DIGITAL APPENDIX 1



**Fig. 1.** A schematic map of point count sites and the main vegetation types of the study area (created using ILWIS, 2005). Mixed land use includes agricultural land, palm plantations, and regrowth. \* = La Ventanilla village. Letter in green indicate point sites in mangrove (Ventanilla) and letters in blue are in the estuarine environment (Tonameca).

Table 1. Characteristics of the 20 sampling points shown in Fig. 1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Vegetation | | | Water | |
| Site | Composition 1 | Ht (m) 2 | % GF 3 | Hydrology 4 | % Area 5 |
| Ventanilla (mangrove) | |  |  |  |  |
| a | *L. racemosa* (79) | 13 | 0 | Precipitation | 23 |
| b | *L. racemosa* (92) | 14 | 0 | Precipitation | 25 |
| c | *L. racemosa* (89) | 12 | 0 | Precipitation | 13 |
| d | *R. mangle* (100) | 12 | 0 | Precipitation | 48 |
| e | *R. mangle* (100) | 12 | 1 | Precipitation | 39 |
| f | *R. mangle* (100) | 12 | 0 | Precipitation | 49 |
| g | *R. mangle* (96) | 16 | 0 | Precipitation | 45 |
| h | *R. mangle* (96) | 12 | 0.1 | Precipitation | 43 |
| i | *R. mangle* (93) | 11 | 0.5 | Precipitation | 51 |
| j | *R. mangle* (83) | 9.5 | 1 | Precipitation | 41 |
| Tonameca (estuary) | |  |  |  |  |
| a | Mon/Herb | <1 | 30 | Tidal/Fluvial | 50 |
| b | Mon/Herb | <1 | 1 | Tidal/Fluvial | 50 |
| c | Mon | <1 | 1 | Tidal/Fluvial | 50 |
| d | Mon/Herb/Flo | <3 | 42.2 | Tidal | 50 |
| e | Mon/Herb/Flo | <3 | 33.7 | Tidal | 50 |
| f | Mon/Herb/ Flo | <3 | 60 | Tidal | 60 |
| g | Mon/Herb/Flo | <3 | 50 | Tidal | 40 |
| h | Mon/Herb/Flo | <3 | 50 | Tidal | 50 |
| i | Mon/Herb/Flo | <3 | 50 | Fluvial | 50 |
| j | Mon/Herb/Flo | <3 | 50 | Fluvial | 50 |

1 For Ventanilla the dominant mangle species is given with its composition percentage in parenthesis (*Rhizophora mangle* is red mangle and *Laguncularia racemosa* is white mangle). Estimates were obtained with point-quarter methodology. For Tonameca, Mon = monocotyledons (includes *Typha domingensis* and *Hymenachne amplexicaulis*), Herb = herbaceous species (includes *Mimosa* sp.), and Flo = floating vegetation (includes *Eichhornia crassipes*, *Pistia stratiotes* and *Nymphaea ampla*).

2 Ht = Vegetation height. At Ventanilla tree heights were visually estimated during point-quarter sampling. For Tonameca, vegetation height estimates were obtained with 10 quadrants of 1 m2 per site.

3 GF = Ground flora. Visual estimates of percent coverage were obtained with 10 quadrants of 1 m2 at each site.

4 Hydrology refers to factors influencing water level and flow. “Tidal” only applied when the ephemeral connection with the Pacific Ocean was open (June to November).

5 Percentage area of open water was estimated within quarters of a 25 m radius around the center of the count site. Estimates of quarters were then averaged. In the mangrove “open water” was defined as areas of 25 m2 with no emergent trunks or roots.

