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## ARIZONA GAME AND FISH DEPARTMENT HERITAGE DATA MANAGEMENT SYSTEM

**Invertebrate Abstract**

**Element Code:** IMGASC9010

**Data Sensitivity:** No

### CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

**NAME:** *Maricopella allynsmithi*  
**COMMON NAME:** Phoenix Talussnail; Squaw Peak Talussnail  
**SYNONYMS:** *Sonorella allynsmithi*  
**FAMILY:** Helminthoglyptidae

**AUTHOR, PLACE OF PUBLICATION:** *Sonorella allynsmithi* W.O. Gregg and W.B. Miller. 1969. A new *Sonorella* from Phoenix, Arizona. *Nautilus* 83 (3): 90-93. *Maricopella allynsmithi* B. Roth. 1996. *intermedia* Pilsbry (Gastropoda: Pulmonata): Insular Phylogeny Revisited. *Veliger*, 39(3), pp.204-212.

**TYPE LOCALITY:** East side of Squaw Peak Parkway about 0.3 miles from Lincoln Drive, Phoenix, Arizona. Rocky foothill to the east of the lower parking lot.

**TYPE SPECIMEN:** Holotype: Academy of Natural Sciences of Philadelphia 314853.

**TAXONOMIC UNIQUENESS:** Only species in genus in *Maricopella*.

**DESCRIPTION:** Land snail with small (up to half inch [13.0 mm] diameter), thin, glossy white globose shell with brownish-gray tinge. Light-brown spiral band on rounded shoulder and approximately 4 to 4 1/4 whorls. Snail has very dark gray to black body. For a helminthoglyptid snail the buccal mass is small and spheroidal. The gastric caecum and the rectal caecum are absent. The radular teeth are endocones and ectocones retained in marginal teeth but these are serrated, on quadrate or rectangular basal plates or the central and lateral teeth may be lacking endocones and ectocones but with a broad mesocone. The prolonged cuspid head on radular teeth may or may not be present. The cephalic shield is reduced, defined only by vestigial grooves. The hyponotum is absent. Inferior tentacles are present. The eye position is at the tip of more or less elongate cephalic tentacle. The tentacular nerve is bifurcated (Barker 2001). This is only land snail fitting this description in Phoenix Mountains area, though it could be confused with *Sonorella* found in McDowell Mountains or further eastward.

**AIDS TO IDENTIFICATION:** Reproductive structures must be dissected out of snail and compared to ascertain positive identification. However, Nick D. Waters developed a photographic reference poster along with a technical report with notes on shell and external snail body morphology and pigmentation that may provide a preliminary means of identification by species, paired with locality (Waters 2015, 2011).

**ILLUSTRATIONS:** Color photo (N.D. Waters)

**TOTAL RANGE:** Hoffman (1995) reported 14 locations among Squaw Peak (=Piestewa Peak) Park, two locations in Mummy Mountain, and one location in the McDowell Mountains. Waters (2011) found the Phoenix talussnail at 16 new localities within the greater Phoenix metropolitan area. Between 2012 and 2018, both Waters and AGFD biologists have detected the species within discontinuous ranges of central and north Phoenix, Scottsdale, Fountain Hills, Glendale, Peoria, Cave Creek, Carefree, New River, and along the western edge of Tonto National Forest. Nearly 70 localities of Phoenix talussnails have been documented in northeastern Maricopa County, Arizona (unpublished AGFD data).

**RANGE WITHIN ARIZONA:** See “Total Range.”

## **SPECIES BIOLOGY AND POPULATION TRENDS**

**BIOLOGY:** Development within shell takes about a month. Eggs seem to have less ability than mature snails to withstand lengthy dry spells; true for immature snails as well. It takes four or more years to reach reproductive maturity. They have very porous epidermis.

**REPRODUCTION:** Hermaphroditic, “each mating encounter usually results in two pregnancies” (Hoffman 1995). Fertilization and egg laying takes several days. If rains are short-lived, snails may be forced to wait for next rain to lay eggs. For helminthoglyptid snails, embryonic brooding may or may not be present and they can be oviparous or viviparous. The eggs are single, not embedded in a jelloid/mucoid mass. The egg capsule could be partially calcified, with calcite crystals embedded in jelly layers but not forming a distinct shell or it could be calcified forming a distinct shell. The larval development has no trochophore or veliger stages, there is direct development in the egg. The larval operculum is absent. The genital orifices in the male and female are fused or nearly so in cephalic region, near right ocular tentacle. The extrapallial sperm duct is a closed duct, free in the body cavity. The lumen of the penis is lacking of spines (Barker 2001).

**FOOD HABITS:** Fungal hyphae and decomposing plant matter that filters down among rocks and soils.

**HABITAT:** Lower Sonoran Life-Zone under conditions of extreme aridity at low elevations (Bequaert and Miller 1973). Because of porous epidermis, snails must inhabit very deep, open, talus piles or rockslides where they can seal shell apertures to solid rock while being protected from heat and dryness by rock layers and plants above. Talussnails cannot survive where decomposing granite, sand, or mud fills the interstitial spaces of rocky slopes (Hoffman 1995). Land snails require calcium carbonate from which to build shells and to buffer carbonic acid created from exhaled water and carbon dioxide. Without a source of calcium carbonate, carbonic acid would build to high levels as snails estivate within sealed shells for many months at a time. Land snails in xeric environments obtain calcium carbonate from limestone (Hoffman 1995). Soils within xeric regions are rich in calcium carbonate, therefore calcium is readily available to snails in the form of gravel and sand fragments of caliche. Limestone geologic formations are not required for talussnail habitat in the greater Phoenix metropolitan area (Waters 2011).

