

ARIZONA GAME AND FISH DEPARTMENT  
HERITAGE DATA MANAGEMENT SYSTEM

Invertebrate Abstract

Element Code: IMGAS67150

Data Sensitivity: Yes

**CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE**

**NAME:** *Oxyloma haydeni*  
**COMMON NAME:** Niobrara Ambersnail, Kanab Ambersnail  
**SYNONYMS:** *Oxyloma haydeni kanabensis*, *Oxyloma haydeni haydeni*  
**FAMILY:** Succineidae

**AUTHOR, PLACE OF PUBLICATION:** Binney, 1858 in Say, T., 1858. The complete writings of Thomas Say, on the conchology of the United States. H. Baillière.

**TYPE LOCALITY:** Nebraska, between Loup Fork and L'Eau qui Cort Rivers.

**TYPE SPECIMEN:** Unknown

**TAXONOMIC UNIQUENESS:** In January of 2020, the Fish and Wildlife Service proposed to delist the Kanab Ambersnail (*Oxyloma haydeni kanabensis*) due to recent and detailed genetic work suggesting that the three populations are not a valid subspecies. Genetic results suggested gene flow among Kanab Ambersnail, Niobrara Ambersnail (*Oxyloma haydeni*), Blunt Ambersnail (*Oxyloma retusum*), and an undescribed species of *Oxyloma*. Additionally, Kanab Ambersnail samples from Vasey's Paradise did not cluster with samples from the other two Kanab Ambersnail populations (Culver et al. 2013). None of the genetic studies conducted on the taxon provide support for *Oxyloma haydeni kanabensis* as a valid subspecies (USDI, FWS 2020). In June of 2021, this determination was upheld, and the species was delisted due to not being a valid subspecies (USDI, FWS 2021).

**DESCRIPTION:** Terrestrial with mottled grayish- to yellowish-amber colored dextral (right-handed spiral) shell. Thin-walled, with elevated spire and an expanded aperture. Fully mature individuals about 14.0 to 19.0 mm (0.55 - 0.74 in.) long, 7.0 to 9.0 mm (0.27 - 0.35 in) in diameter with 3 1/4 to 3 3/4 whorls in a drawn out spire. Eyes borne at ends of long peduncles while tentacles reduced to small protuberances at eye stalk base.

**AIDS TO IDENTIFICATION:** Shell morphology and anatomical characteristics not diagnostic. Genetics, anatomy, and habitat should be used to determine species within *Oxyloma* (Hoagland and Davis 1987, Sorensen and Nelson 2002). The genus *Catinella* is also commonly found throughout the American Southwest and is often mistaken for *Oxyloma* at first glance. Upon closer examination, *Catinella* can typically be distinguished from *Oxyloma* in the field by their shorter, more robust whorls (S. Wu, pers. comm.) (S. W, pers. Comm)" (Sorensen and Nelson, 2002).

**ILLUSTRATIONS:**

Line drawing of types, reproductive anatomy and map of Utah distribution (Ecosearch, Inc. 1991)

Color Photograph (USDI, FWS 2011).

**TOTAL RANGE:** Patchy distribution from the American southwest in Arizona, New Mexico, and Utah to the western Canadian provinces, excluding British Columbia (Natureserve 2021).

**RANGE WITHIN ARIZONA:** Vasey's Paradise and Upper Elves Canyon, Grand Canyon National Park, Coconino County.

### **SPECIES BIOLOGY AND POPULATION TRENDS**

**BIOLOGY:** Terrestrial, but associated with wetted soil. Life span of up to 15 months (Stevens et al. 1997). Growth averages 0.1 mm/day (0.004 in/day), and sexual maturity occurs at approximately 11.5 mm (0.45 in) (Nelson 2001). Increased growth and fecundity has been observed in snails reared on nonnative watercress (*Nasturtium spp.*) compared to those using native monkeyflower (*Mumulus spp.*), though host plant does not appear to effect hatching success (Nelson 2010). Winter dormancy occurs from October to March. During dormancy, Niobrara Ambersnails attach the aperture of their shells to a firm substrate such as plant stems and leaves, rocks, sticks, or bark. During dormancy, mortality rates of 25-80% have been observed (Stevens et al 1997, IKAMT 1998). Due to difficulty of accessing other populations, the above biological knowledge was collected exclusively from Vasey's paradise snails, and it is unknown if it is representative of the Three Lakes and Upper Elves Canyon populations (USDI, FWS 2011).

**REPRODUCTION:** Peak reproduction occurs in mid-summer. Ambersnails may reproduce through cross-fertilization or self-fertilization (Culver et al. 2013). Cross-fertilized Niobrara Ambersnails produce an average of 1.25 egg masses. Egg masses average 12 eggs and are laid in moist soil or on the undersides of host plant stems and leaves. Eggs hatch in approximately 27 days (Nelson 2001).

