

## DEPARTMENT OF THE INTERIOR

## Fish and Wildlife Service

## 50 CFR Part 17

RIN 1018-AB31

**Endangered and Threatened Wildlife and Plants; Pygmy Sculpin Determined To Be Threatened****AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Final rule.

**SUMMARY:** The Service determines the pygmy sculpin, *Cottus pygmaeus*, to be a threatened species under the authority of the Endangered Species Act of 1973, as amended (Act). This fish is known to exist in only Coldwater Spring and the spring run in Calhoun County, Alabama. Groundwater contamination and restricted population represent major threats to this small sculpin. Water sampling has revealed low levels of trichloroethylene in Coldwater Spring.

**EFFECTIVE DATE:** October 30, 1989.

**ADDRESSES:** The complete file for this rule is available for inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Jackson Mall Office Center, 300 Woodrow Wilson Avenue, Suite 316, Jackson, Mississippi 39213.

**FOR FURTHER INFORMATION CONTACT:** James Stewart at the above address, (601/965-4900 or FTS 490-4900).

**SUPPLEMENTARY INFORMATION:****Background**

The pygmy sculpin was first collected from Coldwater Spring, Calhoun County, Alabama, in 1963 and described in 1968 (Williams 1968). This species rarely exceeds 45 millimeters (1.8 inches) in total length. The head is large, body moderately robust and the lateral line is incomplete. Coloration varies by sex, maturity, and breeding condition, while pigmentation is generally consistent (Williams 1968). Pigmentation generally consists of up to three dorsal saddles and mottled or spotted fins. Juveniles have a grayish black body with three light colored saddles. With maturity, the body color becomes lighter, with the grayish black color that remains forming two dark saddles. In juveniles, the head is black, changing to white with small scattered melanophores in adults. In breeding males, the dark spots in the spinous dorsal fin enlarge and become more intense and the fin margin becomes reddish orange. The entire body becomes suffused with black pigment which almost completely conceals the underlying pattern. The

breeding color of females tends to be slightly darker than in non-breeding females.

The only known population of pygmy sculpins is in Coldwater Spring and the spring run. Coldwater Spring is impounded to form a pool of over one acre, 2 to 4 feet deep (McCaleb 1973). The spring run is up to 60 feet wide and 500 feet long to where it is joined by Dry Creek. Below this confluence, the stream is known as Coldwater Creek until it joins Choccolocco Creek. The spring flows from the brecciated zone of the Jacksonville fault in the Weisner formation (Williams 1968, McCaleb 1973, Scott *et al.*, 1987). The average flow is 32 million gallons per day with a fairly constant temperature of 16 to 18 degrees centigrade (61° to 64°F). The bottom is gravel and sand with large rocks where the spring boils occur. Large mats of vegetation are present in the spring pool and along the edges of the spring run. Water excess to needs of the Anniston Water Department flows over a low weir dam that is approximately 22 feet wide, to form the spring run. The downstream limit of the pygmy sculpin population occurs at the confluence of Dry Creek. This small stream drains the area of Anniston Army Depot and of a clay mining operation. Water quality degradation has been a long-term problem in Dry Creek. Historic records are not available to document if the pygmy sculpin occurred below the confluence of dry Creek prior to the water quality degradation.

The City of Anniston owns Coldwater Spring, the spring run, and approximately 240 surrounding acres. The spring pool serves as the primary water supply for Anniston. The average daily withdrawal by Anniston is 16.5 million gallons with an average spring flow of 31.2 million gallons (Scott *et al.* in 1987). The recharge area for Coldwater Spring is estimated at 90 square miles. This area includes portions of Anniston Army Depot, Fort McClellan, the Cities of Anniston and Jacksonville, several smaller towns, and private lands.

Previous Service actions on this species include a notice of review on March 18, 1975 (40 FR 12297); a proposal to list the pygmy sculpin and three other fishes as endangered with critical habitat on November 20, 1977 (42 FR 60765); notice of extension of the comment period and public hearing on February 6, 1978 (43 FR 4872); notice of withdrawal of critical habitat on March 6, 1979 (44 FR 12382); reproposal of critical habitat and notice of public meeting on July 27, 1979 (44 FR 44418); notice of withdrawal of proposed rule on January 24, 1980 (45 FR 5782); notices

of review on December 30, 1982 (47 FR 53454), and September 18, 1985 (50 FR 37953); and proposed rule on February 7, 1989 (54 FR 5986). The pygmy sculpin was placed in category 3C for the 1982 notice and in category 1 for the 1985 notice. Category 3C candidates are defined as taxa that have proven to be more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat. In the 1985 notice, category 1 candidates are defined as comprising taxa for which the Service currently has information on hand to support the biological appropriateness of proposing to list as endangered or threatened.