DIGITAL APPENDIX 2

Classification of bird species from a Mexican wetland in a hierarchical system of key-resource guilds (Kg) nested within trophic guilds (Tg). The following categories of trophic resources are classified as being of minor (Min), significant (Sig), and major (Maj) importance: (1) vegetative parts of terrestrial plants; (2) fruit; (3) nectar; (4) terrestrial seeds; (5) terrestrial, arboreal and aerial invertebrates; (6) soil and leaf-litter invertebrates; (7) herpetofauna; (8) birds and mammals; (9) plankton and aquatic plant matter; (10) aquatic invertebrates of the water column and surface; (11) aquatic infauna; (12) crabs; (13) aquatic vertebrates; and (14) carrion. Nomenclature follows the American Ornithologists’ Union 2015 check-list of North American birds.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Species | Tg1 | Kg2 | Min | Sig | Maj | References |
| *Ortalis*  *poliocephala* | t1 | a | 4 | 1,2 |  | Eguiarte & Martínez del Rio, 1985; Moermond & Denslow, 1985 |
| *Patagioenas*  *flavirostris* | t1 | a |  | 4 | 2 | Greenberg et al., 1997; Rappole et al., 1993; Wheelwright et al., 1984 |
| *Zenaida*  *asiatica* | t1 | a |  | 4 | 2 | Pruitt et al., 2008; Rappole et al., 1983 |
| *Trogon*  *citreolus* | t1 | a |  | 5 | 2 | Eguiarte & Martínez del Rio, 1985; Greenberg & Bichier, 2005; Remsen et al., 1993 |
| *Eupsittula*  *canicularis* | t1 | a | 1 | 2,3,4 |  | Matuzac et al., 2008 |
| *Amazona*  *albifrons* | t1 | a | 1 | 2,3,4 |  | Matuzac et al., 2008 |
| *Saltator*  *coerulescens* | t1 | a | 1,3,4 | 2,5 |  | Eguiarte & Martínez del Rio, 1985; Herrera et al., 2006; Hutto, 1994; Moermond & Denslow, 1985; Wheelwright et al., 1984 |
| *Icterus*  *spurius* | t1 | a |  | 1,2,3,  5 |  | Gryj et al., 1990; Rappole et al., 1983 |
| *Icterus*  *pustulatus* | t1 | a |  | 2,3,5 |  | Eguiarte & Martínez del Rio, 1985; Gryj et al., 1990; Herrera et al., 2006; Hutto, 1994; Rappole et al., 1983 |
| *Cassiculus*  *melanicterus* | t1 | a |  | 2,3,5 |  | Eguiarte & Martínez del Rio, 1985; Gryj et al., 1990; Herrera et al., 2006 |
| *Leptotila*  *verreauxi* | t1 | a | 5 | 2,4 |  | Greenberg et al., 1997; Herrera et al., 2003, 2006; Wheelwright et al., 1984 |
| *Turdus*  *rufopalliatus* | t1 | a | 3,5,6 | 2 |  | Gryj et al., 1990; Hutto, 1994 |
| *Icteria*  *virens* | t1 | a | 3 | 2,5 |  | Gryj et al., 1990; Parrish, 1997; Rappole et al., 1983 |
| Species | Tg1 | Kg2 | Min | Sig | Maj | References |
| *Piranga*  *rubra* | t1 | a | 3 | 2,5 |  | Coates-Estrada & Estrada, 1986; Gryj et al., 1990; Moermond & Denslow, 1985; Rappole et al., 1983; Wheelwright et al., 1984 |
| *Arremonops*  *rufivirgatus* | t1 | b |  | 2,4,5 |  | Herrera et al., 2006; Howell & Webb, 1995 |
| *Cardinalis*  *cardinalis* | t1 | b |  | 2,4,5 |  | Baldwin et al., 2008; McGraw et al., 2003; Poulin et al., 1994 (congener) |
