An Analysis of New World Mangrove Avifaunas Diversity, Endemism, and Conservation

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ABSTRACT

Most bird species inhabiting mangroves are considered visitors to the habitat. However, some species feed or reproduce almost exclusively in mangroves. If most are visitors, then the question arises as to whether bird communities characteristic of mangroves actually exist. Similarly, the influence of adjacent vegetation types on avifaunal composition in mangroves remains unassessed. In this study, I address these questions, providing fundamental information regarding the avifaunas of New World mangroves.

I surveyed avifaunas at nine sites in Mexico and El Salvador. Mangroves were traversed principally by canoe, and on foot when possible. For each area, species presence, type of vegetation, and use of mangroves for perching, nesting, rearing young, or feeding were recorded. Three principal methods were used to complete inventories of the study sites: visual sightings, mist netting, and tape-recordings of bird vocalizations. Inventory completeness was assessed using species accumulation curves and inferential analyses. I assembled species lists for another 32 localities (29 from the New World and three from Gambia, Malaysia, and Australia from the literature. I compiled a matrix of occurrences of 923 bird species at 42 mangrove sites. I carried out an analysis of similarity to establish differences among sites based on 672 resident species. In addition, I analyzed the importance of mangroves for birds as feeding, roosting, and nesting habitat.

I conclude that New World mangrove avifaunas are markedly distinct from those of Gambia, Malaysia, and Australia mangroves. The New World mangrove avifauna clustered in two major groups: North and Central America, and South America. Most of the 715 bird species that inhabit 39 New World mangrove sites used forested areas within the mangrove ecosystem, and fed principally on invertebrates, but few of them nest exclusively in mangroves. However, for some species of parrots (e.g., *Aratinga* spp., and *Brotogeris* spp.) this habitat may be crucial for their reproduction.

In the New World, about 210 protected and proposed coastal areas exist within the general distribution of mangroves, mangrove sites along the Pacific slope of South America and Mexico are in critical need of protection.

To my beloved husband, Jorge A. Vargas Contreras

To my father, Amancio Escalona y Castillo

In memory of my mother, Petra Segura García

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INTRODUCTION

The word "mangrove" has been used with two meanings: 1) a salt-tolerant forest ecosystem that occupies sheltered tropical and subtropical coastal estuarine environments; and 2) the constituent plant species that are not closely related, but share morphological, physiological; and reproductive adaptations that allow survival in saline, waterlogged, and reduced substrates (Dinerstein et al. 1995). Mangrove ecosystems are distributed worldwide along the littoral in tropical and subtropical zones. In the New World, they occur along both the Pacific (southern Baja California, Mexico to northwestern Peru) and Atlantic (Florida, USA to Rio de Janeiro, Brazil) coasts.

New World mangroves are dominated by eight species: *Avicennia germinans*, *A. bicolor* (Avicenniaceae), *Laguncularia racemosa* (Combretaceae), *Conocarpus erecta* (Combretaceae), *Rhizophora mangle*, *R. harrisonii, R. racemosa* (Rhizophoraceae), and *Pelliciera rhizophorae* (Pellicieraceae, Rzedowski 1986, Lot and Novelo 1990). Mangrove genera have contrasting distributional patterns: *Rhizophora* colonizes new areas and grows in deeper water, whereas *Conocarpus* is found in shallower, drier and less salty situations (Lot et al. 1975, Novelo 1978). The intermediate portion of the mangrove community is inhabited by *Laguncularia* and *Avicennia*, which may grow together or displace one another, depending on substratum, seasonal flooding, and salinity (Lot and Novelo 1990). *Pelliciera rhizophorae* is not very salt-tolerant, and therefore is restricted to areas with continuous flow of fresh water (Jiménez 1994).

Among major biological communities, mangrove ecosystems have received the least attention from conservationists and scientific research (Dinerstein et al. 1995). One reason is that mangroves are superficially similar across the entire region, with just a few dominant species; moreover, mangroves cover only 0.2% of total area occupied by terrestrial ecosystems in the New World. However, mangrove ecosystems hold a wide diversity of aquatic and terrestrial species of different taxonomic groups, and when all species are considered, mangrove ecosystems rival many other tropical habitats in alpha diversity (Jiménez 1994, Dinerstein et al. 1995).

The relatively high plant productivity and the active biological processes characteristic of mangrove ecosystems yield many goods and services of direct or indirect benefit to humans. In Latin America, mangroves are used for timber, fuelwood, charcoal, and even medicinal products (*Rhizophora mangle* is used as a poultice and for stomach diseases, Kathiresan 1995). They are also important to estuarine fisheries, because of the detritus and dissolved organic carbon contributed to estuarine food webs and the shelter their roots provide for juveniles (Twilley 1982).

Mangroves play an important role in water storage and trapping of sediments and carbon, contributing to the control of the quality and quantity of water, particulates, and solutes discharged to the ocean (Dinerstein et al. 1995). The intricate network of roots binding the substrate dissipates water energy, thereby reducing erosion and promoting deposition of materials. Thus, where mangroves are removed, extensive coastal erosion occurs negatively influencing coastal biological communities (Thom 1984).

Their functional importance aside, scientific study of the Neotropical mangrove faunas has been largely limited to species lists, without examination of relationships between species distributions and community types. Even for better-known groups, such as birds, information is minimal (Chapman 1975). To present, only 15 published studies have provided mangrove bird species lists in the New World (Haverschmidt 1965, Ffrench 1966, Medina Padilla 1977, Aveline 1980, Tostain 1986, Hernández et al. 1987, Acosta et al. 1988, Dvorak and Tebbich 1992, Novaes and Lima 1992, Jiménez 1994, Warkentin and Hernández 1995, Casler and Esté 1996, Alves et al. 1997, Dvorak et al. 1997, Araujo and Maciel 1979), and a few more that have treated aspects of their ecology (e.g., De Visscher 1977, Lefebvre 1992a, 1992b, 1994, and 1997). Only one study has focused on a mangrove-restricted species, the almost extinct Mangrove Finch (*Cactopiza heliobates*) on the Galápagos Islands, Ecuador (Grant and Grant 1997).

Most bird species inhabiting mangroves are considered visitors, or are thought only to be associated—not restricted—to the habitat (Tomlinson 1986). However, some species feed or reproduce almost exclusively in mangroves (*e.g.*, *Anous* spp., *Fregata* spp.). Other species may be mangrove specialists, but have not been recognized as such because of insufficient information: in Mesoamerica, Mangrove Black-Hawk (*Buteogallus subtilis*), Pacific Screech-Owl (*Otus cooperi*), and Mangrove Warbler (*Dendroica* [*petechia*] *erithachorides*), all inhabit mangroves commonly, but whether they use mangroves only marginally or continuously, or to what degree they are dependent on the habitat, is unknown. Interestingly, populations of some species associated with mangroves appear to differ morphologically from inland populations, and may even represent distinct species (e.g., A.O.U. 1998, Ridgely and Gwynne 1989). Hence, the biological diversity of Latin American mangroves may have been underestimated.

Several studies have demonstrated significant influences of seasonal rainfall patterns on the availability of resources in mangroves, which likely affect bird density and community composition (Lefebvre et al. 1992a, b). If most bird species are visitors, moving to different areas in search of food or other resources in times of low resource availability, the question arises as to whether bird communities characteristic of mangroves exist. An interesting corollary is whether significant variation exists in avian communities associated with different types of mangroves. Similarly, the influence of adjacent vegetation types on mangrove avifauna composition remains unassessed. Thus, this study deals with patterns of avifaunal composition associated with mangroves, avian use of this habitat, and the relevance of this ecosystem for both migratory and resident birds.

PLAN OF THE MONOGRAPH

This work is divided into seven chapters. In Chapter 1, I describe the methods used to compile and analyze the information about mangrove avifaunas. In Chapter 2, I integrate the faunistic information in a regional view of mangrove avifaunas by analyzing patterns of richness, endemism, and similarity. Chapter 3 deals with patterns of ecological restriction of mangrove avifaunas. Chapter 4 emphasizes key natural history features of species that depend on mangroves, discussing in particular the importance of mangroves as nesting, feeding, and roosting areas. In Chapter 5, I present a preliminary analysis of historical factors affecting avifauna composition of the mangroves, based on geographic and ecological distributions of species in question and their relatives. Finally, in Chapter 6, I discuss aspects of conservation of mangrove ecosystems and their associated faunas.

CHAPTER 1

METHODS

LITERATURE REVIEW

Distributional data for bird species were gathered from the literature: Taczanowski 1884-1886, Howell 1932, Cawkell 1964, Harvershmidt 1965, Nisbet 1967, Monroe 1968, Escalante 1988, Tostain 1986, Acosta et al. 1988, Jones 1990, Novaes and Lima 1992, Jiménez 1994, Arellano-Guillermo and Serrano-Islas 1993, Ortíz-Pulido et al. 1995, Howell and Webb 1995, Johnstone 1995, Noske 1995, Warkentin and Hernández 1995, Casler and Esté 1996, Gobierno del Estado de Campeche 1996, Dvorak and Tebbich 1997, Lefebvre and Poulin 1997, Macouzet 1997, Berg 1998. Additional information was supplied by colleagues with unpublished data (J. E. Morales P., Olmos and Silva e Silva, A. T. Peterson, N. H. Rice, M. B. Robbins, B. Schmidt, C. Milensky; Tables 1 and 2).

Lists and maps of protected coastal areas were obtained taken from the World Conservation Monitoring Centre (1999) and Consejo Nacional para el Conocimiento y Uso de la Biodiversidad (1999) in order to compare the protected areas with avian species richness and endemic patterns in the New World mangroves.

FIELD WORK

Study areas.-- I surveyed eight mangrove localities in Mexico and Central America (Fig. 1, Appendix 1). Each represents a different mangrove complex under the classification of Dinerstein et al. (1995). Field work was also carried out at two non-mangrove sites for purposes of comparison (Calakmul, Campeche, and Rancho Los Ebanos, Tamaulipas; both in Mexico, Appendix 1). Field work was conducted in three sessions: one rainy season (July - August 1996); and two complete rainy season-dry season sessions (January - July 1997, December 1997 - October 1998; Table 3).

Three methods were used to detect species at study sites: observations, mist-netting, and tape-recording of vocalizations. Observations were carried out in the mornings and late afternoons. Mangroves were traversed principally by canoe, but censuses were conducted on foot when possible. An average of 10 mist nets was set at each site: five within the mangroves, and five in adjacent vegetation. When possible, voucher specimens of each species were collected (deposited at the Museo de Zoología "Alfonso L. Herrera", Facultad de Ciencias, Universidad Nacional Autónoma de México; Instituto de Ecología y Alimentos, Universidad Autónoma de Tamaulipas, and Instituto de Historia Natural de Chiapas). Vocalizations were recorded to aid complement inventories and document species determinations. Inventory completeness was assessed using species accumulation curves (Peterson and Slade 1998), except at Dzilám de Bravo, Yucatan, and Aguachil, Oaxaca, where approaching hurricanes prevented completion of planned field work. I explored the data available from those sites using various subsampling procedures to assess comparability to other site inventories.

I also assembled the following information for each species (Table 1):

Endemism: I used three levels of endemism: 1) species restricted North and Central America or South America, 2) species confined to north and south; Atlantic, and Pacific coasts, and 3) species restricted to a zoogeographic region in America (Stotz et al. 1996). A species was endemic to that coast whenever its distribution did not reach the other coast.

Restriction to mangroves: I used this category to indicate the degree of ecological restriction to mangroves.

Nesting habitat: I classified species as nesting in mangroves and/or other habitats based on my own observations, and from a variety of resources (Howell 1932, Haverschmidt 1965, Ridgely and Tudor 1989a, b, Johnstone 1990, Sibley and Monroe 1990, Haverschmidt and Mees 1994, Stotz et al. 1996, Howell and Webb 1995). I placed special emphasis on nesting as compared with other activities, because its one of the most critical stages for avian survival, and implies conservation of primary habitat. I use the term breeding or resident species to indicate that a species remains on the general area year-round and likely breeds, although detailed information on nesting may not be available for a particular locality.

Threat: I use this term to refer to species facing high risk of extinction based (IUCN 1996).

Habits: This category refers to the general spatial distribution of species (terrestrial, aquatic, aerial).

Location: This category refers to the particular area that a species uses within the mangroves: interior of mangroves, terrestrial border of mangrove, water border mangrove, open aquatic, aerial.

Food habits: This category refers to food preferences: nectar, fruits, herbs, insects, non-insect invertebrates, carnivores, carrion. When a bird was found to eat different resources, such as fruit and insects, I counted it twice under each category.

Feeding stratum: This category refers to the microhabitat where the species feeds (water, ground, herbs, shrubs, arboreal, or aerial).

Water preference: This category indicates if a species has a particular preference for an micro-aquatic environment: fresh water lakes or rivers, salt water estuaries, or areas where they mix (brackish water).

As a special aside, I recorded numbers of termite nests with and without bird nests, particularly those of parrots, and sampled termites for later identification. For comparative purposes, I also sampled termite nests at an inland site in tropical semideciduous forest in Calakmul Biosphere Reserve, Campeche. These data allowed me to compare use of termite nests for nesting in mangroves and outside mangroves.

A list of species restricted to New World mangroves and their distributions were extracted from the literature (see comments under nesting habitat), and observational data. Sister taxa and their distributions were plotted to test hypothesis regarding the origin of mangrove bird species.

DATA ANALYSIS

To assess inventory completeness, species accumulation curves were developed from raw data and predictions of richness were developed based on algorithms for extrapolation from incomplete data (Soberón and Llorente 1993, Chazdon et al. 1998, Peterson and Slade 1998). Using the program "EstimateS 5" (Colwell 1997), I developed predicted species richness for each site based on the ICE, Chao2, Jack1, Jack2, Bootstrap, and Cole routines. Chazdon et al. (1998) concluded that no estimator seems to satisfy the criteria for a good estimator (independent sample size, stable beyond a threshold, insensitive to patchiness, insensitive to sample order). Consequently, to avoid confusion owning to algorithmic implementation problems, I used all of the estimators. These analyses allow me to estimate species richness, and make comparisons possible among localities.

I carried out an analyses of similarity using the Jaccard index and unweighted pair-group method to establish differences among sites (1995). For this analysis, I excluded waders, aerial, and non-breeding species, because these species move larger distances, and may have distinct seasonal or historical relations.

I used bird species lists for nine Mexican localities (Marismas Nacionales, Aguachil, La Encrucijada, Playa Dos, La Mancha, Petenes de Campeche, Dzilám de Bravo, Puerto Morelos, and Cozumel), that included data on avifaunas of both mangroves and adjacent vegetation types to assess effects of context on mangrove avifaunas. In addition, I tested the influence of mangroves in avian distribution by comparing number of species and species composition for a scrub forest site lacking mangroves completely (Rancho Los Ebanos) and a site with both mangroves and scrub forest (La Playa Dos).

Bird species' preferences for spatial location, feeding, and nesting within mangroves were tested based on 715 species across 39 localities using a χ^2 test. To explore differences between some categories, I selected subsets of the data; for example, I chose all species preferring to feed on invertebrates, and tested if preferences for insects *versus* non-insect invertebrates.

I also used a χ^2 tests to determine if differences exist in numbers of termitaria and bird nests among seven mangrove localities (La Mancha, Puerto Morelos, Marismas Nacionales, Aguachil, La Encrucijada, Jiquilisco, Barra de Santiago) and one non-mangrove locality (Calakmul Biosphere Reserve).

CHAPTER 2

MANGROVE AVIFAUNAS OF THE NEW WORLD

In general, ornithological studies have concentrated on inland forests (Rodríguez-Yañez et al. 1994, Harvey and Howell 1987, Stotz et al. 1996), as opposed to coastal areas. In addition, the study of the animals found in mangrove ecosystems have lagged far behind botanical studies, because botanists were early attracted by the fascinating plant adaptations for survival in intertidal habitats (Stafford-Deitsch 1996).

Part of the lag in zoological studies is that many animals appear not dependent on the mangrove for survival (Stafford-Deitsch 1996), and the majority of vertebrates appear to be only visitors (Ford 1992, Hutchings and Saenger 1987). The idea that most species are just visitors and not dependent has reinforced the prejudice that animal populations are likely therefore to be of secondary interest (Stafford-Deitsch 1996). As consequence, in the majority of countries with mangroves, animals associated with this habitat, and their geographic distributions are poorly known (IUCN et al. 1983). Hence, in this chapter and throughout, I explore the idea of the existence of mangrove bird faunas, showing that many more bird species inhabit mangroves than was thought. In this chapter, I analyzed patterns of richness, endemism, and similarity of New World mangroves avifaunas.

SPECIES RICHNESS

Data on avifaunal composition were available for 42 mangrove localities, were including, sites in the Americas, Africa, Australia and Asia. In all, 923 bird species have been recorded using mangroves at these sites; clearly, many more would be discovered when studied in greater detail. Hence, almost 10% of all bird species are known to use mangroves in the world, and the numbers will clearly climb with better geographic coverage, and more detailed inventories from all sites. In North and Central America, 445 species inhabit mangroves, and 439 species are found in South American mangroves (Table 1).

For sites that I sampled in detail, resident species accumulation curves showed asymptotic tendencies for each locality, indicating that surveys were close to complete (Fig. 2). For two localities, Aguachil, Mexico, and Bahía de Jiquilisco, El Salvador, accumulation curves were still climbing when surveys were interrupted by hurricanes or logistic problems. For Dzilám de Bravo, Yucatan, the accumulation curve was not analyzed owing to inconsistent sampling procedures.

In areas where species richness was low, a clear asymptotic accumulation curve was obtained (e.g., Playa Dos, Barra de Santiago, and Puerto Morelos; Fig. 2). For these sites, observed faunas approaches predicted fauna sizes closely, generally to within 5-6 species. For larger avifaunas, (e.g., La Encrucijada, Marismas Nacionales, and Aguachil; Fig. 2), curves were leveling off, but still accumulating species, when sampling was terminated. For these sites, observed richness was farther removed from the predicted richness, often falling short by 20-30 species.

For some sites that I did not visit personally, such as Cozumel, authors obtained species accumulation curves (Macouzet 1998). For other localities, the authors worked for at least a year *in situ* (e.g., Jesús María river, Juan Díaz, Suriname, French Guyana). If I obtained good asymptotic curves within a week of work, then it seems that their surveys are closed to be complete.

These sites inventories showed different patterns if total (Fig. 3a), terrestrial (Fig. 3b), or only resident species (Fig. 3c) are considered. When total species are analyzed (including migrant, resident, terrestrial, and aquatic species), an interesting pattern is showed: bird species richness is higher in the northern tropical zones along on both, the Pacific and Atlantic coasts of Mexico and the United States (Fig. 3a). Species richness decreases northward in Mexico and the southern United States, and also south into Central America, but increases again throughout South America. The sites with highest known total species richness are the Florida Keys and the Everglades (168 and 175 species, respectively), perhaps owing to the long-term nature of the inventories available from those sites and the consequently large numbers of migrant species detected. Similarly, the northernmost localities are the richest if only terrestrial species are taking into account (Fig. 3b). However, when only resident species are considered; then, some South American localities have more resident species than the Florida Keys and the Everglades. But, in general, mangrove species richness is smaller in Central America, not including Panama, than other American regions.

BREEDING STATUS

Numbers of breeding and non-breeding species are highly variable among mangrove localities. For example, northern localities held many more non-breeding species than breeding species (e.g., Florida Keys with 124 non-breeding and 44 breeding species, 36%, Fig. 3c, Table 4). Southern localities, in contrast, held more breeding species than non-breeding species, reflecting the numerical dominance of north temperate migrants over Austral migrants, because few Austral migrants migrate as far north as the mangroves in northern South America. An extreme example of the latter case is the avifauna of La Encrucijada, where 106 of 127 species breed in the area (83.5%). However, several non-breeding species, especially long-distance migrants, were common throughout the New World mangroves, in particular: *Seiurus noveboracensis* (28 of 38 localities), *Protonotaria citrea* (22 of 38 localities), and *Setophaga ruticilla* (22 of 38 localities).

ENDEMICITY

At a large scale more species are found in mangroves and confined to South America (173 species) than are confined to North and Central America (108 species), but not necessarily restricted to mangroves. Similarly, at a smaller scales, comparing the northern and southern, Atlantic and Pacific coasts; the Atlantic coast of South America holds solely about 3 times more endemic species (89) than either the Pacific and Atlantic coasts of North and Central America (28 on each coast, Fig. 4), and the Pacific coast of South America (25, Fig. 4).

Analyzing endemism at the level of zoogeographic regions *sensu* Stotz et al. (1996) showed that mangroves of the Pacific Arid Slope (PAS) and the Gulf Caribbean Slope (GCS) possess the largest number of endemic species for that region, not only for the mangrove forest (26 and 16 species, respectively, Fig. 5). When numbers of species confined to zoogeographic regions are counted for each studied locality; La Encrucijada was highlighted, with 11 endemic species, followed by four other Pacific coast localities (Marismas Nacionales, Aguachil, Cayapas Mataje, Puerto Pizarro) and one Atlantic coast locality (Dzilám de Bravo) with eight endemic species (Fig. 6). Although South America possesses many more species than North and Central America, most of the species inhabiting its coasts are more broadly distributed, and are found in more than one zoogeographic region, resulting in few endemic species per locality (Fig. 6).

SIMILARITY

Analyzing patterns of similarity among all localities produces a dendrogram in which faunas cluster in two major groups corresponding to the Old World and Australia (Gambia, Malaysia, and Australia) and the New World, which shared only few species (*Bubulcus ibis*, *Ardea alba*, *Butorides striatus, Falco peregrinus*,

Fig. 7a). Examining the diagram, I noted that small faunas (e.g., Omoa and Cayo Matías) were placed incongruently within the dendrogram, because being placed as particularly distinct avifaunas. Assuming that this odd pattern results from well-known biases of small fauna sizes in distance measures (Sánchez and López 1988), I removed them and resulting patterns were clearer (Fig. 4b). Furthermore, the order that New World localities were grouped is not reliable because when several localities were remove, one at a time, this order changed. However, New World and Old World, and Australian localities were always separated clearly, and within the New World two major groups formed: Central and North America, and South America. Gambia, Malaysia, and Australia sites were highly dissimilar from one other, as well as from the New World localities. Dissimilarity was also high for localities within the New World (Jaccard was smaller than 0.6), the only localities that were closely similar being Florida Keys and Everglades, and Onverwagt and Hope, Guyana.

Analyzing only New World localities, I found no clear association among Pacific versus Atlantic slope sites. Localities from North and Central America were separated from those in South America, excepting Juan Díaz and Galeta in Panama, which were more similar to South American localities than North and Central American localities. The avifaunas of the Everglades and the Florida Keys were more similar to the mainland Mesoamerican mangroves than with those of the Caribbean region (Fig. 3b).

DISCUSSION

SPECIES RICHNESS

Factors potentially influencing bird species richness in mangroves could be grouped into three major categories: (1) abiotic factors, (2) biotic factors, and (3) human-caused disturbances. Among the abiotic factors a variety of phenomena are particularly important in coastal mangrove systems: hurricane frequency, temporal patterns of disturbance, salinity, and rainfall have all been considered to explain bird species diversity.

Frequency of disturbance has been implicated as a factor in affecting species richness and abundance in communities (Wiens 1989). For example, a 1935 hurricane in southern Florida, completely destroyed an already severely reduced population of Cape Sable Seaside Sparrows (*Ammodramus maritimus mirabilis*, Wiens 1989). A severe cyclone hitting the Pichavaram mangroves in southern India in 1993 caused high mortality in species such as the Asian Open-billed Stork (*Anastomus oscitans*), Painted Stork (*Mycteria leucocephala*), Indian Pond Heron (*Ardeola grayii*), Little Egret (*Egretta garzetta*), Cattle Egret (*Bubulcus ibis*), Red-Wattled Lapwing (*Vanellus indicus*), Indian Robin (*Erithacus brunneus*), Jungle Crow (*Corvus levaillantii*), Common Crow (*Corvus splendens*), Rose-ringed Parakeet (*Psittacula krameri*), and Brahminy Kite (*Haliastur indus*; Nagarajan and Thiyagesan 1997).

Disturbances such as the hurricanes that affected the present study result in local and temporal extinctions of biodiversity elements. However, in Jamaica, Wunderle et al. (1992) found increased mean numbers at a mangrove site where structural damage to trees was severe, but where new foliage was present, after the presence of hurricane Gilbert. Moreover, areas commonly disturbed by hurricanes, such as Florida, nevertheless maintain high numbers of species.

Climatic factors, particularly rainfall, and freshwater runoff appear to be major determinants of plant species richness, stand structure, biomass, and growth dynamics in mangrove forests (Smith 1992), and therefore could be indirectly related to bird species richness. A discussion of mangrove structure and its relation with bird species richness could be found under biotic factors.

Among biotic factors, two general theories have been suggested to explain variation in species diversity across areas. The first explanation is based in the principle of convergence. Under this idea, predictable local interactions suggest that similar habitats in distinct parts of the world, in which biological communities have evolved independently, should support similar numbers of species (Ricklefs 1987). The alternative view is based in principles of biogeography: here, differences in local species richness arise from the particular history and biogeography of each region (Ricklefs and Latham 1993). A hybrid understanding might mix elements of both: ecological conditions could set limits or constraints on systems, but historical and biogeographic factors produce considerable intersite variation.

The results of this study show little support for the hypothesis of convergence. Under this view, single-site species richness in this superficially uniform habitat should be similar across the region, which was not the case. Explanation of variation in bird species richness in mangroves may lie more with the other hypothesis, with variation in species richness explained by factors of biogeography or interactions between biogeographic and ecological factors.

Age of forest establishment may offer a potential explanation of patterns of species richness on a regional basis. Based on evidence from floristic patterns and past ocean currents, it has been suggested that most mangrove species originated in the Old World and Australia (Old World and Australia). Establishment of mangroves in South America happened either simultaneously with, or subsequent to, establishment in Central America (Duke 1992, Ricklefs and Latham 1993). If mangrove forest age were related to species richness, Central or South American mangroves would be expected to have higher species diversity than those farther north and on the Pacific Coast. Observed patterns, however, contrast sharply with these predictions: in Mexico, species richness is high on both coasts, decreasing north and south. Mangrove bird species richness also contrasts with terrestrial patterns of species richness, which increases north to south (Hernández-Baños et al. 1995), and is greater on the Atlantic than on the Pacific (Escalante et al. 1993). Consequently, becausevariation in bird species richness in mangrove forest does not appear to be well explained in a purely historical framework, consideration of ecological factors may be relevant. Among ecological factors that could explain bird species richness in a mangrove site are (a) plant species composition (monospecific *versus* mixed vegetation), (b) forest stature and complexity, and (c) food sources.

With regard to plant species composition, high bird species richness is often associated with floristically diverse vegetation types, as in the case, for example, in the Amazonian rain forests (James 1971, Stotz et al. 1996). In this study, mangroves in southern Mexico held higher numbers of plants and bird species than the more mangroves (Contreras-Espinosa 1993, Montes-Cartas 1993, Mora-Olivo 1994, Ocampo-Cázares and Flores-Díaz 1995, Vargas-Contreras 1998). However, several sites where mangroves are present in mixed stands, such as at Tivives, had low species richness. At a global scale, areas with highest mangrove plant species richness, such as Australia or southeast Asia (35 and 39 mangrove species, Saenger et al. 1983), do not hold especially rich bird faunas (33 and 127 species, respectively). Within Australia, in northern Queensland, where the richest community floristically occurs (over 30 species), there are only seven mangrove bird specialists (Hutchings and Saenger 1987).

For mangroves in Florida, Puerto Rico, Mexico, and Costa Rica, an index has been developed to measure forest complexity taking into account tree species diversity, stand density, tree basal area, and tree height (Pool et al. 1977). However, because bird species richness is not related to mangrove tree diversity, and comparable complexity data are not available for other sites, I focused on maximum tree height and basal areas. Relating these variables, which are best termed "stature", to breeding bird species richness (Fig. 8), species richness varied positively with maximum tree height and basal area.

In Panama, Lefevbre et al. (1994) studied two floristically similar sites that shared a common source pool of bird species because of their close proximity, but that had very distinct invertebrate communities; bird communities also differed significantly, suggesting that, bird species richness may vary in relation with invertebrate diversity. Finally, two additional related factors may influence species richness in these regions: intense human disturbance and small overall extent. For example, Jiquilisco (62 bird species, 20 ha) has a greatly reduced avifauna compared with similar sites with lower human population and larger extent (e.g., La Encrucijada, 127 bird species, 136,000 ha, Ocampo-Cázares 1995).

BREEDING STATUS

Large numbers of breeding and non-breeding bird species inhabit mangrove forests. In all, 279 of 445 total species in North and Central American mangroves were breeding (62.7%); the rest were non-breeding species, including migrants and winter residents. In comparison with other forest types, numbers of migrant species are relatively high; for example, Mexican cloud forests hold 20-40% migratory birds (Escalona et al. 1995). Other studies also have indicated the importance of mangroves for long-distance migrants, particularly as roosting areas (Hernández et al. 1987, Lefebvre et al. 1992a, 1992b, 1994, Warkentin and Hernández 1995, Warkentin and Morton 1995). Interestingly, some species have high site fidelity to non-breeding areas, in particular the commonest species, such as *Protonotaria citrea* and *Seiurus noveboracensis* (Keast 1980, Lefebvre et al. 1994, Warkentin and Hernández 1995).

Regarding breeding species, species richness has typically been underestimated. For example, for Mexico, only 64 resident species were listed as inhabiting mangroves in a recent review (Escalante-Pliego et al. 1993). Within Mexico, I documented a total of 316 resident species for the country in mangroves. Moreover, most ornithologists associate mangroves principally with wading birds (e.g., Howell and Webb 1995). However, of 715 species for the New World reported here, 544 are terrestrial, of which 489 potentially breed in mangroves. Hence, mangroves are not only important for long-distance migrants and wading birds, but also for terrestrial resident species.

ENDEMICITY

Mangrove forest is generally considered to be poor in endemisms. For example, Stotz et al. (1996) considered only eight bird species endemic to zoogeographic regions inhabited the mangroves. However, endemicity depends on the spatial scale under discussion; changing the regional scale of endemism produce a different picture of endemism (Peterson and Watson 1998). For example, when endemism refers to species restricted to North and Central America or South America, South America possesses a higher number of bird endemic species (164 species). Similarly, if the spatial scale comparison is north *versus* south Atlantic, and Pacific coasts of the two continents, the northern Atlantic coast of South America has the highest endemicity (89 species). However, if the spatial scale is reduced to a single zoogeographic region within the Americas; the Pacific Arid Slope as defined by Stotz et al. (1996, Fig. 5) is the region that holds most endemic species (26). Stotz et al. (1996) based on the third definition (species restricted to a zoogeographic region), listed eight endemic species in the New World mangroves; with improved data, however, I found 80 endemic species to the zoogeographic regions inhabiting the New World mangroves, but not necessarily restricted to mangrove forest (Fig. 5, Table 1).

Endemism of mangrove avifaunas exhibit patterns markedly distinct from those of highland avifaunas (Hernández-Baños et al. 1995). In montane avifaunas, endemism increases continuously from the northern limits south into southern Central America (Hernández-Baños et al. 1995). Detailed analysis including all terrestrial habitats showed higher levels of endemism on the Pacific slope than in any other area of Mexico (Escalante-Pliego et al. 1993, Peterson and Navarro 1998). In contrast, although Pacific coast mangroves show high endemism across the study area, some Atlantic coast localities at similar latitudes also have high endemism.

SIMILARITY AMONG MANGROVE AVIFAUNAS

The analysis of similarity among mangrove avifaunas based on 672 resident bird species, showed a clear-cut separation between Old and New World avifaunas, and within the New World, South America *versus* North and Central America (Fig. 7). However, these outcomes contrast with what is known about mangrove floras. For example, Bo-ping (1993) documented that African mangrove floras, have more genera and species shared with American mangroves than with Asiatic mangrove floras, and that the Atlantic coast of America shared more species with western Africa than with Pacific America. These outcomes suggest that mangrove floras and mangrove avifaunas may not shared a common history, and bird species composition is not related directly with mangrove flora composition.

CONCLUSIONS

New World mangrove avifaunas are highly diverse, including at least 715 species, representing about 25% of the New World avifauna. Based on available data, historical presence of mangroves in a region, mangrove species composition, and frequency of disturbance, all appear to have little explanatory ability, for variation on bird species richness in mangroves. However, variation in mangrove stature coincides closely with variation in bird species richness, suggesting a causal relationship, in which more complex mangrove forests support more bird species. This relationship can be modified by human activity, producing artificially species-poor forests. These topics will be discussed in Chapter 3.

Mangrove avifaunas in the New World possess more resident (63.7%) than migratory (37.3%) bird species. These proportions are comparable with those in other habitats, such as cloud forest in which migrants total 24.2% of all bird species. Two species of migratory birds (*Protonotaria citrea* and *Seiurus noveboracensis*), are nearly ubiquitous throughout New World mangroves.

The three levels of endemism used in my analysis showed that South America, in particular northeastern South America, possesses the largest number of endemic bird species. However, when this large scale is restricted to zoogeographic regions, the Pacific Arid Slope region as defined by Stotz et al. (1996) is the richest in endemics, and the single richest locality identified is La Encrucijada, followed by four other Pacific localities (Marismas Nacionales, Aguachil, Cayapas Mataje, and Puerto Pizarro) and one on the Yucatan Peninsula (Dzilám de Bravo).

Mangrove avifaunas of the New World are highly distinct from those of the Old World and Australia (Gambia, Malaysia, and Australia), sharing only four species. New World localities were clustered in two major groups: North and Central American *versus* South America group. These patterns, although discordant with patterns of plant diversity, suggest complex historical patterns of colonization and diversification by birds.

CHAPTER 3

ECOLOGICAL RESTRICTION OF MANGROVE AVIFAUNAS

Mangroves are generally contiguous with terrestrial forest, and some portion of the terrestrial fauna occurs in both habitats. Often, animals use mangroves simply as an extension of the terrestrial habitat, but in some cases mangroves provide an essential seasonal source of food or a critical site for breeding. Particular species may vary in the number of habitats they occupy in a given area, and their occurrences may vary geographically (Ford 1982, Hutchings and Saenger 1987).

It has been suggested that terrestrial faunas of mangroves are strongly influenced by adjacent vegetation type in Australia: a given mangrove type may have vary animal communities depending on whether the adjacent habitat is tropical lowland forest, eucalypt forest, sedge lands or swamp (Ford 1982). Neither the degree of sharing of faunal elements with adjacent habitats nor the influence of those habitats on mangrove faunas has been analyzed in the New World. Hence, in this chapter I evaluated numbers of bird species shared among habitats at nine Mexican localities, and tested the influence of mangrove forest on local bird species richness.

The nine Mexican localities studied (Marismas Nacionales, Aguachil, La Encrucijada, Playa Dos, La Mancha, Petenes de Campeche, Dzilám de Bravo, Puerto Morelos, and Cozumel) differed with regard to contiguous vegetation types, as well as in the degree of disturbance in adjacent vegetation. The localities least affected by human disturbance were Dzilám de Bravo (Arellano-Guillermo 1993) and Petenes de Campeche (Gobierno del Estado de Campeche 1996), whereas Aguachil, and Marismas Nacionales were heavily disturbed.

Mangrove forest, in comparison with adjacent lowland habitats, held relatively high species richness (29 -175 species, Fig 9). In five of nine localities, mangrove bird species richness exceeded that of all adjacent habitats in species richness. In no case did mangroves hold the smallest avifauna. However, when tropical semideciduous forest, tropical deciduous forest, "Petenes", or well-preserved scrub was present, these habitats held larger numbers of species than mangroves (Fig. 9). Habitats holding fewest species were palm forest (10-50 species) and aquatic vegetation (24-34 species, Fig. 9).

Mangrove avifaunas held between 28% (47 species, Puerto Morelos) and 85% (127 species, La Encrucijada) of the total avifaunas of localities (Figs. 9 and 10, Table 5). This proportion appeared to vary with mangrove stature; for example, the simple mangrove forest at Puerto Morelos held a much smaller percentage of the local avifauna than that at La Encrucijada (Figs. 8 and 9). Although sample sizes were too small to permit formal tests, the effect appears clear: tall forest with large basal areas hold most of the species present locally, regardless of contiguous vegetation types.

Numbers and proportions of bird species shared between mangroves and adjacent vegetation types varied from 1.8% (2 of 47 species, with coastal dunes in Puerto Morelos) to 30.1% (67 of 162 species, with tropical deciduous forest in Dzilám de Bravo, Fig. 10). More species were shared between mangroves and adjacent vegetation when both habitats were well preserved and complex, such as the tropical deciduous forest at Dzilám de Bravo (Arellano-Guillermo 1993), the "Petenes" in Campeche (Gobierno de Campeche 1996), and the tropical semideciduous forest in Marismas Nacionales (Novelo 1978, Ocampo-Cázares et al. 1995). Across the nine localities, the forests that shared more bird species with mangroves were tropical deciduous forest and tropical semideciduous forest (Fig. 10). Palm forest shared fewest of species with mangroves in comparison with other habitats.

The influence of mangrove forest on bird species composition on a regional scale was explored further by comparing the mangrove avifauna at Playa Dos (in northeastern Mexico), with contiguous and not contiguous scrub forest to mangroves (Rancho Los Ebanos, approximately 100 km north of Playa Dos). I found that the two scrub forests shared a high proportion of birds (57 species), and that more bird species were shared between the mangrove and the contiguous scrub forest (23 species) than with the non-contiguous forest (19 species, Fig. 11). However, this difference was constituted principally of aquatic species. For example, *Nyctinassa violacea*, *Ajaia ajaja*, and *Plegadis chihi* were shared with mangrove forest and the non-adjacent forest, but were not found the contiguous scrub forest. These results could suggest that such species could prefer to inhabit mangroves when they are available (Fig. 11).

As mentioned before, in the broader sample of mangrove sites, not all bird species were shared with contiguous habitats; hence, several species were locally restricted to mangroves (Fig. 12). For example, a large number of locally restricted species were present in Marismas Nacionales and Dzilám de Bravo (58 and 48 species, respectively, Fig. 12); however, the percentage of locally restricted species varied enormously across the nine localities, from 5.8% (8 species) in La Mancha to 68% (32) in Puerto Morelos (Fig. 12). In general, Pacific localities (Marismas Nacionales, Aguachil, and La Encrucijada) held large numbers of species restricted locally to mangroves, in comparison with Atlantic slope localities where northern localities held small numbers of locally restricted species.

DISCUSSION

On a regional scale, mangrove forests hold a large proportion of total bird species diversity compared with many other vegetation types. A large proportion of this diversity, however, is shared with other habitats. For example, at Cayo Matías, Cuba, Acosta et al. (1988) found that 51.3% of the lowland avifauna is shared among vegetation types; on San Salvador, Bahamas, Murphy et al. (1998) found that permanent residents composed 40% of species and were spread across all habitats. In this study, I found that up to 85% of the Mexican mangrove avifauna uses other habitats. Hence, species strictly confined to mangrove forests are relatively few in comparison with other habitats. For example, 147 species (43% of resident species) are restricted to cloud forests in Mesoamerica (Hernández-Baños et al. 1995), and 902 (32%) are confined to humid forest in the Neotropics (Stotz et al. 1996). In contrast, for the 38 mangrove forest localities in the New World only four species (*Buteogallus subtilis*, *B. aequinoctialis*, *Amazilia boucardi*, *Cactospiza heliobates*) are restricted to mangroves. Even with the addition of more detailed studies will not significantly increase endemic species composition. For example, in Australia, the region with most bird species restricted to mangroves (8 species strictly restricted, 22 species most common in mangroves; Ford 1982, Johnstone 1990); ecological restriction is still low in comparison with other habitats.

Stotz et al. (1996) listed 34 species as mangrove indicators (Appendix 2), most of which are not restricted, but are most common in the habitat. Several of these species have entire regional populations restricted to mangroves. For example, Pacific populations of *Vireo pallens* are confined to mangroves (Parkes 1991). In Chiapas, Mexico, and El Salvador, populations of *Otus cooperi* are restricted to mangroves (Marshall 1967, Álvarez del Toro 1980). On the other hand, many species on the Stotz et al. (1996) list (e.g. *Ixobrychus exilis*, *Nyctinassa violacea*, *Cochlearius cochlearius*, *Egretta caerulea, Egretta rufescens*) are very common in other habitats. Some species, such as *Nyctinassa violacea* and *Egretta rufescens* are increasingly restricted to mangroves in the southern portions of their distributions (Haverschmidt and Mees 1994).

This phenomena of "locally restricted" species could be explained by the absence of adjacent undisturbed forest. As larger lowland areas are deforested for agricultural purposes, urban development, or tourism in these areas (Saenger et al. 1983, Jiménez 1994, Dinerstein et al. 1995), fewer options remain outside of mangroves; these species might also have ecological requirements that are best fulfilled in mangroves, but populations may be maintained in other habitats, such as with the aquatic species in northeastern Mexico (Playa Dos and Rancho Los Ebanos). The greatest densities of shorebirds, wading birds, and seabirds in coastal habitats occur on mudflats that have adjacent mangrove forests (Butler 1997).

Although the numbers of bird species shared between mangroves and their adjacent habitats are high in the New World mangroves, they are not a unique case. For example, the monsoon rainforest in Kakadu National Park, Australia, has been termed a "cut-and-paste" community (Woinarski 1993) because it is made up of birds from different habitats, whichever happen to be adjacent.

Ford (1982) pointed out that, in some areas, a particular bird species may be restricted to mangroves, whereas in other geographical regions the same species does not occur in mangroves at all, but rather in other types of habitat with closed canopies (in this study, *Aphelocoma coerulescens* is an excellent example). Ford suggested that the degree to which a population is restricted to mangroves is a function of three main factors: (1) proximity of structurally similar habitats, (2) presence of competitors in similar habitats, and (3) selective pressures operating on geographical isolates during climatic cycles in the Pleistocene (when several closed-canopy inhabitants apparently underwent ecological shifts).

