
DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

**Endangered and Threatened Wildlife
and Plants; Determination of
Threatened Status for the Ozark
Cavefish (*Amblyopsis rosae*)**

AGENCY: Fish and Wildlife Service,
Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service determines the Ozark cavefish (*Amblyopsis rosae*) to be a threatened species under the authority contained in the Endangered Species Act of 1973, as amended. This cavefish is presently known from 14 caves in six counties of the Springfield Plateau of southwest Missouri, northwest Arkansas, and northeast Oklahoma. This cavefish has apparently disappeared from over 40 percent of its historic locations. The causes of the decline appear to be habitat alteration and collectors. This determination implements the needed protection provided by the Endangered Species Act, as amended.

DATES: The effective date of this rule is December 3, 1984.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at the Endangered Species Field Station, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316.

300 Woodrow Wilson Avenue, Jackson, Mississippi 39213.

FOR FURTHER INFORMATION CONTACT:

Mr. Dennis B. Jordan, Endangered Species Field Supervisor, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213 (601/960-4900 or FTS 490-4900).

SUPPLEMENTARY INFORMATION:

Background

The Ozark cavefish was described by Dr. C. H. Eigenmann in 1898 as *Typhlichthys rosae*. Woods and Inger (1957), in a treatment of the Amblyopsidae, placed the species in the genus *Amblyopsis*. The only other species in the genus *Amblyopsis* is the northern cavefish *Amblyopsis spelea*, which occurs in southern Indiana and west central Kentucky.

The Ozark cavefish is a true troglitic cavefish reaching 50mm total length. It has an elongate, flattened head, body nearly devoid of pigment, and a projecting lower jaw. The dorsal and anal fins are located far back on the body, the caudal fin is rounded, and the pelvic fins are absent. The sensory papillae occur in two or three rows on the upper and lower half of the caudal fin (Poulson, 1961). It is the only cavefish within the Springfield Plateau of southwest Missouri, northwest Arkansas, and northeast Oklahoma. The literature records of the southern cavefish (*Typhlichthys subterraneus*) within the Ozark cavefish range have been determined to be erroneous (Mayden and Cross, in press). The Ozark cavefish historically occurred in at least nine counties with unconfirmed reports in five additional counties. There are reports of the Ozark cavefish occurring in 52 caves; however, only 24 historic localities are confirmed. Most of the range is in highly soluble limestone of the Boone and Burlington formations which are honeycombed by subsurface drainage.

The Service was petitioned to list this species based on a survey of Missouri caves. To gather complete data Service personnel surveyed the Arkansas and Oklahoma historic range and further investigated the Missouri range. The surveys included 17 counties with actual cave visits in 16 counties. The currently known populations occur in 14 caves in six counties. Although these include much of the historic range, the frequency of sightings of the cavefish is decreasing. In only eight of the 14 known populations could one expect to see any cavefish on a given visit. In only two populations could one expect to see more than five cavefish per visit. In one

of the four remaining populations in Oklahoma, the only two cavefish ever observed were collected. In Greene County, Missouri, there are six historic sites where cavefish are no longer observed, and in the only remaining population, there have been only two cavefish observations in 15 years. This decline may be due to degradation of subsurface or ground water.

The Service received a petition to list the Ozark cavefish from Dr. A. V. Brown of the University of Arkansas on September 9, 1982. The species was included in the Service's Notice of Review of Vertebrate Wildlife in the Federal Register of December 30, 1982 (47 FR 58454), and the petition was subsequently accepted by a notice of finding on February 15, 1983 (48 FR 6752). The petition was based upon a survey of the Missouri portion of the Ozark cavefish range in which cavefish were observed in only four of the over 20 caves where he expected to find it (Brown, 1982). Following acceptance of the petition, the Arkansas and Oklahoma range was surveyed by Service personnel and a biologist from the University of Arkansas.

Summary of Comments and Recommendations

In the January 31, 1984, proposed rule (49 FR 3889) and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. Newspaper notices were published on February 18, 1984, in the Arkansas Democrat; on February 19, 1984, in the Northwest Arkansas Times; on February 20, 1984, in the Springdale News; on February 21, 1984, in the Neosho News; on February 22, 1984, in the Springfield News, the Joplin Globe and the Tulsa Tribune; and on February 23, 1984, in the Miami News-Record and the Arkansas Gazette, and all notices invited general public comment. Twenty-six comments were received and are discussed below. A public hearing was not requested.

Seven comments were received from six State agencies. One county court, nine Federal agencies, six professional biologists, two professional organizations, and one interested individual commented on the proposal.

All State agencies that responded supported the proposal to list the Ozark cavefish as threatened or endangered. These include the Missouri Department of Natural Resources, Arkansas Natural

Heritage Commission, Arkansas Game and Fish Commission, and Oklahoma Department of Wildlife Conservation. Their comments all supported the listing as threatened and in some instances provided information that reinforced the data on which the species was proposed. Comments supporting the proposed threatened status without critical habitat were received from one interested individual, two professional societies, four professional biologists, and the Forest Service. Four Federal agencies and one county court responded but did not provide any information or indicate a position concerning the proposal.