| *Columbina*  *inca* | t1 | b | 5 |  | 4 | Herrera et al., 2006; Pérez & Bulla, 2000 |
| *Columbina*  *talpacoti* | t1 | b | 5 |  | 4 | Herrera et al., 2006 |
| *Cyanocompsa*  *parellina* | t1 | b | 3 | 2,4 |  | Coates-Estrada & Estrada, 1986; Gryj et al., 1990; Hutto, 1994 |
| *Sporophila*  *minuta* | t1 | b |  |  | 4 | Poulin et al., 1994 (congener) |
| *Sporophila*  *torqueola* | t1 | b |  |  | 4 | Poulin et al., 1994 (congener) |
| *Empidonax*  *difficilis* | t2 | c |  | 2,5 |  | Parrish, 1997 (congener); Rappole et al., 1983 |
| *Empidonax*  *minimus* | t2 | c |  | 2,5 |  | Parrish, 1997; Rappole et al., 1983 |
| *Empidonax*  *traillii* | t2 | c |  | 2,5 |  | Eckhardt, 1979; Parrish, 1997; Rappole et al., 1983 |
| *Megarynchus*  *pitangua* | t2 | c |  | 2,5 |  | Greenberg & Bichier, 2005; Wheelwright et al., 1984 |
| *Myiarchus*  *cinerascens* | t2 | c |  | 2,5 |  | Hutto, 1994; Rappole et al., 1983 |
| *Myiarchus*  *tyrannulus* | t2 | c |  | 2,5 |  | Herrera et al., 2006; Moermond & Denslow, 1985; Poulin et al., 1994; Rappole et al., 1983 |
| *Myiozetetes*  *similis* | t2 | c |  | 2,5 |  | Eguiarte & Martínez del Rio, 1985; Herrera et al., 2006; Wheelwright et al., 1984 |
| *Vireo*  *flavoviridis* | t2 | c |  | 2,5 |  | Morton, 1977 |
| *Vireo*  *gilvus* | t2 | c |  | 2,5 |  | Parrish, 1993; Rappole et al., 1983; Root, 1967 |
| *Heliomaster*  *constantii* | t2 | d |  | 3,5 |  | Arizmendi & Ornelas, 1990; Gryj et al., 1990; Remsen et al., 1986 |
| *Amazilia*  *rutila* | t2 | d |  | 3,5 |  | Arizmendi & Ornelas, 1990; Gryj et al., 1990; Remsen et al., 1986 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Species | Tg1 | Kg2 | Min | Sig | Maj | References |
| *Archilochus*  *colubris* | t2 | d |  | 3,5 |  | Arizmendi & Ornelas, 1980; Courter et al., 2013; Rappole et al., 1983 |
| *Agelaius*  *phoeniceus* | t2 | e | 2 | 4 | 5 | Best, 2001; Krauss & Yasukawa, 2013; Rappole et al., 1983; |
| *Attila*  *spadiceus* | t2 | e | 2 | 7 | 5 | Herrera et al., 2003; Poulin et al., 1999; 2001; Sherry & McDade, 1982; |
| *Camptostoma*  *imberbe* | t2 | e |  | 2 | 5 | Fitzpatrick, 1980; Hutto, 1994; Rappole et al., 1983 |
| *Campylorhynchus*  *rufinucha* | t2 | e |  |  | 5 | Greenberg & Bichier, 2005 |
| *Cardellina*  *pusilla* | t2 | e | 3 | 2 | 5 | Greenberg & Bichier, 2005; Gryj et al., 1990; Hutto, 1981; Parrish, 1997; Rappole et al., 1983 |
| *Catharus*  *ustulatus* | t2 | e |  | 2,5,6 |  | Coates-Estrada & Estrada, 1986; Moermond & Denslow, 1985; Parrish, 1997; Rappole et al., 1983; Wheelwright et al., 1984 |
| *Contopus*  *sordidulus* | t2 | e | 2 |  | 5 | Eckhardt, 1979; Rappole et al., 1983 |
| *Crotophaga*  *sulcirostris* | t2 | e | 2,7 |  | 5 | Greenberg & Bichier, 2005; Vehrencamp, 1978; Wheelwright et al., 1984; Wunderle, 1981 |
