

The Central American Waterbird Census 2019

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Deliverable 2: Final report of the Central American Waterbird Census

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WHSRN Executive Office - Manomet

Introduction

The Central American Waterbird Census (CAWC) was launched in 2011 by the Waterbird Conservation Council in coordination with Wetlands International and BirdLife International. The census forms part of the International Waterbird Census (IWC), a program of Wetlands International that was first established in Europe in 1967 and since the 1990s has also covered Africa, Asia and South America. The goals of the IWC are to monitor changes in waterbird numbers and distribution; to improve knowledge of little-known waterbird species and wetland sites; to identify and monitor sites that qualify as Wetlands of International Importance under the Ramsar Convention on Wetlands; to provide information on the conservation status of waterbird species; and to increase awareness of the importance of waterbirds and their wetland habitats at local, national and international levels.

Since its inception in 2011, the CAWC has gradually grown in significance, both in terms of the number of sites and species surveyed, and the number of volunteer participants across the seven countries. Regional coordination was initially led by BirdLife International, then by Fundación Ecológica SalvaNATURA (El Salvador), and since 2017 coordination has been undertaken by the WHSRN Executive Office of Manomet, Inc.

This report presents a summary of the results of the Central American Waterbird Census conducted in February-March 2019, including a comparison with totals of the CAWC between 2012 and 2019 (Figures 1-3).

Methodology

The CAWC has been implemented following the methodology of the Neotropical Waterbird Census and is being carried out in all seven countries of Central America, plus southern Mexico which joined in 2018.

Lead organizations in each Central American country and southern Mexico were contracted to coordinate and undertake the census. Coordinators were asked to implement the survey at sites already covered in previous years, and to identify any other key sites not covered as yet and encourage census participants to undertake surveys at those sites. Key wetland sites are considered to be Ramsar sites, wetland Important Bird Areas (IBAs), Protected Areas covering important wetlands and/or WHSRN sites.

Data were collected on the two standard NWC forms, and three options were provided for submitting the data: via the national coordinating organizations, to the e-mail address censo.avesacuaticas.ca@gmail.com, or via eBird <http://ebird.org/content/ebird> (in which case participants were asked to add “Central American waterbird census” to the note section). Also, participants were asked to specify whether new sites are also monitored for the Migratory Shorebird Project of Point Blue (<http://www.migratoryshorebirdproject.org/es/inicio>). This in order to ensure increased collaboration and sharing of data.

Finally, discussion have been held with Matt Reiter, chief coordinator of the Migratory Shorebird Project, to explore the possibility to use the Californian Avian Data Center (CADC) as the CAWC database platform. The practicalities of this are still being explored, but it seems likely that CADC will become the CAWC platform, which will help facilitate coordination and data sharing with the Migratory Shorebird Project.

Participation

National Coordination

Eight organizations were sub-contracted by the WHSRN Executive Office as national census coordinators. These include the seven organizations that coordinated the census successfully in Central America in 2017 and 2018, and the organization representing southern Mexico that joined in 2018. The national coordinating organization are:

- Asociación Hondureña de Ornitología – Honduras
- Belize Audubon Society – Belize
- Fundación Ecológica SalvaNATURA - El Salvador
- Fundación para el Ecodesarrollo y la Conservación (Fundaecco) – Guatemala
- Sociedad Audubon de Panamá – Panama
- ProNatura Sur A.C. – Mexico
- Quetzalli Nicaragua S.A. – Nicaragua
- Unión de Ornitólogos de Costa Rica (UOCR) - Costa Rica

Other participating organizations

In most of the participating countries, other organizations, both governmental and non-governmental, partnered with the national coordinator organization, taking part in the waterbird census in one way or another. This participation, for example, involved assistance with logistics (i.e. providing trucks/boats or fuel to help transport volunteers) or through providing volunteers to carry out the census. These partnering organizations included:

- Sarteneja Alliance for Conservation (Belize)
- Corozal Sustainable Future Initiative (Belize)
- Universidad de Costa Rica
- Área Conservación Tempisque (Costa Rica)
- Área de Conservación Guanacaste (Costa Rica)
- Hacienda el Viejo (Costa Rica)
- WCS Guatemala
- WCS Beringia
- Club de Observación de Aves Alzacuanes (Honduras)
- Club de Observación de Aves Clorofonias (Honduras)
- Club de Observación de Aves Siguatepeque (Honduras)
- Club de Observación de Aves Cotinga (Honduras)
- Club de Observación de Aves Zorzales (Honduras)
- Universidad Zamorano (Honduras)
- Alcaldía Municipal de San Dionisio, Usulután, Bahía de Jiquilísco (El Salvador)
- Policía Nacional Civil, División de Medio Ambiente y Fuerza Armada (El Salvador)
- Ministerio de Medio Ambiente y Recursos Naturales, Dirección de Ecosistemas (El Salvador)
- Guías de turismo (Nicaragua)
- Estudiantes de Biología (Nicaragua)
- Universidad de Panamá
- Universidad Marítima de Panamá

Participants

A total of 142 people participated in the census. Most volunteers were recruited in Honduras (45 volunteers) where many Bird Clubs joined. Also, in El Salvador a relatively high number (27) of volunteer participated (Table 1).

As with past years, several countries organized workshops to train new volunteers. Such workshops were given in Panama, Belize and Nicaragua. Other ways used to attract volunteers to participate was through social media (e.g. Facebook and WhatsApp groups of bird clubs) and institutional news bulletins.

COUNTRY	NO. PARTICIPANTS
BELIZE	13
COSTA RICA	13
EL SALVADOR	27
GUATEMALA	10
HONDURAS	45
NICARAGUA	14
PANAMA	16
MEXICO	4
TOTAL	142

Table 1: Number of volunteers participating in each country in 2019

Results

In 2019 a total of 230 sites (including sub-sites) were visited in Central America and southern Mexico. A total of 109 waterbird species were recorded and 355,260 individuals counted (Table 2). The country with the highest number of species observed was Honduras with 82 species, followed by 73 in El Salvador and 71 in Guatemala. The highest number of individuals was counted in Panama (138,767 individuals). In Honduras and El Salvador, nearly 50,000 individuals were counted.

