

RECOVERY PLAN

MAGAZINE MOUNTAIN SHAGREEN



U.S. Fish and Wildlife Service

MAGAZINE MOUNTAIN SHAGREEN
Mesodon magazinensis

RECOVERY PLAN

Prepared by

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Jackson, Mississippi

for

Southeast Region
U.S. Fish and Wildlife Service
Atlanta, Georgia

Approved:


James W. Pulliam, Jr.
Regional Director, U.S. Fish and Wildlife Service

Date:

February 1, 1994

Recovery plans delineate reasonable actions that are believed to be required to recover and/or protect the species. Plans are prepared by the U.S. Fish and Wildlife Service, sometimes with the assistance of recovery teams, contractors, State agencies, and others. Objectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Recovery plans do not necessarily represent the views nor the official positions or approvals of any individuals or agencies, other than the U.S. Fish and Wildlife Service, involved in the plan formulation. They represent the official position of the U.S. Fish and Wildlife Service only after they have been signed by the Regional Director or Director as approved. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery tasks.

Literature citations should read as follows:

U.S. Fish and Wildlife Service. 1994. Recovery Plan for Magazine Mountain Shagreen. U.S. Fish and Wildlife Service, Jackson, Mississippi. 26 pp.

Additional copies of this plan may be purchased from:

Fish and Wildlife Reference Service
5430 Grosvenor Lane, Suite 110
Bethesda, Maryland 20814

Telephone: 301/492-6403 or
1-800/582-3421

Fees for recovery plans vary, depending on the number of pages.

EXECUTIVE SUMMARY

Current Status: The Magazine Mountain shagreen (*Mesodon magazinensis*) is listed as a threatened species. It is currently known from near the summit of Magazine Mountain in Logan County, Arkansas. No other historical records exist for the species.

Habitat Requirements and Limiting Factors: This species occurs in wooded talus slopes near the summit of the north and west faces of Magazine Mountain and from the north slope of Bear Hollow on Magazine Mountain. The species is vulnerable to any land use change or activity that would have an adverse effect on its habitat.

Recovery Objective: Delisting.

Recovery Criteria: This species will be considered for delisting when its habitat is protected from any future adverse activity or modification, and its population is stable or increasing. Criteria for determining what constitutes a stable population (minimum number of individuals, size and quality of habitat, population age structure, etc.) will be developed as a recovery task.

Actions Needed:

- (1) Develop and implement a Memorandum of Understanding between the Forest Service and the Fish and Wildlife Service that would ensure protection for the species and its habitat following delisting.
- (2) Determine population parameters and stability.
- (3) Search for additional populations.

Total Estimated Cost of Recovery: The estimated cost of recovery is \$35,000 for the first 3 years of a 10-year recovery effort.

Date of Recovery: Estimated date of recovery is 2010, if recovery criteria are met.

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PART I: INTRODUCTION

Background

The Magazine Mountain shagreen (*Mesodon magazinensis*) is a terrestrial snail originally described as a subspecies of *Polygra edentatus* from a series of 114 specimens collected on Magazine Mountain, Logan County, Arkansas, in 1903 (Pilsbry and Ferriss 1906). Pilsbry (1940) subsequently placed this snail into the genus *Mesodon* and elevated it to specific status.

In 1976, the U.S. Fish and Wildlife Service (Service) published a proposed rule to determine 32 species of snails, including *Mesodon magazinensis*, as endangered or threatened. However, the proposal was withdrawn in 1979 for administrative reasons stemming from new listing requirements of the 1978 amendments to the Endangered Species Act. The Magazine Mountain shagreen was included as a category 2 candidate species in a Notice of Review of Invertebrate Wildlife for Listing as Endangered or Threatened Species in 1984 (U.S. Fish and Wildlife Service 1984). In 1986, Dr. Ronald S. Caldwell completed a status survey of this species under contract with the Arkansas Nongame Species Preservation Program. The Service repropoed the Magazine Mountain shagreen in 1988 based on the results of Dr. Caldwell's survey, and the snail was subsequently listed as a threatened species by the U.S. Department of the Interior, effective April 17, 1989 (U.S. Fish and Wildlife Service 1989).

