Illinois Cave Amphipod
(Gammarus acherondytes)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Illinois-Iowa Field Office
Moline, IL
2/25/2025

5-YEAR REVIEW
Illinois Cave Amphipod (*Gammarus acherondytes*)

GENERAL INFORMATION

Species: Illinois Cave Amphipod *(Gammarus acherondytes)*

Lead Field Office: Illinois-Iowa Field Office, Moline, IL, Matthew Mangan, 618-998-5945, matthew_mangan@fws.gov

Lead Regional or Headquarters Office: Midwest Regional Office (Region 3), Bloomington, MN, Laura Ragan, 612-713-5157, laura_ragan@fws.gov, and Karen Harrington, 763-234-4705, karen_herrington@fws.gov

Date of listing publication: September 3, 1998

FR citation(s): 63 FR 46900 (September 3, 1998)

Classification: Endangered

Methodology used to complete the review:

U.S. Fish and Wildlife Service's (Service) Illinois-Iowa Ecological Services Field Office conducted this 5-year review. We requested information from interested parties through a Federal Register notice announcing this review on January 5, 2024. We also contacted species experts within the Illinois Department of Natural Resources (IDNR) to request any data or information we should consider in our review. Lastly, we conducted a literature search and a review of information in our files including the previous status reviews for the species. From these efforts, we received new information relevant to the species from the IDNR and Robert G. Weck of Southwestern Illinois College. We did not receive any information from the public in response to our Federal Register notice.

In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants. The Service evaluated the biology and status of the Illinois Cave Amphipod (ICA) to inform this status review.

FR Notice citation announcing the species is under active review: January 5, 2024, FR 89, No. 804

Review History:

U.S. Fish and Wildlife Service. 2011. Illinois Cave Amphipod (*Gammarus acherondytes*) 5-Year Review. Finalized September 30, 2011. (Status recommendation - No change is needed)

U.S Fish and Wildlife Service. 2020. Illinois Cave Amphipod (*Gammarus acherondytes*) 5-Year Review. Finalized April 14, 2020. (Status recommendation - No change is needed)

REVIEW ANALYSIS

Recovery Criteria

Recovery Plan:

U.S. Fish and Wildlife Service. 2002. National recovery plan Illinois cave amphipod (*Gammarus acherondytes*). U.S. Fish and Wildlife Service, Region 3, Fort Snelling, Minnesota. 70 pp.

The Service finalized the ICA Recovery Plan on September 20, 2002. As identified in the plan, ICA "*may be considered for reclassification from endangered to threatened when five viable, stable populations in five separate groundwater basins with distribution in two of three sub-regions remain extant, and there is a significant increase in use of best management practices in the groundwater recharge areas in each of the five groundwater basins*." **Error! Reference source not found.** lists the sub-regions, groundwater basins, and populations. We consider the ICA in each cave to be a population. ICA "*may be considered for delisting when five viable, stable populations in five separate groundwater basins with distribution in two of three subregions remain extant and are supported by persistent use of best management practices substantially protecting the groundwater recharge areas of the five groundwater basins.*" These recovery criteria are still appropriate based on our current level of understanding of the species.

Currently, the criteria for downlisting the ICA are partially met as described in the previous 5-year review. We consider ICA to be present in seven populations in seven groundwater basins, fulfilling part of the downlisting criteria. However, the number of individuals observed within six of these populations have fluctuated between monitoring efforts from 2001 and 2014, so we do not consider the populations of these six caves to be stable. In addition, most of the populations have not been assessed since 2014. IDNR and conservation organizations have made efforts at some caves to improve ICA habitat, acquire land to conserve the area at and around caves, and improve management practices affecting groundwater recharge at caves occupied by ICA. However, across the ICA's range, we have not observed a demonstrated increase in the use of best management practices to reduce the threat of habitat loss and degradation of groundwater quality from urbanization, agricultural activities, and an influx of human and animal waste. Furthermore, researchers have documented continued threats affecting ICA populations (R. Weck, Southwestern Illinois College, personal communication, 2024). Based on these factors, the best scientific information currently available does not meet the criteria to downlist the species from endangered to threatened.