COUNTRY	NO. SITES	NO. SPECIES	NO. INDIVIDUALS
BELIZE	5	67	26,952
COSTA RICA	51	66	40,732
EL SALVADOR	49	73	45,822
GUATEMALA	21	71	10,690
HONDURAS	56	82	29,630
NICARAGUA	27	69	29,110
PANAMA	6	49	138,767
MEXICO	15	49	33,557
TOTALS	230	109	355,260

Table 2: Summary of the Central American Waterbird Census results per country over 2019

National or International recognized important wetlands

Of the 230 sites (and sub-sites) visited during the waterbird census, around 51 fall within a protected area (either National Park, Wildlife Refuge, Wildlife Sanctuary or Multiple Use Protected Area). At least 96 sites and sub-sites fall within 26 Important Bird Areas (IBA), 38 sites and sub-sites fall within 15 Ramsar sites and two sites are designated Western Hemisphere Shorebird Reserve Network sites - the Delta del Estero Real in Nicaragua (site of International importance) and the Upper Bay of Panama (site of Hemispheric importance).

Comments on sites

In 2019, the country with most sites surveyed was Honduras, where a total of 56 were visited for the waterbird census, followed by 51 in Costa Rica and 49 in El Salvador (Appendix 1). Specific sites with the highest number of counted waterbirds included Costa del Este and Panama Viejo, both sites in Panama, with respectively 58,360 and 56,687 individuals counted. Also, a relatively high number was counted at Corozal Bay/Shipstern Lagoon in Belize (22,480 individuals) and Sandillal Reservoir in Costa Rica (20,303 individuals).

Highest species diversity was observed at the La Berbería Protected Area, Choluteca, in Honduras where 48 species were observed. Other sites with a relatively high diversity included Finca Tamashan in Guatemala (39 species), Crooked Tree Wildlife Sanctuary and Dangriga in Belize (both 37 species) and Laguna Puente Grande, Monterrico in Guatemala (37 species).

At eight sites no waterbird species were encountered: Piquín Guerrero (Nicaragua), La Puntilla (El Salvador), Laguna el Naranjo (Mexico) and five sites in Costa Rica (See appendix 1).

Comments on species

The total of 109 species recorded in the eight participating countries included 38 resident species (58,173 individuals), 55 Nearctic migrants (148,665 individuals) and 15 species with both resident and migratory populations (34,490 individuals). A total of 113,931 waterbirds were identified just to genera or family level (the majority being Nearctic shorebirds). One species, White-cheeked Pintail *Anas bahamensis*, is considered a vagrant in the region and one individual was observed at Ciénaga de Las Macanas in Panama.

Of all the waterbirds recorded, no less than 74% (261,535 individuals) were Nearctic migrants (including migratory shorebird species identified to genera or family level). When also considering those species with both migratory and resident populations (e.g. Black-necked Stilt *Himantopus mexicanus*, Wilson's Plover *Charadrius wilsonia*, but excluding more regional migrants like the Jabiru *Jabiru mycteria*), nearly 85% (296,003 individuals) of all counted waterbirds could be considered Nearctic migrants. All the species observed and their respective total counts are presented in Appendix 2.

Resident Waterbirds

Of the resident waterbird species the most abundant were Black-bellied Whistling-Duck *Dendrocygna autumnalis*, Neotropical Cormorant *Phalacrocorax brasilianus* and Magnificent Frigatebird *Fregata magnificens* with respectively 24,415, 9,605 and 8,577 individuals. Other abundant species with counts surpassing 1000 individuals included Fulvous Whistling-Duck *Dendrocygna bicolor*, Wood Stork *Mycteria americana*, White Ibis *Eudocimus albus*, Cattle Egret *Bubulcus ibis* and Northern Jacana *Jacana spinosa*.

Nearctic Migrants

Of the Nearctic migrants counted during the census (here excluding the species with both resident and migratory populations), the vast majority, nearly 70%, are species of duck and shorebird. Among the most abundant Nearctic migrants, excluding shorebirds, was Blue-winged Teal *Spatula discors* with a total of 42,153 individuals counted, the majority of which were seen in Sandillal Reservoir, Costa Rica (20,000 individuals). Other species recorded in high numbers were Lesser Scaup *Aythya affinis* (22,335 individuals), Royal Tern *Thalasseus maximus* (6,253 individuals) and Sandwich Tern *Thalasseus sandvicensis* (5,961 individuals).

Nearctic shorebirds

A total of 28 species of Nearctic shorebirds was recorded, including three species considered resident and migrant in Central America (American Oystercatcher *Haematopus palliatus*, *H. mexicanus* and *C. wilsonia*). An overall total of 159,588 individuals were counted (175,760 when including the three species with both resident and migrant populations), of which 112,870 were un-identified species (419 *Calidris* sp., 112,371 *Calidris mauri/pusilla* and 80 *Limnodromus* sp.). Based on these numbers, nearly 50% of all waterbirds counted are Nearctic shorebirds (including *H. palliatus*, *H. mexicanus* and *C. wilsonia*).

The most common species were *Calidris mauri/C. pusilla* (112,371 individuals), *Calidris mauri* (14,249 individuals) and *Charadrius wilsonia* (8,004 individuals). Table 3 summarizes the top 10 most numerous Nearctic shorebirds.