| *Geothlypis*  *tolmiei* | t2 | e | 3 |  | 5 | Hutto, 1981; Parrish, 1997; Rappole et al., 1983 |
| *Geothlypis*  *trichas* | t2 | e |  | 2 | 5 | Hutto, 1981; Parrish, 1997; Rappole et al., 1983 |
| *Icterus*  *gularis* | t2 | e | 3 | 2 | 5 | Pleasants, 1981 |
| *Icterus*  *pectoralis* | t2 | e | 3 | 2 | 5 | Pleasants, 1981 (congener); Wunderle, 1978 |
| *Mniotilta*  *varia* | t2 | e | 2,3 |  | 5 | Greenberg & Bichier, 2005; Gryj et al., 1990; Parrish, 1997; Rappole et al., 1983 |
| *Morococcyx*  *erythropygus* | t2 | e | 6,7 |  | 5 | Fleming & Hooker, 1975; Skutch, 1966 |
| *Pachyramphus*  *aglaiae* | t2 | e | 2 | 5 |  | Greenberg et al., 1997; Hutto 1994 |
| *Passerculus*  *sandwichensis* | t2 | e |  | 4,5,6 |  | Rappole et al., 1983 |
| *Pheugopedius*  *felix* | t2 | e | 2 |  | 5 | Greenberg & Bichier, 2005; Herrera et al., 2006 (congener); pers. obs. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Species | Tg1 | Kg2 | Min | Sig | Maj | References |
| *Polioptila*  *albiloris* | t2 | e |  |  | 5 | Greenberg & Bichier, 2005; Root, 1967 |
| *Setophaga*  *americana* | t2 | e | 3 | 2 | 5 | Parrish, 1997; Rappole et al., 1983 |
| *Setophaga*  *petechia* | t2 | e | 2 |  | 5 | Greenberg et al., 1997; Parrish, 1997; Rappole et al., 1983 |
| *Setophaga*  *ruticilla* | t2 | e | 2 |  | 5 | Parrish, 1997; Poulin et al., 1994; Rappole et al., 1983 |
| *Thryophilus*  *pleurostictus* | t2 | e | 2,6 |  | 5 | Herrera et al., 2006; Hutto, 1994 |
| *Vireo*  *bellii* | t2 | e |  | 2 | 5 | Coates-Estrada & Estrada, 1986; Rappole et al., 1983 |
| *Vireo*  *hypochryseus* | t2 | e | 3 | 2 | 5 | Gryj et al., 1990; Hutto, 1994; Parrish, 1997; Rappole et al., 1983; Wheelwright et al., 1984 |
| *Campephilus*  *guatemalensis* | t2 | f |  |  | 5 | Askins, 1983; Greenberg et al., 1997; Hutto, 1994 |
| *Dryocopus*  *lineatus* | t2 | f |  |  | 5 | Askins, 1983; Greenberg et al., 1997 |
| *Melanerpes*  *chrysogenys* | t2 | f | 3 | 2 | 5 | Eguiarte & Martínez del Rio, 1985; Gryj et al., 1990; Hutto, 1994 |
| *Hirundo*  *rustica* | t2 | g | 2 |  | 5 | Rappole et al., 1983 |
| *Petrochelidon*  *pyrrhonota* | t2 | g | 2 |  | 5 | Rappole et al., 1983 |
| *Progne*  *chalybea* | t2 | g |  |  | 5 | Howell & Webb, 1995 |
| *Stelgidopteryx*  *serripennis* | t2 | g |  |  | 5 | Howell & Webb, 1995 |
| *Streptoprocne*  *zonaris* | t2 | g |  |  | 5 | Rowley & Orr, 1965 |
| *Tachycineta*  *albilinea* | t2 | g |  |  | 5 | Moore et al., 1999 |
| *Tyrannus*  *crassirostris* | t2 | g | 2 | 5 |  | Hutto, 1994; Rappole et al., 1983 |
| *Tyrannus*  *melancholicus* | t2 | g |  | 2 | 5 | Fitzpatrick, 1980; Moermond & Denslow, 1985; Rappole et al., 1983; Wheelwright et al., 1984 |
| *Nyctidromus*  *albicollis* | t2 | g |  |  | 5 | Howell & Webb, 1995 |
