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Coastal waterbirds of El Chorro and Majahuas, Jalisco, México, during the non-breeding season, 1995-1996

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Abstract: We studied how waterbirds used two small estuaries during the non-breeding season of 1995-1996. These estuaries, El Chorro and Majahuas, were located in the middle of a large span of non-wetland habitat along the Pacific coast of México. Whereas El Chorro was basically a large and open waterbody, Majahuas was a long and narrow corridor flanked by mangroves. The two estuaries had 77 species throughout our study, but shared only 58, due to differences in their habitat. Seabirds comprised 66% of all the birds; grebes, ducks and rails 16%; shorebirds 12% and herons and egrets 5%. During late winter and early spring a very reduced number of migratory species accounted for the dominance of seabirds. *Sterna hirundo* and *Phalacrocorax brasilianus* accounted for 40 and 33%, respectively, of all the seabirds. Opening or closure of the estuary mouth at El Chorro affected the bird communities at both sites, by exposing or inundating a large mudflat in that estuary. Overall, however, time of the year was more important in the composition of the bird assemblages. Both estuaries should be considered as a single unit.

Key words: Coastal waterbirds, Jalisco, México, seasonality.

Coastal waterbirds depend on coastal wetlands, either permanent or seasonal, during an important part of the year. Many of these birds are migratory, and during their migration rely on a chain of specific, irreplaceable sites to feed and store energy to fly to their next stop (Myers *et al.* 1987). The disparity between the extensive breeding areas and the much smaller sites used during migration can result in enormous concentrations of birds in small coastal estuaries (Myers 1983), where they use available food to its maximum (Goss-Custard 1977, Clark *et al.* 1993). Adequate environmental conditions and feeding resources in these areas are fundamental for the survival of such birds (Senner 1979, Blem 1980, Myers 1983, Morrison 1984, Myers *et al.* 1987).

Although México has the longest coastline among Latin American countries, valorization of most of its coastal wetlands for migrating or wintering birds has been neglected (Saunders & Saunders 1981, Scott & Carbonell 1986). This is particularly true for small wetlands, which nevertheless might be important sites along a migratory route. Along the Pacific coast of México, between Marismas Nacionales, Nayarit and the center of the state of Guerrero, a span of roughly 1150 Km, there is only one group of large coastal wetlands: Laguna de Cuyutlán and associated wetlands,

in state of Colima. The few, small, isolated, wetlands between Laguna de Cuyutlán and that of Marismas Nacionales, may play an important role in the migration of waterbirds, and the objective of this work was to document the use by waterbirds of two such wetlands: El Chorro, and Majahuas, during the non-breeding season. Although nearby Playón de Mismaloya, an important sea turtle hatching beach, has been under close scrutinity and protection for many years, use by waterbirds of the local wetlands had never been evaluated.

MATERIALS AND METHODS

Study area: El Chorro (132.22 ha) and Majahuas (72.39 ha) are located on the coast of Jalisco, western México (19°52' N, 105°23' W). El Chorro receives fresh water mostly from La Tigra and Cabeza de Otate creeks. Its coastal lagoon is separated from the sea by a 50 m-wide and 2.5 m-high barrier beach, but sea waves, rain, and most often fishermen open it periodically, allowing the wetland to empty into the sea, which causes the exposure of about 40 ha of mudflats. One side of the estuary has 7 m-high sand dunes with patches of thornscrub and low deciduous tropical forest. The area closest to the sea is vegetated with *Pectis arenaria*, *Okenia hypogaea*, *Tephrosia leiocarpa* var. *costenya*, *Chamaecrista chamaecristoides*, *Zinnia maritima*, *Ipomea pes-caprae* and *Jouvea pilosa*. The upper reaches of the sand dunes and sandy cañadas are covered with xerophitic scrub, which includes *Opuntia excelsa*, *Acacia* spp. and *Heliocereus* spp. The waterbody is surrounded mostly by *Conocarpus erectus* and, to a lesser degree, *Laguncularia racemosa*, *Hibiscus pernambucensis*, *Cenchrus brownii*, *Jouvea straminea*, and other grasses.

