

## DEPARTMENT OF THE INTERIOR

## Fish and Wildlife Service

## 50 CFR Part 17

RIN 1018-AB31

**Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Cheat Mountain Salamander and Endangered Status for the Shenandoah Salamander**

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

**ACTION:** Final rule.

**SUMMARY:** The Service determines threatened status for the Cheat Mountain salamander (*Plethodon nettingi*) and endangered status for the Shenandoah salamander (*Plethodon shenandoah*). The latter is known only from three tiny populations on isolated talus slopes in Shenandoah National Park, Virginia. Its existence is endangered by competition with the widespread red-backed salamander (*Plethodon cinereus*). The closely related *P. nettingi* is found above 3,000 feet in an approximately 19 by 50 mile area of Pendleton, Pocahontas, Randolph and Tucker Counties, West Virginia, mostly within the Monongahela National Forest. Its populations are generally small and disjunct, probably remnants of a larger, more continuous distribution fragmented by habitat modifications, such as timbering, mining and recreational development (ski resorts, hiking trails, etc.). This rule implements protection provided by the Endangered Species Act of 1973, as amended, for these salamanders.

**EFFECTIVE DATE:** September 18, 1989.

**ADDRESSES:** The complete file for this rule is available for inspection, by appointment, during normal business hours at the Annapolis Field Office, U.S. Fish and Wildlife Service, 1825 Virginia Street, Annapolis, Maryland 21401.

**FOR FURTHER INFORMATION CONTACT:** Judy Jacobs at the above address or by telephone (301/269-5448).

**SUPPLEMENTARY INFORMATION:**

**Background**

The Cheat Mountain and Shenandoah salamanders are members of the family Plethodontidae, the lungless salamanders. Members of the genus *Plethodon* are also known as woodland salamanders. The Cheat Mountain salamander (*Plethodon nettingi*) was first observed on Barton Knob in Randolph County, West Virginia, in 1935

and was described as a new species by Green (1938). Highton and Grobman (1956) considered *P. nettingi* to be a subspecies of *P. richmondi*, but later, Highton (1971) re-elevated *P. nettingi* to full species status. *Plethodon shenandoah* was first described as a subspecies of *P. richmondi* (Highton and Worthington 1967), and later considered to be a subspecies of *P. nettingi* Highton (1971). Subsequent analyses of electrophoretic data resulted in a determination of full species status for *P. shenandoah* (Highton and Larson 1979).

The Cheat Mountain and Shenandoah salamanders are morphologically similar, small, slender *Plethodons*, reaching a maximum length of 11-12 cm (about 4½ inches), generally with 18 costal grooves (vertical indentations that externally mark the position of the ribs) and dark gray to black bellies. The dorsum, or back of *P. nettingi* is dark, usually with a heavy sprinkling of brassy or silvery flecks. The dorsum of *P. shenandoah* is also dark, but in this species, there are two color phases, striped and unstriped. In the unstriped phase, the dorsum is uniformly dark and may have a few brassy flecks; the striped phase is characterized by a narrow red stripe down the back.

As a general rule, woodland salamanders are found during the day under rocks and logs, or in rock crevices below the surface of the ground. At night, especially during rainy weather, they forage on the surface of the forest floor and occasionally climb trees or other plants for short distances (Pauley 1985, Jaeger 1978). The diet of the Cheat Mountain salamander, fairly typical for woodland salamanders, consists mainly of mites, springtails, small beetles, flies and other insects (Paulet 1980). There are no reported observations of mating for the Cheat Mountain or Shenandoah salamanders, but as in all other woodland salamanders, fertilization is internal and complete development takes place within the egg; in contrast with most other salamanders, there is no aquatic larval stage (Conant, 1975). Eggs are laid in damp logs, moss, etc. Cheat Mountain salamander egg masses containing 4-17 eggs have been found from May to August, with most observations in June (Brooks 1948). Timing of reproductive activity is probably similar for *P. shenandoah*.

