Virginia Fringed Mountain Snail

Polygyriscus virginianus

5-Year Review:
Summary and Evaluation

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5-YEAR REVIEW
Species reviewed: Virginia fringed mountain snail (*Polygyriscus virginianus*)
August 2007

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U.S. FISH AND WILDLIFE SERVICE

5-YEAR REVIEW OF
Virginia fringed mountain snail / *Polygyriscus virginianus* (Helicodiscidae)

August 2007

1.0 GENERAL INFORMATION

1.1 Reviewers:

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Karen Mayne
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Mary Parkin

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Lead Field Office: Virginia Field Office, Mr. Michael Drummond, 804-693-6694, ext.114 mike_drummond@fws.gov

Cooperating Field Offices: None

Cooperating Regions: None

1.2 Methodology Used to Complete This Review:

This 5-year review was conducted as an individual effort by the lead endangered species biologist for the snail. It summarizes and evaluates information from the recovery plan (FWS 1983), historic and recent surveys and studies.

1.3 Background:

1.3.1 Federal Register Notice announcing initiation of this review:

January 29, 2007 (Vol. 72, No. 18, Page 4,018)

1.3.2 Listing history

Federal Register (FR) notice: April 28, 1976
Date listed: July 3, 1978
Entity listed: Species
Classification: Endangered

1.3.3 Associated rulemakings: None

1.3.4 Review history:

The Virginia fringed mountain snail was included in the following 5-year reviews, conducted in 1983 and 1991:

- December 8, 1983 (48 FR 55100) – review of all domestic species listed in 1978, resulting in a notice of completion on July 22, 1985 (50 FR 29900)
- November 6, 1991 (56 FR 56882) – review of all species listed before 1991

In these cursory reviews, the status of many species was evaluated concurrently. The FR notices solicited new or additional information on the various species under review to determine if significant data was available warranting any changes in classification. No change in the snail's listing classification was recommended from these 5-year reviews.

This assessment constitutes the first substantive, individual 5-year status review of the species since its listing. The attachment to this review contains a detailed chronology of events related to *Polygyriscus virginianus*.

1.3.5 Species' Recovery Priority Number at start of review: 4

1.3.6 Recovery plan: Virginia Fringed Mountain Snail (*Polygyriscus virginianus*) Recovery Plan
Date issued: January 1983
Dates of previous revisions: N/A

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) Policy

2.1.1 Is the species under review a vertebrate? No. The species is an invertebrate, and, as such, it does not qualify for consideration as a DPS.

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective measurable criteria? Yes

2.2.2 Adequacy of recovery criteria:

2.2.2.1 Do the criteria reflect the best available and most up-to-date information on the biology of the species and its habitat? Yes

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information. The primary

objective of the Virginia fringed mountain snail recovery plan is to bring about the complete recovery of the snail and allow consideration of delisting by meeting these three criteria: (1) All habitat where the species occurs is assured long-term protection from adverse impacts, (2) a long-term land management and monitoring program is established throughout the species' range, and (3) the monitoring program indicates no downward trend in the species' distribution or habitat quality.

Currently, the only step that has been taken to meet any of these criteria has been completion of several State-funded surveys in the attempt to locate living specimens.

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history: No new information on the snail's biology or life history has become available due to its rarity, i.e., scarcity of observed live individuals.

2.3.1.2 Abundance, population trends, demographic features and/or trends: The scarcity of live individuals observed over the last 60 years makes it impossible to project abundance or determine population trends. Twelve specimens of a previously undescribed species of land snail were collected in 1947 by Paul R. Burch of Radford College, Virginia (Burch 1947); described as *Polygyra virginiana*, they are now known as *Polygyriscus virginianus* (see 2.3.1.4 below). The following year, two additional specimens were collected by Paul R. Burch and his son John B. Burch (Batie 1986). It was 25 years later before additional live specimens were collected (Batie 1986). Since 1978, only four living adults have been sighted (three in 1981 and one in 1986), and living juveniles have not been seen since 1971 (Batie 1987).

Lack of observed live specimens since 1986 has led some biologists to speculate that the species may be extinct; however, lack of sightings could also be due to factors that make *P. virginianus* very difficult to survey. These factors include: (1) Low population numbers within a highly restricted habitat preference, (2) the fact that the snail is a burrower that can be found up to 60 to 200 centimeters below the surface, and (3) a shell of only about 4 millimeters in size (Batie 1987).

