

## NOTES ON AUTUMN BIRD MIGRATION IN COASTAL EL SALVADOR

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**Resumen.** – **Notas sobre la migración otoñal de aves en la costa de El Salvador.** – La migración otoñal de aves en Centroamérica es poca conocida, especialmente por la costa del Pacífico. Hice observaciones de aves que parecían migrar diurnamente sobre 28 estuarios durante 1994. Por lo menos 19 especies migraron por día sobre la costa de El Salvador: la *Mycteria americana* y el *Pelecanus occidentalis* fueron notables dado que no están reconocidas como especies migratorias. El *Pelecanus erythrorhynchos* y la *Recurvirostra americana* posiblemente representan visitantes hibernales o transeuntes regulares en El Salvador. Dos especies raramente reportadas, *Charadrius collaris* y *Sterna elegans*, fueron abundantes durante Octubre y Noviembre, posiblemente su período de máxima migración. Reporto la primera documentación fotográfica en El Salvador para *Charadrius collaris*, *Calidris himantopus* y *Sterna paradisaea*, y las primeras observaciones de *Chaetura pelagica*.

**Abstract.** – Autumn bird migration in Central America is poorly known, especially along the Pacific coast. I observed migrating birds at 28 estuaries along the Pacific coast of El Salvador in 1994. At least 19 species appeared to migrate diurnally along the coast: Wood Storks (*Mycteria americana*) and Brown Pelicans (*Pelecanus occidentalis*) were notable as both are frequently considered non-migratory. American White Pelicans (*Pelecanus erythrorhynchos*) and American Avocets (*Recurvirostra americana*) may represent regular transients or winter visitors in El Salvador. The rarely reported Collared Plovers (*Charadrius collaris*) and Elegant Terns (*Sterna elegans*) were abundant during October and November, perhaps their peak migratory period. I report El Salvador's first photographic documentation for Collared Plover, Stilt Sandpiper (*Calidris himantopus*), and Arctic Tern (*Sterna paradisaea*), and first sight records for the Chimney Swift (*Chaetura pelagica*). Accepted 8 August 2002.

**Key words:** Autumn bird migration, *Pelecanus erythrorhynchos*, *Pelecanus occidentalis*, *Mycteria americana*, *Charadrius collaris*, *Recurvirostra americana*, *Sterna paradisaea*.

### INTRODUCTION

Studies of the autumn bird migration along the Pacific coast of Central America are virtually non-existent. Shorebird migration was studied by Smith & Stiles (1979) and Bar-

rantes & Pereira (1992) in Costa Rica. Rogers (1966), Smith (1980), Thurber (1980), and Stiles (1994) are the only others to publish reports specifically treating autumn bird migration in Central America, and none studied coastal areas. In nearby southern Mexico, Paynter (1953), Thiollay (1977), Buskirk (1980), and Winker (1995) studied autumn bird migration, but not along the Pacific coast. In El Salvador, A. J. van Rossem collected birds throughout autumn 1925; however, his activities were entirely at inland

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locations (Dickey & van Rossem 1938). One recent reference (Thurber *et al.* 1987) includes a few sight records of migrating birds from El Salvador's coast.

The present report is based on observations of migration made opportunistically during population and behavioral studies of shorebirds (Komar in prep.). Given the lack of information in the literature, these data contribute to the understanding of autumn bird migrations in Central America.

## METHODS

In 1994, I surveyed the Río Jiboa estuary (13°22'N, 89°03'W), Department of La Paz, on 4, 13–15, 19–21, and 27–29 October, 3–5, 12, 14, 19, and 29 November, and 1 and 3 December. The estuary occupies about 9 ha of beach, sand bar, tidal flats, and river, and was bordered by scrubby cattle pastures and sorghum fields. *Rhizophora* mangroves (~1 ha) bordered 200 m of the estuary, and there were three small patches of marsh grass; little vegetation existed to attract land birds. The beaches on both sides of the estuary were developed as vacation properties or fishermen's ranches shaded by small coconut (*Cocos nucifera*) plantations.

I obtained additional records of birds while visiting 27 other estuaries on 30–31 July, 4–6 August, 4, 6, and 25–26 October, 1–2, 9–10, 17, and 30 November, and 7–10 December 1994. These visits consisted of inspections usually lasting less than 4 h, at virtually all potentially important shorebird feeding areas located between Río Paz, at the border of Guatemala (13°45'N, 90°08'W), and Río Goascarán, at the border of Honduras (13°24'N, 87°47'W), a distance of 285 km. I visited 24 estuaries twice, for the time needed to count all shorebirds present.

