South Bay Salt Pond Waterbird Surveys
September 2019 – February 2021

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EXECUTIVE SUMMARY

This report serves as a data summary and coarse-scale assessment of waterbird and water quality monitoring efforts at six pond complexes in the South San Francisco Bay. Coyote Hills, Dumbarton, and Mowry salt ponds are owned by Don Edwards San Francisco Bay National Wildlife Refuge and managed for salt production by Cargill Salt. Alviso and Ravenswood complexes are owned and managed by Don Edwards San Francisco Bay National Wildlife Refuge. Eden Landing Ecological Reserve (Eden Landing) ponds are owned and managed by California Department of Fish and Wildlife (CDFW), with the exception pond CP3C, which is owned by Cargill Salt. This report is based primarily on data collected by the San Francisco Bay Bird Observatory between September 2019 and February 2021.

The purpose of this ongoing study is to describe avian use of ponds to guide regional waterbird conservation, management, and habitat restoration efforts. The South Bay Salt Pond Restoration Project (SBSPRP) is restoring over 15,000 acres of former salt evaporation ponds to a mix of tidal marsh and ponded wetland habitats. As the SBSPRP proceeds, understanding how waterbirds use ponds, identifying key habitat associations, and incorporating features essential to pond-dependent species into restoration plans will be increasingly important to maintain baseline numbers of waterbirds in the South Bay.

From September 2019 to February 2020, we conducted waterbird surveys and water quality sampling at 82 ponds (22 Cargill-managed salt production ponds and 60 SBSPRP managed ponds). Due to site access limitations associated with the COVID-19 pandemic, we surveyed 45 ponds across multiple complexes from March to April 11, 2020 and 25 ponds within Eden Landing Ecological Reserve from April 15 to May 2020 and December 2020 to February 2021. We examined species richness, abundance, and behavior of waterbird assemblages within and among pond complexes. We grouped species into guilds (e.g., dabbling ducks, diving ducks, gulls) based on foraging methods and prey requirements to understand waterbird use of these ponds. We also put these waterbird counts in the context of long-term trends to assess changes in waterbird numbers relative to baseline counts from before marsh restoration.

We recorded 1,293,322 waterbird observations of 78 species (all sites combined). The Alviso and Eden Landing pond complexes supported the greatest species diversity and also the highest abundances of all complexes. The abundances of diving ducks, Ruddy ducks, dabbling ducks, and medium shorebirds in winter, as well as small shorebirds in fall and Least Terns in summer have increased in SBSPRP ponds since prior to restoration activities in 2005–2007. Counts of small shorebirds in spring remain at baseline values. Eared Grebes have increased in active salt production ponds (Coyote Hills, Dumbarton, and Mowry complexes), but not in SBSPRP ponds (Alviso, Eden Landing, and Ravenswood complexes), and Bonaparte's gulls have declined by 18%. Since limited ponds were surveyed in 2020, meaningful comparisons to previous years' data were restricted to a subset of sites in spring and winter. Further, no fall surveys were completed in 2020. While the results presented in this report are informative, a complete understanding of contemporary waterbird trends in the project area will require resumption of surveys at all sites in fall, winter, and spring of 2021-2022.

Phalarope migration surveys in 2020 found that counts of Wilson's phalaropes peaked at 767 phalaropes on July 21 and counts of Red-necked phalaropes peaked at 1,700 phalaropes on August 28. The peak count of Red-necked phalaropes was higher than in 2019 (1,447 phalaropes), despite visiting fewer ponds in 2020.

As the SBSPRP progresses, we recommend a precautionary approach to waterbird management and tidal marsh restoration and maintenance of enough of the ponds within the project footprint to provide a variety of salinity and water levels suitable for many different guilds. Special consideration should be given to birds that prefer medium to high salinity ponds, such as phalaropes and Eared Grebes, since restoration activities have already reduced the prevalence of these habitat conditions and the remaining high salinity

habitat is managed for salt production rather than waterbird needs. Creating or maintaining islands or undisturbed levees will provide additional nesting and roosting habitat for other guilds. As the restoration advances, continued monitoring of avian use of Cargill-managed and SBSPRP ponds will be valuable in assessing progress toward the management target of maintaining baseline waterbird numbers. However, a regional perspective will be needed to tease apart drivers of waterbird use in the project area. With more than a decade of bird and water quality monitoring data available, a useful next step will be to model bird habitat use and to use the model to predict the impact of future restoration scenarios on bird abundance.

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

In 2002, the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW, formerly California Department of Fish and Game) entered into an historic agreement with Cargill Salt to acquire 15,100 acres of salt evaporator ponds in the South San Francisco Bay. The South Bay Salt Pond Restoration Project (SBSPRP) has begun to restore the area to a mix of tidal and ponded habitats while continuing to provide flood protection and improved public access to many sites.

Salt ponds have been present in the San Francisco Bay for over 150 years (Ver Planck 1958) and have significant wildlife value (Anderson 1970, Accurso 1992, Takekawa et al. 2001, Warnock et al. 2002). Due to the loss of wetlands elsewhere, the ponds now provide important foraging and roosting areas for many waterbirds. As a major migratory and wintering location along the Pacific Flyway, the San Francisco Bay supports more than a million birds throughout the year (Page et al. 1999, Warnock et al. 2002). The SBSPRP has committed to restoring some ponds to tidal marsh, while retaining some pond habitat (as managed ponds) within the project area for waterbirds. Information is needed to ensure that habitat requirements of large numbers of waterbirds can be met with reduced pond acreage, including both salt production ponds and wildlife managed ponds.

The objectives of this ongoing study are to document avian use of current and former salt evaporation ponds in the South San Francisco Bay and to use data collected on waterbird abundance, distribution, and habitat associations to inform regional conservation, management, and habitat restoration efforts. Prior to October 2013, two entities, the U.S. Geological Survey (USGS) and San Francisco Bay Bird Observatory (SFBBO), conducted monthly waterbird surveys and water quality sampling at South Bay ponds. USGS monitored those ponds located within the SBSPRP footprint, while SFBBO monitored those ponds managed by Cargill Salt for salt production. From October 2013 – January 2014 no waterbird surveys were conducted while the project was in transition. Beginning in January 2014, SFBBO conducted waterbird surveys and water quality sampling at all South Bay ponds (Cargill-managed and SBSPRP ponds). Surveys from January 2014 – November 2017 were conducted twice during the spring, fall, and winter seasons and once during the summer season. No Surveys were completed from February 2018 – December 2018. The survey from December 2018 – mid-January 2019 was canceled after counts occurred at four ponds due to funding restrictions; these data are excluded from summary figures. From mid-January 2019 to February 2020, surveys were conducted twice per season in winter, spring, and fall at all 82 accessible ponds. Due to site access limitations associated with the COVID-19 pandemic, 45 ponds were surveyed from March to April 11, 2020 and the 25 ponds within Eden Landing Ecological Reserve were surveyed from April 15 to May 2020 and December 2020 to February 2021 (Table 1). As the SBSPRP proceeds, understanding how waterbirds use managed ponds, restoration sites and salt production ponds, identifying key habitat associations, and incorporating features needed by marsh or pond-dependent species into restoration design plans will be increasingly important in maintaining numbers of waterbirds in the South Bay.

This report summarizes the results of SFBBO's surveys in the South San Francisco Bay pond complexes from September 2019 to February 2021 (Table 1).

Phalarope Migration Surveys

Over a decade of waterbird counts show that many waterbird species groups increased in abundance by 2017 relative to SBSPRP baselines, which were established prior to implementation of project restoration and enhancement actions. However, phalarope counts in 2017 showed a decline of 78% since years prior to restoration project activities. Less frequent summer surveys during phalarope migration may have made past survey methods inadequate for capturing phalarope use of the SBSPRP area. Understanding phalarope trends within the SBSPRP and how they relate to broader population trends requires targeted surveys during the peak phalarope season and/or evaluation of external datasets.

Through an analysis of the existing dataset and eBird observations (Tarjan 2019), we found that Wilson's Phalarope exhibited one peak that clustered in late summer, whereas Red-necked Phalarope showed one peak in spring and were present for a more prolonged period in late summer to early fall. Both species showed similar preferences for select sites, suggesting that surveys could target specific areas. Based on these results, SFBBO made the following recommendations: 1) Capturing the peak migration for the two common phalarope species in San Francisco Bay requires conducting two sets of surveys, one near July 17 for Wilson's Phalarope and one near August 24 for Red-necked Phalarope; and 2) Surveys of 30 SBSPRP sites are likely to capture 95% of phalaropes on SBSPRP ponds; eBird sightings suggest adding 4 sites outside the SBSPRP footprint to surveys. In accordance with these recommendations, SFBBO piloted two surveys during peak phalarope migration in 2019, and conducted seven surveys across the full range of dates at a subset of sites in 2020; we present the results in this report.

METHODS

Study Area

The study area includes 82 current and former salt ponds in the Santa Clara, Alameda and San Mateo counties of California. The ponds monitored by SFBBO include 25 ponds in the Alviso complex, 12 ponds in the Coyote Hills complex, 4 ponds in the Dumbarton complex, 25 ponds in the Eden Landing complex (pond CP3C is owned by Cargill Salt), 6 ponds in the Mowry complex and 10 ponds in the Ravenswood complex (Figure 1). Although the Coyote Hills, Dumbarton, and Mowry ponds are owned by Don Edwards San Francisco Bay National Wildlife Refuge, Cargill Salt retains salt-making rights and regulates water flow for salt production. The salinity and depth of all surveyed ponds varied over the course of the year due to management practices and business needs of these organizations.

Waterbird Surveys

We conducted waterbird surveys at each of the 82 ponds in the Alviso, Coyote Hills, Dumbarton, Eden Landing, Mowry, and Ravenswood complexes from September 2019 to February 2020. Due to site access limitations associated with the COVID-19 pandemic, 45 ponds were surveyed from March to April 11, 2020 and 25 ponds within Eden Landing Ecological Reserve were surveyed from April 15 to May 2020 and December 2020 to February 2021 (Table 1). We performed surveys exclusively at high tide, defined as a tide of 4.0 feet or greater at the Alameda Creek Tide Sub-Station (37° 35.70' N, 122° 08.70' W). During each survey, we observed birds from the nearest drivable road or levee using spotting scopes and binoculars. We counted the total number of individuals of all waterbird species present on each pond and recorded the location of each using aerial site photos superimposed with 250x250 m^2 individually labeled grids through January 2018. Bird observations were assigned to sites and not grids starting in January 2019. For each sighting of an individual bird or bird group of the same species, we recorded behavioral data (whether the bird or bird group was foraging or roosting). For roosting birds only, we recorded whether we observed the bird or bird group on a levee, an island, or a manmade/artificial structure (e.g., blind, fence post). Pond surveys were randomized as follows: ponds were split into 6 groups based on geographic location and pond complex (Newark & Mowry, Northern Eden Landing, Southern Eden Landing, Ravenswood, Western Alviso, Eastern Alviso), a random list of these groups was generated, field crews surveyed any accessible ponds within 1 area each survey day and moved to the next area if no ponds were accessible in that area. During years with a complete suite of surveys, all 82 ponds were surveyed 6 times per year. Each survey round lasted 6 weeks, during which all ponds were visited. Exceptions to this survey schedule occurred due to changes in funding and land access restrictions due to COVID-19 (Table 1).

We identified birds to the species level whenever possible, with the exception of Long-billed and Short-billed Dowitchers (identified as Dowitchers), and Greater and Lesser Scaup (identified as Scaup). When species identification was not possible, we identified birds to genus (e.g., Calidris) or foraging guild (e.g., gulls, small shorebirds, medium shorebirds, phalaropes).

Water Quality Sampling

During each bird survey, we recorded water levels by reading the water level on staff gauges if present (see Table 2 for a list of all ponds and recent staff gauge statuses). On occasion, staff gauges were removed, replaced, or moved to a different location. We assumed that staff gauges were redeployed in a standardized manner, and therefore that staff gauge levels are comparable before and after all changes within a pond. In ponds with multiple staff gauges, we recorded only the master staff gauge (indicated by a circle of yellow paint on the gauge post). At low staff gauge levels, observers also visually estimated the proportion of any pond substrate exposed to the air (dry pond bottom or mudflat exposed) to provide a finer-scale characterization of habitat variability.

We sampled water quality separately at 79 ponds (excluded ponds with inaccessible water quality points are A8W, E8AE, E8AW) each survey period. Whenever possible, water quality data was collected on the day of the bird survey, but otherwise was collected as close to the date of the bird survey as possible. We recorded dissolved oxygen, salinity, conductivity, pH, and temperature at 1-4 pre-determined sampling sites at each pond using a Hydrolab Minisonde (Hydrolab-Hach Company, Loveland, CO). When salinities exceeded approximately 72 ppt (the maximum value registered by the Hydrolab Minisonde), we calculated salinity using a hydrometer (Ertco, West Paterson, NJ) to measure specific gravity in combination with a temperature reading from the water sample. Additionally, we recorded barometric pressure at the beginning of each day that we collected water quality samples. We calibrated all Hydrolab Minisonde sensors before the start of each sampling day. We followed water quality monitoring methods outlined by Murphy et al. (2007). During this reporting period the Minisonde was unavailable due to servicing for several surveys, so we were unable to obtain some water quality parameters.

Phalarope Migration Surveys

We conducted two surveys in 2019 and seven surveys in 2020 during the season of peak phalarope migration. Surveys in 2020 occurred every two weeks beginning in early July with the following survey start dates: 7/6, 7/20, 8/4, 8/18, 8/31, 9/15, and 9/29. Counts were collected by 22 observers, who represented a combination of SFBBO staff and community scientists. Due to site access restrictions associated with COVID-19, a maximum of 17 out of 32 target sites were visited during each survey in 2020.

During each survey period, all accessible sites were surveyed as close in time as possible. Observers identified and counted phalaropes at each site from the ground using spotting scopes. Data included species counts, date, survey start time, survey end time, an estimate of the percent of the site that was visible to the observer, and an estimate of the percent of the site that was covered in water. Species counts and site information were recorded on datasheets and then entered into a Microsoft Excel spreadsheet.

Data Summary

Species Richness

We calculated species richness as the total number of waterbird species observed (with dowitchers and scaup each counting as one “species” because individual species were not distinguished for those taxa) at each pond and pond complex across all surveys from September 2019 to February 2021.

Abundance

We calculated abundance as the sum of all bird sightings for each species or guild encountered across all surveys from September 2019 to February 2021. We calculated abundance at the pond and complex levels. Due to site fidelity of many birds, the same individuals could have been double-counted when surveys occurred at geographically close sites and across short periods of time, so abundance estimates in this report should be interpreted carefully. As treated here, abundance estimates represent aggregated ground counts, or the total bird sightings (as summed across all surveys) for a given location and period of time.

Behavior

Of the total bird sightings (across all surveys), we calculated the proportions of birds observed foraging, roosting, and resting on islands, levees, and manmade structures for each pond. We also examined these proportions at the guild level (see Guilds below).

Guilds

We categorized each species into a foraging guild based on foraging methods and prey requirements (see Appendix I). Guilds of primary interest include dabbling ducks (dabblers), diving ducks (divers), Eared Grebes, fish-eating birds (fisheaters), gulls, herons and egrets, medium shorebirds, phalaropes, small shorebirds, and terns. We calculated abundance by guild for each site within the survey area, and then used these abundances to create guild-specific maps of abundance distributions using ggplot2 in R version 3.5.1 (R Development Core Team 2018). We also examined guild abundance by pond, complex, season, and year. For analyses that utilized data from multiple years, we defined years as the year in which the study year started. 2005: September 2005 to August 2006; 2006: September 2006 to August 2007; 2007: September 2007 to August 2008; 2008: September 2008 to August 2009; 2009: September 2009 to August 2010; 2010: September 2010 to August 2011; 2011: September 2011 to August 2012; 2012: September 2012 to August 2013; 2013: September 2013 to August 2014; 2014: September 2014 to August 2015; 2015: September 2015 to August 2016; 2016: September 2016 to August 2017; 2017: September 2017 to January 2018; 2018: January 2019 to May 2019, due to a hiatus in surveys from January 2018 to December 2018; 2019: September 2019 to May 2020; 2020: December 2020 to February 2021, due to a hiatus in surveys from September 2020 to November 2020 and inclusion of winter 2020-2021 in the current report. We defined seasons as fall (September, October, and November), winter (December, January, and February), spring (March, April, and May), and summer (June, July, and August). Prior to 2013, the annual reports covered a period from October to September. For the fall season, this meant that data collected in October and November 2011 (for example) were lumped together with data from September 2012. In the 2013 report, we shifted the reporting period to September – August to match our seasonal definitions and to facilitate data interpretation.

Data from pond surveys and the phalarope migration surveys were analyzed separately. Data in tables and figures are from the pond surveys unless the phalarope migration surveys are specifically named in the caption.

Water Quality

We calculated average monthly salinity, temperature, dissolved oxygen, pH, and water level (based on staff gauge values) for each pond by averaging values taken across all sampling locations within that pond during that period. For the purposes of this report, and for consistency with past SFBBO reports, we confined our summary primarily to full water quality sampling events. Staff gauge values were averaged between all surveys (bird surveys and water quality surveys), but treated as a single value due to potential duplication of data between tables. If ponds were dry enough that no water reached the staff gauge, we did not record any staff gauge reading. For each complex, we calculated average salinity for each season (using the season definitions above). In addition, for discussion purposes, we characterized each pond as low (0-60 ppt), moderate (61-120 ppt), or high (>120 ppt) salinity by averaging monthly means across the study period.

Long-term Trends

We visualized waterbird trends by selecting the counts within the peak season for each species/guild (i.e. the season when the species/guild was most abundant) and compared the fits of linear and nonlinear models in R version 3.5.1 (R Development Core Team 2018). Upon inspection of the data and model fits, linear models proved insufficient to capture long-term nonlinear trends for these species. We next compared two methods of characterizing nonlinear trends: non-parametric locally weighted smoothing (LOESS) in the ggplot2 package (Wickham 2016) and Generalized Additive Models (GAM) using the gam package. GAMs were more sensitive to count variability in the data, and the ability to include additive effects was unnecessary in the absence of covariates. We therefore used LOESS regression for the purpose of illustrating overall trends in counts (De La Cruz 2018).

We assessed directional changes in counts over time by comparing the most recent three-year average of complete counts to baseline counts or NEPA/CEQA targets when applicable. NEPA/CEQA targets were used for this assessment for each guild/species addressed in the Adaptive Management Plan (Appendix I in Tarjan 2021). For guilds/species that were not included in the Adaptive Management Plan, we defined baseline values as the mean count per survey from 2005–2007, which is the earliest period for which counts are available in both the SBSPRP area and salt production ponds.

RESULTS & DISCUSSION

Alviso

Species Richness, Abundance, and Behavior.

From September 2019 to March 2020 (with 7 out of 25 ponds visited from March to April 2020), we documented 509,159 sightings of 72 species in the Alviso pond complex, the highest species richness and total waterbird abundance out of all the complexes (Table 3). Alviso ponds contained 39.4% of all sightings and comprised 36.4% of the total study area. Pond A9 was the most used pond in Alviso based on overall bird counts (93,225 sightings). Compared to other complexes, the Alviso ponds supported the highest proportion of gulls (53.1%), fisheaters (64.5%), diving ducks (67.9%), dabbling ducks (66.3%) (Figure 49).

Water Quality.

Average salinities in the Alviso complex ranged from 9.26 ppt (A19, Winter) to 306 ppt (A22, Fall) (Figure 29). Average salinity tended to be highest in the fall survey periods, with the minimum occurring in the spring survey period (Figure 29). Temperature followed the general expected seasonal pattern and was also likely influenced by salinity and by time of day (Figure 33). Average dissolved oxygen concentrations ranged from a low of 3.01 mg/L (A22, Fall) to a high of 17.48 mg/L (A7, Fall) (Figure 37). Average pH values ranged from a low of 7 in A22 in Fall to a high of 9.02 in A8S in Fall, and generally did not display strong seasonal patterns (Figure 41). Staff gauge levels ranged in the Alviso complex from -1.5 feet at A3W in Fall, to 7.6 feet in A17 in Winter (Figure 45). As of the publication of this report, staff gauges are damaged or not present in the following ponds in the Alviso complex: AB1, AB2, A2E, A6S, A7, A8, A8W, A8S, A9, A10, A11, A14, A19, A22 and A23.

Coyote Hills

Species Richness, Abundance, and Behavior.

From September 2019 to March 2020 (with 3 out of 12 ponds visited from March to April 2020), we documented 64,310 sightings of 54 species in the Coyote Hills complex (Table 3). By complex, Coyote Hills ranks number 5 for waterbird abundance and number 3 for species richness. There is little shallow habitat for shorebirds roosting in the Coyote Hills complex; therefore, it is rare for medium or small shorebird flocks to be present. Coyote Hills salt ponds contained only 5% of all sightings, but comprised 12.9% of the total study area (Table 3). Pond N4AB was the most used pond in the complex based on overall bird counts (17,548 sightings). Compared to other complexes, the Coyote Hills complex did not support the highest proportion of any of the guilds studied (Figure 49).

Water Quality.

As in past years, the Coyote Hills complex was characterized by a series of relatively low salinity ponds. The more northern ponds tend to be less saline and salinity increases in the southern ponds. Average salinities ranged from 31.32 ppt (N1A, Fall) to 57.09 ppt (N5, Fall) (Figure 30). All ponds followed a similar seasonal pattern with the minimum in winter and a maximum generally in spring or fall (Figure 30). Temperature followed the general expected seasonal pattern and was also likely influenced by salinity and by time of day (Figure 34). Average dissolved oxygen concentrations ranged from a low of 3.37 mg/L (N4B, Winter) to a high of 14.11 mg/L (N9, Fall) (Figure 38). Average pH values ranged from a low of 7.62 in N7 in Winter to a high of 9.25 in N5 in Fall and generally did not display strong seasonal patterns (Figure 42). Staff gauge levels ranged from 0.6 feet at N4AA in Fall, to 4.8 feet in N1A in Fall (Figure 46). Staff gauges are not present in three ponds in the Coyote Hills complex: N1A, N4AB, N4B.

Dumbarton

Species Richness, Abundance, and Behavior.

From October 2019 to March 2020 (with all 4 out of 4 ponds visited in March 2020), we documented 51,401 waterbird sightings of 39 species in the Dumbarton complex, the lowest total waterbird abundance and richness out of all the complexes (Table 3). Dumbarton salt ponds contained 4% of all waterbird sightings and comprised 6.3% of the total study area (Table 3). Pond NPP1 was the most used based on overall bird counts (24,973 sightings). Compared to other complexes, the Dumbarton complex did not support the highest proportion of any of the guilds studied (Figure 49).

Water Quality.

The Dumbarton complex was characterized by moderate salinities, and salinity tended to increase as water moved east within the system (Figure 30). Average salinities ranged from 63.13 ppt at N3 in Winter to 147 ppt at NPP1 in Spring. All ponds followed a similar seasonal pattern with the minimum in winter and a maximum in fall (Figure 30). Temperature followed the general expected seasonal pattern and was also likely influenced by salinity and by time of day (Figure 34). Average dissolved oxygen concentrations ranged from a low of 4.13 mg/L (N1, Fall) to a high of 10.27 mg/L (N3, Spring) (Figure 38). Average pH values ranged from a low of 7.35 in NPP1 in Winter to a high of 8.73 in N2 in Fall and generally did not display strong seasonal patterns (Figure 42). Staff gauge levels ranged from 1 ft at N1 in Fall, to 3.4 ft in N3 in Fall (Figure 46). Staff gauges are present on all ponds in the Dumbarton complex, except for NPP1.

Eden Landing

Species Richness, Abundance, and Behavior.

From September 2019 to February 2021, we documented 491,917 waterbird sightings of 66 species in the Eden Landing pond complex, the second highest species richness and total waterbird abundance out of all the complexes, after Alviso (Table 3). Eden Landing ponds contained 38% of all sightings and comprised 22.6% of the total study area. Pond E14 was the most used based on overall bird counts (88,703 sightings). Compared to other complexes, the Eden Landing ponds supported the highest proportion of terns (57.8%), small shorebirds (56.5%), phalaropes (94.2%), medium shorebirds (42.9%), herons and egrets (37.2%) (Figure 49).

Water Quality.

The Eden Landing complex was characterized by mostly low to moderate salinities, with one high salinity pond (E6C) (Figure 31). Average salinities ranged from 17.07 ppt at E9 in Spring to 285 ppt at E6C in Fall. Salinities generally followed the expected seasonal pattern of peak salinities in summer or fall and lowest salinities in winter. Temperature followed the general expected seasonal pattern and was also likely influenced by salinity and by time of day (Figure 35). Average dissolved oxygen concentrations ranged from a low of 3.07 mg/L (E11, Spring) to a high of 20.09 mg/L (E8, Winter) (Figure 39). Average pH values ranged from a low of 7.08 in E6C in Fall to a high of 9 in E2 in Fall and generally did not display strong seasonal patterns (Figure 43). Staff gauge levels ranged from 0.3 ft at E13 in Winter, to 7.3 ft in E12 in Winter (Figure 47). Staff gauges were damaged or not present in five ponds at the Eden Landing complex: E4C, E7, E8AE, E8AW, E10.

Mowry

Species Richness, Abundance, and Behavior.

From September 2019 to February 2020, we documented 70,248 waterbird sightings of 41 species in the Mowry complex (Table 3). By complex, Mowry ranks number 4 for waterbird abundance and number 5 for species richness. Mowry salt ponds contained 5.4% of all waterbird sightings and comprised 14.4% of the total study area. Pond M5 was the most used based on overall bird counts (21,383 sightings). Compared to other complexes, the Mowry ponds supported the highest proportion of Eared Grebes (58%) (Figure 49).

Water Quality.

The Mowry complex was characterized by moderate to high salinity ponds; salinity increased as water moved east within the system (Figure 30). M1, M2, and M3 generally had lower salinity than M4, M5, and M6. Average salinities ranged from 65.26 ppt at M2 in Fall to 325.5 ppt at M3 in Fall. This complex sees less of a seasonal swing in salinities. Temperature followed the general expected seasonal pattern and was also likely influenced by salinity and by time of day (Figure 34). Average dissolved oxygen concentrations ranged from a low of 5.05 mg/L (M6, Fall) to a high of 17.12 mg/L (M1, Winter) (Figure 38). Average pH values ranged from a low of 7.1 in M6 in Fall to a high of 8.39 in M1 in Winter and generally did not display strong seasonal patterns (Figure 42). Staff gauge levels ranged from 1.5 ft at M6 in Fall, to 2.8 ft in M1 in Fall (Figure 46). Pond M2 does not have a staff gauge.

Ravenswood

Species Richness, Abundance, and Behavior

From September 2019 to March 2020 (with 6 out of 10 sites visited in March 2020), we documented 106,287 waterbird sightings of 49 species in the Ravenswood complex (Table 3). By complex, Ravenswood ranks number 3 for waterbird abundance and number 4 for species richness. Ravenswood ponds contained 8.2% of all waterbird sightings and comprised 7.3% of the total study area (Table 3). Pond R1 was the most used based on overall bird counts (52,314 sightings). Compared to other complexes, the Ravenswood complex did not support the highest proportion of any of the guilds studied (Figure 49).

Water Quality

The Ravenswood complex was characterized by three low salinity ponds (RSF2U1, U2 and U4) and seven high salinity ponds (Figure 32). The ponds on the north end of the complex tend to be the highest salinities and the RSF2 ponds on the south end of the complex tend to be the lowest salinity, with the exception of RSF2U3. Salinities in this complex ranged widely throughout the season, from 26.34 ppt at RSF2U4 in Winter to 341.67 ppt at R3 in Fall. Temperature followed the general expected seasonal pattern and was also likely influenced by salinity and by time of day (Figure 36). Average dissolved oxygen concentrations ranged from a low of 2.85 mg/L (R5S, Fall) to a high of 14.74 mg/L (R4, Winter) (Figure 40). Average pH values ranged from a low of 5.25 in R5S in Fall to a high of 9.11 in R1 in Winter and generally did not display strong seasonal patterns (Figure 44). Staff gauge levels ranged from often dry on ponds R4 and R5 to 6.1 ft in RSF2U2 in Fall (Figure 48). Staff gauges were not present on ponds R4, R5 and R5S in 2020.

Guilds

Dabblers

By complex, the abundance of dabbling ducks was highest in Alviso ponds A5, A16, and A14; Coyote Hills pond N4AB; Dumbarton pond N1; Eden Landing ponds E6A and E2; Mowry pond M5; and Ravenswood pond RSF2U2 (Table 5, Figure 3, Figure 19). Over all complexes, A5 had the highest total count (38,952 observations), followed by A16 (25,726) and A14 (16,548). At Ponds A5, A16, and A14, we observed the majority of dabbling ducks foraging (43.7%), roosting (55.3%), and roosting (74.2%), respectively (Table 5). Previous reports found that foraging and roosting dabbling ducks were most abundant on ponds with low salinity (≤33 ppt), and roosting dabbling ducks declined in abundance as levees open to hunting increased (De La Cruz et al. 2018). Dabbling ducks were not sensitive to other water quality parameters, indicating that they may be flexible with respect to different water quality parameters (Scullen et al. 2013).

Divers

By complex, the abundance of diving ducks was highest in Alviso ponds A3W, A2W, and A14; Coyote Hills pond N4AB; Dumbarton pond N3; Eden Landing ponds E6A and E10; Mowry pond M4; and Ravenswood pond RSF2U4 (Table 6, Figure 4, Figure 20). Over all complexes, A3W had the highest total count (32,378 observations), followed by A2W (17,408) and A14 (14,199). At Ponds A3W, A2W, and A14, we observed the majority of diving ducks roosting (94.9, 94.1%, and 68.9%, respectively) (Table 6). Previous reports found that diving ducks demonstrated a significant increase in abundance with increases in dissolved oxygen or staff gauge levels (at the grid level, abundance was highest at 0.33 – 2.51 m deep (De La Cruz et al. 2018)) and a significant decrease in abundance with increases in salinity (Scullen et al. 2013). Diving ducks were also most abundant in the largest ponds and at lower abundance in breached ponds (De La Cruz et al. 2018).

Eared Grebes

As the SBSPRP continues, state and federal land managers are concerned that the loss of medium and high salinity ponds may impact species like Eared Grebes that depend on these habitats. Eared Grebes show a significant increase in abundance with increases in pH, salinity, or staff gauge values; and a significant decrease in abundance with increase in temperature (Scullen et al. 2013). By complex, abundance of Eared Grebes was highest in Alviso ponds A8, A8S, and A5; Coyote Hills pond N2A; Dumbarton pond NPP1; Eden Landing ponds E6C and E6A; Mowry pond M4; and Ravenswood pond R1 (Table 7, Figure 5, Figure 21). Over all complexes, M4 had the highest total count (9,795 observations), followed by A8 (5,689) and M3 (3,853). At Ponds M4, A8, and M3, we observed the majority of Eared Grebes foraging (86.2%, 99%, and 72%, respectively) (Table 7).

Fisheaters

By complex, the abundance of fisheaters was highest in Alviso ponds A11, A14, and A5; Coyote Hills pond N3A; Dumbarton pond N3; Eden Landing ponds E2 and E7; Mowry pond M3; and Ravenswood pond RSF2U1 (Table 8, Figure 6, Figure 22). Over all complexes, A11 had the highest total count (2,933 observations), followed by A14 (2,576) and A5 (2,263). At Ponds A11, A14, and A5, we observed the majority of fisheaters roosting on the pond (76.8%), roosting on levees (78.4%), and roosting on levees (61.1%), respectively (Table 8). Fish cannot survive in salinities greater than 80 ppt (Carpelan 1957), which limits the salinity range where we would expect to observe fish-eating birds foraging. Previous reports showed that fisheaters significantly increase in abundance with increases in staff gauge values (ie, higher water levels), and decrease in abundance with increases in dissolved oxygen or salinity (Scullen et al. 2013).

Terns

By complex, the abundance of terns was highest in Alviso ponds A3W, A1, and A9; Coyote Hills pond N3A; Dumbarton pond N1; Eden Landing ponds E7 and E2; Mowry pond M1; and Ravenswood pond RSF2U2 (Table 9, Figure 7, Figure 27). Over all complexes, E7 had the highest total count (724 observations), followed by E2 (516) and E10 (203). At Ponds E2, E7, and E10, we observed the majority of terns foraging (92.8%), and roosting on manmade structures (87.4% and 55.2%), respectively (Table 9). Previous reports found that terns were most abundant in large ponds with lower salinity (De La Cruz et al. 2018).

Gulls

By complex, the abundance of gulls was highest in Alviso ponds A13, A5, and A23; Coyote Hills pond N7; Dumbarton pond N1; Eden Landing ponds CP3C and E2; Mowry pond M5; and Ravenswood pond R2 (Table 10, Figure 8, Figure 23). Over all complexes, A13 had the highest total count (6,339 observations), followed by A5 (3,270) and A23 (2,890). At Ponds A5, A23, and A13, we observed the majority of gulls foraging (51.8% and 52.8%) and roosting (82.4%), respectively (Table 10). Previous reports found that gulls showed a significant increase in abundance with increases in pH, salinity, or staff gauge levels (Scullen et al. 2013). In past survey years we observed most gulls roosting on levees. The presence of gulls on levees is largely due to breeding colonies present during the summer, and the lack of spring surveys in relevant areas accounts for this change in reported behavior. We expect that more than 40,000 gulls were breeding in South San Francisco Bay in 2020, however SFBBO was unable to obtain a count or to document the spatial distribution of breeding colonies in 2020 due to land access restrictions associated with COVID-19.

Medium Shorebirds

By complex, the abundance of medium shorebirds was highest in Alviso ponds A3N, A9, and AB1; Coyote Hills pond N4AA; Dumbarton pond N1; Eden Landing ponds E12 and E9; Mowry pond M5; and Ravenswood pond R1 (Table 11, Figure 9, Figure 25). Over all complexes, A3N had the highest total count (22,854 observations), followed by A9 (22,720) and R1 (12,345). At Ponds A3N, A9, and R1, we observed the majority of medium shorebirds roosting (99.7%, 88.5%, and 79.4%, respectively) (Table 11). Previous reports showed that at the pond scale medium shorebirds were associated with widely varying topography and the presence of islands (De La Cruz et al. 2018). They were also found foraging in grids with islands and roosting near levees. Therefore, the presence of roosting islands or levees that are closed to public access and adjacent to quality foraging mudflat habitat are integral for shorebirds in ponds.

Phalaropes

By complex, the abundance of phalaropes was highest in Alviso pond A3N; Dumbarton pond N3; Eden Landing ponds E4 and E11; Mowry pond M2; and Ravenswood pond R1 (Table 12, Figure 10, Figure 26). No phalaropes were present at Coyote Hills. Over all complexes, E4 had the highest total count (575 observations), followed by E11 (299) and R1 (47). At Ponds E4, E11, and R1, we observed the majority of phalaropes foraging (90.8%, 100%, and 100%, respectively) (Table 12). Like Eared Grebes, land managers are concerned that the loss of medium and high salinity ponds may impact phalaropes, which depend on highly saline bodies of water that host brine flies and brine shrimp (Cullen et al. 1999). Since the onset of this project in 2005, sightings of phalaropes have fluctuated widely (e.g., over 10,000 observations in the 2006-2007 study year, versus fewer than 1,000 in the 2009-2010 study year) (Figure 26 a). It is difficult to know if habitat changes, sampling techniques, or pond management practices are resulting in these observed fluctuations. Since pond surveys are poorly timed to capture comparable counts during peak phalarope migration, we conducted targeted phalarope migration surveys starting in 2019.

Phalarope Migration Surveys

We completed seven Phalarope Migration Surveys from July to September in 2020. The number of sites visited in 2020 was limited due to site access restrictions associated with COVID-19, so 13 – 17 sites were visited during each survey in 2020 (Figure 52). Surveys were not permitted on USFWS lands in 2020, but opportunistic reports of 0 phalaropes provided by essential workers at Ravenswood ponds R1 and R2 were included in analyses. We counted a total of 4,520 Red-necked Phalarope, 2,034 Wilson's Phalarope, and 177 phalarope of unidentified species (Table 17, Figure 53). Counts of Wilson's Phalaropes peaked at 767 phalaropes during the survey beginning on 07/20 and counts of Red-necked Phalaropes peaked at 1,700 phalaropes during the survey beginning on 08/31 (Figure 55). Counts of phalaropes at other staging sites in the Pacific Flyway were lower in 2020 compared to 2019 (Carle et al., 2021). However, the peak count of Red-necked phalaropes in South San Francisco Bay was higher in 2020 than in 2019 (1,447 phalaropes), despite visiting fewer ponds in 2020. Surveys did not occur during peak migration for Wilson's phalarope in 2019.

Of the sites visited in 2020, Red-necked phalaropes were most abundant at Sunnyvale WPCP, Alviso Marina, and E12 (Figure 54). Wilson's phalaropes were most abundant at Sunnyvale WPCP, Alviso Marina, and Spreckles Marsh. Phalaropes were most abundant outside of SBSPRP and salt ponds in 2020, but most of the high salinity salt production ponds were not surveyed in 2020. Even so, the Sunnyvale WPCP was heavily used by phalaropes, indicating that the conditions there are favorable. Investigating the conditions at this site could provide insight into how other ponds could be modified to support phalaropes during their migration. Phalaropes rely on staging sites in San Francisco Bay and elsewhere to feed in preparation for a long migration to South America. Ensuring that they have roosting and foraging sites of adequate quality would contribute to their conservation.

Five hundred and forty-eight Wilson's phalaropes were observed during the first survey in early July, indicating that they begin arriving to San Francisco Bay before SFBBO's earliest survey. The number of Red-necked phalaropes increased from one in early July, reached a peak in late August, and declined to forty phalaropes by the last survey date, indicating that the current survey schedule largely spans the period when they are present in the area.

Small Shorebirds

By complex, the abundance of small shorebirds was highest in Alviso ponds A9, A3N, and A15; Coyote Hills pond N3A; Dumbarton pond NPP1; Eden Landing ponds E14 and E11; Mowry pond M5; and Ravenswood pond R1 (Table 13, Figure 11, Figure 27). Over all complexes, E14 had the highest total count (83,893 observations), followed by A9 (58,854) and R1 (38,833). At Ponds A9, E14, and R1, we observed the majority of small shorebirds foraging (51.9%) and roosting (89.9% and 83.3%, respectively) (Table 13). Previous reports found that small shorebirds showed a significant increase in abundance with increases in salinity or temperature and a significant decrease in abundance with increases in pH (Scullen et al. 2013). As noted for medium shorebirds, islands and levees in the ponds may offer high tide refugia for shorebirds in the San Francisco Bay. Compared with other guilds considered previously, foraging small shorebirds (not including Least Sandpiper) was the only guild with a higher abundance in breached ponds (De La Cruz et al. 2018).

Herons and Egrets

By complex, the abundance of herons and egrets was highest in Alviso ponds A5, A10, and A16; Coyote Hills pond N4AA; Dumbarton pond N3; Eden Landing ponds E6A and E2; Mowry pond M4; and Ravenswood pond RSF2U1 (Table 14, Figure 12, Figure 24). Over all complexes, E6A had the highest total count (403 observations), followed by N4AA (373) and A5 (267). At Ponds E6A, N4AA, and A5, we observed the majority of herons and egrets foraging (78.2%, 96.8%, and 60.7%, respectively) (Table 14). Previous reports showed that herons and egrets decrease in abundance with increases in salinity or

staff gauge values (Scullen et al. 2013). Higher salinity levels (above 80 ppt) are generally detrimental to fish survival, and fish are a primary prey item for herons and egrets. Increased pond depths may allow fish to escape beyond the reach of herons and egrets, while shallow ponds may provide better (or simply a larger area of) foraging habitat.

Long-term Trends

The most recent three-year averages of waterbird counts from surveys that included all ponds (through February 2020) exceeded the SBSPRP baseline values for 7 out of 10 species/guilds (Table 15, Figure 50). Ruddy ducks have more than doubled, and diving ducks (also includes Ruddy Ducks), small shorebirds in fall, and Eared Grebes have increased by over 30%. Least Terns, dabbling ducks, and medium shorebirds showed smaller increases. We also compared counts across ponds in Eden Landing for which we collected more recent data in spring and winter (Figure 51). When considering the most recent surveys at Eden Landing, counts of dabbling ducks were very low during both winter surveys (both below the baseline value) and counts of diving ducks were also low, with one winter count below the baseline value. Based on three-year averages, counts of diving ducks and dabbling ducks are only marginally higher than baseline values (less than a 10% increase) in Eden Landing (Table 16). It is unknown whether dabbling ducks and diving ducks had low abundance at other complexes in winter 2020-2021, as surveys were only permitted at the Eden Landing complex. Counts of small shorebirds in fall 2019 were also lower than in recent years (the average was not below the baseline), but this guild shows high variability in counts. Future surveys are needed to determine whether the low counts are part of natural variability or are reflective of a decline. We recommend that fall, winter, and spring surveys are completed in the 2021-2022 survey year to evaluate waterbird trends.

For most of the species/guilds that increased in abundance across all ponds, the increases are largely due to higher counts within the SBSPRP area. Eared Grebes are the exception; counts have increased overall, but this is attributed to their use of salt production ponds rather than their use of SBSPRP sites. Lending further support to this pattern, considering more recent counts from Eden Landing shows that Eared Grebes have declined by 94% at Eden Landing ponds (Table 16; Figure 51). Eared Grebe numbers may remain above target values in South San Francisco Bay if practices remain consistent at salt production ponds, but it should be noted that SBSPRP ponds are supporting fewer Eared Grebes than prior to the SBSPRP.

Three species/guilds showed negative trends in counts: small shorebirds in spring, Bonaparte's Gulls, and phalaropes. Small shorebirds in spring have declined by 3%, suggesting that their numbers are similar to baseline values. When considering more recent counts at Eden Landing ponds, small shorebirds in fall have increased by 16% (Table 16). Bonaparte's Gulls have declined by 18%; this does not exceed the threshold of a 50% decline and counts have not reached a trigger (Table 15). However, including more recent counts from Eden Landing shows that Bonaparte's Gulls have declined by 81% at those ponds relative to 2005-2007 baseline values at Eden Landing (Table 16). Phalarope numbers have declined by 78%. Phalarope counts reached a trigger and crossed a NEPA/CEQA significance threshold in 2017 (the most recent year of summer surveys at all ponds). Targeted phalarope surveys in the summer and fall are helping to more accurately characterize SBSPRP site use by phalaropes. NEPA/CEQA significance thresholds require that a decline is due to restoration activities. The cause of the declines in phalaropes cannot be attributed to restoration activities without further investigation of phalarope population trends outside of the SBSPRP area and/or South San Francisco Bay. New surveys across the Pacific Flyway will make it possible to compare local phalarope counts to those at other staging sites (Carle et al. 2021).

Considerations for Future Study

We emphasize that this report serves as a data summary and coarse-scale assessment of waterbird and water quality monitoring efforts at South Bay ponds. In general, more advanced analyses are needed to

tease apart complex temporal and spatial patterns operating at different scales within this dynamic system. Analyses considering both Cargill-managed ponds and SBSPRP areas together was a first step that we incorporated into the long-term trend analysis. The lack of inverse trends in the abundance of birds at SBSPRP sites and Cargill-managed sites indicates that changes in numbers may be driven by factors operating on larger geographic scales, for example, at the scale of San Francisco Bay or the Pacific Flyway (Murphy et al. 2007).

In recent years, the topic of local bird movement and its effect on our ability to assess true waterbird abundance within the ponds has generated some interesting discussion among agency, academic, and nonprofit biologists, statisticians, and resource professionals. Currently, we (SFBBO and other entities) do not have the ability to quantify local bird movement in time and space through our ground count methodology, as pond ground counts are not conducted on the same day due to staff, equipment, and other resource constraints. Nevertheless, quantifying bird movement would seem a valuable addition in determining how closely ground counts reflect true waterbird abundance. We would recommend repeated, staggered counts of the same ponds conducted on the same day by the same observer be performed to address this issue and to determine if a correction factor should be applied to ground counts to better approximate true waterbird abundance.

