Turtles of Colombia: an annotated analysis of their diversity, distribution, and conservation status

1,*Vivian P. Páez, 1Brian C. Bock, 1Diego A. Alzate-Estrada, 2Karla G. Barrientos-Muñoz, 1Viviana M. Cartagena-Otálvaro, 4Andrea Echeverry-Alcendra, 1Marley T. Gómez-Rincón, 6Cristian Ramírez-Gallego, 1Jennifer Sofia del Rio, and 8Margarita M. Vallejo-Betancur

Abstract.—With this analysis, we update the state of knowledge on the species richness, distribution, and conservation status of the turtles of Colombia, both at the national level and regionally within Colombia by hydrological drainages and geopolitical distribution units (departments). The richness patterns and conservation status are analyzed at taxonomic and geographic levels, and the implications of the description of new species on our knowledge of their distribution and conservation status in the country are discussed. Finally, annotations are given on the turtle species that have been introduced into Colombia, translocated within the country, erroneously reported, or deemed to be taxonomically invalid. Our conservative analysis in terms of richness (based upon validated occurrence records) confirms that there are 33 species and two subspecies of turtles in Colombia, of which five are sea turtles and 28 are tortoises or freshwater turtle species. Colombia has 17 genera of chelonians in nine families, so it is second behind Brazil in terms of the number of extant species in South America. The proportion of threatened species in Colombia exceeds 43%, and the threatened species are not evenly distributed among higher taxa or regions. Commonalities were found in the national conservation status assessments for most of the turtle species shared among the five most species-rich countries in South America, including sea turtles and podocnemids (except for the podocnemids in Brazil).

Keywords. Chelonians, endemism, Reptilia, sea turtles, South America, threats, tortoises

Resumen.—En este análisis actualizamos el estado de conocimiento sobre la riqueza de especies, distribución y estado de conservación de las tortugas de Colombia, tanto a nivel nacional, como por cuencas hidrológicas y por distribución geopolítica (departamentos). Analizamos los patrones de riqueza y conservación a nivel taxonómico y geográfico, y discutimos las implicaciones de la descripción de especies nuevas en el conocimiento de su distribución y conservación en el país. Finalmente, hacemos anotaciones sobre las especies de tortugas introducidas, traslocadas a nivel nacional, erróneamente reportadas, o consideradas taxonomicamente inválidas. Nuestro análisis conservador a nivel de riqueza de especies (basados en registros de ocurrencia validados) confirma que en Colombia ocurren 33 especies y dos subspecies de tortuga, de las cuales cinco son marinas y 28 son terrestres o de agua dulce. Colombia cuenta con nueve familias de quelonios, 17 géneros y es segundo en Suramérica después de Brasil en términos del número de especies vivientes. La proporción de especies amenazadas en Colombia excede el 43% y no se distribuye equitativamente por familia o por regiones. Encontramos similitudes en las evaluaciones nacionales de los estados de conservación para la mayoría de las especies de tortugas compartidas entre los cinco países de mayor riqueza del orden en Suramérica, incluyendo a las tortugas marinas y los podocnemididos (con la excepción de los podocnemididos de Brasil).

Palabras clave. Amenaza, distribución, diversidad, endemismos, quelonios, Reptilia, Suramérica


Copyright: © 2022 Páez et al. This is an open access article distributed under the terms of the Creative Commons Attribution License [Attribution 4.0 International (CC BY 4.0): https://creativecommons.org/licenses/by/4.0/], which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. The official and authorized publication credit sources, which will be duly enforced, are as follows: official journal title Amphibian & Reptile Conservation; official journal website: amphibian-reptile-conservation.org.

Accepted: 20 September 2021; Published: 7 April 2022

Correspondence. *vivianpaez1@gmail.com
Introduction

The geographic range of a species is determined by a combination of ecological and historical factors, irrespective of political borders (Gaston 2003). However, species inventories are usually conducted for areas defined by artificial boundaries to produce species lists for specific protected areas or political regions. For example, national checklists have been used to identify “mega-diverse” countries, which can help donor agencies and conservation organizations prioritize their efforts to preserve biodiversity. Updates of national checklists may also help to document increases in the known species richness of a country, thereby providing a metric on the rate of growth in knowledge for a particular taxonomic group. National checklists provide an important first step in identifying species that face conservation concerns, because the responsibility for enacting and enforcing conservation legislation and actions lies with institutions at the national level.

Colombia is one of the richest countries in terms of turtle species, and thus plays an important global role in their study and conservation. Ceballos-Fonseca (2000) published the first checklist of turtles for Colombia, which has been followed by other updates in the literature during the past two decades (Páez et al. 2012a; Morales-Betancourt et al. 2015a; Forero-Medina et al. 2016). The richness of the Colombian turtle fauna has also been summarized in several global turtle species compilations, such as Uetz et al. (2021) and the nine editions of the Turtle Taxonomy Working Group checklists (TTWG 2021). Checklists should be updated frequently, especially for countries like Colombia where the effort of biodiversity studies, including turtles (Bock and Páez 2017), has increased exponentially in recent years.

The different checklists have all shown that Colombia and Mexico are the two countries with the most families of turtles (nine), and they rank among the top one-fifth globally in terms of turtle species richness (most recently, 33 species; TTWG 2021). However, these checklists have either failed to detail the sources of the records they were based upon or admitted to having used databases comprised of multiple kinds of records. However, voucher types vary considerably in terms of scientific merit (Lehn et al. 2007), from anecdotal reports of sightings found in gray literature reports, to e-vouchers such as photographs available on the Internet, to those in the published peer-reviewed literature, and catalogued museum voucher specimens.

For this reason, the purpose of this study was to provide an updated checklist of the turtle species of Colombia, including information on their distribution within the country, based upon only the most scientifically solid evidence available. Thus, the information in this catalogue is limited almost exclusively to data from catalogued museum voucher specimens or from peer-reviewed publications in the scientific literature. Annotations are provided in cases where taxonomic issues exist, as well as comments on the conservation status of new or otherwise non-evaluated taxa. Finally, analyses of the occurrence data are presented which compare the turtles found in different hydrological drainages and geopolitical units (departments) within Colombia, as well as comparisons of the species richness and conservation status of turtles in Colombia with the other turtle-rich countries in South America.

Materials and Methods

Previous checklists of Colombian turtles have summarized species distributions within the country either by hydrographic drainage (because most Colombian turtles are freshwater species) or by geopolitical distribution units (departments). This catalogue documents the occurrence of Colombian turtle species by department and by hydrographic drainage, with the latter based on the five macro-drainages recognized by the Instituto de Hidrología, Meteorología y Estudios Ambientales (IDEAM 2013; Fig. 1): Amazon (AMA), Orinoco (OR), Caribbean (CAR), Magdalena-Cauca (MAG-CAU), and Pacific (PA). IDEAM considers the MAG-CAU drainage as distinct from the other Colombian rivers that drain into the Caribbean (CAR) due to its much greater discharge rate. Sea turtle species were excluded from the analyses involving these freshwater macro-drainages, but not from the analyses involving departments.

First, the most recent nomenclatural listings of turtle species proposed by the TTWG (2021; and previous editions) were examined, along with the slightly different taxonomic scheme used by the online Reptile Database (Uetz et al. 2021). For all taxa that have been purported to occur in Colombia, voucher specimens were identified in various biological collection databases by accessing the websites of the Global Biodiversity Information Facility (GBIF.org 2021), HerpNet (HerpNet 2021), and the Sistema de Información sobre Biodiversidad de Colombia (SiB Colombia 2021). We attempted to locate at least one voucher specimen for each macro-drainage, as well as for each of the departments in Colombia where a species had previously been reported to occur. When multiple voucher specimens for the same department were located, the oldest voucher specimen was chosen for citation here as evidence of occurrence. This was done to minimize the risk of including specimens that were translocated to a location outside of their natural range, given the frequent releases of confiscated turtles by Colombian authorities in recent years, often with no knowledge of the provenance of the individuals being released (Morales-Betancourt et al. 2012a).

Vouchers of the Colombian turtle species were found in the following collections, using the museum acronyms of Leviton et al. (1985) and Iverson (1992): AMNH: Herpetology-R (American Museum of Natural History Herpetology Collections), ARAUQ (Colección...
Turtles of Colombia: diversity, distribution, and conservation

Fig. 1. Map indicating the locations of the five macro-drainages used in this study (IDEAM 2013).
History, Smithsonian Institution), and UV-C (Colección de Anfibios y Reptiles de la Universidad del Valle).