2.3.1.3 Genetics, genetic variation, or trends in genetic variation: Again, due to the paucity of observed living specimens, very little is known about the genetics of this snail. As with most land snails, *P. virginianus* is a true hermaphrodite, capable of producing both eggs and sperm. Individuals usually exchange these products with other snails to

maximize outcrossing (Tompa 1984). Insufficient genetic samples are available to analyze variations or trends.

2.3.1.4 Taxonomic classification or changes in nomenclature: Burch (1947) first described this snail as *Polygyra virginiana* (Polygyridae) and contrasted it with *Polygyra cereolus carpenteriana*. Pilsbry (1948) examined the species and felt that it was not a *Polygyra* and established a new subgenus *Polygyriscus* still within the family Polygyridae. Later, Burch (1962) treated this as a full genus, making it a monotypic genus. Taxonomic affinities within snails are determined by soft body parts and internal anatomy (Batie 1987). Until 1971, when three specimens were sent to the Chicago Field Museum, all taxonomic classification had been based on shell characteristics. Solem (1975), who examined these specimens and was able to look at the internal body parts and radular teeth, placed this snail in the family Helicodiscidae.

2.3.1.5 Spatial distribution, trends in spatial distribution, and/or historic range: The snail has a very limited range; its current known distribution is within a 10 kilometer (km) section of bluffs along the New River in Pulaski County, Virginia. Likewise, the snail may have always been rare, based on the limited historical distribution evidence. Historically, shells or living specimens were only found within a 1 km section of this bluff (Batie 1987). Recent survey work by Ken Hotopp has located a few relic shells in additional sites, but no living specimens (K. Hotopp, Appalachian Conservation Biology, pers. comm. 2007).

2.3.1.6 Habitat or ecosystem conditions: Because *Polygyriscus virginianus* is a burrowing snail, little is known about its behavior and habitat preferences. *P. virginianus* is fossorial, living up to 2 meters beneath the surface of talus slope at an elevation of 1,800 feet (Burch 1947). It is found among the fragments of weathered dolomite in loose clay-like soil broken by roots and worked by worms. The soil at this level is free of leaf litter. The dolomite of the steep bluff is overlain by soil that in turn is overgrown by a stand of small trees and a thick mat of honeysuckle. *P. virginianus* apparently needs a place with moist, loosely compacted soil with high calcium content and moderate temperatures (FWS 1983).

The limited number of live *P. virginianus* specimens observed makes it difficult to evaluate habitat suitability and leaves open the question as to whether the habitat historically associated with this snail is actually preferred habitat. It has been suggested that the sites where shells and individuals have been collected over the years may constitute secondary habitat, whereas the areas adjacent to the bluffs may actually be the preferred habitat type (K. Hotopp, pers. comm. 2007).

2.3.2 Five-Factor Analysis

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range: At this time there is no long-term land protection in place for the known habitat; all sites are on private property. The only ameliorating factor for habitat conservation at this time is the relatively low development pressure in the area. Although the creation of Claytor Lake Reservoir inundated portions of the snail's habitat, and operation of the power generating facility continues to result in periods of high water flows, it is unknown whether these actions have caused past or ongoing impacts on the distribution and survival of the species.

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes: N/A

2.3.2.3 Disease or predation: Unknown

2.3.2.4 Inadequacy of existing regulatory mechanisms: To date, the snail's limited distribution within an area that has not, to date, been subject to development pressure has made conservation of its habitat relatively easy. Available regulatory mechanisms provide adequate protection at this time, although the situation could change if development pressures escalate or if other factors are shown to adversely affect the species.

2.3.2.5 Other natural or manmade factors affecting its continued existence: If the snail is found to be extant, it is possible that small-population effects may limit its continued survival and/or recovery potential. Uncertainties surrounding its current population status and distribution may pose the greatest threat to the species due to the potential for inadvertent loss of individuals or populations stemming from human activities and/or natural events.

2.3.3 Synthesis

As a monotypic genus, the Virginia fringed mountain snail (*Polygyriscus virginianus*) is a globally rare species, and, like all fossorial species, it is difficult to find. The snail is known historically only from a small bluff area along the New River in Pulaski County, Virginia, where it inhabits fragmented and weathered dolomite outcroppings with loose clay-like soils in an area covered with small trees and vines. Site conditions and the snail's burrowing behavior make surveying for the species difficult at best. The last living adult was observed in 1986, and the last living juvenile was observed in 1971.