During these field trips I recorded all observations of apparently migrating birds. I define putative diurnal migrants for autumn

as birds flying >30 m above the ground towards the south, east, or southeast, parallel to the coastline, without stopping to feed or rest. Birds flying low to the ground were not considered to be migrating. I use "putative" in this definition because some birds meeting the definition may not actually be migrating. Documentary photographs have been deposited at VIREO, Academy of Natural Sciences, Philadelphia. Accession numbers are available at <http://nhm.ku.edu/komar>.

## RESULTS

I recorded 19 species apparently migrating over the El Salvador coast; the majority were intercontinental and Nearctic-Neotropical migrants, transient in El Salvador (Table 1). Among the most noticeable flights were those of the two species of pelicans (*Pelecanus* sp.) and Wood Storks (*Mycteria americana*). In addition to two flocks of American White Pelicans (*Pelecanus erythrorhynchos*) (Table 1), I had previously observed a vee-formation of 32 individuals of the species migrating eastward at Estero de Jaltepeque, Department of La Paz, on 24 December 1992. I observed seven migratory flocks of Brown Pelicans (*Pelecanus occidentalis*), six in early December (Table 1). The migrating pelicans (338 individuals) were flying in groups of 10–120, at an altitude of 30–50 m, directly over the beach and in vee formation. In contrast, I observed small groups of non-migrating pelicans flying in either direction low over the ocean (not over the beach) on most days all along the coast. I observed 16 flocks of migrating Wood Storks, totalling 1130 birds, in group sizes of 10–140. No flocks or individuals were observed flying in directions other than south or east. Two large flocks flying south several hundred meters above the ground changed to an easterly direction, following the coastline.

I recorded 35 migratory species feeding, foraging, or resting (Table 2). These observa-

TABLE 1. Over-flying migrating birds (putative diurnal migrants) on the coast of El Salvador, autumn 1994.<sup>1</sup>

Species	Date range	Number of groups	Mean group size $\pm$ SE	Maximum group size
American White Pelican ( <i>Pelecanus erythrorhynchos</i> )	28 Oct.–9 Nov.	2	33.0 $\pm$ 2.0	35
Brown Pelican ( <i>Pelecanus occidentalis</i> )	19 Oct.–10 Dec.	7	48.3 $\pm$ 15.8	120
Great Blue Heron ( <i>Ardea herodias</i> ) <sup>2</sup>	19 Oct.–2 Nov.	3	3.7 $\pm$ 2.2	8
White Ibis ( <i>Eudocimus albus</i> )	4 Nov.–8 Dec.	3	13.7 $\pm$ 6.7	27
Wood Stork ( <i>Mycteria americana</i> )	4 Oct.–8 Dec.	16	70.6 $\pm$ 10.2	140
Blue-winged Teal ( <i>Anas discors</i> )	27 Oct.	1	6 $\pm$ 0	6
<i>Anas</i> sp.	19 Oct.–17 Nov.	2	27.5 $\pm$ 7.5	35
Sharp-shinned Hawk ( <i>Accipiter striatus</i> )	19 Oct.	1	4 $\pm$ 0	4
Swainson's Hawk ( <i>Buteo swainsoni</i> )	12 Nov.	1	4 $\pm$ 0	4
Osprey ( <i>Pandion haliaetus</i> )	6 Oct.–17 Nov.	6	1.3 $\pm$ 0.3	3
Peregrine Falcon ( <i>Falco peregrinus</i> ) <sup>2</sup>	6 Oct.–2 Nov.	2	1 $\pm$ 0	1
American Kestrel ( <i>Falco sparverius</i> )	19 Oct.	1	6 $\pm$ 0	6
Merlin ( <i>Falco columbarius</i> )	15–19 Oct.	2	1.5 $\pm$ 0.5	2
Caspian Tern ( <i>Sterna caspia</i> )	25 Oct.–12 Nov.	4	3.0 $\pm$ 1.2	5
Chimney Swift ( <i>Chaetura pelagica</i> )	19–21 Oct.	2	10.5 $\pm$ 7.5	18
Western Kingbird ( <i>Tyrannus verticalis</i> )	1–2 Nov.	2	5.5 $\pm$ 4.5	10
Scissor-tailed Flycatcher ( <i>Tyrannus forficatus</i> ) <sup>2</sup>	4 Oct.–2 Nov.	5	71.6 $\pm$ 52.2	280
Bank Swallow ( <i>Riparia riparia</i> ) <sup>3</sup>	4–21 Oct.	2	2.0 $\pm$ 0	2
Cliff Swallow ( <i>Petrochelidon pyrrhonota</i> ) <sup>3</sup>	4 Oct.–2 Nov.	4	24.0 $\pm$ 13.6	60
Barn Swallow ( <i>Hirundo rustica</i> )	4 Oct.–17 Nov.	8	184.4 $\pm$ 88.2	725

<sup>1</sup>Raw data and localities are available from the author or at <http://nhm.ku.edu/komar>.

