Central Valley Midwinter Waterfowl Survey 2024 Report

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California Department of Fish and Wildlife
Waterfowl Unit

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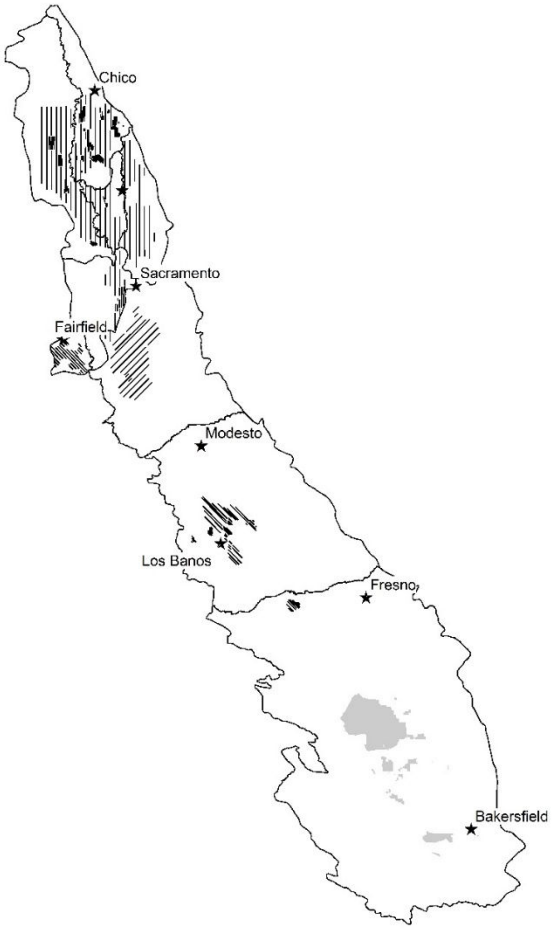

In cooperation with the United States Fish and Wildlife Service and the Central Valley Joint Venture.

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Abstract

The 2024 Midwinter Waterfowl Survey (MWS) was conducted January 8 - 26 by two crews. Weather and staffing constraints created logistical problems throughout the month of January resulting in reduced survey coverage. The survey was 94% complete with minimal reduction in the Sacramento Valley (3%), the Delta (27%), and the San Joaquin Valley (11%). The total flight time for the survey was 34 hours. An estimate of 6.02 million ducks and 6.620 million total birds (i.e., ducks, coots, and cranes) were estimated across the entire Central Valley Joint Venture planning area. Most waterfowl were observed in the Sacramento Valley (49%), followed by Yolo-Delta (40%), Tulare Basin (4%), San Joaquin Valley (4%), and Suisun Marsh (3%). Dabbling ducks comprised 89% of total birds observed, followed by American coots (8%) and diving ducks (1%). Northern pintail (*Anas acuta*) were the most abundant duck species comprising 43% of total waterfowl, followed by American green-winged teal (*Anas carolinensus*) at 18%, Northern shoveler (*Spatula clypeata*) at 17%, and American wigeon (*Mareca americana*) at 16%. Mallards *(Anas platyrynchos)* comprised 3% of waterfowl observed. Ring-necked ducks (Aythya collaris) were the most numerous diving duck species observed, comprising 1% of total waterfowl.

Keywords: aerial waterfowl survey, Central Valley Joint Venture, Midwinter Waterfowl Survey, North American Waterfowl Management Plan

Introduction

The MWS has been conducted throughout the United States since 1935 (Olson 2019), with the goal of estimating the abundance and distribution of waterfowl species in their major wintering areas. This survey is one of the longest-running bird surveys in the United States and has been cited in numerous scientific publications (e.g., Nichols 1991, Takekawa et al. 2001, Afton and Anderson 2001, Johnson et al. 2011, Cramer et al. 2012). While the survey has provided valuable information about waterfowl populations and their status, it has also been criticized due to the lack of a standardized protocol in some of the survey areas (Donaldson 1978, Eggeman and Johnson 1989, Smith 1995, Heussman 1999, Sharpe et al. 1999).

