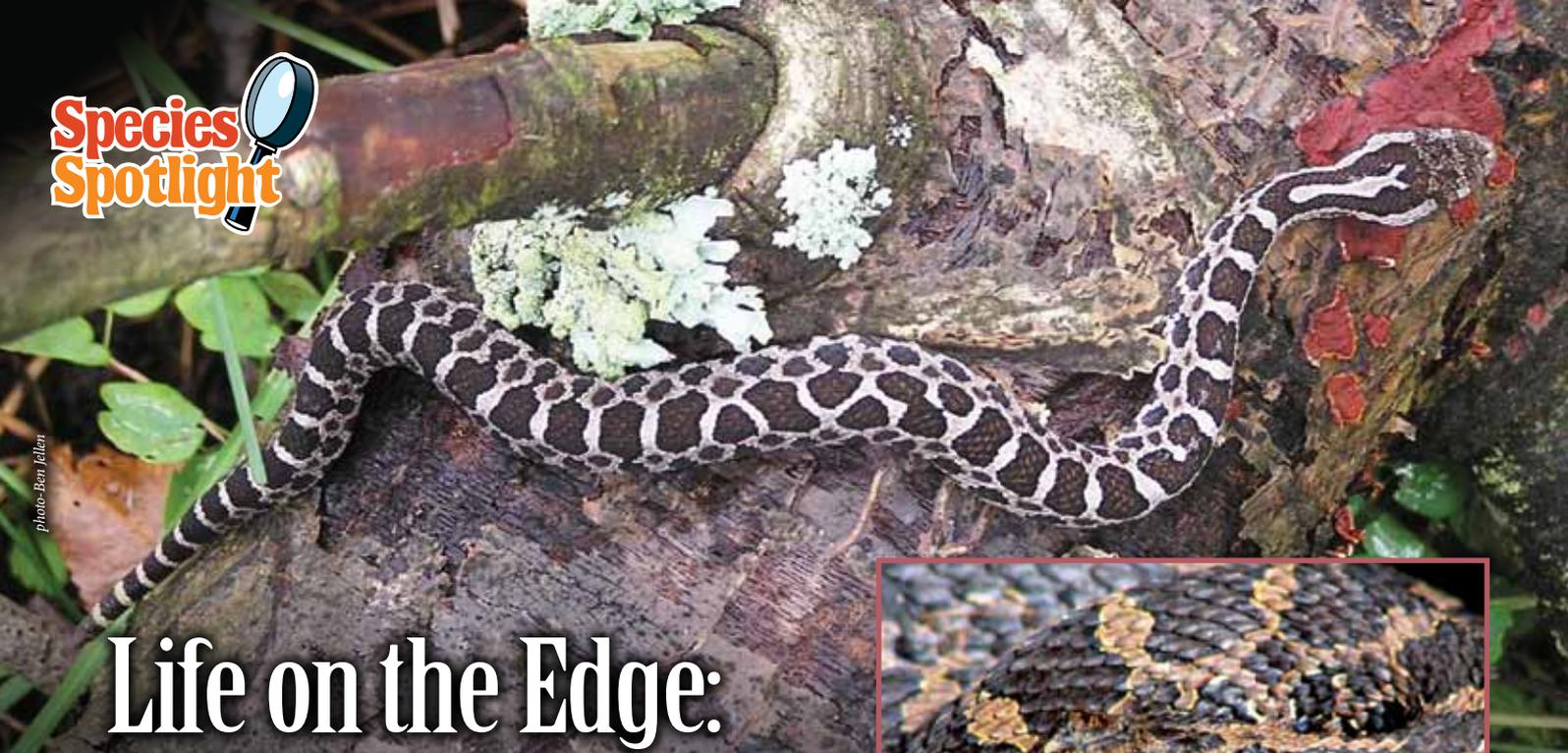


photo: Ben Jellen



# Life on the Edge:

## Pennsylvania's Endangered Eastern Massasauga Rattlesnake

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photo: Tom Diez

The eastern massasauga, one of Pennsylvania's rarest reptiles, is living life on the edge. Pennsylvania is the edge of its national range in the east, and the species is precariously positioned at the edge of extirpation (extinction) in Pennsylvania. We are at a critical time in the conservation and recovery of the eastern massasauga in Pennsylvania.

Once thought to inhabit seven northwestern Pennsylvania counties where glaciated till plains and relict blazing-star prairies occurred, this small, stout rattlesnake known as the "swamp rattler" or "black snapper" by the old-timers is currently found in only four small populations in three small areas of these northwestern counties. Even worse, these small populations of snakes are separated from each other by many miles. You may wonder how and why their populations shrank to such low levels, and can this species be recovered as an endangered species in Pennsylvania?

Eastern massasaugas require both wetlands and surrounding upland areas for survival. Massasaugas overwinter (or hibernate in mammals, brumate in reptiles) in holes reaching groundwater in wetlands. They don't actually dig their own holes but use cracks in the ground, holes in roots and the burrows of crayfish and small mammals that live in and near wetlands. They do this to search out underground areas with groundwater warmer than the above-ground air temperature. Safely below the frost

line, massasaugas will submerge themselves in the warmer groundwater and occasionally take in fresh air before they re-submerge into their watery resting place. They will stay in this burrow from October or November until mid-April, when the rising air and soil temperatures heralding spring tempt them to move to the surface.

