

***Kinosternon dunni* Schmidt 1947 –
Dunn's Mud Turtle, Cabeza de Trozo**

**JOHN B. IVERSON¹, JOHN L. CARR², OLGA V. CASTAÑO-MORA³,
CARLOS A. GALVIS-RIZO⁴, LUIS E. RENTERÍA-MORENO⁵, AND GERMÁN FORERO-MEDINA⁶**

¹Department of Biology, Earlham College, Richmond, Indiana 47374 USA [johni@earlham.edu];

²Department of Biology, The University of Louisiana at Monroe, Monroe, Louisiana 71209 USA,
and Universidad del Valle, Facultad de Ciencias, Departamento de Biología, Sección de Zoología,
Grupo de Investigación en Ecología Animal, A.A. 25360, Cali, Colombia [carr@ulm.edu];

³Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, Colombia [ovcastanom@unal.edu.co];

⁴Fundación Zoológica de Cali, Cali, Colombia [carlosgalvis@zoologicodecali.com.co];

⁵Universidad Tecnológica del Choco, Quibdó, Colombia [lueremo@gmail.com];

⁶Wildlife Conservation Society and Turtle Survival Alliance,
Carrera 25#4-39, Cali, Colombia [forecroc@yahoo.com]

SUMMARY. – Dunn's Mud Turtle, *Kinosternon dunni* (Family Kinosternidae), is a medium-sized aquatic turtle (carapace length to at least 180 mm) found in streams and marshes in the Río Baudó, Río Docampadó, Río San Juan, and Río Atrato drainage basins of the Departamento del Chocó in western Colombia. It is most similar and closely related to *K. angustipons* from Central America, and belongs to the *K. leucostomum* species group. Very little is known of the natural history of this species. It is apparently carnivorous and probably highly aquatic. It may reproduce nearly year-round, laying multiple clutches of one or two eggs each. A field survey of each of the four inhabited basins is urgently needed to assess the population status of this species. Because of its restricted range and apparent rarity, and because it is eaten locally, it could be more threatened than currently recognized.

DISTRIBUTION. – Colombia. Apparently confined to the the Departamento del Chocó in the Chocóan rainforest area in the Pacific coastal drainages of the Ríos Baudó, Docampadó, San Juan, and the Caribbean-drained upper Río Atrato in western Colombia.

SYNONYMY. – *Kinosternon dunni* Schmidt 1947.

SUBSPECIES. – No subspecies have been described.

STATUS. – IUCN 2012 Red List Status: Vulnerable (VU B1+2c; assessed 1996, needs updating);
TFTSG Draft Red List: Vulnerable; CITES: Not Listed; Colombian Red Data Book: Vulnerable.

Taxonomy. — *Kinosternon dunni* was described by Karl Schmidt in 1947 on the basis of two female specimens from “Pizarro, Choco, Colombia” (presumably from the Río Baudó

drainage). The name honors Emmet Reid Dunn [1894-1956], a noted herpetologist at Haverford College who lived and studied in Colombia for many years. Medem (1961, 1962)



Figure 1. Adult male *Kinosternon dunni* from the southern Río Atrato, Chocó, Colombia. Photo by Germán Forero-Medina.



Figure 2. Adult female (left) and male (right) *Kinosternon dunni* from the southern Río Atrato, Chocó, Colombia. Photo by Germán Forero-Medina.

later published the results of his field work in the region of the type locality. He secured only three additional specimens (a male, a female, and a shell), but extended the known range to include the drainages of the Río Baudó, Río Docampadó, and Río San Juan of the Departamento del Chocó. In 1965, Legler described *K. angustipons* from Central America and included a discussion of the clear similarity between that species and *K. dunni*.

