

## Catalogue of American Amphibians and Reptiles.

MCALLISTER, CHRIS T. 1985. *Nerodia rhombifera*.***Nerodia rhombifera* (Hallowell)  
Diamondback Water Snake**

*Tropidonotus rhombifer* Hallowell, 1852:177. Type-locality, "the Arkansas River and its tributaries near the northern boundary of the Creek Nation"; revised to "Arkansas River between Keystone and Tulsa, Tulsa County, Oklahoma" by Conant (1969:56). Holotype, Acad. Natur. Sci. Philadelphia 5047, a young adult male, collected at "type-locality" by Samuel Washington Woodhouse, collection date unknown (not examined by author).

*Natrix rhombifer*: Jordan, 1888:194.

*Nerodia sipedon rhombifer*: Garman, 1892:269-271.

*Natrix rhombifera*: Cope, 1892:668, 673.

*Natrix taxispilota rhombifera*: Cliburn, 1956:200.

*Nerodia rhombifera*: Rossman and Eberle, 1977:42.

• CONTENT. Three subspecies are currently recognized: *blanchardi*, *rhombifera*, and *weleri*.

• DEFINITION. *Nerodia rhombifera* is a stout-bodied semi-aquatic member of the genus having a total length up to 1.6 m. The head is broadly flattened and distinctly wider than the neck. Dorsal

scales are strongly keeled in 25-31 (usually 27) rows at midbody, 21-26 rows immediately in front of anus and 21-28 (usually 25) rows anteriorly. The ventrals number 137 to 152 (mean 143.5) in males, 135 to 150 (mean 140.5) in females; subcaudals number 68 to 88 (mean 78.6) in males, 56 to 73 (mean 65.5) in females. The anal plate is divided. The tail is short, making up approximately 20-27% of the total length. Head scalation includes 1 (sometimes 2 or 3) preoculars, usually 3 postoculars (rarely 2), 8 supralabials (range 7-11) and 11 (sometimes 10 or 12) posterior temporals. The dorsal coloration varies from olive to yellowish gray with a median series of dark brown blotches connected by narrow diagonal stripes, which resemble a chainlike or diamondlike pattern. The venter is predominately yellow with dark semilunar markings that are more numerous posteriorly. The chins of large adult males bear conspicuous projecting protuberances (papillae), a unique character among natricine snakes. Adult females are generally larger than adult males.

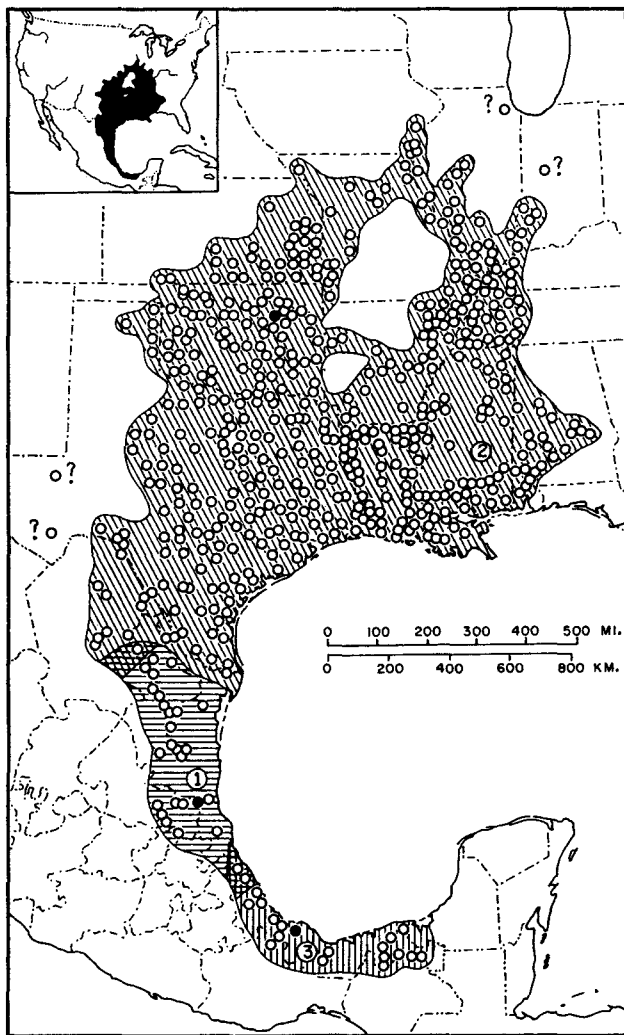
• DESCRIPTIONS. Conant (1969) completely described the characteristics of all subspecies. Additional descriptions are provided in numerous state herpetological manuals and other publications including: Hallowell (1852), Cope (1900), Brown (1901), Clay (1938a, 1938b), Ditmars (1939), Wright and Wright (1957) and Mount and Schwaner (1970). Detailed morphological descriptions are available on: the hemipenes (Blanchard, 1931; Conant, 1969); Duvernoy's gland (Taub, 1967); skull osteology (Marx and Rabb, 1972; Rossman, 1980); chromosomes (Eberle, 1972); and cranial musculature (Varkey, 1979).

