SAN FRANCISCO BAY
BIRD OBSERVATORY

Community Science-Based Colonial Waterbird Monitoring: 2020 Nesting Summary

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Program Summary

The San Francisco Bay Bird Observatory (SFBBO) is a nonprofit organization dedicated to the conservation of birds and their habitats through science and outreach. The Colonial Waterbird Program (CWB) is one of SFBBO's long-standing community science programs, initiated in 1982 to monitor waterbird nesting colonies in the San Francisco Bay. The program has engaged hundreds of community scientists in waterbird nest-monitoring activities and introduced hundreds of local community members to the presence of birds and their needs for protection and management. Trained community scientists independently collect observational data on nesting status, timing of breeding, waterbird behavior, and evidence of disturbance at selected colonies each year. This information is shared with landowners, resource agencies, and other conservation organizations and contributes to the conservation and management of these species. In addition to monitoring colonies, many community scientists in the program help SFBBO develop relationships with landowners and local communities and lead presentations and bird viewings to share these birds with the public.

Introduction

Colonial waterbirds are essential components of wetland and aquatic habitats across the globe (Hoffmann et al. 1996). These species play key roles within their ecosystem, require specific habitat types and qualities in order to survive, and thereby can be viewed as biological indicators of environmental health and function (Kushlan 1993). In densely inhabited areas like the San Francisco Bay, human encroachment and habitat degradation are a few of the many factors that affect wetland habitats (Lotze et al. 2006) and therefore colonial waterbird populations.

Colonial waterbirds are attractive candidates for community science (formerly citizen science) monitoring. In addition to their ecological value, they are conspicuous and intriguing animals, especially when aggregated in large breeding groups (Parnell et al. 1988). SFBBO's colonial waterbird monitoring not only provides information on the health of Bay area ecosystems, but also encourages the public sentiment that fuels many of these conservation efforts.

Since colonial waterbird colonies can be composed of several species utilizing a large geographic area, significant changes within these populations may not be detectable for many years by standard research methods. In addition, funding and personnel limitations may prohibit professional-level monitoring at the required scale. Community science initiatives are excellent methods for contributing to long-term, geographically expansive research goals at low cost (Dickinson et al. 2010; Cooper et al. 2014). Furthermore, community science studies provide opportunities for public involvement, which foster local stewardship and environmental appreciation.

Since 1982, SFBBO has annually recruited and trained community scientists to monitor nesting herons, egrets, cormorants, gulls, and terns in the San Francisco Bay as part of our CWB Program. The CWB emphasizes community engagement and community science in order to: 1) increase monitoring capacity across a large geographic area, and 2) generate public interest in protecting waterbirds and their habitats. Many of the colonies monitored by SFBBO community scientists would not otherwise be tracked. In this report, we summarize results from SFBBO's CWB Program in 2020.

Survey Methods

Study Area

Our study area encompasses colonies within the counties of Santa Clara, San Mateo, Alameda, and San Francisco (Figure 1). Colonies are located as far north as San Francisco, as far east as Livermore, as far south as Coyote Valley, and as far west as Pescadero (Figure 1). The Audubon Canyon Ranch manages a similar monitoring program for herons and egrets in the North and Central Bays and Point Blue Conservation Science manages a program in the San Joaquin Valley.

Waterbird Colony Monitoring

The observational study methods for waterbird colony monitoring have remained largely unchanged since the program's initiation in 1982. Our monitoring efforts are divided based on two guilds: 1) gulls, terns and shorebirds; 2) herons, egrets and cormorants. Our gull, tern and shorebird monitoring includes primarily colonies of California Gull (*Larus californicus*), Forster's Tern (*Sterna forsteri*) and Caspian Tern (*Hydroprogne caspia*), with secondary species, including American Avocet (*Recurvirostra americana*), Black-necked Stilt (*Himantopus mexicanus*), and Black Skimmer (*Rynchops niger*), when nesting with our primary species of interest. Our heron, egret and cormorant monitoring includes primarily colonies of Great Blue Heron (*Ardea herodias*), Great Egret (*A. alba*), Snowy Egret (*Egretta thula*), and Double-crested Cormorant (*Phalacrocorax auritus*). Additionally, we monitor Black-crowned Night Heron (*Nycticorax nycticorax*) and Green Heron (*Butorides virescens*) when nesting with these species. For a list of all species monitored and their 4-letter species code, please see Appendix I.