**FOOD HABITS:** Feeds on plant tissue, fungi, algae, and bacteria, using radula to scrape material off substrates.

**HABITAT:** Marshes and other wetlands watered by springs and seeps at the base of sandstone or limestone cliffs (Clarke 1991, Spamer and Bogan 1993). The Three Lakes site consists of a series of spring-fed ponds and wet meadows below sandstone cliffs. Cattail (*Typha domingensis*) and sedge (*Juncus spp.*) dominate occupied wet meadow and marsh habitat (USDI, FWS 2011). The Vasey's Paradise site consists of spring flow from Mississippian Redwall limestone. Flow is bordered by patches of thick vegetation dominated by native crimson monkeyflower (*Mimulus cardinalis*), nonnative watercress (*Nasturtium officinale*), and native water sedge (*Carex aquatilis*). Niobrara Ambersnails often inhabit dead and decaying monkeyflower litter and live watercress stems and leaves (USDI, FWS 2011). Upper Elves Canyon consists of a spring seep and a large pool area dominated by monkeyflower. Surrounding hanging gardens are comprised of maidenhair ferns (*Adiantum capillus-veneris*) and monkeyflower (Sorenson 2005).

Snail associated with a perennially wet soil surface or shallow standing water, not under logs or other microhabitats commonly frequented by other land snails.

**ELEVATION:** In Arizona, 3,120 to 3,780 ft. (950-1152 m)

**PLANT COMMUNITY:** Dependent on wetland vegetation for food and shelter. Often found in association with monkeyflower (*Mimulus cardinalis*), watercress (*Nasturtium spp.*), sedges, and rushes.

**POPULATION TRENDS:** In Arizona there are two naturally occurring populations and one introduced extant population of Niobrara Ambersnail (USDI, FWS 2011). Population trends are unable to be determined because of high temporal and spatial variability in population densities, sampling error, and variability in sampling efforts has led to highly variable population counts at Vasey's Paradise and Upper Elves Canyon, and access has been denied at Three Lakes (USDI, FWS 2001).

### **SPECIES PROTECTION AND CONSERVATION**

**ENDANGERED SPECIES ACT STATUS:** None (USDI, FWS 2021)  
 [Proposed for Delisting (USDI, FWS 2020)]  
 [LE without Critical Habitat (USDI, FWS 1992) (as *Oxyloma haydeni kanabensis*)]  
 [PE USDI FWS 1991]

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

**OTHER STATUS:** Not Bureau of Land Management Sensitive (USDI, BLM AZ 2017)  
 [Bureau of Land Management Sensitive (USDI, BLM AZ 2000, 2005, 2010)]  
 Not Forest Service Sensitive (USDA, Region 3 2013, 2007)  
 [Forest Service Sensitive (USDA, FS Region 3 1999)]  
 Group 4 under *Oxyloma kanabense* (NNDFW, NESL 2000, 2005, 2008, 2020)

**MANAGEMENT FACTORS:** The main threat to the species is its reduced and highly restricted distribution. Reductions in water availability due to climate change and long-term drought threatens all populations. Habitat loss is a threat for the Three Lakes and Vasey's Paradise populations. The Three Lakes population is at risk from development if absent from the protection of the ESA. Habitat loss due to controlled flooding and high flows are the main threat to the Vasey's Paradise population. River runners and grazing by Bighorn Sheep (*Ovis canadensis*) are potential threats to the population, though neither are considered threats by the US Fish and Wildlife Service at this time (USDI, FWS 2011). The Upper Elves Canyon population is very remote, with little human visitation. There is no livestock use at this location, and the location is protected from controlled flooding, as floods high enough to affect this population are unlikely to occur (Sorenson 2005). Predation and parasitism by trematode worms exist, but is not considered a threat to the species (Sorensen and Nelson 2002).

**PROTECTIVE MEASURES TAKEN:** In 1998, AZGFD stocked three locations within the Grand Canyon with Niobrara Ambersnails (Keyhole Springs, Lower Deer Creek Spring, and Upper Elves Canyon). The snail persisted in the Upper Elves Canyon location, and between 1998 and 2002, 340 Niobrara Ambersnails were translocated from Vasey's Paradise to Upper Elves Canyon by AZGFD (Sorenson 2005).

In 2004, AZGFD staff temporarily moved approximately 25-40% of Ambersnail-supporting vegetation at Vasey's Paradise prior to a high-flow event. The vegetated habitat was replaced after the flood event, and almost full recovery of the scoured habitat was achieved 6 months later (USDI, FWS 2011).

Niobrara Ambersnails and/or their habitats are protected by the National Environmental Policy Act, the Clean Water Act, the National Park Service Organic Act, and AZGFD's Commission Order 42, which prohibits unauthorized collection.

**SUGGESTED PROJECTS:** Additional research is needed to resolve and refine specific and subspecific taxonomy. Regular surveys and monitoring of known populations should be conducted. Attempts should be made to establish a conservation easement to protect the Three Lakes population.

**LAND MANAGEMENT/OWNERSHIP:** Arizona populations occur on National Park Service lands – Grand Canyon National Park. Utah population occurs on private land.

### **SOURCES OF FURTHER INFORMATION**

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**ADDITIONAL INFORMATION:**

Poison ivy is found to such an extent in the habitat of Arizona populations of *Oxyloma haydeni* that these populations are considered partially protected from human disturbance and special protective gear is highly recommended when conducting surveys.

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