The November 1977 listing proposal was based on threats to the pygmy sculpin from restricted distribution, pollution in Coldwater Creek, the effects of aquatic vegetation control, the potential for excessive water pumping to meet future demands, and no commitment from the Anniston Water Works and Sewer Board to protect the sculpin.

Public meetings on the 1977 proposal were held in Birmingham, Alabama, on March 15, 1978, and in Anniston, Alabama, on August 28, 1979. Numerous individuals spoke at these meetings both for and against the proposal. The opposition was based upon the fear of economic impacts and loss of the spring as a water supply. Some individuals expressed doubt that the pygmy sculpin was confined to just Coldwater Spring. Former Governor Wallace opposed the proposal to list the pygmy sculpin and three other fish species based upon questions concerning the listing procedures, and the potentially adverse economic impact that he perceived would result from the listing of two species other than the pygmy sculpin. The Anniston Water Works and Sewer Board opposed the proposal because they did not believe there was sufficient data to support the listing. The Service discontinued efforts to list the species, and, on November 29, 1979, 2 years after publication in the *Federal Register*, the species had not been listed and was therefore automatically withdrawn from proposed status in accordance with provisions of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and 50 CFR part 424. The most recent proposed rule and this final rule determination is based upon new threats to the species.

**Summary of Comments and Recommendations**

In the February 7, 1989, proposed rule and associated notifications, all interested parties were requested to submit factual reports or information

that might contribute to the development of a final rule. The comment period expired on April 10, 1989. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. A newspaper notice was published in the "Gadsden Times" on February 17, 1989, in "The Anniston Star" on February 19, 1989; and in the "Montgomery Advertiser/Alabama Journal" on February 25, 1989, which invited general public comment.

Comments were received from a Federal agency, a local government agency and one private organization and are discussed in the following summary. The State of Alabama provided a comment in support of the proposed listing during the Service's pre-proposal coordination but did not comment during the proposed rules comment period.

The Anniston Army Depot did not consider listing of the pygmy sculpin to be appropriate since, in their view, the species was not threatened by any activities of their installation and that, in their view, their past and present actions have enhanced the species' protection. The Service agrees that removal of toxins that could degrade water quality in the Coldwater Spring's aquifer is beneficial to this species and we support the Depot's efforts in this regard. We disagree with the Depot's position that the species is not presently threatened by their activities. Cleanup of the shallow aquifer involves the removal of large quantities of groundwater that could affect flows at Coldwater Spring. After treatment, this water is released on the surface representing a loss of flow to the spring. While the cleanup of contaminants is necessary, it is important that spring flows not be significantly impacted. Since September 1987, the Depot has been very cooperative in providing the Service information on cleanup activities, and the Service expects to continue this cooperation. The determination to list this species is based on several factors other than just those involving the Depot, as discussed below in the section titled "Summary of Factors Affecting the Species."

The City of Anniston Water Works and Sewer Board recommended the special rule allow the removal of all spring flow above 3 cubic feet per second and they provided water flow data that documents these flow levels are not adverse to the pygmy sculpin. The Service concurs and has so amended the special rule. The 6 cubic feet per second specified in the

proposed rule was based upon records of previous minimum flows that apparently were adequate for the sculpin. However, low flows measured during the recent drought indicate that sculpin survival was not affected when spring outflow was reduced to half the amount of previously recorded minimums. The change in outflow has no bearing upon sculpin survival in the impounded springhead.

The Wildlife Information Center, Inc., commented that the Service yielded to local and State political influence and that the species should be listed as endangered with critical habitat. The Service's decision to propose the threatened classification for the pygmy sculpin was based on a scientific evaluation of the threats to the species. Although the pygmy sculpin's habitat is vulnerable to degradation, threats to the species' survival do not appear to be imminent. Therefore, the Service believes that the category of threatened is biologically more accurate for this species than the category of endangered, as these terms are defined in the Endangered Species Act (Act). It should be noted that the degree of protection afforded to threatened species by section 7(a)(2) of the Act is the same that is given to endangered species.