Iverson (1981) reviewed the literature for the species, mapped its distribution, and located the only three known museum specimens outside of Colombia. The only male was located in the California Academy of Sciences collection. In addition, he identified two additional female turtles as *K. dunni* from among a large series of specimens catalogued as *K. leucostomum* in the American Museum of Natural History collection. In addition, Olga Castaño-Mora (1997) secured four additional live specimens. Recently, 17

individuals were captured and released during a survey of a locality in the Río Atrato drainage (Rentería-Moreno et al. 2012). Fewer specimens of this species are known than for any other kinosternid species. Despite the restricted range of this species, significant geographic variation might still exist across drainage basins (as is the case for several other aquatic kinosternids).

Based on a phylogenetic analysis of morphology, *K. dunni* is most closely related to *K. angustipons* from Central America (Iverson 1991), and shares a number of characters with *K. leucostomum*, with which it is sympatric. A subsequent combined morphological and molecular analysis (Iverson 1998) confirmed the close relationship between *K. leucostomum* and *K. dunni* (tissues were unavailable for *K. angustipons*). Finally, a recent phylogenetic study of mitochondrial and nuclear gene variation (Iverson et al., in prep.) in *Kinosternon* and *Sternotherus* recovered a “*leucostomum*” group, including *acutum*, *angustipons*, *creaseri*, *dunni*, *herrerai*, and *leucostomum*, as sister to all other living kinosternines in the genera *Kinosternon* and *Sternotherus*.

Description. — Dunn’s Mud Turtle is one of the largest kinosternid turtles, with males reaching at least 180 mm carapace length and females up to 166 mm (Forero-Medina et al., 2012). Males average larger in size than females, with males reaching up to 800 g body weight and females up to 595 g.

The carapace of the adult is brown and unkeeled, or with a weak median keel. The first vertebral scute is relatively wide, contacting the second marginal scutes. The plastron is small relative to the carapace (plastral forelobe posterior width is less than 40%, and plastral hindlobe anterior width is less than 35% of maximum carapace length). The plastron has a posterior, medial notch and two distinct transverse hinges that border the central fixed portion of the plastron



Figure 3. Adult female *Kinosternon dunni* from the southern Río Atrato, Chocó, Colombia. Photo by Germán Forero-Medina.

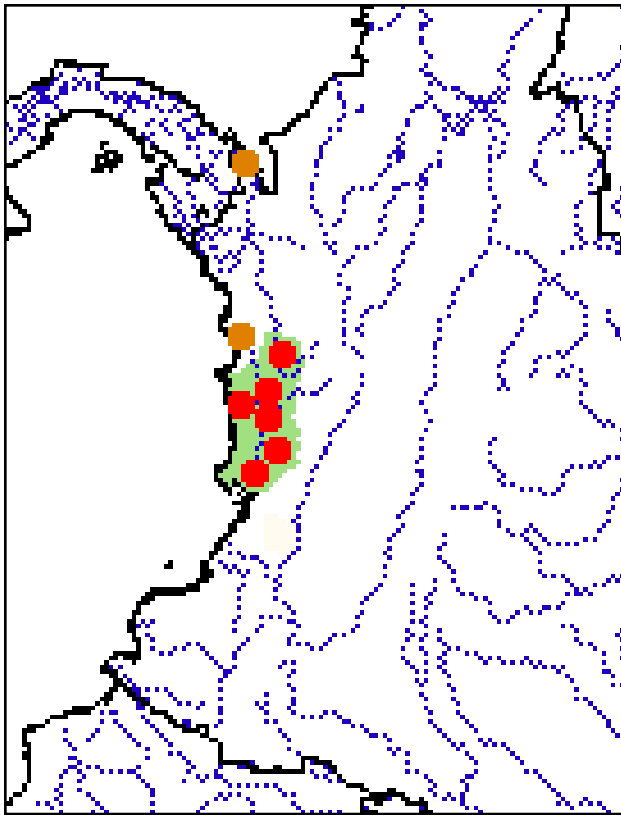


Figure 4. Distribution of *Kinosternon dunni* in Colombia in northwestern South America. Red dots = museum and literature occurrence records of native populations based on Iverson (1992), plus more recent and authors' data; brown dots = possible occurrence records; green shading = projected native distribution 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. 2009), and adjusted based on authors' data.

covered by the abdominal scutes. The latter is connected to the carapace by a bony bridge that is covered by single contiguous axillary and inguinal scutes; bridge length averages 24% of the length of the carapace. The plastron and bridge are usually light yellow with dark seams, but are sometimes stained dark brown.