The Cheat Mountain salamander occurs in the Allegheny Mountains of eastern West Virginia, in Pendleton, Pocahontas, Randolph and Tucker Counties, in an area approximately 19 miles wide and 50 miles long (Pauley 1985), almost entirely within the proclamation boundaries of the

Monongahela National Forest. This species is found in forested areas above 3,120 feet, where red spruce (*Picea rubens*) and yellow birch (*Betula alleghaniensis*) are or were the dominant tree species. Originally, red spruce forest covered nearly half a million acres in West Virginia. Timbering operations around the turn of the century, in combination with wildfires caused by human activity, removed nearly all the red spruce in the state.

The Shenandoah salamander is known only from north-facing talus slopes on three mountains in Shenandoah National Park, Madison and Page Counties, Virginia, at elevations above 3,000 feet (Highton and Worthington 1967). It is confined to pockets of soil and/or vegetative debris within the talus, where moisture conditions are favorable. Because, like all members of the Plethodontidae, these salamanders are lungless, sufficient moisture must be present for respiratory exchange to occur directly through the skin. However, competition with the red-backed salamander (*Plethodon cinereus*), which requires moister conditions than the Shenandoah salamander, plays a major role in restricting the latter's range (Jaeger 1970, 1971, 1974, 1980). The Shenandoah salamander is classified as an endangered species under Virginia state law.

In its Review of Vertebrate Wildlife in the Federal Registers of December 30, 1982 (48 FR 58454-58460) and September 18, 1985, (50 FR 37958-37967), the U.S. Fish and Wildlife Service placed both the Cheat Mountain and Shenandoah salamanders in Category 2, meaning that a proposal to list as endangered or threatened was possibly appropriate, but that substantial biological data were not then available to support such a proposal. Subsequently, the Service received a report from Dr. Thomas K. Pauley, who had been contracted by the Service to investigate the status of the Cheat Mountain salamander. The data presented in Dr. Pauley's report, along with other information assembled by the Service, including published reports by Dr. R.G. Jaeger on the Shenandoah salamander, indicated that a proposal to list both species was warranted. Accordingly, on September 28, 1988, the Service published a proposal in the Federal Register (53 FR 37814) to list *Plethodon nettingi* as threatened and *Plethodon shenandoah* as endangered. With the publication of this final rule, the Service now determines threatened and endangered status for these salamanders.

### Summary of Comments and Recommendations

In the September 28, 1988, proposed rule (53 FR 37814) and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. Comments were requested from appropriate state agencies, county governments, scientific organizations and other interested parties. Newspaper notices inviting public comment were published on October 15, 1988, in the Daily News-Record, Harrisonburg, Virginia, and the Inter-Mountain, Elkins, West Virginia. Six comments were received. Three of these, from the Virginia Natural Heritage Program, Virginia Department of Game and Inland Fisheries and the Nature Conservancy, Eastern Regional Office, fully supported the proposed listing. Another, from the West Virginia division of Parks and Recreation, also supported the listing, but strongly recommended continued fieldwork to locate new populations and monitor existing ones. Monitoring will certainly be a component central to the recovery effort for the Cheat Mountain and the Shenandoah salamanders. Searches for new populations will also be important to the recovery of these species, particularly for *P. shenandoah*, for which only three locations are known. Oftentimes, the increased attention received by species following listing stimulates additional research, resulting in an increased knowledge of the species' life history and distribution.

Two comments from university professors, while supporting the listings, expressed concern that this action might curtail future research on these salamanders, particularly *P. shenandoah*. One respondent noted that the possibility of hybridization between *P. shenandoah* and *P. cinereus* (not fully documented) could complicate protection efforts. This writer raised the concern that legal protection might be "so rigid as to completely prevent the rational study of problems that affect the species in question." With the publication of this rule, it is not the Service's intention to obstruct the acquisition of information contributing to our understanding of factors essential to the species' survival. Permits to work on these species are already required by the State agencies, as well as by the U.S. Forest Service (for *P. nettingi*) and the National Park Service (for *P. shenandoah*). The Service recognizes that the requirement for a Fish and Wildlife Service permit, in addition to those already required, may seem burdensome to the permit applicant.

