# Socorro Springsnail
(*Pyrgulopsis neomexicana*)

# 5-Year Review:
# Summary and Evaluation

**U.S. Fish and Wildlife Service**
**Albuquerque, New Mexico**

# 5-YEAR REVIEW

Socorro springsnail (*Pyrgulopsis neomexicana*)

## 1.0 GENERAL INFORMATION

### 1.1 Reviewers

**Lead Region:** Region 2, Southwest, Wendy Brown, Recovery Coordinator, 505-248-6664; Brady McGee, Recovery Biologist, 505-248-6657.

**Lead Field Office:** New Mexico Ecological Services Field Office, Marilyn Myers, Fish and Wildlife Biologist, 505-761-4754.

**Cooperating Office:** Brian Lang, Invertebrate Biologist, New Mexico Game and Fish, 505-476-8108.

### 1.2 Methodology used to complete the review

This review was conducted through public review notification and a comprehensive review of all documents regarding Socorro springsnail that were available to the U.S. Fish and Wildlife Service's (Service) New Mexico Ecological Services Field Office (NMESFO). The Federal Register notice (73 FR 14995) announcing this review was published on March 20, 2008 and solicited new information about species biology, habitat conditions, conservation measures implemented, threats, trends, and Significant Portion of the Range from other agencies, both Federal and State, non-governmental organizations, academia, and the general public. No new information was received from this solicitation. The primary source of information used in this analysis was the 1991 final listing rule (56 FR 49646), the final recovery plan (U.S. Fish and Wildlife Service 1994), unpublished reports, and personal communication with Brian Lang, Invertebrate Biologist with the New Mexico Department of Game and Fish. This 5-year review document was drafted by Marilyn Myers, Senior Fish and Wildlife Biologist, NMESFO.

### 1.3 Background

**1.3.1 FR Notice citation announcing initiation of this review:** 73 FR 14995; March 20, 2008.

**1.3.2 Listing history:**

Original listing:
**FR notice:** 52 FR 49646
**Date listed:** September 30, 1991
**Entity listed:** species, *Pyrgulopsis neomexicana*
**Classification:** Endangered

**1.3.3 Associated Rulemakings:** None.

**1.3.4 Review History:** This is the first 5-year review for this species since the species was listed in 1991. Status listed as "unknown" in Recovery Data Call every year since 2000.

**1.3.5 Species Recovery Priority Number at start of review:** 5. This number indicates a species with high degree of threat and low recovery potential.

**1.3.6 Recovery Plan or Outline**
**Name of plan:** Socorro and Alamosa Springsnail Recovery Plan
**Date issued:** August 1994
**Dates of previous revisions:** The recovery plan has not been revised.

## 2.0 REVIEW ANALYSIS

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

Not applicable. The Socorro springsnail is an invertebrate, and therefore, not covered by the DPS policy.

### 2.2 Recovery Criteria:

#### 2.2.1 Does the species have a final, approved recovery plan?

Yes.

##### 2.2.1.1 Does the recovery plan contain objective, measurable criteria?

No. The recovery criteria need to be updated with objective, measurable criteria that reflect the most up-to-date information on the species' biology and address all of the five listing factors that are relevant to the species. One criterion for delisting (translocating the springsnails to historically occupied springs) is no longer considered a viable option.

#### 2.2.2 Adequacy of recovery criteria.

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

No. Because access to the one spring where the Socorro springsnail exists (Torreon Spring) has been denied since 1995, no current information on the species, its habitat, or the magnitude of threats is available.

**2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and there is no new information to consider regarding new threats)?**

No. Lack of cooperation by the private land owner and impacts caused by their actions were not specifically identified as a threat. Inability to protect the habitat and monitor the population is a much greater threat than identified in the listing rule. In addition, the effects of climate change are also seen as a potential threat to the species.

**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.**

Downlisting will be considered when: a) a habitat management plan is formulated that provides protection of the species and its habitat, and b) the habitat management plan is in place at least 5 years and demonstrates that the continued existence of the Socorro springsnail population is assured under the conditions of the habitat management plan.

Downlisting criteria have not been met. The Socorro springsnail occurs on private land. The land owner is not interested in cooperating with government agencies (State or Federal) to ensure the conservation of the species and its habitat. A habitat management plan that engages the support of the landowner has not been written or implemented.

