

***Rhinoclemmys nasuta* (Boulenger 1902) – Large-Nosed Wood Turtle, Chocoan River Turtle**

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SUMMARY. – The large-nosed wood turtle, *Rhinoclemmys nasuta* (Family Geoemydidae), is a small to medium-sized aquatic turtle (carapace length to 228 mm) found in a variety of northwestern South American water bodies, including small streams and rivers. It has a restricted distribution in the Chocoan rain forest of Pacific coastal Colombia and Ecuador. The species is known to have a primarily herbivorous diet, but small invertebrates are also eaten. Females lay one large egg per clutch. Adults exhibit female-biased sexual size dimorphism, and growth to maturity is protracted, with estimates varying from 12 to 14 years for males and females, respectively. Although its conservation status has not been studied thoroughly, the species is eaten on a subsistence basis, but it is not thought to be threatened by commercialization. Deforestation within the species range has not been studied with respect to its effect on this highly aquatic species. This species occurs in one protected area in Ecuador and may occur in others in Colombia.

DISTRIBUTION. – Colombia, Ecuador. Confined to the Chocoan rainforest area in Pacific coastal drainages of northwestern Ecuador and western Colombia, and the middle and upper portion of the Caribbean-draining Río Atrato basin in northwestern Colombia.

SYNONYMY. – *Nicoria nasuta* Boulenger 1902, *Geoemyda nasuta*, *Geoemyda punctularia nasuta*, *Rhinoclemmys punctularia nasuta*, *Rhinoclemmys nasuta*, *Callopsis punctularia nasuta*, *Callopsis nasuta*.

SUBSPECIES. – There are no recognized subspecies.

STATUS. – IUCN 2009 Red List Status: Near Threatened (LR/nt) (assessed 1996, needs updating);

CITES: Not Listed; Colombian Red Data Book: Data Deficient.

Taxonomy. – Boulenger (1902) described *nasuta* as a species of *Nicoria* based on a small series from Esmeraldas Province, Ecuador. Subsequent taxonomic works considered this taxon as a species of *Geoemyda* (Siebenrock

1909; Mertens et al. 1934; Wettstein 1934) until Mertens (1954) treated it as a subspecies of *Geoemyda punctularia*. Although Medem (1962:279) considered it to be a discrete species based on his personal field experience, he continued



Figure 1. Adult female *Rhinoclemmys nasuta* from Isla Palma, Departamento del Valle, Colombia. Photo by José Vicente Rueda-Almonacid.

to use the name *Geoemyda punctularia nasuta* throughout the text. In his revision of the genus *Callopsis* (a synonym of *Rhinoclemmys*), Ernst (1978) formally elevated it once again to species status. Since the publication of Smith (1978), it has been recognized universally as a full species in the genus *Rhinoclemmys*, and well established as distinct from *R. punctularia* and its sympatric congeners (*R. annulata* and *R. melanosterna*). Although there is some geographic variation in shell proportions, there are no described subspecies (Ernst 1978). Based largely on morphological and allozyme data, Carr (1991) hypothesized *R. nasuta* to be the basal species in the genus. In a molecular phylogeny based on mitochondrial and nuclear genes, depending on

the type of analysis, the phylogenetic position of *R. nasuta* was unresolved, or poorly supported as sister to a clade of *Rhinoclemmys* including *areolata* (*diademata*, *punctularia*) (*funerea*, *melanosterna*) (Le and McCord 2008).

Description. — This is a small to medium-sized (to ca. 228 mm carapace length) species of *Rhinoclemmys* with an ovate and very depressed shell. The carapace is dark brown to black. Each plastral scute generally has a discrete dark blotch, with variably extensive, intervening light-colored areas between blotches. Ground color of the head is dark brown to black with a pale white or yellowish postorbital and supratemporal stripe. The skin of the posterior and lateral head is scaly, not smooth. The dark gular skin has light-colored, circular spots. This species is distinguished from all other *Rhinoclemmys* by the following combination of shell features: contact between humeral and axillary scutes is absent; there is contact between the lateral portion of the pectoral-abdominal seam and the ventral portion of marginal scute 5; the anterior margin of costal scute 2 contacts either marginal scute 4 or the marginal 4–5 seam; and the dorsal outline of marginal scute 5 is quadrangular.

Rhinoclemmys nasuta exhibits female-biased sexual size dimorphism in shell dimensions, with maximum CL of 228 and 196 mm in females and males, respectively (Medem 1962; Loaiza-Naranjo et al. 2006; Garcés et al. 2008). The same holds true for weight, with females averaging 772 g, and males only 407 g (Loaiza-Naranjo 2006; Giraldo et al.



Figure 2. Female *Rhinoclemmys nasuta* with egg from Isla Palma, Departamento del Valle, Colombia. Photo by José Vicente Rueda-Almonacid.



Figure 3. Female *Rhinoclemmys nasuta* from Isla Palma, Departamento del Valle, Colombia. Photo by Alan Giraldo.



Figure 4. Near hatchling size *Rhinoclemmys nasuta* from Isla Palma, Departamento del Valle, Colombia. Photos by John L. Carr.