• ILLUSTRATIONS. Black and white illustrations or photographs include: all subspecies, intergrades and juveniles (Conant, 1969), *blanchardi* (Clay, 1938a), and *rhombifera* (Parker, 1937; Clay, 1938a; Ditmars, 1939; Schmidt and Davis, 1941; Davenport, 1943; Pope, 1946; Wright and Wright, 1957; Smith, 1961; Minton, 1972; Mount, 1975; Christiansen and Burken, 1978; Collins, 1982). Conant (1969, 1975) and other field guides provide color illustrations. Available ink drawings of either line or stipple and line include: the hemipenes (Cope, 1895; Wright and Wright, 1957); skull (Boulenger, 1894; Cundall and Gans, 1979); chin papillae of the male (Blanchard, 1931; Schmidt and Davis, 1941; Conant, 1975); dorsal pattern (Conant, 1975); cranial myology (Oldham et al., 1970; Cundall and Gans, 1979; Varkey, 1979); heart anatomy (Holmes, 1975); electromyography (Cundall and Gans, 1979); and feeding maneuvers (Kofron and Dixon, 1980).

• DISTRIBUTION. *Nerodia rhombifera* ranges from eastern Kansas, extreme southeastern Iowa, southern Illinois and southwestern Indiana southward through western Kentucky and Tennessee, central Alabama, Mississippi, Missouri, Arkansas, Oklahoma and the eastern two-thirds of Texas into Mexico to Tabasco and southwestern Campeche. Isolated and unconfirmed localities outside the continuous range are represented by the following records: Tippecanoe Co., Indiana, U.S. Nat. Mus. 1330 (Minton, 1972); Cook Co., Illinois, specimen unknown (Garman, 1892); Brewster Co., Calamity Creek, Texas, specimen unknown and Reeves Co., Pecos River, Texas, Acad. Natur. Sci. Philadelphia 12097, 12107 (see Conant, 1969, 1978).

• FOSSIL RECORD. None.

• PERTINENT LITERATURE. The most thorough review of *N. rhombifera* is provided by Conant (1969). Extensive literature is available and includes information on: systematics (Brown, 1901; Clay, 1938b; Conant, 1953; Cliburn, 1956, 1960; Malnate, 1960; Mount and Schwaner, 1970; Rossman and Eberle, 1977; Romano, 1980); comparative ecology (Nakamura and Smith, 1960; Preston, 1970); food habits (Bowers, 1966; Kofron, 1978 and references therein); ontogeny of the diet (Mushinsky et al., 1982; Plummer and Goy, 1984 and references therein); spatial and thermal ecology (Michot, 1981); parasites (Harwood, 1932; Hughes et al., 1942; Thatcher, 1966; Wacha and Christiansen, 1974; Brooks, 1978; Petherline et al., 1984); ecogeography (Morafka, 1977; Lee, 1980); chemical preferences and responses (Czaplicki and Porter, 1974; Porter and Czaplicki, 1974; Czaplicki, 1975; Mushinsky and Lotz, 1980); habitat partitioning (Hebrard and Mushinsky, 1978); reproduction (Guidry, 1953; Carpenter, 1958; Kennedy, 1964; Fitch, 1970; Kofron, 1979); ovarian histology (Betz, 1963); behavior (Wolfe and Brown, 1940; Mushinsky and Hebrard, 1977a; Mushinsky et al., 1980; Scudder and Burghardt, 1983); seasonal activity (Mushinsky and Hebrard, 1977b); diving physiology (Jacob



MAP. Solid circles indicate type-localities; hollow circles indicate other locality records. Question marks indicate uncertain locality records. Overlapping shading patterns indicate zones of intergradation.