To fill the gaps for macro-drainages or departments where no voucher specimens were found, the peer-reviewed scientific literature on Colombian turtle species was consulted. The book *Biología y Conservación de las Tortugas Continentales de Colombia* (Páez et al. 2012a) is a comprehensive edited volume with over 40 contributing authors that summarized the state of knowledge, at that time, on the tortoise and freshwater turtle species in Colombia. An analysis of the bibliography included in that book (Bock and Páez 2017) found that 269 citations involved studies conducted within Colombia on one or more of its native turtle species. We used this database and complimented it with our personal working bibliographies of publications on sea turtles in Colombia, as well as the more recent publications on any turtle species in Colombia, to yield a comprehensive source of solid evidence for the occurrence of Colombian turtle species in different macro-drainages and departments. We also incorporated our own personal records from working on these species in Colombia. Finally, as a secondary means to corroborate the distribution of Colombian turtle species based upon literature records, for departments where our only evidence of presence was a published article, we also consulted iNaturalist (including non-research grade records; iNaturalist 2021) for photographs of those species that show taxonomically useful characters and were accompanied by geographic coordinates.

For the data analysis, the comparisons of the turtle communities occurring within the five macro-drainages were conducted with a cluster analysis of the occurrence data, using a grouping analysis based on Jaccard indices with the vegan package (Oksanen et al. 2007) in R (R Core Team 2016). To summarize species richness data by department, maps were generated based on cartographic information obtained from the databases of the Instituto Geográfico Agustín Codazzi (IGAC 2021) and the Sistema de Información Ambiental de Colombia (SIAC 2021). The data were standardized in terms of format, coordinate system, scale, and resolution, and processed with ArcGIS software (version 10.4) (ESRI 2014).

Results

Species richness and distribution

The presence of 35 taxa (33 species, two of which included two subspecies each) in Colombia was documented based on both voucher specimens and the published literature (Table 1). The lone exception was our failure to locate vouchers or literature records for the recently resurrected species *Mesoclemmys wermuthi* (but see the Recent taxonomic changes section below). If one accepts that *M. wermuthi* is present in Colombia, then Colombia contains populations of a total of five sea turtle species, 28 tortoise and freshwater turtle species, and one exotic species (*Trachemys scripta elegans*). The native Colombian species belong to both suborders (16 Pleurodira species and 17 Cryptodira species) divided among nine families and 17 genera. Colombia has four endemic turtle species: *Kinosternon dumi*, *Mesoclemmys dahli*, *Podocnemis lewyana*, and *Trachemys medemi*. The most speciose families are Chelidae with nine species and Podocnemididae with seven species, constituting 48.5% of the Colombian turtle fauna.

In terms of the distributions of these species within Colombia, both vouchers and scientific publications confirmed the previously reported occurrences of turtle species in the five macro-drainages. However, at the level of departments, only the scientific publications confirmed all previously reported occurrences. Among the total of 263 occurrence reports for Colombian turtle species in specific departments, voucher specimens could not be located to corroborate the evidence from scientific publications in 38% of the cases. Among those cases, 14 reliable observations were found in iNaturalist to help corroborate the scientific literature reporting the presence of a species in a department.

Among the macro-drainages, CAR possesses the highest species richness (14 species), followed by OR and AMA (13), MAG-CA (eight), and PA (six) (Fig. 1). Nine species (*Chelus fimbriata*, *Chelus ornocensis*, *Mesoclemmys wermuthi*, *Podocnemis erythrocephala*, *Podocnemis sextuberculata*, *Podocnemis vogli*, *Rhinoclemmys diademata*, and *Trachemys medemi*) only occur in one of the five macro-drainages. In terms of species compositions, the two macro-drainages located east of the Andes (OR and AMA) differed from the three Andean macro-drainages (CAR, PA, and MAG-CA), with a dissimilarity of 95% (Fig. 2). The most similar macro-drainages were OR and AMA (56%), with nine shared species, and CAR and MAG-CA (60%), with eight shared species (Table 1). The MAG-CA macro-drainage lacked any unique species. The PA macro-drainage was grouped with the CAR and MAG-CA cluster, but with a low similarity (35%), and it shared seven species with CA and four of its species also occupy the MAG-CA macro-drainage.

Eight departments make up Colombia’s Caribbean coastline, plus the island department of San Andres, Providencia, Santa Catalina, while the Pacific coastline of Colombia is divided among four departments. While all five of Colombia’s sea turtle species have been documented to forage and nest in some of Colombia’s departments, two species are restricted to only one coastline: *Caretta caretta* in the Caribbean and *Lepidochelys olivacea* in the Pacific. The Magdalena and Chocó departments present the highest documented nesting species richness for sea turtles (four species each).

Among the non-marine turtles of Colombia, our analysis found that four species (*Chelonoidis carbonarius*, *Kinosternon leucostomum*, *Kinosternon
Turtles of Colombia: diversity, distribution, and conservation

...scorpioides, and Rhinoclemmys melanosterna) have the widest distributions, occupying from 17 to 20 of Colombia’s departments; while at the other extreme are seven species with restricted ranges within the country: Mesoclemmys wermuthi and Rhinoclemmys diademata only occur in one department, Kinosternon dunami and Trachemys medemi only occur in two departments, and Chelus orinocensis, Podocnemis erythrocephala, and Rhinemys rufipes only occur in three departments. The departments with the highest species richness (including marine turtles) are Amazonas with 13 species, and Antioquia, Caquetá, Chocó, Córdoba, Guainía, Meta, and Vichada with 12 species each. At the other extreme, Huila, Norte de Santander, Quindío, Risaralda, and Tolima each have only three species or less (Fig. 3).

Of the 33 Colombian turtle species, only four (Chelus fimbriata, Chelus orinocensis, Rhinoclemmys diademata, and Rhinoclemmys nasuta) have museum voucher specimens which document their occurrence in all departments within their ranges. The species with the most poorly documented distributions in Colombia include one of the endemic species, Mesoclemmys dahli (only two of the six departments where it occurs have vouchers), Peltocephalus dumerilianus (only two of the nine departments), Podocnemis sextuberculata (only one of four departments), and all five sea turtle species (Chelonia mydas, two of 11 departments; Eretmochelys imbricata, four of 11; Dermochelys coriacea, two of 10; Caretta caretta, two of five; and Lepidochelys olivacea, two of four). We do not know if the only voucher of Mesoclemmys raniceps (from only one of the five departments where it occurs) truly belongs to this species or is actually a specimen of M. wermuthi.

Fig. 2. Cluster diagram comparing turtle community species compositions of the five macro-drainages in Colombia.

Erroneous reports and species otherwise excluded from this checklist

Chelonia agasizzi (Bocourt, 1868). Ceballos-Fonseca (2000) listed Chelonia agasizii as having a distribution that includes the Pacific coast of Colombia. However, the consensus since then has been that there is no justification for recognizing the “black sea turtle” as a valid species, but rather that these populations simply constitute somewhat distinctive populations of the Green Sea Turtle, C. mydas (Karl and Bowen 1999; TWWG 2017).

Chelonia mydas (Linnaeus, 1758). Ceballos-Fonseca (2000) stated that this species nests on both the Caribbean and Pacific coasts of the Chocó Department, but in the Caribbean portion of the Chocó Department no nesting by this species has been documented, with sightings limited to juvenile individuals foraging in marine grasses along the coast (C. Ramírez-Gallego and K.G. Barrientos-Muñoz, pers. comm.). Nesting by this species on the Pacific coast of the Chocó Department is sporadic (Barrientos-Muñoz et al. 2013).

Eretmochelys imbricata (Linnaeus, 1766). Ceballos-Fonseca (2000) reported that this species nests on both coasts of Colombia. However, nests have only been documented on Caribbean beaches in Colombia, while nesting by this species in the Pacific has not been recorded, although there have been a few sightings of individuals foraging there (Barrientos-Muñoz et al. 2015a, 2020; Gaos et al. 2010; Tobón-López and Amorocho 2014; Trujillo-Arias et al. 2014).
Mediterranean (Insacco and Spadola 2010). While it is possible that *Lepidochelys kempii* individuals occasional wander into Colombian waters, we found no voucher specimens or reports in the peer-reviewed literature to support this possibility, so this species was not included in the current checklist.