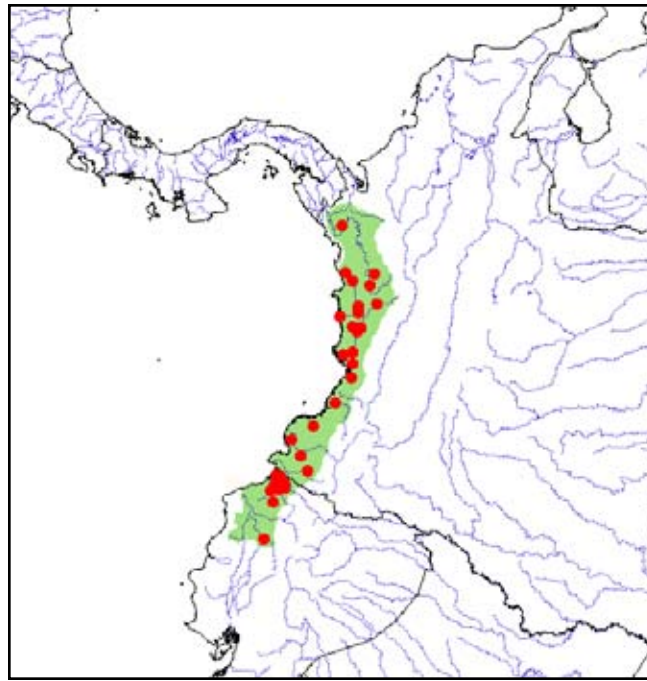


Figure 5. Distribution of *Rhinoclemmys nasuta* in Ecuador and Colombia, northwestern South America. Red points = museum and literature occurrence records based on Carr and Almendáriz (1990), Iverson (1992), Vargas and Bolaños (2000), Castaño-Mora et al. (2004), and Ortega and Regalado-Sotelo (in press), plus more recent and authors' data; green shading = projected distribution based on GIS-defined hydrologic unit compartments (HUCs) constructed around verified localities and then adding HUCs that connect known point localities in the same watershed or physiographic region, and similar habitats and elevations as verified HUCs (Buhlmann et al., in press), and adjusted based on authors' data.

2007; Garcés 2008). The male shell is more elongate and narrow than that of the female, as well as averaging smaller in size, and in some male specimens, the plastron is slightly concave (Medem 1962; Ernst 1978, 1980). Males have a longer tail than females, with the vent opening posterior to the carapace margin (Ernst 1978, 1980). There is also variation in the growth rate between the sexes, with the growth rate estimated as 5.8 mm/yr for juveniles, declining to 0.9 mm/yr for males and -0.5 mm/yr for large females, respectively (Pérez et al., in press).

Distribution. — This species is recorded from the Caribbean-drained middle and upper Río Atrato basin of northwestern Colombia, and from Pacific coastal drainages from the Río Baudó in Colombia south to the Río Esmeraldas basin in Ecuador (Medem 1962; Carr and Almendáriz 1990; Castaño-Mora et al. 2004; Rueda-Almonacid et al. 2007). Erroneous localities in Ecuador and the type localities were discussed by Carr and Almendáriz (1990).

Habitat and Ecology. — Medem (1962) reported that this species lives in a variety of aquatic habitats, including large rivers, small rivers, creeks, and lagoons or lakes. It will apparently also enter brackish water. He considered it the most aquatic species of the genus, capable of swimming very fast. We have found individuals in 1st and 2nd order streams (Carr and Almendáriz 1990; Loaiza-Naranjo 2006; Giraldo et al. 2007). The species inhabits areas of tropical wet forest on the coastal plain and piedmont up to 800 m altitude in Colombia (Castaño-Mora et al. 2004; Ortega and Regalado-Sotelo, in press), and up to 600 m altitude

in Ecuador (Carr and Almendáriz 1990). In some places, streams in degraded, secondary forest are inhabited (Carr and Almendáriz 1990; Vargas and Bolaños 2000).

Based on reports from locals within the natural range, Medem (1962) reported clutches of one or two eggs, laid anytime during the year, but primarily between January and March; however, during dissections he found no more than a single egg in the months of November, December, and April. The number of enlarged ovarian follicles of various sizes led him to suggest that oviposition may occur throughout the year. His informants told him eggs may be laid on a beach (sandbar) or in the forest near the bank. Females were variously reported as not digging a nest or only a shallow hole and not covering the eggs with soil, although sometimes they did so with leaves (Medem 1962). It is estimated that *R. nasuta* requires ca. 12 years to reach the minimum size of sexual maturity for males (approximately 140 mm CL), and ca. 14 years for females (estimated as 160 mm CL; Pérez et al., in press).

Eggs are large and hard-shelled, white, elongate ellipsoids (Medem 1962). Three eggs he measured ranged between 35–39 mm in width and 67–70 mm in length.

The species is primarily herbivorous according to Medem (1962). He found stomach contents that contained aquatic plants, leaves, seeds, and fruits, though one specimen had eaten a grasshopper. Corredor-Londoño et al. (2007) reported stomach contents of leaves, seeds, and flowers in a single specimen. Based on analysis of 25 fecal samples from a population on Isla Palma, Colombia, this species

feeds principally on seeds of Fabaceae and litterfall of Cecropiaceae, as well as animal matter consisting primarily of Hymenoptera and Odonata (Alegria et al. 2007; Giraldo et al. 2007).