The head is dark brown to black dorsally, lighter ventrally, and finely mottled laterally. The nasal scale covers most of the roof of the skull, but is never bifurcate posteriorly. The snout is bulbous in large adult males (the local vernacular name, “Cabeza de Trozo”, presumably refers to this trait). Adult females have a shorter stubbier tail and a relatively larger plastron than males, which also have a patch of rough scales (clasping organs) on the posterior surface of the crus and thigh of each hind leg.

Kinosternon dunni can be distinguished from all other mud turtles by the combination of its larger size; small, posteriorly notched plastron; unkeeled or unicarinate carapace; clasping organs; lack of distinct head stripes; wide first vertebral scute; and short interfemoral seam. Photographs of

the adult appear in Schmidt (1947), Medem (1961, 1962), Legler (1965), Pritchard (1979), Iverson (1981), Ernst and Barbour (1989), Schilde (2001), Castaño-Mora and Medem (2002), Ministerio del Medio Ambiente (2002), Vetter (2005), Corredor-Londoño et al. (2007), Rueda-Almonacid et al. (2007), Forero-Medina et al. (2012), and Rentería-Moreno et al. (2012).

Distribution. — This species was previously known from only approximately ten localities in the Departamento del Chocó near the Pacific coast of western Colombia (Medem 1961, 1962; Iverson 1992; Castaño-Mora 1997; Ceballos-Fonseca 2000; Castaño-Mora et al. 2004). These localities lie in the Pacific drainage basins of the Ríos Baudó, Docampadó, and San Juan.

However, a recent survey found the species at two localities in the southern portion of the drainage basin of the Río Atrato (Rentería-Moreno et al. 2012), which flows northwards into the Caribbean in the Gulf of Urabá. This extends the range of the species to this new drainage, and suggests that it may also occur in more localities in the lower (northern) Atrato region, as had been suggested by Medem (1961).

Besides these confirmed localities in the southern Río Atrato drainage basin, there is also a new record corresponding to a specimen deposited in the museum of the Instituto Alexander von Humboldt, from Acandí, Chocó, in a small drainage in the Gulf of Urabá (Rentería-Moreno et al. 2012). The specimen was collected in 1988 in a rice field and may represent a natural occurrence.

Corredor-Londoño et al. (2006, 2007) and Castro-Herrera and Vargas-Salinas (2008) speculated that this turtle may also range into the northern Departamento del Valle del Cauca, which includes a portion of the lower Río San Juan drainage, although there are no confirmed records of the species in this area.

Habitat and Ecology. — *Kinosternon dunni* is the most poorly known species of kinosternid turtle. Chocoan rainforest people informed Medem (1961) that the species preferred small streams, especially their headwaters, but that it was also found in marshy areas. They seemed to think that it must be well-adapted for a terrestrial existence; however, other kinosternids with such a reduced plastron tend to be highly aquatic.

In a recent survey in the Río Atrato (Rentería-Moreno et al. 2012), most individuals were captured in a marshy area dominated by palm trees of the genus *Euterpe*. Animals were active during the night, and were all captured in water of < 1.5 m depth. One individual was captured in a small stream 3–5 m wide, with a depth that varied more than 1.5 m during a rain event. The sex ratio of the collection was 7:9:1 (males:females:juveniles).

Very little is known of the biology of this species; what is known was reported by Medem (1961, 1962). Natives told Medem that it reproduces throughout the year. His single

female died in captivity and upon dissection was found to contain two shelled eggs (45 x 25 mm and 44 x 25 mm) and one enlarged ovarian follicle 15 mm in diameter. This suggests that multiple clutches are laid, but that clutch size may only be one or two eggs. All kinosternid species studied to date exhibit temperature-dependent sex determination (Ewert et al. 2004), and hence it is likely that *K. dunni* does also.

