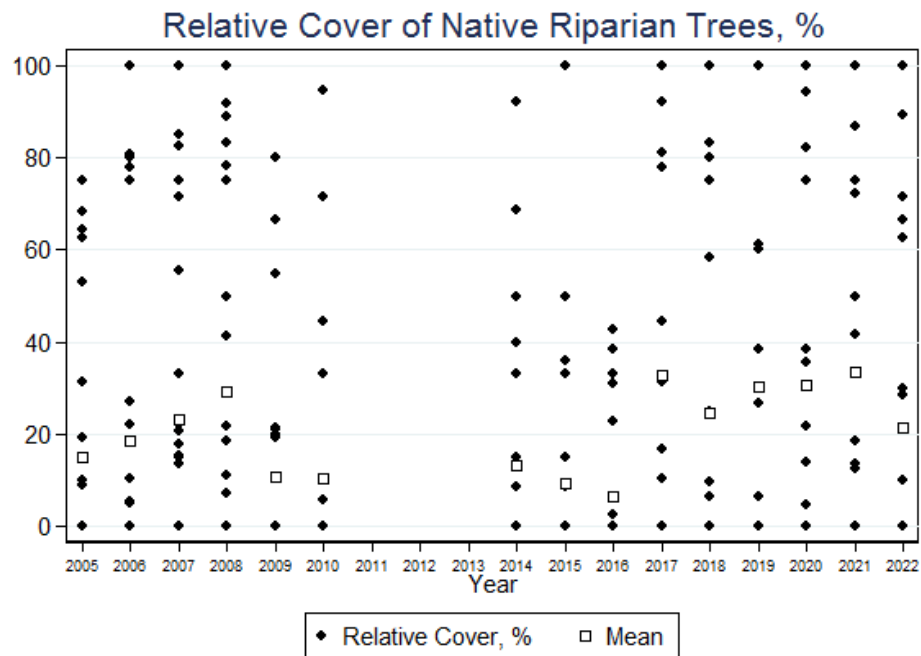


Figure 14. Mean proportion of native riparian tree cover relative to total tree cover in the Las Vegas Wash by year, 2005–2022. (This does not include mesquites.) $R^2 = 0.071$; $P = 0.014$.

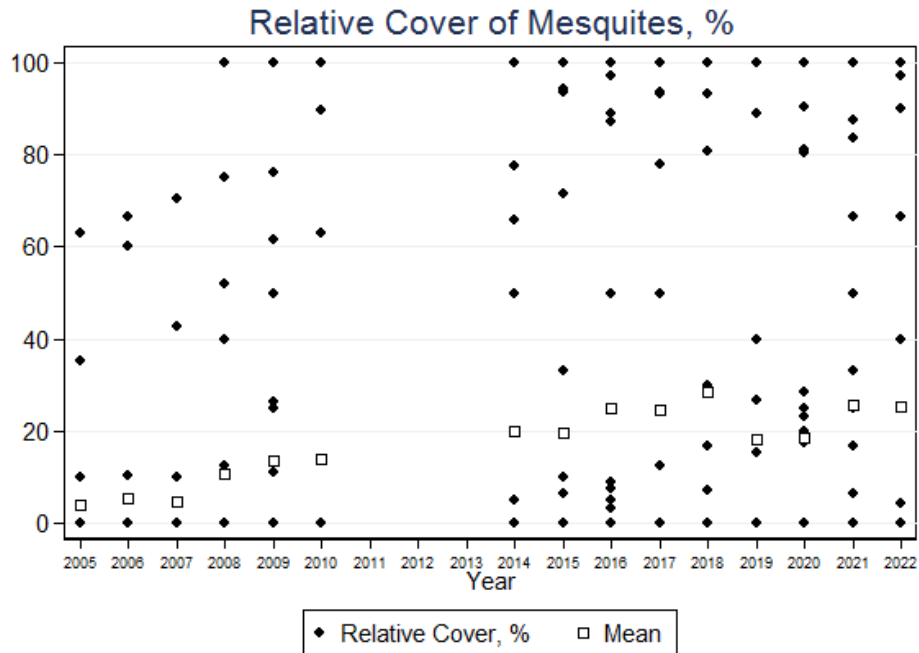


Figure 15. Mean proportion of mesquite cover relative to total tree cover in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.056$; $P = 0.080$.

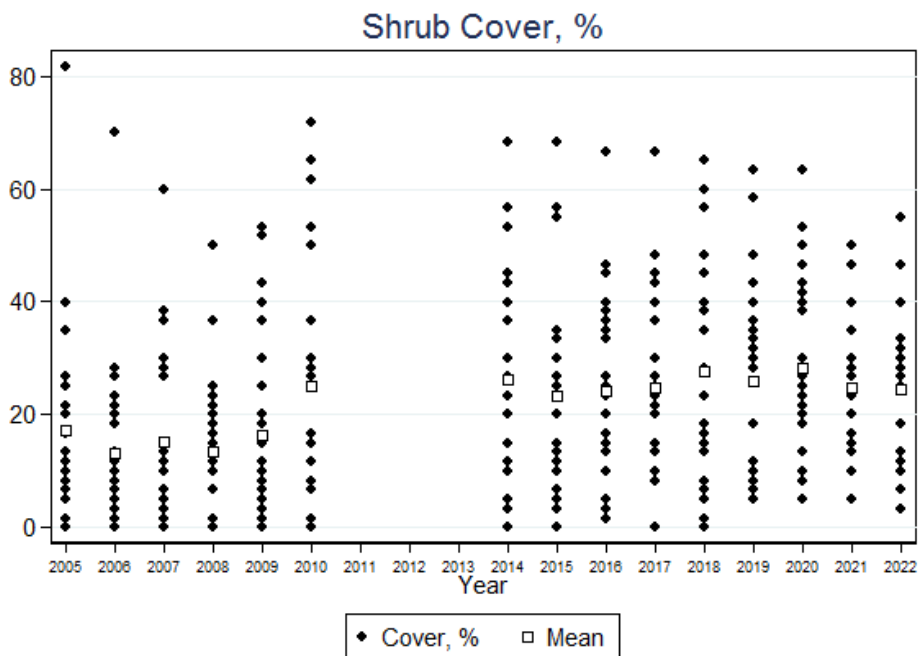


Figure 16. Mean shrub cover (%) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.088$; $P = 0.002$.

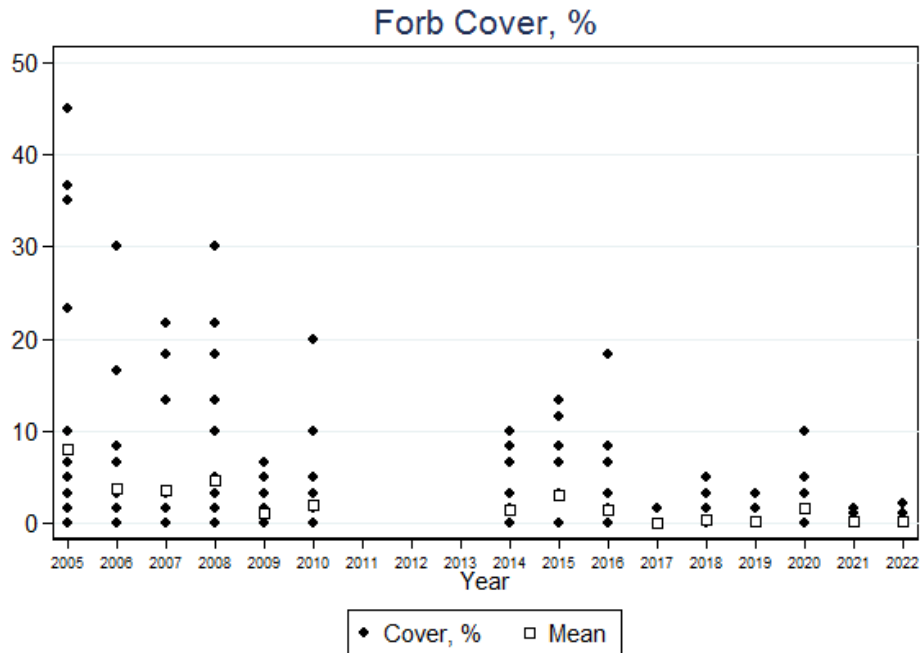


Figure 17. Mean forb cover (%) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.153$; $P < 0.001$.

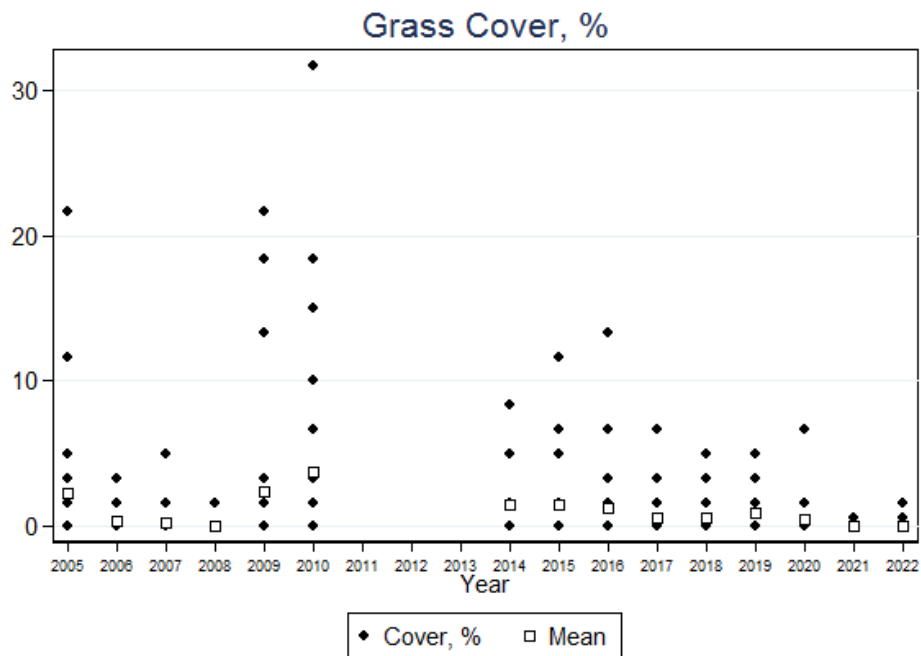


Figure 18. Mean grass cover (%) in the Las Vegas Wash by year, 2005–2022. These values do not include *Phragmites*. $R^2 = 0.100$; $P < 0.001$.

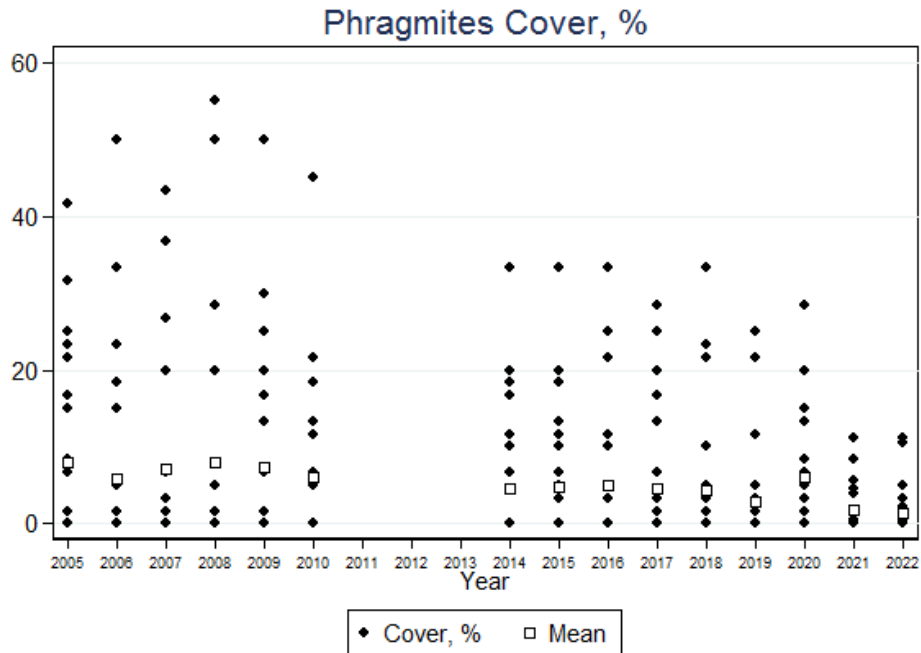


Figure 19. Mean *Phragmites* cover (%) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.039$; $P = 0.384$.

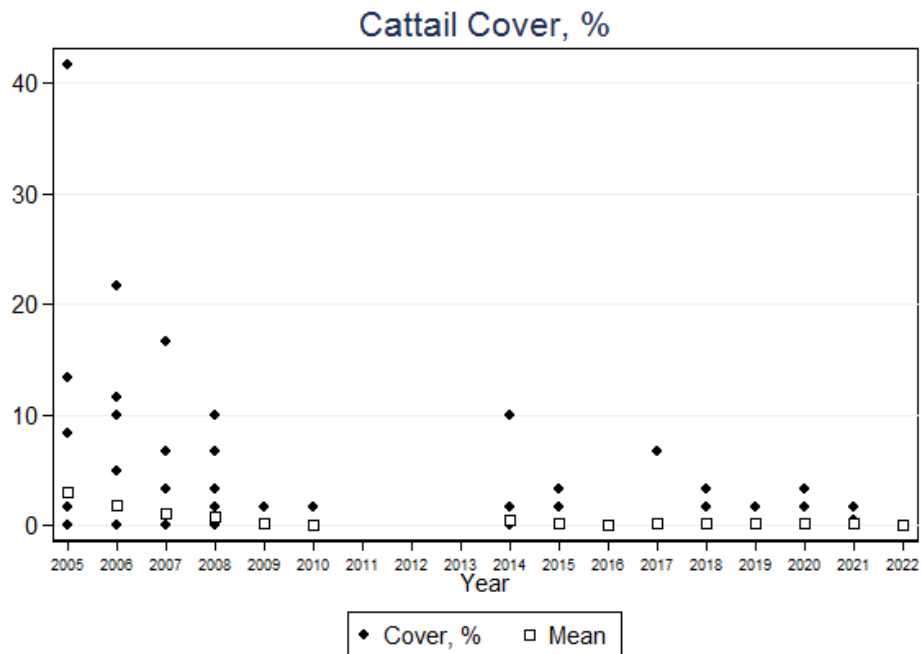


Figure 20. Mean cattail cover (%) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.075$; $P = 0.009$.

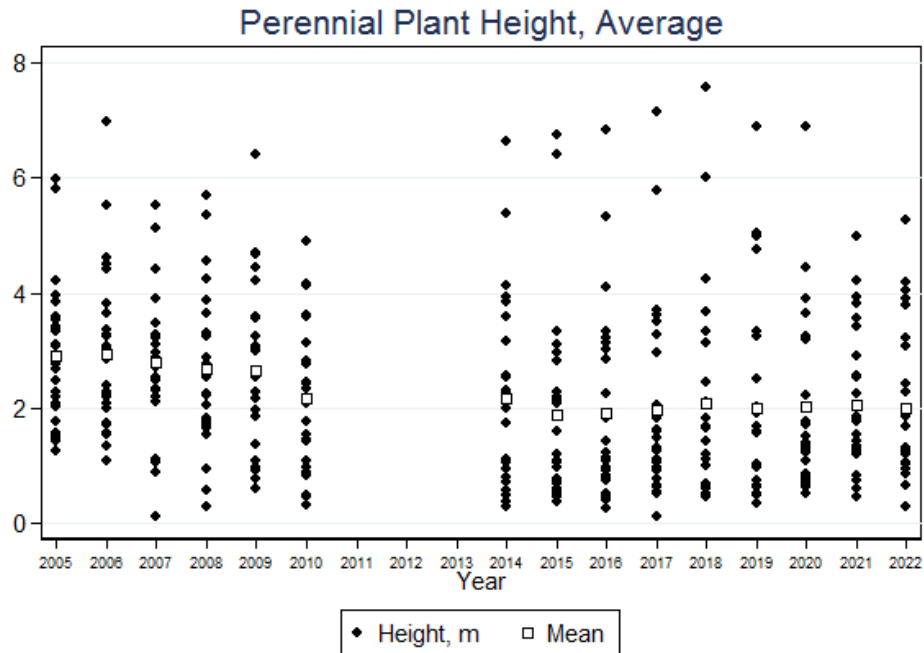


Figure 21. Mean maximum perennial plant height (m) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.060$; $P = 0.058$.

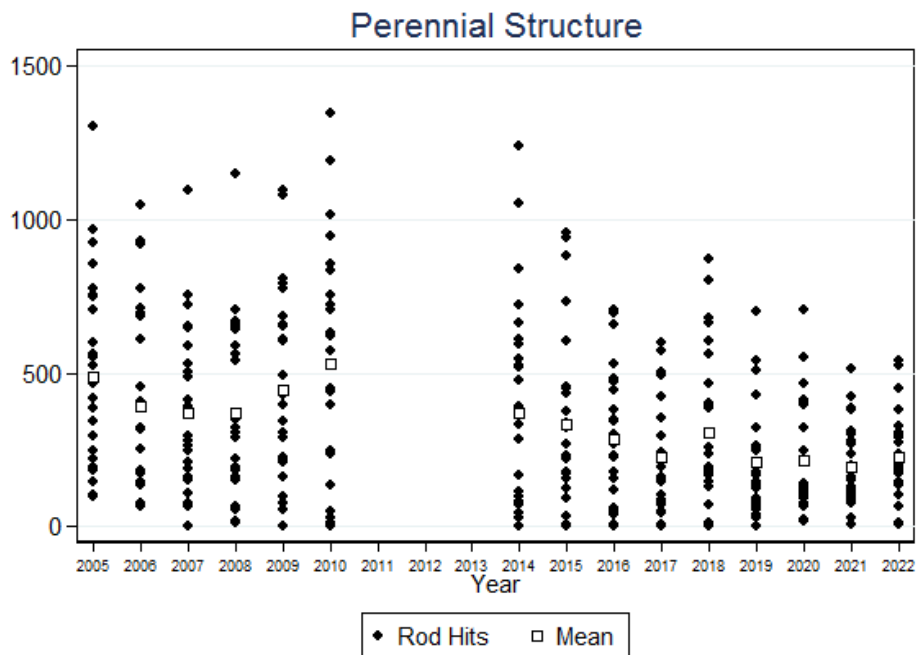


Figure 22. Perennial plant structure (number of rod hits) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.136$; $P = 0.001$.

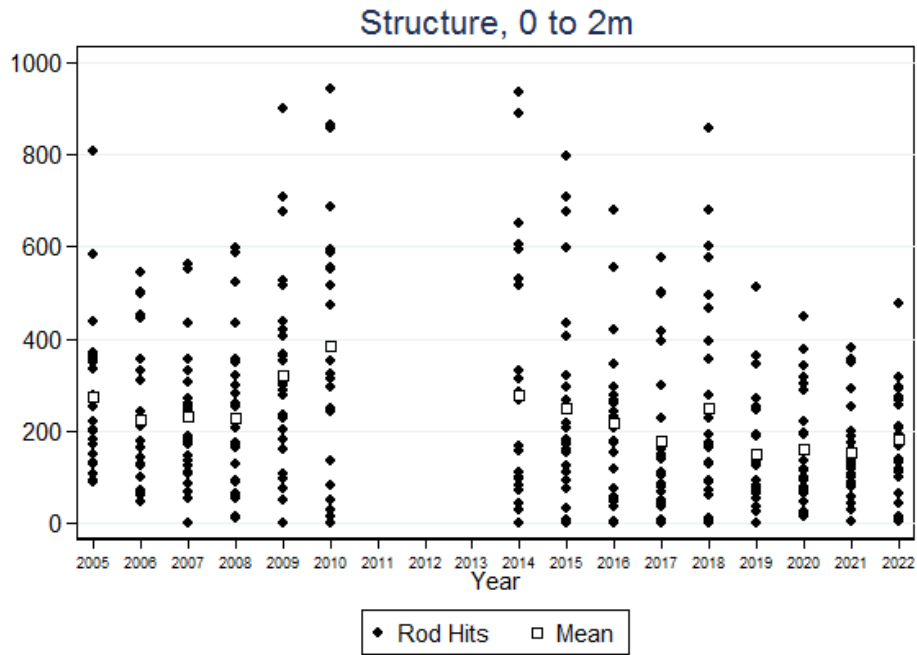


Figure 23. Perennial plant structure in the 0–2 m height category (number of rod hits) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.105$; $P < 0.001$.

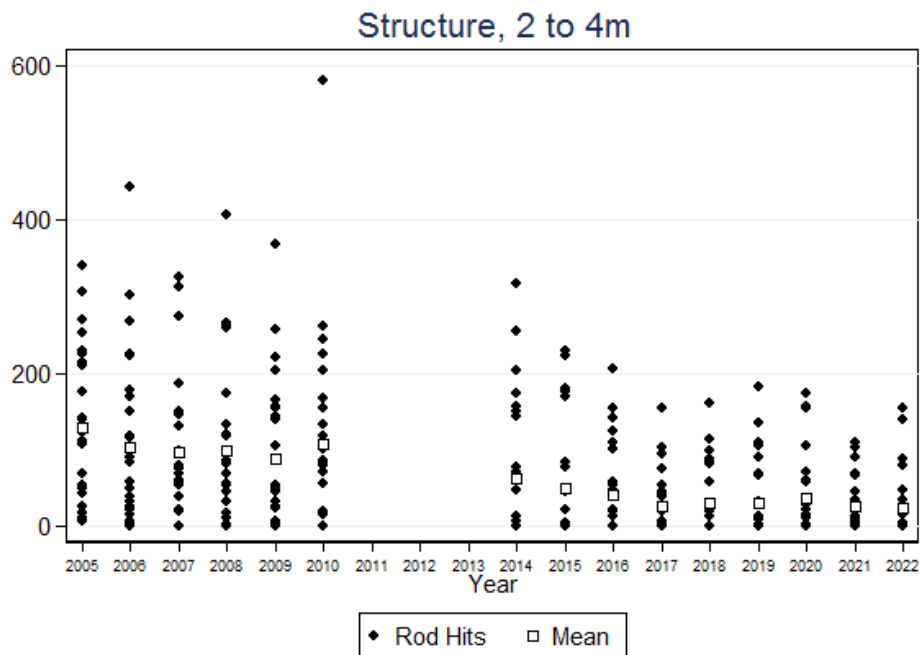


Figure 24. Perennial plant structure in the 2–4 m height category (number of rod hits) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.165$; $P < 0.001$.