Majahuas is 7 km SE of El Chorro. To the sides of the estuary, there are long channels along the coast separated from the sea by a 2.5 m-high barrier beach, that is about 80 m-wide near the mouth of the estuary. Fresh water comes mostly from Tomatlán river, and the estuary is connected to the sea during most of the year. Majahuas is dominated by mangroves (63.03 ha). The channels SE of the main waterbody are dominated by *H. pernambucensis*, along with *Sarcostemma clausum*, and aquatic low-salinity vegetation, such as *Eichhornia crassipes*, *Crinum erubecens* and *Phragmites australis*, in addition to coconut palms. Along the NE channels *L. racemosa*, with small patches of *H. pernambucensis*, are the dominant vegetation, whereas *Ipomea pes-caprea* is the main plant on sand dunes. Some areas near the estuaries have been cleared for production of banana, watermelon, mango, lime, chile, corn, papaya, rice, and coconuts, or for the establishment of pasturelands.

Methods: Between 1 September 1995 and 25 April 1996, we visited both estuaries every 15 days. From each of five observation points (per estuary) we identified and counted all the birds in sight, with the help of 10x binoculars and a spotting telescope (60x). On each sampling date we did one count when the tide began to ebb and one when it started to rise. Each census took about three hours. The channels in Majahuas were surveyed from an fiberglass skiff with a out-of-board motor. The visits were arranged in six periods: late summer (3-15 Sep. 1995), early and late autumn (1 Oct.-3 Nov., and 17 Nov.-18 Dec., 1995, respectivity), early and late winter (5 Jan.-3 Feb., and 18 Feb.-18 Mar., 1996, respectively), and early spring (8-25 Apr. 1996). For each species, we considered the highest tally within a period as its best estimator. The two estuaries were compared in terms of their species richness and bird abundance with chi-2 test.

RESULTS

Wetland characteristics: Two relevent differences occured between the two sites. El Chorro was basically a large and open waterbody, Majahuas a long and narrow corridor flanked by mangroves. Whereas the estuary mouth of Majahuas was kept mostly open by river discharge (except on 3 January and 16

February when it was closed), El Chorro's mouth alternated between open and close (Open on 1 Sep., 16 Oct., 1 Nov., 15 Nov., 16 Jan., 16 Feb., 2 Mar., 8 Apr., and 24 Apr. Closed on 15 Sep., 1 Oct., 17 Dec., 3 Jan., 2 Feb., and 17 Mar). At El Chorro, during the first half of the study water flow was not sufficient to fill the coastal lagoon, even when the mouth was closed, allowing for the exposure of a large mudflat that was protected by mangrove communities and sand dunes.

Species: Using the high values of each period we tallied 48 848 birds of 77 species (Table 1, Appendixes 1 and 2). Both sites were clearly dominated by seabirds, with grebes, ducks and rails, and shorebirds following with modest numbers (Table 1). Herons and egrets exhibited low numbers and "other waterbirds" where almost non-present. As a reflection of the differences in their characteristics, both estuaries shared only 58 species, and they were significantly different with respect to each other in the number of species of grebes, ducks and rails, and that of shorebirds (Table 1, X^2, $a<0.05$, in both cases), and in the number of individuals in all groups ($a<0.01$), except "other waterbirds", which were not analized.