For some guilds that migrate through the area rather quickly, such as phalaropes and Least Terns, bi-seasonal surveys may not be adequate to accurately monitor their use of ponds. More frequent sampling is required during phalarope migration to understand their use of the SBSPRP area. Robinson-Nilsen and Demers (2012b) suggested intervals of 2-3 days during the latter part of summer. The cessation of summer surveys in 2019 makes alternative approaches for these species particularly important. We suggest the continuation of phalarope migration surveys in 2021 and future years at intervals of no less than every two weeks during the peak migration period for Red-necked Phalarope and Wilson's Phalarope.

We recommend that staff gauges be installed at all ponds in a standardized way, so that water levels can be measured more consistently across the survey area and related to waterbird use.

Restored ponds become more difficult to survey as accessibility decreases and vegetation increases, obscuring distant birds from view. To meet the goal of surveying birds at restored sites as tidal marsh habitat reestablishes, it will inevitably become necessary to employ alternative survey strategies. We recommend that efforts are put forward to investigate alternative monitoring methods, such as aerial surveys using Unmanned Aerial Vehicles. Employing a new method requires initial assessments to investigate survey impacts on birds, the feasibility of using aerial photographs to identify bird species, and establishment of a correction factor for converting between ground- and aerial-based counts.

With more than a decade of waterbird and water quality monitoring data available, we suggest support of an effort to model bird site use as a function of site characteristics and habitat availability. This model should be used to predict bird use of sites under alternative future restoration scenarios. This effort would provide a strong link between the bird monitoring work and habitat goals, and directly aid the SBSPRP apply an adaptive management approach to restoration and management.

Management Recommendations for the South Bay

We acknowledge the work of the South Bay Salt Pond Restoration's Pond Management Working Group in recommending and implementing changes at the pond systems since the initiation of the project. In order for the South Bay to retain its current bird numbers, we make the following recommendations for the South Bay Salt Pond Restoration Project's Project Management Team, Don Edwards San Francisco Bay National Wildlife Refuge, and Eden Landing Ecological Reserve to consider while managing ponds within the restoration project area:

1. Maintain the pond systems to have a variety of water quality parameter levels, thereby supporting guilds with different habitat requirements. Special consideration should be given to species of local concern within the SBSPRP management area, such as phalaropes and Eared Grebes. Consider managing ponds to support use by phalaropes, or alter project targets for this guild to address declines at SBSPRP sites.
2. Provide islands or undisturbed levees for shorebird roosting habitat, and nesting habitat for other species. This is especially important during high tides.
3. Continue monitoring waterbird use of Cargill-managed and SBSPRP ponds as the project proceeds with its restoration activities. Attention should be given to alternative methods to monitor restored sites to understand bird use following restoration to tidal marsh habitat.
4. Maintain some flooded units during the winter months for diving duck populations, especially more pond dependent species, like Ruddy Duck.

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Tables

Table 1. Schedule of surveys for the reporting period. Survey numbers are generated consecutively, dating back to when SFBBO began surveying ponds in 2005. Land access was restricted in March 2020 due to COVID-19, so subsequent surveys occurred at a subset of ponds (see Ponds field).

Season	Month/Year	Survey #	Start date	End date	Ponds
Fall 2019	Sept 2019	130	2019-09-01	2019-10-13	All complexes (82 ponds)
	Oct 2019	131	2019-10-14	2019-11-30	All complexes (82 ponds)
	Nov 2019				
Winter 2019-20	Dec 2019	132	2019-12-01	2020-01-12	All complexes (82 ponds)
	Jan 2020	133	2020-01-13	2020-02-29	All complexes (82 ponds)
	Feb 2020				
Spring 2020	Mar 2020	134	2020-03-01	2020-04-14	A8S, A8W, A9, A10, A11, A12, A13, N1, N2, N3, N4B, N7, N8, NPP1, R1, R2, RSF2U1-4, All Eden Landing (25 ponds)
	Apr 2020	135	2020-04-15	2020-05-31	All Eden Landing (25 ponds)
	May 2020				
Winter 2020-21	Dec 2020	136	2020-12-01	2021-01-14	All Eden Landing (25 ponds)
	Jan 2021	137	2021-01-15	2021-02-28	All Eden Landing (25 ponds)
	Feb 2021				

Table 2. List of all ponds surveyed, their staff gauge location, and staff gauge status in 2020.

Complex	Pond	Staff Gauge Grid Location	Staff Gauge Status	Additional notes
	A1	H1	GOOD	
	A10	A2	MISSING	Missing since 10/29/2014
	A11	E1	MISSING	Missing since 10/07/2019
	A12	C5	GOOD	
	A13	A2	GOOD	
	A14	A3	OK	Broken below 2.5
	A15	A2	GOOD	
	A16	E6	GOOD	
	*A17	D1	GOOD	
	*A19	NONE	MISSING	Missing since at least 2014
	A22	NONE	MISSING	Missing since at least 2014
	A23	NONE	MISSING	Missing since at least 2014
Alviso	A2E	H7	MISSING	Missing since 10/03/2019
	A2W	A6	OK	Eroded below 0.5
	A3N	D1	GOOD	
	A3W	E9	GOOD	
	A5	B3	GOOD	
	A6S	NONE	MISSING	Missing since at least 2014
	A7	A2	OK	Broken below 2.3
	A8	NONE	MISSING	Missing since at least 2014
	A8S	NONE	MISSING	Missing since at least 2014
	A8W	NONE	MISSING	Missing since at least 2014
	A9	D2	OK	Broken below 1.8
	AB1	A7	BROKEN	Eroded and covered in barnacles below 1
	AB2	J1	OK	Lines eroded below 1.0
	N1A	C8	BROKEN	
	N2A	C2	GOOD	
	N3A	C6	GOOD	
	N4	E5	GOOD	
Coyote Hills	N4AA	I6	GOOD	
	N4AB	NONE	MISSING	
	N4B	NONE	MISSING	
	N5	A2	GOOD	
	N6	E2	GOOD	

Table 2. List of all ponds surveyed, their staff gauge location, and staff gauge status in 2020.

Complex	Pond	Staff Gauge Grid Location	Staff Gauge Status	Additional notes
	N7	A1	GOOD	
	N8	A2	GOOD	
	N9	A5	GOOD	
Dumbarton	N1	D8	GOOD	
	N2	C2	GOOD	
	N3	G1	GOOD	
	NPP1	C11	MISSING	Missing since 10/10/2019
Eden Landing	E1	A1	GOOD	Replaced in 2019
	E10	F2	MISSING	Missing as of 12/2020; two alternative gauges
	E11	E3	GOOD	
	E12	D6	GOOD	
	E13	C2	GOOD	Two staff gauges, use the white plastic one
	E14	B1	GOOD	
	E1C	E3	GOOD	
	E2	D1	GOOD	
	E2C	A2	GOOD	
	CP3C	B2	GOOD	
	E4	B6	GOOD	
	E4C	NONE	MISSING	Missing since at least 2004
	E5	C6	GOOD	
	E5C	C4	GOOD	
	E6	D8	GOOD	
	E6A	A3	GOOD	
	E6B	A6	GOOD	
	E6C	A4	GOOD	
	E7	B5	MISSING	Missing as of 12/2020; replacement pending
	E8	I6	GOOD	
	*E8AE	NONE	MISSING	
	*E8AW	NONE	MISSING	
	E8XN	D3	OK	Can read up to 8’
	*E8XS	D3	OK	Can read up to 8’, Can have algae below 6’
	*E9	A4	GOOD	
Mowry	M1	H10	GOOD	
	M2	NONE	MISSING	

Table 2. List of all ponds surveyed, their staff gauge location, and staff gauge status in 2020.

Complex	Pond	Staff Gauge Grid Location	Staff Gauge Status	Additional notes
	M3	B6	GOOD	
	M4	C13	GOOD	
	M5	A3	GOOD	
	M6	B5	GOOD	
Ravenswood	R1	F8	GOOD	
	R2	D4	GOOD	
	R3	A6	GOOD	
	R4	F1	MISSING	Removed fall 2019 due to construction
	R5	A1	MISSING	Missing since 2020
	R5S	NONE	MISSING	Missing since at least 2014
	RSF2U1	D6	GOOD	
	RSF2U2	E3	GOOD	
	RSF2U3	E3	GOOD	
	RSF2U4	E6	GOOD	

Table 3. Waterbird species richness, abundance (total sightings for all species combined), and acreage by pond complex and individual pond, South San Francisco Bay, California; Sept. 2019 - Feb. 2021. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	Species Richness	Abundance (Total Sightings)	Percent of Total Sightings in Survey Area	Acreage	Percent of Total Acreage in Survey Area
Alviso	A1§	35	22764	1.76	280.83	1.38
	A10†	40	8990	0.7	255.86	1.26
	A11†	42	8357	0.65	267.79	1.32
	A12†	17	5211	0.4	315.84	1.55
	A13†	11	13601	1.05	274.42	1.35
	A14§	37	35793	2.77	349.09	1.71
	A15§	22	13831	1.07	259.44	1.27
	A16§	47	33707	2.61	248.80	1.22
	A17§	25	8723	0.67	135.31	0.66
	A19§	21	7095	0.55	269.14	1.32
	A22§	10	669	0.05	274.33	1.35
	A23§	7	3920	0.3	457.19	2.25
	A2E§	36	22930	1.77	326.04	1.60
	A2W§	37	22435	1.73	439.42	2.16
	A3N§	24	43050	3.33	168.89	0.83
	A3W§	39	41225	3.19	573.45	2.82
	A5§	43	57451	4.44	645.97	3.17
	A6S§	23	3101	0.24	281.26	1.38
	A7§	41	20695	1.6	270.21	1.33
	A8§	33	16815	1.3	415.09	2.04
	A8S†	35	9056	0.7	170.79	0.84
	A8W†	26	717	0.06	15.99	0.08
	A9†	41	93225	7.21	373.20	1.83
	AB1§	30	6060	0.47	153.83	0.76
	AB2§	39	9738	0.75	182.23	0.90
	Subtotal	**72**	**509159**	**39.37**	**7404.41**	**36.37**
Coyote Hills	N1A§	35	3448	0.27	168.56	0.83
	N2A§	29	3885	0.3	170.23	0.84
	N3A§	32	15266	1.18	420.48	2.07
	N4§	23	2950	0.23	341.49	1.68
	N4AA§	34	9657	0.75	302.32	1.49

Table 3. Waterbird species richness, abundance (total sightings for all species combined), and acreage by pond complex and individual pond, South San Francisco Bay, California; Sept. 2019 - Feb. 2021. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	Species Richness	Abundance (Total Sightings)	Percent of Total Sightings in Survey Area	Acreage	Percent of Total Acreage in Survey Area
	N4AB§	38	17549	1.36	238.3	1.17
	N4B†	28	2593	0.2	64.21	0.32
	N5§	22	469	0.04	194.29	0.95
	N6§	12	1668	0.13	94.28	0.46
	N7†	28	2494	0.19	382.14	1.88
	N8†	23	1828	0.14	114.19	0.56
	N9§	23	2503	0.19	137.28	0.67
	Subtotal	**54**	**64310**	**4.97**	**2627.77**	**12.91**
Dumbarton	N1†	27	14921	1.15	345.39	1.7
	N2†	19	2286	0.18	195.33	0.96
	N3†	30	9221	0.71	553.55	2.72
	NPP1†	19	24973	1.93	193.25	0.95
	Subtotal	**39**	**51401**	**3.97**	**1287.52**	**6.32**
Eden Landing	E1*	39	6956	0.54	297.46	1.46
	E10*	38	11368	0.88	215.7	1.06
	E11*	28	45842	3.54	126.13	0.62
	E12*	40	23662	1.83	107.62	0.53
	E13*	42	21097	1.63	144.72	0.71
	E14*	28	88703	6.86	166.23	0.82
	E1C*	26	3589	0.28	64.42	0.32
	E2*	47	20026	1.55	685.27	3.37
	E2C*	31	8029	0.62	28.31	0.14
	CP3C*	34	16828	1.3	166.68	0.82
	E4*	35	37767	2.92	194.49	0.96
	E4C*	20	25444	1.97	177.75	0.87
	E5*	32	4071	0.31	166.95	0.82
	E5C*	21	7424	0.57	95.27	0.47
	E6*	41	7058	0.55	196.36	0.96
	E6A*	46	47623	3.68	322.54	1.58
	E6B*	44	33842	2.62	284.09	1.4
	E6C*	19	2586	0.2	83.71	0.41
	E7*	46	6190	0.48	218.23	1.07
	E8*	34	23153	1.79	190	0.93

Table 3. Waterbird species richness, abundance (total sightings for all species combined), and acreage by pond complex and individual pond, South San Francisco Bay, California; Sept. 2019 - Feb. 2021. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	Species Richness	Abundance (Total Sightings)	Percent of Total Sightings in Survey Area	Acreage	Percent of Total Acreage in Survey Area
	E8AE*	30	23904	1.85	131.62	0.65
	E8AW*	17	1711	0.13	122.27	0.6
	E8XN*	18	665	0.05	9.88	0.05
	E8XS*	19	1549	0.12	32.42	0.16
	E9*	37	22830	1.77	380.92	1.87
	Subtotal	**66**	**491917**	**38.04**	**4609.04**	**22.64**
Mowry	M1§	22	5806	0.45	498.65	2.45
	M2§	23	5747	0.44	487.22	2.39
	M3§	21	9841	0.76	550.69	2.71
	M4§	23	14373	1.11	537.55	2.64
	M5§	21	21383	1.65	417.79	2.05
	M6§	15	13098	1.01	448.7	2.2
	Subtotal	**41**	**70248**	**5.43**	**2940.6**	**14.44**
Ravenswood	R1†	32	52314	4.04	452.5	2.22
	R2†	23	34802	2.69	143.27	0.7
	R3§	12	967	0.07	284.06	1.4
	R4§	7	1024	0.08	299.84	1.47
	R5§	3	167	0.01	31.36	0.15
	R5S§	6	449	0.03	30.48	0.15
	RSF2U1†	30	5778	0.45	56.76	0.28
	RSF2U2†	35	8330	0.64	84.2	0.41
	RSF2U3†	14	975	0.08	90.05	0.44
	RSF2U4†	27	1481	0.11	15.47	0.08
	Subtotal	**49**	**106287**	**8.22**	**1487.99**	**7.31**
Survey Area Total		**81**	**1293322**	**100**	**20357.33**	**100**

Table 4. Percentage of total birds foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 - Feb 2021. N is the total number of bird sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	15.7	82.8	0.1	0.5	0.9	22764
	A10†	22.4	72.7	0.0	4.9	0.0	8990
	A11†	23.4	64.7	2.0	9.9	0.0	8357
	A12†	48.1	51.4	0.0	0.6	0.0	5211
	A13†	29.1	65.5	0.9	4.6	0.0	13601
	A14§	25.4	63.8	0.0	10.7	0.0	35793
	A15§	60.4	38.9	0.0	0.7	0.0	13831
	A16§	35.9	51.6	12.3	0.1	0.1	33707
	A17§	58.9	39.8	0.6	0.7	0.0	8723
	A19§	69.6	30.4	0.0	0.0	0.0	7095
	A22§	90.0	9.4	0.0	0.5	0.2	669
	A23§	61.9	38.1	0.0	0.0	0.0	3920
	A2E§	44.7	54.1	0.1	0.7	0.5	22930
	A2W§	13.8	82.2	0.1	1.5	2.6	22435
	A3N§	3.4	96.5	0.0	0.0	0.1	43050
	A3W§	10.8	88.0	0.0	0.3	1.0	41225
	A5§	40.8	33.9	0.0	25.3	0.0	57451
	A6S§	18.8	77.8	0.0	0.1	3.4	3101
	A7§	40.6	47.2	0.3	11.8	0.1	20695
	A8§	50.0	44.6	0.5	4.4	0.5	16815
	A8S†	61.3	36.0	0.0	2.7	0.0	9056
	A8W†	65.0	30.0	0.0	5.0	0.0	717
	A9†	38.0	61.9	0.1	0.1	0.0	93225
	AB1§	30.0	66.7	0.5	1.4	1.4	6060
	AB2§	21.4	73.2	3.8	1.2	0.3	9738
Coyote Hills	N1A§	49.3	29.6	0.0	20.2	0.9	3448
	N2A§	22.5	64.0	0.0	13.2	0.2	3885
	N3A§	60.7	27.7	0.0	11.3	0.3	15266
	N4§	56.1	14.4	0.0	27.9	1.5	2950
	N4AA§	82.5	14.6	0.2	0.8	1.9	9657
	N4AB§	36.1	59.1	0.1	4.6	0.1	17549
	N4B†	72.0	20.3	0.0	1.5	6.2	2593
	N5§	31.6	43.9	0.0	19.2	5.3	469
	N6§	20.3	2.3	0.0	77.5	0.0	1668
	N7†	22.6	20.5	0.0	55.7	1.1	2494
	N8†	18.3	22.2	0.0	59.4	0.2	1828

Table 4. Percentage of total birds foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 - Feb 2021. N is the total number of bird sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N9§	35.2	43.4	0.0	21.4	0.0	2503
Dumbarton	N1†	41.0	45.5	3.2	3.1	7.3	14921
	N2†	43.4	34.1	4.9	17.5	0.1	2286
	N3†	21.0	60.7	2.5	14.8	1.1	9221
	NPP1†	14.2	85.0	0.4	0.3	0.1	24973
Eden Landing	E1*	24.3	67.6	2.2	5.2	0.7	6956
	E10*	19.2	79.1	0.5	0.1	1.1	11368
	E11*	6.9	93.0	0.0	0.0	0.2	45842
	E12*	13.3	56.9	10.5	4.1	15.2	23662
	E13*	31.8	61.6	3.5	1.5	1.7	21097
	E14*	10.5	89.4	0.0	0.0	0.1	88703
	E1C*	87.2	12.7	0.0	0.1	0.0	3589
	E2*	47.9	33.2	18.1	0.4	0.4	20026
	E2C*	63.1	36.9	0.0	0.0	0.0	8029
	CP3C*	68.3	29.4	1.6	0.1	0.6	16828
	E4*	65.7	33.2	0.1	0.3	0.7	37767
	E4C*	29.4	60.2	7.5	0.0	2.9	25444
	E5*	60.3	20.9	0.0	7.5	11.4	4071
	E5C*	62.1	37.6	0.0	0.0	0.2	7424
	E6*	37.7	58.7	0.0	1.6	2.0	7058
	E6A*	48.5	51.2	0.0	0.2	0.1	47623
	E6B*	52.7	47.2	0.0	0.0	0.1	33842
	E6C*	91.4	8.3	0.0	0.3	0.0	2586
	E7*	58.7	21.4	0.0	0.2	19.6	6190
	E8*	38.0	58.8	0.0	0.0	3.2	23153
	E8AE*	47.2	52.8	0.0	0.0	0.1	23904
	E8AW*	29.2	70.8	0.0	0.0	0.0	1711
	E8XN*	12.0	87.7	0.0	0.3	0.0	665
	E8XS*	67.3	32.7	0.0	0.0	0.0	1549
	E9*	21.2	78.5	0.0	0.0	0.3	22830
Mowry	M1§	30.9	67.6	0.0	1.2	0.3	5806
	M2§	29.2	28.3	39.6	2.8	0.2	5747
	M3§	59.8	34.7	3.1	1.8	0.7	9841
	M4§	70.5	26.2	0.0	3.3	0.0	14373

Table 4. Percentage of total birds foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 - Feb 2021. N is the total number of bird sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	M5§	80.6	19.0	0.0	0.4	0.0	21383
	M6§	74.3	24.4	0.0	0.5	0.8	13098
Ravenswood	R1†	17.5	81.8	0.6	0.1	0.1	52314
	R2†	13.1	81.5	0.0	5.4	0.0	34802
	R3§	20.4	78.6	0.0	1.0	0.0	967
	R4§	15.3	84.7	0.0	0.0	0.0	1024
	R5§	70.7	14.4	0.0	15.0	0.0	167
	R5S§	16.7	83.3	0.0	0.0	0.0	449
	RSF2U1†	21.6	66.1	7.4	34.0	0.8	5778
	RSF2U2†	45.5	32.5	16.0	6.1	0.0	8330
	RSF2U3†	45.1	51.9	0.6	2.4	0.0	975
	RSF2U4†	45.6	49.4	0.0	5.0	0.0	1481

Table 5. Percentage of dabblers foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of dabbler sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	24.8	74.3	0.0	0.8	0.12	7798
	A10†	48.1	38.7	0.0	13.3	0.0	1003
	A11†	35.0	43.2	0.0	21.8	0.0	206
	A12†	0.0	100.0	0.0	0.0	0.0	3
	A13†	0.0	0.0	0.0	0.0	0.0	0
	A14§	22.0	74.2	0.0	3.8	0.0	16548
	A15§	100.0	0.0	0.0	0.0	0.0	46
	A16§	39.8	55.3	4.9	0.1	0.0	25726
	A17§	34.9	63.8	0.8	0.5	0.0	4273
	A19§	86.8	13.2	0.0	0.0	0.0	4099
	A22§	0.0	96.3	0.0	3.7	0.0	27
	A23§	0.0	0.0	0.0	0.0	0.0	0
	A2E§	86.3	12.0	0.2	1.6	0.0	9074
	A2W§	41.0	49.3	0.4	9.3	0.1	3327
	A3N§	83.0	17.0	0.0	0.0	0.0	165
	A3W§	28.9	70.9	0.0	0.2	0.1	7488
	A5§	43.7	27.8	0.0	28.5	0.0	38952
	A6S§	11.4	88.5	0.0	0.1	0.0	1848
	A7§	52.9	39.8	0.0	7.2	0.0	11417
	A8§	30.8	58.5	0.2	10.1	0.3	3839
	A8S†	73.8	23.6	0.0	2.6	0.0	4983
	A8W†	67.4	30.8	0.0	1.8	0.0	435
	A9†	22.7	76.6	0.7	0.0	0.0	8204
	AB1§	31.7	61.5	1.6	5.3	0.0	1480
	AB2§	27.3	70.0	0.8	2.0	0.0	4340
Coyote Hills	N1A§	54.0	9.7	0.0	36.3	0.0	1101
	N2A§	81.8	18.2	0.0	0.0	0.0	11
	N3A§	57.3	42.0	0.0	0.8	0.0	8319
	N4§	65.8	34.2	0.0	0.0	0.0	38
	N4AA§	80.7	17.9	0.0	0.6	0.8	3176
	N4AB§	48.8	51.2	0.0	0.0	0.0	10309
	N4B†	86.3	13.4	0.0	0.0	0.3	351
	N5§	77.8	0.0	0.0	22.2	0.0	18
	N6§	100.0	0.0	0.0	0.0	0.0	2
	N7†	60.9	39.1	0.0	0.0	0.0	138
	N8†	45.8	54.2	0.0	0.0	0.0	24

Table 5. Percentage of dabblers foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of dabbler sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N9§	75.0	25.0	0.0	0.0	0.0	4
Dumbarton	N1†	59.7	34.0	0.2	6.2	0.0	5405
	N2†	36.6	26.9	6.9	29.7	0.0	1221
	N3†	74.7	22.5	2.8	0.0	0.0	213
	NPP1†	71.7	28.3	0.0	0.0	0.0	1750
Eden Landing	E1*	84.6	15.4	0.0	0.0	0.0	156
	E10*	17.4	82.0	0.6	0.0	0.0	339
	E11*	70.1	29.7	0.0	0.0	0.2	458
	E12*	39.7	41.3	9.8	9.2	0.0	3002
	E13*	26.5	53.4	18.5	1.6	0.0	676
	E14*	100.0	0.0	0.0	0.0	0.0	51
	E1C*	71.4	28.6	0.0	0.0	0.0	35
	E2*	51.0	48.7	0.3	0.0	0.0	4909
	E2C*	92.2	7.9	0.0	0.0	0.0	331
	CP3C*	68.5	31.2	0.0	0.4	0.0	2834
	E4*	85.6	14.4	0.0	0.0	0.0	1368
	E4C*	99.0	1.0	0.0	0.0	0.0	203
	E5*	87.7	7.2	0.0	5.0	0.1	1602
	E5C*	76.1	24.0	0.0	0.0	0.0	167
	E6*	24.5	75.3	0.0	0.0	0.2	1806
	E6A*	43.3	55.5	0.0	1.2	0.0	6403
	E6B*	68.9	30.5	0.3	0.3	0.0	1195
	E6C*	67.9	32.1	0.0	0.0	0.0	131
	E7*	85.7	14.0	0.0	0.0	0.3	1549
	E8*	63.2	36.8	0.0	0.0	0.0	1840
	E8AE*	75.1	24.9	0.0	0.0	0.0	398
	E8AW*	76.3	23.6	0.0	0.0	0.0	93
	E8XN*	0.0	100.0	0.0	0.0	0.0	35
	E8XS*	49.6	50.4	0.0	0.0	0.0	137
	E9*	16.3	83.7	0.0	0.0	0.0	2689
Mowry	M1§	25.4	74.6	0.0	0.0	0.0	681
	M2§	52.7	5.2	29.2	12.9	0.0	791
	M3§	29.3	66.2	0.0	4.6	0.0	3050
	M4§	34.4	61.6	0.0	4.0	0.0	2032

Table 5. Percentage of dabblers foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of dabbler sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	M5§	91.1	8.9	0.0	0.0	0.0	4100
	M6§	56.5	43.5	0.0	0.0	0.0	232
Ravenswood	R1†	50.0	50.0	0.0	0.0	0.0	150
	R2†	100.0	0.0	0.0	0.0	0.0	1
	R3§	0.0	0.0	0.0	0.0	0.0	0
	R4§	0.0	0.0	0.0	0.0	0.0	0
	R5§	0.0	0.0	0.0	0.0	0.0	0
	R5S§	0.0	0.0	0.0	0.0	0.0	0
	RSF2U1†	40.1	46.6	5.7	7.5	0.0	279
	RSF2U2†	44.6	18.4	36.9	0.2	0.0	2415
	RSF2U3†	54.8	45.2	0.0	0.0	0.0	343
	RSF2U4†	59.3	20.4	0.0	20.4	0.0	216

Table 6. Percentage of divers foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of diver sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	7.9	92.1	0.0	0.0	0.0	12604
	A10†	12.0	88.0	0.0	0.0	0.0	6403
	A11†	21.7	78.2	0.0	0.2	0.0	3527
	A12†	0.0	100.0	0.0	0.0	0.0	3
	A13†	18.3	81.7	0.0	0.0	0.0	71
	A14§	31.1	68.9	0.0	0.0	0.0	14199
	A15§	69.8	30.2	0.0	0.0	0.0	53
	A16§	12.4	87.3	0.4	0.0	0.0	1924
	A17§	35.3	64.4	0.0	0.3	0.0	303
	A19§	11.8	88.2	0.0	0.0	0.0	450
	A22§	100.0	0.0	0.0	0.0	0.0	1
	A23§	0.0	0.0	0.0	0.0	0.0	0
	A2E§	13.8	86.2	0.0	0.0	0.0	13060
	A2W§	5.9	94.0	0.0	0.0	0.0	17408
	A3N§	0.0	100.0	0.0	0.0	0.0	2
	A3W§	5.1	94.9	0.0	0.0	0.0	32378
	A5§	17.4	82.2	0.0	0.4	0.0	9560
	A6S§	45.2	54.8	0.0	0.0	0.0	792
	A7§	21.7	78.2	0.0	0.1	0.0	6449
	A8§	25.9	74.1	0.0	0.0	0.0	4839
	A8S†	37.3	62.6	0.0	0.1	0.0	1767
	A8W†	30.2	69.8	0.0	0.0	0.0	53
	A9†	8.7	91.3	0.0	0.0	0.0	2369
	AB1§	13.4	86.5	0.0	0.0	0.0	1917
	AB2§	6.7	93.23	0.0	0.0	0.0	3557
Coyote Hills	N1A§	68.8	31.2	0.0	0.0	0.0	250
	N2A§	10.8	89.3	0.0	0.0	0.0	2494
	N3A§	86.0	14.1	0.0	0.0	0.0	1103
	N4§	99.2	0.8	0.0	0.0	0.0	390
	N4AA§	98.8	1.2	0.0	0.0	0.0	249
	N4AB§	15.8	84.2	0.0	0.0	0.0	5731
	N4B†	64.7	35.3	0.0	0.0	0.0	116
	N5§	34.1	65.9	0.0	0.0	0.0	44
	N6§	80.0	20.0	0.0	0.0	0.0	10
	N7†	11.7	88.3	0.0	0.0	0.0	154

Table 6. Percentage of divers foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of diver sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N8†	92.7	7.3	0.0	0.0	0.0	150
	N9§	45.7	54.3	0.0	0.0	0.0	422
Dumbarton	N1†	68.5	31.2	0.0	0.0	0.3	333
	N2†	78.4	21.6	0.0	0.0	0.0	213
	N3†	85.1	14.9	0.0	0.0	0.0	536
	NPP1†	1.6	98.4	0.0	0.0	0.0	63
Eden Landing	E1*	17.5	82.5	0.0	0.0	0.0	5324
	E10*	14.1	86.0	0.0	0.0	0.0	7881
	E11*	51.4	48.7	0.0	0.0	0.0	185
	E12*	11.6	88.3	0.0	0.2	0.0	2195
	E13*	13.4	86.6	0.0	0.0	0.0	880
	E14*	55.6	44.4	0.0	0.0	0.0	9
	E1C*	81.8	18.2	0.0	0.0	0.0	66
	E2*	18.4	81.6	0.0	0.0	0.0	4682
	E2C*	95.2	4.8	0.0	0.0	0.0	63
	CP3C*	53.6	46.4	0.0	0.0	0.0	84
	E4*	79.9	20.1	0.0	0.0	0.0	149
	E4C*	100.0	0.0	0.0	0.0	0.0	42
	E5*	62.6	37.4	0.0	0.0	0.0	530
	E5C*	100.0	0.0	0.0	0.0	0.0	52
	E6*	25.2	74.8	0.0	0.0	0.0	1129
	E6A*	16.0	84.0	0.0	0.0	0.0	12536
	E6B*	11.7	88.3	0.0	0.0	0.0	5169
	E6C*	89.2	10.8	0.0	0.0	0.0	406
	E7*	71.1	28.9	0.0	0.0	0.0	1769
	E8*	14.1	85.9	0.0	0.0	0.0	2928
	E8AE*	70.6	29.4	0.0	0.0	0.0	17
	E8AW*	36.4	63.6	0.0	0.0	0.0	33
	E8XN*	10.2	89.9	0.0	0.0	0.0	601
	E8XS*	50.0	50.0	0.0	0.0	0.0	2
	E9*	11.7	88.3	0.0	0.0	0.0	300
	M1§	73.9	26.2	0.0	0.0	0.0	65

Table 6. Percentage of divers foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of diver sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Mowry	M2§	61.5	38.5	0.0	0.0	0.0	104
	M3§	48.9	51.1	0.0	0.0	0.0	464
	M4§	24.3	75.7	0.0	0.0	0.0	1135
	M5§	33.6	66.4	0.0	0.0	0.0	110
	M6§	13.7	86.3	0.0	0.0	0.0	124
Ravenswood	R1†	50.9	49.1	0.0	0.0	0.0	466
	R2†	53.0	47.0	0.0	0.0	0.0	351
	R3§	0.0	0.0	0.0	0.0	0.0	0
	R4§	0.0	0.0	0.0	0.0	0.0	0
	R5§	0.0	0.0	0.0	0.0	0.0	0
	R5S§	0.0	0.0	0.0	0.0	0.0	0
	RSF2U1†	55.3	39.5	2.6	2.6	0.0	76
	RSF2U2†	40.4	59.7	0.0	0.0	0.0	114
	RSF2U3†	70.3	29.7	0.0	0.0	0.0	91
	RSF2U4†	22.9	76.2	0.0	0.9	0.0	872

Table 7. Percentage of Eared Grebes foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of Eared Grebe sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	69.7	30.3	0.0	0.0	0.0	178
	A10†	85.3	14.7	0.0	0.0	0.0	211
	A11†	96.4	3.6	0.0	0.0	0.0	617
	A12†	100.0	0.0	0.0	0.0	0.0	21
	A13†	0.0	0.0	0.0	0.0	0.0	0
	A14§	31.1	68.9	0.0	0.0	0.0	781
	A15§	0.0	100.0	0.0	0.0	0.0	262
	A16§	95.5	4.6	0.0	0.0	0.0	330
	A17§	0.0	0.0	0.0	0.0	0.0	0
	A19§	0.0	0.0	0.0	0.0	0.0	0
	A22§	0.0	0.0	0.0	0.0	0.0	0
	A23§	0.0	0.0	0.0	0.0	0.0	0
	A2E§	60.0	40.0	0.0	0.0	0.0	40
	A2W§	76.4	23.7	0.0	0.0	0.0	351
	A3N§	0.0	0.0	0.0	0.0	0.0	0
	A3W§	91.2	8.8	0.0	0.0	0.0	125
	A5§	53.1	46.9	0.0	0.0	0.0	1257
	A6S§	0.0	100.0	0.0	0.0	0.0	1
	A7§	91.0	9.1	0.0	0.0	0.0	210
	A8§	99.0	1.0	0.0	0.0	0.0	5689
	A8S†	54.5	45.5	0.0	0.0	0.0	1565
	A8W†	100.0	0.0	0.0	0.0	0.0	123
	A9†	100.0	0.0	0.0	0.0	0.0	1
	AB1§	90.0	10.0	0.0	0.0	0.0	10
	AB2§	91.2	8.8	0.0	0.0	0.0	125
Coyote Hills	N1A§	0.0	0.0	0.0	0.0	0.0	0
	N2A§	87.3	12.7	0.0	0.0	0.0	55
	N3A§	0.0	0.0	0.0	0.0	0.0	0
	N4§	70.8	29.2	0.0	0.0	0.0	24
	N4AA§	0.0	100.0	0.0	0.0	0.0	1
	N4AB§	63.2	36.8	0.0	0.0	0.0	19
	N4B†	0.0	100.0	0.0	0.0	0.0	1
	N5§	100.0	0.0	0.0	0.0	0.0	1
	N6§	0.0	0.0	0.0	0.0	0.0	0
	N7†	0.0	0.0	0.0	0.0	0.0	0
	N8†	0.0	0.0	0.0	0.0	0.0	0

Table 7. Percentage of Eared Grebes foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of Eared Grebe sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N9§	0.0	0.0	0.0	0.0	0.0	0
Dumbarton	N1†	88.0	12.0	0.0	0.0	0.0	25
	N2†	93.4	6.6	0.0	0.0	0.0	76
	N3†	100.0	0.0	0.0	0.0	0.0	44
	NPP1†	41.2	58.8	0.0	0.0	0.0	464
Eden Landing	E1*	35.7	64.3	0.0	0.0	0.0	14
	E10*	83.3	16.7	0.0	0.0	0.0	6
	E11*	0.0	0.0	0.0	0.0	0.0	0
	E12*	92.3	7.7	0.0	0.0	0.0	13
	E13*	0.0	0.0	0.0	0.0	0.0	0
	E14*	0.0	0.0	0.0	0.0	0.0	0
	E1C*	0.0	0.0	0.0	0.0	0.0	0
	E2*	100.0	0.0	0.0	0.0	0.0	10
	E2C*	0.0	0.0	0.0	0.0	0.0	0
	CP3C*	0.0	0.0	0.0	0.0	0.0	0
	E4*	0.0	0.0	0.0	0.0	0.0	0
	E4C*	100.0	0.0	0.0	0.0	0.0	3
	E5*	74.1	25.9	0.0	0.0	0.0	27
	E5C*	0.0	0.0	0.0	0.0	0.0	0
	E6*	100.0	0.0	0.0	0.0	0.0	23
	E6A*	87.5	12.5	0.0	0.0	0.0	48
	E6B*	50.0	50.0	0.0	0.0	0.0	4
	E6C*	96.6	3.5	0.0	0.0	0.0	58
	E7*	0.0	0.0	0.0	0.0	0.0	0
	E8*	60.0	40.0	0.0	0.0	0.0	5
	E8AE*	0.0	0.0	0.0	0.0	0.0	0
	E8AW*	0.0	0.0	0.0	0.0	0.0	0
	E8XN*	0.0	100.0	0.0	0.0	0.0	1
	E8XS*	0.0	0.0	0.0	0.0	0.0	0
	E9*	100.0	0.0	0.0	0.0	0.0	1
Mowry	M1§	92.0	8.0	0.0	0.0	0.0	817
	M2§	29.1	70.9	0.0	0.0	0.0	1569
	M3§	72.0	28.0	0.0	0.0	0.0	3853
	M4§	86.3	13.8	0.0	0.0	0.0	9795

Table 7. Percentage of Eared Grebes foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of Eared Grebe sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	M5§	66.5	33.5	0.0	0.0	0.0	427
	M6§	3.4	96.6	0.0.	0.0	0.0	1336
Ravenswood	R1†	48.9	51.1	0.0	0.0	0.0	186
	R2†	0.0	0.0	0.0	0.0	0.0	0
	R3§	0.0	0.0	0.0	0.0	0.0	0
	R4§	0.0	0.0	0.0	0.0	0.0	0
	R5§	0.0	0.0	0.0	0.0	0.0	0
	R5S§	0.0	0.0	0.0	0.0	0.0	0
	RSF2U1†	0.0	0.0	0.0	0.0	0.0	0
	RSF2U2†	0.0	0.0	0.0	0.0	0.0	0
	RSF2U3†	0.0	0.0	0.0	0.0	0.0	0
	RSF2U4†	100.0	0.0	0.0	0.0	0.0	8

Table 8. Percentage of fisheaters foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of fisheater sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	44.0	44.6	3.4	0.3	7.7	873
	A10†	60.4	16.3	0.0	23.4	0.0	633
	A11†	8.2	76.8	0.0	15.0	0.0	2933
	A12†	0.0	0.0	0.0	0.0	0.0	0
	A13†	0.0	0.0	0.0	0.0	0.0	0
	A14§	14.4	7.2	0.0	78.4	0.0	2576
	A15§	100.0	0.0	0.0	0.0	0.0	1
	A16§	48.8	4.0	43.7	0.0	3.6	806
	A17§	9.5	23.8	66.7	0.0	0.0	21
	A19§	66.7	33.3	0.0	0.0	0.0	3
	A22§	0.0	0.0	0.0	0.0	0.0	0
	A23§	0.0	0.0	0.0	0.0	0.0	0
	A2E§	80.7	14.6	0.0	0.0	4.7	254
	A2W§	34.8	38.5	0.0	0.0	26.7	776
	A3N§	0.0	0.0	0.0	0.0	0.0	0
	A3W§	40.4	28.5	0.0	5.3	25.8	453
	A5§	35.2	3.5	0.0	61.1	0.2	2263
	A6S§	100.0	0.0	0.0	0.0	0.0	2
	A7§	36.9	8.2	0.0	54.2	0.7	1168
	A8§	5.8	54.4	1.5	29.5	8.8	603
	A8S†	50.1	38.9	0.0	11.0	0.0	471
	A8W†	7.4	63.0	0.0	29.6	0.0	54
	A9†	25.3	49.4	0.0	25.3	0.0	83
	AB1§	7.8	7.8	11.7	1.3	71.4	77
	AB2§	16.3	5.0	61.3	11.3	6.3	160
Coyote Hills	N1A§	33.8	1.9	0.0	58.2	6.0	364
	N2A§	26.2	28.3	0.0	44.2	1.3	466
	N3A§	46.7	2.9	0.0	48.8	1.6	2134
	N4§	69.0	11.0	0.0	0.0	20.0	100
	N4AA§	85.0	11.4	0.0	2.1	1.6	193
	N4AB§	28.3	29.6	0.2	39.5	2.4	615
	N4B†	84.7	15.3	0.0	0.0	0.0	85
	N5§	41.0	30.8	0.0	2.6	25.6	78
	N6§	53.3	33.3	0.0	13.3	0.0	15
	N7†	41.1	30.7	0.0	22.7	5.5	163

Table 8. Percentage of fisheaters foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of fisheater sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N8†	53.0	9.3	0.0	37.3	0.4	236
	N9§	49.6	23.0	0.0	27.4	0.0	135
Dumbarton	N1†	0.0	0.0	0.0	0.0	100.0	2
	N2†	0.0	0.0	0.0	0.0	0.0	0
	N3†	15.0	5.0	0.0	0.0	80.0	20
	NPP1†	0.0	0.0	0.0	0.0	0.0	0
Eden Landing	E1*	21.4	7.4	7.9	57.6	5.7	458
	E10*	24.0	63.4	8.0	0.0	4.6	175
	E11*	100.0	0.0	0.0	0.0	0.0	1
	E12*	74.7	9.6	0.0	15.7	0.0	83
	E13*	41.7	25.0	0.0	33.3	0.0	12
	E14*	0.0	100.0	0.0	0.0	0.0	1
	E1C*	100.0	0.0	0.0	0.0	0.0	2
	E2*	45.9	24.6	21.6	4.2	3.7	1159
	E2C*	0.0	100.0	0.0	0.0	0.0	2
	CP3C*	0.0	37.5	0.0	0.0	62.5	8
	E4*	6.6	5.0	0.0	87.6	0.8	121
	E4C*	0.0	0.0	0.0	0.0	0.0	0
	E5*	1.8	5.4	0.0	91.0	1.8	167
	E5C*	0.0	0.0	0.0	0.0	0.0	0
	E6*	50.5	1.8	0.0	44.1	3.6	111
	E6A*	37.6	43.4	0.0	2.1	16.9	189
	E6B*	44.0	52.0	0.0	0.0	4.0	50
	E6C*	0.0	0.0	0.0	0.0	0.0	0
	E7*	47.4	13.5	0.0	0.0	39.1	555
	E8*	75.0	25.0	0.0	0.0	0.0	4
	E8AE*	100.0	0.0	0.0	0.0	0.0	2
	E8AW*	0.0	100.0	0.0	0.0	0.0	1
	E8XN*	63.6	36.4	0.0	0.0	0.0	11
	E8XS*	0.0	0.0	0.0	0.0	0.0	0
	E9*	0.0	100.0	0.0	0.0	0.0	8
	M1§	0.0	0.0	0.0	0.0	0.0	0

Table 8. Percentage of fisheaters foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of fisheater sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Mowry	M2§	0.0	0.0	0.0	0.0	0.0	0
	M3§	0.0	0.0	0.0	0.0	100.0	5
	M4§	0.0	100.0	0.0	0.0	0.0	1
	M5§	0.0	100.0	0.0	0.0	0.0	1
	M6§	0.0	0.0	0.0	0.0	0.0	0
Ravenswood	R1†	0.0	50.0	0.0	0.0	50.0	2
	R2†	0.0	0.0	0.0	0.0	0.0	0
	R3§	0.0	0.0	0.0	0.0	0.0	0
	R4§	0.0	0.0	0.0	0.0	0.0	0
	R5§	0.0	0.0	0.0	0.0	0.0	0
	R5S§	0.0	0.0	0.0	0.0	0.0	0
	RSF2U1†	36.8	2.6	26.3	34.2	0.0	38
	RSF2U2†	39.1	0.0	60.9	0.0	0.0	23
	RSF2U3†	0.0	0.0	0.0	0.0	0.0	0
	RSF2U4†	64.3	35.7	0.0	0.0	0.0	14