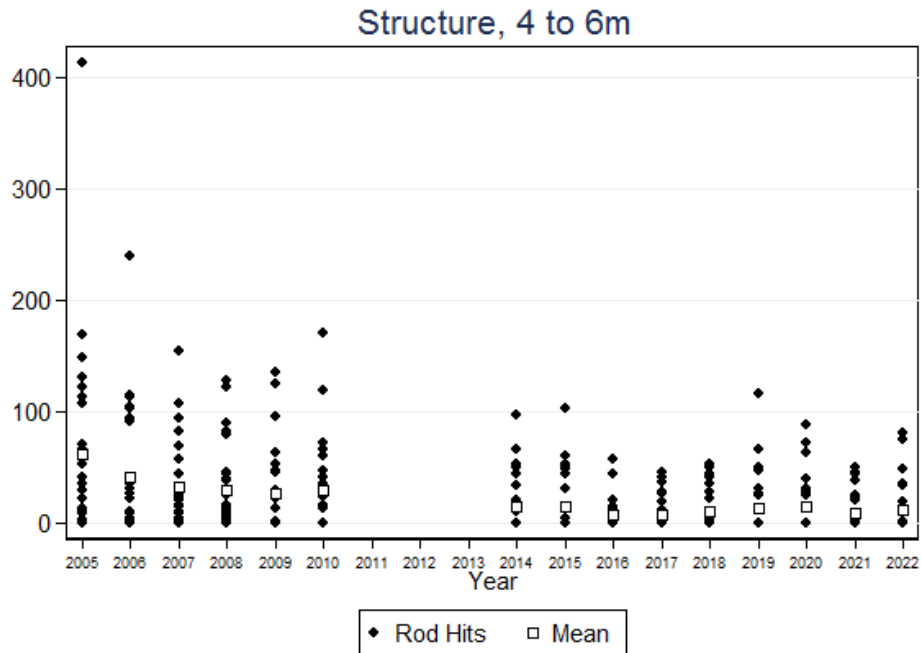


Figure 25. Perennial plant structure in the 4–6 m height category (number of rod hits) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.131$; $P < 0.001$.

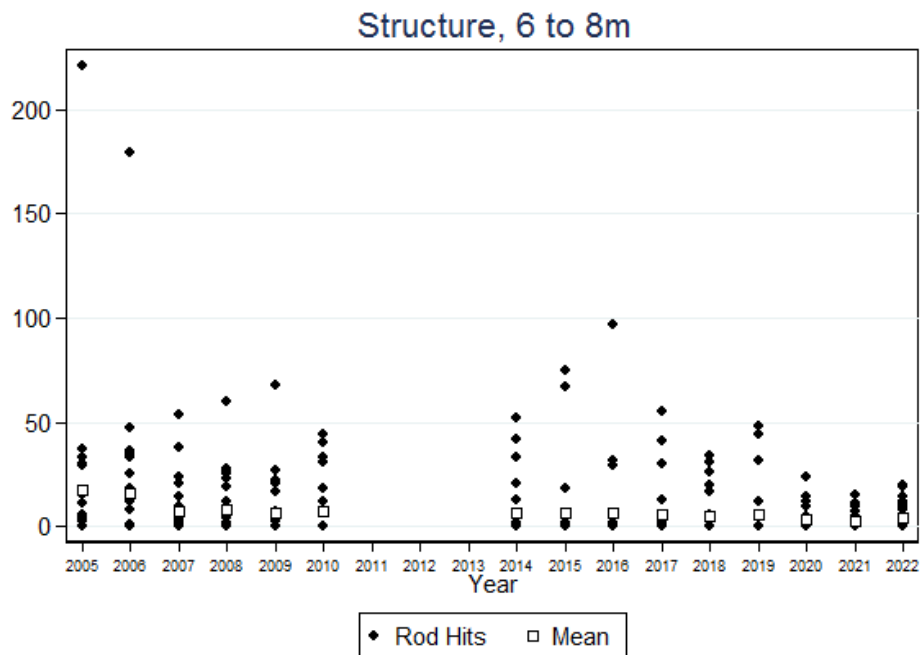


Figure 26. Perennial plant structure in the 6–8 m height category (number of rod hits) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.042$; $P = 0.286$.

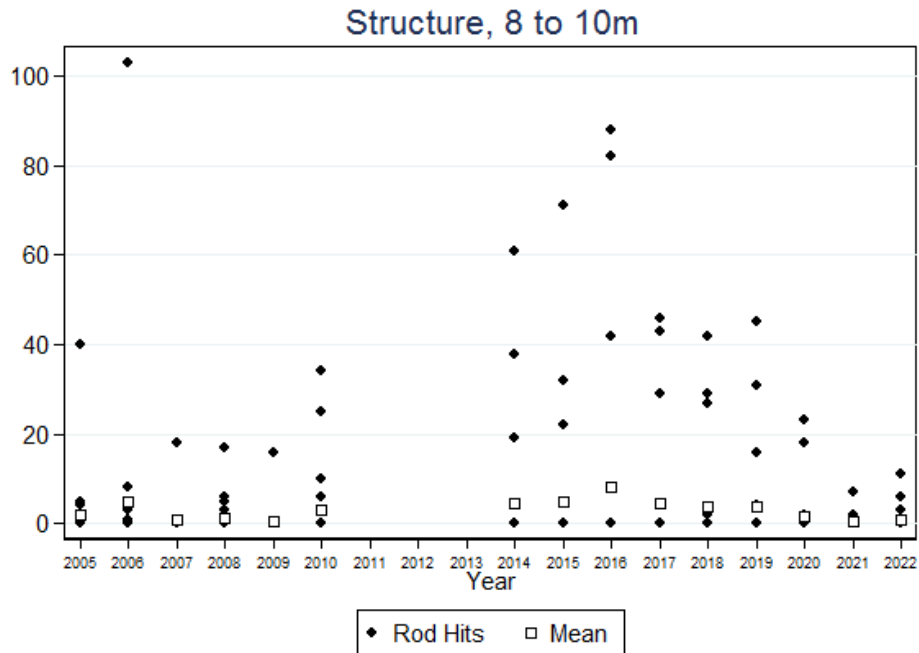


Figure 27. Perennial plant structure in the 8–10 m height category (number of rod hits) in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.034$; $P = 0.534$.

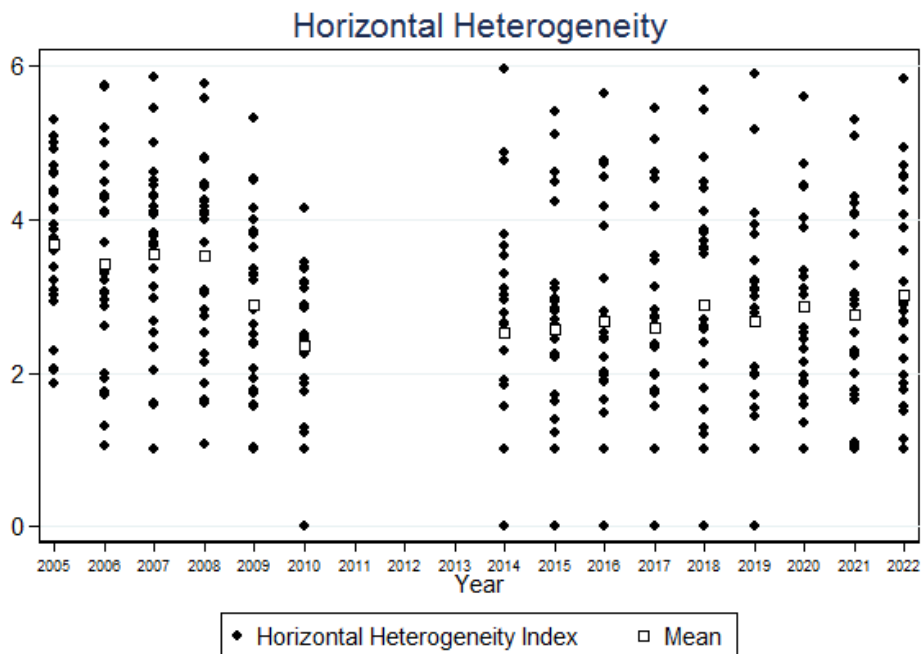


Figure 28. Horizontal vegetation heterogeneity based on the proportional number of hits for each of six vegetation transects per survey point in the Las Vegas Wash by year, 2005–2022. $R^2 = 0.093$; $P = 0.001$.

Tables

Table 1. Number of point count surveys conducted per year along the Las Vegas Wash.

Year	Points/Survey	Number of Surveys	Max. Number of Points/Year	Total Number of Survey Visits
Year 1	26	6	29	26
	28	1		
	29	19		
Year 2	29	22	32	26
	31	3		
	32	1		
Year 3	30	2	31	26
	31	24		
Year 4	30	1	31	26
	31	25		
Year 5	22	1	31	26
	28	1		
	30	2		
	31	22		
Year 6	25	1	31	26
	26	2		
	27	2		
	29	1		
	30	11		
	31	9		
Year 10	30	1	37*	26
	31	25		
Year 11	31	26	33*	26
Year 12	29	2	31	26
	30	10		
	31	14		
Year 13	27	1	35*	26
	29	3		
	30	16		
	31	6		
Year 14	27	1	31	26
	28	1		
	29	1		
	30	3		
	31	20		
Year 15	29	1	31	23
	31	22		
Year 16	28	3	31	26
	29	1		
	30	14		
	31	8		
Year 17	27	1	31	26
	28	1		
	29	3		
	30	11		
	31	10		
Year 18	27	2	31	26
	29	3		
	30	3		
	31	18		

* Numbers are larger than 31 because they include original and replacement points.

Table 2. All bird species detected at Las Vegas Wash, February 2005 to August 2023, during breeding, non-breeding, and transitional seasons. Conservation status includes priority species from multiple sources: A (Clark County 2000); B (LCRMSCP 2004); C (GBBO 2010); D (Rosenberg et al. 2016, Intermountain Partners in Flight); E (Rosenberg et al. 2016, Continental Partners in Flight); F (Nevada Department of Wildlife 2012). “X” denotes at least one detection in that season (for season definitions, see Methods). Asterisks indicate species that were recorded incidentally, as flyovers, or > 100 m from a survey point. Species listed in taxonomic order.

Common Name	Scientific Name	Conservation Status	Breeding Season	Fall Transition	Non-Breeding Season	Winter Transition	Overall
Snow Goose	<i>Anser caerulescens</i>		*		X	X	X
Ross's Goose	<i>Anser rossii</i>				X	*	X
Graylag Goose	<i>Anser anser</i>		*	*	*		*
Greater White-fronted Goose	<i>Anser albifrons</i>			*	X	X	X
Cackling Goose/Lesser Canada Goose †	<i>Branta hutchinsii/canadensis</i>					*	*
Canada Goose	<i>Branta canadensis</i>		X	X	X	X	X
Tundra Swan	<i>Cygnus columbianus</i>	C			*		*
Wood Duck	<i>Aix sponsa</i>			X	X	*	X
Blue-winged Teal	<i>Spatula discors</i>		*	X	X		X
Cinnamon Teal	<i>Spatula cyanoptera</i>	C	X	X	X	X	X
Northern Shoveler	<i>Spatula clypeata</i>		X	X	X	X	X
Gadwall	<i>Mareca strepera</i>		X	X	X	X	X
American Wigeon	<i>Mareca americana</i>		X	X	X	X	X
Mallard	<i>Anas platyrhynchos</i>		X	X	X	X	X
Northern Pintail	<i>Anas acuta</i>	C; F	X	X	X	X	X
Green-winged Teal	<i>Anas crecca</i>		X	X	X	X	X
Canvasback	<i>Aythya valisineria</i>	C; F			X		X
Redhead	<i>Aythya americana</i>	C; F	X	*	X	X	X
Ring-necked Duck	<i>Aythya collaris</i>		X		X	X	X
Greater Scaup	<i>Aythya marila</i>		X		X	X	X
Lesser Scaup	<i>Aythya affinis</i>	C	X	*	X	X	X
Bufflehead	<i>Bucephala albeola</i>		X		X	X	X
Common Goldeneye	<i>Bucephala clangula</i>		X		X	X	X
Barrow's Goldeneye	<i>Bucephala islandica</i>					X	X
Hooded Merganser	<i>Lophodytes cucullatus</i>		X	X	X	X	X
Common Merganser	<i>Mergus merganser</i>		X	X	X	X	X
Ruddy Duck	<i>Oxyura jamaicensis</i>		X		X	X	X
Gambel's Quail	<i>Callipepla gambelii</i>	C	X	X	X	X	X
Pied-billed Grebe	<i>Podilymbus podiceps</i>		X	X	X	X	X
Horned Grebe	<i>Podiceps auritus</i>		X		X	*	X
Eared Grebe	<i>Podiceps nigricollis</i>	C	X	X	X	X	X
Western Grebe	<i>Aechmophorus occidentalis</i>	C	X		X	*	X

Common Name	Scientific Name	Conservation Status	Breeding Season	Fall Transition	Non-Breeding Season	Winter Transition	Overall
Clark's Grebe	<i>Aechmophorus clarkii</i>	C	*		*	*	*
Rock Pigeon	<i>Columba livia</i>		*	*	X	*	X
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>		X	X	X	X	X
White-winged Dove	<i>Zenaida asiatica</i>		X	X	X		X
Mourning Dove	<i>Zenaida macroura</i>		X	X	X	X	X
Groove-billed Ani	<i>Crotophaga sulcirostris</i>				X		X
Greater Roadrunner	<i>Geococcyx californianus</i>		X	X	X	X	X
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	B; C; F	X				X
Lesser Nighthawk	<i>Chordeiles acutipennis</i>		X	X			X
Common Nighthawk	<i>Chordeiles minor</i>	D; F		*			*
Vaux's Swift	<i>Chaetura vauxi</i>		X	*	*		X
White-throated Swift	<i>Aeronautes saxatalis</i>	C	X	*	*	*	X
Black-chinned Hummingbird	<i>Archilochus alexandri</i>		X	X	X	X	X
Anna's Hummingbird	<i>Calypte anna</i>		X	X	X	X	X
Costa's Hummingbird	<i>Calypte costae</i>	C	X	X	X	X	X
Rufous Hummingbird	<i>Selasphorus rufus</i>	C; E; F	X	*			X
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>			X			X
Ridgway's Rail	<i>Rallus obsoletus</i>	B; C; F	*				*
Virginia Rail	<i>Rallus limicola</i>		X	X	X	X	X
Sora	<i>Porzana carolina</i>		X	X	X	X	X
Common Gallinule	<i>Gallinula galeata</i>		X	X	X	X	X
American Coot	<i>Fulica americana</i>		X	X	X	X	X
Sandhill Crane	<i>Antigone canadensis</i>	C; F	X		*	*	X
Black-necked Stilt	<i>Himantopus mexicanus</i>	C	X	X		*	X
American Avocet	<i>Recurvirostra americana</i>	C; F	X	X	X	X	X
Killdeer	<i>Charadrius vociferus</i>		X	X	X	X	X
Semipalmated Plover	<i>Charadrius semipalmatus</i>		X				X
Whimbrel	<i>Numenius phaeopus</i>		*				*
Long-billed Curlew	<i>Numenius americanus</i>	C; F	*	*			*
Marbled Godwit	<i>Limosa fedoa</i>	C	*	*			*
Stilt Sandpiper	<i>Calidris himantopus</i>			*			*
Dunlin	<i>Calidris alpina</i>		X		X		X
Baird's Sandpiper	<i>Calidris bairdii</i>				X		X
Least Sandpiper	<i>Calidris minutilla</i>	C	X	X	X	X	X
Pectoral Sandpiper	<i>Calidris melanotos</i>			X			X
Semipalmated Sandpiper	<i>Calidris pusilla</i>		X				X
Western Sandpiper	<i>Calidris mauri</i>	C; F	X	X	X	X	X
Short-billed Dowitcher	<i>Limnodromus griseus</i>		*	X			X
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	C; F	X	X	X	X	X

Common Name	Scientific Name	Conservation Status	Breeding Season	Fall Transition	Non-Breeding Season	Winter Transition	Overall
Wilson's Snipe	<i>Gallinago delicata</i>		X	*	X	X	X
Spotted Sandpiper	<i>Actitis macularius</i>		X	X	X	X	X
Solitary Sandpiper	<i>Tringa solitaria</i>		X	X			X
Lesser Yellowlegs	<i>Tringa flavipes</i>		X	X	X	X	X
Willet	<i>Tringa semipalmata</i>	C	X				X
Greater Yellowlegs	<i>Tringa melanoleuca</i>		X	X	X	X	X
Wilson's Phalarope	<i>Phalaropus tricolor</i>	C; F	*	*			*
Red-necked Phalarope	<i>Phalaropus lobatus</i>	C; F		*			*
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>		X				X
Franklin's Gull	<i>Leucophaeus pipixcan</i>	C	*				*
Ring-billed Gull	<i>Larus delawarensis</i>		X	*	X	X	X
California Gull	<i>Larus californicus</i>		X		X	X	X
Iceland Gull	<i>Larus glaucoides</i>					*	*
Lesser Black-backed Gull	<i>Larus fuscus</i>		*				*
Caspian Tern	<i>Hydroprogne caspia</i>		X	*	*		X
Forster's Tern	<i>Sterna forsteri</i>		*				*
Double-crested Cormorant	<i>Nannopterum auritum</i>		X	X	X	X	X
Neotropic Cormorant	<i>Nannopterum brasilianum</i>		X	*	X	X	X
American White Pelican	<i>Pelecanus erythrorhynchos</i>	C; F	X	X	X	X	X
American Bittern	<i>Botaurus lentiginosus</i>	F	X	X	X	*	X
Least Bittern	<i>Ixobrychus exilis</i>	B; C; F	X	X	X	X	X
Great Blue Heron	<i>Ardea herodias</i>		X	X	X	X	X
Great Egret	<i>Ardea alba</i>		X	X	X	X	X
Snowy Egret	<i>Egretta thula</i>	C	X	X	X	X	X
Cattle Egret	<i>Bubulcus ibis</i>		*	X			X
Green Heron	<i>Butorides virescens</i>		X	X	X	X	X
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>		X	X	X	X	X
White Ibis	<i>Eudocimus albus</i>		*				*
White-faced Ibis	<i>Plegadis chihi</i>	C; F	X	X	X	X	X
Roseate Spoonbill	<i>Platalea ajaja</i>		*				*
Turkey Vulture	<i>Cathartes aura</i>		X	X	*	X	X
Osprey	<i>Pandion haliaetus</i>		X	X	X	X	X
White-tailed Kite	<i>Elanus leucurus</i>		*				*
Golden Eagle	<i>Aquila chrysaetos</i>	C; F			*		*
Northern Harrier	<i>Circus hudsonius</i>		X	X	X	X	X
Sharp-shinned Hawk	<i>Accipiter striatus</i>		X	X	X	X	X
Cooper's Hawk	<i>Accipiter cooperii</i>		X	X	X	X	X
American Goshawk	<i>Accipiter atricapillus</i>	C; F			*		*
Bald Eagle	<i>Haliaeetus leucocephalus</i>	C; F			*		*

Common Name	Scientific Name	Conservation Status	Breeding Season	Fall Transition	Non-Breeding Season	Winter Transition	Overall
Mississippi Kite	<i>Ictinia mississippiensis</i>		*				*
Red-shouldered Hawk	<i>Buteo lineatus</i>		X	X	X	X	X
Swainson's Hawk	<i>Buteo swainsoni</i>	C	X				X
Red-tailed Hawk	<i>Buteo jamaicensis</i>		X	*	X	X	X
Barn Owl	<i>Tyto alba</i>		X	X	X		X
Great Horned Owl	<i>Bubo virginianus</i>		X	X	X	X	X
Long-eared Owl	<i>Asio otus</i>	E	*	X			X
Belted Kingfisher	<i>Megaceryle alcyon</i>		X	X	X	X	X
Lewis's Woodpecker	<i>Melanerpes lewis</i>	C; D; E; F		*			*
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>		X	X	X	X	X
Ladder-backed Woodpecker	<i>Dryobates scalaris</i>		X	X	X	X	X
Hairy Woodpecker	<i>Dryobates villosus</i>				X		X
Northern Flicker	<i>Colaptes auratus</i>		X	X	X	X	X
American Kestrel	<i>Falco sparverius</i>		X	X	X	X	X
Merlin	<i>Falco columbarius</i>		*	X	X	X	X
Peregrine Falcon	<i>Falco peregrinus</i>	C; F	X	*	X	*	X
Prairie Falcon	<i>Falco mexicanus</i>	C; F	*	*	X		X
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>		X	X		X	X
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>		X				X
Cassin's Kingbird	<i>Tyrannus vociferans</i>		*				*
Western Kingbird	<i>Tyrannus verticalis</i>		X	X			X
Eastern Kingbird	<i>Tyrannus tyrannus</i>		X				X
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>			X			X
Olive-sided Flycatcher	<i>Contopus cooperi</i>	C; D; E; F	X	*			X
Western Wood-Pewee	<i>Contopus sordidulus</i>		X	X			X
Willow Flycatcher	<i>Empidonax traillii</i>	A; B; C; F	X	X			X
Hammond's Flycatcher	<i>Empidonax hammondi</i>		X		X		X
Gray Flycatcher	<i>Empidonax wrightii</i>	C	X	X	X		X
Dusky Flycatcher	<i>Empidonax oberholseri</i>		X	X			X
Western Flycatcher	<i>Empidonax difficilis</i>		X	X			X
Black Phoebe	<i>Sayornis nigricans</i>		X	X	X	X	X
Eastern Phoebe	<i>Sayornis phoebe</i>				*		*
Say's Phoebe	<i>Sayornis saya</i>		X	X	X	X	X
Vermilion Flycatcher	<i>Pyrocephalus rubinus</i>	A; B	X	X	X		X
Bell's Vireo	<i>Vireo bellii</i>	A; B; C; F	X	X			X
Cassin's Vireo	<i>Vireo cassinii</i>		X	X			X
Plumbeous Vireo	<i>Vireo plumbeus</i>		X	*			X
Warbling Vireo	<i>Vireo gilvus</i>		X	X	X		X
Loggerhead Shrike	<i>Lanius ludovicianus</i>	D; F	X	X	X	X	X