Species confined to mangroves in the New World seem not to support Ford's idea of entry via contiguous structurally similar habitats, because current contiguous vegetation in the New World is in general, structurally different and heterogeneous. For example, at La Encrucijada adjacent to mangroves are palm forest, tropical deciduous forest, aquatic vegetation, and dunes; and in this area, the mangrove specialist, *Buteogallus subtilis* is found throughout the mangroves regardless adjacent vegetation. Thus, mangrove forest that possess restricted species are not, and were not, in the New World contiguous to structurally similar habitats.

Ford's second idea on competition has been supported in the Malaysia by observations on *Corvus enca* and *C. macrorhynchus* (Nisbet 1968). In the New World, I observed that individuals of *Dendroica [petechia] erithachorides* an *D. [p]. aestiva* were never found syntopically. Furthermore, some migrant populations (*D. [p]. aestiva*) are not found in mangroves, but at La Mancha, where individuals of *D. [p.] erithachorides* were not present in mangroves, I found several individuals of *D. [p]. aestiva*. These observations suggest possible competition between resident and migrant populations of *D. [petechia]*. Similarly, other species might be confined to mangroves in the New World due to competition, but further research needs to be done.

The idea that species could be confined to mangroves due to selective pressures on geographical isolates during the Pleistocene could be applicable to the New World mangrove avifaunas, because several species that are locally restricted to mangroves have a fragmented distribution. For example, *Conirostrum bicolor* is locally common in mangroves along South American coast, and throughout its distributional range constitute disjunct populations (Ridgely and Tudor 1989). Thus, the model of peripheral isolates could explain *C. bicolor* discontinuous distributions, and its local restriction to mangroves on the Atlantic coast of South America.

In addition to these hypothesis, it has been suggested (Ford 1982) that availability for a special resource could count for restriction to mangroves such as the case of *Amazilia boucardi* which feeds mainly on the flowers of the mangrove *Pellicera rhizophorae*. Similarly, *Buteogallus aequinoctialis* feeds mostly or exclusively on crabs, e.g. *Ulcides cordatus* and *Callinectes bocourti* (Del Hoyo et al. 1994), and *Cactospiza heliobates* apparently feeds exclusively on a species of beetle larvae. Thus, these species could be confined to mangroves because their source of food also are restricted to this habitat.

CONCLUSIONS

In the New World, tall mangrove forest with high basal areas hold most of the species, particularly when it is well preserved.

Several species, principally aquatic and semiaquatic, prefer to inhabit mangroves when they are available, otherwise use vegetation contiguous to bodies of water.

Each of the nine Mexican localities possess species locally restricted, and in general Pacific localities hold a larger number of these species in comparison with Atlantic localities. In addition, some species, such as *Nyctinassa violacea*, and *Egretta rufescens*, further south in their distributions, become more restricted to mangroves. The only species strictly restricted to mangroves in the New World are: *Buteogallus subtilis*, *B. aequinoctalis*, *Amazilia boucardi*, *Cactospiza heliobates*.

Species confined to mangroves in the New World seem not to support Ford's idea of restriction due to contiguous structurally similar habitats, because contiguous vegetation to New World mangroves are in general, structurally different and heterogenous. In contrast, the second Ford's idea has been supported for Malaysia mangrove species, but needs further research for the New World. The idea of peripheral isolates, seems to explain current distribution of restricted species. In addition, some mangrove restricted species appear to have a specialized food that also is confined to mangroves.

CHAPTER 4

MANGROVES AS CRITICAL ROOSTING, FEEDING, AND NESTING HABITAT

The general idea regarding mangrove faunas is that they are not dependent on the mangrove for survival (Stafford-Deitsch 1996). Although some species spend much of their life cycles in mangroves, they do not appear to have to, as the same species often occur in other habitats. Other species may depend on the mangrove only at some stage of their development or only seasonal. Given the transient nature of many mangrove animal populations, zoologist interested in such transients are likely to choose less difficult environments in which to study them (Stafford-Deitsch 1996). However, faunas in areas where mangroves are more extensive than contiguous habitats may depend more on mangroves for survival (e.g., Australia, Johnstone 1990).

Hutchings and Saenger (1987) suggested that for the terrestrial faunas, mangroves provide additional habitat, or serve as corridors between other habitat types, constitute island refuges, provide isolated breeding sites, or may be used as feeding grounds during migratory passage. In actuality, the importance of mangroves for faunas has not yet been documented, and much of their importance to terrestrial faunas remains underappreciated. The goal of this chapter is to provide information showing the ways in which mangroves are important to birds by identifying key natural history features of species that depend on mangroves. These analyses are based on bird's use of mangroves as nesting, feeding, and roosting areas; a particular example focuses on the use of termite nests within mangroves by parrot populations.

ROOSTING

Many birds use mangroves for roosting during the day or night. For example, at La Mancha, La Encrucijada, Petenes de Campeche, and Dzilám de Bravo, *Cairina moschata* was found feeding in open water, but resting inside mangroves. Similarly, scavengers, such as *Coragyps atratus,* were found sleeping during the day in mangroves. At night, many species were observed roosting in mangroves, including *Egretta* spp., *Ardea* spp., *Ajaia ajaja*, *Mycteria americana*, and terrestrial species including *Aratinga* spp., *Amazona* spp., and *Quiscalus mexicanus*.

When bird species were divided by their principal location within the mangroves (interior of the mangroves, terrestrial border, aquatic border, and open water), I found a highly significant non random pattern. Many species inhabit the interior of the mangroves than the border, and more species on the terrestrial side than the aquatic part of the habitat ($\chi^2_{\mathrm{d.f.}=3,}$ $P < 10^{-66}$, Fig. 13). Hence, somewhat surprisingly, most mangrove birds are not just aquatic species visiting or roosting, but terrestrial forest interior species using the habitat.

Proportions of birds in the interior, border, and in open water vary significantly from one locality to another ($\chi^2_{\mathrm{d.f.}=114}$ $P < 10^{-28}$), some localities possessed large numbers of aquatic species (e.g., the Everglades with 74 species), but for other localities there are no aquatic birds (e.g., Chacopata and French Guyana), possibly as consequence of the emphasis on terrestrial species. Regardless of these sampling biases, and even if these localities are not considered for this analysis, more species still use the terrestrial side of the mangrove forest than the aquatic side.

FEEDING STRATA AND HABITS

The typical picture of mangrove birds might be an aquatic bird feeding in open water at the edge of the mangroves. In contrast to this view, principal feeding strata for mangrove birds are shrubs and trees. Species using these strata are much more numerous than those feeding on the ground or in shallow water ($\chi^2_{d.f.=3}$, $P < 10^{-4}$, Fig. 14).

Frequencies of bird species feeding on specific stratum differed from one locality to another ($\chi^2_{d.f.=152}$ $P = 1.15085 \times 10^{-14}$, Fig. 14). This fact is certainly related with the number of aquatic and terrestrial species that inhabit a particular area, if there are more aquatic species in a particular site, then more species will be feeding in open water and on the ground.

Among 39 New World localities included in this study, most mangrove bird species are insectivorous or carnivorous ($\chi^2_{d.f.=228}$ $P=0$, Fig. 15). In localities with large avifaunas, the number of birds species feeding on non-insect invertebrates (e.g., molluscs and spiders) exceeded numbers feeding on other animal sources ($\chi^2_{d.f.=38}$ $P < 10^{-154}$, Fig. 15).

NESTING IN THE MANGROVES

Few bird species nest exclusively in mangroves. For example, for 42 mangrove localities, 35 out of 923 species nest exclusively in mangroves ($\chi^2_{d.f.=76}$, $P < 10^{-38}$, Fig. 16). Of these, 16 and 15 are from Western Australia and southeast Asia, respectively, with one species shared between these regions. In the New World at least five species nest exclusively in mangroves: *Amazilia boucardi*, *A. leucogaster*, *Aramides axillaris*, *Buteogallus aequinoctalis*, and *B. subtilis*. In addition, all resident populations of Mexico and Central America of the *Dendroica* [*petechia*] complex (*D. erithachorides*, sometimes used, Klein and Brown 1994, A.O.U. 1998), and most populations of *Tachycineta albilinea* nest in mangroves (Dyrcz 1984, Robbins et al. 1997).

Owing to deforestation along much of the New World coasts, several bird species that formerly nested in other tropical forest types are found nesting locally exclusively in mangroves. Particularly good examples of this phenomenon that I observed, include several species of parrots: *Aratinga canicularis* in Oaxaca, *Amazona auropalliata* in Chiapas, and *Aratinga strenua* in El Salvador. Thus, mangrove forest could be considered a "refuge" for bird species in areas where the contiguous forest have been destroyed.

Parrot nests are usually in tree hollows or in holes in termitaries, and occasionally in holes in banks or crevices among rocks (Forshaw 1978). Small parakeets in particular depend on the availability of termitaries as nesting sites, which in the lowlands of Mexico and Central America are generally nests of the termite genus *Nasuatermites* (pers. observ.). For these reasons, I analyzed avian use of termitaries for nesting at each study site.

I censused numbers of termitaries and bird nests in the mangroves at seven localities (La Mancha, Puerto Morelos, Marismas Nacionales, Aguachil, La Encrucijada, Jiquilisco, Barra de Santiago), and compared the results with parallel censuses with numbers in tropical deciduous forest at Calakmul Biosphere Reserve (Table 6, Fig. 17). All the same, my results are biased, because I found that at all study sites the local people destroy the termitaries or the tree hollows to obtain the parrots chicks. Similarly, figure 17 appears to show that termitaries of the deciduous forest had more bird nests than those in mangroves, but this may be an artifact of human exploitation of parrot nests in mangroves.

Apparently, avian use of termitaries differs in species composition between tropical deciduous forest and mangroves. At Calakmul, *Amazona xantholora*, *Trogon melanocephalus*, and *Hylomanes momotula* were found nesting in termitaria (pers. observ., Amauri Pérez and Javier Salgado pers. comm.). In the mangroves, on the other hand, *Trogon melanocephalus* was present but was never found nesting in termitaries. *Hylomanes momotula* has not been found in mangroves, but *Amazona xantholora* was observed nesting in termitaries at Dzilám de Bravo. Other species nesting in mangrove terminataries were: *Aratinga canicularis* (Aguachil), *A. strenua* (La Encrucijada, Jiquilisco), *A. nana* (La Mancha, Petenes de Campeche, Dzilám de Bravo), and *Brotogeris jugularis* (La Encrucijada). Few of these birds were found nesting in termitaria in adjacent tropical deciduous and semideciduous forest contiguous with mangroves. But no comparable data were obtained, thus I could not test differences among mangroves and contiguous forests. Furthermore, the results could be also biased due to deforestation and human exploitation of bird nests in termitaries. Thus, in order to test differences in the number of termite and bird nests in mangroves and other habitats, a measure of human impact needs to be obtained.

DISCUSSION

ROOSTING AND PROTECTION

This study showed that most birds in mangroves focus their activities in the interior of the mangrove forests. For some aquatic and semiaquatic species, mangroves are primarily a habitat for roosting. Other investigators have documented similar cases: for example, *Dendrocygna arborea* roost in mangroves during the day and forage at ponds or tidal flats at night (Staus 1998). Thompson and Baldassarre (1991) observed *Anas discors*, *A. clypeata*, *A. acuta*, and *A. americana* using *Rhizophora mangle* in Yucatan, Mexico, as sites for roosting and preening. I observed these species using the mangroves for roosting in La Mancha and La Encrucijada, Mexico. In Guinea-Bissau, Altenburg and Van Spanje (1989) observed large wading birds using mangroves as breeding sites, night roosts, and high-tide roosts.

In the present study, not only wading birds used mangroves for roosting, but also aquatic birds such *Pelecanus occidentalis*, *P. erythrorhynchos*, and *Fregata magnificens*, as well as terrestrial birds such as parrots, migrants, and vultures. For example, I found hundreds, if not thousands, of *Aratinga strenua* roosting overnight in tall mangroves in Estero de Jiquilisco, El Salvador. These parrots dispersed during·the day to surrounding areas. At La Encrucijada, tens of *Amazona* parrots were hidden in the understory of tall mangroves forest. Omaston (1906) also reported thousands of *Psittacula eupatria magnirostris* and *P. alexandri fasciatus* roosting in the mangroves of the Andaman Islands from all points. Similarly, Warketin and Morton (1995) reported single individuals and groups of *Protonotaria citrea* roosting in the mangroves at night, and foraging during the day in adjacent vegetation types.

During tropical storms and periods of high winds most aquatic birds use mangroves as a shelter. For example, during a "northern" at La Mancha, Veracruz, I observed several species of *Larus* spp. as well as *Pelecanus occidentalis*, *P. erythrorhynchos* and *Phalacrocorax brasilianus* flying into the mangroves before the high winds arrived.

FEEDING

Comparing aquatic and terrestrial birds, the two show marked differences in feeding habits and feeding strata. Aquatic birds feed mostly off of aquatic vegetation, invertebrates, and fish on the wet border and in open water within the mangroves. In contrast, most terrestrial land birds feed on insects and other small invertebrates within the mangroves.

In general, it is clear that most mangrove birds feed on animal sources, because the tree species do not bear fruits edible to birds (Altenburg and Van Spanje 1989). Similarly, Lefebvre et al. (1992a, 1994) showed that most birds in Venezuelan mangroves, were generalists feeding on varied invertebrate and plant taxa. Noske (1995) also mentioned that mangrove birds in Malaysia have generalized foraging niches. These patterns may have evolved in response to fluctuations in food availability and the peculiar dynamics of mangrove communities.

Nectarivores living in mangroves appear to be mostly facultative, and not restricted to the habitat. For example, most hummingbirds that I observed in mangroves in Mexico and Central America were feeding on ants and other small insects. Noske (1995), however, mentioned that two species of sunbirds (*Anthreptes malacensis* and *Nectarinia calcostetha*) spent 70% of their time probing flowers (*Bruguiera* spp.) for nectar, and may play an important role in the pollination of Malaysian mangroves. In Costa Rica, *Amazilia boucardi* feeds principally on the flowers of *Pelliciera rhizophorae* (Jiménez 1994). However, information is insufficient to support the idea of its being the principal pollinator of this mangrove, nor to speak to the extent and importance of this phenomenon for either the tree or the hummingbird. Other species completely restricted to mangroves, such as *Cactospiza heliobates* is believed to feed on a specific mangrove insect larvae (Grant and Grant 1997).

NESTING

At least 131 have been documented to breed in the New World mangroves. However, this number is conservative, because I could not spend the breeding season in all the study sites.

One general result of my work is that most of the birds do not nest exclusively in mangroves. However, a large number prefer mangroves that the adjacent vegetation (e.g., Curnutt and Robertson 1994). Furthermore, several species nest exclusively in mangroves in Central and South America, but nest in other habitats in northern Mexico and the United States. For example, *Columba leucocephala* nests exclusively in mangroves across much of its distribution, particularly in Cozumel (Macouzet-Fuentes 1997), but enters tropical deciduous forest in Florida (Strong and Bancroft 1994). Other examples include: (1) *Anhinga anhinga* (American Ornithologist's Union 1998); (2) *Mycteria americana* (González 1999); (3) *Myiarchus tyrannulus* (Harvershmidt and Mees 1994, Howell and Webb 1995); (4) *Progne chalybea* (pers. obs.), (5) *Busarellus nigricollis* (Haveshmidt and Mees 1994). Hence, even though most birds do not nest only in mangrove forest, appear to constitute a critical substrate for nesting for a broad diversity of bird species.

An interesting aspect of the natural history of some terrestrial species, in particular parrots, are tied to the presence of termitaria. For example, *Aratinga canicularis* nests principally in termitaria of *Nasutermites nigripes* (Forshaw 1981). In addition to the species that I observed nesting in termitaria (*Amazona xantholora, Aratinga canicularis*, *Aratinga strenua*, *Aratinga nana*, *Brotogeris jugularis,* and probably *Trogon melanocephalus*), Haverschmidt and Mees (1994) mentioned for South America *Forpus passerinus*, *Trogon viridis*, and *Galbula ruficauda*. In Australia, *Agapornis pullaria* (Eberhard 1998) and *Psephotus dissimilis* (Reed and Tidemann 1994), have been reported as nesting in termitaries.

An important impulse for nesting or roosting in a variable regularly inundated environment such as mangroves appears to be predation. For example, between inundations, the ground dries considerably in black mangrove (*Avicennia*) forests, so that they become accessible to ground predators. In the red mangrove (*Rhizophora*) forests, however, nests are well protected, because of its dense shade and roots continuously submerged in water or deep mud (Cawkell 1964). In the Everglades, snakes accounted for 23% of nest failures of *Eudocimus albus*, *Ardea alba*, *Egretta tricolor*, *E. caerulea,* and *E. thula*; mammal predators accounted for an additional 20%, and 57% of nest failures were unidentifiable. Visitation by mammals to colonies occurred only when the water surrounding them receded (Frederick and Collopy 1989).

CONCLUSIONS

Bird species inhabiting mangroves use the interior or the terrestrial border to feed and roost. Most mangrove birds are carnivorous (insects, other invertebrates, vertebrates), and feed in vegetative strata, but most do not nest in mangroves. Although many species nest regularly in the habitat (e.g. herons, parrots, frigatebirds, etc.), only five species in the New World are known to nest only in mangroves: *Amazilia boucardi*, *Amazilia leucogaster*, *Aramides axillaris*, *Buteogallus aequinoctalis*, and *Buteogallus subtilis*. Termitaries in mangroves are nesting sites for parakeets and parrots, even though do not nest exclusively in this habitat. Mangroves apparently represent areas especially well protected from non-human predation.

CHAPTER 5

BIOGEOGRAPHIC ANALYSIS OF MANGROVE AVIFAUNAS

Ford (1982) and Schodde et al. (1982) suggested that Australian mangrove specialist birds evolved from rain forest species. According to their scenario, isolated stands of mangroves in northwestern Australia served as refuges for dwindling stocks of formerly widespread rainforest species. As the mangrove areas in the northwest became patchy, many opportunities for isolation of populations arose leading to speciation. In contrast, mangroves areas in northeastern Australia were accompanied by large tracts of rainforest throughout the Pleistocene. As there was continual interchange of birds between the two environments, speciation did not occur. By this mechanism, these authors proposed an explanation for the disparate numbers of mangrove endemics in the two regions.

Ford (1982) also suggested that specialization to mangrove has occurred in response to particular food types not found elsewhere in closed-canopy habitats, and through association with the structure and microclimate of mangroves (a warm mesic habitat with good overhead cover for concealment and protection).

However, several of these conditions are not present the New World mangroves. For example, mangrove contiguous vegetation types differ and differed during the Pleistocene between Australia and the New World. Thus, factors leading birds to specialize on mangroves might be different or fewer than in Australia. In this chapter, I discuss the provenance of mangrove bird species. Because phylogenetic information for the critical group is preliminary, sketchy or lacking, geographic and ecological distributions of species and potential sister taxa are used to develop historical hypotheses for their derivation.

NEW WORLD MANGROVE BIRDS

Bird species completely restricted to mangroves in the New World include three mainland species, *Buteogallus subtilis*, *B. aequinoctialis*, *Amazilia boucardi*, and one island species *Cactospiza heliobates*. Several additional species are restricted to mangroves across much of their distributions, including *Aramides mangle, A. wolfi*, *Conirostrum bicolor*, and *Dendroica [petechia] erithachorides*. Comparing geographic distributions of these species and likely sister species shows, that all sister species have wider geographic and ecological ranges (Figs. 18-23). A tentative conclusion, then would be that New World mangrove species originated by invasion of mangroves from adjacent terrestrial habitats. The following is a brief review for each species, developing the reasoning and the available evidence.

Buteogallus.– This genus includes at least five species: *B. aequinoctialis*, *B. anthracinus*, *B. subtilis*, *B. urubitinga*, and *B. meridionalis* (Del Hoyo et al. 1994). Older sources and few recent authors subsume *B. subtilis* in *B. anthracinus* (e.g., Howell and Webb 1995). Whereas others suggest a sister species relationship (e.g., Monroe 1968, Blake 1977). Still others include *B. aequinoctialis*, *B. anthracinus*, and *B. subtilis* within a superspecies (Amadon 1961, AOU 1998). Morphologically, *B. subtilis*, *B. anthracinus* and *B. urubitinga* differ from the other two members of the genus by being black with a broad tail band, and having the base of the bill conspicuously yellow. At present, no evidence is available to distinguish between these hypothesis; however, because the geographic distributions of the mangrove specialists (*B. subtilis* and *B. aequinoctialis*) are restricted in comparison with their generalist sister species (Figs. 13-14), it seems likely that both species originated by invasion of the coast by inland species. Other *Buteogallus* species (*B. meridionalis*) inhabit inland forest as well.

Amazilia boucardi.– Based on morphological, ecological, and behavioral characters, Ornelas-Rodríguez (1995) identified as the sister species of *A*. boucardi, *A. franciae*. Both species shared the following characteristics: widened based, maxilla red with black tip, glittering blue on throat, blue crown, and are sexually dichromatic. The sister species to *A. boucardi-A. franciae* is formed by *A. leucogaster* - *A. chionopectus* clade (Ornelas-Rodríguez 1995, Fig. 19).

The three closest relatives to *A. boucardi* have greater distributional areas and habitat breaths, in comparison with *A. boucardi* (Fig. 19), and none is found in sympatry with it. Its presumed sister species, *A. franciae*, is found at middle and high elevations (1000-2000 m) in the Andes (Hilty and Brown 1986). This geographic and ecological situation suggest that their ancestor had a wider range, but no possible inferences can be made respect if *A. boucardi* originated *in situ*, or if its provenance was from another habitat.

Interestingly, the same reasoning can be applied to the other mangrove hummingbird, *A. leucogaster* whose presumed sister species (*A. chionopectus*) has greater geographic distribution in lowland forests (Meyer and Phelps 1995). Suggesting that the origin of this species could have occurred in the mangroves or in the contiguous vegetation, with subsequent invaded to the mangroves.

Cactospiza heliobates.– According to Lack (1961) and by the fact that *C*. heliobates and *C. pallidus* are the sole members of the genus *Cactospiza*, another insectivorous tree-finch, they are presumed to be sister taxa. More recently, two studies have discussed the systematics of these finches using molecular characters (Yang and Patton 1981, and Stern and Grant 1996). In both papers, *Cactospiza* and *Platyspiza* were identified as sister genera. However, *Cactospiza heliobates* was not considered in either analysis, and hence, no sister species was identified. For this preliminary analysis, I thus considered *C. heliobates* and *C. pallidus* as sister species, and their closest relative as *Platyspiza crassirostris. Cactospiza heliobates* is distributed sympatrically with *C. pallidus* and *P. crassirostris* on Isla Isabela (Fig.20). These two species ocuppy greater distributional areas and use mangroves, transitional forest, and humid forests for reproduction (Lack 1961). It can thus be suggested that *C. heliobates* originated from more broadly distributed form and subsequently become specialized on mangroves.

Dendroica petechia.– Based on morphological characters, Browning (1994) divided *D. petechia* in three groups: *aestiva* (migratory, breeding in the Nearctic), *erithachorides* (resident of both coasts of Middle America and northern South America), and *petechia* (resident of West Indies). Klein and Brown's study (1994) showed that (*Dendroica* [*petechia*] *erithachorides*) and (*D.* [*petechia*] *aestiva*) have diverged sufficiently to be considered as distinct species, as they were previously considered (Hellmayr 1935a). Furthermore, Klein and Brown (1994) showed that the *petechia* group is polyphyletic, being derived from within either *aestiva* or *erithachorides*.

Under Browning (1994) results, populations of *Dendroica* [*petechia*] *erithachorides*, *D.* [*p.*] *aestiva, and D.* [*p.*] *petechia* are part of the same species, then no mangrove specialization has occurred. However, by considering *D. erithachorides* and *D. aestiva* as species; then continental populations of *D. erithachorides* are confined to mangrove, whereas island forms used different habitats. The sister species, *D. aestiva* uses a large variety of habitats. These results suggest that continental populations of *D. erithachorides* were derived from a form that occupied a wide range of habitats (Fig. 21).

Aramides mangle.– Knowledge of *Aramides mangle* and *A. wolfi* is minimal (Del Hoyo et al. 1994). However, both are known to be more common in mangrove forest than in any other habitat (Del Hoyo et al. 1994). Based on features of plumage and voice (Del Hoyo et al. 1994), they are likely to be closely related to *A. cajanea* and *A. ypecaha*. If these four species form a clade, with other *Aramides* species as a sister taxa, the mangrove specialists would have been derived from an ecologically more diverse non-habitat-restricted species (Fig. 22).

Conirostrum bicolor.– This species is restricted to mangroves on the Atlantic coast of South America (Ridgely and Tudor 1989). However, small populations are also found along the Amazon River, where this species is considered a rare obligate river-island dweller (Rosenberg 1990, Fig. 23).

Ridgely and Tudor (1989) mentioned that the species *conirostrum*, *margaritae*, *speciosum*, and *leucogenys* constitute the subgenus *Ateleodacnis*, distinct from the montane *Conirostrum* group, perhaps deserving the rank of genus. In addition, some individuals of *C. bicolor* possess underparts washed with pale buff (Hellmayr 1935a) as *C. margaritae* suggesting that these species could be sister taxa (Fig. 23). Phylogenetic studies are urgently needed to clarify relationships within this group. However, in view of the distribution of *C. bicolor*, and assuming that *C. margaritae* and *C. conirostrum* are sister species, the reconstruction of their ancestral species distribution is difficult, because both are disjunct.

DISCUSSION

Two general classes of hypotheses could explain the origins of mangrove species: ecological and historical. The ecological explanations have been supported by Nisbet (1967), who observed that species most specialized for life in mangroves are replaced in inland areas by potential competitor species. For example, in Borneo, *Corvus enca* occupies semi-open country inland where; the only other species, *C. macrorhynchus*, is extremely rare. In Malaysia, however, *C. macrorhynchus* is common in all types of open country, and *C. enca* is a scarce and little-known, seeming most numerous in mangroves, although older books describe it as a forest bird (Nisbet 1967). Hence, Nisbet (1967) argued that competitive displacement of species to mangroves by their competitors constitutes a mechanism for the origin of the specialized mangrove species. This explanation might apply to those species not restricted to mangroves in other parts of their range.

The historical hypothesis suggests that birds specialized on mangroves in Australia became dependent on mangroves as rainforest and monsoonal forests retracted during past arid periods Ford (1980).

For the New World mangrove birds, the ecological and historical hypothesis seem to be complementary instead of being opposed. For example, three of four strictly restricted species to mangroves are found in the Pacific coasts (*Buteogallus subtilis*, *Amazilia boucardi,* and *Cactospiza heliobates*), where seasonality is more extreme than the Atlantic.Thus, mangrove specialists could be forced to use mangroves, and simultaneously they could also be forced, by competition, to exploit a specific source of food.

Distributional information about species restricted to mangroves shows that mangrove specialists were derived from taxa widely distributed that used different habitats, thus supporting the historical hypothesis.

CONCLUSIONS

Right now, and based on distributional data and systematic knowledge of species restricted to mangroves in America, it seems that the idea of their origins came from widely distributed and unspecialized species, but *Amazilia boucardi*, and they could have become restricted to mangroves due to competition, mainly for food.

CHAPTER 6

CONSERVATION AND MANGROVES

Latin America and the Caribbean contain some of the most critically threatened areas in the world (Dinerstein et al. 1995, Stotz et al. 1996). In this region, resides a large portion of world biodiversity - 3 751 of 10, 000 species of birds -(Stotz et al. 1996). Because of the expanding human populations, not all the remaining habitat can be protected due to human necessities; thus, scientists and conservationists have made first attempts to prioritize habitats and sites for protection.

In Latin America and the Caribbean, a rough prioritization was done by Dinerstein et al. (1995), who divided the region's habitats in five major groups: tropical broadleaf forests, temperate broadleaf coniferous forests, grasslands/savannas/shrublands, xeric formations, and mangroves. Tropical broadleaf forest had the greatest area (8, 214, 285 km^2, 38% of total continental area), and mangroves the least (40 623 km^2, 0.2%). Thus, mangrove forest, being less extensive than other habitats, limited to the tropical and subtropical zones (Dinerstein et al. 1995), and coupled with a rate of reduction exceeding 1% per year in many countries (Robertson 1992), is clearly under high threat.

Even though mangroves were considered a keystone ecosystem, no attempt was made to rank its importance in Latin America by importance. The reasoning was that mangroves throughout the region share a high proportion of species, and have similar levels of alpha-diversity and low levels of endemism (Dinerstein et al. 1995). However, because no region wide review of patterns of diversity was previously available, no further refinement of the need for conservation action was possible. Here, I attempt to produce a preliminary prioritization of New World mangroves by comparing the current coastal protected areas with patterns of endemism and species richness in birds.

PROTECTED AREAS

At least 600 protected areas exist along the coast of the New World. Of these, approximately 210 are found within the distribution of mangroves (World Conservation Monitoring Centre 1999, Fig. 24, Table 7). For some countries, the list of coastal protected areas needs to be divided into which ones possess mangroves or other coastal habitats. For example, in Mexico only eight protected areas include mangroves (Chamela-Cuixmala, Laguna de Términos, Pantanos de Centla, Ría Celestún, Ría Lagartos, Sian Ka'an, Uaymil, Yum Balam, and La Encrucijada, Fig.25). In addition, about 70 areas on the Mexican coast have been designated as priority areas for protection ("proposed", even some of them are already national parks, e.g., Lagunas de Chacahua) based on environmental criteria (e.g., ecological integrity, endemism, species richness, oceanic processes, etc.), economic criteria (e.g., commercially important species, fishing, tourism, natural resources, etc.), and threatened (e.g., pollution, environmental modifications, distance effects, introduced species; Comisión Nacional para el Conocimiento y Uso de la Biodiversidad 1999). Only 40 of these 70 proposed areas possess mangroves, suggesting that the number of currently protected areas in New World mangroves is likely to be less than 100.

MANGROVE CONSERVATION PRIORITIES

Comparing figures 3, 5, and 6, endemism and species richness are concentrated in subtropical areas, principally on the Pacific slope region, where few areas are protected. In Mexico, only La Encrucijada is protected, but at least two proposed areas need to be protected: Marismas Nacionales and Aguachil (Fig. 25). The Pacific coast of South America and northeastern Brazil are the regions with the fewest protected areas in the New World (Fig. 24). However, comparing species richness and endemism in mangroves between these regions, Pacific South America is richer. In addition, it possesses species that are highly threatened (e.g., *Cactospiza heliobates*). The bird species observed in the New World mangroves and categorized as threaten are: *Amazilia boucardi*, *Amazona ochrocephala*, *Amazona viridiginalis*, *Amazonetta brasiliensis*, *Cactospiza heliobates*, *Carpodectes antoniae*, *Geothypis flavovelata*, and *Todirostrum viridanum* (World Conservation Monitoring Centre 1999).

DISCUSSION

The mangrove habitat, limited as it is (0.2% of the New World) is facing major threat of destruction by man. Noske (1995) mentioned that mangroves have almost completely disappeared from much of the Malaysian peninsula owing to land reclamation. Similar processes are affecting New World mangroves. Thus mangrove distribution is becoming more restricted and highly fragmented. Most regions, in particular the Pacific arid slope of Mesoamerica that is rich in species and endemisms, have few protected areas and urgently need protection.

Not only the mangrove forest *per se* its under risk, but also the organisms that inhabit it. For example, one of the most spectacular mangrove views is the herons and other wading birds nesting and feeding there. However, reductions in numbers of individuals of species are becoming apparent: in the southern Everglades, waders have dropped in numbers from 30, 000 birds in the 1930s to 10,000 - 15,000 in the 1990s (Ogden 1999). Unfortunately, no similar data are available for other mangrove areas, and no such data exist for terrestrial mangrove avifaunas.

Threatened species inhabiting New World mangroves represent only 1.83% of the total mangrove avifauna. However, when this number is compared with the numbers of threatened species in other habitats, it ranks fifth. It follows evergreen montane forest of the northern Andes (41 species), evergreen lowland forest of the

Atlantic Forest (38), grasslands of central South America (17), and evergreen montane forest of the Central Andes (15, Stotz et al. 1996). In addition, it is possible that rarer species may have been missed due to the brevity of the studies, and given that many sites were included based on records in the scientific literature.

In general mangrove fauna is still poorly known, and new approaches need to be done to protect mangrove forest, and its associated fauna.

CONCLUSIONS

In the New World exist around 210 protected and priority coastal areas within mangrove distribution. Among mangrove regions for birds, the Pacific slope, particularly the Pacific of South America, needs to be protected, not only because of richness and endemism, but also because it possesses several threatened species.

MAJOR GAPS IN MANGROVE AVIFAUNA KNOWLEDGE

The goal of this study was to summarize the bird faunas of New World mangroves. General information on the birds of mangroves is still sketchy, particularly, regarding the natural history of mangrove specialists. Now having assembled what I believed to be the great majority of existing information on the birds of the habitat, I am able to identify four aspects of mangrove avifaunas in the New World that are in particular need of further study: (1) factors that determine avian species richness, (2) factors that determine locally restricted and strictly restricted species, (3) an evaluation of human impact on parrots and their nesting areas in mangroves, and (4) systematic studies of bird mangrove specialists and their allies.

Among factors that could determine species richness, forest stature and invertebrate availability as food source appear positively related with bird species richness. However, many other potential factors, such as salinity, soil composition, geomorphology, competition, and detritus composition were not discussed here for lack of information. Nonetheless, these phenomena could also explain bird species richness, and are certainly worthy of exploration. Similarly, levels of human disturbance and their effects on species richness needs to be assessed. Some bird species are locally restricted to mangroves, but no study has focused on this phenomenon; of particular interest is whether competition, food availability, and/or historical distribution are linked to this phenomenon.

It is known that small parrots such as *Aratinga canicularis* nest mainly in termitaries, and that termitaries are common in mangroves. However, it is not known if nesting in termitaries is related to nest success, perhaps compared with nests in tree hollows. Furthermore, the impacts of human predation (for pets) of parrots nesting in termitaries and tree hollows in mangroves and non-mangrove habitats are.

Based on geographic and ecological distributions of bird species restricted to mangroves and their sister species, I concluded that ancestors of specialized mangrove birds have wider geographic and ecological distributions. However, detailed phylogenetic hypotheses of these groups are lacking. Such information would make possible assessment of factors that led to mangrove specialization on evolutionary time scales.

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APPENDICES

Appendix 1. List of mangrove localities cited in this paper, with their major vegetational characteristics.

Aguachil.– This coastal site is on the southwestern portion of the Isthmus of Tehuantepec near San Francisco Ixhuatán, Oaxaca, Mexico (16^0 11' N 94^0 31' W). Three major vegetation types are present in this area: short mangrove mixed with cacti, thorn scrub, and tropical deciduous forest.

Australia.– Most of the information came from the northwestern portion of the island. Johnstone (1990) conducted surveys in the region along the coast from Black Cliff Point (15^0 02' S 128^0 06' E) to Little Lagoon (25^0 54' S 113^0 32' E). In this region, there is a reduction in the number of mangrove trees from north to south. The most diverse mangals (mangrove forest) in Australia occur along north-west Kimberley (Johnstone 1990). Other adjacent vegetation are monsoonal, tropical rain forest, and moist forest.

Barra de Santiago.– This locality is situated on the northern coast of El Salvador, close to the Guatemalan border (13^0 41' N 90^0 1' W). It is an area protected by the Salvadoran government that contains the best mangrove stand in the country. Specific sites within this area are Colegio de las Aves (13^0 40' N 89^0 58' W), Boca del Mar (13^0 41' N 90^0 1' W), and Las Morenas (13^0 43' N 90^0 0' W). The principal vegetation is mangrove dominated by *Rhizophora mangle,* surrounded by secondary vegetation, mainly coconut plantations.

Calakmul.– Calakmul Biosphere Reserve is located southeast of Campeche City, Mexico (ca. 17^0 50' - 19^0 25' N 89^0 - 90^0 30' W). Termite nest data were recorded for seven sites (18^0 19' N 89^0 51' W,18^0 18' N 89^0 51' W, 18^0 14'

N 89^0 48' W, 18^0 7' N 89^0 49' W, 18^0 33' N 89^0 54' W, 18^0 33' N 89^0 53', 18^0 36' N 89^0 52' W), mainly on tropical deciduous forest. Tropical deciduous forest, scrub forest, and tropical evergreen forest are also found in the region.

Cariaco, Muelle de.– This locality is on the south shores of Gulf of Cariaco, Venezuela (10^0 29' N 63^0 45' W). Bird records came from a monospecific stand of black mangrove (*Avicennia germinans*) surrounded by arid vegetation (Lefebvre et al. 1994).

Cayapas-Mataje, Reserva Ecológica.– This site is located in the coastal plain of northern Esmeraldas, which is the northernmost province of Ecuador, near the border with Colombia. The site embraces Río Cayapas (1^0 13' N 79^0 03 W). Here, mangroves are surrounded by flooded tropical forest, and can be reached only by canoe.

Cayo Matías.– This site is located in the archipelago of Canarreos near Punta del Este, Isla Juventud, Cuba (82^0 14'N 21^0 2' W). This cay holds mangroves, dry scrub, and coastal vegetation (Acosta et al. 1988).

Chacopata.– This locality is situated in a coastal lagoon in Venezuela (10^0 41' N 63^0 47' W). Similar to Cariaco and Chiguana, the mangrove forest is isolated from other types of vegetation by extensive mudflats and savannas (Lefebvre et al. 1994).

Chiguana.– This inland site is located on the northern shores of the Gulf of Cariaco, Venezuela (10^0 29' N 63^0 45' W). It is located 100-400 m from dry terrestrial vegetation (Lefebvre et al. 1994).

Cozumel, Island.–This island is located at the northeastern extreme of the Yucatan Peninsula, Mexico. Observations were focused at Laguna Colombia (20^0 17' N and 87^0 1', Macouzet 1997). The area holds four major vegetation types:

evergreen forest, tropical deciduous forest, mangrove forest, and tasistal, a type of palm forest.

Dzilám de Bravo.– This reserve is located at the northern extreme of the Yucatan Peninsula (20^0 21' - 20^0 41' N and 88^0 15' - 88^0 59' W), in Mexico. I worked mainly near Rancho Sinkehuel (21^0 28' N and 88^0 35' W). Additional data were gathered at Bocas de Dzilám by Arellano-Guillermo and Serrano-Islas (1993, 21^0 27' N and 88^0 42' W). Mangroves surrounded by arid scrub, secondary vegetation, coastal dunes, and tropical deciduous forest.

Encrucijada, La.– The biosphere reserve La Encrucijada, Chiapas, Mexico, is located at 15^0 00' and 15^0 18' N and 92^0 33' and 92^0 55' W. It holds the most extensive stand of mangroves in Mexico (136, 000 ha), with some trees reaching 35 m tall (Flores-Verdugo et al. 1992, Ocampo-Cázares 1995). In addition to mangroves, palm forest, tropical evergreen forest, aquatic vegetation, zapotal, and dunes are also present.

Everglades.– This locality is the largest remaining subtropical wilderness in the United States. It is situated in southern Florida (ca. 25^0 51' - 25^0 53' N 80^0 24'- 80^0 35' W), where fresh and salt water, open saw grass prairie, mangrove, and pine forest can be found. Raised wooded islands called hammocks and forested with hardwoods.

Florida Keys.– This area in located is southern Florida, USA, and embraces three refuges: National Key Deer Refuge, Great White Heron Refuge, Dry Tortugas, and Key West Refuge (ca. 24^0 24' - 24^0 36' N and 81^0 9'- 81^0 49' W). A variety of tropical and subtropical vegetation on the higher interiors of the keys is ringed by red and black mangroves.

French Guyana.– Bird records mainly came from southeast of Cayenne, French Guyana, on the banks of the Kaw River (ca. 4^0 54' - 4^0 29' N and 52^0 9'- 51^0 56' W). Three types of mangrove forest are present: palm swamp forest with mixture of some mangrove trees, mature mangrove forest, and young coastal mangrove. Adjacent to mangrove forest are coastal marshes, savannas, and coastal forest (Tostain 1986, Jullien and Thiollay 1996).

Galapagos, Ecuador.– This archipelago lies in the eastern Pacific, 966 kilometers from the inland Ecuador and 1609 kilometers from Panama. The only adjacent islands are Isla Cocos and Isla Rock Malpelo. The islands are volcanic in origin, and volcanic activity still occurs on some of them. The area is considered as a national park by the Ecuadorean government (0^0 36' S and 91^0 04' W). It holds dense scrub, thorn scrub, mangrove, and humid forest (Lack 1961). The species list was taken from the south-eastern coast of Isla Isabela (Devorak et al. 1997).

Galeta, Panama.– This locality is on the Caribbean coast of central Panama (9^0 20' N 79^0 09' W), and embrace a mangrove basin forest characterized by a ground cover of pneumatophores, sparsely distributed understory, and large widely spaced trees of varying sizes reaching 12-14 m in height (Lefebvre and Poulin 1997). No information on other vegetation type in the area was available.

Gambia.– The coast and creeks of this African country (ca. 13^0 25' - 13^0 28' N 15^0 16'- 16^0 0' W) carry large areas of two species of mangroves: *Avicennia* and *Rhizophora* (Cawkell 1964).

Golfito.– This site is a refuge on the northern side of the Golfo Dulce (8^0 38' N 83^0 04' W). Present are mangroves (in poor state) to the north of the town, and steeply sloping forests behind (Wege and Long 1995, Taylor 1993).

Guanaja.-This is the easternmost of the Bay Islands on the Caribbean coast of Honduras (ca.16^0 28' N 85^0 54' W, Monroe 1968). No additional data for vegetation types were available.