Scientific Name	Common Name	Total count
<i>Calidris mauri/ pusilla</i>	Western/ Semipalmated Sandpiper	112,371
<i>Calidris mauri</i>	Western Sandpiper	14,249
<i>Charadrius wilsonia*</i>	Wilson's Plover	8,004
<i>Calidris minutilla</i>	Least Sandpiper	6,370
<i>Charadrius semipalmatus</i>	Semipalmated Plover	5,069
<i>Tringa semipalmata</i>	Willet	4,218
<i>Limnodromus griseus</i>	Short-billed Dowitcher	4,231
<i>Calidris pusilla</i>	Semipalmated Sandpiper	2,540
<i>Pluvialis squatarola</i>	Black-bellied Plover	2,244
<i>Numenius phaeopus</i>	Whimbrel	1,910

Table 3. Top 10 most abundant Nearctic shorebirds counted during the 2019 Central American Waterbird Census. *species considered both resident and migratory

Banded shorebirds

A total of five banded migratory shorebirds were observed in El Salvador and Honduras, including four *H. palliatus* and one *C. wilsonia*. Two *H. palliatus* were observed in El Salvador of which one was banded in 2010 in South Carolina and the other in 2018 in Georgia. Interestingly, the bird from South Carolina was also seen in El Salvador in 2017. The two other banded *H. palliatus* were seen in Honduras. One of these was banded in North Carolina in 2017 and the other was banded in Florida in 2015. In Nicaragua banded *H. palliatus* have been observed in previous years, but not during the 2019 census. The one banded *C. wilsonia* was seen in El Salvador, however, it is unclear where and when this bird was banded.

Key Shorebird Sites

Twelve sites proved to be of significant importance to Nearctic shorebirds due to the total number of a species surpassing the 1% threshold level. A total of 10 sites qualified as such based on the presence of significant numbers of *Charadrius wilsonia* (presumed ssp. *beldingi*) including one site of Hemispheric importance, one site of International importance and eight sites of regional importance (Table 4). One site with significant count of *Charadrius wilsonia*, Delta Estero Real in Nicaragua, is already a WHSRN site of International Importance for the species.

Country	Site	Count	Threshold	WHSRN criteria
Costa Rica	Isla Chira, Bocana	223	2.97%	Regional
Costa Rica	Punta Morales--Cocorocas salinas	141	1.88%	Regional
El Salvador	Salinera El Conchal Bahia de La Union	236	3.15%	Regional
El Salvador	Salinera Rank	184	2.45%	Regional
El Salvador	Isla Pajarito	131	1.75%	Regional
Honduras	Punta Ratón--Sector Sur, Choluteca	373	4.97%	Regional
Honduras	Finca Camaronera Las Conchas, Choluteca	109	1.45%	Regional
Honduras	Salinera La Ostia (El Caimito), Valle	85	1.13%	Regional
Nicaragua	Camaronera Acuicola Real (Farallones)	1,500	20.00%	International
Panamá	El Agallito	4,293	57.24%	Hemispheric

Table 4. Sites with counts reaching the 1% threshold of *Charadrius wilsonia* (ssp. *beldingi*).

At Laguna Tisma in Nicaragua, a total of 1,000 *Limnodromus griseus* were counted, representing 1.3% of the species biogeographic population (ssp. *caurinus*) and qualifying the site as a candidate

WHSRN site of Regional importance. At Punta Morales-Cocorocas Salinas (Costa Rica), the count of 776 *Limnodromus griseus* also surpasses the 1% threshold, representing 1% of the species biogeographic population (ssp. *caurinus*) and thus also triggering the site as a candidate WHSRN site of Regional importance.

Overview of the results of the Central American Waterbird Census from period 2012-2019

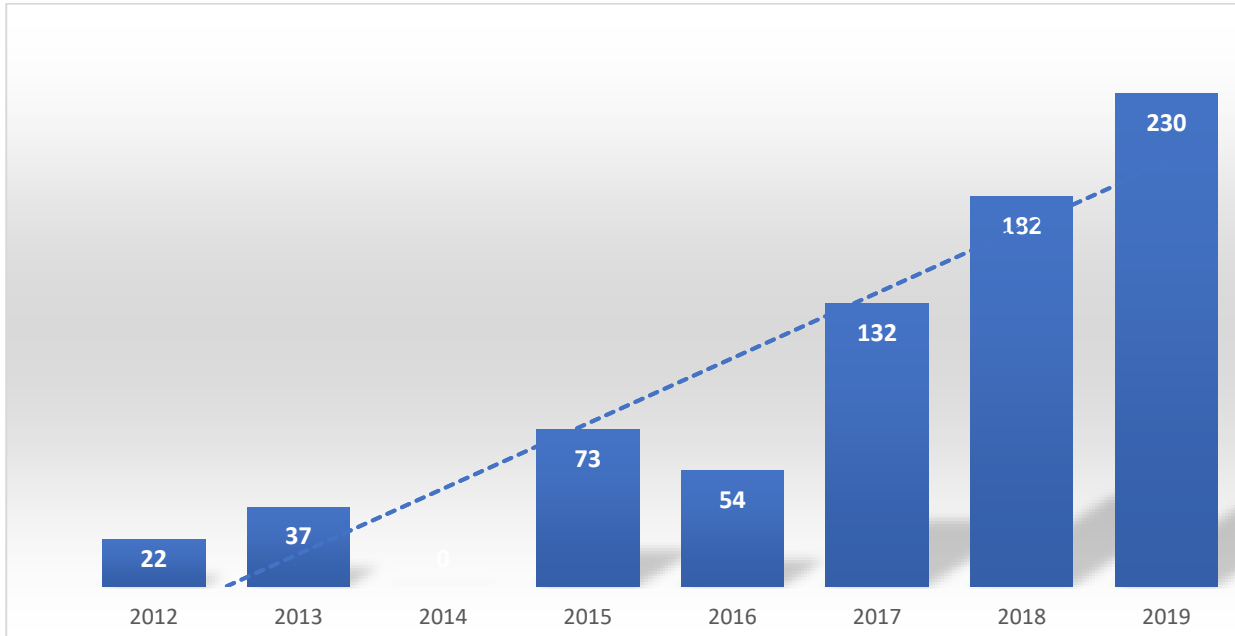


Fig. 1 Number of sites visited in January-February during the Central American Waterbird Census from 2012 till 2019. *In 2014 no results were reported for the CAWC

