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27 November 2022

Dear Illinois Pollution Control Board members,

Stemler Cave, located in southwestern Illinois is a biologically important ecosystem that has suffered in recent decades from declining water quality. The cave has an approximately 7 square mile recharge area (Aley and Moss, 2000). The primary entrance to the cave and a short segment of associated cave passage was dedicated as an Illinois Nature Preserve, Stemler Cave Nature Preserve, in 1997. The nearly 4 square mile portion of the groundwater basin feeding into Stemler Cave Nature Preserve was listed as a Class III Special Resource Groundwater by the Illinois EPA in 2005. The Class III designation makes the Stemler Cave Nature Preserve groundwater basin “suitable for application of a water quality standard more stringent than the otherwise applicable water quality standard specified”.

In spite of the layers of protection that should be afforded by nature preserve status, the Class III groundwater designation, and existing county-level regulations regarding home septic systems in karst areas, the water in Stemler Cave is plagued by chronically high fecal coliforms counts, hypoxia, and low pH. Therefore, as a biologist concerned with declining biodiversity and as a current landowner of Stemler Cave Nature Preserve I urge you to adopt and proposals that will increase the water quality in Stemler Cave. If the preceding narrative is not compelling enough, I offer the following additional justifications.

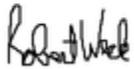
- Stemler Cave is one of Illinois’ largest and most biodiverse caves. Several biological surveys of Stemler Cave have been conducted (Peck and Lewis 1978; Webb et al. 1993; Lewis et al. 2003; Soto-Adames and Taylor 2010, Weck 2016). Approximately 50 invertebrate species are known from the cave and 26 species of amphibians and reptiles have been documented in the nature preserve. Fourteen globally rare species and 10 cave-limited (troglobitic) animals, mostly aquatic, are known to inhabit Stemler Cave (Lewis et al. 2003) and are at risk due to poor water quality.
- Stemler Cave is one of the two original localities for the Federally endangered Illinois Cave Amphipod (*Gammarus acherondytes*) when it was first discovered in 1940. In recent decades, high levels of fecal coliforms and other contaminants linked to septic effluence and agriculture have been documented in Stemler Cave (see Taylor et al. 2000, Dodgen et al. 2017 for summaries) and the resulting hypoxia has likely led to the extirpation of Illinois Cave Amphipod from that cave system (Panno et al. 2006).
- Stemler Cave is the only Illinois home of the Enigmatic Cavesnail, *Fontigens antroecetes*. The snail has a NatureServe ranking of G2 (Imperiled), is listed as Endangered in Illinois (S1 ranking). Research on population density and habitat use in Stemler Cave (Taylor et al. 2013), and life history details discovered via captive breeding

in the laboratory (Weck 2022) show the species is slow growing and is vulnerable to competition by invasive species that have become established in the cave, likely due to nutrient enrichment.

- As a dedicated Illinois nature preserve, by state law the site is “to be maintained as nearly as possible in its natural condition and to be used in a manner and under limitations consistent with its continued preservation, without impairment, disturbance or artificial development, for the public purposes of present and future scientific research, education, esthetic enjoyment and providing habitat for plant and animal species and communities and other natural objects” (Illinois Natural Areas Preservation Act, section 3.11). For Stemler Cave, the water quality of the preserve is the most crucial parameter needed to maintain the site in a natural condition.

In summary, I support the proposed changes to the standards for pH and Chlorine but urge more stringent water quality standards and policies should be developed to address the declining water quality in Stemler Cave and other biologically important caves with Class III groundwater basins in Illinois.

Respectfully,



Robert Weck

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