Guanabara.- This study site embraces all the Guanabara Bay, located in the southeastern coast of Brazil (22^0 40'-22^0 52' S 42^0 55'-43^0 15'W). Mangrove forest is well preserved along the rivers Guapi, Guaraí, Cacerebu and Guaxindiba. However, mangroves are surrounded mainly by urbanized areas and small fragments of secondary vegetation (Alves et al. 1997, Araújo et al. 1979).

Hope.– This locality is in Guyana, in the east Demerara District (6^0 45' N 57^0 57'W). Mangroves have been partially deforested for shrimp farming and tourism; no additional data for vegetation types were available.

Jesús María River.– This river is located northern to Tivives, Puntarenas, Costa Rica (9^0 52' N 84^0 42' W), and bird observations were taken in and adjacent to coastal mangrove forest at the mouth of the Jesús María River. In this area, there is a large stand of black mangrove (*Avicennia germinans*), which lines the inland edge of this mangrove forest. Adjacent to mangrove forest is dry-second growth forest (Warketin and Hernández 1995).

Jiquilisco.– Bahía de Jiquilisco is located on the coast of El Salvador. In this area, *Rhizophora mangle* is de dominant tree species, however, some stands of *Laguncularia racemosa* are also present. Specific observational points were El Cañón del Espino (13^0 10' N and 88^0 18' W), and El Rión (13^0 14' N and 88^0 22' W). Plantations and human buildings surround the mangrove forest in this area.

Juan Díaz, Panama.– This locality is on the Pacific coast of central Panama (9^0 0' N and 79^0 4' W). As at Galeta, the type of vegetation is mangrove basin forest made up of black, red, and white mangroves, among other tree species (Lefebvre and Poulin 1997).

Malaysia.– The studies were conducted in different sites of the Malaysian Peninsula; however specific localities for mangroves sites were not given in Nisbet (1968). Noske (1995) mentioned four localities in his work (Tanjung Keramat, South Banjar, Kapar North and Kapar South). The most conspicuous trees in the mangroves of this Asian region are *Avicennia* and *Sonneratia*. Probably the most important trees in this region for nesting birds are *Sonneratia*, by their height (Nisbet 1968). No further information is available for adjacent vegetation types.

Mancha, La.– This site is located in the coastal plain of the eastern Mexico, in Veracruz, Mexico (19^0 22' N 96^0 22' W). Seven habitats occur in the vicinity of La Mancha lagoon: mangrove, semideciduous tropical forest, dune, grassland, salt aquatic area, and tropical deciduous forest (Ortíz-Pulido et al. 1994).

Maracaibo.– This study site is located in the Ana María Campos Peninsula, on the eastern coast of Lago de Maracaibo, Venezuela (10^0 48' N 71^0 32' W). This mangrove is in an urban setting, surrounded on the north by the petrochemical complex El Tablazo, to the east, and south by two towns (El Hornito y Puerto de Altagracia). The only adjacent vegetation to the mangroves is savanna (Casler and Esté 1996).

Margarita Island (Isla Santa Margarita).– This locality is situated in southern Baja California, Mexico (24^0 29' N 111^0 48' W). Short mangroves with less than 3 m high, and dry tropical scrub are the major vegetation types. Mangroves are distributed in small areas (ca. 1 ha), forming a strip only about 3 m wide (A. T. Peterson pers. com.).

Marismas Nacionales.– This site is located on the northwestern coast of Mexico, and possesses the second largest stand of mangrove trees in Mexico. Specific sites within the study area were: Estero del Yugo (23^0 18' N and 106^0 28' W), Estero Tecualilla -Teacapán (22^0 32' N 105^0 44' W), El Novillero (22^0 21' N 105^0 38' W), Mayorquín (21^0 55' N 105^0 33' W), and San Blas (21^0 32' N 105^0 17' W). Adjacent to mangroves are tropical semideciduous forest, tropical deciduous forest, coastal dunes, and palm forests, but principally secondary vegetation.

Omoa.– This site is a seaport on the Caribbean coast 12 km SW of Puerto Cortés, Honduras (15^0 43' N 88^0 2' W, Monroe 1968). No additional information on vegetation types was available.

Ovenwargt.– This locality is west to Berbice District in Guyana (6^0 27' N and 57^0 38' W), and is surrounded by mangrove forest and secondary vegetation. No further information is available.

Pará.– The study site was located between two municipalities: Vigia and São Caetano de Odivelas, Brazil (ca. 1^0 0' S and 97^0 47' W). The landscape is a mosaic of savannas, body waters, and mangroves (Novaes and Lima 1992).

Playa Dos.– This locality is situated in southeastern Tamaulipas, Mexico (from 23^0 0' N and 97^0 46' W), and four types of vegetation can be found in the vicinity: short mangroves (mainly *Conocarpus* and *Avicennia*), tropical deciduous forest, scrub, and coastal dunes.

Petenes, Los.– This area is located on the Yucatan Peninsula, in Campeche, Mexico. Surveys were focused in three localities: Estación Hampolol (19^0 56' N and 90^0 24' W), 16 km E of Isla Jaina (20^0 13' N and 90^0 19' W), and El Remate (20^0 32' N and 90^0 22' W). Four habitats are found in this area: mangrove forest, petenes, tropical semideciduous forest, and aquatic vegetation (Gobierno del Estado de Campeche 1996).

Puerto Morelos.– Surveys were made on the border of the botanical garden "Dr. Alfredo Barrera Marín", 34 km south of Cancún, Quintana Roo, Mexico (20^0 50' N 86^0 54' W). Dominant vegetation types in this area are tropical semideciduous forest, coastal dunes, and mangrove.

Rancho Los Ebanos.– This locality is situated at about 22° 10' - 22° 23' N 97° 12' - 98° 06' W in the Municipio de Matamoros, Tamaulipas, in northeastern Mexico. Landscape is dominated by scrub, halophyte vegetation, and grasslands (no mangroves), dominate the landscape.

Roatán.– This is the largest of the Bay Islands, on the Caribbean slope of Honduras. The principal town in the island is also named Roatán (16^0 18' N 86^0 35' W). Small fragments of mangroves are found in this island (Monroe 1968). No additional information on vegetation types were available.

San Lorenzo.– This locality is on the Pacific side of Honduras in the Bay of Fonseca 13 km SSE of Nacaome (13^0 25' N; 87^0 27' W, Monroe 1968). Mangrove patches are surrounded by coastal dunes and aquatic grass, but mainly by disturbed areas.

Santos-Cubãtao.– This locality is on the southeastern coast of Brazil (ca. 23^0 53' S 46^0 25' W) and is surrounded by marshlands and wetlands with dispersed shrubs. The original terrestrial vegetation has been deforested, and banana plantations currently dominate (Luederwalt 1919).

Surinam.– Harvershmidt (1965), and Harvershmidt and Mees (1994) surveyed the coastline of this South American country at 54^0-57^0 0' W 6^0 0' N. Much of the coast lined with mangroves, and some sandy beaches. No specific localities were mentioned nor were additional data on adjacent vegetation available.

Trinidad.– One locality was mentioned by Ffrench (1966) in his paper on mangrove birds in Trinidad, but it is uncertain if it was the only on surveyed. This locality is known as the Caroni Swamp (10^0 30'- 10^0 37' N and 61^0 25' - 61^0 30' W), located on the western side of the island. It is the largest area of mangrove in the island with two abundant genera: *Avicennia* and *Rhizophora*. No additional data were available for this area.

Utila Island.– The westernmost of the Bay Islands, on the Caribbean slope of Honduras, located about 32 km N of la Ceiba (ca. 16^0 06' N 86^0 56' W, Monroe 1968). No additonal information on vegetation types were available.

Appendix 2. List of bird species that indicators of mangroves in America (Stotz et al. 1996).

1.-*Ixobrychus exilis*
2.-*Nycticorax violaceus*
3.-*Cochlearius cochlearius*
4.-*Egretta caerulea*
5.-*Egretta rufescens*
6.-*Eudocimus albus*
7.-*Eudocimus ruber*
8.-*Buteogallus subtilis*
9.-*Buteogallus aequinoctalis*
10.-*Rallus longirostris*
11.-*Rallus obsoletus*
12.-*Rallus wetmorei*
13.-*Aramides axillaris*
14.-*Aramides mangle*
12.-*Aramides wolfi*
13.-*Columba leucocephala*
15.-*Coccizus minor*
16.-*Otus cooperi*
17.-*Lepidopyga lilliae*
18.-*Leucippus fallax*
19.-*Amazilia boucardi*
20.-*Veniliornis sanguineus*
21.-*Xiphorhynchus picus*
22.-*Thamnophilus bridgesi*

23.-*Sublegatus arenarum*

24.-*Todirostrum maculatum*

25.-*Fluvicola atripennis*

26.-*Tyrannus dominicensis*

27.-*Carpodectes antoniae*

28.-*Tachycineta albilinea*

29.-*Camarhynchus heliobates*

30.-*Dendroica [petechia] erithachorides*

31.-*Conirostrum bicolor*

32.-*Vireo altiloquus*

33.-*Vireo magister*

34.-*Vireo pallens*

Table 1. Bird species in New World mangroves. Endemism 1: X not endemic, N North and Central America, and S South America. Endemism 2: X not endemic, 1 Pacific coast, 2 North Atlantic and Caribbean coasts, 3 South American Atlantic coast; and 4 South American Pacific coast. Endemism 3: X not endemic, AMN Amazonian North, AMS Amazonian South, ATL Atlantic Forest, BSR Baja-Sonora, CHO Chocó lowlands, EPC Equatorial Pacific, GAL Galapagos, GAN Greater Antilles, GCS Gulf-Caribbean Slope, NSA Northern South America, and PAS Pacific arid slope. Restriction to mangroves: 1 only mangroves, and 2 mangroves and other habitats. Habits: 1 terrestrial, 2 aquatic and 3 aerial. Location: 1 interior of mangroves, 2 border mangrove and inland, 3 border mangrove and water, 4 open aquatic, and 5 aerial. Food habits: N nectarivore, F frugivore, H herbivore, I insectivore, IN non-insectivore invertebrates, C carnivore, and S scavenger. Feeding stratus: W water, G ground, H herbs, S shrubs, A arboreal, and AE aerial. Water preference: N no large source of water necessary (river, estuary, etc.), F fresh water, B brackish, and S salt water. Nesting habitat: 0 no nest in mangroves, 1 nest in mangroves and other habitats, and 2 nest in mangroves only. Introduced or occasional species such as *Estrilda astrild* and *Sula leucogaster* were not included in this study. Taxonomy based on Sibley and Monroe (1990), Ridgely and Tudor (1994), and A.O.U. (1998).

Family	Genus	Species	Endemism 1	Endemism 2	Endemism 3	Restriction	Habits	Location	Food habits	Feeding stratus	Water preference	Nesting habitat	Margarita	Marismas	Aquachil	La Encrucijada	Jiquilisco	Barra de Santiago	Jesús María River	Golfito	Florida Keys	Everglades	Cayo Matías	Playa Dos	La Mancha	Petenes de Campeche	Dzilám de Bravo Dzilám	Puerto Morelos	Cozumel	Omoa	Utila	Guanaja	San Lorenzo	Roatán	Juan Díaz	Galeta	Galapagos	Cayapas-Mataje	Puerto Pizarro	Onverwagt	Hope	French Guyana	Surinam	Trinidad	Maracaibo	Chiquana	Cariaco	Chacopata	Pará	Guanabara	Santos-Cubatão
Mangrove residents																																																			
Tinamidae	*Crypturellus*	*soui*	X	X	X	2	1	1	F	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Podicipedidae	*Tachybaptus*	*dominicus*					2	4	C,IN	W	F	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelecanidae	*Pelecanus*	*occidentalis*					2	4	C	AE	S	1	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	1	0	1	1	1	0	0	0	0	0	0
Pelecanidae	*Pelecanus*	*erythrorhynchos*					2	4	C	AE	S	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phalacrocoracidae	*Phalacrocorax*	*penicillatus*					2	4	C	W	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Phalacrocoracidae	*Phalacrocorax*	*brasilianus*				2	2	4	C	W	N	1	0	1	1	1	0	0	1	0	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1
Phalacrocoracidae	*Phalacrocorax*	*auritus*	X	X	X	2	2	4	C	W	N	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anhingidae	*Anhinga*	*anhinga*	X	X	X	2	2	3	C	W	F	1	0	1	0	1	0	0	0	0	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
Fregatidae	*Fregata*	*magnificens*	X	X	X	2	2	4	C,IN	AE	S	1	1	0	0	1	0	0	1	0	1	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	0	1	0
Ardeidae	*Ixobrychus*	*involucris*	X	X	X	2	2	3	C,IN	S	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Ardeidae	*Ixobrychus*	*exilis*	X	X	X	2	2	3	C,IN	H	F	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Ardeidae	*Tigrisoma*	*mexicanum*	X	X	X	2	2	4	C,IN	W,G	N	1	0	1	0	1	1	1	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardeidae	*Tigrisoma*	*lineatum*	X	X	X	2	2	3	C,IN	W,G	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardeidae	*Ardea*	*herodias*	X	X	X	2	2	4	C,IN	W	S	0	0	1	1	1	1	0	0	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Ardeidae	*Ardea*	*alba*	X	X	X	2	2	3	C,IN	W	S,F	1	0	1	1	1	0	0	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	1	1	1	0	0	0	0	1	1
Ardeidae	*Egretta*	*tricolor*	X	X	X	2	2	4	C,IN	G	S,F	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	1	0	0	1	1	1	0	1	1	1	0	0	0	0	0	0
Ardeidae	*Egretta*	*caerulea*	X	X	X	2	2	4	C,IN	G	S,F	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	1	1	0	0	1	1	0	0	0	0	1	1	1
Ardeidae	*Egretta*	*thula*	X	X	X	2	2	4	C,IN	G	S,F	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	0	1	1	1
Ardeidae	*Bubulcus*	*ibis*	X	X	X	2	2	3	O	G	S,F	1	0	1	1	1	0	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	0	1	0	1	1	0	0	1	1	0	0	0	0	0	1
Ardeidae	*Butorides*	*striatus*	X	X	X	2	2	3	C,IN	G,H,S,A	S,F	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	1	1	0	0	0	1	1	1
Ardeidae	*Butorides*	*virescens*	N	X	X	2	2	3	C,IN	G,H,S,A	S,F	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Ardeidae	*Butorides*	*sundevalli*	S	4	GAL	2	2	3	C,IN	G,H,S,A	S	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardeidae	*Agamia*	*agami*	X	X	X	2	2	3	C	G	B	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardeidae	*Nycticorax*	*nycticorax*	X	X	X	2	2	3	IN	S,A	S,F	1	1	1	1	1	0	0	0	1	1	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1
Ardeidae	*Nyctinassa*	*violacea*	X	X	X	2	2	3	C,IN	S,A	S,F	1	1	1	0	1	1	1	0	0	0	1	0	1	1	1	1	0	0	1	1	0	0	1	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1	1

Ardeidae	*Cochlearius*	*cochlearius*	X	X	X	2	1	3	C,IN	S,A	S,F	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Threskiornithidae	*Eudocimus*	*albus*	X	X	X	2	2	4	IN	W	S,F	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Threskiornithidae	*Eudocimus*	*ruber*	X	3	X	2	2	4	IN	W	S,F	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	1	0	1
Threskiornithidae	*Ajaia*	*ajaja*	X	X	X	2	2	4	C,IN	W	S,F	1	0	1	1	1	0	0	1	1	0	1	1	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	1
Ciconiidae	*Mycteria*	*americana*	X	X	X	2	2	4	C	W	F	1	0	1	1	1	1	1	1	1	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Ciconiidae	*Jabiru*	*mycteria*	X	X	X	2	2	4	C,IN	W	S,F	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Phoenicopteridae	*Phoenicopterus*	*ruber*					2	4	I	G	S	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Dendrocygna*	*bicolor*	N	X	X	2	2	3	F,I	W	F	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Anatidae	*Dendrocygna*	*autumnalis*	X	X	X	2	2	3	F	G,H,S,A	S,F	1	0	1	1	1	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0
Anatidae	*Dendrocygna*	*viduata*	S	X	X	2	2	3	F,I	W,G	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Anatidae	*Cairina*	*moschata*	N	X	X	2	2	4	O	W	S,F	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Anatidae	*Amazonetta*	*brasiliensis*	S	X	X	2	2	4	IN	W	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Accipitridae	*Pandion*	*haliaetus*	X	X	X	2	1	3	C	A	S,F	1	0	1	1	1	1	0	1	1	1	1	0	0	1	1	1	1	0	0	1	1	0	1	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	1
Accipitridae	*Leptodon*	*cayanensis*	X	X	X	2	1	2	C	A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Chondrohierax*	*uncinatus*	X	X	X	2	1	3	IN	A	S,F	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Gampsonyx*	*swainsonii*	S	X	X	2	1	2	C	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Elanus*	*leucurus*	X	X	X	2	1	2	C,IN	A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Accipitridae	*Rosthramus*	*sociabilis*	X	X	X	2	1	3	IN	S,A	F	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Ictinia*	*plumbea*	X	X	X	2	1	3	I	A	N	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Haliaeetus*	*leucocephalus*	N	X	X	2	1	2	C	A	N	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Geranospiza*	*caerulescens*	X	X	X	2	1	2	C	A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Accipitridae	*Buteogallus*	*anthracinus*	X	X	X	2	1	1	C	A	N	1	0	1	1	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Accipitridae	*Buteogallus*	*subtilis*	N	X	PAS	1	1	3	C	A	N	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Buteogallus*	*aequinoctialis*	S	3	X	1	1	3	IN	S,A	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
Accipitridae	*Buteogallus*	*urubitinga*	X	X	X	2	1	2	C	A	N	1	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1
Accipitridae	*Buteogallus*	*meridionalis*	S	X	X	2	1	3	C	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Accipitridae	*Parabuteo*	*unicinctus*	X	X	X	2	1	2	C	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Accipitridae	*Busarellus*	*nigricollis*	X	X	X	2	1	3	C	G,H,S,A	F	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Accipitridae	*Asturina*	*nitida*	X	X	X	2	1	2	C	A	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Buteo*	*magnirostris*	X	X	X	2	1	2	C	A	N	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	1	1
Accipitridae	*Buteo*	*brachyurus*	X	X	X	2	1	2	C	AE	N	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Buteo*	*polyosoma*	X	X	X	2	1	2	C	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Buteo*	*jamaicensis*	X	X	X	2	1	2	C	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Spizaetus*	*tyrannus*	X	X	X	2	1	2	C	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Spizaetus*	*ornatus*	X	X	X	2	1	2	C	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Falconidae	*Micrastur*	*semitorquatus*	X	X	X	2	1	2	C	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Falconidae	*Caracara*	*plancus*	X	X	X	2	1	2	C	S,A	N	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Falconidae	*Milvago*	*chimachima*	X	X	X	2	1	2	S	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	1	1	1
Falconidae	*Herpetotheres*	*cachinnans*	X	X	X	2	1	2	C	A	N	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Falconidae	*Falco*	*sparverius*	X	X	X	2	1	2	C,IN	S,A	N	0	0	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Falconidae	*Falco*	*rufigularis*	X	X	X	2	1	2	C	A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Cracidae	*Ortalis*	*vetula*	N	2	X	2	1	2	F,I	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cracidae	*Ortalis*	*poliocephala*	N	1	X	2	1	2	F	S	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cracidae	*Ortalis*	*leucogastra*	N	1	PAS	2	1	1	F	S	N	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cracidae	*Ortalis*	*erythroptera*	S	4	EPC	2	1	2	F	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Cracidae	*Penelope*	*albipennis*	S	4	EPC	2	1	2	F	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Rallidae	*Laterallus*	*melanophaius*	S	3	X	2	2	3	H,IN	G	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rallidae	*Laterallus*	*ruber*	N	X	X	2	2	3	H,IN	G	F	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rallidae	*Laterallus*	*albigularis*	X	X	X	2	2	3	H,IN	G	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Rallidae	*Rallus*	*longirostris*	X	X	X	2	2	2	IN	G	S	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Rallidae	*Rallus*	*wetmorei*	S	3	NSA	2	2	2	IN	G	S,F	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rallidae	*Aramides*	*mangle*	S	3	X	2	2	2	IN	G	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

Rallidae	*Aramides*	*axillaris*	X	X	X	2	2	3	IN	G	S,F	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0
Rallidae	*Aramides*	*cajanea*	X	X	X	2	2	3	IN	G	S,F	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0
Rallidae	*Amaurolimnas*	*concolor*	X	X	X	2	1	3	H,IN	G	N	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rallidae	*Porzana*	*carolina*	X	X	X	2	2	3	F,H	G	F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Rallidae	*Pardirallus*	*maculatus*	X	X	X	2	1	2	I,IN	G	B	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aramidae	*Aramus*	*guarauna*	X	X	X	2	2	3	IN	S	F	1	0	0	1	1	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1
Burhinidae	*Burhinus*	*bistriatus*	X	X	X	2	2	3	C,IN	G	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Columba*	*leucocephala*	N	2	X	2	1	1	F	S,A	N	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Columba*	*picazuro*	S	3	X	2	1	2	F	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Columbidae	*Columba*	*cayennensis*	X	X	X	2	1	1	F	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0
Columbidae	*Columba*	*flavirostris*	N	X	X	2	1	1	F	S,A	N	1	0	0	1	1	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Columba*	*subvinacea*	X	X	X	2	1	1	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Columba*	*nigrirostris*	X	X	X	2	1	1	F	S,A	N	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Columba*	*goodsoni*	S	4	X	2	1	1	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Zenaida*	*macroura*	N	X	X	2	1	1	F	G,H,S,A	N	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Zenaida*	*auriculata*	X	3	X	2	1	1	F	G,H,S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Columbidae	*Zenaida*	*aurita*	N	2	GCS	2	1	1	F	G,H,S,A	N	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Zenaida*	*asiatica*	N	X	X	2	1	1	F	G,H,S,A	N	1	0	1	1	0	1	1	1	0	1	1	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Zenaida*	*galapagoensis*	N	4	GAL	2	1	2	F	G,H,S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Columbina*	*inca*	X	X	X	2	1	2	F	G,H,S,A	N	0	0	1	1	1	1	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Columbina*	*squamata*	S	3	X	2	1	2	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Columbidae	*Columbina*	*passerina*	X	X	X	2	1	2	H	G,H,S,A	N	1	0	1	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0
Columbidae	*Columbina*	*minuta*	X	X	X	2	1	2	F	G,H,S,A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Columbidae	*Columbina*	*talpacoti*	X	X	X	2	1	2	F	G,H,S,A	N	1	0	0	1	1	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	1	1	0	1	1	0	0	0	0	0	1	1
Columbidae	*Claravis*	*pretiosa*	X	X	X	2	1	1	F	S,A	N	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Leptotila*	*verreauxi*	X	X	X	2	1	1	F	S,A	N	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0
Columbidae	*Leptotila*	*plumbeiceps*	X	2	X	2	1	1	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Leptotila*	*rufaxilla*	X	X	X	2	1	2	F	G,H,S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Columbidae	*Leptotila*	*jamaicensis*	N	2	GCS	2	1	1	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae	*Leptotila*	*pallida*	S	4	CHO	2	1	1	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Ara*	*manilata*	S	3	X	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Psittacidae	*Aratinga*	*strenua*	N	1	PAS	2	1	1	F	A	N	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Aratinga*	*leucophthalmus*	S	3	X	2	1	1	F	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Psittacidae	*Aratinga*	*nana*	N	2	GCS	2	1	1	F	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Aratinga*	*canicularis*	N	1	PAS	2	1	1	F	A	N	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Aratinga*	*pertinax*	X	X	X	2	1	1	F	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
Psittacidae	*Pyrrhura*	*frontalis*	S	3	ATL	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Psittacidae	*Forpus*	*passerinus*	S	3	X	2	1	1	F	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Psittacidae	*Forpus*	*xanthopterygius* *coelestis*	S	4	EPC	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Brotogeris*	*tirica*	S	3	ATL	2	1	2	F	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Psittacidae	*Brotogeris*	*jugularis*	X	X	X	2	1	1	F	A	N	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Touit*	*dilectissima*	X	X	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Pionites*	*melanocephala*	S	X	X	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Psittacidae	*Pionopsitta*	*pulchra*	S	4	CHO	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Graydidascalus*	*brachyurus*	S	X	X	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Psittacidae	*Pionus*	*menstruus*	X	X	X	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Pionus*	*chalcopterus*	S	4	X	2	0	0	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Amazona*	*viridigenalis*	N	2	GCS	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Amazona*	*autumnalis*	X	X	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Amazona*	*albifrons*	N	X	X	2	1	1	F	A	N	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Amazona*	*xantholora*	N	2	GCS	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae	*Amazona*	*auropalliata*	N	1	PAS	2	1	1	F	A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Psittacidae	*Amazona*	*ochrocephala*	X	X	X	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Psittacidae	*Amazona*	*amazonica*	S	3	X	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
Cuculidae	*Coccyzus*	*minor*	X	X	X	2	1	1	I	S,A	N	1	0	1	0	1	0	0	1	1	1	1	0	0	1	0	1	0	1	0	1	0	0	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0
Cuculidae	*Coccyzus*	*melacoryphus*	S	X	X	2	1	2	I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0
Cuculidae	*Piaya*	*cayana*	X	X	X	2	1	2	I	S,A	N	1	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Cuculidae	*Piaya*	*minuta*	S	3	X	2	1	2	I,IN	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
Cuculidae	*Tapera*	*naevia*	X	X	X	2	1	1	I,IN	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0
Cuculidae	*Crotophaga*	*major*	X	X	X	2	1	2	I,IN	S	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	0	0	0	0	1	0
Cuculidae	*Crotophaga*	*ani*	X	X	X	2	1	2	O	S	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	1	1
Cuculidae	*Crotophaga*	*sulcirostris*	X	X	X	2	1	2	I	G,H,S,A	N	0	0	0	1	0	0	1	1	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Cuculidae	*Guira*	*guira*	S	3	X	2	1	2	I	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Opisthocomidae	*Opisthocomus*	*hoazin*	S	3	X	2	1	2	F	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tytonidae	*Tyto*	*alba*	X	X	X	2	1	1	C	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strigidae	*Otus*	*asio*	N	2	X	2	1	1	C,IN	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strigidae	*Otus*	*cooperi*	N	1	PAS	2	1	1	C,IN	A	S,F	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strigidae	*Otus*	*choliba*	X	X	X	2	1	1	I	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Strigidae	*Ciccaba*	*nigrolineata*	X	X	X	2	1	1	C	A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strigidae	*Ciccaba*	*virgata*	X	X	X	2	1	1	C	A	N	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strigidae	*Pulsatrix*	*perspicillata*	X	X	X	2	1	2	C,IN	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Strigidae	*Bubo*	*virginianus*	X	X	X	2	1	1	C	A	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Strigidae	*Glaucidium*	*brasilianum*	X	X	X	2	1	1	C,IN	A	N	1	0	1	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nyctibiidae	*Nyctibius*	*jamaicensis*	N	X	X	2	1	3	I	A	N	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nyctibiidae	*Nyctibius*	*griseus*	X	X	X	2	1	3	I	A		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Caprimulgidae	*Nyctidromus*	*albicollis*	X	X	X	2	1	2	I	G	N	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Caprimulgidae	*Phalaenoptilus*	*nuttallii*	N	X	X	2	1	2	I	G	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caprimulgidae	*Caprimulgus*	*cayennensis*	S	X	X	2	1	2	I	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Caprimulgidae	*Caprimulgus*	*maculicaudus*	S	X	X	2	1	2	I	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Trochilidae	*Glaucis*	*hirsuta*	S	X	X	2	1	3	I,IN	S,A	S,F	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0
Trochilidae	*Phaethornis*	*superciliosus*	X	X	X	2	1	2	IN	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Phaethornis*	*longuemareus*	X	X	X	2	1	2	IN	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Trochilidae	*Eupetomena*	*macroura*	S	3	X	2	1	2	N,I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Trochilidae	*Phaeochroa*	*cuvierii*	X	X	X	2	1	2	F,I	H,S	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Campylopterus*	*duidae*	S	3	X	2	1	2	N	G,H,S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Trochilidae	*Florisuga*	*mellivora*	X	X	X	2	1	2	N	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Colibri*	*serrirostris*	S	X	X	2	1	2	N	.H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Trochilidae	*Anthracothorax*	*viridigula*	S	3	X	2	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Trochilidae	*Anthracothorax*	*prevostii*	X	X	X	2	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Trochilidae	*Anthracothorax*	*nigricollis*	X	X	X	2	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Trochilidae	*Chrysolampis*	*mosquitus*	S	X	X	2	1	1	N	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Trochilidae	*Chlorestes*	*notatus*	S	X	X	2	1	2	N	G,H,S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Trochilidae	*Chlorostilbon*	*canivetii*	N	2	X	2	1	2	N	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Chlorostilbon*	*mellisugus*	S	X	X	2	1	2	N	G,H,S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Trochilidae	*Cynanthus*	*latirostris*	N	X	X	2	1	2	I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Thalurania*	*furcata*	X	X	X	2	1	2	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Trochilidae	*Damophila*	*julie*	S	X	X	2	1	2	N	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Leucippus*	*fallax*	S	3	NAN	2	1	1	N,I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0
Trochilidae	*Lepidopyga*	*coeruleogularis*	X	X	X	2	1	1	N,I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Hylocharis*	*eliciae*	N	X	X	2	1	2	N	H,S	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Amazilia*	*chionopectus*	S	3	X	2	1	1	N	S,A	S,F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Trochilidae	*Amazilia*	*boucardi*	N	1	PAS	1	1	1	N	S,A	N	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Amazilia*	*leucogaster*	S	2	X	2	1	1	N,I	S,A	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Trochilidae	*Amazilia*	*saucerrottei*	X	X	X	2	1	1	N	S,A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Trochilidae	*Amazilia*	*tobaci*	S	3	X	2	1	1	N	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0
Trochilidae	*Amazilia*	*rutila*	N	X	X	2	,	1	N,I	S,A	N	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Amazilia*	*yucatanensis*	N	2	GCS	2	1	1	N,I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Amazilia*	*tzacatl*	X	X	X	2	1	1	N	S	N	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Amazilia*	*amazilia*	S	4	X	2	1	2	N,I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Chalybura*	*urochrysia*	X	X	X	2	1	1	N	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Eugenes*	*fulgens*	X	X	X	2	1	2	I	H,S	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochilidae	*Doricha*	*eliza*	N	2	GCS	2	1	2	N,I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trogonidae	*Trogon*	*melanurus*	X	X	X	2	1	2	F,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trogonidae	*Trogon*	*viridis*	S	X	X	2	1	1	F,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Trogonidae	*Trogon*	*citreolus*	N	1	PAS	2	1	1	F,I	A	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trogonidae	*Trogon*	*melanocephalus*	N	X	X	2	1	2	F,I	A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trogonidae	*Trogon*	*violaceus*	X	X	X	2	1	1	F,I	A	N	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Momotidae	*Eumomota*	*superciliosa*	N	X	X	2	1	2	F,I	A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Momotidae	*Momotus*	*mexicanus*	N	1	PAS	2	1	2	F,I	A	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Momotidae	*Momotus*	*momota*	X	X	X	2	1	2	F,I	A	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alcedinidae	*Ceryle*	*torquata*	X	X	X	2	2	3	C	H,S	N	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	1	0	1	1	1	1	0	1	0	1	0	0	0	0	1	1
Alcedinidae	*Chloroceryle*	*amazona*	X	X	X	2	2	3	IN	S	S,F	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1
Alcedinidae	*Chloroceryle*	*americana*	X	X	X	2	2	3	C	S,A	S,F	0	0	0	0	1	1	0	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	1	1	1	0	0	0	1	1
Alcedinidae	*Chloroceryle*	*inda*	X	X	X	2	2	3	C	S,A	S,F	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Alcedinidae	*Chloroceryle*	*aenea*	X	X	X	2	2	3	C	S	S,F	1	0	1	0	1	1	0	1	1	0	0	0	0	1	1	1	1	1	0	0	1	1	0	1	0	0	1	0	0	0	0	1	1	0	1	1	0	0	0	0
Bucconidae	*Notharcus*	*macrorhynchos*	X	X	X	2	1	1	I	A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Bucconidae	*Notharcus*	*tectus*	X	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
Bucconidae	*Hypnelus*	*ruficollis*	S	3	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0
Galbulidae	*Galbula*	*ruficauda*	X	X	X	2	1	3	I	S,A	S,F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Ramphastidae	*Pteroglossus*	*aracari*	S	3	X	2	1	2	C,IN	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Ramphastidae	*Pteroglossus*	*erythropygius*	S	4	EPC	2	1	1	C,IN	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Ramphastidae	*Ramphastos*	*sulfuratus*	X	X	X	2	1	2	F,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ramphastidae	*Ramphastos*	*tucanus*	S	3	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Ramphastidae	*Ramphastos*	*toco*	S	3	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Picidae	*Picumnus*	*exilis*	S	3	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Picidae	*Picumnus*	*minutissimus*	S	3	AMN	2	1	1	I	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Picidae	*Picumnus*	*cirratus*	S	3	ATL	2	1	1	I	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Picidae	*Picumnus*	*olivaceus*	X	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Melanerpes*	*pucherani*	X	X	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Melanerpes*	*pygmaeus*	N	2	GCS	2	1	1	O	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Melanerpes*	*rubricapillus*	X	X	X	2	1	1	F,I	S	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Picidae	*Melanerpes*	*uropygialis*	N	1	X	2	1	1	O	A	N	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Melanerpes*	*aurifrons*	N	X	X	2	1	1	F	A	N	1	0	0	1	1	1	1	0	0	0	0	0	1	1	0	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Melanerpes*	*hoffmannii*	N	1	PAS	2	1	1	O	A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Melanerpes*	*carolinus*	N	X	X	2	1	1	I	S,A	N	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Melanerpes*	*superciliaris*	N	2	GAN	2	1	1	I	A	N	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Xiphidiopicus*	*percussus*	N	2	GAN	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Picoides*	*scalaris*	N	X	X	2	1	2	F	A	N	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Veniliornis*	*sp.*	X	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Veniliornis*	*callonotus*	S	4	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Veniliornis*	*fumigatus*	X	X	X	2	1	1	I	A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Veniliornis*	*passerinus*	S	3	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Picidae	*Veniliornis*	*spilogaster*	S	3	ATL	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Picidae	*Veniliornis*	*sanguineus*	S	3	AMN	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Picidae	*Colaptes*	*punctigula*	S	3	X	2	1	1	I	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Picidae	*Colaptes*	*campestris*	X	3	X	2	1	1	I	H	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Picidae	*Celeus*	*loncatus*	X	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Celeus*	*elegans*	S	X	X	2	1	1	I	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Picidae	*Celeus*	*flavescens*	S	3	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Picidae	*Celeus*	*flavus*	S	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Picidae	*Celeus*	*torquatus*	S	3	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Picidae	*Dryocopus*	*lineatus*	X	X	X	2	1	1	I	A	N	1	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	1	1	0	0	1	0	0	1	1	0	0	1	0	0	0	0	1
Picidae	*Campephilus*	*guatemalensis*	N	X	X	2	1	1	I	A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Campephilus*	*melanoleucus*	S	X	X	2	1	1	F,I	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0
Picidae	*Campephilus*	*melanoleucos guayaquilensis*	S	4	EPC	2	1	1	F,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Furnariidae	*Furnarius*	*leucopus*	S	X	X	2	1	2	IN	G	S,F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Furnariidae	*Synallaxis*	*albescens*	S	X	X	2	1	1	I,IN	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Furnariidae	*Synallaxis*	*spixi*	S	3	X	2	1	2	I,IN	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Furnariidae	*Synallaxis*	*gujanensis*	S	X	X	2	1	1	I	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Furnariidae	*Synallaxis*	*stictothorax*	S	4	EPC	2	1	1	I	G,H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Furnariidae	*Certhiaxis*	*cinnamomea*	S	3	X	2	1	1	I	H,S	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	1	0	0	1	0
Furnariidae	*Xenops*	*minutus*	X	X	X	2	1	1	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Dendrocolaptidae	*Dendrocincla*	*fuliginosa*	X	X	X	2	1	1	I,IN	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Dendrocolaptidae	*Dendrocincla*	*anabatina*	N	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dendrocolaptidae	*Dendrocincla*	*homochroa*	X	X	X	2	1	1	I	A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dendrocolaptidae	*Sittasomus*	*griseicapillus*	X	X	X	2	1	1	I	A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Dendrocolaptidae	*Glyphorhynchus*	*spirurus*	X	X	X	2	1	1	I,IN	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Dendrocolaptidae	*Xiphorhynchus*	*picus*	N	X	X	2	1	1	I,IN	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0
Dendrocolaptidae	*Xiphorhynchus*	*guttatus*	X	X	X	2	1	1	I,IN	A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0
Dendrocolaptidae	*Xiphorhynchus*	*flavigaster*	N	X	X	2	1	1	I,IN	A	N	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dendrocolaptidae	*Xiphorhynchus*	*lachrymosus*	S	4	CHO	2	1	1	I,IN	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Dendrocolaptidae	*Lepidocolaptes*	*souleyetii*	X	X	X	2	1	1	I	A	N	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0
Dendrocolaptidae	*Campylorhamphus*	*trochilirostris*	X	X	X	2	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Thamnophilidae	*Sakesphorus*	*canadensis*	S	3	X	2	1	1	I,IN	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	0
Thamnophilidae	*Sakesphorus*	*bernardi*	S	4	EPC	2	1	1	I,IN	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Thamnophilidae	*Thamnophilus*	*doliatus*	X	X	X	2	1	2	F	S,A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Thamnophilidae	*Thamnophilus*	*nigrocinereus*	S	X	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Thamnophilidae	*Thamnophilus*	*atrinucha*	S	X	X	2	1	2	I,IN	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thamnophilidae	*Myrmotherula*	*surinamensis*	S	X	X	2	1	1	I,IN	H	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Thamnophilidae	*Formicivora*	*grisea*	S	3	X	2	1	1	I	H	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Thamnophilidae	*Cercomacra*	*tyrannina*	S	X	X	2	1	1	I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thamnophilidae	*Hypocnemoides*	*melanopogon*	S	3	AMN	2	1	1	I	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Thamnophilidae	*Sclateria*	*naevia*	S	3	X	2	1	1	I,IN	G	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
Thamnophilidae	*Percnostola*	*rufifrons*	S	X	AMN	2	1	1	F,I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Thamnophilidae	*Myrmeciza*	*exsul*	X	X	X	2	1	1	I,IN	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Thamnophilidae	*Myrmeciza*	*atrothorax*	S	3	X	2	1	1	I	H	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tyrannidae	*Mionectes*	*oleagineus*	X	X	X	2	1	1	F,I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Tyrannidae	*Todirostrum*	*maculatum*	S	3	X	2	1	1	F,I	S	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
Tyrannidae	*Todirostrum*	*poliocephalum*	S	3	ATL	2	1	2	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Tyrannidae	*Todirostrum*	*cinereum*	X	X	X	2	1	1	I	S	N	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0
Tyrannidae	*Todirostrum*	*viridanum*	S	3	NSA	2	1	1	I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Tyrannidae	*Todirostrum*	*chrysocrotaphum*	X	X	X	2	1	1	I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tyrannidae	*Zimmerius*	*chrysops*	S	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Tyrannidae	*Camptostoma*	*imberbe*	N	X	X	2	1	1	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Camptostoma*	*obsoletum*	X	X	X	2	1	1	F,I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
Tyrannidae	*Phaeomyias*	*murina*	X	X	X	2	1	2	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0
Tyrannidae	*Sublegatus*	*arenarum*	X	X	X	2	1	1	I	S,A	N	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	1	0	1	1	0	0	0	0
Tyrannidae	*Myiopagis*	*gaimardi*	S	3	X	2	1	1	F,I	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0