Table 9. Percentage of terns foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of tern sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	58.3	12.5	0.0	0.0	29.2	168
	A10†	100.0	0.0	0.0	0.0	0.0	23
	A11†	48.7	51.4	0.0	0.0	0.0	37
	A12†	0.0	0.0	0.0	0.0	0.0	0
	A13†	0.0	0.0	0.0	0.0	0.0	0
	A14§	100.0	0.0	0.0	0.0	0.0	16
	A15§	0.0	0.0	0.0	0.0	0.0	0
	A16§	0.0	0.0	62.5	0.0	37.5	8
	A17§	0.0	0.0	0.0	0.0	100.0	1
	A19§	0.0	0.0	0.0	0.0	0.0	0
	A22§	0.0	0.0	0.0	0.0	0.0	0
	A23§	0.0	0.0	0.0	0.0	0.0	0
	A2E§	17.7	0.0	0.0	0.0	82.4	102
	A2W§	61.8	0.0	0.0	0.0	38.2	55
	A3N§	0.0	100.0	0.0	0.0	0.0	83
	A3W§	0.6	0.0	0.0	0.0	99.4	169
	A5§	19.1	0.0	0.0	77.4	3.6	84
	A6S§	0.0	0.0	0.0	0.0	0.0	0
	A7§	93.2	0.0	0.0	2.7	4.1	74
	A8§	5.0	0.0	0.0	90.0	5.0	20
	A8S†	100.0	0.0	0.0	0.0	0.0	29
	A8W†	0.0	0.0	0.0	100.0	0.0	5
	A9†	8.8	88.3	0.0	0.0	2.9	137
	AB1§	100.0	0.0	0.0	0.0	0.0	2
	AB2§	30.0	0.0	0.0	0.0	70.0	10
Coyote Hills	N1A§	18.2	0.0	0.0	72.7	9.1	11
	N2A§	0.0	0.0	0.0	87.5	12.5	8
	N3A§	90.9	0.0	0.0	8.0	1.1	88
	N4§	55.8	0.0	0.0	0.0	44.2	43
	N4AA§	100.0	0.0	0.0	0.0	0.0	2
	N4AB§	33.3	0.0	0.0	66.7	0.0	3
	N4B†	100.0	0.0	0.0	0.0	0.0	77
	N5§	0.0	0.0	0.0	0.0	0.0	0
	N6§	0.0	0.0	0.0	0.0	0.0	0
	N7†	0.0	0.0	0.0	0.0	100.0	10

Table 9. Percentage of terns foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of tern sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N8†	83.3	0.0	0.0	16.7	0.0	6
	N9§	0.0	0.0	0.0	0.0	0.0	0
Dumbarton	N1†	0.0	0.0	0.0	0.0	100.0	4
	N2†	0.0	0.0	0.0	0.0	0.0	0
	N3†	0.0	0.0	0.0	0.0	0.0	0
	NPP1†	0.0	0.0	0.0	0.0	0.0	0
Eden Landing	E1*	31.9	36.2	25.5	0.0	6.4	141
	E10*	23.2	19.7	2.5	0.0	54.7	203
	E11*	0.0	23.1	0.0	0.0	76.9	52
	E12*	38.4	0.0	6.9	1.4	53.4	73
	E13*	85.7	0.0	0.0	0.0	14.3	7
	E14*	0.0	0.0	0.0	0.0	0.0	0
	E1C*	0.0	0.0	0.0	0.0	0.0	0
	E2*	92.8	0.2	3.1	0.0	3.9	516
	E2C*	0.0	0.0	0.0	0.0	0.0	0
	CP3C*	42.9	0.0	0.0	0.0	57.1	28
	E4*	90.2	9.8	0.0	0.0	0.0	41
	E4C*	0.0	80.0	0.0	0.0	20.0	5
	E5*	0.0	0.0	0.0	100.0	0.0	1
	E5C*	100.0	0.0	0.0	0.0	0.0	11
	E6*	60.0	0.0	0.0	40.0	0.0	5
	E6A*	23.3	20.0	0.0	0.0	56.7	30
	E6B*	28.6	4.8	0.0	0.0	66.7	21
	E6C*	0.0	0.0	0.0	0.0	0.0	0
	E7*	9.4	3.3	0.0	0.0	87.3	724
	E8*	100.0	0.0	0.0	0.0	0.0	1
	E8AE*	100.0	0.0	0.0	0.0	0.0	2
	E8AW*	0.0	0.0	0.0	0.0	0.0	0
	E8XN*	100.0	0.0	0.0	0.0	0.0	2
	E8XS*	0.0	0.0	0.0	0.0	0.0	0
	E9*	23.5	5.9	0.0	0.0	70.6	17
Mowry	M1§	0.0	0.0	0.0	0.0	100.0	6
	M2§	0.0	0.0	0.0	0.0	100.0	1

Table 9. Percentage of terns foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of tern sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	M3§	0.0	0.0	0.0	0.0	0.0	0
	M4§	0.0	0.0	0.0	0.0	0.0	0
	M5§	0.0	0.0	0.0	0.0	0.0	0
	M6§	0.0	0.0	0.0	0.0	0.0	0
Ravenswood	R1†	41.2	0.0	0.0	0.0	58.8	34
	R2†	0.0	0.0	0.0	0.0	100.0	4
	R3§	0.0	0.0	0.0	0.0	0.0	0
	R4§	0.0	0.0	0.0	0.0	0.0	0
	R5§	0.0	0.0	0.0	0.0	0.0	0
	R5S§	0.0	0.0	0.0	0.0	0.0	0
	RSF2U1†	0.0	0.0	0.0	0.0	100.0	5
	RSF2U2†	0.0	0.0	86.7	13.3	0.0	45
	RSF2U3†	0.0	0.0	0.0	0.0	0.0	0
	RSF2U4†	100.0	0.0	0.0	0.0	0.0	5

Table 10. Percentage of gulls foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of gull sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	0.6	93.5	0.1	0.0	5.8	1030
	A10†	2.1	55.2	0.0	42.7	0.0	330
	A11†	2.6	33.2	23.9	40.3	0.0	704
	A12†	47.0	50.8	0.0	2.3	0.0	1197
	A13†	6.0	82.4	1.8	9.8	0.0	6339
	A14§	13.4	1.7	0.0	84.9	0.0	1292
	A15§	57.3	39.2	0.0	3.4	0.0	2852
	A16§	27.0	36.5	36.0	0.3	0.2	2432
	A17§	20.5	78.9	0.4	0.0	0.2	536
	A19§	20.5	79.5	0.0	0.0	0.0	1035
	A22§	0.0	0.0	0.0	0.0	0.0	0
	A23§	52.8	47.2	0.0	0.0	0.0	2890
	A2E§	15.8	26.3	0.0	10.5	47.4	19
	A2W§	34.8	11.4	0.0	0.0	53.9	141
	A3N§	4.1	81.5	0.0	2.3	12.1	173
	A3W§	8.3	12.9	0.0	0.0	78.8	132
	A5§	51.8	2.9	0.0	45.3	0.0	3270
	A6S§	3.5	4.4	0.0	0.9	91.2	114
	A7§	11.0	4.9	5.1	78.9	0.0	1073
	A8§	20.7	66.6	0.0	12.4	0.3	1125
	A8S†	43.1	27.7	0.0	27.7	1.5	65
	A8W†	0.0	100.0	0.0	0.0	0.0	2
	A9†	6.0	93.6	0.0	0.3	0.1	739
	AB1§	90.4	2.8	0.0	1.6	5.2	251
	AB2§	6.1	30.6	26.5	4.1	32.7	49
Coyote Hills	N1A§	10.0	62.6	0.0	27.5	0.0	211
	N2A§	11.7	47.8	0.0	40.0	0.6	180
	N3A§	37.4	9.9	0.0	51.9	0.8	988
	N4§	10.0	60.0	0.0	10.0	20.0	10
	N4AA§	81.8	3.3	0.0	5.0	9.9	973
	N4AB§	7.8	7.5	0.2	84.1	0.5	653
	N4B†	100.0	0.0	0.0	0.0	0.0	4
	N5§	18.2	74.6	0.0	5.5	1.8	55
	N6§	0.0	0.5	0.0	99.5	0.0	1295
	N7†	0.2	16.7	0.0	82.6	0.5	1603

Table 10. Percentage of gulls foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of gull sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N8†	0.3	3.8	0.0	95.7	0.2	1001
	N9§	1.0	1.6	0.0	97.4	0.0	492
Dumbarton	N1†	82.1	10.1	0.0	7.8	0.1	1290
	N2†	67.0	24.8	3.0	3.9	1.3	230
	N3†	76.5	3.4	0.2	5.2	14.7	537
	NPP1†	42.4	56.3	1.3	0.0	0.0	238
Eden Landing	E1*	21.2	59.3	7.5	8.4	3.5	226
	E10*	0.0	53.9	7.7	0.0	38.5	13
	E11*	27.1	72.3	0.0	0.0	0.6	329
	E12*	23.5	26.5	11.4	36.7	1.9	264
	E13*	6.1	66.7	3.5	21.9	1.8	114
	E14*	0.5	99.5	0.0	0.0	0.0	219
	E1C*	100.0	0.0	0.0	0.0	0.0	11
	E2*	84.1	1.5	13.4	0.0	1.0	680
	E2C*	33.3	66.7	0.0	0.0	0.0	6
	CP3C*	7.9	80.2	10.7	0.0	1.2	1726
	E4*	3.6	94.4	0.0	0.0	2.0	450
	E4C*	5.6	94.4	0.0	0.0	0.0	54
	E5*	61.9	4.1	0.0	16.2	17.8	315
	E5C*	0.0	50.0	0.0	0.0	50.0	2
	E6*	33.8	28.4	0.0	14.2	23.5	408
	E6A*	5.6	92.0	0.0	0.0	2.4	373
	E6B*	14.5	84.7	0.0	0.0	0.8	124
	E6C*	98.3	1.7	0.0	0.0	0.0	58
	E7*	16.0	42.2	0.0	0.3	41.5	294
	E8*	50.0	50.0	0.0	0.0	0.0	6
	E8AE*	33.3	66.7	0.0	0.0	0.0	6
	E8AW*	0.0	0.0	0.0	0.0	0.0	0
	E8XN*	0.0	0.0	0.0	0.0	0.0	0
	E8XS*	0.0	0.0	0.0	0.0	0.0	0
	E9*	45.1	47.1	0.0	0.0	7.8	51
Mowry	M1§	50.2	42.6	0.0	5.9	1.3	747
	M2§	44.6	25.3	29.9	0.2	0.1	1625

Table 10. Percentage of gulls foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of gull sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	M3§	82.1	3.4	12.2	0.8	1.5	2170
	M4§	36.3	25.4	0.0	38.3	0.0	765
	M5§	71.0	25.9	0.0	3.1	0.0	2444
	M6§	79.2	3.6	0.0	0.0	17.3	446
Ravenswood	R1†	3.0	95.8	0.0	0.0	1.3	236
	R2†	73.3	26.4	0.0	0.0	0.3	337
	R3§	0.0	100.0	0.0	0.0	0.0	1
	R4§	0.0	0.0	0.0	0.0	0.0	0
	R5§	0.0	0.0	0.0	0.0	0.0	0
	R5S§	0.0	0.0	0.0	0.0	0.0	0
	RSF2U1†	14.4	38.1	0.0	5.2	42.3	97
	RSF2U2†	2.5	1.5	96.1	0.0	0.0	204
	RSF2U3†	33.3	66.7	0.0	0.0	0.0	6
	RSF2U4†	0.0	0.0	0.0	0.0	0.0	0

Table 11. Percentage of medium shorebirds foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of medium shorebird sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	100.0	0.0	0.0	0.0	0.0	5
	A10†	65.6	34.4	0.0	0.0	0.0	32
	A11†	50.0	15.8	0.0	34.2	0.0	38
	A12†	50.0	50.0	0.0	0.0	0.0	14
	A13†	66.7	33.3	0.0	0.0	0.0	3
	A14§	63.2	15.8	0.0	21.1	0.0	19
	A15§	65.6	34.4	0.0	0.0	0.0	32
	A16§	8.3	23.5	68.2	0.0	0.0	1063
	A17§	63.0	37.0	0.0	0.0	0.0	322
	A19§	74.0	26.1	0.0	0.0	0.0	1478
	A22§	30.0	70.0	0.0	0.0	0.0	10
	A23§	0.0	100.0	0.0	0.0	0.0	130
	A2E§	97.1	1.4	0.0	0.5	1.0	209
	A2W§	20.0	40.0	0.0	20.0	20.0	5
	A3N§	0.3	99.7	0.0	0.0	0.0	22854
	A3W§	58.8	40.0	0.0	0.0	1.2	85
	A5§	53.6	5.7	0.0	40.7	0.0	140
	A6S§	1.0	99.0	0.0	0.0	0.0	310
	A7§	28.6	7.1	0.0	57.1	7.1	28
	A8§	7.7	82.3	9.2	0.5	0.3	649
	A8S†	66.7	26.7	0.0	6.7	0.0	60
	A8W†	66.7	11.1	0.0	22.2	0.0	9
	A9†	11.5	88.5	0.0	0.0	0.0	22720
	AB1§	33.0	66.8	0.0	0.0	0.3	2178
	AB2§	25.6	59.1	15.3	0.0	0.0	1206
Coyote Hills	N1A§	12.6	86.9	0.0	0.5	0.0	785
	N2A§	75.0	0.0	0.0	25.0	0.0	20
	N3A§	100.0	0.0	0.0	0.0	0.0	525
	N4§	0.2	11.4	0.0	88.4	0.0	878
	N4AA§	74.5	24.6	0.0	0.1	0.8	3151
	N4AB§	66.7	16.7	16.7	0.0	0.0	12
	N4B†	41.6	55.2	0.0	0.5	2.7	639
	N5§	100.0	0.0	0.0	0.0	0.0	1
	N6§	100.0	0.0	0.0	0.0	0.0	2
	N7†	40.0	20.0	0.0	40.0	0.0	10
	N8†	1.0	98.0	0.0	1.0	0.0	302

Table 11. Percentage of medium shorebirds foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of medium shorebird sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N9§	30.4	66.1	0.0	3.6	0.0	56
Dumbarton	N1†	20.5	46.8	11.9	0.3	20.5	3752
	N2†	47.1	30.0	22.9	0.0	0.0	70
	N3†	35.4	9.1	10.1	45.4	0.0	901
	NPP1†	13.4	86.3	0.0	0.0	0.3	1772
Eden Landing	E1*	13.8	86.2	0.0	0.0	0.0	58
	E10*	6.2	93.6	0.1	0.0	0.2	1887
	E11*	8.5	91.2	0.0	0.0	0.3	9135
	E12*	5.0	58.6	3.1	3.0	30.2	11664
	E13*	8.3	81.8	0.9	0.0	9.0	2581
	E14*	17.1	80.8	0.0	0.0	2.1	4507
	E1C*	83.7	15.8	0.0	0.6	0.0	711
	E2*	6.7	0.2	93.1	0.1	0.0	1986
	E2C*	27.1	72.8	0.0	0.0	0.0	2434
	CP3C*	33.3	65.1	0.0	0.0	1.6	3572
	E4*	87.1	12.7	0.0	0.0	0.3	758
	E4C*	59.2	15.0	0.8	0.0	25.0	1908
	E5*	11.7	54.5	0.0	0.0	33.9	841
	E5C*	87.5	12.4	0.0	0.1	0.0	1554
	E6*	19.7	76.7	0.0	0.0	3.6	416
	E6A*	47.3	52.7	0.0	0.1	0.0	4347
	E6B*	15.7	84.2	0.0	0.0	0.1	3080
	E6C*	90.0	10.1	0.0	0.0	0.0	806
	E7*	23.0	35.7	0.0	0.0	41.4	353
	E8*	3.6	87.5	0.0	0.0	8.9	4687
	E8AE*	7.6	92.2	0.0	0.0	0.2	4980
	E8AW*	0.9	99.1	0.0	0.0	0.0	1026
	E8XN*	100.0	0.0	0.0	0.0	0.0	2
	E8XS*	14.5	85.6	0.0	0.0	0.0	346
	E9*	8.4	91.1	0.0	0.0	0.5	10752
Mowry	M1§	0.8	98.0	0.0	1.2	0.0	2300
	M2§	0.0	0.0	98.9	1.1	0.0	1090
	M3§	97.5	0.6	1.3	0.6	0.0	159
	M4§	70.8	0.0	0.0	29.2	0.0	24

Table 11. Percentage of medium shorebirds foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of medium shorebird sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	M5§	66.2	33.7	0.0	0.0	0.1	2418
	M6§	51.4	47.8	0.4	0.4	0.0	255
Ravenswood	R1†	20.2	79.5	0.2	0.1	0.0	12345
	R2†	57.7	42.0	0.0	0.0	0.3	3197
	R3§	18.9	80.8	0.0	0.3	0.0	307
	R4§	12.4	87.6	0.0	0.0	0.0	452
	R5§	100.0	0.0	0.0	0.0	0.0	3
	R5S§	49.4	50.6	0.0	0.0	0.0	89
	RSF2U1†	18.1	71.9	6.3	3.7	0.0	4963
	RSF2U2†	41.7	43.7	4.0	10.6	0.0	4640
	RSF2U3†	40.8	48.0	2.8	8.4	0.0	179
	RSF2U4†	86.7	0.0	0.0	13.3	0.0	15

Table 12. Percentage of phalaropes foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of phalarope sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020. This table does not include counts from the Phalarope Migration Surveys.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	0.0	0.0	0.0	0.0	0.0	0
	A10†	0.0	0.0	0.0	0.0	0.0	0
	A11†	0.0	0.0	0.0	0.0	0.0	0
	A12†	0.0	0.0	0.0	0.0	0.0	0
	A13†	0.0	0.0	0.0	0.0	0.0	0
	A14§	0.0	0.0	0.0	0.0	0.0	0
	A15§	0.0	0.0	0.0	0.0	0.0	0
	A16§	0.0	0.0	0.0	0.0	0.0	0
	A17§	0.0	0.0	0.0	0.0	0.0	0
	A19§	0.0	0.0	0.0	0.0	0.0	0
	A22§	0.0	0.0	0.0	0.0	0.0	0
	A23§	0.0	0.0	0.0	0.0	0.0	0
	A2E§	0.0	0.0	0.0	0.0	0.0	0
	A2W§	0.0	0.0	0.0	0.0	0.0	0
	A3N§	100.0	0.0	0.0	0.0	0.0	11
	A3W§	0.0	0.0	0.0	0.0	0.0	0
	A5§	0.0	0.0	0.0	0.0	0.0	0
	A6S§	0.0	0.0	0.0	0.0	0.0	0
	A7§	0.0	0.0	0.0	0.0	0.0	0
	A8§	0.0	0.0	0.0	0.0	0.0	0
	A8S†	0.0	0.0	0.0	0.0	0.0	0
	A8W†	0.0	0.0	0.0	0.0	0.0	0
	A9†	0.0	0.0	0.0	0.0	0.0	0
	AB1§	0.0	0.0	0.0	0.0	0.0	0
	AB2§	0.0	0.0	0.0	0.0	0.0	0
Coyote Hills	N1A§	0.0	0.0	0.0	0.0	0.0	0
	N2A§	0.0	0.0	0.0	0.0	0.0	0
	N3A§	0.0	0.0	0.0	0.0	0.0	0
	N4§	0.0	0.0	0.0	0.0	0.0	0
	N4AA§	0.0	0.0	0.0	0.0	0.0	0
	N4AB§	0.0	0.0	0.0	0.0	0.0	0
	N4B†	0.0	0.0	0.0	0.0	0.0	0
	N5§	0.0	0.0	0.0	0.0	0.0	0
	N6§	0.0	0.0	0.0	0.0	0.0	0

Table 12. Percentage of phalaropes foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of phalarope sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020. This table does not include counts from the Phalarope Migration Surveys.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N7†	0.0	0.0	0.0	0.0	0.0	0
	N8†	0.0	0.0	0.0	0.0	0.0	0
	N9§	0.0	0.0	0.0	0.0	0.0	0
Dumbarton	N1†	0.0	0.0	0.0	0.0	0.0	0
	N2†	0.0	0.0	0.0	0.0	0.0	0
	N3†	100.0	0.0	0.0	0.0	0.0	1
	NPP1†	0.0	0.0	0.0	0.0	0.0	0
Eden Landing	E1*	0.0	0.0	0.0	0.0	0.0	0
	E10*	0.0	0.0	0.0	0.0	0.0	0
	E11*	100.0	0.0	0.0	0.0	0.0	299
	E12*	100.0	0.0	0.0	0.0	0.0	4
	E13*	100.0	0.0	0.0	0.0	0.0	12
	E14*	0.0	0.0	0.0	0.0	0.0	0
	E1C*	0.0	0.0	0.0	0.0	0.0	0
	E2*	0.0	0.0	0.0	0.0	0.0	0
	E2C*	0.0	0.0	0.0	0.0	0.0	0
	CP3C*	0.0	0.0	0.0	0.0	0.0	0
	E4*	90.8	9.2	0.0	0.0	0.0	575
	E4C*	0.0	0.0	0.0	0.0	0.0	0
	E5*	100.0	0.0	0.0	0.0	0.0	13
	E5C*	0.0	0.0	0.0	0.0	0.0	0
	E6*	100.0	0.0	0.0	0.0	0.0	43
	E6A*	0.0	0.0	0.0	0.0	0.0	0
	E6B*	100.0	0.0	0.0	0.0	0.0	7
	E6C*	100.0	0.0	0.0	0.0	0.0	3
	E7*	0.0	100.0	0.0	0.0	0.0	15
	E8*	0.0	0.0	0.0	0.0	0.0	0
	E8AE*	0.0	0.0	0.0	0.0	0.0	0
	E8AW*	0.0	0.0	0.0	0.0	0.0	0
	E8XN*	0.0	0.0	0.0	0.0	0.0	0
	E8XS*	0.0	0.0	0.0	0.0	0.0	0
	E9*	0.0	0.0	0.0	0.0	0.0	0

Table 12. Percentage of phalaropes foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of phalarope sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020. This table does not include counts from the Phalarope Migration Surveys.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Mowry	M1§	0.0	0.0	0.0	0.0	0.0	0
	M2§	0.0	0.0	100.0	0.0	0.0	1
	M3§	0.0	0.0	0.0	0.0	0.0	0
	M4§	0.0	0.0	0.0	0.0	0.0	0
	M5§	0.0	0.0	0.0	0.0	0.0	0
	M6§	0.0	0.0	0.0	0.0	0.0	0
Ravenswood	R1†	100.0	0.0	0.0	0.0	0.0	47
	R2†	0.0	0.0	0.0	0.0	0.0	0
	R3§	0.0	0.0	0.0	0.0	0.0	0
	R4§	0.0	0.0	0.0	0.0	0.0	0
	R5§	0.0	0.0	0.0	0.0	0.0	0
	R5S§	0.0	0.0	0.0	0.0	0.0	0
	RSF2U1†	0.0	0.0	0.0	0.0	0.0	0
	RSF2U2†	0.0	0.0	0.0	0.0	0.0	0
	RSF2U3†	0.0	0.0	0.0	0.0	0.0	0
	RSF2U4†	0.0	0.0	0.0	0.0	0.0	0

Table 13. Percentage of small shorebirds foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	0.0	0.0	0.0	0.0	0.0	0
	A10†	66.2	33.8	0.0	0.0	0.0	133
	A11†	77.3	9.7	0.0	13.0	0.0	154
	A12†	48.2	51.8	0.0	0.0	0.0	3969
	A13†	49.5	50.5	0.0	0.0	0.0	7188
	A14§	75.6	14.6	0.0	9.8	0.0	205
	A15§	62.4	37.6	0.0	0.0	0.0	10583
	A16§	7.1	22.8	70.1	0.0	0.0	1209
	A17§	100.0	0.0	0.0	0.0	0.0	3220
	A19§	0.0	0.0	0.0	0.0	0.0	0
	A22§	95.7	4.3	0.0	0.0	0.0	624
	A23§	100.0	0.0	0.0	0.0	0.0	899
	A2E§	97.0	2.0	0.0	0.0	1.0	99
	A2W§	1.5	2.6	0.0	0.4	95.5	268
	A3N§	6.2	93.8	0.0	0.0	0.0	19749
	A3W§	76.6	14.9	0.0	1.4	7.1	295
	A5§	81.9	0.0	0.0	18.1	0.0	1637
	A6S§	0.0	100.0	0.0	0.0	0.0	20
	A7§	48.2	5.8	0.0	46.0	0.0	226
	A8§	88.9	0.0	0.0	5.6	5.6	18
	A8S†	11.1	66.7	0.0	22.2	0.0	45
	A8W†	82.6	17.4	0.0	0.0	0.0	23
	A9†	51.9	48.1	0.0	0.0	0.0	58854
	AB1§	96.6	1.7	0.0	0.0	1.7	118
	AB2§	81.6	7.4	10.7	0.0	0.3	365
Coyote Hills	N1A§	96.5	1.7	0.0	1.7	0.0	633
	N2A§	60.0	5.1	0.0	34.9	0.0	622
	N3A§	73.7	21.8	0.0	4.5	0.0	1881
	N4§	77.6	19.3	0.0	2.9	0.3	1433
	N4AA§	96.8	0.4	0.9	0.0	2.0	1530
	N4AB§	63.7	15.0	15.9	5.3	0.0	113
	N4B†	83.8	3.9	0.0	1.6	10.7	1243
	N5§	26.8	42.9	0.0	29.1	1.2	261
	N6§	92.5	7.5	0.0	0.0	0.0	334
	N7†	95.6	0.0	0.0	4.4	0.0	367

Table 13. Percentage of small shorebirds foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N8†	33.3	0.0	0.0	66.7	0.0	42
	N9§	42.3	57.3	0.0	0.4	0.0	1352
Dumbarton	N1†	19.6	71.9	0.5	0.5	7.5	4106
	N2†	25.4	67.7	0.9	6.1	0.0	473
	N3†	7.6	77.4	1.8	13.2	0.0	6940
	NPP1†	8.5	90.6	0.5	0.3	0.1	20661
Eden Landing	E1*	76.1	0.0	11.9	12.1	0.0	522
	E10*	98.7	1.2	0.1	0.0	0.0	748
	E11*	4.4	95.6	0.0	0.0	0.0	35362
	E12*	11.5	55.2	29.4	3.6	0.4	6121
	E13*	36.5	57.7	3.6	1.6	0.7	16752
	E14*	10.1	89.9	0.0	0.0	0.0	83893
	E1C*	88.5	11.5	0.0	0.0	0.0	2757
	E2*	73.7	2.3	23.8	0.2	0.0	5806
	E2C*	77.8	22.2	0.0	0.0	0.0	5182
	CP3C*	96.3	2.8	0.9	0.0	0.1	8456
	E4*	64.9	34.4	0.1	0.0	0.6	34054
	E4C*	26.3	64.4	8.2	0.0	1.1	23224
	E5*	69.9	7.2	0.0	1.8	21.1	545
	E5C*	54.1	45.6	0.1	0.0	0.3	5617
	E6*	51.4	48.5	0.0	0.1	0.0	3056
	E6A*	67.9	32.1	0.0	0.0	0.0	23254
	E6B*	65.7	34.3	0.0	0.0	0.0	24153
	E6C*	96.1	3.9	0.0	0.1	0.0	1116
	E7*	64.7	27.3	0.0	0.0	8.0	812
	E8*	51.4	46.2	0.0	0.0	2.4	13658
	E8AE*	57.2	42.8	0.0	0.0	0.0	18482
	E8AW*	73.2	26.8	0.0	0.0	0.0	541
	E8XN*	100.0	0.0	0.0	0.0	0.0	2
	E8XS*	87.0	13.0	0.0	0.0	0.0	1056
	E9*	37.9	62.1	0.0	0.0	0.0	8957
	M1§	36.0	64.0	0.0	0.0	0.0	1190

Table 13. Percentage of small shorebirds foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019–Feb. 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Mowry	M2§	3.2	3.8	85.3	6.4	1.3	559
	M3§	38.4	0.0	29.0	9.4	23.2	138
	M4§	66.9	18.3	0.0	14.8	0.0	616
	M5§	82.9	17.0	0.0	0.1	0.0	11882
	M6§	84.6	14.6	0.0	0.6	0.2	10704
Ravenswood	R1†	16.0	83.3	0.7	0.0	0.0	38833
	R2†	7.4	86.6	0.0	6.1	0.0	30908
	R3§	16.3	83.7	0.0	0.0	0.0	589
	R4§	10.9	89.1	0.0	0.0	0.0	477
	R5§	92.5	7.5	0.0	0.0	0.0	40
	R5S§	7.5	92.5	0.0	0.0	0.0	345
	RSF2U1†	56.9	8.2	34.9	0.0	0.0	195
	RSF2U2†	81.8	18.2	0.0	0.0	0.0	863
	RSF2U3†	31.9	65.5	0.3	2.3	0.0	354
	RSF2U4†	99.7	0.3	0.0	0.0	0.0	313

Table 14. Percentage of herons and egrets foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019 – Feb 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
Alviso	A1§	37.1	10.3	1.0	43.3	8.3	97
	A10†	28.8	62.1	0.0	8.7	0.5	219
	A11†	78.7	9.2	0.0	12.1	0.0	141
	A12†	0.0	0.0	0.0	0.0	0.0	0
	A13†	0.0	0.0	0.0	0.0	0.0	0
	A14§	50.3	7.5	0.0	32.7	9.5	147
	A15§	100.0	0.0	0.0	0.0	0.0	1
	A16§	47.3	17.9	29.5	2.9	2.4	207
	A17§	4.7	4.7	4.7	86.1	0.0	43
	A19§	84.2	10.5	0.0	5.3	0.0	19
	A22§	50.0	50.0	0.0	0.0	0.0	2
	A23§	100.0	0.0	0.0	0.0	0.0	1
	A2E§	76.7	5.5	0.0	8.2	9.6	73
	A2W§	61.3	9.7	1.1	16.1	11.8	93
	A3N§	30.8	23.1	0.0	15.4	30.8	13
	A3W§	44.6	2.7	0.0	46.0	6.8	74
	A5§	60.7	1.9	0.0	36.0	1.5	267
	A6S§	83.3	16.7	0.0	0.0	0.0	6
	A7§	64.6	8.3	0.0	22.9	4.2	48
	A8§	30.3	6.1	0.0	54.6	9.1	33
	A8S†	33.3	26.3	0.0	40.4	0.0	57
	A8W†	45.5	9.1	0.0	45.5	0.0	11
	A9†	77.8	9.4	0.0	11.1	1.7	117
	AB1§	69.4	8.3	0.0	2.8	19.4	36
	AB2§	43.3	13.3	23.3	20.0	0.0	30
Coyote Hills	N1A§	81.7	4.3	0.0	5.4	8.6	93
	N2A§	65.5	10.3	0.0	24.1	0.0	29
	N3A§	87.7	4.6	0.0	5.9	1.8	219
	N4§	56.3	31.3	3.1	9.4	0.0	32
	N4AA§	96.8	0.8	0.3	0.0	2.1	373
	N4AB§	85.0	4.3	2.2	6.5	2.2	93
	N4B†	37.0	32.9	0.0	17.8	12.3	73
	N5§	71.4	0.0	0.0	14.3	14.3	7
	N6§	90.0	0.0	0.0	10.0	0.0	10
	N7†	94.4	0.0	0.0	2.8	2.8	36

Table 14. Percentage of herons and egrets foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019 – Feb 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	N8†	50.8	38.8	0.0	10.5	0.0	67
	N9§	67.7	5.9	0.0	26.5	0.0	34
Dumbarton	N1†	33.3	0.0	0.0	66.7	0.0	3
	N2†	100.0	0.0	0.0	0.0	0.0	1
	N3†	56.5	17.4	0.0	17.4	8.7	23
	NPP1†	0.0	0.0	0.0	0.0	0.0	0
Eden Landing	E1*	49.1	15.1	9.4	22.6	3.8	53
	E10*	63.9	1.9	28.7	4.6	0.9	108
	E11*	77.8	0.0	0.0	11.1	11.1	9
	E12*	93.8	1.2	0.4	3.3	1.2	243
	E13*	69.8	19.1	0.0	6.4	4.8	63
	E14*	78.6	0.0	0.0	21.4	0.0	14
	E1C*	71.4	28.6	0.0	0.0	0.0	7
	E2*	85.1	1.2	3.9	4.7	5.1	255
	E2C*	36.4	54.6	0.0	9.1	0.0	11
	CP3C*	66.0	26.0	2.0	6.0	0.0	50
	E4*	79.2	1.3	0.0	3.8	15.7	235
	E4C*	0.0	0.0	0.0	0.0	0.0	0
	E5*	46.2	7.7	0.0	30.8	15.4	13
	E5C*	100.0	0.0	0.0	0.0	0.0	21
	E6*	34.1	22.7	0.0	6.8	36.4	44
	E6A*	78.2	20.8	0.0	0.0	1.0	403
	E6B*	71.0	16.1	0.0	3.2	9.7	31
	E6C*	0.0	0.0	0.0	0.0	0.0	0
	E7*	65.7	2.0	1.0	4.9	26.5	102
	E8*	43.5	52.2	0.0	4.4	0.0	23
	E8AE*	43.8	50.0	0.0	0.0	6.3	16
	E8AW*	73.3	26.7	0.0	0.0	0.0	15
	E8XN*	54.6	27.3	0.0	18.2	0.0	11
	E8XS*	50.0	50.0	0.0	0.0	0.0	8
	E9*	53.2	36.2	0.0	10.6	0.0	47
Mowry	M1§	0.0	0.0	0.0	0.0	0.0	0
	M2§	0.0	0.0	0.0	100.0	0.0	1

Table 14. Percentage of herons and egrets foraging, roosting, and using islands, levees, or manmade structures (e.g., blinds, fence posts) in each pond, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. N is the total number of sightings during the study period. Pond CP3C is in the Eden Landing area but owned by Cargill. *Ponds surveyed Sep. 2019–Feb. 2021; †Ponds surveyed Sep. 2019–Apr. 2020; §Ponds surveyed Sep. 2019 – Feb 2020.

Complex	Pond	% Foraging	% Roosting	% Island	% Levee	% Manmade	N
	M3§	0.0	0.0	0.0	0.0	0.0	0
	M4§	50.0	50.0	0.0	0.0	0.0	2
	M5§	0.0	0.0	0.0	0.0	0.0	0
	M6§	0.0	0.0	0.0	100.0	0.0	1
Ravenswood	R1†	40.0	20.0	0.0	40.0	0.0	5
	R2†	50.0	0.0	0.0	0.0	50.0	2
	R3§	0.0	0.0	0.0	100.0	0.0	1
	R4§	0.0	0.0	0.0	0.0	0.0	0
	R5§	0.0	0.0	0.0	0.0	0.0	0
	R5S§	0.0	0.0	0.0	0.0	0.0	0
	RSF2U1†	48.0	30.4	16.8	4.8	0.0	125
	RSF2U2†	46.2	11.5	30.8	11.5	0.0	26
	RSF2U3†	0.0	0.0	0.0	0.0	0.0	0
	RSF2U4†	4.4	17.4	0.0	78.3	0.0	23

Table 15. Summary of recent three-year average (ending in Data Year) waterbird trends compared with SBSPRP targets or baseline values (2005–2007). Season = the season in which the species/guild counts are highest; SBSPRP target = baseline count defined by the SBSPRP Science Advisory Team. Targets for dabbling ducks and medium shorebirds were not defined in the Adaptive Management Plan, so we assumed that baseline values were the mean count per survey in 2005–2007 (denoted by *); Threshold = NEPA/CEQA significance threshold; Data year = the most recent year with data collected during the relevant season; Percent change = percent difference between recent counts (most recent three-year average) and SBSPRP targets or baseline values; Trigger = true if a trigger was detected, where two out of the most recent three consecutive years had counts below baseline values for most species/guilds. The trigger for PHAL, BOGU, and EAGR was three consecutive years more than 25% below NEPA/CEQA baseline, or any single year more than 50% below NEPA/CEQA baseline.

Species/Guild	Season	SBSPRP Target	Threshold	Data Year	Percent change	Trigger
Ruddy duck	Winter	12602	-15%	2020	242%	F
Diving duck	Winter	39645	-20%	2020	68%	F
Small shorebird	Fall	60623	-20%	2019	37%	F
Small shorebird	Spring	73728	-20%	2019	-3%	F
Eared grebe	Winter	5640	-50%	2020	99%	F
Phalarope	Summer	3225	-50%	2017	-78%	T
Bonaparte’s gull	Winter	1270	-50%	2020	-18%	F
Dabbling duck	Winter	48524*	NA	2020	16%	F
Medium shorebird	Winter	23312*	NA	2020	16%	F
Least tern	Summer	63	NA	2017	21%	F

Table 16. Summary of recent three-year average (ending in Data Year) waterbird trends at ponds in Eden Landing Ecological Reserve compared with baseline values (2005–2007). Season = the season in which the species/guild counts are highest; Baseline count = the mean count per survey in 2005–2007; Threshold = NEPA/CEQA significance threshold for south San Francisco Bay; Data year = the most recent year with data collected during the relevant season; Percent change = percent difference between recent counts (most recent three-year average) and baseline values.

Species/Guild	Season	Baseline Count	Threshold	Data Year	Percent change
Ruddy duck	Winter	6155	-15%	2021	29%
Diving duck	Winter	9400	-20%	2021	9%
Small shorebird	Fall	35353	-20%	2019	37%
Small shorebird	Spring	29705	-20%	2020	16%
Eared grebe	Winter	678	-50%	2021	-94%
Phalarope	Summer	585	-50%	2017	-95%
Bonaparte's gull	Winter	334	-50%	2021	-81%
Dabbling duck	Winter	5888	NA	2021	2%
Medium shorebird	Winter	8497	NA	2021	23%
Least tern	Summer	89	NA	2017	-89%

Table 17. Schedule for phalarope migration surveys. Sites = the number of sites visited during each survey, where each site was visited once between the start and end dates. RNPH = number of Red-necked Phalaropes; WIPH = number of Wilson's Phalaropes; REPH = number of Red Phalaropes; PHAL = number of phalaropes that could not be identified to species.

Survey ID	Year	Start date	End date	Sites	Observers	RNPH	WIPH	REPH	PHAL
1	2019	15-Aug	20-Aug	30	10	1447	284	0	10
2	2019	26-Aug	1-Sep	34	10	1068	114	0	1
3	2020	6-Jul	9-Jul	15	7	1	548	0	0
4	2020	20-Jul	23-Jul	17	8	182	767	0	140
5	2020	4-Aug	6-Aug	15	7	758	446	0	5
6	2020	18-Aug	20-Aug	15	8	904	162	0	0
7	2020	31-Aug	1-Sep	14	7	1700	110	0	0
8	2020	15-Sep	16-Sep	13	7	935	0	0	32
9	2020	29-Sep	29-Sep	14	7	40	1	0	0

Figures

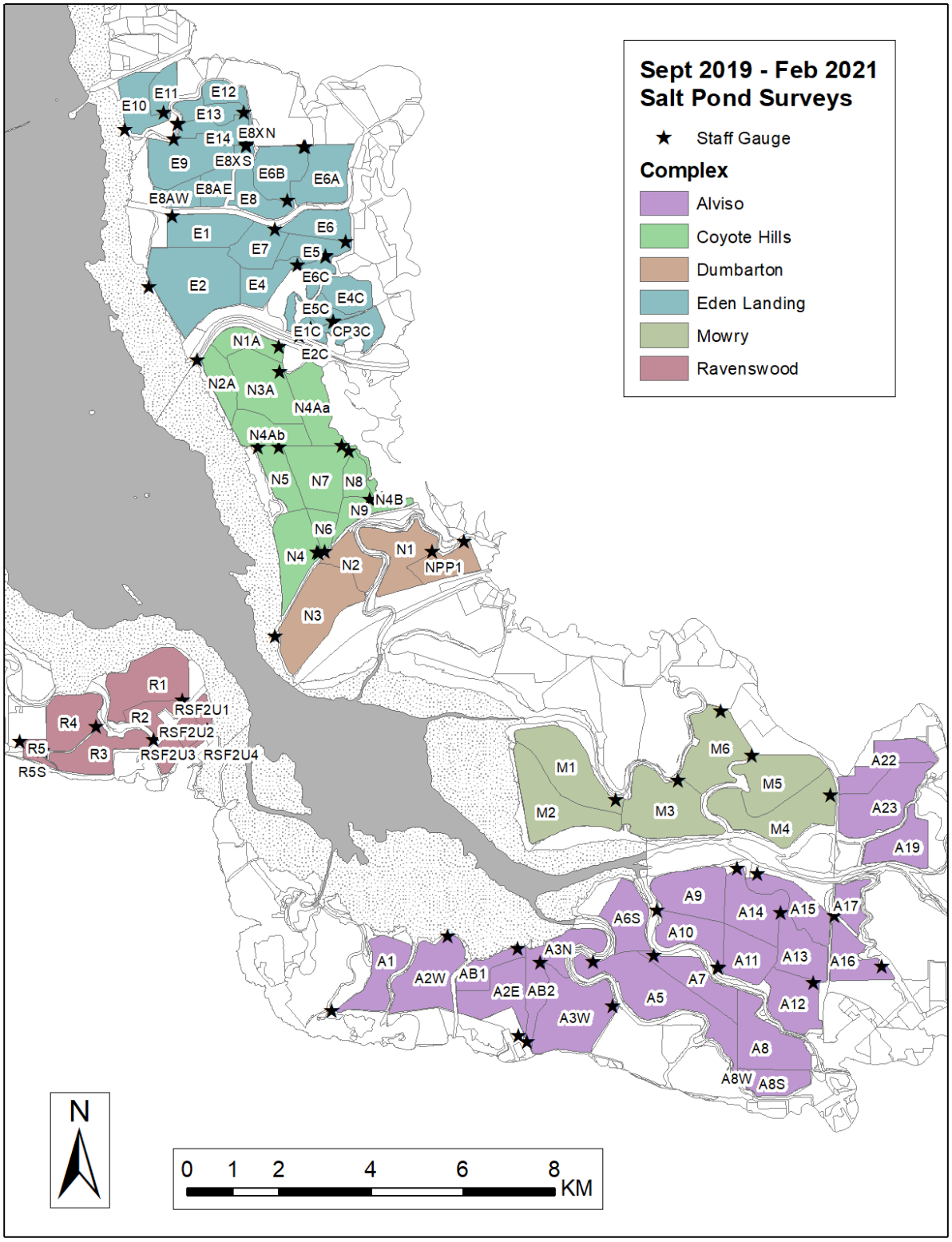

Figure 1. Map of the study area and all ponds surveyed by the San Francisco Bay Bird Observatory from September 2019–February 2021, South San Francisco Bay, California. The first spring survey (March to April, 11 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

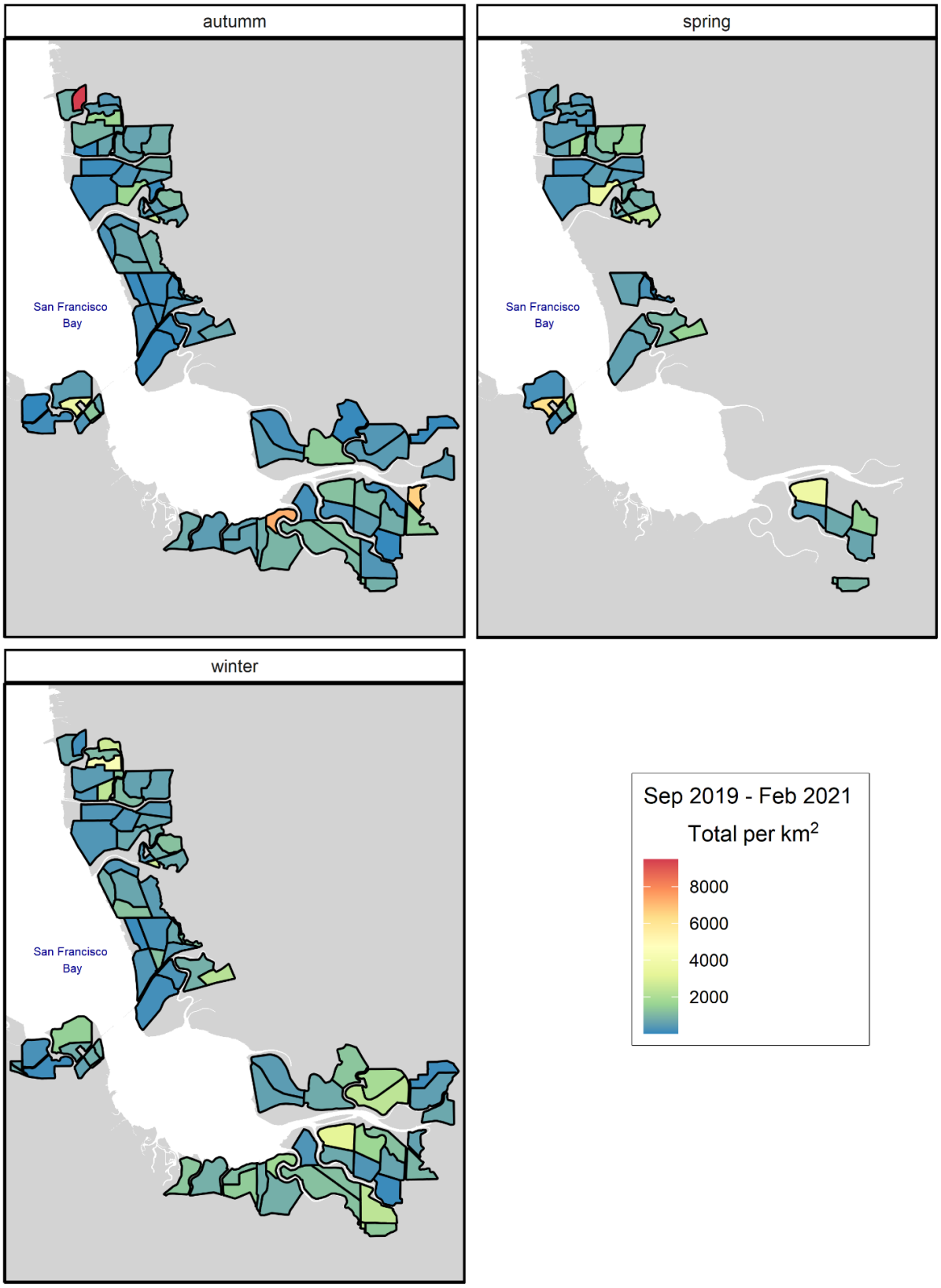

Figure 2. Bird density (all guilds) averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