*Lepidochelys olivacea* (*Eschscholtz, 1829*). Ceballos-Fonseca (2000) reported that this species occurs and nests along the Caribbean coast of Colombia. However, the range of this species has been characterized as limited to coastal habitats of the northern Gulf of Mexico and northwestern Atlantic Ocean (Mexico and the USA; Márquez 1990; TTWG 2017), with occasional sightings of individuals in the northeastern Atlantic (Bolton and Martins 1990; Covelo et al. 2016) and even in the Mediterranean (Insacco and Spadola 2010). While it is possible that *Lepidochelys kempii* individuals occasional wander into Colombian waters, we found no voucher specimens or reports in the peer-reviewed literature to support this possibility, so this species was not included in the current checklist.
Table 1. Diversity, distribution, and conservation status of the turtles of Colombia. Abbreviations: Distribution in hydrographic drainages: the shortened forms represent: AMA (Amazon), CAR (Cauca), MAG-CA (Magdalena-Cauca), OR (Orinoquia), PA (Pacific), Geopolitical distribution (by Department): AMAZONAS (AMAZ), AMBAR (AMBAR), CORDOBA (COR), CUNDINAMARCA (CUND), PUTUMAYO (PUT), QUINDIO (QUI), RISARALDA (RIS), SAN (SAN), SUCUMBIO (SUC). Vouchers: *Voucher may correspond to or .

<table>
<thead>
<tr>
<th>Taxon (common name in English and name used in Colombia)</th>
<th>Geopolitical distribution</th>
<th>Distribution in hydrographic drainages</th>
<th>Geographical distribution</th>
<th>Author, Year(s)</th>
<th>References for geographic distribution</th>
<th>Vouchers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Chelonia mydas (Large-Beaked Green Turtle, Tortuga de Río Chocoana)</td>
<td>X X X</td>
<td>X X X</td>
<td>1,000</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Eretmochelys imbricata (Large-Beaked Green Turtle, Tortuga de Río Chocoana)</td>
<td>X X X</td>
<td>X X X</td>
<td>1,500</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Rhinoclemmys diademata (Diamondback Wood Turtle, Montañera, Inguensa)</td>
<td>X X X</td>
<td>X X X</td>
<td>800</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Rhinoclemmys annulata (Rough-spotted Wood Turtle, Hicotea, Palmarca)</td>
<td>X X X</td>
<td>X X X</td>
<td>1,120</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Rhinoclemmys nasuta (Large-Nosed Wood Turtle, Tortuga de Río Chocoana)</td>
<td>X X X</td>
<td>X X X</td>
<td>1,700</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Trachemys venusta callirostris (Colombian Slider; Hicotea, Palmarca)</td>
<td>X X X</td>
<td>X X X</td>
<td>2,000</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Taxon (common name in English and name used in Colombia)</th>
<th>Author, holotype, and type locality</th>
<th>Distribution in hydrographic drainages</th>
<th>Geopolitical distribution</th>
<th>Max. Elev. (m asl)</th>
<th>Endemic</th>
<th>National conservation status</th>
<th>References for geographic distribution</th>
<th>Vouchers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trachemys medemi (Atrato Slider, Hicotea del Atrato)</td>
<td>Vargas-R, del Valle, Ceballos, and Fritz 2017, IA VH-R 1606, Río Sucio, Chocó, Colombia</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trachemys medemi (Atrato Slider, Hicotea del Atrato)</td>
<td>Vargas-R, del Valle, Ceballos, and Fritz 2017, IA VH-R 1606, Río Sucio, Chocó, Colombia</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kinosternon dunni (Dunn’s Mud Turtle; Cabeza de Trozo)</td>
<td>Schmidt 1947, FMNH 42804, Pizarro, Chocó, Colombia</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>VU</td>
<td>Rentería-Moreno et al. 2012b; Forero-Medina et al. 2015a</td>
<td>FMNH 42804</td>
</tr>
<tr>
<td>Kinosternon dunni (Dunn’s Mud Turtle; Cabeza de Trozo)</td>
<td>Schmidt 1947, FMNH 42804, Pizarro, Chocó, Colombia</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>VU</td>
<td>Rentería-Moreno et al. 2012b; Forero-Medina et al. 2015a</td>
<td>FMNH 42804</td>
</tr>
<tr>
<td>Kinosternon scorpioides albogulare (White-throated Mud Turtle; Swanka)</td>
<td>Duméril and Bocourt, 1870, MNHN 1760, San José, Costa Rica</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>VU</td>
<td>Forero-Medina and Castaño-Mora 2011; Forero-Medina et al. 2015b</td>
<td>SAP: MLS-quel 11</td>
</tr>
</tbody>
</table>

Amphib. Reptile Conserv. 113 April 2022 | Volume 16 | Number 1 | e306
<table>
<thead>
<tr>
<th>Taxon (common name in English and name used in Colombia)</th>
<th>Author, holotype, and type locality</th>
<th>Distribution in hydrographic drainages</th>
<th>Geopolitical distribution</th>
<th>Max. Elev. (m asl)</th>
<th>Endemic</th>
<th>National conservation status</th>
<th>References for geographic distribution</th>
<th>Vouchers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family Cheloniidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Caretta caretta (Loggerhead Turtle; Caguama, Cabezona)</td>
<td>Linnaeus 1758, Type designated in American Islands</td>
<td>(A) BOL, LAG, MAG, SAP, SUC; (B) MAG, SAP</td>
<td>0</td>
<td>CR</td>
<td></td>
<td></td>
<td>Borrero et al. 2013; Martinez-Ortega and Hernández-Fernández 2013; Moreno-Munoz et al. 2014; Pizarro et al. 2015a; Franco-Espinosa and Hernández-Fernández 2017; Moncada et al. 2019; Ramirez-Gallego and Barrientos-Muñoz 2020a; Hernández-Obando 2020</td>
<td>LAG: IAvH-CT 4251; MAG: IAvH-CT 9286,</td>
</tr>
<tr>
<td>14. Eretmochelys imbricata (Hawksbill Turtle; Carey)</td>
<td>Linnaeus 1766, ZMUU 130, Bermuda Islands</td>
<td>(A) ANT, BOL, CAU, CHO, SUC, LAG, MAG, SUC, VH; (B) ANT, BOL, CHO, SUC, LAG, MAG, SUC</td>
<td>0</td>
<td>CR</td>
<td></td>
<td></td>
<td>Moreno-Munoz et al. 2014; Trujillo-Arias et al. 2014; Barrientos-Muñoz et al. 2015a; Barreto 2016; Eckert and Eckert 2019; Cañas-Urbez et al. 2020; Ramirez-Gallego and Barrientos-Muñoz 2020a; Alvarez-Rodríguez et al. 2021; Ramirez-Gallego and Barrientos 2021; Barrientos-Muñoz et al. 2022</td>
<td>BOL: IAvH-CT 9251; CAU: IAvH-CT 10313; LAG: IAvH-CT 4255; SUC: CAS-34960</td>
</tr>
<tr>
<td>15. Chelonia mydas (Green Turtle; Tortuga Verde, Tortuga Blanca)</td>
<td>Linnaeus 1758, Syntype NRM 19,26, Ascencion Island</td>
<td>(A) ANT, BOL, CAU, CHO, COR, SUC, LAG, MAG, SUC, VH; (B) ANT, CHO, SUC, LAG, MAG, SUC</td>
<td>0</td>
<td>EN</td>
<td>VU</td>
<td></td>
<td>Amorocho and Reina 2008; Barrientos-Muñoz et al. 2013; Moreno-Munoz et al. 2014; Barreto 2016; Eckert and Eckert 2019; Páez et al. 2015b; Ramirez-Gallego and Barrientos-Muñoz 2020a; Vasquez-Carrillo et al. 2020; Barrientos-Muñoz et al. 2022 [In Press]</td>
<td>CAU: IAvH-CT 10312; LAG: IAvH-CT 4245</td>
</tr>
<tr>
<td>16. Lepidochelys olivacea (Olive Ridley Turtle; Golfina)</td>
<td>Eschscholtz 1829, Possibly in MZT, Manila Bay, Philippines</td>
<td>(A) CAU, CHO, SUC, LAG, MAG, SUC, VH; (B) CAU, CHO, SUC, LAG, MAG, SUC</td>
<td>0</td>
<td>EN</td>
<td>VU</td>
<td></td>
<td>Amorocho et al. 1992; Camacho-Mosquera et al. 2008; Barrientos-Muñoz et al. 2014; Barreto 2016; Eckert and Eckert 2019; Páez et al. 2015b; Ramirez-Gallego and Barrientos-Muñoz 2020a; Rivera-Robles and Adames-Jiménez 2021; Barrientos-Muñoz et al. 2022 [In Press]</td>
<td>CAU: IAvH-CT 10332; CHO: MHUA-R 17000</td>
</tr>
<tr>
<td>17. Dermochelys coriacea (Leatherback Turtle, Caná Laúd)</td>
<td>Vandelli 1761, ZMUP unnumbered, Mediterranean and Adriatic seas</td>
<td>(A) ANT, BOL, CAU, CHO, COR, SUC, LAG, MAG, SUC, VH; (B) ANT, CHO, SUC, LAG, MAG</td>
<td>0</td>
<td>CR</td>
<td></td>
<td></td>
<td>Patiño-Martinez et al. 2008; Borrero et al. 2013; Moreno-Munoz et al. 2014; Ramirez-Gallego and Barrientos-Muñoz 2013; Rivera-Gómez et al. 2016; Barreto 2016; Hernández-Obando 2020a</td>
<td>CHD: MHUA 17011; LAG: IAvH-CT 4248</td>
</tr>
<tr>
<td><strong>Suborder Pleurodira</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Family Chelidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Chelus fimbriata (Amazon mata mata Turtle; Matamata del Amazonas)</td>
<td>Schneider 1783, Holotype not located, French Guiana</td>
<td>X</td>
<td>AMA, CAQ, CAS, GUA, GUV, PUT, VAU</td>
<td>250</td>
<td>LC</td>
<td>Medem 1969; Prihant 2008; Alfaro et al. 2011; Morales-Butacouto and Lasso 2012b; Angarita-Sierra 2014; Vargas-Ramírez et al. 2020</td>
<td>AMA: IAvH-R 1764; CAQ: ICN 1764; CAS: IAvH-R 7305; GUA: Icn 7700; GUV: IAvH-R 1763; PUT: IAvH-R 1770; VAU: IAvH-R 7300</td>
<td></td>
</tr>
<tr>
<td>19. Chelus ornata (sp. nov. (Orinoco mata mata Turtle, Matamata Osmocence, Matamata del Orinoco)</td>
<td>Vargas-R et al. 2020, IAvH-R 8755, Río Bita, Yichada, Colombia</td>
<td>X</td>
<td>ARA, MET, VID</td>
<td>250</td>
<td>NE</td>
<td>Vargas-Ramírez et al. 2020; Cunha et al. 2021</td>
<td>ARA: ICN 7311; MET: IAvH-R-8746; VID IAvH-R 8755</td>
<td></td>
</tr>
<tr>
<td>Taxon (common name in English and name used in Colombia)</td>
<td>Author, holotype, and type locality</td>
<td>Distribution in hydrographic drainages</td>
<td>Geopolitical distribution</td>
<td>Max. Elev. (m asl)</td>
<td>Endemic</td>
<td>National conservation status</td>
<td>References for geographic distribution</td>
<td>Vouchers</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>-----------------------------------</td>
<td>--------------------------------------</td>
<td>--------------------------</td>
<td>-------------------</td>
<td>---------</td>
<td>-----------------------------</td>
<td>---------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>26. Phrynops geoffroanus</strong> (Geoffroy's Side-necked Turtle; Tepapo, Malamata)</td>
<td>Schweigger 1812, MNHN 9417, Brazila, Brazil</td>
<td>X X</td>
<td>AMA, CAQ, CAS, GUA, GUV, MET, PUT, VAU, VID</td>
<td>200</td>
<td>LC</td>
<td>Morales-Betancourt et al. 2012c</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Family Podocnemididae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>27. Peltocephalus dumerilius</strong> (Big-headed Amazon River Turtle; Cabezudo, Cabezon)</td>
<td>Schweigger 1812, Holotype lost, South America</td>
<td>X X</td>
<td>AMA, ARA, CAQ, GUA, GUV, MET, PUT, VAU, VID</td>
<td>200</td>
<td>DD</td>
<td>Medem 1960; De La Ossa et al. 2012b</td>
<td>GUA: ICN-MHN-Rep 7990; VAU: IAvH-R 7423</td>
<td></td>
</tr>
<tr>
<td><strong>31. Podocnemis sextuberculata</strong> (Six-tubercled River Turtle; Cupiro)</td>
<td>Cornalia 1849, Holotypecto, Amazon River, South America</td>
<td>X</td>
<td>AMA, CAQ, PUT, VAU</td>
<td>200</td>
<td>DD</td>
<td>Medem 1968; Gascia 2005; Ceballos et al. 2012b</td>
<td>GUA: ICN-MHN-Rep 7786</td>
<td></td>
</tr>
</tbody>
</table>