Description

The Magazine Mountain shagreen is a medium-sized snail, dusky brown, or buff colored, measuring approximately 13 millimeters (mm) (0.5 inches) wide and 7 mm (0.3 inches) high. The rough shell surface is covered with half-moon, scalelike processes that can be seen with a hand lens. The outer lip of the aperture has a small triangular shaped tooth, the inner side has a bladelike tooth, and there is a small swelling on the basal lip near the center of the shell (Pilsbry and Ferriss 1906). It is separated from the shagreen (*Mesodon inflectus*), which is also found on Magazine Mountain, by its reduced aperture teeth and a broader penial retractor muscle (Caldwell 1986). Another similar species, the smoothlip shagreen (*Mesodon edentatus*), is not known to occur with the Magazine Mountain shagreen and is distinguished by its smaller size and genitalial differences (Caldwell 1986).

Distribution

The Magazine Mountain shagreen is historically known from only the north slopes of Magazine Mountain in Logan County, Arkansas (Figure 1). A single dead specimen was found on the south slope of Magazine Mountain in 1903 (Pilsbry and Ferriss 1906), but a south slope population has never been verified. Over a 12-month period, Caldwell (1986) surveyed the majority of appropriate habitat on the north face of the mountain, as well as

ARKANSAS

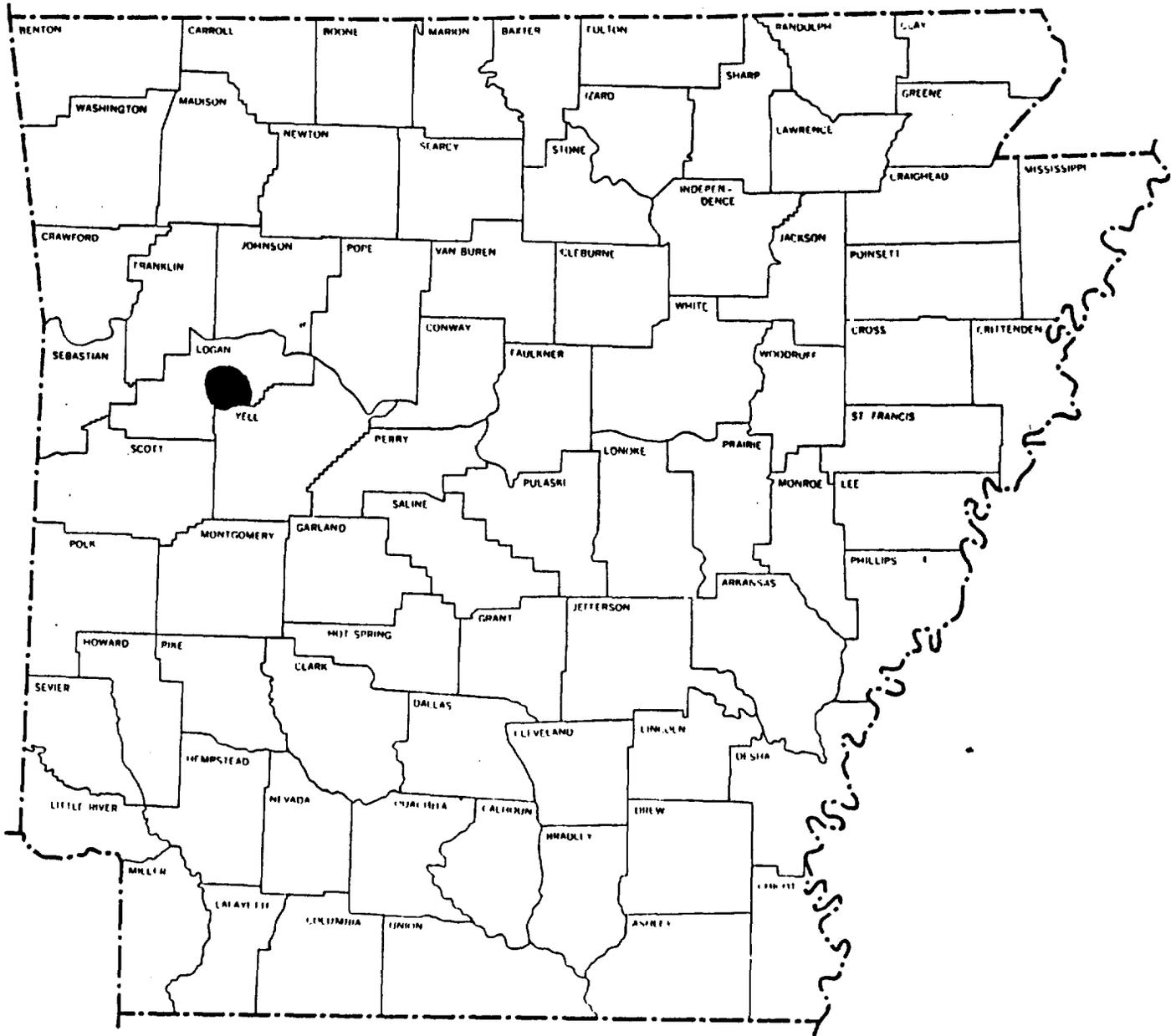


Figure 1 - Known Range of Magazine Mountain Shagreen

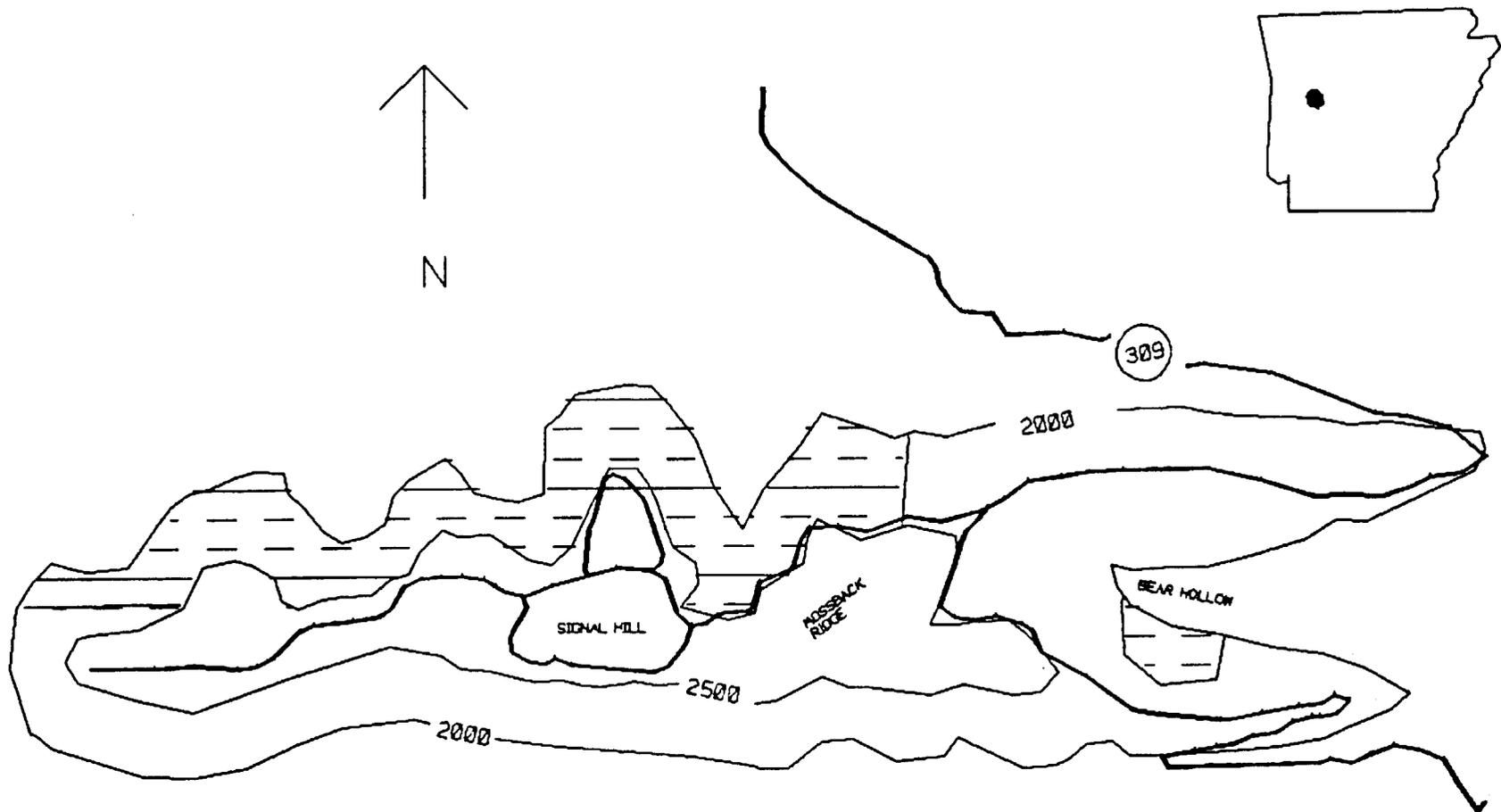
appropriate habitat on the west and south faces for occurrence of the species. He found populations of the snail along the base of the north face and the west end of the mountain between 600 meters (2,000 feet) and 790 meters (2,600 feet) elevation where suitable habitat occurred (Figure 2). Caldwell estimated total habitat available to the species at 218.5 hectares (540 acres). Caldwell was unable to locate the snail on the south slope and found that the west slope population of the Magazine Mountain shagreen ended abruptly upon moving to the south face. He hypothesized that drier and warmer conditions on the south slope made the area less habitable for the species.