Tyrannidae	*Elaenia*	*flavogaster*	X	X	X	2	1	2	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	1	0	0	1	0
Tyrannidae	*Serpophaga*	*subcristata*	S	3	X	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Tyrannidae	*Euscarthmus*	*meloryphus*	S	X	X	2	1	1	I	G,H	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Inezia*	*subflava*	S	3	X	2	1	1	I,IN	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0
Tyrannidae	*Lophotriccus*	*pileatus*	X	X	X	2	1	1	I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Oncostoma*	*olivaceum*	S	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Tolmomyias*	*sulphurescens*	X	X	X	2	1	1	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tyrannidae	*Tolmomyias*	*poliocephalus*	S	3	X	2	1	1	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Tyrannidae	*Tolmomyias*	*flaviventris*	S	3	X	2	1	1	I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	1	0	0	0	0
Tyrannidae	*Myiophobus*	*fasciatus*	S	X	X	2	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Tyrannidae	*Myiobius*	*barbatus*	S	X	X	2	1	1	I	G,H,S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Myiobius*	*atricaudus*	S	X	X	2	1	1	I	G,H,S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Cnemotriccus*	*fuscatus*	S	3	X	2	1	1	I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Tyrannidae	*Contopus*	*cinereus*	X	X	X	2	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Tyrannidae	*Contopus*	*caribaeus*	N	2	GAN	2	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Empidonax*	*albigularis*	X	X	X	2	1	1	I	S,A	N	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Empidonax*	*difficilis*	N	X	PAS	2	1	1	I	S,A	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Pyrocephalus*	*rubinus*	X	X	X	2	1	2	I	S	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1
Tyrannidae	*Fluvicola*	*pica*	S	X	X	2	1	1	I	H,S	S,F	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	0	0	0	0
Tyrannidae	*Fluvicola*	*nengeta*	S	X	X	2	1	1	I	G	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Tyrannidae	*Arundinicola*	*leucocephala*	X	X	X	2	1	2	I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Tyrannidae	*Satrapa*	*icterophrys*	S	3	X	2	1	2	I	S, A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Tyrannidae	*Attila*	*cinnamomeus*	S	3	X	2	1	1	O	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tyrannidae	*Attila*	*spadiceus*	X	X	X	2	1	1	C,IN	S,A	N	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Myiarchus*	*tuberculifer*	X	X	X	2	1	2	H,IN	S,A	N	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Tyrannidae	*Myiarchus*	*panamensis*	S	X	X	2	1	2	F,I	A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Myiarchus*	*ferox*	S	3	X	2	1	2	F,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Myiarchus*	*cinerascens*	N	X	X	2	1	2	F	S,A	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Myiarchus*	*tyrannulus*	X	X	X	2	1	2	I	S,A	N	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0
Tyrannidae	*Myiarchus*	*magnirostris*	S	4	GAL	2	1	2	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Tyranopsis*	*sulphurea*	S	3	X	2	1	1	C	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tyrannidae	*Tyrannus*	*melancholicus*	X	X	X	2	1	1	H,IN	S,A	N	1	0	1	1	1	0	1	1	0	0	0	0	1	1	1	1	1	1	1	0	0	1	0	1	0	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1
Tyrannidae	*Tyrannus*	*vociferans*	N	X	X	2	1	2	H,IN	A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Tyrannus*	*crassirostris*	N	1	PAS	2	1	2	I	A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Tyrannus*	*savana*	X	X	X	2	1	2	I,IN	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1
Tyrannidae	*Tyrannus*	*dominicensis*	X	X	X	2	1	1	H,IN	S	S	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0
Tyrannidae	*Empidonomus*	*varius*	S	X	X	2	1	2	I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Tyrannidae	*Conopias*	*albovittata*	S	4	CHO	2	1	1	I,IN	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Myiodynastes*	*bairdi*	S	4	EPC	2	1	2	F,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Myiodynastes*	*maculatus*	X	X	X	2	1	1	F,I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0
Tyrannidae	*Myiodynastes*	*luteiventris*	N	X	X	2	1	1	F,I	S,A	N	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Myiozetetes*	*cayanensis*	S	X	X	2	1	2	F,I	S	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0
Tyrannidae	*Myiozetetes*	*similis*	X	X	X	2	1	2	F,I	S	N	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1
Tyrannidae	*Legatus*	*leucophaius*	X	X	X	2	1	1	F,I	S	N	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Tyrannidae	*Philohydor*	*lictor*	S	X	X	2	1	1	I	H	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Pitangus*	*sulphuratus*	X	X	X	2	1	1	H,IN	S,A	N	1	0	1	1	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	1	0	0	1	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1
Tyrannidae	*Megarynchus*	*pitangua*	X	X	X	2	1	2	I	S,A	N	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Schiffornis*	*turdinus*	X	X	X	2	1	1	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Pachyramphus*	*cinnamomeus*	X	X	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Pachyramphus*	*polychopterus*	S	X	X	2	1	2	I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0
Tyrannidae	*Pachyramphus*	*rufus*	S	3	X	2	1	2	F,I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Tyrannidae	*Pachyramphus*	*aglaiae*	X	X	X	2	1	2	F	A	N	1	0	1	0	1	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tyrannidae	*Tityra*	*cayana*	X	X	X	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tyrannidae	*Tityra*	*semifasciata*	X	X	X	2	1	2	I,IN	A	N	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Gymnoderus*	*foetidus*	S	3	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Cotingidae	*Carpodectes*	*antoniae*	N	1	PAS	2	1	2	F	S,A	N	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cotingidae	*Querula*	*purpurata*	S	3	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Pipridae	*Manacus*	*vitellinus*	S	X	CHO	2	1	1	F	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pipridae	*Manacus*	*manacus*	S	X	X	2	1	1	F	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Pipridae	*Chiroxiphia*	*linearis*	N	1	PAS	2	1	1	F	H,S	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pipridae	*Chiroxiphia*	*lanceolata*	S	X	X	2	1	1	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Pipridae	*Pipra*	*mentalis*	X	X	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Vireo*	*griseus*	N	2	GCS	2	1	1	I	S	N	1	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Vireo*	*pallens*	N	X	X	2	1	1	I	G,H,S,A	N	1	0	1	0	1	1	1	1	0	0	0	0	1	0	1	1	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Vireo*	*latimeri*	N	2	GAN	2	1	2	I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Vireo*	*altiloquus*	X	X	X	2	1	1	H,IN	S,A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Vireo*	*magister*	N	2	GCS	2	1	1	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Hylophilus*	*thoracicus*	S	3	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Vireonidae	*Hylophilus*	*pectoralis*	S	3	X	2	1	1	I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0
Vireonidae	*Hylophilus*	*flavipes*	X	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Vireonidae	*Hylophilus*	*auratifrons*	S	3	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0
Vireonidae	*Hylophilus*	*decurtatus*	X	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Vireolanius*	*leucotis*	S	X	X	2	1	1	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Cyclarhis*	*gujanensis*	X	X	X	2	1	1	I,IN	S,A	N	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	1
Corvidae	*Calocitta*	*colliei*	N	1	PAS	2	1	2	F,I	S,A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Calocitta*	*formosa*	N	1	PAS	2	1	2	F,I	S,A	N	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Cyanocorax*	*yncas*	X	X	X	2	1	2	O	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Cyanocorax*	*morio*	N	2	X	2	1	2	O	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Cyanocorax*	*sanblasianus*	N	X	PAS	2	1	1	F,I	S,A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Cyanocorax*	*yucatanicus*	N	2	GCS	2	1	2	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Cyanocorax*	*beecheii*	N	X	PAS	2	1	1	F,I	S,A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Aphelocoma*	*coerulescens*	N	X	X	2	1	2	I	S,A	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Corvus*	*brachyrhynchos*	N	X	X	2	1	2	O	S	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Corvus*	*imparatus*	N	2	GCS	2	1	2	O	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Corvus*	*sinaloae*	N	1	PAS	2	1	2	O	S,A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corvidae	*Corvus*	*ossifragus*	N	2	GCS	2	1	2	O	S,A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirundinidae	*Tachycineta*	*albilinea*	X	X	X	2	3	5	I	AE	S,F	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirundinidae	*Progne*	*chalybea*	X	X	X	2	3	1	I	AE	N	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	1
Troglodytidae	*Donacobius*	*atricapillus*	S	3	X	2	1	2	I, IN	S, H	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Troglodytidae	*Campylorhynchus*	*brunneicapillus*	N	X	X	2	1	2	F	H,S	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Campylorhynchus*	*chiapensis*	N	1	PAS	2	1	2	I	S	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Campylorhynchus*	*griseus*	S	3	X	2	1	2	I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Troglodytidae	*Campylorhynchus*	*rufinucha*	N	X	X	2	1	2	I	S	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Campylorhynchus*	*zonatus*	N	X	X	2	1	2	I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Thryothorus*	*rutilus*	X	X	X	2	1	2	I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Thryothorus*	*nigricapillus*	S	4	X	2	1	2	I,IN	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Thryothorus*	*sinaloa*	N	1	PAS	2	1	2	I	H,S	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Thryothorus*	*superciliaris*	S	4	EPC	2	1	2	I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Thryothorus*	*longirostris*	S	3	X	2	1	2	I, IN	H,S	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Troglodytidae	*Troglodytes*	*musculus*	X	X	X	2	1	2	I	G,H,S,A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	0	1	1	1	1	0	1	1	1	1	0	1	1
Troglodytidae	*Uropsila*	*leucogastra*	N	X	X	2	1	1	I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sylviidae	*Polioptila*	*californica*	N	1	BSR	2	1	1	I	S,A	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sylviidae	*Polioptila*	*nigriceps*	N	1	PAS	2	1	1	I	S,A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sylviidae	*Polioptila*	*albiloris*	N	1	X	2	1	1	I	S,A	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sylviidae	*Polioptila*	*plumbea*	X	X	X	2	1	1	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	0	1	1	1	0	0	0	0
Turdidae	*Platycichla*	*flavipes*	S	3	X	2	1	2	I,F,H	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Turdidae	*Turdus*	*fulviventris*	S	3	X	2	1	1	IN	G,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Turdidae	*Turdus*	*amaurochalinus*	S	3	X	2	1	1	IN	G,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Turdidae	*Turdus*	*fumigatus*	X	X	X	2	1	1	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Turdidae	*Turdus*	*grayi*	X	X	X	2	1	1	F,I	S,A	N	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turdidae	*Turdus*	*nudigenis*	S	3	X	2	1	1	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Mimidae	*Melanoptila*	*glabrirostris*	N	2	GCS	2	1	1	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mimidae	*Mimus*	*polyglottos*	N	X	X	2	1	2	F	S	N	0	1	1	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mimidae	*Mimus*	*gilvus*	N	X	X	2	1	2	F,I	S	N	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Mimidae	*Mimus*	*longicaudatus*	S	4	X	2	1	2	F,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Mimidae	*Toxostoma*	*rufum*	N	X	X	2	1	2	O	H	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Vermivora*	*chrysoptera*	X	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Parula*	*pitiayumi*	X	X	X	2	1	2	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
Parulidae	*Geothlypis*	*flavovelata*	N	2	GCS	2	1	3	I	H,S	S,F	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Geothlypis*	*aequinoctialis*	S	X	X	2	1	3	I	H, S	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Parulidae	*Geothlypis*	*poliocephala*	N	X	X	2	1	2	I	H,S	S,F	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Basileuterus*	*fulvicauda*	S	4	X	2	1	1	I	G	F,S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Coerebidae	*Coereba*	*flaveola*	X	X	X	2	1	2	N	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1	0	0	1	1
Thraupidae	*Conirostrum*	*speciosum*	S	X	X	2	1	1	I,IN	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Thraupidae	*Conirostrum*	*bicolor*	X	X	X	2	1	1	I,IN	S,A	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
Thraupidae	*Thlypopsis*	*sordida*	S	3	X	2	1	2	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Thraupidae	*Hemithraupis*	*guira*	S	X	X	2	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Thraupidae	*Nemosia*	*pileata*	S	X	X	2	1	1	F,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Thraupidae	*Habia*	*rubica*	X	X	X	2	1	2	F,I	S,A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraupidae	*Ramphocelus*	*icteronotus*	S	4	X	2	1	2	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraupidae	*Ramphocelus*	*carbo*	S	X	X	2	1	2	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
Thraupidae	*Ramphocelus*	*bresilius*	S	3	ATL	2	1	2	F,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Thraupidae	*Thraupis*	*episcopus*	X	X	X	2	1	2	F	A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Thraupidae	*Thraupis*	*glaucocolpa*	S	3	NSA	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Thraupidae	*Thraupis*	*sayaca*	S	3	X	2	1	2	F, I	S, A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Thraupidae	*Thraupis*	*abbas*	X	X	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraupidae	*Thraupis*	*palmarum*	X	X	X	2	1	2	F,I	A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0
Thraupidae	*Euphonia*	*affinis*	N	X	X	2	1	1	F	A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraupidae	*Euphonia*	*trinitatis*	S	3	X	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Thraupidae	*Euphonia*	*violacea*	S	3	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Thraupidae	*Euphonia*	*laniirostris*	X	X	X	2	1	1	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraupidae	*Tangara*	*mexicana*	S	3	X	2	1	2	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Thraupidae	*Tangara*	*larvata*	X	X	X	2	1	1	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraupidae	*Dacnis*	*cayana*	X	X	X	2	1	2	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Thraupidae	*Cyanerpes*	*cyaneus*	X	X	X	2	1	3	N	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*[petechia]* *erithacorides*	X	X	X	1	1	1	I	S,A	N	2	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	0	0	0	1	0	1	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Emberizidae	*Volatinia*	*jacarina*	X	X	X	2	1	2	I,IN	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	1	1	1	0	0	1	0
Emberizidae	*Sporophila*	*americana*	S	X	X	2	1	2	F	H	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Sporophila*	*torqueola*	N	X	X	2	1	2	F	S,A	N	1	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Sporophila*	*collaris*	S	3	X	2	1	2	F	H,S	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Emberizidae	*Sporophila*	*lineola*	S	3	X	2	1	2	F	H	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0
Emberizidae	*Sporophila*	*nigricollis*	X	X	X	2	1	2	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Sporophila*	*peruviana*	X	4	X	2	1	2	F	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Sporophila*	*minuta*	X	1	X	2	1	2	F	S,A	N	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Emberizidae	*Oryzoborus*	*angolensis*	X	X	X	2	1	2	F,I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Tiaris*	*olivacea*	X	X	X	2	1	2	F,I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Emberizidae	*Tiaris*	*bicolor*	S	3	NSA	2	1	2	F,I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Emberizidae	*Sicalis*	*flaveola*	X	X	X	2	1	2	F,I	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Sicalis*	*luteola*	X	X	X	2	1	2	F	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Emberizidae	*Paroaria*	*gularis*	S	3	X	2	1	1	F,I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Emberizidae	*Arremonops*	*rufivirgatus*	N	X	X	2	1	1	H,IN	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Arremonops*	*çonirostris*	S	3	X	2	1	1	H,IN	G	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Aimophila*	*ruficauda*	N	1	PAS	2	1	2	F	H	N	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Zonotrichia*	*capensis*	S	X	X	2	1	2	I	G,H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Emberizidae	*Geospiza*	*fuliginosa*	S	4	GAL	2	1	2	F	G	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Cactospiza*	*heliobates*	S	4	GAL	1	1	1	I	S,A	N	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardinalidae	*Saltator*	*albicollis*	S	X	X	2	1	2	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Cardinalidae	*Saltator*	*coerulescens*	X	X	X	2	1	2	F,I	S,A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0
Cardinalidae	*Saltator*	*atriceps*	N	X	X	2	1	2	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardinalidae	*Saltator*	*maximus*	X	X	X	2	1	2	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardinalidae	*Cyanocompsa*	*cyanoides*	X	X	X	2	1	2	F	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardinalidae	*Cyanocompsa*	*parellina*	N	X	X	2	1	2	F	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardinalidae	*Guiraca*	*caerulea*	N	X	X	2	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Agelaius*	*phoeniceus*	N	X	X	2	1	2	H,IN	H,S	F	1	0	1	0	0	0	0	1	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Agelaius*	*icterocephalus*	S	3	X	2	1	2	H,IN	S,A	F	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Icteridae	*Agelaius*	*humeralis*	N	2	GAN	2	1	2	H,IN,	S,A	N	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Agelaius*	*ruficapillus*	S	3	X	2	1	2	F,I,IN	H,S,A	F,S	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Icteridae	*Sturnella*	*bellicosa*	S	4	X	2	1	2	H,I,IN	G,H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Sturnella*	*superciliaris*	S	3	o	2	1	3	H,I,IN	G,H,	F	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Icteridae	*Dives*	*dives*	N	X	X	2	1	2	H,IN	G,H,S,A	N	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Dives*	*warszewiczi*	S	4	X	2	1	2	H,I,IN	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Quiscalus*	*mexicanus*	X	X	X	2	1	3	O	H,S	N	1	0	1	0	1	1	1	1	0	0	0	0	1	1	0	1	1	1	0	1	1	0	1	1	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0
Icteridae	*Quiscalus*	*niger*	S	2	X	2	1	2	O	G,S,A	N	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Quiscalus*	*lugubris*	S	3	X	2	1	2	I,IN	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0
Icteridae	*Molothrus*	*bonariensis*	X	X	X	2	1	2	I	S	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1
Icteridae	*Molothrus*	*aeneus*	N	X	X	2	1	2	F,I	H,S	N	0	0	1	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Molothrus*	*ater*	N	X	X	2	1	2	F,I	H,S	N	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Icterus*	*chrysater*	N	X	GCS	2	1	1	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Icterus*	*nigrogularis*	S	X	X	2	1	1	F,I	S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1	1	1	1	1	0	0	0	0
Icteridae	*Icterus*	*mesomelas*	X	X	X	2	1	1	F,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Icterus*	*graceannae*	S	4	EPC	2	1	2	F,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Icterus*	*pectoralis*	N	1	PAS	2	1	1	F,I	A	N	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Icterus*	*gularis*	N	X	X	2	1	1	F,I	S,A	N	1	0	0	1	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Icterus*	*pustulatus*	N	1	PAS	2	1	1	F,I	S,A	N	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Icterus*	*galbula*	X	X	X	2	1	1	F,I	S,A	N	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Icterus*	*cucullatus*	N	X	X	2	1	1	F,I	S	N	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Amblycercus*	*holosericeus*	X	X	X	2	1	1	I	S,A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Cacicus*	*cela*	S	X	X	2	1	2	F,I	A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0
Icteridae	*Cacicus*	*haemorrhous*	S	3	X	2	1	2	F	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Icteridae	*Cacicus*	*melanicterus*	N	1	PAS	2	1	1	F,I	A	N	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Psarocolius*	*decumanus*	S	X	X	2	1	2	O	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Psarocolius*	*montezuma*	N	X	X	2	1	2	O	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passeridae	*Passer*	*domesticus*	X	X	X	2	1	2	O	G,H,S,A	N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Open water residents (sometimes visit mangroves)																																																			
Ardeidae	*Ardea*	*cocoi*					2	4	C.IN	W	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0	1	1
Ardeidae	*Pilherodius*	*pileatus*					2	1	C	G	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Threskiornithidae	*Plegadis*	*falcinellus*					2	4	C.IN	W	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Threskiornithidae	*Plegadis*	*chihi*	2	4	C.IN	W	S.F.B	0	0	1	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Anatidae	*Nomonyx*	*dominicus*	2	4	H	G	S.F.B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rallidae	*Gallinula*	*chloropus*	2	3	O	G	S.F.B	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1
Rallidae	*Porphyrula*	*martinica*	2	4	H.I	W	N	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Heliornithidae	*Heliornis*	*fulica*	2	4	IN	W	F	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Charadriidae	*Vanellus*	*chilensis*	2	4	I,IN	G	S.F.B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	1
Charadriidae	*Pluvialis*	*dominica*	2	4	IN	W	S.F.B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Charadriidae	*Charadrius*	*wilsonia*	2	3	IN	G	S.F.B	0	1	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Charadriidae	*Charadrius*	*collaris*	2	3	IN	G	S	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Recurvirostridae	*Himantopus*	*mexicanus*	2	4	IN	W	S.F.B	1	0	0	1	1	0	0	0	0	1	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Jacanidae	*Jacana*	*spinosa*	2	3	I	G	F	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Jacanidae	*Jacana*	*jacana*	2	3	I	G	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Scolopacidae	*Arenaria*	*interpres*	2	4	IN	G	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Laridae	*Larus*	*cirrocephalus*	2	3	IN	G,W	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Terrestrial migrants																																															
Accipitridae	*Elanoides*	*forficatus*	1	2	C,IN	A	F	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Circus*	*buffoni*	1	3	C	AE	S.F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Accipitridae	*Circus*	*cyaneus*	1	3	C	A	F	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Accipiter*	*striatus*	1	2	C	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Buteo*	*lineatus*	1	2	C	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Buteo*	*platypterus*	1	2	C	A	N	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accipitridae	*Buteo*	*albonotatus*	1	2	C	AE	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Falconidae	*Falco*	*columbarius*	1	3	C,IN	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Falconidae	*Falco*	*peregrinus*	1	3	C	A	N	0	0	1	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cuculidae	*Coccyzus*	*americanus*	1	2	I	S,A	N	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Caprimulgidae	*Caprimulgus*	*carolinensis*	1	2	I	G	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae	*Sphyrapicus*	*varius*	1	1	IN	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Elaenia*	*parvirostris*	1	2	F	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Tyrannidae	*Contopus*	*borealis*	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Contopus*	*sordidulus*	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Contopus*	*virens*	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Empidonax*	*virescens*	1	1	H,I	S,A	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Empidonax*	*traillii*	1	1	H,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Empidonax*	*minimus*	1	1	H,I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Empidonax*	*oberholseri*	1	1	I	S,A	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Sayornis*	*phoebe*	1	2	I	S,A	N	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Sayornis*	*saya*	1	2	I	S,A	F	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Machetornis*	*rixosus*	1	2	I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Tyrannidae	*Myiarchus*	*swainsoni*	1	2	H,I	S,A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Tyrannidae	*Myiarchus*	*crinitus*	1	2	H,I	A	N	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Tyrannus*	*verticalis*	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Tyrannus*	*forficatus*	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyrannidae	*Tyrannus*	*tyrannus*	1	2	I	S,A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Vireonidae	*Vireo*	*solitarius*	1	1	I	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Vireo*	*flavifrons*	1	1	I	A	N	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Vireo*	*philadelphicus*	1	1	I	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Vireo*	*olivaceus*	1	1	I	S,A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0
Vireonidae	*Vireo*	*flavoviridis*	1	1	I	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vireonidae	*Vireo*	*gilvus*	1	1	I	S,A	N	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Cistothorus*	*platensis*	1	3	I	A	N	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Cistothorus*	*palustris*	1	3	C	H,S	F	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Troglodytidae	*Troglodytes*	*aedon*	1	2	I	G,H,S,A	N	0	0	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troglodytidae	*Polioptila*	*caerulea*	1	1	I	A	N	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regulidae	*Regulus*	*calendula*	1	1	I	S,A	N	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turdidae	*Catharus*	*fuscescens*	1	1	H,I	S	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turdidae	*Catharus*	*minimus*	1	1	H,I	S	N	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turdidae	*Catharus*	*ustulatus*	1	1	H,I	S,A	N	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Turdidae	*Turdus*	*migratorius*	1	1	H,I	S,A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mimidae	*Dumetella*	*carolinensis*	1	2	H,I	S	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Motacilidae	*Anthus*	*rubescens*	1	2	IN	G	S,F	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Vermivora*	*pinus*	1	1	I	G,H,S,A	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Vermivora*	*chrysoptera*	1	1	I	A	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Vermivora*	*peregrina*	1	1	I	H,S	N	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	0	0	1	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Vermivora*	*celata*	1	1	I	G,H,S,A	N	0	0	1	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Vermivora*	*ruficapilla*	1	1	I	H,S	N	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Parula*	*americana*	1	1	I	A	N	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*pensylvanica*	1	2	I	H,S	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*magnolia*	1	2	I	S,A	N	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*tigrina*	1	2	I	S,A	N	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*coronata*	1	2	I	H,S	N	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*nigrescens*	1	2	I	A	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*virens*	1	2	I	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*fusca*	1	2	I	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*dominica*	1	2	I	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*discolor*	1	1	I	S	N	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*palmarum*	1	2	I	H,S	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*castanea*	1	2	I	A	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Parulidae	*Dendroica*	*striata*	1	2	I	A	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0
Parulidae	*Mniotilta*	*varia*	1	2	I	G,H,S,A	N	0	0	0	1	0	0	0	1	0	1	1	0	1	0	0	1	1	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Parulidae	*Setophaga*	*ruticilla*	1	1	I	A	N	0	0	1	0	0	0	0	1	0	1	1	0	0	1	0	1	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0
Parulidae	*Protonotaria*	*citrea*	1	1	I	A	F	0	0	0	0	1	0	0	1	0	1	1	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	1	1	1	1	1	0	0	0	0	0
Parulidae	*Seiurus*	*aurocapillus*	1	1	I	G	S,F	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	1	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Seiurus*	*noveboracensis*	1	1	I	G	S,F	0	1	1	1	1	0	0	1	0	1	1	0	1	1	0	1	1	1	0	0	1	0	1	1	1	0	0	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0
Parulidae	*Seiurus*	*motacilla*	1	1	I	G	S,F	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Oporornis*	*formosus*	1	1	I	G	N	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Oporornis*	*philadelphia*	1	1	I	S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Oporornis*	*tolmiei*	1	1	I	G	N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Geothlypis*	*trichas*	1	1	I	H,S	S,F	0	1	1	0	1	0	0	0	0	1	1	0	1	1	0	1	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Wilsonia*	*citrina*	1	1	I	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Wilsonia*	*pusilla*	1	1	I	G,H,S,A	N	0	0	1	0	0	0	0	0	0	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Wilsonia*	*canadensis*	1	1	I	S,A	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parulidae	*Icteria*	*virens*	1	1	I	H,S	N	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraupidae	*Piranga*	*rubra*	1	1	IN	A	F	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraupidae	*Piranga*	*olivacea*	1	1	IN	A	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Pooecetes*	*gramineus*	1	2	IN	G	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Passerculus*	*sandwichensis*	1	2	I	H	N	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Ammodramus*	*savannarum*	1	2	H,IN	H	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Melospiza*	*lincolnii*	1	2	IN	H,S	N	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emberizidae	*Zonotrichia*	*leucophrys*	1	2	IN	H,S	N	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardinalidae	*Pheucticus*	*ludovicianus*	1	2	H,I	S	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardinalidae	*Passerina*	*cyanea*	1	2	I	S	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardinalidae	*Passerina*	*ciris*	1	2	I	H,S	N	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringillidae	*Carduelis*	*tristis*	1	2	F	H	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Icteridae	*Dolichonyx*	*oryzivorus*	1	2	H,I	H	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Xanthocephalus*	*xanthocephalus*	1	2	F	H	F	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Icteridae	*Icterus*	*spurius*	1	1	H,I	S,A	N	0	0	1	1	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aquatic migrants																																															
Podicipedidae	*Podilymbus*	*podiceps*	2	4	C,IN	W	N	0	0	1	1	1	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Podicipedidae	*Podiceps*	*auritus*	2	4	C,IN	W	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Podicipedidae	*Podiceps*	*nigricollis*	2	4	C,IN	W	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardeidae	*Egretta*	*rufescens*	2	4	C,IN	G	B	1	1	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ardeidae	*Botaurus*	*lentiginosus*	2	3	C,IN	H	B	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Anser*	*albifrons*	2	3	H	W	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Chen*	*caerulescens*	2	3	H	W	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Aix*	*sponsa*	2	4	F,0	W	S,F,B	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Anas*	*americana*	2	4	I	W	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Anas*	*fulvigula*	2	4	IN	G	F	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Anas*	*platyrhynchos*	2	4	F0	W	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Anas*	*discors*	2	4	IN	W	S,F,B	0	0	1	0	1	0	0	0	0	1	1	0	1	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Anatidae	*Anas*	*cyanoptera*	2	4	H	W	S,F,B	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Anas*	*clypeata*	2	4	H,IN	W	S,F,B	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Anas*	*bahamensis*	2	4	H	W	S	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1
Anatidae	*Anas*	*acuta*	2	4	I	H	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Anas*	*crecca*	2	4	IN	W	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Anas*	*versicolor*	2	4	IN	W	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Anatidae	*Aythya*	*valisineria*	2	4	IN	W	F	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Aythya*	*americana*	2	4	H	W	S,F,B	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Aythya*	*collaris*	2	4	O	W	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Aythya*	*affinis*	2	4	IN	W	S,F,B	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Bucephala*	*albeola*	2	4	IN	W	F	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae	*Mergus*	*serrator*	2	4	C,IN	W	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rallidae	*Porzana*	*carolina*	2	4	H,I	W	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rallidae	*Fulica*	*americana*	2	4	O	W	F	0	0	1	1	1	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Charadriidae	*Pluvialis*	*squatarola*	2	4	IN	W	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	1
Charadriidae	*Charadrius*	*semipalmatus*	2	3	IN	G	S,F,B	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	1	1
Charadriidae	*Charadrius*	*wilsonia*	2	3	IN	G	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Charadriidae	*Charadrius*	*melodus*	2	3	IN	G	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Charadriidae	*Charadrius*	*alexandrinus*	2	3	IN	G	S,F,B	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Charadriidae	*Charadrius*	*modestus*	2	3	IN	G	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Charadriidae	*Charadrius*	*vociferus*	2	3	IN	G	S,F,B	0	0	1	0	1	0	0	0	0	1	1	0	1	1	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Haematopodidae	*Haematopus*	*palliatus*	2	4	IN	W	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Recurvirostridae	*Himantopus*	*himantopus*	2	4	IN	W	S,F,B	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Recurvirostridae	*Recurvirostra*	*americana*	2	4	O	W	S,F,B	0	0	1	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Gallinago*	*gallinago*	2	3	IN	W	F	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Limosa*	*fedoa*	2	4	IN	G	S,F,B	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Limosa*	*haemastica*	2	4	IN	G	S,F,B	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Numenius*	*phaeopus*	2	4	IN	G	S	0	0	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Numenius*	*americanus*	2	4	IN	G	S	0	1	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Tringa*	*melanoleuca*	2	4	IN	G	S	0	1	1	1	0	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	1
Scolopacidae	*Tringa*	*flavipes*	2	4	IN	G	S	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	1
Scolopacidae	*Tringa*	*solitaria*	2	4	IN	G	S	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0
Scolopacidae	*Catoptrophorus*	*semipalmatus*	2	3	IN	W	N	0	0	1	1	1	0	1	0	1	1	1	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
Scolopacidae	*Heteroscelus*	*incanus*	2	4	IN	W	S,F,B	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Actitis*	*macularia*	2	4	IN	G	S,F,B	0	0	1	1	1	0	0	1	1	1	1	0	1	0	1	0	1	0	0	1	0	1	1	1	0	0	1	0	1	0	0	0	1	1	0	0	0	0	1	1

Scolopacidae	*Arenaria*	*interpres*	2	4	IN	G	S,F,B	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Limnodromus*	*griseus*	2	4	IN	G	S,F,B	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Limnodromus*	*scolopaceus*	2	4	IN	G	S,F,B	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Calidris*	*canutus*	2	4	IN	G	S	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Calidris*	*alba*	2	4	IN	G	S,F,B	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Calidris*	*pusilla*	2	4	IN	G	S,F,B	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
Scolopacidae	*Calidris*	*mauri*	2	4	IN	G	S,F,B	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Calidris*	*minutilla*	2	4	IN	G	S,F,B	0	0	0	1	1	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Calidris*	*fuscicollis*	2	4	IN	G	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Scolopacidae	*Calidris*	*bairdii*	2	4	IN	G	S,F,B	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Calidris*	*melanotos*	2	4	IN	G	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Calidris*	*alpina*	2	4	IN	G	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolopacidae	*Calidris*	*himantopus*	2	4	IN	G	S,F,B	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Larus*	*delawarensis*	2	4	O	AE	S,F,B	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Larus*	*dominicanus*	2	3	I	G,W	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Laridae	*Larus*	*argentatus*	2	4	S	AE	S,F,B	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Larus*	*philadelphia*	2	4	IN	AE	S,F,B	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Larus*	*atricilla*	2	4	O	AE	S,F,B	0	0	0	0	1	1	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Larus*	*pipixcan*	2	4	I	AE	S,F,B	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Sterna*	*nilotica*	2	4	C,IN	AE	S,F,B	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Sterna*	*caspia*	2	4	C,IN	AE	S,F,B	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Sterna*	*maxima*	2	4	C,IN	AE	S,F,B	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Sterna*	*elegans*	2	4	C,IN	AE	S,F,B	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Sterna*	*sandvicensis*	2	4	C,IN	AE	S,F,B	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Sterna*	*hirundo*	2	4	C,IN	AE	S,F,B	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Laridae	*Sterna*	*forsteri*	2	4	C,IN	AE	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Sterna*	*antillarum*	2	4	C,IN	AE	S,F,B	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Sterna*	*fuscata*	2	4	C,IN	AE	S,F,B	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Chlidonias*	*niger*	2	4	IN	AE	S,F,B	0	0	0	0	0	1	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laridae	*Rynchops*	*niger*	2	4	C,IN	W	N	0	0	0	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
Alcedinidae	*Ceryle*	*alcyon*	2	3	C,IN	S,A	S,F,B	1	0	1	1	1	0	0	1	0	1	1	0	1	1	1	1	1	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Aerial species																																															
Cathartidae	*Coragyps*	*atratus*	3	1	S	S,A	N	0	0	1	1	1	1	1	1	0	0	1	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	1	1
Cathartidae	*Cathartes*	*aura*	3	5	S	AE	N	0	0	1	1	1	1	1	1	0	1	1	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	1
Cathartidae	*Cathartes*	*burrovianus*	3	5	C	AE	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caprimulgidae	*Chordeiles*	*acutipennis*	3	1	I	G	N	0	1	1	1	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0
Caprimulgidae	*Chordeiles*	*minor*	3	1	I	G	N	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apodidae	*Streptoprocne*	*zonaris*	3	5	I	AE	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Apodidae	*Chaetura*	*vauxi*	3	5	I	AE	N	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apodidae	*Chaetura*	*brachyura*	3	5	I	AE	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Apodidae	*Chaetura*	*andrei*	3	5	I	AE	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Apodidae	*Chaetura*	*cinereiventris*	3	5	I	AE	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hirundinidae	*Progne*	*subis*	3	5	I	AE	N	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirundinidae	*Progne*	*tapera*	2	5	I	AE	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Hirundinidae	*Tachycineta*	*bicolor*	3	5	H,I	AE	N	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirundinidae	*Pygochelidon*	*cyanoleuca*	3	1	I	AE	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	1
Hirundinidae	*Stelgidopteryx*	*ruficollis*	3	5	I	AE	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1
Hirundinidae	*Stelgidopteryx*	*ruficollis*	3	5	I	AE	S,F,B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0
Hirundinidae	*Riparia*	*riparia*	3	5	I	G	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2. List of bird species in Australia, Gambia, and Malaysia mangroves (Cawkell 1964, Nisbet 1968, Ford 1982, Johnstone 1990, Noske 1995).

Genus	Species	Australia	Gambia	Malaysia
Accipiter	*novaehollandiae*	1	0	0
Accipiter	*virgatus*	0	0	1
Aceros	*plicatus*	0	0	1
Acridotheres	*fuscus*	0	0	1
Acrocephalus	*scirpaceus*	0	1	0
Aegithina	*tiphia*	0	0	1
Aethopyga	*siparaga*	0	0	1
Alcedo	*atthinis*	0	0	1
Alcedo	*cristata*	0	1	0
Alcedo	*pusilla*	1	0	0
Anhinga	*rufa*	0	1	0
Anthreptes	*gabonica*	0	1	0
Anthreptes	*longuemarei*	0	1	0
Anthreptes	*malacensis*	0	0	1
Antreptes	*sinalagensis*	0	0	1
Aplonis	*panayensis*	0	0	1
Apus	*affinis*	0	0	1
Apus	*pacificus*	0	0	1
Ardea	*alba*	0	1	1
Ardea	*cinerea*	0	1	1
Ardea	*goliath*	0	1	0
Ardea	*purpurea*	0	1	1
Ardea	*sumatrana*	1	0	1
Ardeola	*bacchus*	0	0	1
Ardeola	*ralloides*	0	1	0
Artamus	*leucorhynchus*	1	0	0
Bubulcus	*ibis*	0	1	0
Butorides	*striatus*	1	1	1
Cacomantis	*variolosus*	0	0	1
Caprimulgus	*macrurus*	0	0	1
Ceryle	*rudis*	0	1	0
Ceyx	*erithacus*	0	0	1
Ceyx	*rufidorsus*	0	0	1
Charadrius	*mongolus*	0	0	1
Chloropsis	*sonnerati*	0	0	1
Chrysococcyx	*minutillus*	1	0	0
Chrysocolaptes	*lucidus*	0	0	1
Cinnyris	*coccinigaster*	0	1	0
Circus	*aeruginosus*	0	1	0
Clamator	*coromandus*	0	0	1
Coliupasser	*macrourus*	0	1	0
Collocalia	*brevirostris*	0	0	1
Collocalia	*maxima*	0	0	1
Colluricincla	*megarhyncha*	1	0	0
Copsychus	*saularis*	0	0	1
Coracina	*striata*	0	0	1
Coracina	*tenuirostris*	1	0	0
Corvus	*enca*	0	0	1
Corvus	*macrorhynchus*	0	0	1
Corvus	*splendens*	0	0	1
Cracticus	*quoyi*	1	0	0
Cuculus	*fugax*	0	0	1
Cymbirhynchus	*macrorhynchos*	0	0	1
Dendrocopos	*canicapillus*	0	0	1
Dendrocopos	*moluccensis*	0	0	1
Dicaeum	*cruentatum*	0	0	1
Dicrurus	*annectans*	0	0	1
Dicrurus	*leucophaeus*	0	0	1

Dinopium	*javanense*	0	0	1
Dryocopus	*gambensis*	0	1	0
Dryocopus	*javensis*	0	0	1
Ducula	*aenea*	0	0	1
Ducula	*badia*	0	0	1
Ducula	*bicolor*	0	0	1
Egretta	*ardesiaca*	0	1	0
Egretta	*eulophotes*	0	0	1
Egretta	*garzetta*	0	1	1
Egretta	*gularis*	0	1	0
Egretta	*intermedia*	0	0	1
Elminia	*longicauda*	0	1	0
Eopsaltria	*pulvurulenta*	1	0	0
Eudynamis	*scolopacea*	0	0	1
Eulabeornis	*castaneoventris*	1	0	0
Eurystomus	*orientalis*	0	0	1
Falco	*peregrinus*	0	0	1
Ficedula	*zanthopygia*	0	0	1
Gallicrex	*cinerea*	0	0	1
Geopelia	*humeralis*	1	0	0
Gerygone	*fusca*	0	0	1
Gerygone	*levigaster*	1	0	0
Gerygone	*magnirostris*	1	0	0
Gerygone	*sulphurea*	0	0	1
Gerygone	*tenebrosa*	1	0	0
Gracula	*religiosa*	0	0	1
Gypohierax	*angolensis*	0	1	0
Halcyon	*chloris*	1	0	1
Halcyon	*coromanda*	0	0	1
Halcyon	*malimbica*	0	1	0
Halcyon	*pileata*	0	0	1
Halcyon	*smyrnensis*	0	0	1
Haliaeetus	*leucogaster*	0	0	1
Haliaeetus	*vocifer*	0	1	0
Haliastur	*indus*	0	0	1
Hemiprocne	*longipennis*	0	0	1
Hirundo	*abyssinica*	0	1	0
Hirundo	*rustica*	0	0	1
Hirundo	*tahitica*	0	0	1
Hypergerus	*atriceps*	0	1	0
Hyphanturgus	*brachypterus*	0	1	0
Ketupa	*ketupu*	0	0	1
Lalage	*leucolema*	1	0	0
Lalage	*nigra*	0	0	1
Laniarius	*barbarus*	0	1	0
Leptotilus	*javanicus*	0	0	1
Lichenostomus	*versicolor*	1	0	0
Limosa	*limosa*	0	0	1
Lophocerus	*nasutus*	0	1	0
Loriculus	*galgulus*	0	0	1
Lybius	*bidentatus*	0	1	0
Macronous	*gularis*	0	0	1
Macronyx	*croceus*	0	1	0
Megalaima	*haemacephala*	0	0	1
Merops	*philippinus*	0	0	1
Merops	*viridis*	0	0	1
Microeca	*flavigaster*	1	0	0
Microeca	*tormenti*	1	0	0
Micropternus	*brachyurus*	0	0	1
Motacilla	*flava*	0	0	1
Motacilla	*indica*	0	0	1
Mulleripicus	*pulverulentus*	0	0	1
Muscicapa	*aquatica*	0	1	0
Muscicapa	*latirostris*	0	0	1
Muscicapa	*rufigastra*	0	0	1
Mycteria	*cinerea*	0	0	1
Myiagra	*alecto*	1	0	0
Myiagra	*ruficollis*	1	0	0
Myzomela	*erythrocephala*	1	0	0
Myzomela	*obscura*	1	0	0
Nectarinia	*chalcostetha*	0	0	1
Nectarinia	*jugularis*	0	0	1

Nectarinia	*sperata*	0	0	1
Ninox	*scutulata*	0	0	1
Numenius	*phaeopus*	0	0	1
Numida	*meleagris*	0	1	0
Nycticorax	*leuconotus*	0	1	0
Nycticorax	*nycticorax*	0	1	1
Oriolus	*chinensis*	0	0	1
Orthotomus	*atrogularis*	0	0	1
Orthotomus	*sepium*	0	0	1
Orthotomus	*sericeus*	0	0	1
Orthotomus	*sutorius*	0	0	1
Otus	*scops*	0	0	1
Pachycephala	*cinerea*	0	0	1
Pachycephala	*lanioides*	1	0	0
Pachycephala	*melanura*	1	0	0
Pachycephala	*simplex*	1	0	0
Pandion	*haliaetus*	0	1	1
Parus	*major*	0	0	1
Pelargopsis	*amauropterus*	0	0	1
Pelargopsis	*capensis*	0	0	1
Pericrocotus	*divaricatus*	0	0	1
Pericrocotus	*roseus*	0	0	1
Phaenicophaeus	*sumatranus*	0	0	1
Phalacrocorax	*africanus*	0	1	0
Philemon	*buceroides*	1	0	0
Phylloscopus	*borealis*	0	0	1
Phylloscopus	*collybita*	0	1	0
Phylloscopus	*fuscata*	0	0	1
Phylloscopus	*trochilus*	0	1	0
Picoides	*moluccensis*	0	0	1
Picus	*mentalis*	0	0	1
Picus	*miniaceus*	0	0	1
Picus	*vittatus*	0	0	1
Pitta	*brachyura*	0	0	1
Pitta	*iris*	1	0	0
Pitta	*megarhyncha*	0	0	1
Platysteira	*cyanea*	0	1	0
Ploceus	*cucullatus*	0	1	0
Prionochilus	*percussus*	0	0	1
Psittacula	*longicauda*	0	0	1
Psittinus	*cyanurus*	0	0	1
Ptilonopus	*jambu*	0	0	1
Pycnonotus	*atriceps*	0	0	1
Pycnonotus	*barbatus*	0	1	0
Pycnonotus	*goiavier*	0	0	1
Pycnonotus	*plumosus*	0	0	1
Pycnonotus	*zeylanicus*	0	0	1
Rhiphidura	*rufifrons*	1	0	0
Rhipidura	*dryas*	1	0	0
Rhipidura	*javanica*	0	0	1
Rhipidura	*phasiana*	1	0	0
Sitta	*frontalis*	0	0	1
Spermophaga	*haematina*	0	1	0
Sphenurus	*seimundi*	0	0	1
Spilornis	*cheela*	0	0	1
Spizaetus	*cirrhatus*	0	0	1
Streptopelia	*chinensis*	0	0	1
Streptopelia	*semitorquata*	0	1	0
Strix	*leptogrammica*	0	0	1
Sylvia	*cantillans*	0	1	0
Tchagra	*senegala*	0	1	0
Telophorus	*sulfureopectus*	0	1	0
Tephrodornis	*gularis*	0	0	1
Terpsiphone	*atrocaudata*	0	0	1
Terpsiphone	*paradisi*	0	0	1
Treron	*curvirostra*	0	0	1
Treron	*fulvicollis*	0	0	1
Treron	*vernans*	0	0	1
Trichastoma	*rostratum*	0	0	1
Tringa	*hypoleucus*	0	0	1
Tringa	*terek*	0	0	1
Tringa	*totanus*	0	0	1

Turtur	*afer*	0	1	0
Uraeginthus	*bengalus*	0	1	0
Zosterops	*lutea*	1	0	0
Zosterops	*palpebrosa*	0	0	1

Table 3. Summary of field work carried out as part of this study.