**Totals**  | 13 | 14 | 8 | 13 | 6 | 4 | 14 | |

**Notes:**
- X: Present
- ?: Present but not endemic
- NE: Neotropical Endemic
- LC: Lower Concern
- DD: Data Deficient
- EN: Endangered
on both the Pacific and Caribbean coasts of Colombia, describing the Caribbean presence as “accidental” (Ceballos-Fonseca 2004). However, this species has only been documented to occur and nest along the Pacific coast of Colombia thus far (Barrientos-Muñoz et al. 2014; Barrientos-Muñoz et al. 2015b), with no documentation of the species occurring or nesting on Colombia’s Caribbean coast. It is possible that individuals may occasionally traverse the Caribbean waters of Colombia, as sightings in the Caribbean and sporadic nesting on Caribbean islands have been reported (Eckert and Eckert 2019; Moncada and Romero 2015), but the principal nesting colonies of this species in the western Atlantic Ocean occur in Guyana, Suriname, and French Guiana (Eckert and Eckert 2019; Márquez 1990).

Phrynops tuberosus (Peters, 1870). Historically, the most widespread chelid species in South America was considered to be Phrynops geoffroanus, with the morphological variation throughout its range leading some authors to consider it as comprised of different subspecies, including P. g. tuberosus (Müller 1939; Wermuth and Mertens 1961; Duellman 1978). The taxonomic revision of Phrynops by McCord et al. (2001) elevated P. tuberosus to the species level, and it is currently considered to be restricted to northeastern South America in Venezuela, Guyana, and Brazil (TTWG 2021). However, Ferrara, et al. (2017) claimed that P. tuberosus occurs throughout the northern Amazon of Ecuador, Peru, Colombia, Brazil, and Venezuela, based upon the results of a molecular analysis in the thesis of Carvalho (2016). While recent publications from Brazil have shown that the Phrynops complex is comprised of several cryptic species, or at least evolutionarily significant units (Friol 2014; Carvalho et al. 2016), the molecular evidence arguing that Colombian populations should be considered P. tuberosus rather than P. geoffroanus has yet to be published, so we therefore do not replace P. geoffroanus with P. tuberosus in this checklist.

Podocnemis lewyana (Duméril, 1852). Castaño-Mora and Medem (2002a) reported that this species had been extirpated from the Río Ranchería (La Guajira Department) based on a mention of this conclusion in a non-peer reviewed document by Hurtado-Sepúlveda (1973), and this claim was perpetuated in later literature (i.e., Páez et al. 2012a, 2013). However, a niche modeling analysis to predict potential habitat for this species both now and under different scenarios of future global climate change (Ortiz-Yusty et al. 2014) failed to predict the presence of P. lewyana in the Río Ranchería, and the visits to this drainageway that were part of the ground-confirmation effort in this analysis also failed to detect this species or any indications that local people recognized it from photographs. They concluded that the report by Hurtado-Sepúlveda (1973) of its extirpation from Río Ranchería was questionable, and for this reason we do not include the La Guajira Department in the distribution of this species.

Recent taxonomic changes

Chelidae

Chelus. Matamata turtles exhibit geographic variation in carapace shape and color, with individuals from the Orinoco drainage having rounder, lighter colored carapaces than Amazonian individuals (Pritchard and Trebbau 1984; Sánchez-Villagra et al. 1995; Pritchard 2008). An examination of two mtDNA fragments (Lasso et al. 2018) also revealed haplotype differences between the Orinoco and Amazonian individuals from Colombia. Finally, an examination of three mtDNA fragments, one nuclear DNA fragment, and multiple SNPs from individuals across the range of Chelus fimbriata (sensu lato) revealed a deep phylogenetic division between samples from the Orinoco, Rio Negro, and Essequibo drainages versus samples from the Amazon and Mahury drainages, prompting Vargas-Ramírez et al. (2020) to elevate the former clade to the species level as Chelus orinocensis.