However, it is likely that all of the above-mentioned agencies will use similar criteria in evaluating permit applications: i.e. the amount and types of information to be gained by the proposed research and the critical nature of this information relative to the species' recovery, weighed against the type and amount of proposed "take." Therefore Fish and Wildlife Service permit issuance decisions will very likely concur with those already required by other agencies.

This same respondent questioned whether additional U.S. tax dollars would be spent unnecessarily on *P. shenandoah*, since it is already protected by its location on Park Service land. Fish and Wildlife Service funding of recovery, research or protection efforts for *P. shenandoah* will be prioritized with the needs of other listed species and authorized only if deemed appropriate.

In summary, while questions and concerns were raised by some commentators, all were in support of the listings, and no new biological information was presented.

### Summary of Factors Affecting the Species

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 (50 CFR part 424) set forth the procedures for adding species to the Federal Lists. 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 Cheat Mountain salamander (*Plethodon nettingi*) and the Shenandoah salamander (*Plethodon shenandoah*) are as follows:

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

Habitat modification is a primary factor threatening the continued existence of the Cheat Mountain salamander. This species prefers cool moist forests where mature red spruce (*Picea rubens*) and yellow birch (*Betula alleghaniensis*) predominate. At West Virginia's latitude, these northern forest types occur only at higher elevations. The Cheat Mountain salamander is found only at elevations above 3120 feet (Pauley 1985). Prior to the late 1800's, *P. nettingi* may have been more widely distributed in these high elevation areas. The timber boom began in West Virginia during the 1880's; forty years later, virtually all of the old-growth, high quality timber had been stripped from the mountains in the eastern part of the

state. Wildfires, some set intentionally to clear pasture, others resulting from the slash left from timbering operations, or from sparks from the stacks of steam locomotives, also contributed to the demise of spruce in the state (Clarkson 1964). Only one sizeable tract of virgin spruce, encompassing some 200 acres, remains. Interestingly, one of the healthiest remaining populations of *P. nettingi* now occurs in this vicinity.

Subsequent to the lumbering operations, the Cheat Mountain salamander somehow managed to survive, perhaps in small pockets of marginally suitable habitat. High elevation forests have since regenerated, and today, spruce and mixed spruce-northern hardwood forests cover an estimated 27,000-67,000 acres in West Virginia, roughly 10% of the area covered prior to the lumbering era (Bones 1978, Zinn and Sutton 1978). Although at present only 10% to 15% of the red spruce in the state measure over 15 inches in diameter at breast-height (dbh), smaller spruce are economically valuable in today's timber market, and spruce timber sales are again occurring in West Virginia. The Cheat Mountain salamander's extirpation from one clearcut area has been documented, and seven other populations that have been impacted by timbering operations are likely to die out due to the hot, dry conditions that prevail in their habitat (T. Pauley, pers. comm.).

In addition to timber cutting, access roads, hiking trails and pipeline rights-of-way bisect or limit the expansion of many *P. nettingi* populations. Such openings decrease soil moisture and increase soil temperature, thus presenting a barrier to these salamanders, which require cool, moist conditions. Due to genetic considerations, these bisected "half-populations" may not be viable over the long term. Nearly 40% of the populations Pauley (1985) found were bisected by or adjacent to roads or pipeline rights-of-way.

Other activities that threaten Cheat Mountain salamander habitat include the construction of ski resorts and coal mining. Within the range of *P. nettingi*, four ski resorts are in operation and an additional one is presently being developed. Cutting of high-elevation forests for ski trails, lodges and condominiums is ongoing as these resorts expand. One Cheat Mountain salamander population has already been subdivided by ski slopes, and another presently healthy population is threatened by an additional proposed ski resort and development. One historical population occurred on an

area that is now developed as a ski resort (Pauley 1985).

Although high elevation coal mining in West Virginia makes up only a small percentage of the total, high elevation coal deposits consist of low-sulphur coal, which is becoming increasingly desirable, thus valuable, due to air quality considerations. Pauley (1985) reported five *P. nettingi* populations that have been severely impacted by surface or deep mining activities. One of these is likely extirpated and another is known to have been destroyed. Clearing and haul roads associated with mining activity broaden the scope of the impact of this threat of *P. nettingi*.

