

Appendix D

Waterbird, Raptor, and Upland Bird Survey Report for Kern Water Bank



Great Egret (*Ardea alba*)

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Kern Water Bank

Waterbird, Raptor and Upland Bird Survey Report: August 2012 - May 2019

23 May 2019

Introduction

The property managed by the Kern Water Bank Authority supports a wealth of native wildlife, especially an abundance of upland birds and raptors attracted to the recharge ponds and/or the upland habitats. In order to document and quantify this natural resource value, John Sterling of Sterling Wildlife Biology conducted bird surveys from late August 2012 to May 2019. These surveys are intended to capture a snapshot of the bird use of the project area during the winter, spring/fall migration and the breeding seasons. The resulting data serve to document the regional importance of habitats on the Kern Water Bank for raptors and upland birds during this period. Most importantly, the data describe the baseline of existing conditions that may be used to inform range management practices with regard to productive bird habitat. This baseline data will be used to measure population trends with range management enhancement and/or unmanaged changes in habitat due to the extension or end of current drought conditions.

Methods

Survey Methods

For the waterbird surveys, John Sterling visited watered ponds. The survey dates for 2011-12 were 18-19 October, 25-26 October, 15-16 November, 30 November - 1 December, 13-14 December, 23-25 January, 10-11 February, 28-29 February, 10-11 March, and 8-9 April; for 2017 were 21-22 January, 3-4 February, 23-24 February, 14-15 March, 23-24 March, 1-2 April, 9-10 April, 21-22 April, 3-4 May, 11-12 May, 1 October, 19 October, 2 December; for 2018 were 17 January, 16 February, 20 March; and for 2019 only one visit (1 April) due to fluctuations of ponds. Each pond was labeled in the datasheet according to the name on the map provided by the Kern Water Bank Authority. One pond was not marked on the map and was labeled CX for this study. For each pond, Mr. Sterling counted all individuals for species with fewer than one hundred individuals. For species with larger numbers of individuals, he made estimates by counting in increments of ten or one hundred. All watered ponds were visited in all surveys. All data were entered into Microsoft Excel spreadsheets (See attached Appendix A excel file).

For the raptor/Loggerhead Shrike and upland bird surveys, John Sterling visited the sites approximately every two weeks for a total of 162 raptor/Loggerhead Shrike and 130-132 upland bird surveys. The dates of the surveys were approximately every two weeks starting on 31 August 2012 to 4 May 2019, with breaks in June and July in some years. Raptor/Loggerhead Shrike surveys were conducted in June and July only in 2015–2018. Upland bird surveys were not conducted during much of the summer period as most nesting had been completed by 31 May and there were few birds remaining on the study area until fall migration began in September. Upland bird surveys were conducted on fixed, one-half mile long transects (Figure 1). Mr. Sterling conducted upland bird surveys by walking transects and recording all birds heard or seen within 200 meters of the transect line. He tabulated the numbers of each species. Transects were 0.5 miles long with the exception of Transect G, which was 0.25 miles long due to the small size of that habitat fragment. For one hundred and sixteen of raptor surveys, Mr. Sterling drove most roads to cover the entire project area and kept running tallies of numbers of individuals of all raptor species and Loggerhead Shrike. All data were compiled onto spreadsheets (See attached Appendix B & C files).

Figure 1. Locations of Upland Bird Survey Transects on the Kern Water Bank



Descriptions of Upland Bird Survey Transects

The following are brief descriptions of the bird habitat along each of the survey transects including photographs showing conditions on 7 June 2013.

Transect A

The transect borders a large canal that is watered and supports a few water birds. As such, it also supports tules and some sunflowers and other ruderal plants along its edge. There are several large willow trees (*Salix sp.*) but the habitat is mostly open, ruderal fields with some tumbleweed cover (*Salsola sp.*). During wet years, the ruderal vegetation is rank and relatively tall (up to 4 ft).



Transect B

This transect borders a canal that was watered until spring 2012. It supports several willow trees along its banks along with mulefat, thistles and other ruderal vegetation. The fields are dry ponds and support ruderal vegetation.



Transect C

This transect is a honey mesquite (*Prosopis glandulosa*) woodland with some tree tobacco, annual grasses and some ruderal vegetation.



Transect D

The west side of this transect is a dry pond that is now an open willow woodland with moderate ruderal and annual grassland cover. The east side is a dry pond that is now a ruderal field with low, sparse vegetative cover.



Transect E

This transect has a honey mesquite woodland on the south side, with some annual grasses, but otherwise little vegetative cover apart from the mesquite. On the north side is a dry pond that is a ruderal field.



Transect F

This transect is relatively barren with some grasses, forbs and in some years dominated by tumbleweed.



Transect G

This transect has several honey mesquite shrubs on the east side, but the west side is dominated by saltbush (*Atriplex* sp.).



Transect H

This transect has some Fremont cottonwood saplings, along with an open honey mesquite woodland and tall ruderal vegetation on the west side. The east side is a dry pond and now a ruderal field.



Transect I

This transect has two small willow trees in a field dominated by tumbleweed on the south side, while the north side is an alfalfa field on property adjacent to the project area.



Special-Status Species Criteria

In evaluating the potential presence of special-status species, the following criteria were used to determine which species should be included:

- Bird species listed, or proposed for listing, as threatened or endangered under the ESA (50 CFR 17.11 [listed animals], and various notices in the Federal Register [proposed species]);
- bird species that are candidates for possible future listing as threatened or endangered under the ESA (61 FR 40: 7596-7613, February 28, 1996);
- bird species listed, or proposed for listing, by the State of California as threatened or endangered under CESA (14 CCR 670.5);
- bird species that meet the definitions of rare or endangered under CEQA (CEQA Guidelines, Section 15380);
- bird species of special concern to CDFG (CDFG in preparation [birds, Shuford and Gardali 2008];
- bird species fully protected in California (California Fish and Game Code, Section 3511 [birds]; and
- bird species included in CDFG’s list of special animals and monitored by the California Natural Diversity Database (CNDDDB).

Results

Two hundred and twelve species of birds have been recorded thus far at the Kern Water Bank during water bird, upland bird and raptor surveys since this project began in mid October 2011 (Appendix A). Many of those are discussed below or in the previous reports (Sterling Wildlife Biology, 27 April 2012, 9 December 2013, 1 June 2015, 23 May 2016, 11 June 2017 and 26 June 2018).

Upland Birds

One hundred and twelve species of birds were detected during the upland bird surveys. Of the nine transects, Transects A and C have the largest number of species with eighty-two and seventy-nine, respectively (Figure 2). Although species richness (number of species) did not vary greatly over time in each transect, numbers of birds counted fluctuated greatly (Figures 3-11). Transects with the most birds contained mesquite and/or willow trees although Transect I with its grassland and alfalfa harbored large numbers of sparrows during the winter. Each year additional species are found in each transect, so it is likely that more species will continue to be documented.

Figure 2. Cumulative Number of Species Found in Each Transect: 2012-2019

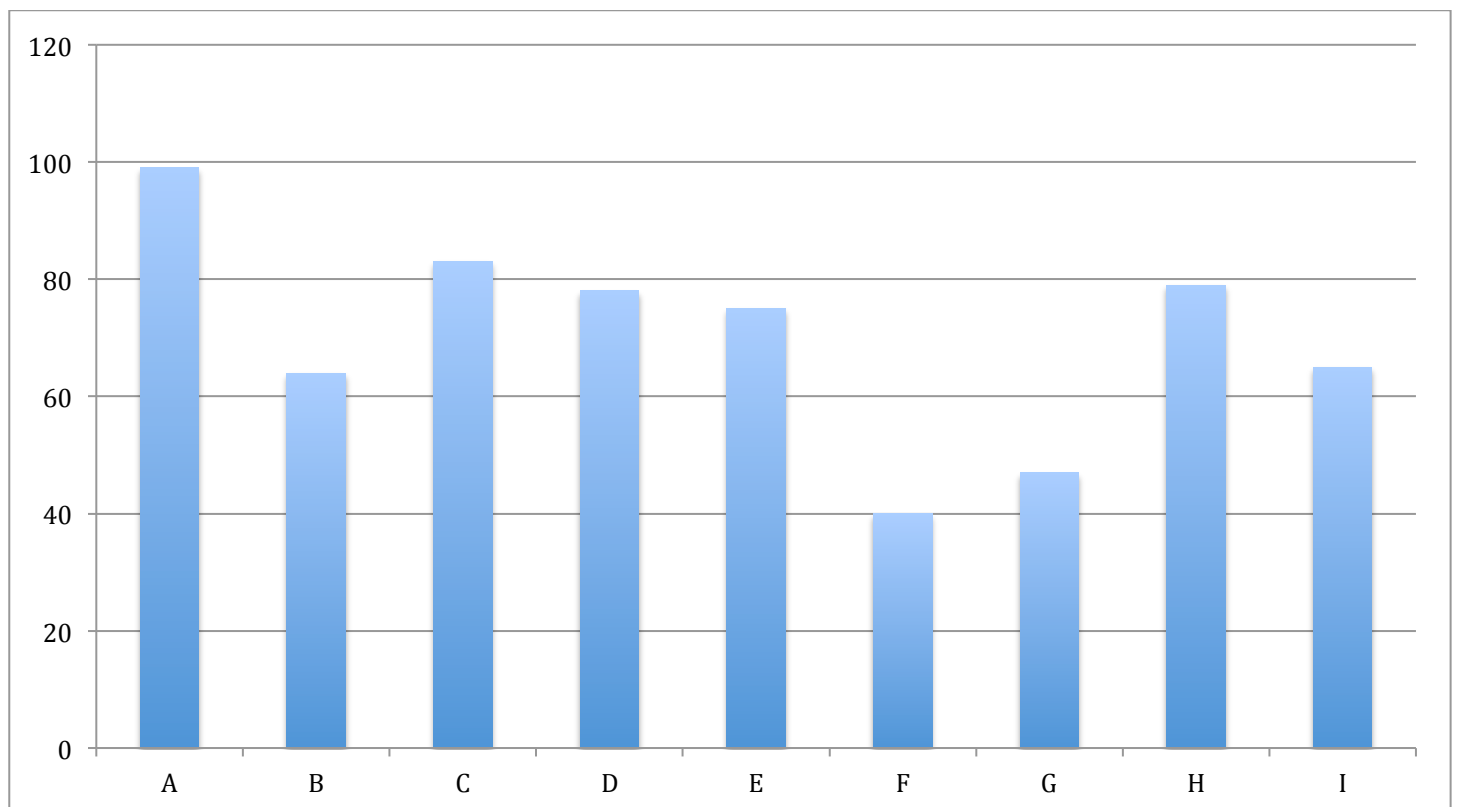


Figure 3. Mean Number of Birds Found During Each Survey in Each Transect: 2012-2019

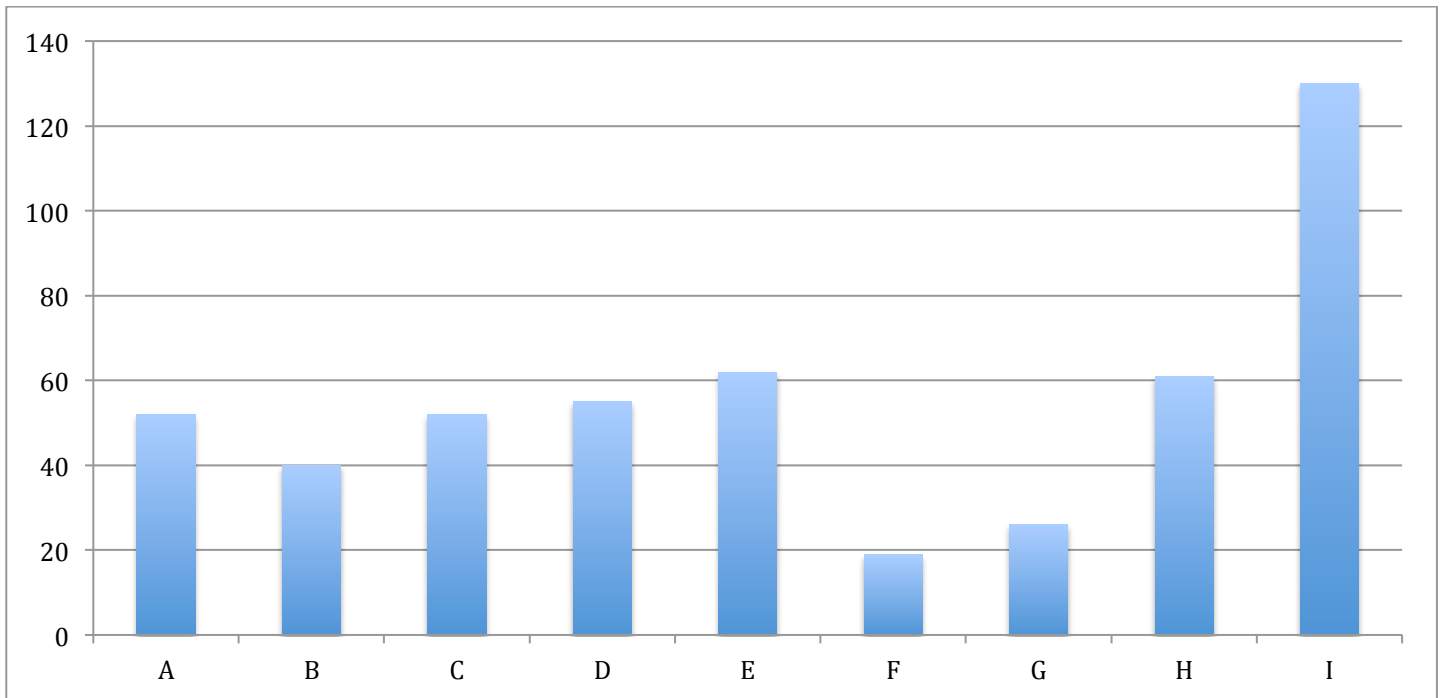


Figure 4. Number of Birds and Bird Species: Transect A.

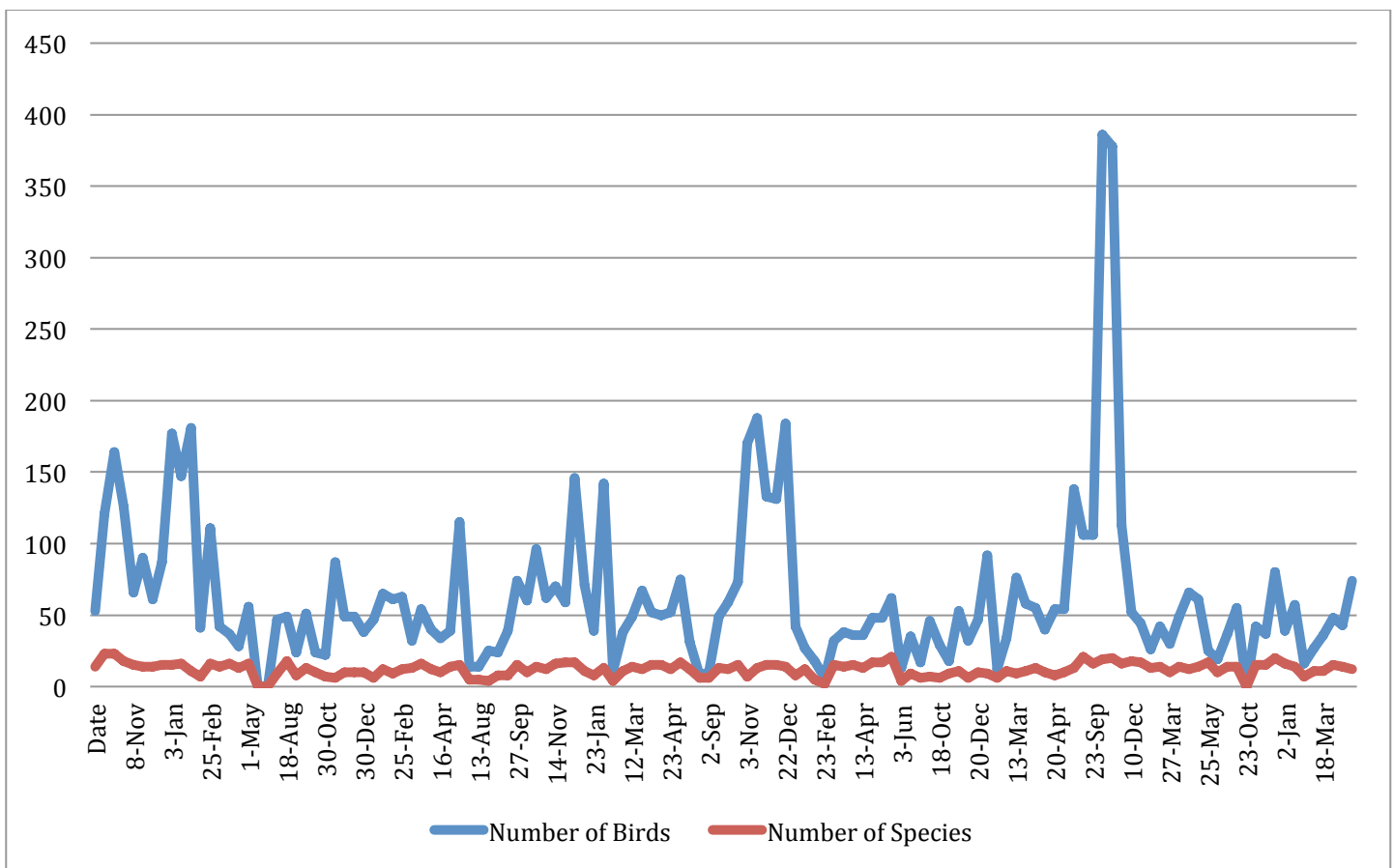


Figure 5. Number of Birds and Bird Species: Transect B.