Mesoclemmys heliostemma (McCord, Jospeh-Ouni, and Lamar, 2001). This species was described based on five voucher specimens and nine live individuals from the western Amazon region, specifically northeastern Peru, eastern Ecuador, and southern Venezuela (McCord et al. 2001). Molina et al. (2012) examined eight additional individuals from eastern Peru and northern Brazil, and concluded that the species is valid and morphologically distinct from M. raniceps (but see Cunha et al. 2019). They suggested that reports of M. heliostemma for Colombia were cases of misidentification of M. raniceps individuals. The previous TTWG checklist (TTWG 2017) mentioned Colombia as likely to include M. heliostemma, presenting a range map with a polygon that included Colombia but without any point locations. Our searches failed to find any vouchers or literature reports corroborating the occurrence of this species in Colombia. Finally, Cuhna et al. (2019) reviewed the convoluted history of the taxonomy of the genus Mesoclemmys and presented evidence indicating that females of M. raniceps may oviposit clutches that produce hatchlings with both M. raniceps and M. heliostemma phenotypes. They concluded that M. heliostemma should be considered a junior synonym to M. raniceps and warned against describing species solely on the basis of differences in color patterns. This recent taxonomic proposal, combined with the lack of any vouchers or literature records for the occurrence of turtles exhibiting the “M. heliostemma” phenotype in Colombia, led us to exclude this species from our checklist.

Mesoclemmys raniceps and M. wermuthi. Cuhna et al. (2019) not only synonymized M. raniceps and M. heliostemma, they also resurrected the species
Mesoclemmys wermuthi, which had been previously synonymized with *M. raniceps* (Bour and Pauler 1987). They also argued that the name *Mesoclemmys maculata* had precedence as the correct name for this resurrected species. Although the most recent TTWG (2021) checklist chose to recognize the species, it retained the name *M. wermuthi*. Apparently both *M. raniceps* and *M. wermuthi* have been reported to occur along the Colombian borders with Peru and Brazil (TTWG 2021), but our searches only produced one voucher specimen identified as *M. raniceps*. Thus, this is the one instance in which we failed to find a rigorous record for a species purported to occur in Colombia (*M. wermuthi*), or alternately, the voucher we located is actually a specimen of *M. wermuthi* that was misidentified, in which case we lack a rigorous record for *M. raniceps*.

### Emydidae

**Slider turtles.** The slider turtles in the Atrato River drainage and the Gulf of Urabá region in northwestern Colombia have long been recognized as morphologically distinct from the slider turtles from other more eastern populations in Colombia, located along the Caribbean coast and in the Sinú, Magdalena, and the lower Cauca river drainages (Williams 1956; Medem 1958). Medem (1962) and Ceballos-Fonseca and Brand (2014) summarized the details of these morphological differences which involve plastron and color pattern characteristics. However, over the past two decades, the taxonomy of both “western” and “eastern” Colombian slider taxa has been unstable (as has the taxonomy of slider turtles in the Americas overall). The names assigned to the more widespread eastern slider turtle taxon in Colombia include *Pseudemys scripta ornata* (Williams 1956), *Pseudemys scripta callirostris* (Moll and Legler 1971; Pritchard and Trebbau 1984), *Trachemys callirostris* (Seidel 2002), and *Trachemys venusta callirostris* (Fritz et al. 2012; Parham et al. 2015). Similarly, the names employed for the western Colombian slider turtle taxon include *Pseudemys scripta ornata* (Williams 1956), *Pseudemys scripta venusta* (Moll and Legler 1971), *Pseudemys scripta ca. venusta* (Pritchard and Trebbau 1984), *Trachemys venusta* (Seidel 2002), *Trachemys venusta uhrigi* (McCord et al. 2010), and *Trachemys medemi* (Vargas-Ramírez et al. 2017).

Studies on the relationships of these two taxa to other slider turtle species and subspecies, as well as phylogeographic studies of their origins, have also been equivocal. Over the past two decades, various cladistic analyses have concluded that the two slider turtle taxa in Colombia are either closely (Stephens and Weins 2003) or distantly (Seidel 2002) related, and are of Mesoamerican (Jackson et al. 2008; Fritz et al. 2012) or Caribbean (Stephens and Weins 2003) origin, or both (Seidel 2002). Most recently, Vargas-Ramírez et al. (2017) expanded upon the study by Fritz et al. (2012) by adding samples from 12 individuals of the western Colombian slider turtle to their genetic analysis of mtDNA and nuclear DNA. They concluded that South America has been colonized twice by slider turtles from Central America; first by the ancestor of *Trachemys dorhagni* (currently occurring in Brazil, Uruguay, and Argentina) and the western Colombian slider, which they elevated to the species level, assigning the name *Trachemys medemi*. Much later, Colombia was again colonized from Central America by the ancestor of the eastern Colombian slider (*Trachemys venusta callirostris*) and the Venezuelan slider (*Trachemys venusta chichiriviche*).

### Translocated native and exotic species

The occurrence of *Chelonoidis carbonarius* on the Caribbean island of Providencia (CAR macro-drainage, San Andrés, Providencia, and Santa Catalina Department) has long been assumed to be due to either pre-colonial or more recent human transport (Castaño-Mora and Lugo-Rugeles 1981). This also seems to be the case for the population of *Kinosteron scorpoides albogulare* occupying the island of San Andrés (Montes-Correa et al. 2017; McCraine 2018). Medem (1969) also reported several apparently successful attempts by colonists in the Amazonian region to introduce populations of *Podocnemis expansa* into the upper Cauetá and Caguán rivers (AMA macro-drainage, Caquetá Department), presumably because of the economic importance of this species, but we failed to find any museum vouchers to support this claim. The only other documented case to date of apparent artificial range expansion for a turtle species in Colombia is from a publication (including museum voucher information) documenting the occurrence of *Trachemys venusta callirostris* individuals in several locations in Quindío Department (Cordillera Central of the Andes mountains) at approximately 1,500 m asl (Adames-Jiménez et al. 2018).

Our searches for voucher specimens in this study failed to document any additional suspicious location records for Colombian turtles (i.e., individuals collected far outside of their previously known ranges), except for vouchers in the collection of the ICN that erroneously cite the municipality of Villavicencio in the Meta Department for some locality data. For example, ICN-MHN-Rep 7531, 7544, 7546, 7646, 7713, 7855, 7856, and 7859 are all *Trachemys venusta callirostris* specimens listed for the Meta Department. Presumably, these turtles were collected within their natural range and transported to the Estación de Biología Tropical Roberto Franco by Federico Medem, where they were kept in captivity until their deaths, and then deposited in the ICN collection with the locality data indicating where they died rather than reflecting where they had been collected.

Exotic species occasionally appear among the turtles that are confiscated by environmental authorities as they are being transported in Colombia. There is no way to
estimate how many of these individuals are released into natural habitats when authorities fail to recognize them as exotics, but when confiscated turtles are correctly identified as non-native species, Colombian authorities usually relocate them to zoological parks or aquariums. For example, individuals of the Venezuelan endemic *Mesocollemmys zuliea* occasionally appear on lists of fauna confiscated by Colombian authorities (A. Echeverry-Aлечandra, pers. comm.) and some eventually make their way into zoological collections. Another example is an individual of the Mediterranean *Mauremys leprosa* (Bertolero and Busack 2017) that was confiscated in Bogotá in 2003 and relocated to the Barranquilla Zoo, generating an entry for this species for Colombia in the Global Register of Introduced and Invasive Species records (Baptiste et al. 2018). This database also lists *Trachemys scripta elegans* for Colombia. This slider subspecies presumably entered Colombia as part of the illegal pet trade. The Zoological Information Management System (ZIMS 2021) documents that some individuals of this exotic species are housed in some zoos in the country. There are more ambiguous anecdotal reports of *Trachemys scripta elegans* individuals living freely in Cundinamarca Department, as well as in portions of the Cauca and Magdalena river drainages (Morales-Betancourt et al. 2012b). However, we found no museum vouchers of *Trachemys scripta elegans* or any other exotic turtle species that were collected in natural habitats in Colombia.

**Conservation status update and summary**

The book *Libro Rojo de Reptiles de Colombia* (Morales-Betancourt et al. 2015a) updated Castaño-Mora (2002a), and evaluated the conservation status of all turtle species in Colombia using the most recent IUCN criteria for the first time (IUCN 2012). However, three recent changes in turtle taxonomy create the need to examine their implications regarding the conservation status of the species in Colombia. In 2015, *Chelus fimbriata* was classified as Least Concern (LC) based upon its wide distribution and apparent abundance, despite the recognition that the illegal pet trade poses a threat to some populations (Morales-Betancourt et al. 2015a). The splitting of this species into *Orinoco* (*Chelus orinocensis*) and Amazonian (*Chelus fimbriata*) species (Vargas-Ramírez et al. 2020) does not substantially modify this assessment, and we recommend that both species tentatively be considered as LC as well, at least until their next formal reassessment. Similarly, the recognition of *Mesocollemmys warmuthi* as a valid species and its apparent co-occurrence with *M. raniceps* in the Amazon department argues that both should be assigned a Data Deficient (DD) status at present. Finally, *Trachemys callirostris* (here *Trachemys venusta callirostris*) was classified as Vulnerable (VU) in 2015, while *Trachemys venusta* (here *Trachemys medemi*) was classified as DD (Morales-Betancourt et al. 2015a). The recent taxonomic revision (Vargas-Ramírez et al. 2017) did not affect the classification of either taxon, so *Trachemys venusta callirostris* should continue to be considered as VU at the national level and *Trachemys medemi* should continue to be classified as DD.