Common Name	Scientific Name	Conservation Status	Breeding Season	Fall Transition	Non-Breeding Season	Winter Transition	Overall
Woodhouse's Scrub-Jay	<i>Aphelocoma woodhouseii</i>			X			X
American Crow	<i>Corvus brachyrhynchos</i>		*		*		*
Common Raven	<i>Corvus corax</i>		X	X	X	X	X
Verdin	<i>Auriparus flaviceps</i>		X	X	X	X	X
Horned Lark	<i>Eremophila alpestris</i>	D	X	X	X	X	X
Bank Swallow	<i>Riparia riparia</i>	F	X	*			X
Tree Swallow	<i>Tachycineta bicolor</i>		X	*	X	X	X
Violet-green Swallow	<i>Tachycineta thalassina</i>		X	X	*	X	X
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		X	X	X	X	X
Barn Swallow	<i>Hirundo rustica</i>		X	X	X	*	X
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>		X	X	X	X	X
Bushtit	<i>Psaltriparus minimus</i>		X	X	X	X	X
Ruby-crowned Kinglet	<i>Corthylio calendula</i>		X	X	X	X	X
Golden-crowned Kinglet	<i>Regulus satrapa</i>				X	X	X
Cedar Waxwing	<i>Bombycilla cedrorum</i>		X	X	X		X
Phainopepla	<i>Phainopepla nitens</i>	A	X	X	X	X	X
Red-breasted Nuthatch	<i>Sitta canadensis</i>			X	X	X	X
Brown Creeper	<i>Certhia americana</i>				X		X
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>		X	X	X	X	X
Black-tailed Gnatcatcher	<i>Polioptila melanura</i>		X	X	X	X	X
Rock Wren	<i>Salpinctes obsoletus</i>		X	X	X	X	X
Canyon Wren	<i>Catherpes mexicanus</i>		X	*	X	X	X
Cactus Wren	<i>Campylorhynchus brunneicapillus</i>				*	X	X
Bewick's Wren	<i>Thryomanes bewickii</i>		X	X	X	X	X
House Wren	<i>Troglodytes aedon</i>		X	X	X	X	X
Pacific Wren	<i>Troglodytes pacificus</i>				X	X	X
Marsh Wren	<i>Cistothorus palustris</i>		X	X	X	X	X
Gray Catbird	<i>Dumetella carolinensis</i>				X		X
Brown Thrasher	<i>Toxostoma rufum</i>				X		X
Crissal Thrasher	<i>Toxostoma crissale</i>		X	X	X	X	X
Sage Thrasher	<i>Oreoscoptes montanus</i>	C; F	X	*	*	X	X
Northern Mockingbird	<i>Mimus polyglottos</i>		X	X	X	X	X
European Starling	<i>Sturnus vulgaris</i>		X	X	X	*	X
Western Bluebird	<i>Sialia mexicana</i>				X		X
Mountain Bluebird	<i>Sialia currucoides</i>				X		X
Swainson's Thrush	<i>Catharus ustulatus</i>			X			X
Hermit Thrush	<i>Catharus guttatus</i>		X	X	X	X	X
American Robin	<i>Turdus migratorius</i>		X	X	X	X	X
House Sparrow	<i>Passer domesticus</i>		X	*	X	X	X

Common Name	Scientific Name	Conservation Status	Breeding Season	Fall Transition	Non-Breeding Season	Winter Transition	Overall
American Pipit	<i>Anthus rubescens</i>		X	X	X	X	X
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	D; E			X		X
House Finch	<i>Haemorhous mexicanus</i>		X	X	X	X	X
Cassin's Finch	<i>Haemorhous cassinii</i>	D; E; F	*		*		*
Red Crossbill	<i>Loxia curvirostra</i>				X		X
Pine Siskin	<i>Spinus pinus</i>	D	X	*	X		X
Lesser Goldfinch	<i>Spinus psaltria</i>		X	X	X	X	X
American Goldfinch	<i>Spinus tristis</i>		X		X	X	X
Black-throated Sparrow	<i>Amphispiza bilineata</i>		X	*	X	*	X
Lark Sparrow	<i>Chondestes grammacus</i>		X	X	X		X
Chipping Sparrow	<i>Spizella passerina</i>		X	X	X		X
Brewer's Sparrow	<i>Spizella breweri</i>	C; F	X	X	X		X
Fox Sparrow	<i>Passerella iliaca</i>				X		X
Dark-eyed Junco	<i>Junco hyemalis</i>		X	X	X	X	X
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>		X	X	X	X	X
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>				*		*
White-throated Sparrow	<i>Zonotrichia albicollis</i>				X	*	X
Bell's Sparrow	<i>Artemisospiza belli</i>	C		X	*	*	X
Sagebrush Sparrow	<i>Artemisospiza nevadensis</i>	C; F	*	*	X		X
Vesper Sparrow	<i>Poocetes gramineus</i>		X	X			X
Savannah Sparrow	<i>Passerculus sandwichensis</i>		X	X	X	X	X
Song Sparrow	<i>Melospiza melodia</i>		X	X	X	X	X
Lincoln's Sparrow	<i>Melospiza lincolni</i>		X	X	X	X	X
Swamp Sparrow	<i>Melospiza georgiana</i>				X	*	X
Canyon Towhee	<i>Melozone fusca</i>		X				X
Abert's Towhee	<i>Melozone aberti</i>	C	X	X	X	X	X
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>		X				X
Green-tailed Towhee	<i>Pipilo chlorurus</i>	C	X	X			X
Spotted Towhee	<i>Pipilo maculatus</i>		X	X	X	X	X
Yellow-breasted Chat	<i>Icteria virens</i>		X	X	X		X
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>		X	X	X	*	X
Western Meadowlark	<i>Sturnella neglecta</i>		X	X	X	X	X
Hooded Oriole	<i>Icterus cucullatus</i>		X	X	*		X
Bullock's Oriole	<i>Icterus bullockii</i>		X	X	X	X	X
Red-winged Blackbird	<i>Agelaius phoeniceus</i>		X	X	X	X	X
Brown-headed Cowbird	<i>Molothrus ater</i>		X	X	X	X	X
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	D	X	*	X	X	X
Great-tailed Grackle	<i>Quiscalus mexicanus</i>		X	X	X	X	X
Ovenbird	<i>Seiurus aurocapilla</i>				X		X

Common Name	Scientific Name	Conservation Status	Breeding Season	Fall Transition	Non-Breeding Season	Winter Transition	Overall
Northern Waterthrush	<i>Parkesia novaboracensis</i>			X			X
Black-and-white Warbler	<i>Mniotilta varia</i>		X	*	X	X	X
Orange-crowned Warbler	<i>Leiothlypis celata</i>		X	X	X	X	X
Lucy's Warbler	<i>Leiothlypis luciae</i>	C	X	X		X	X
Nashville Warbler	<i>Leiothlypis ruficapilla</i>		X	X	X		X
Virginia's Warbler	<i>Leiothlypis virginiae</i>	C; D; E; F		X			X
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>		X	X	X		X
Common Yellowthroat	<i>Geothlypis trichas</i>		X	X	X	X	X
Hooded Warbler	<i>Setophaga citrina</i>		*				*
American Redstart	<i>Setophaga ruticilla</i>		X				X
Northern Parula	<i>Setophaga americana</i>			X			X
Yellow Warbler	<i>Setophaga petechia</i>	B	X	X	X		X
Blackpoll Warbler	<i>Setophaga striata</i>				X		X
Palm Warbler	<i>Setophaga palmarum</i>				X		X
Yellow-rumped Warbler	<i>Setophaga coronata</i>		X	X	X	X	X
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>		X	X	X		X
Townsend's Warbler	<i>Setophaga townsendi</i>		X	X	X		X
Hermit x Townsend's Warbler †	<i>Setophaga occidentalis x townsendi</i>				X		X
Hermit Warbler	<i>Setophaga occidentalis</i>	C		*			*
Wilson's Warbler	<i>Cardellina pusilla</i>		X	X	X	X	X
Summer Tanager	<i>Piranga rubra</i>	A; B	X	X			X
Western Tanager	<i>Piranga ludoviciana</i>		X	X			X
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>		X				X
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>		X	X			X
Blue Grosbeak	<i>Passerina caerulea</i>	A	X	X	X		X
Lazuli Bunting	<i>Passerina amoena</i>		X	X	X		X
Lazuli x Indigo Bunting †	<i>Passerina amoena x cyanea</i>		X				X
Indigo Bunting	<i>Passerina cyanea</i>		X	X			X
Species Richness		66	206	184	186	141	252
Conservation Priority Richness		66	54	51	43	30	66

† Not included in count of species.

Table 3. Average bird species richness along the Las Vegas Wash, by season and year, with numbers of weirs and revegetated hectares.

Year	Breeding	Fall Transition	Non-Breeding	Winter Transition	COMBINED (avg # species/survey)	# Weirs	# Ha Reveg*
Year 1	34.0	34.0	31.7	26.3	32.3	9	30
Year 2	32.9	40.0	30.3	32.7	32.5	10	55
Year 3	35.3	34.5	35.2	29.0	34.5	10	71
Year 4	33.8	39.5	31.2	39.3	34.0	11	79
Year 5	34.8	44.5	34.0	31.3	34.8	12	105
Year 6	33.1	45.5	33.9	30.7	34.2	12	113
Year 10	46.2	41.5	43.9	44.7	44.8	19	172
Year 11	45.9	47.5	48.1	50.0	47.3	19	198
Year 12	44.9	50.0	46.2	47.3	46.0	19	204
Year 13	41.8	54.7	51.0	45.7	46.5	21	201
Year 14	46.1	51.7	45.6	44.3	46.4	21	208
Year 15 **	44.1	51.5	45.6	51.5	46.6	21	231
Year 16	46.5	51.0	46.1	46.3	46.7	21	247
Year 17	43.2	43.0	40.0	43.3	42.1	21	249
Year 18	40.7	44.5	42.6	51.5	43.2	21	249
COMBINED	40.2	44.9	40.4	40.9	40.8	16.5	160.8

* For Years 1–6, this number was derived from acreages reported in Las Vegas Wash Coordination Committee year-end reports as the study year ran February–January. From Year 10 onward, this number was derived from acreages reported in annual Las Vegas Wash vegetation monitoring reports, which reflect areas planted up to but not including the fall of that year, thus more closely approximating the new September–August study year.

** In Year 15, three surveys during the early breeding season were missing due to coronavirus restrictions.

Table 4. Average total bird abundance along the Las Vegas Wash, by season and year, with numbers of weirs and revegetated hectares.

Year	Breeding	Fall Transition	Non-Breeding	Winter Transition	COMBINED (avg # birds per 40 ha/survey)	# Weirs	# Ha Reveg*
Year 1	134.9	106.7	131.4	78.5	125.0	9	30
Year 2	132.3	123.8	126.2	114.7	127.5	10	55
Year 3	127.0	91.4	157.2	146.9	137.0	10	71
Year 4	143.8	109.3	151.9	156.3	145.4	11	79
Year 5	148.1	217.5	173.4	137.9	161.0	12	105
Year 6	131.3	141.7	192.1	121.4	152.0	12	113
Year 10	171.0	203.7	292.1	341.9	235.1	19	172
Year 11	193.2	167.4	302.7	452.9	259.1	19	198
Year 12	209.0	150.1	367.2	351.0	275.6	19	204
Year 13	156.7	198.2	386.4	291.7	247.7	21	201
Year 14	185.9	164.4	268.2	296.3	221.5	21	208
Year 15 **	162.3	193.9	275.2	397.2	245.2	21	231
Year 16	203.5	141.1	304.2	358.4	247.8	21	247
Year 17	167.9	139.4	235.9	228.2	196.2	21	249
Year 18	163.3	146.4	261.0	315.0	215.4	21	249
COMBINED	162.0	154.8	239.5	257.0	199.1	16.5	160.8

* For Years 1–6, this number was derived from acreages reported in Las Vegas Wash Coordination Committee year-end reports as the study year ran February–January. From Year 10 onward, this number was derived from acreages reported in annual Las Vegas Wash vegetation monitoring reports, which reflect areas planted up to but not including the fall of that year, thus more closely approximating the new September–August study year.

** In Year 15, three surveys during the early breeding season were missing due to coronavirus restrictions.

Table 5. Estimated species-specific densities (birds per 40 ha) for survey visits overall, among seasons from the full dataset (2005–2023), and overall values by survey year. Species are in descending order of overall abundance. Conservation status includes priority species from multiple sources: A (Clark County 2000); B (LCRMSCP 2004); C (GBBO 2010); D (Rosenberg et al. 2016, Intermountain Partners in Flight); E (Rosenberg et al. 2016, Continental Partners in Flight); and F (Nevada Department of Wildlife 2012). An “X” indicates the species was recorded, but not within 100 m of a point; no entry means that the species was not detected.

Species (Conservation Status)	Overall	Breeding	Non-Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
American Coot	23.1	9.2	35.9	2.2	8.7	10.1	5.4	4.8	3.7	34.8	43.1	45.1	45.6	22.9	30.5	32.8	25.4	32.0
Yellow-rumped Warbler	12.5	1.7	29.9	6.2	3.2	11.5	10.7	13.7	14.4	13.3	8.6	10.1	13.8	16.9	10.3	17.9	13.7	23.3
Mallard	10.8	5.5	15.7	1.0	2.1	4.6	4.0	8.4	6.3	18.0	24.5	18.4	15.7	11.4	17.7	10.8	8.6	10.4
Red-winged Blackbird	10.7	15.5	7.3	7.0	7.4	9.7	9.9	12.3	6.9	15.6	17.3	14.3	10.0	9.2	9.3	10.2	11.7	9.2
Gadwall	10.5	2.8	17.2	0.7	1.1	1.6	1.5	2.0	2.5	12.9	20.8	30.9	20.9	18.4	15.6	13.5	6.3	9.1
Abert's Towhee (C)	9.8	10.3	8.7	15.6	14.3	10.2	10.8	11.5	10.9	8.6	8.1	8.9	7.7	6.8	8.7	7.3	8.8	8.4
Gambel's Quail (C)	7.7	8.8	6.5	1.7	1.1	1.0	1.7	3.3	8.6	6.3	5.7	8.1	9.4	11.5	14.9	14.9	14.2	12.5
American Wigeon	7.7	2.8	12.6	X	0.1	0.2	0.2	0.3	0.7	11.2	21.5	22.2	15.5	9.7	13.7	9.5	4.6	5.6
White-crowned Sparrow	7.5	1.2	17.5	4.2	4.3	5.5	5.8	8.3	8.7	6.7	5.7	7.6	9.9	8.6	6.7	13.3	10.6	6.6
Great-tailed Grackle	7.3	10.9	3.9	0.7	1.5	3.7	4.1	4.3	3.3	7.8	10.7	10.8	8.3	9.1	8.7	10.3	14.1	12.2
Marsh Wren	6.8	3.9	9.6	4.5	5.5	7.5	9.9	9.2	9.0	7.6	7.3	6.8	6.6	5.7	6.6	5.5	5.1	5.9
Song Sparrow	6.8	7.9	5.8	12.2	12.8	10.5	9.4	7.7	9.2	5.9	6.4	6.7	4.7	3.2	3.6	3.9	3.1	2.4
Verdin	6.6	7.3	5.7	3.5	4.5	3.9	4.9	5.6	5.4	5.9	5.5	6.7	8.0	9.7	10.1	8.7	8.4	8.5
Black-tailed Gnatcatcher	5.6	5.8	5.3	4.6	5.4	3.3	4.3	5.5	5.3	5.8	5.3	5.3	5.3	6.4	6.9	7.3	6.6	6.2
Common Yellowthroat	4.8	9.3	0.2	4.1	4.6	4.6	6.0	4.8	4.5	4.9	5.4	6.3	3.4	3.5	4.1	5.2	5.0	4.9
American Pipit	4.3	0.7	8.5	1.3	2.7	2.1	5.8	6.0	4.9	11.4	3.5	4.7	6.4	5.4	4.7	3.2	0.5	1.8
Bewick's Wren	4.2	4.2	3.7	7.4	8.0	4.9	6.8	6.7	5.4	4.6	4.0	3.3	2.7	2.4	2.5	1.6	1.7	1.2
Black Phoebe	3.6	2.2	4.7	3.9	4.4	3.4	3.8	3.7	3.8	4.9	3.9	4.0	3.1	3.2	3.3	3.6	2.8	2.8
Orange-crowned Warbler	3.1	0.6	5.3	1.7	1.1	1.8	2.0	1.7	2.7	1.2	3.0	4.2	3.6	4.0	5.0	5.1	4.4	5.0
Ruby-crowned Kinglet	2.9	0.4	6.0	4.7	4.2	3.4	2.2	2.3	2.4	2.3	2.0	1.8	2.6	3.4	3.3	4.4	2.3	1.9
Brown-headed Cowbird	2.1	4.6	0.0	3.3	3.8	3.6	4.4	3.1	3.0	2.1	1.6	1.6	0.9	1.3	0.7	1.2	0.6	0.6
Mourning Dove	1.9	3.4	0.5	5.1	1.8	1.7	1.4	2.2	2.1	1.2	0.7	1.3	2.8	2.0	2.2	2.1	1.4	1.1
Crissal Thrasher	1.8	1.7	2.0	1.9	1.4	0.8	1.2	1.8	1.9	1.6	2.0	2.3	1.9	1.7	2.6	2.4	2.2	2.0
Lucy's Warbler (C)	1.8	3.8		5.0	3.2	2.5	2.9	1.8	1.6	1.2	1.3	1.5	0.9	0.9	0.6	0.9	1.2	0.9
House Finch	1.7	1.4	2.4	0.9	1.3	1.4	1.3	4.0	2.8	0.9	2.4	1.4	1.5	1.5	0.9	1.5	1.0	3.0

Species (Conservation Status)	Overall	Breeding	Non-Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Yellow-breasted Chat	1.5	3.2	0.0	3.2	2.9	2.2	3.4	1.1	1.5	1.0	1.5	0.8	0.8	0.9	0.7	0.7	0.8	1.0
Yellow Warbler (B)	1.5	2.9	0.0	1.0	1.0	1.3	2.7	2.4	2.2	1.1	1.7	1.8	1.7	1.3	0.8	1.5	0.8	0.9
Blue Grosbeak (A)	1.2	2.5	0.0	2.3	1.7	1.6	1.7	1.0	1.0	0.9	1.2	1.6	0.9	1.0	1.5	0.9	0.7	0.7
Greater Roadrunner	1.2	1.6	0.7	0.7	0.6	0.6	0.6	0.5	0.6	1.0	1.4	2.0	1.3	1.7	2.4	1.4	1.5	1.7
Killdeer	1.1	1.2	0.9	1.7	0.9	0.3	0.8	0.9	0.3	2.1	1.3	0.7	1.5	2.1	2.3	0.5	0.3	0.2
Ring-billed Gull	1.0	0.3	1.1	X	0.6	1.2	X	0.0	X	0.1	0.9	0.0	1.2	1.2	4.8	1.9	1.0	2.2
Say's Phoebe	1.0	0.7	1.3	0.5	0.6	0.3	1.0	1.7	1.1	0.8	1.1	1.1	1.3	0.9	1.3	2.2	0.3	0.5
Anna's Hummingbird	1.0	1.1	0.7	0.1	0.0	0.0	0.0	0.1	0.0	0.6	1.0	1.5	1.8	1.5	2.1	1.8	2.1	2.0
Yellow-headed Blackbird	1.0	1.3	0.1	0.9	0.3	0.0	0.3	0.3	0.1	5.4	1.7	0.7	0.4	1.2	1.0	1.1	0.5	0.4
Lesser Scaup (C)	0.9	0.2	0.9							0.2	0.0	0.5	0.7	0.8	1.9	3.7	2.8	3.6
Great Blue Heron	0.9	0.7	1.0	0.2	0.3	0.3	0.2	0.7	0.4	1.4	1.7	1.8	1.5	1.0	1.4	0.6	0.9	1.1
Canada Goose	0.8	0.5	0.7		X	0.2		0.0	0.1	0.5	0.5	1.8	0.8	0.7	2.5	2.2	1.1	0.9
Northern Flicker	0.7	0.1	1.6	0.4	0.5	0.9	0.9	0.6	0.7	1.0	0.9	0.8	0.8	0.9	0.6	0.7	0.6	0.7
White-faced Ibis (CF)	0.7	1.1	0.2	0.1	0.2	X	0.0	0.0	0.0	0.4	0.2	0.5	1.4	3.1	1.8	1.1	1.1	0.3
Brewer's Sparrow (CF)	0.6	0.5	0.1	0.3	0.5	1.0	1.0	2.0	0.9	0.2	0.4	0.2	0.2	0.5	0.6	0.9	0.3	0.1
Northern Pintail (CF)	0.6	0.0	1.3	X	0.0		X	X	0.1	1.6	1.5	1.5	0.6	0.5	0.3	0.9	1.5	0.7
Lincoln's Sparrow	0.6	0.2	1.1	0.8	0.2	0.5	0.3	0.3	0.3	0.3	0.4	0.6	0.8	0.4	0.6	1.1	1.3	1.1
Double-crested Cormorant	0.6	0.3	0.8	0.0	0.1	0.6	0.2	0.1	0.0	0.7	0.6	2.2	1.4	0.5	0.6	0.5	0.7	0.7
Western Kingbird	0.6	1.2		0.2	0.3	0.6	0.4	0.5	0.4	1.1	0.6	1.2	0.3	0.1	1.2	1.0	0.6	0.3
Northern Mockingbird	0.6	0.7	0.5	0.0	0.2	0.2	0.1	0.2	0.2	0.5	1.1	1.2	0.6	0.8	1.7	0.8	0.5	0.7
Northern Rough-Winged Swallow	0.5	1.0	0.0	0.2	0.2	0.2	1.0	0.4	0.1	0.1	0.4	0.3	0.2	1.5	0.7	1.1	0.5	1.3
Lesser Goldfinch	0.5	0.3	0.5	0.4	0.7	0.3	0.6	1.1	2.8	0.3	0.4	0.2	0.2	0.2	0.4	0.3	0.1	0.1
Wilson's Warbler	0.5	0.9	0.0	1.1	0.8	0.6	0.5	0.5	0.2	1.0	0.1	0.2	0.7	0.2	0.0	0.8	0.1	0.2
Eared Grebe (C)	0.4	0.9	0.0	0.0		0.2		0.1	X	0.0	2.0	3.3	0.3	0.2	0.0	0.1	0.1	0.2
Black-chinned Hummingbird	0.4	0.9	0.0	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.4	0.8	0.5	0.6	0.5
Green-winged Teal	0.4	0.1	0.5		0.1	0.3	0.1	0.1	0.1	0.5	0.7	0.2	0.7	0.6	1.1	0.6	0.4	0.8
Spotted Sandpiper	0.4	0.5	0.3	0.3	0.6	0.1	0.3	0.6	0.2	0.8	0.6	0.5	0.3	0.5	0.4	0.4	0.3	0.4
Dark-eyed Junco	0.4	0.0	0.9	0.1	0.2	1.6	0.9	0.9	0.4	0.3	0.4	0.1	0.3	0.0	0.1	0.5	0.0	0.0
Savannah Sparrow	0.4	0.3	0.4	0.1		0.3	0.5	0.3	0.3	0.2	0.5	0.6	0.4	0.4	0.4	0.9	0.7	0.2
Bufflehead	0.4	0.0	0.7			0.2	0.3	0.0	0.1	0.7	1.1	0.4	0.6	0.3	0.4	1.1	0.3	0.5