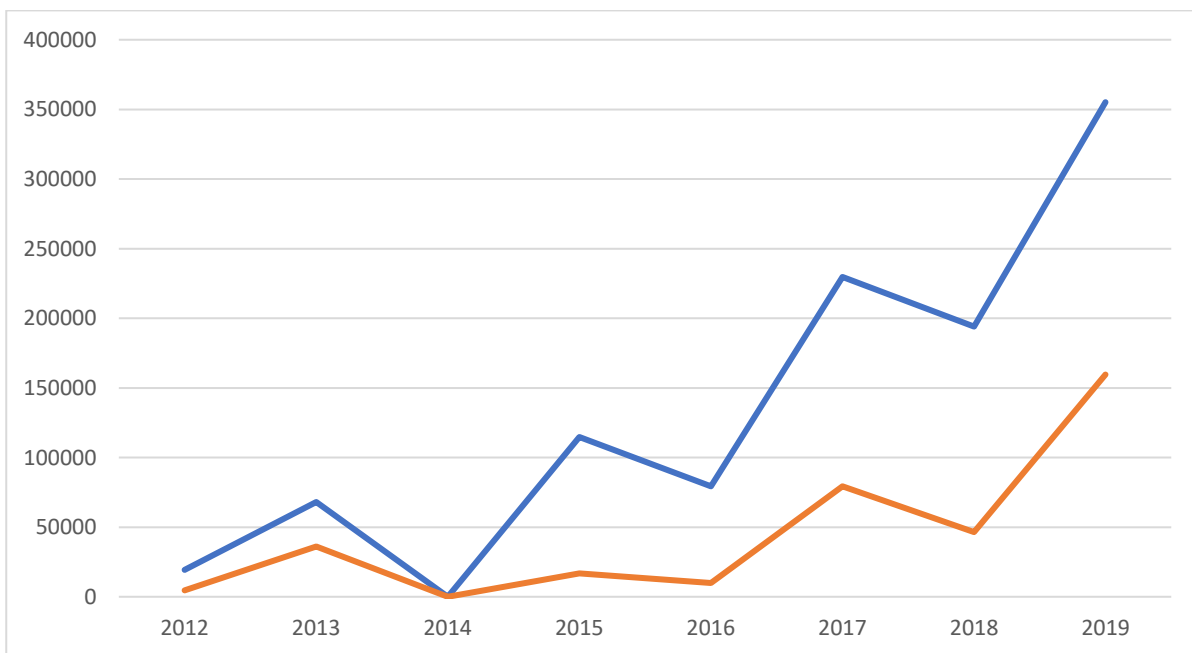


Fig. 2 Total of waterbirds counted in January-February during the Central American Waterbird Census from 2012 till 2019. Blue represent total of all waterbirds and orange the total of Nearctic shorebirds. *In 2014 no results were reported for the CAWC

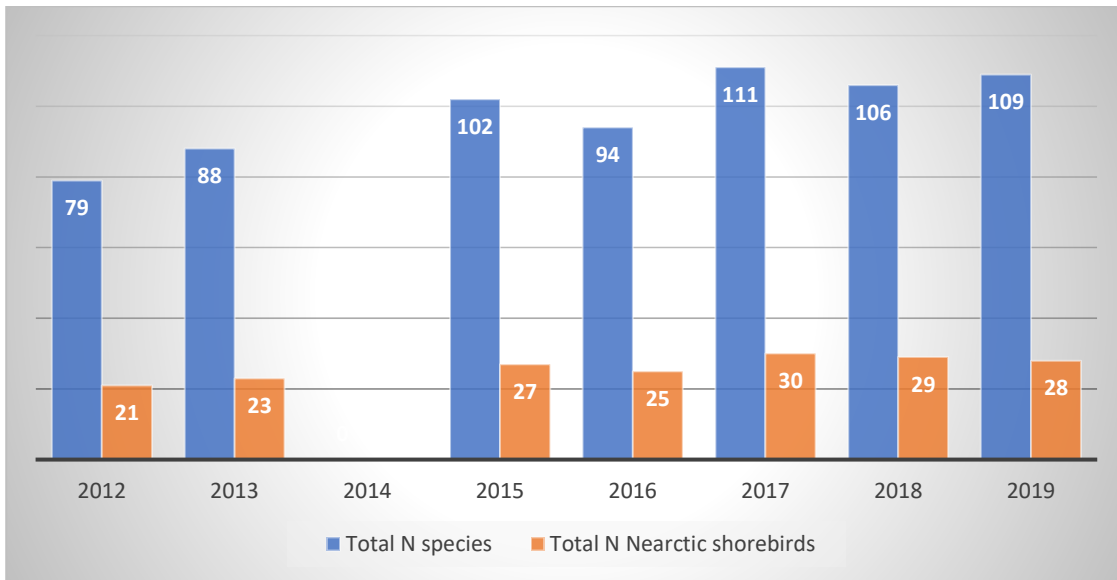


Fig. 3. Number of species observed in January-February during the Central American Waterbird Census from 2012 till 2019. Blue represent total of species and orange only the Nearctic shorebirds.

*In 2014 no results were reported for the CAWC

APPENDIX 1. Summary of species and individuals recorded at sites covered during the February 2019 Central American Waterbird Census