Critical habitat was not designated for the pygmy sculpin because the Service believes that no additional benefits would accrue in this case from such a designation. Because the area occupied by the pygmy sculpin is limited, any adverse effects to its habitat from Federal activities would likely jeopardize its survival and be considered a violation of section 7(a)(2).

It should be emphasized that the listing proposal was based solely on the Service's evaluation of biological factors, as required by the Act. After the Service notified interested parties that the pygmy sculpin was under review for possible listing, the Alabama Department of Conservation and Natural Resources agreed that listing the pygmy sculpin would be appropriate, and it did not express a preference as to endangered or threatened status. On September 17, 1987, the Service also made a presentation on the merits of a listing proposal to the Commissioners of the Anniston Water and Sewer Board (Board), which owns the species' entire range. At the meeting and in a subsequent letter to Senator Howell Heflin of Alabama, the Board expressed its general agreement to listing the species. The Board made no distinction between a designation of endangered or threatened.

### Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the pygmy sculpin (*Cottus pygmaeus*) should be classified as a threatened species. Procedures found at section 4(a)(1) of the Endangered Species Act and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1). These factors and their application to the pygmy sculpin (*Cottus pygmaeus*) are as follows:

#### A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

The pygmy sculpin is known to exist in only Coldwater Spring and the spring run. It has never been collected below the confluence of Dry Creek after water from these two streams has completely mixed. Thus, its present range is also the known historic range. However, the historic range may have extended downstream of the Dry Creek confluence prior to the occurrence of environmental pollution, as discussed in Factor E.

The pygmy sculpin and its habitat are threatened by the proposed construction of a highway bypass from Interstate Highway 20 to the City of Anniston. The Alabama Highway Department has identified three alternate routes for the proposed Anniston Bypass. The early planning preferred route is along the side of Coldwater Mountain immediately above and to the east of Coldwater Spring. The second alternate is to the west of Coldwater Spring. The third alternate is an enlargement of the existing road immediately adjacent to and west of Coldwater Spring and the spring run (*Carwile in litt.*). All three of these proposed routes pass through the recharge area for Coldwater Spring (Scott *et al.* 1987). Water in subsurface aquifers moves along fissures, faults and cracks in reaching the aquifer and in returning to the surface. The recharge area for Coldwater Spring is estimated at 90 square miles and includes Coldwater Mountain. Construction of alternate one will be along the side of Coldwater Mountain and will undoubtedly require the use of explosives in carving out the roadway. This use of explosives might result in the shifting and closing of cracks and fissures which allow water to surface at Coldwater Spring.

An additional threat posed by the completion of alternate one is the accidental spillage of toxic substances. Coldwater Mountain is so steep and the underlying rock formations of such relatively low permeability that the susceptibility for contamination from the mountain is low. However, parallel to Coldwater Mountain and in the valley, is the Jacksonville Fault. The valley has a thick residual mantle with underlying cavernous carbonate rocks over the Fault. This area is highly susceptible to contamination because sinkholes and depressions on the land surface are common in parts of this recharge area (Scott *et al.* 1987). Any accidental spill from the proposed roadway into this highly permeable area would likely result in rapid contamination of Coldwater Spring to the detriment of the pygmy sculpin. Alternates two and three are to the west of Coldwater Spring and do not pose the same magnitude of threat as alternate one. However, they are still within a portion of the recharge area and the potential for contamination by accidental spillage does exist.

#### *B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*

Coldwater Spring and the spring run are owned and protected from trespassing and collecting by the Anniston Water Works and Sewer Department. As long as this protection exists, this species should not be overutilized.

#### *C. Disease or Predation*

Although the pygmy sculpin may be a prey species for larger carnivorous fish and water snakes, and may be afflicted by diseases and parasites common to fish, there is no evidence to indicate that natural mortalities from these sources are a problem at present.

