

**U.S. FISH AND WILDLIFE SERVICE  
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Pyrgulopsis notidicola*

COMMON NAME: Elongate Mud Meadow springsnail

LEAD REGION: Region 8

INFORMATION CURRENT AS OF: April, 2010

**STATUS/ACTION**

Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: May 11, 2004

90-day positive - FR date:

12-month warranted but precluded - FR date:

Did the petition request a reclassification of a listed species?

**FOR PETITIONED CANDIDATE SPECIES:**

- a. Is listing warranted (if yes, see summary of threats below)? Yes
- b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
- c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

The petition received on May 11, 2004, to list *Pyrgulopsis notidicola* as endangered under the Endangered Species Act, was largely based on the present or threatened destruction, modification, or curtailment of its habitat or range, disease or predation, the inadequacy of existing regulatory mechanisms, and other natural or manmade factors affecting its continued existence (Center for Biological Diversity *et al.* 2004, pp. 196-199). We considered the information contained in the petition in this assessment; however, no new substantive data on *P. notidicola* was presented.

Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (<http://endangered.fws.gov/>) provides information on listing actions taken during the last 12

months.

Listing priority change

Former LPN:

New LPN:

Date when the species first became a Candidate (as currently defined): February 22, 2002

Candidate removal: Former LPN:

A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

F – Range is no longer a U.S. territory.

I – Insufficient information exists on biological vulnerability and threats to support listing.

M – Taxon mistakenly included in past notice of review.

N – Taxon does not meet the Act’s definition of “species.”

X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Class - Mollusca, Family - Hydrobiidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Nevada.

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:  
Humboldt County, Nevada; endemic to Soldier Meadow.

LAND OWNERSHIP: All habitat is on public lands under the management authority of the Bureau of Land Management (BLM).

LEAD REGION CONTACT: R-8, Andy DeVolder, (916) 414-6188, andy\_devolder@fws.gov

LEAD FIELD OFFICE CONTACT: Nevada Fish and Wildlife Office, Todd Gilmore, (775) 861-6300, todd\_gilmore@fws.gov

BIOLOGICAL INFORMATION

## Species Description

*Pyrgulopsis notidicola* are small (shell height is less than 3 millimeters (mm) [0.2 inch (in)]; shell width is less than 2 mm (0.1 in); and the number of whorls less than five (whorls are the spiral growth of the shell) (Hershler 1998, p. 84). The outer shell of *P. notidicola* is light to dark brown and is darkly pigmented internally. *Pyrgulopsis notidicola* is distinguished from three other native snail species in the Soldier Meadow area by its more elongate shell with short spire; larger and more disjunct aperture; well-developed columellar shelf; smaller, globose bursa copulatrix; penis with larger terminal gland; and very weak ventral gland (Hershler 1998, p. 84).

## Taxonomy

*Pyrgulopsis notidicola* is a member of the family Hydrobiidae, which consists of approximately 100 species of small freshwater gastropods found in the western United States. *Pyrgulopsis notidicola* was first described by Hershler (1998, pp. 83-84). Taxonomic analysis from samples collected in 2005 show that a newly discovered species, *P. cf. notidicola* (*cf.* = identification not confirmed), closely resembling *P. notidicola*, exists in close proximity in the Satellite Spring area of Soldier Meadow. The taxonomic relationship between *P. notidicola* and *P. cf. notidicola* (hereafter collectively referred to as *P. notidicola*) is similar enough to group them into the same clade (clade is a term used to describe a taxonomic group comprising a single common ancestor and all the descendants of that ancestor) and treat them as a single species (Hershler *et al.* 2007, p. 176). Based on the available taxonomic information (Hershler 1998, pp. 83-84), the Service recognizes *P. notidicola* as a valid taxon that is unique to the Soldier Meadow area of northwestern Nevada.

