

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Invertebrate Abstract

Element Code: IMGASJ0560Data Sensitivity: Yes**CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE**

NAME: *Pyrgulopsis trivialis*
COMMON NAME: Three Forks Springsnail, Black River Springsnail
SYNONYMS: *Fontelicella trivialis*, *Pyrgulopsis confluentis*
FAMILY: Hydrobiidae

AUTHOR, PLACE OF PUBLICATION: D.W. Taylor. 1987. Fresh-water molluscs from New Mexico and vicinity. Bulletin 116 New Mexico Bureau of Mines & Mineral Resources. Socorro, New Mexico. P. 34-36.

TYPE LOCALITY: Spring on north side of Blanket Creek at Three Forks, Apache County, Arizona.

TYPE SPECIMEN: Holotype: USNM 859053. J.J. Landye, 7 October 1973. Another Holotype is also listed: Holotype, LACM 2225. D.W. Taylor, 11 May 1980.

TAXONOMIC UNIQUENESS: There are 12 known species in the genus *Pyrgulopsis* in Arizona. (Pearson et al. 2014).

DESCRIPTION: Shell narrowly elongate with relatively long spire. Shell height (from top of shell to bottom of shell) is 1.5 to 4.8 mm. The shell has 3.5-4.75 unshouldered and well-rounded whorls. The shell size and shape is different between the two populations. Periostracum, a layer of chitin surrounding the outer shell, is tan. There are dark pigments on snout and tentacles; pigment is somewhat lighter on sides of head/foot. The operculum, a door-like flap that is closed by the withdrawal of the head/foot, is amber. The proximal half of the penial filament darkly pigmented, with the pigment sometimes extending into the penis as well. The penial accessory crests on the ventral surface are swollen. Sexual dimorphism is significant with the females being larger than the males in one population.

AIDS TO IDENTIFICATION: Due to the small size of this animal, it cannot be identified to species in the field but must be identified in a laboratory by a qualified authority. Therefore, to trap specimens, sand believed to contain the snail must be put through an ordinary kitchen strainer. A rule of thumb is that a springsnail species is specific to a particular spring and location, and therefore may be used as a means of identification. This species links with the *P. glandulosus* group on the basis of penial morphology but differs in lacking accessory crests.

ILLUSTRATIONS:

Line drawings (Taylor, 1987)

Line drawings (Hershler and Landye, 1988)

Scanning electron microscope micrographs of radula (Hershler and Landye, 1988)

Line drawings (Hershler and Ponder, 1998)

Color Photos (various):

<http://www.bing.com/images/search?q=Pyrgulopsis+trivialis&FORM=HDRSC2>

TOTAL RANGE: Several springs at Three Forks on the Black River, and a tributary of the Black River (Boneyard Creek and Bog) on the southern slopes of the White Mountains, Apache County, Arizona.

RANGE WITHIN ARIZONA: See "Total Range."

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: The Three Forks Springsnail is strictly aquatic and respiration occurs through an internal gill known as a ctenidium. The hydrobioid digestive system is typical of style-bearing neotaenioglossans. The mouth opens to a short oral area containing a pair of dorsolateral chitinous jaws composed of small, simple rodlets, immediately behind which is a well-developed buccal mass (situated within the snout). A pair of simple, unbranched, tubular salivary glands opens anterodorsally to the buccal cavity and (almost always) pass posteriorly over the nerve ring, rarely stopping short of the ring, but never passing through it in hydrobioids. Hydrobioids have a taenioglossate radula (i.e., seven teeth per row) comprising numerous rows of cusped teeth, each of which includes a typically squarish or trapezoidal central tooth flanked on each side by lateral, inner marginal, and outer marginal teeth. Teeth near the anterior end of the radula are often worn or broken, whereas the proximal portion of the ribbon has several to many rows of poorly differentiated or incompletely formed teeth. (Hershler and Ponder, 1998).

REPRODUCTION: Breeding rate in the wild and in captivity unknown. Most hydrobioids are oviparous, with females depositing small egg capsules, either singly or (rarely) in strings, on the substrate. A small number of hydrobioids are ovoviviparous, in which female's brood shelled young in the pallial gonoduct. Hydrobioid egg capsules are typically hemispherical to spherical. Copulation in hydrobioids is usually via an anterior opening to the glandular oviduct. The ventral channel may be traversed at least in part by the penis, but it is more likely that the penis only enters the anterior most section. (Hershler and Ponder, 1998).

FOOD HABITS: The primary food of springsnails is believed to be periphytic diatoms, which are scraped from hard surfaces with the radula.

HABITAT: “The presence of *P. trivialis* [is] associated with gravel/pebble substrates, shallower water, higher conductivity, higher pH, and presence of *Physia gyrina*.” (Martinez and Myers 2008)

ELEVATION: 8,220 - 8,459 ft. (2505 - 2578 m)

PLANT COMMUNITY: Aquatic vegetation includes *Nasturtium* sp. (watercress), *Ranunculus* (crowfoot), and algae.

POPULATION TRENDS: Species is extirpated from Three Forks – last seen in 2004. (USFWS General Species Information Page). Boneyard Creek population discovered in 2011. Both Boneyard Creek and Boneyard Bogs populations continue to persist after the 2011 Wallow Fire with plenty of representation at the spring heads. (Myers 2011).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: LE with Critical Habitat (USDI, FWS 2012)
[PE USDI, FWS 2011]
[C USDI, FWS 2001, 2002, 2004-2010]
[SC USDI, FWS 1996]
[C2 USDI, FWS 1991, 1994]
[C2 USDI, FWS 1989]

STATE STATUS: 1 (AZGFD, AWCS 2022)

OTHER STATUS: [1A (AGFD SWAP 2012)]
Not Forest Service Sensitive (USDA, FS Region 3, 2013)
Bureau of Land Management Sensitive (USDI, BLM AZ 2000, 2005, 2008, 2010)
[Forest Service Sensitive (USDA, FS Region 3 1999, 2007)]

MANAGEMENT FACTORS: **Threats:** highly restricted distribution with associated potential for extinction due to chance events such as the recent 2011 Wallow Fire, and the attendant use of toxic chemical fire retardants. The degradation of spring run banks due to excessive ungulate trampling and crayfish burrowing, contributes to accelerated sedimentation and high turbidity, resulting in changes to microhabitat conditions such as shifts in substrate composition. Habitat invasion by non-native crayfish contributes to unnatural predatory pressure. Drought and loss of groundwater may affect springsnail habitat. **Management needs:** Periodic monitoring of snail population and its habitat; research on ecology and systematics.

PROTECTIVE MEASURES TAKEN: A permit from the Forest Service is now required for access to the Three Forks Springs area. Springsnails at risk of post fire-flooding along Boneyard Creek and Boneyard Bog were captured and placed in captive refugium at AZGFD Region I office, the Phoenix Zoo, and a contractor's residence. (Myers 2013) In 2014, two historic springboxes at Three Forks were modified to improve habitat and remove crayfish for possible future repatriation of this extirpated site. Enclosure fencing was installed around six of the eight snail-occupied springs at Boneyard Creek to prevent degradation by livestock and elk. (AFS Wildlife Society Presentation 2015)

SUGGESTED PROJECTS: Continue monitoring springsnail habitat and take protective measures. If habitat improvements at Three Forks are successful, consider repatriating the site from nearest neighbor populations along Boneyard Creek and Boneyard Bog.

LAND MANAGEMENT/OWNERSHIP: USFS Apache-Sitgreaves National Forest.

SOURCES OF FURTHER INFORMATION

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ADDITIONAL INFORMATION:

None

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