#### *D. The Inadequacy of Existing Regulatory Mechanisms*

The State of Alabama requires a scientific collector's permit if species such as the pygmy sculpin is to be collected. This species is listed as threatened by the Alabama Nongame Conference (Mount 1986) and is designated a nongame species by the State of Alabama. As a nongame species, it is unlawful to possess more than four individuals without a scientific collection permit. The difficulty of enforcing the permit requirement and the priority demands for law enforcement officers' time virtually eliminate any protection for this species. Therefore, the most effective protection is provided by a Cooperative Agreement between the Anniston Water Works and

Sewer Board and the Service that no action will be taken which would endanger the pygmy sculpin. While this good faith agreement provides protection from actions under the control of the Board, it does not provide protection from water contamination and construction projects discussed in Factors A and E, or from other factors beyond the Board's control.

#### *E. Other Natural or Manmade Factors Affecting Its Continued Existence*

Water contamination is occurring in surface water and the subsurface aquifer and is affecting both Coldwater Spring and Dry Creek. Water sampling on and adjacent to the Anniston Army Depot indicates hexavalent chromium is discharged to Dry Creek and that chlorinated hydrocarbons are in the ground water at the Depot (Schalla *et al.* 1984). Schalla *et al.* conclude that the migration of chlorinated hydrocarbon is not of immediate concern but may have long-range impacts. Trichloroethylene occurs in strong concentrations (up to 120,000 parts per billion) in test wells on the Depot and up to 3.4 parts per billion in Coldwater Spring (Environmental Science and Engineering, Inc. 1986). Sampling in 1986 did not find phenols and hexavalent chromium in Coldwater Spring, yet these chemicals may be migrating in the aquifer since they are found in test wells 2 and 4 on the Depot. Shallow ground water in the area of these wells likely contributes to the recharge of the Jacksonville fault zone (Kangas 1987). Kangas' assessment indicates that water is lost from the shallow aquifer between the Depot boundary and test well 2. This indicates that water from the Depot's shallow aquifer is sinking to a deeper aquifer and possibly surfacing at Coldwater Spring. The 90 square mile recharge area includes several potential contamination sources, including a chemical manufacturing industry, Fort McClellan, the City of Anniston, at least one landfill, and the proposed highway connecting Interstate 20 and State Highway 202.

The Service has carefully assessed the best scientific and commercial 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 pygmy sculpin as threatened. The determination of threatened status for the pygmy sculpin was based on a scientific evaluation of the threats to the species. Although the pygmy sculpin's habitat is vulnerable to degradation, threats to the species' survival do not appear to be imminent. Therefore, the

Service believes that the category of threatened is biologically more accurate for this species than the category of endangered, as these terms are defined in the Endangered Species Act. Critical habitat is not designated for reasons given in that section.

#### **Critical Habitat**

Section 4(a)(3) of the Act requires, to the maximum extent prudent and determinable, that the Secretary designate critical habitat at the same time the species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not presently prudent for this species owing to lack of benefit from such designation. No additional benefits would accrue from a critical habitat designation that do not already accrue from the listing. The only landowner, the City of Anniston, is aware of the pygmy sculpin's occurrence and has provided protection for several years under a Conservation Agreement with the Service. Protection of this species' habitat will be addressed through the recovery process and through the section 7 jeopardy standard. Therefore, it would not now be prudent to determine critical habitat for the pygmy sculpin.

#### **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. 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 and with respect to its critical habitat if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. 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 or to

destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

Federal involvement with this species is expected to include the Federal Highway Administration relative to highway construction, and the Environmental Protection Agency and Department of Defense relative to pollution of the subsurface aquifer.

The Act and implementing regulation found at 50 CFR 17.21 and 17.31 set forth a series of general prohibitions and exceptions that apply to all threatened wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect; or to attempt any of these), 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 has been taken illegally. Certain exceptions 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.

A special rule is provided to clarify the continued use of Coldwater Spring as a municipal water supply for the City

of Anniston, Coldwater Spring and the spring run contain the only known population of this species. The withdrawal of substantial quantities of water from the spring has not adversely impacted this species, as evidenced by the continued stable population in the spring and spring run. Under the conditions of the special rule, the use of this spring by the City of Anniston is harmless to the pygmy sculpin and continues the protection provided to the species by having a continuous presence on the property.

**National Environmental Policy Act**

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined under the authority of 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).