Locality	Period
La Mancha, Veracruz	8-12 July 1996; 11-18 February 1997
La Encrucijada, Chiapas	15 July - 1 August 1996; 23-28 February 1997
Dzilám de Bravo, Yucatán	16-18 December 1997
La Playa Dos, Tamaulipas	19-25 January1997; 18-21 May 1998
Aguachil, San Francisco Ixhuatán	9-15 March 1997; 15-19 October 1998
Los Ebanos, Tamaulipas	18-21 April 1997; 27-28 April 1998
Barra de Santiago and Jiquilisco,Salvador	1-18 July
Puerto Morelos, Quintana Roo	20-21 December 1997; 18-22 February 1998; 2-6 September 1998
Dzilám de Bravo, Yucatán	25 February - 4 March 1998
Calakmul, Campeche	June-Aug 1998
Marismas Nacionales, Sinaloa and Nayarit	1-10 October 1998

Tabla 4. Characteristics of bird species at 39 New World mangrove localities.

	Status			Restriction			Habits			Nesting habitat			Location				Feeding stratus					Water preference				Food habits									
Locality	Breeding	Non-breeding	Threaten	Only mangroves	Locally confined	Man. and other habitats	Terrestrial	Aquatic	Aerieal	No in mangroves	Only in mangroves	Man. and other vegetation	Mangrove interior	Mangrove border, land side	Mangrove border. water side	Open water	Water	Ground	Herbs	Shrubs	Arboreal	No preference	Fresh water	Brackish	Salt water	Nectar	Fruits and seeds	Herbs	Insects	Non-insect invertebrates	Vertebrates	Scavengers	Total species richness	Field work effort	Visits
Margarita	18	11	2	1		28	13	15	1	19	1	9	7	7	5	10	2	13	4	11	10	13	12	13	15	0	4	1	10	15	8	0	29		
Marismas Nacionales	84	26	4	1	58	109	66	35	9	74	2	33	34	29	19	22	17	26	18	49	63	69	38	29	32	1	22	14	37	49	38	2	110	7 days	1
Aguachil	70	21	1	1	37	89	56	31	3	51	1	37	34	23	14	19	13	25	12	39	55	61	25	22	24	1	28	11	18	44	27	2	91	13 days	2
La Encrucijada	106	21	4	2	35	125	72	51	4	69	3	54	46	19	29	30	19	21	13	47	78	72	48	40	43	1	30	14	35	60	46	2	127	5 months	
Jiquilisco	50	12	1	2		60	37	20	5	32	2	28	20	14	13	13	5	7	7	27	37	41	19	17	20	2	19	3	19	16	19	2	62	5 days	1
Barra de Santiago	50	3	1	2		51	34	15	4	23	2	28	18	14	11	8	11	15	10	35	33	60	13	12	13	0	8	18	19	22	15	2	53	7 days	1
Jesús María river	35	19	2	2		52	24	27	3	29	3	22	12	10	5	25	7	13	9	18	36	25	26	23	26	1	9	9	12	30	23	3	54	~40 days	2
Golfito	17	9	3	1		25	5	20	1	11	2	13	3	1	8	13	5	9	1	7	12	5	19	18	20	1	1	2	4	18	12	0	26		
Florida Keys	44	124	4	2		166	107	56	6	139	1	28	42	61	20	40	19	47	29	63	81	100	55	47	55	1	20	26	68	84	41	1	168	years	
Everglades	54	99	6	3		172	93	74	8	139	1	35	45	43	25	56	32	53	24	58	76	90	72	57	66	1	16	23	66	81	46	2	175	years	
Playa Dos	29	25	1	1	12	50	34	18	2	31	2	21	19	15	8	11	8	16	16	30	29	30	22	16	18	0	9	8	20	22	20	1	54	14 days	2
La Mancha	80	37	6	0	8	137	83	51	3	89	2	46	39	36	28	32	18	27	22	56	79	82	49	43	47	3	32	16	44	69	46	2	137	2 years	15
Petenes de Campeche	64	18	3	1	25	81	43	34	5	43	3	36	20	23	16	21	12	27	12	30	39	46	30	26	30	0	11	8	23	38	30	2	82	years	
Dzilám de Bravo	118	44	4	1	48	161	101	51	10	105	4	53	58	41	28	30	22	36	23	71	97	104	50	37	43	5	34	18	57	71	46	2	162	1 year	
Puerto Morelos	39	8	0	1	32	46	17	27	3	21	3	23	9	9	13	15	9	19	8	15	21	19	25	22	23	1	3	8	13	23	24	0	47	10 days	2
Cozumel	28	22	2	0	27	60	32	23	5	37	1	22	29	10	9	18	7	12	8	22	33	27	20	18	23	14	8	7	20	18	22	2	60	12 days in a year	12
Omoa	33	5	2	0		38	24	11	3	25	0	13	11	15	8	3	1	10	6	16	26	28	10	8	8	0	7	7	13	18	13	2	38		
Utila	24	18	2	0		42	29	12	1	25	0	17	11	15	9	7	3	12	6	20	22	27	13	12	14	1	5	7	20	19	14	0	42		
Guanaja	22	11	1	0		33	26	7	0	21	1	11	10	13	8	2	0	10	6	15	19	22	11	11	11	1	3	6	19	10	12	0	33		
San Lorenzo	33	15	1	1		47	39	7	2	27	0	21	22	16	4	4	2	11	6	25	33	40	5	4	7	0	19	5	17	17	5	0	48		
Roatán	24	39	3	0		63	54	7	2	49	1	13	27	23	10	2	0	11	11	34	40	49	13	11	12	1	13	5	37	19	10	0	63		
Cayo Matías	17	2	0	2		17	12	7	0	4	1	14	6	6	1	6	3	7	3	10	10	12	4	2	6	0	2	3	6	7	5	0	19	4 days	1
Juan Díaz	29	12	0	3		52	49	6	0	38	3	14	30	17	6	2	1	9	15	37	39	46	9	7	7	2	15	2	30	16	5	0	57	1 year	12
Galeta	70	13	0	3		77	73	7	0	58	2	19	41	28	9	2	0	10	21	47	55	68	12	9	9	4	24	4	38	31	10	0	82	1 year	12
Galapagos	10	4	1	2		12	7	7	0		2	12	2	5	4	4	3	5	2	7	6	7	4	3	7	0	2	0	4	7	4	0	14		
Cayapas-Mataje	74	14	3	0		88	54	20	4	66	20	2	36	24	16	9	5	17	8	25	49	65	16	6	16	0	26	5	35	29	19	1	88		
Puerto Pizarro	58	27	3	2		83	40	38	7	55	2	28	20	22	16	4	12	26	12	24	35	51	26	14	32	1	15	4	12	32	23	2	85		
Onverwagt	27	39	0	3		63	39	24	3	32	3	31	23	15	9	17	6	18	8	27	37	41	19	16	22	0	11	6	27	37	16	2	66	1 day	1
Hope	41	5	0	2		44	36	8	2	18	2	26	22	13	6	4	1	9	9	26	29	35	8	6	9	0	10	3	23	20	9	1	46	2 days	1
French Guyana	26	47	0	2		71	73	0	0	47	2	24	46	25	2	0	0	4	9	35	57	71	2	2	2	1	27	4	40	29	3	0	73	years	
Surinam	59	28	3	2		85	64	20	3	29	5	53	43	18	18	7	4	16	9	42	61	63	23	21	22	1	18	2	38	36	23	2	87	years	
Trinidad	43	51	2	2		87	54	36	3	36	4	49	31	23	23	17	12	20	8	42	52	52	34	24	32	1	12	8	37	49	24	1	94	years	
Maracaibo	41	20	1	3		58	39	20	2	39	1	21	20	17	9	13	5	16	11	32	29	39	15	14	21	0	9	7	25	33	18	2	61	1 year	11
Chiguana	44	25	0	3		66	65	3	1	47	1	21	35	29	5	0	0	9	13	50	54	59	11	9	9	9	19	4	36	20	2	0	69	2 year	
Cariaco	53	7	0	2		58	57	2	1	39	2	19	28	27	4	0	0	6	7	40	44	52	8	7	7	4	18	2	35	18	1	0	60	1 year	
Chacopata	14	6	0	2		18	20	0	0	13	1	6	11	9	0	0	0	3	2	14	14	17	2	1	2	2	0	3	16	5	0	0	20	1 year	
East of Pará	17		0	0		17	11	6	0		0	17	8	3	1	5	11	5	0	4	10	11	4	1	6	0	3	0	9	7	3	1	17	-	2
Guanabara	51	15	0	0		66	35	28	3	36	0	30	13	23	16	12	7	17	11	30	22	41	21	7	18	3	13	2	30	28	14	2	66	2 years	24
Santos-Cubatão	68	30	4	0		98	48	42	8	59	2	37	19	30	22	22	18	26	8	28	39	60	35	12	29	0	19	7	35	39	27	3	98	-	

Table 5. Bird species lists for nine mangrove localities and one non-mangrove locality (Los Ebanos) by vegetation type, excluding aquatic species not found in estuaries, denuded beaches, and aerial species for the analyses, but are listed without a vegetation type asociated. A: aquatic vegetation, D: dune, G: grassland, Man: mangrove, TDF: tropical deciduous forest, TSF: tropical semideciduous forest, S: scrub. Additional information on this localities and species lists can be found in Appendix 1.

Genus	Species	Marismas Nacionales	Aguachil	La Encrucijada	Ebanos	Playa Dos	La Mancha	Petenes Campeche	Dzilám de Bravo	Puerto Morelos	Cozumel
Accipiter	*cooperi*		MAN				TSF, D, G, TDF				
Accipiter	*striatus*				S		TSF, D, TDF				
Actitis	*macularia*	MAN,	MAN, TDF	MAN	S		MAN		MAN		MAN
Agamia	*agami*			MAN		MAN					
Agelaius	*phoeniceus*	MAN, TSF		G, A	S	MAN, TDF, S	MAN, G	MAN, P, A	MAN, S	TSF	
Agriocharis	*ocellata*								TDF		
Aimophila	*botterii*							TDF	S, TDF		
Aimophila	*ruficauda*		MAN, S, TDF								
Aimophila	*rufescens*	TSF									
Ajaia	*ajaja*	MAN,	MAN	MAN	S	MAN	MAN	MAN, P	MAN	MAN	MAN
Amaurolimnas	*concolor*						MAN				
Amazilia	*candida*		S, TDF						TDF	TSF	
Amazilia	*rutila*	MAN, TSF	MAN, S, TDF	MAN, TSF				TDF	MAN, S, TDF	TSF, MAN	
Amazilia	*tzacatl*						D		MAN, TDF		
Amazilia	*yucatanensis*				S	TDF, S	MAN, D, TDF		MAN, S, TDF	TSF	
Amazona	*albifrons*		MAN	MAN, TSF, G			MAN		S		
Amazona	*auropalliata*			MAN, TSF, G							
Amazona	*finschi*	MAN, TSF	MAN	MAN, TSF			TSF, G, TDF				
Amazona	*oratrix*					TDF					
Amazona	*viridiginalis*					TDF	MAN				
Amazona	*xantholora*							P	TDF	TSF	MAN, TDF
Amblycercus	*holosericeus*			MAN, TSF, A				P	MAN, S, TDF	TSF	
Ammodramus	*savannarum*	TSF									
Anas	*acuta*										
Anas	*americana*				S						
Anas	*clypeata*	MAN		MAN	S						
Anas	*crecca*				S						
Anas	*cyanoptera*				S						
Anas	*discors*	MAN		MAN	S		MAN				MAN, TDF
Anas	*platyrhynchos*				S						
Anhinga	*anhinga*	MAN		MAN			MAN	MAN, P	MAN	MAN	MAN
Anthracothorax	*prevostii*								S, TDF		TDF
Anthus	*rubescens*				S		G				
Anthus	*spragueii*		MAN				D, G				
Aramides	*axillaris*							MAN, P	MAN	MAN	
Aramides	*cajanea*		MAN	MAN, TSF			MAN	MAN, P	MAN, S, TDF	MAN	

Aramus	*guarauna*		MAN	MAN, A				MAN, A	MAN.		
Aratinga	*nana*	MAN, TSF	MAN, TDF			TDF	MAN, TSF, D, G, TDF		MAN, S, TDF	TSF	
Aratinga	*canicularis*		MAN	MAN, A							
Aratinga	*holochlora*			MAN, TSF							
Archilochus	*colubris*		S, TDF		S	S	TSF, G		S, TDF	TSF	
Ardea	*alba*	MAN	MAN	MAN, TSF, G, A	S	MAN	MAN, G	MAN, A	MAN	MAN	MAN, TDF
Ardea	*herodias*	MAN	MAN	MAN, A	S	MAN	MAN	MAN, A	MAN	MAN	MAN
Arenaria	*interpres*					MAN					
Arremonops	*chloronotus*							TDF	TDF	TSF	
Arremonops	*rufivirgatus*				S	TDF, S					
Attila	*spadiceus*	TSF		MAN, TSF, G			G		MAN, S, TDF	TSF	TDF
Asturina	*nitida*	TSF	MAN, S	TSF, G	S	TDF, S	TSF, D, G, TDF	TDF	MAN	TSF, MAN	
Auriparus	*flaviceps*					TDF					
Aythya	*affinis*	MAN	MAN								
Aythya	*americana*				S						
Aythya	*valiserina*										
Basileuterus	*culicivorus*					TDF					
Bombicilla	*cedrorum*		MAN, TDF			TDF, S	TSF, D, TDF				
Botaurus	*lentiginosus*			MAN, A							
Brotogeris	*jugularis*			MAN, TSF, G							
Bubo	*virginianus*				S			P	TDF	TSF	
Bubulcus	*ibis*	TSF	MAN, S, TDF	MAN	S		MAN, D, G	MAN	MAN	MAN	MAN
Burhinus	*bistriatus*		MAN								
Busarellus	*nigricollis*			MAN, A							
Buteo	*albonotatus*				S	TDF, S	MAN		S		
Buteo	*brachyurus*		MAN		S	TDF, S	TSF	TDF	S, TDF		
Buteo	*jamaicensis*				S	S	D, TDF				
Buteo	*magnirostris*	MAN, TSF	MAN, S, TDF	PAL, TSF, A	S	TDF	TSF, D, G, TDF	TDF	MAN, S, TDF	TSF, MAN, D	MAN, TDF
Buteo	*platypterus*					TDF, S	TSF, D				
Buteo	*swainsoni*				S	TDF, S	TDF				
Buteogallus	*anthracinus*	MAN, TSF	MAN	MAN		MAN, TDF	MAN, TSF, D, G, TDF		MAN	MAN	
Buteogallus	*subtilis*			MAN							
Buteogallus	*urubitinga*	TSF		MAN			MAN, TSF, D, G, TDF	MAN, A	MAN, TDF		
Butorides	*virescens*	MAN,	MAN	MAN, G			MAN, D	MAN	MAN	MAN	MAN
Cacicus	*melanicterus*	MAN, TSF	TDF	MAN, TSF							
Cairina	*moschata*			MAN			MAN	MAN			
Calidris	*alpina*				S						
Calidris	*alba*	MAN						MAN		MAN, D	
Calidris	*canutus*										
Calidris	*fuscicollis*							MAN			
Calidris	*himantopus*										
Calidris	*mauri*	MAN			S						
Calidris	*melanotus*										
Calidris	*minutilla*	MAN	MAN	MAN							
Calidris	*pusilla*										
Callipepla	*douglasii*	TSF									
Calocitta	*colliei*	MAN, TSF									
Calocitta	*formosa*		MAN, S, TDF	MAN, TSF, G, A							
Campephilus	*guatemalensis*	TSF		MAN, TSF					MAN	TSF	
Camptostoma	*imberbe*	TSF				S	TSF, D, TDF		MAN, S, TDF	TSF	TDF
Campylopterus	*curvipennis*									TSF	
Campylorhynchus	*brunneicapillus*				S	TDF					

Campylorhynchus	*chiapensis*			MAN, PAL, TSF, G							
Campylorhynchus	*rufinucha*			TSF, G, A			D, G				
Campylorhynchus	*yucatanicus*								S		
Campylorhynchus	*zonatus*						MAN, TSF, D, G, TDF				
Caprimulgus	*badius*								S		
Caprimulgus	*carolinensis*					TDF, S					
Caprimulgus	*ridgwayi*								TDF		
Caprimulgus	*vociferus*					D	TDF		TDF		
Cardinalis	*cardinalis*				S	TDF, S	D, G, TDF		S, TDF		TDF
Cardinalis	*sinuatus*				S		D, TDF				
Carduelis	*psaltria*						D, G				
Cathartes	*aura*	MAN, TSF	MAN, S, TDF	MAN, G	S	TDF, S, D	MAN, TSF, D, G, TDF	MAN, TDF, A			MAN, TDF
Cathartes	*burrovianus*								MAN		
Catharus	*guttatus*				S	S	TSF, TDF				
Catharus	*minimus*						TSF, TDF				
Catharus	*ustulatus*	TSF					TSF, TDF		MAN, TDF		
Catoptrophorus	*semipalmatus*	MAN	MAN	MAN, D	S	D	MAN		MAN		
Ceryle	*alcyon*	MAN	MAN, S	MAN, A			MAN	MAN, TDF	MAN	MAN	TDF
Ceryle	*torquata*	MAN		MAN	S	MAN	MAN		MAN		
Chaetura	*pelagica*										
Chaetura	*vauxi*									TSF	
Charadrius	*alexandrinus*										
Charadrius	*collaris*	MAN									
Charadrius	*melodus*										
Charadrius	*semipalmatus*		MAN								
Charadrius	*vociferous*	MAN		MAN	S	D	MAN	MAN	MAN		
Charadrius	*wilsonia*	MAN			S		MAN	MAN			
Chlidonias	*niger*										
Chloroceryle	*aenea*			MAN A			MAN	MAN, P, A	MAN	MAN	MAN, TDF
Chloroceryle	*amazona*	MAN		MAN			MAN				
Chloroceryle	*americana*			MAN	S	MAN	MAN	P	MAN	MAN	
Chlorostilbon	*canivetii*						TSF, D, G		S, TDF	TSF	MAN, TDF
Chondestes	*grammacus*	TSF			S						
Chondrohierax	*uncinatus*	MAN, TSF		MAN							
Chordeiles	*acutipennis*	MAN, TSF	MAN	A				MAN, P	MAN, S, TDF		
Chordeiles	*minor*	MAN		G	S	S	D, G	MAN, P	MAN, TDF		
Ciccaba	*nigrolineata*			MAN, TSF							
Ciccaba	*virgata*	MAN, TSF	MAN, S, TDF	MAN, G						TSF	
Circus	*cyaneus*	MAN, TSF				TDF	D, G				
Cistothorus	*palustris*				S						
Claravis	*pretiosa*			MAN, TSF					MAN, TDF		
Coccyzus	*americanus*	TSF			S	TDF	TSF		TDF		
Coccyzus	*erythrophthalmus*								TDF		
Coccyzus	*minor*	MAN		MAN		TDF	MAN, TDF		MAN		MAN
Cochlearius	*cochlearius*			MAN			MAN		MAN		MAN
Coereba	*flaveola*									TSF	MAN, TDF
Colinus	*nigrogularis*								S, TDF		
Colinus	*virginianus*				S	TDF, S	D, G				
Columba	*flavirostris*	MAN, TSF	MAN, S, TDF	MAN, TSF, G	S	TDF, S	MAN, TSF, D, G, TDF	TDF, A	MAN, TDF	TSF	
Columba	*leucocephala*										MAN, TDF
Columbina	*inca*	MAN, TSF	MAN, S, TDF	MAN, PAL, TSF, G, A	S	TDF, S	MAN, TSF, D, G, TDF				TDF
Columbina	*passerina*	MAN, TSF	MAN, S, TDF		S	MAN, TDF, S	MAN, D, G, TDF	MAN, TDF, A	MAN, TDF	MAN	TDF

Columbina	*talpacoti*	TSF	MAN, S, TDF	MAN, PAL, G		MAN	D, G, TDF	MAN, TDF	MAN, TDF		
Contopus	*borealis*										
Contopus	*cinereus*						TSF, D, G, TDF		TDF	TSF	
Contopus	*pertinax*	TSF									
Contopus	*sordidulus*					TDF					
Contopus	*virens*						TSF, D, TDF				
Coragyps	*atratus*	MAN	MAN	MAN, PAL, G, D	S	TDF, S	MAN, TSF, G	MAN, TDF	MAN		MAN, TDF
Corvus	*corax*	TSF									
Corvus	*cryptoleucus*				S	TDF, S					
Corvus	*imparatus*				S	MAN, TDF, S					
Corvus	*sinaloae*	MAN, TSF									
Crotophaga	*sulcirostris*	TSF	MAN, S, TDF	TSF, G, A	S	MAN, TDF, S	MAN, D, G	MAN, P, TDF	MAN, S, TDF		
Crypturellus	*cinnamomeus*					TDF	TDF	P	S, TDF	TSF	
Cyanocompsa	*cyanoides*									TSF	
Cyanocompsa	*parellina*	TSF			S	TDF, S	MAN, TSF, D, G, TDF		MAN, TDF	TSF	
Cyanocorax	*beecheii*	MAN, TSF									
Cyanocorax	*morio*					TDF, S	MAN, TSF, D, TDF		TDF	TSF	
Cyanocorax	*sanblasianus*	MAN									
Cyanocorax	*yncas*				S	TDF, S		TDF	TDF	TSF	
Cyanocorax	*yucatanicus*							TDF	MAN, S, TDF	TSF	
Cyclarhis	*gujanensis*							P	MAN, S, TDF	TSF	MAN, TDF
Cynanthus	*latirostris*						MAN, TDF				
Dendrocincla	*anabatina*								TDF	TSF	
Dendrocincla	*homochroa*			MAN, TSF					TDF	TSF	
Dendrocolaptes	*certhia*									TSF	
Dendrocygna	*autumnalis*	MAN	MAN	MAN, A	S	MAN	MAN, D, G		MAN	MAN	
Dendrocygna	*bicolor*	MAN									
Dendroica	*castanea*						G		TDF		TDF
Dendroica	*coronata*	TSF		MAN, TSF, G		TDF	TDF	MAN, P	MAN, S, TDF		
Dendroica	*discolor*										
Dendroica	*dominica*					TDF	MAN, D, G, TDF	MAN	S, TDF	TSF, MAN	
Dendroica	*fusca*						G				
Dendroica	*magnolia*			MAN, TSF, G		S	TSF, D, G, TDF	P	MAN, S, TDF	TSF	MAN, TDF
Dendroica	*nigrescens*	TSF									
Dendroica	*occidentalis*						D				
Dendroica	*palmarum*						D	MAN	S, TDF		MAN, TDF
Dendroica	*pensylvanica*						D		TDF	TSF	MAN
Dendroica	*petechia aestiva*	TSF		TSF	S	TDF, S	TSF, D, G	P	S		
Dendroica	*petechia erythacori*	MAN	MAN	MAN		MAN	MAN	MAN	MAN, TDF	MAN	
Dendroica	*petechia rufivertex*										MAN, TDF
Dendroica	*virens*					S	TSF		TDF	TSF	MAN
Dives	*dives*		MAN, TDF	TSF, G			MAN, TSF, D, G, TDF	P, TDF	MAN, S	TSF, MAN	
Doricha	*eliza*						MAN		S, TDF		
Dryocopus	*lineatus*	MAN, TSF		MAN, TSF, G, A		TDF	MAN, TSF, D, G, TDF	MAN, P	MAN, TDF	TSF	
Dumetella	*carolinensis*				S	TDF, S	TSF, D, TDF	P	S, TDF	TSF	TDF
Egretta	*caerulea*	MAN	MAN	MAN, A	S	MAN	TSF, D, G, TDF	MAN	MAN	MAN	MAN
Egretta	*rufescens*		MAN	MAN,	S	MAN		MAN	MAN	MAN	MAN
Egretta	*thula*	MAN	MAN	MAN, A	S	MAN	MAN, G	MAN	MAN	MAN	MAN
Egretta	*tricolor*	MAN	MAN	MAN,	S	MAN	MAN, D, G	MAN, A	MAN	MAN	MAN
Elaenia	*flavogaster*								MAN, S, TDF		
Elaenia	*martinica*										TDF
Elanoides	*forficatus*					TDF	MAN				

Elanus	*leucurus*	MAN			S	TDF, S	G		MAN, TDF		
Empidonax	*albigularis*	TSF	MAN, TDF	MAN, TSF		TDF, S					
Empidonax	*alnorum*						D				
Empidonax	*difficilis*	TSF	MAN, TDF				D, G				
Empidonax	*flaviventris*						TSF, D, G		TDF	TSF	
Empidonax	*hammondi*	TSF									
Empidonax	*minimus*					TDF, S	TSF, G, TDF		MAN, S, TDF	TSF	
Empidonax	*oberholseri*	MAN, TSF									
Empidonax	*traillii*	MAN, TSF				S	MAN, TSF, D, G, TDF				
Empidonax	*virescens*						TDF		TDF		
Eremophila	*alpestris*				S						
Eudocimus	*albus*	MAN	MAN	MAN	S	MAN	MAN	MAN, P	MAN	MAN	MAN, TDF
Eumomota	*superciliosa*							TDF	TDF		
Euphonia	*affinis*	MAN, TSF	TDF				TSF, G, TDF		S, TDF		
Euphonia	*hirundinacea*						D		S, TDF	TSF	
Euthlypis	*lachrymosa*	TSF									
Falco	*columbarius*						D, TDF		TDF		MAN
Falco	*femoralis*										
Falco	*peregrinus*	MAN, TSF		A			MAN, D, G	MAN	MAN, S, TDF		
Falco	*rufigularis*	MAN, TSF						MAN, P			
Falco	*sparverius*	MAN, TSF			S	MAN, TDF, S	G		TDF		
Forpus	*cyanopygius*	TSF									
Fregata	*magnificens*	MAN		MAN, D	S		MAN		MAN		MAN
Fulica	*americana*	TSF	MAN	MAN, A	S		MAN		MAN	MAN	
Gallinago	*gallinago*										
Gallinula	*chloropus*	MAN, TSF		MAN, A			MAN		S	MAN	
Geococcyx	*californianus*				S	TDF, S					
Geococcyx	*velox*	TSF	S, TDF				D, TDF		S, TDF		
Geothlypis	*flavovelata*						MAN, D, G				
Geothlypis	*poliocephala*	TSF	TDF	MAN		MAN, TDF	MAN, TSF, D		MAN, S		
Geothlypis	*trichas*	MAN		MAN	S	MAN, TDF, S, D	D, G	A	MAN, S	TSF	MAN, TDF
Geotrygon	*montana*	TSF							TDF	TSF	
Geranospiza	*caerulescens*	MAN, TSF	TDF				TDF	MAN			
Glaucidium	*brasilianum*	MAN, TSF	MAN, S, TDF	MAN, TSF, G, A		TDF, S	MAN, TSF, G, TDF	MAN, P	MAN, S, TDF	TSF	
Glaucidium	*palmarum*	TSF									
Granatellus	*sallaei*								TDF	TSF	
Guiraca	*caerulea*	TSF	TDF			TDF, S	MAN, TSF	P, TDF	TDF		
Habia	*fuscicauda*								TDF	TSF	
Habia	*rubica*	TSF		MAN, TSF						TSF	
Haematopus	*palliatus*	MAN									
Harpagus	*bidentatus*								TDF		
Heliornis	*fulica*			MAN, A							
Helmintheros	*vermivorus*					S				TSF	MAN, TDF
Henicorhina	*leucosticta*									TSF	
Herpetotheres	*cachinnans*	MAN, TSF		MAN, TSF, G			TSF, D, TDF	MAN, P	S, TDF	TSF, MAN, D	
Heteroscelus	*incanus*	MAN									
Himantopus	*mexicanus*		MAN	MAN	S		MAN	MAN			MAN
Petrochelidon	*fulva*										
Petrochelidon	*pyrrhonota*	MAN, TSF									
Hirundo	*rustica*	MAN, TSF	TDF		S	TDF, S		A			MAN, TDF
Hylocichla	*mustelina*							P		TSF	MAN
Hylophilus	*decurtatus*							P		TSF	

Hylophilus	*ochraceiceps*									TSF	
Icteria	*virens*	MAN, TSF	MAN, TDF		S	TDF, S	TSF, D			TSF	
Icterus	*auratus*							P, TDF	TDF	TSF	
Icterus	*chrysater*						G	P	TDF	TSF	
Icterus	*cucullatus*			MAN, PAL, TSF, G, A	S	MAN, S, D	MAN, TSF, D, G	TDF, A	MAN, S, TDF	TSF	
Icterus	*dominicensis*								S	TSF	
Icterus	*galbula*		MAN, TDF		S	S	MAN, TSF, D, G, TDF				
Icterus	*graduacauda*					TDF, S					
Icterus	*gularis*		MAN, S, TDF	MAN, A	S	MAN, TDF, S, D	MAN, TSF, D, G	P	MAN, TDF	TSF	
Icterus	*mesomelas*							P	TDF	TSF	
Icterus	*pectoralis*		MAN	A							
Icterus	*pustulatus*	MAN, TSF	MAN, TDF	MAN,							
Icterus	*spurius*	MAN, TSF	MAN, TDF	MAN, A			MAN, TSF, D, G	P, TDF	MAN, S		
Ictinia	*missisipiensis*	MAN	MAN	MAN, A	S		D, TDF				
Ictinia	*plumbea*		MAN	MAN,					MAN		
Ixobrychus	*exilis*	MAN									
Jabiru	*mycteria*			MAN,			MAN, G	MAN, A	MAN		
Jacana	*spinosa*	MAN		MAN, A			MAN		MAN	MAN	
Lanius	*ludovicianus*				S						
Larus	*atricilla*			MAN,	S	MAN	MAN	MAN			
Larus	*argentatus*										
Larus	*dominicanus*										
Larus	*philadelphia*			MAN,		MAN	MAN				
Larus	*pipixcan*					MAN					
Laterallus	*ruber*		MAN					A	MAN	MAN	
Legatus	*leucophaius*		MAN, S								
Lepidocolaptes	*souleyetii*			MAN, TSF			MAN, TSF, TDF				
Leptodon	*cayanensis*			MAN, TSF					TDF	TSF	
Leptotila	*jamaicensis*										MAN, TDF
Leptotila	*verreauxi*	MAN, TSF	MAN, S	MAN, TSF		MAN, TDF, S	MAN, TSF, D, G, TDF	MAN, TDF, A	MAN, S, TDF		
Limnodromus	*griseus*				S				MAN		MAN
Limnodromus	*scolopaceus*	MAN			S						
Limnothlypis	*swainsonii*									TSF	TDF
Limosa	*fedoa*	MAN									
Megarhynchus	*pitangua*	TSF					MAN, TSF, D, TDF		MAN, S, TDF	TSF	
Melanerpes	*aurifrons*		MAN, TDF	MAN, TSF, G	S	MAN, TDF, S	MAN, TSF, D, G, TDF	P	MAN, S, TDF	TSF	MAN, TDF
Melanerpes	*chrysogenis*	TSF									
Melanerpes	*pygmaeus*							TDF	MAN, S, TDF	TSF	MAN, TDF
Melanerpes	*uropygialis*	MAN, TSF									
Melanoptila	*glabrirostris*								S, TDF	TSF	MAN, TDF
Meleagris	*gallopavo*					TDF					
Meleagris	*ocellata*								TDF		
Melospiza	*lincolnii*	TSF			S	MAN, TDF, S			S		
Micrastur	*semitorquatus*			TSF			TSF, D, TDF			TSF	
Mimus	*gilvus*		MAN, S					MAN, TDF, A	MAN, S, TDF	TSF, MAN	
Mimus	*polyglottos*	TSF			S	MAN, TDF, S	MAN, TSF, D				
Mniotilta	*varia*	MAN, TSF	MAN			MAN, TDF, S	TSF, D, G		MAN, S, TDF	TSF	TDF
Molothrus	*aeneus*	MAN, TSF	S		S	MAN, TDF, S	MAN, D, G	MAN, P, TDF	TDF		
Molothrus	*ater*					S					
Momotus	*mexicanus*	TSF	MAN								
Momotus	*momota*		MAN	G		TDF, S	TSF		MAN, TDF	TSF	
Mycteria	*americana*	MAN	MAN	MAN, A	S		MAN, D	MAN, A	MAN		

Myiarchus	*cinerascens*	MAN, TSF							TDF		
Myiarchus	*crinitus*					TDF, S			TDF		MAN, TDF
Myiarchus	*nuttingi*								TDF		
Myiarchus	*tuberculifer*	TSF	MAN, S, TDF	MAN, TSF, G	S	TDF, S	TSF		MAN, S, TDF	TSF	MAN, TDF
Myiarchus	*tyrannulus*	MAN			S	TDF, S	D		S, TDF		TDF
Myiarchus	*yucatanensis*							P	MAN, S, TDF	TSF	TDF
Myiobius	*sulphureipygius*		S								
Myiodynastes	*luteiventris*			PAL			MAN, D				
Myiopagis	*viridicata*	TSF							S, TDF	TSF	
Myiozetetes	*similis*	MAN, TSF	MAN, S, TDF	MAN, TSF, G, A		TDF, S	MAN, TSF, D, TDF	MAN, P	MAN, S, TDF	TSF	
Notharchus	*macrorhynchus*								S	TSF	
Numenius	*americanus*	MAN			S	D	MAN		MAN		
Numenius	*phaeopus*	MAN, TSF		MAN	S						
Nyctibius	*jamaicensis*			TSF, G			MAN				
Nycticorax	*nycticorax*	MAN	MAN	A	S		MAN, D, G		MAN		
Nycticorax	*violaceus*	MAN		MAN		MAN	MAN	MAN, P	MAN		
Nyctidromus	*albicollis*	MAN, TSF	MAN, S, TDF	MAN, G	S	S	MAN, TSF, D	MAN, P	MAN, S, TDF		
Nyctiphrynus	*yucatanicus*								TDF		
Oncostoma	*cinereigulare*								TDF	TSF	
Onychorhynchus	*coronatus*									TSF	
Oporornis	*formosus*	TSF				TDF				TSF	TDF
Oporornis	*philadelphia*					TDF	G, TDF				
Oporornis	*tolmiei*	MAN, TSF			S		TSF, D, TDF				
Ortalis	*leucogastra*			MAN, TSF, G							
Ortalis	*poliocephala*	MAN, TSF	S, TDF				TSF				
Ortalis	*vetula*				S	TDF, S	MAN, TSF, D, TDF	MAN, P	S, TDF	TSF	
Otus	*asio*				S	TDF					
Otus	*cooperi*		S	MAN, G							
Otus	*guatemalae*	TSF							TDF		
Nomonyx	*dominicus*									MAN	
Oxyura	*jamaicensis*				S						
Pachyramphus	*aglaiae*	MAN, TSF		MAN, TSF, G		TDF	MAN, TDF	P	MAN, S, TDF	TSF	
Pandion	*haliaetus*	MAN	MAN	MAN	S	S	MAN, TSF, D, G	MAN	MAN	TSF, MAN	
Parabuteo	*unicinctus*	MAN, TSF	S, TDF		S	TDF, S	D, G				
Parula	*americana*	MAN, TSF	MAN						MAN, S, TDF	TSF	MAN, TDF
Baeolophus	*bicolor*					TDF, S	G				
Passerculus	*sandwichensis*				S				S		
Passerina	*ciris*	TSF	S, TDF		S	TDF, S	TSF, D, TDF		S, TDF	TSF	
Passerina	*cyanea*		TDF		S	S	TSF, D, TDF	MAN, A	S, TDF	TSF	TDF
Passerina	*leclancherii*		TDF								
Passerina	*versicolor*	TSF				S	TDF				
Pelecanus	*erythrorhynchos*		MAN	MAN	S		MAN				MAN
Pelecanus	*occidentalis*			MAN			MAN				MAN
Phaethornis	*superciliosus*	TSF									
Phalacrocorax	*auritus*				S				MAN	MAN	
Phalacrocorax	*brasilianus*	MAN	MAN	MAN	S		MAN	MAN	MAN	MAN	MAN
Phalaropus	*tricolor*				S						
Pheucticus	*melanocephalus*		TDF								
Pheuticus	*ludovicianus*		TDF				TSF, TDF		S, TDF		
Phoenicopterus	*ruber*							MAN	MAN		MAN
Piaya	*cayana*	TSF	TDF	MAN, TSF, A		TDF, S	MAN, TSF, D, TDF	MAN, P	MAN, S, TDF	TSF	
Picoides	*scalaris*			TSF	S	MAN, TDF, S	MAN, D, G, TDF	MAN	MAN, S		

Piculus	*aeruginosus*					TDF					
Piculus	*rubiginosus*								TDF	TSF	
Pipilo	*chlorurus*	TSF									
Pipilo	*erythrophthalmus*								TDF		
Pipra	*mentalis*									TSF	
Piranga	*bidentata*						G				
Piranga	*ludoviciana*						TSF, D, G, TDF				
Piranga	*olivacea*						D, G, TDF	P	TDF		
Piranga	*roseogularis*									TSF	TDF
Piranga	*rubra*	TSF					TSF, G, TDF	P	S, TDF	TSF	
Pitangus	*sulphuratus*	MAN, TSF	MAN, S, TDF	MAN, PAL., TSF, G, A	S	MAN, TDF, S, D	MAN, TSF, D, TDF	MAN, P, A	MAN, S, TDF	TSF	
Platyrinchus	*cancrominus*									TSF	
Plegadis	*chihi*	MAN	MAN		S	MAN	MAN		MAN		
Plegadis	*falcinellus*									MAN	
Pluvialis	*dominica*										
Pluvialis	*squatarola*			MAN	S		MAN			MAN	
Podiceps	*nigricollis*								MAN		
Podylimbus	*podiceps*	MAN	MAN	MAN, A	S				MAN		
Polioptila	*albiloris*		MAN, S						S, TDF		
Polioptila	*caerulea*	TSF			S	MAN, TDF, S	MAN, TSF, D, G, TDF	TDF	MAN, S, TDF		MAN, TDF
Polioptila	*nigriceps*	TSF									
Polioptila	*plumbea*						TSF, D			TSF	
Caracara	*plancus*	MAN, TSF	MAN, S, TDF	PAL	S	MAN, TDF, S	MAN, G	MAN, P	TDF		
Porphyrula	*martinica*			MAN, A			MAN				
Porzana	*carolina*								MAN		
Progne	*chalybea*	MAN, TSF						MAN, A	MAN, TDF	MAN	
Progne	*subis*								MAN, TDF		MAN, TDF
Protonotaria	*citrea*			MAN		MAN	MAN, TSF		MAN, TDF	TSF	
Psarocolius	*montezuma*						MAN, TSF, D, G, TDF				
Pteroglossus	*torquatus*								TDF	TSF	
Ptilogonys	*cinereus*						G				
Pyrocephalus	*rubinus*	MAN, TSF				S	G	MAN, P, TDF	S, TDF		
Quiscalus	*mexicanus*	MAN, TSF	MAN, S	MAN, G	S	MAN, TDF, S	MAN, TSF, D, G	P, TDF	MAN, S, TDF	TSF, MAN	MAN, TDF
Ramphastos	*sulfuratus*								TDF	TSF	
Ramphocaenus	*melanurus*									TSF	
Ramphocelus	*sanguinolientus*						TSF, G				
Recurvirostra	*americana*	MAN	MAN		S		MAN				
Regulus	*calendula*					MAN, S					
Rhynchocyclus	*brevirostris*									TSF	
Rhynchops	*niger*				S		MAN				
Riparia	*riparia*										
Rosthramus	*sociabilis*							MAN, P	MAN		
Saltator	*atriceps*						TSF, G	TDF	MAN, S,	TSF	
Saltator	*coerulescens*	MAN, TSF					TSF, TDF		MAN		
Sarcoramphus	*papa*								TDF		
Sayornis	*phoebe*	MAN				TDF, S	G				
Sayornis	*saya*	MAN					D, G				
Scaphidura	*oryzivora*						D				
Seiurus	*aurocapillus*	TSF				MAN, TDF, S	MAN, TSF, D		MAN, S, TDF	TSF	TDF
Seiurus	*motacilla*					MAN, TDF					
Seiurus	*noveboracensis*	MAN, TSF	MAN, TDF	MAN	S	MAN, S	TDF	P	MAN, S, TDF	TSF, MAN	MAN, TDF
Setophaga	*ruticilla*	MAN, TSF		TSF		S	MAN, TSF, G, TDF	P	MAN, S, TDF	TSF	MAN, TDF

Sittasomus	*griseicapillus*			MAN, TSF					MAN	TSF	
Sphyrapicus	*varius*						TSF, D, G	MAN			
Spindalis	*zena*										TDF
Spiza	*americana*	TSF			S						
Spizaetus	*tyrannus*							MAN, P		TSF	
Spizella	*pallida*	TSF			S		D				
Spizella	*passerina*				S						
Sporophila	*minuta*		MAN, S	MAN, G		D					
Sporophila	*torqueola*	MAN, TSF	MAN, S, TDF	MAN, TSF, G, A			MAN, D, G	MAN, P, A	MAN, S, TDF		
Stelgidopteryx	*serripennis*	MAN			S	TDF, S	TSF			MAN	
Sterna	*antillarum*										MAN
Sterna	*caspia*				S		MAN				
Sterna	*elegans*			MAN			MAN				
Sterna	*fuscata*										
Sterna	*hirundo*			MAN			MAN				
Sterna	*maxima*						MAN				
Sterna	*nilotica*				S						
Sterna	*sandwichensis*										
Sterna	*sanvicensis*										
Streptoprocne	*zonaris*						TSF				
Sturnella	*magna*				S	TDF, S	G		TDF		
Sturnella	*neglecta*					D	G				
Tachybaptus	*dominicus*	MAN			S	MAN			MAN		
Tachycineta	*albilinea*	MAN		MAN, A		MAN	TSF	MAN	MAN	MAN	
Tachycineta	*bicolor*	MAN, TSF						TDF			MAN
Tachycineta	*thalassina*	MAN, TSF			S						
Thamnophilus	*doliatus*						D		TDF		
Thraupis	*abbas*						MAN, TSF, D, G		TDF		
Thraupis	*episcopus*						D, G				
Thryomanes	*bewickii*				S	TDF, S					
Thryothorus	*albinucha*								TDF	TSF	
Thryothorus	*ludovicianus*					TDF, S					
Thryothorus	*maculipectus*			TSF		TDF, S	TSF, D, G		TDF	TSF	
Thryothorus	*pleurostictus*		S, TDF								
Thryothorus	*sinaloa*	MAN, TSF									
Tiaris	*olivacea*					TDF			TDF		MAN, TDF
Tigrisoma	*mexicanum*	MAN		MAN, A		MAN	MAN, D	MAN	MAN	MAN	
Tityra	*inquisitor*								TDF	TSF	
Tityra	*semifasciata*	TSF		TSF			MAN, TSF, D	P, TDF	MAN, S, TDF	TSF	
Todirostrum	*cinereum*			MAN					MAN, TDF		
Tolmomyias	*sulphurescens*									TSF	
Toxostoma	*curvirostre*				S	S					
Toxostoma	*guttatum*										TDF
Toxostoma	*longirostre*				S	S					
Tringa	*flavipes*	MAN			S			MAN	MAN		MAN
Tringa	*melanoleuca*	MAN	MAN		S			MAN	MAN	MAN	
Tringa	*solitaria*				S	D		MAN	MAN		
Troglodytes	*aedon*	MAN				MAN, TDF, S					
Troglodytes	*musculus*						D, G, TDF	MAN, P	MAN, TDF	TSF	
Troglodytes	*beani*										TDF
Trogon	*citreolus*	MAN, TSF	MAN						TDF		
Trogon	*collaris*									TSF	

Trogon	*elegans*	TSF				TDF					
Trogon	*melanocephalus*						TSF, D, TDF		MAN, S	TSF	
Trogon	*violaceus*			MAN, TSF, G, A					MAN, TDF	TSF	
Turdus	*grayi*		TDF	MAN, G		TDF	MAN, TSF, D, G	P, TDF	MAN, TDF		
Turdus	*migratorius*								TDF		
Tyrannus	*couchii*				S				S, TDF		
Tyrannus	*crassirostris*	MAN, TSF									
Tyrannus	*forficatus*		S		S	TDF, S			TDF		
Tyrannus	*melancholicus*	MAN, TSF	MAN, S, TDF	MAN, PAL, TSF, G, A	S	MAN, TDF, S, D	MAN, D	MAN, TDF, A	MAN, S, TDF	TSF, MAN	MAN, TDF
Tyrannus	*savana*		S								
Tyrannus	*tyrannus*				S				TDF		
Tyrannus	*verticalis*					S					
Tyrannus	*vociferans*			MAN, G							
Tyto	*alba*				S	TDF, S	D, G, TDF		MAN, TDF		
Uropsila	*leucogastra*					TDF, S	TSF, D, TDF		S, TDF	TSF	
Veniliornis	*fumigatus*			MAN, TSF						TSF	
Vermivora	*celata*	MAN, TSF	MAN	TSF		TDF, S	MAN, D, G	P			
Vermivora	*chrysoptera*								TDF		
Vermivora	*peregrina*							MAN	TDF		MAN
Vermivora	*pinus*								S, TDF	TSF	TDF
Vireo	*atricapillus*	TSF									
Vireo	*bairdi*										TDF
Vireo	*belli*	MAN, TSF	MAN, TDF								
Vireo	*flavifrons*						G		TDF	TSF	
Vireo	*gilvus*	MAN								TSF	
Vireo	*griseus*				S	MAN, TDF, S	MAN, TSF, G, TDF		MAN, S, TDF	TSF	MAN, TDF
Vireo	*magister*								MAN, TDF	TSF, MAN	TDF
Vireo	*olivaceus*	TSF		TSF		TDF, S	D, G, TDF			TSF	TDF
Vireo	*pallens*	MAN, TSF		MAN, TSF		MAN		MAN	MAN, S, TDF	TSF	
Vireo	*philadelphicus*						D			TSF	
Vireo	*solitarius*					TDF, S	MAN, TSF, D, TDF				
Volatinia	*jacarina*	MAN	S, TDF	TSF			MAN, D, G, TDF	TDF	S, TDF		
Wilsonia	*canadensis*					TDF, S	TSF, D				TDF
Wilsonia	*citrina*					TDF	MAN, TSF, TDF		S, TDF	TSF	TDF
Wilsonia	*pusilla*	MAN, TSF				MAN, TDF, S	MAN, TSF, D, G, TDF		MAN, TDF		
Xiphorhynchus	*flavigaster*	MAN, TSF		MAN, TSF		TDF	MAN, D, TDF	MAN, P	MAN, S, TDF	TSF	
Zenaida	*asiatica*	MAN, TSF	MAN, S, TDF		S		MAN, D, G, TDF	MAN, TDF, A	MAN, S, TDF	TSF, MAN	MAN
Zenaida	*aurita*	MAN				TDF, S			S, TDF		
Zenaida	*macroura*	TSF			S	TDF, S	G		MAN		

Table 6. Abundance of termitaries and bird nests in termitaries at seven mangrove localities and one non-mangrove locality with tropical deciduous forest (Calakmul).

