CANDIDATE ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: Leptoxis downei

COMMON NAME: Georgia rocksnail

LEAD REGION: 4

INFORMATION CURRENT AS OF: January 2003

STATUS/ACTION (Check all that apply):
___ New candidate
_X_ Continuing candidate
    _X_ Non-petitioned
    ___ Petitioned - Date petition received: ___
        ___ 90-day positive - FR date: ___
        ___ 12-month warranted but precluded - FR date: ___
        _ Is the petition requesting a reclassification of a listed species?
    ___ Listing priority change
        Former LP: ___
        New LP: ___
Latest date species first became a Candidate: _____
___ Candidate removal: Former LP: ___ (Check only one reason)
    ___ A - Taxon more abundant or widespread than previously believed or not subject to a degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
    ___ F - Range is no longer a U.S. territory.
    ___ M - Taxon mistakenly included in past notice of review.
    ___ N - Taxon may not meet the Act=s definition of Aspecies.@
    ___ X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Snails - Pleuroceridae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Alabama, Georgia

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Georgia

LEAD REGION CONTACT (Name/phone number): Rick Gooch 404/679-7124

LEAD FIELD OFFICE CONTACT (Office, name, phone number): Jackson, Mississippi Field Office, Paul Hartfield, 601/321-1125

SUPPORT FIELD OFFICE(S): Athens, Georgia Field Office
BIOLOGICAL INFORMATION (Describe habitat, historic vs. current range, historic vs. current population estimates (#populations, #individuals/population), etc.):

Species Description

The Georgia rocksnail is a small to medium sized freshwater snail that historically occurred in the upper Coosa River drainage of Alabama and Georgia. The shell is plicate with obscure striations, subglobose, thick, dark, olive in color, and may be spotted. The spire of the shell is very low, and the aperture is large and surotund.

Taxonomy

The Georgia rocksnail is a freshwater prosobranch gastropod in the family Pleuroceridae. The species was described from the Conasauga River, Whitfield County, Georgia, as Anculosa downiei by Lea, 1861, and subsequently placed in the genus Leptoxis. Leptoxis downiei is a member of the Leptoxis plicata (Conrad 1834) group, which is considered to have two closely related species, Leptoxis foremani (Lea 1843) and Leptoxis formosa (Lea 1860), both of which are presumed extinct.

Habitat

Rocksnails live in shoals, riffles, and reefs of small to large rivers. Their habitats are generally subject to moderate currents during low flows and strong currents during high flows. These snails live attached to bedrock, boulders, cobble, and gravel, and tend to move little, except in response to changes in water level. They are believed to lay their adhesive eggs within the same habitat (Goodrich 1922). Georgia rocksnails are currently found in shoal habitats with sand-boulder substrate, at depths less than 50 cm (20 in), and in currents less than 40 cm/sec (16 in/sec) (Johnson and Evans 2001).

Historical Range/Distribution

The Georgia rocksnail was historically found in the Coosa River in Cherokee, Etowah, and St. Clair Counties, and in Terrapin Creek in Cherokee County, Alabama; the Coosa and lower Etowah Rivers in Floyd County, Georgia; the Oostanaula River in Floyd and Gordon Counties, and the Conasauga River in Gordon, Whitfield, and Murray Counties, Georgia (Goodrich 1922). The snail was found in colonies on reefs and shoals.

Current Range/Distribution

Numerous snail surveys have been recently conducted within the historical range of the Georgia rocksnail (Davis 1974; M. Pierson, Field Records 1991-1998, Calera, Alabama, in litt.; Bogan and Pierson 1993; Williams and Hughes 1998; Jim Godwin, Alabama Natural Heritage Program, in litt. 1998). These survey efforts resulted in the collection of only a single live specimen from the Oostanaula River, Floyd County, Georgia, during 1997 (Williams and Hughes 1998). Intensive surveys of the Oostanaula, Coosa, and Conasauga Rivers in 1999 identified two small populations in a 5-mile reach of the Oostanaula River upstream of the Gordon/Floyd County line (Johnson and Evans 2000).

Population Estimates/Status

Numbers of Georgia rocksnails within these populations have been measured at average densities of 10 to 45 snails per square meter (Johnson and Evans 2001).