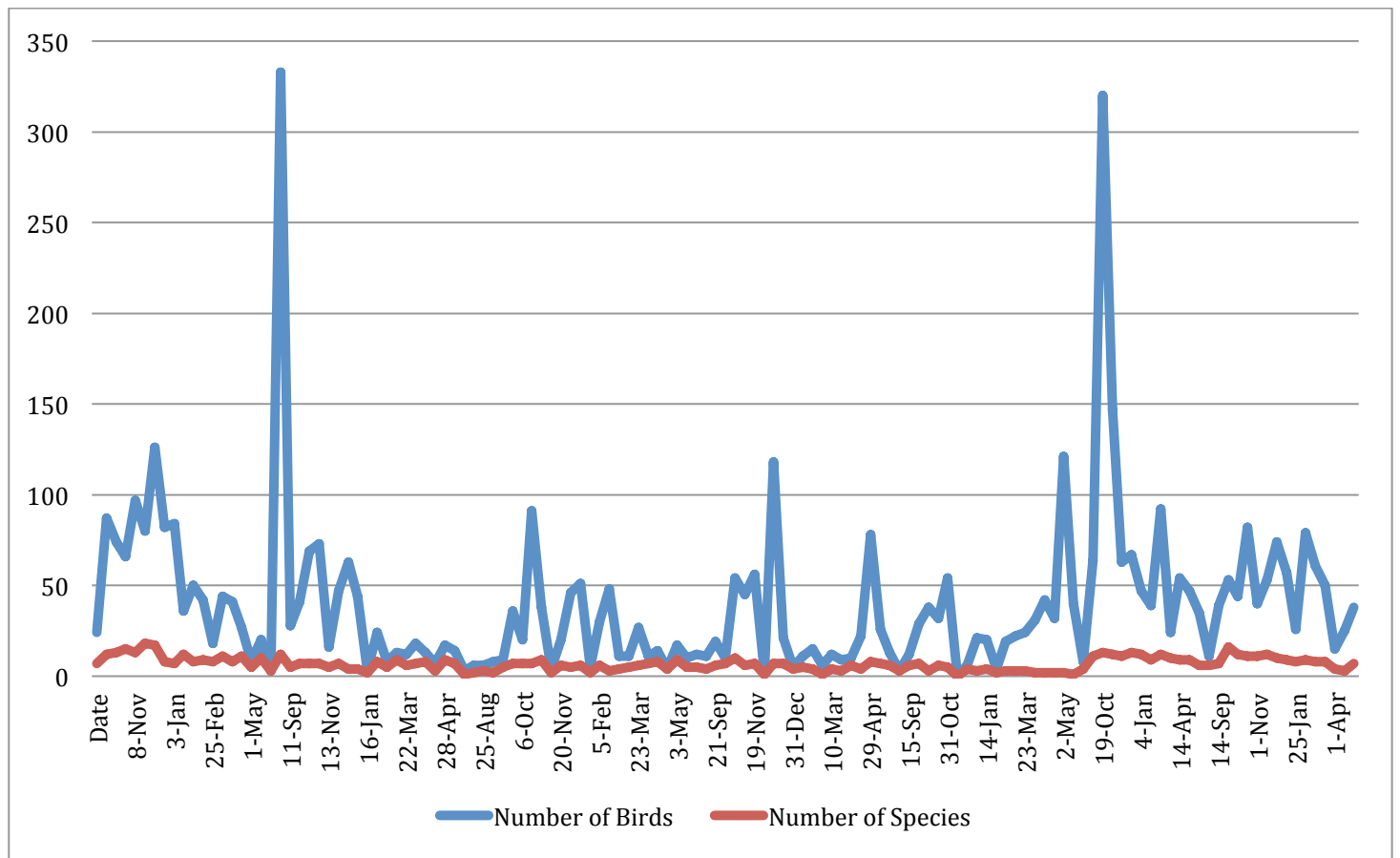


Figure 6. Number of Birds and Bird Species: Transect C.

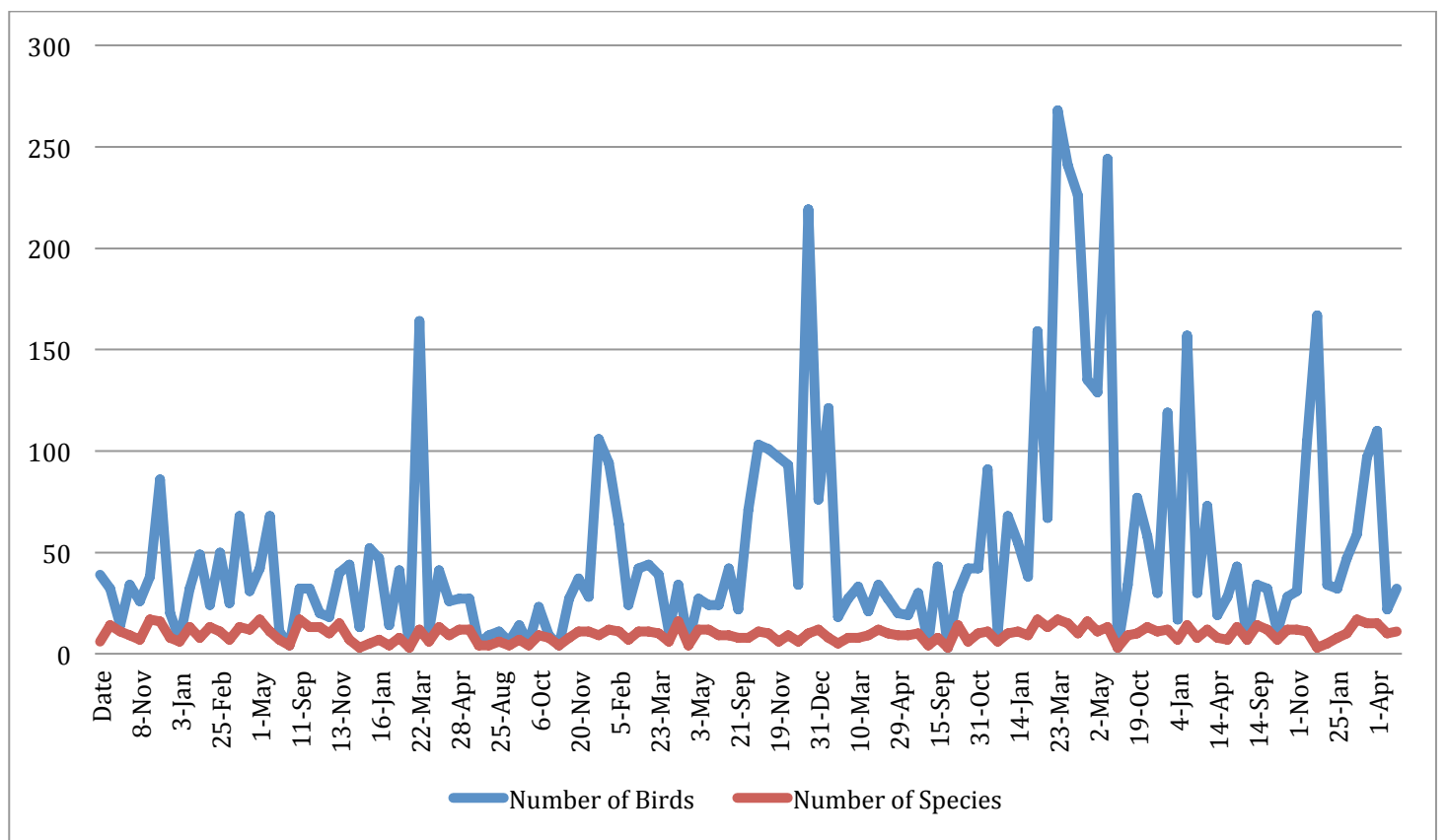


Figure 7. Number of Birds and Bird Species: Transect D.

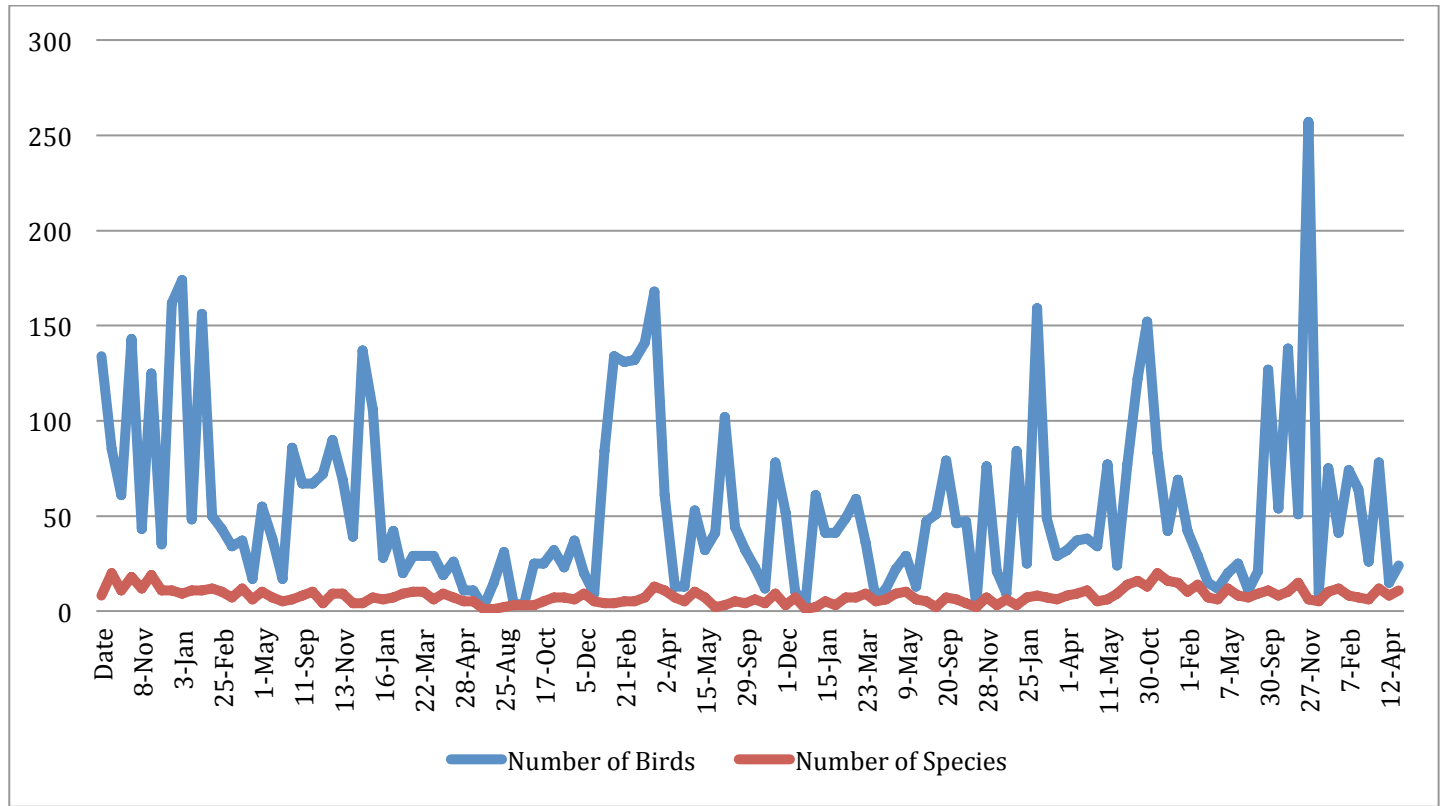


Figure 8. Number of Birds and Bird Species: Transect E.

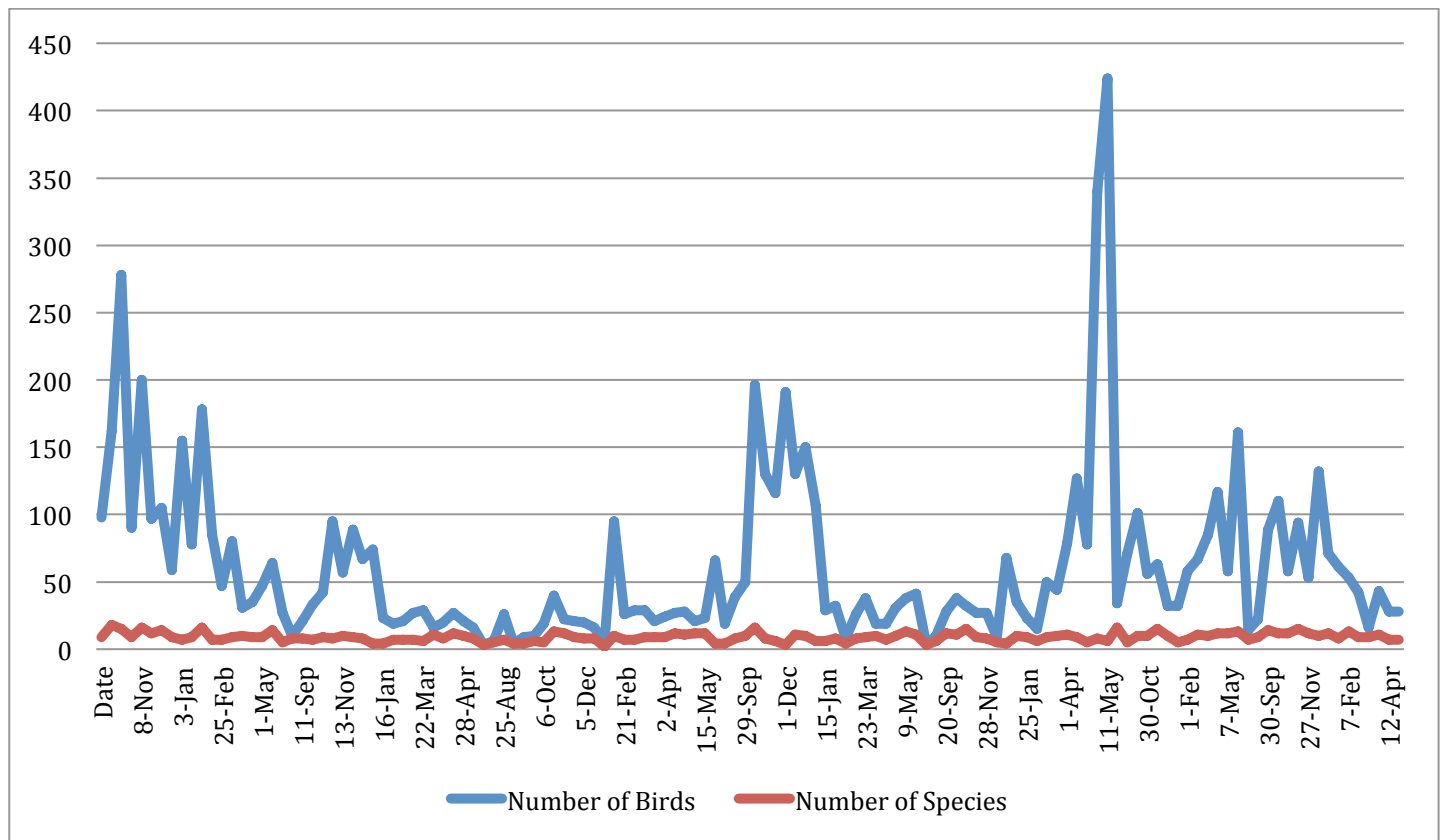


Figure 9. Number of Birds and Bird Species: Transect F.