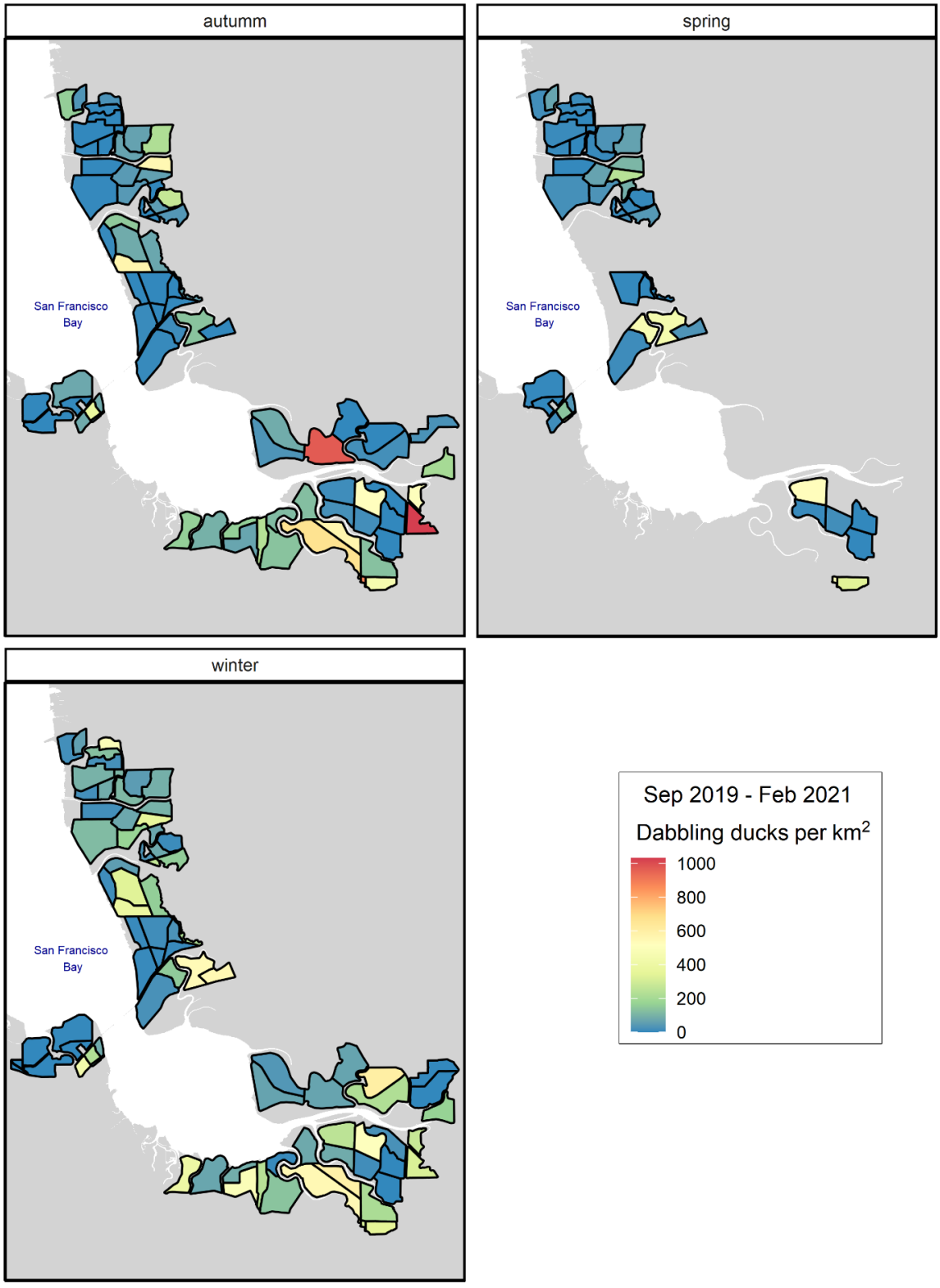

Figure 3. Dabbler density averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

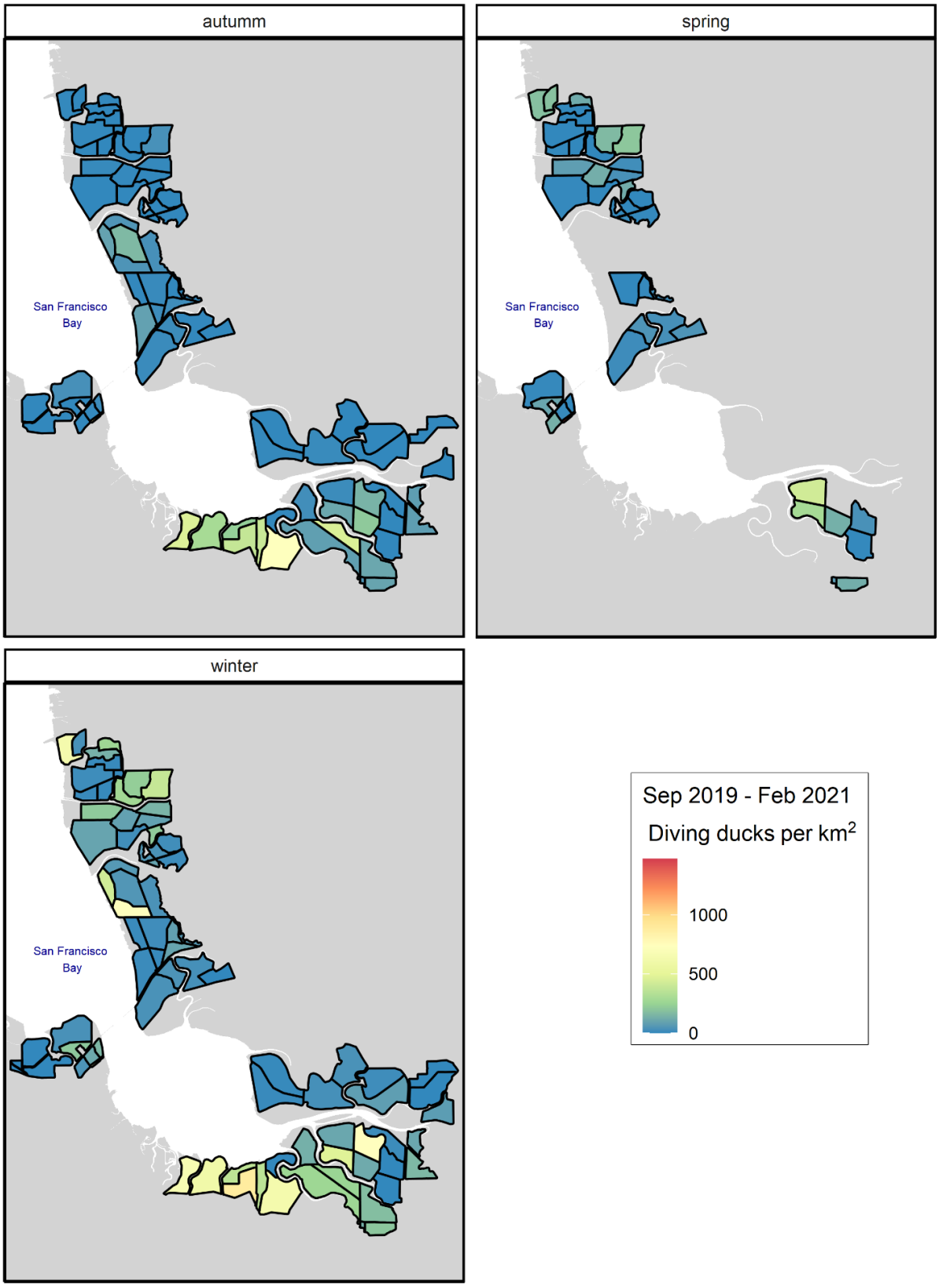

Figure 4. Diver density averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

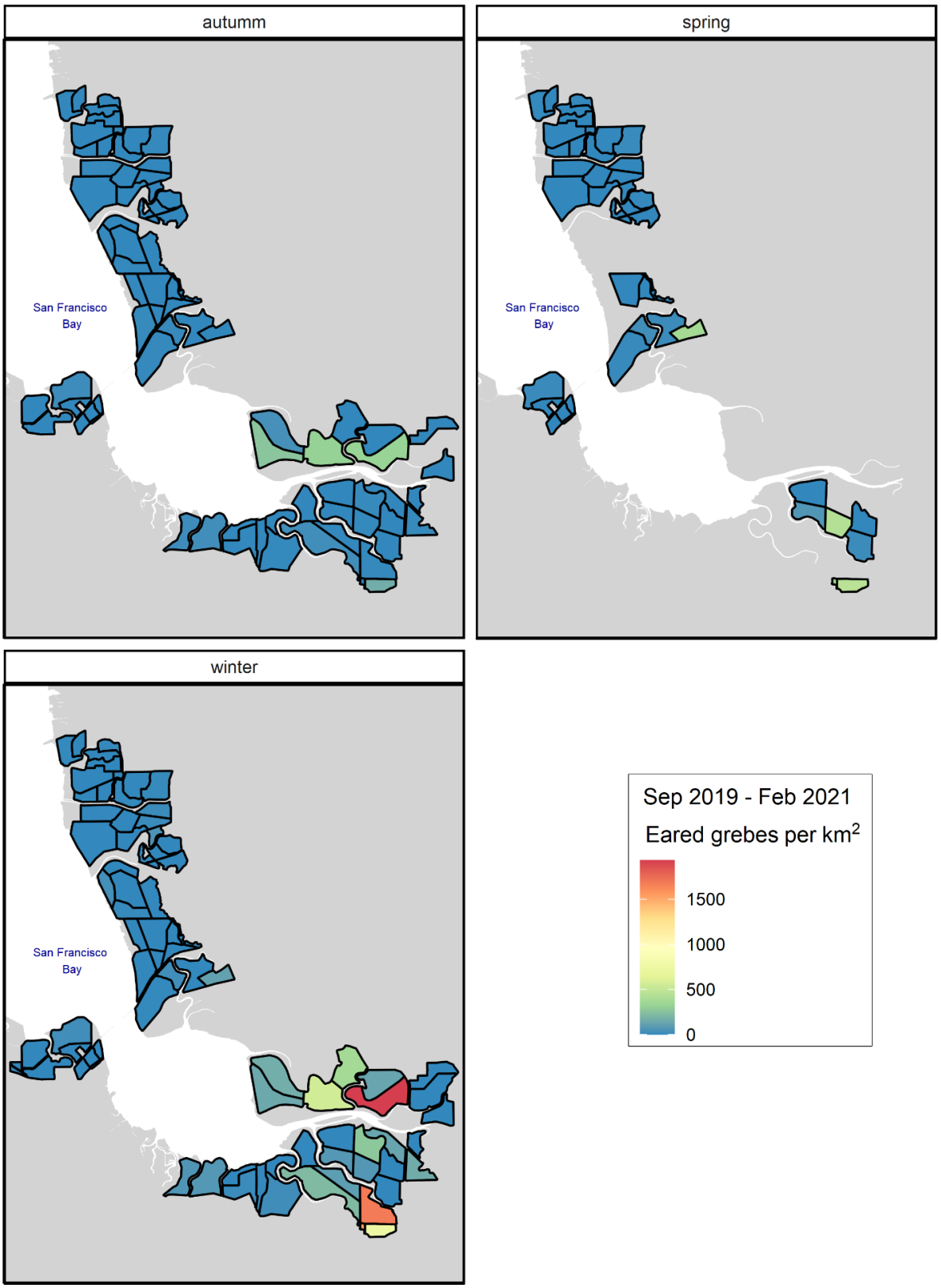

Figure 5. Eared Grebe density averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

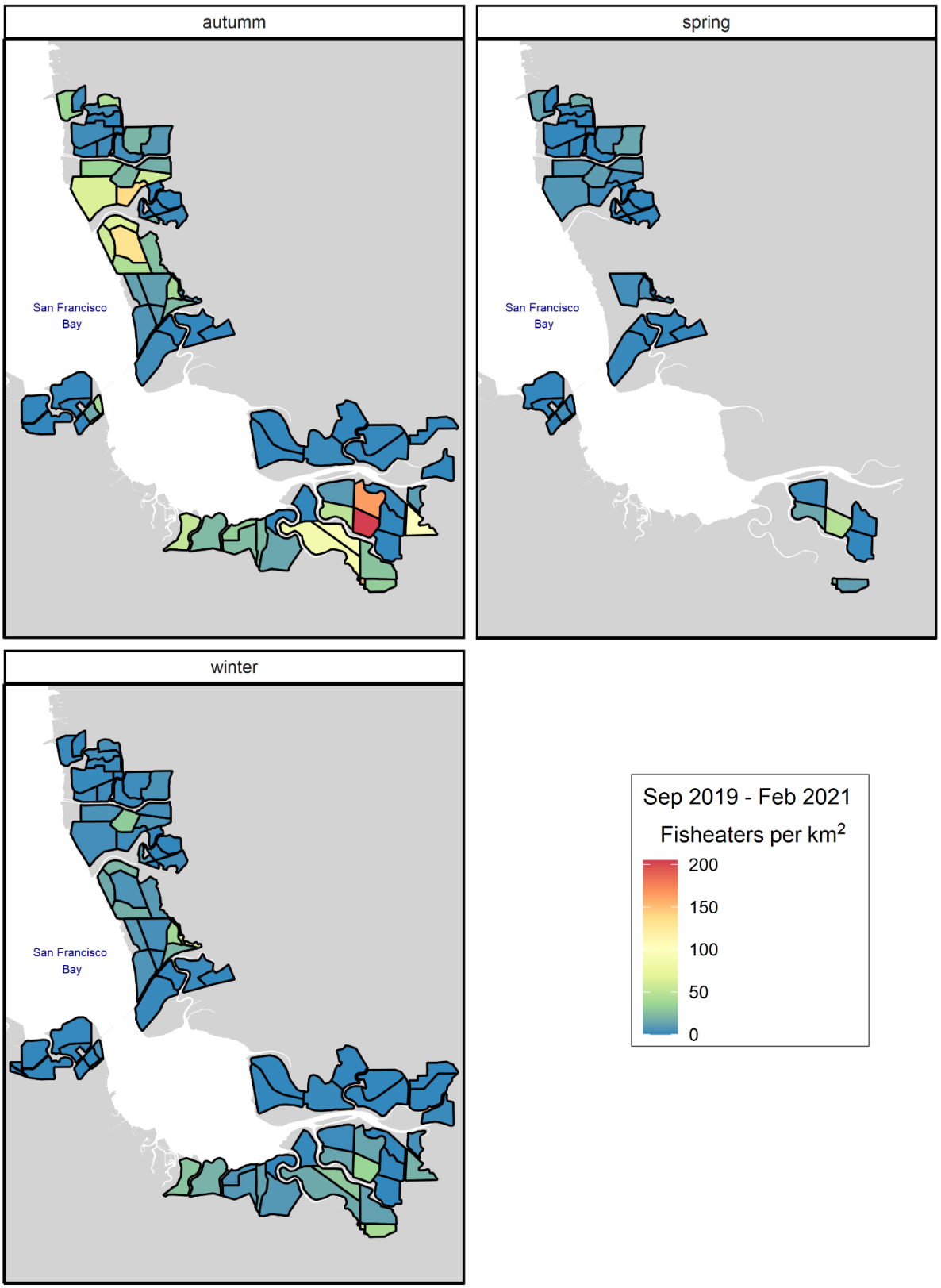

Figure 6. Fisheater density averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

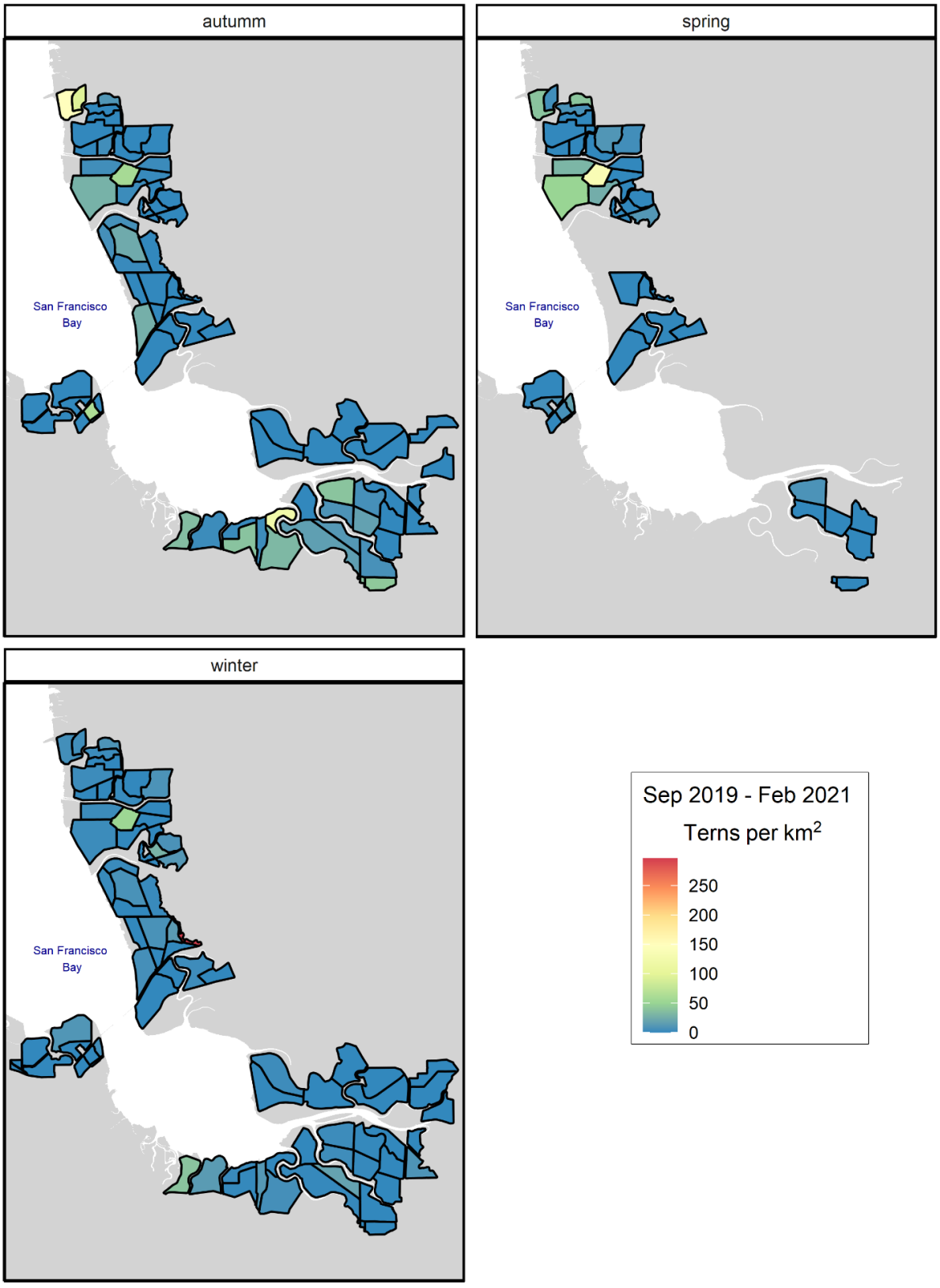

Figure 7. Tern density averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

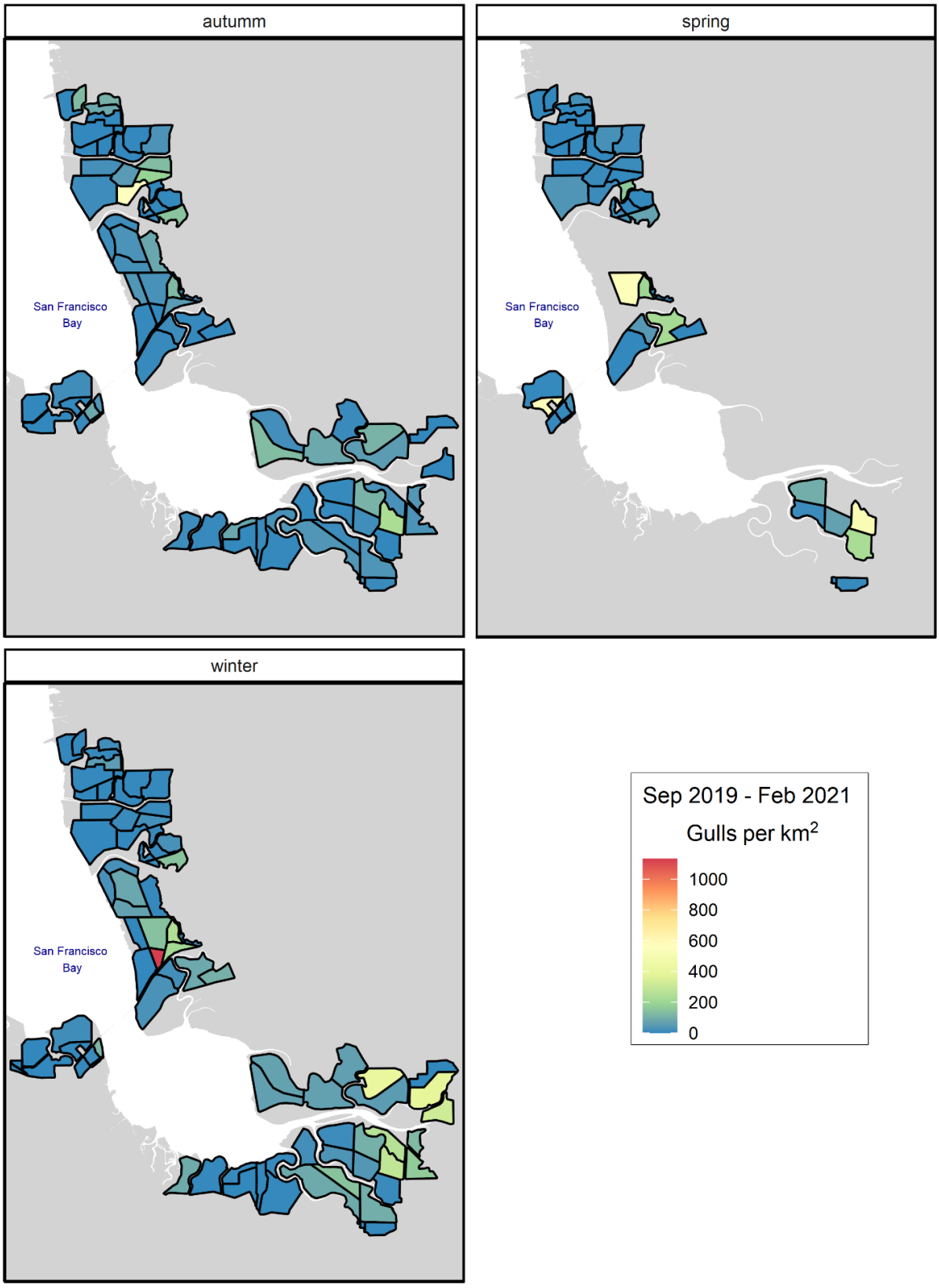

Figure 8. Gull density averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

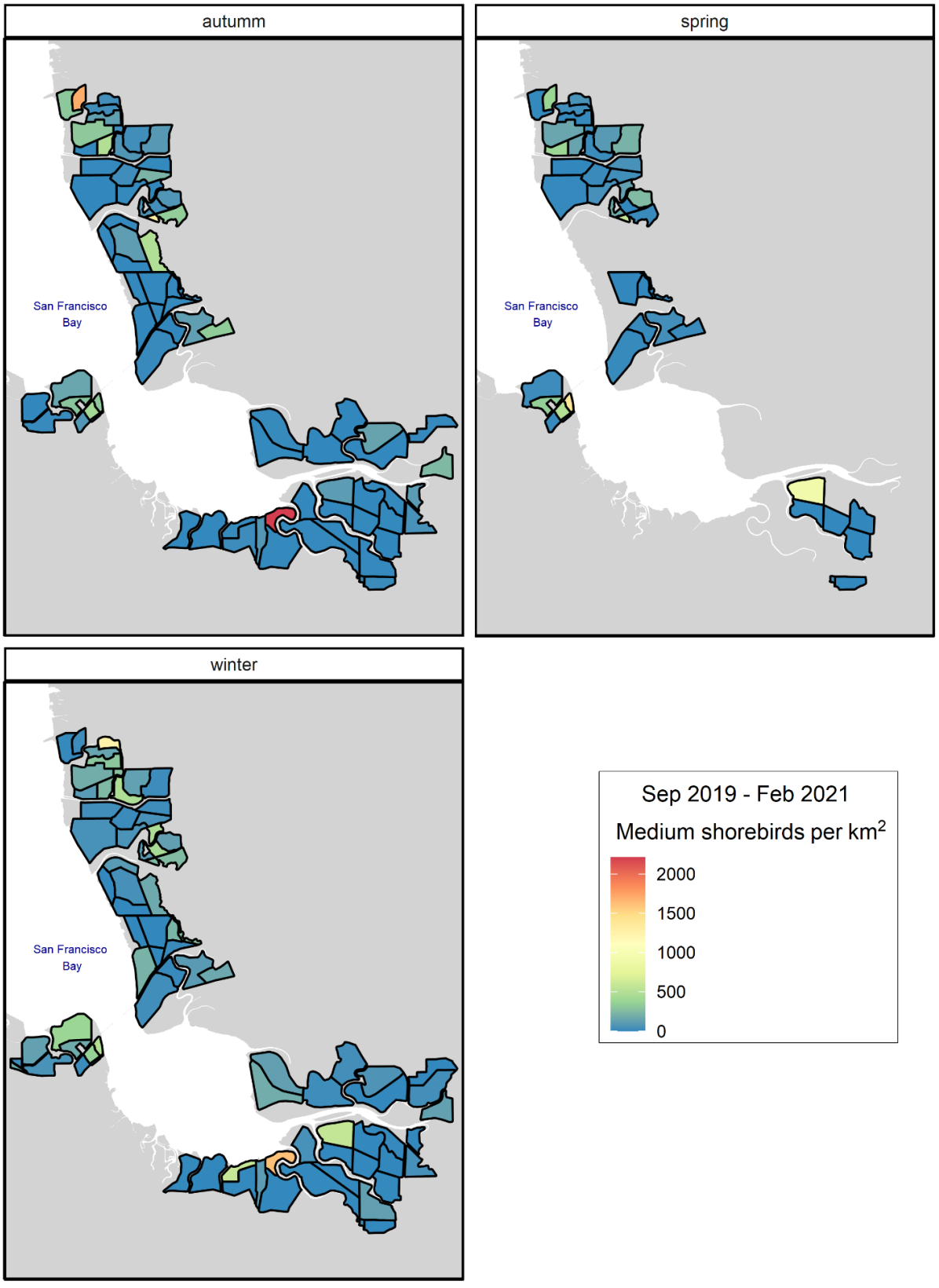

Figure 9. Medium shorebird density averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

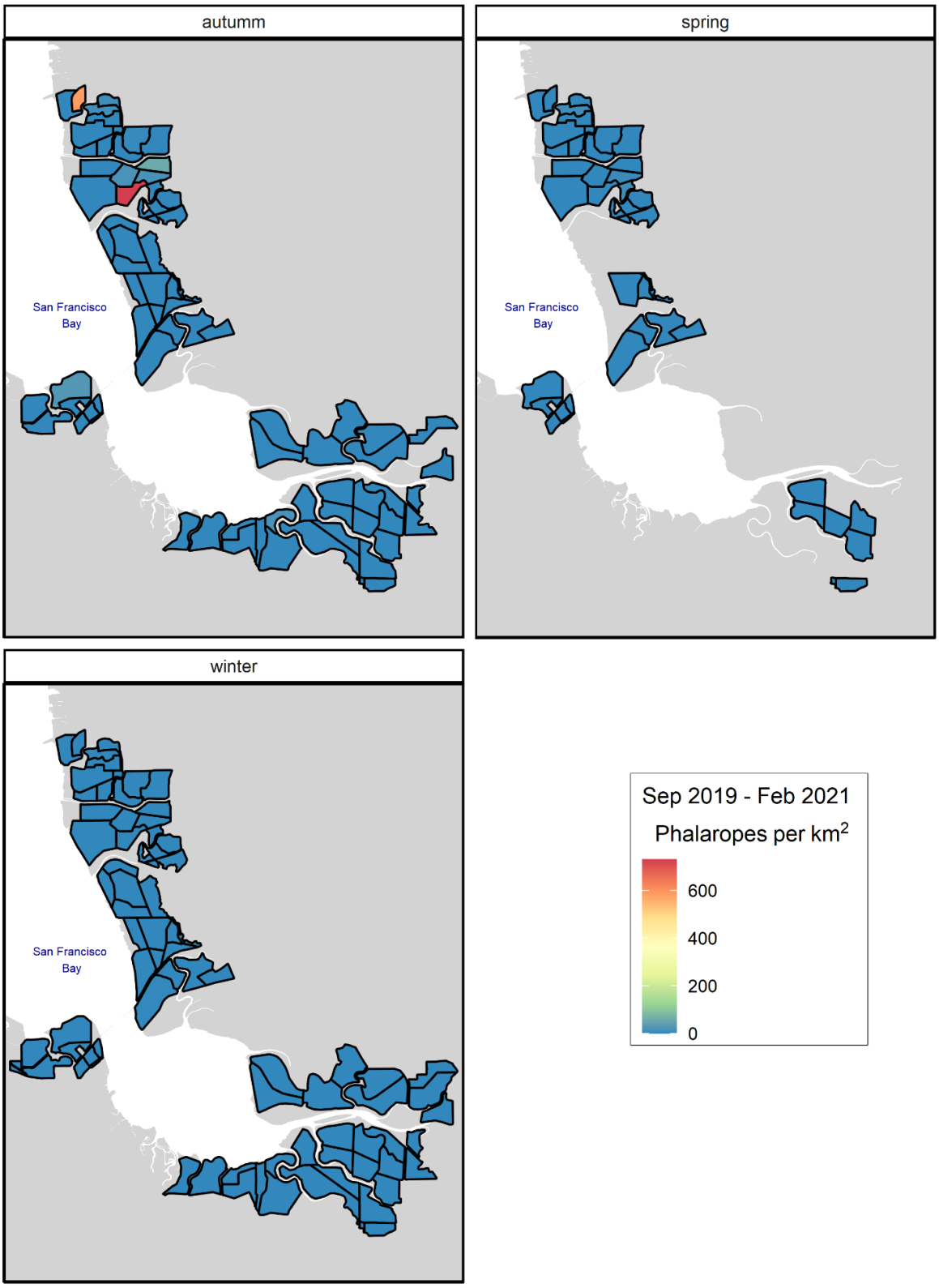

Figure 10. Phalarope density averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing. This figure does not include counts from the Phalarope Migration Surveys.

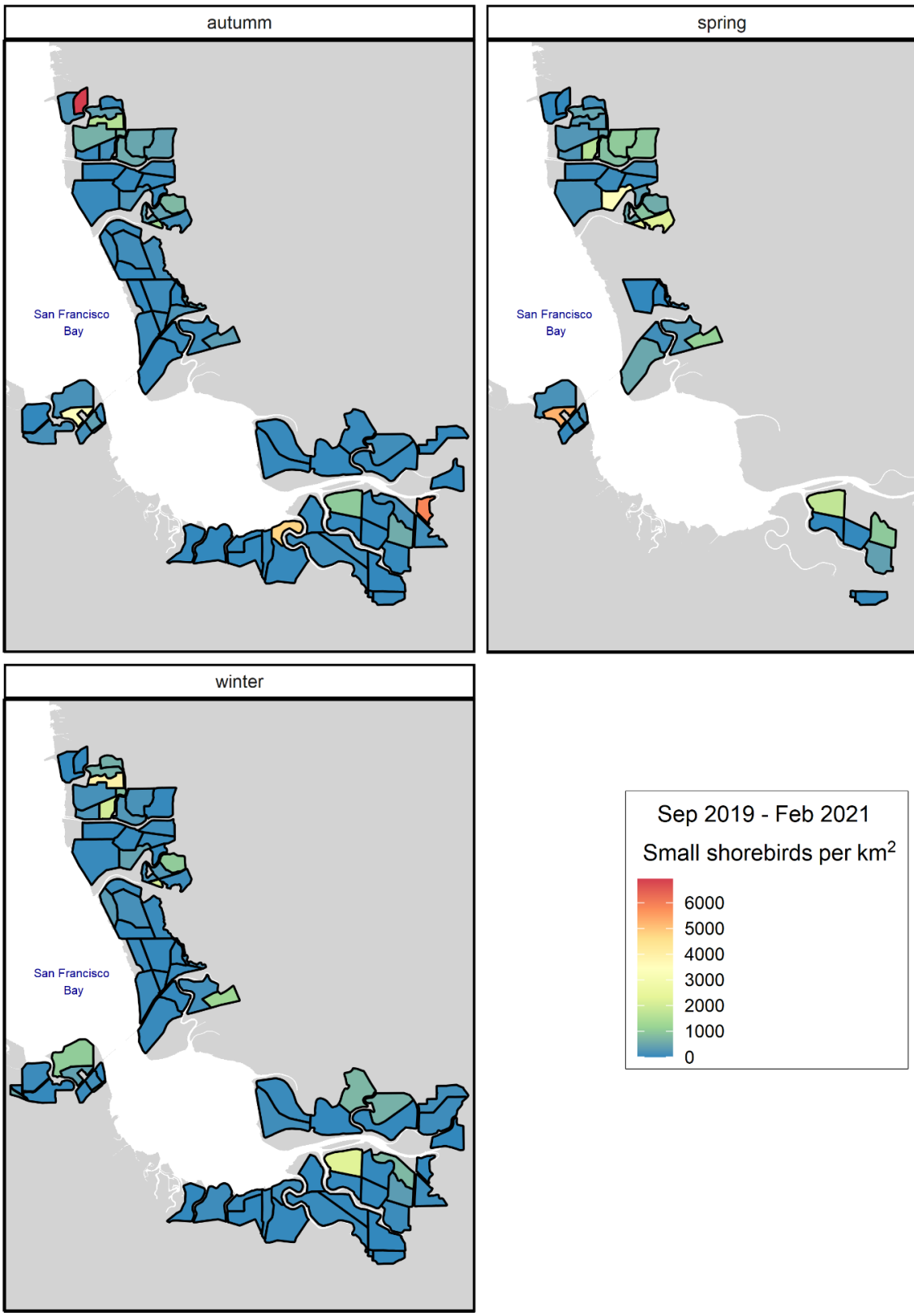

Figure 11. Small shorebird density averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

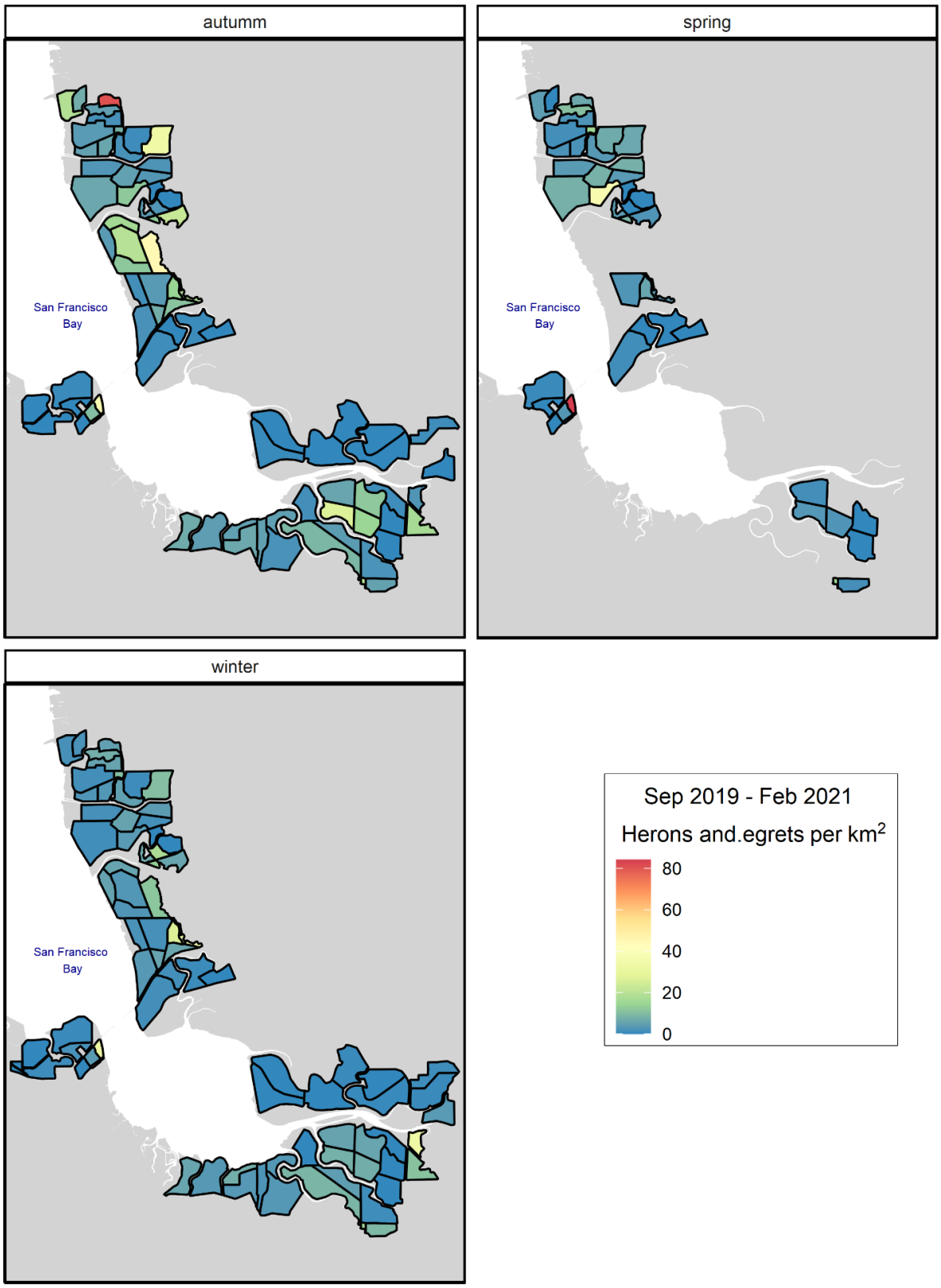

Figure 12. Heron and egret density averaged across survey rounds by season, South San Francisco Bay, California; September 2019–February 2021. The first spring survey (March to April, 14 2020) included 55% of ponds across complexes (Table 1), and the second spring (April 15 to May 2020) and winter (December 2020–February 2021) surveys occurred exclusively at Eden Landing.

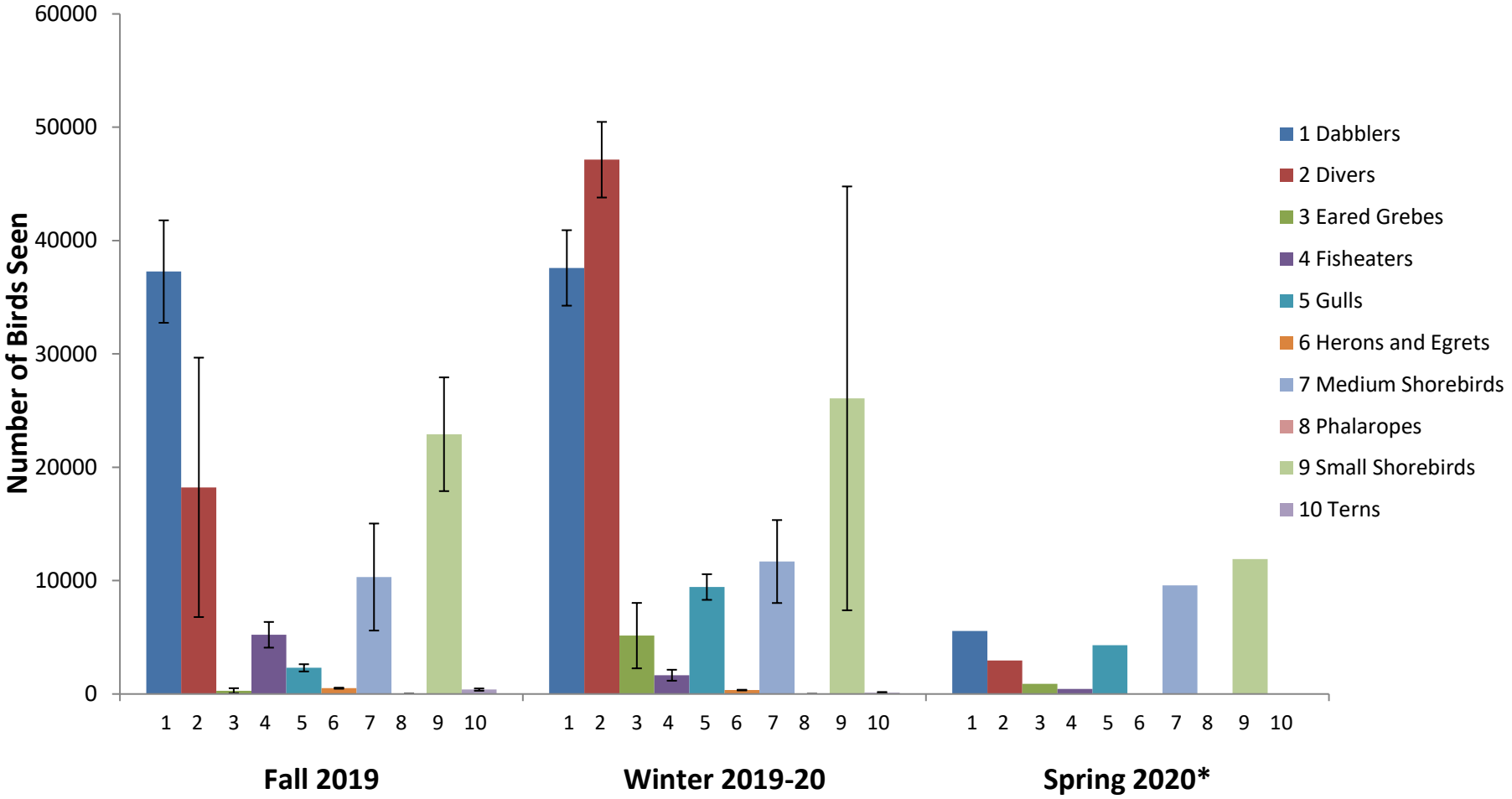

Figure 13. Avian abundance (mean number of bird sightings + 1 SE) by guild and by season at the Alviso complex, South San Francisco Bay, California; Sept. 2019 – March 2020. *Only 7 Alviso ponds were surveyed during the first round of spring surveys and no Alviso ponds were surveyed during the second. Scales on vertical axis are unique for each complex (Figure 13–Figure 18).

