

Major range extension of a *Chelone* population and extirpation of seven populations in Arkansas and Missouri

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ABSTRACT. — A range extension for white turtlehead (*Chelone glabra*) is documented for Saline County, Arkansas. We also report the extirpation of two populations of white turtlehead in Greene County, Arkansas and three in Butler County, Missouri. Rose turtlehead (*C. obliqua* var. *speciosa*) is likely extirpated from Arkansas and a population near Poplar Bluff, Missouri has also been extirpated. We update the current status of eight populations of these two species. Both white and rose turtleheads need review in Arkansas and Missouri to determine their conservation status.

INTRODUCTION

We are currently working to update the global conservation status of selected plants with rare or unknown status in NatureServe (2023). Here we report the extirpation of five populations of white turtlehead (*Chelone glabra* L.) and two populations of rose turtlehead (*Chelone obliqua* L. var. *speciosa* Pennell and Wherry) in Arkansas and Missouri. Additionally, we add observations on a population of white turtlehead in Arkansas that represents a major range extension. The five populations of white turtlehead that have been extirpated were previously surveyed by A.D. Nelson in October 1991 (Nelson & Elisens 1999; Nelson 1995). These populations were resurveyed in 2021 and 2022. Observations of the population recently discovered in Saline County in central Arkansas, were conducted in 2005.

ARKANSAS POPULATIONS

Arkansas is the southwestern edge of the distribution for white turtlehead. It is listed as critically imperiled (S1) in Arkansas, which is defined as being a high risk of extirpation due to restricted range, few populations, and severe threats (NatureServe 2023). We conducted fieldwork as a part of a status survey of *Chelone*, which will provide data needed by NatureServe to update populations used in assigning conservation status.

In August 2005, the Arkansas Natural Heritage Commission gave directions to assess a white turtlehead site discovered in 1979 in Saline County, Arkansas. In a posting on iNaturalist, Theo Witsell stated “Wet seep along creek at base of sandy hill. This site represents a southwestern

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range extension for this species of more than 150 miles. The nearest known site is in a seep on Crowley's Ridge in Greene Co., AR" (iNaturalist 2023). We relocated a site in this vicinity of Saline County in a wet ravine leading to a creek near the town of Shaw. Associates at this site include red maple (*Acer rubrum*), American holly (*Ilex opaca*), blunt-lobed cliff fern (*Woodsia obtusa*), and several other fern species. The *Chelone* population consisted of eight stems in three clumps. Plants were in early flower bud and a few were just opening to reveal white corollas. Because of the small size of the population, voucher collections were not made in 2005. The site is listed by Gentry et al. (2013) in their Arkansas state atlas, but is absent in a Green County checklist (Harris et al. 2012).

In October 1991, fieldwork in Greene County, Arkansas revealed two populations of white turtlehead. The first population was at a site locally called Pine Hill Bog and the second at Glory Hole Bog.

On 11 October 1991, Pine Hill Bog had 30 or more plants and about 60 stems. Flowers and fruits were both present and fruits were heavily impacted by green hemipterans. Plants were in rich black loam, growing with upland boneset (*Eupatorium sessiflorum*), peat moss (*Sphagnum* sp.), sedges, and rushes. Sweetgum (*Liquidamber styraciflua*) shaded parts of the population.

The Pine Hill Bog site was revisited on 9 August 2021. The area around the bog had been cleared and the wetland dug out to form a stock watering hole for cattle, which were present at the site. All that remained of the former forest was a tree fringe dominated by post oak (*Quercus stellata*) and shortleaf pine (*Pinus echinata*), which grew along the fence and edge of a cemetery above the former bog site. White turtlehead was not located, and the former habitat was completely altered by the clearing and grazing.

The population at Glory Hole Bog consisted of 15 plants and 30 stems with brown coleopterans entering and exiting flowers. Fruits were not present on 11 October 1991. Plants were in rich black loam, associated with upland boneset, peat moss, cinnamon fern (*Osmunda cinnamomea*), broadleaf cattail (*Typha latifolia*), sedges, and rushes. River birch (*Betula nigra*) was the dominant woody plant near the white turtlehead population.

The Glory Hole Bog site was revisited on 9 August 2021, and no white turtlehead was found. The site exhibited extensive rutting caused by all-terrain vehicles (ATVs), installation of several game feeders, and addition of a ground hunting stand. Another difference was altered hydrology as the broadleaf cattails present in 1991 were absent in 2021. River birch, peat moss, cinnamon fern, sedges, and rushes were still present. A house had been built on the bog's edge and there were relatively large housing developments in the area that were not present in 1991. This new land use of hunting using ATVs and change in hydrology, possibly due to increased residential water usage, likely contributed to the extirpation of white turtlehead in the bog.

Rose turtlehead is known in Arkansas from a single Greene County record from 1893 (pers. comm. Arkansas Natural Heritage Commission 1992). Its conservation status needs to be updated in Arkansas and Missouri as well as other states (NatureServe 2023). The Arkansas population has probably been destroyed and it is not likely to be rediscovered (pers. comm. Arkansas Natural Heritage Commission 1992). It is unlikely that the species is still extant in the state (Smith 1988), but it is listed in the state atlas (Gentry et al. 2013). It was not located during our 1991 and 2021 fieldwork in Greene County.