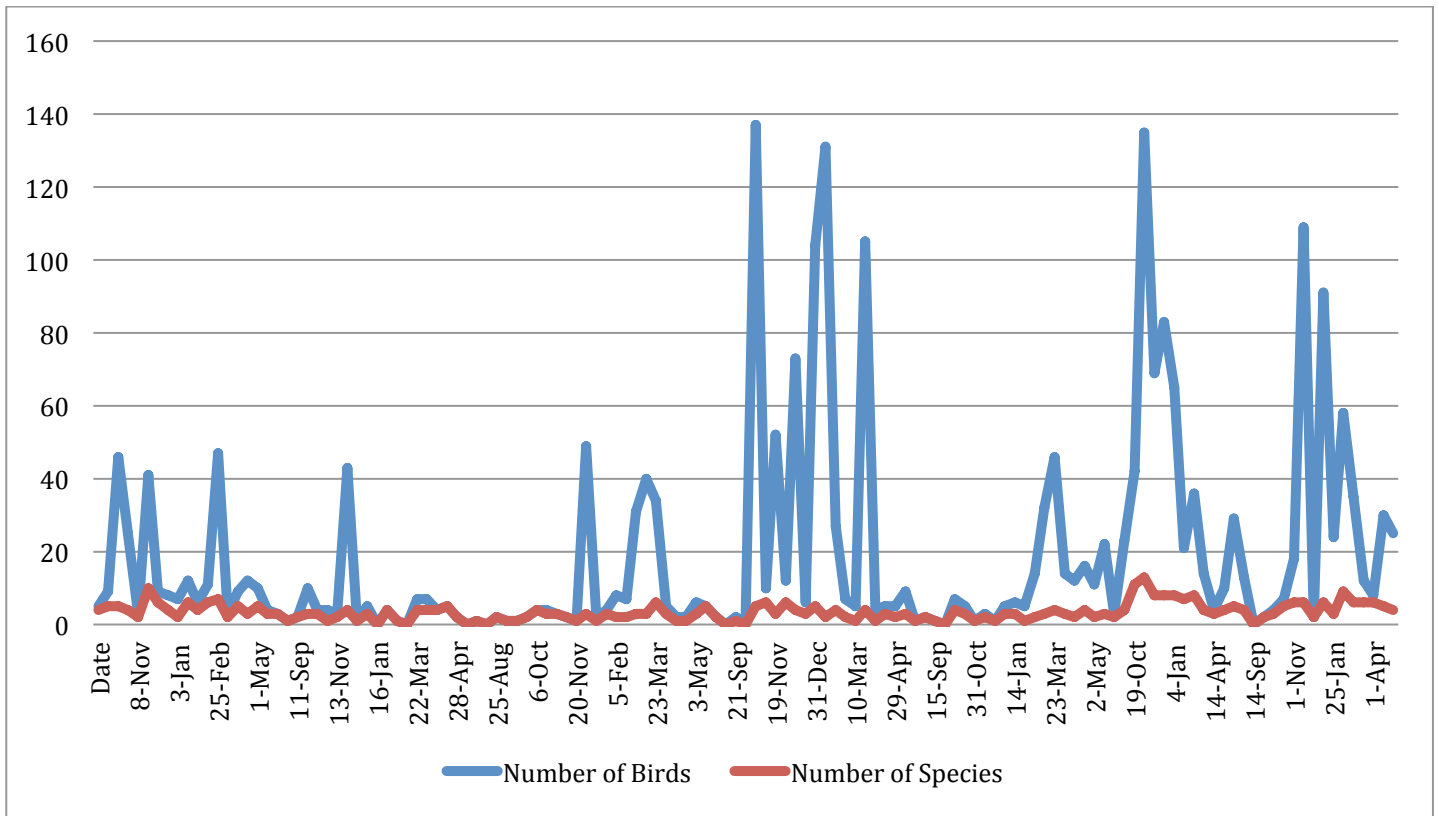


Figure 10. Number of Birds and Bird Species: Transect G.

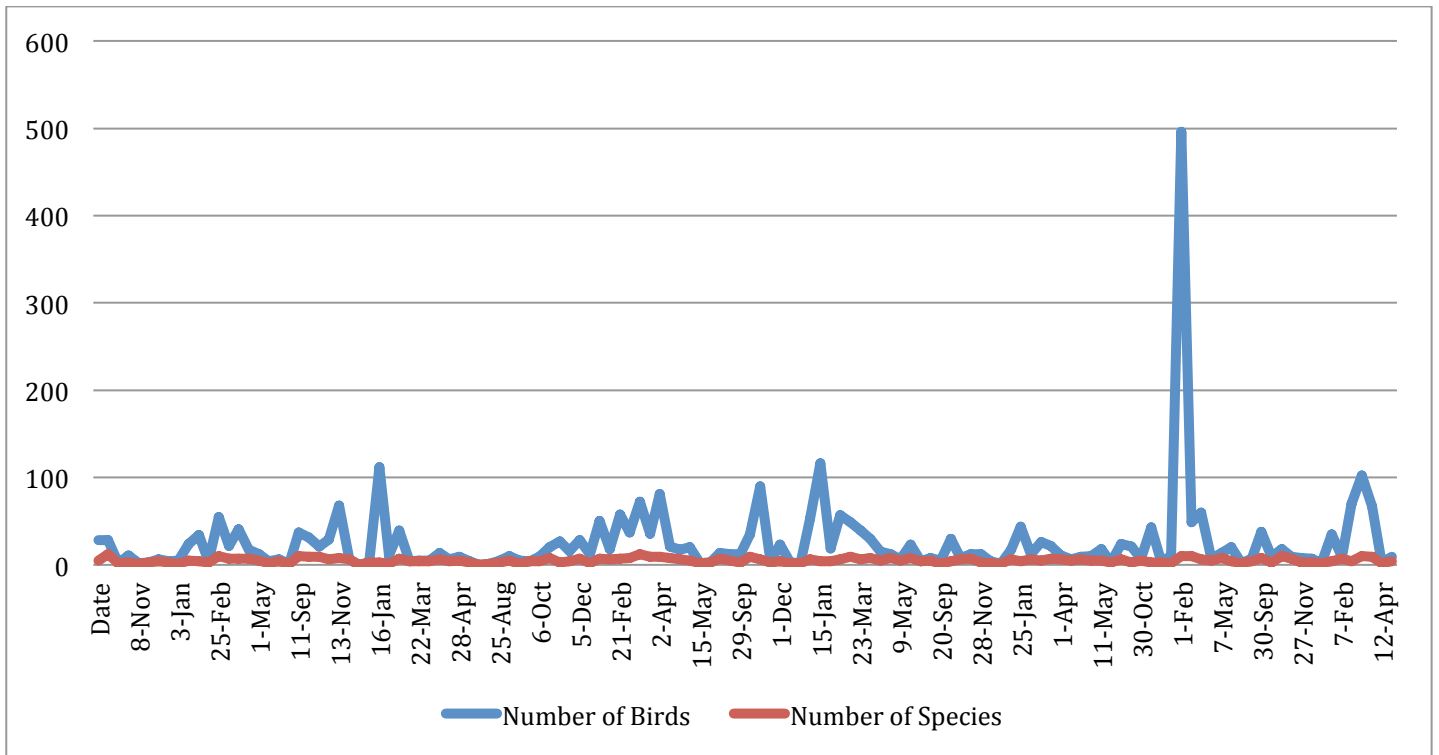


Figure 11. Number of Birds and Bird Species: Transect H.

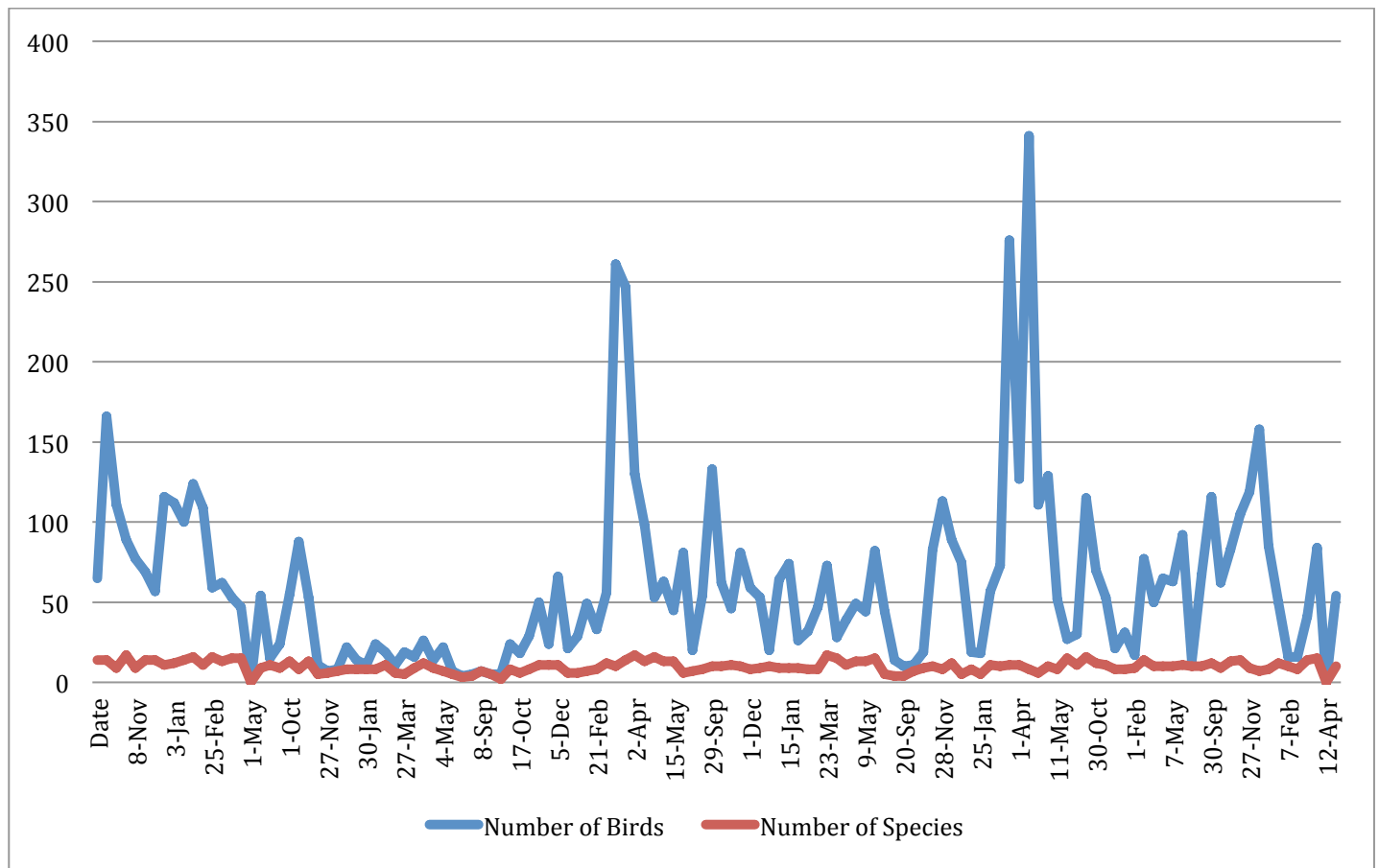
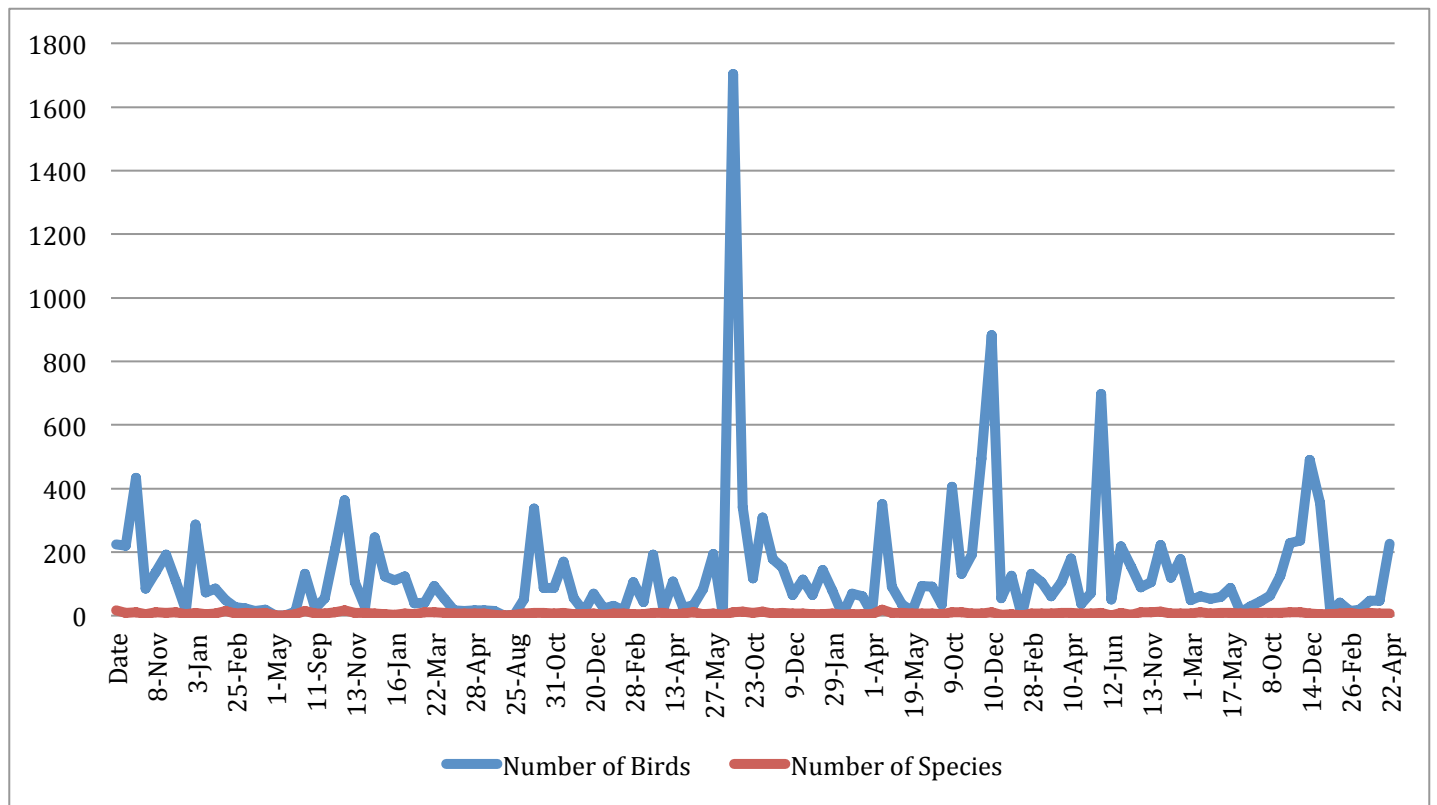


Figure 12. Number of Birds and Bird Species: Transect I.



Raptors and Shrikes

The comprehensive survey for raptors and Loggerhead Shrikes on the entire project area resulted in high numbers of raptors including Red-tailed Hawks and Loggerhead Shrikes (Figures 12-13), but also documented fifteen species of raptors using upland habitats during the surveys (Appendix B). Overall numbers of raptors dipped sharply after the winter of 2012-2013 and then steadily decline to fewer than twenty individuals from February 2014 through May 2015, then consistently over twenty from October 2015 to March 2016, and rising considerably to over sixty for much of the fall and winter of 2017-18. Conversely, Loggerhead Shrikes rebounded during the breeding season in 2015 after a similar decline (Figure 21). The increase from ten to fifty-five during a two-month period in spring 2015 was due to good reproductive success of local breeding population. The primary difference among the habitat conditions between spring of 2014 and 2015 was the lack of grasses and forbs in 2014 that resulted in low prey populations (large insects and lizards) in contrast to the tremendous amount of grasses and forbs in winter and spring of 2015. Although the amount of grasses and forbs were lower in 2016, the higher population maintained through the winter of 2015-2016 led to a higher breeding population that also had good reproductive success. The raptor and shrike populations increased dramatically during the winters of 2017-18 and 2018-19 likely due to increased populations of prey.