Country	Site	Ramsar/IBA/ WHSRN	Total species	Total count
Belize	Crooked Tree Wildlife Sanctuary	Ramsar/IBA	37	2.784
Belize	Dangriga	IBA	37	483
Belize	Gales Point - Southern Lagoon	IBA	28	1.129
Belize	Corozal Bay/Shipstern Lagoon	IBA	25	22.480
Belize	Hopkins Wetlands	IBA	19	76
El Salvador	El Jocotal	Ramsar/IBA	35	5.463
El Salvador	Laguna Olomega	Ramsar/IBA	31	2.908
El Salvador	Puerto Viejo (El Jocotal)	Ramsar/IBA	31	1.314
El Salvador	Salinera Rank		27	1.283
El Salvador	Estero Jatepeque	Ramsar/IBA	27	841
El Salvador	Isla San Sebastián	Ramsar/IBA	27	636
El Salvador	Lago de Guija	Ramsar/IBA	26	3.346
El Salvador	Barra de Santiago	Ramsar/IBA	26	1.398
El Salvador	Estero Las Bocanitas		26	634
El Salvador	Banco de Arena Ramadita Bahía de La Unión	IBA	25	1.119
El Salvador	Salinera Handal	Ramsar/IBA	24	1.389
El Salvador	Camaronera Handal	Ramsar/IBA	24	514
El Salvador	Camaronera Las Animas	Ramsar/IBA	23	1.155
El Salvador	Cerrón Grande Oriente	Ramsar/IBA	22	6.568
El Salvador	Laguna de Metapan	Ramsar/IBA	21	1.240
El Salvador	Río Jiboa	IBA	21	993
El Salvador	Isla Perico	IBA	21	926
El Salvador	Estero San Diego		20	412
El Salvador	Humedal cooperativa la Gemelitas CA-2E	Ramsar/IBA	20	387
El Salvador	El Aguaje Guadalupe la Zorra	Ramsar/IBA	19	707
El Salvador	Playa San Carlos	IBA	19	432
El Salvador	Poza los Conacastes (El Jocotal)	Ramsar/IBA	19	266
El Salvador	Bahía de Jiquilisco sector oriental	Ramsar/IBA	19	233
El Salvador	Salinera El Conchal Bahía de La Unión	IBA	18	2.235
El Salvador	Isla Pajarito	Ramsar/IBA	18	1.688
El Salvador	Salinera San Ramon	IBA	18	260
El Salvador	Salinera Isla de Rico	IBA	18	218
El Salvador	Bocana San Juan	Ramsar/IBA	17	322
El Salvador	Bocana El Saite	Ramsar/IBA	17	140
El Salvador	Estero Toluca		17	96
El Salvador	Salinera Maculis		16	241
El Salvador	Salinera Milagro de Dios		16	71
El Salvador	Cooperativa camaronera la Salvadoreña	Ramsar/IBA	15	738
El Salvador	Punta San Juan	Ramsar/IBA	15	68

El Salvador	Banco de arena Costa de Rico	IBA	14	3.401
El Salvador	Cooperativa camaronera San Hilario	Ramsar/IBA	13	121
El Salvador	Cooperativa camaronera a 31	Ramsar/IBA	13	104
El Salvador	Camaronera Vientos Marinos	Ramsar/IBA	12	225
El Salvador	Banco de Conchas- Bahía de La Unión	IBA	12	190
El Salvador	Cooperativa camaronera los pequinese RL	Ramsar/IBA	12	68
El Salvador	Cooperativa camaronera Playas Dorada y Rincones Cucho de Monte	Ramsar/IBA	11	172
El Salvador	Salinera Marco Sandoval	Ramsar/IBA	10	53
El Salvador	Estero Los Pinos		10	41
El Salvador	Cooperativa camaronera la Milagrosa	Ramsar/IBA	9	254
El Salvador	Garita Palmera	Ramsar/IBA	9	58
El Salvador	Laguna Nahualapa	IBA	8	721
El Salvador	Camaronera Isla de Rico	IBA	8	166
El Salvador	Camaronera Mancornados	Ramsar/IBA	4	7
El Salvador	La Puntilla	Ramsar/IBA	0	0
Guatemala	Finca Tamashan	IBA	39	2.075
Guatemala	Laguna Puente Grande, Monterrico	IBA	37	1.835
Guatemala	Playon Paredon		27	2.738
Guatemala	Playon Hawaii		25	898
Guatemala	Barrona		20	565
Guatemala	Aldea la Barrita	IBA	15	229
Guatemala	Aldea Chapeton		15	34
Guatemala	Laguna del Nance, Sipacate		14	423
Guatemala	Laguna Chicho		13	92
Guatemala	Tilapa	IBA	13	161
Guatemala	Manglar el dormido	IBA	12	58
Guatemala	Canal Monterrico	IBA	11	50
Guatemala	Manglar Las lisas		9	62
Guatemala	Iztapa	IBA	8	301
Guatemala	Embarcadero a Barra del Jiote		8	25
Guatemala	Manglar Paredon		7	66
Guatemala	Potrero Lisas		7	19
Guatemala	Frente a playón, Hotel Quilombo		5	206
Guatemala	Playa del Hotel Quilombo		5	30
Guatemala	Embarcadero Viejo, Sipacate		5	14
Guatemala	Playon frente a Hotel Quilombo		4	809
Honduras	AP La Berbería, Choluteca		48	6.118
Honduras	Desembocadura del Río Cangrejal, Atlántida		34	406
Honduras	Estero Las Aguas, Choluteca		31	3.822
Honduras	Finca Camaronera Montoya, Valle		26	395