Each season, community scientists receive training in waterbird identification, natural history, proper "etiquette" around nesting birds, and observational study methods through a standardized protocol. Community scientists are assigned colonies based on a prioritization method developed by SFBBO staff. Priority for monitoring is based on the number of years the colony has been monitored, date of most recent nesting activity, accessibility and community scientist availability. Colonies are located on both public and private lands and are either detected opportunistically or visited with the existing knowledge of nesting activity.

Scheduled monitoring occurs from February to August and includes 7-9 survey dates per colony, depending on the species observed. Great Blue Heron colonies are monitored from early February to July, Double-crested Cormorant and egret colonies are monitored from early March to early August, and gull, tern and shorebird colonies are monitored from early April to early August. Our goal is to monitor once a month (first weekend) during the early and late nesting months and twice a month (first and third weekends) during the peak nesting months. During each monitoring session, community scientists use binoculars and spotting scopes to estimate the number of breeding adults, active nests and chicks. They also note nesting behaviors, such as incubation, nest-building and courtship displays, and any evidence of human disturbance or predation.

On March 19, 2020 the state of California issued a shelter in place order to address the spread of COVID-19. SFBBO directed volunteers to suspend their monitoring activities except in limited cases

where site visits were permitted under the order and visits posed limited risk to surveyors. Surveyors were not granted any access to sites at the Don Edwards San Francisco Bay National Wildlife Refuge for the remainder of the year. In late May and June, SFBBO staff conducted one visit to accessible sites to estimate peak nesting activity.

SFBBO biologists and volunteers typically survey California Gull nesting colonies using a walkthrough method in mid-May. These surveys were not completed in 2020 due to restrictions to land access and health risks associated with COVID-19.

Scouting at Sites with Inactive Colonies

In 2020, SFBBO staff searched sites with inactive colonies for evidence of new breeding activity. There are 65 sites that historically had colonies and became inactive prior to 2020. SFBBO staff visited 38 of these sites, which comprised every known inactive colony with permissible access. Staff searched for target species in suitable habitat within a one quarter mile radius of the geographic coordinates of the inactive colony. If breeding activity was observed, a full observational survey was conducted.