| *Parkesia*  *noveboracensis* | t2 | I | 2,4,5,  13 | 10 | 6 | Parrish, 1997; Poulin et al., 1994; Rappole et al., 1983 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Species | Tg1 | Kg2 | Min | Sig | Maj | References |
| *Pitangus*  *sulphuratus* | t2 | II | 7,12,  13 | 2,5 |  | Eguiarte & Martínez del Rio, 1985; Fitzpatrick, 1980; Herrera et al., 2006; Iribarne & Martinez, 1999; Rappole et al., 1983 |
| *Quiscalus*  *mexicanus* | t2 | II | 2,7,  12,14 | 6 | 4,5 | Wehtje, 2003; Teather & Weatherhead 1988; pers. obs. |
| *Rupornis magnirostris* | t3 | h | 5 | 7 | 8 | Baldarón et al., 2011; Panasci & Whitacre, 2000 |
| *Buteo*  *plagiatus* | t3 | h | 5 | 7 | 8 | pers. obs |
| *Buteogallus*  *anthracinus* | t3 | h |  | 5,7,8,  12 |  | Rappole et al., 1983 |
| *Circus*  *cyaneus* | t3 | h | 5,7 |  | 8 | García & Arroyo, 2005; Rappole et al., 1983 |
| *Falco*  *peregrinus* | t3 | h | 5 |  | 8 | Castellanos et al., 2006; Ellis et al., 2004 |
| *Geranospiza*  *caerulescens* | t3 | h |  | 7 | 8 | Sutter et al., 2001 |
| *Calocitta*  *formosa* | t3 | i |  | 2,5,7,  8 |  | Berg, 2004 |
| *Glaucidium*  *brasilianum* | t3 | i |  | 5,7,8 |  | Poulin et al., 1994; pers. obs |
| *Piaya*  *cayana* | t3 | i | 2,8 | 5,7 |  | Greenberg et al., 1997; Greenberg & Birchier, 2005; Komar & Thurber, 2003; Skutch, 1966 |
| *Anas*  *clypeata* | a1 | j | 4,13 | 9,10 |  | Bellrose, 1980; Rappole et al., 1983; Tietje & Teer, 1996 |
| *Anas*  *discors* | a1 | j |  | 4,9,10 |  | Bellrose, 1980; Botrero & Rusch, 1994; Rappole et al., 1983 |
| *Aythya*  *americana* | a1 | j | 4,5,  10,13 |  | 9 | Adair et al., 1996; Bellrose, 1980; Mitchell et al., 1994; Rappole et al., 1983 |
| *Dendrocygna*  *bicolor* | a1 | j |  | 4,9,10 |  | Carroll, 1932; Rappole et al., 1983; Rylander & Bolen, 1974 |
| *Gallinula*  *galeata* | a1 | j |  | 5,9,10 |  | Rappole et al., 1983 |
| *Porphyrio*  *martinicus* | a1 | j |  | 9,10 |  | Rappole et al., 1983; Stephens, 1984 |
| *Actitis*  *macularius* | a2 | k | 13 | 5 | 10 | Placyk & Harrington, 2004; Rappole et al., 1983 |
| *Arenaria*  *interpres* | a2 | k | 12 | 5,10,  11 |  | Rappole et al., 1983; Whitfield, 1990 |
| *Calidris*  *alba* | a2 | k | 9,12,  13 | 5,10,  11 |  | Petracci, 2002; Rappole et al., 1983; Vanermen et al., 2009 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Species | Tg1 | Kg2 | Min | Sig | Maj | References |
| *Calidris*  *mauri* | a2 | k |  | 5,10,  11 |  | Paulson, 2005; Rappole et al., 1983 |
| *Calidris*  *melanotos* | a2 | k | 9 | 5,10,  11 |  | Brooks, 1967; Holden & Cleeves, 2002; Rappole et al., 1983 |
| *Calidris*  *minutilla* | a2 | k |  | 5,10,  11 |  | Baker & Baker, 1973; Brooks, 1967; Paulson, 2005; Rappole et al., 1983 |
| *Charadrius*  *collaris* | a2 | k | 12 | 5,10 |  | Howell & Webb, 1995; Iribarne & Martinez, 1999 |
| *Charadrius*  *nivosus* | a2 | k | 11 | 5,10 |  | Paulson, 2005; Rappole et al., 1983 |
