

Discovery of New Localities for the Threatened Kirtland's Snake (*Clonophis kirtlandii*) in Central Illinois

Angelo P. Capparella^{1*}, Todd Springer², and Lauren E. Brown¹

¹School of Biological Sciences, Illinois State University

Campus Box 4120, Normal, IL 61790-4120

²1835 E. Lafayette St., Bloomington, IL 61701

*Correspondence: apcappar@ilstu.edu

ABSTRACT

Three localities (two new, one reconfirmed) in central Illinois with habitat and behavioral observations are described for Kirtland's snake which is quite rare throughout its range in the U.S.A.

INTRODUCTION

The Illinois State Threatened Kirtland's snake *Clonophis kirtlandii* (Kennicott, 1856) is one of the rarest snakes in the Midwest because of the nearly complete destruction of native prairie, its primary former habitat. This small snake is semifossorial and tends to occupy crayfish burrows (Anton et al., 2003) in damp, open areas. The species can be easily identified by its red or orange belly bordered by a single row of round black spots on each side (Phillips et al., 1999). The purpose of the red belly is unknown. It is questionable if aposematic coloration is involved as the snake is not known to be poisonous and is reluctant to bite. When first captured, the snake flattens its body like a thin ribbon. Known natural food includes earthworms, slugs, water striders, leeches, and crayfish (Conant, 1943; Minton, 1944; Bavetz, 1993; Thurow, 1993).

The range of *C. kirtlandii* was probably best shown in Conant and Collins (1998, map p. 305), although new records have extended its range southward into northwestern Tennessee (Frymire and Scott, 2012). The species has been found from eastern Missouri to western Pennsylvania, and from northeastern Illinois and southern Michigan to northwestern Tennessee. In Illinois its range encompassed much of the central and northeastern portions of the State. Most of the distribution in Illinois and elsewhere occurred within the historic Prairie Peninsula (Transeau, 1935). By the 1890s the species had become rare in the northern half of Illinois (Garman, 1892). Brown et al. (1975) suggested that the populations in Illinois may be relictual and that the species might be becoming extinct in the western portion of its range. Since 1975, a few additional relictual localities have been reported in Illinois (e.g., Brown, 1987), always based on only one or a few specimens. The purpose of this paper is to report two new records and the confirmation of a nearly half-century old record in central Illinois with habitat notes and behavioral observations.

NEW AND RECONFIRMED LOCALITY RECORDS

Living specimens were captured, photographed, and released unharmed at the following three localities in southern McLean County.

1. NW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 26, T22N, R2E, Randolph Township, 4 km (2.5 mi) NE Heyworth. One individual was captured and photographed by T. Springer 16 October 2010 in a small grassy area adjacent to a small creek fed by a spring. The creek is a tributary of Kickapoo Creek. The snake was in leaf litter and nearby there were crayfish burrow chimneys. Old field-savannah is north of the site and a nearly pristine mature woodland occurs on a hillside south of the creek. When an attempt was made to pick up the snake, it flattened its body. Another sighting was made in the summer of ca. 2001 in mowed grass about 20 m (65.6 ft) north of the creek.

2. SE $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 19, T22N, R1E, Funks Grove Township, 2.4 km (1.5 mi) SW Funks Grove. One individual was caught and photographed 6 June 2004 by E. Smith and A. Funk in an old field (former pasture) adjacent to the parking lot of the Sugar Grove Nature Center. A small intermittent creek and outhouse are located near the capture site. Subsequent inspection of this creek revealed crayfish burrow chimneys. Another *C. kirtlandii* was seen by R. Carriger on 12 September 2011 along a small intermittent creek that receives flow from the aforementioned creek. Another sighting by S. Marshall occurred on 20 September 2011, not far from the September 12 sighting along this second intermittent creek. This snake was photographed by J. Tobias and measured at 38 cm (14.9 in) in total length. It was moving in a shaded area near a group of tree stumps and logs approximately 9 m (29.5 ft) from the creek and not far from a playground. The last documented sighting was 20 May 2012. It was found in a mulch pile by a young girl near the Marshall site and photographed by M. Litwiller. Habitats in the nearby area include restored prairie, old field in various successional stages, streams, former pasture or tilled areas, and open woodland.

3. SE $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 35, T23N, R4E, Dawson Township, 7 km (4.4 mi) NE LeRoy. K. Harness caught one individual and photographed it on 9 April 2011. Another capture was photographed on 14 August 2011. Both were found under rocks a considerable distance from each other (ca. 222 m [728 ft]) at the dam for Dawson Lake in Moraine View State Recreation Area. Both were estimated to be 20.3-25.4 cm (8-10 in) in total length. The specific habitat at the two sightings is under riprap for erosion control at the dam. A road runs across the dam with dense forest and cleared areas nearby. Numerous other potential habitats (marshes, streams, pond, old fields, former pasture, other prairie-like habitats) occur in the area.