TABLE 1

Number of species (first value in each cell) and individuals (second value) of estuarine birds during the non-breeding season at estuaries Majahuas and El Chorro, Jalisco, México. 1995-1996

	Late Summer	Early Fall	Late Fall	Early Winter	Late Winter	Early spring
			Majahuas			
Seabirds	4/75	5/227	6/106	9/1 903	11/8 223	12/8 692
Grebes, ducks and rails	0/0	0/0	1/77	7/1 520	9/2 252	6/172
Herons and egrets	7/69	11/69	8/75	12/150	10/253	11/580
Shorebirds	11/395	13/479	12/370	17/414	17/891	13/158
Other	0/0	2/7	2/3	4/11	6/23	4/6
TOTAL	22/539	31/782	29/631	49/398	53/11 642	46/9 605
			El Chorro			
Seabirds	8/226	7/344	4/1 221	11/1 580	12/3 613	10/5 967
Grebes, ducks and rails	1/8	5/384	6/1 606	9/1 241	5/231	3/178
Herons and egrets	7/33	8/320	10/245	9/139	7/328	8/98
Shorebirds	10/126	17/652	17/604	20/936	19/841	8/312
Other	0/0	1/4	1/2	2/2	3/4	2/6
TOTAL	26/393	38/1 704	38/3 678	51/3 898	46/5 017	31/6 561

The much greater abundance of seabirds was restricted to late winter and later. Moreover, the total numbers of seabirds were due to two species: *Sterna hirundo*, which accounted for 40% of all seabirds (of which 81% were tallied in a single period), and *Phalacrocorax brasilianus*, with 33% of the individuals. Of the 20 species of seabirds we never recorded more than 12 in any single period.

Sterna hirundo is a common species along the Mexican Pacific during fall and winter (Schaldach 1963, Binford 1989, Howell & Webb 1995). We found it feeding at sea and resting on sandy areas on the barrier beach.

Although there were almost twice as many *Sterna hirundo* in Majahuas as in El Chorro, the proportion of this species among the seabirds was similar at both localities (41 and 38%, respectively). *Phalacrocorax brasilianus* is a widesprad resident of the region (Howell & Webb 1995). It fed within the coastal lagoons, and rested on sandy areas. It was proportionately more abundant at El Chorro where it accounted for 46% of all seabirds present (vs. 25% in Majahuas). Among the other common seabirds, the gulls preferred Majahuas, where they used the sandy areas.

Seabirds exhibited a strong seasonal variation, and they gradually increased from less than 1% of the total birds tallied in late summer, to 46% in early spring. To a large degree this reflects the increase of *Sterna hirundo* during this last period. It is also notable that the *Phalacrocorax brasilianus*, despite being a local resident, was most abundant during late winter. *Larus heermanni* had their largest numbers in early spring, but the other seabird species had their maximum numbers in late winter.

Throughout the study we observed 14 species of grebes, ducks and rails. In late summer we recorded only *Dendrocygna autumnalis*, a regional resident, and migratory species began to arrive in the fall until ten species were found in early winter. After that, species began to dissapear, and in early spring there were only seven. Number of individuals followed a similar pattern. Two species accounted for the majority of birds in this: *Anas americana* (34% of all grebes, ducks and rails) and *Fulica americana* (30%). Both are common in the area outside the breeding season, and both preferred the waterbody.

We identified 15 species of herons and egrets throughout the study, and there were from nine to 13 species in each individual period. *Egretta thula* accounted for 64% of all herons and egrets. This species preferred mangrove associations and mudflats to rest, and shallow waters to feed. It was common throughout the study, but there was a clear reduction in numbers in late summer. This suggests that the areas are used by a number of wintering birds, but that there might also be a local breeding population. *Bubulcus ibis* had a clear concentration in late fall. At other locations along the coast of southern México, this species also exhibits high numbers in the fall, and later move to cattle pastures to forage (Mellink *et al.* 1998). Different species of herons and egrets had differences in the timing of the highest tallies: *Ardea herodias* and *Egretta caerulea* had their greatest abundance during early fall; *Plegadis chihi* and *Bubulcus ibis* in late fall; *Nyctanassa violacea* in early winter; *Ardea alba* in late winter; and the other species in early spring. *Egretta tricolor* was equally abundant the last two study periods. Some of these data should be taken with care, because of the low numbers involved.