Other responses from Federal agencies concerning the proposal were received from the Federal Energy Regulatory Commission, Housing and Urban Development, Office of Surface Mining, and Bureau of Reclamation. These four agencies did not know of any project that would affect or be affected by the listing of the Ozark cavefish.

The Arkansas Department of Pollution Control and Ecology agreed with the " * * * assessment of the vulnerable position of *Amblyopsis rosae*, the Ozark cavefish." They commented that "Northwest Arkansas is an area of heavy agricultural use vis-a-vis land application of animal waste from poultry and swine production. The Department has detected high nitrate levels in shallow wells and feel that un-ionized ammonia toxicity during portions of the year may be at least partially blamed for the decline of this species." Their concern was that sanctions imposed by the Endangered Species Act with a range-wide listing of the Ozark cavefish may affect the economy of this section of Arkansas. The Department suggested the best approach would be " * * * isolation in national forest [sic] rather than attempting a regional protection concept."

The Service does not view the land application of animal waste from poultry and swine production as a potential problem for the Ozark cavefish. If the animal waste is spread so that large amounts will not enter the subsurface water system through a sinkhole or some other direct method so as to create an oxygen deficit situation or ammonia toxicity, the waste material should not be a problem. On the contrary, the gradual addition of animal waste free of chemical pollutants may be beneficial to cave fauna by increasing the energy source and augmenting the food chain. No populations of Ozark cavefish are known to exist on national forest land.

Two professional biologists and the Missouri Department of Conservation recommended the Ozark cavefish be listed as endangered rather than threatened. One of the biologists based his recommendation on those species that are listed as endangered and are much more abundant than the Ozark cavefish. The other biologist and the Missouri Department of Conservation recommended listing as endangered based on the loss of cavefish populations in Missouri as detailed in Dr. A. V. Brown's petition to the Service.

To qualify as endangered, a species must be in danger of extinction throughout all or a significant portion of its range. Our data do not indicate the Ozark cavefish is in danger of extinction within a significant portion of its range. The Service does believe this species is likely to become endangered within the foreseeable future in a significant portion of its range, especially in Missouri, unless it is protected by listing. Dr. Brown's petition included as historic populations of cavefish some unconfirmed instances where cavefish had been reported. There were also some cases where the individuals reported to have seen cavefish in specific caves had been misunderstood or misquoted to Dr. Brown and his investigators. As a result of this misleading information, Dr. Brown reported 26 historic populations in Missouri with four of these surviving. The Service survey determined that two additional populations were surviving. Two of the six known populations appear very small and may be declining further. At present, based on all available data, the Service believes the Ozark cavefish is a threatened species.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the Ozark cavefish should be classified as a threatened species. Procedures found at section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations promulgated to implement the listing provisions of the Act (codified at 50 CFR Part 424) were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the Ozark cavefish (*Amblyopsis rosae*) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* The sinkholes found in the soluble limestone bedrocks in the Ozark cavefish range make this

species especially susceptible to contamination. Development of the Greene County, Missouri, area has resulted in highly hazardous water contamination in this portion of Ozark cavefish range (Aley, 1982). The documentation of high levels of nickel in one cave system in Greene County supports this finding (Jones, pers. comm.). Pollution of cave stream systems in rural areas due to highway, railroad, and pipeline spills; landfills and dump discharges; human and animal waste disposal; and the use of toxic chemicals, is an ever present threat. In Greene County, Missouri, only one of seven historic populations remains and it is very small.

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* The low reproductive abilities, confined habitat, and inability to elude captors make the Ozark cavefish very vulnerable to overutilization. Offers to purchase cavefish have appeared in various publications. Pet stores often display blind cavefish for sale to aquarists. There are several documented instances of scientific collectors taking large numbers of Ozark cavefish. A scientific collection in the 1930's from one Arkansas cave may be responsible for reducing that population to a very low level, and in recent years only an occasional cavefish has been observed (Aley and Aley, 1979).

C. *Disease or predation.* Disease in Ozark cavefish has not been studied, but it is reasonable to assume that they are susceptible to disease outbreaks, especially when the water quality deteriorates. Predation may pose a more significant threat. Raccoons and epigeal fishes are known to prey upon cavefish as are salamanders and cave crayfish. Raccoons are known to venture for great distances in caves feeding upon whatever they catch. There is one observation of a smallmouth bass entering a cave for a distance of ½ mile (Willis, pers. comm.). The use of cave water systems for trout hatcheries increases the density and probability of trout entering the cave and feeding upon cavefish.

D. *The inadequacy of existing regulatory mechanisms.* Current regulations protecting this cavefish are limited to the nongame regulations of the concerned States. These regulations require a permit for collecting fish species. Enforcement of the permit restrictions is very difficult and often nonexistent. This can result in the taking of the species by individuals if they can gain entrance to a cave system inhabited by the Ozark cavefish.