Which of the 5 listing factors are addressed by this criterion? The recovery plan is not specific about elements the habitat management plan should include other than "This plan should specifically focus on the historic use of the land surrounding the springs and continuation of that use." Unfortunately, the recovery plan was written for two species of springsnail (Alamosa and Socorro springsnails) and the habitat of each was/is owned by a different private landowner. It is clear from the administrative record that the land owners viewed listing of the springsnails very differently. The habitat of the Alamosa springsnail is managed by the Monticello Community Ditch Association which has owned the springs for over 130 years. In providing comments on the draft recovery plan in 1994 they emphasized that because the Alamosa springsnail had thrived under their care for the past century, they should be trusted to continue to care for the thermal springs which it inhabits. There is no evidence in our records that the landowners of the spring with the Socorro springsnail had the same intentions or motivations. However, the listing rule states that the landowners had no objections to the listing of the species (56 FR 49648).

In the case of the Socorro springsnail, historic use of the land or elements of the land use that were protective of the Socorro springsnail and its habitat were not evident or specified. Because of the vague language, it is difficult to know which of the five listing factors this criterion might have addressed. Although cattle grazing was a historic land use, it was also listed as a threat under Factor A. Modification of the

habitat (spring impoundment, a historic use) occurred before listing but continuation of those practices was also seen as a threat under Factor A. Any conditions that lessened spring flow were also seen as a threat and it is assumed that a habitat management plan would have prevented anthropogenic loss of water. However, cattle grazing was a historic use and water development for consumption by cattle would therefore have also been considered a threat. Collection of the species (Factor B), because of its rarity was seen as a minor threat. A habitat management plan could have addressed collection through restricting access to the spring.

The inability of the State to protect the habitat of the Socorro springsnail, was identified as a threat under Factor D. A habitat management plan could have effectively addressed this threat. Vandalism was considered a threat under Factor E and it is likely that a habitat management plan could have addressed this threat. Critical habitat was not designated because of the threat of vandalism. It was felt that the publication of critical habitat descriptions and maps would increase the vulnerability of the species to vandalism and collection without significantly increasing protection.

Delisting will be considered when: a) protection of the springsnail's habitat in perpetuity can be assured, and b) additional populations can be successfully established, as evidenced by recruitment and persistence over a period of 5 consecutive years, in habitat that was likely to have been historically occupied by the springsnail while the habitat management plan continues to provide protection for the habitat of the original populations.

Delisting criteria have not been met. The habitat is not protected now, there is no indication it will be protected in the near future, and there is no mechanism in place to protect it in perpetuity. No additional suitable springs have been identified that might be used for replicate populations. Although additional springs might have been suitable at one time, because of ground-water pumping, use of springs for municipal water supplies, and knowledge of the sensitivity of desert springs and the endemic species they contain, this criterion is no longer seen as a viable management option.

## 2.3 Updated Information and Current Species Status

### 2.3.1 Biology and Habitat:

The Socorro springsnail is known from only one spring (Torreon Spring) on private land in Socorro County, New Mexico. Because access to the spring has been denied since 1995, one year after the recovery plan was written, we do not have any new information on the species biology or its habitat.

### 2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

#### 2.3.2.1 Present or threatened destruction, modification, or curtailment of its habitat or range:

Because access to Torreon Spring has been denied, the status of the spring habitat and the snail population is unknown. Lack of cooperation by land owner could be viewed as a threat that was not anticipated when Socorro springsnail was listed.

#### 2.3.2.2 Overutilization for commercial, recreational, scientific or educational purposes:

Although collection was considered a potential threat in the listing, the lack of access to Torreon Spring most likely prevents any collection activities.

#### 2.3.2.3 Disease or predation:

Although the introduction of predaceous nonnative species is a potential threat, because of the restricted access, the likelihood that non-natives have been introduced is reduced. However, spring impoundment would create more favorable habitat for bullfrogs, crayfish, and nonnative fishes. It is unknown if non-natives are present at the site.

#### 2.3.2.4 Inadequacy of existing regulatory mechanisms:

The final rule listing the Socorro springsnail recognized that the State's ability to protect their habitat was limited (56 FR 49648). The rule also stated that listing the species would provide additional protection and encourage active management through the "Available Conservation Measures" (56 FR 49648). However, the conservation measures suggested in the listing rule have not provided protection. The conservation measures were: 1) The Endangered Species Act provides for possible land acquisition, 2) prohibitions of the Act make it illegal to take a listed species, and 3) permits may be issued to carry out otherwise prohibited activities. The land has not been purchased, it is unknown if take has occurred, and no permits have been issued to the landowners.

At the time of the listing, it was not foreseen that State and Federal personnel would be denied access to Torreon Spring. Although a habitat management plan was to be written which presumably would have protected the spring habitat and provided guidelines for acceptable management practices, a plan has not been written and it is not known how the spring has been managed.