Figure 13. Raptor Population: 2012-2019

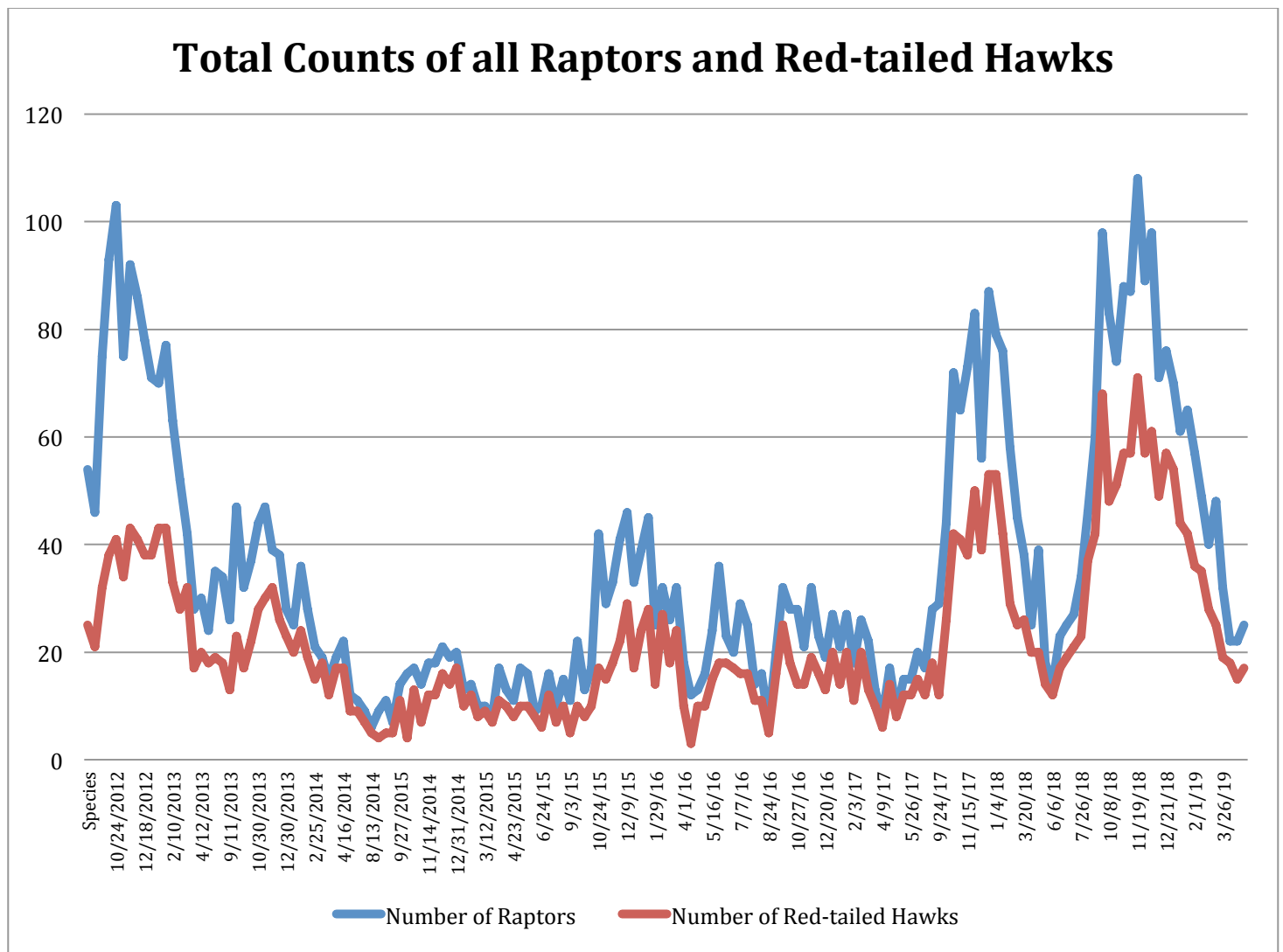
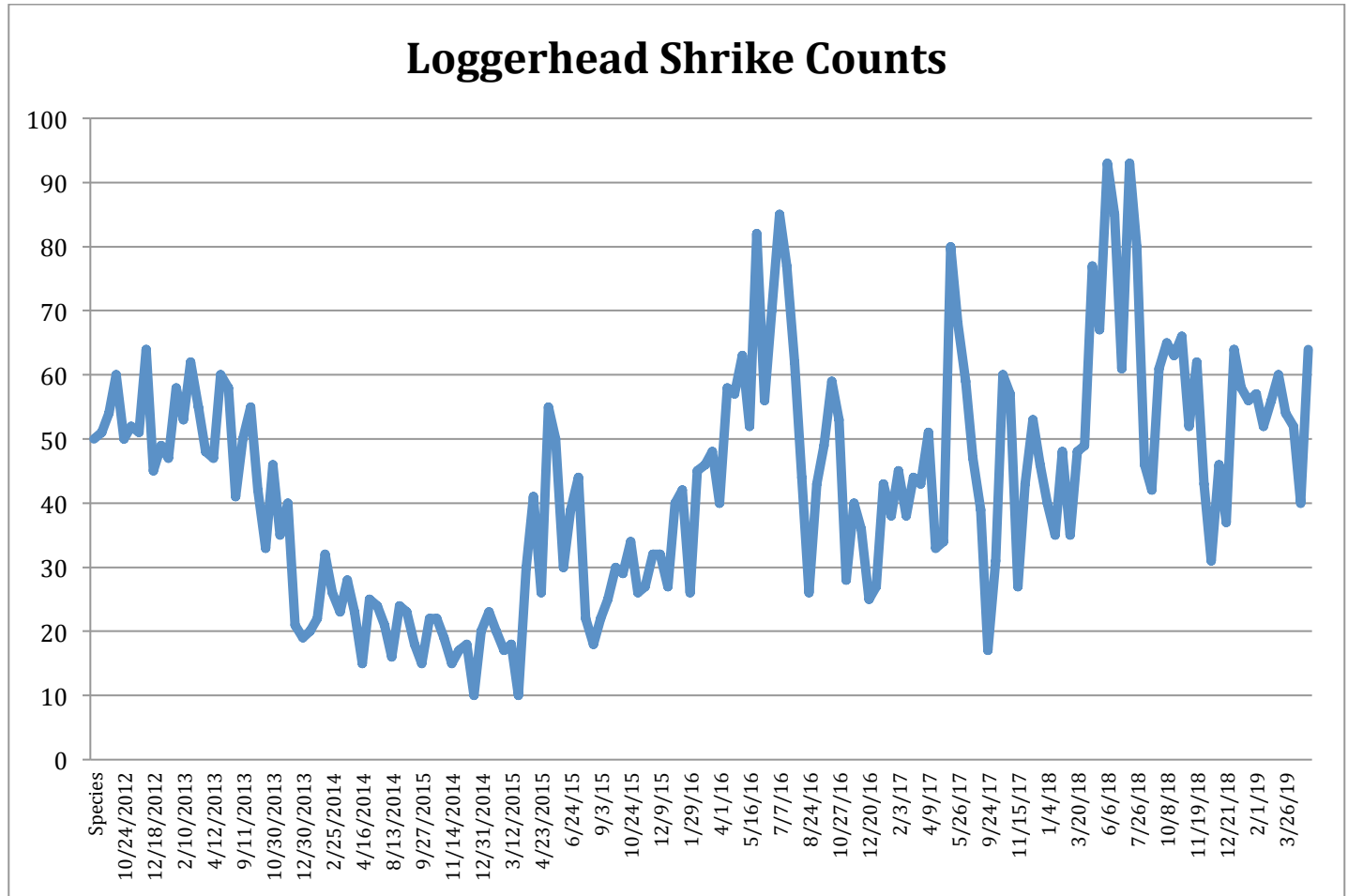


Figure 14. Loggerhead Shrike Population: 2012-2019



Waterbirds

A total of seventy-nine native waterbird species were detected during these surveys in which the number of watered ponds varied (Figures 15 - 17). Overall numbers were consistently high during the first eight survey periods (mid-October through February) with 19,823 - 34,945 individuals estimated in 2011-2012. However, numbers were much lower overall in early 2017 when ponds were initially watered but then peaked at 33,728 in December 2017 as fish and invertebrate prey as well as aquatic vegetation dramatically increased with the re-creation of wetland habitat after five years of drought (Figure 18). The ponds were dry during the fall and early winter of 2018, but water was pumped into ponds intermittently during winter and spring of 2019. A survey on 1 April 2019 yielded 11,903 total waterbirds in 32 watered ponds (13 were dry) (Table 1).

The seventy-nine species of waterbirds are grouped according to foraging ecology and evolutionary relationships. Grebes (Figure 19), gulls and terns (Figure 20), dabbling and diving ducks (Figures 21 and 22), egrets/herons (Figure 23), and shorebirds (sandpipers and plovers) (Figure 24) were classified into separate categories. American Coot (*Fulica americana*), White-faced Ibis (*Plegadis chihi*), Double-crested Cormorant (*Phalacrocorax auritus*), and White Pelican (*Pelicanus erythrorhynchos*) were treated individually in the summary data (Figures 25-28).

The ponds that were most important for high numbers of species and populations throughout the surveys were W2, W4, W5, W6, M1, M8, and M10. But many other ponds were important (for details see Appendix excel file). The variation in ponds was dramatic with several ponds consistently having over 2,000 birds and others fewer than 100. Because of the varied topography of many of the ponds and the lack of direct measurements of water depths, it was not possible to determine average depths or the range of depths for the ponds during the surveys.

Table 1. Number of Waterbirds found in Survey During Peak Water in Winter/Spring of 2018-2019: 1 April 2019.

Total Waterbirds	11,903
Grebes	94
Hérons and Egret	83
Dabbling Ducks	3,698
Diving Ducks	619
Shorebirds	206
Gulls and Terns	0
American White Pelicans	11
Double-crested Cormorants	1
White-faced Ibis	129
American Coots	7,022