**References Cited**

Environmental Science and Engineering, Inc. 1986. Off-post investigation of Anniston Army Depot summary of preliminary results. Report to U.S. Army Toxic and Hazardous Materials Agency. 35 pp and appendices.  
 Kangas, M.J. 1987. Draft Anniston Army Depot endangerment assessment. Contract Report to Anniston Army Depot. 66 pp and appendix.  
 McCaleb, J.E. 1973. Some aspects of the ecology and life history of the pygmy sculpin, *Cottus pygmaeus* Williams, a rare spring species of Calhoun County, Alabama (Pisces: Cottidae). Thesis to Auburn Univ. 82 pp.  
 Mount, R.H. 1986. Vertebrate animals of Alabama in need of special attention. Alabama Agri. Exp. Sta. 124 pp.  
 Schalla, R., G.L. McKown, J.M. Meuser, R.G. Parkhurst, C.M. Smith. F.W.

Bond, and C.J. English. 1984. Source identification, contaminant transport simulation, and remedial action analysis, Anniston Army Depot, Anniston, Alabama. Report to Anniston Army Depot. 55 pp.  
 Scott, J.C., W.F. Harris, and R.H. Cobb. 1987. Geohydrology and susceptibility of Coldwater Spring and Jacksonville Fault areas to surface contamination in Calhoun County, Alabama. U.S. Geological Survey, Tuscaloosa, AL. Water-resources Investigations Report 87-4031. 29 pp.  
 Williams, J.D. 1968. A new species of sculpin, *Cottus pygmaeus*, from a spring in the Alabama River Basin. Copeia 1968:334-342.

**Author**

The primary author of this rule is James H. Stewart (see "ADDRESSES" section).

**List of Subjects in 50 CFR Part 17**

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

**Regulations Promulgation**

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

**PART 17—[AMENDED]**

1. The authority citation for part 17 continues to read as follows:

**Authority:** 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1543; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500; unless otherwise noted.

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.**

\* \* \* \* \*  
 (h) \* \* \*

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
<b>FISHES</b>							
Sculpin, pygmy	<i>Cottus pygmaeus</i>	U.S.A. (AL)	Entire	T	364	NA	17 44(u)

3. Add the following paragraph (u) as special rule to § 17.44.

**§ 17.44 Special rules—fishes.**

\* \* \* \* \*

(u) Pygmy sculpin (*Cottus pygmaeus*). The City of Anniston Water Works and Sewer Board will continue to use Coldwater Spring as a municipal water

supply. Pumpage may remove all spring flow in excess of 3 cubic feet per second (1,938,000 gallons per day).

Dated: September 14, 1989.

**Bruce Blanchard.**

Acting Director, Fish and Wildlife Service.

[FR Doc. 89-22846 Filed 9-27-89; 8:45 am]

BILLING CODE 4310-55-M

## 50 CFR Part 17

RIN 1018-AB23

### Endangered and Threatened Wildlife and Plants; Designation of the Cracking Pearly-Mussel as an Endangered Species

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Final rule.

**SUMMARY:** The Service designates the cracking pearly mussel (*Hemistena* (= *Lastena*) *lata*) as an endangered species under the Endangered Species Act of 1973, as amended (Act). This species, which was once known from the Ohio, Cumberland, and Tennessee River systems, is presently known to survive only at a few shoals in the Clinch, Powell, and Elk Rivers, and possibly a short reach of the Tennessee and Green Rivers. The species' range has been seriously restricted by the construction of impoundments and by other impacts to its habitat. Due to the species' limited distribution, any factors that adversely modify habitat or water quality in the river reaches it now inhabits could further threaten the species.

**EFFECTIVE DATE:** October 30, 1989.

**ADDRESSES:** The complete file for this rule is available for inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service's Asheville Field Office, 100 Otis Street, Room 224, Asheville, North Carolina 28801.

**FOR FURTHER INFORMATION CONTACT:** Mr. Richard G. Biggins at the above address (704/259-0321 or FTS 672-0321).

#### SUPPLEMENTARY INFORMATION:

##### Background

The cracking pearly mussel (*Hemistena* (= *Lastena*) *lata*) was initially described by Rafinesque (1820). This freshwater mussel has a thin, medium-size, elongated shell (Bogan and Parmalee 1983). The shell's outer surface is brownish green to brown and often has broken dark green rays. The nacre (inside of shell) color is pale bluish to purple. Because of its rarity, little is known of the mussel's biology. The species inhabits moderate-size streams on gravel riffles where it is often deeply

buried in the substrate (Bogan and Parmalee 1983). Like other freshwater mussels, it feeds by filtering food particles from the water. It has a complex reproductive cycle in which the mussel larvae parasitize fish. The mussel's life span, fish species its larvae parasitize, and other aspects of its life history are unknown.