Locality	Termitaries/km	Bird nest in termitaries/km	Sampled distance (km)
Playa Dos	0	0	4
La Mancha	0.8	0.4	7.5
Marismas Nacionales	3.2	0	10
Aguachil	2	0.1	10
Jiquilisco	3.2	0.2	10
Barra de Santiago	0.4	0	14
Puerto Morelos	0.18	0	2.5
Calakmul	0.85	0.71	7

Table 7. Protected and proposed areas along the coast of the New World that are within the geographic distribution of mangrove forests.

Country	Locality	Longitude	Latitude
Belize	Bird Sanctuary(Bird Cay)	88° 19' W	17° 20' N
Belize	Bird Sanctuary(Doubloon Bank Cay)	88° 37' W	18° 2' N
Belize	Bird Sanctuary(Little Guana Cay)	87° 58' W	18° 2' N
Belize	Bird Sanctuary(Man-o-war Cay)	88° 6' W	16° 52' N
Belize	Bird Sanctuary(Small Mangrove Cay)	88° 6' W	17° 57' N
Belize	Bird Sanctuary(Unnamed Cay (II))	88° 27' W	16° 24' N
Belize	Bird Sanctuary(Unnamed Cay (III))	88° 20' W	17° 20' N
Belize	Half Moon Cay	88° 0' W	17° 52' N
Belize	Hol Chan	87° 31' W	17° 13' N
Belize	Shipstern	88° - 89° W	17° 15' - 18° 15' N
Brazil	Cabo Orange	51° 22' W	3° 58' N
Brazil	Canaeia-Iguape e Peruibe	47° 38' W	24° 54' S
Brazil	Corrego do Veado	40° 9' W	18° 21' S
Brazil	Guapi-Mirim	42° 2' W	22° 56' S
Brazil	Guaraqueba	48° 32' W	25° 6' S
Brazil	Guaraqueçaba	48° 35' W	25° 13' S
Brazil	Guaratuba	45° 55' W	24° 35' S
Brazil	Ilha Anchieta	43° 3' W	22° 33' S
Brazil	Ilha Comprida	47° 38' W	24° 54' S
Brazil	Ilha do Cardoso	47° 59' W	25° 10' S
Brazil	Ilha Maracá-Jipioca	50° 29' W	2° 2' N
Brazil	Ilhabela	41° 14' W	23° 51' S
Brazil	Jureia	47° 17' W	24° 27' S
Brazil	Jureia-Itatins	47° 29' W	25° 1' S
Brazil	Lago Piratuba	50° 5' W	1° 38' N
Brazil	Lencóis Maranhenses	43° 7' W	2° 32' S
Brazil	Manuel Luis	44° 11' W	0° 52' S
Brazil	Marinho dos Abrolhos	38° 55' W	17° 52' S
Brazil	Nova Vicosa	39° 22' W	17° 53' S
Brazil	Paripueira	35° 29' W	9° 30' S
Brazil	Piacabucu	36° 10' W	10° 3' S
Brazil	Saltinho	35° 9' W	8° 40' S
Brazil	Saltinho	35° 1' W	8° 40' S
Brazil	Santa Isabel	37° 17' W	11° 11' S
Brazil	Serra de Bocaina	44° 41' W	23° 1' S
Brazil	Sooretama	40° 5' W	18° 59' S
Brazil	Supergui	48° 18' W	25° 6' S
Brazil	Tamoios	44° 16' W	22° 55' S
Brazil	Tijuca	43° 12' W	22° 53' S
Brazil	Tupinambas	46° 8' W	23° 45' S
Colombia	Ciénaga Grande de Santa Marta	74° 23' W	10° 52' N
Colombia	Corales del Rosario	75° 45' W	10° 9' N
Colombia	Isla de Salamanca	74° 40' W	11° 2' N

Colombia	Haines Cay to Cotton Cay	81° 48' W	12° 6' N
Colombia	Los Flamencos	73° 8' W	11° 23' N
Colombia	Sanquianga	78° 22' W	2° 33' N
Colombia	Tayrona	74° 2' W	11° 20' N
Colombia	Utría	77° 17' W	6° 0' N
Costa Rica	Barra del Colorado	83° 43' W	10° 45' N
Costa Rica	Cahuita	82° 47' W	9° 44' N
Costa Rica	Corcovado	83° 35' W	8° 30' N
Costa Rica	Curú	84° 52' W	9° 50' N
Costa Rica	Golfo Dulce	83° 16' W	8° 41' N
Costa Rica	Isla del Caño	83° 53' W	8° 42' N
Costa Rica	Isla Pájaros	85° 0' W	10° 6' N
Costa Rica	Islas Guayabo y Negritos	84° 51' W	9° 52' N
Costa Rica	Manuel Antonio	84° 9' W	9° 22' N
Costa Riça	Matina	83° 18' W	10° 04' W
Costa Rica	Ostional	85° 40' W	10° 2' N
Costa Rica	Santa Rosa	85° 39' W	10° 49' N
Costa Rica	Tortuguero	83° 28' W	10° 27' N
Costa Rica	Vida Silvestre Gondoca Manzanillo	82° 30' W	9° 36' N
Cuba	Baitiquiri	70° 40' W	20° 4' N
Cuba	Cabo Corrientes	84° 27' W	21° 48' N
Cuba	Cayo Caguanes/Cayos de Piedra	79° 9' W	22° 25' N
Cuba	Cayo Cantiles	81° 54' W	21° 37' N
Cuba	Cayo Coco/Cayo Guillermo	78° 29' W	22° 29' N
Cuba	Cayo Largo-Cayo Rosario	81° 28' W	21° 38' N
Cuba	Cayo Romano	70° 45' W	22° 0' N
Cuba	Cayo Saetia	75° 31' W	20° 47' N
Cuba	El Veral	84° 34' W	21° 57' N
Cuba	Gran Parque Sierra Maestra	76° 30' W	20° 1' N
Cuba	Jibacoa Bacunayagua	81° 47' W	23° 10' N
Cuba	Las Salinas	81° 18' W	22° 9' N
Ecuador	Galápagos- Reserva de Recursos Marinos	90° 39' W	0° 2' S
Ecuador	Galápagos, Parque Nacional	91° 4' W	0° 36' S
Ecuador	Machalilla	80° 40' W	1° 33' S
Ecuador	Manglares-Churute	79° 42' W	2° 28' S
El Salvador	Barra de Santiago	90° 0.77' W	13° 40.7' N
El Salvador	Santa Clara	89° 3' W	13° 24' N
Guatemala	Monterrico	90° 28' W	13° 54' N
Guatemala	Río Dulce	88° 50' W	15° 43' N
Guatemala	Río Plátano	85° 0' W	15° 50' N
Honduras	Barbareta	86° 8' W	16° 25' N
Honduras	Cayo Cochinos	86° 32' W	15° 58' N
Honduras	Cayos Zapotillos	88° 10' W	16° 8' N
Honduras	Guanaja	85° 54' W	16° 28' N
Honduras	Laguna de Caratasca	84° 3' W	15° 30' N
Honduras	Manglar Golfo de Fonseca	87° 30' W	13° 30' N

Honduras	Port Royal	86° 22' W	16° 24' N
Honduras	Punta Condega	87° 25' W	13° 7' N
Honduras	Punta Sal	87° 48' W	15° 56' N
Honduras	Ragged Cay	86° 57' W	16° 6' N
Honduras	Río Negro	85° 22' W	15° 38' N
Honduras	Santa Elena	86° 13' W	16° 25' N
Honduras	Turtle Harbor	86° 55' W	16° 8' N
Honduras	West End	86° 36' W	16° 17' N
Jamaica	Bogue	77° 57' W	18° 26' N
Jamaica	Discovery Bay Proposed Marine Park	77° 25' W	18° 30' N
Jamaica	Montego Bay	77° 58' W	18° 27' N
Jamaica	Negril	78° 22' W	18° 19' N
Jamaica	Ocho Ríos	77° 7' W	18° 28' N
Jamaica	Palisadoes-Port Royal Cays	76° 52' W	17° 56' N
Jamaica	Pedro Bank and Cays Management Area	77° 50' W	17° 0' N
Jamaica	Priory	77° 13' W	18° 27' N
Jamaica	Unity Hall	77° 59' W	18° 26' N
Mexico	Islas del Golfo de California	109° 42'-114° 36' W	24° 08'-30° 08' N
Mexico	Yum Balam	87° 07'-89° 44' W	21° 00'-21° 57' N
Mexico	Ría Lagartos	87° 07'-89° 44' W	21° 00'-21° 57' N
Mexico	Ría Celestún-Petenes Campeche	90° 14'-90°28' W	20° 05'-21° 03' N
Mexico	Chamela-Cuixmala	104° 45'-105° 42' W	19° 20'-20° 30' N
Mexico	Pantanos de Centla	91° 08' - 92° 46' W	17° 52'-19° 46' N
Mexico	La Encrucijada	92° 31'- 93° 36' W	14° 52'-15° 58' N
Mexico	San Ignacio	114° 1'- 112°46' W	27° 18'-26° 4' N
Mexico	Bahía Magdalena	112° 55'-111° 21' W	25° 47'-23° 43' N
Mexico	Bahía Concepción	112° 05'-111°33' W	27° 07'-26° 31' N
Mexico	Sistema lagunar del sur de Sonora	110° 41'-109° 21' W	27° 34'- 26° 21' N
Mexico	Laguna de Chiricahueto	107° 33'- 107° 25' W	24° 29'-24° 49' N
Mexico	Piaxtla-Urías	106° 55'-106° 13' W	23° 48'-23° 5' N
Mexico	Marismas Nacionales	106° 47'-105° 09' W	22° 41'-21° 14' N
Mexico	Bahía Banderas	105° 54'-105° 11' W	21° 27'-20° 23' N
Mexico	Chamela-El Palmito	105° 13'-104° 34' W	19° 19'-18° 31' N
Mexico	Punta Graham-El Carrizal	104° 55' -104° 26' W	19° 10' -18° 27' N
Mexico	Cuyutlán-Chupadero	104° 44'-103° 44' W	19° 3'-18° 5' N
Mexico	Maruata-Colola	103° 25'-103° 12' W	18° 18' -18° 10' N
Mexico	Mexiquillo-Delta del Balsas	102° 48' -101° 56' W	18° 2'-16° 50' N
Mexico	Tlacoyunque	101° 43'-101° 01'W	17° 40'-17° 13' N
Mexico	Coyuca-Tres Palos	99° 25'-100° 33' W	16° 35'-17° 28' N
Mexico	Chacahua-Escobilla	97° 47'-97°1' W	16° 2'-15° 47' N
Mexico	Laguna Superior e Inferior	95° 07'-94°31' W	16° 28'-16° 10' N
Mexico	Laguna Mar Muerto	94° 28'-93°48' W	16° 18'-15° 55' N
Mexico	Puerto Arista	93° 50'-93°49' W	15° 58'-15° 40' N
Mexico	Corredor Puerto Madero	93° 19'-92°09' W	15° 36'-14° 31' N
Mexico	La Pesca-Rancho Nuevo	97° 48'-97°18' W	23° 30'-22°54' N
Mexico	Laguna San Andrés	97° 56' -97° 23' W	22° 54'-22° 25' N

Mexico	Pueblo Viejo-Tamiahua	97° 56'-97° 00' W	22° 18'-21° 11' N
Mexico	Tecolutla	97° 10'-96° 38' W	20° 48'-20° 22' N
Mexico	Laguna Verde-Antón Lizardo	96° 29'-95°48' W	20° 00'-19° 01' N
Mexico	Sistema Laguna Alvarado	96° 04' -95° 22' W	19° 11'-18° 17' N
Mexico	Los Tuxtlas	95° 19' -94° 43' W	18° 57'-18° 27' N
Mexico	Delta del río Coatzacoalcos	94° 45'-94° 16' W	18° 42'-17° 39' N
Mexico	Pantanos Centla-Laguna de Términos	94° 09'-90° 57' W	20° 02' -17° 48' N
Mexico	Champotón-El Palmar	91° 03'-90° 02' W	21° 22' -19°15' N
Mexico	Sisal-Dzilám	90° 21'-88° 26' W	21° 40'-20° 28' N
Mexico	Dzilám-Contoy	88° 52'-86° 31' W	22° 50'-21° 5' N
Mexico	Punta Maroma-Punta Nizuc	87° 7'-86°40' W	21° 11'-20° 32' N
Mexico	Tulum-Xpuha	87° 31'-87° 06' W	20° 35'-20° 05' N
Mexico	Sian Ka'an-Uaymil+B125	88° 00' -87° 21'W	20° 08'-18° 50' N
Mexico	Bahía Chetumal	88° 22' -87° 34' W	19°12'-18°09' N
Mexico	Xcalac-Majahual	87° 53' -87° 28' W	19° 03'-18°07' N
Mexico	Arrow Smith	86° 31' -86° 19' W	21° 12'-20° 50' N
Mexico	Cozumel	87° 03' -86° 48' W	20° 43'-20° 12' N
Mexico	Banco Chinchorro	87° 28' -87° 10' W	18° 48'-18° 19' N
Nicaragua	Cayos Miskitos	82° 50' W	14° 20' N
Nicaragua	Delta del Estero Real	87° 15' W	12° 53' N
Nicaragua	Río Escalante-Chococente	88° 11' W	11° 33' N
Nicaragua	Laguna Bismuna	83° 22' W	14° 47' N
Panama	Coiba	81° 46' W	7° 33' N
Panama	Darién	77° 47' W	7° 52' N
Panama	Isla Iguana	79° 34' W	7° 38' N
Panama	Marino Islas Bastimientos	82° 6' W	9° 17' N
Panama	Portobelo	79° 39' W	9° 30' N
Panama	Sarigua	80° 28' W	8° 3' N
Panama	Taboga	79° 33' W	9° 48' N
Surinam	Bigi Pan	56° 49' W	5° 58' N
Surinam	Coppename	55° 39' W	5° 59' N
Surinam	Galibi	53° 59' W	5° 46' N
Surinam	Wia-wia	54° 28' W	5° 53' N
Trinidad y Tobago	Buccoo Reef	60° 55' W	11° 10' N
Trinidad y Tobago	Bush Bush	61° 4' W	10° 23' N
Trinidad y Tobago	Caroni Swamp	61° 28' W	10° 34' N
Trinidad y Tobago	Chaguaramas	61° 38' W	10° 40' N
Trinidad y Tobago	Eastern Tobago	60° 37' W	11° 17' N
Trinidad y Tobago	Galera Point	60° 55' W	10° 49' N
Trinidad y Tobago	Kronstadt	61° 37' W	10° 39' N
Trinidad y Tobago	Little Tobago	60° 30' W	11° 17' N
Trinidad y Tobago	Morne l'Enfer	61° 35' W	10° 9' N
Trinidad y Tobago	Nariva Swamp	61° 4' W	10° 25' N
Trinidad y Tobago	Saut d'Eau	61° 31' W	10° 46' N
Trinidad y Tobago	Soldado Rock	62° 0' W	10° 3' N
Trinidad y Tobago	Southern Watershed	61° 29' W	10° 5' N

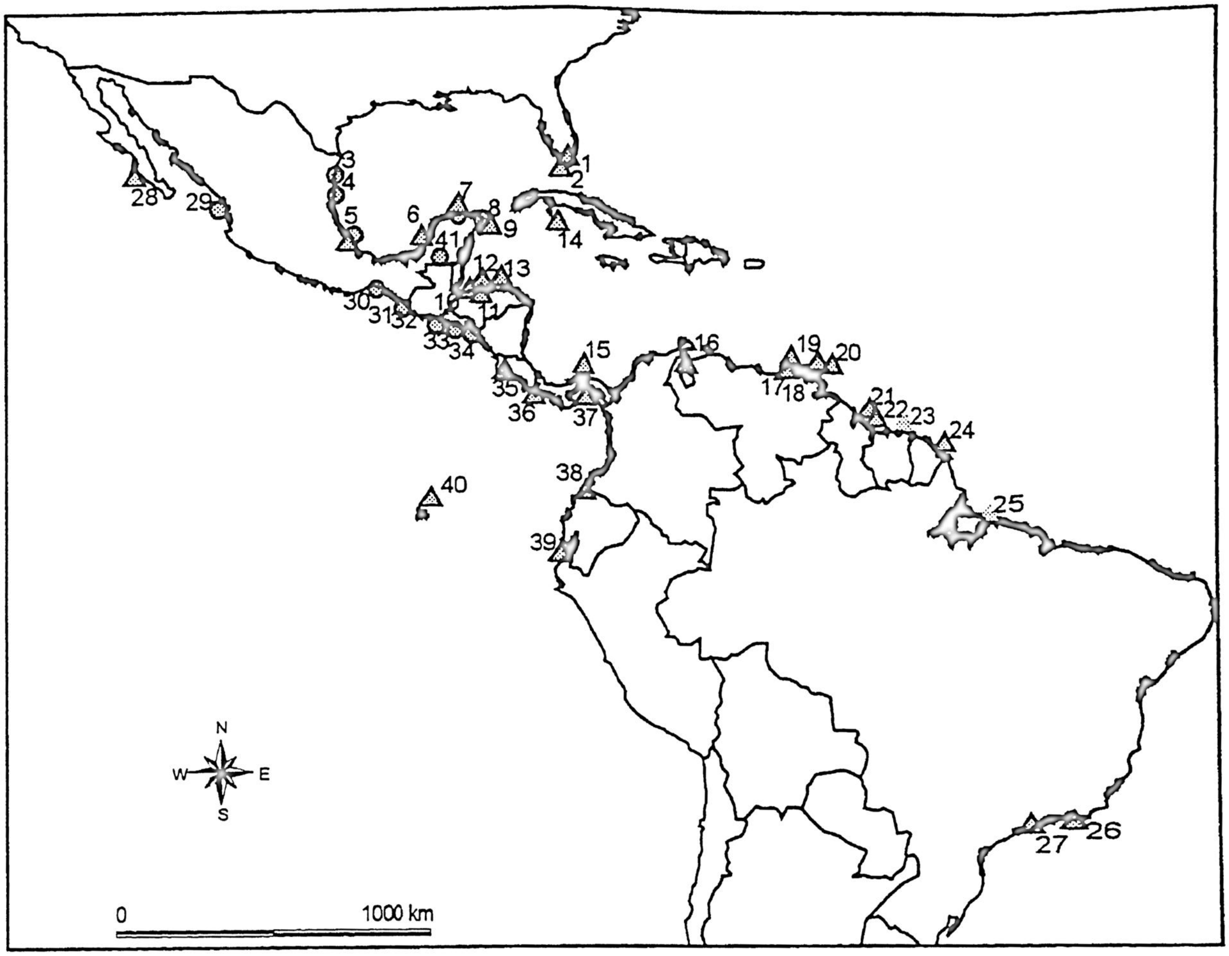
Trinidad y Tobago	St. Giles Island	60° 32' W	11° 21' N
USA	Caloosahatchee	81° 48' W	26° 40' N
USA	Cañaveral	80° 46' W	28° 46' N
USA	Crocodile Lake	80° 15' W	25° 19' N
USA	Egmont Key	82° 45' W	27° 36' N
USA	Everglades	80° 55' W	25° 22' N
USA	Fort Jefferson	80° 55' W	25° 22' N
USA	Great White Heron	81° 25' W	24° 49' N
USA	Island Bay	82° 11' W	24° 46' N
USA	J.N. "Dong"Darling	82° 5' W	25° 26' N
USA	Key Largo Coral Reef	80° 16' W	25° 9' N
USA	Looey Key	81° 24' W	24° 37' N
USA	Matlacha Pass	82° 2' W	26° 0' N
USA	Pinellas	82° 41' W	27° 41' N
Venezuela	Archipiélago Los Roques	66° 45' W	11° 50' N
Venezuela	Cuare	68° 15' W	11° 55' N
Venezuela	El Avila	66° 40' W	10° 32' N
Venezuela	Henri Pittier	67° 51' W	10° 28' N
Venezuela	Isla de Aves	67° 39' W	12° 0' N
Venezuela	Isla Margarita	64° 00' W	11° 0' N
Venezuela	Laguna de la Marites	63° 58' W	10° 55' N
Venezuela	Laguna de la Restinga	64° 5' W	10° 59' N
Venezuela	Laguna de Tacarigua	65° 49' W	10° 16' N
Venezuela	Las Tetas de María Guevara	64° 7' W	10° 55' N
Venezuela	Médanos de Coro	69° 45' W	11° 40' N
Venezuela	Mochima	64° 30' W	10° 20' N
Venezuela	Morrocoy	68° 15' W	10° 53' N
Venezuela	Península de Paria	62° 15' W	10° 40' N
Venezuela	San Esteban	68° 0' W	10° 23' N
Venezuela	Turuépano	63° 35' W	10° 20' N

Figure 1. Localities studied. Circles: areas where actual field work was conducted; triangles: areas from the literature. Sites 3 and 41 are localities without mangrove forest. Mangrove distribution is represented by black shading along the coast.

Atlantic and Caribbean coasts
USA: (1) Everglades, (2) Florida Keys; Mexico: (3) Los Ebanos, (4) La Playa Dos, (5) La Mancha, (6) Los Petenes, (7) Dzilám de Bravo, (8) Puerto Morelos, (9) Cozumel; Honduras: (10) Omoa, (11) Utila, (12) Roatán, (13) Guanaja; Cuba: (14) Cayo Matías; Panama: (15) Galeta; Venezuela: (16) Maracaibo, (17) Cariaco, (18) Chiguana, (19) Chacopata; (20) Trinidad; Guyana: (21) Hope, (22) Ovenwargt; (23) Surinam; (24) French Guyana; Brazil: (25) Pará, (26) Guanabara, and (27) Santos-Cubatão.

Pacific coast
Mexico: (28) Isla Margarita, (29) Marismas Nacionales, (30) Aguachil, (31) La Encrucijada; El Salvador: (32) Barra de Santiago, (33) Jiquilisco; Honduras: (34) San Lorenzo; Costa Rica: (35) Jesús María River, (36) Golfito; Panama: (37) Juan Díaz; Ecuador: (38) Galapagos, (39) Cayapas-Mataje; and Peru: (40) Puerto Pizarro.

Inland locality in Mexico: (41) Calakmul.


1
2
3
4
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9
41
14
12
13
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11
28
29
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31
32
33
34
15
16
19
20
17
18
35
36
37
21
22
23
24
38
40
25
39
N
W
E
S
26
27
0
1000 km

Figure 2. Accumulation of resident bird species richness for eight mangrove sites in Mexico (localities 4, 5, 8, 28, 29, and 30 in Fig. 1) and El Salvador (localities 33 and 34). Contrary to other sites, samples at La Mancha refers to complete species lists obtained by A. T. Peterson, Ortíz-Pulido et al. 1995, and my self, and so represents much more intensive sampling than for other sites.

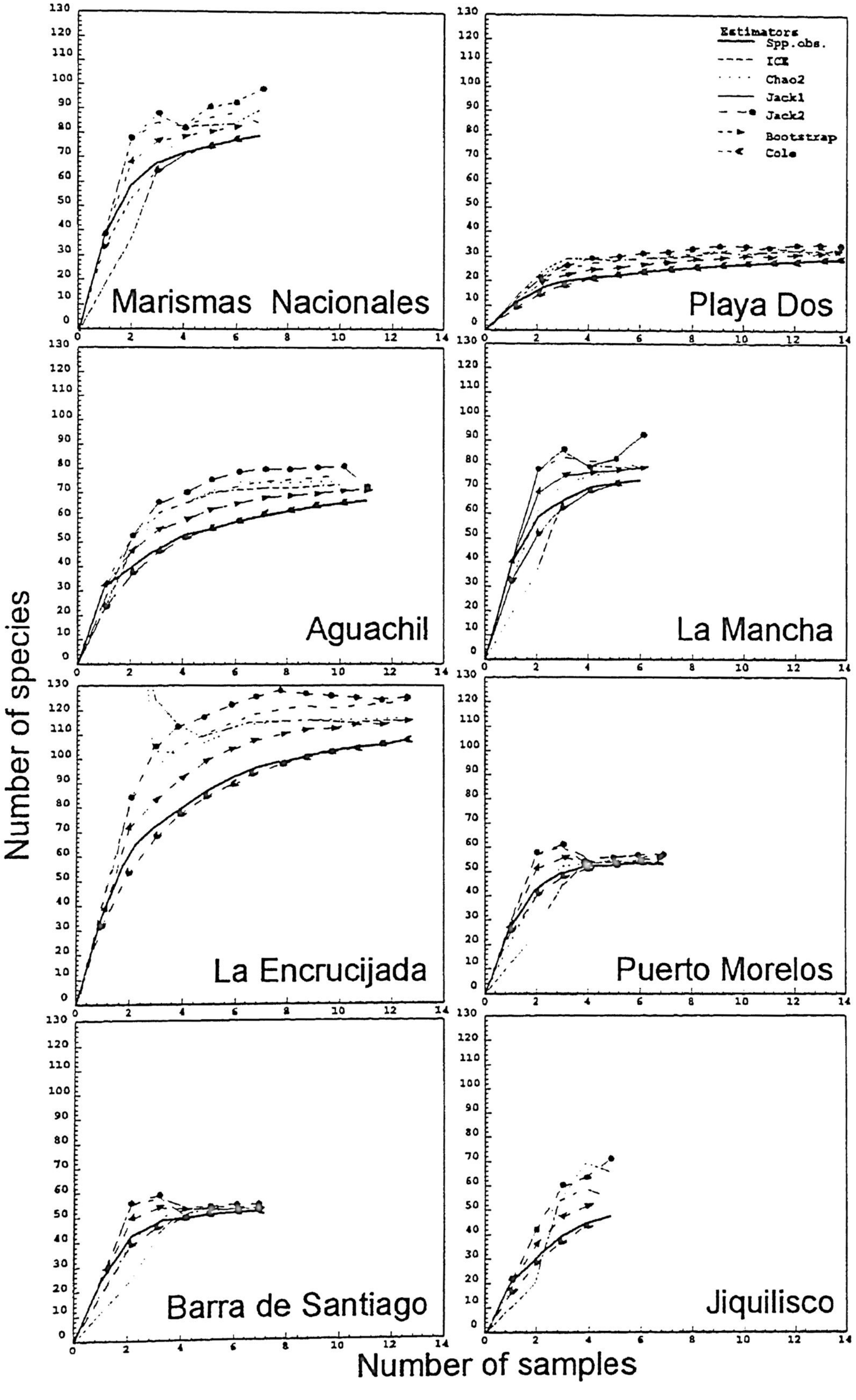
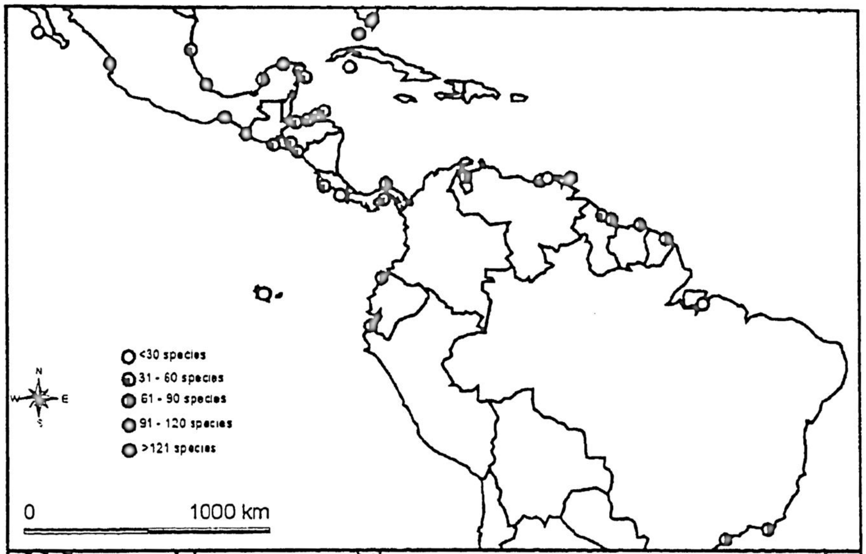

Estimators
Spp.obs.
ICE
Chao2
Jack1
Jack2
Bootstrap
Cole
Marismas Nacionales
Playa Dos
Aguachil
La Mancha
La Encrucijada
Puerto Morelos
Barra de Santiago
Jiquilisco
Number of species
Number of samples
0
10
20
30
40
50
60
70
80
90
100
110
120
130
0
2
4
6
8
10
12
14

Figure 3. Bird species richness in New World mangroves. (a) Total bird species richness, including resident, migrants, and aquatics; (b) terrestrial bird species richness, and (c) breeding species richness.


○ <30 species
● 31 - 60 species
● 61 - 90 species
● 91 - 120 species
● >121 species
N
W
E
S
0
1000 km


○ <30 species
● 31 - 60 species
● 61 - 90 species
● >91 species
N
W
E
S
0
1000 km

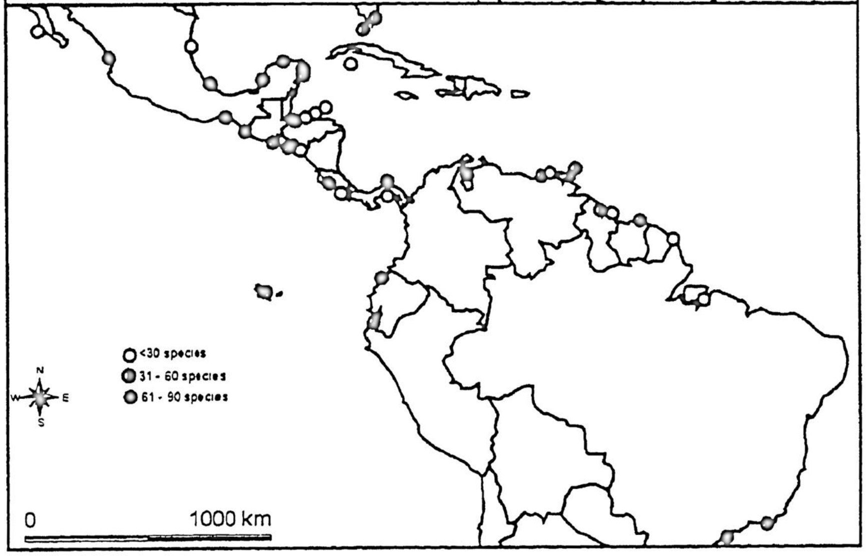

○ <30 species
● 31 - 60 species
● 61 - 90 species
N
W
E
S
0
1000 km

Figure 4. Number of endemic species by slope: (1) Pacific North and Central America, (2) Pacific South America, (3) Atlantic North and Central America, and (4) Atlantic South America Atlantic.

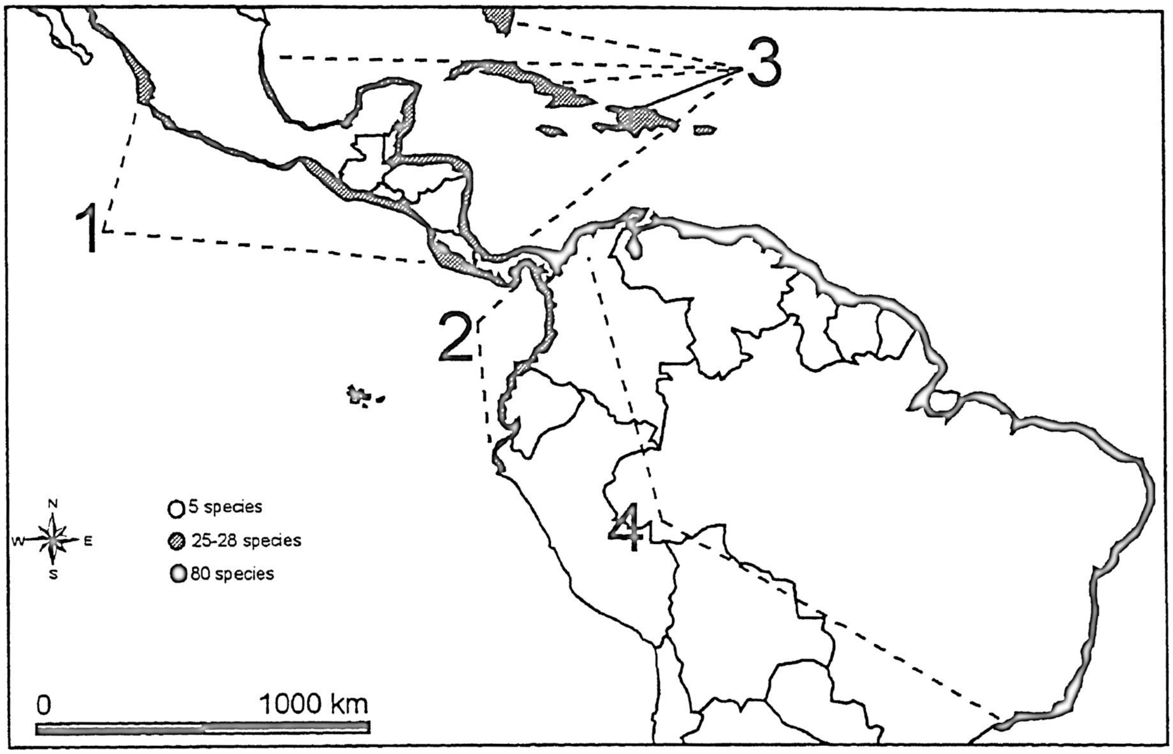

1
2
3
4
N
W
E
S
○5 species
▨ 25-28 species
● 80 species
0
1000 km

Figure 5. Number of endemic species to zoogeographic lowland regions in the New World mangroves (Stotz et al. 1996). AMN: Amazonia North, AMS: Amazonia South, ATL: Atlantic Forest, BSR: Baja-Sonora, CHO: Chocó Lowlands, CSA: Central South America, EPC: Equatorial Pacific, GAL: Galapagos, GAN: Greater Antilles, GCS: Gulf-Caribbean Slope, PAS: Pacific Arid Slope.

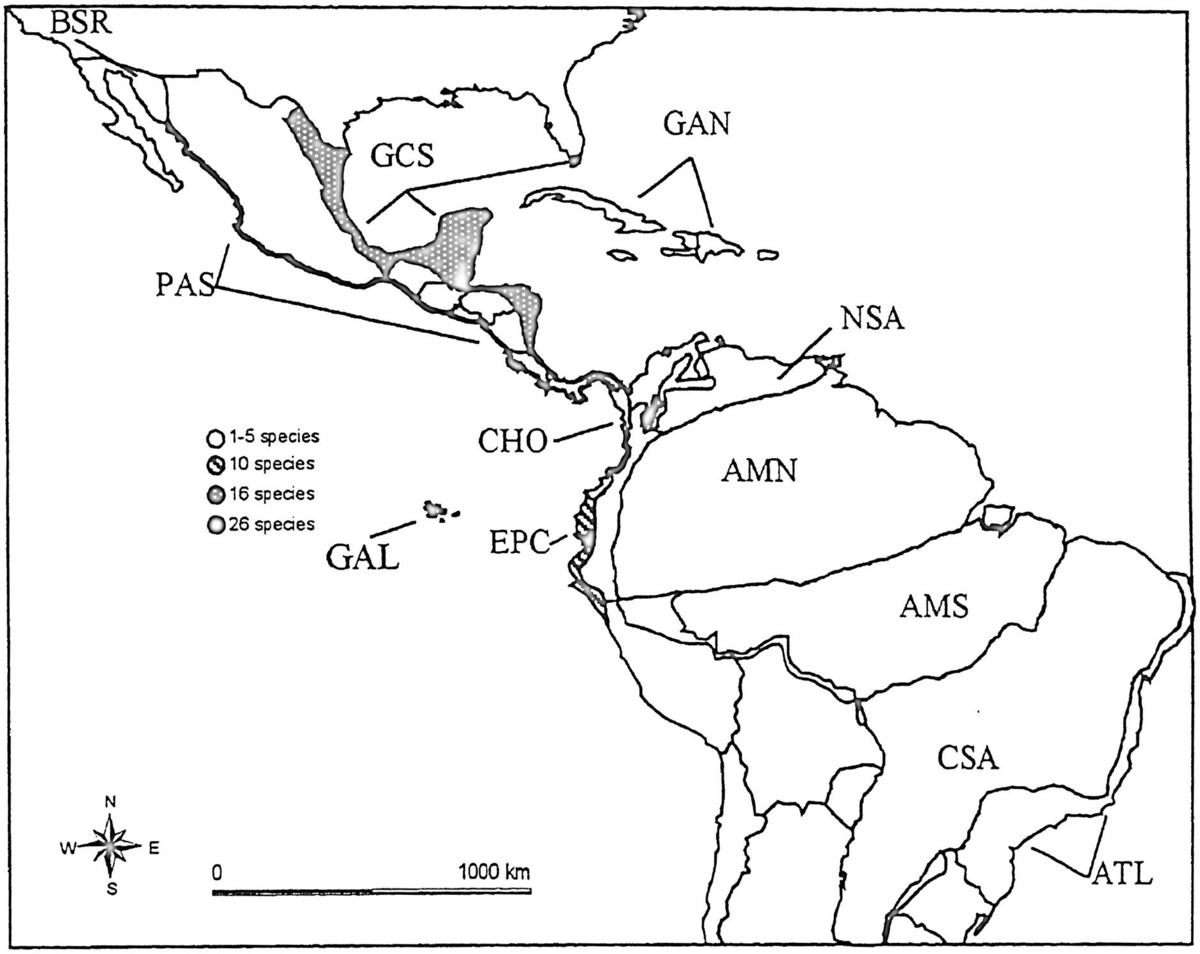

BSR
GAN
GCS
PAS
NSA
CHO
AMN
1-5 species
10 species
16 species
26 species
GAL
EPC
AMS
CSA
N
W
E
S
0
1000 km
ATL

Figure 6. Numbers of species endemic to the zoogeographic regions of Stotz et al. (1996) at individual mangrove localities.