DISCUSSION

Numerous species of snakes in eastern North America flatten their body when alarmed (Conant and Collins, 1998). This behavior is particularly well developed in *C. kirtlandii* in both frequency and thinness of body. Often this is interpreted as a defensive reaction to make the body appear larger in dorsal view, and hence more threatening to a potential predator. The body flattening has also been noted by Tucker (1994) to enhance the ability of *C. kirtlandii* to utilize small subterranean crevices. At the Randolph Township site,

T.S. attempted to pick up the newly encountered *C. kirtlandii* which was exhibiting flattening behavior. However, this proved to be rather difficult because T.S. was wearing gloves at the time. Thus, another potential function of flattening behavior may be to inhibit a potential predator from picking up and devouring the *C. kirtlandii*.

There are two other historical localities known for McLean County: (1) Normal: Garman (1892), no voucher specimen; UIMNH 4962, no other information; BMNH 93.1.2.1-2 (Conant 1943); and (2) Lake Bloomington: Holman (1966), no voucher specimen. In addition, there is an older record for Dawson Lake in Moraine View State Recreation Area, ISUC 703, 5 May 1966, J.A. Holman collector. It is likely that the Normal population is extinct because of intense urbanization. However, the Lake Bloomington region encompasses a relatively large area that has numerous habitats which might be suitable for and inhabited by *C. kirtlandii*. We do not know the exact location of Holman's record from Dawson Lake.

Bavetz (1993, 1994) indicated there was a total of 70 known locality records for *C. kirtlandii* in Illinois. He surveyed 19 of these sites, and 14 other sites near known localities that appeared to have appropriate habitat to support the species. Living *C. kirtlandii* were seen at only two of the old sites and only one new locality was found. Bavetz (1994) suggested that only eight localities "support reproducing populations" based on voucher specimens or photographic slides. In light of Bavetz's findings, our report of living *C. kirtlandii* sighted multiple times at two new localities and one older locality in McLean County take on considerable significance because of the Threatened status of the species in Illinois.

In the species description, Kennicott (1856: 96) commented briefly on early habitat of *C. kirtlandii* in northern Illinois: "The few specimens obtained have been found in the woods, generally under logs." Garman (1892: 275) commented further on early habitat in Illinois: "A handsome snake, which ten years ago was not uncommon along prairie brooks, in the central part of the State. Tiling, ditching, and cultivation of the soil have destroyed its haunts and nearly exterminated it...I have never seen it elsewhere than on the open prairie."

Mid-20th century habitat for *C. kirtlandii* was described in Conant's (1943: 328) monograph as: "essentially an inhabitant of open country...does occur in woods, but it is far more abundant in prairie-like situations." Later, Conant's (1958) field guide indicated that the species usually occurs in wet meadows.

We suggest that many present habitats of *C. kirtlandii* may be primarily successional and degraded derivatives (including extremely disturbed urbanized areas) of historical wet prairies. In non-urban regions they may be most frequently found in small, open grassy areas that are wet or adjacent to small watercourses or ponds. Some might also be found in wooded areas (possibly old fields). Presence of crayfish burrows or previously constructed burrows of other animals are also of importance (Tucker, 1994).

The primary cause of the decline of *C. kirtlandii* is probably the pervasive destructive effects of agriculture on the snake's habitat, with urbanization being a secondary cause. However, there are many possible factors that have had a role in the global decline of

reptiles (Gibbons et al., 2000). Two or more of these may have acted together in a detrimental manner causing the decline of *C. kirtlandii*.

Clonophis kirtlandii is classified as a State Threatened Species in Illinois and Ohio, and State Endangered in Indiana, Kentucky, Michigan and Pennsylvania (Ernst and Ernst, 2003; Gibson and Kingsbury, 2004). The U.S. Fish and Wildlife Service (Dodd et al., 1985) placed *C. kirtlandii* in its Category 2 (possibly appropriate for federal listing as Endangered or Threatened but more information may be needed). Furthermore, there is apparently no conservation program specifically targeting *C. kirtlandii* anywhere throughout its range (Gibson and Kingsbury, 2004).

McLean County might be an appropriate county to initiate a conservation program, as four of the records (our three plus Lake Bloomington area) occur in areas with suitable, or potentially suitable habitat (nature preserves, undeveloped land owned by the City of Bloomington, sympathetic land owner). Furthermore, the occurrence of two or more sightings at each of the three localities we report suggests the existence of extant populations. Another locality occurs in Woodford County near the McLean County line in a pasture but otherwise relatively undisturbed "wet meadow" (Brown, 1987). Other counties that have a number of locality records (Champaign, Cook) may also have several areas suitable for conservation programs of *C. kirtlandii*. If conservation programs are not soon activated by governmental agencies or the public, this small innocuous snake may become extinct.

ACKNOWLEDGMENTS

We thank: C.A. Phillips (Illinois Natural History Survey) for the loan of UIMNH 4962; J.R. Brown, E.L. Mockford, and two anonymous reviewers for critically reading the ms.; E. Smith and A. Funk for providing information on the Funks Grove locality and photographs of the specimen; R. Carriger and S. Marshall for their separate reports of recent sightings; J. Tobias and M. Litwiller for their photographs; and K. Harness for providing the Dawson Lake confirmation and photographs.