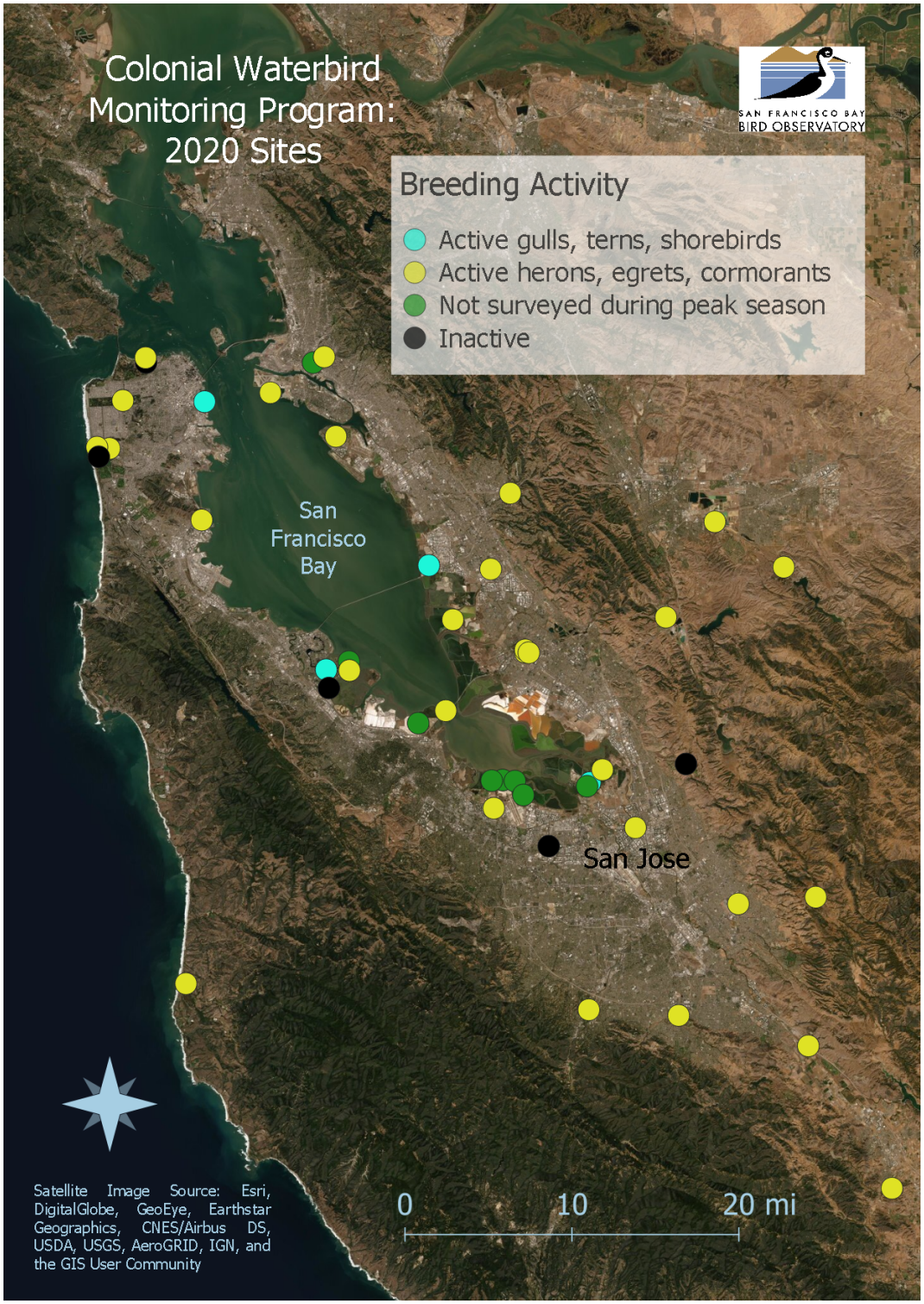

Figure 1. Map of colonial waterbird sites surveyed by SFBBO biologists and volunteers in 2020 in San Francisco Bay, CA. Sites in yellow contained breeding herons, egrets, and/or cormorants; sites in cyan contained breeding gulls, terns, and/or shorebirds; green sites were not surveyed or were surveyed before the peak breeding season (May-July); black sites were visited and no breeding activity was observed.