Honduras	Punta Ratón--Sector Sur, Choluteca		25	1.030
Honduras	PN Jeannette Kawas--Laguna de los Micos, Atlántida	IBA	25	409
Honduras	Finca Camaronera Las Conchas, Choluteca		24	306
Honduras	Marañones viejo manga de la laguna, Colón		23	195
Honduras	V-262, La Brea, Departamento de Valle, HN (13.468, - 87.572), Valle		22	191
Honduras	Lago Yojoa--Ruta Noreste Monitoreo, Cortés		21	1.628
Honduras	RVS Las Iguanas y Punta Condega--Centro Tortuga Golfina, Choluteca		21	942
Honduras	Salinera La Ostia (El Caimito), Valle		21	736
Honduras	Lago Yojoa--Sector turístico en sureste, Cortés		20	632
Honduras	Reserva El Jicarito--Entrada principal, Choluteca	IBA	20	551
Honduras	Lago Yojoa--Ruta Sur Oeste Monitoreo, Santa Bárbara		19	1.618
Honduras	Lago Yojoa--Ruta Sur Este Monitoreo, Cortés		19	957
Honduras	Laguna Finca El Jiote, Choluteca		19	847
Honduras	Finca Aquagolfo, Choluteca		19	481
Honduras	Playa Cabañas (13.414x-87.444), Valle		19	149
Honduras	Inshore waters Guapinol, Choluteca		17	818
Honduras	Lago Yojoa--Sector Honduyate, Cortés		16	572
Honduras	East side of Amapala, Valle		16	274
Honduras	RVS Cuero y Salado--sendero acuático El Espejo, Atlántida	IBA	16	38
Honduras	Reserva El Jicarito--Entrada princ. calle norte, Choluteca	IBA	15	188
Honduras	Finca Hondufar, Choluteca		15	153
Honduras	Camaronera/salinera Los Puentes, Choluteca		15	74
Honduras	Laguna 300 m antes de la entrada Granjas Marinas, Choluteca		15	63
Honduras	Desembocadura Rio Sambo Creek, Atlántida		15	58
Honduras	Outer beach Punta Condega, Choluteca		14	3.261
Honduras	Guapinol manglar, Choluteca		14	152
Honduras	Punta Ratón - road to southern tip, Choluteca		14	70
Honduras	Reserva El Jicarito--Sector Laguna de invierno Guapinol, Choluteca	IBA	13	378
Honduras	PN Jeannette Kawas--El Canalón, Atlántida	IBA	13	81

Honduras	PN Jeannette Kawas-- El Quinelito, Atlántida	IBA	12	197
Honduras	Carretera V421 (Los Lirios), Choluteca		12	189
Honduras	Finca Camaronera Las Gemelas, Choluteca		12	107
Honduras	Amapala oeste, Valle		12	91
Honduras	Between desembocadura Guapinol and Punta Condega, Choluteca		11	32
Honduras	RVS Cuero y Salado--Barra (estuario y playa), Atlántida	IBA	11	32
Honduras	Guapinol desembarcadero, Choluteca		10	836
Honduras	RVS Cuero y Salado--sendero acuático El Olingo, Atlántida	IBA	10	17
Honduras	Small pond near Ojochal, Choluteca		9	45
Honduras	Punta Raton restaurant Jennifer 13.2904 X -87.5084, Choluteca		8	74
Honduras	RVS Cuero y Salado--[Considerar usar sublocalidades específicas], Atlántida	IBA	8	24
Honduras	Golfo de Fonseca--Sector pelágico 3-10 km sureste de Amapala, Valle		7	220
Honduras	PN Jeannette Kawas--Sector Miami a Barra Vieja, Atlántida	IBA	7	28
Honduras	Humedales frente Camaronera Culcamar, Choluteca		7	22
Honduras	Humedales adyacentes a la Camaronera El Faro, Choluteca		7	12
Honduras	Mangrove shrub swamp 13.2793 X -87.4850, Choluteca		6	12
Honduras	Lagunas de Villanueva en RR V420, Choluteca		5	35
Honduras	Tren de La Unión a RVS Cuero y Salado, Atlántida	IBA	5	16
Honduras	Salinera Santa Alejandra, Valle		4	13
Honduras	Puente Río Negro, Choluteca		4	12
Honduras	Transect SSW of Amapala, Valle		4	11
Honduras	Sendero a Boca Cerrada, Atlántida		4	7
Honduras	RVS Cuero y Salado--Sendero terrestre El Sitio, Atlántida	IBA	2	5
méxico	laguna la joya	IBA	27	804
méxico	santa maría xadani	IBA	22	1.784
méxico	pesquería cerro grande	IBA	21	1.395
méxico	laguna cerritos	IBA	18	2.860
méxico	laguna paila	IBA	17	1.205
méxico	laguna chingorro	IBA	16	2.183
méxico	laguna miguel hidalgo	IBA	15	517

méxico	cerro tortuga	IBA	13	1.143
méxico	laguna calavera	IBA	12	13.745
méxico	isla pajaros	IBA	12	7.548
méxico	laguna quirio	IBA	8	150
méxico	salinas del marqués	IBA	6	189
méxico	mar tileme	IBA	5	21
méxico	la polka	IBA	3	13
méxico	laguna el naranjo	IBA	0	0
Nicaragua	El Guayabo		28	1.867
Nicaragua	Delta Estero Real	WHSRN/IBA	26	7.627
Nicaragua	Estero de la Isla Juan Venado		24	201
Nicaragua	Laguna Tisma	IBA	23	4.328
Nicaragua	El Tintal		19	118
Nicaragua	Laguna Moyua		18	139
Nicaragua	Camaronera Acuícola Real (Farallones)		17	4.520
Nicaragua	Camaronera Torrecilla		17	1.873
Nicaragua	Salineras de Salina Grande		17	614
Nicaragua	La Bayona		17	415
Nicaragua	Buena Vista Mateare		17	282
Nicaragua	Rio Papaturo Los Guatuzos		16	198
Nicaragua	Arrozales de Sebaco		15	1.876
Nicaragua	Salinera Pasocaballos		14	345
Nicaragua	Bocana de Las Peñitas		14	235
Nicaragua	Apacunca		14	121
Nicaragua	Camaronera de Puerto Morazan		14	50
Nicaragua	Muelle los Lirios		13	268
Nicaragua	Bocana de Salina Grande		12	167
Nicaragua	Las playitas		11	625
Nicaragua	Rio San Miguelito		11	158
Nicaragua	Puerto El Toro		11	62
Nicaragua	Apanas Canal		10	126
Nicaragua	Bocana de Potosi		9	2.236
Nicaragua	Pueblo Nuevo		8	348
Nicaragua	Laguna de Tecomapa		7	311
Nicaragua	Piquín Guerrero		0	0
Panamá	Panamá Viejo	IBA	25	56.687
Panamá	Ciénaga de Las Macanas	IBA	19	14.066
Panamá	Salinas de Aguadulce	IBA	19	4.731
Panamá	El Agallito	IBA	16	4.586
Panamá	Costa del Este	Ramsar/IBA/ WHSRN	15	58.360
Panamá	El Retén	IBA	13	337
Costa Rica	Arrozal 1		0	0
Costa Rica	Arrozal 2		2	52
Costa Rica	Arrozal 3		2	107
Costa Rica	Arrozal 4		0	0
Costa Rica	Bahia Thomas		13	125