Habitat/Ecology

Magazine Mountain is located in southeastern Logan County, Arkansas, on the southern edge of the Arkansas River Valley, south of the Boston Mountain range and north of Fourche Mountain range. Rising to an elevation of 2,753 feet above sea level, it is the highest peak in Arkansas. The average annual temperature at the summit of the mountain is about 6 degrees Fahrenheit (F) cooler than the surrounding area; however, the midsummer summit temperature is often as much as 10 to 25 degrees F cooler. The average annual precipitation at the summit is 55 inches, approximately 5 inches greater than at lower elevations. Precipitation ranged from a high of 81 inches to a low of 37 inches during the period from 1951 to 1960. The mountain bedrock is Pennsylvanian sedimentary rock consisting of various shale and sandstone formations. Magazine Mountain is within the Ozark National Forest, and the U.S. Forest Service owns all lands on the mountain (USDA 1980).

Populations of the Magazine Mountain shagreen occur in rock debris accumulations (talus slopes or rock streams) of approximately 60 percent slope along the base of cliffs on the north and west slope of the summit. Vere (1983) has discussed the development and characteristics of the rock streams of Magazine Mountain. Light deciduous woods are found along the edges of the talus slopes, and organic debris such as logs and leaf litter are probably utilized by the snail for cover and/or food. These conditions exist on the south face of the mountain as well, however, it is considerably drier on the south face. The snail apparently prefers cool, moist conditions and appears to move deep into rock crevasses in response to warm or dry weather. Caldwell found the species to be most active during the spring of the year, and becoming difficult to collect with the onset of dry, warm weather. The only two specimens that have been collected under warm and dry conditions had secreted epiphragms (a membrane to protect the shell aperture).

The reproductive biology is unknown for this species. Caldwell did not find eggs in the field or in the reproductive tracts of dissected specimens. He suspected that eggs are laid deep within the talus (Caldwell 1986). No information is available on life history or population densities.



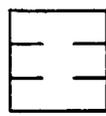
 DISTRIBUTION OF
MAGAZINE MOUNTAIN SHAGREEN

FIGURE 2

Limiting Factors

The restricted range of the Magazine Mountain shagreen makes it vulnerable to any land use change or activity that would have an adverse effect on the talus slopes where it is found. Toxic chemical application, runoff, or drift (i.e., herbicides, pesticides, fire-retardant slurries) may have a detrimental impact on the species.