<sup>2</sup>Earliest arrival on record.

<sup>3</sup>Latest on record.

tions include transients that do not normally winter in El Salvador, early arrivals of potentially wintering species, and species for which few or no previous records exist from El Salvador. Transients included Franklin's Gull (*Larus pipixcan*) and Elegant Tern (*Sterna elegans*). Arriving migratory species included Killdeer (*Charadrius vociferus*), Ruby-throated Hummingbird (*Archilochus colubris*), and Barn Swallow (*Hirundo rustica*). Arrival dates for those three species (Table 2) are the earliest on record for El Salvador (Dickey & van Rossem 1938), as are those for Great Blue Heron (*Ardea herodias*), Peregrine Falcon (*Falco peregrinus*), and Scissor-tailed Flycatcher (*Tyrannus forficatus*) (Table 1). Twenty species in Table 2 have been reported rarely in El Salvador,

some on fewer than five occasions.

An adult Arctic Tern (*Sterna paradisaea*) on 19 October 1994, the first documented from mainland Central America (photograph deposited at VIREO), arrived at the mouth of the Río Jiboa during the night and departed < 1 h after sunrise. A Collared Plover (*Charadrius collaris*) photographed on 30 July 1994 was the first documented for El Salvador, but the species was common all along the coast during October and November. A group of seven Stilt Sandpipers (*Calidris himantopus*) photographed in salt-production impoundments of the Bay of La Unión on 6 August 1994 was the second record and first documented for El Salvador. I obtained sight records of 21 Chimney Swifts (*Chaetura*

TABLE 2. Migratory birds feeding, foraging, or resting on El Salvador coast, autumn 1994.<sup>1</sup>

Species	Date range or first date	Date of maximum	Maximum daily count	Days detected
Transients				
Collared Plover ( <i>Charadrius collaris</i> )	30 July–8 Dec.	25 Oct.	48	>10
Franklin's Gull ( <i>Larus pipixcan</i> )	27 Oct.–29 Nov.	12 Nov.	440	6
Elegant Tern ( <i>Sterna elegans</i> ) <sup>2</sup>	30 July–30 Nov.	29 Nov.	80	>10
Arctic Tern ( <i>Sterna paradisaea</i> )	19 Oct.		1	1
Early arrivals				
Blue-winged Teal ( <i>Anas discors</i> )	6 Oct.		1	1
Peregrine Falcon ( <i>Falco peregrinus</i> )	15 Oct.	25 Oct.	2	>10
American Kestrel ( <i>Falco sparverius</i> )	4 Oct.		1	>10
Killdeer ( <i>Charadrius vociferus</i> ) <sup>2</sup>	28 Oct.		1	1
Ruby-throated Hummingbird ( <i>Archilochus colubris</i> ) <sup>2</sup>	19 Oct.		1	1
White-winged Dove ( <i>Zenaida asiatica</i> )	Throughout	15 Oct.	76	>10
Mourning Dove ( <i>Zenaida macroura</i> )	2–9 Nov.	2 Nov.	28	3
Mangrove Cuckoo ( <i>Coccyzus minor</i> )	2 Nov.		1	1
Scissor-tailed Flycatcher ( <i>Tyrannus forficatus</i> )	15 Oct.	26 Oct.	46	>10
Barn Swallow ( <i>Hirundo rustica</i> ) <sup>2</sup>	4 Aug.	12 Nov.	475	>10
Dickcissel ( <i>Spiza americana</i> )	4 Oct.–2 Nov.	2 Nov.	125	2
Few published records				
American Wigeon ( <i>Anas americana</i> )	30 Oct.		18	1
Northern Harrier ( <i>Circus cyaneus</i> )	21 Oct.		1	5
Cooper's Hawk ( <i>Accipiter cooperi</i> )	17 Nov.		1	1
White-tailed Hawk ( <i>Buteo albicaudatus</i> )	18 Oct.		1	1
Zone-tailed Hawk ( <i>Buteo albonotatus</i> )	15 Oct.		1	5
Merlin ( <i>Falco columbarius</i> )	28 Oct.		1	7
American Avocet ( <i>Recurvirostra americana</i> )	13 Oct.	21 Oct.	34	6
American Golden-Plover ( <i>Pluvialis dominica</i> )	31 July		1	1
Wandering Tattler ( <i>Heteroscelus incanous</i> )	6 Oct.	9 Dec.	3	2
Long-billed Curlew ( <i>Numenius americanus</i> )	11 Nov.		1	1
Marbled Godwit ( <i>Limosa fedoa</i> )	31 July–4 Aug.	31 July	22	2
Stilt Sandpiper ( <i>Calidris himantopus</i> )	6 Aug.		7	1
Short-billed Dowitcher ( <i>Limnodromus grisens</i> )	30 July	21 Oct.	2	2
Royal Tern ( <i>Sterna maxima</i> )	Throughout	29 Nov.	630	>10
Sandwich Tern ( <i>Sterna sandvicensis</i> )	4 Aug.	29 Nov.	15	>10
Common Tern ( <i>Sterna hirundo</i> )	30 July–8 Dec.	29 Nov.	11	4
Forster's Tern ( <i>Sterna forsteri</i> )	5 Nov.–3 Dec.		1	2
Gull-billed Tern ( <i>Sterna nilotica</i> )	31 July–6 Aug.	6 Aug.	4	2
Black Skimmer ( <i>Rynchops niger</i> )	4 Oct.	8 Dec.	386	>10
Green-breasted Mango ( <i>Anthracoceros prevostii</i> ) <sup>2</sup>	25 Oct.	26 Oct.	2	2