**2.3.2.5 Other natural or manmade factors affecting its continued existence:**

Several biological traits have been identified as putting a species at risk of extinction (McKinney 1997, O'Grady 2004). Some of these characteristics include having a localized range, limited mobility, and fragmented habitat (Noss et al. 2006, Fagan et al. 2002). The Socorro springsnail has all of these characteristics. Having a small, localized range means that any perturbation (e.g., drought, water contamination) can eliminate the species. Having a high number of individuals at a site provides no protection against extinction. Noel (1954) noted that an amphipod (another aquatic invertebrate) in Lander Spring, New Mexico was the most abundant animal present when she did her research. The species was extirpated from that site when the spring dried up (Cole 1985). Extremely limited dispersal capability effectively eliminates the ability of the spingsnail to find and disperse to other suitable habitats or to move out of habitat that becomes unsuitable. Consequently, they are unable to avoid contaminants or other unfavorable changes to their habitat. Severe drought, spring contamination, fire, or spring development (impoundment, dredging, piping, riparian management) could result in the extinction of the species.

The effect climate change will have on springs in the southwest is unknown. However, the southwestern U.S. may be entering a period of prolonged drought (McCabe et al. 2004, Seager et al. 2007). Seager et al. (2007) showed that there is a broad consensus among climate models that the Southwest will get drier in the 21$^{st}$ century and that the transition to a more arid climate is already under way. Only one of 19 models examined showed a trend toward a wetter climate in the southwest (Seager et al. 2007). An increase in average mean air temperature of just under 1˚C (1.8˚F) has already been documented in New Mexico since 1976 (Lenart 2007). Udall (2007) found that multiple independent data sets confirm widespread warming in the western U.S.

In consultation with leading scientists from the southwest, the New Mexico Office of the State Engineer (2006) prepared a report for the Governor which made the following observations about the impact of climate change in New Mexico: "warming trends in the American southwest exceed global averages by about 50 percent; models suggest that even moderate increases in precipitation would not offset the negative impacts to the water supply caused by increased temperature; temperature increases in the southwest are predicted to continue to be greater than the global average; the intensity, frequency, and duration of drought may increase."

Increased air temperatures lead to higher evaporation rates which may reduce the amount of runoff, groundwater recharge, and consequently spring discharge. Increased temperatures across the southwest may also increase the extent of area influenced by drought (Lenart 2003), decreasing groundwater

recharge regionally, and consequently, reducing spring discharge. Prolonged drought leading to diminishment or drying of the spring would have a negative impact on the springsnail. The spring would not have to dry out completely to have an adverse effect. Decreased spring flow could lead to a decrease in the amount of suitable habitat, increased water temperature fluctuations, lower dissolved oxygen levels, and an increase in salinity (MacRae et al. 2001). In addition, as water becomes increasingly scarce, conflict over its use becomes more intense. Human and/or cattle consumption of water would be expected to increase during drought in the absence of normal rainfall. Any of these factors, alone or in combination, could lead either to the reduction or extirpation of the population.

### 2.4 Synthesis

The Socorro springsnail is a rare, hydrobiid snail that survives in only one spring located on private land in Socorro County, New Mexico. Access to the site has been denied since 1995. Designation of critical habitat was determined to not be prudent at the time of listing because the threats of vandalism and collection outweighed benefits that designation may have bestowed. Population numbers are unknown, status of habitat is unknown, and the magnitude of current threats is unknown. Specific life history and habitat needs have not been documented. The effects of climate change, if they include widespread drought, decreased spring discharge, or a change in water chemistry is a newly recognized threat that could eliminate the species. A habitat management plan has not been written for the species, as directed by the recovery plan. Translocation to other springs, a criterion for delisting, is no longer viewed as a viable option. It will continue to be very difficult to assess the status of the species until the land owner grants access to the site or land ownership changes. Because this species only occurs in one location where it could easily be extirpated by biological or environmental threats, we recommend that Socorro springsnail remain listed as endangered.

## 3.0 RESULTS

### 3.1 Recommended Classification:

No change needed**.** Remain as endangered.

### 3.2 New Recovery Priority Number: 5C

We recommend changing the recovery priority number from a 5 to a 5C. The current recovery priority number of 5 indicates a high degree of threat and a low recovery potential. The extreme isolation of this species, the lack of cooperation from the landowner, and the lack of any redundant populations indicate that the magnitude of threat to this species is high. Recovery potential is judged to be low. Because the Socorro springsnail is a narrow endemic, restricted to one spring, the potential for

range expansion or population replication is very limited. It is clear from the landowner's unwillingness to allow access to the site that conflict exists.