THREATS (Describe threats in terms of the five factors in section 4 of the ESA providing specific, substantive information. If this is a removal of a species from candidate status or a change in listing priority, explain reasons for change):

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

The Georgia rocksnail has disappeared from virtually its entire historic range. This significant curtailment of range is primarily attributed to the construction of dams and increases in water-borne pollution, particularly sediments.

About 50 percent (161 kilometers (100 miles)) of the Georgia rocksnail=s historic habitat is affected by dams. Rivers impounded by dams have reduced water velocities, allowing sediments to accumulate on river channel habitats behind dams. Impounded waters also experience changes in water chemistry, which can affect survival or reproduction of riverine snails. For example, reservoirs in the Coosa River drainage currently experience some level of eutrophic (i.e., enrichment of a water body with nutrients) conditions (Alabama Department of Environmental Management (ADEM) 1994, 1996). The Georgia rocksnail requires highly oxygenated moving waters and clean rock bottoms to survive and reproduce. The physical and chemical changes to water and habitat resulting from impoundments affect feeding, respiration, and reproduction of the Georgia rocksnail.

Prior to the passage of the Clean Water Act and the adoption of State water quality criteria, water pollution may have been a significant factor in the disappearance of Georgia rocksnail populations from unimpounded portions of river channels. For example, Hurd (1974) noted the extirpation of freshwater mussel communities from the Conasauga River below Dalton, Georgia, apparently as a result of textile and carpet mill waste discharges. He also attributed the disappearance of the mussel fauna from the Etowah River and other tributaries of the Coosa River, to organic pollution and siltation.

Short-term and long-term impacts of point and non-point source water and habitat degradation continue to be a primary concern for the survival of the Georgia rocksnail. Point source discharges and land surface runoff (non-point pollution) can cause nutrification, decreased dissolved oxygen concentration, increased acidity and conductivity, and other changes in water chemistry that are likely to seriously impact aquatic snails. Point sources of water quality degradation include municipal and industrial effluents.

Non-point source pollution from land surface runoff can originate from virtually any ground-disturbing land use activity and may include sediments, fertilizers, herbicides, pesticides, animal wastes, septic tank and gray water leakage, and oils and greases. During recent mollusk surveys of the upper Coosa River system, sediment deposition and other forms of pollution were identified as causes of habitat degradation (Williams and Hughes 1998).

Excessive sediments impact riverine snails requiring clean, hard shoal stream and river bottoms, by making the habitat unsuitable for feeding and/or reproduction. Similar impacts resulting from sediments have been noted for many other components of aquatic communities. For example, sediments have been shown to abrade and/or suffocate periphyton (i.e., organisms attached to underwater surfaces, upon which snails may feed); affect respiration, growth, reproductive success, and behavior of aquatic insects and mussels; and affect fish growth,

survival, and reproduction (Waters 1995). Field observations indicate that the Coosa rocksnail is limited by fine sediment deposition in the shoals where it survives (Paul Johnson, Southeast Aquatic Research Institute, pers. comm. 2000). Portions of the Oostanaula River drainage are affected to varying degrees by sedimentation.

Land surface runoff also contributes the majority of human-induced nutrients to water bodies throughout the country. Excessive nutrient input from fertilizers, sewage waste, animal manure, etc. can result in periodic low dissolved oxygen levels that are detrimental to aquatic species (Hynes 1970). Nutrients also promote heavy algal growth that may cover and eliminate clean rock or gravel habitats of shoal dwelling snails. Nutrient and sediment pollution may have synergistic effects (a condition in which the toxic effect of two or more pollutants is much greater than the sum of the effects of the pollutants when operating individually) on freshwater snails and their habitats, as has been suggested for aquatic insects (Waters 1995).

B. Overutilization for commercial, recreational, scientific, or educational purposes.

The Georgia rocksnail has no commercial value, and overutilization has not been a problem. However, unregulated collecting by private and institutional collectors could pose a threat due to the species= rarity.

C. Disease or predation.

Aquatic snails are consumed by various vertebrate predators, including fishes, mammals, and possibly birds. Predation by naturally occurring predators is a normal aspect of the population dynamics of a species and is not considered a threat to this species.