Species (Conservation Status)	Overall	Breeding	Non-Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Common Gallinule	0.4	0.5	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.5	0.4	0.6	0.6	0.5	0.5	0.6	0.5	0.7
Loggerhead Shrike (DF)	0.3	0.2	0.4	0.4	0.2	0.1	0.2	0.6	0.2	0.5	0.6	0.5	0.4	0.3	0.2	0.2	0.3	0.0
Costa's Hummingbird (C)	0.3	0.5	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.6	0.8	0.8	0.8
Least Sandpiper (C)	0.3	0.2	0.5					1.1	0.4	1.5	0.1	0.0	0.7	0.4	0.1	0.2	X	0.1
Northern Shoveler	0.3	0.1	0.5	0.1	0.0			0.0	X	0.4	1.5	1.4	0.0	0.4	0.1	0.1	0.1	0.3
Pied-billed Grebe	0.3	0.2	0.4	0.1	0.1	0.5	0.2	0.1	0.1	0.1	0.5	0.8	0.5	0.3	0.3	0.3	0.2	0.4
Green Heron	0.3	0.5	0.1	0.3	0.5	0.3	0.3	0.2	0.2	0.4	0.1	0.3	0.2	0.2	0.5	0.2	0.2	0.4
American Avocet (CF)	0.3	0.3	0.0	0.2				0.0	X	0.3	0.0	0.0	0.3	0.9	1.9	0.2	0.1	0.0
Greater Yellowlegs	0.3	0.2	0.4	0.3	0.3	0.1	0.2	0.2	0.3	0.5	0.6	0.1	0.3	0.2	0.7	0.2	0.1	0.1
Cooper's Hawk	0.3	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.4	0.5	0.5	0.3	0.3	0.2	0.2
Western Meadowlark	0.2	0.0	0.5	X	0.0		0.0	0.1	0.1	0.2	0.3	1.1	0.3	0.5	0.4	0.3	0.2	0.0
Cinnamon Teal (C)	0.2	0.4	0.0	0.1	X	X	0.0	0.2		0.3	0.5	0.1	0.4	0.7	0.3	0.5	0.1	0.3
Belted Kingfisher	0.2	0.1	0.4	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.4	0.3	0.2	0.3	0.3	0.1	0.1	0.2
Sora	0.2	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.3	0.3	0.6	0.5	0.4	0.3
Bushtit	0.2	0.0	0.4	0.6	0.4	0.2	0.0	1.2	0.5						0.0	0.0		0.1
Snowy Egret (C)	0.2	0.2	0.2	0.2	0.0	0.3	0.0	0.1	0.1	0.3	0.3	0.4	0.2	0.5	0.4	0.0	0.0	0.0
Ring-necked Duck	0.2	0.0	0.3				X	X		0.1	0.4	0.1	0.5	0.7	0.3	0.3	0.2	0.2
Barn Swallow	0.2	0.3	0.1	X	X	1.2	0.1	X	X	X	X	X	0.0	0.0	0.0	1.3	0.1	0.0
American White Pelican (CF)	0.2	0.1	0.1				0.0	X	0.0	0.3	0.3	0.0	X	X	0.4	0.3	0.3	1.1
Common Merganser	0.2	0.1	0.2	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.4	0.6	0.2	0.2	0.5	0.0	0.1	0.0
Blue-gray Gnatcatcher	0.2	0.2	0.1	0.4	0.5	0.2	0.6	0.1	0.1	0.2		0.0	0.1	0.1	0.0	0.2	0.1	0.0
Tree Swallow	0.2	0.1	0.0			0.0	0.0	X	X	X	X	X	X	X	0.4	1.0	0.0	1.1
Black-crowned Night-Heron	0.2	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.1	0.4	0.4	0.3	0.4	0.1	0.1	0.1
Bullock's Oriole	0.2	0.3	0.0	0.0	0.1	0.1		0.1	0.2	0.2	0.4	0.4	0.2	0.2	0.1	0.3	0.1	0.2
Osprey	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.2	0.2	0.2	0.3	0.0	0.3	0.3
Black-necked Stilt (C)	0.1	0.3		0.1	X			0.1	X	0.1	0.0	0.0	0.2	0.9	0.5	0.1	0.0	0.1
Cliff Swallow	0.1	0.3	0.0	X	X	0.1	0.7	0.1	X	X	X	X	X	0.5	0.1	0.2	0.1	0.2
White-winged Dove	0.1	0.3	0.0	0.3	0.2	0.3	0.3	0.4	0.2	0.2	0.0	X	X	X		0.0		0.0
Western Wood-Pewee	0.1	0.2		0.1	0.1	0.1	0.2	0.0	0.2	0.3	0.1	0.1	0.2	0.2	0.0	0.3	0.2	0.0
Spotted Towhee	0.1	0.0	0.3	0.1	0.1	0.2	0.3	0.1	0.1	0.1	0.0		0.1	0.3	0.1	0.1	0.2	0.1

Species (Conservation Status)	Overall	Breeding	Non-Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Great Egret	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.3	0.1	0.2	0.3	0.1	0.0	0.0
Ruddy Duck	0.1	0.0	0.0						X	0.2	0.0			0.1	0.0	X	0.1	1.4
Lazuli Bunting	0.1	0.2	0.0	0.1	0.1	0.0	0.2	0.0	X	0.0	0.0	0.0	0.4	0.2	0.3	0.2	0.0	0.0
Northern Harrier	0.1	0.0	0.2	0.0	0.1	0.3	0.1	0.0	X	0.0	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1
Red-tailed Hawk	0.1	0.0	0.2	0.1	0.0	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2
Chipping Sparrow	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.7	0.1	X	0.0	0.1	0.1	0.0	0.1	X		X
Pine Siskin (D)	0.1	0.0	0.3	0.1		0.3			0.2		0.2					0.8		
Rock Wren	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.3	0.3	0.0	0.1	0.0	0.0	0.0	0.1	0.1		X
Virginia Rail	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.0
American Kestrel	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.1
Warbling Vireo	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.2	0.0	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1
Phainopepla (A)	0.1	0.0	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.0	0.1	X	0.1	0.0	0.1	0.0	0.1	0.1
House Wren	0.1	0.0	0.2	0.0	0.0			0.0		0.0	0.1	0.2	0.3	0.2	0.1	0.2	0.0	0.0
Great Horned Owl	0.1	0.1	0.1		0.0	0.0		0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.3	0.1	0.1	0.2
Sharp-shinned Hawk	0.1	0.0	0.2	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Western Tanager	0.1	0.1		0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.1	0.1	0.3	0.1	0.0
Hooded Merganser	0.1	0.0	0.1							0.0	0.3	0.2	0.3	0.1	0.1	0.0	X	0.0
Common Goldeneye	0.1	0.0	0.1			0.0	0.1	0.0	X	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2
Indigo Bunting	0.1	0.2						0.1	0.1	0.1	0.2	0.3	0.1	0.1		X	0.1	0.0
American Robin	0.1	0.0	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2
Brewer's Blackbird (D)	0.1	0.0	0.2		X		0.4	0.1	0.4				0.0		0.0	0.0	0.1	X
Western Sandpiper (CF)	0.1	0.1	0.0	0.4	0.0			0.2	0.1	0.1			X	0.0	0.1		0.1	
Long-billed Dowitcher (CF)	0.1	0.1	0.0		0.1					0.1	0.1	0.2	0.1	0.2	0.1	X	0.1	
Red-shouldered Hawk	0.1	0.0	0.1					X	0.0	0.0	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Ash-throated Flycatcher	0.1	0.1		0.1	0.0	0.1	0.0	X	0.1	0.1	0.0	0.1		0.0	0.0	0.3	0.0	0.0
Black-headed Grosbeak	0.1	0.1		0.1	0.1	0.0		0.0	0.1	0.0	0.0	0.0	0.1	0.1		0.1	0.1	0.0
Horned Lark (D)	0.1	0.1	0.0	0.1		0.3	0.3	0.0	0.0	0.1		X	X		X	X	0.0	
Bell's Vireo (ABCF)	0.0	0.1		0.2		0.1			0.1	0.1	0.2	0.0	0.0	0.1	0.0	0.0		0.0
Ladder-backed Woodpecker	0.0	0.0	0.1	0.0			0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.0	X	0.0		X
Hermit Thrush	0.0	0.0	0.1	0.1	0.2	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	X	0.1

Species (Conservation Status)	Overall	Breeding	Non-Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
California Gull	0.0	0.0	0.0					X	X	X		X	X	0.0	0.4	0.1	X	0.2
MacGillivray's Warbler	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.1		0.0	0.0	0.1	0.1	0.1
Least Bittern (BCF)	0.0	0.1	0.0	0.0	0.0	0.1	0.1	X	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0		0.1
Lark Sparrow	0.0	0.1	0.0			0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1
Common Raven	0.0	0.0	0.0	X	X	0.1	X	0.0	X	0.1	X	0.1	0.0	0.0	X	0.0	0.1	0.0
Violet-green Swallow	0.0	0.0	X		X	0.0	0.0	0.0	X	X	X		X	X	0.0	0.1	X	0.2
Black-throated Gray Warbler	0.0	0.0	0.0					0.0				0.0	0.1	0.1	0.1	0.1	0.0	0.0
Bank Swallow (F)	0.0	0.1						X			X			0.2	0.0	0.2	X	X
Redhead (CF)	0.0	0.0	0.0				0.0		X	0.0	X	X	X	0.0	0.2	0.1	0.0	X
Greater White-fronted Goose	0.0		0.1						X			0.0		0.3	0.0	X		
Nashville Warbler	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		X	0.0	0.0	X
Western Flycatcher	0.0	0.0		0.0	0.1	0.1	0.0		X	0.1		0.0	0.0	0.0	0.0		0.0	
Townsend's Warbler	0.0	0.0	0.0						0.1	0.1			0.0	0.0		0.1	0.0	0.0
Eurasian Collared-Dove	0.0	0.0	0.0					0.0	X	0.0	0.0	0.1	0.0	0.0		0.0	0.0	0.0
American Goldfinch	0.0	0.0	0.0					0.0		0.0			0.0	X	0.1	0.1	X	0.0
Summer Tanager (AB)	0.0	0.0		X						0.0				0.0	0.1	0.1	0.0	0.0
Hooded Oriole	0.0	0.0	X			0.0						0.0	0.1	0.1	0.1		0.0	X
Neotropical Cormorant	0.0	0.0	0.0							0.0	0.2	X	0.0	0.0	0.0			X
Greater Scaup	0.0	0.0	0.0													0.0	X	0.2
Gray Flycatcher (C)	0.0	0.0	0.0	0.0		0.1		0.0	0.0		0.0	0.0				0.0	0.0	X
Red-naped Sapsucker	0.0	0.0	0.0	0.0	0.1	0.0				0.0	0.0		0.0		0.1	0.0		
Dusky Flycatcher	0.0	0.0		0.0	0.0	0.1		0.0		0.0						X	0.0	
Wilson's Snipe	0.0	0.0	0.0					0.0	X	0.0	0.0		0.0	0.1		0.0	X	
Golden-crowned Kinglet	0.0		0.0	0.0		0.1	0.0	0.0	0.0					0.0				
Cedar Waxwing	0.0	0.0	0.0	0.1	0.0			X					0.1	X	X		X	0.1
Black-throated Sparrow	0.0	0.0	0.0		0.0				0.1						0.0	0.0	0.0	X
Pacific Wren	0.0		0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	X	0.0			
Olive-sided Flycatcher (CDEF)	0.0	0.0		0.0		0.0			0.0	0.0	0.0	0.0		0.0		0.0	X	0.0
Lesser Nighthawk	0.0	0.0		X	0.0	X	X	0.0	X	0.0	0.0	0.1	X	X	0.0	X	X	X
Horned Grebe	0.0	0.0	0.0							0.0	0.1	0.0					0.0	

Species (Conservation Status)	Overall	Breeding	Non-Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Barn Owl	0.0	0.0	0.0	0.1	0.0	0.0		0.0		X		X	0.0	X		0.0		
Plumbeous Vireo	0.0	0.0					0.0			0.0	0.0		0.0		X	0.0	0.0	0.0
Green-tailed Towhee (C)	0.0	0.0					0.0	0.0				0.0	0.0			0.1	0.0	
Snow Goose	0.0	X	0.0	X				X	X		0.0		X	0.1	X		X	0.0
Brown-crested Flycatcher	0.0	0.0		0.0				X					0.0	0.0	0.0	0.0	0.0	X
Vermilion Flycatcher (AB)	0.0	0.0	0.0										0.0	0.0	0.0	0.0	X	0.0
Vesper Sparrow	0.0	0.0						0.0	0.0	0.0			X	X	X	0.0	X	
Red-breasted Nuthatch	0.0		0.0			0.0	0.0			0.0	0.0		0.0		X			
Solitary Vireo (unidentified)	0.0	0.0		X	0.0	0.0	0.1							X		0.0		
Lesser Yellowlegs	0.0	0.0	0.0					0.0		0.0	X		0.0	0.0	X			X
Turkey Vulture	0.0	0.0	X	X	X	X	0.0	X	X	X	X	0.0	X	X	X	X	X	0.1
Western Grebe (C)	0.0	0.0	0.0	X		0.0				0.0	0.0	X		X	X			X
Caspian Tern	0.0	0.0	X				X			X	X		0.0	0.0	0.1	X		
Merlin	0.0	X	0.0		0.0			0.0	X		0.0		X	0.0		X	0.0	0.0
Willow Flycatcher (ABCF)	0.0	0.0					0.0		0.0						X	0.0		0.0
Dunlin	0.0	0.0	0.0							0.1						0.0		
Wood Duck	0.0		0.0				0.0			X		X	0.0	X	X	0.0		0.0
Sagebrush Sparrow (CF)	0.0	X	0.0								0.0	0.0				0.0		
Semipalmated Sandpiper	0.0	0.0			0.1													
Canyon Wren	0.0	0.0	0.0	0.0	0.0	X	X			X			0.0					
Peregrine Falcon (CF)	0.0	0.0	0.0	X	X	X	0.0	0.0	X	X	X	X	0.0	X	0.0	X	X	X
Rose-breasted Grosbeak	0.0	0.0													0.0		0.0	0.0
Black-and-White Warbler	0.0	0.0	0.0									0.0	X	0.0				
European Starling	0.0	0.0	0.0				X	X	0.0		0.0			0.0	X	X	X	
American Redstart	0.0	0.0													0.1			
Western Bluebird	0.0		0.0	0.1	X			X										
House Sparrow	0.0	0.0	0.0	0.0		X				0.0					0.0			
Swamp Sparrow	0.0		0.0										0.0	X			0.0	
Hammond's Flycatcher	0.0	0.0	0.0							0.0				X		0.0	0.0	

Species (Conservation Status)	Overall	Breeding	Non-Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
American Bittern (F)	0.0	0.0	0.0		0.0			0.0				X					0.0	X
Short/Long-billed Dowitcher	0.0	0.0														0.0		
Eastern Kingbird	0.0	0.0							0.0		0.0	0.0						
Cassin's Vireo	0.0	0.0											0.0	0.0				
Rock Pigeon	0.0	X	0.0	X	X	0.0	0.0	X	X			X	X	X	X		X	X
Sage Thrasher (CF)	0.0	0.0	X													0.0		
Woodhouse's Scrub-Jay	0.0																	0.0
Lazuli x Indigo Bunting	0.0	0.0													0.0		0.0	
Brown Creeper	0.0		0.0							0.0			0.0					
Domestic Mallard	0.0	0.0																0.0
Prairie Falcon (CF)	0.0	X	0.0	X	X			0.0	X	X	X	X	X	0.0	X	X	X	X
Rufous Hummingbird (CEF)	0.0	0.0						X	0.0									
Solitary Sandpiper	0.0	0.0											0.0					X
Blue-winged Teal	0.0	X	0.0	X						X	0.0		X	X		0.0		X
Cactus Wren	0.0		X					X			0.0							
Palm Warbler	0.0		0.0													0.0		
Virginia's Warbler (CDEF)	0.0					0.0										0.0		
White-throated Swift (C)	0.0	0.0	X	X	X	X	X	X	X	X	X	X	X	0.0	X	X	X	X
Willet (C)	0.0	0.0								X	0.0			0.0	X			
Northern Parula	0.0																0.0	
Northern Waterthrush	0.0																0.0	
Barrow's Goldeneye	0.0														0.0			
Baird's Sandpiper	0.0		0.0													0.0		
Hermit x Townsend's Warbler	0.0		0.0													0.0		
Sage Sparrow (unidentified) (CF)	0.0		0.0											X		0.0		
Semipalmated Plover	0.0	0.0		0.0														
Canyon Towhee	0.0	0.0			0.0													
Fox Sparrow	0.0		0.0										0.0					
Hairy Woodpecker	0.0		0.0		0.0													

Species (Conservation Status)	Overall	Breeding	Non- Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Bonaparte's Gull	0.0	0.0								X	X		0.0					
Canvasback (CF)	0.0		0.0								X						0.0	
Long-eared Owl (E)	0.0	X		X										0.0				
Sandhill Crane (CF)	0.0	0.0	X						X		X		0.0					
Swainson's Hawk (C)	0.0	0.0				X			X		X	X	0.0			X		
Vaux's Swift	0.0	0.0	X			X		X					X			0.0	X	
Bell's Sparrow (C)	0.0		X											0.0	X	X		
Blackpoll Warbler	0.0		0.0								0.0							
Broad-tailed Hummingbird	0.0								0.0									
Brown Thrasher	0.0		0.0											0.0				
Cattle Egret	0.0	X								X	0.0			X		X	X	
Evening Grosbeak (DE)	0.0		0.0													0.0		
Gray Catbird	0.0		0.0											0.0				
Groove-billed Ani	0.0		0.0											0.0				
Mountain Bluebird	0.0		0.0				0.0											
Ovenbird	0.0		0.0						0.0									
Pectoral Sandpiper	0.0							0.0										
Red Crossbill	0.0		0.0								0.0							
Ross's Goose	0.0		0.0					X				0.0		X				
Rufous-crowned Sparrow	0.0	0.0				0.0												
Scissor-tailed Flycatcher	0.0								0.0									
Short-billed Dowitcher	0.0	X											X		X	0.0		
Swainson's Thrush	0.0													0.0				
White-throated Sparrow	0.0		0.0											0.0				
Yellow-billed Cuckoo (BCF)	0.0	0.0																0.0
American Crow	X	X	X												X		X	
American Goshawk (CF)	X		X						X									
Bald Eagle (CF)	X		X												X			
Cackling Goose/Lesser Canada Goose	X													X				

Species (Conservation Status)	Overall	Breeding	Non-Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Cassin's Finch (DEF)	X	X	X												X	X		X
Cassin's Kingbird	X	X												X				
Clark's Grebe (C)	X	X	X				X			X	X			X				X
Common Nighthawk (DF)	X												X	X				
Eastern Phoebe	X		X											X				
Forster's Tern	X	X									X							
Franklin's Gull (C)	X	X									X			X		X		
Golden Eagle (CF)	X		X											X				
Golden-crowned Sparrow	X		X													X		
Graylag Goose	X	X	X					X	X	X								
Hermit Warbler (C)	X															X	X	
Hooded Warbler	X	X								X								
Iceland Gull	X																	X
Lesser Black-backed Gull	X	X								X								
Lewis's Woodpecker (CDEF)	X																	X
Long-billed Curlew (CF)	X	X									X	X		X				
Marbled Godwit (C)	X	X									X				X			
Mississippi Kite	X	X													X			
Red-necked Phalarope (CF)	X																X	
Ridgway's Rail (BCF)	X	X																X
Roseate Spoonbill	X	X													X			
Snow Goose (x Domestic Goose?)	X		X										X					
Stilt Sandpiper	X											X						
Tundra Swan (C)	X		X									X						
Western/Clark's Grebe	X	X									X							
Western/Least Sandpiper	X										X							
Whimbrel	X	X								X								
White Ibis	X	X										X						
White-tailed Kite	X	X								X								

Species (Conservation Status)	Overall	Breeding	Non- Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Wilson's Phalarope (CF)	X	X									X		X	X	X			X

Table 6a. Breeding abundance (birds per 40 ha) by species for each of 15 survey years (2005–2023). Species listed are in descending order of mean breeding abundance. Conservation status includes priority species from multiple sources: A (Clark County 2000); B (LCRMSCP 2004); C (GBBO 2010); D (Rosenberg et al. 2016, Intermountain Partners in Flight); E (Rosenberg et al. 2016, Continental Partners in Flight); F (Nevada Department of Wildlife 2012). An “X” indicates the species was recorded, but not within 100 m of a point; no entry means that the species was not detected.