**3.3 Listing and Reclassification Priority Number:** Not applicable.

## 4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- The recovery plan needs to be revised and updated. Because the habitat and management of the habitat of the Socorro springsnail is so different from that of the Alamosa springsnail and because the plan is out-of-date for both species, it is recommended that revised recovery plans be written for each species.

- Continue efforts to gain access to the spring.

- If access is granted, conduct life history studies, monitor population numbers, determine attributes of suitable habitat (substrate, water temperature limits, pH, hardness, alkalinity etc.). Set up long-term monitoring of discharge and temperature.

- If access continues to be denied, attempt to set up a one-time visit to the spring to collect individuals for a captive refugium population.

**REFERENCES**


Cole, G.A. 1985. Analysis of the Gammarus-Pecos complex (Crustacea:Amphipoda) in Texas and New Mexico, USA. Journal of the Arizona-Nevada Academy of Science 20:93-103.

Fagan, W.F., P.J. Unmack, C. Burgess, and W.L. Minckley. 2002. Rarity, fragmentation, and extinction risk in desert fishes. Ecology 83:3250-3256.

Lenart, M. 2003. Southwestern drought regimes might worsen with climate change. CLIMAS, Southwest Climate Outlook. December 2003.

Lenart, M., G. Garfin, B. Colby, T. Swetnam, B. J. Morehouse, S. Doster and H. Hartmann. 2007. Global warming in the Southwest: projections, observations, and impacts. Climate Assessment for the Southwest, University of Arizona. 88 pp.

MacRae, R.K., J.D. Lusk, and W.R. Radke. 2001. Investigation of the role of environmental contaminants upon ecological sentinel species and their habitats at Bitter Lake national Wildlife Refuge, New Mexico. Report prepared by the New Mexico Ecological Services field Office, Environmental Contaminants Program. Project ID 2N27 9620001A.

McCabe, G.J., M.A. Palecki, and J.L. Betancourt. 2004. Pacific and Atlantic ocean influences on multidecadal drought frequency in the United States. Proceedings of the National Academy of Sciences (www.pnas.org/cgi/doi/10.1073/pnas.0306738101).

McKinney, M.L. 1997. Extinction vulnerability and selectivity: combining ecological and paleontological views. Annual Review of Ecology and Systematics 28:495-516.

New Mexico Office of the State Engineer. 2006. The impact of climate change on New Mexico's water supply and ability to manage water resources. 69 pp.

Noel, M. S. 1954. Animal ecology of a New Mexico springbrook. Hydrobiologia 6:120-135.

Noss, R. B. Csuti, and M.J. Groom. 2006. Habitat Fragmentation. Pages 213-251 *In* M.J. Groom, G.K. Meffe, and C.R. Carroll (editors) Principles of Conservation Biology. Sinauer Associates, Inc. Sunderland, Massachusetts.

O'Grady, J.J., D.H. Reed, B.W. Brook, and R. Frankham. 2004. What are the best correlates of predicted extinction risk? Biological Conservation 118:513-520

Seager, R., M. Ting, I. Held, Y. Kushnir, J. Lu, G. Vecchi, H-P. Huang, N. Harnik, A. Leetmaa, N-C. Lau, C. Li, J. Velez, and N. Naik. 2007. Model projections of an imminent transition to a more arid climate in SW North America. Science 316:1181-1184.

Udall, B. and G. Bates. 2007. Climatic and hydrologic trends in the Western U.S.: A review of recent peer reviewed research. The Intermountain West Climate Summary. January 2007 pp. 1-8.

U.S. Fish and Wildlife Service. 1991. Final Rule to list the Alamosa Springsnail and the Socorro Springsnail as endangered. Federal Register 56:49646-49649.

U.S. Fish and Wildlife Service. 1994. Socorro and Alamosa Springsnail Recovery Plan. New Mexico Ecological Services State Office, Albuquerque, New Mexico, August 1994. 24 pp.

**U.S. FISH AND WILDLIFE SERVICE**
**5-YEAR REVIEW of Socorro springsnail (*Pyrgulopsis neomexicana*)**

**Current Classification:** Endangered

**Recommendation resulting from the 5-Year Review:**

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
_X_ No change needed

**Appropriate Listing/Reclassification Priority Number, if applicable:** Not applicable

**Review Conducted By:** Marilyn Myers, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office

**FIELD OFFICE APPROVAL:**

**Lead Field Supervisor, U.S. Fish and Wildlife Service**

Approve _____ Date 9-24-08

**REGIONAL OFFICE APPROVAL:**

Acting **Assistant Regional Director, Ecological Services, U.S. Fish and Wildlife Service, Region 2**

Approve Susan Jacobsen Date Oct 10, 2008