

## Catalogue of American Amphibians and Reptiles.

FITCH, HENRY S. 1984. *Thamnophis couchii*.***Thamnophis couchii* (Kennicott)  
Western aquatic garter snake**

*Eutaenia couchii* Kennicott, 1859:10. Type-locality, "Banks of Pitt River, California"; "probably near mouth of Hat Creek" (Fitch, 1940:59). Holotype, U.S. Nat. Mus. 866, adult female, collected by J. S. Newberry (not seen by author).

*Eutaenia hammondii*: Cooper, 1870:71.

• CONTENT. Six subspecies are recognized: *couchii*, *aquaticus*, *atratus*, *gigas*, *hammondii* and *hydrophilus*.

• DEFINITION. This is a medium-sized to large (32–108 cm S–V) *Thamnophis* characterized by: keeled dorsal scales (except those of lowest row) in 21–23–21–19–17, 21–19–17, or 19–21–19–17 (or 15) rows, reduced from maximum of 23 by loss, successively, of 5th, 6th and 4th; 8 supralabials, 4th and 5th bordering orbit, 6th and 7th relatively low with suture between them oblique; 1 or occasionally 2 pairs of preoculars, usually 3 pairs of postoculars; posterior genials markedly longer than anterior in most; internasals longer than broad, narrow anteriorly; 140–187 ventrals, 61–97 subcaudals, vertebral stripe usually faint, pale tan, sometimes confined to anterior end of body, bright yellow in some populations, totally absent in others; lateral stripes on 3rd and 4th scale rows, usually dull yellow or tan, sometimes absent; pale, creamy yellow or green flecks mainly confined to skin between scales in dorsolateral area, setting off dark spots in two alternating series between dorsal and lateral stripes; ventral surface dull white, yellow or gray tinted with pink or purple posteriorly; tip of retracted hemipenis at about 14th (13th to 17th) subcaudal; males average 82% of female length S–V and 55% of female weight, have tails about 24–27% of total length (vs 22–25% in females), and average 3–6 more ventrals and 8–13 more subcaudals than females.

• DESCRIPTIONS. Brief descriptions of these snakes are to be found in the compilations of Stebbins (1954, 1966), Wright and Wright (1957) and Behler and King (1979); more detailed and technical accounts are available in the revisionary studies listed under "Pertinent Literature."

• ILLUSTRATIONS. Photographs and drawings have been presented by Van Denburgh and Slevin (1918), Fitch (1940), Stebbins (1954, 1966) and Rossman (1979). Color plates are shown for *aquaticus* in Stebbins (1966) and for *hammondii* in Behler and King (1979).

• DISTRIBUTION. The species occurs throughout California except the northeastern and southeastern parts, extending into SW Oregon in the Rogue and Umpqua basins, to west-central Nevada along the Truckee, Carson and Walker rivers, and into NW Baja California del Norte, México.

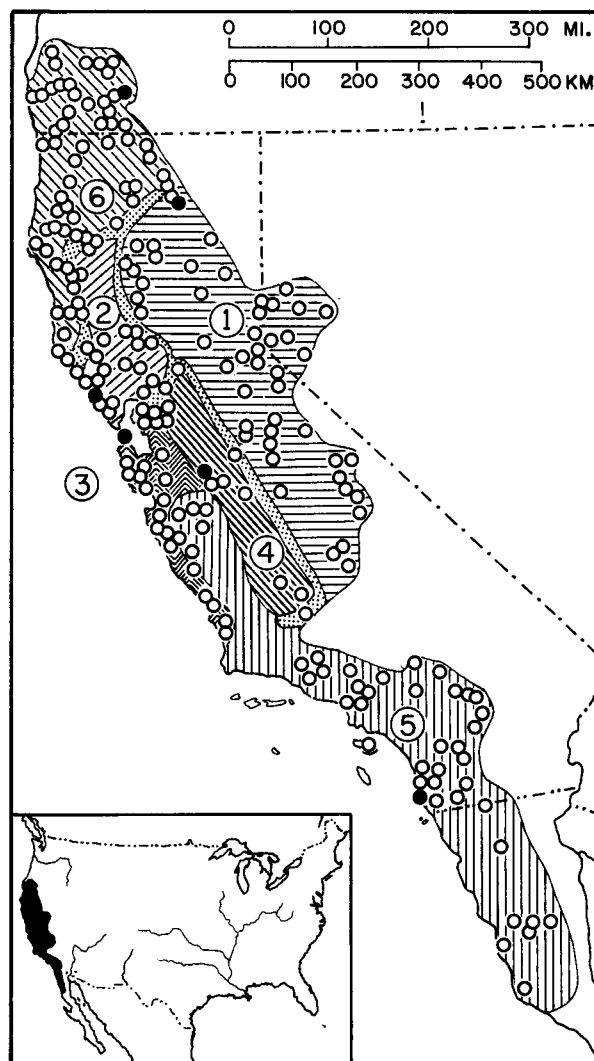
• FOSSIL RECORD. None.