Population Status. — Native Colombians, who were well acquainted with *K. dunni* because they frequently ate them, told Medem (1961) that it was much rarer than *K. leucostomum*, and this is supported by the relative numbers of museum specimens of each from their area of sympatry.

Almost nothing is known of the current status of this rare turtle. A small population recently identified in the Atrato region yielded 17 individuals in 2 nights of sampling. At this locality it was sympatric with *K. leucostomum*, which was more abundant, and *Rhinoclemmys melanosterna* (Rentería-Moreno et al. 2012).

Threats to Survival. — This species is vulnerable to extinction not only due to its restricted range, but also because it is eaten locally by humans (Medem 1961; Castaño-Mora 1997). Deforestation, use of streams to extract logs, and the intense mining activity in the region may significantly destroy and pollute habitat (Castaño-Mora and Medem 2002). There are no records of commercial-scale exploitation of this species, presumably because it is so rare. However, one individual was found on a city street in Cali and turned over to the Cali Zoo in 2008, injured and debilitated—this individual was evidently a victim of illegal wildlife trafficking within Colombia.

Conservation Measures Taken. — Colombian restrictions on the commercial collection of wildlife for export no doubt provide some benefit to this species. It is not listed on the CITES Appendices, nor did it receive a rating in the now-outdated IUCN/SSC Action Plan (IUCN 1989). The species is listed in the IUCN 2012 Red List as Vulnerable (B1+2c; IUCN 2012) based on an outdated assessment from 1996 reflecting its apparent rarity. More recently, however, Rueda-Almonacid (2000) proposed that the species be considered Endangered, and in the Colombian Red Data Book it was assessed as Vulnerable (Castaño-Mora and Medem 2002; Ministerio del Medio Ambiente 2002). The species is not recorded from any protected areas within its known range (Rueda-Almonacid 2000).

Conservation Measures Proposed. — A field survey of western Colombia is desperately needed to determine the distribution, population status, threat levels, and conservation status of this turtle. Corredor-Londoño et al. (2006) proposed that *K. dunni* was a good candidate for *ex-situ* propagation as an endemic species with a restricted distribution subject to habitat destruction.

Captive Husbandry. — In captivity, Medem (1961, 1962) found both the male and female to be quite aggressive,

and to prefer to rest in shallow water that failed to even cover their shells. They also apparently estivated terrestrially for periods of two to four weeks, but it is not known whether this is normal field behavior. He found no intestinal or external parasites in his two captive animals. Those two captive specimens were carnivorous, eating meat, fish scraps, and mollusks.

More recently (2003–09), three individual *K. dunni* were maintained at the Cali Zoo in Colombia. Specimens were kept in an outdoor enclosure with a concrete pool and access to land following a protocol similar to that used for *K. leucostomum* at the zoo. However, *K. dunni* proved less adaptable to captive conditions than *K. leucostomum*, and the one specimen to survive the longest lived only four years; although the sample size was very small and one of the three was injured when obtained. Two specimens with available records gained weight on a diet consisting of a gelatinous mixture used at the zoo for aquatic turtles, and one died of septicemia.

Current Research. — Germán Forero-Medina and Luis Rentería-Moreno began survey and population work for this species in July 2011 in the Department of Chocó. We are not aware of other ongoing research.

Acknowledgments. — Iverson's research has been supported by Earlham College; Carr's by the Turtle Research Fund of the University of Louisiana at Monroe Foundation and the Grupo de Investigación en Ecología Animal at the Universidad del Valle. Surveys by Forero-Medina and Rentería-Moreno were supported by the Turtle Survival Alliance seed grants program.