Updated Information Relevant to the Current Species' Status

Biology and Habitat:

<u>Range and distribution:</u>

The ICA historically occurred in a 230-square-kilometer (89-square-mile) area within the Salem Plateau karst region in Monroe and St. Clair Counties, Illinois (USFWS 2002). Within this area, biologists documented ICA in the streams of 16 caves that occur in ten groundwater basins in three sub-regions between 1938 and 2014. Since biologists first documented the ICA, its range has decreased. Before its listing in 1998, biologists determined ICA had been extirpated from

Stemler Cave as early as 1993. This represents extirpation from one groundwater basin and one sub-region (Table 1). From 2007 to 2014, researchers frequently monitored nine caves and observed ICA in all of these except Wednesday and Fogelpole caves (Table 1). Since 2014, only the population at Illinois Caverns has been monitored. We are uncertain of the species' status in Wednesday and Fogelpole caves and additional monitoring is needed for the other populations to confirm species persistence. Based on the uncertainties about the ICA's status at Wednesday and Fogelpole caves and limited monitoring over the last 10 years, we currently do not have enough information to determine if the ICA's range has decreased since our last status review. A map of the current range can be found at the link below. This map may be updated as new information on the species' range becomes available.

https://www.fws.gov/species/illinois-cave-amphipod-gammarus-acherondytes/map

Population demographics:

Since we completed the last status review for ICA (USFWS 2020), the only monitoring of the species that has been conducted occurred within Illinois Caverns (Weck 2021, 2022, 2023, 2024). We used this and past monitoring information over the last 20 years to assess the status of ICA as present, extirpated, or unknown at each cave (Table 1). We presume ICA to be present at a cave if biologists observed them during the last extensive monitoring effort conducted in 2014 and/or during recent monitoring efforts. We presume ICA are extirpated from a cave based on expert opinion and the lack of detection through multiple monitoring efforts over the decades. Based on these criteria, we continue to consider the status of ICA as present in seven caves, extirpated in one, and unknown in eight (Table 1). Below is a summary of monitoring efforts since the last status review (USFWS 2020).

Renault Subregion - Illinois Caverns Groundwater Basin

Illinois Caverns

Biologists first documented ICA at Illinois Caverns in 1938, counting 25 ICA (Hubricht and Mackin 1940). Researchers have observed ICA during seven of the last eight monitoring efforts conducted between 2007 and 2024 and the counts have ranged from zero to 16 individuals (Table 1). Based on the most recent monitoring efforts, we presume ICA to be extant at Illinois Caverns.

Genetics:

We did not identify new information on the genetics, genetic variation, trends in genetic variation, genetic drift, or inbreeding for the ICA since the last status review.

Taxonomic and nomenclature:

We did not identify new information on the taxonomic classification or nomenclature of the ICA since the last status review.

Habitat:

We did not identify new information on the amount, distribution, or suitability of the species habitat since the last status review.

Additional information:

None

Threats Analysis (threats, conservation measures, and regulatory mechanisms):

As stated in the final rule listing the ICA as endangered, the primary reason for listing this species was the present or threatened destruction, modification, or curtailment of its habitat or range due to degradation of habitat through groundwater contamination resulting from agricultural practices and urbanization. The recovery plan identified several specific threats including agricultural and residential pesticides and fertilizers; human and animal wastes from residential sewage disposal systems and livestock; sedimentation from agricultural and residential runoff; oil well production; surface runoff from roads, storm sewers, and increased surface paving due to urban development; sinkhole dumping of solid waste; and disruption of groundwater flow paths from quarry operations (USFWS 2002). Excessive visitation to caves and over-collecting for scientific purposes were also listed as potential threats to the species. New threats identified in the last status review included predatory fish, detergent, sewage or septic waste, non-native greenhouse millipedes, and non-native honeysuckles (Lewis and Lewis 2014, 2015).

Present or threatened destruction, modification or curtailment of its habitat or range:

We did not identify new information since the last status review.

Overutilization for commercial, recreational, scientific, or educational purposes:

Re-opening of Illinois Caverns

For over a decade, IDNR closed public access to Illinois Caverns with the onset of white-nose syndrome in bat species. IDNR reopened public visitation to the cave on June 16, 2021, on a seasonal basis (April through October). The Service provided management recommendations to IDNR to decrease potential impacts to the ICA including cave ecosystem protection, access restrictions, visitation monitoring, and continued monitoring of the ICA population (USFWS 2021).

Disease or predation:

We did not identify new information since the last status review.

Inadequacy of existing regulatory mechanisms:

Inadequate protection of water quality in a sensitive geological formation (karst topography) through current state and local regulations remains a concern.

Other natural or manmade factors affecting its continued existence:

We did not identify new information since the last status review.

Conservation Measures:

Purchase of properties by Illinois Audubon Society

In 2023, Illinois Audubon Society, a non-profit organization, purchased 18 hectares (44.5 acres) of land around the Fogelpole Cave. According to their website (see link below), they plan to protect the groundwater recharge basin that drains into the Fogelpole Cave Nature Preserve.

https://illinoisaudubon.org/blog/2023/09/06/illinois-audubon-society-purchases-land-to-protect-subterranean-wilderness/

Recommendations for future activities:

Coordinate with other agencies and non-governmental organizations to develop conservation strategies to alleviate threats to the ICA. In addition, identify sites that can be protected through land acquisition and conservation easements and seek opportunities for funding stewardship of the land purchased by conservation partners.