• PERTINENT LITERATURE. Revisionary studies of western garter snakes by Ruthven (1908), Van Denburgh and Slevin (1918), Fitch (1940, 1948), Fox (1951), Rossman (1979) and Lawson and Dessauer (1979) included this species. Early authors consistently failed to distinguish between *T. couchii* and *T. elegans*. Fitch (1940) recognized the *hydrophilus-couchii-hammondii* series as an ecological unit characterized by highly aquatic habits, contrasting in this respect with sympatric representatives of *T. elegans*, but he included all in *Thamnophis ordinoides*. Fox (1951) divided the former *T. ordinoides* into the monotypic species, *T. ordinoides* and the polytypic *T. elegans*, but retained *couchii* and its subspecies in the latter. Mayr (1942) and Savage (1960) on theoretical grounds, Fox and Dessauer (1964) on serological findings, and Rossman (1979) on dental characters advocated separation of *couchii* and *elegans* as distinct species. Habitats were described by Fitch (1940) and Fox (1951), and food habits by Fitch (1940, 1941); these snakes are more aquatic than their sympatric congeners, and, except for *T. c. atratus*, (Bellemín and Stewart, 1977) they normally escape into the water, and feed on aquatic vertebrates.

• NOMENCLATURE HISTORY. Until relatively recently authors have generally confused *Thamnophis couchii* and its subspecies with other western garter snakes. Ruthven (1908) recognized *ham-*

*mondii* as a distinct species, but other *T. couchii* available to him were referred to *Thamnophis elegans*. Van Denburgh and Slevin (1918) allocated *hammondii* and *couchii* as subspecies of *T. ordinoides*, along with several subspecies of *T. elegans*. Fitch (1936, 1940) named as *hydrophilus* and *gigas* populations previously referred to *couchii* or misidentified as *elegans*, but followed Van Denburgh and Slevin (1918) in including both the *couchii* and *elegans* series in the species *ordinoides*. Fox (1951) showed that the name *atratus* had been applied incorrectly to the coastal subspecies of *elegans* (= *terrestris*) and needed to be transferred to a brightly striped partly sympatric subspecies of *couchii*; he also named (by partitioning *T. c. hydrophilus*) *T. couchii aquaticus* in northern California. Fox and Dessauer (1964) and Rossman (1979) recognized *couchii* as a species distinct from *elegans*.

• REMARKS. *Thamnophis couchii* is more aquatic than most kinds of garter snakes. *T. c. hydrophilus* and *T. c. aquaticus* probably capture all their prey under water. Sculpins (*Cottus* sp.) and tadpoles of *Rana boylei* are their principal foods, but trout and adult frogs are also eaten. *T. c. couchii* is exceedingly aquatic, occurring chiefly in swift-flowing mountain streams, and subsisting on fish such as trout. *T. c. gigas* is also an aquatic fish-eater, but lives in sluggish streams and sloughs of the Sacramento–San Joaquin flood plain. *T. c. atratus* is the least aquatic member of the group and terrestrial animals such as slugs make up part of its prey. *T. c. hammondii* often occurs along small and intermittent streams, and tree frogs, especially *Hyla regilla*, constitute its principal food source.