## Habitat/Life History

*Pyrgulopsis notidicola* is endemic to Soldier Meadow, which is located at the northern extreme of the western arm of the Black Rock Desert in the transition zone between the Basin and Range Physiographic Province and the Columbia Plateau Province, Humboldt County, Nevada. This region is characterized by cold, dry winters influenced primarily by cool, polar air masses, and by hot, dry summers influenced primarily by warm, tropical air masses (Nachlinger 1991, p. 4). Soldier Meadow lies between the Calico Mountains to the west and the Black Rock Range to the east, and encompasses a province of approximately 50 thermal, connected and isolated springs in an alluvial basin about 121 kilometers (km) [75 miles (mi)] north of Gerlach, Nevada and 16 km (10 mi) south of the Summit Lake Paiute Indian Reservation. The local vegetation is broadly classified into four wetland communities and three upland communities, one of which is considered transitional. The wetland communities support a tremendous diversity of plants, with over 60 different species identified in the marshes, seeps, and meadows. Thermal springs occur in the area at elevations ranging from 1,320 to 1,393 meters (m) [4,330 to 4,570 feet (ft)] (Nachlinger 1991, p. 1). Some of the springs provide the only known habitat for the desert dace (*Eremichthys acros*), a federally-listed fish endemic to approximately eight spring systems in Soldier Meadow (Rissler *et al.* 2004, p. 1).

*Pyrgulopsis notidicola* occurs in four separate stretches of thermal aquatic habitat. The first stretch is the largest at approximately 600 m (1,968 ft) long and 2 m (6.7 ft) wide. The other stretches where *P. notidicola* occurs are less than 6 m (19.7 ft) long and 0.5 m (1.6 ft) wide (Sada and Powell 2001, p. 7; Hershler *et al.* 2007, p. 169; Gilmore and Harter 2008, pp. 1-3). Water depths in unaltered portions of the spring brook do not exceed 15 cm (6 in) and substrate composition includes sand, gravel, and cobble. Current velocity varies from just greater than 0 cm per second (along the banks) to less than 40 cm per second (16 in per sec) in mid-channel (Sada and Powell 2001, p. 3). Riparian vegetation along the spring brook is dominated by sedges and rushes; woody vegetation is absent. Water temperature decreases downstream from the spring source, and *P. notidicola* becomes less abundant where temperatures drop below 34° Celsius (C) [(93° Fahrenheit (F))] (Sada and Powell 2001, pp. 7, 9).

*Pyrgulopsis notidicola* occupies two basic habitat types (D. Sada, Desert Research Institute, pers. obs. 1996; Sada and Powell 2001, pp. 7-10). The first type is near the source of springs with temperatures greater than 45° C (113° F). In this habitat, the species occupies the splash zone on rocks and riparian grasses, occurring only in wetted areas within 1 cm (0.4 in) of the water. In these high temperatures, it is semi-aquatic and not submerged. The second type of habitat occurs where the temperature decreases downstream from spring sources. In this habitat, the species disappears from the splash zone and becomes submerged, limiting itself to gravel substrate in riffles. It does not occupy sites with low current velocity or habitats with fine substrates. *Pyrgulopsis* often decline dramatically in density downstream from spring sources, presumably reflecting their requirement for the stable temperature, chemistry, and flow regime characterized by headsprings (Sada and Powell 2001, p. 7). *Pyrgulopsis* feed on algae gleaned from the substrate and aquatic vegetation, and they occupy habitats with good water quality (Sada and Powell 2001, p. 3).

#### Historic and Current Range/Distribution

*Pyrgulopsis notidicola* was first collected by J.J. Landye in Soldier Meadow during 1978 (Hershler 1998, p. 84), and populations that he collected were extant during 2001 surveys by Sada and Powell (2001, p. 6). The absence of early (pre-settlement) distributional surveys makes it impossible to determine how current distribution of *P. notidicola* compares with historical conditions. *Pyrgulopsis notidicola* is currently known only from four unnamed spring systems in the Mud Meadow drainage within the Soldier Meadow complex, three of which were discovered in 2005 (Hershler *et al.* 2007, pp. 171-172). This area is the northernmost of a large series of thermal springs having broad outflows. Additional surveys in the Soldier Meadow region have not recorded any populations outside this restricted range (Sada, pers. obs. 1996; Hershler 1998, p. 84; Hershler *et al.* 2007, p. 169).