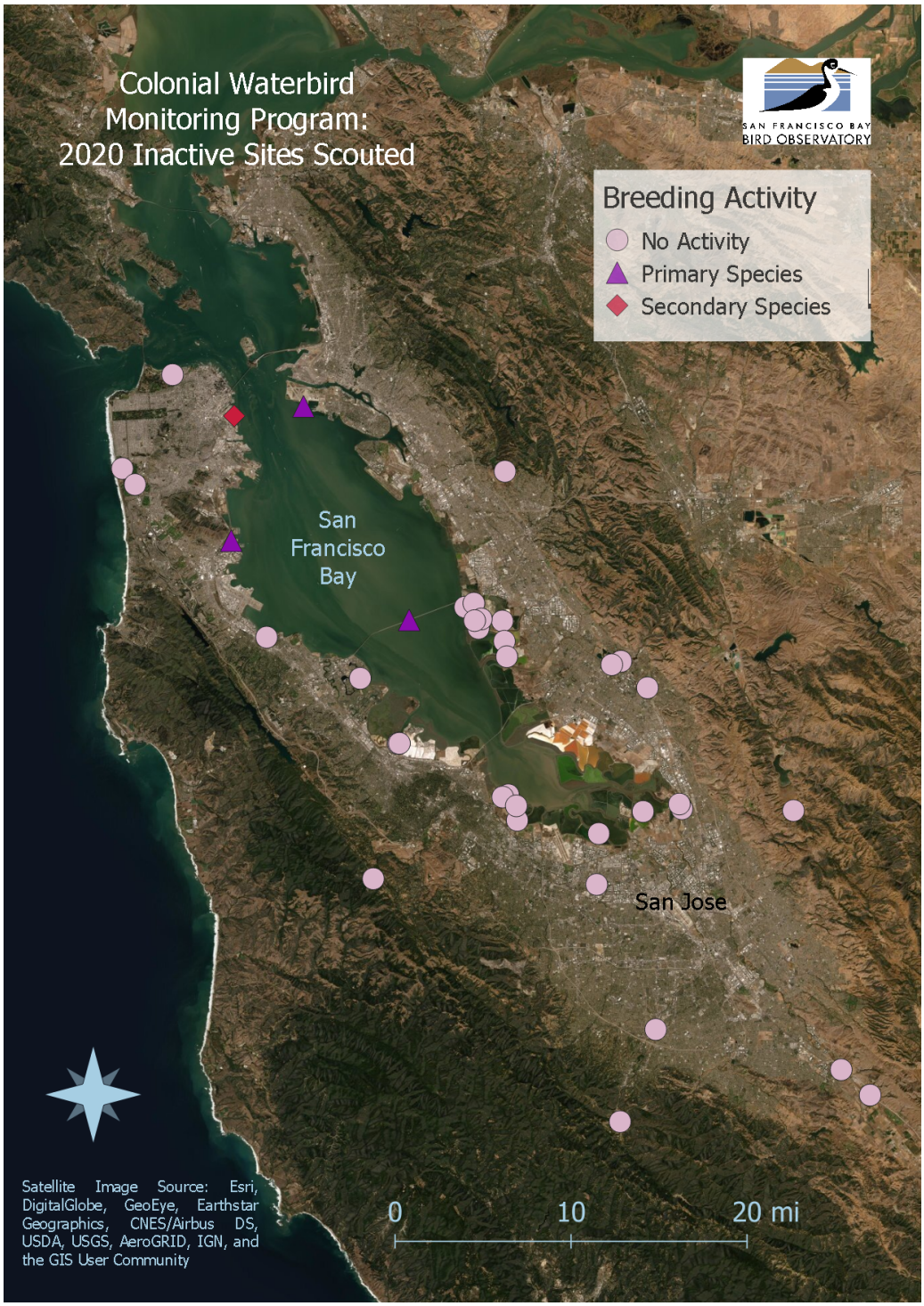

Figure 2. Locations of inactive colony sites scouted by SFBBO staff in 2020 in San Francisco Bay, CA. Locations in pink remained inactive in 2020; primary species that SFBBO targets for monitoring (Great Blue Herons or Double-crested Cormorants) were found breeding at purple locations; secondary species (Western Gulls), which are surveyed when they co-occur at colonies with primary species, were found breeding at the red location.

Results and Discussion

Waterbird colonies

SFBBO surveyed a total of 40 active breeding colonies in 2020 (Table 1, Table 2). The timing and frequency of visits varied by site in 2020, which is presented in the tables. Six colonies were active in 2019, but were not visited in 2020 due to COVID-19 restrictions. In addition, we have anecdotal evidence of breeding at several other colonies that we were unable to survey due to limited access or because they are surveyed by other organizations. These sites include Elmwood Correctional Facility, Shoreline Park, and the Bay Bridge. Due to the interruption of this year's survey schedule by COVID-19 restrictions, survey frequency and timing must be considered when comparing the number of nests for each colony across years.

Waterbirds nested in a variety of habitats, including islands within former salt ponds at Alviso A16, power towers along the Dumbarton Bridge, and eucalyptus trees within a residential neighborhood at Ruus Park. The maximum number of nests documented at each colony during the peak breeding season (May-July) varied from one Green Heron nest (Vasona Reservoir Island) to over 100 nests (e.g., Forster's Terns at Hayward Shoreline and Double-crested Cormorants at Steinberger Slough). Species composition at the colony sites monitored also varied considerably. In 2020, Almaden Lake had four species actively nesting, comprising Great Egrets, Black-crowned Night Herons, Great Blue Herons, and Snowy Egrets. In contrast, Alviso pond A16 had American Avocet, Black Skimmer, Black-necked Stilt, Caspian Terns, and Forster's Terns.

We surveyed at 5 sites with active gull, tern and shorebird colonies (Table 1). An additional four colonies were active in 2019, but could not be surveyed in 2020 due to land access restrictions. Forster's Terns were the most abundant nesting species at the sites that we monitored. American Avocet and Black-necked Stilt nesting was most active at Alviso A16. We observed 25 active Black Skimmer nests at Hayward Shoreline. Caspian Terns again nested on islands at Alviso A16, which was part of a successful Caspian Tern social attraction study initiated in 2015 by the U.S. Geological Survey and U.S. Fish and Wildlife Service (Hartman et al. 2018). The most active nesting sites for Forster's Terns were Hayward Shoreline and Alviso A16.