Costa Rica	Bocana Catalina	IBA	4	36
Costa Rica	Chomes		19	169
Costa Rica	Concavas		8	36
Costa Rica	Desembocadura Río Tarcoles	IBA	25	871
Costa Rica	Desembocadura, Tivives		6	33
Costa Rica	El Viejo 1		2	49
Costa Rica	El Viejo 2		11	214
Costa Rica	El Viejo 3		0	0
Costa Rica	Embalse JASEC		4	99
Costa Rica	Embalse San Miguel		13	81
Costa Rica	Embalse Sandillal		4	20.303
Costa Rica	Estero Cuajiniquil		12	57
Costa Rica	Estero Mata Redonda		6	209
Costa Rica	Hacienda El Viejo, Laguna Nueva1		7	105
Costa Rica	Hacienda El Viejo, Laguna Nueva2		6	134
Costa Rica	Humedal Caño Negro, Laguna San Sebastian	RAMSAR	13	516
Costa Rica	Isla Chira, Bocana		28	1.219
Costa Rica	Lago TEC		0	0
Costa Rica	Laguna Antes Carara		5	13
Costa Rica	Laguna Camino Costa Pajaros		5	164
Costa Rica	Laguna Capilla y Laguna Caño Negro	RAMSAR	24	404
Costa Rica	Laguna El Jicote		16	1.292
Costa Rica	Laguna ENSENADA		13	83
Costa Rica	Laguna Florida	RAMSAR	26	521
Costa Rica	Laguna Guabal	RAMSAR	17	2.449
Costa Rica	Laguna Lankester		4	4
Costa Rica	Laguna Meandrica	IBA	0	0
Costa Rica	Laguna Orilla Calle		6	30
Costa Rica	Muelle Colorado		11	302
Costa Rica	Palo Verde 1	IBA	17	2.333
Costa Rica	Palo Verde 2	IBA	5	149
Costa Rica	Palo Verde 3	IBA	9	1.750
Costa Rica	Planta Tratamiento TEC		15	131
Costa Rica	Playa Punta E'piedra		4	43
Costa Rica	Puerto Humo/Puerto Chamorro		4	34
Costa Rica	Punta Morales Cocorocas		16	1.671
Costa Rica	Represa Cachí		5	217
Costa Rica	Represa Chucas		8	130
Costa Rica	Represa La Garita		1	33
Costa Rica	Rio Coris		4	5
Costa Rica	Río Frío – Sector Laguna Las Cubas y Laguna Mónico	RAMSAR	24	316
Costa Rica	Salinas Colegio Colorado		20	1.268
Costa Rica	Salinas Ensenada Lodge		23	546
Costa Rica	Salinas Santos		22	1.277
Costa Rica	Salinas SERPOSA		13	1.092
Costa Rica	Salinas Zamora		7	60

APPENDIX 2. Waterbird species recorded during the 2019 Central American Waterbird Census.
(Occurrence: R= resident; M= Nearctic Migrant;)

Scientific name	Common name	Occurrence	Total count	Total sites
<i>Actitis macularius</i>	Spotted Sandpiper	M	484	119
<i>Agamia agami</i>	Agami Heron	R	7	3
<i>Anas acuta</i>	Northern Pintail	M	725	5
<i>Anas bahamensis</i>	White-cheeked Pintail	V	1	1
<i>Anas crecca</i>	Green-winged Teal	M	1	1
<i>Anas cyanoptera</i>	Cinnamon Teal	M	1	1
<i>Anatidae sp.</i>			845	1
<i>Anhinga anhinga</i>	Anhinga	R	101	26
<i>Aramides albiventris</i>	Russet-naped Wood-Rail	R	13	4
<i>Aramides axillaris</i>	Rufous-necked Wood-Rail	R	1	1
<i>Aramides cajaneus</i>	Gray-cowled Wood-Rail	R	1	1
<i>Aramus guarauna</i>	Limpkin	R	277	22
<i>Ardea alba</i>	Great Egret	R & M	5265	168
<i>Ardea herodias</i>	Great Blue Heron	M	506	102
<i>Arenaria interpres</i>	Ruddy Turnstone	M	326	24
<i>Aythya affinis</i>	Lesser Scaup	M	22335	16
<i>Aythya collaris</i>	Ring-necked Duck	M	55	2
<i>Botaurus pinnatus</i>	Pinnated Bittern	R	14	5
<i>Bubulcus ibis</i>	Cattle Egret	R	1636	44
<i>Burhinus bistriatus</i>	Double-striped Thick-knee	R	69	4
<i>Butorides virescens</i>	Green Heron	R & M	339	70
<i>Cairina moschata</i>	Muscovy Duck	R	50	12
<i>Calidris alba</i>	Sanderling	M	1423	31
<i>Calidris canutus</i>	Red Knot	M	46	6
<i>Calidris himantopus</i>	Stilt Sandpiper	M	758	24
<i>Calidris mauri</i>	Western Sandpiper	M	14249	59
<i>Calidris mauri/ pusilla</i>		M	112371	8
<i>Calidris melanotos</i>	Pectoral Sandpiper	M	1	1
<i>Calidris minutilla</i>	Least Sandpiper	M	6370	85
<i>Calidris pusilla</i>	Semipalmated Sandpiper	M	2540	34
<i>Calidris sp.</i>		M	419	3
<i>Charadrius collaris</i>	Collared Plover	R	13	7
<i>Charadrius nivosus</i>	Snowy Plover	M	8	2
<i>Charadrius semipalmatus</i>	Semipalmated Plover	M	5069	61
<i>Charadrius vociferus</i>	Killdeer	M	158	18
<i>Charadrius wilsonia</i>	Wilson's Plover	R & M	8004	41
<i>Chroicocephalus philadelphia</i>	Bonaparte's Gull	M	2	2
<i>Cochlearius cochlearius</i>	Boat-billed Heron	R	87	13
<i>Dendrocygna autumnalis</i>	Black-bellied Whistling-Duck	R	24415	35
<i>Dendrocygna bicolor</i>	Fulvous Whistling-Duck	R	5545	14
<i>Egretta caerulea</i>	Little Blue Heron	M	1643	150
<i>Egretta rufescens</i>	Reddish Egret	R & M	71	28