#### Population Estimates/Status

No quantitative monitoring of *P. notidicola* has occurred. However, Sada and Powell (2001, p. 7) estimated that the density of springsnails per 25 cm<sup>2</sup> (4 in<sup>2</sup>) ranged from 0 to 27 (mean 2.7 to 13.0) in riffle habitats with gravel substrate. In 2008, Service biologists conducted presence-

absence surveys and found snails to be abundant in the same locations as in past surveys (Gilmore and Harter 2008, pp. 1-3).

## THREATS

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

The spring systems inhabited by *P. notidicola* are on public land managed by the BLM. This area of thermal springs has some of the most desirable campsites in the entire Black Rock Desert-High Rock Canyon-Emigrant Trails National Conservation Area (NCA). The top four recreational uses of Soldier Meadow listed in order are: bathing in hot springs, camping, all-terrain vehicle travel, and four wheel driving (BLM 2004, p. 22). Because the spring brook that *P. notidicola* inhabits is relatively shallow, bathers have constructed impoundments to increase water depths to a point suitable for bathing (BLM 1998, p. 22). On May 13, 2004, the BLM intensively surveyed the *P. notidicola* habitat to collect baseline information on the number and condition of the dams and associated impoundments within the complex. Within the *P. notidicola* habitat, two active dams were documented (Varner 2004, p. 99). In addition to collecting spatial and physical information on the dams, other physiochemical data were collected. These data were entered into a Geographic Information System (GIS) database, and a report (Varner 2004, pp. 1-113) was submitted to the Service in July 2004.

*Pyrgulopsis notidicola* occurs only in shallow, flowing water on gravel substrate and in adjacent splash zones or rocks and riparian grasses (Sada and Powell 2001, p. 10). The species does not occur in deep water (i.e., impoundments) where water velocity is low, gravel substrate is absent, and sediment levels are high. Along its 600 m (1,968 ft) range, the species is absent from areas where impoundments have been constructed for recreational bathing. That *P. notidicola* is found upstream and downstream of these constructed impoundments suggests that they have eliminated habitat for this species and reduced its historical range. Bathers also adversely impact habitat by increasing sedimentation through stream bank trampling and removal of vegetation. The placement of various materials (e.g., carpet in the spring brook and on its banks) to increase the comfort of the bathers also adversely impacts *P. notidicola* and its habitat. Post Burning Man Festival event cleanup by BLM in 2000 resulted in the removal of new rock dams, carpet and other various materials, which had been left behind by recreationists (L. Berglund, BLM, pers. comm. 2000). Additional cleanup was undertaken by BLM in 2005 at the most popular bathing pools; all carpet, plywood and other debris was removed.

Vehicle counts and observed visitor use data show that during the summer of 1990, approximately 2,800 people visited the Black Rock Desert (BLM 1998, pp. 3-61). Between 1994 and 1995, visitor use increased by 3,000-4,000 12-hour visitor days (BLM 1998, p. 22). By 2001, dispersed recreational users increased to nearly 70,000 days (BLM 2003, pp. 3-61). The highest use of Soldier Meadow occurs on Memorial Day weekend and the opening day of chukar hunting season; in 2003, about 26 separate hunting camps were counted with an estimated 100 people (R. Farschon, BLM, pers. comm. 2005). The visibility of the area has also increased since the designation of the NCA in 2000 (Farschon, pers. comm. 2002; BLM 2003, p. 63).