Since 2015, constituents of the Central Valley Joint Venture (CVJV) made substantial changes to the MWS in the Central Valley of California that: 1) link results with specific habitat joint-venture implementation areas to support habitat management decisions; 2) improve sampling design and area coverage by standardization (i.e., transects); 3) excludes areas with low densities; and 4) improve safety.

Methods

Survey design.—The Central Valley Midwinter Waterfowl Survey [CVMWS] was designed using methodology similar to other published waterfowl surveys (United States Fish and Wildlife Service [USFWS] and Canadian Wildlife Service [CWS] 1987, Pearse et al. 2008, Lehnen 2013). The survey was stratified by CVJV Planning Basins to provide information at the basin-level, to implement control for regional differences in abundance and to aid in flight planning (CVJV 2020). For survey efficiency, only portions of each basin with potential waterfowl habitat (i.e., wetlands and flooded agriculture) were included in the design. Areas with known high waterfowl densities were isolated as substrata. These substrata are termed “high-density” (HD) and are defined as an area within a basin with greater mean abundance and variance in relation to the overall basin. Transects represent the sampling unit of the survey. The CVMWS does not address visibility correction bias (Pearse et al. 2007, Koneff et al. 2008); thus, the numbers reported here should be viewed as indices and not estimates of abundance.

Survey timing.—The CVMWS is conducted in the first or second week of January and continues until complete, or until 30 January, whichever comes first. This timeframe ensures all waterfowl have arrived from northern latitudes and densities are at their peak (Fleskes et al. 2005). Surveys after 30 January could be biased, as some species may begin spring migration to or from the Central Valley after this date. The survey can be completed in one week; however, winter weather conditions often prevent flights on consecutive days. The survey is intended to be completed in the shortest timeframe possible, weather permitting.

Survey procedure.—The survey is conducted only during Visual Flight Rules conditions (i.e., ceiling of 1000–3000 ft and visibility of at least 5 mi.) and in wind speeds below 20 miles per hour (32 km/hr).The pilot maintains an altitude of 150 feet (45 m), where

possible, and a flight speed between 90 and 110 miles per hour (145 to 180 km/hr; USFWS and CWS 1987). Front-right and rear-left observers record duck species, American coots and Sandhill cranes (*Grus canadensis*) to a distance of 0.125 miles (200 m) on their respective sides of the aircraft, for a total survey width of 0.25 miles (400 m). Geese are not recorded during the CVMWS since other surveys are used to estimate their wintering abundance (see Olson 2019).

Population estimates.—Within strata, a density of each species was calculated by summing the total number of birds observed on each transect and dividing by the total transect area surveyed. The transect area was subtracted from the total stratum area to obtain an expansion factor (Smith 1995). The remaining stratum area was then multiplied by the mean waterfowl density, by species, to estimate the abundance index.

Habitat and weather conditions.—Weather data were gathered from multiple sources for habitat-related context to survey results. National Oceanic and Atmospheric Administration (NOAA) weather stations in Willows, Sacramento, Fairfield, Los Banos and Wasco, California, have consistent long-term averages for precipitation and temperature dating back to 1960. Monthly precipitation data was downloaded and tabulated from the NOAA National Climactic Data Center for each of these stations.

The California Central Valley's agricultural canal infrastructure removes floodwater from the landscape quickly; therefore, it is necessary to characterize surface flooding at the time of the survey (Point Blue Conservation Science 2024; Figure 1.). Freezing conditions in other areas of the Pacific Flyway likely impact the number of waterfowl observed during the CVMWS. For example, eastern Washington State supports large numbers of waterfowl during their migration along the Pacific Flyway. Freezing temperatures in this area of the flyway often occur in December and extend into February; therefore, temperature data from the Moses Lake weather station are included in this report for reference (Figure 2.).

Results

Survey results.—Two crews, composed of CDFW and USFWS biologists, conducted the CVMWS from 8–26 January 2024. The survey consisted of 34 flight hours and was 94% complete. Survey completion varied by basin (Table 1.) and was largely affected by weather conditions. As such, some transects were randomly skipped to provide time to survey as much of the study area as possible.