We monitored 35 sites with active heron, egret, and cormorant colonies (Table 2). An additional two colonies were active in 2019, but could not be surveyed in 2020 due to land access restrictions. Double-crested Cormorants were the most abundant nesting species at surveyed sites. The largest cormorant colony monitored was at the Steinberger Slough, with an estimated 107 nests; this species also nested in large numbers at Dumbarton PG&E towers. Great Blue Herons occupied one large colony (18 nests) at Ovation Court, with several smaller colonies throughout the region. We monitored 7 colonies that included Snowy Egret nests. Nesting for this species was most active at Shorebird Way in Mountain View, with 82 nests. We surveyed 7 colonies that included Black-crowned Night Heron nests. The most active nesting areas for this species were Shorebird Way in Mountain View, with 67 nests, and Lakeshore Park, Newark, with 36 nests.

Table 1. Nests observed within gull, tern and shorebird nesting colonies in 2020 in San Francisco Bay, CA. Nest counts represent the maximum number of active nests observed per colony visit in 2020. DESFBNWR = Don Edwards San Francisco Bay National Wildlife Refuge, EBRPD = East Bay Regional Park District. See Appendix I for species codes. Active sites in DESFBNWR that SFBBO was unable to survey in 2020 due to COVID-19 related site access restrictions comprise Moffett AB1, Moffett AB2, New Chicago Marsh, and Ravenswood SF2.

ColonyName	Organization	AMAV	BLSK	BNST	CATE	FOTE	LETE	WEGU	Survey Dates
Agua Vista	Port of San Francisco	0	0	0	0	0	0	27	05-22
Alviso A16	DESFBNWR	17	5	9	19	14	0	0	04-10, 05-04
Belmont Slough	Other	8	0	4	0	0	0	0	05-18, 07-05, 08-02
Hayward Shoreline	EBRPD	6	25	3	0	661	12	0	05-03, 05-16, 05-20, 06-07, 06-20, 07-13, 08-01
Redwood Shores Parkway, Nob Hill Market	Other	0	0	0	0	0	0	0	05-18, 07-04
	TOTAL	**31**	**30**	**16**	**19**	**675**	**12**	**27**	

Table 2. Nests observed within heron, egret and cormorant nesting colonies in 2020; San Francisco Bay, CA. Nest counts represent the maximum number of active nests observed for each species and colony in 2020. DESFBNWR = Don Edwards San Francisco Bay National Wildlife Refuge, EBRPD = East Bay Regional Park District, SFPUC = San Francisco Public Utilities Commission. See Appendix I for species codes. Active colonies that SFBBO was not able to monitor in 2020 comprise Downtown Oakland and Moffett A3W.

Colony Name	Organization	BCNH	DCCO	GBHE	GREG	GRHE	SNEG	Survey Dates
Alameda WR	Alameda Wildlife Reserve	0	0	9	0	0	0	06-15
Almaden Lake	City of San Jose	3	0	2	5	0	7	02-01, 03-07, 04-04, 04-19, 05-19, 06-06, 06-23, 07-05
Alviso A18	City of San Jose	0	18	0	0	0	0	02-25, 03-19, 04-23, 05-27, 06-24, 07-30
Bay Farm Island, Alameda	Other	0	0	0	11	0	2	03-08, 04-05, 06-15, 08-02
Coyote Ranch Rd Colony	Santa Clara County	0	0	13	0	0	0	02-02, 03-09, 04-04, 04-18, 05-02, 05-18, 06-08, 06-21, 07-05
Don Castro	EBRPD	0	0	9	0	0	0	02-02, 03-08, 04-12, 04-19, 05-10, 05-24, 06-06, 06-22, 07-05, 08-02
Dumbarton PG&E Towers	Other	0	91	0	0	0	0	03-08, 04-04, 05-02, 07-05, 08-02
Eden Landing E4/7	CDFW	0	0	12	0	0	0	03-04, 05-21, 05-28
Grant Lake	Santa Clara County	0	0	3	0	0	0	02-02, 03-08, 05-06, 05-16, 06-08, 06-30, 07-06
King's Academy	Other	0	0	0	0	0	0	05-21
Lake Cunningham	City of San Jose	4	0	1	0	4	0	03-09, 04-17, 05-25, 06-22, 07-06, 08-02
Lake Merced Mesa	San Francisco Recreation & Parks	0	66	6	0	0	0	02-01, 05-20