Species (Conservation Status)	Overall Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Red-winged Blackbird	15.5	5.3	8.7	11.7	15.1	15.6	14.1	25.4	24.0	23.6	11.8	15.9	13.5	17.8	15.3	13.8
Great-tailed Grackle	10.9	0.6	2.0	5.2	5.9	7.2	4.4	13.4	17.0	16.9	11.0	14.5	11.8	15.1	19.8	18.2
Abert's Towhee (C)	10.3	17.4	15.8	9.9	11.1	11.0	10.8	7.8	7.5	9.6	7.7	8.0	10.5	8.5	9.7	8.8
Common Yellowthroat	9.3	8.1	8.9	9.3	11.3	10.1	9.0	9.4	10.5	12.2	6.2	6.3	9.1	9.1	10.1	9.4
American Coot	9.2	1.2	1.4	5.5	3.3	1.3	1.1	10.5	17.5	20.4	12.3	15.0	2.1	18.3	13.3	15.1
Gambel's Quail (C)	8.8	3.2	1.8	1.5	1.7	4.6	9.6	6.2	7.4	10.8	8.9	12.2	17.9	18.2	15.6	12.8
Song Sparrow	7.9	14.2	15.2	12.1	12.0	9.1	10.9	7.9	7.9	9.1	4.2	3.3	3.0	4.1	3.2	2.3
Verdin	7.3	3.9	5.9	4.3	5.0	6.0	5.6	6.2	5.8	8.0	9.6	11.8	11.0	9.4	8.6	8.6
Black-tailed Gnatcatcher	5.8	5.0	6.8	3.2	4.2	5.2	4.8	6.2	5.2	5.9	6.1	6.7	7.7	6.8	6.9	6.1
Mallard	5.5	0.5	0.4	2.0	2.4	4.8	3.1	6.8	11.5	7.6	5.1	6.6	6.0	8.4	8.6	8.3
Brown-headed Cowbird	4.6	7.2	8.2	7.8	9.5	6.7	6.4	4.4	3.6	3.4	1.8	2.6	1.7	2.4	1.2	1.3
Bewick's Wren	4.2	7.1	9.0	4.8	7.0	6.6	3.8	4.6	5.0	3.9	2.5	2.4	1.7	1.4	1.9	1.5
Marsh Wren	3.9	2.0	2.9	4.7	8.2	7.6	6.9	4.1	3.4	3.5	3.6	3.1	0.5	2.7	3.0	2.1
Lucy's Warbler (C)	3.8	10.8	7.0	5.2	6.2	3.9	3.5	2.4	2.8	3.2	2.0	2.0	1.4	1.7	2.6	1.9
Mourning Dove	3.4	10.5	3.5	3.1	2.8	4.3	4.5	2.3	1.2	2.8	3.1	2.6	3.5	3.3	2.1	2.1
Yellow-breasted Chat	3.2	6.8	6.1	4.6	6.9	2.4	3.2	2.1	3.3	1.7	1.6	2.0	1.7	1.4	1.8	2.1
Yellow Warbler (B)	2.9	2.3	2.0	2.8	5.6	4.8	4.6	2.1	3.3	3.2	3.3	2.3	1.6	2.3	1.7	1.5
Gadwall	2.8	0.1	0.0	0.3	0.5	0.7	0.2	0.7	5.4	9.8	7.0	8.7	1.1	3.3	1.5	2.4
American Wigeon	2.8		X	0.1	0.3	X	X	2.5	12.0	7.0	5.2	5.7	X	3.9	2.0	3.0
Blue Grosbeak (A)	2.5	4.4	3.5	3.3	3.5	2.3	1.9	2.0	2.3	3.2	1.7	2.0	3.7	1.7	1.3	1.5
Black Phoebe	2.2	2.3	2.7	2.1	2.3	2.3	2.0	3.4	2.1	2.0	2.2	2.2	2.9	2.1	1.4	1.7
Yellow-rumped Warbler	1.7	0.3	1.1	1.7	0.7	0.9	0.4	1.2	1.7	3.1	3.8	1.5		3.7	1.7	4.3
Crissal Thrasher	1.7	1.5	1.7	0.5	1.0	1.7	1.4	1.8	1.5	2.2	1.0	1.6	2.4	2.5	2.2	1.8
Greater Roadrunner	1.6	0.9	1.0	1.0	0.7	0.7	0.9	1.7	1.6	2.4	1.5	1.8	3.5	1.7	2.0	2.4
House Finch	1.4	1.3	1.1	0.9	1.1	4.3	1.6	0.7	0.6	0.7	0.8	0.4	0.9	2.2	0.7	3.4
Yellow-headed Blackbird	1.3	1.9	0.2	0.1	0.4	0.7	0.2	4.9	1.4	1.1	0.5	2.3	2.1	2.2	1.1	0.1
White-crowned Sparrow	1.2	0.6	1.4	0.3	0.2	0.6	0.7	0.8	1.2	1.2	2.3	1.2		6.1	1.3	0.8
Killdeer	1.2	2.3	1.0	0.4	0.4	1.6	0.5	2.2	1.4	0.8	2.0	2.7	2.0	0.5	0.3	0.1
Western Kingbird	1.2	0.4	0.7	1.2	0.8	0.9	0.5	2.3	1.0	2.5	0.4	0.1	2.9	1.9	1.2	0.7
Anna's Hummingbird	1.1	0.2	0.1		0.1	0.1	0.0	0.7	1.2	1.9	1.9	1.8	2.0	1.7	2.2	2.2
White-faced Ibis (CF)	1.1	0.1	0.5	X	0.0	0.0	0.1	0.7	0.2	0.6	2.9	3.9	2.4	2.1	1.7	0.4
Northern Rough-Winged Swallow	1.0	0.2	0.4	0.3	2.0	0.7	X	0.2	0.8	0.7	0.4	2.9	1.5	2.1	0.9	2.0
Eared Grebe (C)	0.9	0.0		0.5		0.1		X	4.4	7.1	0.7	0.3	0.0	0.2	0.2	0.4
Wilson's Warbler	0.9	2.1	1.7	1.3	0.5	1.0	0.4	2.2	0.1	0.4	1.4	0.4	0.0	1.4	0.3	0.3
Black-chinned Hummingbird	0.9	0.3	0.7	0.7	0.5	0.7	0.6	0.6	1.0	1.0	0.9	0.7	2.0	0.9	1.2	1.0

Species (Conservation Status)	Overall Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Say's Phoebe	0.7	0.4	0.7	0.5	1.1	1.2	0.7	0.9	0.4	0.4	0.9	0.4	1.2	1.3	0.3	0.3
Great Blue Heron	0.7	0.2	0.1	0.3	0.1	0.8	0.3	1.5	1.5	1.0	0.6	0.9	1.2	0.6	0.8	0.7
Northern Mockingbird	0.7	0.1	0.3	0.2	0.0	0.2	0.2	0.8	1.2	1.1	0.7	0.9	2.4	0.9	0.5	0.8
American Pipit	0.7	X	0.1	0.4	X	3.8	0.4	1.1	0.3	0.1	2.5	0.8		0.4	0.1	X
Orange-crowned Warbler	0.6	0.4	0.4	0.4	0.1	0.3	0.4	0.2	0.3	0.8	0.7	0.8	0.6	1.6	1.3	0.6
Green Heron	0.5	0.5	0.8	0.4	0.5	0.4	0.4	0.9	0.3	0.4	0.4	0.3	1.0	0.4	0.3	0.8
Canada Goose	0.5			0.2		X	0.1	1.0	0.3	0.2	1.0	0.3	2.8	0.7	0.5	0.5
Common Gallinule	0.5	0.1	0.2	0.2	0.1	0.3	0.3	0.7	0.5	0.6	0.4	0.8	0.7	1.0	0.9	0.9
Brewer's Sparrow (CF)	0.5		0.7	1.7	0.3	0.6	1.2	0.2	0.0	0.1	0.4	X	1.0	0.9	0.4	0.1
Spotted Sandpiper	0.5	0.4	0.9	0.1	0.5	0.7	0.2	1.0	0.8	0.5	0.0	0.6	0.4	0.5	0.4	0.3
Costa's Hummingbird (C)	0.5	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.3	0.5	1.2	1.1	1.2	1.3
Ruby-crowned Kinglet	0.4	0.8	0.8	0.5	0.4	0.2	0.1	0.4	0.3	0.6	0.4	0.6		0.7	0.4	0.3
Cinnamon Teal (C)	0.4	0.2	X	X	0.1	0.1		0.1	1.0	0.2	0.6	1.4	0.7	1.0	0.2	0.4
Lesser Goldfinch	0.3	0.1	0.4	0.2	0.1	0.5	1.8	0.3	0.1	0.2	0.1	0.5	0.2	0.2	0.2	0.2
Barn Swallow	0.3		X	2.6	X	X	X	X	X	X	0.1	0.0	X	2.1	0.2	X
Bullock's Oriole	0.3	0.0	0.3	0.2		0.1	0.2	0.4	0.7	0.8	0.4	0.4	0.2	0.7	0.1	0.4
American Avocet (CF)	0.3	0.4				0.1	X	0.3	X	X	0.6	2.0	0.7	0.3	0.3	0.0
Double-crested Cormorant	0.3	0.0	0.1	0.2	0.1	0.2	0.0	0.5	0.5	0.8	0.2	0.2	0.0	0.4	0.6	0.4
Ring-billed Gull	0.3	X	X		X	X	X	0.0	X	X	1.5	1.7	X	0.0	0.2	0.8
White-winged Dove	0.3	0.6	0.4	0.7	0.7	0.8	0.5	0.3	0.1	X	X	X		0.0		0.1
Black-necked Stilt (C)	0.3	0.1	X			0.2	X	0.2	0.0	0.1	0.4	1.7	1.1	0.1	0.0	0.1
Savannah Sparrow	0.3	0.2		0.4	0.2	0.0	0.1	0.2	0.1	0.1	0.2	0.2	0.0	1.1	1.0	
Cliff Swallow	0.3	X	X	0.2	1.5	0.0	X	X	X	X	X	1.1	0.4	0.4	0.2	X
Pied-billed Grebe	0.2		0.0	0.4	0.3	0.2	0.1	0.1	0.5	0.5	0.3	0.5	0.1	0.3	0.2	0.4
Loggerhead Shrike (DF)	0.2	0.6	0.3	0.1	0.3	0.5	0.1	0.4	0.1	0.5	0.0	0.0	0.3	0.1	0.2	0.0
Least Sandpiper (C)	0.2					1.2	0.7	0.5	0.3	X	0.1	0.5	X	X		0.1
Cooper's Hawk	0.2	0.0		0.0	0.1	0.0	X	0.3	0.4	0.3	0.5	0.6	0.3	0.3	0.1	0.3
Lincoln's Sparrow	0.2	0.1	0.1	0.3	0.1	0.1	0.0	0.1	0.2	0.4	0.4	0.0		0.5	0.8	0.2
Lesser Scaup (C)	0.2							X	0.1	0.1	0.0	0.1		1.0	0.9	1.1
Western Wood-Pewee	0.2	0.1	0.1	0.1	0.2	0.0	0.4	0.5	0.1	0.1	0.3	0.2		0.5	0.2	0.0
Snowy Egret (C)	0.2	0.3	X	0.2	0.0	0.1	X	0.4	0.4	0.3	X	0.3	0.5	0.0	0.0	0.0
Greater Yellowlegs	0.2	X	0.1		0.0	0.1	0.3	0.3	0.3	0.0	0.3	0.1	0.7	0.3	0.0	0.1
Blue-gray Gnatcatcher	0.2	0.6	0.3	0.3	0.9					0.1	0.0	X		0.1	0.2	0.0
Lazuli Bunting	0.2	0.1	0.2	0.1	0.0	0.0	X	0.1	0.1	0.0	0.8	0.1	0.6	0.4	0.1	
Indigo Bunting	0.2					0.2	0.1	0.2	0.5	0.6	0.2	0.2		X	0.2	0.0
Green-winged Teal	0.1		0.0	X	0.1	X	0.1	0.2	0.2	0.0	0.2	0.3	0.2	0.3	0.4	0.1
American Kestrel	0.1	0.1	0.1	0.1		0.1	0.1	0.3	0.3	0.1	0.3	X	0.4	X	0.1	0.1
American White Pelican (CF)	0.1				0.1			0.0	0.3	0.1			X	0.4	0.3	0.7
Chipping Sparrow	0.1	0.1		0.2		1.0	0.2				0.1		0.3			
Western Tanager	0.1	0.1	0.0	0.1		0.1	0.1	0.0	0.1	0.0	0.4	0.1	0.1	0.4	0.0	0.1

Species (Conservation Status)	Overall Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Osprey	0.1	X	0.1	0.0	X	0.1	0.0	0.2	0.3	0.2	X	0.2	0.1	0.1	0.2	0.2
Sora	0.1		0.0	0.0	0.0		0.1	0.0	0.1	0.2	0.2	0.1	0.1	0.3	0.3	0.1
Warbling Vireo	0.1	0.2	0.1	0.1	0.1	0.3	0.1	0.2	0.0	0.1	0.1	0.1	0.0	0.2	0.1	0.1
Black-crowned Night-Heron	0.1	0.1	0.1	0.0	0.0	X	0.0	0.2	0.1	0.3	0.1	0.3	0.1	0.1	0.1	0.2
Tree Swallow	0.1				0.1	X	X	X	X	X	X	X	0.9	0.6	0.0	X
Ash-throated Flycatcher	0.1	0.1	X	0.2	0.0		0.2	0.1	0.1	0.1		0.1	0.1	0.5	0.1	0.0
Bell's Vireo (ABCF)	0.1	0.4		0.2			0.1	0.1	0.3	0.0	0.0	0.2	0.1	0.0		0.0
Black-headed Grosbeak	0.1	0.2	0.1			0.1	0.1	0.0	0.1	0.1	0.2	0.2		0.3	0.1	0.1
Western Sandpiper (CF)	0.1	0.8				0.5	0.2	X			X		X			
Great Egret	0.1	0.0	X	X	0.0	0.2	0.1	0.1	0.0	0.2	0.0	0.2	0.1	0.3	0.1	X
Virginia Rail	0.1	0.0	0.0	0.0	0.0		0.2	0.1	0.1	0.2	0.1	0.0	0.0	0.3	0.3	0.0
Great Horned Owl	0.1			0.0		0.1	0.1	0.0		0.1	0.1	0.0	0.4	0.1	0.1	0.2
Northern Shoveler	0.1					0.1		0.1	0.1	0.1	X	0.2		0.1	X	0.5
Horned Lark (D)	0.1	0.1		0.6	0.3	0.0		0.1		X			X			
Common Merganser	0.1	0.1	X		0.0	X	X	0.2	0.2	0.5	X	0.1			X	X
Lark Sparrow	0.1			0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.2		0.0		0.0	0.1
Belted Kingfisher	0.1	0.0	0.1	0.0	X	0.0	0.1	0.1	0.2	0.1	X	0.1	X	0.2	X	0.1
Least Bittern (BCF)	0.1	0.0		0.1	0.1	X	0.1	0.2	0.1	0.1	0.0	0.1	0.0	0.0		0.1
Bank Swallow (F)	0.1					X			X			0.4	0.1	0.3	X	
Rock Wren	0.1	0.0	0.1	0.0	0.2	0.2	0.2	0.0	X				X	X		
Long-billed Dowitcher (CF)	0.1		0.1					0.2	0.1	0.3	X	0.0	X	X		
Northern Flicker	0.1	X		0.1	0.1		0.0	0.0	0.1	0.1	X	0.2		0.0	0.0	0.0
Ruddy Duck	0.0							X				X		X	0.1	0.6
Bufflehead	0.0			0.0				0.1	0.0	0.2				0.1	0.0	0.1
Summer Tanager (AB)	0.0											0.0	0.3	0.1	0.1	0.1
Hooded Oriole	0.0			0.1						0.1	0.2	0.1	0.1		0.0	X
Western Flycatcher	0.0		0.0	0.2	0.0		X	0.2		0.1	0.1	0.0				
Dark-eyed Junco	0.0	0.1			0.3			0.1				0.1				
Common Raven	0.0	X	X		X	X	X	0.1	X	0.2	X	X	X	0.0	0.2	0.1
Neotropic Cormorant	0.0							0.0	0.3	X	0.1	X	0.1			
Townsend's Warbler	0.0						0.2	0.1				0.0		0.2		X
MacGillivray's Warbler	0.0	0.0		0.0			0.0	0.0		0.0		0.1	0.0	0.1	0.1	0.0
Gray Flycatcher (C)	0.0	0.0		0.2		0.1			0.0	0.0				0.1	0.0	X
Eurasian Collared-Dove	0.0					0.0	X	0.1	0.0	0.1	X	0.1		0.1	X	0.1
Dusky Flycatcher	0.0	0.0	0.0	0.3				0.0						X	0.0	
Olive-sided Flycatcher (CDEF)	0.0	0.0		0.0			0.0	0.0	0.0	0.1		0.0		0.1	X	0.1
Western Meadowlark	0.0		0.0					0.1	X	0.1	X	0.1		0.1	X	
Violet-green Swallow	0.0		X	0.1	0.1	X	X	X	X		X	X	0.1	0.1	X	
Black-throated Gray Warbler	0.0									X	0.2	0.1	0.0	0.0	0.0	
Northern Harrier	0.0		0.0	0.1	X	0.0	X	X	X	X	X	0.0	X	0.0	0.1	0.1

Species (Conservation Status)	Overall Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Common Goldeneye	0.0							X	0.1	0.1	0.0	X		0.0	0.0	0.1
American Robin	0.0								0.0			0.1		0.1		0.2
Brewer's Blackbird (D)	0.0					0.2					0.0		X		0.1	
Black-throated Sparrow	0.0		0.0				0.2						0.1		X	X
Plumbeous Vireo	0.0				0.0			0.0	0.0		0.1			0.0	0.1	0.1
House Wren	0.0		0.0					0.0		0.0		0.1	0.1	0.0		0.0
Northern Pintail (CF)	0.0							X		X		0.1		0.2		
Spotted Towhee	0.0	0.1		0.0	0.1		0.0				0.0	X			0.0	0.0
Red-shouldered Hawk	0.0							X	0.0	0.0	0.1	0.0	0.0	0.0	0.0	
Ladder-backed Woodpecker	0.0	0.0			0.0		0.1	0.1	X	0.1				0.0		X
Brown-crested Flycatcher	0.0	0.1				X					0.0	0.1	0.0	0.0	0.0	X
Red-tailed Hawk	0.0	X	0.0		0.0	X	X	0.1	X	X	X	0.0		0.0	X	0.0
Pine Siskin (D)	0.0	X								0.2				0.1		
Lesser Nighthawk	0.0	X	0.0	X	X	0.0	X	0.1	X	0.0	X	X	0.1	X	X	X
Solitary Vireo (unidentified)	0.0	X	0.0	0.0	0.2							X				
Nashville Warbler	0.0			0.1			0.0	0.1	X	0.0	X					X
Caspian Tern	0.0				X			X	X		0.1	0.0	0.1	X		
Horned Grebe	0.0							0.0	0.1	0.1					0.0	
Barn Owl	0.0	0.1	0.1			0.0		X								
Willow Flycatcher (ABCF)	0.0				0.1		0.0							X		0.1
Greater Scaup	0.0															0.2
Dunlin	0.0							0.2								
Lesser Yellowlegs	0.0							0.1			0.1	0.0	X			X
Bushtit	0.0	0.1					0.1									
California Gull	0.0						X	X				0.0	0.1	X	X	0.0
Wilson's Snipe	0.0					0.0	X	0.0	0.0			0.0		X	X	
Rose-breasted Grosbeak	0.0												0.0		0.0	0.1
Semipalmated Sandpiper	0.0		0.1													
Turkey Vulture	0.0		X	X	X	X	X	X	X	0.0	X	X	X	X	X	0.1
Hooded Merganser	0.0							X	0.0	0.1	X			0.0	X	
American Redstart	0.0												0.1			
Green-tailed Towhee (C)	0.0				0.0					0.0					0.1	
Hermit Thrush	0.0	0.0	0.0													0.0
Cedar Waxwing	0.0										X	X			X	0.1
Phainopepla (A)	0.0						0.0	X		X	0.0	X			0.0	X
Vesper Sparrow	0.0					0.1	0.0							X	X	
Eastern Kingbird	0.0						0.0		0.0	0.0						
Ring-necked Duck	0.0							X	X		X	X		X	X	0.1
Western Grebe (C)	0.0							0.1	X	X		X				
American Goldfinch	0.0					0.0		X						0.1		

Species (Conservation Status)	Overall Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Redhead (CF)	0.0							X		X	X	0.0		0.1		X
Sharp-shinned Hawk	0.0	X	X	X		0.0	X	X	X	X	X			0.1	X	
Short/Long-billed Dowitcher	0.0													0.1		
Lazuli x Indigo Bunting	0.0												0.0		0.0	
Canyon Wren	0.0	0.0			X						0.0					
Cassin's Vireo	0.0										0.0	0.0				
Domestic Mallard	0.0															0.1
Peregrine Falcon (CF)	0.0			X	0.0	X	X	X	X	X	0.0			X		X
Rufous Hummingbird (CEF)	0.0						0.1									
Hammond's Flycatcher	0.0							0.0				X			0.0	
White-throated Swift (C)	0.0	X	X	X	X	X	X	X	X	X	X	0.1	X	X	X	X
Willet (C)	0.0							X	0.0			0.0	X			
Vermilion Flycatcher (AB)	0.0												0.0	X	X	
Red-naped Sapsucker	0.0	0.0														
Semipalmated Plover	0.0	0.0														
American Bittern (F)	0.0		0.0													
Canyon Towhee	0.0		0.0													
Bonaparte's Gull	0.0							X	X		0.0					
Sandhill Crane (CF)	0.0										0.0					
Swainson's Hawk (C)	0.0			X			X		X	X	0.0			X		
Black-and-White Warbler	0.0											0.0				
European Starling	0.0								0.0			X				
House Sparrow	0.0							0.0								
Rufous-crowned Sparrow	0.0			0.0												
Solitary Sandpiper	0.0										0.0					X
Yellow-billed Cuckoo (BCF)	0.0															0.0
Sage Thrasher (CF)	0.0													0.0		
Vaux's Swift	0.0			X							X			0.0	X	
American Crow	X														X	
Blue-winged Teal	X	X						X	X		X	X				X
Cassin's Finch (DEF)	X															X
Cassin's Kingbird	X											X				
Cattle Egret	X							X						X	X	
Clark's Grebe (C)	X				X				X							X
Forster's Tern	X								X							
Franklin's Gull (C)	X								X			X		X		
Graylag Goose	X						X									
Hooded Warbler	X							X								
Lesser Black-backed Gull	X							X								
Long-billed Curlew (CF)	X									X		X				

Species (Conservation Status)	Overall Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Long-eared Owl (E)	X	X														
Marbled Godwit (C)	X												X			
Merlin	X											X				
Mississippi Kite	X												X			
Prairie Falcon (CF)	X						X			X						
Ridgway's Rail (BCF)	X															X
Rock Pigeon	X	X	X	X	X	X				X	X	X	X		X	X
Roseate Spoonbill	X												X			
Sagebrush Sparrow (CF)	X									X						
Short-billed Dowitcher	X										X		X			
Snow Goose	X	X					X									X
Western/Clark's Grebe	X								X							
Whimbrel	X							X								
White Ibis	X									X						
White-tailed Kite	X							X								
Wilson's Phalarope (CF)	X								X		X		X			X

Table 6b. Non-breeding abundances (birds per 40 ha) by species for each of 15 survey years (2005–2023). Species listed are in descending order of overall abundance. Conservation status includes priority species from multiple sources: A (Clark County 2000); B (LCRMSCP 2004); C (GBBO 2010); D (Rosenberg et al. 2016, Intermountain Partners in Flight); E (Rosenberg et al. 2016, Continental Partners in Flight); F (Nevada Department of Wildlife 2012). An “X” indicates the species was recorded, but not within 100 m of a point; no entry means that the species was not detected.