Specimens examined.—ISUC 703, Dawson Lake, McLean Co., IL, 5 May 1966, J. A. Holman; UIMNH 4962 Normal, McLean Co., IL [no date or collector given]. Color photos of the snakes (showing key characters) from the Dawson Lake, Funks Grove and Heyworth localities were deposited with the Illinois Natural History Survey and Illinois State University Collection. Museum abbreviations: BMNH British Museum (Natural History); ISUC Illinois State University Collections; UIMNH University of Illinois Natural History Museum.

LITERATURE CITED

- Anton, T.G., D. Mauger, C.A. Phillips, M.J. Drezlik, J.E. Petzing, A.R. Kuhns, and J.M. Mui. 2003. *Clonophis kirtlandii* (Kirtland's snake). Aggregating behavior and site fidelity. *Herpetol. Rev.* 34:248-249.
- Bavetz, M. 1993. Geographic variation, distribution, and status of Kirtland's snake, *Clonophis kirtlandii* (Kennicott) in Illinois. M.S. Thesis, Southern Ill. Univ. Carbondale.
- Bavetz, M. 1994. Geographic variation, status, and distribution of Kirtland's snake (*Clonophis kirtlandii* Kennicott) [sic] in Illinois. *Trans. Ill. St. Acad. Sci.* 87:151-163.

- Brown, L.E. 1987. A newly discovered population of Kirtland's snake with comments on habitat and rarity in central Illinois. *Bull. Chicago Herpetol. Soc.* 22:32-33.
- Brown, L.E., R.S. Funk, D. Moll, and J.K. Tucker. 1975. Distributional notes on reptiles in Illinois. *Herpetol. Rev.* 6:78-79.
- Conant, R. 1943. Studies on North American water snakes—1 *Natrix kirtlandii* (Kennicott). *Am. Midl. Nat.* 29:313-341.
- Conant, R. 1958. *A Field Guide to Reptiles and Amphibians of the United States and Canada East of the 100th Meridian.* Houghton Mifflin Co., Boston.
- Conant, R. and J.T. Collins. 1998. *A Field Guide to Reptiles & Amphibians Eastern and Central North America.* 3rd ed. Houghton Mifflin Co., Boston and New York.
- Dodd, C.K., Jr., G.E. Drewry, R.M. Nowak, J.M. Sheppard, and J.D. Williams. 1985. Endangered and threatened wildlife and plants; review of vertebrate wildlife; notice of review. Part III. U.S. Dept. Interior, Fish and Wildlife Serv., *Federal Register* 50:37958-37967.
- Ernst, C.H. and E.M. Ernst. 2003. *Snakes of the United States and Canada.* Smithsonian Books, Washington, D.C. and London.
- Frymire, D. and A.F. Scott. 2012. *Clonophis kirtlandii* (Kirtland's Snake). *Herpetol. Rev.* 43:447.
- Garman, H. 1892. A synopsis of the reptiles and amphibians of Illinois. *Bull. Ill. St. Lab. Nat. Hist.* Vol. III, Art. XIII, pp. 215-389.
- Gibbons, J.W., D.E. Scott, T.J. Ryan, K.A. Buhlmann, T.D. Tuberville, B.S. Metts, J.L. Greene, T. Mills, Y. Leiden, S. Poppy, and C.T. Winnie. 2000. The global decline of reptiles, déjà vu amphibians. *BioScience* 50:653-666.
- Gibson, J. and B. Kingsbury. 2004. Conservation assessment for Kirtland's snake (*Clonophis kirtlandii*). U.S.D.A. Forest Service, Eastern Region, Milwaukee, 29 pp.
- Holman, J.A. 1966. Herpetological records from northcentral Illinois. *Trans. Ill. St. Acad. Sci.* 59:298-300.
- Kennicott, R. 1856. Description of a new snake from Illinois. *Proc. Acad. Nat. Sci. Philadelphia* 8:95-96.
- Minton, S., Jr. 1944. Introduction to the study of the reptiles of Indiana. *Am. Midl. Nat.* 32:438-477.
- Phillips, C.A., R.A. Brandon, and E.O. Moll. 1999. *Field Guide to Amphibians and Reptiles of Illinois.* Manual 8. Ill. Nat. Hist. Surv., Champaign.
- Thurow, G.R. 1993. *Clonophis kirtlandii* (Kirtland's snake). *Diet. Herpetol. Rev.* 24:34-35.
- Transeau, E.N. 1935. The prairie peninsula. *Ecology* 16:423-437.
- Tucker, J.K. 1994. A laboratory investigation of fossorial behavior in Kirtland's snake, *Clonophis kirtlandii* (Kennicott) (Serpentes: Colubridae), with some comments on management of the species. *Bull. Chicago Herpetol. Soc.* 29:93-94.