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Colony Name	Organization	BCNH	DCCO	GBHE	GREG	GRHE	SNEG	Survey Dates
Lake Merced North	San Francisco Recreation & Parks	0	12	0	0	0	0	02-01, 05-20
Lake Merced South	San Francisco Recreation & Parks	0	0	0	0	0	0	02-01, 05-20
Lake Merritt	City of Oakland	0	2	0	0	0	0	03-08, 04-08, 06-07
Lakeshore Park, Newark (Channel Island)	Other	3	0	0	27	0	18	03-19, 04-10, 05-02, 05-19, 06-08, 06-23, 07-06, 08-04
Lakeshore Park, Newark (Ramsgate Island)	Other	2	0	0	0	0	5	03-19, 04-10, 05-02, 05-19, 06-08, 06-23, 07-06, 08-04
Lakeshore Park, Newark (Salisbury Island)	Other	36	0	0	0	0	53	03-09, 04-06, 04-20, 05-16, 06-08, 06-22, 07-06, 08-03
Livermore VA Park & Hospital	Other	0	0	5	1	0	0	02-02, 03-03, 05-21, 06-28, 07-04
Llagas Creek, Morgan Hill	Other	0	0	3	11	0	0	02-01, 03-07, 05-26
Moffett A2W	DESFBNWR	0	0	0	0	0	0	03-07
Ovation Court	City of San Jose	0	0	18	0	0	0	02-02, 03-09, 05-19
Oyster Cove Pier	Other	0	0	3	0	0	0	06-10
Palace of Fine Arts	Other	0	0	0	0	0	0	02-01, 03-09, 05-17, 06-08
Pescadero Marsh	Other	0	0	8	0	0	0	03-22
Redwood Shores Water Treatment Plant	Other	0	0	0	0	0	0	03-09

Table 2. Nests observed within heron, egret and cormorant nesting colonies in 2020; San Francisco Bay, CA. Nest counts represent the maximum number of active nests observed for each species and colony in 2020. DESFBNWR = Don Edwards San Francisco Bay National Wildlife Refuge, EBRPD = East Bay Regional Park District, SFPUC = San Francisco Public Utilities Commission. See Appendix I for species codes. Active colonies that SFBBO was not able to monitor in 2020 comprise Downtown Oakland and Moffett A3W.

Colony Name	Organization	BCNH	DCCO	GBHE	GREG	GRHE	SNEG	Survey Dates
Ruus Park	Other	0	0	0	23	10	76	03-07, 05-28, 08-02
Sandy Wool/ Ed Levin Park	Other	0	0	0	0	0	0	05-27
Shadow Cliffs	EBRPD	0	27	17	1	0	0	02-02, 03-08, 05-19
Shorebird Way	Other	67	0	0	51	0	82	05-15, 06-04
St. Francis Yacht Club	Other	0	0	4	0	0	0	02-01, 03-09, 05-17, 06-08, 06-22, 07-06
Steinberger Slough	DESFBNWR	0	107	0	0	0	0	03-09, 05-18
Stow Lake	San Francisco Recreation & Parks	0	0	7	0	0	0	05-18
Sunol Water Temple	SFPUC	0	0	8	0	0	0	02-22, 03-08, 05-03
Vasona Reservoir Island	Santa Clara County	2	0	2	0	1	0	02-01, 03-20, 04-03, 04-24, 05-08, 05-20, 06-01, 06-11, 06-16, 07-05
	TOTAL	**117**	**323**	**130**	**130**	**15**	**243**	

Scouting at Sites with Inactive Colonies

Staff scouted for breeding activity at 40 sites that had historical breeding but became inactive prior to 2019 (Figure 2). Great blue herons were observed breeding at two of the sites: Oyster Cove Pier and Alameda Wildlife Reserve (Table 1). Western gulls—a secondary species for this program—were observed breeding at Agua Vista (Table 2). Double-crested cormorant breeding activity was observed in electrical towers in the Bay near the San Mateo Bridge, but counts could not be obtained from a safe vantage point. Scouting surveys will allow us to resume monitoring at sites with re-established colonies and to improve estimates in Bay-wide breeding populations.