MAP. Solid circles mark type-localities, hollow circles other localities.

• ETYMOLOGY. The name *couchii* is for a Lieutenant Couch of the U.S. Army expedition who obtained the original specimens; *aquaticus* is Latin, aquatic; *atratus* is Latin, blackened; *gigas* is Latin, giant; *hammondii* is for W. A. Hammond, collector of the holotype; *hydrophilus* is from Greek, *hydro* (*hygro*), water and *philus*, lover.

### 1. *Thamnophis couchii couchii* (Kennicott) Sierra garter snake

*Eutaenia couchii* Kennicott, 1859:10. See species account.  
*Eutaenia hammondii*: Kennicott, 1860a:332.  
*Thamnophis hammondii*: Van Denburgh, 1897:212.  
*Eutaenia elegans vagrans*: Brown, 1903:295. (Misidentification resulting in inclusion with this Great Basin snake).  
*Eutaenia hammondii*: Brown, 1903:295.  
*Thamnophis ordinoides elegans*: Ruthven, 1908:138 (inclusion of most populations then known of both *couchii* and *elegans*).  
*Thamnophis ordinoides hammondii*: Grinnell and Camp, 1917:186.  
*Thamnophis ordinoides couchii*: Van Denburgh and Slevin, 1918:251.  
*Thamnophis ordinoides atratus*: Grinnell et al., 1930:151.  
*Thamnophis elegans couchii*: Fox, 1948:120.  
*Thamnophis couchii couchii*: Fox and Dessauer, 1964:266.

• DEFINITION. Adult length S-V 42-75 cm, lateral stripes distinct, dull yellow (sometimes absent), vertebral stripe usually poorly developed, mostly confined to vertebral scale row and to anterior part of body, more distinct in some; dorsolateral area brown with two alternating rows of squarish black spots that are somewhat larger than interspaces and hence have overlapping corners in a checkered pattern; ventral surface ochraceous, usually marked with black; iris uniform yellowish brown; scale rows 21 on forebody (rarely increased to a maximum of 22 or 23 by addition of a very short 5th row on one or both sides), reduced posteriorly to 19 and then to 17; snout narrow and pointed; supralabials low, those behind eye separated by slanting sutures; ventrals 163-180 in females, 170-184 in males; subcaudals 69-91 in females, 79-98 in males.

### 2. *Thamnophis couchii aquaticus* (Fox) Aquatic garter snake

*Thamnophis elegans*: Van Denburgh, 1897:207. (Erroneous inclusion of some populations with this taxon through failure to discriminate between them.)  
*Thamnophis ordinoides ordinoides*: Ruthven, 1908:147. (Inclusion along with various other garter snakes in the composite form "*ordinoides*".)  
*Thamnophis ordinoides atratus*: Van Denburgh and Slevin, 1918:224. (Inclusion along with the present *T. c. hydrophilus* and *T. elegans terrestris*.)  
*Thamnophis ordinoides hydrophila*: Fitch, 1940:50. (Included all populations then known of both *hydrophilus* and *aquaticus*.)  
*Thamnophis elegans hydrophila*: Fox, 1948:120.  
*Thamnophis elegans aquaticus* Fox, 1951:493. Type-locality "Dillon Beach, Marin County, California." Holotype, Univ. California Mus. Vert. Zool. 48196, adult male, collected by Wade Fox, 18 July 1949 (not seen by author).  
*Thamnophis couchii aquaticus*: Fox and Dessauer, 1964:266.

• DEFINITION. Vertebral stripe bright yellow or orange yellow, including vertebral scale row and from about half to all of each paravertebral row; lateral stripes distinct, light olive buff, occasionally absent in some populations; ventral surface light blue or green with varying amounts of pale salmon in central area, increasing posteriorly; iris gray or drab; dorsal scale rows 19-19-17 or 19-19-15, rarely 19-21-19-17; ventrals 142-167 in females, 147-167 in males; subcaudals 63-82 in females, 74-93 in males.