We tallied 6 178 shorebirds of 22 species throughout the study. However, two species accounted for almost half of all individuals: *Calidris alba* (24%) and *Himantopus mexicanus* (21%), with two other species having moderate numbers: *Catoptrophorus semipalmatus* and *Recurvirostra americana* (12% each). *Calidris alba* preferred the sandy habitats, such as the outside beaches of the barrier beach, and sand flats at the mouth of the estuary, while *Himantopus mexicanus*, *Catoptrophorus semipalmatus*, and *R. americana* fed in shallow waters, mudflats, and sandflats.

Abundance of shorebirds was bimodal, with peaks in early fall and late winter, reflecting the general migration pattern of shorebirds. However, not all species of shorebirds exhibited both peaks. Those that did were the *Calidris mauri*, *Charadrius alexandrinus*, *C. alba*, *Catoptrophorus semipalmatus*, *H. mexicanus*, and *Pluvialis squatarola*. The peaks of *C. mauri* abundance were in late summer and early winter, those of *C. alexandrinus* in late summer and late winter. The other species with two peaks had one in early fall and one in late winter. *Actitis macularia*, *Charadrius semipalmatus*, *Charadrius wilsonia*, and *Gallinago gallinago* had only one peak, in in early fall. *Calidris minutilla* and T*ringa melanoleuca*, one peak in late fall; *Numenius americanus*, *Numenius phaeopus*, and *R. americana* one

peak in early winter; and *Calidris mauri* and *Haematopus palliatus* one peak in late winter. The remaining species exhibited no clear peak in their abundance.

We recoded six additional waterbirds during the study (Appendixes 1and 2). However, their numbers were to low to merit discussion.

DISCUSSION

The two estuaries summed 77 species throughout our study, 48% of all the waterbird species potentially present in the area (Howell & Webb 1995). The avifauna at both estuaries were dominated by seabirds, especially by a very reduced number of migratory species during late winter and early spring. The two estuaries had a similar variation in the number of species of seabirds. However, the differences in habitat caused *Pelecanus erythrorhynchos*, *Sula nebouxii* and a single *Mycteria americana* to use El Chorro, only. Majahuas had a more abrupt and later increase in its richness of grebes, ducks and rails, and less variation in shorebirds than El Chorro (Table 1). Overall, during the first four periods El Chorro had a similar, or larger, number of birds than Majahuas, but during the last two periods Majahuas greatly outnumbered it, except for the shorebirds. The seabird species that were shared by both sites either preferred Majahuas or had similar numbers in both places, except the *P. brasilianus*, which was slightly more abundant at El Chorro. This later preference was due to the conjunction of mangrove with open relatively deep, waters. The preference of most larids for Majahuas was a function of its very shallow waters in which they could stand. A similar preference has been found in wetlands of the Costa Chica of Oaxaca (Mellink *et al.* 1998).

The late winter change in preference by *A. americana* appears to have been the result of the exposure of the mudflat at El Chorro. The *D. autumnalis* change from Majahuas to El Chorro in early spring might reflect its wandering behavior (Howell & Webb 1995).

Only two species of herons and egrets clearly preferred one of the sites. The preference of the *B. ibis* for El Chorro and its near-abscence from Majahuas is puzzling as this is a very common occupant of other well vegetated tropical wetlands (Mellink *et al.* 1998). Although the *E. thula* preferred Majahuas, this preference developed only after the water level of El Chorro rised inundating habitat it had been using.

The preference of mid-sized and large shorebirds, except *H. mexicanus* (and, in this species because of one event of high abundance), and several small shorebirds (*A. macularia*, *Arenaria interpres*, *C. minutilla*, *Charadrius semipalmatus*, *C. wilsonia* and, and *P. squatarola*) for El Chorro, appeared to be a response to its larger mudflats. The preference of *C. alba*, *C. mauri*, and *C. alexandrinus* for Majahuas was due to its sandier habitat.