Figure 15. Number of Watered and Dry Ponds: 2011-2012

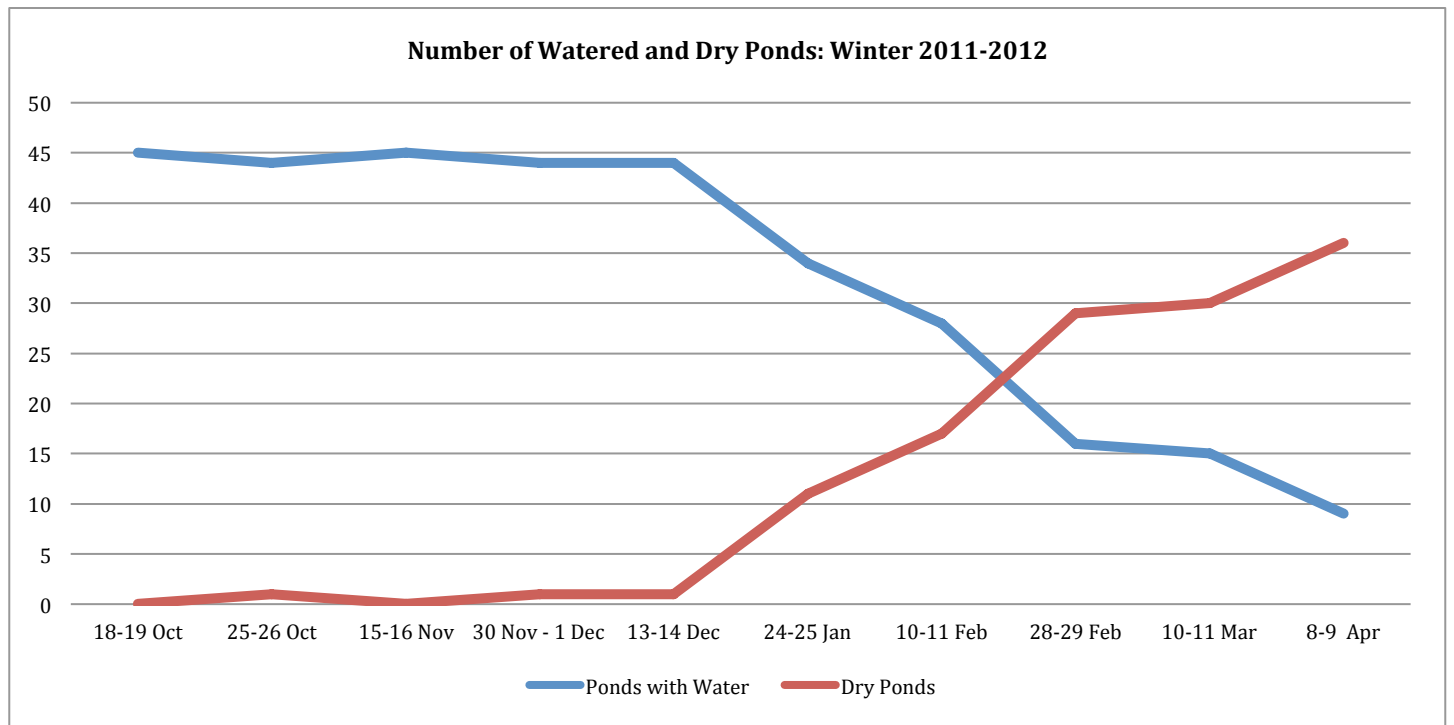


Figure 16. Number of Watered and Dry Ponds: 2017

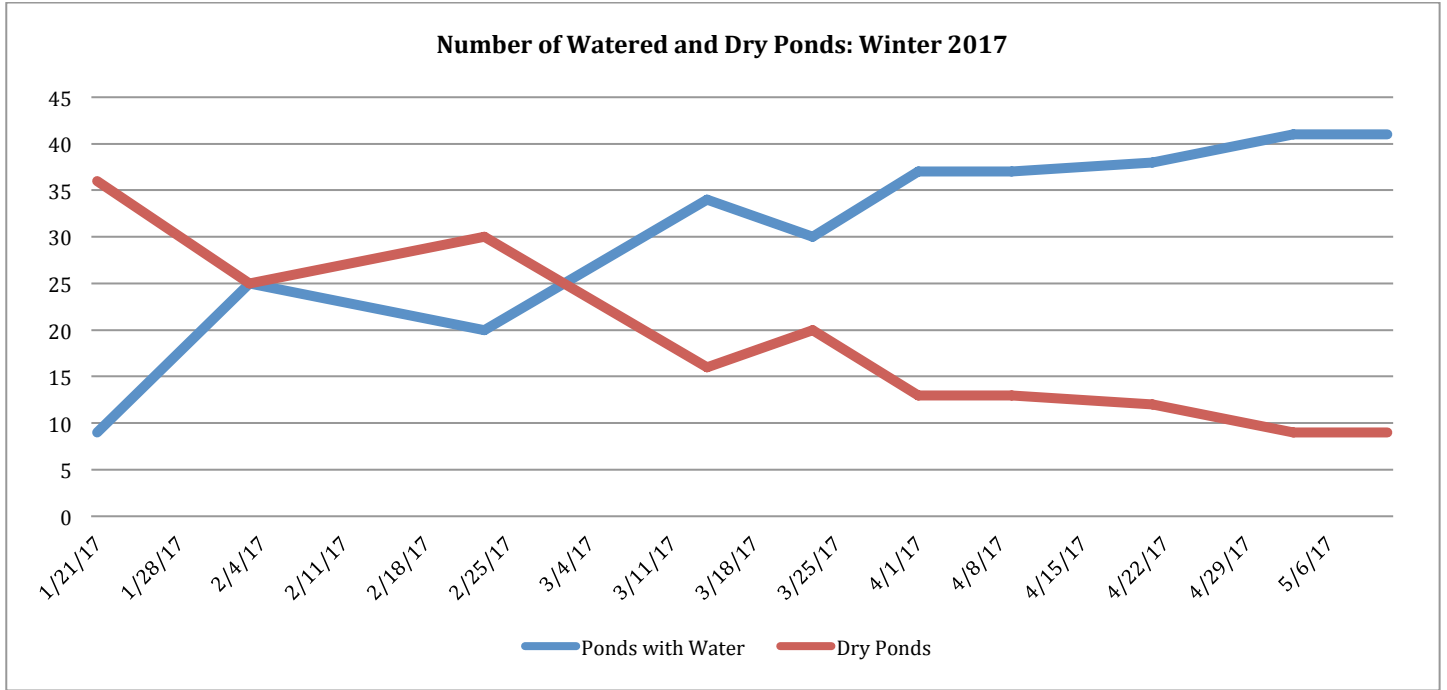


Figure 17. Number of Watered and Dry Ponds: 2018

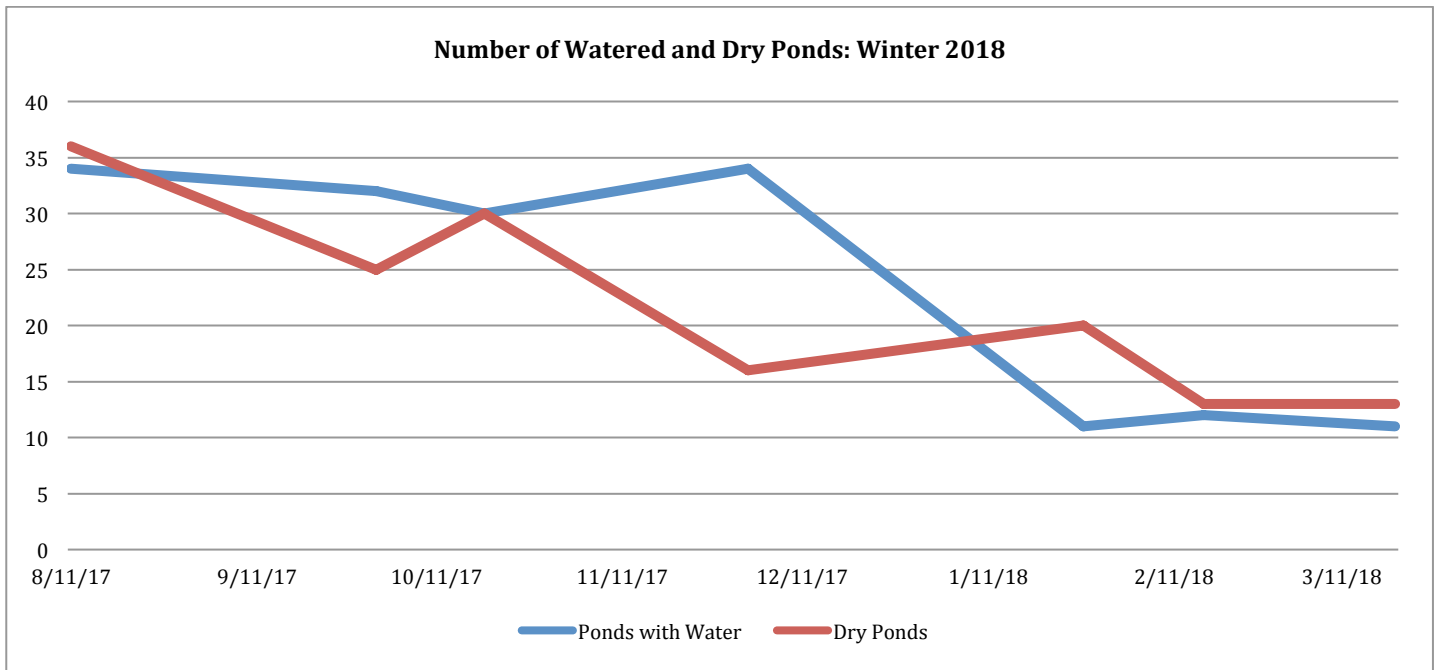


Figure 18. Total Number of Waterbirds Counted

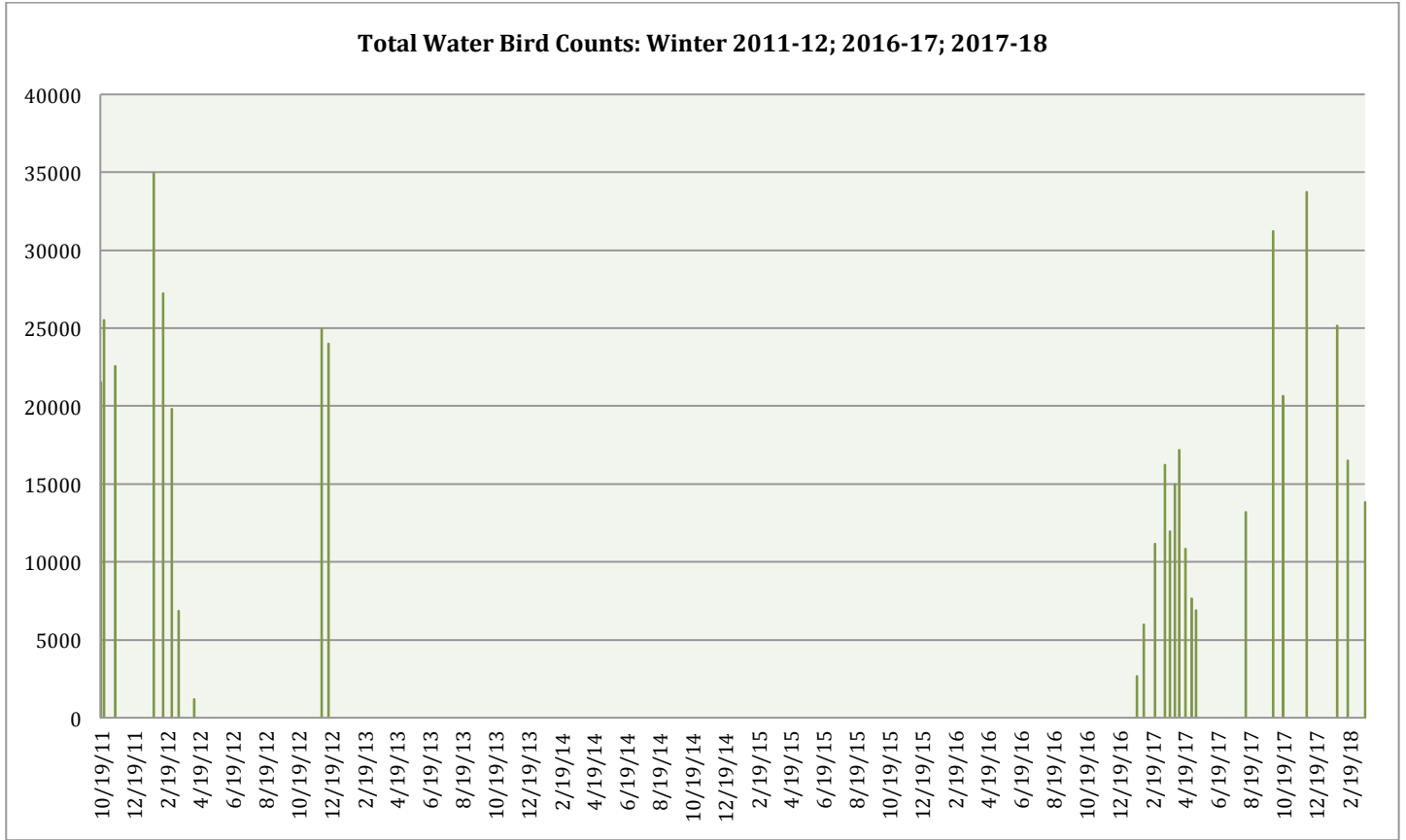


Figure 19. Total Number of Grebes Counted

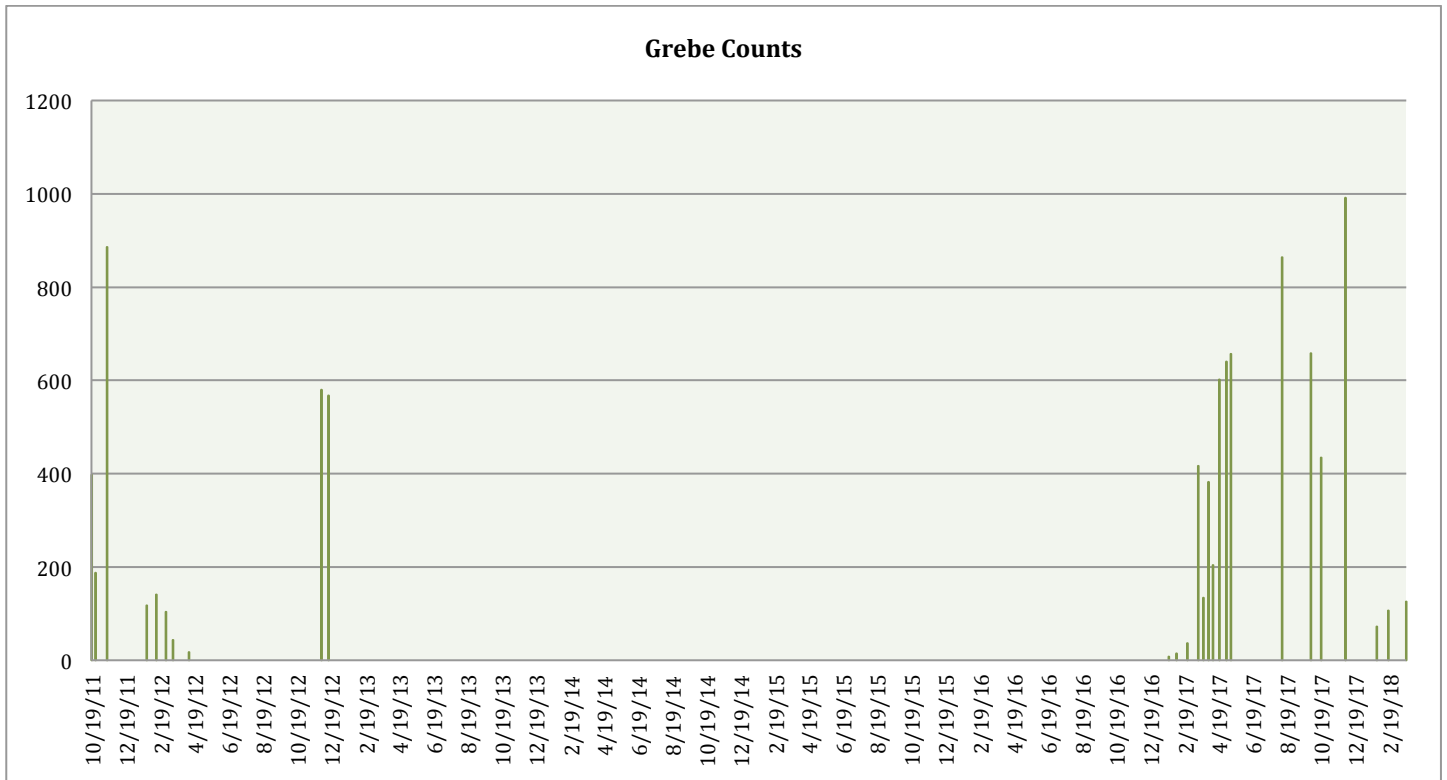


Figure 20. Total Number of Gulls and Terns Counted

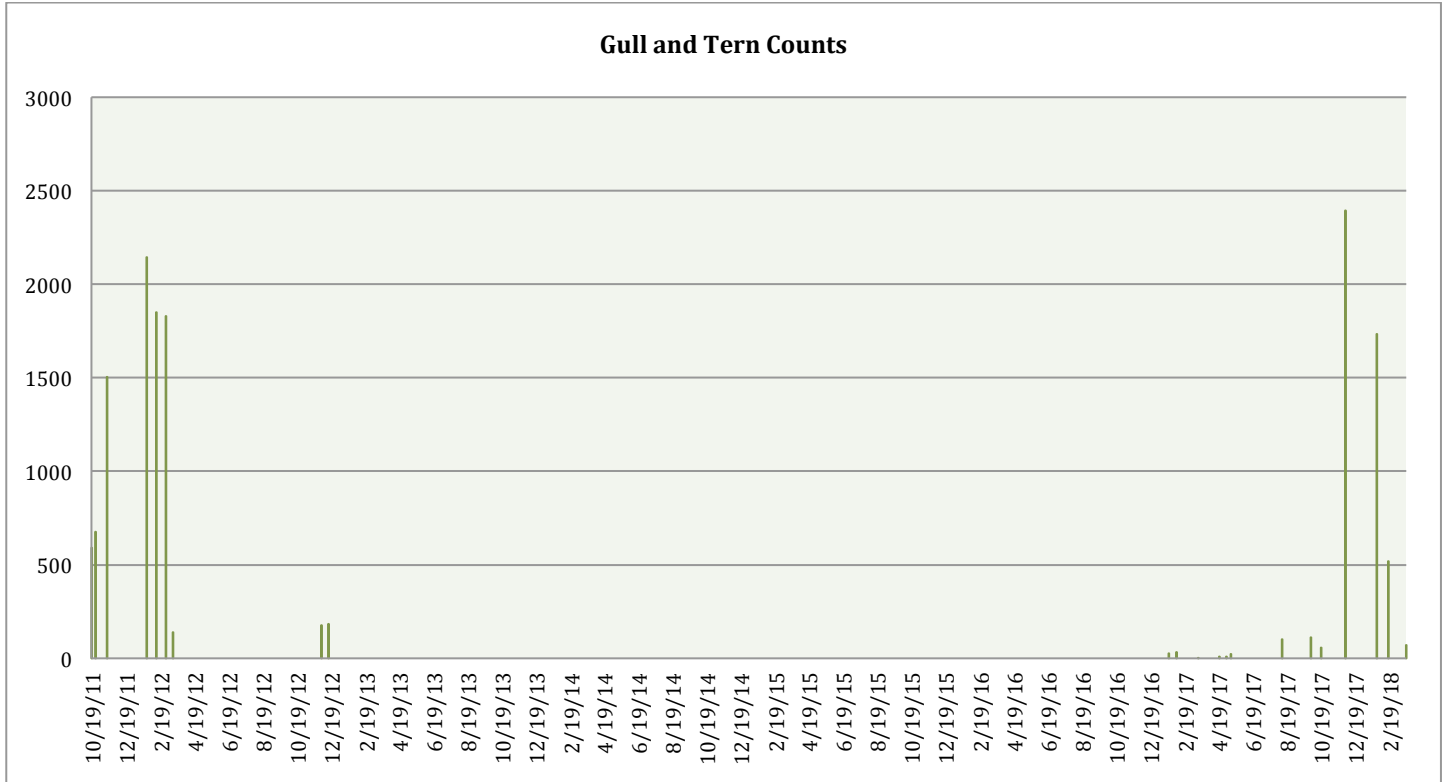


Figure 21. Total Number of Dabbling Ducks Counted

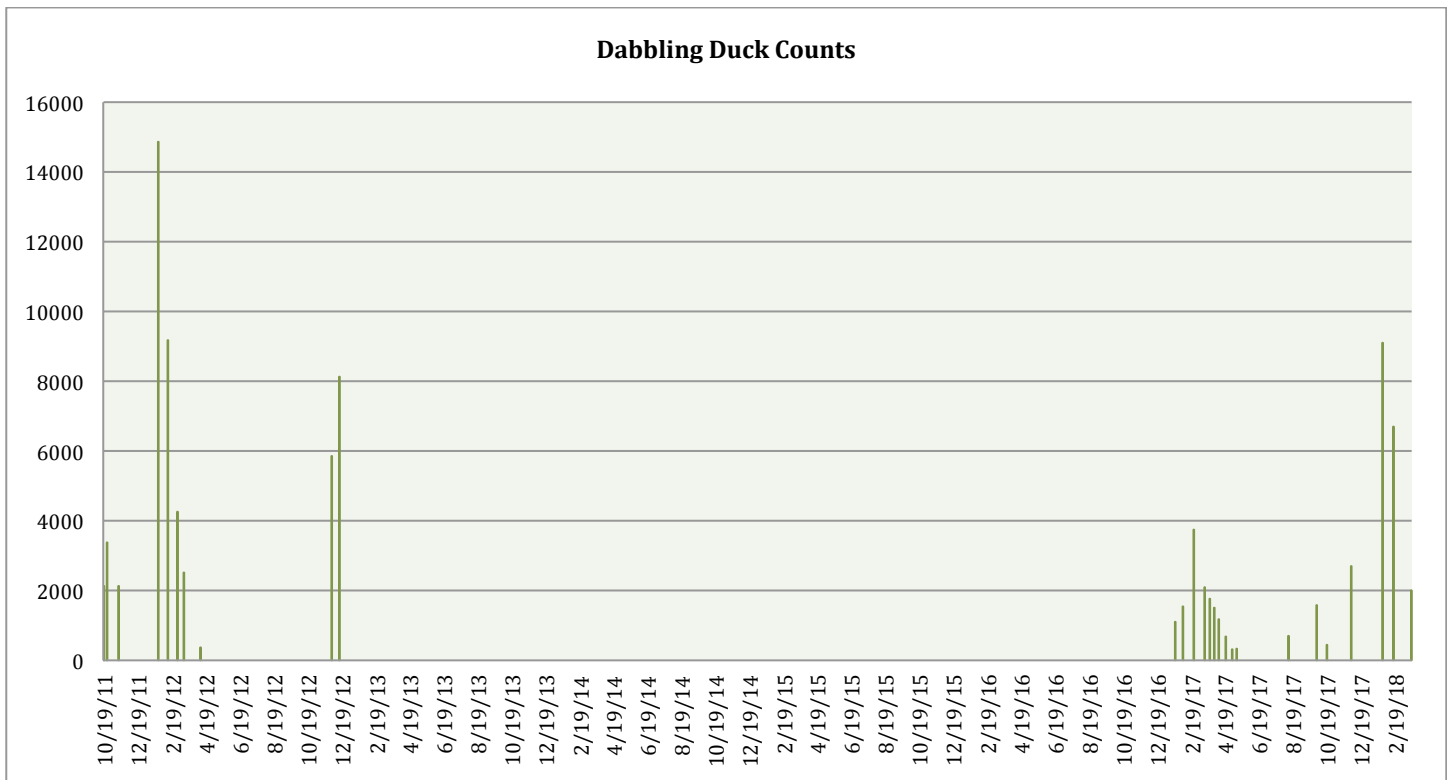


Figure 22. Total Number of Diving Ducks Counted

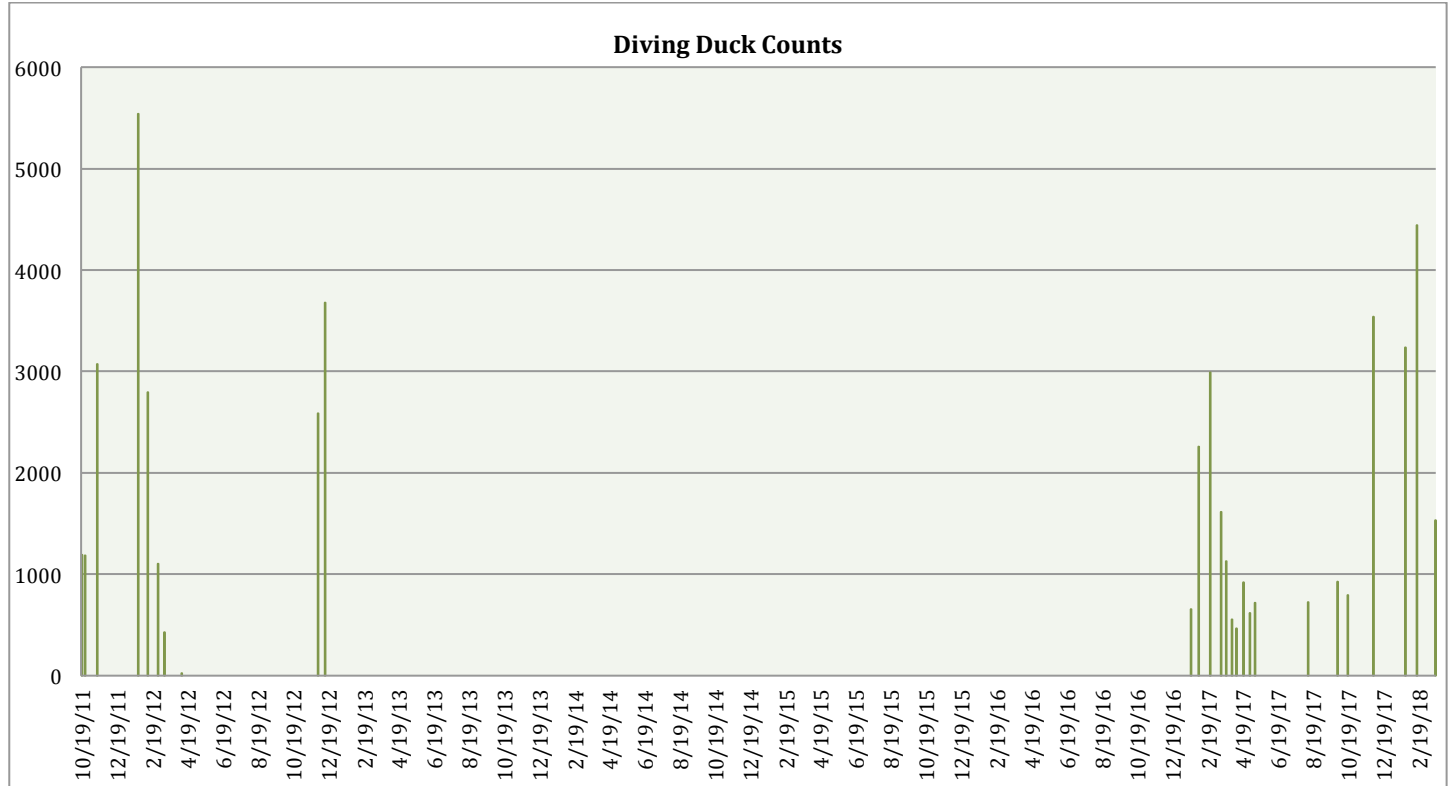


Figure 23. Total Number of Herons and Egrets Counted

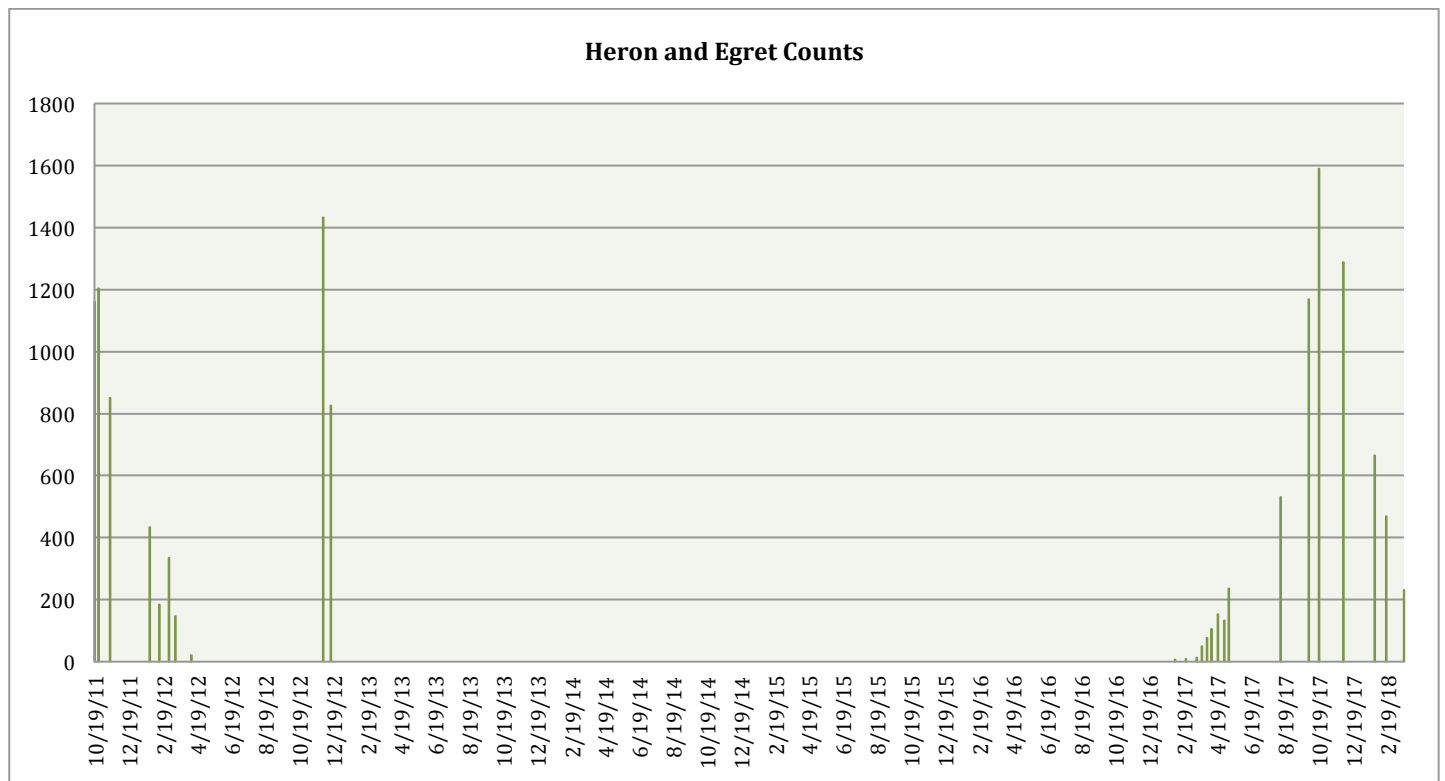


Figure 24. Total Number of Shorebirds Counted

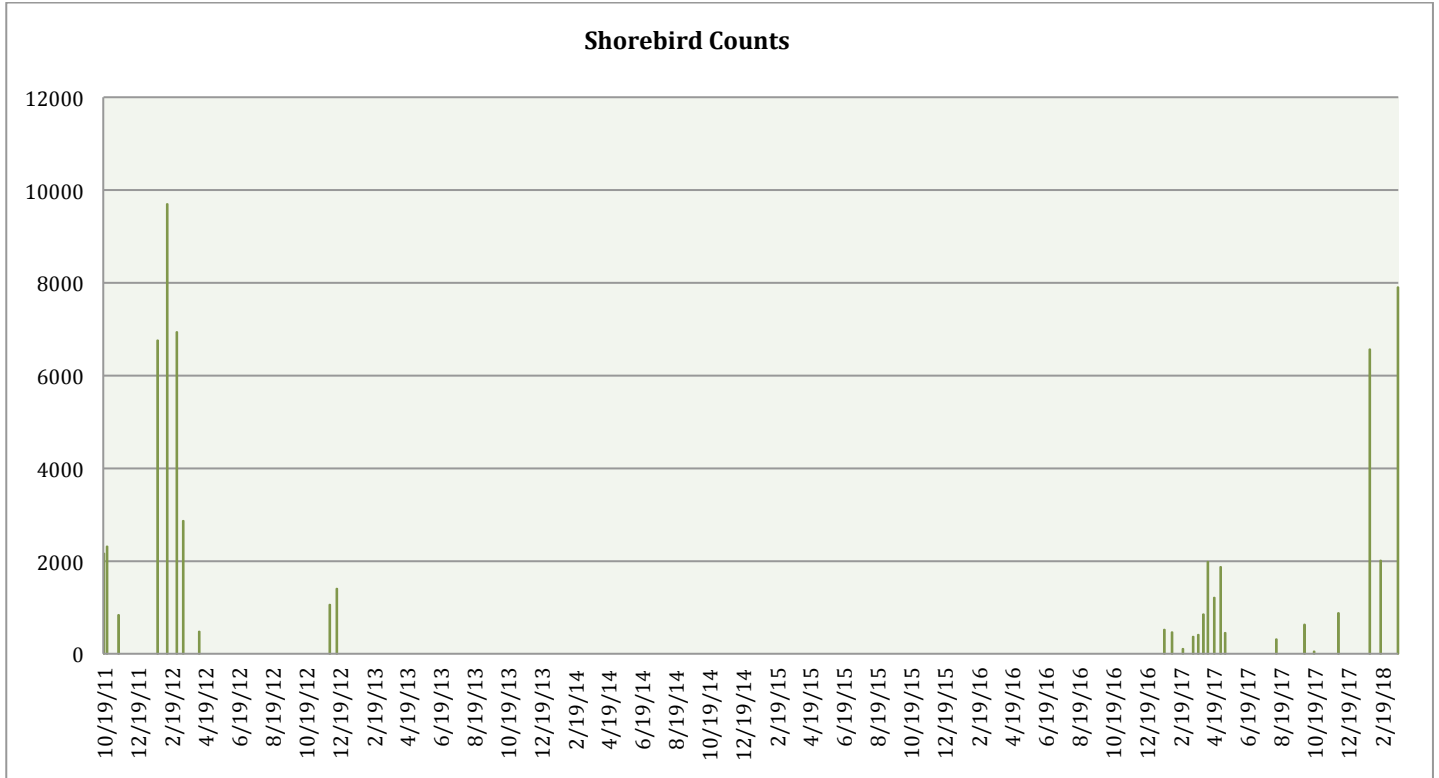


Figure 25. Total Number of American Coots Counted

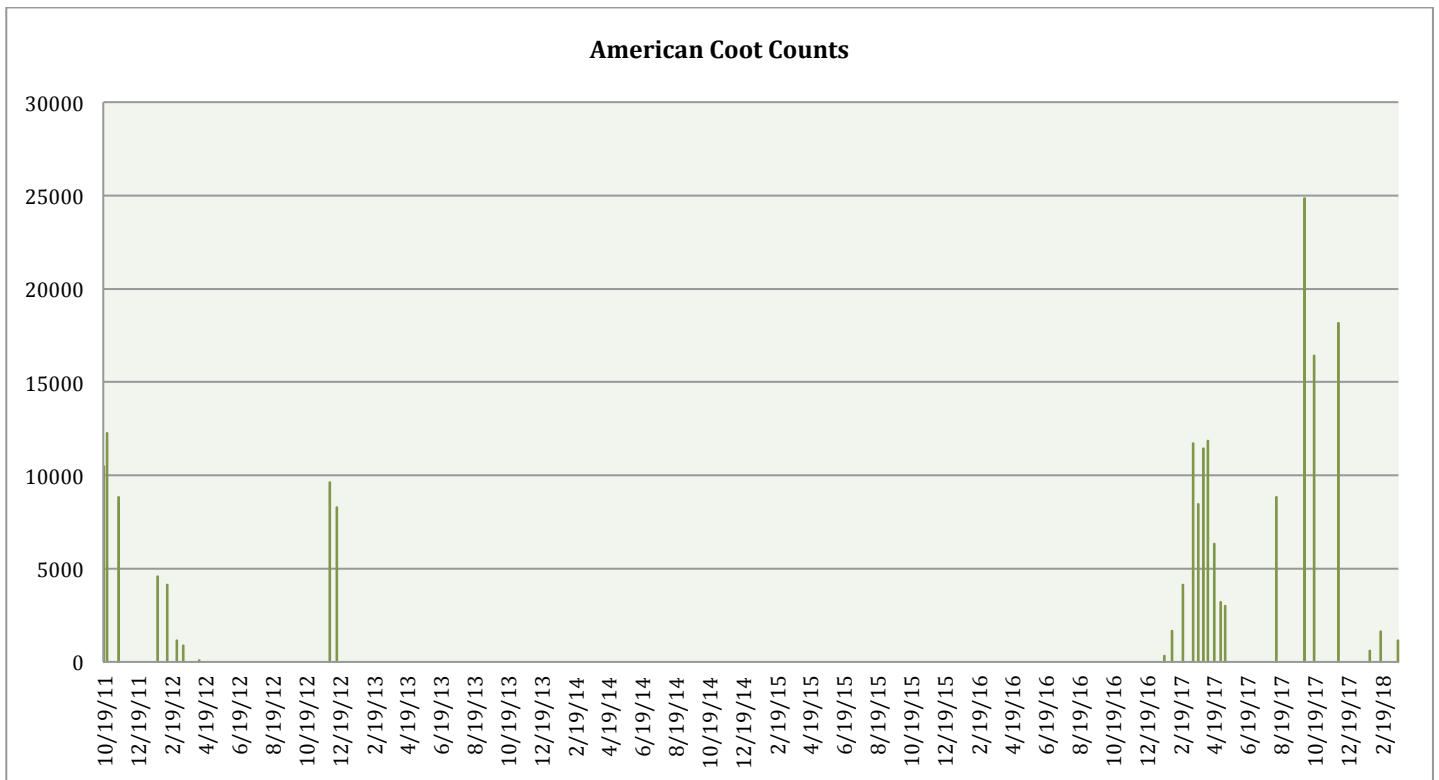


Figure 26. Total Number of Ibis Counted

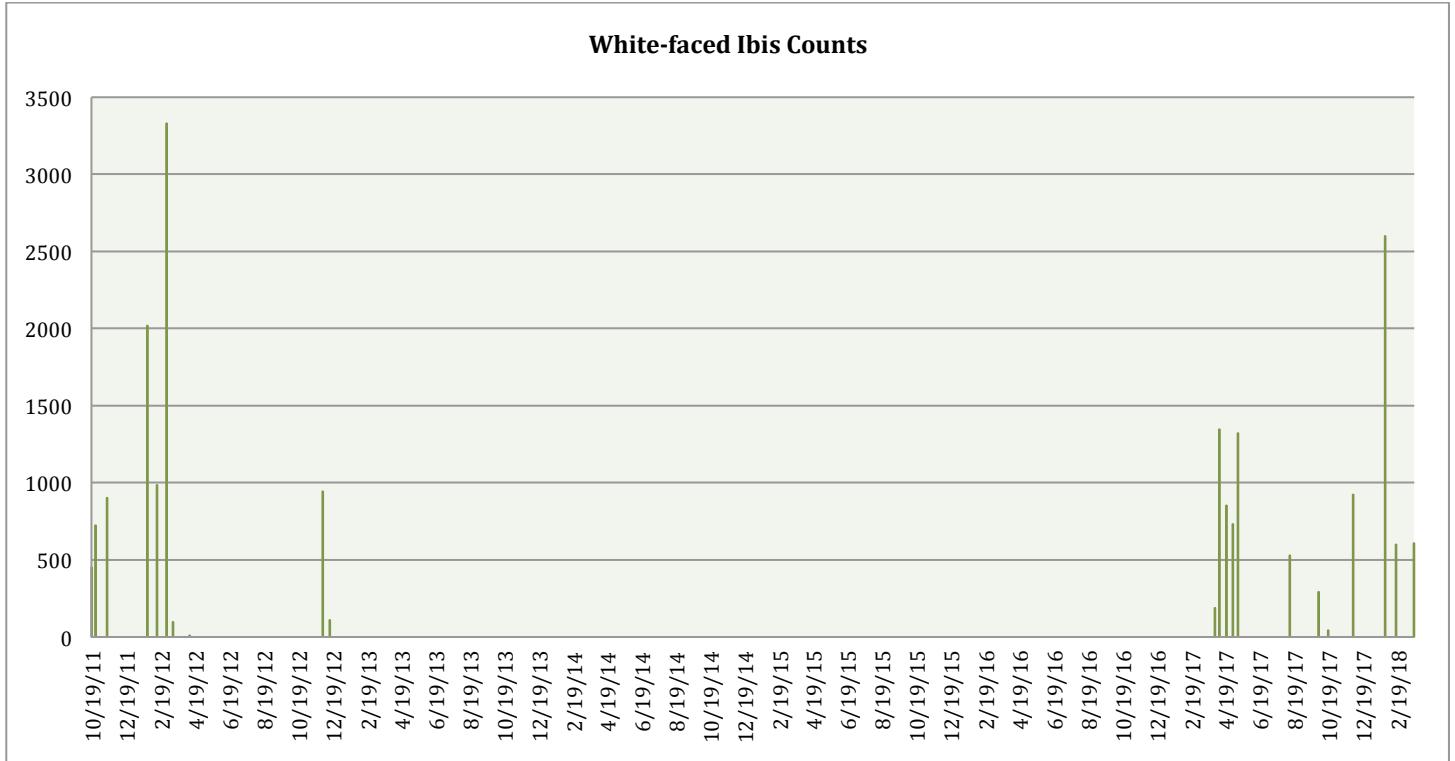


Figure 27. Total Number of Cormorants Counted

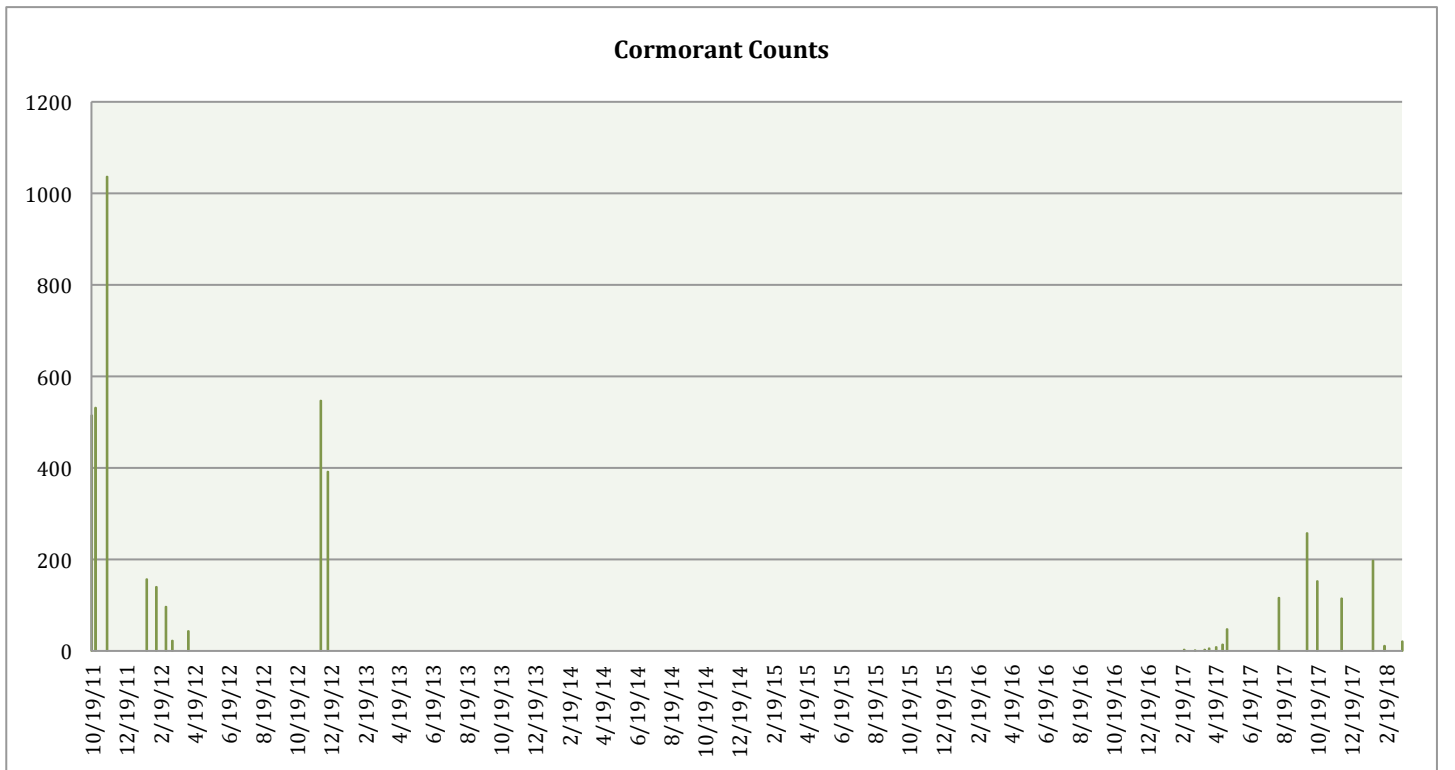
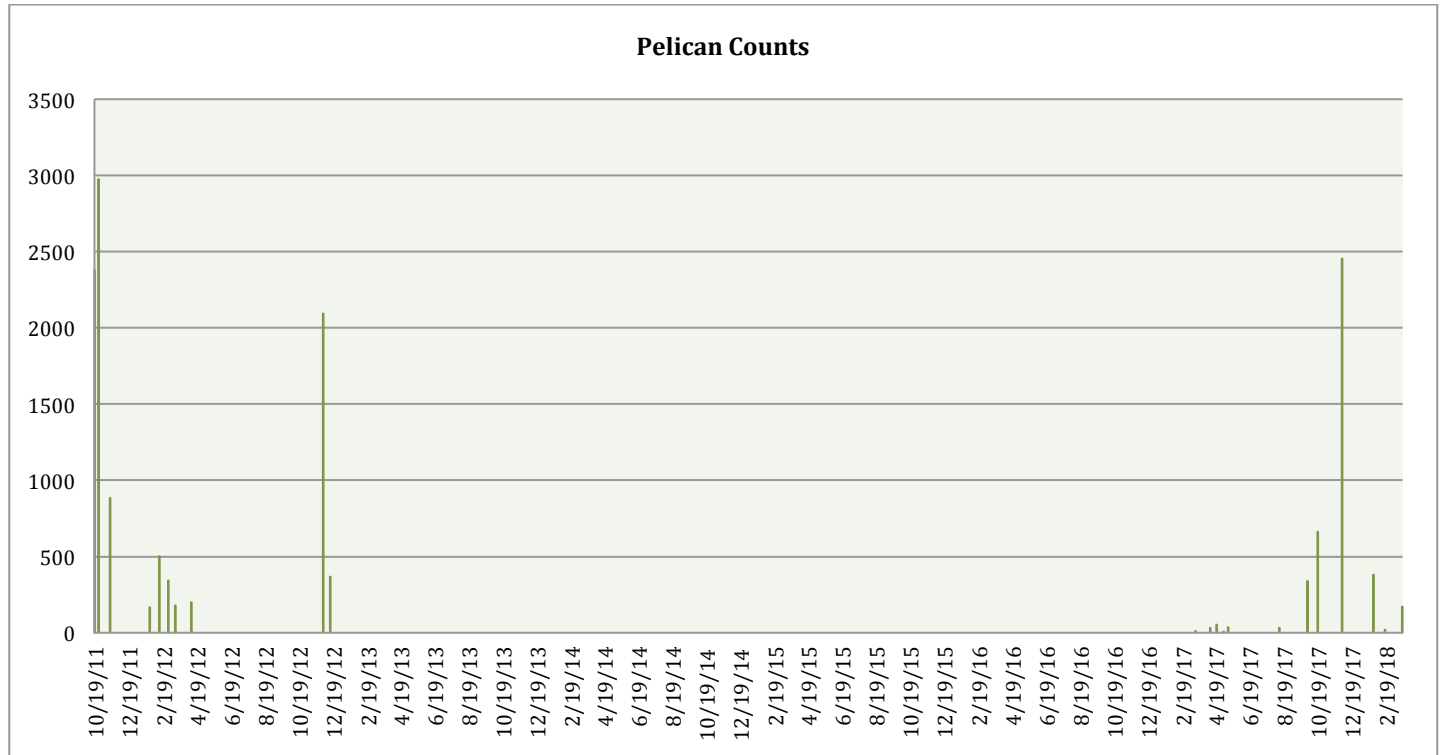


Figure 28. Total Number of Pelicans Counted



Special Status Bird Species

There have been twenty-five special-status bird species found during the raptor and upland bird surveys since the project began in October 2011 (Table 2) with an additional ten species of waterbirds found during waterbird surveys. Table 1. Species Status Bird Species (Waterbirds, Landbirds and Raptors) found on the Kern Water Bank

Species Name	Conservation/Legal Status	Seasonal Status	Habitat	Record Dates
Canvasback	IUCN Least Concern	Migration, Winter	Marshes and open ponds	Found almost daily in winter and in smaller numbers in spring when habitat is available.
Redhead	CA Species of Special Concern	Migration, Winter, Nesting	Marshes and open ponds	Found almost daily throughout year when habitat is available.
Barrow's Goldeneye	CA Species of Special Concern			One on 25 January 2012
White-faced Ibis	CA Watch List; IUCN Least Concern	Migration, Winter, Nesting	Marshes and open ponds	Found daily throughout year when habitat is available.
American White Pelican	CA Species of Special Concern	Migration, Winter	Marshes and open ponds	Found almost daily throughout year when habitat is available.
Double-crested Cormorant	IUCN Least Concern	Migration, Winter	Marshes and open ponds	Found almost daily throughout year when habitat is available.
Cooper's Hawk	CA Watch List	Migration, Winter, Potential nesting	Nests in trees, hunts in woodlands and open grasslands	Daily during migration with some in winter

White-tailed Kite	State Fully Protected	Migration, Winter, Potential nesting	Nests in trees, hunts in open grasslands	Daily during migration and winter in 2011-2012 with up to 16 individuals, but absent during drought. Only 1-3 in winters of 2017-18 and 2018-19.
Northern Harrier	CA Species of Special Concern	Migration, Winter, Potential nesting	Nests on the ground, hunts in wetlands and open grasslands	Daily during migration and winters in 2011-2012, 2016-17, 2017-18 and 2018-19, but mostly absent in drought winters with a few scattered records of individual migrants. May be nesting in spring 2018 and 2019 as a pair was seen in mid May.
Swainson's Hawk	CA Threatened Species	Nesting, Migration, Winter	Nests in trees, hunts in open grasslands	Nesting in summer 2012, scattered winter records in 2011-12; up to five individuals in Mar-May 2013; up to three individuals in Mar-May 2014; and up to four individuals in Apr/May 2015. No nest located on water bank property in 2015. Three active nests on water bank property in 2016 (Figure 14). Approximate locations: 1) 35°20'35.59"N, 119°20'27.20"W; 2) 35°20'43.52"N, 119°15'42.37"W; and 3) 35°19'11.17"N, 119°13'15.58"W. No active nests found in 2017. No active nests found in 2018, but up to fourteen individuals seen in spring 2018 so may be nesting on site. Probable nesting at two locations in 2019.
