ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Invertebrate Abstract **Element Code:** IMGASC9150
Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Sonorella christenseni*
COMMON NAME: Clark Peak Talussnail
SYNONYMS: *Sonorella* sp 1
FAMILY: Helminthoglyptidae

AUTHOR, PLACE OF PUBLICATION: Fairbanks, H.L. and R.L. Reeder. 1980. Two new species of *Sonorella* (Gastropoda: Pulmonata: Helminthoglyptidae) from the Pinaleño Mountains, Arizona. Proceedings of the Biological Society of Washington. 93(2): 395-404.

TYPE LOCALITY: Rockslide on north slope of Clark Peak, Pinaleño Mountains, Graham County, Arizona.

TYPE SPECIMEN: Holotype: USNM 783321. No name of collector or date of collection given.
Paratypes: USNM 783322, No name of collector or date of collection given.
6916 and 6916B, W.B. Miller, No date given.
4024B, C.C. Cristensen, No date given.
2548, H.L. Fairbanks, No date given.

TAXONOMIC UNIQUENESS: The Clark Peak Talussnail was originally described by Fairbanks and Reeder (1980) from specimens collected from the Pinaleño Mountains, Graham County, Arizona. This species is considered valid by the Integrated Taxonomic Information System, Turgeon *et al*. (1998), and more recently confirmed to be genetically distinct from its congeners by Weaver *et al*. (2010).

DESCRIPTION: Description of holotype: shell depressed, heliciform, convex above and below, thin, glossy, tan in color, with one chestnut-brown spiral band just above midline of rounded shoulder of body whorl; umbilicate. Aperture oblique, oval, slightly wider than high, parietal callus thin. This species is characterized anatomically by a large epiphallic caecum, vagina shorter than the penis, and a long smooth pointed verge. Measurements of holotype: diameter 20.6 mm, height 11.0 mm; whorls 4 and 2/3. Embryonic shell of approximately 1.5 whorls, first .5 whorl including apex, with radial striae only, remainder of embryonic shell having a reticulate pattern of fine lines that break up into a granular pattern in the last .25 whorl.

For helminthoglyptidae 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).

AIDS TO IDENTIFICATION: Location as well as physical characteristics. "Differentiated from *S. grahamensis* by shell characteristics. However, the two are still difficult to separate with casual examination. Comparisons of the genitalia of these two species will separate them easily." (Fairbanks and Reeder 1980). Inseparable from *S. imitator* on the basis of shell alone. Examination of the genitalia separates these two species (Fairbanks and Reeder 1980).

ILLUSTRATIONS: Photos of dorsal, ventral and side (Fairbanks and Reeder, 1980: P. 396, Fig. 1)
Line drawings of reproductive organs (Fairbanks and Reeder, 1980: P. 398, Fig. 2)
Photo of shell (Hoffman, undated: P. 19, Fig. 8)
Line drawing of reproductive tract (Hoffman, undated: P. 23, Fig. 11)

TOTAL RANGE: Pinaleño Mountains, Graham County, Arizona. Previously believed to be restricted to rockslides on the north slope of Clark Peak, Blue Jay Ridge area, and Ladybug Saddle in the Pinaleño Mountains, but recent genetic work reveals the Clark Peak Talussnail is only found in the northern part of the Pinaleño Mountains at Clark Peak (Weaver *et al.* 2010).

RANGE WITHIN ARIZONA: See "**Total Range**."

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Adapted to fairly wet conditions. Weather conditions greatly affect activity of *Sonorella*, with live talus snails only becoming active above ground during or after monsoon rains (Jontz *et al.* 2002, Weaver *et al.* 2010). Although suitable moisture conditions are likely for this snail during most summers, it spends a large part of year in estivation; it may have limited activity in some summers. Calcium carbonate from the limestone aids in shell deposition and buffers carbonic acid produced by the buildup of respiratory carbon dioxide during estivation. It is believed that most Pinaleño land snails mature in 2-3 years with a lifespan of approximately 6 years.