Despite the differences between both estuaries, the migratory birds that used them produced a seasonal pattern, more than a locality pattern. The importance of resident species, which have more defined habitat preferences, was swamped by the numbers of the migratory birds. The high dynamism of the avifauna of the two estuaries was a function of the migration of the species that used them, but also of the status of the mouth of one estuary, which caused changes in the availability of certain habitats inside the estuary and according movements of birds between estuaries. So, rather than two different estuaries, they should be considered, and managed, as a single, coherent unit.

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RESUMEN

Durante la estación no reproductiva de 1995-1996 estudiamos las aves acuáticas de los estuarios El Chorro y Majahuas, Jalisco, México. El Chorro es un cuerpo de agua más abierto, mientras que Majahuas está formado por canales rodeados por manglares. Registramos 77 especies de aves. Las aves marinas comprendieron el 66%, los patos y similares el 16%, las aves playeras el 12% y las garzas el 5%. *Sterna hirundo* y *Phalacrocorax brasilianus* representaron el 40 y 33%, respectivamente, del total de aves marinas. El que la bocabarra de El Chorro estuviera abierta o cerrada influyó en la concentración de aves en los dos esteros, debido a la exposición o inundación de áreas lodosas y arenosas. A pesar de las diferencias entre los dos estuarios, la época del año fue más importante en la composición de las comunidades de aves. Ambos esteros deben considerarse como una sola entidad ecológica.

REFERENCES

Binford, L.C. 1989. A distributional survey of the birds of the Mexican state of Oaxaca. Ornithol. Monog. 43: 1-412.

Blem, C. R. 1980. The energetics of migration, p.175-224 *In* Gauthreaux (ed.), Animal migration, orientation, and navigation. Academic, New York.

Clark, K.E., L.J. Niles & J. Burger. 1993. Abundance and distribution of migrant shorebirds in Delaware Bay. Condor 95: 604-705.

Goss-Custard, J.D. 1977. The ecology of the Wash. III. Density related behaviour and the possible effects of a loss of feeding grounds on wading birds (Charadrii). J. Appl. Ecol. 14: 721-739.

Howell, S.N.G. & S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University. New York. 851 pp.

Mellink, E., J. Luévano & I. Zuria. 1998. Nota sobre los pelecaniformes, ciconiiformes, gallitos marinos (Sterninae) y rayadores (Rynchopinae) de la Costa Chica de Oaxaca, México. Ciencias Marinas. 24: 367-388.

Morrison, R.I.G. 1984. Migration systems of some New World shorebirds, Behav. Mar. Anim. 6: 125-202.

Myers, J.P. 1983. Conservation of migrating shorebirds: Staging areas, geographic bottlenecks, and regional movements. Amer. Birds 37: 23-25.

Myers, J.P., R.I.G. Morrison, P.Z. Antas, B.A. Harrington, T.E. Lovejoy, M. Sallaberry, S.E. Senner & A.Tarak. 1987. Conservation strategy for migratory species. Amer. Scient. 75: 18-26.

Saunders, G.B. & D.Ch. Saunders. 1981. Waterfowl and their wintering grounds in México 1937-64. Fish and Wildlife Service Resource Publication 138. Washington, D.C. 151 pp.

Schaldach, W.J., Jr. 1963. The avifauna of Colima and adjacent Jalisco, Mexico. Proc. W. Found. Verteb. Zool. 1: 1-100.

Scott, D.A. & M. Carbonell. 1986. A Directory of neotropical wetlands. International Union for Conservation of Nature and Natural Resources and International Waterfowl Research Bureau. Cambridge, U.K.

Senner, S.E. 1979. An evaluation on the Copper River delta as critical habitat for migrating shorebirds, en F.A. Pitelka (ed.). Stud. Avian Biol. 2: 131-146.