Habitat of the Shenandoah salamander has been timbered and burned in the past, which may have negatively impacted the species. At present, *P. shenandoah* habitat is protected from active modification, since it is located within the Shenandoah National Park. However, deterioration of the talus areas in which it occurs could promote the incursion of *Plethodon cinereus*, its chief competitor, which could ultimately lead to the extinction of *P. shenandoah* (see Factor "E" below).

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

These salamanders have no known commercial utility; however, in the past, considerable numbers of both species have been collected for scientific purposes or as curiosities, by amateur collectors. It is debatable whether unlimited collection can have any long-term effect upon salamander populations (R. Highton, University of Maryland, pers. comm.). Such impacts may be assessed through use of "surrogate" species (C. Pague, pers. comm.). Permitting requirements for collection of these species were mentioned above.

#### C. Disease or Predation

There is no evidence that these salamanders are threatened by disease or predation.

#### D. Inadequacy of Existing Regulatory Mechanisms

As mentioned above, collecting these salamanders already requires a permit, thereby providing limited protection from take. The habitat of both species also receives some protection, since both Shenandoah National Park and Monongahela National Forest recognize *P. shenandoah* and *P. nettingi* respectively as species of concern. Despite this recognition, the habitat of *P. nettingi* is still threatened with

destruction from a variety of sources, as specified in (A) above, and *P. shenandoah* may be declining due to natural causes, as mentioned in (E) below.

#### E. Other Natural or Manmade Factors Affecting Their Continued Existence

The existence of the Shenandoah salamander is threatened by a naturally-occurring phenomenon, competition with the closely related red-backed salamander, *Plethodon cinereus* one of the most abundant and common woodland salamanders. *P. shenandoah* is essentially confined to its few talus islands by competition with *P. cinereus*. The species is able to survive there due to its higher tolerance to dry conditions, relative to *P. cinereus* (Jaeger 1971). The talus in which *P. shenandoah* lives is in the process of disintegration. Organic matter and the products of erosion accumulate in the less steep talus slopes, fragmenting them, decreasing their area and ultimately creating moister conditions in which *P. cinereus* could possibly survive. As this process continues, *P. cinereus* is likely to invade the habitat now occupied by *P. shenandoah*, possibly resulting in the eventual extinction of the latter species.

The Cheat Mountain salamander also experiences competition with *Plethodon cinereus* and with the mountain dusky salamander (*Desmognathus ochrophaeus*), which may limit the ability of *P. nettingi* to expand its range or re-populate areas previously occupied. Pauley's survey work revealed one or both of these potential competitor species present at 83% of the sites where he found *P. nettingi*, and their numbers exceeded those of *P. nettingi* at half of the observed population sites. Recent evidence indicates that *P. nettingi* populations may actually be declining where these competing species are present (Pauley, in prep.).

The ability of *P. nettingi* to establish populations in unoccupied, suitable habitat appears to be limited. In an experimental effort to save a population, 53 of these salamanders were removed from an area where habitat destruction from mining activities was imminent. These animals were carefully relocated to another area of very similar habitat, soil type and temperature from which all salamanders of other species found had been removed. Follow-up studies over the past four years have as yet revealed no surviving *P. nettingi* from this transplant effort (T. Pauley, pers. comm.).

The Service has carefully assessed the best scientific and commercial information available regarding the past, present and future threats faced by

these species in determining to make this rule final. Based on this evaluation, the Service has determined to list the Cheat Mountain salamander (*Plethodon nettingi*) as threatened and the Shenandoah salamander (*Plethodon shenandoah*) as endangered. The Cheat Mountain salamander is known from numerous populations within its limited range, and the management of much of its habitat is under the jurisdiction of a Federal agency, the U.S. Forest Service. Although its habitat has already been considerably altered, proper habitat management should prevent this species from becoming endangered throughout its range. In contrast, although the Shenandoah salamander also occurs on Federal land (National Park Service), its population numbers are much lower and the management of its habitat does not appear to be the major factor contributing to its endangerment or to its recovery. The reasons for not designating critical habitat are discussed below.

#### Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that to the maximum extent prudent and determinable, the Secretary designate any habitat of a species which is considered to be critical habitat at the time the species is determined to be endangered or threatened. Implementing regulations at 50 CFR 424.12(a)(1) state: "A designation of critical habitat is not prudent when one or both of the following situations exist: (i) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of such threat to the species, or (ii) such designation of critical habitat would not be beneficial to the species." In the case of these salamanders, the Service finds that a determination of critical habitat is not prudent. Such a determination would result in no known benefit to the species. Nearly all of the known habitat of these salamanders is under the jurisdiction of Federal agencies (U.S. Forest Service and National Park Service). Forest and park supervisors and other involved parties are already aware of the occupied range of these species. Furthermore, both the Park Service and the Forest Service have their own regulations which give high priority to protection of endangered and threatened species. Thus, no benefit would accrue from designation of critical habitat.

#### 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 prohibition against certain practices. Recognition through listing encourages and results in conservation action 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 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 cooperative provision of the Act are codified at 50 CFR Part 402. Section 7(a)(2) requires 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.

Federal actions which could impact these salamanders would include land management decisions on the Monongahela National Forest or Shenandoah National Park, and possibly, Federal permitting requirement for private actions, such as mining or recreational development. Such actions will require formal consultation, unless the Service concurs in writing that the action has been designed in a manner that eliminates adverse effects to these salamanders.

The Act and implementing regulations found at 50 CFR 17.21 and 17.31 set forth a series of general prohibitions and exceptions that apply to all endangered and threatened wildlife. 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 commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that was illegally taken. 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. As mentioned above, the Service will promote the issuance of permits for scientific research essential to the species' continued existence.

#### 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, amended. A notice outlining the Service's reasons for this determination was published in the Federal Register on October 25, 1983 (48 FR 49244).

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#### Author

The primary author of this proposed rule is Judy Jacobs (see ADDRESSES section), 301/269-5448.

#### 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 continues to read 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; Pub. L. 100-478, 102 Stat. 2306; Pub. L. 100-653, 102 Stat. 3825 (16 U.S.C. 1531 *et seq.*); Pub. L. 99-625, 100 Stat. 3500, unless otherwise noted.

2. Amend § 17.11(h) by adding the following, in alphabetical order under Amphibians, 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						
AMPHIBIANS							
Salamander, Cheat Mountain	<i>Plethodon nettingi</i>	U.S.A. (WV)	Entire	T	358	NA	NA
Salamander, Shenandoah	<i>Plethodon shenandoah</i>	U.S.A. (VA)	Entire	E	358	NA	NA

Dated: July 18, 1989.

Susan Recco Lamson,  
Acting Assistant Secretary for Fish and  
Wildlife and Parks.

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BILLING CODE 4310-55-M

50 CFR Part 17

RIN 1018-AB23

Endangered and Threatened Wildlife  
and Plants; Endangered Status for the  
Roanoke Logperch

AGENCY: Fish and Wildlife Service,  
Interior.

ACTION: Final rule.

**SUMMARY:** The Service determines the Roanoke logperch (*Percina rex*) to be an endangered species. Endemic to Virginia, this fish now occurs only in four widely separated populations: In the upper Roanoke River, the Pigg River, the Nottoway River and the Smith River. Each population is vulnerable because of its relatively low density and limited extent. The largest and most vigorous population, in the upper Roanoke River, is subject to the most serious threats: from urbanization, industrial development, water supply and flood control projects, and, in the upper basin, from agricultural runoff. The other three populations are subject to siltation resulting from agricultural activities and to potential chemical spills. The Smith River population is especially vulnerable because of its small size. This rule implements the protection of the Endangered Species Act of 1973, as amended, for this fish.