<sup>1</sup>Overflying birds of Table 1 are not included in Table 2. Raw data, localities, and photographic documentation for selected species are available from the author or at <http://nhm.ku.edu/komar>.

<sup>2</sup>Earliest arrival on record.

*pelagica*), not previously reported in El Salvador, which were migrating among flocks of

Barn Swallows over the beach at the Río Jiboa estuary.

## DISCUSSION

Few migratory land birds were noted feeding or resting in coastal vegetation. I observed most putative diurnal migration in October, but Wood Stork migration continued through November, and Brown Pelicans moved mostly in early December. Of some concern is the broad definition that I use for diurnal migration. Nevertheless, I present all observations that fit the definition, and did not subjectively decide which birds should have been migrants. While some species may regularly fly high above the coast as part of normal daily movements not related to migration, only four species presented as diurnal migrants occasionally flew westward (against the flow of migration): Brown Pelican, White Ibis (*Eudocimus albus*), Merlin (*Falco columbarius*), and Barn Swallow. The White Ibis is not considered migratory (American Ornithologists' Union 1998), and the few observations I report are inconclusive in that respect. Some Barn Swallows flying eastward may have been foraging and not migrating, but most were probably migrants.

The Brown Pelican is widely considered to be non-migratory (American Ornithologists' Union 1998), although migration is known in the eastern United States (Schreiber & Mock 1988). Brown Pelicans may be common in El Salvador throughout the year (Dickey & van Rossem 1938) but are not known to nest there, the nearest colonies being about 500 km away in Costa Rica, 750 km away in southeastern Mexico, and 2100 km away in western Mexico. The Costa Rica population, which breeds from January through May (Stiles & Skutch 1989), is a likely source for pelicans in El Salvador. Most banding recoveries have been within 600 km of breeding colonies (Schreiber & Mock 1988) although dispersal distances of 3800 km are known (Johnsgard 1993). A closer source is possible, as a large breeding colony

is rumored in the Gulf of Fonseca, Honduras, just east of El Salvador (Dickey & van Rossem 1938, Monroe 1968, American Ornithologists' Union 1998). Thurber *et al.* (1987) noted a recovery from El Salvador of a Brown Pelican banded in Baja California, where breeding occurs January through July (Gómez Cordero *et al.* 1982, Anderson & Gress 1983, Gaviño de la Torre 1986). The migrants, however, were flying east a few weeks before the start of breeding in Mexico, making that an unlikely source. Furthermore, Wetmore (1945) determined that Pacific Central America specimens were of the subspecies *P. o. carolinensis*, distinct from the West Mexican *P. o. californicus*. An Atlantic source is also possible (South Carolina populations migrate southward in November and December, Schreiber & Mock 1988).