Data Uses and Limitations

The dataset resulting from this program has many values and some inherent limitations. Due to the consistency of data collection over the course of the program, this dataset can be used to track colonies over time and provide local managers with information on the histories of particular colony sites. Additionally, this program provides essential data that serve as a valuable starting point for the development of more comprehensive regional efforts to track population sizes and trends on a larger scale. For example, SFBBO collaborated with other scientists in the region to synthesize counts from Double-crested Cormorant colonies and to create a population model showing regional trends over the last few decades (Rauzon et al. 2019). Additionally, some of SFBBO's CWB data were previously incorporated into a San Francisco Bay heron and egret atlas by Kelly et al. (2007). SFBBO has also partnered with the U.S. Fish and Wildlife Service in their effort to understand and manage the relationship between Double-crested Cormorants and special status fish species along the Pacific Flyway (Adkins et al. 2014).

SFBBO has consistently monitored many sites for 20-30 years, which provides a detailed account of activity within and around these localized populations. For example, areas adjacent to the Llagas Creek heronry in the city of Morgan Hill experienced high levels of human disturbance for several years as a result of residential development. While there are no direct observations of detrimental effects from construction activity on the active heron colony, we have documented changes in the size and species composition of the colony since the start of development in 2003. This may be related to natural species composition changes over time, or to other factors such as the differential tolerance of, response to, or habituation to disturbances by species, as noted in Carney and Sydeman (1999). In 2019 this colony relocated to a new set of nesting trees, and we were able to use observations in 2018 to identify the likely cause as conflict with neighboring Red-tailed Hawks.

The dataset has some limitations that must be considered when interpreting resulting trends. Notably, the sampling scheme is biased toward known, occupied, and accessible sites and observational methods are used to prevent disturbance to the birds. The nesting sites monitored here should not be viewed as a comprehensive list of all active waterbird colonies for these species in the region; nor should the peak nest numbers observed be used for Bay-wide population-level trend analyses. More intensive nest-monitoring, a strategic sampling approach, and a broader geographic scope would be better-suited to such goals. While SFBBO community scientists visited some colonies that were also surveyed by other

agencies, the data collected by the different entities should not be directly compared due to the difference in monitoring methods used.

Focusing on long term sites, in addition to urban habitat characterization and documenting breeding responses to habitat changes, will greatly increase our understanding of waterbird ecology and further assist resource managers in making well informed decisions related to maintaining valuable breeding locations throughout the San Francisco Bay. In addition, planned improvements to the protocols (see "Next Steps" section) will greatly improve the relevance of this dataset for answering key questions about waterbird conservation.

Research and Management Recommendations

1. Regulatory agencies, such as the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife, should work directly with private landowners to protect colonies on privately-owned land. In the case of wading birds, Kelly et al. (2007) urged prioritized protection for larger, more stable colonies of 20 or more nests, and especially for those with 100 or more nests. Since many small colonies (5-50 active nests) exist in South Sanfrancisco Bay, and small colonies can be more vulnerable to human disturbance and abandonment than larger colonies, protection and management efforts should take these factors into consideration (Kelly et al. 2007).

2. It remains largely unknown what factors, or interactions of factors, influenced the overall rapid population growth of the California Gull population in San Francisco Bay. Unfortunately, monitoring of breeding California Gull populations was not possible in 2020 due to COVID-19. While yearly fluctuations in the breeding population have been relatively small in the past, roosting numbers at Southeast Farallon Island increased by 357% from Fall 2019 to Fall 2020 (J. Tietz, personal communication). Without monitoring of the breeding population in 2020, it is unknown whether increased breeding in South San Francisco Bay contributed to this substantial change. We strongly encourage support of annual breeding surveys in 2021 to address this hypothesis and further the scientific understanding of gull populations in the Bay.

3. California Gull depredation is a concern for several sensitive waterbird species, including Western Snowy Plovers and Least Terns. In previous years, gulls have been monitored and deterred from nesting in sensitive habitats by the U.S. Fish and Wildlife Service and SFBBO. These activities were suspended in 2020 due to COVID-19, with unknown impacts on breeding birds. Therefore, we recommend resuming this monitoring in 2021. A study of the impact of gull predation on nesting success would also be informative.