<i>Egretta thula</i>	Snowy Egret	R & M	3597	141
<i>Egretta tricolor</i>	Tricolored Heron	R & M	594	126
<i>Eudocimus albus</i>	White Ibis	R	1910	107
<i>Fregata magnificens</i>	Magnificent Frigatebird	R	8577	72
<i>Fulica americana</i>	American Coot	M	3125	20
<i>Gallinago delicata</i>	Wilson's Snipe	M	5	1
<i>Gallinula galeata</i>	Common Gallinule	R	419	22
<i>Gelochelidon nilotica</i>	Gull-billed Tern	M	2050	16
<i>Haematopus palliatus</i>	American Oystercatcher	R & M	168	13
<i>Hapalocrex flaviventer</i>	Yellow-breasted Crake	R	3	2
<i>Heliornis fulica</i>	Sungrebe	R	4	3
<i>Himantopus mexicanus</i>	Black-necked Stilt	R & M	8000	111
<i>Hydroprogne caspia</i>	Caspian Tern	M	708	34
<i>Ixobrychus exilis</i>	Least Bittern	R & M	5	2
<i>Jabiru mycteria</i>	Jabiru	R & M	22	4
<i>Jacana jacana</i>	Wattled Jacana	R	339	1
<i>Jacana spinosa</i>	Northern Jacana	R	1468	64
<i>Laridae sp.</i>			1	1
<i>Larus argentatus</i>	Herring Gull	M	5	3
<i>Larus delawarensis</i>	Ring-billed Gull	M	1	1
<i>Laterallus albigularis</i>	White-throated Crake	R	3	2
<i>Laterallus exilis</i>	Gray-breasted Crake	R	2	1
<i>Laterallus ruber</i>	Ruddy Crake	R	29	8
<i>Leucophaeus atricilla</i>	Laughing Gull	M	5068	74
<i>Leucophaeus pipixcan</i>	Franklin's Gull	M	30	5
<i>Limnodromus griseus</i>	Short-billed Dowitcher	M	4231	43
<i>Limnodromus scolopaceus</i>	Long-billed Dowitcher	M	155	6
<i>Limnodromus sp.</i>		M	80	4
<i>Limosa fedoa</i>	Marbled Godwit	M	733	23
<i>Mareca americana</i>	American Wigeon	M	5887	14
<i>Mergus serrator</i>	Red-breasted Merganser	M	1	1
<i>Mesembrinibis cayennensis</i>	Green Ibis	R	15	3
<i>Mycteria americana</i>	Wood Stork	R	2895	67
<i>Nomonyx dominicus</i>	Masked Duck	R	1	1
<i>Numenius americanus</i>	Long-billed Curlew	M	7	2
<i>Numenius phaeopus</i>	Whimbrel	M	1910	100
<i>Nyctanassa violacea</i>	Yellow-crowned Night-Heron	R & M	239	55
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	R & M	144	30
<i>Oxyura jamaicensis</i>	Ruddy Duck	M	10	1
<i>Pardirallus maculatus</i>	Spotted Rail	R	2	1
<i>Pelecanus erythrorhynchos</i>	American White Pelican	M	3791	45
<i>Pelecanus occidentalis</i>	Brown Pelican	R & M	3647	68
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	M	202	2
<i>Phalacrocorax brasilianus</i>	Neotropic Cormorant	R	9605	116
<i>Phalaropus tricolor</i>	Wilson's Phalarope	M	73	4
<i>Platalea ajaja</i>	Roseate Spoonbill	R	277	51

<i>Plegadis falcinellus</i>	Glossy Ibis	M	239	13
<i>Pluvialis squatarola</i>	Black-bellied Plover	M	2244	48
<i>Podilymbus podiceps</i>	Pied-billed Grebe	R	67	15
<i>Porphyrio martinicus</i>	Purple Gallinule	R	114	20
<i>Porzana carolina</i>	Sora	M	6	1
<i>Rallus crepitans</i>	Clapper Rail	R	6	2
<i>Rallus longirostris</i>	Mangrove Rail	R	12	2
<i>Recurvirostra americana</i>	American Avocet	M	765	9
<i>Rynchops niger</i>	Black Skimmer	R & M	4293	22
<i>Spatula clypeata</i>	Northern Shoveler	M	927	18
<i>Spatula discors</i>	Blue-winged Teal	M	42153	82
<i>Stercorarius parasiticus</i>	Parasitic Jaeger	M	1	1
<i>Sterna forsteri</i>	Forster's Tern	M	79	7
<i>Sterna hirundo</i>	Common Tern	M	8	4
<i>Sternidae sp.</i>			215	1
<i>Sula leucogaster</i>	Brown Booby	R	4	2
<i>Sula neboxii</i>	Blue-footed Booby	R	2	1
<i>Tachybaptus dominicus</i>	Least Grebe	R	152	15
<i>Thalasseus elegans</i>	Elegant Tern	M	174	12
<i>Thalasseus maximus</i>	Royal Tern	M	6253	83
<i>Thalasseus sandvicensis</i>	Sandwich Tern	M	5961	39
<i>Tigrisoma mexicanum</i>	Bare-throated Tiger-Heron	R	38	19
<i>Tringa flavipes</i>	Lesser Yellowlegs	M	468	64
<i>Tringa melanoleuca</i>	Greater Yellowlegs	M	457	68
<i>Tringa semipalmata</i>	Willet	M	4218	93
<i>Tringa solitaria</i>	Solitary Sandpiper	M	20	12
<i>Vanellus chilensis</i>	Southern Lapwing	R & M	102	16