The CVMWS was not conducted in 2019, 2021, and 2022, due to multiple reasons: federal government shutdown, weather conditions, pilot availability. Consequently, comparisons of in-season estimates are made to averages from the five years the survey has been standardized (2016, 2017, 2018, 2020, and 2023). Amongst standardized survey areas, total waterfowl was 22% above the survey average ($\overline{x}$ = 4.714 million), dabbling ducks were up 27%, diving ducks were down 67% and coots were down 12% from the long-term average.

Comparing all strata, including unstandardized areas (e.g. Kern NWR), most waterfowl were detected in the Sacramento Valley (49%), followed by the Yolo-Delta (40%), San Joaquin Valley (4%), Tulare Basin (4%), and the Suisun Marsh (3%; Table 2.). Dabbling

ducks (5.93 million) comprised 89% of total birds observed (6.63 million), followed by coots (8%; 561,797) and diving ducks (1%; 90,055). Of the five most numerous species, northern pintails were the most abundant (2.58 million) and comprised 39% of total birds. The remaining top five species, in order of abundance, were: American green-winged teal (17%), northern shoveler (15%), American wigeon (15%), and American coots (8%). Mallards were the sixth most numerous species, comprising 2% of all birds observed. Ring-necked ducks were the most abundant diving ducks, comprising 1% of total waterfowl observed.

Sandhill crane abundance has remained relatively stable since 2016, with an average of 38,000 individuals estimated. In 2024, 50,008 were estimated and, like other years, the Yolo–Delta Region supported the largest population (62% of the total sandhill crane observed), followed by the Sacramento Valley (35%) and the San Joaquin Valley (2%; Table 2.).

Habitat and weather conditions.— Rainfall during the July–January period of 2023–2024 was average to slightly below average throughout much of the Central Valley, except for the Tulare Basin which experienced above average rainfall (NOAA 2023; Table 3). The 2024 Water Year was punctuated by atmospheric rivers from November through January, largely impacting the Pacific Northwest and Northeastern parts of California. Central and Southern California received the bulk of their annual precipitation in February, after the CVMWS. The variation in storm track and strength during Water Year 2024 resulted in more widespread normal to near-normal conditions throughout the state.

Habitat flooding in the Central Valley was average compared to other years since 2013 (Point Blue Conservation Science 2024; Fig. 1.). Temperatures at Moses Lake, Washington were average (30° F) throughout November and December, with the longest stretch of sub-freezing temperatures taking place from November 20 to December 3 (17° - 31° F; NOAA 2023, Figure 2.).

Discussion

The distribution of wintering ducks throughout the Central Valley was typical, with most birds observed in the Sacramento Valley. However, the Tulare Basin had a notable increase in total ducks observed (484%; 257,249) compared to 2023. This was likely due to the considerable increase in wetland habitat, i.e. Tulare Lake, from the record-breaking snowmelt in the Southern Sierras and subsequent flooding that occurred in the spring of 2023. The top four species in Tulare included northern shovelers (527%; 98,239), northern pintails (182%; 34,271), American green-winged teal (338%; 49,112), and American wigeon (6382%; 28,779). Tulare Basin was the only region that experienced an increase (650%; 22,023) in estimated diving ducks. The Yolo-Delta region also saw large increases in total ducks (156%; 2,427,918), with northern pintail (61%; 836,682), America green-winged teal (1137%; 635,919), American wigeon (489%; 514,179), and northern shovelers (135%; 383,553) constituting the majority.

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Table 1. Midwinter Survey hours, distances flown, area covered, and percent completed by Central Valley Joint Venture planning Region and Basin, January 2024.