Surveys undertaken to date have generally been small and spotty, indicating the need for a comprehensive survey of known habitat and suspected habitat areas. Until such a survey is completed and it can be determined whether the species is

extant, our provisional conclusion is that the snail continues to be in danger of extinction throughout its range, due to extreme scarcity compounded by lack of permanent habitat protection. Inadvertent loss of individuals or populations through human activity or naturally changing environmental conditions, as well as the potential for deleterious small-population effects, could lead to the demise of this species. Thus, although current impacts cannot be measured at this time, we recognize the precarious nature of the snail's status, and it is our recommendation that the Virginia fringed mountain snail's classification as an endangered species be retained.

3.0 RESULTS

3.1 Recommended Classification: No change is warranted.

Rationale: The species should retain its endangered classification unless and until sufficient population data become available to evaluate both its biological status and its status relative to threats. Until such time, the snail's presumed status should be based on a recognition that uncertainties could inadvertently impair its ability to survive and/or recover, rendering the species vulnerable to extinction.

3.2 Recommended Recovery Priority Number: 4 (no change)

Rationale: As a monotypic genus with a very narrow range and unknown status, *Polygyriscus virginianus* is presumably subject to a high degree of threat (whether deliberate or inadvertent) and a low recovery potential.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

1) Conduct a comprehensive survey to determine (a) if the species is extant and, if so, its population status; and (b) if the habitat associated with shells and live specimens observed to date is the preferred habitat type.

2) Determine land ownership of sites, and implement some degree of long-term protection.

5.0 REFERENCES

Cited references are located with the U.S. Fish and Wildlife Service's Virginia Field Office, 6669 Short Lane, Gloucester, Virginia 23061.

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Tompa, Alex. 1984. Land snails (Stylommatophora). Chapter 2. The Mollusca: Reproduction. Vol. 7: Pp. 47-140.

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U.S. FISH AND WILDLIFE SERVICE

5-YEAR REVIEW OF Virginia fringed mountain snail, *Polygyriscus virginianus*

Current classification: Endangered

Recommendation resulting from the 5-Year Review:

_____ Downlist to Threatened
_____ Uplist to Endangered
_____ Delist
__x__ No change needed

Review conducted by: Michael Drummond

FIELD OFFICE APPROVAL

Lead Field Supervisor, Fish and Wildlife Service

Approve Karen L. Mayne Date 8/30/2007

Karen L. Mayne
Supervisor, Virginia Field Office

REGIONAL OFFICE APPROVAL

Lead Regional Director, Fish and Wildlife Service

Approve _____ Date 1/29/08

Acting Regional Director, Northeast Region

/s/Wendi Weber

Attachment: History of Events Relating to the Virginia Fringed Mountain Snail

1947 Twelve specimens of an unknown snail were collected, and later named by Paul Burch as *Polygyra virginiana* (within the family Polygyridae).

1948 Two more specimens collected by Paul Burch and sent for taxonomic review of soft body parts: specimens were allowed to dry out and no taxonomic review could be done.

1948 Pilsbry examined the species and felt it was not *Polygyra* and established a new subgenus, *Polygyriscus*.

1962 Burch treats this as a full genus, making it a monotypic genus.

1971 Three specimens collected and sent to the Chicago Field Museum for taxonomic classification. Solem examined the specimens and placed the snail in the family Helicodiscidae.

1971 Living juveniles were last observed.

1978 Federally listed as endangered.

1981 Three living adult snails observed.

1983 Recovery plan approved.

1986 One living adult snail observed (last observation of a living adult).

2002 Survey for proposed pipeline right-of-way, 33 land snail species collected, no *Polygyriscus virginianus*.

2005 Virginia Department of Game and Inland Fisheries funded a small survey by Ken Hotopp (Appalachian Conservation Biology). Shells of *Polygyriscus virginianus* were found at two sites (subfossil shells).

2007 Virginia Department of Game and Inland Fisheries funded another small survey by Ken Hotopp (Appalachian Conservation Biology). Results not available as of this report.

2007 U.S. Fish and Wildlife Service initiates status review.