### 3. *Thamnophis couchii atratus* (Kennicott) Santa Cruz garter snake

*Eutaenia atrata* Kennicott, 1860b:296. Type-locality, "San Francisco, California." Lectotype, U.S. Nat. Mus. 970-A (designated by Fitch, 1940:89, from 2 syntypes, both U.S. Nat. Mus. 970), adult male, collected by Richard D. Cutts (not seen by author).  
*Eutaenia infernalis vidua* Cope, 1892:658. Type-locality, "San Francisco, California." Syntypes, 2, U.S. Nat. Mus. 970 (the

same listed above, described by Kennicott as *Eutaenia atrata*), collected by Richard D. Cutts.

*Thamnophis ordinatus* var. *infernalis*: Boulenger, 1893:207. (Erroneous application of this name, which pertains to the species *sirtalis*.)

*Thamnophis elegans*: Brown, 1903:288.

*Thamnophis elegans infernalis*: Ditmars, 1907:226, pl. 69, fig. 2. (Misapplication of name belonging to sympatric *T. sirtalis*.)

*Thamnophis ordinoides ordinoides*: Ruthven, 1908:147. (Inclusion along with various other taxa in the composite former "*ordinoides*".)

*Thamnophis ordinoides*: Thompson, 1915:351.

*Thamnophis ordinoides atratus*: Van Denburgh and Slevin, 1918:224.

*Thamnophis elegans atratus*: Fox, 1948:120.

*Thamnophis couchii atratus*: Fox and Dessauer, 1964:266.

• DEFINITION. Body relatively short and stout; snout pointed; vertebral stripe bright yellow or orange yellow, and includes the vertebral scale row and all or most of each paravertebral row; lateral stripes pale yellow and conspicuous, or absent (San Francisco Peninsula); dorsal ground color dark olive to black with no red marks; ventral surface pale green to deep blue, blotched with orange or salmon, especially posteriorly; iris dark, with loose silvery network; dorsal scales typically 19-17-15; ventrals 138-167 in females, 145-169 in males; subcaudals 64-82 in females, 70-89 in males; 6th, 7th and 8th supralabials relatively deep and separated by nearly vertical sutures.

### 4. *Thamnophis couchii gigas* (Fitch) Giant garter snake

*Eutaenia hammondii*: Cooper, 1870:71.

*Thamnophis hammondii*: Ruthven, 1908:133.

*Thamnophis ordinoides couchii*: Van Denburgh and Slevin, 1918:251.

*Thamnophis ordinoides gigas* Fitch, 1940:69. Type-locality, "Gadwall, Merced County, California." Holotype, Univ. California, Mus. Vert. Zool. 5428, adult female, collected by Harold C. Bryant, 16 May 1914.

*Thamnophis elegans gigas*: Fox, 1951:487.

*Thamnophis couchii gigas*: Fox and Dessauer, 1964:266.

• DEFINITION. Size relatively very large, adult length S-V often exceeding 70 cm, occasionally exceeding 100 cm; vertebral stripe narrow and dull, lateral stripes dull yellow; dorsal ground color muddy brown, with alternating rows of dark blotches reduced and inconspicuous; facial markings faint; iris olive buff; ventral surface olive gray; ventrals 155-170 in females, 160-168 in males; subcaudals 65-82 in females, 77-94 in males; scale rows typically 21-23-21-19, the maximum present for only a short distance on forebody.

### 5. *Thamnophis couchii hammondii* (Kennicott) Two-striped garter snake

*Eutaenia hammondii* Kennicott 1860a:332. Type-locality, "San Diego, California"; holotype U.S. Nat. Mus. 894; collected by W. A. Hammond, date unknown.

*Eutaenia Couchii*: Cooper, 1870:64.