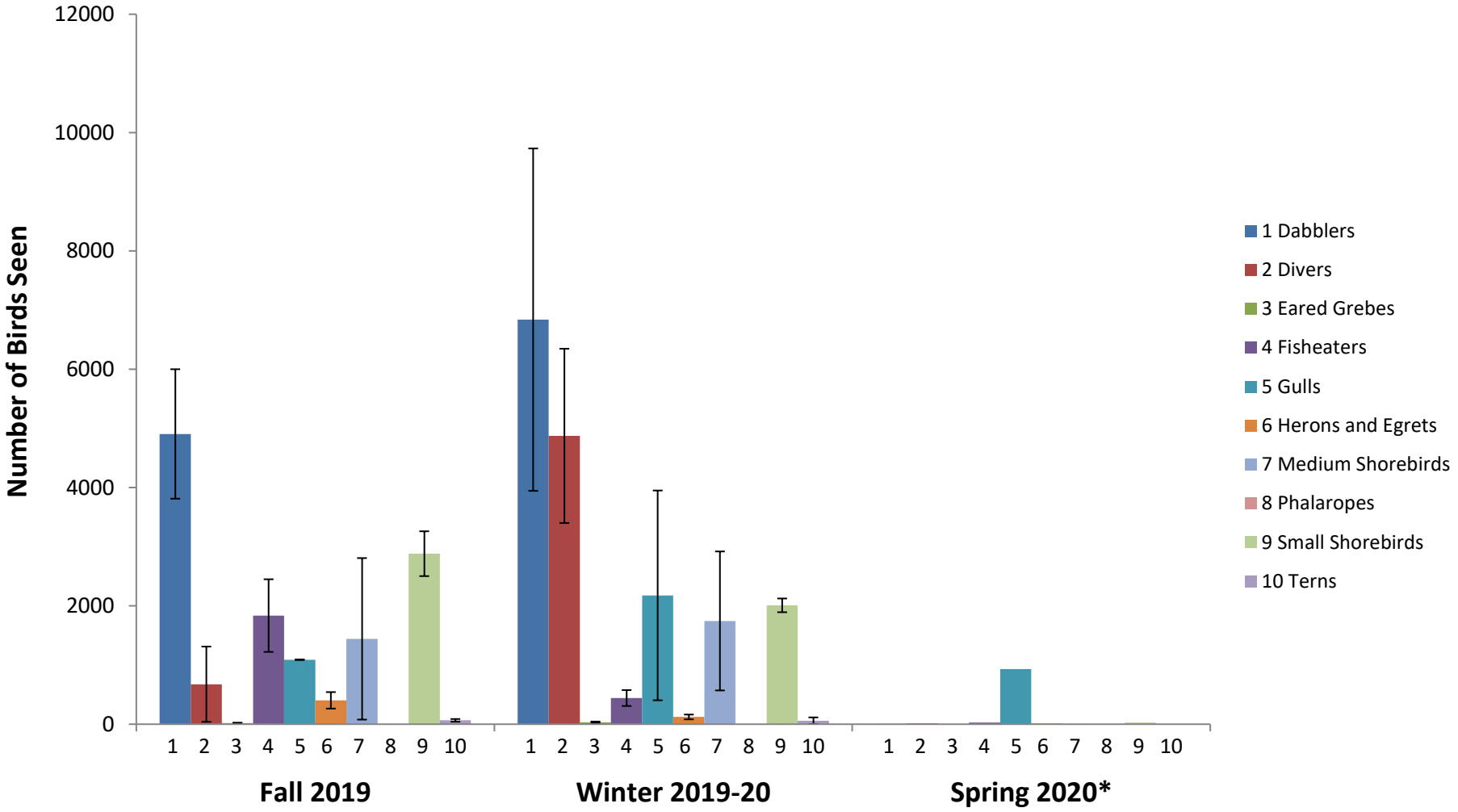

Figure 14. Avian abundance (mean number of bird sightings + 1 SE) by guild and by season at the Coyote Hills complex, South San Francisco Bay, California; Sept. 2019 – March 2020. *Only 3 Coyote Hills ponds were surveyed during the first round of spring surveys and no Coyote Hills ponds were surveyed during the second. Scales on vertical axis are unique for each complex (Figure 13–Figure 18).

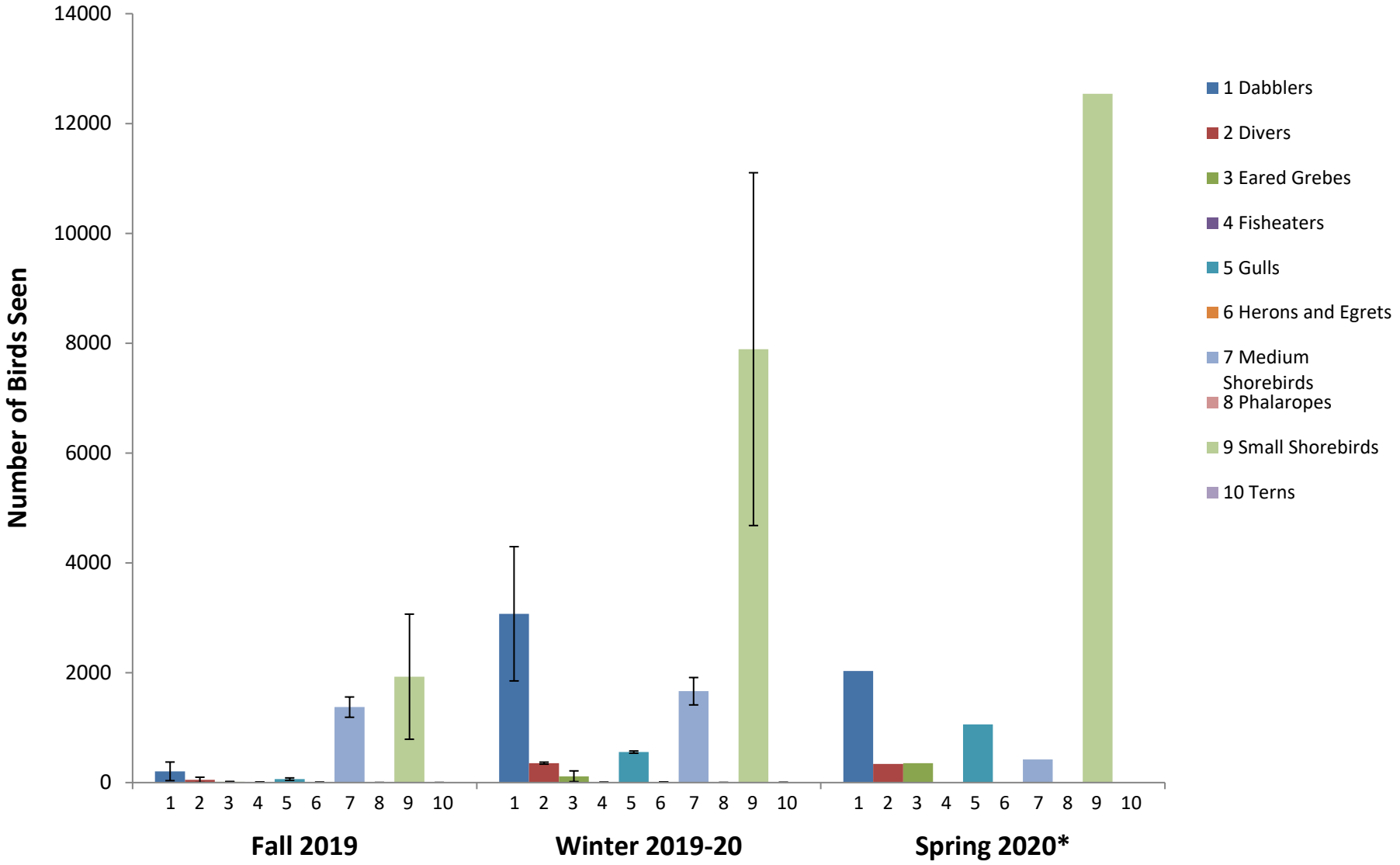

Figure 15. Avian abundance (mean number of bird sightings + 1 SE) by guild and by season at the Dumbarton complex, South San Francisco Bay, California; Sept. 2019 – March 2020. *Only 4 Dumbarton ponds were surveyed during the first round of spring surveys and no Dumbarton ponds were surveyed during the second. Scales on vertical axis are unique for each complex (Figure 13–Figure 18).

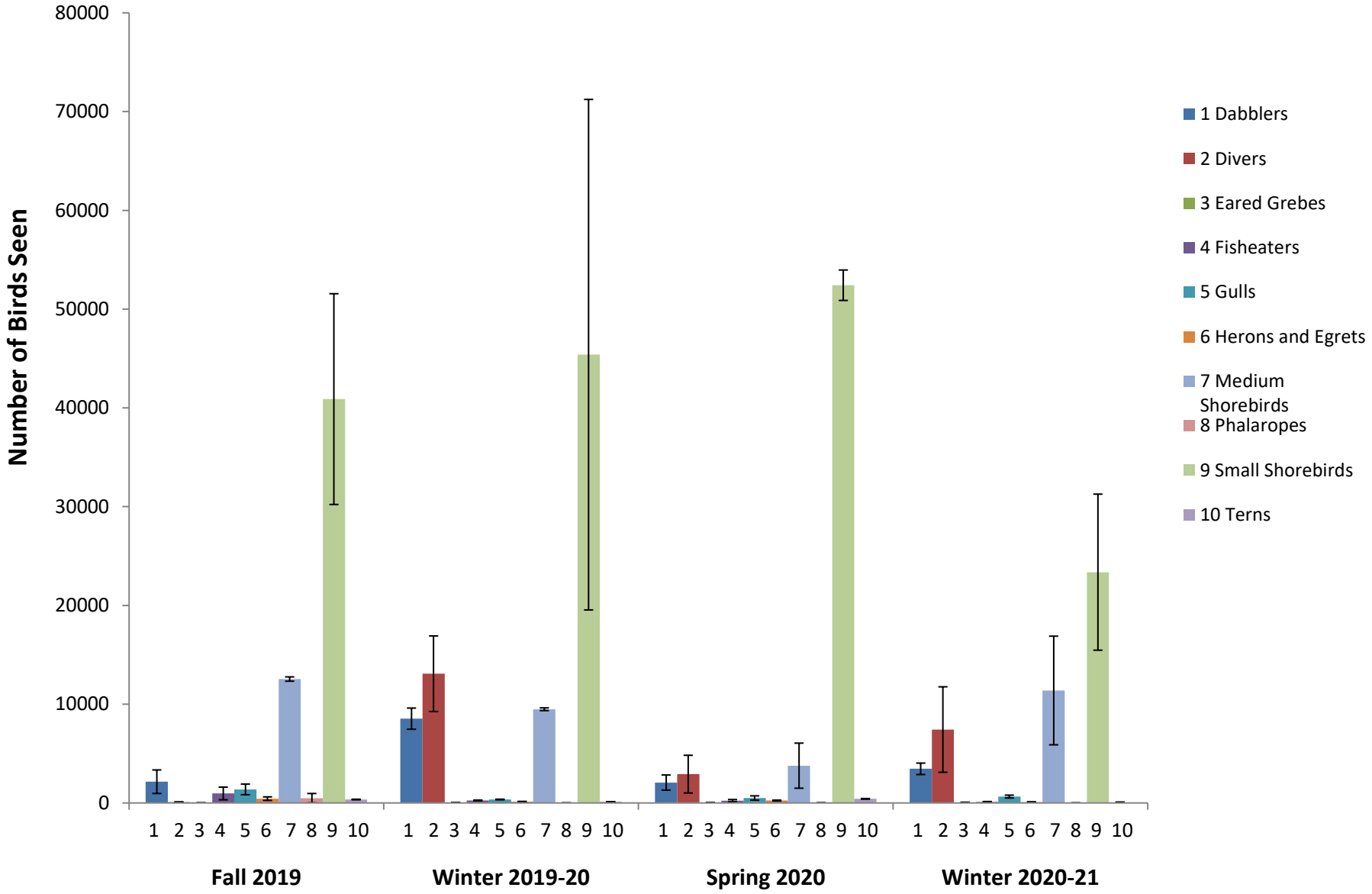

Figure 16. Avian abundance (mean number of bird sightings + 1 SE) by guild and by season at the Eden Landing complex, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. Scales on vertical axis are unique for each complex (Figure 13–Figure 18).

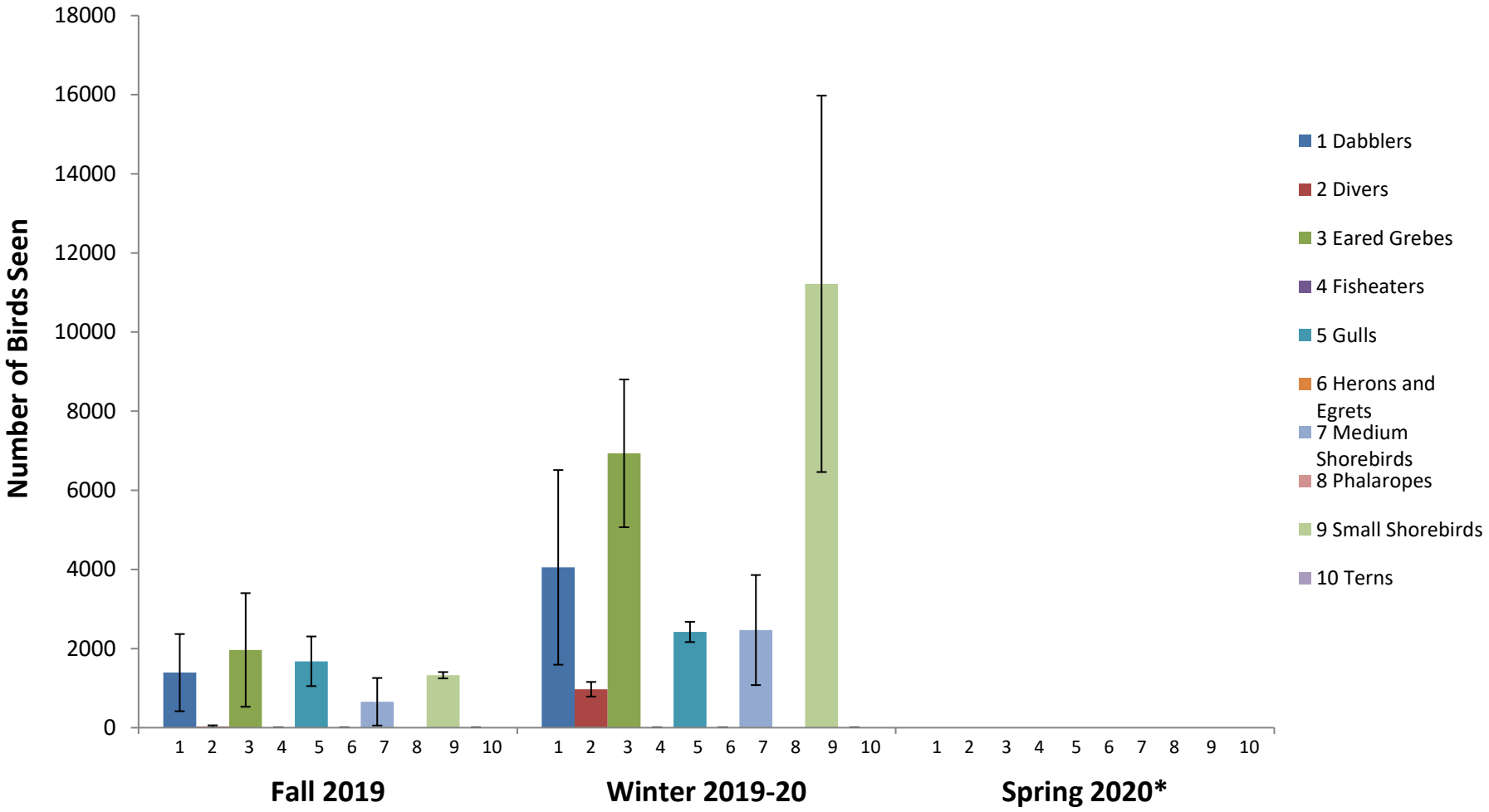

Figure 17. Avian abundance (mean number of bird sightings + 1 SE) by guild and by season at the Mowry complex, South San Francisco Bay, California; Sept. 2019–Feb. 2020. *No surveys were conducted at Mowry ponds from March 2020 to Feb. 2021. Scales on vertical axis are unique for each complex (Figure 13–Figure 18).

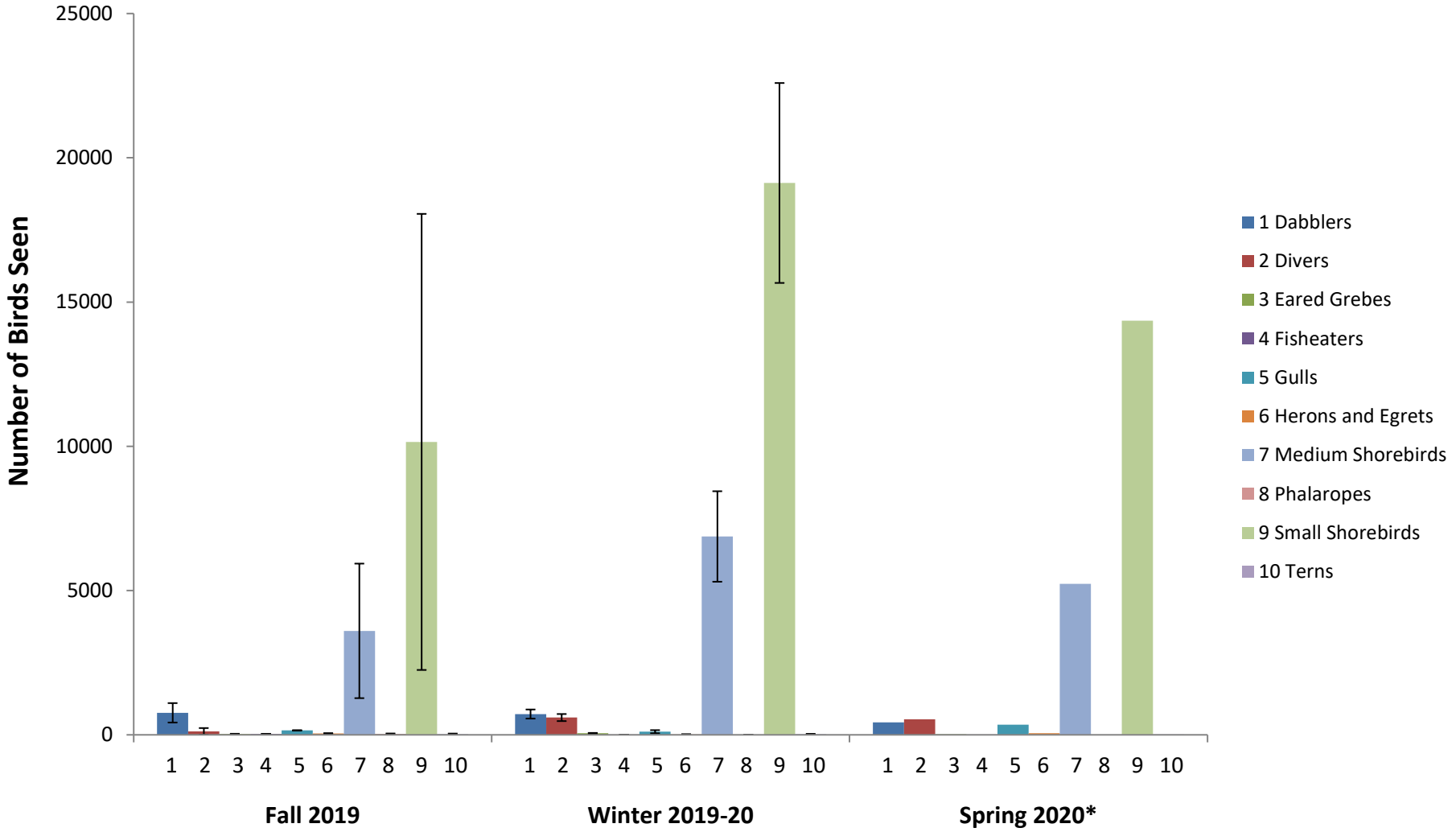

Figure 18. Avian abundance (mean number of bird sightings + 1 SE) by guild and by season at the Ravenswood complex, South San Francisco Bay, California; Sept. 2019 –March 2021. *Only 6 Ravenswood ponds were surveyed during the first round of spring surveys and no Ravenswood ponds were surveyed during the second. Scales on vertical axis are unique for each complex (Figure 13–Figure 18).

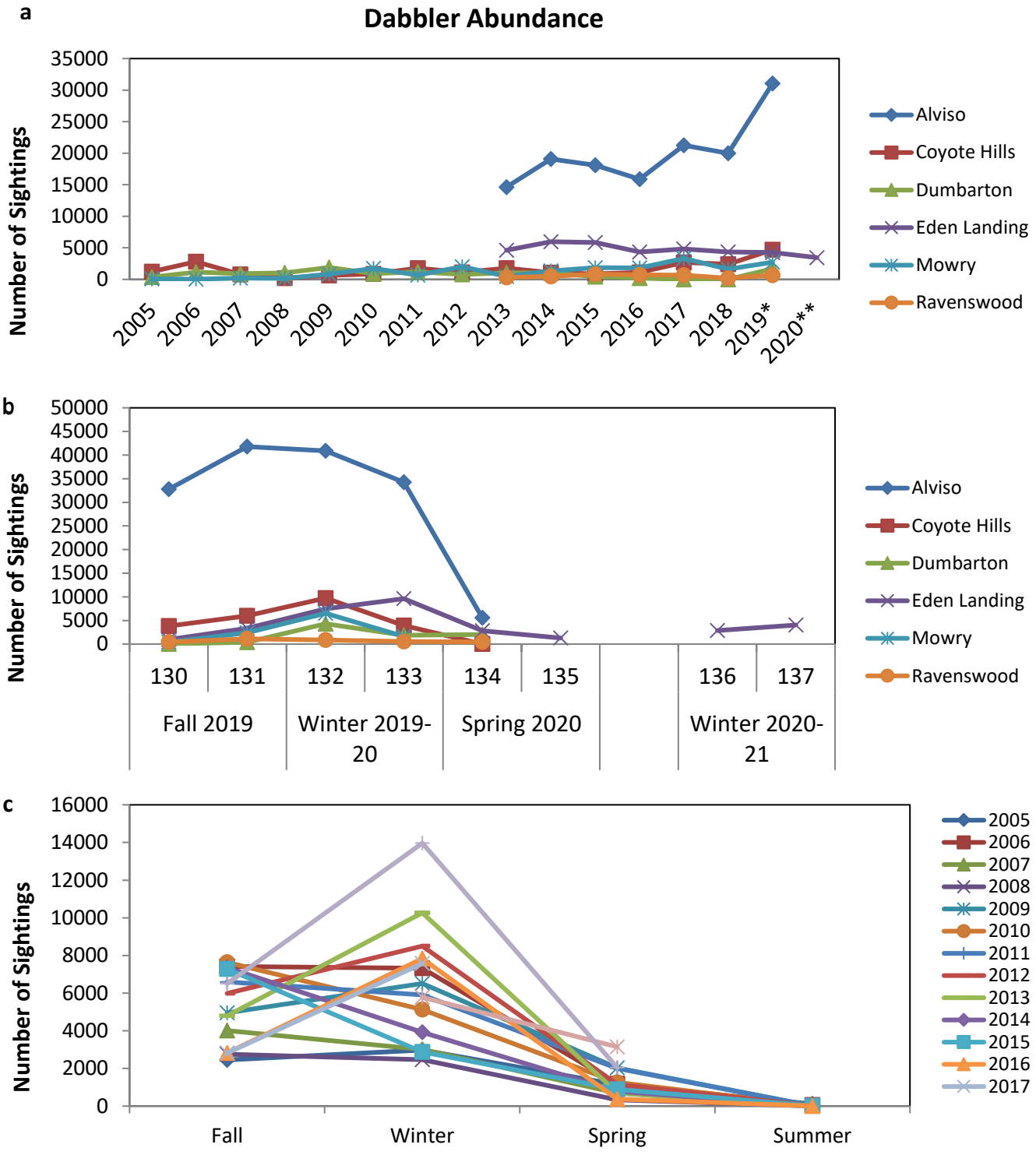

Figure 19. Dabbler abundance by (a) study year (September to August of the following year) for each complex (averaged across surveys), (b) survey period for each complex during the current report period (Sept. 2019 – Feb. 2021), and (c) season for each study year at all salt production ponds combined (Coyote Hills, Dumbarton and Mowry complexes); South San Francisco Bay, California, Sept. 2005-March 2020 (averaged across surveys). *Study year 2019 contains two incomplete survey rounds; only a subset of ponds were surveyed outside of Eden Landing during round 134, and only Eden Landing ponds were surveyed during round 135. **Study year 2020 contains two incomplete surveys rounds; only Eden Landing ponds were surveyed during rounds 136-137.

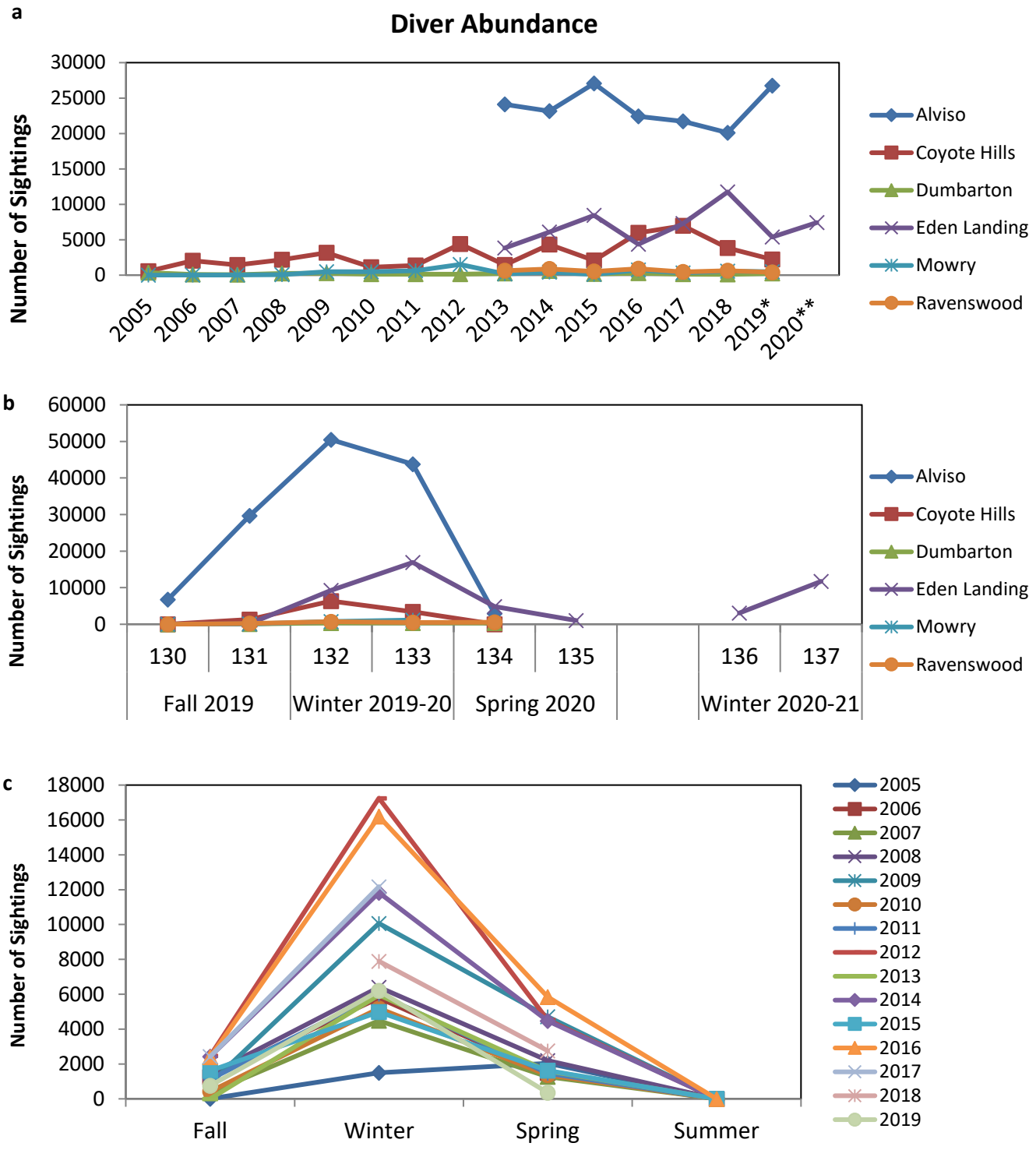

Figure 20. Diver abundance by (a) study year (September to August of the following year) for each complex (averaged across surveys), (b) survey period for each complex during the current report period (Sept. 2019 – Feb. 2021), and (c) season for each study year at all Salt Production Ponds combined (Coyote Hills, Dumbarton and Mowry complexes); South San Francisco Bay, California, Sept. 2005-March 2020 (averaged across surveys). *Study year 2019 contains two incomplete surveys; only a subset of ponds outside of Eden Landing were surveyed in round 134 and only Eden Landing ponds were surveyed in round 135. **Study year 2020 contains two incomplete surveys; only Eden Landing ponds were surveyed in rounds 136-137.

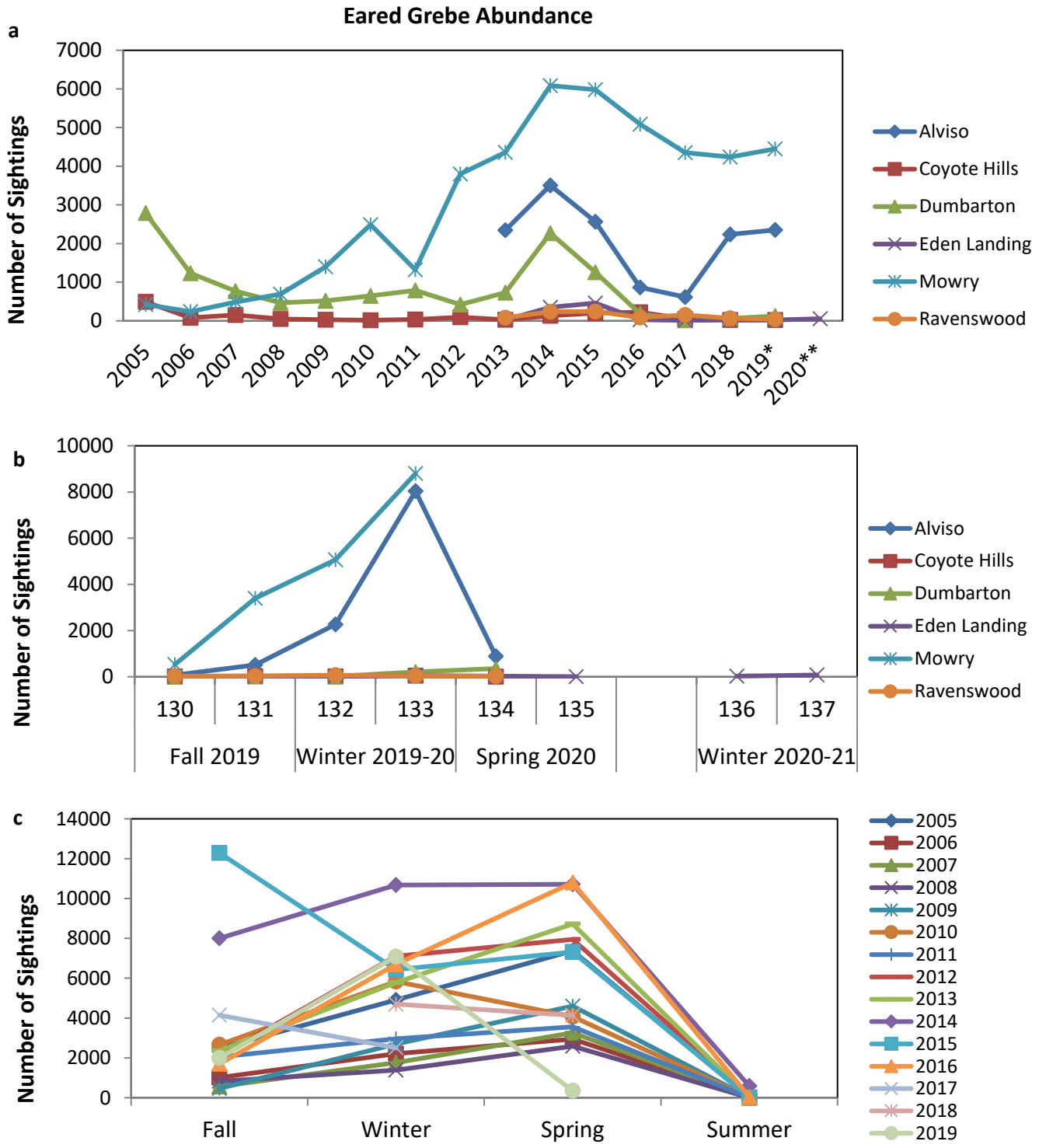

Figure 21. Eared Grebe abundance by (a) study year (September to August of the following year) for each complex (averaged across surveys), (b) survey period for each complex during the current report period (Sept. 2019 – Feb. 2021), and (c) season for each study year at all Salt Production Ponds combined (Coyote Hills, Dumbarton and Mowry complexes); South San Francisco Bay, California, Sept. 2005-March 2020 (averaged across surveys). *Study year 2019 contains two incomplete surveys; only a subset of ponds outside of Eden Landing were surveyed in round 134 and only Eden Landing ponds were surveyed in round 135. **Study year 2020 contains two incomplete surveys; only Eden Landing ponds were surveyed in rounds 136-137.

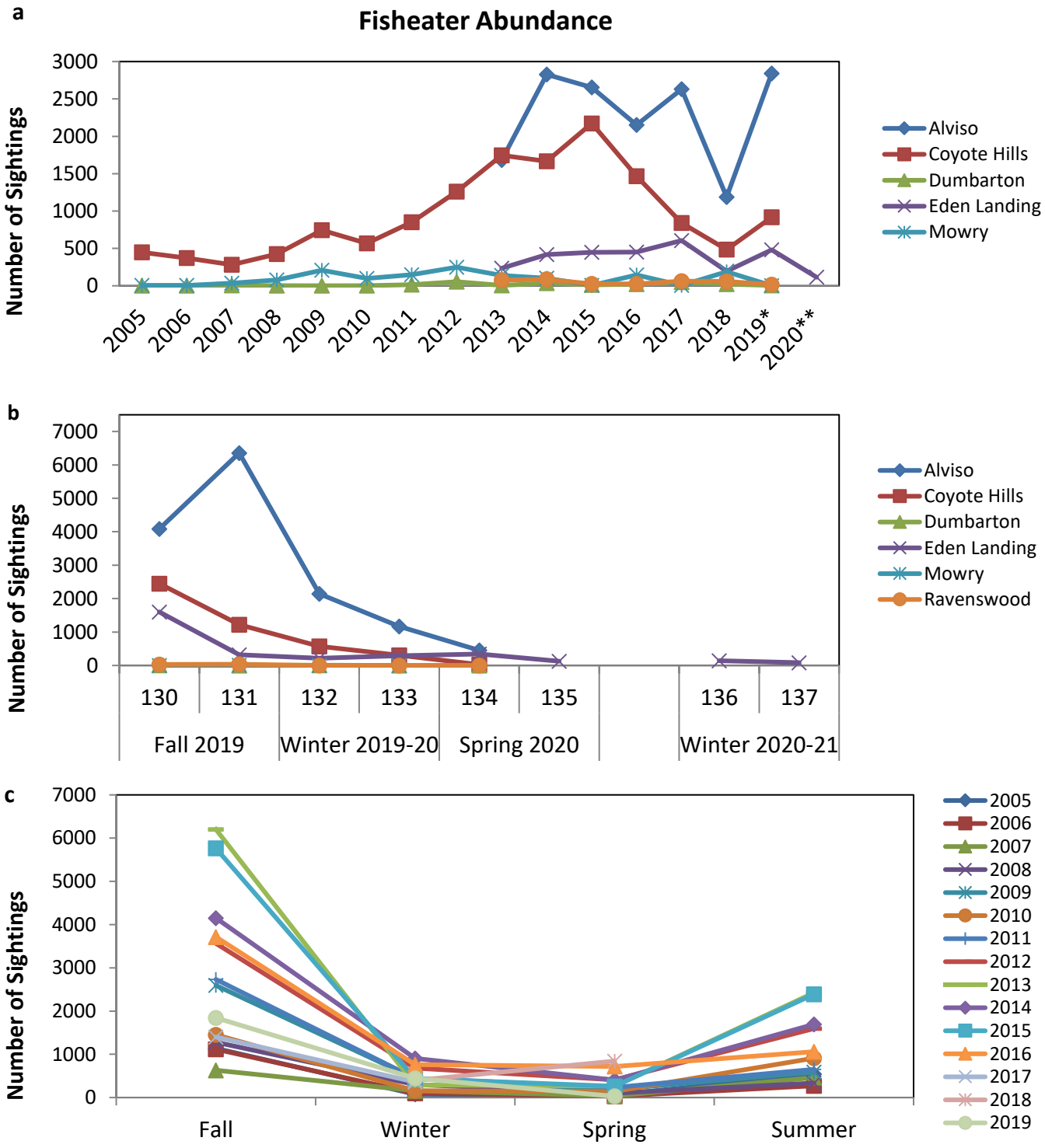

Figure 22. Fisheater abundance by (a) study year (September to August of the following year) for each complex (averaged across surveys), (b) survey period for each complex during the current report period (Sept. 2019 – Feb. 2021), and (c) season for each study year at all Salt Production Ponds combined (Coyote Hills, Dumbarton and Mowry complexes); South San Francisco Bay, California, Sept. 2005-March 2020 (averaged across surveys). *Study year 2019 contains two incomplete surveys; only a subset of ponds outside of Eden Landing were surveyed in round 134 and only Eden Landing ponds were surveyed in round 135. **Study year 2020 contains two incomplete surveys; only Eden Landing ponds were surveyed in rounds 136-137.

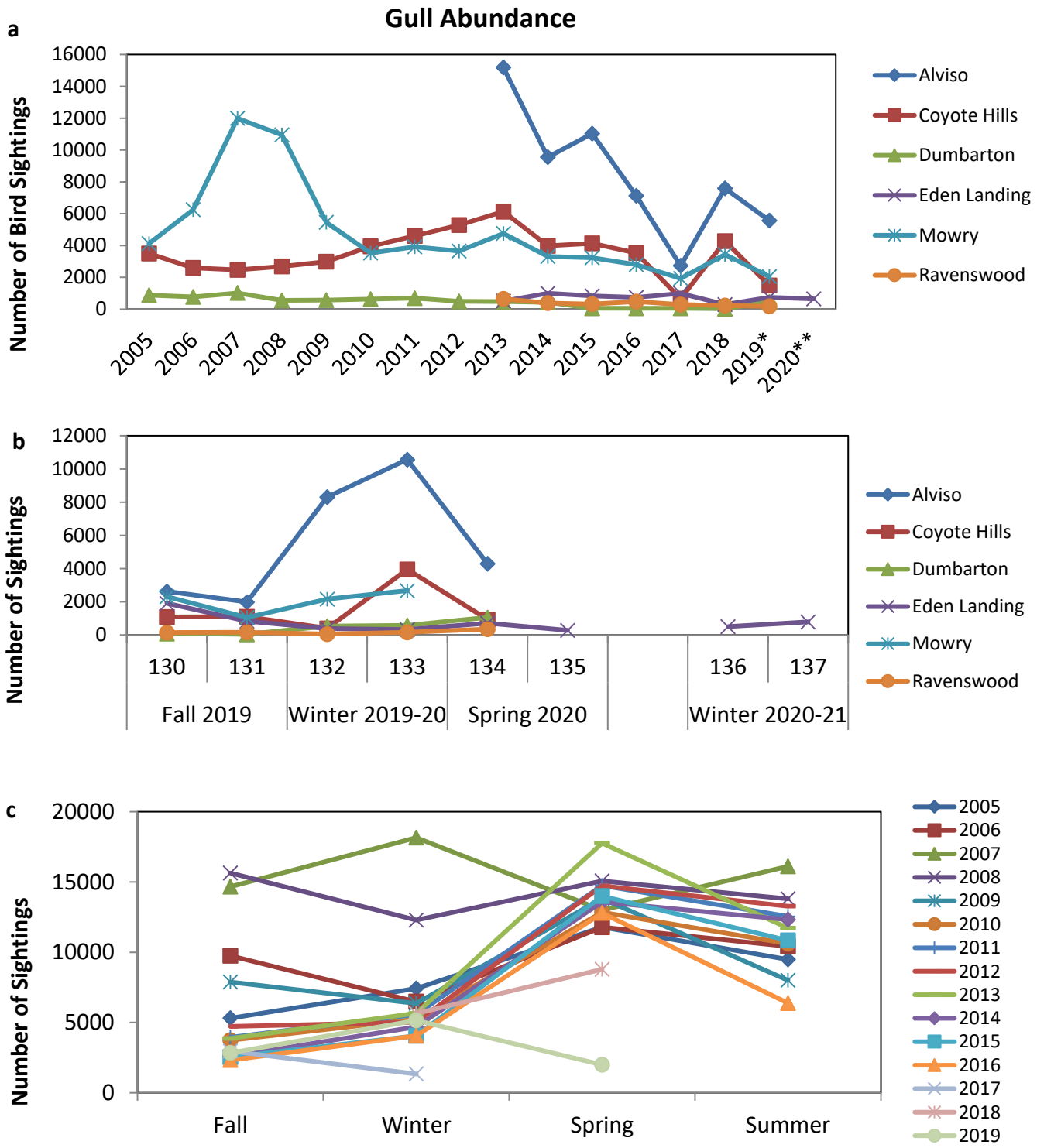

Figure 23. Gull abundance by (a) study year (September to August of the following year) for each complex (averaged across surveys), (b) survey period for each complex during the current report period (Sept. 2019 – Feb. 2021), and (c) season for each study year at all Salt Production Ponds combined (Coyote Hills, Dumbarton and Mowry complexes); South San Francisco Bay, California, Sept. 2005-March 2020 (averaged across surveys). *Study year 2019 contains two incomplete surveys; only a subset of ponds outside of Eden Landing were surveyed in round 134 and only Eden Landing ponds were surveyed in round 135. **Study year 2020 contains two incomplete surveys; only Eden Landing ponds were surveyed in rounds 136-137.