The cracking pearly mussel has undergone a substantial range reduction. It was historically distributed in the Ohio, Cumberland, and Tennessee River systems (Stansbery 1970, Kentucky Nature Preserves Commission 1980, Bogan and Parmalee 1983, Bates and Dennis 1985). The loss of populations occurring in these river systems was probably due to direct impacts of impoundments, pollution and habitat alteration, and the indirect impacts associated with the reduction or elimination of its larval host species by these same factors. Based on personal communications with knowledgeable mussel experts (Steven Ahlstedt and John Jenkinson, Tennessee Valley Authority, 1987; Arthur Bogan, Philadelphia Academy of Sciences, 1987; Richard Neves, Virginia Polytechnic Institute and State University, 1987; David Stansbery, Ohio State University, 1987) and a review of current literature on the species (see above, plus Ahlstedt 1986), the species is definitely known to survive in only three river reaches—the Clinch River, Hancock County, Tennessee, and Scott County, Virginia; the Powell River, Hancock County, Tennessee, and Lee County, Virginia; and the Elk River, Lincoln County, Tennessee.

Although the species has not been collected in the Green River since 1966, and a survey of the Green River in Hart and Edmonson Counties in 1987 failed to collect the species, there is a possibility that an isolated population may still exist in the Green River (Richard Hannan, Kentucky Nature Preserves Commission, personal communication, 1988). Another small population may also still exist in the Tennessee River below Pickwick Dam in Hardin County, Tennessee (Paul Yokley, Jr., University of North Alabama, personal communication, 1988). Live specimens have not been taken below Pickwick Dam since the 1970s, but a few relic shells have been taken in the 1980s, indicating that a small population may still be holding on in a short reach of the Tennessee River.

All of the known populations and the populations that may exist in the Green and Tennessee Rivers are threatened and are located in areas bordered primarily by private lands. The Powell River is severely threatened by the

impacts of coal mining. The Clinch River, although in much better condition, is also impacted by coal mining, and in the past has experienced extensive fish and mussel kills caused by toxic spills from a riverside power plant. The Elk River mussel fauna has been impacted by cold-water discharges from Tims Ford Reservoir, and the Green River has had a history of water quality problems from oil and gas production in the watershed. The Tennessee River below Pickwick Dam has been impacted by gravel dredging, channel maintenance work, and the upstream reservoir.

The cracking pearly mussel was recognized by the Service in the May 22, 1984, **Federal Register** (49 FR 21664) as a category 2 species that was being considered for possible addition to the Federal List of Endangered and Threatened Wildlife and Plants. Category 2 is for those species for which the Service has some information indicating that the taxa may be under threat, but sufficient information is lacking to prepare a proposed rule. The service has met and been in phone contact with various Federal and State agency personnel concerning the species' status and the need for the protection provided by the Endangered Species Act. On January 14, 1988, and May 16, 1988, the Service also notified appropriate Federal, State, and local governmental agencies by mail that a status review was being conducted and that the species might be proposed for listing. No negative comments were received.

On February 17, 1989, the Service published in the **Federal Register** (54 FR 7225) a proposal to list the cracking pearly mussel as an endangered species. That proposal provided information on the species' biology, status, and threats to its continued existence.

#### Summary of Comments and Recommendations

In the February 17, 1989, proposed rule and associated notifications, all interested parties were requested to submit factual reports and information that might contribute to development of the final rule. Appropriate Federal and State agencies, county governments, scientific organizations, and interested parties were contacted and requested to comment. A legal notice was published in the following newspapers: "Elk Valley Times," Fayetteville, Tennessee, March 1, 1989; "Kingsport Times News," Kingsport, Tennessee, March 5, 1989; "Hart County News," Munfordville, Kentucky, March 9, 1989; and "Savannah Courier," Savannah, Tennessee, March 9, 1989.