Medem (1962) found trematodes in the stomach and nematodes in the intestines. Dyer and Carr (1990a) listed four species of digenetic trematodes of two families from specimens of *R. nasuta* collected in Ecuador: *Octangioides tlacotalpensis* (Angiodictyidae), and three in the Paramphistomidae: *Nematophila grandis*, *Pseudocleptodiscus margaritae*, and *Pseudallassostoma heteroxenus*. In addition, Dyer and Carr (1990b) reported two species of nematodes from *R. nasuta* in Ecuador: *Falcaustra tikasinghi* (Ascaridida) and *Hedruris* sp. (Spirurida).

Medem (1962) noted that *Crocodylus acutus* and *Caiman crocodilus* eat *R. nasuta*. He also reported finding a small specimen in the stomach of a 2 m long snake (*Drymarchon corais melanurus*).

Population Status. — Medem (1962) reported the species was abundant in the San Juan, Docampadó, and Baudó rivers in the Department of Chocó, Colombia. Based on a capture-recapture study of a population on the Pacific coast of Colombia with a reduced incidence of anthropogenic influence and no natural predators (Isla Palma, Bahía Málaga, 3°53'N, 77°21'W), population size was estimated as 756 ± 100 individuals with a male:female sex ratio of 1:1.3 (Loaiza-Naranjo et al. 2006; Giraldo et al. 2007; Garcés 2008). For the same population, density was estimated as 1428 individuals per ha of stream (Garcés 2008). Recently, Garcés et al. (2008) found that the male-female sex ratio was the same in a population from a mainland locality with a high level of human intervention.

Threats to Survival. — Humans eat this species as a source of protein or use it in traditional medicinal practices in Colombia (Medem 1962; Castaño-Mora and Medem 2002; Galvis-Rizo and Corredor-Londoño 2006; Garcés 2008) and northwestern Ecuador (Carr et al., in prep.). They are also frequently kept as pets and their shells are used in the construction of decorative items (Corredor-Londoño et al. 2006; Galvis-Rizo and Corredor-Londoño 2006; Loaiza-Naranjo 2006; Corredor-Londoño et al. 2007; Garcés 2008).

Conservation Measures Taken. — *Rhinoclemmys nasuta* undoubtedly benefits from general measures against commercial scale collecting of wildlife for export in Colombia and Ecuador. It is not listed on the CITES Appendices, nor did it receive a rating in the IUCN/SSC Action Plan (IUCN 1989). This species is listed in the IUCN 2009 Red List as Lower Risk / Near Threatened (IUCN 2009). At the national level within Colombia, it has also been treated as Near Threatened (Rueda-Almonacid 2000; MMA 2002) or Data Deficient (Castaño-Mora and Medem 2002).

In Ecuador, this species is known from the Cotacachi-Cayapas Ecological Reserve, and in Colombia it is possibly found in Sanquianga and Utría Natural National Parks. A locality in Machalilla National Park, Ecuador, which is outside the known range of *R. nasuta*, was noted by Cisneros-Heredia (2006) who erroneously attributed the record

to Almendáriz and Carr (1992). Reserves and communal territories for indigenous Amerindians and populations of African descent also contain populations of this species in Ecuador and Colombia.

Conservation Measures Proposed. — A status survey throughout the species range would be desirable, but the species does not presently appear to be greatly threatened with extinction. Among the recommendations of action plans in Colombia are additional study of the biology of the species, environmental education activities to raise awareness of threats to turtle populations in general, and strengthening of enforcement activities related to protective legislation already in place (Castaño-Mora 2002; MMA 2002; Corredor-Londoño et al. 2006).

This species hardly ever enters the international pet trade, but several years ago one of us (JLC) noted importation of *R. nasuta* into the United States from Peru, which is a non-range country for this species. Trade officials should be vigilant for shipments of this species being “laundered” through countries that neighbor on range states.

Captive Husbandry. — Specimens maintained in captivity by Medem (1962) ate plantains and raw meat, but did not eat well and died within a couple of months. One specimen of Ecuadorian origin lived in captivity for 19 years (Carr, pers. obs.). When newly captured, specimens are relatively aggressive and defend themselves by biting, but after awhile they become more timid and do not attack other turtles (Medem 1962; Carr, pers. obs.). Along the central part of the Colombian Pacific coast, young specimens that are captured may be raised in captivity to be used later as food (Corredor-Londoño et al. 2007).

Current Research. — Observations on the subsistence use of *R. nasuta* and other species by rural inhabitants of northwestern Ecuador are in preparation for publication (Carr et al., in prep.). Analyses of genetic diversity and molecular characterization of a population of *R. nasuta* (Isla Palma, Bahía Málaga) using genetic markers and mitochondrial DNA sequencing are being developed (Molina et al. 2008; Castillo et al. 2009). An analysis of spatial ecology, including movements (Pérez 2007), is in preparation for publication.

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