Conservation Measures

The entire range of the Magazine Mountain shagreen is in the Ozark National Forest and the U.S. Forest Service is aware of its presence. The Forest Service has designated the north slope of the mountain from the bluff line to the 1600 foot contour interval as a Special Interest Area. This encompasses the Magazine Mountain shagreen habitat. The designation protects the area from forest management practices that might be detrimental to the vegetation associated with the snail's habitat. This area is also being considered for classification as a Research Natural Area (RNA) by the Forest Service. RNA designation would offer a higher level of protection to current habitat conditions, as well as controlling collections, research, and recreational activities in the area. The U.S. Army is no longer considering the use of Magazine Mountain for training exercises, an activity that was considered as a threat to the species when it was listed.

Several agencies, including the U.S. Fish and Wildlife Service, have contributed to an Environmental Impact Statement for the development and construction of a State park on the summit of Magazine Mountain (USDA Forest Service 1993). The Impact Statement assessed five considered alternatives and concluded that the selected alternative, with appropriate management, will not impact the snail or its habitat. The selected alternative includes construction of facilities on the south face of the mountain, improvement of existing camping and picnic facilities on the north slope, additional hiking trails, and a reconstructed homestead. Mitigation measures that will help minimize impacts to the snail and its habitat include the development of a revegetation/erosion/sediment control plan, monitoring of sensitive species habitats, and reduction of foot traffic along bluff lines and rock outcrops where sensitive species occur.

PART II: RECOVERY

A. Objective

The recovery objective is to delist the Magazine Mountain shagreen. This species will be considered recovered when long-term protection of its habitat is achieved; and it is determined from 10 years of data that the snail population is stable or increasing.

Long-term protection of habitat will be achieved when a Memorandum of Understanding (MOU) between the Forest Service and the Fish and Wildlife Service is developed and implemented. The MOU must delineate measures protecting the species and its habitat from any foreseeable threats prior to and following delisting. In order to provide long-term protection, this MOU must be continuous in effect and must require a minimum 2-year written notification prior to cancellation by either party. Criteria for determining what constitutes a stable population (minimum number of individuals, size and quality of habitat, population age structure, catch per unit effort, etc.) will be developed as one of the recovery tasks.

The estimated date for delisting is 2010, based upon the effective implementation of the following recovery tasks by the year 2000.

These recovery criteria are preliminary and may be revised on the basis of new information.

B. Outline For Recovery Actions Addressing Threats

1. Provide long-term protection for Magazine Mountain shagreen habitat through a Memorandum of Understanding (MOU) between the Forest Service and the Fish and Wildlife Service. All known historic habitat for the species encompasses approximately 540 acres of talus slopes along the north and west faces of the Magazine Mountain summit. Protection of this area is essential to ensure the survival of the Magazine Mountain shagreen. The snail's habitat, as well as an extensive surrounding area, is administered by the U.S. Forest Service. A MOU should be developed and implemented that ensures protection for the shagreen, its known habitat, and a surrounding buffer area from any land use change or activity that might have a potential adverse effect. The MOU should provide for consideration of the impacts of activities such as forestry practices, construction activities, recreation activities, road and campground maintenance, sewage treatment and disposal, herbicide and pesticide use, fire management actions, etc.. In order to ensure long-term protection, the MOU should be a continuing agreement without a designated termination date, and require a minimum 24-month notification period prior to cancellation by either party.