As a temperature inversion occurs in the burrow, the temperature becomes warmer on the surface and cooler in the burrow, enticing these snakes to move to the surface. While in these overwintering burrows, once again, they are "on the edge" and in a vulnerable state. Unfortunately, nearly 100 years ago, during these vulnerable times, many wetlands in this part of the state were drastically changed or destroyed for other land uses—conversion to croplands by draining or filling the wetlands, or conversion to large ponds and lakes by flooding (which inundated vast areas of habitat). These habitat disturbances and hydrologic manipulations of wetlands, especially during the winter months when massasaugas were overwintering, are what are thought to be the main culprits of the drastic eastern massasauga decline in Pennsylvania.

Historical agricultural practices and dam building weren't the only culprits in massasauga habitat destruction. Direct pressure from intensive mining and highway construction has also affected their overwintering and basking habitat. Gravid

(pregnant) female snakes use wet meadows and fields that occur near the wetlands they overwinter in to bask most of the summer. It is important that these gestation areas are in an early successional state, where the canopy is open and receives significant sun throughout the day. These field conditions succeeding to forests have left fewer gestation areas for the sun-craving gravid females, which affects the overall reproductive success of the local population of massasaugas. In big, open landscapes that existed in Pennsylvania centuries ago, the snakes could search for the next nearest open patch. Now, the areas that the massasaugas live in are isolated, surrounded by development and other barriers, so each little habitat area is very important.

It doesn't help that the snake is venomous. While there are very few reported snakebites, this snake was thought of as a pest to some people. Massasaugas often meet their fate by the end of a shovel. Another killer of massasaugas is cars. Mostly in search of small mammals as food, these small snakes move slowly across roads to get from one patch of habitat to the other. Roads and snakes don't mix well. Road kills are common across their range. Due to the attractive nature and increasing rarity of the massasauga, it has also become a target for collectors and poachers. All of these factors add up, and the massasauga found its way to the Pennsylvania endangered species list in 1978. In 1999, the United States Fish & Wildlife Service listed the eastern massasauga as a "candidate" species. It is currently under review for federal threatened or endangered species status, and a final decision as to its federal status will occur sometime in 2014 or 2015. It is important to note that it is illegal anywhere in North America to have eastern massasaugas in captivity without special permits.

Since the eastern massasauga was listed as endangered in Pennsylvania, the Commission with the help of its conservation partners and funding through the Wild Resource Conservation Program and State Wildlife Program have researched the species in Pennsylvania by inventorying their populations across their range in Pennsylvania, conducted radio-telemetry studies and habitat management work and developed a protection plan. Recently, through State Wildlife Grant funding, the Commission is working with Dr. Howard Reinert, a Research Associate of the Mid-Atlantic Center of Herpetology and Conservation, to study the restoration and management of eastern massasauga habitats in the most viable habitat area left in Pennsylvania.

Commission staff has been working with developers by consulting on projects and making recommendations to avoid and minimize impacts to the eastern massasauga. While this is a reactive form of conservation at the project level (case by case), it has protected numerous existing massasauga areas from further degradation and destruction. The Marcellus and Utica Shale formations overlap the entire massasauga range in Pennsylvania. Commission biologists will be working with developers to ensure that unconventional natural gas infrastructure will not directly or indirectly affect massasauga populations.

Numerous massasauga recovery efforts are underway in Pennsylvania. In 2011, the Commission put together a Species Action Plan, with the goal to recover the eastern massasauga in Pennsylvania. For more information, go to [www.fishandboat.com/water/amprep/species-plan-eastern-massasauga.pdf](http://www.fishandboat.com/water/amprep/species-plan-eastern-massasauga.pdf).

Land protection in the form of acquisitions and easements of sensitive habitats as well as restoring reverted forests back to field or wet meadows are sorely needed for the long-term protection and recovery of this species. The Pennsylvania Game Commission, in consultation with the Pennsylvania Fish & Boat Commission, has been actively managing some of their properties in northwestern Pennsylvania with the conservation and restoration of massasauga habitat in mind. In 2012, the National Resource Conservation Service, working with the Commission and United States Fish & Wildlife Service, launched a new initiative as part of the Wetlands Reserve Program to protect land where eastern massasaugas live. This is an incentive-based program that offers interested land owners money to protect massasaugas by protecting their land through conservation easements and developing management plans to restore vital massasauga habitat and ultimately protect and restore populations. To learn more about this program, contact Christopher Urban at 814-359-5113 or e-mail [curban@pa.gov](mailto:curban@pa.gov).

We will continue to study the remaining populations of the eastern massasauga including their genetic variation. If these populations are found to be in trouble, population augmentation may be needed to help restore their populations. Provided that historically occupied sites are intact and have suitable habitat, reintroduction of massasaugas into former parts of their range are not out of the question.

There is a lot of work to do to recover the eastern massasauga in Pennsylvania. Truthfully, their future is still very uncertain. With the help of our conservation partners, active land protection efforts, habitat restoration and the support of the conservation-minded citizens of Pennsylvania, we are hopeful that these curious little rattlesnakes will be moving away from the edge of extinction and be here for the foreseeable future. ☐



photo - Tom Diez

*The eastern massasauga is an endangered species in Pennsylvania.*