**ELEVATION:** 1,100 - 3,900 ft (336 - 1,190 m) according to Bequaert and Miller (1973).

**PLANT COMMUNITY:** Hoffman (1995) reported that the talussnail may be found associated with the following plant species: saguaro (*Carnegiea gigantea*), little-leaf paloverde (*Parkinsonia microphylla*), white brittle-bush (*Encelia farinose*), foxtail brome (*Bromus rubens*), natal grass (*Rhynchelytrum roseum*), creosote bush (*Larrea tridentata*), Mohave lupine (*Lupinus sparsiflorus*), and globe-mallow (*Sphaeralcea* sp.).

**POPULATION TRENDS:** Unknown. In his 1995 report, Hoffman considered the Phoenix talussnail to be abundant in locations within Squaw Peak (=Piestewa Peak) Park, and in the McDowell Mountains. AGFD surveys at the type locality, near some of Hoffman's previous locations in Piestewa Peak Park, the Hedgpeth Hills, Union Hills, the hill behind the Ben Avery Shooting Facility, and a hill in the Cave Creek Recreational Area have documented dozens to hundreds of shells during timed counts among rocky habitat (unpublished AGFD data).

## SPECIES PROTECTION AND CONSERVATION

**ENDANGERED SPECIES ACT STATUS:** None (USDI, FWS 1996)  
[C2 USDI, FWS 1994]

**STATE STATUS:** 2 (AZGFD, AWCS 2022)  
[1B (AGFD SWAP 2012)]

**OTHER STATUS:** Forest Service Sensitive (USDA, FS Region 3, 1999)  
None (USDA, FS Region 3, 2013)  
Forest Service Sensitive (USDA, FS Tonto National Forest 2017 draft)

**MANAGEMENT FACTORS:** Waters (2011) reports that buffelgrass (*Pennisetum ciliare*) and fountaingrass (*Pennisetum setaceum*) have become widespread throughout mountains occupied by the Phoenix talussnail, particularly adjacent to heavily landscaped developments at the type locality, Piestewa Peak, and at Hedgpeth Hills, Deem Hills, and Ludden Mountain. Wildfires fueled from dense stands of these invasive grasses and weeds burn rapidly and at high temperature. While rocky soils and talus mitigate temperature extremes caused by fire (Stoof and others 2010), high temperatures rapidly shatter and break down rock into smaller particles, reducing shade and forming soil which subsequently reduce interstitial space (Blackwater 1927; Dorn 2003; Dragovich 1993). Urban development and materials mining are also primary threats to the species, although most occupied habitats are either on city and county park preserves, or on hillsides that are unsuitable for residential development or commercial rock and mineral excavation.

**Threats:** wildfire fueled by invasive weeds and grasses; housing development; rock and mineral mining; and as a lesser impact, the disturbance of habitat from off-trail hikers. Management needs: invasive weed management; educational outreach in parks to alert hikers of activities that may be detrimental to the talussnail; periodic monitoring of snail populations and their habitat.

**PROTECTIVE MEASURES TAKEN:** City and county park preserves already have habitat protections in place and manage recreation use with designated trails, law enforcement patrols, prohibit off-trail hiking, collecting, and disturbance of natural resources including the snails and their habitat.

**SUGGESTED PROJECTS:** Population surveys to determine snail status among occupied sites, along with *in situ* and laboratory studies of their life history, reproduction and habitat preferences, including temperature and humidity tolerances to model impacts of future climate change.

**LAND MANAGEMENT/OWNERSHIP:** City of Phoenix (Phoenix Mountains Preserve); City of Glendale; City of Paradise Valley; Maricopa County Parks; Town of Cave Creek; City of Peoria; Tonto National Forest; and private land.

## SOURCES OF FURTHER INFORMATION

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**MAJOR KNOWLEDGEABLE INDIVIDUALS:**

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**ADDITIONAL INFORMATION:**

According to Jim Hoffman, the name *Maricopella allysmithi* is not widely accepted in Arizona. He questions the genetic work that split out several of the *Sonorella*'s to *Maricopella*'s. (Hoffman 2000). Roth (1996) recommended the Phoenix talussnail be placed in the monotypic genus *Maricopella*, which he considered sister to *Sonorella*, with *Eremarionta* likely ancestral to both genera. However, recent molecular analysis (Waters and others, in preparation) does not support separation as the species is nested within *Sonorella* (Waters 2011).

Revised: 1995-01-09 (DBI)  
1997-03-03 (SMS)  
2003-12-04 (AMS)  
2015-09-11 (JAS)  
2018-04-18 (JAS)  
2023-01-17 (MBL)

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Arizona Game and Fish Department. 20XX (= year of last revision as indicated at end of abstract). X...X (= taxon of animal or plant). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. X pp.