LITERATURE CITED

- BUHLMANN, K.A., AKRE, T.S.B., IVERSON, J.B., KARAPATAKIS, D., MITTERMEIER, R.A., GEORGES, A., RHODIN, A.G.J., VAN DIJK, P.P., AND GIBBONS, J.W. 2009. A global analysis of tortoise and freshwater turtle distributions with identification of priority conservation areas. *Chelonian Conservation and Biology* 8:116–149.
- CASTAÑO-MORA, O.V. 1997. Status of the tortoises and freshwater turtles of Colombia. In: Van Abbema, J. (Ed.). *Proceedings: Conservation, Restoration and Management of Tortoises and Turtles - An International Conference*. New York: New York Turtle and Tortoise Society, pp. 302–306.
- CASTAÑO-MORA, O.V. AND MEDEM, F. 2002. *Kinosternon dunni*. In: Castaño-Mora, O.V. (Ed.). *Libro Rojo de Reptiles de Colombia*. Bogotá, Colombia: Instituto de Ciencias Naturales-Universidad Nacional de Colombia, Ministerio del Medio Ambiente, and Conservación Internacional-Colombia, p. 125.
- CASTAÑO-MORA, O.V., CÁRDENAS-A., G., HERNÁNDEZ-R., E.J., AND CASTRO-H., F. 2004. Reptiles en el Chocó biogeográfico. In: Rangel Ch., J.O. (Ed.). *Colombia Diversidad Biótica IV: El Chocó Biogeográfico/Costa Pacífica*. Bogotá, Colombia: Universidad Nacional de Colombia, pp. 599–631.
- CASTRO-HERRERA, F. AND VARGAS-SALINAS, F. 2008. Anfibios y reptiles en el departamento del Valle del Cauca, Colombia. *Biota Colombiana* 9:251–277.