In fall 2004, the BLM constructed a central campground away from the habitat for *P. notidicola*, and implemented a campground host system during the period of peak visitor use in accordance with the Soldier Meadows Recreation Management Plan (BLM 2004, pp. 10, 14);(M. Varner, BLM, pers. comm. 2005). Although recreational use of the pools still occurs, it is now managed to preclude camping in sensitive habitats and direct foot traffic to areas where it will have minimal impacts on sensitive habitats. Flat rocks were hand placed to form level, permanent platforms for bathers and eliminate the tendency for users to place carpet or plywood at the pool edges. Interpretive signs have also been placed to educate the public about the sensitive nature of the hot springs and the native species they support. While impoundment assessments have not been performed annually, and *P. notidicola* abundance-distribution monitoring has not yet been implemented, we believe that these efforts to minimize the impacts of recreational use on *P. notidicola* have reduced the significance of the threat to the species from habitat modification and destruction.

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

Not known to be a threat to *P. notidicola* at this time.

C. Disease or predation.

Not known to be a threat to *P. notidicola* at this time.

D. The inadequacy of existing regulatory mechanisms.

Approximately 841 hectares (ha) [2,077 acres (ac)] of public land including all *P. notidicola* habitat has been designated by BLM as the Soldier Meadows Area of Critical Environmental Concern (ACEC). The ACEC initially encompassed 124 ha (307 ac) and was designated in 1982 to highlight the area where special management attention was needed to protect and prevent irreparable damage to important biological, cultural, and historical resources including the threatened desert dace. In 2004, the ACEC was increased to its current size to provide more protection and management focus on the desert dace, springsnails, and *Potentilla basaltica* (Soldier Meadow cinquefoil), a Federal candidate plant species known only from Soldier Meadow and an area in northeastern California. The ACEC is also designated as a BLM Research Natural Area (RNA), an area which contains natural resource values of scientific interest and is managed primarily for research and educational purposes.

The BLM manages *P. notidicola* and its habitat as a sensitive species in accordance with BLM Manual 6840 Release 6-125, last revised on December 12, 2008 (BLM 2008, pp. 1-47). BLM policy is to manage candidate species as sensitive species, defined as “species that require special management or considerations to avoid potential future listing” (BLM 2008, Glossary p. 5). The stated objective for sensitive species is to initiate proactive conservation measures that reduce or eliminate threats to minimize the likelihood of and need for listing (BLM 2008, p. 3). Conservation, as it applies to BLM sensitive species, is defined as “the use of programs, plans, and management practices to reduce or eliminate threats affecting the status of the species, or improve the condition of the species’ habitat on BLM-administered lands” (BLM 2008, Glossary p. 2). Conservation actions for the Soldier Meadow population were identified in the Black Rock-High Rock Resource Management Plan (RMP) (BLM 2003, Chapter 2) (see Conservation Measures Planned or Implemented below).

In 1998, the BLM completed the Soldier Meadow Activity Plan (SMAP). The preferred alternative within the SMAP was designed to: 1) address impacts to special status species and cultural resources from increased recreation, livestock, wild horse and burro grazing, and potential geothermal and mineral development; 2) implement management actions to provide favorable habitat conditions for desert dace that will enable the Service to delist the species; 3) implement management actions to protect habitat for *P. basaltica* so the Service will not need to list the species; and 4) implement management actions to protect cultural resources in the area from further degradation. Specific actions identified in the SMAP included: monitoring area use, increasing law enforcement, designating visitor use areas, designating specific bathing pools with walk-in access, limiting camping, limiting vehicle parking and camping within 61 m (200 ft) of the spring brook, developing interpretive signs, and dismantling impoundments in non-designated bathing areas. Although these actions were originally developed to conserve other rare native species, many are also beneficial to *P. notidicola* and its habitat.