- 1.1. Recharge Area Protection – Agricultural
    - Recovery Task 1.1.1: Encourage voluntary best management practices and land use protection plans through landowner contacts using incentives from existing U.S. Department of Agriculture tools such as Environmental Quality Incentives Program (EQUIP), Conservation Reserve Program (CRP), Rural Development, and others, and promoting new programs specific to the Sinkhole Plains.
- 1.2. Recharge Area Protection – Residential
    - Recovery Task 1.2.2.1: Encourage adequate storm water control ordinances that deal with the unique features of a karst terrain are implemented and enforced.
    - Recovery Task 1.2.3.1: Encourage enforcement of regulations pertaining to dumping of waste in sinkholes and other karst features. Implement a program to clean-up existing sinkholes.
    - Recovery Task 1.2.5: Encourage development of residential land use plans and regulations which would prevent perturbations to lands and its groundwater system.
- 1.3. Cave Ecosystem Protection.
    - Recovery Task 1.3.2: Monitor visitation trends in selected caves containing *G. acherondytes*.
    - Recovery Task 1.3.3: Reduce the potential impacts of visitation in Illinois Caverns.
    - Recovery Task 1.3.4: Utilize measures to assist with controlling access to caves.

Continue to plan and implement regular surveys that monitor ICA occurrence, groundwater quality, and habitat as well as any threats to ICA.

- 3.1. Biology, Ecology, Life History and Habitat Requirements
    - Recovery Task 3.1.1: Conduct studies aimed at increasing understanding of the biology and ecology of *G. acherondytes*, including life history, behavior, and population level genetics.
    - Recovery Task 3.1.2. Assess potential adverse effects of contaminants and other water quality factors on the ICA.
- 3.2. Determine the Current Range of the Species
    - Recovery Task 3.2.1: Conduct surveys to define the species' range.
- 3.3. Monitor the Status of the Species and its Environment
    - Recovery Task 3.3.1: Quantitatively monitor population status of the ICA.
    - Recovery Task 3.3.2. Monitor and evaluate trends in land use practices.
    - Recovery Task 3.3.3: Monitor water quality both above ground and in shallow karst aquifers within the known range of the ICA.

Synthesis

After reviewing the best available scientific information, we conclude that the ICA remains an endangered species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Act and analysis of the status of the species since our previous 5-year review (USFWS 2020) indicates no substantial change in the species status.

RESULTS

U.S. FISH AND WILDLIFE SERVICE
STATUS REVIEW of Illinois Cave Amphipod (*Gammarus acherondytes*)

Current Classification: Endangered

Status Recommendation resulting from Status Review:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (Indicate reasons for delisting per 50 CFR 424.11):
____ The species is extinct
____The species does not meet the definition of an endangered or threatened species
____The listed entity does not meet the statutory definition of a species
__X_ No change needed

Lead Field Supervisor, Fish and Wildlife Service

Approve KRAIG MCPEEK Digitally signed by KRAIG MCPEEK Date: 2025.02.25 12:30:04 -06'00' Date _____

REFERENCES

Hubricht, L., and J.G. Mackin. 1940. Descriptions of nine new species of fresh-water amphipod crustaceans with notes and new localities for other species. American Midland Naturalist 23:187-21

Lewis J.J., and S.L. Lewis. 2007. The 2007 census of Gammarus acherondytes communities in Southwestern Illinois. Final report submitted to the U.S. Fish and Wildlife Service. 39 pp.

Lewis J.J., and S.L. Lewis. 2011. The 2011 census of Gammarus acherondytes communities in southwestern Illinois. Final report submitted to the U.S. Fish and Wildlife Service. 32 pp.

Lewis J.J., and S.L. Lewis. 2014. The 2014 census of *Gammarus acherondytes* communities in southwestern Illinois. Final report submitted to the U.S. Fish and Wildlife Service. 54 pp.

Lewis J.J., and S.L. Lewis. 2015. The extirpation of a population of the endangered Illinois cave amphipod (*Gammarus acherondytes*) by an exotic species: the Wednesday Cave debacle. Twenty First National Cave and Karst Management Symposium. 3 pp

Panno, S.V., K.C. Hackley, W.R. Kelly, H.H. Hwang, F.M. Wilhelm, S.J. Taylor, and B.J. Stiff. 2006. Potential effects of recurrent low oxygen conditions on the Illinois cave amphipod. Journal of Cave and Karst Studies 68:66-63.

Vernarsky, M.P., F.E. Anderson, and F.M. Wilhelm. 2009. Population genetic study of the U.S. federally listed Illinois cave amphipod, Gammarus acherondytes. Conservation Genetics 10:915-921.