Region	Basin	Hours	Miles Flown	Total Area (sq-mi)	Area Flown (sq-mi)	Percent Complete
Sacramento	American	2.5	147.1	364.8	364.8	100%
Valley	Butte	5.5	272.4	397.7	385.1	97%
	Glenn-Colusa	4.5	353.1	689.0	689.0	100%
	Sutter	2.0	121.0	274.8	274.8	100%
Yolo-Delta	Yolo	1.0	68.4	133.9	133.9	100%
	Delta	3.0	152.0	485.2	351.8	73%
Suisun	Suisun	2.5	97.1	101.0	101.0	100%
San Joaquin	San Joaquin	5.0	185.2	245.9	218.3	89%
Tulare	Mendota WA	1.0	26.2			
	Kern NWR	7.0				
Total	----------	34.0	1,347.5	2,692.3	2477.2	94%

Table 2. Total estimated waterfowl by species and Central Valley Joint Venture Region, January 2024

Species	Sacramento Valley	San Joaquin Valley	Suisun	Yolo-Delta	[a]Tulare	Total
Green-winged teal	309,864	73,467	26,793	635,919	49,112	1,095,154
American wigeon	376,065	14,705	45,595	514,179	28,779	979,323
Cinnamon teal	477	-	126	123	7,657	8,382
Gadwall	75,368	715	2,160	491	11,062	89,795
Mallard	104,294	2,111	4,994	43,958	6,100	161,457
Northern pintail	1,652,892	33,843	23,465	836,682	34,271	2,581,153
Northern shoveler	376,425	103,827	46,143	383,553	98,239	1,008,187
Wood duck	1766	0	0	0	6	1,772
Dabblers	**2,897,150**	**228,667**	**149,274**	**2,414,906**	**235,226**	**5,925,223**
Bufflehead	2,933	396	1,197	5,711	2,374	12,611
Canvasback	145	4,188	728	1,233	3,661	9,955
Common merganser	441	0	33	0	19	493
Goldeneye	1,065	0	402	812	71	2,349
Redhead	119	0	339	37	2,350	2,846
Ring-necked duck	21,565	14,786	0	3,864	306	40,521
Ruddy duck	4,450	0	1,185	151	11,067	16,852
Scaup	935	0	113	1,205	2,175	4,428
Divers	**31,653**	**19,369**	**3,997**	**13,012**	**22,023**	**90,055**
Total Ducks	**2,928,804**	**248,037**	**153,271**	**2,427,918**	**257,249**	**6,015,277**
Coots	254,090	85,023	36,227	143.435	43,022	561,797
Sandhill cranes	17,701	1,216	0	31,062	29	50,008
Total Birds	**3,200,595**	**334,276**	**189,498**	**2,602,414**	**300,300**	**6,627,083**

[a]Tulare Basin complete count and transect strata combined

Table 3. July to January rainfall recorded at one weather station within each region, long-term average (LTA) since 1960, measure of deviance (z-score).

Station [a]Location	Region	2023 Rainfall	LTA	Z-Score
Willows	Sacramento Valley	7.11	10.32	-0.65
Sacramento	Delta	9.26	10.16	-0.21
Fairfield	Suisun Marsh	7.25	13.53	-0.98
Los Banos	San Joaquin Valley	5.90	5.07	0.35
Wasco	Tulare Basin	8.45	3.37	2.99

[a] Data available at: https://gis.ncdc.noaa.gov/maps/ncei/

Figure 1. Estimated area of surface water (in hectares) by Central Valley Joint Venture planning basin January 2020 – February 2024. Available at: http://data.pointblue.org/apps/autowater/?page_id=201