2. Determine and monitor population parameters of the Magazine Mountain shagreen. In order to determine if the shagreens' population is stable or increasing, the distribution and density of the snail should be determined and monitored. A sampling program should be established and implemented for a 10-year period to determine population parameters.
 - 2.1 Determine, map, and monitor the distribution of the Magazine Mountain shagreen and its associated habitat on the north and west slopes of Magazine Mountain. Talus slopes and other appropriate habitat should be identified, mapped, and intensively surveyed for the presence/absence of the Magazine Mountain shagreen during a spring and early summer season. Survey information should be recorded on USGS 7.5 minute topographic maps. Snail localities, as well as adjacent peripheral habitats and talus slopes where the snails are not found on the north and west slopes, should be surveyed during a spring season at 2-year intervals for a minimum period of 10 years to determine if the range is stable or increasing.
 - 2.2 Design and implement a standard survey procedure to estimate population density and to determine population age structure. A survey procedure should be designed and implemented to monitor population trends that can be reliably compared through time. At least 10 sampling stations should be established representing both optimum and peripheral habitat. Sampling should be conducted during the spring season annually for a period of at least 10 years. Snails should be measured and recorded to determine population age structure.
3. Develop other information on life history and habitat parameters. There is no data on the life history and ecology of the Magazine Mountain shagreen. Information on reproduction and fecundity of the species and its habitat preferences should be developed as a process of establishing distributional and density parameters under task 2.
4. Determine the parameters of a stable population. The species can be delisted only if it is determined that the population is stable. The criteria necessary for this determination (i.e., minimum number of individuals, size and quality of habitat, population age structure, etc.) would be developed under tasks 2 and 3.
5. Conduct surveys of potential habitat in the vicinity of Magazine Mountain. Sites within the vicinity of Magazine Mountain which have talus slopes and similar habitat as that utilized by the species should be searched for unknown populations during the initial 2-year survey period. Potential habitat on the south slope of Magazine Mountain should be surveyed at 2-year intervals until the species is delisted to determine if the population is utilizing that habitat.

6. Develop monitoring plan to ensure that Magazine Mountain shagreen recovery has been achieved. Information on this species' distribution, habitat needs, and life history characteristics is critical to the development of this monitoring plan. The specifics of this monitoring plan will materialize, as recovery tasks are completed and this information is obtained. Monitoring should be implemented for a minimum of 5 years following delisting.

C. Literature Cited

- Caldwell, R.S. 1986. Status of *Mesodon magazinensis* (Pilsbry and Ferriss), the Magazine Mountain middle-toothed snail. Grant Number 84-1 for Arkansas Nongame Species Preservation Program. 18 pp.
- Pilsbry, H.A., and J. Ferriss. 1906. Mollusca of the Ozarkian fauna. Proc. Acad. Nat. Sci., Philadelphia. 1906:529-567.
- Pilsbry, H.A. 1940. Land Mollusca of North America (North of Mexico). Acad. Nat. Sci., Philadelphia, Monog. 3, 1(2):575-994.
- U.S. Department of Agriculture. 1980. Mt. Magazine Recreation Development Level. Final Environmental Impact Statement. Forest Service, Atlanta, GA. 62 pp.
- U.S. Fish and Wildlife Service. 1984. Endangered and threatened wildlife and plants; review of Invertebrate wildlife for listing as endangered or threatened species. Federal Register 49(100):21674.
- U.S. Fish and Wildlife Service. 1989. Endangered and threatened wildlife and plants; determination of *Mesodon magazinensis* (Magazine Mountain shagreen) to be a threatened species. Federal Register 54(72):15206-15208.
- Vere, V.K. 1983. A preliminary report on the rock streams of Mount Magazine, Arkansas. Report to U.S. Forest Service, Ozark National Forest, Russelville, AR. 16 pp.
- USDA Forest Service. 1993. Environmental Impact Statement, Proposed Mt. Magazine State Park. Ozark-St. Francis National Forests. Russellville, AR.

PART III: IMPLEMENTATION SCHEDULE

The following Implementation Schedule outlines recovery actions and their estimated costs for the first 3 years of the recovery program. It is a guide for meeting the objective discussed in Part II of this plan. This schedule indicates task priorities, task numbers, task descriptions, duration of tasks, the responsible agencies, and lastly, estimated costs.

Priorities in column 1 of the following Implementation Schedule are assigned as follows:

- 1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.
- 2 - An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction.
- 3 - All other actions necessary to provide for full recovery of the species.