and McDonald, 1976; Baeyens et al., 1978, 1979, 1980); pupillary responses (Stovall and Kennedy, 1979); renal physiology (Dantzler, 1970; Clark and Dantzler, 1972); metabolic physiology (Gratz and Hutchison, 1977; Pough, 1977; Gratz, 1978, 1979); thyroid physiology (Harclerode et al., 1971); thermal acclimation (Jacobson and Whitford, 1970; Turner and Tipton, 1972); surgical anesthesia (Betz, 1962); electrophoresis (Dessauer and Fox, 1964; Garnett, 1979); karyology (Cundall, 1970; Eberle, 1972; Kilpatrick and Zimmerman, 1973); adrenal response (Fickness, 1963); predation (McGrew, 1963); variation (Boyles, 1952; Cliburn, 1953); thymic myoid cells (Raviola and Raviola, 1967); cranial myology (Varkey, 1979); tongue histology (Morgans and Heidt, 1978); sexual dimorphism (Quinn, 1979); introduced populations (Conant, 1977); endangered populations (Roosa, 1977; Christiansen, 1981); red blood cell staining substance (Daly and Calhoun, 1978); blood chemistry (Dessauer, 1970); vertebral form (Johnson, 1955); skull ontogeny (Rossman, 1980); and pesticide mortality (Ferguson, 1963).

● **ETYMOLOGY.** The specific name *rhombifera* is derived from the Greek *rhombos* (rhomb), referring to the diamond-shaped dorsal pattern. The subspecific names *blanchardi* and *werleri* are patronyms honoring Frank N. Blanchard and John E. Werler, respectively.

### 1. *Nerodia rhombifera blanchardi* Clay

*Natrix rhombifera blanchardi* Clay, 1938a:251. Type-locality, "within a radius of 85 miles of Tampico in the triangle formed by the Rio Tamesi and Rio Panuco." Holotype, Carnegie Museum 9512, an adult male, collected between Jan. 15 and Feb. 20, 1937, by J. Mortimer Sheppard (not examined by author).

*Nerodia rhombifera blanchardi*: Rossman and Eberle, 1977:42.

● **DEFINITION.** A subspecies characterized by a marked reduction in the intensity of the dorsal pattern. The dorsal coloration varies from dull brown to dark olive. The ventral markings are immaculate, often represented by dark smudgy spots in adults. Typically, the venter ranges in color from a buff or dull yellow to pale gray. There is a single preocular (rarely 2) and usually 3 postoculars (rarely 4). The ventrals number 139 to 150 (mean 143.2) in males, 136 to 150 (mean 141.1) in females; subcaudals number 76 to 88 (mean 81.3) in males, 63 to 73 (mean 68.6) in females.

### 2. *Nerodia rhombifera rhombifera* (Hallowell)

*Tropidionotus rhombifer* Hallowell, 1852:177. See species synonymy.

*Natrix rhombifera rhombifera*: Clay, 1938a:251. (First use of trinomial).

*Nerodia rhombifera rhombifera*: Rossman and Eberle, 1977:42.

● **DEFINITION.** A subspecies characterized by a strongly contrasting dorsal netlike pattern of dark brown markings on an olive-brown ground coloration. The venter is intensely patterned with dark gray, brown or black pigment in the form of semilunar spots. There is a single preocular (rarely 2) and usually 3 postoculars (rarely 2 or 4). The ventrals number 141 to 152 (mean 146.0) in males, 137 to 146 (mean 141.8) in females; subcaudals number 68 to 77 (mean 72.2) in males, 56 to 66 (mean 60.0) in females.

### 3. *Nerodia rhombifera werleri* Conant

*Natrix rhombifera werleri* Conant, 1953:4. Type-locality, "the Alvarado-San Andres Tuxtla road (Mexico No. 180), approximately 18 miles southeast of Alvarado, Veracruz." Holotype, Univ. Illinois Mus. Natur. Hist. 67067, a young adult male, collected Feb. 8, 1953, by John E. Werler (not examined by author).

*Nerodia rhombifera werleri*: Rossman and Eberle, 1977:42.

● **DEFINITION.** A subspecies characterized by a conspicuous dorsal pattern of black or dark brown middorsal markings. The ground color of the venter is yellowish and includes faint gray, greenish gray or black semilunar spots which become darker and more numerous under the tail. There are normally 2 preoculars (rarely 1 or 3) and usually 3 postoculars (rarely 4). The ventrals number 137 to 145 (mean 141.4) in males, 135 to 142 (mean 138.5) in females; subcaudals number 78 to 86 (mean 82.2) in males, 64 to 73 (mean 68.0) in females.

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