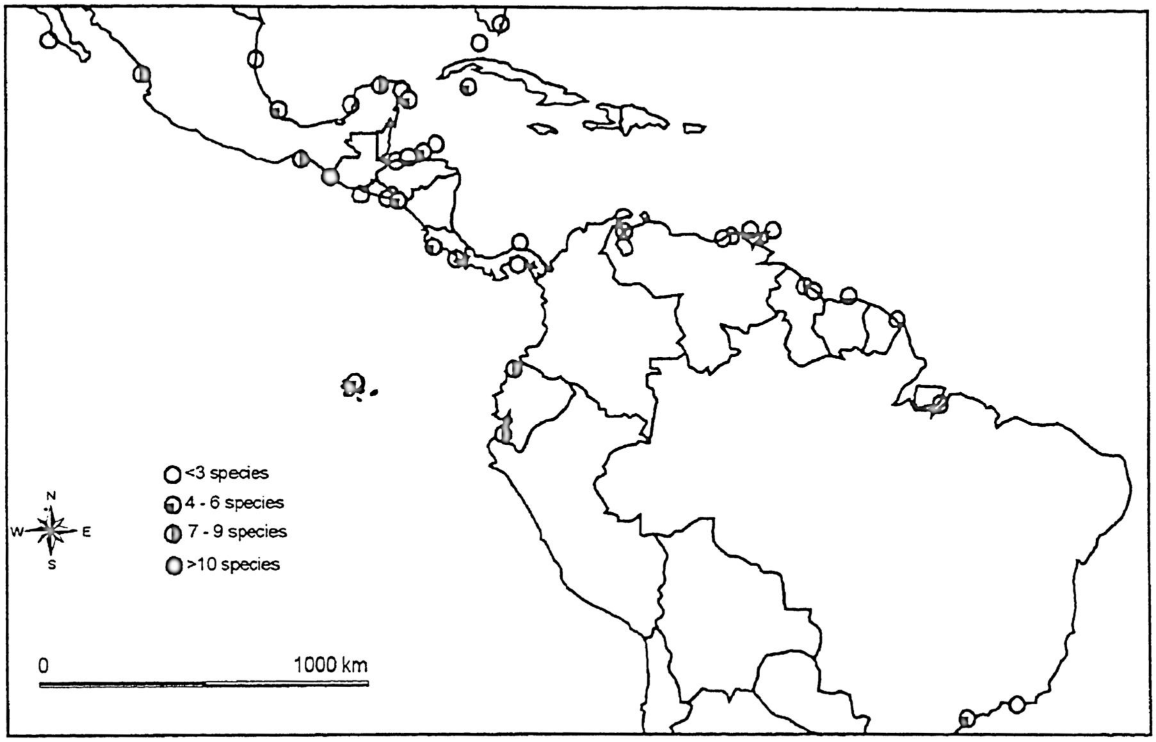
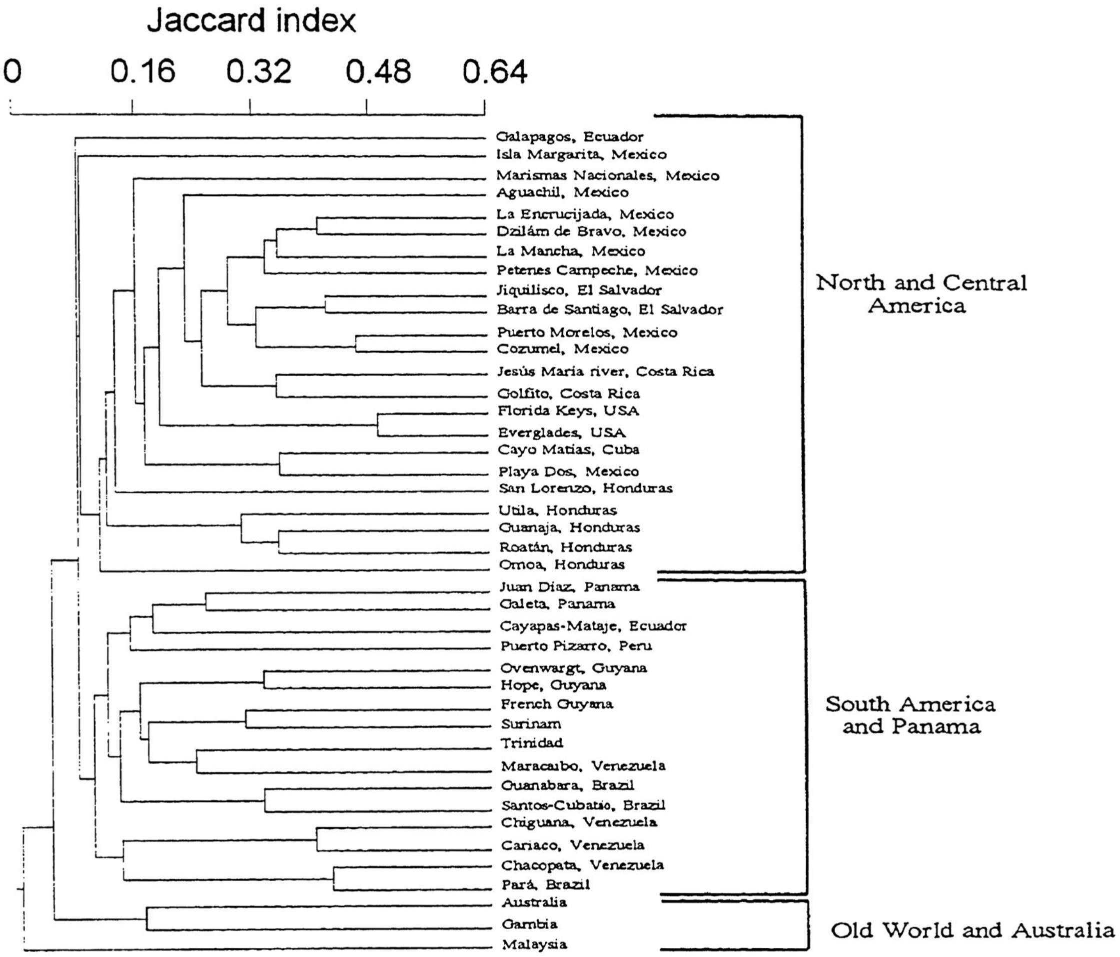

○ <3 species
4 - 6 species
7 - 9 species
>10 species
N
W
E
S
0
1000 km

Figure 7. Similarity among terrestrial mangrove avifaunas based on UPGMA (unweighted pair group method of analysis) and Jaccard index of similarity. Upper dendrogram includes all avifaunas. Lower dendrogram excludes small avifaunas (<30 species).


Jaccard index
0
0.16
0.32
0.48
0.64
Galapagos, Ecuador
Isla Margarita, Mexico
Marismas Nacionales, Mexico
Aguachil, Mexico
La Encrucijada, Mexico
Dzilám de Bravo, Mexico
La Mancha, Mexico
Petenes Campeche, Mexico
Jiquilisco, El Salvador
Barra de Santiago, El Salvador
Puerto Morelos, Mexico
Cozumel, Mexico
Jesús María river, Costa Rica
Golfito, Costa Rica
Florida Keys, USA
Everglades, USA
Cayo Matias, Cuba
Playa Dos, Mexico
San Lorenzo, Honduras
Utila, Honduras
Guanaja, Honduras
Roatán, Honduras
Omoa, Honduras
Juan Diaz, Panama
Galeta, Panama
Cayapas-Mataje, Ecuador
Puerto Pizarro, Peru
Ovenwargt, Guyana
Hope, Guyana
French Guyana
Surinam
Trinidad
Maracaibo, Venezuela
Guanabara, Brazil
Santos-Cubatao, Brazil
Chiguana, Venezuela
Cariaco, Venezuela
Chacopata, Venezuela
Pará, Brazil
Australia
Gambia
Malaysia
North and Central America
South America and Panama
Old World and Australia

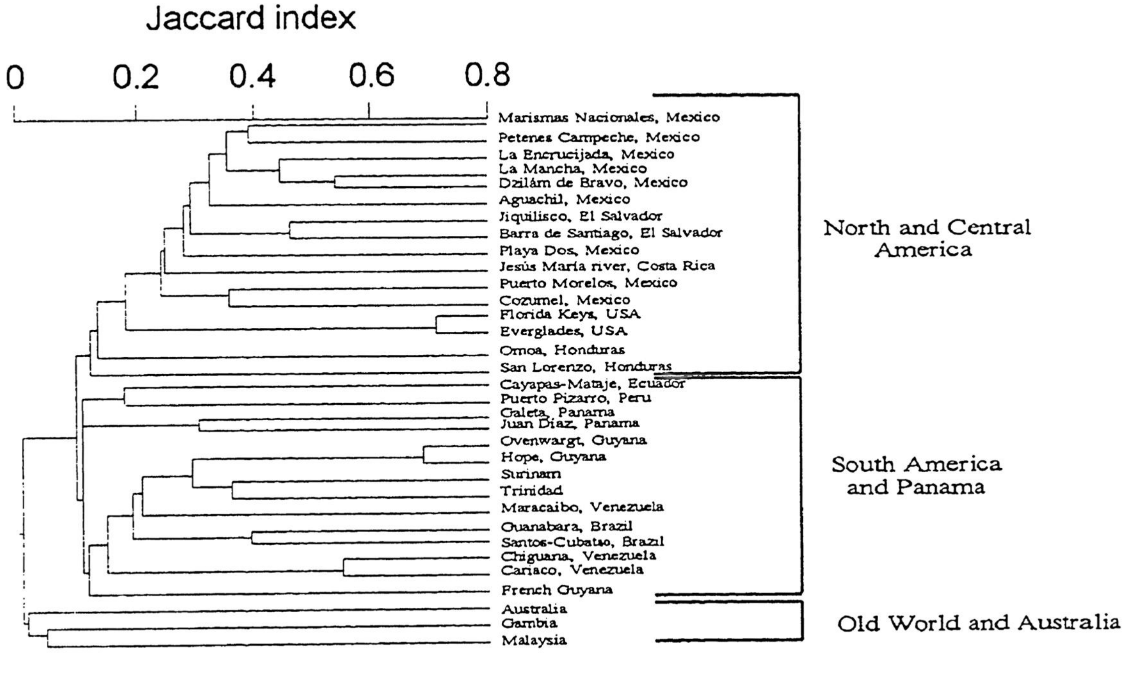
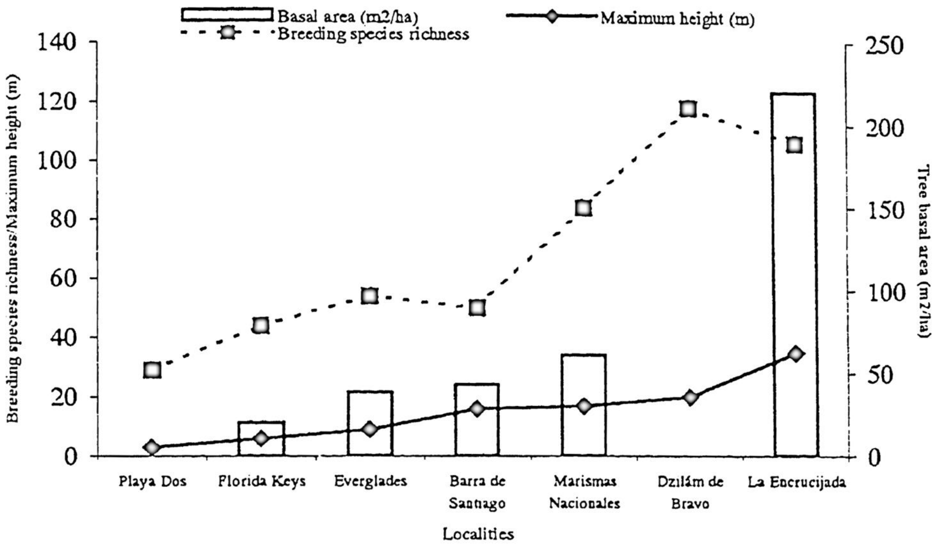

Jaccard index
0
0.2
0.4
0.6
0.8
Marismas Nacionales, Mexico
Petenes Campeche, Mexico
La Encrucijada, Mexico
La Mancha, Mexico
Dzilám de Bravo, Mexico
Aguachil, Mexico
Jiquilisco, El Salvador
Barra de Santiago, El Salvador
Playa Dos, Mexico
Jesús María river, Costa Rica
Puerto Morelos, Mexico
Cozumel, Mexico
Florida Keys, USA
Everglades, USA
Omoa, Honduras
San Lorenzo, Honduras
Cayapas-Mataje, Ecuador
Puerto Pizarro, Peru
Galeta, Panama
Juan Diaz, Panama
Ovenwargt, Guyana
Hope, Guyana
Surinam
Trinidad
Maracaibo, Venezuela
Guanabara, Brazil
Santos-Cubatao, Brazil
Chiguana, Venezuela
Cariaco, Venezuela
French Guyana
Australia
Gambia
Malaysia
North and Central America
South America and Panama
Old World and Australia

Figure 8. Average mangrove tree height and basal area for seven mangrove sites in North and Central America.



Basal area (m2/ha)
Maximum height (m)
Breeding species richness
Breeding species richness/Maximum height (m)
140
120
100
80
60
40
20
0
250
200
150
100
50
0
Tree basal area (m2/ha)
Playa Dos
Florida Keys
Everglades
Barra de Santiago
Marismas Nacionales
Dzilám de Bravo
La Encrucijada
Localities

Figure 9. Total numbers of bird species at nine Mexican mangrove localities divided by vegetation type.

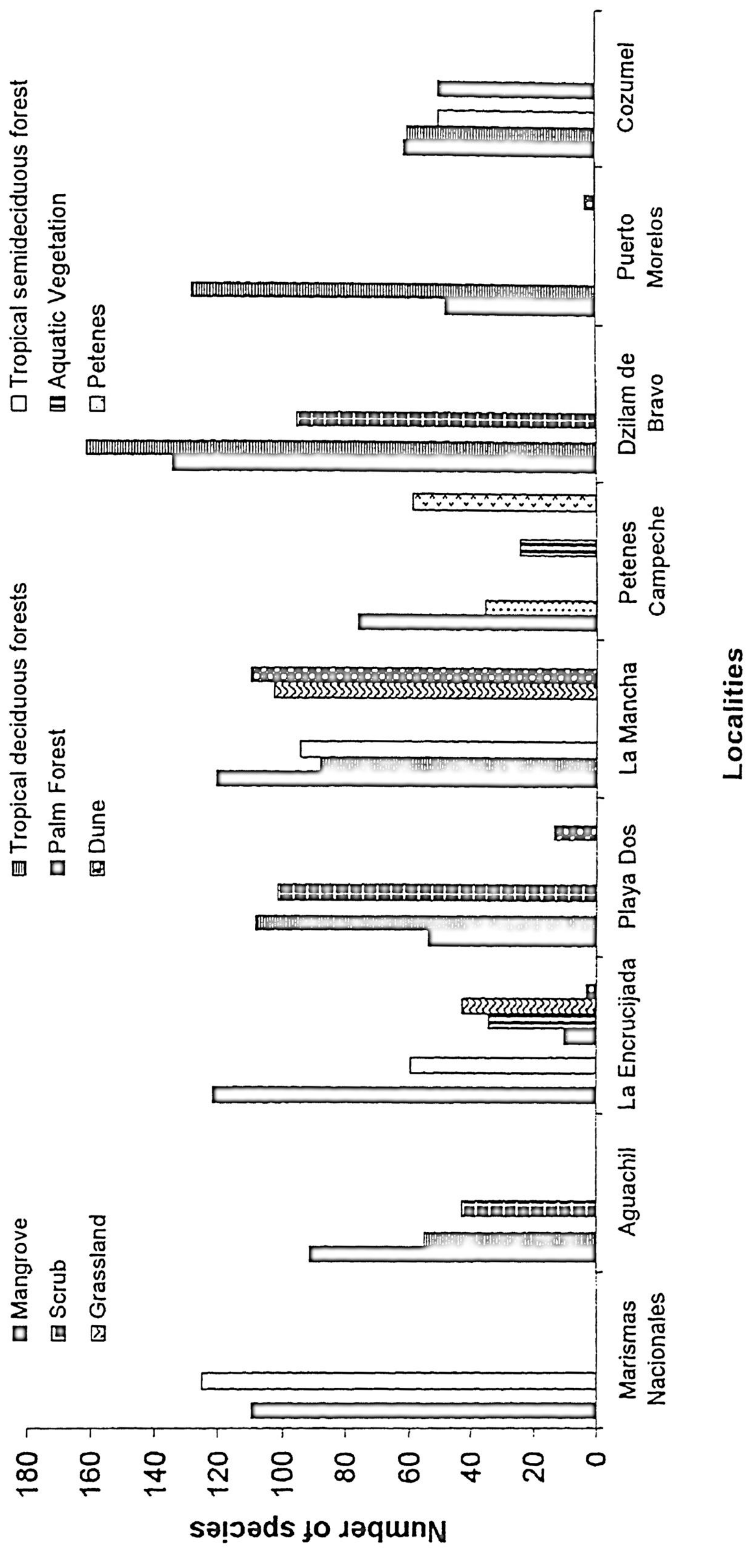

Number of species
0
20
40
60
80
100
120
140
160
180
Localities
Marismas Nacionales
Aguachil
La Encrucijada
Playa Dos
La Mancha
Petenes Campeche
Dzilam de Bravo
Puerto Morelos
Cozumel
Mangrove
Scrub
Grassland
Tropical deciduous forests
Palm Forest
Dune
Tropical semideciduous forest
Aquatic Vegetation
Petenes

Figure 10. Percentage of bird species occurring in mangroves that are shared with adjacent forest types at nine Mexican mangrove localities.

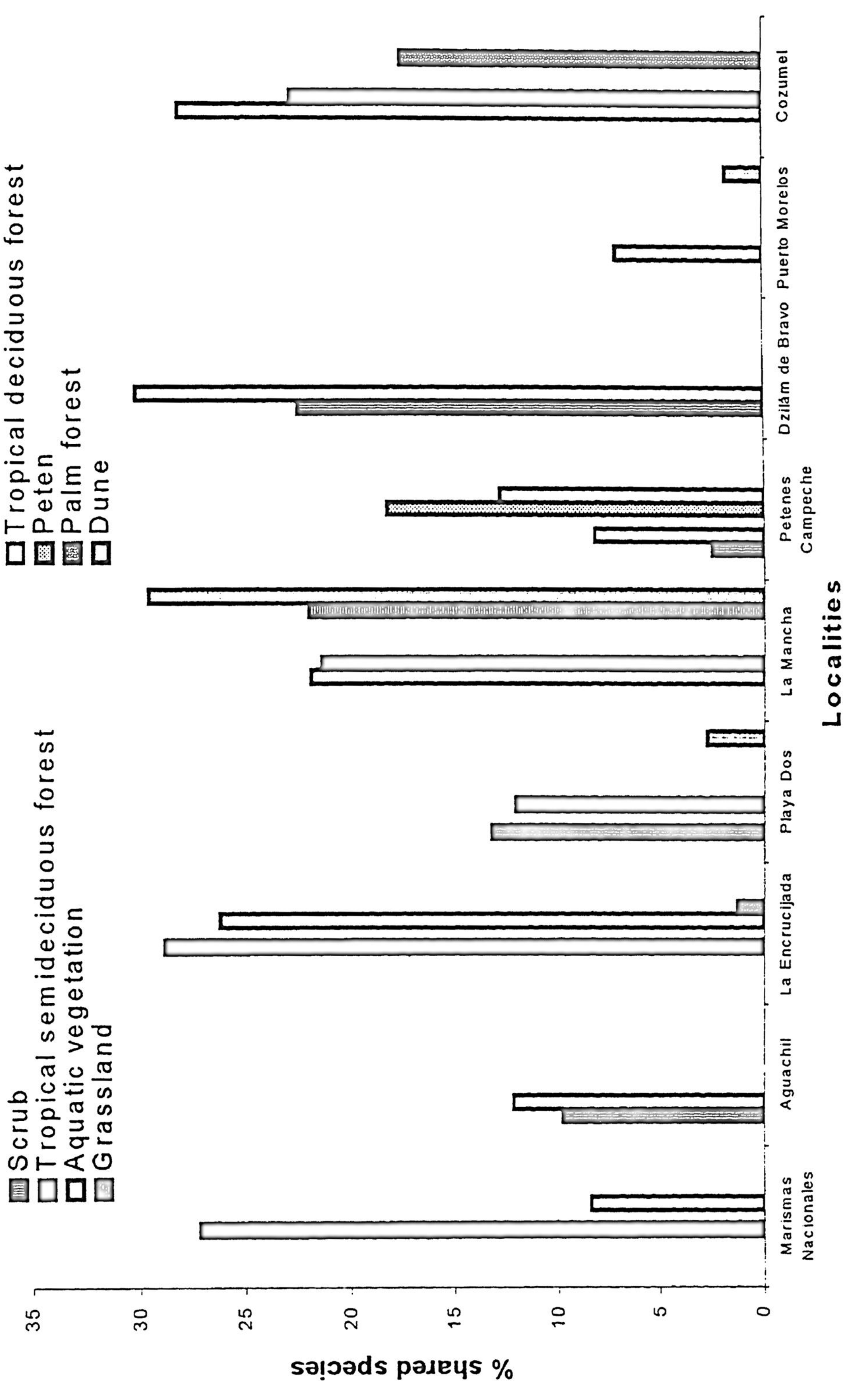
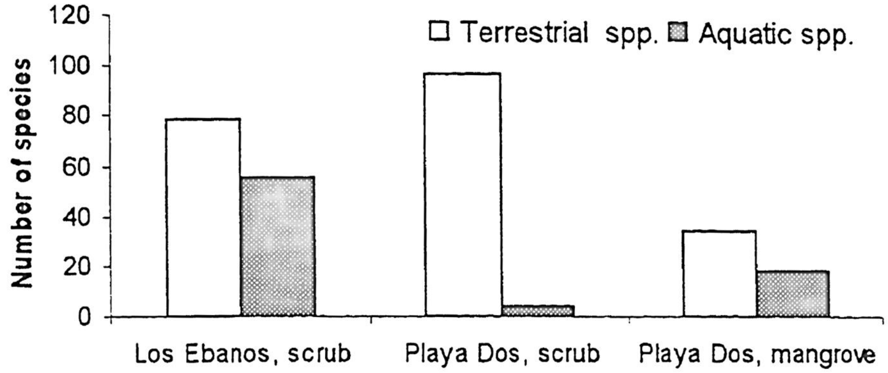

Scrub
Tropical semideciduous forest
Aquatic vegetation
Grassland
Tropical deciduous forest
Peten
Palm forest
Dune
% shared species
35
30
25
20
15
10
5
0
Marismas Nacionales
Aguachil
La Encrucijada
Playa Dos
La Mancha
Petenes Campeche
Dzilám de Bravo
Puerto Morelos
Cozumel
Localities

Figure 11. Upper graph: Comparison of terrestrial and aquatic bird species richness of two scrub forests (Playa Dos and Los Ebanos), and the mangroves at Playa Dos. Lower graph: Numbers of shared terrestrial and aquatic birds species among mangrove forest of Playa Dos and both scrub forests.


□ Terrestrial spp. ▨ Aquatic spp.
Number of species
120
100
80
60
40
20
0
Los Ebanos, scrub
Playa Dos, scrub
Playa Dos, mangrove

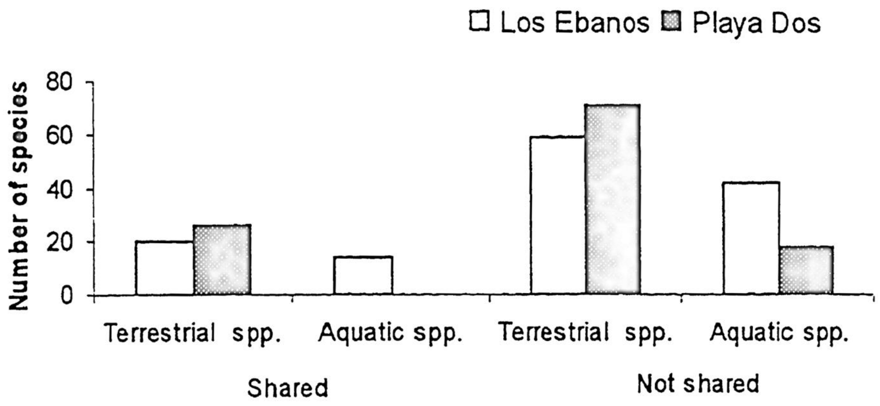

□ Los Ebanos ▨ Playa Dos
Number of species
80
60
40
20
0
Terrestrial spp.
Aquatic spp.
Terrestrial spp.
Aquatic spp.
Shared
Not shared

Figure 12. Comparison of total number of bird species in a region (white bars), bird species richness in mangrove forest (patterned), and numbers of species locally restricted to mangroves (black) at nine Mexican localities.

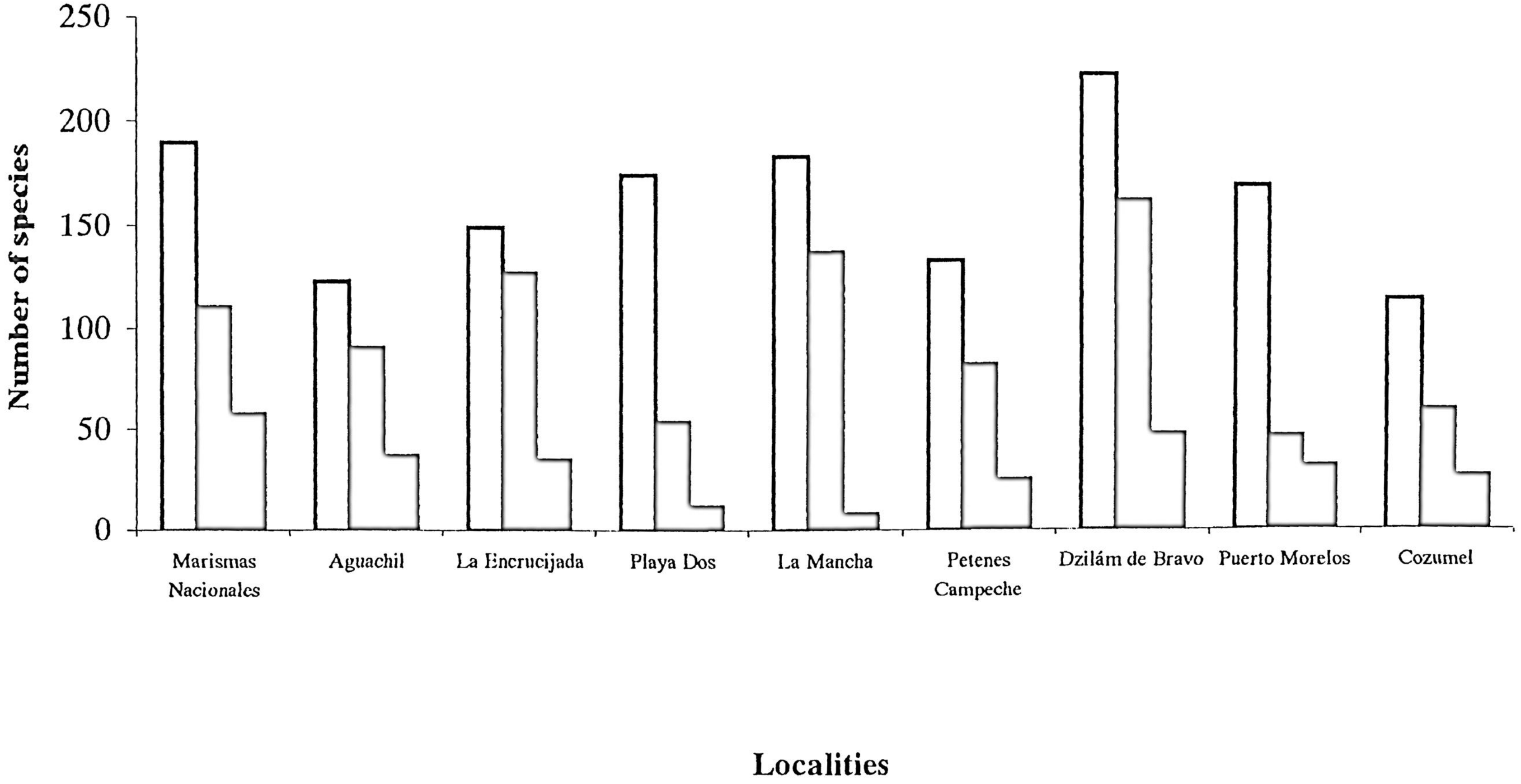

250
200
150
100
50
0
Number of species
Marismas Nacionales
Aguachil
La Encrucijada
Playa Dos
La Mancha
Petenes Campeche
Dzilám de Bravo
Puerto Morelos
Cozumel
Localities

Figure 13. Spatial distribution of birds within mangrove forest sites.

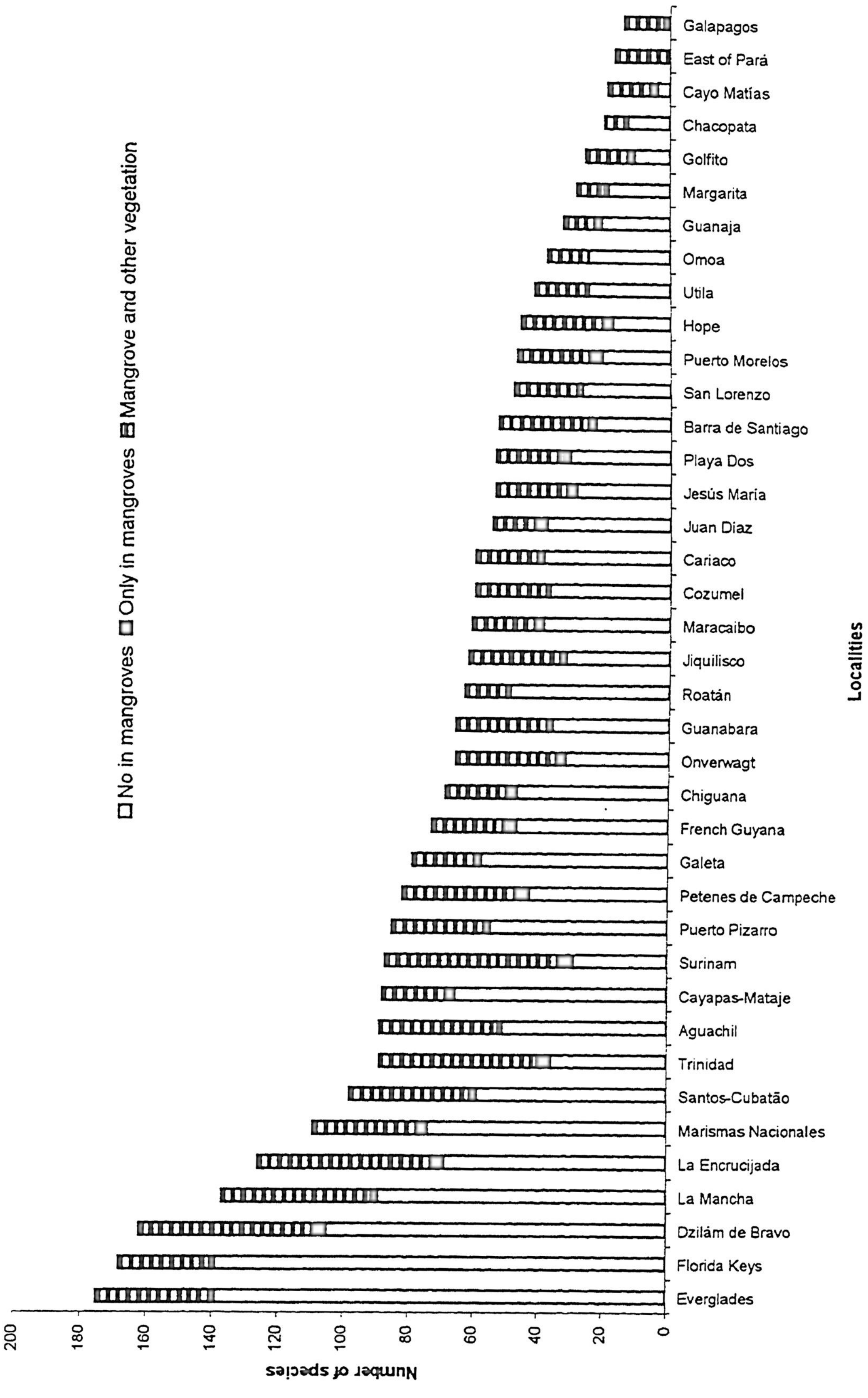

No in mangroves
Only in mangroves
Mangrove and other vegetation
Number of species
200
180
160
140
120
100
80
60
40
20
0
Localities
Galapagos
East of Pará
Cayo Matías
Chacopata
Golfito
Margarita
Guanaja
Omoa
Utila
Hope
Puerto Morelos
San Lorenzo
Barra de Santiago
Playa Dos
Jesús María
Juan Diaz
Cariaco
Cozumel
Maracaibo
Jiquilisco
Roatán
Guanabara
Onverwagt
Chiguana
French Guyana
Galeta
Petenes de Campeche
Puerto Pizarro
Surinam
Cayapas-Mataje
Aguachil
Trinidad
Santos-Cubatão
Marismas Nacionales
La Encrucijada
La Mancha
Dzilám de Bravo
Florida Keys
Everglades

Figure 14. Feeding strata used by birds at mangrove localities.

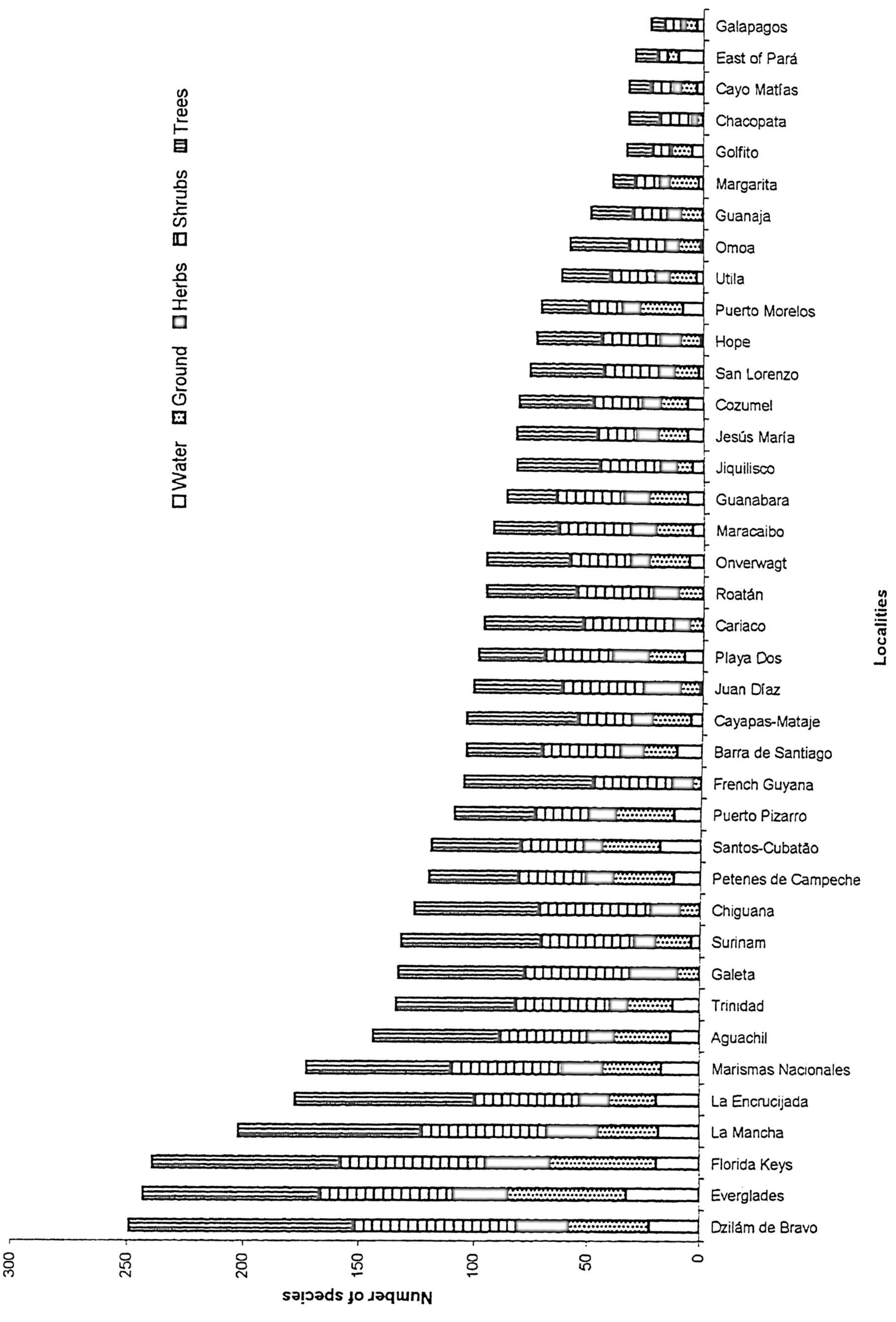

☐ Water
▨ Ground
▨ Herbs
▨ Shrubs
▨ Trees
Number of species
0
50
100
150
200
250
300
Localities
Galapagos
East of Pará
Cayo Matías
Chacopata
Golfito
Margarita
Guanaja
Omoa
Utila
Puerto Morelos
Hope
San Lorenzo
Cozumel
Jesús María
Jiquilisco
Guanabara
Maracaibo
Onverwagt
Roatán
Cariaco
Playa Dos
Juan Díaz
Cayapas-Mataje
Barra de Santiago
French Guyana
Puerto Pizarro
Santos-Cubatão
Petenes de Campeche
Chiguana
Surinam
Galeta
Trinidad
Aguachil
Marismas Nacionales
La Encrucijada
La Mancha
Florida Keys
Everglades
Dzilám de Bravo

Figure 15. Food types used by bird species at mangrove localities, expressed as raw frequencies of species.