- CEBALLOS-FONSECA, C.P. 2000. Tortugas (Testudinata) marinas y continentales de Colombia. *Biota Colombiana* 1(2):187–194.
- CORREDOR-LONDOÑO, G., AMOROCHO, D., AND GALVIS-RIZO, C.A. 2006. Plan de Acción para la Conservación de las Tortugas Continentales y Marinas del Departamento del Valle de Cauca. Santiago de Cali, Colombia: Corporación Autónoma Regional del Valle de Cauca, 28 pp.
- CORREDOR-LONDOÑO, G., KATTAN, G., GALVIS-RIZO, C.A., AND AMOROCHO, D. 2007. Tortugas del Valle del Cauca. Santiago de Cali, Colombia: Corporación Autónoma Regional del Valle de Cauca, 74 pp.
- ERNST, C.H. AND BARBOUR, R.W. 1989. *Turtles of the World*. Washington, DC: Smithsonian Institution Press, 313 pp.
- EWERT, M.A., ETCHBERGER, C.R., AND NELSON, C. E. 2004. Turtle sex-determining modes and TSD patterns, and some TSD pattern correlates. In: Valenzuela, N. and Lance, V. (Eds.). *Temperature-dependent Sex Determination in Vertebrates*. Washington: Smithsonian Institution Press, pp. 21–32.
- FORERO-MEDINA, G., IVERSON, J.B., CARR, J.L., CASTAÑO-MORA, O.V., GALVIS-RIZO, C.A., AND RENTERÍA-MORENO, L.E. 2012. *Kinosternon dunni*. In: Páez, V.P., Morales-Betancourt, M.A., Lasso, C.A., Castaño-Mora, O.V., and Bock, B. (Eds.). *Biología y Conservación de las Tortugas Continentales de Colombia*. Serie Editorial Recursos Hidrobiológicos y Pesqueros Continentales de Colombia. Instituto de Investigación de los Recursos Biológicos Alexander von Humboldt, Bogotá, Colombia, pp. 327–331.
- IUCN. 1989. *Tortoises and Freshwater Turtles: An Action Plan for their Conservation*. Gland, Switzerland: IUCN, 47 pp.
- IUCN. 2012. 2012 IUCN Red List of Threatened Species. Version 2012.2. www.iucnredlist.org.
- IVERSON, J.B. 1981. *Kinosternon dunni*. *Catalogue of American Amphibians and Reptiles* 278:1–2.
- IVERSON, J.B. 1991. Preliminary phylogenetic hypotheses of the evolution of kinosternine turtles. *Herpetological Monographs* 5:1–27.
- IVERSON, J.B. 1992. A Revised Checklist with Distribution Maps of the Turtles of the World. Richmond, Indiana: Privately printed, 363 pp.
- IVERSON, J.B. 1998. Molecules, morphology, and mud turtle phylogenetics. *Chelonian Conservation and Biology* 3:113–117.
- IVERSON, J.B., LE, M., AND INGRAM, C.M. In prep. Molecular phylogenetics of the mud turtles of the family Kinosternidae.
- LEGLER, J.M. 1965. A new species of turtle, genus *Kinosternon* from Central America. University of Kansas Publications, Museum of Natural History 15(13):615–625.
- MEDEM, F. 1961. Contribuciones al conocimiento sobre la morfología, ecología y distribución geográfica de la tortuga *Kinosternon dunni* K.P. Schmidt. *Novedades Colombianas* 1:446–476.
- MEDEM, F. 1962. La distribución geográfica y ecología de los *Crocodylia* y *Testudinata* en el Departamento del Chocó. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 11(44):279–303.
- MINISTERIO DEL MEDIO AMBIENTE. 2002. Programa Nacional para la Conservación de las Tortugas Marinas y Continentales en Colombia. Bogotá, Colombia: Dirección General de Ecosistemas, 63 pp.
- PRITCHARD, P.C.H. 1979. *Encyclopedia of Turtles*. Neptune, New Jersey: T.F.H. Publications, 895 pp.
- RENTERÍA-MORENO, L.E., FORERO-MEDINA, G., GARCÉS-RESTREPO, M. F., CARR, J.L., AND RUEDA-ALMONACID, J.V. 2012. Range extension of *Kinosternon dunni* Schmidt, 1947 (Reptilia, Testudines, Kinosternidae) in Chocó, Colombia. *Check List* 8(6):1310–1312.
- RUEDA-ALMONACID, J.V. 2000 [“1999”]. Anfibios y reptiles amenazados de extinción en Colombia. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 23 (Suplemento Especial):475–497.
- RUEDA-ALMONACID, J.V., CARR, J.L., MITTERMEIER, R.A., RODRÍGUEZ-MAHECHA, J.V., MAST, R.B., VOGT, R.C., RHODIN, A.G.J., DE LA OSSA-VELÁSQUEZ, J., RUEDA, J.N., AND MITTERMEIER, C.G. 2007. Las Tortugas y los Cocodrilianos de los Países Andinos del Trópico. Bogotá, Colombia: Editorial Panamericana, Formas e Impresos, Serie de Guías Tropicales de Campo No. 6, Conservación Internacional, 538 pp.
- SCHILDE, M. 2001. *Schlamm Schildkröten: Kinosternon, Sternotherus, Claudius, und Staurotypus*. Münster, Germany: Natur und Tier-Verlag, 133 pp.
- SCHMIDT, K.P. 1947. A new kinosternid turtle from Colombia. *Fieldiana Zoology* 31(13):109–112.
- VETTER, H. 2005. *Terralog: Turtles of the World*. Vol. 3., Central and South America. Edition Chimaira, Verlag ACS GmbH (AQUALOG), Frankfurt am Main, 132 pp.

Citation Format for this Account:

- IVERSON, J.B., CARR, J.L., CASTAÑO-MORA, O.V., GALVIS-RIZO, C.A., RENTERÍA-MORENO, L.E., AND FORERO-MEDINA, G. 2012. *Kinosternon dunni* Schmidt 1947 – Dunn’s Mud Turtle, Cabeza de Trozo. In: Rhodin, A.G.J., Pritchard, P.C.H., van Dijk, P.P., Saumure, R.A., Buhlmann, K.A., Iverson, J.B., and Mittermeier, R.A. (Eds.). *Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group*. Chelonian Research Monographs No. 5, pp. 067.1–067.5, doi:10.3854/crm.5.067.dunni.v1.2012, <http://www.iucn-tftsg.org/cbftt/>.