Key to acronyms used in Implementation Schedule:

USFWS - U.S. Fish and Wildlife Service
TE - Division of Endangered Species, Ecological Services
FS - U.S. Forest Service
ADPT - Arkansas Department of Tourism and Parks

IMPLEMENTATION SCHEDULE										
PRIORITY #	TASK #	TASK DESCRIPTION	TASK DURATION	RESPONSIBLE PARTY			COST ESTIMATES (\$K)			COMMENTS/NOTES
				USFWS		Other	FY 1	FY 2	FY 3	
				Region	Division					
1	1	Develop and implement Memorandum of Understanding.	2 years	4	TE	FS, ADPT				TE will provide technical assistance.
2	2.1	Determine and monitor distribution.	10 years	4	TE	FS	10.0	5.0		
2	2.2	Design and implement survey.	10 years	4	TE	FS	5.0	3.0	3.0	
2	3	Life history information	10 years	4	TE	FS	Covered	under	Task 2.	
2	4	Determine population parameters.	10 years	4	TE	FS	Covered	under	Task 2	and 3.
3	5	Survey potential habitat.	10 years	4	TE	FS	3.0	3.0	3.0	
3	6	Post-recovery monitoring	5 years	4	TE	FS				Costs to be determined.

PART IV: APPENDIX

List of Reviewers

Bill Shepherd
Arkansas Natural Heritage Commission
225 East Markham, Suite 200
Little Rock, AR 72201

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Room 235, Thomas Bldg.
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Dr. Art Bogan
Philadelphia Academy of Science
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Philadelphia, PA 19103

Dr. Fred Thompson
Florida Museum of Natural History
Gainesville, FL 32611

Dr. Jim Williams
U.S. Fish and Wildlife Service
7920 NW. 71st St.
Gainesville, FL 32606

Dr. Carol Stein
Museum of Zoology
The Ohio State University
Columbus, OH 43210

U.S. Forest Service
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Russelville, AR 72801

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Division of Endangered Species
Mail Stop 452 ARLSQ
U.S. Fish and Wildlife Service
Washington, D.C. 20240

Office of Public Affairs
(PA, 3447 MIB)
U.S. Fish and Wildlife Service
Washington, D.C. 20240

Office of Research Support
(RD-8/ORS, Mail Stop 725, ARLSQ)
U.S. Fish and Wildlife Service
Washington, D.C. 20240

Environmental Protection Agency
Hazard Evaluation Division - EEB (TS769C)
401 M Street, SW.
Washington, D.C. 20460

Arkansas Department of Parks and Tourism
One Capitol Mall
Little Rock, AR 72201

Arkansas Game and Fish Commission
#2 Natural Resources Drive
Little Rock, AR 72201



water resources consultants

ASSOCIATES LTD. 3 INNWOOD CIRCLE • SUITE 220 • LITTLE ROCK, AR 72211

12 July 1993

Dr. Robert Bowker
Complex Field Supervisor
Fish and Wildlife Service
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

RECEIVED
JUL 14 1993

U.S. FISH AND WILDLIFE SERVICE
JUL 14 1993

Re: Agency Review Draft Recovery Plan for the Magazine Mountain Shagreen

Dear Dr. Bowker:

This letter is in response to your request for review comments on the Agency Review Draft Recovery Plan for the Magazine Mountain shagreen. The following comments are presented for your consideration.

Several text passages pertaining to the Magazine Mountain shagreen, both in the Executive Summary of the Draft Recovery Plan and on page 1, seem to be at a slight variance with the map on page 5. The Executive Summary says "known from a single site..." The account on page 1 says "known only from the north and west summit slopes..." and cites a 1986 publication by Caldwell as the source of the information. Caldwell performed field investigations during the preparation of the Environmental Impact Statement associated with the proposed State Park on Mt. Magazine and at that time also found the species in Bear Hollow. This information is probably the basis for the map presented on page 5. Suitable habitat for the species, therefore, occurs at two locally disjunct areas on the Mountain: (1) on north-facing slopes of the summit from Cameron Bluffs to the west end of the Mountain, and (2) on north-facing slopes in Bear Hollow. This is perhaps a minor point, but in view of proposed development activities on the Mountain, it might be best to define the two areas and have the narrative text reflect the information found on the map.

The next to the last sentence within the paragraph titled Limiting Factors, on page 7, should be re-phrased to be more compatible with other sentences in the paragraph. A better alternative would be "There may be a potential for siltation of the talus interstices believed to be utilized for snail egg deposition as a result of unchecked erosion from recreation or construction activities."