Species (Conservation Status)	Overall Non- Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
American Coot	35.9	4.5	16.8	9.6	6.0	7.7	6.7	61.1	58.6	82.9	97.1	30.2	41.2	43.5	34.2	37.7
Yellow-rumped Warbler	29.9	16.8	6.1	25.3	27.1	32.3	39.6	32.0	19.0	21.0	29.9	45.1	22.3	41.9	33.8	56.0
White-crowned Sparrow	17.5	10.4	6.5	13.5	15.0	19.2	21.2	15.7	13.7	17.2	21.7	21.6	14.8	27.2	25.5	18.7
Gadwall	17.2	1.7	2.5	2.1	1.7	2.7	4.6	18.6	29.3	51.5	37.3	30.2	19.9	27.8	10.6	17.0
Mallard	15.7	1.3	5.2	6.6	4.8	11.3	11.1	31.4	33.5	30.3	28.4	12.5	25.3	14.6	9.1	9.7
American Wigeon	12.6	X	X	0.3	0.1	0.3	0.6	17.5	23.9	44.1	37.4	11.2	18.6	19.0	8.4	8.0
Marsh Wren	9.6	7.1	7.6	9.7	11.0	10.5	11.2	9.9	10.5	10.2	10.2	8.0	11.2	9.3	7.6	9.1
Abert's Towhee (C)	8.7	13.1	12.6	10.5	9.3	11.1	9.9	8.8	8.9	8.0	5.7	5.2	6.6	5.9	6.8	7.7
American Pipit	8.5	3.8	6.7	3.6	13.0	8.7	12.3	20.5	9.1	8.4	12.9	10.5	10.9	5.8	0.9	1.0
Red-winged Blackbird	7.3	12.9	8.8	11.1	4.4	8.2	0.6	4.4	14.4	5.9	11.3	3.0	5.8	2.5	10.9	5.9
Gambel's Quail (C)	6.5	0.6	0.7	0.6	1.8	1.6	8.9	6.5	4.0	5.1	10.3	12.1	10.8	10.0	12.6	11.3
Ruby-crowned Kinglet	6.0	10.1	7.7	7.4	4.1	5.4	4.8	3.9	4.4	3.4	5.8	7.9	6.2	9.7	5.1	3.9
Song Sparrow	5.8	10.2	9.7	9.5	5.9	6.8	7.7	2.9	5.2	4.7	5.4	3.7	4.8	4.2	3.4	2.8
Verdin	5.7	3.0	2.3	3.8	4.7	5.5	4.6	5.8	4.9	5.1	5.6	7.5	8.6	7.4	7.7	8.1
Black-tailed Gnatcatcher	5.3	3.6	4.6	3.1	4.4	5.7	5.4	4.6	5.5	4.5	4.4	6.9	6.9	8.1	5.9	6.2
Orange-crowned Warbler	5.3	2.9	2.0	3.1	4.0	2.6	4.5	1.4	4.9	8.0	6.1	6.9	6.9	9.0	7.6	9.6
Black Phoebe	4.7	4.9	5.6	4.3	5.9	4.2	5.6	5.7	5.4	6.3	3.8	3.5	3.6	5.2	3.5	3.2
Great-tailed Grackle	3.9	1.2	1.2	2.6	2.8	1.2	2.9	2.8	3.2	3.7	5.8	4.0	7.5	4.8	7.5	7.8
Bewick's Wren	3.7	6.8	6.1	4.7	7.0	5.0	6.9	3.5	2.5	2.2	2.5	1.3	2.5	2.2	1.2	0.7
House Finch	2.4	0.3	1.9	2.6	1.9	1.2	4.1	1.6	5.5	2.9	2.6	3.9	0.8	1.2	1.9	4.2
Crissal Thrasher	2.0	2.4	0.9	1.0	1.5	2.0	2.2	1.3	2.4	2.6	2.7	2.1	2.4	2.5	1.9	1.9
Northern Flicker	1.6	0.9	1.1	2.1	1.9	1.0	1.7	2.0	2.0	1.7	2.1	2.1	1.1	1.5	1.4	1.8
Say's Phoebe	1.3	0.6	0.5	0.2	1.2	2.3	1.1	1.0	1.9	1.9	2.1	1.6	1.6	3.0	0.3	0.5
Northern Pintail (CF)	1.3	X			X	X	0.2	4.3	3.1	3.4	1.7	1.0	0.7	0.4	3.6	0.5
Lincoln's Sparrow	1.1	1.9	0.2	0.9	0.7	0.5	0.7	0.8	0.5	1.0	1.1	0.7	1.1	2.1	2.3	2.7
Ring-billed Gull	1.1	X	1.8	3.1	X	0.1	X	0.2	1.0	0.0	0.8	0.2	2.3	2.8	2.0	2.2
Great Blue Heron	1.0	0.2	0.4	0.3	0.2	0.6	0.4	1.4	1.7	2.6	2.2	1.0	1.6	0.6	1.3	1.3
Lesser Scaup (C)	0.9							0.5	X	0.1	1.1	0.7	2.1	1.5	2.8	5.4
Dark-eyed Junco	0.9	0.1	0.5	4.7	1.4	2.5	0.6	0.4	1.0	0.3	1.0		0.4	1.0	0.1	0.1
Killdeer	0.9	1.1	0.4	0.2	1.0	0.2	0.1	2.0	1.2	0.6	1.3	1.1	3.3	0.6	0.1	0.3
Double-crested Cormorant	0.8	X	0.1	1.3	0.1	0.1	X	0.3	0.9	3.5	2.7	0.6	0.8	0.7	0.9	0.6
Anna's Hummingbird	0.7	0.0		0.0	0.1			0.3	0.6	1.0	1.7	0.8	1.8	1.3	1.8	1.6
Canada Goose	0.7			0.4		0.1	X	0.0	0.2	1.0	0.7	1.3	1.0	3.9	1.8	0.6
Bufflehead	0.7			0.5	X	0.1	0.2	1.5	2.1	0.7	1.6	0.6	0.4	1.7	0.6	0.7

Species (Conservation Status)	Overall Non- Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Greater Roadrunner	0.7	0.4	0.1	0.2	0.4	0.2	0.1	0.4	0.9	1.4	1.1	1.1	1.3	1.0	0.6	1.0
Least Sandpiper (C)	0.5					1.6	0.0	3.5	X	0.1	1.9	X		0.7	X	
Green-winged Teal	0.5		0.3	0.3	0.1	0.2	0.1	0.3	1.2	0.4	0.8	1.2	0.9	1.0	X	1.0
Northern Mockingbird	0.5		0.2	0.0	0.1	0.3	0.2	0.4	0.8	1.4	0.3	0.7	1.3	0.6	0.5	0.6
Northern Shoveler	0.5	0.2					X	0.6	1.6	4.0	0.1	0.8	X	X	0.2	0.1
Mourning Dove	0.5	0.3	X	0.3	0.1	0.2	X	0.4	0.3	0.0	0.1	1.6	2.1	1.1	0.8	0.3
Western Meadowlark	0.5				0.0	0.3	0.1	0.2	0.8	1.8	0.7	0.8	1.0	0.8	0.5	X
Lesser Goldfinch	0.5	0.2	0.1	0.2	0.8	0.6	3.6	0.3	0.3	0.4	0.1	0.1	0.2	0.2	X	X
Bushtit	0.4	1.6	1.0	0.1		3.3							0.1	0.2		0.2
Savannah Sparrow	0.4			0.2	0.6	0.5	0.4	0.1	0.5	0.6	0.8	0.3	0.4	1.1	0.3	0.1
Loggerhead Shrike (DF)	0.4	0.2	0.1	0.1	0.1	0.6	0.3	0.6	0.8	0.6	0.7	0.5	0.3	0.3	0.5	0.1
Belted Kingfisher	0.4	0.5	0.2	0.4	0.3	0.1	0.1	0.5	0.7	0.9	0.3	0.4	0.6	0.2	0.2	0.3
Greater Yellowlegs	0.4	0.7	0.2	0.3	0.3	0.2	0.1	0.5	1.0	0.3	0.4	0.1	1.0	0.1	0.2	0.1
Sora	0.4	0.1	0.1	0.0	0.1	0.0	0.1	0.2	0.2	0.6	0.5	0.6	0.9	0.7	0.7	0.4
Pied-billed Grebe	0.4	0.2	0.2	0.7	X	0.1	0.3	0.1	0.5	1.3	0.7	0.1	0.2	0.4	0.2	0.3
Ring-necked Duck	0.3				X	X		0.1	0.6	0.3	1.4	1.2	X	0.3	0.5	0.2
Spotted Sandpiper	0.3	0.2	0.2		0.1	0.2	0.2	0.5	0.5	0.5	0.6	0.3	0.4	0.4	0.0	0.4
Pine Siskin (D)	0.3	0.3		0.7			0.7		0.4					2.3		
Spotted Towhee	0.3	0.1	0.2	0.5	0.6	0.1	0.1	0.2	0.1		0.2	0.9	0.2	0.3	0.4	0.3
Cooper's Hawk	0.3	X	0.1	0.2	0.0	0.1	0.3	0.3	0.4	0.4	0.5	0.6	0.3	0.3	0.2	0.1
Red-tailed Hawk	0.2	0.2	X	0.2	0.1	0.1	0.4	0.4	0.2	0.3	0.5	0.3	0.3	0.2	0.2	0.3
Common Gallinule	0.2	0.1	0.2		0.1	0.1	0.1	0.2	0.4	0.2	0.8	0.2	0.1	0.3	0.0	0.3
Phainopepla (A)	0.2	0.5	0.5	0.1	0.5	0.3	0.0	0.1	0.2	X	0.3	0.1	0.3	0.2	0.1	0.1
Northern Harrier	0.2	0.1	0.2	0.6	0.1	0.1	X	0.1	0.0	0.2	0.2	0.3	0.7	0.2	0.3	0.1
Common Yellowthroat	0.2	0.0		0.0	0.2		0.1	0.5	0.3	0.4	0.1	0.2		0.7	0.0	0.4
Common Merganser	0.2	X	0.0	0.1	0.0	X	0.0	0.2	0.5	0.6	0.2	0.3	0.5	0.2	0.3	X
Black-crowned Night-Heron	0.2	X	0.2	0.1	0.0	X	0.3	0.3	0.1	0.4	0.8	0.2	0.1	0.2	0.1	X
Snowy Egret (C)	0.2	X	0.1	0.5	X	0.0	0.0	0.0	0.1	0.5	0.5	0.5	0.4	0.1	0.0	X
Rock Wren	0.2	0.2	0.2	0.1	0.1	0.5	0.6	0.1	0.2	0.1	0.1	0.1	0.2	0.3		X
Brewer's Blackbird (D)	0.2		X		1.3	0.1	1.2						0.1			X
American Robin	0.2	0.1	0.0	0.3	0.2	0.1		0.1	0.1	0.2	0.1	0.2	0.4	0.1	0.2	0.5
White-faced Ibis (CF)	0.2	X	X		X				X	0.5	0.1	0.4	1.0	0.1	0.4	0.1
Sharp-shinned Hawk	0.2	0.4	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.3
House Wren	0.2	0.0				0.0		0.1	0.2	0.5	0.6	0.5	0.1	0.4	0.1	X
Osprey	0.2	X			0.0	X	X	0.5	0.1	0.1	0.3	0.1	0.5	X	0.3	0.4
Blue-gray Gnatcatcher	0.1	0.3			0.0	0.2	0.4	0.3			0.2	0.4		0.2	0.1	0.1
Hooded Merganser	0.1							X	0.4	0.2	0.5	0.4	0.3	0.1		
Great Egret	0.1	0.1	0.0	0.2	0.0	0.1	0.1	X	0.2	0.5	0.3	0.2	X	X	X	X
Brewer's Sparrow (CF)	0.1	0.3			0.5	0.4		0.0	0.3	X				0.3		
Yellow-headed Blackbird	0.1	0.0			0.3	X			0.0	X	X	X			X	1.3

Species (Conservation Status)	Overall Non- Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
American White Pelican (CF)	0.1						X	0.5	0.2	X	X	X	0.2		0.0	0.8
Virginia Rail	0.1	0.1	0.1	0.1	0.1	0.1	0.3	X	0.1	0.1	0.2	0.1	0.2	0.1	0.0	
Costa's Hummingbird (C)	0.1			X	0.0		0.0	0.2	0.1	0.0			0.1	0.4	0.3	0.3
Great Horned Owl	0.1					0.0	0.0	X	0.2	0.0	0.1	0.2	0.3	0.2	0.0	0.2
Hermit Thrush	0.1	0.3	0.2	0.0	0.0				0.1		0.1	0.1	0.1	0.2	X	0.2
American Kestrel	0.1	X	X		X	X	0.2	X	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Greater White-fronted Goose	0.1						X			0.1		1.1		X		
Red-shouldered Hawk	0.1					X		0.0	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1
Common Goldeneye	0.1			0.1		0.1	X	0.0	0.0	X	0.2	0.2	X	0.2	X	0.3
Ladder-backed Woodpecker	0.1					0.1	0.3	0.1	0.3		0.1		X	0.1		
Green Heron	0.1	0.1	0.2	0.1		0.0	0.1		X	0.1	X	0.1	0.1		X	0.1
Barn Swallow	0.1			X	X	X	X		X	X	0.1	X	X	0.7		0.2
Long-billed Dowitcher (CF)	0.0							X	X	0.1	0.2				0.4	
American Goldfinch	0.0					0.1		0.1			0.1	X	0.3	0.1	X	0.1
Chipping Sparrow	0.0				0.1	0.5		X								
Golden-crowned Kinglet	0.0	0.0		0.3	0.1	0.1	0.0					0.1				
Yellow Warbler (B)	0.0							0.1		0.0				0.4		0.1
Common Raven	0.0	X	X	0.3	X	X	X	0.0	X	X	0.1	0.1	X	X	0.0	X
Horned Lark (D)	0.0			0.1	0.4		0.0						X	X		
California Gull	0.0					X	X	X		X	X			0.2		0.3
Cinnamon Teal (C)	0.0					0.1		0.3	X	X						0.1
Ruddy Duck	0.0						X	0.3	0.1			X	X		0.0	X
Wilson's Warbler	0.0	0.3							0.0					0.1		
Red-naped Sapsucker	0.0	0.0	0.1	0.0				0.0	0.0				0.1			
Western Sandpiper (CF)	0.0						X	0.2					0.2			
Snow Goose	0.0					X	X		X		X	0.3	X		X	0.1
Pacific Wren	0.0	0.1					0.1	0.0		X	0.1	X	0.1			
Eared Grebe (C)	0.0						X	0.1	X	0.1		0.1				
Cedar Waxwing	0.0	0.0				X					0.3					
Vermilion Flycatcher (AB)	0.0										0.1	0.1		0.1	X	0.1
Brown-headed Cowbird	0.0		X		0.0			0.0						0.1		0.1
Least Bittern (BCF)	0.0		0.0	0.1						X	0.1					0.1
Black-chinned Hummingbird	0.0				0.0			0.1	0.0	0.0						
Sagebrush Sparrow (CF)	0.0								0.1	0.1				0.1		
Wood Duck	0.0				0.0			X		X	0.1	X	X	0.1		
Merlin	0.0		0.0			0.0	X		X		X	0.1		X	X	0.1
Nashville Warbler	0.0						0.0		0.0	0.0					0.0	
Eurasian Collared-Dove	0.0								0.1	0.1	X	X				X
Horned Grebe	0.0							0.0	0.1	X						
Western Grebe (C)	0.0	X		0.0				X	0.1							X

Species (Conservation Status)	Overall Non- Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Greater Scaup	0.0														X	0.2
Black-throated Gray Warbler	0.0					0.0								0.1		
Swamp Sparrow	0.0										0.1				0.0	
Barn Owl	0.0			0.0		X				X	0.1			0.1		
Wilson's Snipe	0.0								0.0		0.1	X				
Black-throated Sparrow	0.0						X							0.1	0.0	
Blue Grosbeak (A)	0.0						0.0						0.1			
Western Bluebird	0.0	0.1	X			X										
Red-breasted Nuthatch	0.0				0.0				0.0		0.1					
Warbling Vireo	0.0							X		0.1						0.1
Rock Pigeon	0.0			0.1	0.0											X
European Starling	0.0					X	X		X			0.1	X	X	X	
Palm Warbler	0.0													0.1		
Redhead (CF)	0.0						X		X			X	0.1	X	X	
MacGillivray's Warbler	0.0									0.0				0.1		
Brown Creeper	0.0							0.0			0.1					
Prairie Falcon (CF)	0.0					0.0	X	X	X		X	0.1	X	X	X	X
Peregrine Falcon (CF)	0.0	X				0.0	X	X	X	X	X	X	0.1	X	X	X
Tree Swallow	0.0			0.1			X			X				X	X	
Baird's Sandpiper	0.0													0.1		
Hammond's Flycatcher	0.0													0.1		
Hermit x Townsend's Warbler	0.0													0.1		
Lark Sparrow	0.0													0.1		
Sage Sparrow (unidentified) (CF)	0.0											X		0.1		
Fox Sparrow	0.0										0.1					
Black-and-White Warbler	0.0											0.1				
Brown Thrasher	0.0											0.1				
Dunlin	0.0													0.1		
Evening Grosbeak (DE)	0.0													0.1		
Gray Catbird	0.0											0.1				
Groove-billed Ani	0.0											0.1				
Lazuli Bunting	0.0		X													0.1
Lesser Yellowlegs	0.0					X						0.1	X			
Neotropic Cormorant	0.0											0.1				
Northern Rough-Winged Swallow	0.0	X			X	X	X	X	X	X		X	0.1	X	X	X
White-throated Sparrow	0.0											0.1				
Canyon Wren	0.0		0.0													
Hairy Woodpecker	0.0		0.0													
House Sparrow	0.0	0.0														
Townsend's Warbler	0.0														0.0	

Species (Conservation Status)	Overall Non- Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
White-winged Dove	0.0	0.0														
American Bittern (F)	0.0														0.0	
Bullock's Oriole	0.0						0.0									
Canvasback (CF)	0.0								X						0.0	
American Avocet (CF)	0.0							0.0	X	X		X				
Blackpoll Warbler	0.0								0.0							
Blue-winged Teal	0.0	X							0.0							
Cliff Swallow	0.0			X	X	0.0				X						
Gray Flycatcher (C)	0.0								0.0							
Mountain Bluebird	0.0				0.0											
Ovenbird	0.0							0.0								
Red Crossbill	0.0								0.0							
Ross's Goose	0.0					X				0.0						
Yellow-breasted Chat	0.0			0.0												
American Crow	X												X			
American Goshawk (CF)	X						X									
Bald Eagle (CF)	X												X			
Bell's Sparrow (C)	X												X			
Cactus Wren	X					X										
Caspian Tern	X								X							
Cassin's Finch (DEF)	X												X	X		
Clark's Grebe (C)	X							X	X							
Eastern Phoebe	X											X				
Golden Eagle (CF)	X											X				
Golden-crowned Sparrow	X													X		
Graylag Goose	X					X	X									
Hooded Oriole	X			X												
Sage Thrasher (CF)	X													X		
Sandhill Crane (CF)	X						X									
Snow Goose (x Domestic Goose?)	X										X					
Tundra Swan (C)	X									X						
Turkey Vulture	X								X	X		X				
Vaux's Swift	X					X										
Violet-green Swallow	X				X	X			X							
White-throated Swift (C)	X		X							X						

Table 7. Relative species abundance (percent of total bird abundance) for all 15 years (overall), among seasons, and by survey year (2005–2023). Only species that represent at least 1% of the total bird abundance in one or more periods are listed (in descending order of overall relative abundance). Conservation status includes priority species from multiple sources: A (Clark County 2000); B (LCRMSCP 2004); C (GBBO 2010); D (Rosenberg et al. 2016, Intermountain Partners in Flight); E (Rosenberg et al. 2016, Continental Partners in Flight); F (Nevada Department of Wildlife 2012). “X” indicates the species was only detected outside of the survey period or beyond 100 m of a point. No entry means that the species was not detected.

Species (Conservation Status)	Overall	Breeding	Non-Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
American Coot	11.6	5.7	14.8	1.8	6.9	7.3	3.7	3.0	2.4	14.8	16.6	16.4	18.4	10.3	12.4	13.2	12.9	14.9
Yellow-rumped Warbler	6.3	1.1	12.4	5.0	2.5	8.4	7.3	8.5	9.5	5.7	3.3	3.7	5.6	7.6	4.2	7.2	7.0	10.8
Mallard	5.4	3.4	6.5	0.8	1.7	3.3	2.8	5.2	4.1	7.6	9.5	6.7	6.3	5.1	7.2	4.4	4.4	4.8
Red-winged Blackbird	5.3	9.5	3.0	5.6	5.8	7.1	6.8	7.6	4.6	6.6	6.7	5.2	4.0	4.1	3.8	4.1	6.0	4.3
Gadwall	5.3	1.7	7.1	0.6	0.8	1.2	1.0	1.3	1.7	5.5	8.0	11.2	8.4	8.3	6.4	5.5	3.2	4.2
Abert's Towhee (C)	4.9	6.3	3.6	12.5	11.2	7.5	7.4	7.1	7.2	3.7	3.1	3.2	3.1	3.1	3.6	2.9	4.5	3.9
Gambel's Quail (C)	3.8	5.4	2.7	1.4	0.9	0.7	1.1	2.1	5.7	2.7	2.2	2.9	3.8	5.2	6.1	6.0	7.2	5.8
American Wigeon	3.8	1.7	5.2	X	0.1	0.2	0.1	0.2	0.4	4.7	8.3	8.1	6.3	4.4	5.6	3.8	2.3	2.6
White-crowned Sparrow	3.8	0.8	7.2	3.4	3.4	4.0	4.0	5.2	5.7	2.9	2.2	2.8	4.0	3.9	2.7	5.4	5.4	3.1
Great-tailed Grackle	3.7	6.7	1.6	0.6	1.2	2.7	2.8	2.7	2.2	3.3	4.1	3.9	3.3	4.1	3.6	4.1	7.2	5.6
Marsh Wren	3.4	2.4	4.0	3.6	4.3	5.5	6.8	5.7	5.9	3.2	2.8	2.5	2.7	2.6	2.7	2.2	2.6	2.8
Song Sparrow	3.4	4.9	2.4	9.7	10.0	7.7	6.4	4.8	6.0	2.5	2.5	2.4	1.9	1.5	1.5	1.6	1.6	1.1
Verdin	3.3	4.5	2.3	2.8	3.5	2.9	3.4	3.5	3.6	2.5	2.1	2.4	3.2	4.4	4.1	3.5	4.3	4.0
Black-tailed Gnatcatcher	2.8	3.6	2.2	3.7	4.3	2.4	2.9	3.4	3.5	2.4	2.0	1.9	2.2	2.9	2.8	3.0	3.3	2.9
Common Yellowthroat	2.4	5.7	0.1	3.3	3.6	3.4	4.1	3.0	3.0	2.1	2.1	2.3	1.4	1.6	1.7	2.1	2.5	2.3
American Pipit	2.2	0.4	3.5	1.1	2.1	1.5	4.0	3.7	3.2	4.8	1.4	1.7	2.6	2.4	1.9	1.3	0.2	0.8
Bewick's Wren	2.1	2.6	1.5	5.9	6.3	3.6	4.7	4.1	3.6	2.0	1.6	1.2	1.1	1.1	1.0	0.7	0.9	0.5
Black Phoebe	1.8	1.4	2.0	3.1	3.4	2.5	2.6	2.3	2.5	2.1	1.5	1.5	1.3	1.4	1.3	1.5	1.4	1.3
Orange-crowned Warbler	1.6	0.4	2.2	1.4	0.9	1.3	1.4	1.1	1.8	0.5	1.1	1.5	1.5	1.8	2.0	2.0	2.2	2.3
Ruby-crowned Kinglet	1.4	0.3	2.5	3.7	3.3	2.4	1.5	1.4	1.6	1.0	0.8	0.6	1.0	1.6	1.4	1.8	1.2	0.9
Brown-headed Cowbird	1.1	2.8	0.0	2.7	3.0	2.6	3.0	1.9	2.0	0.9	0.6	0.6	0.4	0.6	0.3	0.5	0.3	0.3
Mourning Dove	1.0	2.1	0.2	4.1	1.4	1.2	0.9	1.4	1.4	0.5	0.3	0.5	1.1	0.9	0.9	0.8	0.7	0.5
Crissal Thrasher	0.9	1.0	0.8	1.5	1.1	0.6	0.8	1.1	1.2	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.1	0.9
Lucy's Warbler (C)	0.9	2.3		4.0	2.5	1.8	2.0	1.1	1.1	0.5	0.5	0.5	0.4	0.4	0.2	0.3	0.6	0.4
House Finch	0.9	0.8	1.0	0.7	1.1	1.0	0.9	2.5	1.9	0.4	0.9	0.5	0.6	0.7	0.4	0.6	0.5	1.4