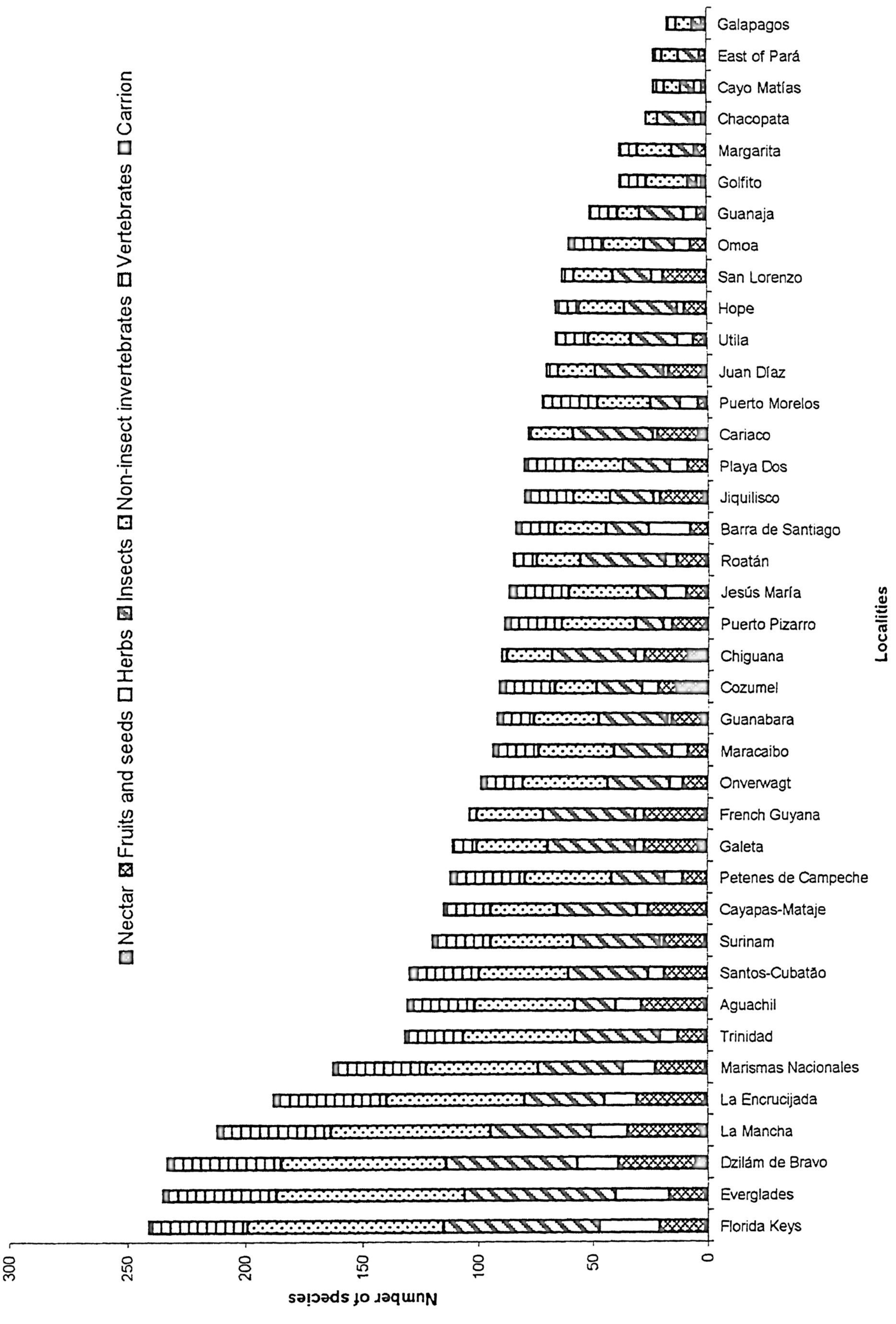

Nectar
Fruits and seeds
Herbs
Insects
Non-insect invertebrates
Vertebrates
Carrion
Galapagos
East of Pará
Cayo Matías
Chacopata
Margarita
Golfito
Guanaja
Omoa
San Lorenzo
Hope
Utila
Juan Díaz
Puerto Morelos
Cariaco
Playa Dos
Jiquilisco
Barra de Santiago
Roatán
Jesús María
Puerto Pizarro
Chiguana
Cozumel
Guanabara
Maracaibo
Onverwagt
French Guyana
Galeta
Petenes de Campeche
Cayapas-Mataje
Surinam
Santos-Cubatão
Aguachil
Trinidad
Marismas Nacionales
La Encrucijada
La Mancha
Dzilám de Bravo
Everglades
Florida Keys
Localities
0
50
100
150
200
250
300
Number of species

Figure 16. Use of mangroves for nesting by bird species at mangrove sites.

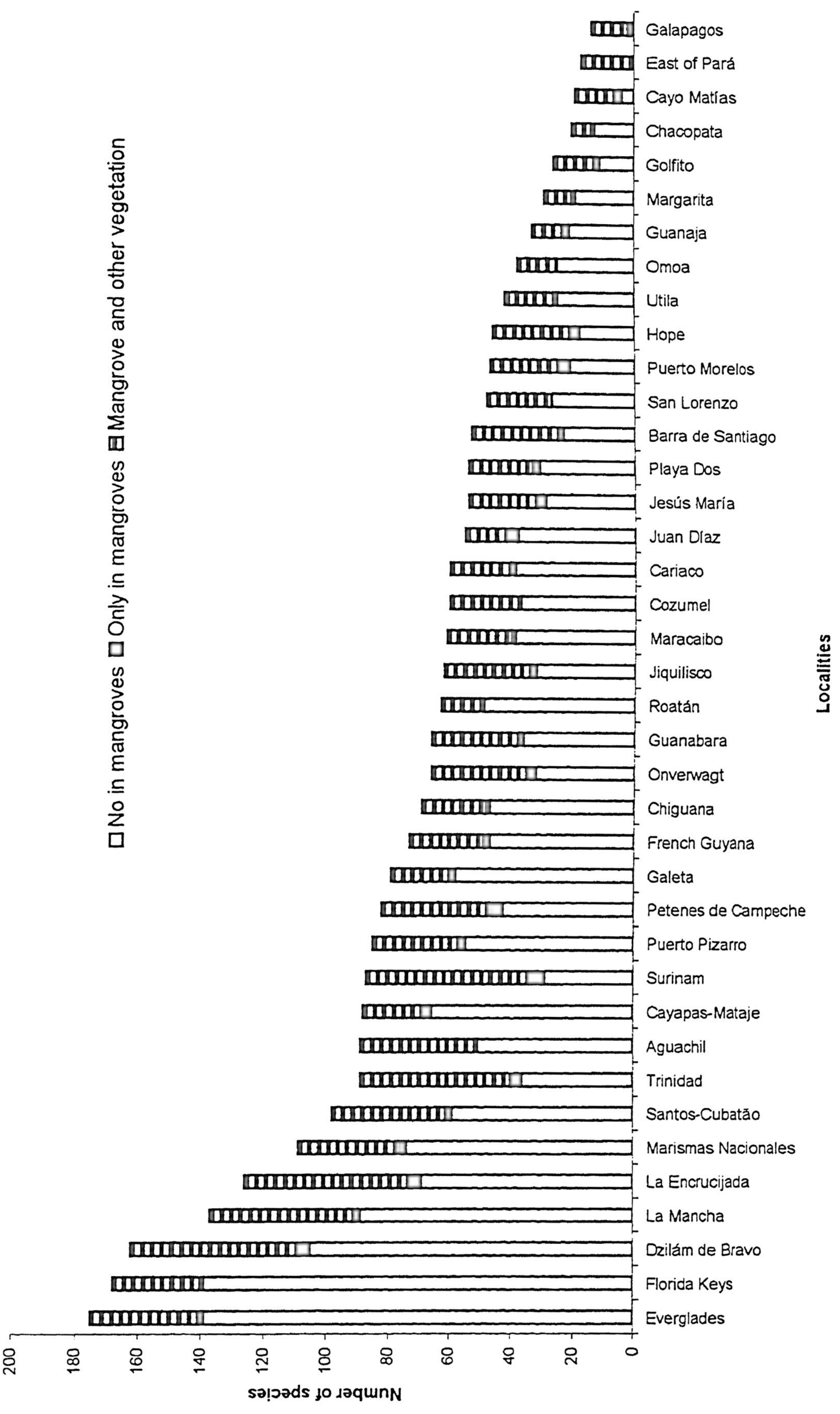

□ No in mangroves
▨ Only in mangroves
▦ Mangrove and other vegetation
Number of species
0
20
40
60
80
100
120
140
160
180
200
Localities
Galapagos
East of Pará
Cayo Matías
Chacopata
Golfito
Margarita
Guanaja
Omoa
Utila
Hope
Puerto Morelos
San Lorenzo
Barra de Santiago
Playa Dos
Jesús María
Juan Díaz
Cariaco
Cozumel
Maracaibo
Jiquilisco
Roatán
Guanabara
Onverwagt
Chiguana
French Guyana
Galeta
Petenes de Campeche
Puerto Pizarro
Surinam
Cayapas-Mataje
Aguachil
Trinidad
Santos-Cubatão
Marismas Nacionales
La Encrucijada
La Mancha
Dzilám de Bravo
Florida Keys
Everglades

Figure 17. Abundance of termitaries and bird nests in termitaries at seven mangrove localities and one tropical deciduous forest locality (Calakmul).

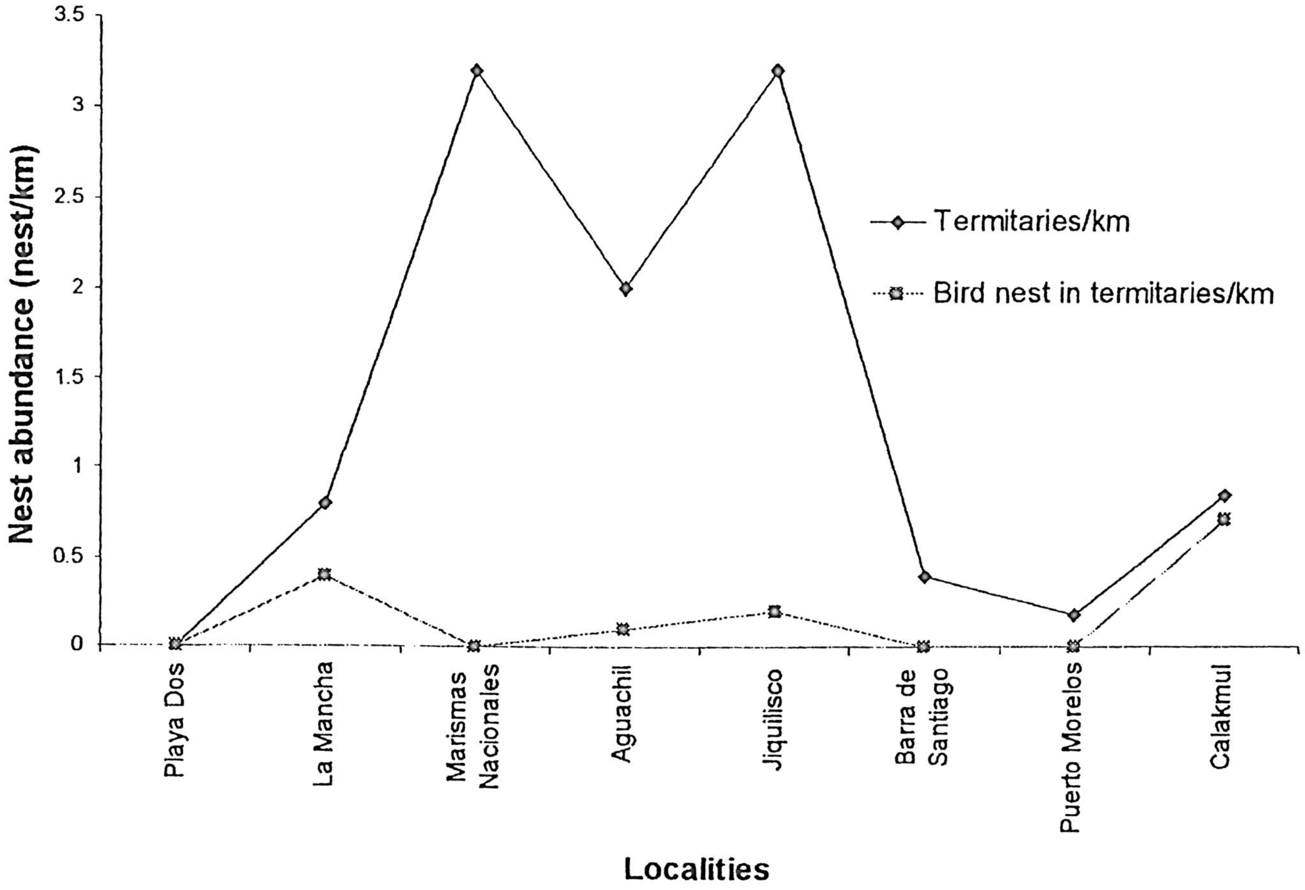

3.5
3
2.5
2
1.5
1
0.5
0
Nest abundance (nest/km)
Termitaries/km
Bird nest in termitaries/km
Playa Dos
La Mancha
Marismas Nacionales
Aguachil
Jiquilisco
Barra de Santiago
Puerto Morelos
Calakmul
Localities

Figure 18. Geographic distribution of *Buteogallus subtilis* (black area), *B. aequinoctalis* (dashed area), *B. anthracinus* (dotted area), and *B. urubitinga* (black outline).

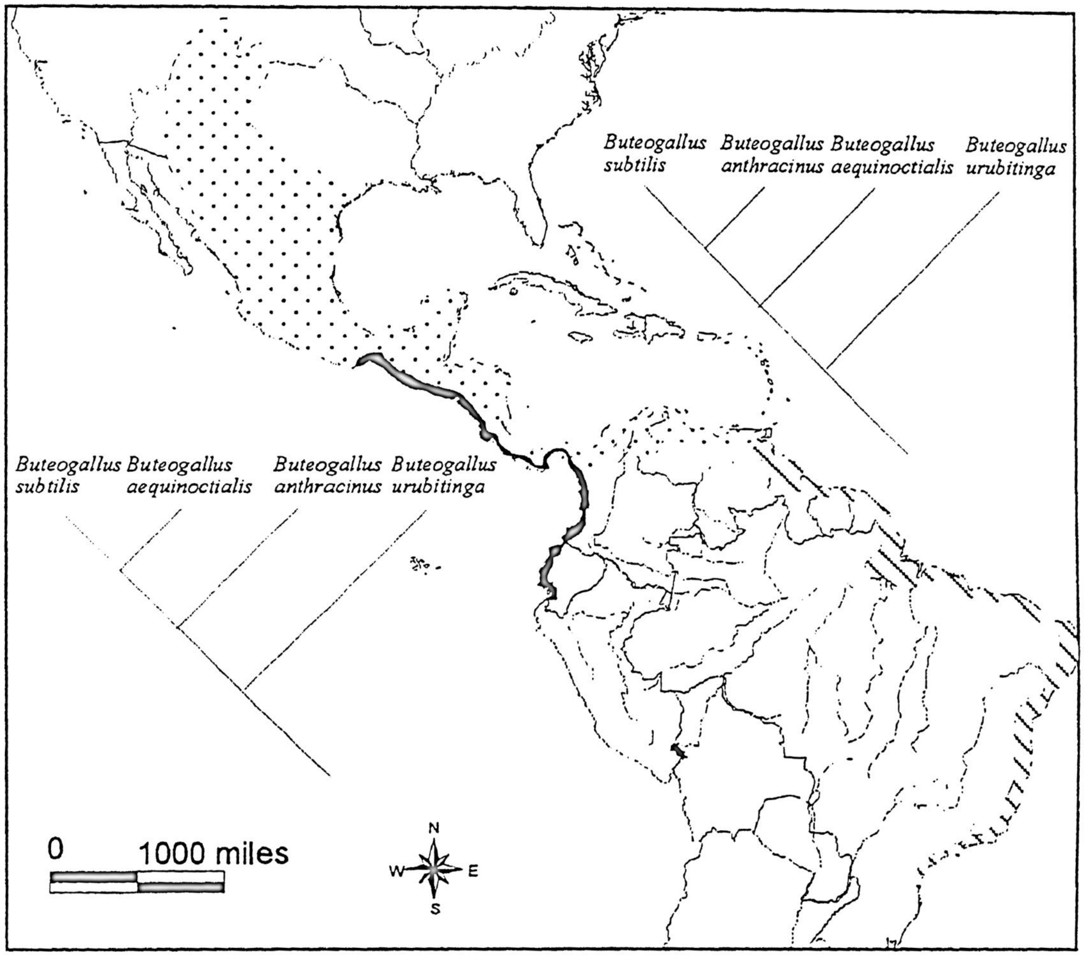

Buteogallus subtilis
Buteogallus anthracinus
Buteogallus aequinoctialis
Buteogallus urubitinga
Buteogallus subtilis
Buteogallus aequinoctialis
Buteogallus anthracinus
Buteogallus urubitinga
0
1000 miles
N
W
E
S

Figure 19. Geographic distribution of *Amazilia boucardi* (black area) and its relatives: *A. franciae* (dashed area), *A. chionopectus* (dispersed dots), and *A. leucogaster* (clustered dots).

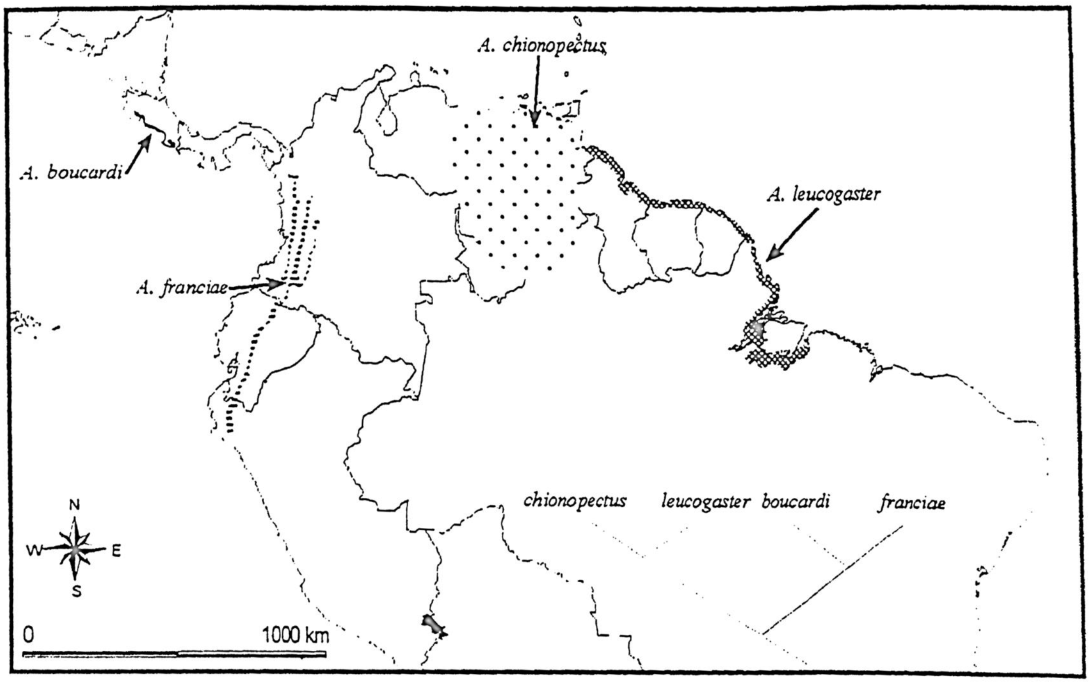

A. chionopectus
A. boucardi
A. leucogaster
A. franciae
chionopectus
leucogaster
boucardi
franciae
N
W
E
S
0
1000 km

Figure 20. Geographic distribution of *Cactospiza heliobates* (black dots) in the Galapagos Islands, and relatives: *C. pallida* (islands bordered with broken lines) and *Platyspiza crassirostris* (dotted islands).

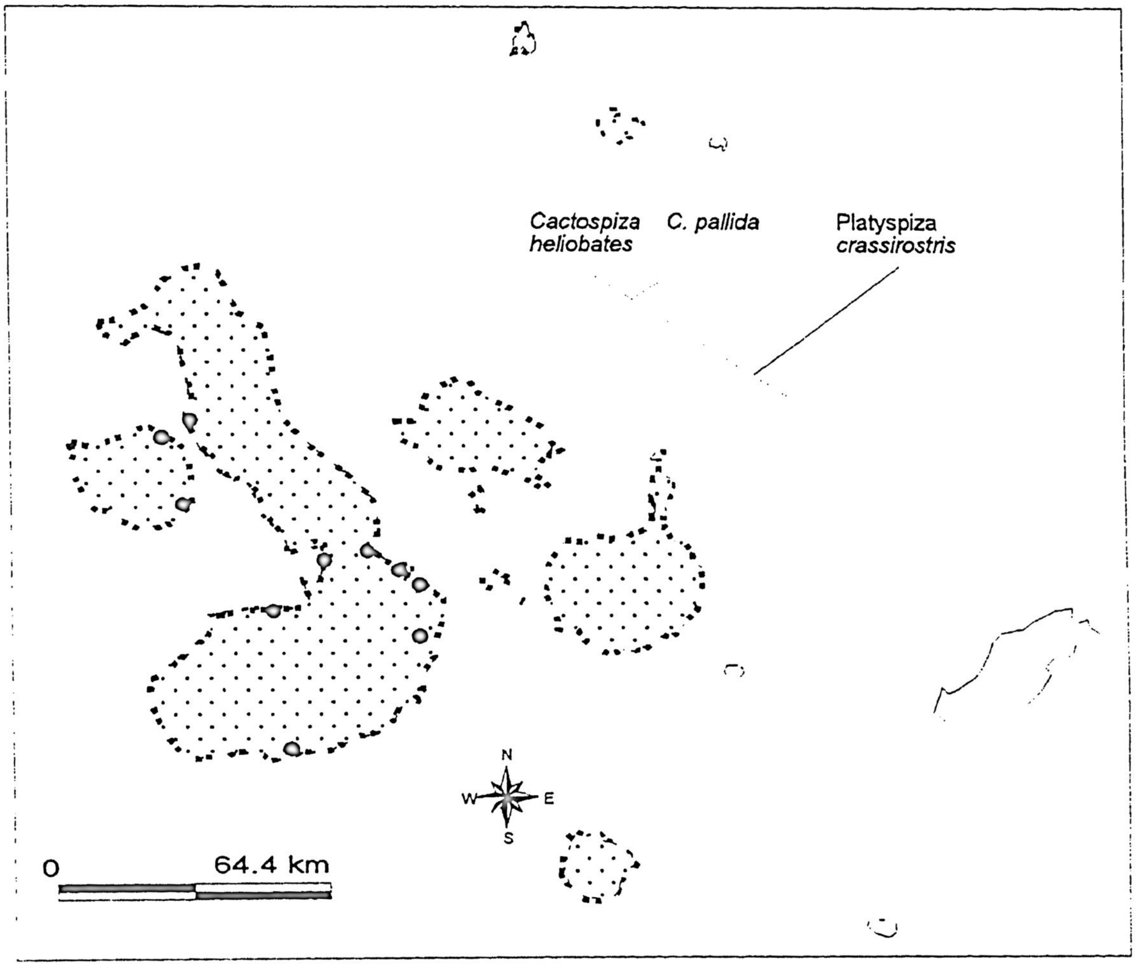

Cactospiza heliobates
C. pallida
Platyspiza crassirostris
N
W
E
S
0
64.4 km

Figure 21. Geographic distribution of the *Dendroica petechia* superspecies: *D.* [*petechia*] *aestiva* (dotted area, winter distribution; dashed area breeding distribution), and *D.* [*petechia*] *erithachorides* (black area).

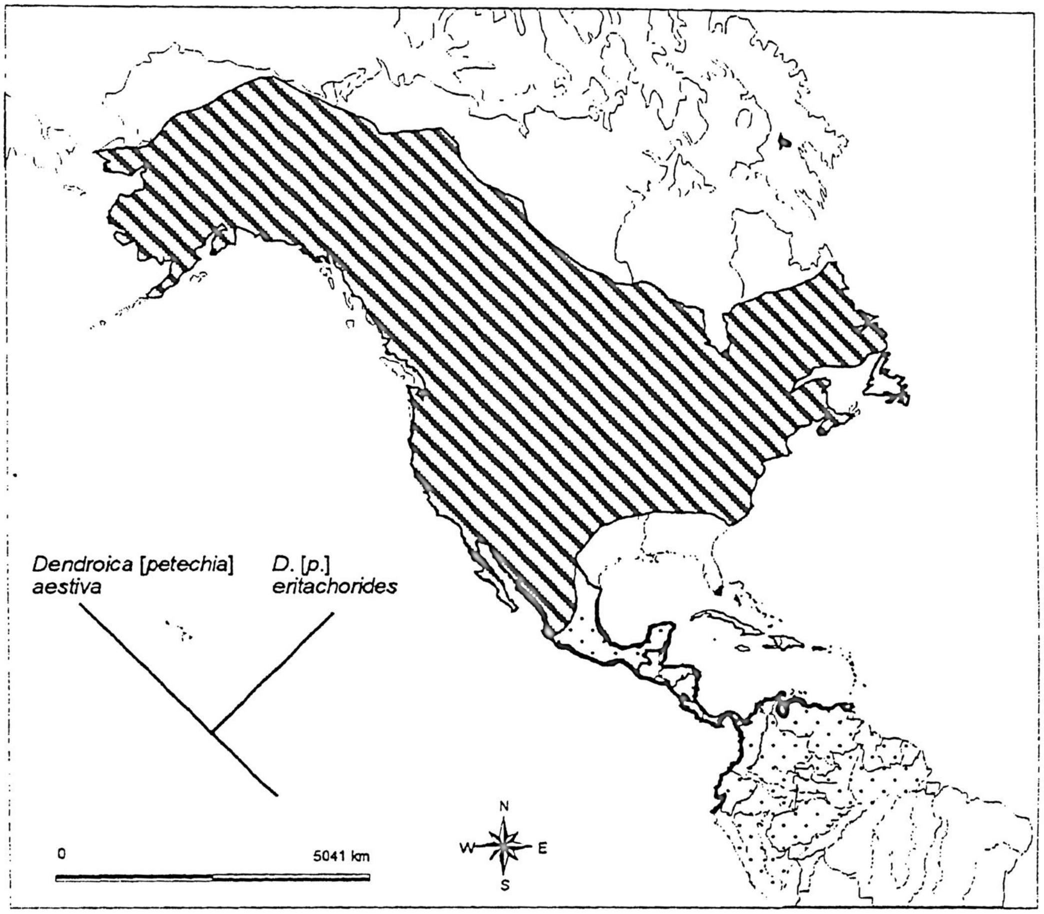

Dendroica [petechia] aestiva
D. [p.] eritachorides
0
5041 km
N
W
E
S

Figure 22. Geographical distribution of *Aramides cajanea* (dotted area), *A. wolfi* (dashed area), *Aramides mangle* (black area), and *A. ypecaha* (gray area).

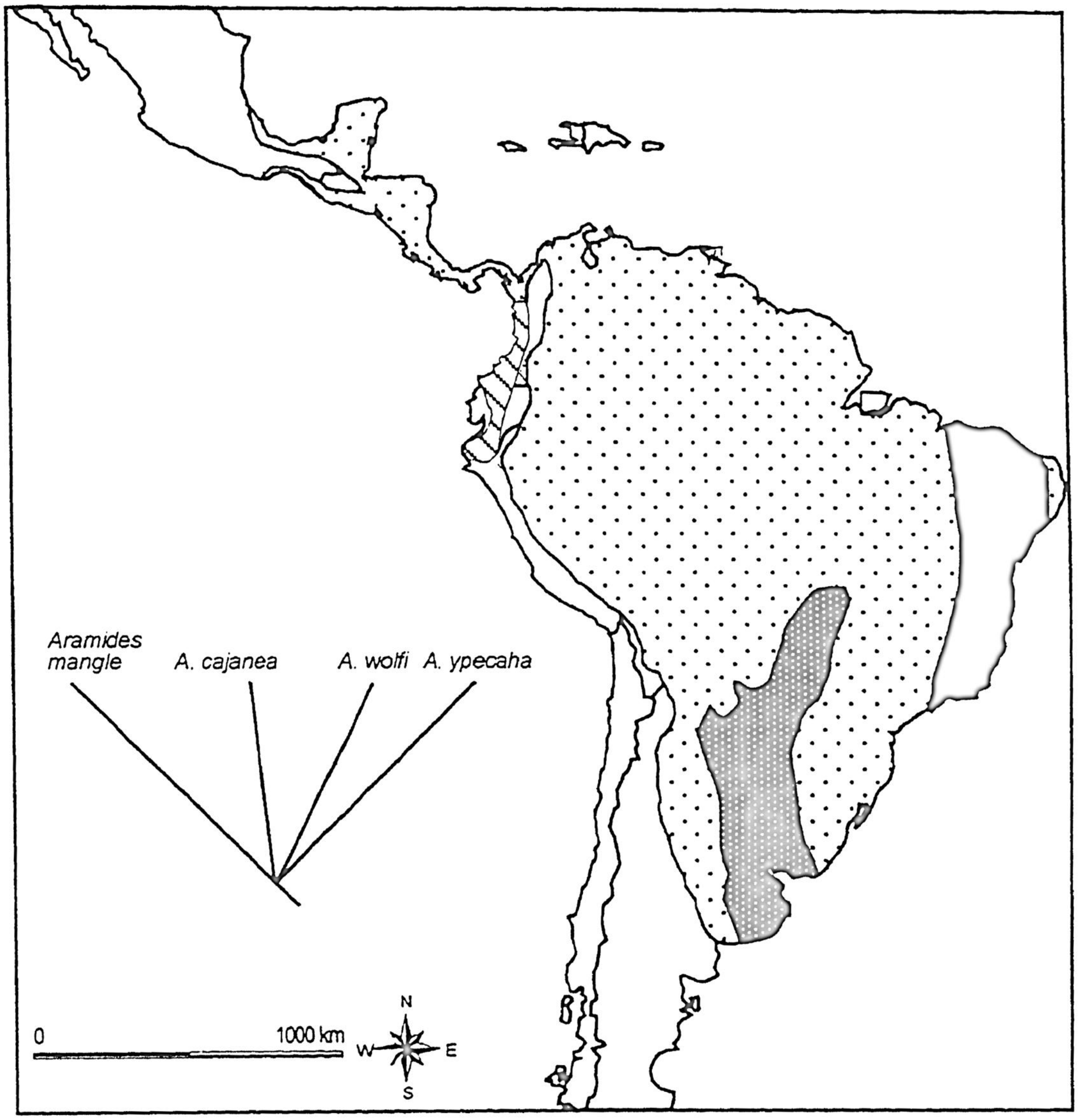

Aramides mangle
A. cajanea
A. wolfi
A. ypecaha
0
1000 km
N
W
E
S

Figure 23. Geographic distribution of the lowland forms of *Conirostrum* (subgenus *Ateleodacnis*): *Conirostrum bicolor* (black area), *C. margaritae* (dark gray area), *C. speciosum* (dots) and *C. leucogenys* (C pattern).

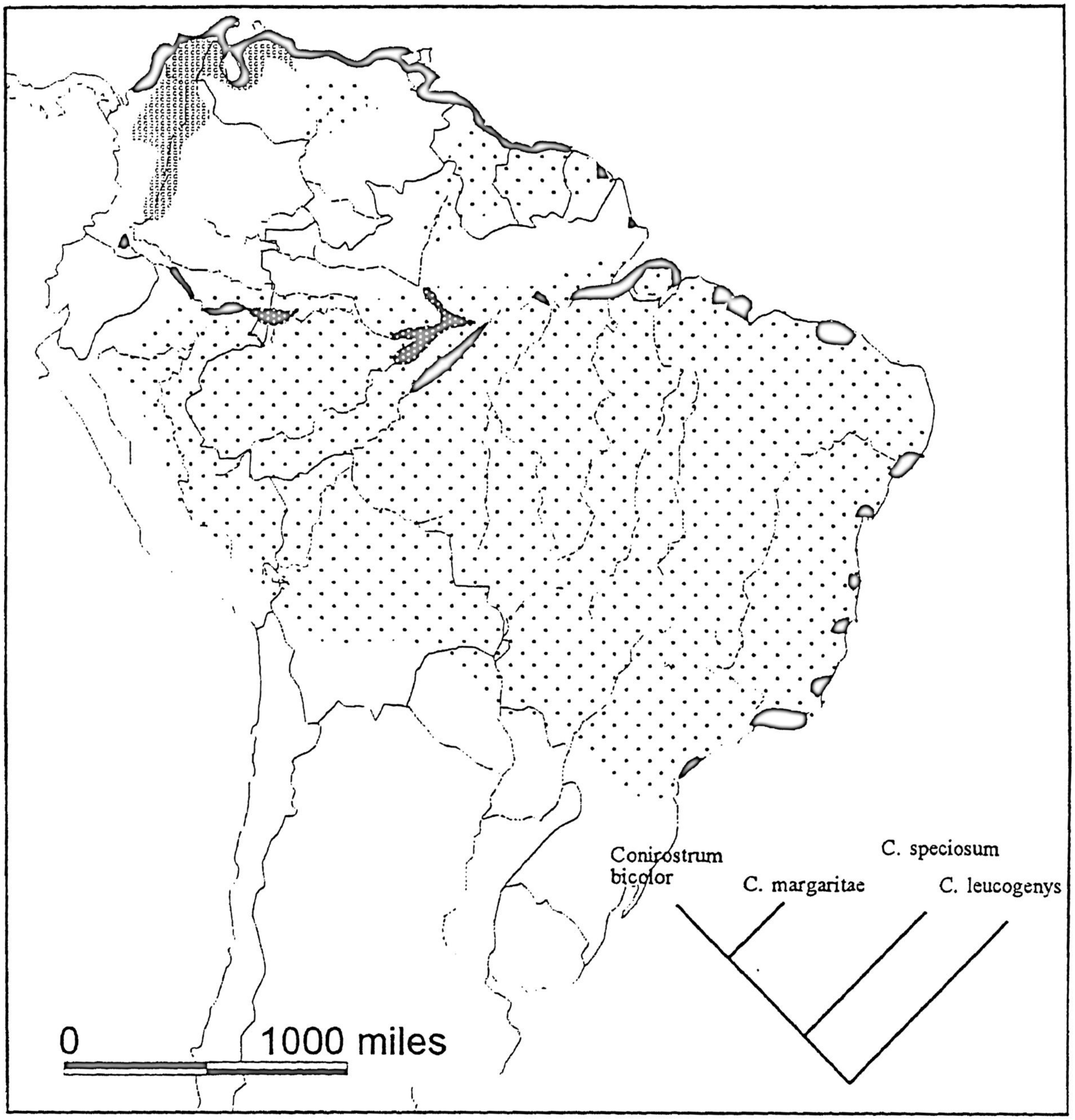

Conirostrum bicolor
C. margaritae
C. speciosum
C. leucogenys
0
1000 miles

Figure 24. Coastal protected areas of the New World that fall within the general distribution of mangroves.

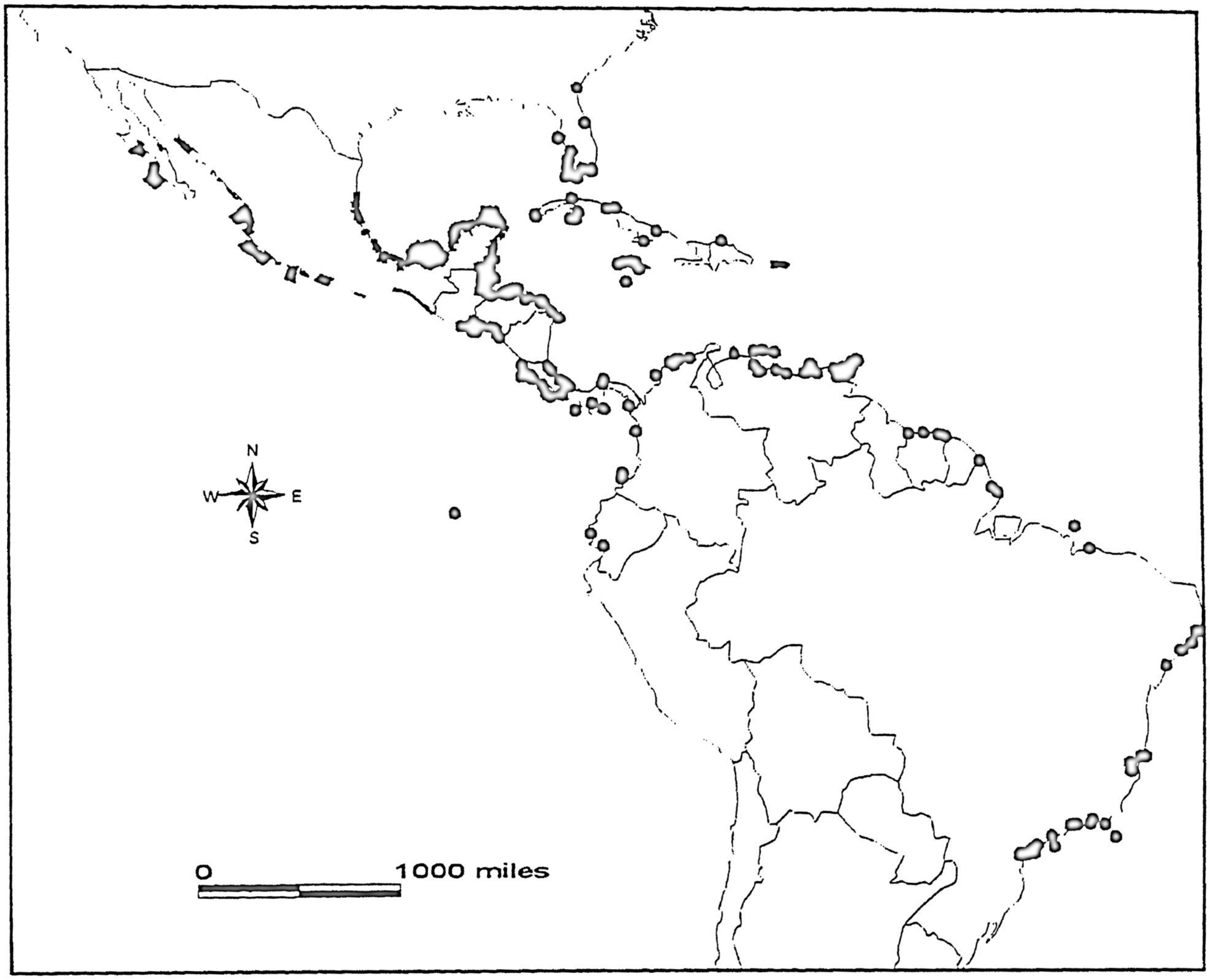
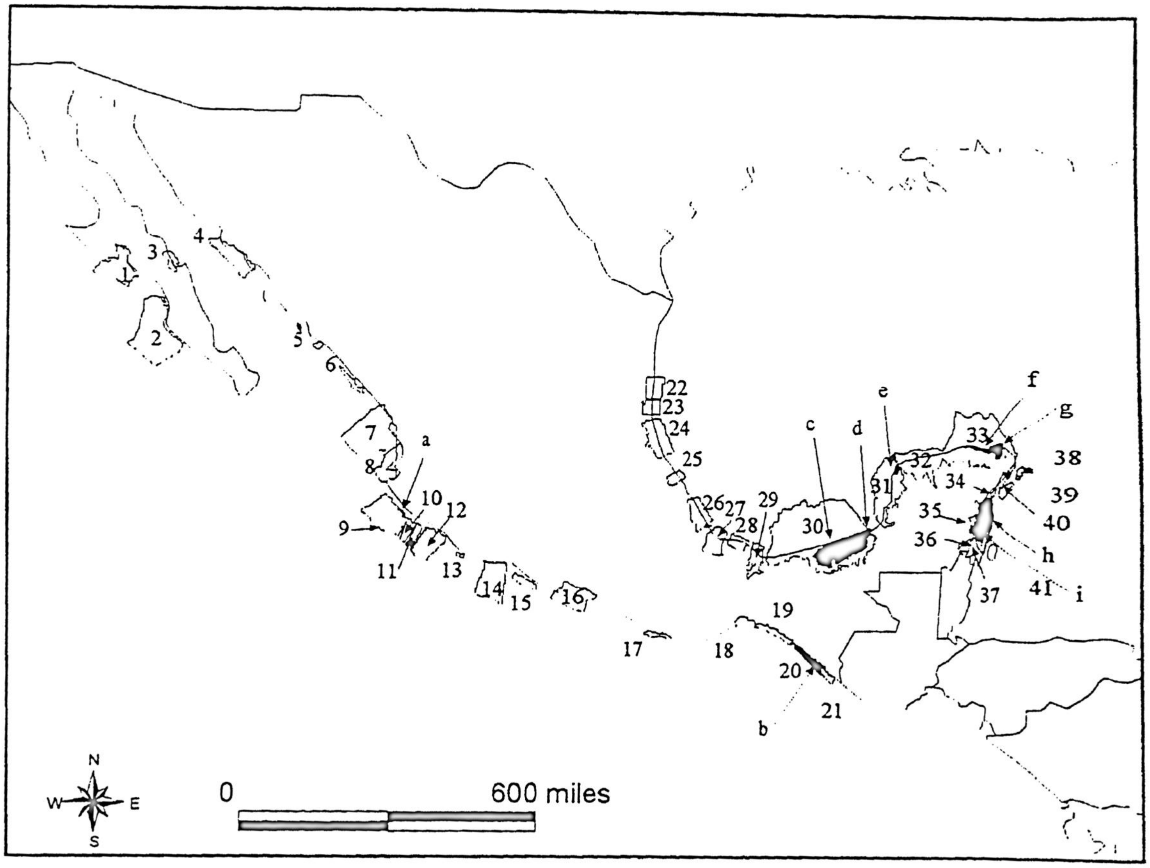

N
W
E
S
0
1000 miles

Figure 25. Protected (black areas), and areas proposed for protection (outlined areas) holding mangroves in Mexico.

Protected areas: (a) Chamela-Cuixmala, (b) La Encrucijada, (c) Laguna de Términos, (d) Pantanos de Centla, (e) Ría Celestún, (f) Ría Lagartos, (g) Yum Balam, (h) Sian Ka'an, and (i) Uaymil.

Proposed areas: (1) San Ignacio, (2) Bahía Magdalena, (3) Bahía Concepción, (4) Sistema Lagunas sur de Sonora, (5) Mismaloya-Punta Soledad, (6) Laguna de Chiracahueto, (7) Piaxtla-Urias, (8) Marismas Nacionales, (9) Bahía de Banderas, (10) Chamela-El Palmito, (11) Punta Graham-El Carrizal, (12) Cuyutlán-Chupadero, (13) Maruata-Colola, (14) Mexiquillo-Delta del Balsas, (15) Tlacoyunque, (16) Cajón del Diablo, (17) Puerto Ángel-Mazunte, (18) Laguna Superior e Inferior, (19) Laguna Mar Muerto, (20) Punta Arista, (21) Corredor Puerto Madero, (22) La Pesca-Rancho Nuevo, (23) Laguna San Andrés, (24) Pueblo Viejo-Tamiahua, (25) Tecolutla, (26) Laguna Verde-Antón Lizardo, (27) Sistema Lagunar de Alvarado, (28) Los Tuxtlas, (29) Delta del río Coatzacoalcos, (30) Pantanos de Centla-Laguna de Términos, (31) Champotón-El Palmar, (32) Sisal-Dzilám, (33) Dzilám-Contoy, (34) Punta Maroma-Nizuc, (35) Tulum-Xpuha, (36) Sian Ka'an, (37) Bahía Chetumal, (38) Xcalac-Majahual, (39) Arrow Smith, (40) Cozumel, and (41) Banco Chinchorro.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
a
b
c
d
e
f
g
h
i
N
S
E
W
0
600 miles