Ferruginous Hawk	CA Watch List	Winter	Hunts in open grasslands	Daily during winter except in 2017-18 with only one occurrence; rare dark morph individual in March 2016.
Golden Eagle	State Fully Protected and Federal Eagle Protection Act	Winter	Hunts in open grasslands	Five winter records
Bald Eagle	State Fully	Winter, Migration	Hunts in wetlands and	One record of second-

	Protected and Federal Eagle Protection Act		open grasslands	year old bird on 30 October 2018.
Osprey	CA Watch List	Migration, Winter	Hunts in wetlands and canals	Daily during winters of 2011-12, 2016-17 and 2017-2018, only a few sightings of migrants during other periods
Snowy Plover (inland)	CA Species of Special Concern	Migration, potentially in Winter	Open mudflats	Two on 20 March 2018
Mountain Plover	CA Species of Special Concern and Federal Proposed Threatened	Migration, Winter	Roosts and forages in grasslands	Two on 14 October 2013
Long-billed Curlew	CA Watch List and Federal Bird of Conservation Concern	Migration, Winter	Roosts and forages in grasslands and wetlands	Scattered winter and migration records including flocks.
Caspian Tern	CA Watch List; Federal Bird Species of Conservation Concern	Migration, Winter, Potential nesting	Marshes and open ponds	Found almost daily throughout year when habitat is available.
Black Tern	CA Species of Special Concern	Migration	Open ponds	Two on 21 April and 3 May 2017
Burrowing Owl	CA Species of Special Concern	Nesting, Migration, Winter	Nests and hunts in grasslands	Found on most visits through year, and nested each spring
Vaux's Swift	CA Species of Special Concern	Migration	Forages over wetlands and grasslands	Found during a few spring migration visits
Merlin	CA Watch List and Federal Bird of Conservation Concern		Hunts in grasslands and wetlands	Regular during late fall to spring with 32 records.
Peregrine Falcon	Federal Bird of Conservation Concern	Migration, Winter	Hunts in grasslands and wetlands	Regular during fall and winter of 2011-12, scattered records since then, increased sightings in 2017 and 2018. Total of 25 records.
Prairie Falcon	CA Watch List and Federal Bird of Conservation Concern	Migration, Winter	Hunts in grasslands	Found on most visits from Nov through Mar during the drought winters with 52 records.
Nuttall's Woodpecker	Federal Bird of Conservation Concern	Nesting, Migration, Winter	Nests in trees, forages in woodlands	Found during most survey visits on Transect C.
Willow Flycatcher	CA Endangered Species	Migration	Roosts in trees, hunts in open woodlands forages	Regular but sparse during migration
Vermilion Flycatcher	CA Species of Special Concern	Migration, Winter. Potential nesting	Nests in trees, forages in open woodlands and scrublands	Several fall and winter records of at least ten individuals since 2011 including at least six different individuals in 2017
Loggerhead Shrike	CA Species of Special Concern and Federal Bird of Conservation Concern	Nesting, Migration, Winter	Nests in trees, hunts in open woodlands and scrublands	Found during each survey visit with up to 95 recorded on a single visit.

California Horned Lark	CA Watch List	Nesting, Migration, Winter	Nests on ground, forages in barren fields with little grassland cover	Found during each survey visit. Many breeding during 2015-2019.
Purple Martin	CA Species of Special Concern	Migration	Forages over wetlands and grasslands	1 Apr 2012, very rare in Tulare Basin/San Joaquin Valley floor
Lucy's Warbler	CA Species of Special Concern	Migration	Nests in trees, hunts in open woodlands and scrublands	1-4 Oct 2012; second record for the entire Central Valley
Grasshopper Sparrow	CA Species of Special Concern	Migration, Winter, Potential nesting	Nests on ground in grasslands	13 Nov, 10 Dec 2013, 23 Oct 2015
Tricolored Blackbird	CA Species of Special Concern and Federal Bird of Conservation Concern	Nesting, Migration, Winter	Nests in ruderal and marsh vegetation, forages in grasslands, fields and wetlands	Nesting in summer 2012 and 2017, found most days in migration and winter during 2011-2012; nesting off site in 2015 and 2018 but foraging on the water bank property, probable nesting in 2019