*Eutaenia marciiana*: Yarrow and Henshaw, 1878:1638. (Erroneous inclusion with this more eastern species.)

*Eutaenia elegans couchii*: Cope, 1892:656.

*Tropidonotus vagrans*: Boulenger, 1893:202. (Erroneous inclusion with this Great Basin snake.)

*Thamnophis hammondii*: Van Denburgh, 1897:212.

*Thamnophis ordinoides hammondii*: Grinnell and Camp, 1917:181.

*Thamnophis elegans hammondii*: Fox, 1951:487.

*Thamnophis couchii hammondii*: Fox and Dessauer, 1964:266.

• DEFINITION. Vertebral stripe, confined to neck, and often narrow and faint, or lacking; lateral stripes usually distinct (rarely absent); yellowish tan; dorsal ground color light brown or gray (rarely reddish brown or black), with two alternating rows of small, well separated black spots on each side; head marked with bright yellow parietal spots edged with black; ventral surface tinted with pink, immaculate or almost so; iris pale yellowish brown; scale rows 21-19-17; ventrals 150-172 in females, 159-178 in males; subcaudals 67-82 in females, 75-93 in males.

## 6. *Thamnophis couchii hydrophilus* (Fitch) Oregon garter snake

*Thamnophis vagrans*: McLain, 1899:12. (Erroneous inclusion with this Great Basin snake).

*Thamnophis ordinoides atratus*: Van Denburgh and Slevin, 1918:224.

*Thamnophis ordinoides biscutatus*: Van Denburgh and Slevin, 1918:245.

*Thamnophis ordinoides hydrophila* Fitch, 1936:648. Type-locality, "Trail Creek 6 miles from its mouth, Jackson County, Oregon." Holotype, Univ. California Mus. Vert. Zool. 18127, adult male; collected by H. S. Fitch, 27 July 1934.

*Thamnophis elegans hydrophila*: Fox, 1951:487.

*Thamnophis couchii hydrophila*: Fox and Dessauer, 1964:266.

• DEFINITION. Vertebral stripe usually narrow and dull or faint, sometimes absent; lateral stripes dull yellow, sometimes faint or absent; dorsal ground color bluish gray to brown, with a checkered pattern of two alternating rows of dark spots; ventral surface white anteriorly to gray posteriorly, immaculate or nearly so, tinted with pink or purple which increases posteriorly; iris uniformly gray or brown; scale rows usually 19-21-19-17, with reduction to 15 rows at the posterior end of the body in some specimens; ventrals 140-168 in females, 150-171 in males; subcaudals 61-84 in females, 76-88 in males.

### COMMENT

Where ranges of the subspecies are broadly in contact and characters are similar, intergradation has been assumed but it is somewhat conjectural in several instances. Each subspecies varies over its range, and geographic populations may differ almost as much within a subspecies as between adjacent subspecies. *T. couchii* is highly aquatic and usually occurs near watercourses or bodies of water, and the divides separating drainages constitute at least partial barriers. Although intergradation has been reported between adjacent subspecies, several instances of sympatry or parapatry have been reported. *T. c. atratus* overlaps extensively with *T. c. hammondii*, and evidently these two, at least, are too divergent to intergrade directly. However, apparent hybrids are known (Stevan J. Arnold, pers. comm.). *Thamnophis digueti* of Baja California del Sur is obviously most closely related to the similar *T. couchii hammondii*, but the two are barred from contact by a desert barrier; hence full species status is appropriate for *digueti*.

*T. couchii hydrophilus* at the northern end of the species range is much like neighboring *T. elegans vagrans* and presumably is derived from a *vagrans*-like ancestor. However, southward, *T. couchii* shows progressive changes linked with aquatic adaptations. The longitudinal stripes are suppressed (except in *T. c. atratus*) and there is change to drab dorsal color, checkered or gray or brown, matching streamside gravel, rock or mud; also head shape is altered, with nostrils rotated to the top of the snout, and with salivary glands of the posterior supralabial region and their overlying scales reduced.

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