In 2004, the RMP was finalized which incorporated implementation of the SMAP. Most actions of the SMAP have been implemented including increased recreational area use monitoring, limiting camping and vehicle parking to designated areas, and increased enforcement. Enforcement occurs mainly during holiday weekends or major events, such as the Burning Man Festival. Limited resources and the remote nature of the site have made it difficult to implement and enforce most of the specific actions. A designated camping area has been developed which restricts vehicle access to the spring system. BLM has increased their presence and enforcement within the area and has had a volunteer site steward camp host for the 6-month primary public use period for 5 of the last 6 years (2004-2009). The steward is able to directly interact with visitors and provided an additional mechanism to provide public outreach. A site steward is in place for the 2010 use period. Progress has been made on restricting the creation of new bathing pools and permanent improvements (e.g., platforms) to specific pools are designed to focus use in these areas. However, visitor use bathing areas have not been formally designated, allowing for continued dispersed use of the area, which negatively impacts *P. notidicola* and its habitat.

In 2004, the BLM also completed a 1,215 ha (3,000 ac) enclosure fence within Soldier Meadow.

The purpose of the fence was to eliminate livestock and wild horse grazing from the thermal springs and associated spring brooks occupied by the listed desert dace (Service 2002, p. 34), but it also provides habitat protection for the entire known distribution of *P. notidicola*.

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

Spring-dwelling species in the western United States are vulnerable to unpredictable events, which have caused decline and extirpation of many populations (Sada and Vinyard 2002, pp. 278, 280). Habitats occupied by springsnails are often small, unique habitats where environmental conditions are predictable and stochastic events are rare. However, the small size of their habitats and their limited range (many are endemic) makes them highly susceptible to any factors that negatively impact their habitat. Other spring-dwelling species have been particularly vulnerable to habitat alteration by diversion and to introduction of predaceous and competitive nonnative species (Williams *et al.* 1985, p. 2; Sada and Vinyard 2002, pp. 278, 282-283).

Because of its extremely limited range, *P. notidicola* is highly susceptible to extinction if factors in its environment become unfavorable. *Pyrgulopsis notidicola* cannot withstand desiccation for more than a few hours and does not have the ability to migrate to other suitable habitats. Its inability to withstand desiccation also means that any impacts, such as water diversions that would result in drying of its habitat, could result in extinction. This is possible even if the impact is temporary.

Introductions of nonnative species often result from intended management actions or accidental introduction by fisherman and recreational bathers. The red-rimmed thiara (*Melanoides tuberculata*) and New Zealand mudsnail (*Potamopyrgus antipodarum*) are two nonnative snail species present in western Nevada and eastern California that may be introduced into Soldier Meadow in the future (Kerans *et al.* 2005, p. 124). Both of these species are hardy, tolerant of surviving dry conditions of extended periods, and both have been transported in moist clothing or footwear. The mudsnail was recently established in North American waters where it has rapidly dominated the macroinvertebrate community (Kerans *et al.* 2005, p. 124). Continued use of *P. notidicola* habitat by bathers provides a continuing threat that these species may be accidentally introduced.

#### CONSERVATION MEASURES PLANNED OR IMPLEMENTED

The BLM has issued a Record of Decision on the RMP and Final Environmental Impact Statement for the NCA, which encompasses the Soldier Meadow area and addresses many conservation measures. In accordance with the 2004 Final Multiple Use Decision for the Soldier Meadow Allotment, the hot springs area has been fenced to exclude livestock, wild horses, and burros from the majority of *P. basaltica*, desert dace, and *P. notidicola* habitats (BLM 2004, pp. 1-78).

In May 2004, the BLM completed the Soldier Meadows Recreation Management Plan (SMRMP) (BLM 2004, pp. 1-78). The SMRMP was intended to implement numerous conservation actions

identified in the RMP for the listed and candidate species of Soldier Meadow including closing access roads to the spring, riparian and wetland areas; limiting off highway vehicles to designated roads and trails; establishing a central campground away from sensitive habitats; and implementing a monitoring program to assess the effects of these actions on listed, candidate, and sensitive species. It also included the installation of educational signage and increased presence of BLM staff, including law enforcement and a site steward during the summer camping season. All of these actions, with the exception of the monitoring program, have been fully implemented and are reported to have been successful at reducing recreational impacts to the habitats of sensitive species, including that of *P. notidicola* (T. Gilmore, Service, pers. obs. 2009). In addition to the successful reduction of threats from recreational impacts, in 2008 the Service completed presence-absence surveys and determined that *P. notidicola* was still present in all known locations within the Soldier Meadow complex (Gilmore and Harter 2008, pp. 1-3).