| *Charadrius*  *semipalmatus* | a2 | k | 11 | 5,10,  12 |  | Baker & Baker, 1973; Rappole et al., 1983; Smith & Nol, 2000 |
| *Charadrius*  *wilsonia* | a2 | k | 11 | 5,10,  12 |  | Iribarne & Martinez, 1999; Paulson, 2005; Rappole et al., 1983 |
| *Pluvialis*  *squatarola* | a2 | k | 12 | 5,10 |  | Iribarne & Martinez, 1999; Rappole et al., 1983 |
| *Himantopus*  *mexicanus* | a2 | l |  | 5,13 | 10 | Rappole et al., 1983; Ueng et al., 2009 (congener) |
| *Phalaropus*  *tricolor* | a2 | l |  | 5,9 | 10 | Paulson, 2005; Rappole et al., 1983 |
| *Recurvirostra*  *americana* | a2 | l | 5,9,13 | 10,11 |  | Boettcher et al., 1995; Rappole et al., 1983 |
| *Tringa*  *flavipes* | a2 | l | 13 | 5,11 | 10 | Baker & Baker, 1973; Brooks, 1967; Paulson, 2005; Rappole et al., 1983; Weber & Haig, 1997 |
| *Tringa*  *melanoleuca* | a2 | l | 11 | 5,13 | 10 | Brooks, 1967; Paulson, 2005; Rappole et al., 1983 |
| *Tringa*  *semipalmata* | a2 | l | 11,12,  13 | 5,10 |  | Castillo-Guerrero et al., 2009; Paulson, 2005; Rappole et al., 1983 |
| *Limnodromus*  *griseus* | a2 | m |  | 10 | 11 | Baker & Baker, 1973; Rappole et al., 1983; Weber & Haig, 1997 |
| *Limosa*  *fedoa* | a2 | m | 5,10,  12 |  | 11 | Castillo-Guerrero et al., 2009; Rappole et al., 1983 |
| *Numenius*  *phaeopus* | a2 | m | 5,10,  12 |  | 11 | Rappole et al., 1983; Velásquez & Navarro, 1993 |
| *Plegadis*  *chihi* | a2 | I | 7,13 | 5,11 | 10 | Rappole et al., 1983; Safran et al., 2000; Soave et al., 2006 |
| *Jacana*  *spinosa* | a2 | I | 5,9,13 |  | 10 | Howell & Webb, 1995; Jenni & Collier, 1972 |
| *Eudocimus*  *albus* | a2.5 | n | 5,7 | 10,12,  13 |  | Kushlan, 1979; Rappole et al., 1983 |
| *Ixobrychus*  *exilis* | a2.5 | n | 7 | 5,10,  13 |  | Rappole et al., 1983 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Species | Tg1 | Kg2 | Min | Sig | Maj | References |
| *Platalea*  *ajaja* | a2.5 | n | 9 | 10,13 |  | Rappole et al., 1983; Swennen & Yu, 2005 (congener) |
| *Podilymbus*  *podiceps* | a2.5 | n | 9 | 5,10,  13 |  | Rappole et al., 1983 |
| *Tachybaptus*  *dominicus* | a2.5 | n |  | 5,10,  13 |  | Howell & Webb, 1995 |
| *Egretta*  *caerulea* | a2.5 | o | 5,7 | 10,13 | 12 | Miranda & Collazo, 1997; Olmos et al., 2001; Rappole et al., 1983; Wunderle, 1981 |
| *Nyctanassa*  *violacea* | a2.5 | o | 5,7,  10,13 |  | 12 | Martínez, 2004; Rappole et al., 1983 |
| *Chlidonias*  *niger* | a2.5 | III |  | 5,10,  13 |  | Beintema et al., 2010; Rappole et al., 1983 |
| *Ardea*  *alba* | a3 | p | 5,7,12 | 10 | 13 | Miranda & Collazo, 1997; Ramo & Busto, 1993; Rappole et al., 1983 |
| *Ardea*  *herodias* | a3 | p | 5,7,8,  9,10 |  | 13 | Ramo & Busto, 1993; Rappole et al., 1983 |
| *Butorides*  *virescens* | a3 | p | 5 | 10 | 13 | Helm, 2012; Rappole et al., 1983 |
| *Cochlearius*  *cochlearius* | a3 | p |  | 10 | 13 | Kushlan, 2009; Ramo & Busto, 1993 |