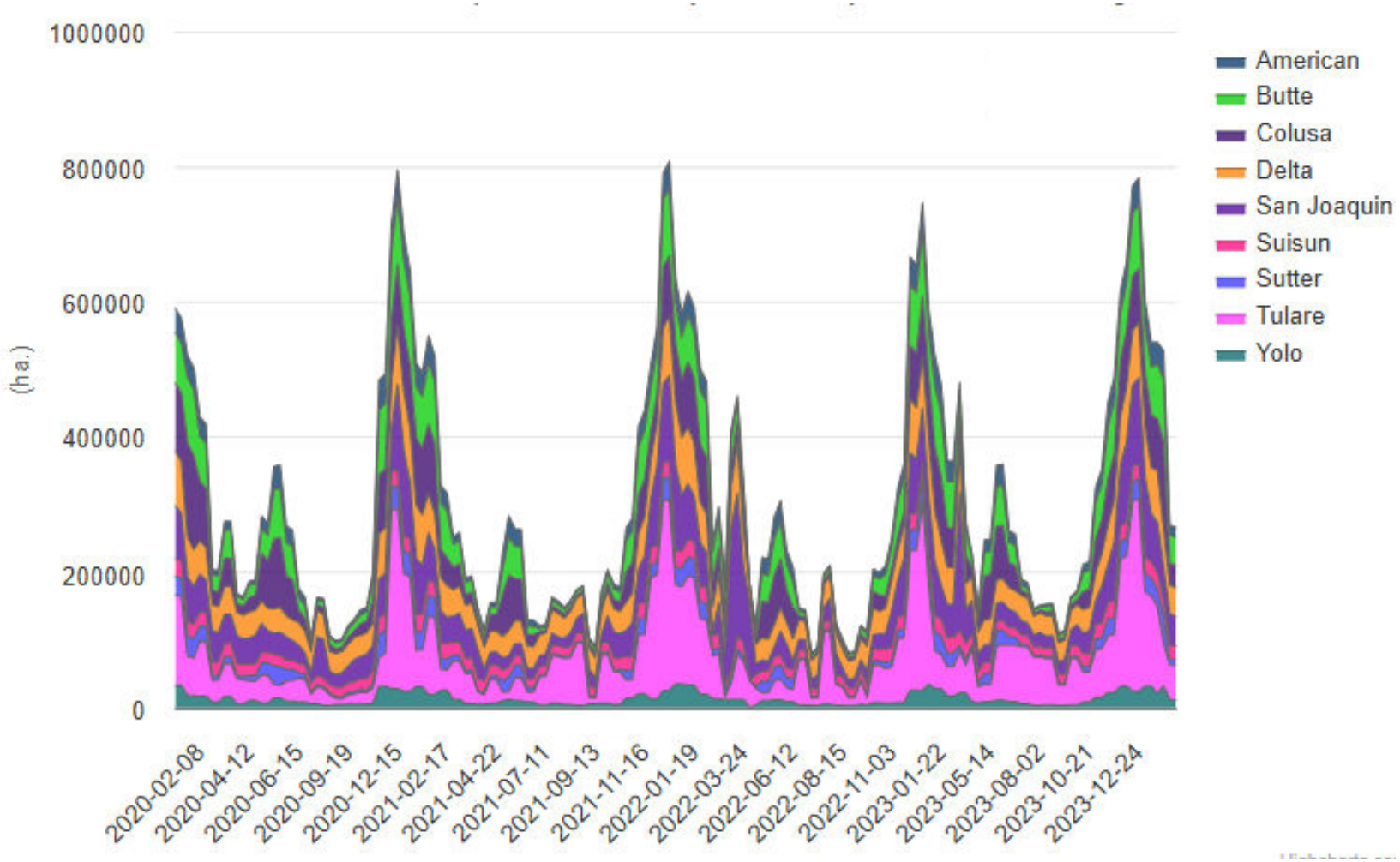
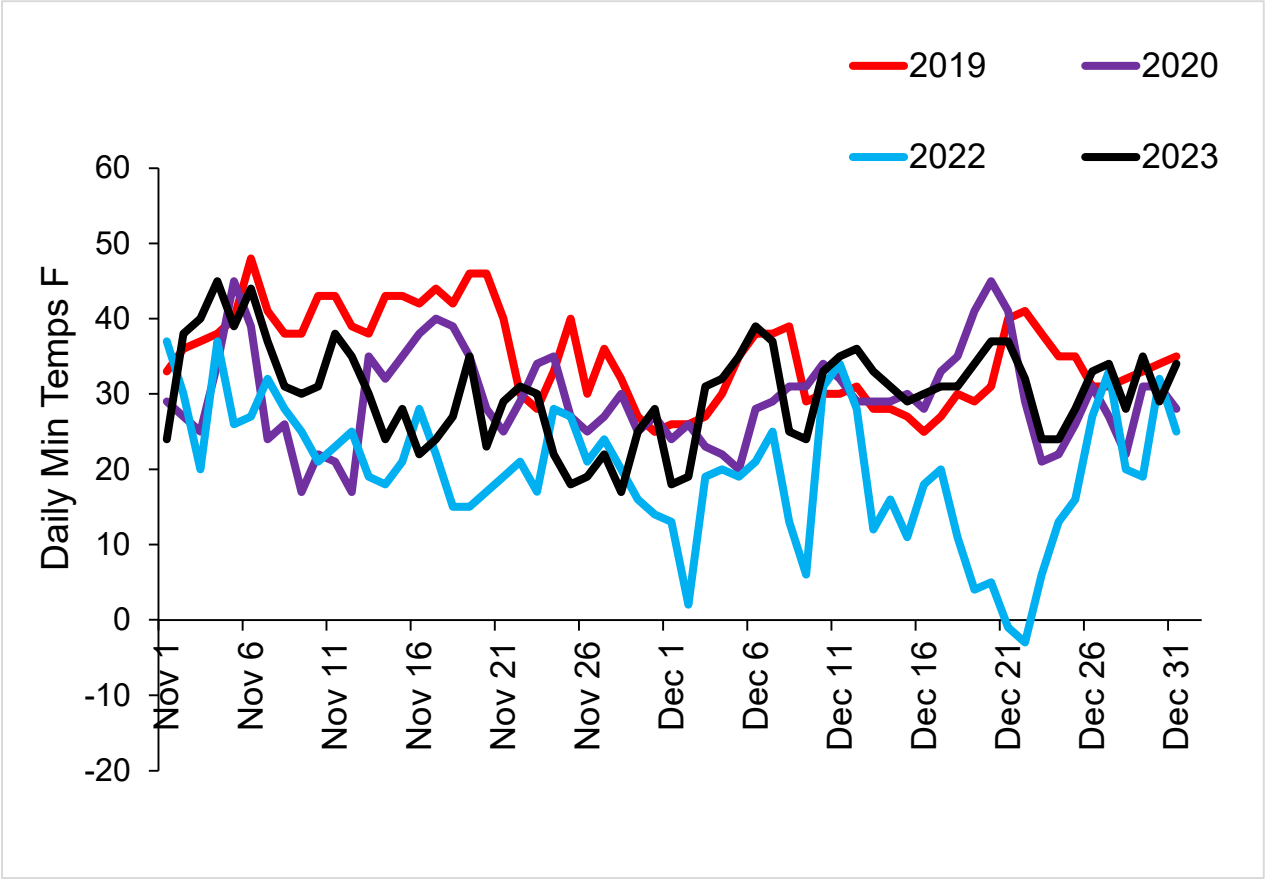