### SUMMARY OF THREATS

The present or threatened destruction, modification, or curtailment of its habitat or range is the greatest threat to *P. notidicola*. The small size of their habitats and their limited range makes them highly susceptible to any factors that negatively impact their habitat. Regulatory mechanisms, including conservation measures outlined in SMRMP, have been put in place and the effectiveness of these actions is helping to reduce impacts and threats (see Threats discussion). However, without monitoring data that show short- and long-term beneficial effects of current management actions, it would be premature to remove *P. notidicola* from candidate status.

For species that are being removed from candidate status:

\_\_\_ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

### RECOMMENDED CONSERVATION MEASURES

Short- and long-term monitoring of the effects of current management actions on *P. notidicola* should be implemented as soon as possible. The monitoring plan should identify specific indicators that will be monitored, set clear management objectives, and specify the management response given a range of alternative results (Kershner 1997, p. 118). Following BLM guidance on conserving springs should be a priority in the Soldier Meadow area (BLM 2001, pp. 1-70). Other actions required on an annual basis, such as increased staff presence and campground hosts should be continued. Compliance with the designated route system should also be monitored.

### LISTING PRIORITY

THREAT
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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
		<b>Species</b>	<b>11</b>
		Subspecies/population	12

Rationale for listing priority number:

*Magnitude:* The Service considers the magnitude of threats to *P. notidicola* to be moderate to low based on conservation actions set forth and implemented by BLM and the 2005 discovery of an additional population of *P. notidicola*. The SMRMP was completed in May 2004, and several conservation actions (see conservation measures discussion) were implemented. Since implementation of the conservation actions outlined in the SMRMP, impacts and threats to *P. notidicola* have been reduced and in some cases eliminated (Gilmore, pers. obs. 2006, 2007).

*Imminence:* The Service considers the immediacy of threats to be non-imminent. There are no known plans for any new activities that would adversely impact *P. notidicola* in the future.

\_\_\_ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes

Is Emergency Listing Warranted? No. The ACEC, RNA, SMAP, RMP, and SMRMP should provide enough protection for the species if they are fully implemented and enforced. The Service will continue to monitor the implementation of these plans and designations and evaluate their effectiveness. The BLM is continuing to monitor habitat conditions and unless additional habitat destruction or water quality issues arise, emergency listing is not warranted at this time.

#### DESCRIPTION OF MONITORING

No quantitative monitoring of the original *P. notidicola* population has occurred since 2004. The Satellite Springs population has not been fully surveyed since identified from 2005 collections (Hershler *et al.* 2007, p. 176). However, Service biologists implemented presence-absence

surveys in 2008 and found snails to be abundant in all locations as in past surveys (Gilmore and Harter 2008, pp. 1-3).

#### COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: None.

Indicate which State(s) did not provide any information or comments: Nevada. The State of Nevada does have regulations or management authority for aquatic invertebrates.

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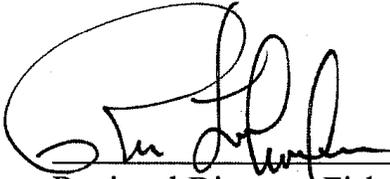
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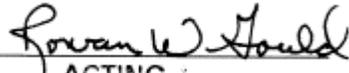
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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:   
Regional Director, Fish and Wildlife Service Date 6.7.2010

Concur:   
ACTING :  
Director, Fish and Wildlife Service Date: October 22, 2010

Do not concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 15, 2010  
Conducted by: Todd Gilmore

FY 2010, R8 CNOR: Elongate Mud Meadow springsnail