| *Egretta*  *rufescens* | a3 | p | 10 |  | 13 | Ramo & Busto, 1993; Rappole et al., 1983 |
| *Egretta*  *thula* | a3 | p | 5,7 | 10 | 13 | Miranda & Collazo, 1997; Ramo & Busto, 1993; Rappole et al., 1983 |
| *Egretta*  *tricolor* | a3 | p | 5,10 |  | 13 | Miranda & Collazo, 1997; Ramo & Busto, 1993; Rappole et al., 1983 |
| *Mycteria*  *americana* | a3 | p | 5,7,9,  10 |  | 13 | Ogden et al., 1976; Rappole et al., 1983 |
| *Nycticorax*  *nycticorax* | a3 | p | 5,7,9,  10 | 8 | 13 | Hall & Kress, 2008; Rappole et al., 1983 |
| *Phalacrocorax*  *brasilianus* | a3 | q | 9,10 |  | 13 | Casaux et al., 2009; Rappole et al., 1983 |
| *Anhinga*  *anhinga* | a3 | q | 9,10 |  | 13 | Owre, 1967; Rappole et al., 1983 |
| *Hydroprogne*  *caspia* | a3 | q | 10 |  | 13 | Collis et al., 2012; Rappole et al., 1983; Thompson et al., 2002 |
| *Megaceryle*  *alcyon* | a3 | q | 10 |  | 13 | Rappole et al., 1983; Sullivan et al., 2006 |
| *Megaceryle*  *torquata* | a3 | q | 10 |  | 13 | Green et al., 1978; Rappole et al., 1983; Willard, 1985 |
| *Pandion*  *haliaetus* | a3 | q | 5,7 |  | 13 | Green et al., 1978; Rappole et al., 1983 |
| *Pelecanus*  *occidentalis* | a3 | q | 10 |  | 13 | Rappole et al., 1983; Visser et al., 2005 |
| Species | Tg1 | Kg2 | Min | Sig | Maj | References |
| *Rynchops*  *niger* | a3 | q |  | 10 | 13 | Naves & Vooren, 2006; Rappole et al., 1983 |
| *Sternula*  *antillarum* | a3 | q |  |  | 13 | Atwood & Kelly, 1984; Elliott et al., 2007; Zuria & Mellink, 2005 |
| *Chloroceryle*  *amazona* | a3 | q | 10 |  | 13 | Willard, 1985 |
| *Chloroceryle*  *americana* | a3 | q | 10 |  | 13 | Fry et al., 1992; Willard, 1985 |
| *Thalasseus*  *elegans* | a3 | III | 10 |  | 13 | Dahdul & Horn, 2003; Rappole et al., 1983 |
| *Thalasseus*  *maximus* | a3 | III | 10,12 |  | 13 | Aygen & Emslie, 2006; Rappole et al., 1983 |
| *Fulica*  *americana* | Ex1 | n/a | 4,5,  10,13 |  | 9 | Rappole et al., 1983; Villamagna et al., 2010 |
| *Dendrocygna*  *autumnalis* | Ex2 | n/a | 1,5,10 |  | 4 | Bellrose, 1980; Kramer & Euliss, 1986 |
| *Fregata*  *magnificens* | Ex2 | n/a | 10 |  | 13 | Calixto-Albarrán & Osorno, 2000 |
| *Bubulcus*  *ibis* | Ex2 | n/a | 7 | 5 |  | Rappole et al., 1983; Wunderle, 1981 |
| *Cathartes*  *aura* | Ex3 | n/a | 5 |  | 14 | Rappole et al., 1983 |
| *Coragyps*  *atratus* | Ex3 | n/a | 5 |  | 14 | Rappole et al., 1983 |
| *Leucophaeus*  *atricilla* | Ex4 | n/a | 12 | 5,10,  13,14 |  | Bernhardt et al., 2010; Dosch, 1997; Howell & Dunn, 2007; Rappole et al., 1983 |
| *Leucophaeus*  *pipixcan* | Ex4 | n/a |  | 5,10,  13,14 |  | Howell & Dunn, 2007; Rappole et al., 1983 |
| *Coccyzus*  *minor* | Ex4 | n/a |  | 2,5,7 |  | Rappole et al., 1983; Wunderle, 1981 |
| *Momotus*  *mexicanus* | Ex4 | n/a |  | 2,5,7 |  | Remsen et al., 1993; pers. obs. |