APPENDIX 1

Estuarine birds of Majahuas, Jalisco, México, during the non-breeding season, 1995-1996

	L-sum	E-fall	L-fall	E-win	L-win	E-spr
Seabirds						
Puffinusgriseus	0	0	0	0	3	0
Pelecanus erythrorhynchos	0	0	0	0	4	0
Pelecanus occidentalis	36	26	30	152	53	147
Phalacrocorax brasilianus	10	161	59	1490	2449	575
Phalacrocorax auritus	10	34	0	0	0	0
Fregata magnificens	0	0	1	7	7	3
Larus atricilla	0	0	0	175	967	146
Larus pipixcan	0	0	0	22	2255	60
Larus heermanni	0	0	1	1	20	660

	L-sum	E-fall	L-fall	E-win	L-win	E-spr
Larus argentatus	0	4	0	0	0	0
Sterna caspia	0	2	7	19	95	60
Sterna elegans	0	0	0	0	0	150
Sterna hirundo	0	0	0	0	2050	5846
Sterna forsteri	19	0	8	34	0	0
Sterna antillarum	0	0	0	0	0	18
Chlidonias niger	0	0	0	0	0	917
Rynchops niger	0	0	0	3	320	110
Grebes, Ducks and Rails						
Podylimbus podiceps	0	0	0	1	0	1
Podiceps nigricollis	0	0	0	0	15	0
Dendrocygna autumnalis	0	0	0	360	1	15
Aix sponsa	0	0	0	0	4	0
Anas americana	0	0	0	389	850	44
Anas discors	0	0	0	60	10	28
Anas cyanoptera	0	0	0	0	60	0
Anas clypeata	0	0	0	35	40	0
Anas acuta	0	0	0	45	0	0
Aythya affinis	0	0	0	0	130	0
Porphyrula martinica	0	0	0	0	0	2
Gallinula chloropus	0	0	0	0	0	3
Fulica americana	0	0	77	630	1134	79
Herons and Egrets						
Tigrisoma mexicanum	0	2	0	1	6	2
Ardea herodias	0	5	5	4	4	4
Ardea alba	0	6	1	4	14	6
Egretta thula	45	26	55	74	195	478
Egretta caerulea	2	5	7	1	5	4
Egretta tricolor	1	2	3	4	4	11
Egretta rufescens	0	0	0	0	0	4
Bubulcus ibis	0	6	0	0	0	0
Butorides virescens	0	0	0	3	6	11
Nycticorax nycticorax	1	2	2	1	0	0
Nyctanassa violacea	6	12	1	43	12	13
Eudocimus albus	2	2	0	8	5	36
Plegadis chihi	0	0	1	1	0	0
Ajaia ajaja	12	1	0	6	2	11
Shorebirds						
Pluvialis squatarola	0	0	1	2	1	0
Charadrius alexandrinus	56	20	2	10	37	0
Charadrius wilsonia	18	1	9	6	12	1
Charadrius semipalmatus	0	28	9	21	17	10
Charadrius melodus	0	0	0	0	4	0
Haematopus palliatus	0	0	0	2	2	0
Himantopus mexicanus	27	98	42	135	453	48
Recurvirostra americana	3	0	0	32	3	4
Tringa melanoleuca	34	12	57	12	3	5
Tringa flavipes	0	11	0	7	0	0
Catoptrophorus semipalmatus	40	61	25	64	30	49
Actitis macularia	0	6	2	4	2	2
Numenius phaeopus	3	4	3	2	5	3
Numenius americanus	2	6	2	8	5	4
Limosa fedoa	0	0	0	0	0	4
Arenaria interpres	2	7	0	2	0	0

	L-sum	E-fall	L-fall	E-win	L-win	E-spr
Calidris alba	180	220	168	80	290	18
Calidris mauri	30	5	50	20	22	7
Calidris minutilla	0	0	0	7	5	0
Other						
Anhinga anhinga	0	1	1	0	1	1
Jacana spinosa	0	6	0	3	6	2
Pandion haliaetus	0	0	0	2	1	1
Ceryle torquata	0	0	0	2	1	0
Ceryle alcyon	0	0	2	4	12	2
Chloroceryle americana	0	0	0	0	2	0

L=Late, E=early: sum=summer, win=winter, spr=spring.