Species (Conservation Status)	Overall	Breeding	Non- Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Yellow-breasted Chat	0.8	2.0	0.0	2.5	2.2	1.6	2.3	0.7	1.0	0.4	0.6	0.3	0.3	0.4	0.3	0.3	0.4	0.5
Yellow Warbler (B)	0.7	1.8	0.0	0.8	0.8	1.0	1.9	1.5	1.5	0.5	0.6	0.7	0.7	0.6	0.3	0.6	0.4	0.4
Blue Grosbeak (A)	0.6	1.6	0.0	1.9	1.3	1.1	1.2	0.6	0.6	0.4	0.5	0.6	0.4	0.4	0.6	0.3	0.3	0.3
Killdeer	0.5	0.8	0.4	1.4	0.7	0.3	0.5	0.6	0.2	0.9	0.5	0.3	0.6	0.9	0.9	0.2	0.1	0.1
Ring-billed Gull	0.5	0.2	0.4	X	0.5	0.9	X	0.0	X	0.1	0.3	0.0	0.5	0.5	2.0	0.8	0.5	1.0
Say's Phoebe	0.5	0.4	0.5	0.4	0.5	0.3	0.7	1.0	0.7	0.3	0.4	0.4	0.5	0.4	0.5	0.9	0.2	0.2
Anna's Hummingbird	0.5	0.7	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.3	0.4	0.5	0.7	0.7	0.8	0.7	1.1	0.9
Yellow-headed Blackbird	0.5	0.8	0.0	0.7	0.2	0.0	0.2	0.2	0.1	2.3	0.7	0.3	0.2	0.5	0.4	0.4	0.3	0.2
Lesser Scaup (C)	0.5	0.1	0.4							0.1	0.0	0.2	0.3	0.3	0.8	1.5	1.4	1.7
Canada Goose	0.4	0.3	0.3		X	0.2		0.0	0.1	0.2	0.2	0.7	0.3	0.3	1.0	0.9	0.5	0.4
White-faced Ibis (CF)	0.3	0.6	0.1	0.1	0.2	X	0.0	0.0	0.0	0.2	0.1	0.2	0.6	1.4	0.7	0.4	0.5	0.1
Brewer's Sparrow (CF)	0.3	0.3	0.0	0.2	0.4	0.7	0.7	1.2	0.6	0.1	0.2	0.1	0.1	0.2	0.3	0.4	0.2	0.0
Lesser Goldfinch	0.3	0.2	0.2	0.3	0.5	0.2	0.4	0.7	1.8	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1
Eared Grebe (C)	0.2	0.6	0.0	0.0		0.2		0.0	X	0.0	0.8	1.2	0.1	0.1	0.0	0.0	0.0	0.1
Dark-eyed Junco	0.2	0.0	0.4	0.1	0.2	1.2	0.6	0.5	0.3	0.1	0.2	0.0	0.1	0.0	0.1	0.2	0.0	0.0

Table 8a. Breeding relative species abundances (percent of total bird abundance) for each of 15 survey years (2005–2023). Only species that represent at least 1% of the total bird abundance in one or more periods are listed (in descending order of overall relative abundance). Conservation status includes priority species from multiple sources: A (Clark County 2000); B (LCRMSCP 2004); C (GBBO 2010); D (Rosenberg et al. 2016, Intermountain Partners in Flight); E (Rosenberg et al. 2016, Continental Partners in Flight); F (Nevada Department of Wildlife 2012). “X” indicates the species was only detected outside of the survey period or beyond 100 m of a point. No entry means that the species was not detected.

Species (Conservation Status)	Overall Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Red-winged Blackbird	9.5	3.9	6.6	9.2	10.5	10.6	10.8	14.9	12.4	11.3	7.5	8.6	8.3	8.8	9.1	8.4
Great-tailed Grackle	6.7	0.4	1.5	4.1	4.1	4.9	3.4	7.9	8.8	8.1	7.0	7.8	7.3	7.4	11.8	11.2
Abert's Towhee (C)	6.3	12.9	12.0	7.8	7.7	7.4	8.3	4.6	3.9	4.6	4.9	4.3	6.5	4.2	5.8	5.4
Common Yellowthroat	5.7	6.0	6.7	7.4	7.9	6.8	6.9	5.5	5.5	5.8	4.0	3.4	5.6	4.5	6.0	5.8
American Coot	5.7	0.9	1.0	4.4	2.3	0.9	0.8	6.1	9.1	9.8	7.8	8.1	1.3	9.0	7.9	9.2
Gambel's Quail (C)	5.4	2.3	1.3	1.2	1.2	3.1	7.3	3.6	3.8	5.2	5.7	6.6	11.0	8.9	9.3	7.9
Song Sparrow	4.9	10.5	11.5	9.6	8.4	6.2	8.3	4.6	4.1	4.4	2.6	1.8	1.9	2.0	1.9	1.4
Verdin	4.5	2.9	4.5	3.3	3.5	4.1	4.3	3.6	3.0	3.8	6.1	6.4	6.8	4.6	5.1	5.3
Black-tailed Gnatcatcher	3.6	3.7	5.1	2.5	2.9	3.5	3.7	3.6	2.7	2.8	3.9	3.6	4.7	3.3	4.1	3.7
Mallard	3.4	0.3	0.3	1.6	1.7	3.2	2.4	4.0	6.0	3.7	3.3	3.6	3.7	4.1	5.2	5.1
Brown-headed Cowbird	2.8	5.3	6.2	6.2	6.6	4.5	4.9	2.6	1.8	1.6	1.2	1.4	1.0	1.2	0.7	0.8
Bewick's Wren	2.6	5.3	6.8	3.8	4.9	4.5	2.9	2.7	2.6	1.9	1.6	1.3	1.1	0.7	1.2	0.9
Marsh Wren	2.4	1.5	2.2	3.7	5.7	5.1	5.2	2.4	1.8	1.7	2.3	1.7	0.3	1.3	1.8	1.3
Lucy's Warbler (C)	2.3	8.0	5.3	4.1	4.3	2.6	2.7	1.4	1.5	1.5	1.3	1.1	0.8	0.8	1.6	1.2
Mourning Dove	2.1	7.8	2.6	2.5	1.9	2.9	3.4	1.4	0.6	1.4	2.0	1.4	2.2	1.6	1.3	1.3
Yellow-breasted Chat	2.0	5.0	4.6	3.6	4.8	1.6	2.4	1.2	1.7	0.8	1.0	1.1	1.1	0.7	1.1	1.3
Yellow Warbler (B)	1.8	1.7	1.5	2.2	3.9	3.2	3.5	1.2	1.7	1.5	2.1	1.3	1.0	1.1	1.0	0.9
Gadwall	1.7	0.1	0.0	0.2	0.3	0.4	0.1	0.4	2.8	4.7	4.5	4.7	0.7	1.6	0.9	1.5
American Wigeon	1.7	0.0	X	0.1	0.2	X	X	1.5	6.2	3.3	3.3	3.1	X	1.9	1.2	1.8
Blue Grosbeak (A)	1.6	3.3	2.6	2.6	2.4	1.5	1.5	1.1	1.2	1.5	1.1	1.1	2.3	0.8	0.8	0.9
Black Phoebe	1.4	1.7	2.0	1.7	1.6	1.6	1.6	2.0	1.1	0.9	1.4	1.2	1.8	1.0	0.8	1.1
Yellow-rumped Warbler	1.1	0.2	0.8	1.4	0.5	0.6	0.3	0.7	0.9	1.5	2.4	0.8	0.0	1.8	1.0	2.7
Crissal Thrasher	1.0	1.1	1.3	0.4	0.7	1.1	1.1	1.0	0.8	1.0	0.7	0.9	1.5	1.2	1.3	1.1
Greater Roadrunner	1.0	0.6	0.7	0.8	0.5	0.5	0.7	1.0	0.8	1.2	1.0	1.0	2.1	0.8	1.2	1.5
House Finch	0.8	0.9	0.8	0.7	0.7	2.9	1.3	0.4	0.3	0.3	0.5	0.2	0.5	1.1	0.4	2.1
Yellow-headed Blackbird	0.8	1.4	0.1	0.1	0.3	0.5	0.2	2.9	0.7	0.5	0.3	1.2	1.3	1.1	0.6	0.1

Species (Conservation Status)	Overall Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
White-crowned Sparrow	0.8	0.4	1.1	0.2	0.1	0.4	0.5	0.5	0.6	0.6	1.5	0.6	0.0	3.0	0.8	0.5
Killdeer	0.8	1.7	0.7	0.3	0.3	1.1	0.4	1.3	0.7	0.4	1.3	1.4	1.2	0.3	0.2	0.1
Western Kingbird	0.7	0.3	0.5	0.9	0.5	0.6	0.4	1.3	0.5	1.2	0.3	0.1	1.8	1.0	0.7	0.4
Anna's Hummingbird	0.7	0.2	0.1	0.0	0.0	0.1	0.0	0.4	0.6	0.9	1.2	1.0	1.2	0.8	1.3	1.3
White-faced Ibis (CF)	0.6	0.1	0.4	X	0.0	0.0	0.1	0.4	0.1	0.3	1.9	2.1	1.5	1.0	1.0	0.3
Northern Rough-Winged Swallow	0.6	0.2	0.3	0.2	1.4	0.5	X	0.1	0.4	0.3	0.2	1.6	0.9	1.0	0.6	1.2
Eared Grebe (C)	0.6	0.0	0.0	0.4	0.0	0.1	0.0	X	2.3	3.4	0.4	0.2	0.0	0.1	0.1	0.3
Wilson's Warbler	0.6	1.5	1.3	1.0	0.4	0.7	0.3	1.3	0.1	0.2	0.9	0.2	0.0	0.7	0.2	0.2
Black-chinned Hummingbird	0.5	0.2	0.5	0.6	0.4	0.5	0.5	0.4	0.5	0.5	0.6	0.4	1.2	0.4	0.7	0.6
Northern Mockingbird	0.4	0.1	0.2	0.2	0.0	0.2	0.1	0.4	0.6	0.5	0.4	0.5	1.5	0.4	0.3	0.5
American Pipit	0.4	X	0.1	0.3	X	2.5	0.3	0.7	0.1	0.0	1.6	0.4	0.0	0.2	0.1	X
Canada Goose	0.3	0.0	0.0	0.2	0.0	X	0.1	0.6	0.2	0.1	0.6	0.2	1.7	0.3	0.3	0.3
Brewer's Sparrow (CF)	0.3	0.0	0.5	1.3	0.2	0.4	0.9	0.1	0.0	0.0	0.2	X	0.6	0.4	0.2	0.0
Lesser Goldfinch	0.2	0.1	0.3	0.2	0.1	0.3	1.4	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
Barn Swallow	0.2	0.0	X	2.0	X	X	X	X	X	X	0.0	0.0	X	1.0	0.1	X
American Avocet (CF)	0.2	0.3	0.0	0.0	0.0	0.0	X	0.2	X	X	0.4	1.1	0.4	0.2	0.2	0.0
Cliff Swallow	0.2	X	X	0.2	1.0	0.0	X	X	X	X	X	0.6	0.2	0.2	0.1	X

Table 8b. Non-breeding relative species abundances (percent of total bird abundance) for each of 15 survey years (2005–2023). Only species that represent at least 1% of the total bird abundance in one or more periods are listed (in descending order of overall relative abundance). Conservation status includes priority species from multiple sources: A (Clark County 2000); B (LCRMSCP 2004); C (GBBO 2010); D (Rosenberg et al. 2016, Intermountain Partners in Flight); E (Rosenberg et al. 2016, Continental Partners in Flight); F (Nevada Department of Wildlife 2012). “X” indicates the species was only detected outside of the survey period or beyond 100 m of a point. No entry means that the species was not detected.

Species (Conservation Status)	Overall Non-Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
American Coot	14.8	3.4	13.3	6.1	4.0	4.4	3.5	20.9	19.4	22.6	25.1	11.3	15.0	14.3	14.5	14.4
Yellow-rumped Warbler	12.4	12.8	4.8	16.1	17.9	18.6	20.6	11.0	6.3	5.7	7.7	16.8	8.1	13.8	14.3	21.4
White-crowned Sparrow	7.2	7.9	5.1	8.6	9.9	11.1	11.1	5.4	4.5	4.7	5.6	8.0	5.4	8.9	10.8	7.1
Gadwall	7.1	1.3	2.0	1.3	1.1	1.6	2.4	6.4	9.7	14.0	9.7	11.2	7.2	9.1	4.5	6.5
Mallard	6.5	1.0	4.1	4.2	3.2	6.5	5.8	10.7	11.1	8.3	7.4	4.7	9.2	4.8	3.8	3.7
American Wigeon	5.2	X	X	0.2	0.1	0.2	0.3	6.0	7.9	12.0	9.7	4.2	6.8	6.2	3.6	3.1
Marsh Wren	4.0	5.4	6.1	6.2	7.2	6.1	5.8	3.4	3.5	2.8	2.6	3.0	4.1	3.1	3.2	3.5
Abert's Towhee (C)	3.6	9.9	10.0	6.7	6.1	6.4	5.2	3.0	2.9	2.2	1.5	1.9	2.4	1.9	2.9	2.9
American Pipit	3.5	2.9	5.3	2.3	8.5	5.0	6.4	7.0	3.0	2.3	3.3	3.9	4.0	1.9	0.4	0.4
Red-winged Blackbird	3.0	9.8	7.0	7.1	2.9	4.7	0.3	1.5	4.7	1.6	2.9	1.1	2.1	0.8	4.6	2.2
Gambel's Quail (C)	2.7	0.5	0.6	0.4	1.2	0.9	4.6	2.2	1.3	1.4	2.7	4.5	3.9	3.3	5.3	4.3
Ruby-crowned Kinglet	2.5	7.7	6.1	4.7	2.7	3.1	2.5	1.3	1.5	0.9	1.5	2.9	2.3	3.2	2.2	1.5
Song Sparrow	2.4	7.8	7.7	6.0	3.9	3.9	4.0	1.0	1.7	1.3	1.4	1.4	1.7	1.4	1.4	1.1
Verdin	2.3	2.3	1.8	2.4	3.1	3.2	2.4	2.0	1.6	1.4	1.5	2.8	3.1	2.4	3.3	3.1
Black-tailed Gnatcatcher	2.2	2.7	3.6	2.0	2.9	3.3	2.8	1.6	1.8	1.2	1.1	2.6	2.5	2.7	2.5	2.4
Orange-crowned Warbler	2.2	2.2	1.6	2.0	2.7	1.5	2.3	0.5	1.6	2.2	1.6	2.6	2.5	3.0	3.2	3.7
Black Phoebe	2.0	3.7	4.5	2.8	3.9	2.4	2.9	2.0	1.8	1.7	1.0	1.3	1.3	1.7	1.5	1.2
Great-tailed Grackle	1.6	0.9	1.0	1.7	1.9	0.7	1.5	1.0	1.1	1.0	1.5	1.5	2.7	1.6	3.2	3.0
Bewick's Wren	1.5	5.2	4.9	3.0	4.6	2.9	3.6	1.2	0.8	0.6	0.6	0.5	0.9	0.7	0.5	0.3
House Finch	1.0	0.3	1.5	1.7	1.2	0.7	2.1	0.6	1.8	0.8	0.7	1.5	0.3	0.4	0.8	1.6
Crissal Thrasher	0.8	1.9	0.7	0.6	1.0	1.2	1.2	0.4	0.8	0.7	0.7	0.8	0.9	0.8	0.8	0.7
Northern Flicker	0.7	0.7	0.9	1.3	1.2	0.6	0.9	0.7	0.6	0.5	0.5	0.8	0.4	0.5	0.6	0.7
Say's Phoebe	0.5	0.4	0.4	0.1	0.8	1.3	0.6	0.3	0.6	0.5	0.6	0.6	0.6	1.0	0.1	0.2
Northern Pintail (CF)	0.5	X			X	X	0.1	1.5	1.0	0.9	0.4	0.4	0.2	0.1	1.5	0.2
Lincoln's Sparrow	0.5	1.4	0.2	0.6	0.5	0.3	0.4	0.3	0.2	0.3	0.3	0.2	0.4	0.7	1.0	1.0
Ring-billed Gull	0.4	X	1.4	1.9	X	0.1	X	0.1	0.3	0.0	0.2	0.1	0.8	0.9	0.8	0.8

Species (Conservation Status)	Overall Non- Breeding	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Lesser Scaup (C)	0.4							0.2	X	0.0	0.3	0.3	0.7	0.5	1.2	2.1
Dark-eyed Junco	0.4	0.1	0.4	3.0	0.9	1.4	0.3	0.1	0.3	0.1	0.2		0.1	0.3	0.1	0.0
Killdeer	0.4	0.8	0.3	0.1	0.7	0.1	0.0	0.7	0.4	0.2	0.3	0.4	1.2	0.2	0.0	0.1
Canada Goose	0.3			0.2		0.1	X	0.0	0.1	0.3	0.2	0.5	0.4	1.3	0.8	0.2
Least Sandpiper (C)	0.2					0.9	0.0	1.2	X	0.0	0.5	X		0.2	X	
Northern Shoveler	0.2	0.1					X	0.2	0.5	1.1	0.0	0.3	X	X	0.1	0.0
Lesser Goldfinch	0.2	0.1	0.1	0.1	0.5	0.4	1.9	0.1	0.1	0.1	0.0	0.0	0.1	0.1	X	X
Bushtit	0.2	1.2	0.8	0.1		1.9							0.0	0.1		0.1

Table 9. Relative frequencies (percent of survey points with detections on any of 26 surveys) of bird species in each of the 15 years of surveys in the Las Vegas Wash (2005–2023). Number of survey points increased from 29 to 31 after the second year (see Methods; Table 1). Only 23 surveys were conducted in Year 15, due to COVID-19. Birds recorded incidentally, as flyovers, or > 100 m from the survey point are excluded. Species listed in descending order of average frequency. Conservation status includes priority species from multiple sources: A (Clark County 2000); B (LCRMSCP 2004); C (GBBO 2010); D (Rosenberg et al. 2016, Intermountain Partners in Flight); E (Rosenberg et al. 2016, Continental Partners in Flight); F (Nevada Department of Wildlife 2012).

Species (Conservation Status)	Average Frequency	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Yellow-rumped Warbler	98	100	91	100	97	100	90	97	100	97	94	100	100	100	100	100
Abert's Towhee	96	100	100	97	97	97	94	90	97	97	94	90	94	100	100	100
Verdin	96	93	91	90	97	100	87	90	94	94	100	100	100	100	100	100
Black Phoebe	95	100	94	100	94	94	90	100	97	94	94	97	90	94	94	100
White-crowned Sparrow	95	93	97	97	97	97	84	94	97	100	88	94	97	100	97	94
Black-tailed Gnatcatcher	92	93	94	94	90	100	81	84	84	90	81	94	100	97	97	97
Common Yellowthroat	90	93	81	94	90	90	81	90	90	94	84	87	94	90	94	100
Song Sparrow	90	100	94	97	97	100	87	87	90	90	88	84	81	90	84	74
Orange-crowned Warbler	87	93	78	77	87	74	81	68	90	94	91	90	94	94	94	100
Red-winged Blackbird	83	72	84	97	94	94	84	81	90	81	84	77	71	77	84	74
Ruby-crowned Kinglet	83	100	94	94	87	90	74	68	71	74	69	84	77	100	84	77
Marsh Wren	82	93	81	81	87	81	81	77	87	74	81	74	87	84	87	77
Bewick's Wren	81	97	94	90	97	97	90	84	77	77	75	68	74	87	61	42
Great-tailed Grackle	79	34	38	55	71	84	68	90	100	84	97	94	90	87	100	97
Gambel's Quail	78	76	47	48	71	58	84	84	84	84	78	87	94	90	94	97
American Coot	77	59	69	74	74	77	74	84	77	87	75	81	77	74	84	87
Brown-headed Cowbird	77	97	88	94	94	94	84	77	84	84	63	74	55	58	58	52
Greater Roadrunner	76	66	59	68	71	65	58	77	68	90	78	87	100	81	84	87
Crissal Thrasher	75	90	75	77	77	90	77	61	61	68	72	65	68	84	71	94
Mallard	72	31	47	81	68	81	71	81	77	84	81	81	68	77	81	77
Blue Grosbeak	70	97	78	81	84	74	68	68	61	65	63	65	71	58	58	55
Say's Phoebe	67	52	44	35	68	97	77	68	71	81	72	74	77	90	35	61
Yellow Warbler	65	59	44	55	61	74	68	55	74	84	75	84	55	77	58	58
House Finch	62	59	69	68	68	68	68	42	68	61	66	61	42	58	48	81
Lucy's Warbler	61	93	81	77	84	74	68	55	42	48	44	58	45	52	52	39

Species (Conservation Status)	Average Frequency	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Mourning Dove	60	90	69	87	71	84	84	48	52	42	41	55	52	55	32	42
Northern Flicker	58	59	59	65	77	55	52	58	58	45	50	68	48	61	52	61
Yellow-breasted Chat	54	90	69	77	84	61	65	45	58	45	44	45	39	35	23	29
American Pipit	52	59	56	77	61	52	65	52	45	68	41	52	48	55	45	10
Great Blue Heron	52	24	38	32	29	42	42	61	65	77	72	68	61	39	68	61
Lincoln's Sparrow	52	66	28	61	39	29	29	35	39	58	69	45	52	77	81	71
Gadwall	49	31	34	42	48	55	52	45	48	58	59	45	42	52	58	65
Western Kingbird	46	24	16	55	32	45	39	87	42	68	31	23	77	71	42	39
Wilson's Warbler	41	76	59	65	48	35	29	58	23	26	56	29	6	61	16	32
Killdeer	40	55	50	29	48	32	19	55	48	45	53	48	32	23	32	23
American Wigeon	39	0	3	19	13	13	13	42	68	55	66	58	55	65	48	71
Northern Mockingbird	39	7	28	23	13	29	19	32	52	68	41	48	77	52	35	55
Loggerhead Shrike	38	52	28	13	35	58	35	48	65	48	47	32	32	32	32	6
Anna's Hummingbird	38	24	3	3	10	16	6	35	39	48	53	58	65	71	71	61
Spotted Sandpiper	35	31	31	10	32	32	29	45	55	52	31	48	32	39	29	29
Brewer's Sparrow	35	21	25	42	58	65	55	19	39	16	22	45	39	48	19	10
Black-chinned Hummingbird	32	17	34	35	32	32	32	32	39	29	31	35	45	26	29	29
Green Heron	32	21	50	32	29	19	29	52	29	35	25	23	45	23	29	35
Common Gallinule	30	10	9	16	13	19	23	29	26	52	44	35	42	39	42	45
Belted Kingfisher	29	38	25	26	29	32	23	35	39	48	28	26	26	26	16	23
Northern Rough-Winged Swallow	27	21	19	13	45	19	16	13	23	13	13	58	35	61	29	32
Costa's Hummingbird	27	14	16	26	16	6	23	19	16	6	16	26	45	58	61	58
Lesser Goldfinch	26	24	31	32	39	45	48	39	19	13	16	16	23	23	10	13
Savannah Sparrow	25	14	0	19	16	19	32	19	29	32	38	23	19	42	45	26
Double-crested Cormorant	25	3	13	35	23	19	3	29	26	42	28	29	48	16	19	35
Pied-billed Grebe	23	7	16	26	19	16	13	16	32	35	34	29	26	23	19	39
Cooper's Hawk	23	10	13	16	10	10	26	26	32	29	28	35	35	32	23	23
Greater Yellowlegs	22	31	9	13	16	13	19	32	52	19	28	16	35	16	16	19
Dark-eyed Junco	22	21	22	61	45	39	29	23	29	13	16	3	10	19	3	3
Blue-gray Gnatcatcher	22	52	56	29	58	10	19	23	0	3	13	16	3	19	23	6
Sora	21	3	6	6	10	3	10	13	19	29	31	29	39	35	39	35