D. The inadequacy of existing regulatory mechanisms.

There is currently no information on the sensitivity of the Georgia rocksnail to common industrial and municipal pollutants. Current State and Federal regulations regarding such discharges are assumed to be protective; however, this snail species may be more susceptible to some pollutants than test organisms currently used in bioassays. A lack of adequate research and data may prevent existing authorities, such as the Clean Water Act, administered by the Environmental Protection Agency and the Army Corps of Engineers, from being fully utilized. Lacking State or Federal recognition, the Georgia rocksnail is not currently given any special consideration under other environmental laws when project impacts are reviewed.

E. Other natural or manmade factors affecting its continued existence.

The species is known from a restricted reach of the Oostanaula River, making it vulnerable to random natural or manmade catastrophic events. Inbreeding and reduced genetic diversity may also be a threat.

FOR RECYCLED PETITIONS:

a. Is listing still warranted? ___

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? ___

c. Is a proposal to list the species as threatened or endangered in preparation? ___

d. If the answer to c. above is no, provide an explanation of why the action is still precluded.

LAND OWNERSHIP (Estimate proportion Federal/state/local government/private, identify non-private owners):

Watersheds flowing into the Oostanaula River are primarily privately owned.

PRELISTING (Describe status of conservation agreements or other conservation activities):

Extensive survey activity for mollusks has occurred throughout the upper Coosa River drainage. Partners currently conducting studies (U.S. Geological Survey, Southeast Aquatic Research Institute (SARI), etc.) are aware of the rediscovery of the species and are actively searching for additional populations. SARI has established a captive colony for research and propagation. State and Federal regulatory agencies have been informally notified of the general location of the rediscovery.

REFERENCES (Identify primary sources of information (e.g., status reports, petitions, journal publications, unpublished data from species experts) using formal citation format):

Alabama Department of Environmental Management (ADEM). 1996. Water quality report to Congress for calender years 1994 and 1995. Montgomery, Alabama. 144 pp.

Alabama Department of Environmental Management. 1994. Water quality report to Congress for calender years 1992 and 1993. Montgomery, Alabama. 111 pp.

Bogan, A.E. and J.M. Pierson. 1993. Survey of the aquatic gastropods of the Coosa River Basin, Alabama: 1992. Alabama Natural Heritage Program. Contract Number 1923.

Davis, G.M. 1974. Report on the rare and endangered status of a selected number of freshwater Gastropoda from southeastern U.S.A. Report to the U.S. Department of Interior, Fish and Wildlife Service, Washington, D.C. 51 pp. 25 maps.

Goodrich, C. 1922. The Anculosae of the Alabama River Drainage. Miscellaneous Publications, Museum of Zoology, University of Michigan (7):1-57.

Hurd, J.C. 1974. Systematics and zoogeography of the unionacean mollusks of the Coosa River drainage of Alabama, Georgia, and Tennessee. Ph.D. Dissertation, Auburn University, Auburn, AL. 240 pp.

Hynes, H.B.N. 1970. The Ecology of Running Waters. University of Toronto Press, Toronto.

Johnson, P. D. and R.R. Evans. 2000. A contemporary and historical database of freshwater mollusks in the Conasauga River Basin. Report to USGS. SARI, Cohutta, GA.

Johnson, P. D. and R.R. Evans. 2001. The status of Leptoxis downiei in the upper Coosa River syystem of Georgia and Alabama. Report to USFWS. SARI, Cohutta, GA.

Waters, T.F. 1995. Sediment in streams: sources, biological effects, and control. American Fisheries Society Monograph 7. 251 pp.

Williams, J.D. and M.H. Hughes. 1998. Freshwater mussels of selected reaches of the main channel rivers in the Coosa drainage of Georgia. U.S. Geological Survey report to U.S. Army Corps of Engineers, Mobile District. 21 pp. and appendices.

LISTING PRIORITY (place * after number)

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5*
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: Only a small reach of river currently supports the species. This reach is subject to hydropower releases and detrimental land use activities.

Imminence: Federal and State water quality laws have reduced water quality threats to some degree. Non-point pollution threats are cumulative and gradual.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all additions of species to the candidate list, removal of candidates, and listing priority changes.

Approve: Linda Kelsey March 14, 2003

Acting Regional Director, Fish and Wildlife Service Date

Concur: _____ _____

Director, Fish and Wildlife Service Date

Do not concur: _____ _____

Director, Fish and Wildlife Service Date

Director's Remarks:

-

-

Date of annual review: January 2003

Conducted by: Paul Hartfield - Jackson, Mississippi FO

Comments:

-

-

-