Weck, R.G. 2021. Illinois Cave Amphipod Survey of Illinois Caverns State Natural Area. Final Report to Illinois Department of Natural Resources. 18 pp.

Weck, R.G. 2022. Illinois Cave Amphipod Survey of Illinois Caverns State Natural Area. Final Report to Illinois Department of Natural Resources. 16 pp.

Weck, R.G. 2023. Illinois Cave Amphipod Survey of Illinois Caverns State Natural Area. Final Report to United States Fish and Wildlife Service. 12 pp.

Weck, R.G. 2024. Illinois Cave Amphipod Survey of Illinois Caverns State Natural Area. Final Report to United States Fish and Wildlife Service and Illinois Department of Natural Resources. 14 pp.

U.S. Fish & Wildlife Service (USFWS). 1998. Final rule to list the Illinois cave amphipod as endangered. Federal Register 63:46900-46909.

U.S. Fish and Wildlife Service. 2002. National recovery plan Illinois cave amphipod (*Gammarus acherondytes*). U.S. Fish and Wildlife Service, Region 3, Fort Snelling, Minnesota. 70 pp.

U.S. Fish and Wildlife Service. 2011. Illinois cave amphipod (*Gammarus acherondytes*) 5-year

review: summary and evaluation. U.S. Fish and Wildlife Service, Region 3, Rock Island Field Office, Moline, Illinois. 20 pp.

U.S Fish and Wildlife Service. 2020. Illinois Cave Amphipod (Gammarus acherondytes) 5-Year Review. U.S. Fish and Wildlife Service, Region 3, Illinois-Iowa Field Office, Moline, Illinois. 9 pp.

U.S Fish and Wildlife Service. 2021. Letter to Illinois Department of Natural Resources. Illinois-Iowa Field Office, Moline, Illinois. 3 pp.

Table 1. ICA occurrence and status from observations, collections, and monitoring between 2004 and 2024.

Sub-region	Groundwater Basin	Cave	2004[1]	2007[2]	2008[3]	2011[4]	2014[5]	2021[6]	2022[7]	2023[8]	2024[9]	Last Record	Last Survey	Status[10]
Columbia	Stemler	Stemler	0	nm[11]	0	nm	nm	nm	nm	nm	nm	1965	2006	Extirpated
Renault	Fogelpole	Fogelpole	nm	11	P[12]	0	0	nm	nm	nm	nm	2008	2014	Unknown
	Illinois Caverns	Illinois Cavern's (Morrison's Cave)	nm	16	P	3	6	5	0	4	3	2024	2024	Present
	Krueger-Dry Run	Krueger-Dry Run		Access Denied								1999	2000	Unknown
		Spider	nm	12	P	10	2	nm	nm	nm	nm	2014	2014	Present
Waterloo	Annbriar	Cedar Ridge		Determined to be inaccessible due to size								1998	1998	Unknown
		Reverse Stream	nm	70	P	nm	9	nm	nm	nm	nm	2014	2014	Present
		Triple Delight	nm	17	nm	nm	nm	nm	nm	nm	nm	2007	2007	Unknown
		Wednesday	nm	9	nm	1	0	nm	nm	nm	nm	2011	2014	Unknown
	Dual Spring	Snow White	nm	1	P	3	2	nm	nm	nm	nm	2014	2014	Present
	Frog Cave	Frog	nm	24	P	30	14	nm	nm	nm	nm	2014	2014	Present
	Luhr Spring	Pump House (Rick's Pit)	nm	6	P	4	4	nm	nm	nm	nm	2014	2014	Present
	Madonnaville	Madonnaville	nm	nm	nm	nm	nm	nm	nm	nm	nm	1986	1998	Unknown
	Pautler	Danes	nm	nm	P	nm	nm	nm	nm	nm	nm	2008	2008	Unknown
		Pautler (KCI)	nm	2	P	8	12	nm	nm	nm	nm	2014	2014	Present
		Rose Hole	nm	nm	nm	nm	nm	nm	nm	nm	nm	1999	1999	Unknown

[1]Panno et al. 2006
[2]Lewis and Lewis 2007
[3]Vernasky et al. 2009
[4]Lewis and Lewis 2011
[5]Lewis and Lewis 2014
[6]Weck 2021
[7]Weck 2022
[8]Weck 2023
[9]Weck 2024
[10]Because biologists last monitored for ICA over 10 years ago, we presume the status of ICA at each cave based on the available information.
[11]The designation "nm" stands for not monitored. Biologists did not monitor cave for various reasons.
[12]The designation "P" stands for present. Biologists did not provide a count but did note their observation of ICA at the site.