REPRODUCTION: Reproduction in *Sonorella* of the Pinaleño Mountains has not been studied. Hoffman (undated) believes that they are probably similar to other *Sonorella* species, which are hermaphroditic. "Each *Sonorella* lays a clutch of thirty to forty eggs once or, in particularly good years, twice during each summer" (Hoffman, undated). For helminthoglyptidae embryonic brooding may or may not be present and they can be oviviparous 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: Hoffman states that *Sonorella* in the Pinaleño Mountains feed primarily on fungus and decaying plant matter which is supplemented with young green shoots when available. For helminthoglyptidae, the openings of the digestive gland lobes are more or less adjacent, openings are intestinal. The stomach is greatly simplified, with very poorly developed musculature. The diagonal intestinal folds are absent. The intestinal valve is absent (Barker 2001).

HABITAT: As stated in the draft 2011 Conservation Agreement for Pinaleño Land Snails, "habitat for *Sonorella* and *Oreohelix* includes pine-oak and conifer forests with: (1) talus slopes (e.g., scree, natural rockslides, boulder fields); (2) streamside colluvial rock; or (3) mesic areas on hillsides with partial shade, rock, and leaf litter."

ELEVATION: 6,520 - 9,100 ft. (1987- 2776 m).

PLANT COMMUNITY: Hoffman (undated) states that "the plants associated with the land snails in the Pinaleño Mountains vary with elevation." He lists that there are various plant species associated with these snails for "higher" and "lower" elevations, but only defines those for lower elevations above Ladybug Saddle. These include *Quercus gambelii* (gambel oak), *Pinus ponderosa* (Ponderosa pine), and *Robina Neomexicana* (New Mexicana locust).

POPULATION TRENDS: Unknown.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS:	SC (USDI, FWS, 1996) [C2 USDI, FWS 1994] [C2 USDI, FWS 1991]
STATE STATUS:	1 (AZGFD, AWCS 2022) [1B (AGFD SWAP 2012)]
OTHER STATUS:	Forest Service Sensitive (USDA, FS Region 3 1999, 2013)

MANAGEMENT FACTORS: Factors that may affect this species are restricted and declining distribution with associated potential for extinction due to chance events; potentially intense fires resulting from increased fuel loads.

PROTECTIVE MEASURES TAKEN: The USFS has ongoing fuel load evaluations and fuel reduction efforts within the Pinaleño Mountains, to reduce the risk of future catastrophic

wildfires. Standards and guidelines for Forest activities that may affect USFS sensitive species are also being incorporated into the Forest Plan revision.

SUGGESTED PROJECTS: Finalize the 2011 draft multi-species conservation agreement for Pinaleño land snails, including the Clark Peak Talussnail. Conservation activities under that agreement include: continuing a monitoring program for land snails within the Pinaleño Mountains, conducting evaluations of fuel load conditions and fuel reductions in areas occupied and adjacent to land snails, and maintaining talus habitat and other habitat components used by Pinaleño land snails.

LAND MANAGEMENT/OWNERSHIP: USFS - Coronado National Forest.

SOURCES OF FURTHER INFORMATION

REFERENCES:

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Arizona Game and Fish Department. 2022. Arizona Wildlife Conservation Strategy: 2022-2032. Arizona Game and Fish Department, Phoenix, Arizona. 378 pages.

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MAJOR KNOWLEDGEABLE INDIVIDUALS:

Hoffman, J.E. - Pima Community College (West), Tucson, Arizona.
Kathleen Weaver – University of University of La Verne, La Verne, California

ADDITIONAL INFORMATION:

Revised: 1992-03-13 (DBI)
1992-03-23 (DBI)
1992-03-24 (DBI)
1992-04-23 (DBI)
1996-10-31 (SMS)
2003-12-04 (AMS)
2015-08-14 (AJM)
2023-02-06 (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.