APPENDIX 2

Estuarine birds of El Chorro, Jalisco, México, during the non-breeding season, 1995-1996.

	L-sum	E-fall	L-fall	E-win	L-win	E-spr
Seabirds						
Sula nebouxii	4	0	0	0	0	0
Pelecanus erythrorhynchos	0	0	0	13	15	0
Pelecanus occidentalis	45	5	32	72	41	440
Phalacrocorax brasilianus	13	230	1 120	1 200	2 643	758
Phalacrocorax auritus	0	1	0	0	0	0
Fregata magnificens	4	3	0	3	10	8
Larus atricilla	1	0	0	147	83	44
Larus pipixcan	0	0	0	24	370	3
Larus heermanni	0	0	0	0	11	68
Larus californicus	0	1	0	0	0	0
Sterna caspia	0	10	8	38	20	46
Sterna elegans	15	0	0	0	10	0
Sterna hirundo	0	0	0	18	400	4 480
Sterna forsteri	0	94	61	28	4	0
Sterna antillarum	140	0	0	0	0	0
Chlidonias niger	0	0	0	0	0	60
Rynchops niger	4	0	0	35	6	60
Mergus serrator	0	0	0	2	0	0
Grebes, Ducks and Rails						
Dendrocygna autumnalis	8	4	0	4	0	150
Anas americana	0	56	900	308	97	0
Anas discors	0	189	56	70	40	10
Anas cyanoptera	0	0	0	15	15	0
Anas clypeata	0	1	29	35	18	18
Anas acuta	0	0	95	60	0	0
Anas crecca	0	0	383	660	0	0
Aythya affinis	0	0	0	28	0	0
Fulica americana	0	134	143	61	61	0
Herons and Egrets						
Ardea herodias	2	12	5	3	3	3
Ardea alba	2	4	10	3	26	5

	L-sum	E-fall	L-fall	E-win	L-win	E-spr
Egretta thula	10	253	43	28	263	71
Egretta caerulea	3	32	5	3	2	2
Egretta tricolor	3	2	7	2	13	6
Egretta rufescens	0	0	0	0	0	2
Bubulcus ibis	0	8	135	73	0	0
Nyctanassa violacea	4	7	16	3	7	5
Eudocimus albus	0	2	4	23	14	4
Plegadis chihi	0	0	13	0	0	0
Ajaia ajaja	9	0	0	1	0	0
Mycteria americana	0	0	7	0	0	0
Shorebirds						
Pluvialis squatarola	3	28	3	16	82	0
Charadrius alexandrinus	0	4	8	6	5	0
Charadrius wilsonia	5	68	9	1	0	0
Charadrius semipalmatus	18	38	53	1	7	0
Charadrius vociferus	0	0	0	1	0	0
Charadrius melodus	0	0	0	1	0	0
Charadrius sp.	5	0	0	0	0	0
Haematopus palliatus	0	0	0	4	10	6
Himantopus mexicanus	0	74	130	134	149	28
Recurvirostra americana	6	20	63	250	161	179
Tringa melanoleuca	11	39	27	59	36	18
Tringa flavipes	0	0	3	1	6	0
Catoptrophorus semipalmatus	16	144	44	72	153	64
Actitis macularia	0	36	4	3	1	1
Numenius phaeopus	46	35	87	99	42	1
Numenius americanus	3	8	18	31	11	0
Limosa fedoa	13	1	4	0	5	0
Arenaria interpres	0	6	10	6	12	0
Calidris alba	0	129	90	185	125	15
Calidris mauri	0	6	0	59	24	0
Calidris minutilla	0	1	45	2	8	0
Gallinago gallinago	0	15	6	5	4	0
Other						
Anhinga anhinga	0	4	0	0	0	0
Pandion haliaetus	0	0	0	1	1	5
Ceryle torquata	0	0	0	0	1	0
Ceryle alcyon	0	0	2	1	2	1

L=Late, E=early: sum=summer, win=winter, spr=spring.