Figure 2. Minimum temperatures from 1 November to 31 December at Moses Lake, Washington, during the past four survey years. Available at: NOAA, MOSES LAKE , WA - National Climatic Data Center



Appendix 1. The California Mid-Winter Survey results from areas outside of the Central Valley Joint Venture, January 2024. Salton Sea was surveyed on January 27, 2024. San Francisco Bay was surveyed on January 8-9 & 11-12, 2024.

Species	Salton Sea (14-7)	San Francisco Bay (14-4)
Mallard	963	291
Gadwall	1,289	2,154
American wigeon	47	21,550
American Green-winged teal	858	6,046
Cinnamon teal	956	4
Northern shoveler	8,049	6,944
Northern pintail	5,300	2,176
Wood duck	-	-
Dabblers	**17,462**	**39,165**
Redhead	256	494
Canvasback	360	12,988
Scaup	442	75,855
Ring-necked Duck	278	-
Goldeneye	38	725
Bufflehead	481	10,843
Ruddy Duck	2,984	6,235
Scoters	6	13,935
Mergansers	10	9
Divers	**4,855**	**121,084**
Unidentified	6,670	832
Total Waterfowl	**28,987**	**161,081**
Coots	6,966	9,417
Sandhill cranes	735	-
Total Birds	**36,688**	**170,498**