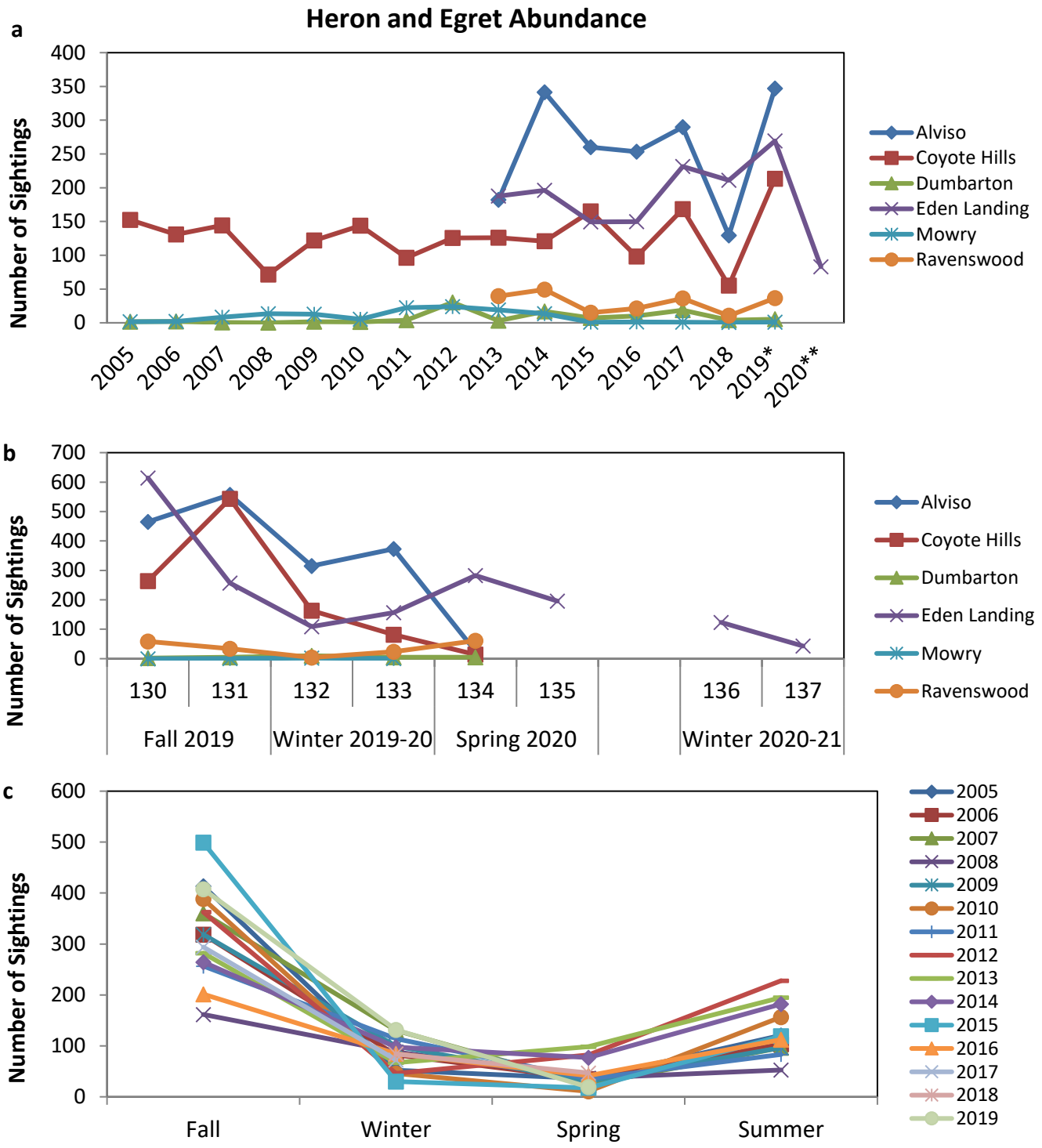

Figure 24. Heron and egret abundance by (a) study year (September to August of the following year) for each complex (averaged across surveys), (b) survey period for each complex during the current report period (Sept. 2019 – Feb. 2021), and (c) season for each study year at all Salt Production Ponds combined (Coyote Hills, Dumbarton and Mowry complexes); South San Francisco Bay, California, Sept. 2005-March 2020 (averaged across surveys). *Study year 2019 contains two incomplete surveys; only a subset of ponds outside of Eden Landing were surveyed in round 134 and only Eden Landing ponds were surveyed in round 135. **Study year 2020 contains two incomplete surveys; only Eden Landing ponds were surveyed in rounds 136-137.

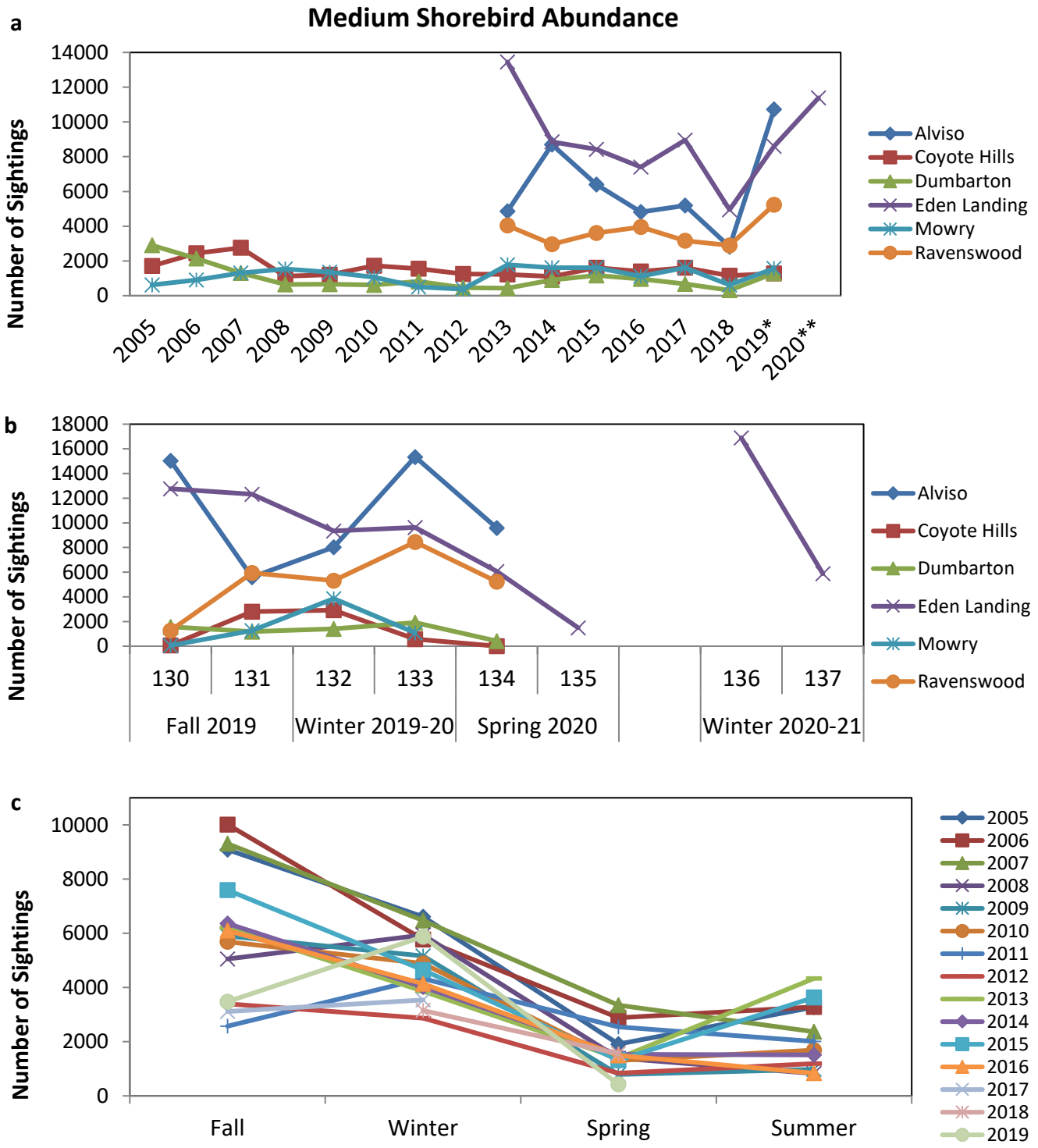

Figure 25. Medium Shorebird abundance by (a) study year (September to August of the following year) for each complex (averaged across surveys), (b) survey period for each complex during the current report period (Sept. 2019 – Feb. 2021), and (c) season for each study year at all Salt Production Ponds combined (Coyote Hills, Dumbarton and Mowry complexes); South San Francisco Bay, California, Sept. 2005-March 2020 (averaged across surveys). *Study year 2019 contains two incomplete surveys; only a subset of ponds outside of Eden Landing were surveyed in round 134 and only Eden Landing ponds were surveyed in round 135. **Study year 2020 contains two incomplete surveys; only Eden Landing ponds were surveyed in rounds 136-137.

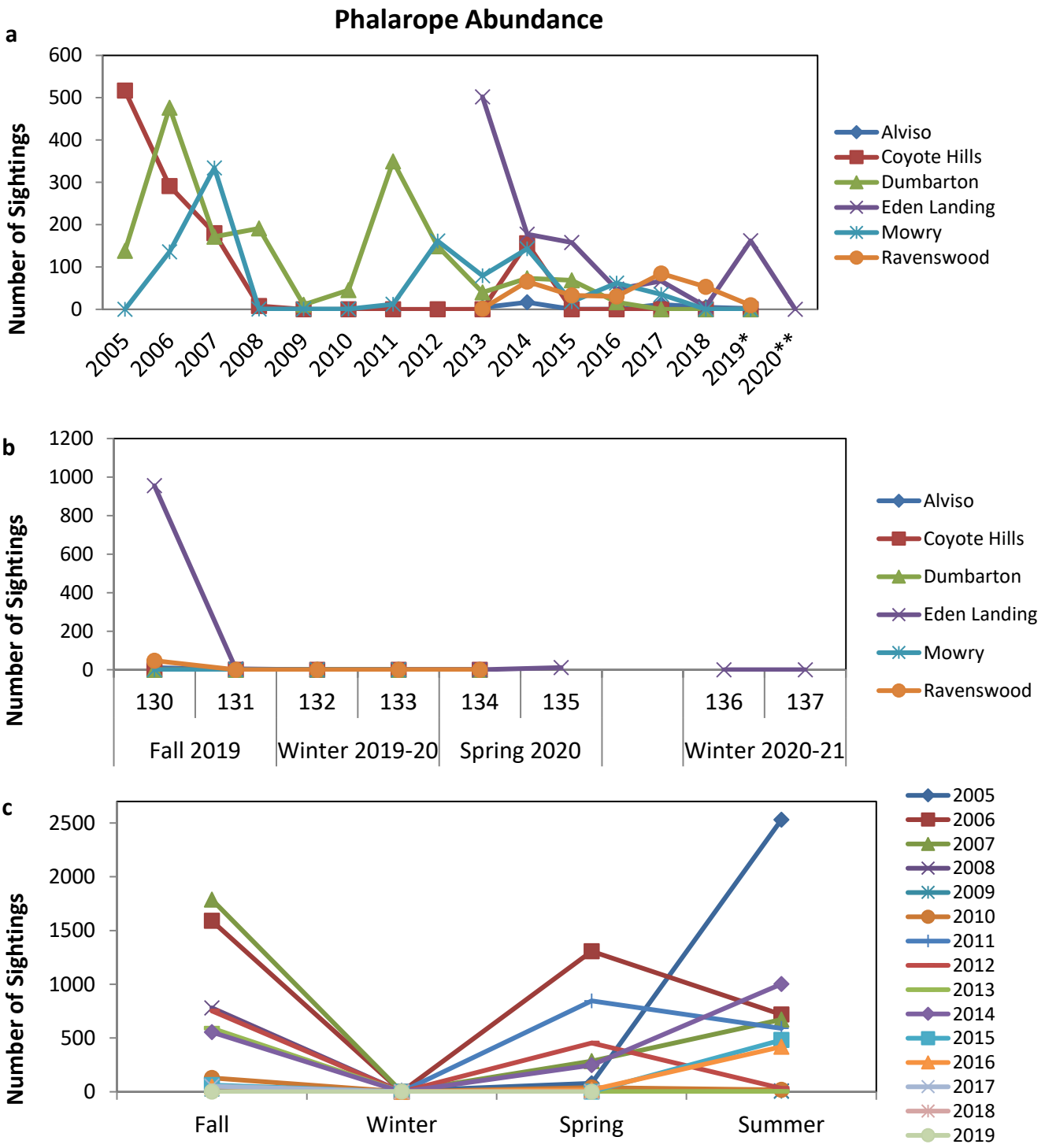

Figure 26. Phalarope abundance by (a) study year (September to August of the following year) for each complex (averaged across surveys), (b) survey period for each complex during the current report period (Sept. 2019 – Feb. 2021), and (c) season for each study year at all Salt Production Ponds combined (Coyote Hills, Dumbarton and Mowry complexes); South San Francisco Bay, California, Sept. 2005-March 2020 (averaged across surveys). Counts from Phalarope Migration Surveys are not included in these plots. *Study year 2019 contains two incomplete surveys; only a subset of ponds outside of Eden Landing were surveyed in round 134 and only Eden Landing ponds were surveyed in round 135. **Study year 2020 contains two incomplete surveys; only Eden Landing ponds were surveyed in rounds 136-137.

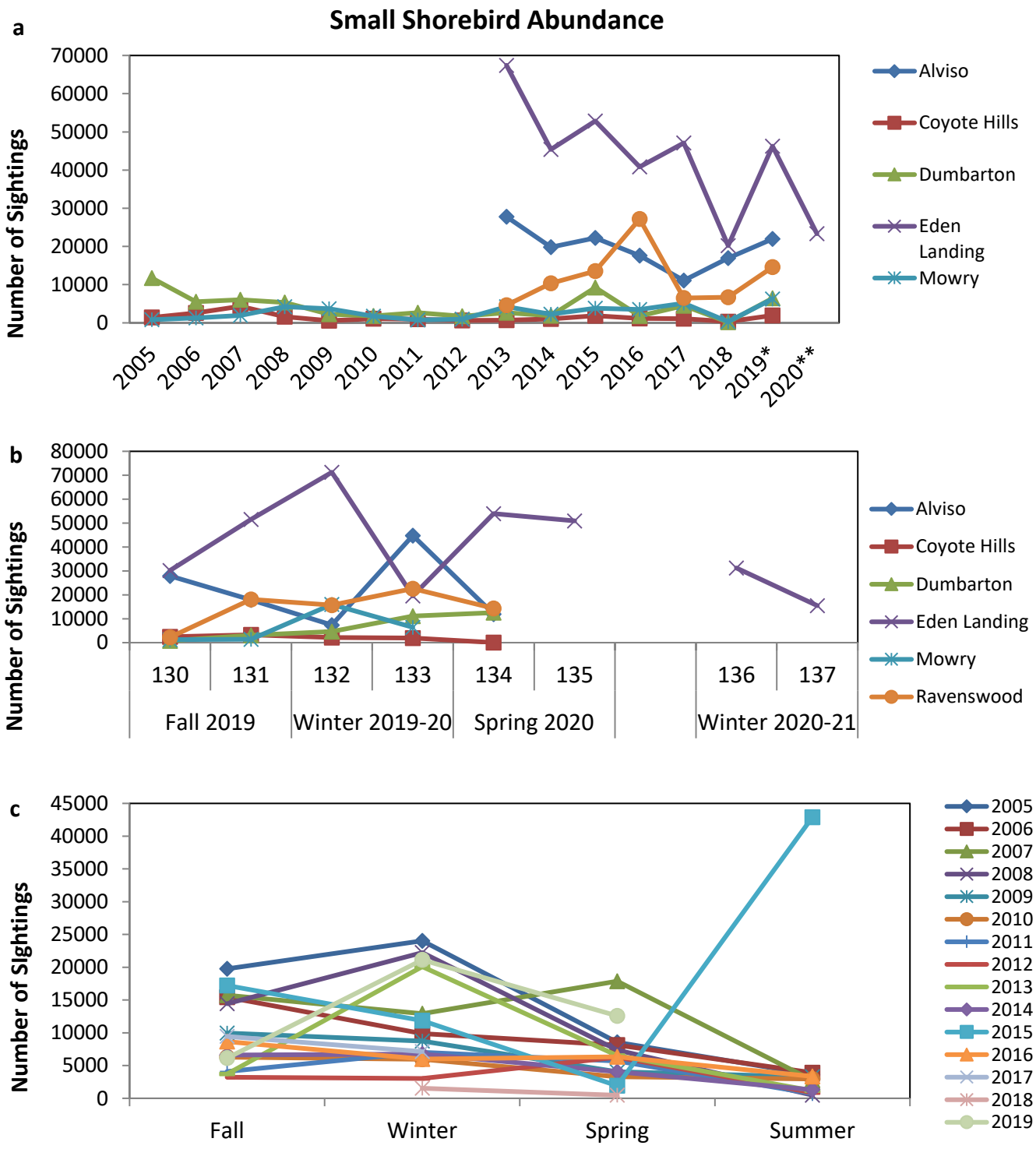

Figure 27. Small Shorebird abundance by (a) study year (September to August of the following year) for each complex (averaged across surveys), (b) survey period for each complex during the current report period (Sept. 2019 – Feb. 2021), and (c) season for each study year at all Salt Production Ponds combined (Coyote Hills, Dumbarton and Mowry complexes); South San Francisco Bay, California, Sept. 2005-March 2020 (averaged across surveys). *Study year 2019 contains two incomplete surveys; only a subset of ponds outside of Eden Landing were surveyed in round 134 and only Eden Landing ponds were surveyed in round 135. **Study year 2020 contains two incomplete surveys; only Eden Landing ponds were surveyed in rounds 136-137.

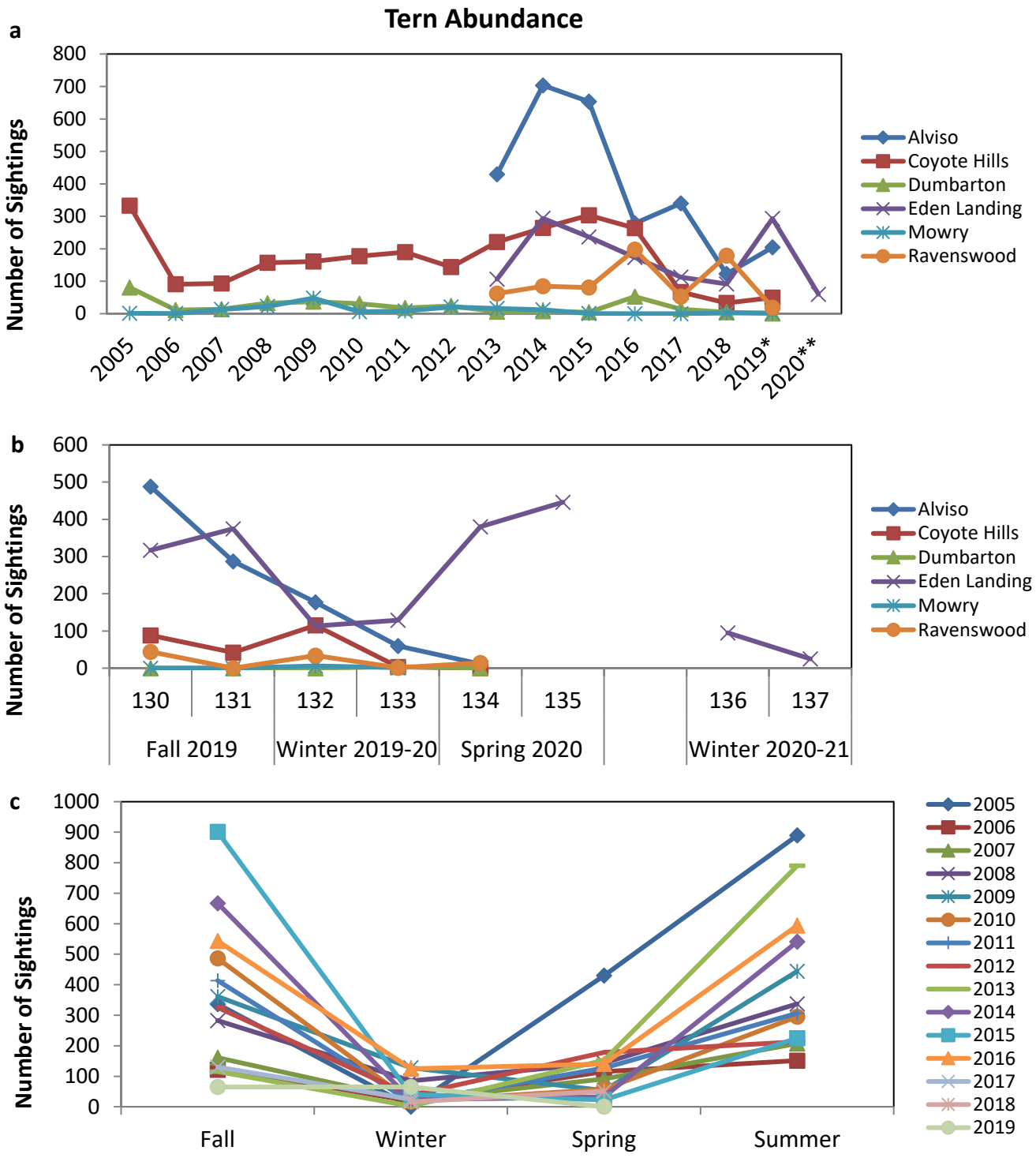

Figure 28. Tern abundance by (a) study year (September to August of the following year) for each complex (averaged across surveys), (b) survey period for each complex during the current report period (Sept. 2019 – Feb. 2021), and (c) season for each study year at all Salt Production Ponds combined (Coyote Hills, Dumbarton and Mowry complexes); South San Francisco Bay, California, Sept. 2005-March 2020 (averaged across surveys). *Study year 2019 contains two incomplete surveys; only a subset of ponds outside of Eden Landing were surveyed in round 134 and only Eden Landing ponds were surveyed in round 135. **Study year 2020 contains two incomplete surveys; only Eden Landing ponds were surveyed in rounds 136-137.

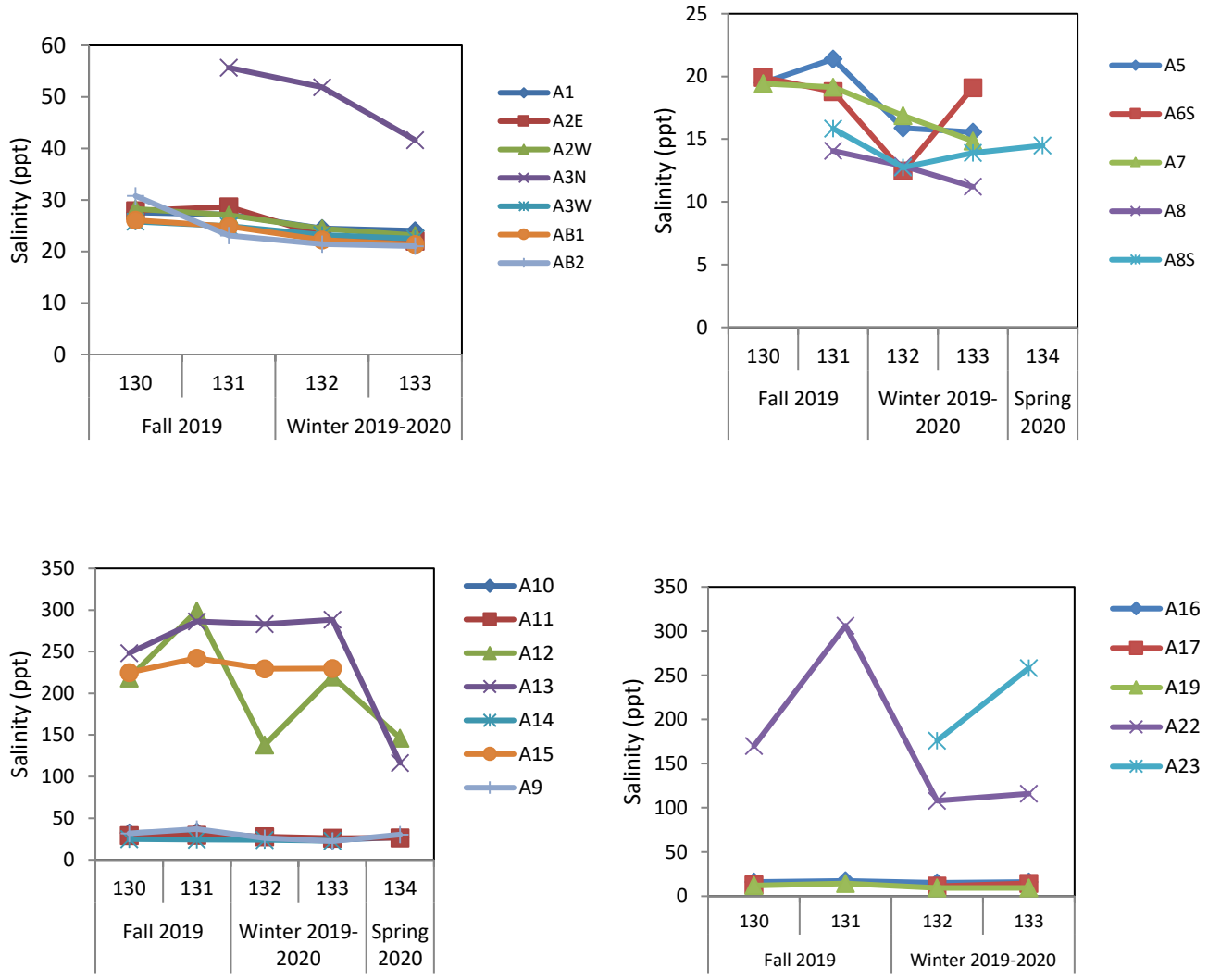

Figure 29. Average salinity (ppt) at the Alviso pond complex, South San Francisco Bay, California; Sept. 2019 – Marc 2020. Not all ponds were surveyed during round 134 (Table 1).

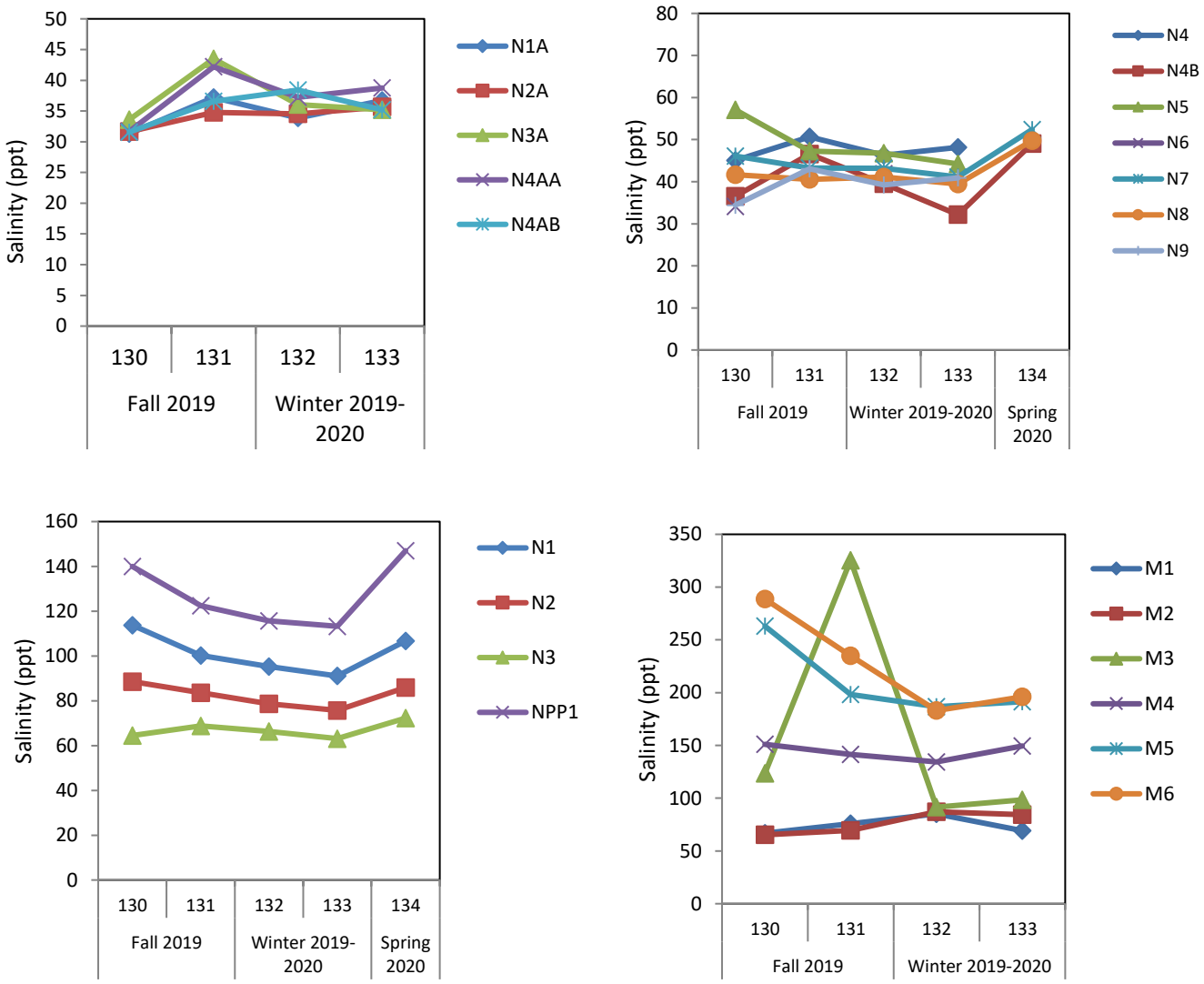

Figure 30. Average monthly salinity (ppt) at the Coyote Hills, Dumbarton and Mowry pond complexes, South San Francisco Bay, California; Sept. 2019 – March 2020. Not all ponds were surveyed during round 134 (Table 1).

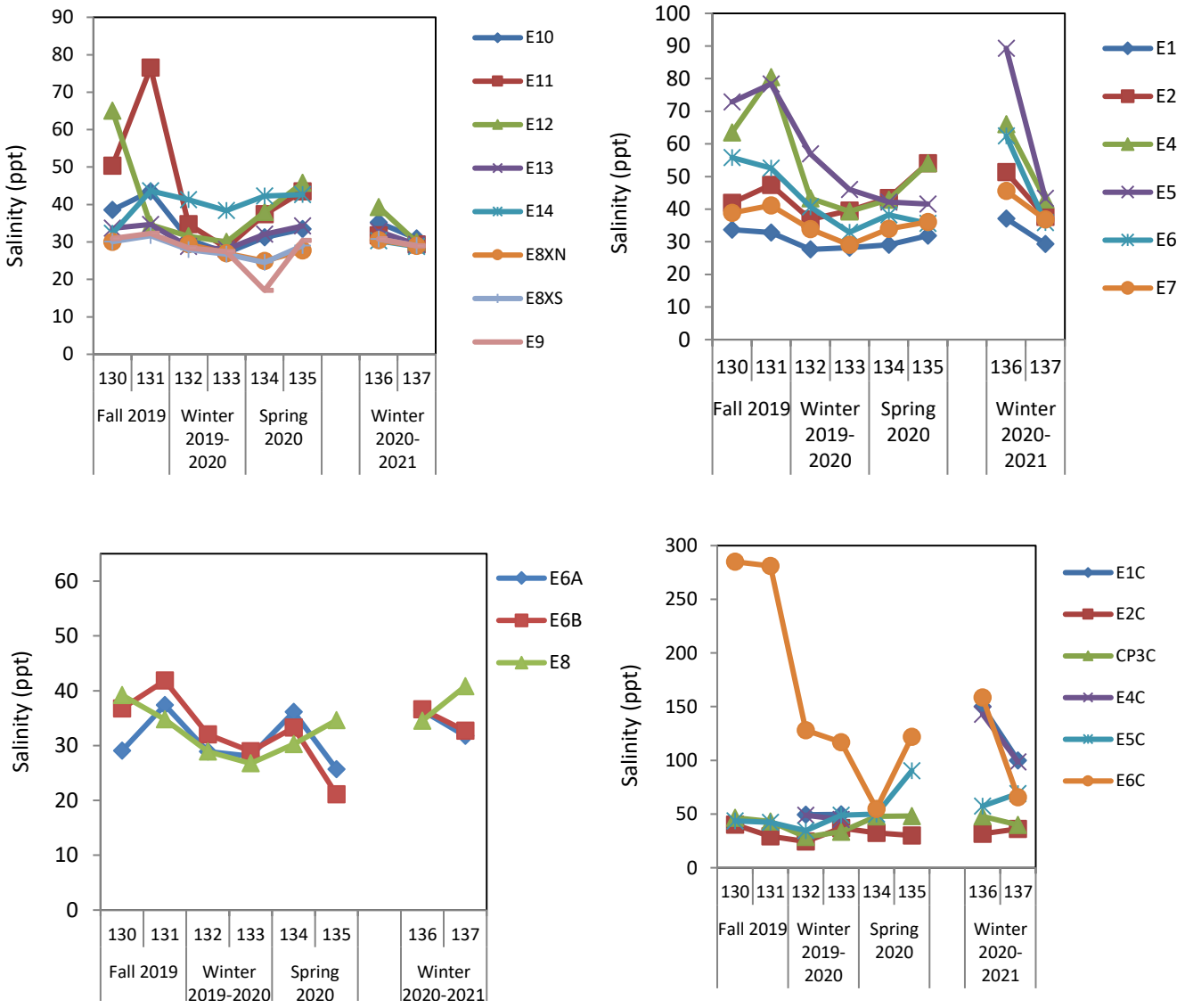

Figure 31. Average monthly salinity (ppt) at the Eden Landing pond complex, South San Francisco Bay, California; Sept. 2019 – Feb. 2021.

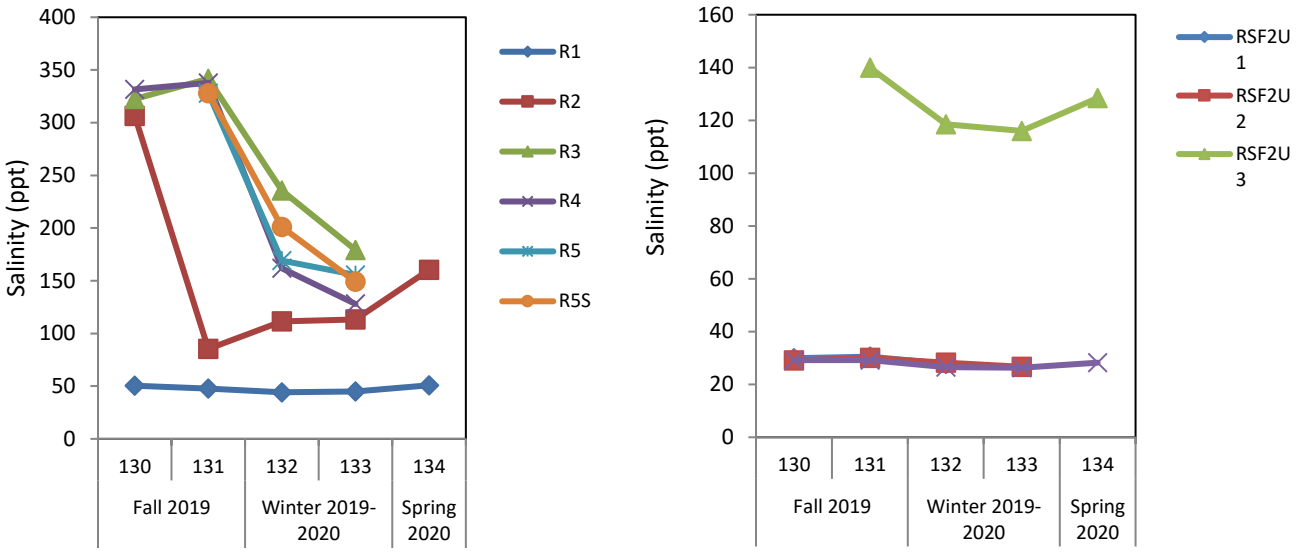

Figure 32. Average monthly salinity (ppt) at the Ravenswood pond complex, South San Francisco Bay, California; Sept. 2019 – March 2020. Not all ponds were surveyed during round 134 (Table 1).

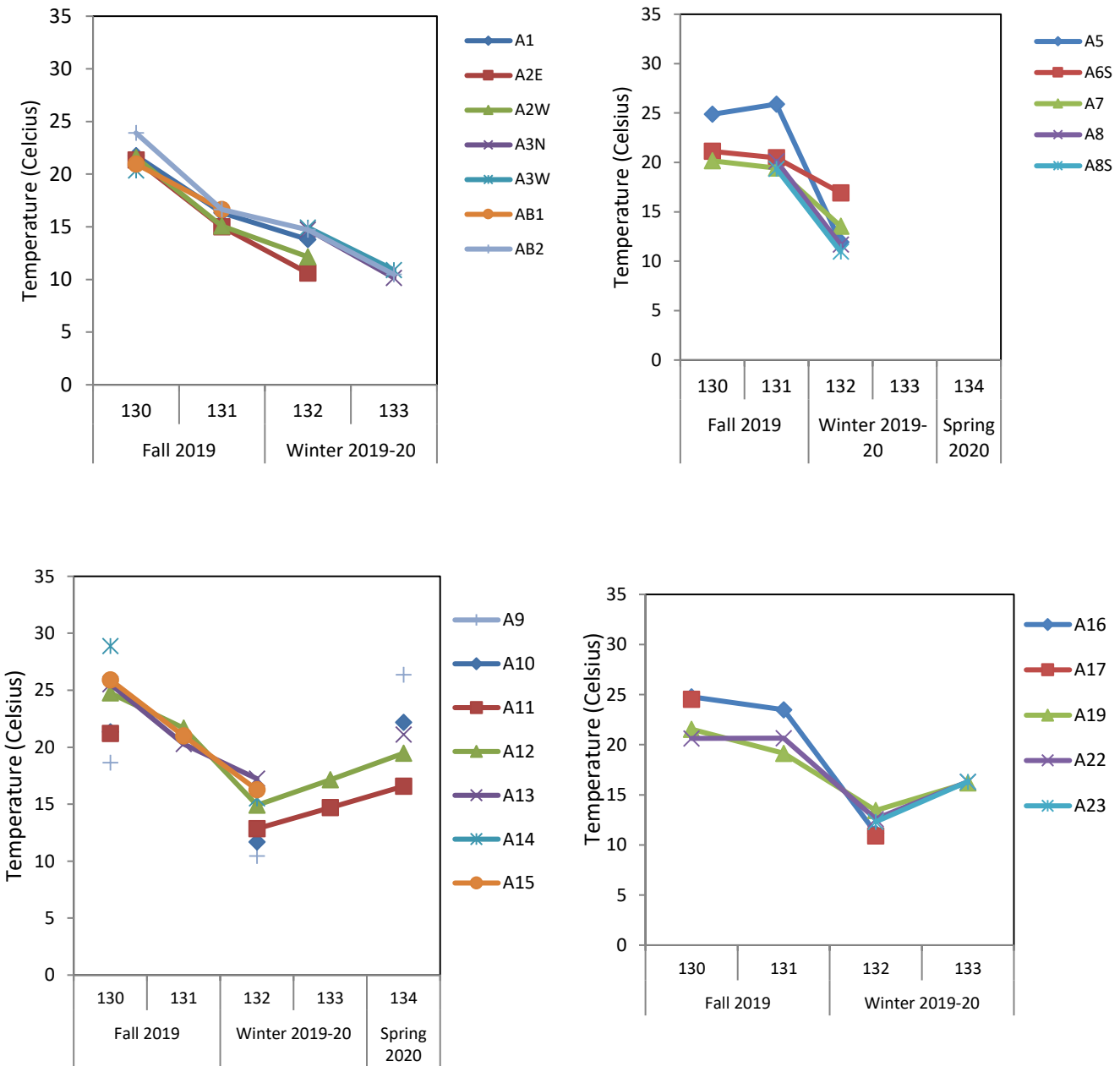

Figure 33. Average monthly temperature (°C) at the Alviso pond complex, South San Francisco Bay, California; Sept. 2019 – March 2020. Not all ponds were surveyed during round 134 (Table 1). Intermittent datasonde malfunctions interfered with readings during rounds 133 and 134.

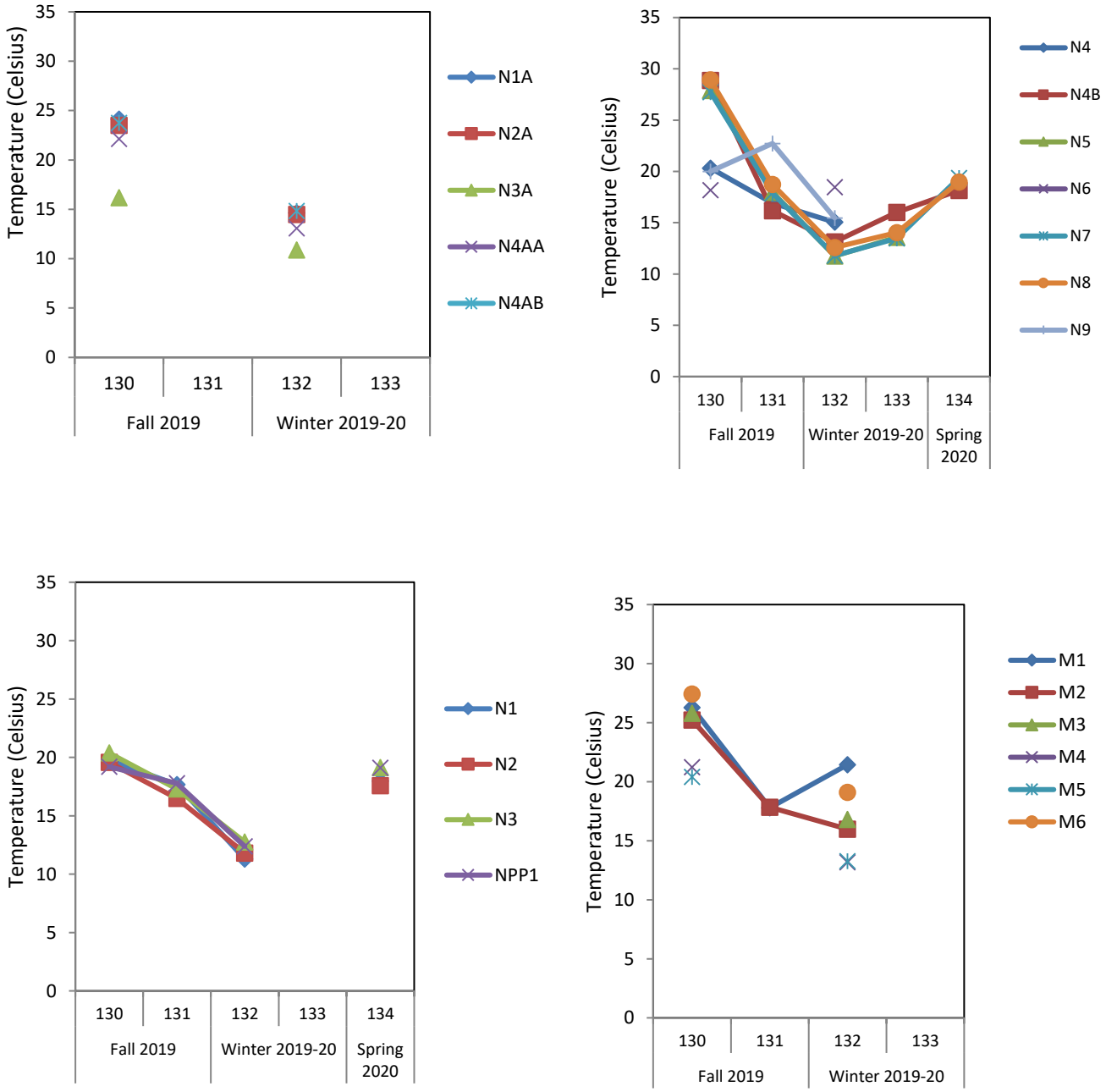

Figure 34. Average monthly temperature (°C) at the Coyote Hills, Dumbarton and Mowry pond complexes, South San Francisco Bay, California; Sept. 2019 – March 2020. Not all ponds were surveyed during round 134 (Table 1). Intermittent datasonde malfunctions interfered with readings during rounds 133 and 134.