While Wood Storks are present year-round in El Salvador, consistent observations of large flocks flying eastward in vee-formation from mid-October to early December support the hypothesis that the species migrates either to or through El Salvador. Thurber *et al.* (1987) reported seven Wood Storks migrating at 2200 m, above a mountaintop on 23 November 1977, but noted that migration was not known for Wood Storks and suggested post-breeding wandering. However, Thiollay (1977) reported migrating groups of Wood Storks in Veracruz. U.S. Wood Stork populations winter in the United States, based on marking studies (Coulter *et al.* 1999) and satellite tracking (Savage *et al.* 1999), and are not likely to winter in Central America. Neotropical breeding populations (Mexico, Honduras, Nicaragua, Costa Rica) are more likely the source of migrating Wood Storks observed in Mexico and Central America. Breeding in northwest Costa Rica begins in late October, about 500 km from El Salvador (J. Villarreal pers. com.). Wood Storks begin to breed in Mexico, eastern Honduras, and eastern Nicaragua, within 750

km from El Salvador, in late December (Lopez-Ornat & Ramo 1992, Frederick *et al.* 1997, Coulter *et al.* 1999). Breeding in Venezuela begins in October (González 1996, 1999), so it is unlikely that El Salvador birds were from that population.

The Collared Plover was common at seven estuaries. As the species had been reported only once previously in El Salvador (Thurber *et al.* 1987), the 236 counted (at least 158 individuals) were surprising. The Collared Plover appeared to be a migratory transient, occurring in small flocks. I did not find the species during previous visits to several of the same estuaries in June and in January. While the species is considered a resident at the regional level (Howell & Webb 1995), I searched for this species during 14 days during late December 1992 and January 1993, visiting numerous suitable sites along the El Salvador coast, and failed to locate any individuals. There are no breeding records from El Salvador (Thurber *et al.* 1987), and the population appeared to peak in mid October. Strauch & Abele (1979) found small flocks present at a Panamanian beach only from September through February.

The least expected species was Arctic Tern. Only two other records exist from Central America, both undocumented sight records from Panama: at sea in May 1995 (Engleman 1995) and ashore on 18 October 1997 (Angehr 1997). A few have been documented visiting coastal Mexico in late October (Villaseñor 1993). The Elegant Tern was previously known in El Salvador from an 1862 specimen (Dickey & van Rossem 1938) of questionable locality, and one sight record (Komar 2001); the 237 counted during this study suggest that the Elegant Tern was a common autumn transient in El Salvador during 1994. The Chimney Swifts were undocumented, and should be regarded as unverified, but were identified by their relatively larger size and slower wing beats than

the resident Vaux's Swift (*Chaetura vauxi*).

Observations of American White Pelican and American Avocet were especially interesting because they confirmed these species as regular winter visitors and not just vagrants in El Salvador. The pelican is reported regularly only as far south as Mexico (Johnsgard 1993); there are four previous records from El Salvador (Thurber *et al.* 1987). Additionally, a bank published a photograph of more than 140 at a coastal bay in El Salvador ("El Rincón Mágico," 1996, Banco Agrícola, San Salvador), and there have been numerous observations during winters from 1997 to 2002. The avocet was first reported from El Salvador in 1993 (Komar 2001), but I observed 65 individuals during the present study, suggesting its regular status. Cooper's Hawks (*Accipiter cooperi*) and Caspian Terns (*Sterna caspia*) were only recently reported for the country (Komar 2001), but my records suggest they are regular migratory visitors.

Records for American Golden-Plover (*Pluvialis dominica*), Wandering Tattler (*Heteroscelus incanus*), Stilt Sandpiper, Common Tern (*Sterna hirundo*), and Forster's Tern (*Sterna forsteri*) were interesting in that these species had been recorded just once previously in El Salvador (Thurber *et al.* 1987, Komar 2001). The Green-breasted Mango (*Anthracoceros prevostii*) was reported here because the population in western and central El Salvador is thought to be migratory (Dickey & van Rossem 1938, Howell & Webb 1995), with Mexico as a presumed source. The only previous published records were from January, thus the October records presented here may represent early arrivals, or indicate a longer residency period.

Considering the enormous amount of information available about migratory patterns of birds in some parts of the world, the small amount of information presented here represents only a start at understanding migration in Central America. I suggest that

future studies incorporate extensive standardized observations that might shed light on timing of migration. Unfortunately, long-distance migrants may fly diurnally at altitudes well beyond the limits of human observation from sea level (Richardson 1976, Smith 1980, Alerstam 1990), for which mountaintop observations may be informative.

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