**EFFECTIVE DATE:** The effective date of this rule is September 16, 1989.

**ADDRESSES:** The complete file for this rule is available for inspection, by appointment, during normal business hours at the Annapolis Field Office, U.S. Fish and Wildlife Service, 1825 Virginia Street, Annapolis, Maryland 21401.

**FOR FURTHER INFORMATION CONTACT:** Mr. G. Andrew Moser at the above address (301/269-5448).

SUPPLEMENTARY INFORMATION:

Background

The Roanoke logperch, (*Percina rex*), was discovered in the Roanoke River near Roanoke, Virginia in 1888 and described by Jordan (1889).

A large darter, *P. rex* reaches 14 centimeters (5.5 inches) total length. It is characterized by an elongate, cylindrical to slab-sided body, conical snout and complete lateral line. The back is dark green, the sides are greenish to yellowish and belly is white to yellowish. The upper sides and back have dark scrawlings and numerous small saddles. Bar markings on its sides are prominent, usually separated from the dorsal markings and typically ovoid in shape.

The species commonly lives 5 to 8 years; both sexes probably reach maturity by age four. Spawning occurs in April or May in deep runs over gravel and small cobble (Simonson and Neves 1986). *P. rex* feeds primarily on aquatic insect larvae, especially the larvae of chironomids and caddisflies (Burkhead 1983). During warm months, adults occupy gravel and cobble runs and riffles, while juveniles typically utilize slow runs and pools with clean sand substrates. Winter habitat of all individuals appears to be deep pools, under boulders (Burkhead 1983).

The Roanoke logperch is endemic to two river systems in Virginia—the Roanoke River drainage (including the Pigg and Smith Rivers) and the Nottoway River drainage. Its distribution extends from the Ridge and Valley province through the Blue Ridge to the lower Piedmont. It now occurs in four disjunct populations located in widely separated segments of four rivers: the upper Roanoke River, the Pigg River, the Nottoway River and the Smith River. It is probable that these represent remnants of a single much larger population that once occupied much of the Roanoke drainage upstream of the fall line.

All extant populations of the Roanoke logperch are in Virginia in the river reaches described below. Within the upper Roanoke River, the logperch occurs in Roanoke and Montgomery Counties from within the city limits of Roanoke upstream into the North and

South Forks of the Roanoke. It also occurs in Tinker Creek, a tributary of the upper Roanoke in Roanoke County. In the Pigg River system the logperch occurs in a 32-mile reach of the mainstem Pigg River in Pittsylvania and Franklin Counties, and in Big Chestnut Creek, a Franklin County tributary of the Pigg. In the Nottoway River system the species occurs in a 32-mile reach of the mainstem in Sussex County, Virginia, and in Stony Creek, a tributary of the Nottoway in Dinwiddie and Sussex Counties. In the Smith River system, *P. rex* occurs in a 2.5-mile reach in Patrick County upstream of Philpott Reservoir, and in Town Creek, a Smith River tributary in Henry County.

Recent survey data (Simonson and Neves 1986) indicate that the largest population of *P. rex* inhabits the Upper Roanoke River. The Pigg River system is rather sparsely inhabited by the logperch, while the Nottoway River has even lower population densities of the species. The Smith River logperch population appears to be extremely small.

Threats to the upper Roanoke population of the logperch are posed by a pending Roanoke County water supply project and a proposed U.S. Army Corps of Engineers (Corps) flood control project. Results of the most recent comprehensive survey (Simonson and Neves 1986) indicate that the species has probably already declined in the North Fork of the Roanoke. Chemical spills, which have increased in frequency in the industrialized sections of the river in Salem and Roanoke, present a continuing threat. The Pigg River and North Fork of the Roanoke are heavily impacted by silt washed from agricultural lands in the watersheds.

The Roanoke logperch has been included in three Notices of Review indicating that it was a candidate for Federal listing. These were published in May 13, 1980, Federal Register (45 FR 31447), the December 30, 1982, Federal Register (47 FR 58454), and the September 18, 1985, Federal Register (50 FR 37958). The last of these Notices placed the logperch in category 1, indicating that the Service had substantial information on hand to