Species (Conservation Status)	Average Frequency	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Western Wood-Pewee	19	10	16	13	26	6	29	42	13	10	25	26	3	35	26	3
Bullock's Oriole	19	3	19	16	0	13	23	19	35	39	31	16	13	19	13	23
Yellow-headed Blackbird	18	10	6	10	16	10	6	35	32	26	16	32	16	26	19	13
White-faced Ibis	17	7	6	0	3	6	6	16	16	23	25	32	39	32	23	23
Black-crowned Night-Heron	17	10	9	13	3	3	10	23	19	35	25	26	35	13	13	16
Canada Goose	17	0	0	10	0	3	10	23	16	23	22	23	19	26	39	39
Northern Harrier	16	7	13	35	19	6	0	10	13	13	13	26	35	13	23	19
Western Meadowlark	16	0	6	0	3	10	13	19	19	39	19	23	32	26	26	6
Spotted Towhee	16	17	13	16	39	13	10	16	10	0	6	23	16	13	26	19
Osprey	15	3	3	6	3	10	6	29	19	19	16	32	16	10	35	16
Red-tailed Hawk	15	14	6	13	10	6	16	23	19	16	16	19	23	10	6	26
Lazuli Bunting	14	17	22	6	29	3	0	6	6	3	34	23	23	23	10	6
Great Egret	14	14	6	13	6	13	16	13	26	26	16	29	13	13	3	3
Warbling Vireo	14	17	13	10	10	19	6	10	19	16	13	19	3	23	16	13
Snowy Egret	14	7	3	23	6	13	13	16	29	32	13	26	16	3	3	3
American Kestrel	14	14	6	6	3	6	13	23	26	13	31	10	23	13	10	6
Virginia Rail	13	14	6	6	6	6	23	10	16	16	19	13	13	19	26	6
White-winged Dove	13	45	19	39	29	16	23	13	3	0	0	0	0	3	0	6
Sharp-shinned Hawk	13	24	6	10	19	23	13	13	10	10	9	6	6	16	13	16
Bufflehead	13	0	0	6	3	3	3	19	13	23	19	16	16	23	19	26
Green-winged Teal	12	0	16	13	6	6	6	19	19	10	19	19	16	10	13	13
Northern Pintail	12	0	3	0	0	0	3	23	16	19	28	23	10	13	19	16
Rock Wren	11	14	16	10	16	23	29	6	13	6	3	10	10	13	0	0
Western Tanager	11	10	3	6	3	10	10	3	13	6	28	19	10	29	6	10
Eared Grebe	11	3	0	3	0	6	0	6	42	45	19	16	3	10	3	6
Common Merganser	11	7	3	10	6	6	3	16	19	35	13	19	10	6	3	3
Lesser Scaup	11	0	0	0	0	0	0	3	3	10	16	19	23	26	23	35
Cinnamon Teal	10	3	0	0	3	10	0	19	13	3	16	19	6	23	16	23
Phainopepla	10	21	28	6	23	16	6	3	10	0	9	3	10	3	6	3
Ash-throated Flycatcher	10	14	3	16	3	0	13	13	10	10	0	10	6	35	6	3
American Robin	9	7	3	16	13	6	3	6	10	10	3	10	13	13	10	19

Species (Conservation Status)	Average Frequency	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Indigo Bunting	9	0	0	0	0	16	10	16	26	39	9	10	0	0	13	3
House Wren	9	7	3	0	0	3	0	3	13	16	28	26	6	23	6	6
Black-headed Grosbeak	9	14	13	6	0	6	13	3	6	10	9	13	0	26	10	6
Red-shouldered Hawk	8	0	0	0	0	0	3	6	16	16	13	16	19	13	13	10
Common Goldeneye	8	0	0	6	6	3	0	6	6	10	16	10	10	10	6	29
Ring-billed Gull	7	0	3	16	0	3	0	6	13	3	13	16	10	6	6	13
Ring-necked Duck	7	0	0	0	0	0	0	6	19	6	16	13	10	10	13	16
Great Horned Owl	7	0	3	3	0	10	19	3	6	3	16	6	13	6	6	13
Chipping Sparrow	7	17	6	16	10	23	10	0	3	3	9	3	6	0	0	0
American White Pelican	7	0	0	0	3	0	3	10	10	3	0	0	13	10	13	39
Bell's Vireo	7	21	0	10	0	0	6	13	16	6	6	10	6	3	0	3
MacGillivray's Warbler	7	3	3	3	0	0	10	3	0	16	0	10	3	16	10	23
American Avocet	6	7	0	0	0	6	0	13	3	3	19	13	16	6	6	3
Bushtit	6	31	19	6	3	16	10	0	0	0	0	0	3	3	0	3
Ladder-backed Woodpecker	6	3	0	0	3	6	23	10	23	10	3	6	0	6	0	0
Cliff Swallow	6	0	0	6	10	10	0	0	0	0	0	19	13	16	10	10
Hermit Thrush	6	14	25	3	3	3	0	3	6	0	6	3	3	6	0	10
Northern Shoveler	6	3	3	0	0	6	0	6	13	6	3	19	3	3	3	13
Black-necked Stilt	5	3	0	0	0	3	0	10	3	6	6	19	16	6	3	3
Least Bittern	5	3	3	6	6	0	6	6	6	6	9	6	3	3	0	10
Barn Swallow	5	0	0	3	3	0	0	0	0	0	6	3	3	42	13	3
Lark Sparrow	4	0	0	6	3	3	6	10	3	3	9	3	6	3	3	6
Western Flycatcher	4	3	6	13	3	0	0	16	0	6	6	3	3	0	3	0
Least Sandpiper	4	0	0	0	0	3	10	19	3	3	6	10	3	3	0	3
Nashville Warbler	4	0	0	3	6	3	6	10	10	10	9	0	0	3	3	0
Common Raven	4	0	0	10	0	3	0	6	0	13	3	3	0	3	10	6
Black-throated Gray Warbler	4	0	0	0	0	3	0	0	0	3	6	10	10	16	6	3
Tree Swallow	4	0	0	6	3	0	0	0	0	0	0	0	16	19	3	6
Hooded Merganser	4	0	0	0	0	0	0	3	13	10	6	6	3	6	0	6
Ruddy Duck	3	0	0	0	0	0	0	6	6	0	0	3	3	0	13	19
Townsend's Warbler	3	0	0	0	0	0	13	13	0	0	3	3	0	13	3	3

Species (Conservation Status)	Average Frequency	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Pine Siskin	3	7	0	6	0	0	13	0	10	0	0	0	0	13	0	0
Hooded Oriole	3	0	0	6	0	0	0	0	0	6	9	10	10	0	3	0
Dusky Flycatcher	3	3	6	23	0	3	0	3	0	0	0	0	0	0	3	0
Bank Swallow	3	0	0	0	0	0	0	0	0	0	0	16	3	23	0	0
Eurasian Collared-Dove	3	0	0	0	0	3	0	10	6	6	3	3	0	3	3	3
Gray Flycatcher	3	3	0	6	0	6	3	0	6	3	0	0	0	6	3	0
Olive-sided Flycatcher	3	3	0	3	0	0	3	3	3	6	0	3	0	6	0	6
Red-naped Sapsucker	3	7	9	3	0	0	0	3	3	0	3	0	6	3	0	0
Violet-green Swallow	3	0	0	3	6	3	0	0	0	0	0	0	6	13	0	6
American Goldfinch	3	0	0	0	0	6	0	3	0	0	3	0	10	13	0	3
Long-billed Dowitcher	3	0	3	0	0	0	0	6	6	3	6	6	3	0	3	0
Western Sandpiper	2	10	3	0	0	6	3	3	0	0	0	3	3	0	3	0
Horned Lark	2	3	0	10	6	3	3	6	0	0	0	0	0	0	3	0
Pacific Wren	2	7	3	0	0	0	3	3	3	6	6	0	3	0	0	0
Summer Tanager	2	0	0	0	0	0	0	3	0	0	0	3	10	6	6	6
Redhead	2	0	0	0	3	0	0	3	0	0	0	3	13	6	3	0
Plumbeous Vireo	2	0	0	0	3	0	0	3	3	0	6	0	0	3	6	6
Barn Owl	2	10	6	3	0	3	0	0	0	0	3	0	0	3	0	0
Brewer's Blackbird	2	0	0	0	3	10	3	0	0	0	3	0	3	3	3	0
Wilson's Snipe	2	0	0	0	0	3	0	3	10	0	3	6	0	3	0	0
Brown-crested Flycatcher	2	7	0	0	0	0	0	0	0	0	3	6	3	3	3	0
Golden-crowned Kinglet	2	3	0	10	3	3	3	0	0	0	0	3	0	0	0	0
Horned Grebe	2	0	0	0	0	0	0	6	10	6	0	0	0	0	3	0
Neotropic Cormorant	2	0	0	0	0	0	0	6	10	0	3	3	3	0	0	0
Solitary Vireo (unidentified)	2	0	3	3	16	0	0	0	0	0	0	0	0	3	0	0
Black-throated Sparrow	2	0	3	0	0	0	6	0	0	0	0	0	6	6	3	0
Green-tailed Towhee	2	0	0	0	3	3	0	0	0	3	3	0	0	6	6	0
Red-breasted Nuthatch	2	0	0	3	3	0	0	3	6	0	9	0	0	0	0	0
Lesser Nighthawk	1	0	3	0	0	3	0	3	3	3	0	0	6	0	0	0
Vermilion Flycatcher	1	0	0	0	0	0	0	0	0	0	3	3	3	6	0	6
Lesser Yellowlegs	1	0	0	0	0	3	0	6	0	0	6	6	0	0	0	0

Species (Conservation Status)	Average Frequency	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Cedar Waxwing	1	10	3	0	0	0	0	0	0	0	3	0	0	0	0	3
Greater Scaup	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	16
Vesper Sparrow	1	0	0	0	0	3	6	3	0	0	0	0	0	6	0	0
Merlin	1	0	3	0	0	3	0	0	3	0	0	3	0	0	3	3
California Gull	1	0	0	0	0	0	0	0	0	0	0	3	6	3	0	3
Sagebrush Sparrow	1	0	0	0	0	0	0	0	3	6	0	0	0	3	0	0
Snow Goose	1	0	0	0	0	0	0	0	3	0	0	6	0	0	0	3
Turkey Vulture	1	0	0	0	3	0	0	0	0	3	0	0	0	0	0	6
Western Grebe	1	0	0	3	0	0	0	6	3	0	0	0	0	0	0	0
Willow Flycatcher	1	0	0	0	3	0	3	0	0	0	0	0	0	3	0	3
Caspian Tern	1	0	0	0	0	0	0	0	0	0	3	3	6	0	0	0
Peregrine Falcon	1	0	0	0	3	3	0	0	0	0	3	0	3	0	0	0
Wood Duck	1	0	0	0	3	0	0	0	0	0	3	0	0	3	0	3
House Sparrow	1	3	0	0	0	0	0	3	0	0	0	0	3	0	0	0
Canyon Wren	1	3	3	0	0	0	0	0	0	0	3	0	0	0	0	0
Black-and-White Warbler	1	0	0	0	0	0	0	0	0	3	0	6	0	0	0	0
Eastern Kingbird	1	0	0	0	0	0	3	0	3	3	0	0	0	0	0	0
European Starling	1	0	0	0	0	0	3	0	3	0	0	3	0	0	0	0
Greater White-fronted Goose	1	0	0	0	0	0	0	0	0	3	0	3	3	0	0	0
Hammond's Flycatcher	1	0	0	0	0	0	0	3	0	0	0	0	0	3	3	0
Rose-breasted Grosbeak	1	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
American Bittern	1	0	3	0	0	3	0	0	0	0	0	0	0	0	3	0
Cassin's Vireo	1	0	0	0	0	0	0	0	0	0	3	6	0	0	0	0
Swamp Sparrow	1	0	0	0	0	0	0	0	0	0	6	0	0	0	3	0
Blue-winged Teal	0	0	0	0	0	0	0	0	3	0	0	0	0	3	0	0
Cactus Wren	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0
Dunlin	0	0	0	0	0	0	0	3	0	0	0	0	0	3	0	0
Lazuli x Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0
Prairie Falcon	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0
Rock Pigeon	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0
Rufous Hummingbird	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0

Species (Conservation Status)	Average Frequency	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Sage Thrasher	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0
Virginia's Warbler	0	0	0	3	0	0	0	0	0	0	0	0	0	3	0	0
Willet	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0
Brown Creeper	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0
Solitary Sandpiper	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0
Semipalmated Plover	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Western Bluebird	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Baird's Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Barrow's Goldeneye	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Bell's Sparrow	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Broad-tailed Hummingbird	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Brown Thrasher	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Canvasback	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Cattle Egret	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Domestic Mallard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Evening Grosbeak	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Gray Catbird	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Groove-billed Ani	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Hermit x Townsend's Warbler	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Long-eared Owl	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Mountain Bluebird	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Northern Parula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Northern Waterthrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Ovenbird	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Palm Warbler	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Pectoral Sandpiper	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Red Crossbill	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Ross's Goose	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
Rufous-crowned Sparrow	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0

Species (Conservation Status)	Average Frequency	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
Sage Sparrow (unidentified)	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Scissor-tailed Flycatcher	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Short/Long-billed Dowitcher	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Short-billed Dowitcher	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Vaux's Swift	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
White-throated Sparrow	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
White-throated Swift	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Woodhouse's Scrub-Jay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Bonaparte's Gull	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Canyon Towhee	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Fox Sparrow	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Hairy Woodpecker	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Sandhill Crane	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Semipalmated Sandpiper	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Swainson's Hawk	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0

Table 10. Estimated densities (birds per 40 ha) and abundance ranks for Nevada Bird Count (NBC) Mojave lowland riparian transects within Clark County (2005–2014) compared to Las Vegas Wash breeding season data (2005–2023). Species are listed in descending order of abundance from the NBC data, and include the 50 most abundant species from each of the datasets. Conservation status includes priority species from multiple sources: A (Clark County 2000); B (LCRMSCP 2004); C (GBBO 2010); D (Rosenberg et al. 2016, Intermountain Partners in Flight); E (Rosenberg et al. 2016, Continental Partners in Flight); F (Nevada Department of Wildlife 2012).

Species (Conservation Status)	NBC		Wash	
	Abundance	Rank	Abundance	Rank
Gambel's Quail (C)	7.7	1	8.8	6
Abert's Towhee (C)	7.5	2	10.3	3
Lucy's Warbler (C)	6.1	3	3.8	14
Mourning Dove	5.0	4	3.4	15
Brown-headed Cowbird	4.6	5	4.6	11
Yellow Warbler (B)	4.2	6	2.9	17
Verdin	4.0	7	7.3	8
House Finch	3.9	8	1.4	25
Red-winged Blackbird	3.9	9	15.5	1
Song Sparrow	3.6	10	7.9	7
Bewick's Wren	3.6	11	4.2	12
Yellow-breasted Chat	3.2	12	3.2	16
Phainopepla (A)	2.8	13	0.0	150
Northern Rough-winged Swallow	2.4	14	1.0	32
Black-tailed Gnatcatcher	2.2	15	5.8	9
Cliff Swallow	2.2	16	0.3	58
Black-throated Sparrow	2.1	17	0.0	119
Common Yellowthroat	2.0	18	9.3	4
Ash-throated Flycatcher	2.0	19	0.1	81
Crissal Thrasher	1.4	20	1.7	23
Blue Grosbeak (A)	1.3	21	2.5	20
Blue-gray Gnatcatcher	1.1	22	0.2	68
Bell's Vireo (ABCF)	1.0	23	0.1	82
Lesser Goldfinch	1.0	24	0.3	49
Spotted Towhee	1.0	25	0.0	123
Great-tailed Grackle	1.0	26	10.9	2
Mallard	0.8	27	5.5	10
Say's Phoebe	0.8	28	0.7	36
Northern Mockingbird	0.8	29	0.7	38
Bullock's Oriole	0.7	30	0.3	51
Brewer's Sparrow (CF)	0.7	31	0.5	44

Species (Conservation Status)	NBC		Wash	
	Abundance	Rank	Abundance	Rank
American Coot	0.64	32	9.2	5
White-winged Dove	0.6	33	0.3	55
Wilson's Warbler	0.6	34	0.9	34
Rock Wren	0.6	35	0.1	95
Black-chinned Hummingbird	0.5	36	0.9	35
Killdeer	0.5	37	1.2	28
White-crowned Sparrow	0.5	38	1.2	27
Western Scrub-Jay (Unidentified)	0.5	39		
White-faced Ibis (CF)	0.5	40	1.1	31
Western Kingbird	0.5	41	1.2	29
Yellow-rumped Warbler	0.5	42	1.7	22
Lazuli Bunting	0.5	43	0.2	69
House Sparrow	0.5	44	0.0	178
Eurasian Collared-Dove	0.4	45	0.0	109
Western Meadowlark	0.4	46	0.0	112
Cactus Wren	0.4	47		
Black Phoebe	0.43	48	2.2	21
Canyon Wren	0.4	49	0.0	160
Common Raven	0.4	50	0.0	104
American Pipit			0.7	39
American Wigeon			2.8	19
Anna's Hummingbird	0.2		1.1	30
Barn Swallow	0.0		0.3	50
Canada Goose	0.2		0.5	42
Cinnamon Teal (C)	0.0		0.4	48
Common Gallinule			0.5	43
Costa's Hummingbird (C)	0.2		0.5	46
Eared Grebe (C)	0.0		0.9	33
Gadwall			2.8	18
Great Blue Heron	0.1		0.7	37
Greater Roadrunner	0.3		1.6	24
Green Heron	0.1		0.5	41
Marsh Wren	0.4		3.9	13
Orange-crowned Warbler	0.1		0.6	40
Ruby-crowned Kinglet	0.1		0.4	47
Spotted Sandpiper	0.2		0.5	45
Yellow-headed Blackbird	0.2		1.3	26

Table 11. Summary trends from negative binomial regression statistics for 20 species with more than 1 detection per 40 ha overall, that were detected within 100 m of survey points at the Las Vegas Wash from February 2005 through August 2023. Species listed in descending order of detections. Dark gray shading indicates significantly negative trends (seven species), and light gray shading indicates significantly positive trends (nine species).

Species	No. of Visits with Detections	Total No. of Birds Detected	Overall Density Estimate (Birds/40 ha)	Incident Rate Ratio	P
American Coot	352	21,377	23.1	1.15	< 0.001
Yellow-rumped Warbler	260	11,600	12.5	1.05	< 0.001
Mallard	353	9,948	10.8	1.11	< 0.001
Red-winged Blackbird	355	9,844	10.7	1.02	0.100
Gadwall	228	9,719	10.5	1.24	< 0.001
Abert's Towhee	387	8,987	9.8	0.97	< 0.001
Gambel's Quail	347	7,023	7.7	1.15	< 0.001
Song Sparrow	384	6,200	6.8	0.92	< 0.001
Marsh Wren	381	6,311	6.8	0.99	0.032
Verdin	387	6,091	6.6	1.05	< 0.001
Black-tailed Gnatcatcher	386	5,117	5.6	1.03	< 0.001
Common Yellowthroat	238	4,370	4.8	1.00	0.937
American Pipit	186	3,997	4.3	1.01	0.681
Bewick's Wren	381	3,882	4.2	0.91	< 0.001
Black Phoebe	382	3,356	3.6	0.98	0.004
Orange-crowned Warbler	272	2,848	3.1	1.09	< 0.001
Ruby-crowned Kinglet	239	2,631	2.9	0.99	0.348
Crissal Thrasher	366	1,696	1.8	1.03	< 0.001
Lucy's Warbler	170	1,603	1.8	0.92	< 0.001
Yellow-breasted Chat	154	1,374	1.5	0.92	< 0.001

Table 12. Results of ANOVA analysis evaluating differences in vegetation measurements among years of riparian bird monitoring along the Las Vegas Wash. Where ANOVA results were significant, two-sample t-test results are shown for early and late phases of the project.

Habitat Variable	ANOVA			t-test		
	F-statistic	P	DF	Mean, Early	Mean, Late	P
Overall Tree Cover	8.52	< 0.001	14, 373	32%	15%	< 0.001
Tamarisk	18.77	< 0.001	14, 373	25%	3%	< 0.001
Native Riparian Trees (not including Mesquites)	1.67	0.059	14, 373			
Cottonwood Trees	0.33	0.990	14, 373			
Goodding’s Willows	0.70	0.776	14, 373			
Sandbar Willows	0.96	0.495	14, 373			
Mesquite Trees	1.06	0.392	14, 373			
Native Riparian Tree Proportion (not including Mesquites)	2.04	0.014	14, 373	18%	22%	0.202
Mesquite Proportion	1.59	0.080	14, 373			
Overall Shrub Cover	2.57	0.002	14, 372	17%	26%	< 0.001
Riparian Shrub Cover	0.81	0.661	14, 372			
Upland Shrub Cover	2.34	0.004	14, 373	16%	24%	< 0.001
Forb Cover	4.83	< 0.001	14, 373	4%	1%	< 0.001
Grass Cover	2.95	< 0.001	14, 373	2%	1%	0.033
Phragmites Cover	1.07	0.384	14, 372			
Cattail Cover	2.16	0.009	14, 373	1%	0%	0.001
Perennial Height	1.68	0.058	14, 367			
Perennial Structure	4.21	< 0.001	14, 373	431	263	< 0.001
0–2 m	3.12	< 0.001	14, 373	277	203	< 0.001
2–4 m	5.28	< 0.001	14, 373	104	37	< 0.001
4–6 m	4.02	< 0.001	14, 373	37	12	< 0.001
6–8 m	1.18	0.286	14, 373			
8–10 m	0.92	0.534	14, 373			
Horizontal Heterogeneity	2.72	0.001	14, 373	3.2	2.7	< 0.001