Yellow-headed Blackbird	CA Species of Special Concern	Migration, Winter. Potential nesting	Nests in marsh vegetation, forages in grasslands, fields and wetlands	Regular during migration and winter in 2011-12, and spring 2017 and 2019 (may have nested in 2017)
Lawrence's Goldfinch	Federal Bird of Conservation Concern	Migration, Winter, Potential nesting	Nests in trees, forages in open woodlands and scrublands	Two late fall records in 2013, pairs on 23 Apr 2015, 1 Apr and 9 May 2016. Flocks Oct 2015-Jan 2016. Small flocks in April - May 2017 and March - May 2018, and May 2019. Flock of 700 in a single field on 4 Dec 2018, which may be largest flock on record for this species.

Rare Birds

A few birds were discovered during the surveys that are not special-status species, but out of their normal range. These records are very important to our understanding of vagrancy in birds and the data are archived by county editors for "North American Birds" magazine and the online eBird database (administered by Cornell University's Laboratory of Ornithology). During fall migration two Black-throated Sparrows were found on Transects A and C. This desert species is very rare in the Central Valley. A fall migrant Clay-colored Sparrow was in mesquite and cottonwoods between transects A and B on 25 October 2012. This northern and Midwestern species is rare anywhere in California and especially in the Central Valley from which there are fewer than ten documented records. Surprisingly, no fewer than eight Brewer's Sparrows were found wintering in 2012-13 and several have been found each subsequent winter thereby establishing the area as a regular wintering area. Before the project there were almost no documented records of this Great Basin and desert species during winter months in the Central Valley. There have been seven records of migrant Sage Thrashers—a Great Basin species, which is a rare but annual migrant in the Central Valley. During a 2012 fall survey, a Chestnut-collared Longspur was heard calling in flight over Transect I. This is a very rare wintering bird in the San Joaquin Valley and Tulare Basin with fewer than ten records. On a Christmas Bird Count before these surveys began, an Eastern Phoebe was documented for one of very few San Joaquin Valley and Tulare Basin records of this eastern species, which rarely occurs in California. During a spring surveys on 1 April 2012 and 12 March 2015, single Cassin's Kingbirds were found establishing the only Tulare Basin records away from eastern Bakersfield (only one record

from nearby Kings County). Also on 1 April 2012, a male Purple Martin was photographed migrating over grasslands for one of few records for the Tulare Basin and San Joaquin Valley. Two rare warblers, a Lucy's (29 September to 4 October 2013) and a Virginia's (21 September 2015) were only the second and third records for the Central Valley, respectively. At least six different Vermilion Flycatchers were present from fall 2017 to early spring 2018. This rare desert species has been increasing in the Central Valley in recent years and has nested in nearby Kings County at least once. Rare inland gulls include Sabine's, Glaucous, and Western found on 1 October 2017, 26 February 2019, and 27 January 2018, respectively. On 12 May 2019, the Central Valley's second Neotropic Cormorant was found and seen again on 15 May. Also the first Kern County record of Glossy Ibis was photographed on 23 April 2019, but could not be relocated as of 15 May 2019. The Kern Water Bank has exceptional habitats for birds and many rare birds will likely be found and documented in the future dependent upon survey efforts. An amazingly large flock of 700 Lawrence's Goldfinches were in one dry field on 4 December 2018, which may be the largest flock on record for this species. High counts in the global database eBird were less than 350.