E. *Other natural or manmade factors affecting its continued existence.* The energy source supporting the food supply in a cave is limited in diversity and quantity. The loss or diminution of this energy source affects the existence of the Ozark cavefish. The better populations of this cavefish occur in caves used by the endangered gray bat (*Myotis grisescens*), where bat guano is the primary energy source (Poulson, 1963). The decline of bat populations in caves where Ozark cavefish occur is probably followed by a decline in the cavefish populations. The low reproductive capabilities and apparent small populations are natural limitations to the ability of this species to recover from any adversity.

The Service has carefully assessed the best scientific information available regarding the past, present, and future threats faced by this species in determining to make this rule final. Based on this evaluation, the preferred action is to list the Ozark cavefish as threatened. Threatened designation is more appropriate because this cavefish still exists throughout much of its historic range with the decline in numbers in much of the range the result of collecting and human disturbance. However, it does not appear to be in danger of extinction throughout all or a significant portion of its range. The reasons for not designating critical habitat may be found in the "Critical Habitat" section of this rule.

Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not prudent for this species at this time. This finding is based upon the susceptibility of the Ozark cavefish to over-collecting if specific sites are identified. Publication of critical habitat descriptions would make this species even more vulnerable and increase enforcement problems. Therefore, it would not be prudent to determine critical habitat for the Ozark cavefish at this time.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in

conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. Such recovery actions are initiated by the Service following listing. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402 and are now under revision (see proposal at 48 FR 29990; June 29, 1983). Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species. If a Federal action may affect a listed species, the responsible Federal agency must enter into formal consultation with the service. From information received during preparation of the proposed rule and from comments on the proposed rule, we do not expect or know of any Federal involvement with this species except for law enforcement activities.

The Act and its implementing regulations found at 50 CFR 17.21 and 17.31 set forth a series of general prohibitions and exceptions that apply to all threatened wildlife. With respect to the Ozark cavefish, all prohibitions of section 9(a)(1) of the Act, as implemented by § 17.31, apply. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take, import or export, ship in interstate commerce in the course of a commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell, deliver,

carry, transport, or ship any such wildlife that had been taken illegally. Certain exceptions would apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving threatened wildlife species under certain circumstances. Regulations governing permits are at 50 CFR 17.22, 17.23, and 17.32. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities. For threatened species there are also permits for zoological exhibition, educational purposes, or special purposes consistent with the purposes of the Act. In some instances, permits may be issued during a specified period of time to relieve undue economic hardship that would be suffered if such relief were not available.

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined by the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

Literature Cited

- Aley, T. 1982. Effects on water resources of planned land development in the vicinity of the Springfield Regional Airport. A Synopsis for the Utility Committee, Springfield Area Chamber of Commerce, Springfield, Missouri. 10 pp.
- Aley, T., and C. Alley. 1979. Prevention of adverse impacts on endangered, threatened, and rare animal species in Benton and Washington Counties, Arkansas. Contract report for the Northwest Arkansas Regional Planning Commission. 35 pp.
- Brown, A.V., K.B. Brown, L.D. Willis, and P.P. Brussock. 1982. Distribution and abundance

of the Ozark cavefish *Amblyopsis rosae* (Eigenmann) in Missouri. Contract report for the Missouri Department of Conservation, Springfield. 20 pp.

Mayden, R., and F. Cross. (In Press). Re-evaluation of Oklahoma records of the southern cavefish. *Southwestern Naturalist*.

Poulson, T.L. 1961. Cave adaptations in Amblyopsid fishes. Ph.D. Dissertation Univ. of Mich. Univ. Microfilm International, Ann Arbor, Michigan 185 pp.

Woods, Loren P. and Robert F. Inger. 1957. The cave, spring and swamp fishes of the family Amblyopsidae of central and eastern United States. *Amer. Midl. Nat.* 58:232-256.

Author

The primary author of this final rule is Mr. James H. Stewart, U.S. Fish and Wildlife Service, Jackson Mall Office Center, Suite 316, 300 Woodrow Wilson Avenue, Jackson, Mississippi 39213 (601/960-4900 or FTS 490-4900).

List of Subjects in 50 CFR Part 17

Endangered and threatened wildlife, Fish, Marine mammals, Plants (agriculture).

Regulation Promulgation

PART 17—(AMENDED)

Accordingly, Part 17, Subchapter B of Chapter I, Title 50 of the Code of Federal Regulations, is amended as set forth below:

1. The authority citation for Part 17 reads as follows:

Authority: Pub. L. 93-205, 87 Stat. 884; Pub. L. 94-359, 90 Stat. 911; Pub. L. 95-632, 92 Stat. 3751; Pub. L. 96-159, 93 Stat. 1225; Pub. L. 97-304, 96 Stat. 1411 (16 U.S.C. 1531 *et seq.*).

2. Amend § 17.11(h) by adding the following, in alphabetical order, under "FISHES" to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

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Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Fishes							
Cavefish, Ozark	<i>Amblyopsis roseae</i>	U.S.A. (AR, MO, OK)	Entire	T	184	NA	NA

Dated: October 12, 1984.

J. Craig Potter,
Acting Assistant Secretary for Fish and Wildlife and Parks.

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