MISSOURI POPULATIONS

Fieldwork was conducted at three Missouri sites in the Poplar Bluff area (Butler County) in October 1991 and 2022. In 1991, fieldwork documented three populations of white turtlehead and one of rose turtlehead. These were at sites locally called Military Crossing Cemetery, State Forest near Hilliard, and the McLane Subdivision in Poplar Bluff.

On 12 October 1991, the population at Military Crossing Cemetery consisted of 24+ plants and about 50 stems. Flowers and fruits were both present, and fruits had been heavily impacted by green hemipterans. Plants were in rich black loam, growing with upland boneset, bottle gentian (*Gentiana andrewsii*), small-fruited panic grass (*Dichanthelium microcarpon*), sedges, and rushes. Eastern cottonwood (*Populus deltoides*) shaded parts of the population.

The site was revisited on 8 October 2022. The area around the swamp included none of the previously associated species. White turtlehead was not located, and the former habitat was significantly altered by beaver activity and associated hydrological changes. Vegetation was dominated by woolgrass (*Scirpus cyperinus*) and swamp smartweed (*Persicaria hydro-piperoides*) with woody species dominated by American hornbeam (*Carpinus caroliniana*) and buttonbush (*Cephalanthus occidentalis*).

On 12 October 1991, the white turtlehead population at State Forest consisted of 35 plants and 70 stems, with no fruits present. Plants were in rich black loam, growing with upland boneset, bottle gentian, small-fruited panic grass, Canadian lousewort (*Pedicularis canadensis*), and sedges. The area had been partially cleared for electrical lines and had more tree diversity than the cemetery site, including eastern cottonwood, sweetgum, and red maple. A seep from the hillside provided a consistent wetland hydrology.

On 9 October 2022, the State Forest site had extensive rutting caused by ATVs, and none of the former associates were present except some sedges along edges of ATV ruts. Water from the seep filled numerous ATV ruts but did not expand out into the wetland as it had in 1991. This new impact of repeated ATV traffic through the seep and surrounding wetland likely contributed to the extirpation of white turtlehead at this site.

On 12 October 1991, the McLane Subdivision site was along a creek bordering a housing project in Poplar Bluff, Missouri. The wooded creek valley had dark loam with green arrow arum

(*Peltandra virginica*), bottle gentian, Canadian lousewort, and sedges. Red maple was the dominant woody plant near the white turtlehead population. The population consisted of 20 stems from about 10 plants. Deeper into the valley was a population of rose turtlehead consisting of 20 plants with about 30 flowering stems.

During a site visit on 10 October 2022, neither white nor rose turtlehead were found. Associated species seen in 1991 were absent, except for red maple. The subdivision had expanded, and storm drains and underground electrical lines had been installed in the creek valley, destroying the habitat and the turtlehead populations.

In addition to the fieldwork reported above, we used the Texas Oklahoma Regional Consortium of Herbaria (TORCH) portal to examine two imaged specimens of rose turtlehead, both collected by Steyermark in Wayne County, Missouri adjacent to Stanley Creek (APSC 0051300 and GA 220258). ImageJ 1.x (Collins 2007) was used on the two digital images to examine calyx pubescence and leaf characters so that the specimen's varietal determination could be confirmed following Nelson (2019). A.D. Nelson visited parts of Stanley Creek near a roadside to search for rose turtlehead, but the area was privately owned and posted, so only a small area could be examined. From the road, the area looked like potential habitat might still occur but as illustrated for the other sites discussed here, many land use changes may have occurred since Steyermark's visit in the late 1940s.

These data indicate a compelling need to reassess the conservation status of both species in Arkansas and Missouri, as well as throughout their ranges. Recent declines and local extirpations associated with land use changes and other disturbances, including potential climate change effects, may result in continued losses and require intensified conservation efforts.

REPRESENTATIVE SPECIMENS EXAMINED

Chelone glabra. **U.S.A. ARKANSAS:** GREENE CO.: Glory Hole Bog, 11 October 1991, *A.D. Nelson 143* (OKL); Pine Hill Bog, 11 October 1991, *A.D. Nelson 142* (OKL). **SALINE CO.:** 27 September 2002, *Theo Witsell 1172* (ANHC). **MISSOURI:** BUTLER CO.: Poplar Bluff, McClane Subdivision, 12 October 1991, *A.D. Nelson 146 with S. Hudson* (OKL); Military Crossing Cemetery, 12 October 1991, *A.D. Nelson 144 with S. Hudson* (OKL); State Forest near Hilliard [=Poplar Bluff/Stephen J. Sun Conservation Area], 12 October 1991, *A.D. Nelson 145 with S. Hudson* (OKL).

Chelone obliqua var. *speciosa*. **U.S.A. MISSOURI:** BUTLER CO.: Poplar Bluff, McClane Subdivision, 12 October 1991, *A.D. Nelson 146 with S. Hudson* (OKL).

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