With this updated classification of the threat levels faced by the Colombian turtle species, the sea turtles exhibit the highest level of conservation concern, with all five species categorized in one of the three threatened categories (VU, EN, or CR; IUCN 2012). Next is the family Podocnemididae, with four of its seven species (54%) being classified in a threatened category. In terms of macro-drainages, the CAR macro-drainage is the most impacted, with 43% of its turtle species considered threatened, while the AMA macro-drainage is at the other extreme, with only 16% of its species considered as threatened. Finally, in terms of the 27 departments that possess at least four turtle species, seven (Bolívar, Cundinamarca, La Guajira, Magdalena, San Andrés, Providencia, and Santa Catalina, Santander, and Sucre) exhibit the highest proportions of turtle species facing conservation concerns (more than 60%), followed by six departments (Antioquia, Atlántico, Boyacá, Cesar, Chocó, and Córdoba) with more than 50% of their turtle species categorized as facing some level of threat. It is relevant to examine the threat levels by department in Colombia because it is usually at this local level that conservation decisions are made and resources are appropriated for management actions.

Historically, Neotropical countries included evaluations of their conservation status at the national level (Venezuela: Rodríguez et al. 2015; Brazil: ICMBio 2018, Costa et al. 2022; Peru: SERFOR 2018; Ecuador: assessment from IUCN Red List 2018, Torres-Carvajal et al. 2019). Together, these five countries are the most diverse in terms of turtle species in South America. The results of our update are compared to those of these other four species-rich neighboring countries in Table 2. With 33 species, Colombia ranks second behind Brazil (38) in turtle species richness. All five countries largely concur that their sea turtle species should be considered as threatened, but Brazil does not classify any of their podocnemid species as threatened, while almost all species in this family in the remaining four countries are classified nationally as either VU, EN, or CR (except for two species classified as DD in Colombia).

**Discussion**

Although turtles are relatively large and conspicuous, as well as ecologically, and often economically, important (Lovich et al 2018), they are poorly represented in reptile collections in general (~4% of all specimens; Lehn et al. 2007). Most turtle species are easily identifiable even as
### Table 2. Extant turtle species that occur in the five most species-rich South American countries and their global and national conservation status. Cells in gray indicate species that are categorized as facing some level of threat by that country. Conservation status at the national level as taken from: Colombia: Morales-Betancourt et al. 2015; Venezuela: Rodríguez et al. 2015; Brazil: Livro Vermelho da Fauna Brasileira Amenaçada de Extinção 2018; Perú: SERFOR 2018; Ecuador: Torres-Carvajal et al. 2019. Global conservation status based upon the IUCN Red List (http://www.iucnredlist.org).

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Brazil</th>
<th>Colombia</th>
<th>Ecuador</th>
<th>Peru</th>
<th>Venezuela</th>
<th>Global status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suborder Cryptodira</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Family Chelydridae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Chelydra acutirostris</td>
<td>X</td>
<td>X</td>
<td>NE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Family Geoemydidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Rhinoclemmys annulata</td>
<td>X</td>
<td>X</td>
<td></td>
<td>NT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Rhinoclemmys diademata</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>4. Rhinoclemmys melanosterna</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>5. Rhinoclemmys nasuta</td>
<td>X</td>
<td>X</td>
<td></td>
<td>NT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Rhinoclemmys punctularia</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td><strong>Family Emydidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Trachemys adiutrix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EN</td>
<td></td>
</tr>
<tr>
<td>8. Trachemys dorbigni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>9. Trachemys medemi sp. nov.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>NE</td>
<td></td>
</tr>
<tr>
<td>10. Trachemys venusta (T. v. callirostris in Colombia, T. v. chichiriviche in Venezuela)</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td>NE</td>
<td></td>
</tr>
<tr>
<td><strong>Family Kinosternidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Kinosternon dummi</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>VU</td>
<td></td>
</tr>
<tr>
<td>12. Kinosternon leucostomum</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>13. Kinosternon scorpioides</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>LC</td>
</tr>
<tr>
<td><strong>Family Testudinidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Chelonoidis carbonarius</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>LC</td>
</tr>
<tr>
<td>15. Chelonoidis denticulatus</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>VU</td>
</tr>
<tr>
<td>16. Chelonoidis niger</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Varies among the subspecies</td>
</tr>
<tr>
<td><strong>Family Cheloniidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Caretta caretta</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>VU</td>
</tr>
<tr>
<td>18. Chelonia mydas</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>EN</td>
</tr>
<tr>
<td>19. Eretmochelys imbricata</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>CR</td>
</tr>
<tr>
<td>20. Lepidochelys olivacea</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>VU</td>
</tr>
<tr>
<td><strong>Family Dermochelyidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Dermochelys coriacea</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>VU</td>
</tr>
<tr>
<td><strong>Suborden Pleurodira</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Family Chelidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Acanthochelys macrocephala</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NT</td>
<td></td>
</tr>
<tr>
<td>23. Acanthochelys radiolata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NT</td>
<td></td>
</tr>
<tr>
<td>24. Acanthochelys spixii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NT</td>
<td></td>
</tr>
<tr>
<td>25. Chelus fimbriata</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>LC</td>
</tr>
<tr>
<td>26. Chelus ornicensis sp. nov.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>LC</td>
</tr>
<tr>
<td>27. Mesoclemmys dahli</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>28. Mesoclemmys gibba</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>LC</td>
</tr>
</tbody>
</table>
Table 2 (continued). Extant turtle species that occur in the five most species-rich South American countries and their global and national conservation status. Cells in gray indicate species that are categorized as facing some level of threat by that country. Conservation status at the national level as taken from: Colombia: Morales-Betancourt et al. 2015; Venezuela: Rodríguez et al. 2015; Brazil: Livro Vermelho da Fauna Brasileira Amenazada de Extinção 2018; Perú: SERFOR 2018; Ecuador: Torres-Carvajal et al. 2019. Global conservation status based upon the IUCN Red List (http://www.iucnredlist.org).

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Brazil</th>
<th>Colombia</th>
<th>Ecuador</th>
<th>Peru</th>
<th>Venezuela</th>
<th>Global status</th>
</tr>
</thead>
<tbody>
<tr>
<td>29. Mesoclemmys jurutiensis sp. nov.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NE</td>
</tr>
<tr>
<td>30. Mesoclemmys nasuta</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
</tr>
<tr>
<td>31. Mesoclemmys perplexa</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NE</td>
</tr>
<tr>
<td>32. Mesoclemmys raniceps</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>LC</td>
</tr>
<tr>
<td>33. Mesoclemmys tuberculata</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
</tr>
<tr>
<td>34. Mesoclemmys vanderhaegei</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NT</td>
</tr>
<tr>
<td>35. Mesoclemmys wermuthi</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>NE</td>
</tr>
<tr>
<td>36. Mesoclemmys zuliae</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VU</td>
</tr>
<tr>
<td>37. Phrynops geoffroanus</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>38. Phrynops hilarii</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
</tr>
<tr>
<td>39. Phrynops tuberosus</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NE</td>
</tr>
<tr>
<td>40. Phrynops williamsi</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VU</td>
</tr>
<tr>
<td>41. Platemys platycephala</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>LC</td>
</tr>
<tr>
<td>42. Ranacephala hagei</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>43. Rhinemys rufipes</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>NT</td>
</tr>
<tr>
<td>44. Hydromedusa maximiliani</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VU</td>
</tr>
<tr>
<td>45. Hydromedusa tectifera</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LC</td>
</tr>
</tbody>
</table>

**Family Podocnemididae**

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Brazil</th>
<th>Colombia</th>
<th>Ecuador</th>
<th>Peru</th>
<th>Venezuela</th>
<th>Global status</th>
</tr>
</thead>
<tbody>
<tr>
<td>46. Peltocephalus dumerilianus</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>VU</td>
</tr>
<tr>
<td>47. Podocnemis erythrocephala</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>VU</td>
</tr>
<tr>
<td>48. Podocnemis expansa</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>LR/cd</td>
</tr>
<tr>
<td>49. Podocnemis levyana</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CR</td>
</tr>
<tr>
<td>50. Podocnemis sextuberculata</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>VU</td>
</tr>
<tr>
<td>51. Podocnemis unifilis</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>VU</td>
</tr>
<tr>
<td>52. Podocnemis vogli</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>LC</td>
</tr>
</tbody>
</table>