In conclusion, it is obvious that tasks 2 and 3, on pages 11-12 of the Draft Recovery Plan, are critical to any future delisting of the organism. Considerable fieldwork, ostensibly directed

Dr. Robert Bowker
12 July 1993
Page 2

toward determination of the status of the Magazine Mountain shagreen, has been done already. It appears, however, that much of the work has been of a qualitative nature and that little information has been recorded as to exactly where the organism has been found within the two areas of suitable habitat. Also, it appears that essentially no information has been gained relative to population structure.

It is imperative that good methodologies are employed to determine the individual points of local distribution and to derive population structure/dynamics. A good base map showing the accurate locations of talus piles is essential if those goals are to be met. Dr. Victor Vere, Geology Department, Arkansas Tech University, has mapped all of the talus slopes between Cameron Bluffs and the west end of the Mountain. Perhaps his maps, if available, could be adapted for use in this study. This might eliminate the need for production of a new base map showing the talus pile locations. Establishment of permanent plots for repeated sampling will be very important in the recovery effort, and accurate mapping is essential to that task.

Thank you for the opportunity to review the Draft Recovery Plan. If I can be of any further assistance to you, please call me at 501-225-7779.

Kindest regards,



Gary Tucker, PhD
Ecologist

get\shagreen.wp



Reply to: 2670

Date: August 12, 1993

Mr. Robert Bowker
U.S. Fish and Wildlife Service
Jackson Field Office
6578 Dogwood View Parkway, Suite A
Jackson, MS 39213

Dear Mr. Bowker:

In response to your request dated June 30, 1993, we offer the following comments concerning review of the Agency Draft Magazine Mountain Shagreen Recovery Plan.

Page 7 - Due to the completion of the Final Environmental Impact Statement (FEIS) and Record of Decision permitting a state park to be developed on the top of Mt. Magazine by the Arkansas Department of Parks and Tourism we feel that the section on Limiting Factors needs reworking. The selected alternative D is described on pages 2-15 thru 2-17 of the FEIS. There will be no construction of buildings, roads, pipelines or trails or anything else within the known distribution of the shagreen. The new waterline and access road will be coming up the south side of the mountain. The Cameron Bluff campground, which is above the snail habitat, will have a bathhouse and amphitheater constructed, but no new campsites. Siltation from these activities will be insignificant given the small acreage involved, the gentle slope of campground, and mitigation. The same applies to the rim trail which heads east from the campground. The bottom line is there will be no measurable disturbance or siltation from construction of a state park. With the exception of rockclimbing/rappelling, recreation activities are somewhat restricted to outside of the snail habitat by the terrain which includes bluffs up to 200 feet high. However, to offset increased visitation, the entire west end of the mountain will be gated from where the gravel road leaves the pavement at the Brown Springs Area, and rockclimbing will be restricted to the south side of the mountain. No additions could be made to the state park facilities without NEPA compliance.

Page 9 - Paragraph 2 states that "Long-term protection of habitat will be achieved when a Memorandum of Understanding (MOU) between the Forest Service and the Fish and Wildlife Service protects the species and its habitat from any foreseeable threats following delisting". An MOU can

outline and delineate protection measures while assigning specific tasks to each agency, but the MOU itself does not protect a species or its habitat.

Page 16 - The costs associated with recovery for the first 3 FYs if added up come to \$35,000 (35K). This figure doesn't match the cost figure given on Executive Summary under Total Estimated Cost of Recovery which states that "The estimated cost of recovery is \$45,000 for the first three years of a 10 year recovery effort".

Page 16 - The implementation schedule lists the surveying of potential habitat on surrounding mountains as a priority #3. While we agree it is important to determine and monitor the known shagreen population, it is equally important to survey those surrounding mountains for possible, yet undiscovered, shagreen populations.

Robert, we were happy to have the opportunity to review the Agency Draft Recovery Plan for the Magazine Mountain Shagreen. I hope that our comments will be of use to you and your staff. In addition, we look forward to the continued close working relationship our agencies share, and hopefully we can work together to help recover this species.

Sincerely,



for LYNN C. NEFF
Forest Supervisor