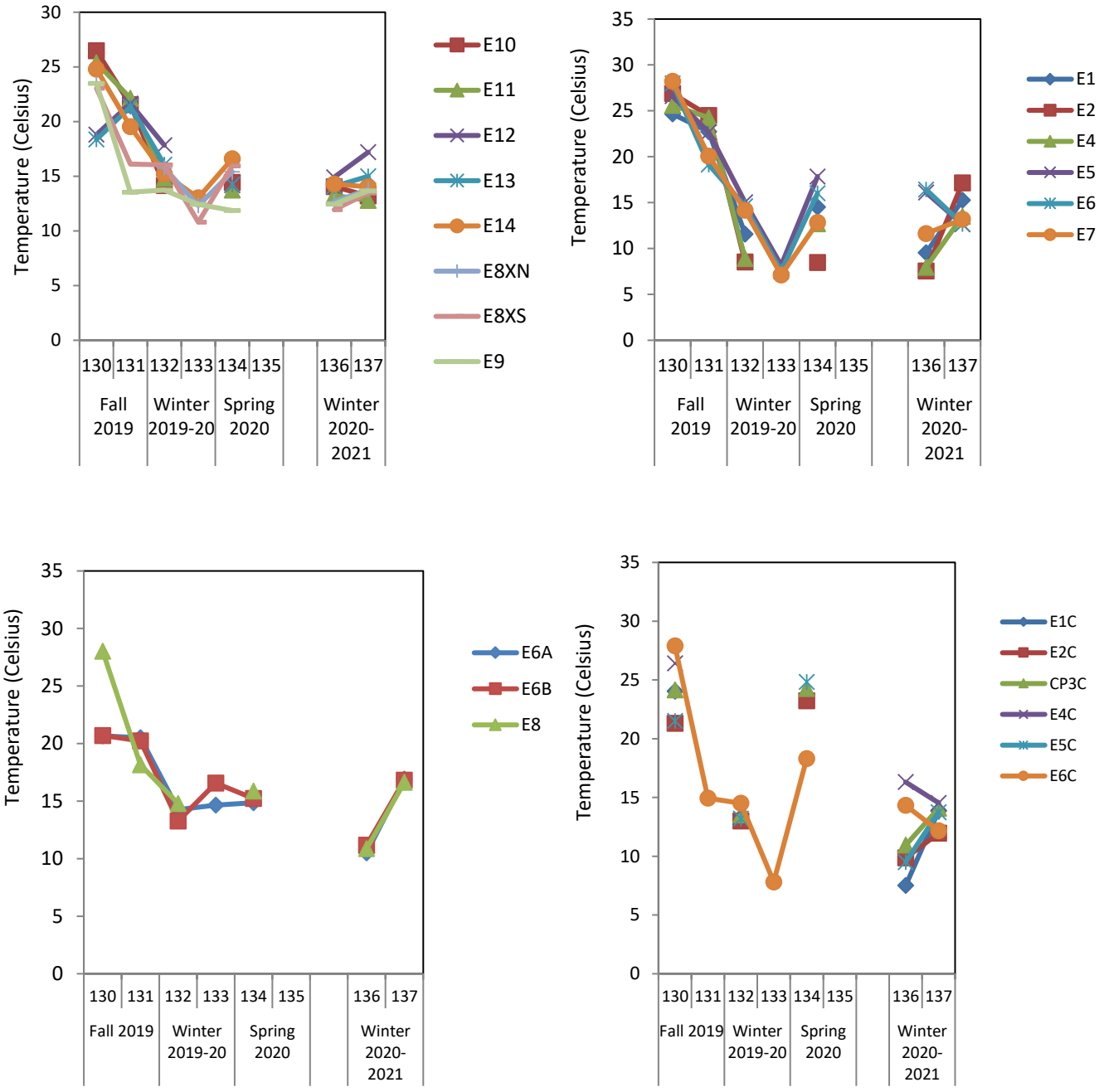

Figure 35. Average monthly temperature (°C) at the Eden Landing pond complex, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. Intermittent datasonde malfunctions interfered with readings during rounds 133-135.

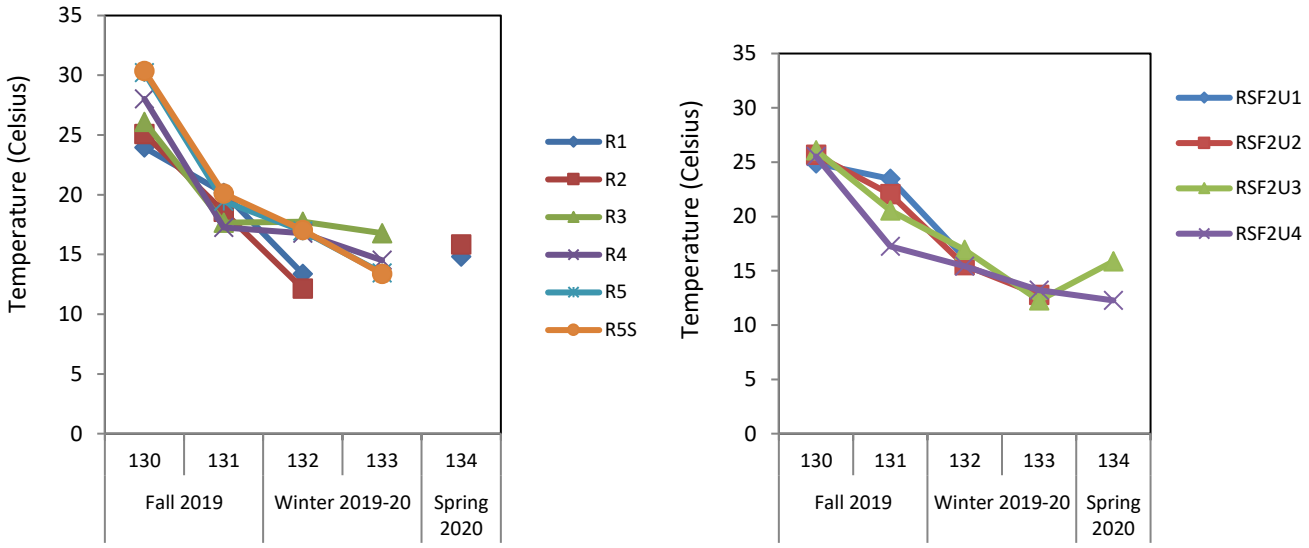

Figure 36. Average monthly temperature (°C) at the Ravenswood pond complex, South San Francisco Bay, California; Sept. 2019 – March 2020. Not all ponds were surveyed during round 134 (Table 1). Intermittent datasonde malfunctions interfered with readings during rounds 133 and 134.

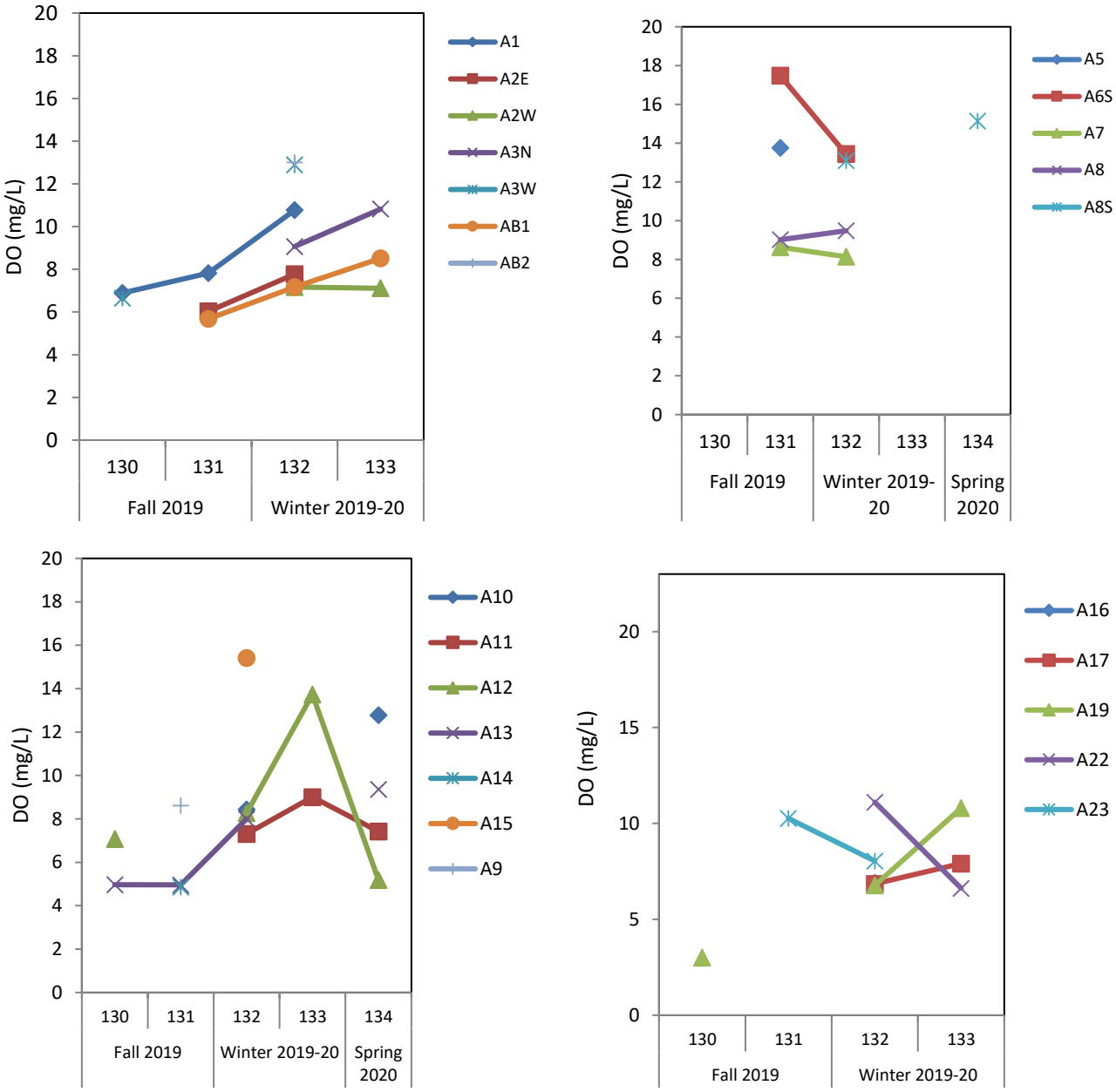

Figure 37. Average monthly dissolved oxygen (mg/L) at the Alviso pond complex, South San Francisco Bay, California; Sept. 2019 – March 2020. Not all ponds were surveyed during round 134 (Table 1). Intermittent datasonde malfunctions interfered with readings during rounds 133 and 134.

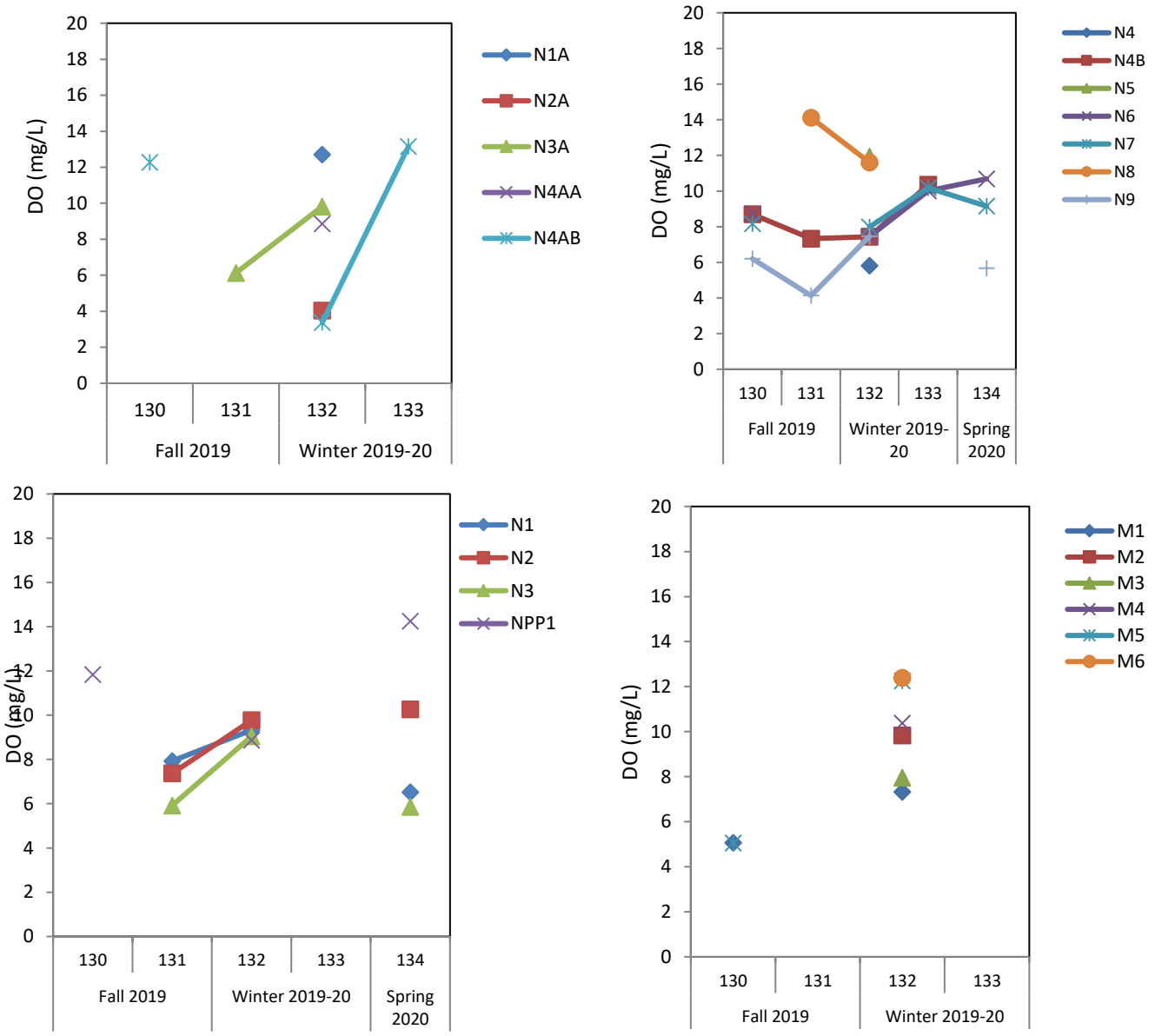

Figure 38. Average monthly dissolved oxygen (mg/L) at the Coyote Hills, Dumbarton and Mowry pond complexes, South San Francisco Bay, California; Sept. 2019 – March 2020. Not all ponds were surveyed during round 134 (Table 1). Intermittent datasonde malfunctions interfered with readings during rounds 133 and 134.

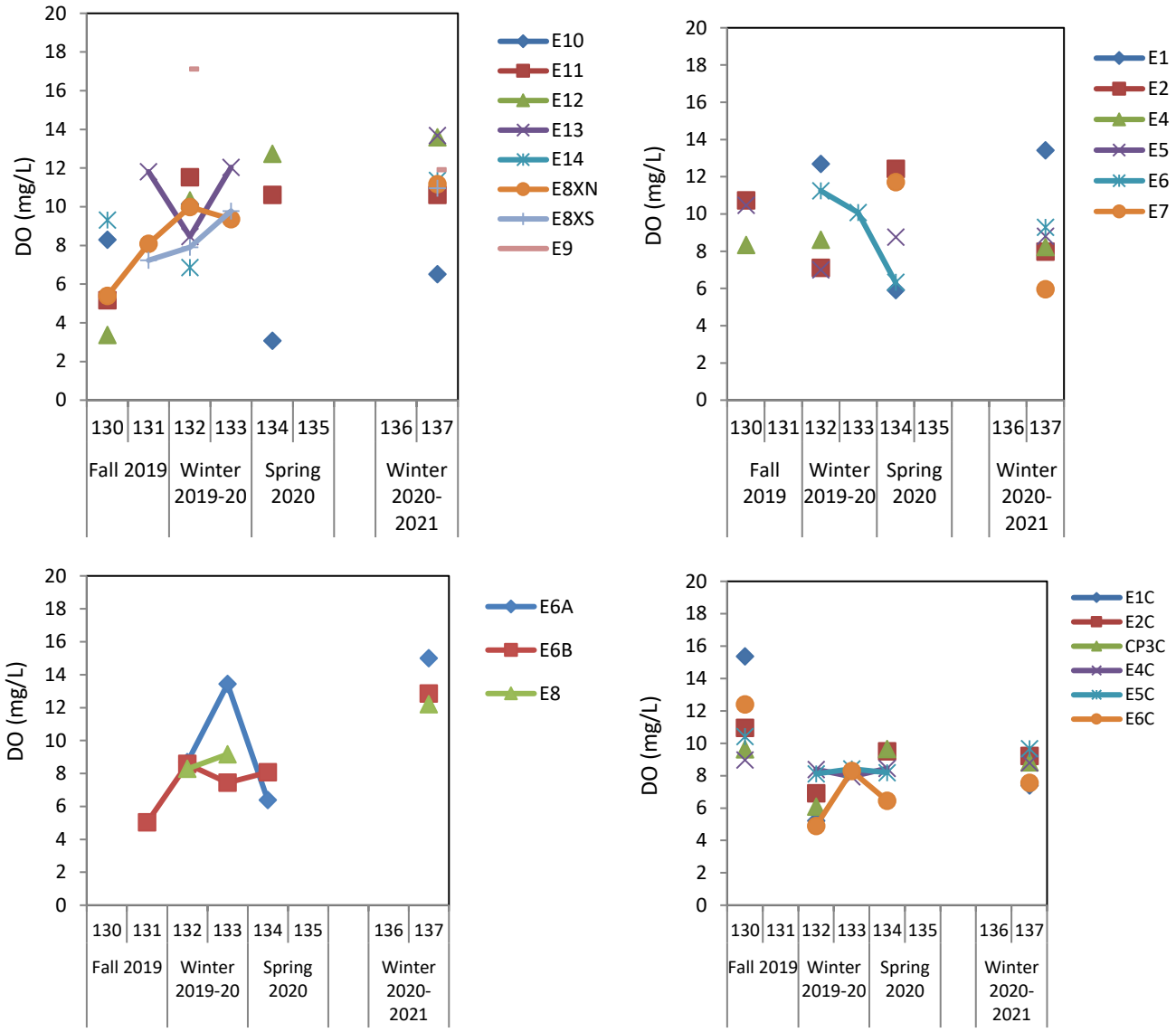

Figure 39. Average monthly dissolved oxygen (mg/L) at the Eden Landing pond complex, South San Francisco Bay, California; Sept. 2019 – Feb 2021. Intermittent datasonde malfunctions interfered with readings during rounds 133-135.

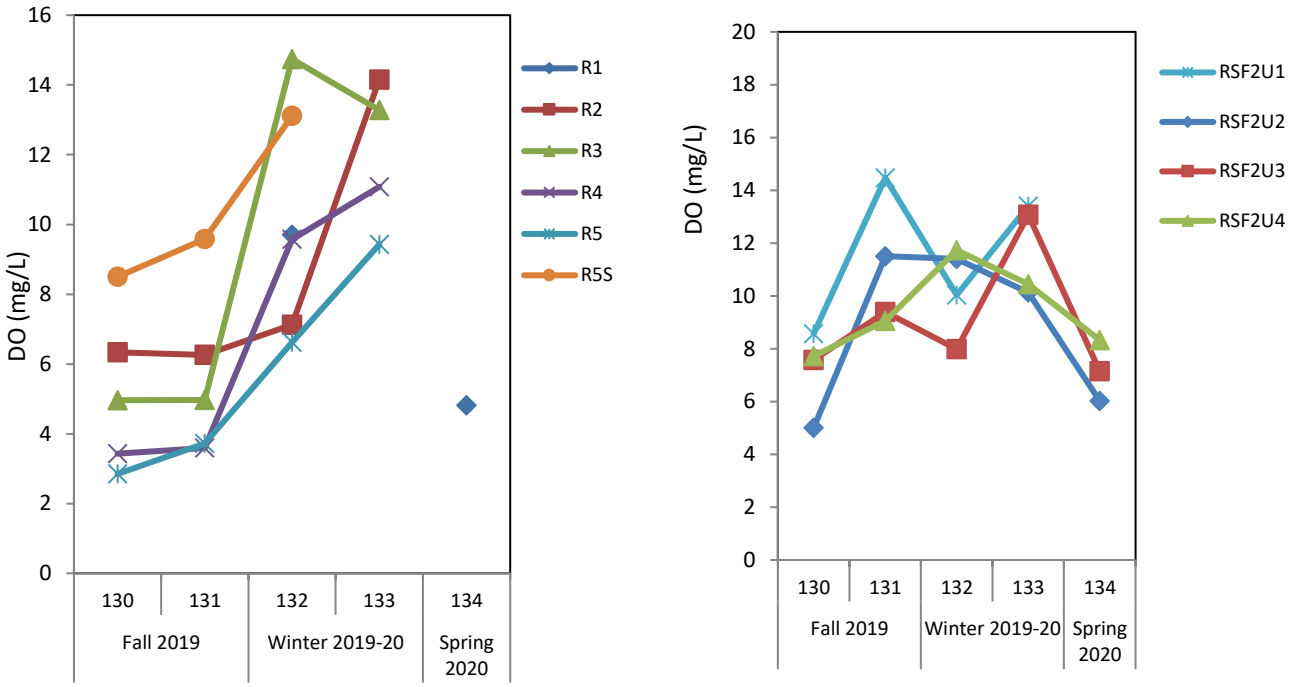

Figure 40. Average monthly dissolved oxygen (mg/L) at the Ravenswood pond complex, South San Francisco Bay, California; Sept. 2097 – March 2020. Not all ponds were surveyed during round 134 (Table 1). Intermittent datasonde malfunctions interfered with readings during rounds 133 and 134.

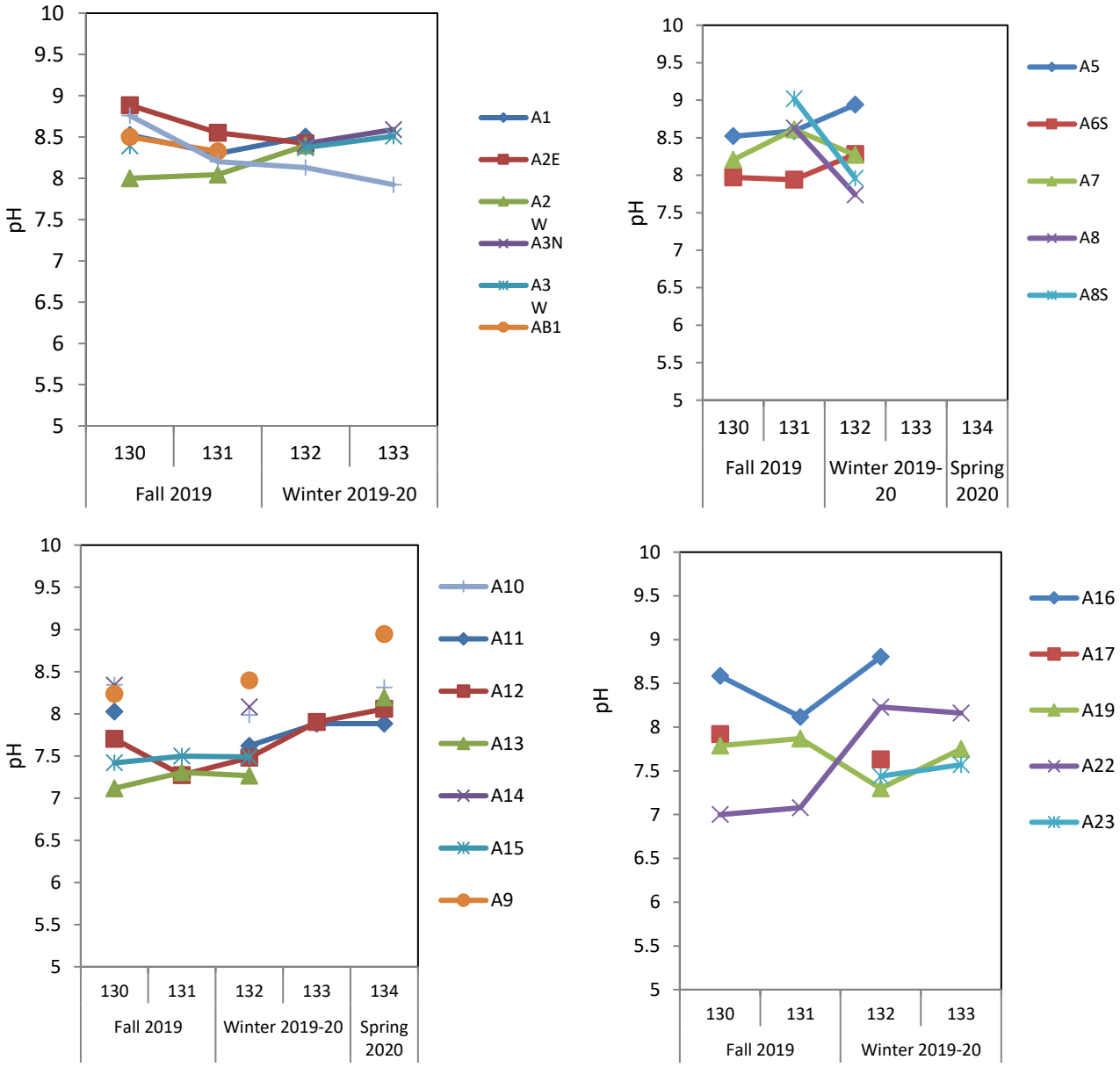

Figure 41. Average monthly pH at the Alviso pond complex, South San Francisco Bay, California; Sept. 2019 – March 2021. Not all ponds were surveyed during round 134 (Table 1). Intermittent datasonde malfunctions interfered with readings during rounds 133 and 134.

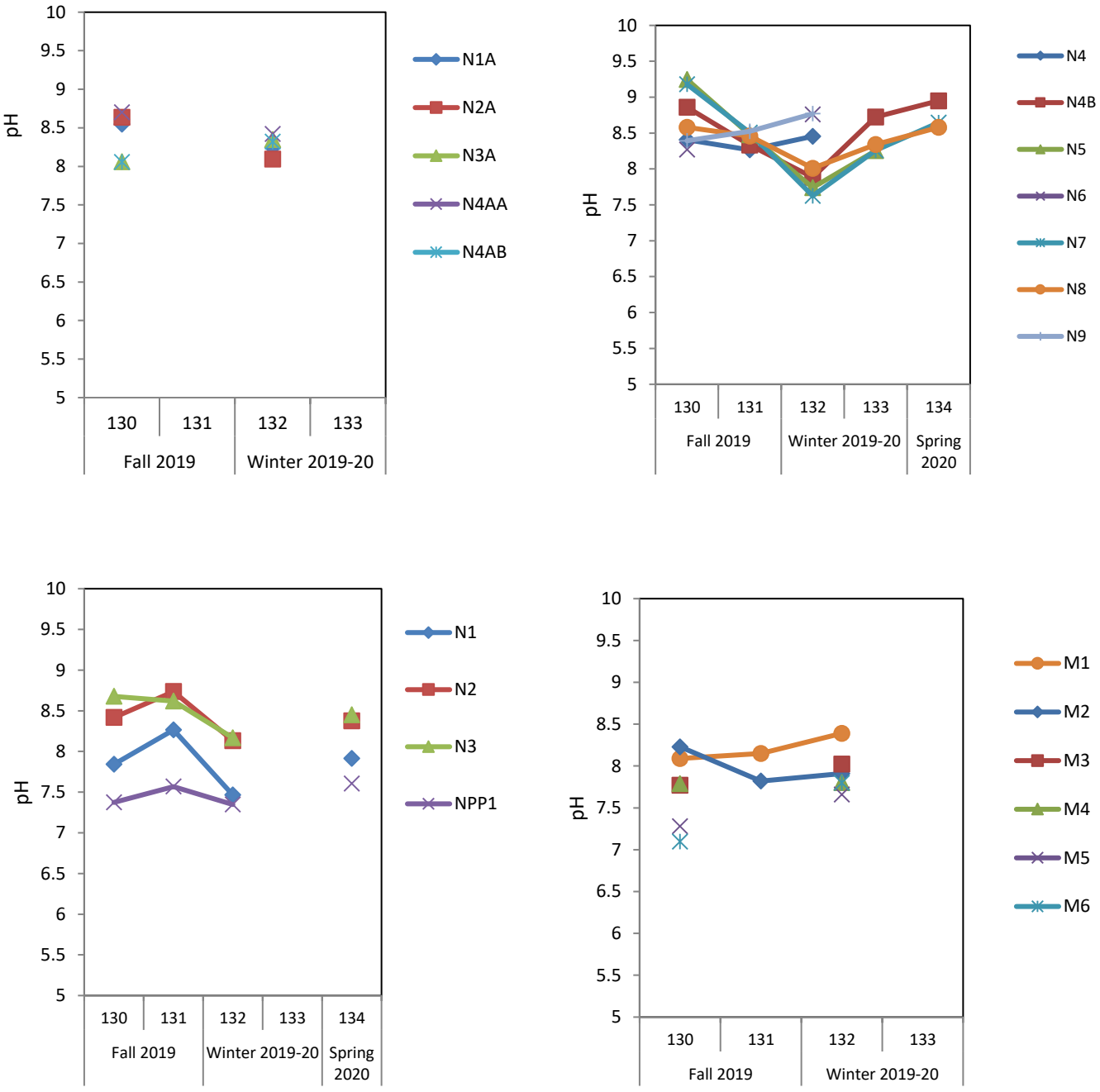

Figure 42. Average monthly pH at the Coyote Hills, Dumbarton and Mowry pond complexes, South San Francisco Bay, California; Sept. 2019 – March 2020. Not all ponds were surveyed during round 134 (Table 1). Intermittent datasonde malfunctions interfered with readings during rounds 133 and 134.

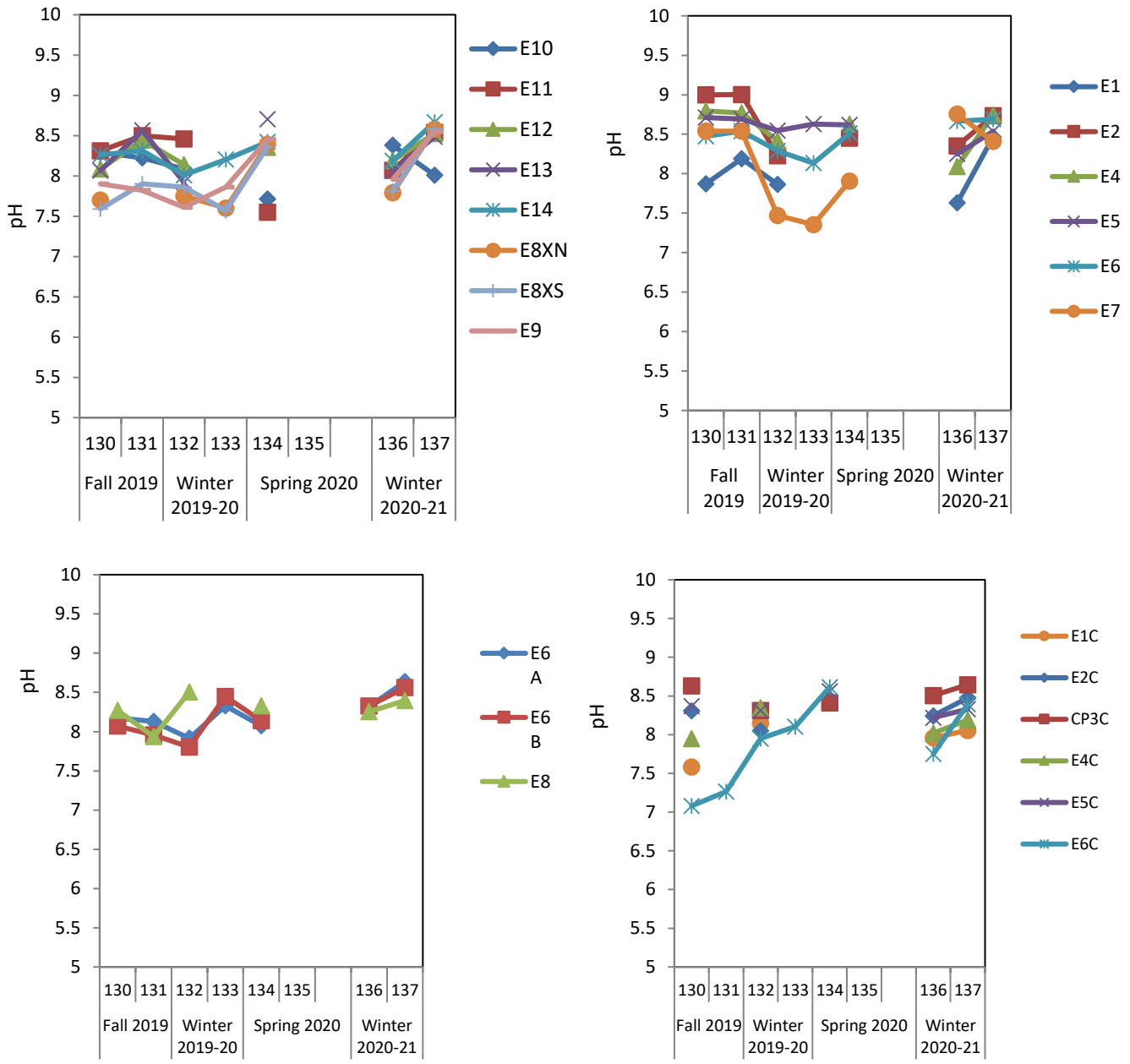

Figure 43. Average monthly pH at the Eden Landing pond complex, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. Intermittent datasonde malfunctions interfered with readings during rounds 133-135.

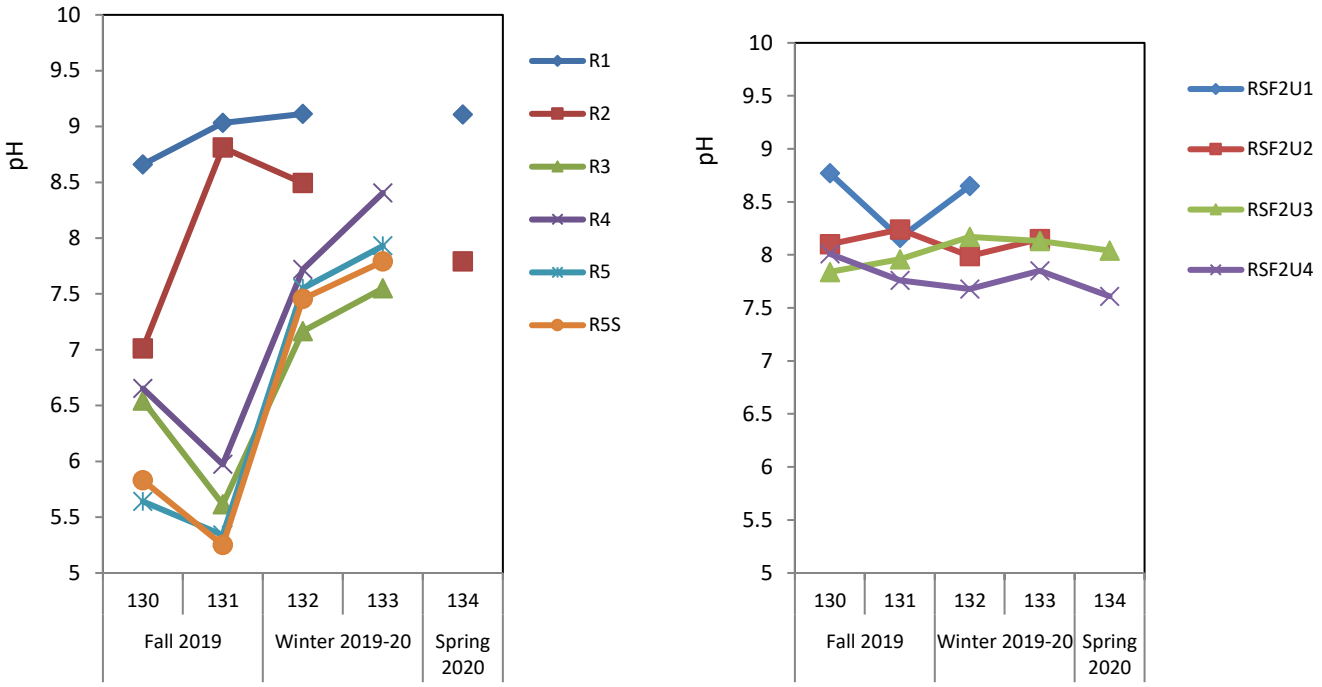

Figure 44. Average monthly pH at the Ravenswood pond complex, South San Francisco Bay, California; Sept. 2019 – March 2020. Not all ponds were surveyed during round 134 (Table 1). Intermittent datasonde malfunctions interfered with readings during rounds 133 and 134.

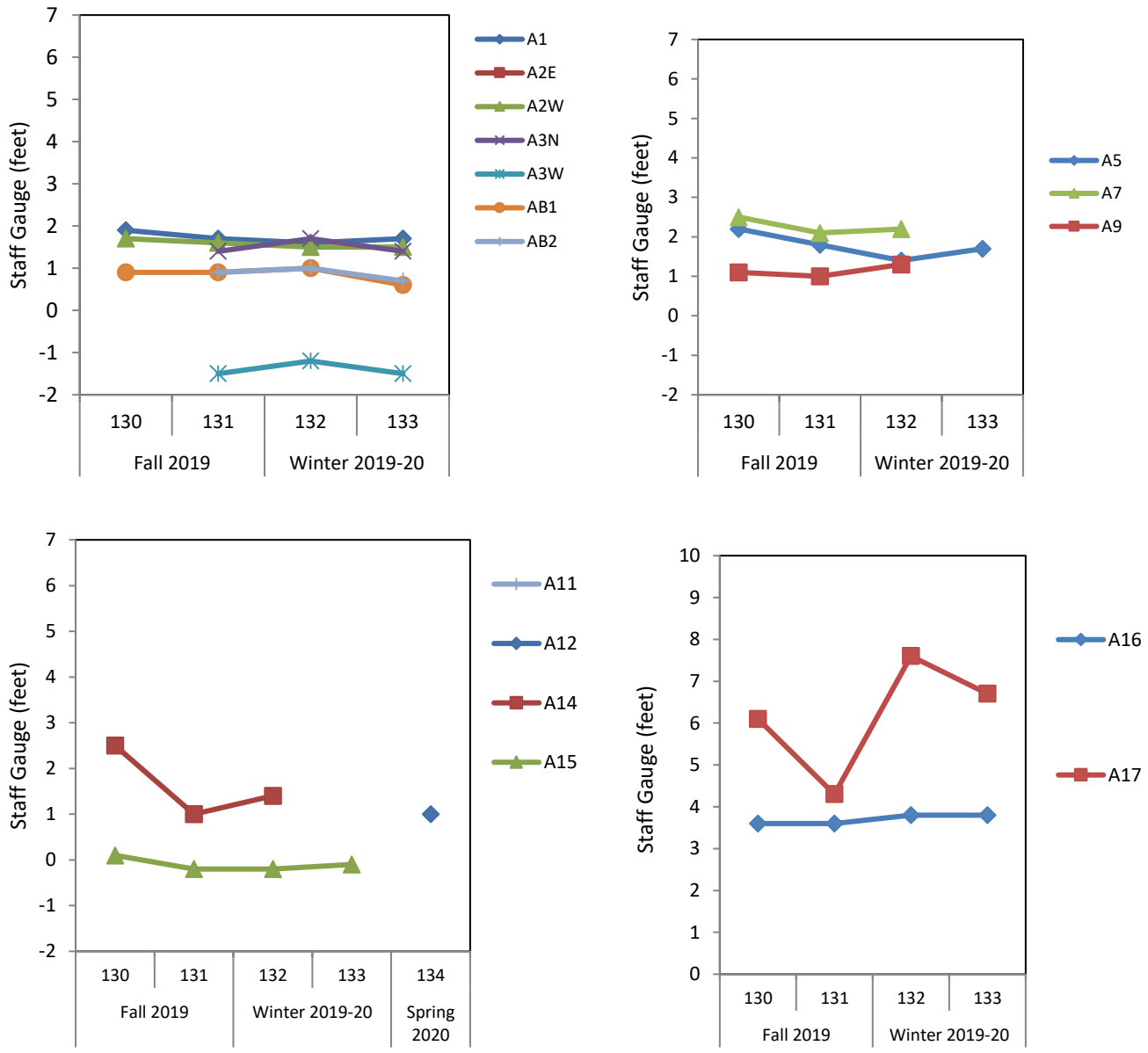

Figure 45. Average monthly staff gauge (feet) at the Alviso pond complex, South San Francisco Bay, California; Sept. 2019 - March 2021. Staff gauge values were averaged among all surveys (bird surveys and water quality surveys, if separate), but treated as a single value due to potential duplication of data between tables. Not all ponds were surveyed during round 134 (Table 1).

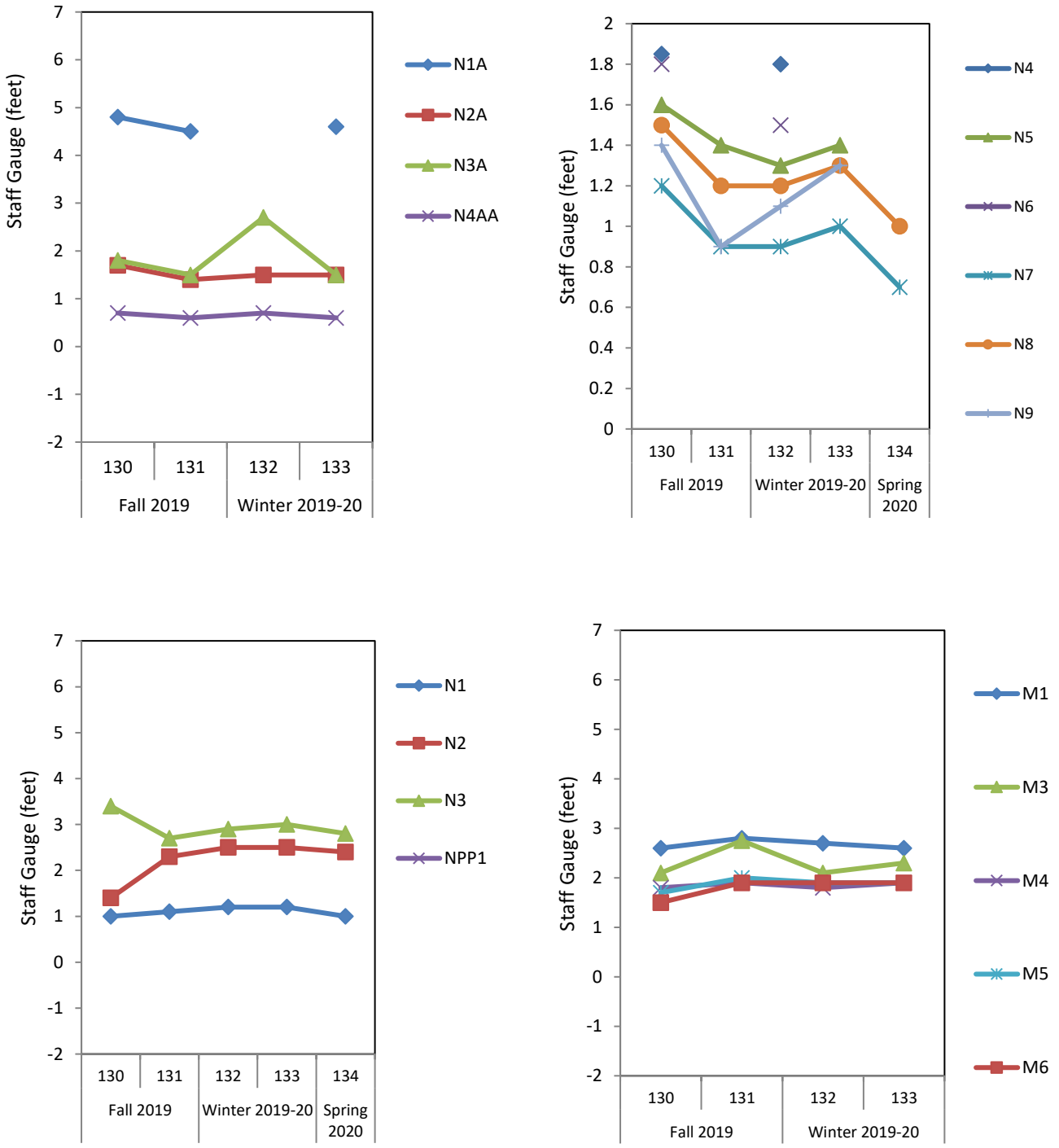

Figure 46. Average monthly staff gauge (feet) at the Coyote Hills, Dumbarton and Mowry pond complexes, South San Francisco Bay, California; Sept. 2019 - March 2020. Staff gauge values were averaged between all surveys (bird surveys and water quality surveys, if separate), but treated as a single value due to potential duplication of data between tables. Not all ponds were surveyed during round 134 (Table 1).