Discussion

The bird use of property managed by the Kern Water Bank Authority is clearly very high in accordance to the large acreages of upland and wetland habitats. Overall, in terms of bird abundance, species diversity, acreage, location and habitat diversity, it is an important area of upland habitat, especially when compared to surrounding agricultural lands. And it is even more important for its wetland habitat when water is available. These surveys documented particularly large populations raptors and shrikes, sparrows, and many other species typical of native upland habitats on the San Joaquin Valley floor. Of particular interest were the differences in the effect of the drought conditions among the years. There was measureable precipitation in winter of 2014-2015 and in the spring of 2015 with lesser amounts in winter 2015-2016 and spring 2016, and again in winter 2016-2017 which resulted in much growth of grasses and forbs throughout the water bank property. This was in contrast to no new growth during spring 2014 that left the area devoid of grasses and forbs. As a result, Loggerhead Shrike populations rebounded to pre-winter 2013-2014 levels, primarily as a result of good reproductive success of local breeders. These shrikes prey upon large insects and lizards that were common during the springs of 2015, 2016, 2017 and 2018. The highest counts of Loggerhead Shrikes of the survey project were of 93 during two surveys in June and July 2018—the result of a successful breeding season for a large nesting population.

Raptor counts also rebounded to pre-drought year levels in response to relief of severe drought conditions and increase in prey in general. With the likely increase in the vole population in 2017-19 due to much vegetation growth especially near the newly watered ponds, raptors such as White-tailed Kites, Northern Harriers, and American Kestrels responded with increased populations.

The watering of many recharge ponds from January 2017 to January 2018 had created exceptional conditions for most waterbirds. Forster's Terns, Clark's and Western grebes and several duck species had re-established breeding populations. A large White-faced Ibis breeding colony of several hundred pairs also formed in M1 for spring 2017. Although peak population levels for some groups did not reach those of 2011-2012, there was still a sizeable population for all groups of waterbirds including some that exceeded the 2011-12 population peaks. As fish populations grew into late 2017, fish-eating birds, including herons, egrets, terns, gulls, grebes, Double-crested Cormorant and American White Pelican numbers increased dramatically to take advantage of their fish prey. Ducks and American Coots also boosted their populations in response to the increased aquatic vegetation and invertebrate prey. As ponds were drying in late winter and spring 2018, much mudflat was exposed creating ideal conditions for shorebird habitat. Shorebird numbers peaked at close to 8,000 by early spring. Watered ponds in spring of 2019 have created conditions for breeding grebes, herons, egrets, White-faced Ibis, terns, waterfowl and Black-necked Stilts. As of mid-May, many potential breeding species were still present in the ponds.

**Appendix A. List of Bird Species Recorded at the Kern Water Bank
Compiled By John Sterling (22 May 2019)
Bold-faced names = species rare in the Tulare Basin**

Anseriformes - Screamers, Swans, Geese, and Ducks

Anatidae - Ducks, Geese, and Swans

Greater White-fronted Goose *Anser albifrons*

Snow Goose *Chen caerulescens*

Ross's Goose *Chen rossii*

Cackling Goose *Branta hutchinsii*

Canada Goose *Branta canadensis*

Tundra Swan *Cygnus columbianus*

Wood Duck *Aix sponsa*

Gadwall *Anas strepera*

Eurasian Wigeon *Anas penelope*

American Wigeon *Anas americana*

Mallard *Anas platyrhynchos*

Blue-winged Teal *Anas discors*

Cinnamon Teal *Anas cyanoptera*

Northern Shoveler *Anas clypeata*

Northern Pintail *Anas acuta*

Green-winged Teal *Anas crecca*

Canvasback *Aythya valisineria*

Redhead *Aythya americana*

Ring-necked Duck *Aythya collaris*

Greater Scaup *Aythya marila*

Lesser Scaup *Aythya affinis*

Bufflehead *Bucephala albeola*

Common Goldeneye *Bucephala clangula*

Barrow's Goldeneye *Bucephala islandica*

Hooded Merganser *Lophodytes cucullatus*

Common Merganser *Mergus merganser*

Red-breasted Merganser *Mergus serrator*

Ruddy Duck *Oxyura jamaicensis*

Galliformes - Gallinaceous Birds

Odontophoridae - New World Quail

California Quail *Callipepla californica*

Phasianidae - Partridges, Grouse, Turkeys, and Old World Quail

Ring-necked Pheasant *Phasianus colchicus* - I

Podicipediformes - Grebes

Podicipedidae - Grebes

Pied-billed Grebe *Podilymbus podiceps*

Horned Grebe *Podiceps auritus*

Eared Grebe *Podiceps nigricollis*

Western Grebe *Aechmophorus occidentalis*

Clark's Grebe *Aechmophorus clarkia*

Pelecaniformes - Pelicans, Cormorants, Herons, Ibises, and Allies

Phalacrocoracidae - Cormorants

Double-crested Cormorant *Phalacrocorax auritus*

Neotropic Cormorant *Phalacrocorax brasilianus*

Pelecanidae - Pelicans

American White Pelican *Pelecanus erythrorhynchos*

Ardeidae - Herons, Bitterns, and Allies

Great Blue Heron *Ardea herodias*
 Great Egret *Ardea alba*
 Snowy Egret *Egretta thula*
 Cattle Egret *Bubulcus ibis*
 Green Heron *Butorides virescens*
 Black-crowned Night-Heron *Nycticorax nycticorax*

Threskiornithidae - Ibises and Spoonbills

White-faced Ibis *Plegadis chihi*
Glossy Ibis *Plegadis falcinellus*

Accipitriformes - Hawks, Kites, Eagles, and Allies

Cathartidae - New World Vultures

Turkey Vulture *Cathartes aura*

Pandionidae - Ospreys

Osprey *Pandion haliaetus*

Accipitridae - Hawks, Kites, Eagles, and Allies

White-tailed Kite *Elanus leucurus*
Bald Eagle *Haliaeetus leucocephalus*
 Northern Harrier *Circus cyaneus*
 Sharp-shinned Hawk *Accipiter striatus*
 Cooper's Hawk *Accipiter cooperii*
 Red-shouldered Hawk *Buteo lineatus*
 Swainson's Hawk *Buteo swainsoni*
 Red-tailed Hawk *Buteo jamaicensis*
 Ferruginous Hawk *Buteo regalis*
 Golden Eagle *Aquila chrysaetos*

Gruiformes - Rails, Cranes, and Allies

Rallidae - Rails, Gallinules, and Coots

Virginia Rail *Rallus limicola*
 Sora *Porzana carolina*
 Common Gallinule *Gallinula galeata*
 American Coot *Fulica americana*

Charadriiformes - Shorebirds, Gulls, Auks, and Allies

Recurvirostridae - Stilts and Avocets

Black-necked Stilt *Himantopus mexicanus*
 American Avocet *Recurvirostra americana*

Charadriidae - Lapwings and Plovers

Black-bellied Plover *Pluvialis squatarola*
 Snowy Plover *Charadrius nivosus*
 Semipalmated Plover *Charadrius semipalmatus*
Mountain Plover *Charadrius montanus*
 Killdeer *Charadrius vociferus*

Scolopacidae - Sandpipers, Phalaropes, and Allies

Spotted Sandpiper *Actitis macularius*
Solitary Sandpiper *Tringa solitaria*
 Greater Yellowlegs *Tringa melanoleuca*
 Willet *Tringa semipalmata*
 Lesser Yellowlegs *Tringa flavipes*
 Wimbrel *Numenius phaeopus*
 Long-billed Curlew *Numenius americanus*
 Marbled Godwit *Limosa fedoa*
 Dunlin *Calidris alpina*

Least Sandpiper *Calidris minutilla*
 Western Sandpiper *Calidris mauri*
 Short-billed Dowitcher *Limnodromus griseus*
 Long-billed Dowitcher *Limnodromus scolopaceus*
 Wilson's Snipe *Gallinago delicata*
 Wilson's Phalarope *Phalaropus tricolor*
 Red-necked Phalarope *Phalaropus lobatus*

Laridae - Gulls, Terns, and Skimmers

Bonaparte's Gull *Chroicocephalus Philadelphia*
Franklin's Gull *Leucophaeus pipixcan*
Mew Gull *Larus canus*
 Ring-billed Gull *Larus delawarensis*
 California Gull *Larus californicus*
 Herring Gull *Larus argentatus*
Thayer's Gull *Larus thayeri*
Western Gull *Larus occidentalis*
Glaucous-winged Gull *Larus glaucescens*
Glaucous Gull *Larus hyperboreus*
Sabine's Gull *Xena sabinii*
 Caspian Tern *Hydroprogne caspia*
 Black Tern *Chlidonias niger*
Common Tern *Sterna hirundo*
 Forster's Tern *Sterna forsteri*

Columbiformes - Pigeons, and Doves

Columbidae - Pigeons and Doves

Rock Pigeon *Columba livia* - I
 Eurasian Collared-Dove *Streptopelia decaocto* - I
 Mourning Dove *Zenaida macroura*

Cuculiformes - Cuckoos and Allies

Cuculidae - Cuckoos, Roadrunners, and Anis

Greater Roadrunner *Geococcyx californianus*

Strigiformes - Owls

Tytonidae - Barn Owls

Barn Owl *Tyto alba*

Strigidae - Typical Owls

Great Horned Owl *Bubo virginianus*
 Burrowing Owl *Athene cunicularia*

Caprimulgiformes - Goatsuckers, Oilbirds, and Allies

Caprimulgidae - Goatsuckers

Lesser Nighthawk *Chordeiles acutipennis*

Apodiformes - Swifts, and Hummingbirds

Apodidae - Swifts

Vaux's Swift *Chaetura vauxi*
 White-throated Swift *Aeronautes saxatalis*

Trochilidae - Hummingbirds

Black-chinned Hummingbird *Archilochus alexandri*
 Anna's Hummingbird *Calypte anna*
 Rufous Hummingbird *Selasphorus rufus*

Coraciiformes - Rollers, Motmots, Kingfishers, and Allies

Alcedinidae - Kingfishers

Belted Kingfisher *Megasceryle alcyon*

Piciformes - Puffbirds, Jacamars, Toucans, Woodpeckers, and Allies

Picidae - Woodpeckers and Allies

Nuttall's Woodpecker *Picoides nuttallii*
Downy Woodpecker *Picoides pubescens*
Northern Flicker *Colaptes auratus*

Falconiformes - Caracaras and Falcons

Falconidae - Caracaras and Falcons

American Kestrel *Falco sparverius*
Merlin *Falco columbarius*
Peregrine Falcon *Falco peregrinus*
Prairie Falcon *Falco mexicanus*

Passeriformes - Passerine Birds

Tyrannidae - Tyrant Flycatchers

Olive-sided Flycatcher *Contopus cooperi*
Western Wood-Pewee *Contopus sordidulus*
Willow Flycatcher *Empidonax traillii*
Hammond's Flycatcher *Empidonax hammondii*
Dusky Flycatcher *Empidonax oberholseri*
Gray Flycatcher *Empidonax wrightii*
Pacific-slope Flycatcher *Empidonax difficilis*
Black Phoebe *Sayornis nigricans*
Eastern Phoebe *Sayornis phoebe*
Say's Phoebe *Sayornis saya*
Vermilion Flycatcher *Pyrocephalus rubinus*
Ash-throated Flycatcher *Myiarchus cinerascens*
Cassin's Kingbird *Tyrannus vociferans*
Western Kingbird *Tyrannus verticalis*

Laniidae - Shrikes

Loggerhead Shrike *Lanius ludovicianus*

Vireonidae - Vireos

Cassin's Vireo *Vireo cassinii*
Warbling Vireo *Vireo gilvus*

Corvidae - Crows and Jays

Western Scrub-Jay *Aphelocoma californica*
American Crow *Corvus brachyrhynchos*
Common Raven *Corvus corax*

Alaudidae - Larks

Horned Lark *Eremophila alpestris*

Hirundinidae - Swallows

Purple Martin *Progne subis*
Tree Swallow *Tachycineta bicolor*
Violet-green Swallow *Tachycineta thalassina*
Northern Rough-winged Swallow *Stelgidopteryx serripennis*
Cliff Swallow *Petrochelidon pyrrhonota*
Barn Swallow *Hirundo rustica*

Aegithalidae - Long-tailed Tits and Bushtits

Bushtit *Psaltriparus minimus*

Troglodytidae - Wrens

Rock Wren *Salpinctes obsoletus*
House Wren *Troglodytes aedon*
Marsh Wren *Cistothorus palustris*
Bewick's Wren *Thryomanes bewickii*

Poliophtilidae - Gnatcatchers and Gnatwrens

Blue-gray Gnatcatcher *Poliophtila caerulea*

Regulidae - Kinglets

Ruby-crowned Kinglet *Regulus calendula*

Turdidae - Thrushes

Western Bluebird *Sialia mexicana*
Mountain Bluebird *Sialia currucoides*
Swainson's Thrush *Catharus ustulatus*
Hermit Thrush *Catharus guttatus*
American Robin *Turdus migratorius*

Mimidae - Mockingbirds and Thrashers

California Thrasher *Toxostoma redivivum*
Sage Thrasher *Oreoscoptes montanus*
Northern Mockingbird *Mimus polyglottos*

Sturnidae - Starlings

European Starling *Sturnus vulgaris* - 1

Motacillidae - Wagtails and Pipits

American Pipit *Anthus rubescens*

Bombycillidae - Waxwings

Cedar Waxwing *Bombycilla cedrorum*

Ptiliognatidae - Silky-flycatchers

Phainopepla *Phainopepla nitens*

Calcariidae - Longspurs and Snow Buntings

Chestnut-collared Longspur *Calcarius ornatus*

Parulidae - Wood-Warblers

Orange-crowned Warbler *Oreothlypis celata*
Lucy's Warbler *Oreothlypis luciae*
Virginia's Warbler *Oreothlypis virginiae*
Nashville Warbler *Oreothlypis ruficapilla*
MacGillivray's Warbler *Geothlypis tolmiei*
Common Yellowthroat *Geothlypis trichas*
Yellow Warbler *Setophaga petechia*
Yellow-rumped Warbler *Setophaga coronata*
Black-throated Gray Warbler *Setophaga nigrescens*
Townsend's Warbler *Setophaga townsendi*
Wilson's Warbler *Cardellina pusilla*

Emberizidae - Emberizids

Spotted Towhee *Pipilo maculatus*
California Towhee *Melospiza crissalis*
Chipping Sparrow *Spizella passerina*
Clay-colored Sparrow *Spizella pallida*
Brewer's Sparrow *Spizella breweri*
Vesper Sparrow *Pooecetes gramineus*
Grasshopper Sparrow *Ammodramus savannorum*

Lark Sparrow *Chondestes grammacus*
Black-throated Sparrow *Amphispiza bilineata*
Bell's Sparrow *Artemisospiza belli canescens*
Savannah Sparrow *Passerculus sandwichensis*
Fox Sparrow *Passerella iliaca*
Song Sparrow *Melospiza melodia*
Lincoln's Sparrow *Melospiza lincolni*
White-crowned Sparrow *Zonotrichia leucophrys*
Golden-crowned Sparrow *Zonotrichia atricapilla*
Dark-eyed Junco *Junco hyemalis*

Cardinalidae - Cardinals and Allies

Western Tanager *Piranga ludoviciana*
Black-headed Grosbeak *Pheucticus melanocephalus*
Blue Grosbeak *Passerina caerulea*
Lazuli Bunting *Passerina amoena*

Icteridae - Blackbirds

Red-winged Blackbird *Agelaius phoeniceus*
Tricolored Blackbird *Agelaius tricolor*
Western Meadowlark *Sturnella neglecta*
Yellow-headed Blackbird *Xanthocephalus xanthocephalus*
Brewer's Blackbird *Euphagus cyanocephalus*
Great-tailed Grackle *Quiscalus mexicanus*
Brown-headed Cowbird *Molothrus ater*
Hooded Oriole *Icterus cucullatus*
Bullock's Oriole *Icterus bullockii*

Fringillidae - Fringilline and Cardueline Finches and Allies

House Finch *Haemorhous mexicanus*
Purple Finch *Haemorhous purpureus*
Pine Siskin *Spinus pinus*
Lesser Goldfinch *Spinus psaltria*
Lawrence's Goldfinch *Spinus lawrencei*
American Goldfinch *Spinus tristis*

Passeridae - Old World Sparrows

House Sparrow *Passer domesticus* - I