Total number of families: 8 9 8 6 8
Total number of genera: 20 17 15 13 15
Total number of species: 38 33 21 17 22
% Threatened species: 24.3 42.4 42.8 47.0 47.8

neonates, so space limitations cannot fully explain their scarcity in collections. Vouchering neonates would also have a limited demographic impact on threatened turtle populations (Heppell 1998). Therefore, we urge turtle biologists to be more aware of the need to deposit voucher specimens in museums in order to better document the distributions of the species they are studying, and to allow the re-examination of specimens when taxonomic changes occur. For example, in Colombia there is currently a need to reassess Matamata and *M. raniceps* voucher specimens in collections, in view of the recent split of *Chelus fimbriatus* into two species and the resurrection of *M. wermuthi* as a valid species separate from *M. raniceps* (Vargas-Ramírez et al. 2020; Cunha et al. 2019, 2021). Such a reassessment would permit a re-definition of their documented distributions in Colombia and identify possible areas of sympathy. Re-examination of Colombian slider turtle voucher specimens would also be desirable now that the two *Trachemys* taxa in Colombia have been shown to be valid and distinctive species, rather than merely subspecies (Vargas-Ramírez et al. 2017), to better determine their range limits and/or identify possible zones of contact. Having accurate distribution information on turtle species is relevant to conservation, given that three of the five criteria the IUCN employs to categorize threat levels for species consider the size of the range of the species being...
classified (IUCN 2012).

We also encourage future authors to report voucher specimens as support for the inclusion of each species in their inventory checklists. Erroneous, unsubstantiated reports tend to self-perpetuate in the literature when rigorous supporting evidence is not proffered. In this checklist, despite our conservative approach of only including species that were supported by museum vouchers and scientific publications, we have shown Colombia to house a large and diverse turtle fauna that includes species from nine families. The evidence of occurrence of the non-marine turtle species within the five main hydrological drainages in Colombia was well supported both by vouchers and literature, but many gaps remain in terms of not finding vouchers to support the occurrence of various turtle species at the department level. Surprisingly, sea turtles were among the species most poorly documented by specimens in museum collections in terms of departmental occurrence, despite the attention they receive from conservation NGOs. The failure of sea turtle biologists to deposit voucher specimens in biological collections in the past means that now we cannot distinguish between the two explanations for the disparities in reports of where certain species nest (i.e., erroneous historical reports of nesting versus extirpation of these populations during the past decades).

Photographic vouchers of species occurrences uploaded to the Internet represent another means to incorporate citizen science into species distribution databases (Brown and Williams 2018), but we made sparing use of such records here. Some online records either include photographs that do not show taxonomically important characters, fail to mention whether the individual in the photograph was part of a captive collection, or only provide “obscured” geographic data to avoid revealing the precise locality information to potential commercial collectors. While sites such as iNaturalist offer opportunities to refine our information on the distributions of Colombian turtle species, care should be used in evaluating such evidence (Tiago et al. 2017). Photographic vouchers are complementary, but should never be considered as a replacement for the scientific collecting of vouchers for deposit in curated biological collections.

We have probably failed to locate some important voucher specimens during our searches, in part because some collections in Colombia still do not publish their voucher data online. Our hope is that this publication will stimulate others to make currently “hidden” voucher data accessible, as well as to continue updating the voucher information now contained in Table 1. Such efforts will provide rigorous evidence for the occurrence of all species in all departments in Colombia, both by reporting additional relevant vouchers that exist but we were unable to find, and especially by encouraging targeted collecting efforts in the departments that now genuinely lack vouchers. Additional collecting efforts may also add new species to our national inventory for Colombia, such as *Mesoclemmys gibba* in the Vichada department, *Mesoclemmys zulii* in the Cesar and Norte de Santander departments, and perhaps *Trachemys venusta venusta* or *Trachemys grayi* in the Chocó region along the Caribbean or Pacific borders with Panama, respectively.

Hopefully, future scientific collecting efforts for turtles will also routinely include the deposition of genetic samples in museum collections along with the preserved specimens, as genetic data can reveal “cryptic” species (Vargas-Ramírez et al. 2020) and evolutionarily significant units (Jensen et al. 2014; Vargas-Ramírez et al. 2010). Genetic data also may help in identifying cases of genetic contamination, since native turtle species in Colombia are collected and transported as part of the illegal national and international pet trade and for the human consumption market. For the OR and AMA basins, species such as *C. fimbriata* and *C. ornocensis* are illegally harvested and transported to Leticia for export to Peru, a country where the international turtle trade is legal, unlike Colombia (Lasso et al. 2018). For example, records indicate that exports of *P. unifilis* from Peru to Hong Kong and China have increased up to 190-fold in less than a decade (Sinovas et al. 2017). Unfortunately, there are no reliable data on the magnitude of harvests for most species, but the data that do exist on the confiscation rates of illegally transported turtles suggest the harvest is massive (Arroyave et al. 2014; Lasso et al. 2018; Morales-Betancourt et al. 2012a). In many cases, environmental authorities in Colombia do not record information on confiscations (or voluntary surrendering of illegal wildlife pets) in a standardized manner, but the limited information available (Morales-Betancourt et al. 2012a) suggests that the most widely trafficked species are (in descending order) *Trachemys venusta callirostris*, *Podocnemis unifilis*, *Chelonoidis carbonarius*, and *Podocnemis expansa*.

Environmental authorities in Colombia often fail to register and monitor the fates of turtles they confiscate and relocate for reinforcement or reintroduction in a consistent manner (IUCN 2013). Individuals of native turtle species are sometimes released within the jurisdiction of the environmental authority that confiscated the turtles, despite a lack of information on the provenance of the individuals. These authorities also transfer many confiscated turtles, especially those confiscated in urban centers, to other areas for release, again without knowing the exact provenance of the individuals. In addition, people who buy turtles as pets in Colombia (which is an illegal practice) or receive them as gifts often decide later to release them in natural habitats, again without knowing their origin. Thus, the risks of genetic contamination and/or artificial range expansion for native turtle species in Colombia appear to be high. Although fast, cost-effective, and practical genetic protocols have recently been developed to aid in identifying the source of confiscated Matamata.
turtles in Colombia, at least to the level of the correct river basin (Cardeñosa et al. 2021), much work remains before similar protocols are available for the majority of species that are subjected to illegal harvest and transport in the country. Such efforts not only help to avoid genetic contamination of native populations, but also reduce the time and cost of maintaining individuals in captivity, reducing the health and welfare risks to these turtles.

Our analyses revealed considerable geographic heterogeneity in turtle species richness in Colombia, and they also revealed substantial variation in the conservation status of the turtles that occupy different regions of the country. CAR was both the most species-rich of the five macro-drainages and the one with the greatest percentage of threatened turtle species. This region of Colombia has suffered from substantial perturbation and loss of natural habitats (Correa-Ayram et al. 2018). It is also where the custom of consuming turtles is culturally the strongest, especially during lent (Morales-Betancourt et al. 2012a). In terms of taxonomy, the most threatened turtle species in Colombia are the sea turtles and podocnemidids (i.e., the largest species), suggesting that harvest for human consumption is a more important factor than collecting for the pet trade, as is the case for most other large vertebrate species in the world (Ripple et al. 2017). The national threat classifications for turtles in Colombia are comparable to similar national classifications for the same species in neighboring countries, with the exception of Brazil where the threat levels of podocnemidids are considered to be lower for some reason. The only other divergence with respect to the classifications of podocnemidids was Colombia’s classifications of Peltocephalus dumerilianus and Podocnemis sextuberculata as DD. We suspect that when more data on these two species in Colombia become available, they will be updated to receive a classification of some level of threat, as in the neighboring countries (excluding Brazil).