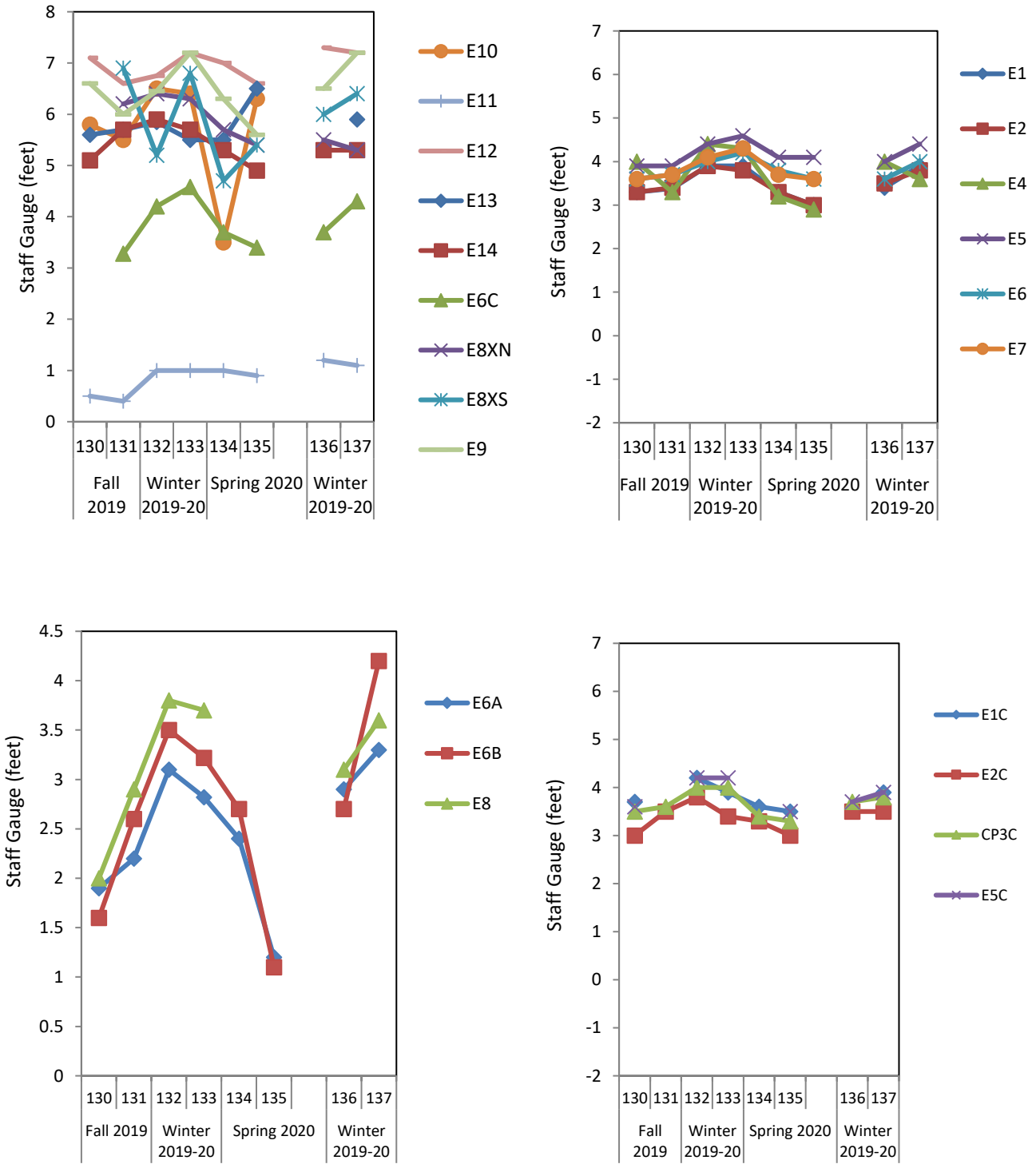

Figure 47. Average monthly staff gauge (feet) at the Eden Landing pond complex, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. Staff gauge values were averaged among all surveys (bird surveys and water quality surveys, if separate), but treated as a single value due to potential duplication of data between tables.

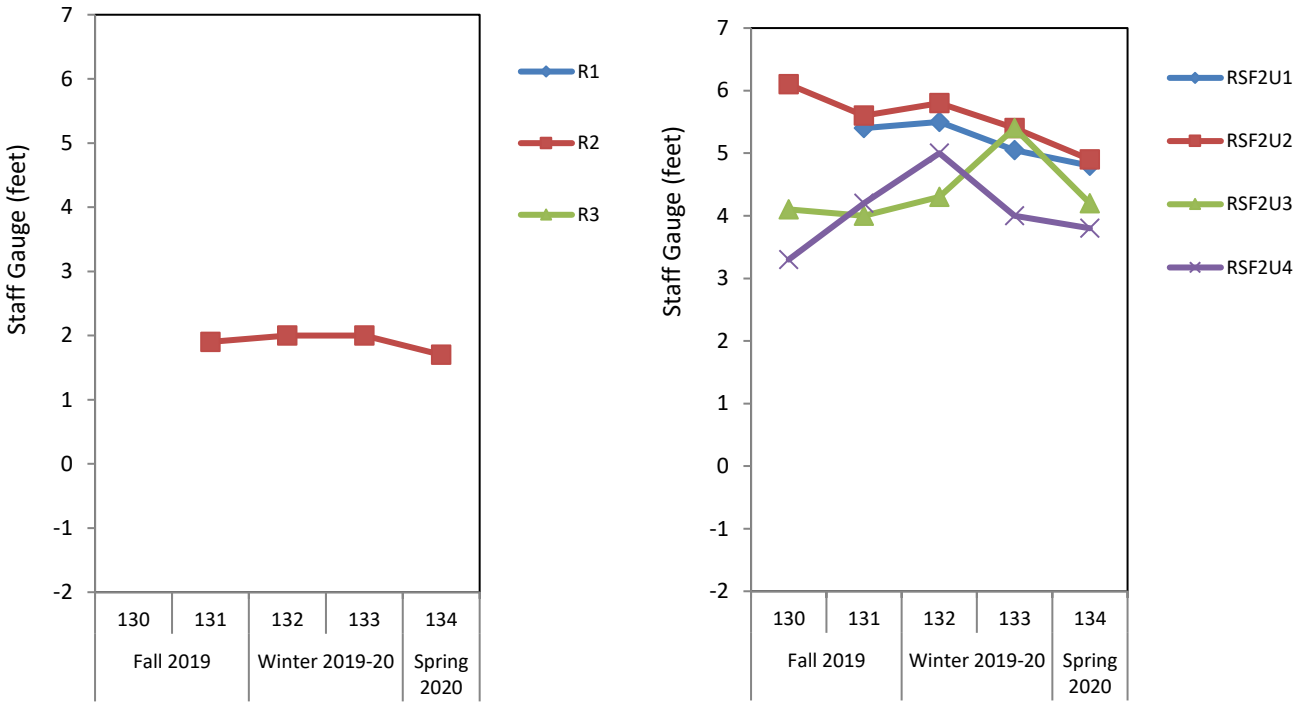

Figure 48. Average monthly staff gauge (feet) at the Ravenswood pond complex, South San Francisco Bay, California; Sept. 2019 - March 2020. Staff gauge values were averaged among all surveys (bird surveys and water quality surveys, if separate), but treated as a single value due to potential duplication of data between tables. Not all ponds were surveyed during round 134 (Table 1).

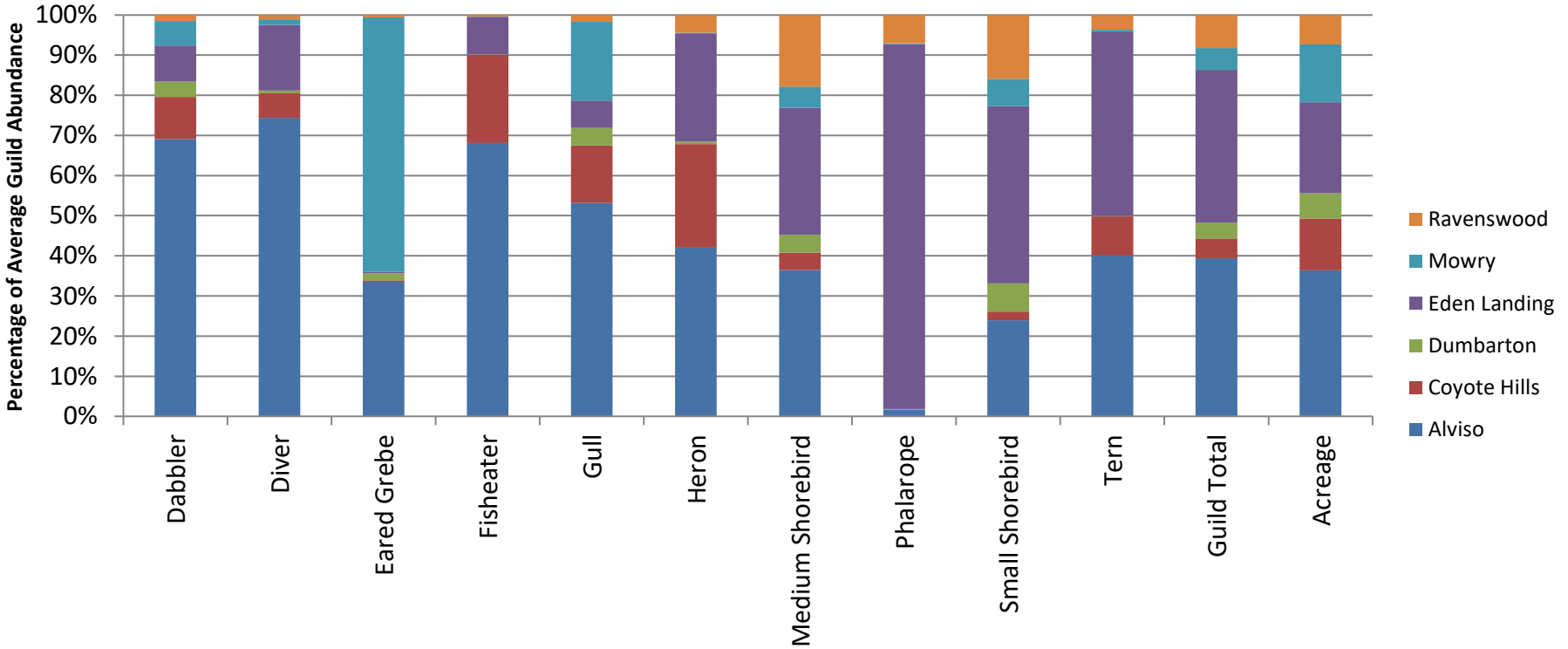

Figure 49. Percentage of average guild abundance by complex with relative acreage of the complexes, South San Francisco Bay, California; Sept. 2019 – Feb. 2021. Reports prior to 2014 reported total abundance, rather than average abundance. Average abundance is more representative when sample sizes (number of surveys) are different between complexes, as was the case in 2014. If sample sizes are equal, total abundance and average abundance should result in the same proportions between complexes. Only a subset of ponds were surveyed outside of Eden Landing from March to April 14, 2020. Only Eden Landing ponds were surveyed from April 15, 2020 to February 2021 (Table 1).

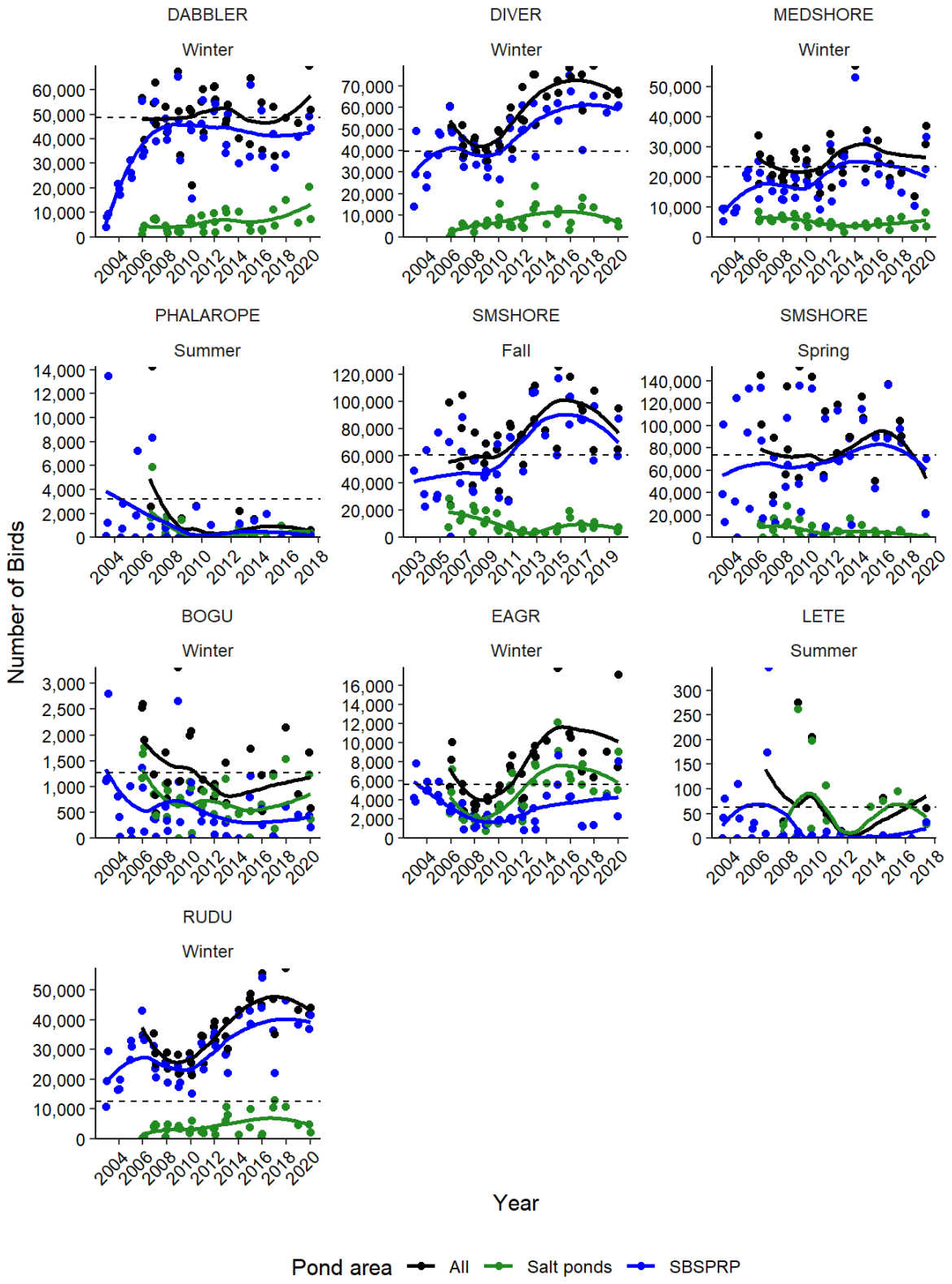

Figure 50. Counts of dabbling ducks, diving ducks, medium shorebirds (MEDSHORE), phalaropes, small shorebirds (SMSHORE), Bonaparte's Gulls (BOGU), Eared Grebe (EAGR), Least Terns (LETE), and Ruddy Ducks (RUDU) during peak seasons within the SBSPRP and salt production ponds. Lines represent LOESS curves and the dashed lines denote SBSPRP Targets or baseline values (average counts from 2005-2007). Only complete surveys of all sites are included.

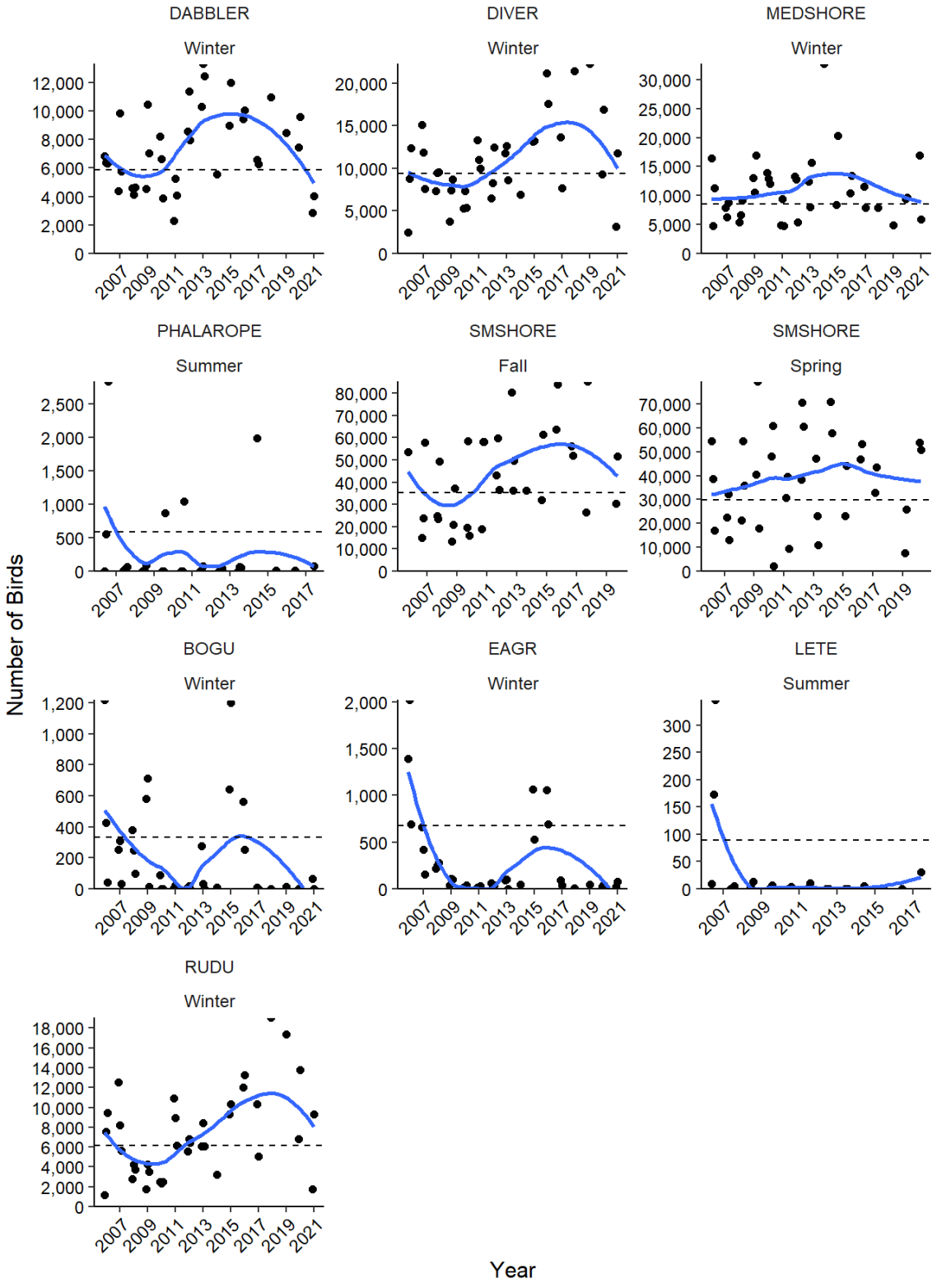

Figure 51. Counts of dabbling ducks, diving ducks, medium shorebirds (MEDSHORE), phalaropes, small shorebirds (SMSHORE), Bonaparte's Gulls (BOGU), Eared Grebe (EAGR), Least Terns (LETE), and Ruddy Ducks (RUDU) during peak seasons at Eden Landing Ecological Reserve sites. Lines represent LOESS curves and the dashed lines denote baseline values (average counts from 2005-2007).

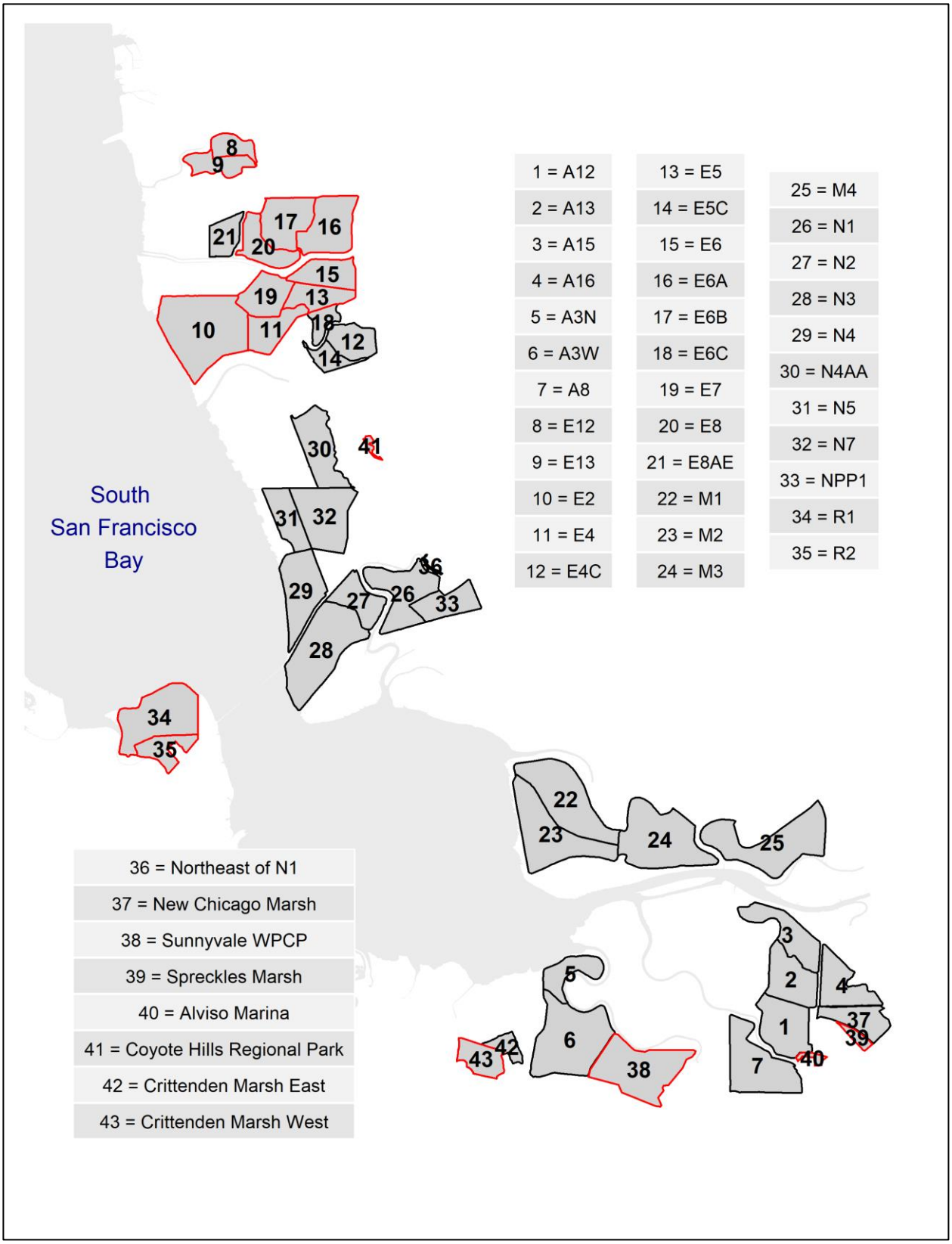

Figure 52. Map of target sites for Phalarope Migration Surveys. All recommended phalarope survey sites are outlined in black, plus sites that were surveyed opportunistically and contained phalaropes in 2019 or 2020. Sites that were surveyed in 2020 are outlined in red.

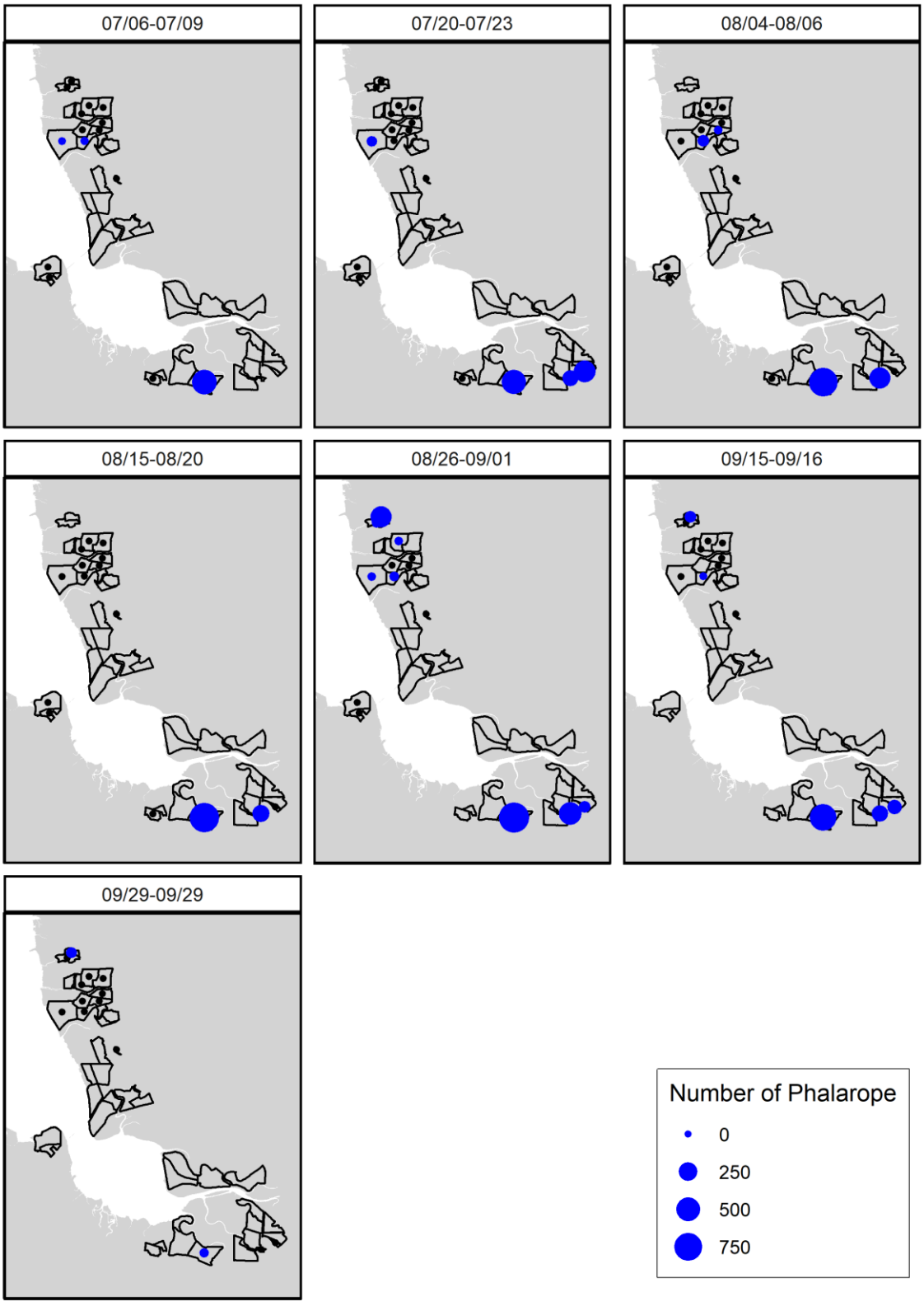

Figure 53. Maps with the number of phalaropes counted during each Phalarope Migration Survey in south San Francisco Bay in 2020. Dates for each survey appear at the top of the map. Blue dots indicate the total number of phalaropes observed at each site. Black dots indicate sites that were surveyed and contained zero phalaropes. Salt ponds (former and current) and other suitable habitats are outlined in black. Surveys were not permitted on USFWS lands in 2020, but opportunistic reports of 0 phalaropes provided by essential workers at Ravenswood ponds R1 and R2 were included in analyses.

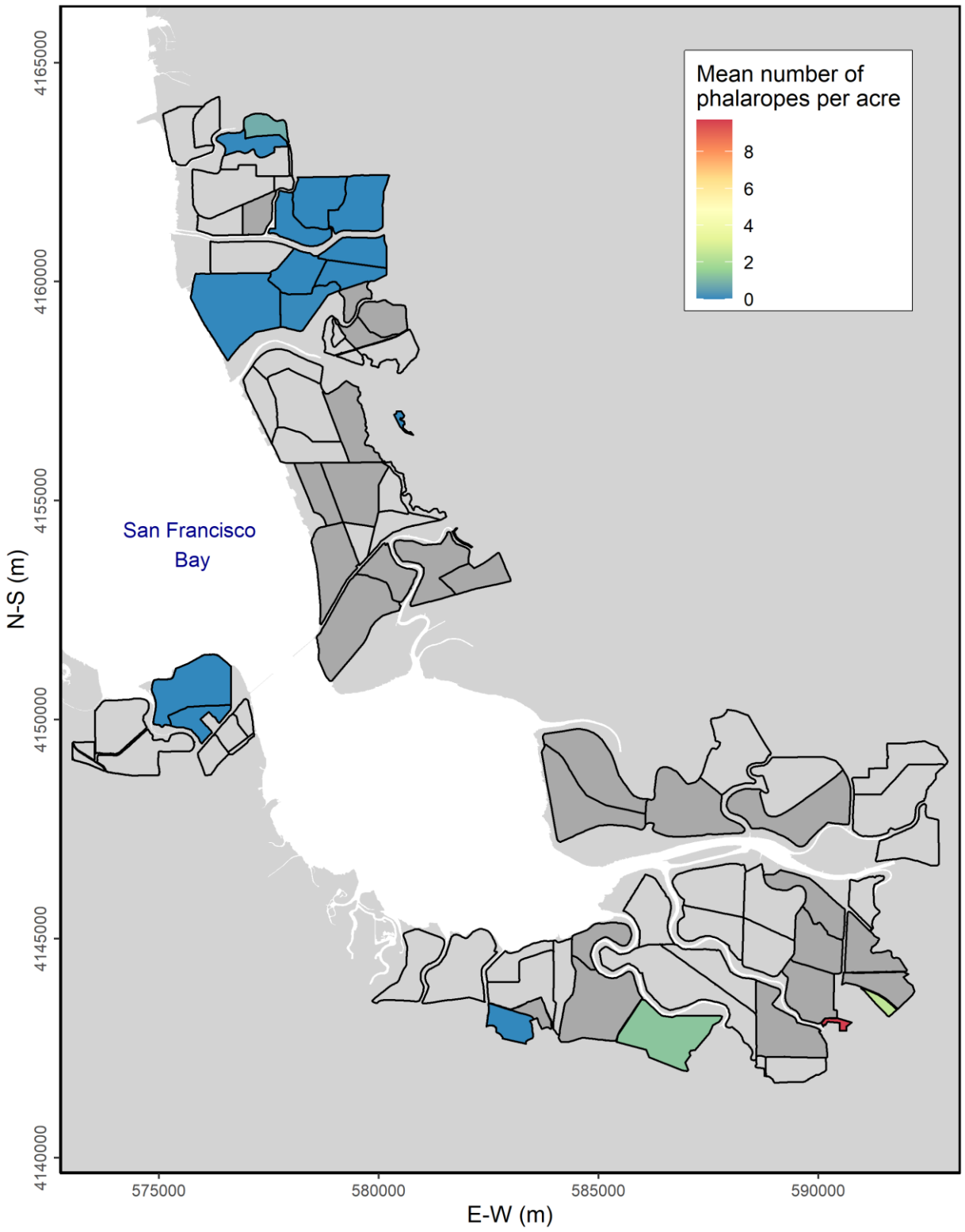

Figure 54. Map of the density of phalaropes averaged across Phalarope Migration Surveys in 2020. Salt ponds (former and current) and other suitable habitats are outlined in black. Sites with high numbers of phalaropes in 2003-2017 that were not surveyed in 2020 appear in dark grey. Surveys were not permitted on USFWS lands in 2020, but opportunistic reports of 0 phalaropes provided by essential workers at Ravenswood ponds R1 and R2 were included in analyses.

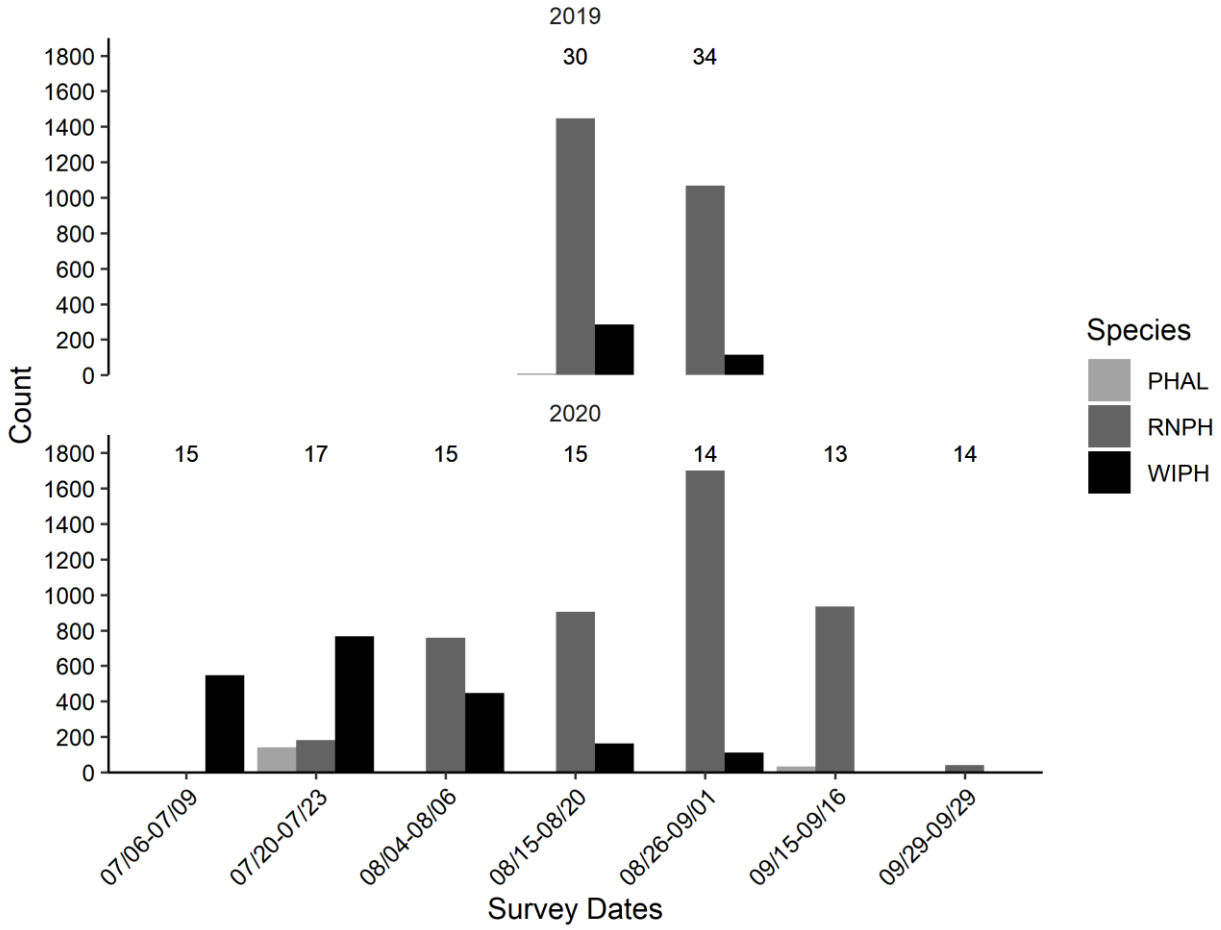

Figure 55. Counts of phalarope species observed during the Phalarope Migration Surveys in 2019-2020. PHAL = phalaropes of unidentified species; RNPH = Red-necked Phalarope; WIPH = Wilson's Phalarope. Counts are summed across all sites visited during each survey. The numbers above each count indicate the number of sites surveyed. Two pilot surveys were conducted in 2019 and seven surveys were conducted in 2020. Survey dates encompass the dates of every site visit for each survey round across all years.

APPENDIX I. Species assignments to foraging guilds. Guilds included dabblers, divers, Eared Grebes, fisheaters, gulls, herons, medium shorebirds, phalaropes, small shorebirds, and terns.

Common Name	Scientific Name	Guild
American Coot	*Fulica americana*	Dabbler
American Green-winged Teal	*Anas crecca*	Dabbler
American Wigeon	*Anas americana*	Dabbler
Blue-winged Teal	*Anas discors*	Dabbler
Cinnamon Teal	*Anas cyanoptera*	Dabbler
Common Moorhen	*Gallinula chloropus*	Dabbler
Domestic Mallard	*Anas spp*	Dabbler
Eurasian Wigeon	*Anas penelope*	Dabbler
Gadwall	*Anas strepera*	Dabbler
Green-winged Teal	*Anas crecca*	Dabbler
Long-tailed Duck	*Clangula hyemalis*	Dabbler
Mallard	*Anas platyrhynchos*	Dabbler
Northern Pintail	*Anas acuta*	Dabbler
Northern Shoveler	*Anas clypeata*	Dabbler
Unidentified dabbling duck	*dabbling duck spp.*	Dabbler
Barrow's Goldeneye	*Bucephala islandica*	Diver
Bufflehead	*Bucephala albeola*	Diver
Canvasback	*Aythya valisineria*	Diver
Common Goldeneye	*Bucephala clangula*	Diver
Greater Scaup	*Aythya marila*	Diver
Lesser Scaup	*Aythya affinis*	Diver
Redhead	*Aythya americana*	Diver
Ring-necked Duck	*Aythya collaris*	Diver
Ruddy Duck	*Oxyura jamaicensis*	Diver
Surf Scoter	*Melanitta perspicillata*	Diver
Tufted Duck	*Aythya fuligula*	Diver
Unidentified diving duck	*diving duck spp.*	Diver
Unidentified scaup	*Aythya spp.*	Diver
White-winged scoter	*Melanitta fusca*	Diver
Eared Grebe	*Podiceps nigricollis*	Eared Grebe
American White Pelican	*Pelecanus erythrorhynchos*	Fisheater
Belted Kingfisher	*Ceryle alcyon*	Fisheater
Black Skimmer	*Rhynchops niger*	Fisheater
Brown Booby	*Sula leucogaster*	Fisheater
Brown Pelican	*Pelecanus occidentalis*	Fisheater
Clark's Grebe	*Aechmophorus clarkii*	Fisheater
Common Loon	*Gavia immer*	Fisheater
Common Merganser	*Mergus merganser*	Fisheater
Double-crested Cormorant	*Phalacrocorax auritus*	Fisheater
Hooded Merganser	*Lophodytes cucullatus*	Fisheater
Horned Grebe	*Podiceps auritus*	Fisheater
Long-tailed Jaeger	*Stercorarius longicaudus*	Fisheater
Pacific Loon	*Gavia pacifica*	Fisheater

Pelagic Cormorant	*Phalacrocorax pelagicus*	Fisheater
Pied-billed Grebe	*Podilymbus podiceps*	Fisheater
Red-breasted Merganser	*Mergus serrator*	Fisheater
Red-necked Grebe	*Podiceps grisegena*	Fisheater
Red-throated Loon	*Gavia stellata*	Fisheater
Unidentified Cormorant	*Phalacrocorax spp*	Fisheater
Unidentified grebe	*grebe spp*	Fisheater
Western Grebe	*Aechmophorus occidentalis*	Fisheater
Western Grebe or Clark's Grebe	*Aechmophorus spp.*	Fisheater
Bonaparte's Gull	*Larus philadelphia*	Gull
California Gull	*Larus californicus*	Gull
California Gull or Ring-billed Gull	*Larus spp.*	Gull
Franklin's Gull	*Larus pipixcan*	Gull
Glaucous Gull	*Larus hyperboreus*	Gull
Glaucous-winged Gull	*Larus glaucescens*	Gull
Herring Gull	*Larus argentatus*	Gull
Mew Gull	*Larus canus*	Gull
Ring-billed Gull	*Larus delawarensis*	Gull
Sabine's Gull	*Xena sabini*	Gull
Slaty-backed Gull	*Larus schistisagus*	Gull
Thayer's Gull	*Larus thayeri*	Gull
Unidentified gull	*Larus spp.*	Gull
Western Gull	*Larus occidentalis*	Gull
American Bittern	*Botarus lentiginosus*	Heron
Black-crowned Night-Heron	*Nycticorax nycticorax*	Heron
Cattle Egret	*Bubulcus ibis*	Heron
Great Blue Heron	*Ardea herodias*	Heron
Great Egret	*Ardea alba*	Heron
Green Heron	*Butorides virescens*	Heron
Little Blue Heron	*Egretta caerulea*	Heron
Snowy Egret	*Egretta thula*	Heron
White-faced Ibis	*Plegadis chihi*	Heron
American Avocet	*Recurvirostra americana*	Medium shorebird
Black Oystercatcher	*Haematopus bachmani*	Medium shorebird
Black Turnstone	*Arenaria melanocephala*	Medium shorebird
Black-bellied Plover	*Pluvialis squatarola*	Medium shorebird
Black-necked Stilt	*Himantopus mexicanus*	Medium shorebird
Common Snipe	*Gallinago gallinago*	Medium shorebird
Golden Plover	*Pluvialis spp.*	Medium shorebird
Greater Yellowlegs	*Tringa melanoleuca*	Medium shorebird
Killdeer	*Charadrius vociferus*	Medium shorebird
Lesser Yellowlegs	*Tringa flavipes*	Medium shorebird
Long-billed Curlew	*Numenius americanus*	Medium shorebird
Marbled Godwit	*Limosa fedoa*	Medium shorebird
Pacific Golden-Plover	*Pluvialis fulva*	Medium shorebird
Red Knot	*Calidris canutus*	Medium shorebird
Ruddy Turnstone	*Arenaria interpres*	Medium shorebird

Ruff	*Philomachus pugnax*	Medium shorebird
Spotted Redshank	*Tringa erythropus*	Medium shorebird
Stilt Sandpiper	*Calidris himantopus*	Medium shorebird
Surfbird	*Aphriza virgata*	Medium shorebird
Unidentifed yellowlegs	*Tringa spp.*	Medium shorebird
Unidentified medium shorebird	*med shorebird spp.*	Medium shorebird
Wandering Tattler	*Tringa incana*	Medium shorebird
Whimbrel	*Numenius phaeopus*	Medium shorebird
Willet	*Catoptrophorus semipalmatus*	Medium shorebird
Red Phalarope	*Phalaropus fulicaria*	Phalarope
Red-necked Phalarope	*Phalaropus lobatus*	Phalarope
Unidentified phalarope	*Phalaropus spp.*	Phalarope
Wilson's Phalarope	*Phalaropus tricolor*	Phalarope
Baird's Sandpiper	*Calidris bairdii*	Small shorebird
Dunlin	*Calidris alpina*	Small shorebird
Least Sandpiper	*Calidris minutilla*	Small shorebird
Long-billed Dowitcher	*Limnodromus scolopaceus*	Small shorebird
Pectoral Sandpiper	*Calidris melanotos*	Small shorebird
Sanderling	*Calidris alba*	Small shorebird
Semipalmated Plover	*Charadrius semipalmatus*	Small shorebird
Semipalmated Sandpiper	*Calidris pusilla*	Small shorebird
Short-billed Dowitcher	*Limnodromus griseus*	Small shorebird
Snowy Plover	*Charadrius alexandrinus*	Small shorebird
Spotted Sandpiper	*Actitis macularia*	Small shorebird
Unidentified Dowitcher	*Limnodromus spp.*	Small shorebird
Unidentified peeps	*Calidris spp.*	Small shorebird
Western Sandpiper	*Calidris mauri*	Small shorebird
Western Sandpiper or Dunlin	*Calidris spp.*	Small shorebird
Western Sandpiper or Least Sandpiper	*Calidris spp.*	Small shorebird
Arctic Tern	*Sterna paradisaea*	Tern
Black Tern	*Chlidonias niger*	Tern
Caspian Tern	*Sterna caspia*	Tern
Common Tern	*Sterna hirundo*	Tern
Elegant Tern	*Sterna elegans*	Tern
Forster's Tern	*Sterna forsteri*	Tern
Least Tern	*Sterna antillarum browni*	Tern
Unidentified tern	*Sterna spp.*	Tern