4. Continued monitoring of San Francisco Bay waterbird colonies will be crucial as the South Bay Salt Pond Restoration Project progresses with its Phase Two actions. This includes construction activity near or at waterbird colony sites and conversion of some habitats currently supporting breeding waterbirds to tidal marsh. We believe that the combined efforts of professional scientists and community scientists alike are needed in this endeavor. However, we advise

against direct comparisons of waterbird nesting data collected using different methods and encourage future collaboration and communication among different entities collecting these data in the South Bay.

5. The scientific and social benefits that these educational opportunities provide, not only to our research but also to our community members, are still not fully understood (Jordan et al. 2012). We encourage community engagement in ecological research and recommend that scientists work to develop multi-disciplinary measures of success for such programs.

Outreach Through Community Science

Since the establishment of SFBBO's CWB Program in the early 1980s, hundreds of community scientists have helped carry out this research to help us better understand the state of bird populations in the Bay Area. Each nesting season, around 65 new and veteran community scientists receive the CWB Volunteer Manual and then attend a detailed training and orientation with SFBBO staff. At this meeting, staff give community scientists an overview of SFBBO and the CWB Program, highlight the results from the previous season's efforts, go over monitoring protocols, answer questions, and address common issues people experience in the field. Following training, the community scientists spend one or two mornings each month (from February through August) monitoring their colony.

Community scientists observe breeding activity; count birds, nests, and chicks; and record environmental conditions and human impacts. The commitment of this strong network of community scientists has produced a valuable, long-term dataset that helps land managers, organizations, and the public make informed decisions to conserve birds. In addition to providing valuable scientific data, SFBBO's CWB Program is one of the strongest parts of SFBBO's Outreach Program. By engaging people from the community in avian research, we build their awareness about birds and conservation and nurture their understanding of and appreciation for science. In turn, our community scientists carry their experiences and passion for birds, conservation, and science into the wider community.

In 2020, 53 SFBBO community scientists contributed 395 volunteer hours to the CWB Program. This includes office work, data entry, and colony monitoring. If valued at a rate of $16 per hour, this amounts to $13,360 in donated labor. Many CWB community scientists are long-term participants and supporters, highlighting the interest in and value of this community science program.

Data Sharing

SFBBO shared our data in 2020 with land managers and others working to conserve Bay Area birds. This year we created a new website for data requests for community decision-making or research purposes. SFBBO responded to five data requests from researchers and community members in 2020. In addition to writing this Annual Report, SFBBO staff shared a report with the City of Mountain View to support their work in developing a sustainability metric for monitoring environmental issues. This type of request for information grew from relationships that were developed and nurtured by our community scientists as they worked in the field. With the new website as a resource, we plan to provide more site-specific information for people in the community.

Next Steps

To maintain a strong scientific foundation and ensure the collection of data that are impactful for conservation, we regularly review the methodology and training materials. In 2020, SFBBO staff assessed program goals and worked on protocol revisions to better align data collection with key conservation goals. Program revisions (e.g., updates to datasheets and training materials) will occur in 2021 and changes to field protocols will be implemented in the 2022 monitoring season. As in 2020, we will continue our efforts to streamline data sharing by improving data accessibility and producing quality accompanying metadata and documentation.

Community science experiences may have deeper and more positively significant socio-ecological impacts than are currently recognized, that affect not only the quality of scientific studies but also the function of members within their social community (Jordan et al. 2012). In 2020 SFBBO created a focused Commitment to Racial Justice, which will remain at the forefront of program improvements moving forward. We plan to investigate opportunities to reduce systemic barriers to participation in this monitoring program and to promote greater inclusivity.

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Appendix I

Table A1. Waterbird species codes, common names, and scientific names.

Species Code	Common Name	Scientific Name
AMAV	American Avocet	*Recurvirostra americana*
BLSK	Black Skimmer	*Rhynchops niger*
BCNH	Black-Crowned Night Heron	*Nycticorax nycticorax*
BNST	Black-Necked Stilt	*Himantopus mexicanus*
CAGU	California Gull	*Larus californicus*
CATE	Caspian Tern	*Sterna caspia*
ELTE	Elegant Tern	*Thalasseus elegans*
FOTE	Forster's Tern	*Sterna forsteri*
GBHE	Great Blue Heron	*Ardea herodias*
GREG	Great Egret	*Ardea alba*
GRHE	Green Heron	*Butorides virescens*
LETE	Least Tern	*Sterna antillarum browni*
SNEG	Snowy Egret	*Egretta thula*
WEGU	Western Gull	*Larus occidentalis*