About 14% of Colombia’s maritime territory is designated as protected areas (RUNAP 2018), so all sea turtle species have ranges that contain some refuge from harvest. The percentage of terrestrial territory in protected areas in Colombia is slightly higher (~16%), yet it fails to afford protection to all of the non-marine turtle species. Forero-Medina et al. (2014) reported that only 15 of the 25 non-marine Colombian turtle species they evaluated had records documenting their occurrence in protected areas (PAs); however, they noted that information on the distribution of some of these species predicted their undocumented occurrences in these PAs. The situation of having better documentation of species occurrences outside of PAs may reflect the historical difficulties associated with collecting in national parks and other PAs in Colombia, due to both existing legislation (MADS 2015, 2016) and restricted access to these areas due to armed conflicts (Negret et al. 2017). It has long been recognized that conservation strategies cannot rely exclusively on the existence of nature reserves (Western 1989; DeClerck et al. 2010; Morales-Betancourt and Lasso 2015a). In Colombia, many protected areas are also recognized as reserves where ethnic groups are allowed to engage in subsistence hunting (Moreno and Negrete 2012) and/or are located in regions where armed conflict occurs (Dávalos 2001; Clerici et al. 2020; Liévano-Latorre et al. 2021), making the protection of turtle species in these areas difficult. In addition, nature reserves are not insurance against possible impacts on turtle populations from global climate change (Ihlow et al. 2012). Protecting the rich turtle fauna of Colombia will require monitoring of the populations both within (Laurance et al. 2012) and outside of reserves, and implementing effective mitigation efforts when declines are detected. Continued vouchering of the distributions of Colombian turtles should be a part of this effort, as evidence of range declines is one of the most compelling indicators that a species is becoming threatened (IUCN 2012).

Conclusions

Here we present an updated, annotated checklist of the turtle species of Colombia, compiled using a conservative approach that only includes species documented by museum vouchers and peer-reviewed scientific literature. Colombia includes 33 turtle species belonging to nine families. We also assessed the quality of the evidence for the occurrence of each of these species in the five major hydrological drainages and each department in Colombia. Occurrence in the drainages was confirmed by vouchers and the literature, but there are gaps in terms of evidence for the occurrence of some species in some departments. We evaluated the threat levels for turtle species in Colombia based on taxonomy and geographic regions, and urge biologists to recognize the importance of vouchering specimens of turtle species in biological collections. A better documentation of the distributions of these species, and changes in their range sizes, is essential for correctly classifying their threat levels and for reducing the number of species that must be designated as Data Deficient.

Acknowledgements.—John Carr helped improve this manuscript in many ways. Andrés Camilo Montes shared his opinions about the validity of the distribution data for some species. We also would like to thank all our colleagues who have helped make the databases we consulted available on the Internet.

Literature Cited


Giving IDs to turtles: SNP markers for assignment of individuals to lineages of the geographically structured Phrynops geoffroanus (Chelidae: Testudines).


Ceballos-Fonseca CP. 2000. Tortugas (Testudinata)
Turtles of Colombia: diversity, distribution, and conservation


Echeverry-Alcendra A. 2019. Chelonoidis carbonarius


Echeverry-Alcendra A. 2019. Chelonoidis carbonarius


Medem F. 1958. Informe sobre reptiles colombianos. (II). El conocimiento actual sobre la distribución...
Turtles of Colombia: diversity, distribution, and conservation


Vivian P. Páez obtained her Ph.D. degree in Ecology, Ethology, and Evolution from Ohio University (Athens, Ohio, USA) in 1995, and is currently a Professor in the Instituto de Biología of the Universidad de Antioquia in Medellín, Colombia, where she teaches courses in Population Ecology and Herpetology. She has edited two books and published over 70 scientific articles and book chapters. Her research interests have focused on the influences of nest microclimatic conditions and paternal effects on different fitness components of turtles with temperature-dependent sex determination. She is also conducting demographic projects using population matrix models to permit the elaboration of management plans for several species of freshwater turtles. Since arriving in Antioquia, Colombia, she has been involved in several projects on the natural history and diversity of the herpetofauna in this region, including the founding of the Museo de Herpetología of the Universidad de Antioquia (MHUA). Photo by Mónica Nieto.

Brian C. Bock obtained his Ph.D. degree in Ethology from the University of Tennessee (Knoxville, Tennessee, USA) in 1984. He held Smithsonian, Fulbright, and American Association for the Advancement of Science (AAAS) fellowships before moving to Colombia, first as a Professor at the Universidad Nacional de Colombia in Medellín, Colombia, and now as a Professor in the Instituto de Biología de la Universidad de Antioquia in Medellín, Colombia, where he teaches courses in Conservation Biology and Behavioral Ecology. Brian has edited two books and published over 70 scientific articles and book chapters. His early research focused on how reptile movement patterns influence population structure, but he has also conducted studies on reptile nesting ecology and demography, as well as on the population genetics of other species of Colombian flora and fauna. Photo by Jessica Bock Páez.

Diego A. Alzate-Estrada is a Biologist with a degree from the Universidad de Antioquia in Medellín, Colombia, and a Master’s degree from the same university. He is interested in the population ecology and conservation of freshwater turtles and crocodilians. Photo by Lucas Burgos Álvarez.

Karla Georgina Barrientos-Muñoz is a Biologist with a degree from the Universidad de Antioquia in Medellín, Colombia, and a Master’s degree from the University of Puerto Rico, Río Piedras Campus in San Juan, Puerto Rico. She is a co-founder and scientific director of the Fundación Tortugas del Mar in Colombia and country coordinator in Colombia for the Wider Caribbean Sea Turtle Conservation Network (WIDECAST). Karla has published over 13 scientific articles and book chapters, and she was the winner of the Archie Carr Student Award - Runner-Up: Biology, by the International Sea Turtle Society in 2014. Her research and interests are on the nesting ecology and in-water assessments of sea turtles, and the trade of sea turtles, focusing on the “tortoiseshell,” conservation biology, community outreach, and relationships between local communities and stakeholders for applicable solutions to sea turtle conservation issues. Photo by Álvaro Orozco.
Viviana Cartagena graduated in Biology from the Universidad de Antioquia in Medellín, Colombia, in 2013, and in 2020 received a Master’s degree in Biology from the same university. She is interested in the population ecology and conservation of amphibians and reptiles. Photo by Laura Cristina Osorno-Giraldo.

Andrea Echeverry-Alcendra graduated as a Biologist from the Universidad del Magdalena, Santa Marta, Colombia, in 2009, and is completing her Master’s degree in Conservation and Biodiversity at the Pontificia Universidad Javeriana, Bogotá, Colombia. She works as Coordinator of Animal Collections of the Barranquilla Zoo and is a member of the Conservation Planning Specialist Group of the IUCN. Her research interests range across diverse topics in wildlife management, but with an emphasis on the ecology and conservation of tortoises and freshwater turtles under the “One Plan Approach” that links in situ and ex situ methods and tools. She is particularly interested in exploring the effects of land use and climate change on chelonian conservation and how restoration ecology may contribute to the persistence of Testudines. Photo by Ricardo Madriñan-Valderrama.

Cristian Ramirez-Gallego is a Biologist with a degree from the Universidad de Antioquia in Medellín, Colombia, and a Master’s degree from the Universidad de Puerto Rico, Río Piedras campus in San Juan, Puerto Rico. He was awarded the Archie Carr Student Award – Runner-up: Biology, by the international Sea Turtle Society in 2014, and has published over 16 scientific articles and book chapters. His research interests are on the nesting ecology and conservation genetics of sea turtles, illegal commerce of sea turtles and their products, with a focus on “tortoiseshell,” as well as in strengthening the technical capacities of communities and public entities for sea turtle management and conservation. He is a co-founder of the Fundación Tortugas del Mar in Colombia and an Associate Investigator of the Corporación para el Desarrollo de la Costa Caribe – CORPOCARIBE. Photo by Cristian Ramírez-Gallego.

Jennifer Sofía del Río is a Biologist with a degree from the Universidad Distrital Francisco José de Caldas in Bogotá, Colombia, and is finishing another degree in Biology at the Universidad INCCA de Colombia. She works for WWF Colombia, focusing on protected area planning and management effectiveness assessments and the implementation of the IUCN Green List Program in Colombia. She has experience in promoting the establishment of private protected areas, working with private landowners in biodiversity conservation and the sustainable use of biological resources. Jennifer also has expertise in the biology and conservation ecology of freshwater turtles and is interested in acoustic communication, conservation strategies, and population ecology of turtles. Photo by Sindy Martínez.

Marley T. Gómez-Rincón is a Biologist from the Universidad de Antioquia in Medellín, Colombia. Her interests are focused on the population ecology, conservation, and biology of freshwater turtles. Photo by Jennifer Del Río.

Margarita M. Vallejo-Betancur obtained her Master’s degree in Biological Sciences from the Universidad CES and Escuela de Ingeniería de Antioquia, Colombia, in 2018. She is interested in animal behavior and demography, and has worked on strategies for preventing and combating illegal wildlife trafficking as well as wildlife management and welfare. She conducted an internship in wildlife conservation in the United Kingdom and has experience in wildlife conservation centers in Oceania. Photo by Juan Pablo Lopera.