1 ‘Ex’ denotes species excluded from trophic guilds on account of: (1) abundance fluctuations (559 of 661 observations were between November 2011 and March 2012); (2) lagoon used exclusively for non-foraging activities; (3) carrion-based diet; or (4) significant resource consumption across three trophic levels.

2 Species excluded from key-resource guilds because they: (I) did not share resources, microhabitat, or foraging technique with any other; (II) did not consume a sufficient portion of any one resource, or (III) presented relatively little foraging activity within the lagoon.

**Additional details and criteria**

Trophic guild ʻt2ʼ: Terrestrial insectivores

Species were included if they had significant consumption of fruit and terrestrial invertebrates, or nectar and terrestrial invertebrates, and no other categories. This was because insectivory among invertebrates raises the trophic level of insectivorous birds.

Key-resource guild ʻeʼ: Terrestrial insectivores

*Parkesia noveboracensis* was excluded because it consumes <0.25 terrestrial invertebrates (category 5). *Pitangus sulphuratus* and *Quiscalus mexicanus* consume >0.25 terrestrial invertebrates, but were excluded because they also consume an equal portion of fruit (*P. sulphuratus*) or seeds (*Q. mexicanus*). Because of similarity between terrestrial invertebrates (category 5) and soil invertebrates (category 6), two species were included that consume equal portions of >0.25 of these categories (*Catharus ustulatus* and *Passerculus sandwichensis*).

Key-resource guild ʻfʼ: Woodpeckers

Species in this group have functional adaptations for obtaining resources that are unavailable to other insectivores (Bock, 1999).

Key-resource guild ʻgʼ: Aerial hawkers or sweepers

Single point observations indicated that these species used airspace for foraging.

Trophic guild ʻa2ʼ: Aquatic invertebrates

Soil invertebrates were excluded from shorebird diets as this resource is characteristic of breeding habitat (O´Brien, Crossley &, Karlson 2006) and diet (Custer & Pitelka, 1978), and because shorebirds were never observed outside aquatic environments in the study area. Single point observations of *Jacana spinosa* and *Plegadis chihi* were in aquatic vegetation or vegetated shorelines. Because of these distinct foraging substrates, these species were not included in any nested key-resource guilds.

Key-resource guild ʻkʼ: Shore-line insectivores

These species were always observed foraging on sandy shores, wet sediments or sand, and never observed foraging in shallow water.

Key-resource guild ʻlʼ: Wading insectivores

At least 25 % of single point observations involving foraging in shallow water, which implied the consumption of different prey species to birds in ‘k’. No single point observations were obtained for *Tringa flavipes*, and *Phalaropus tricolor*, although we observed wading and swimming (*P. tricolor*) outside point counts. Furthermore, the morphological adaptations in these species (i.e., bill and leg length) are similar to other members of ‘l’.

Key-resource guild ʻmʼ: Probing aquatic insectivore

Structural specializations in the bill and specific foraging methods allow these species to access resources by deep sediment probing (Baker & Baker 1973; references in Wiens, 1989, p. 324). These resources are unavailable to other species in the trophic guild of aquatic insectivores.

Trophic guild ʻa2.5ʼ: Secondary aquatic consumers

Key-resource guild ʻnʼ: Aquatic insectivores/piscivores

*Chlidonias niger* was not included because most single point observations involved resting instead of foraging (95 %).

Trophic guild ʻa3ʼ: Piscivores

Key-resource guild ʻqʼ: Deep water piscivores

*Thalasseus maximus* and *T. elegans* were not included because most single point observations involved resting (>98 %).

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