

The Plight of the Bog Turtle

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Photo John Bunnell
New Jersey Pinelands Commission

Of all the endangered or threatened animals in New Jersey, no species' plight is more tied to the scourge of invasive plants than the tiny bog turtle (*Clemmys muhlenbergii*). Easily recognized by the orange patch on either side of its head, the bog turtle favors open, groundwater-fed wet meadows and mucky bogs. The soft soils provide protection from predators and the elements. The turtles use rivulets to travel within the fen, and short clumps of vegetation let in plenty of sunlight for incubating eggs and basking.

Exotic and native invasive plants dominate nearly half of the wetlands currently known to support bog turtles in New Jersey, one of the largest bog turtle strongholds in the eastern United States. The three most prevalent invasive plants degrading bog turtle habitats are purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), and reed canary grass (*Phalaris arundinacea*).^{*} Once established in bog turtle habitats, these plants form dense, shaded monocultures that rapidly replace the native low-growing, grassy vegetation the bog turtle depends on for survival.

In the late 1990s, the New Jersey Department of Environmental Protection's (DEP) Division of Fish and Wildlife ranked each bog turtle site in New Jersey according to the degree invasive plants posed a threat.

The DEP's Division of Fish and Wildlife concluded that sites where livestock grazed not only had the lowest coverage of invasive vegetation, but also contained some of the most robust bog turtle populations. Cattle, the primary livestock in these grazed sites, kept the invasive plants at low enough densities to allow native sedges and grasses to flourish. In addition, cattle hoof prints created water-filled microhabitats within which bog turtles could often be found wading or submerged.

In 1999, with funding and technical assistance from the Natural Resource Conservation Service and the U.S. Fish & Wildlife Services's New Jersey Field Office (the Endangered Species and the Partners for Fish and Wildlife programs), DEP's



Bog turtle (*Clemmys muhlenbergii*) nesting on a tussock

Photo Bill Smejkal / Amy S. Greene Environmental Consultants



Adult bog turtle (approximately life-size) with prominent orange patch visible on neck

Photo New Jersey Division of Fish and Wildlife

Division of Fish and Wildlife launched a special project to harness the power of grazing livestock at selected bog turtle sites throughout New Jersey. This project was largely the brainchild of DEP's Fish and Wildlife biologist Jason Tesauro, who had spent several years scouring New Jersey's wetlands to locate important bog turtle populations and researching the effects of livestock grazing on bog turtles.

In choosing livestock for each site, biologists considered both habitat size and the structure of the plant community. To avoid overgrazing and excessive trampling, cattle were used in sites larger than an acre. Goats and sheep were used in smaller sites densely colonized by common reed, shrubs, and briars. Unlike cattle, which tend to avoid thicket-like habitats, goats and sheep will search for food and shelter in the core of dense patches of vegetation.

To monitor results of the grazing project, biologists established six-square-meter sample plots within sites overrun with invasive plants. By the fifth year, DEP's Division of Fish and Wildlife biologists

documented between 80 to 95 percent reduction of *Phragmites* and purple loosestrife and a 70 to 95 percent increase in natural plants species at several sites. Additionally, for purple loosestrife control, DEP is successfully using leaf-eating beetles (*Galerucella pusilla* and *G. calmariensis*), reared and released by the New Jersey Department of Agriculture's Beneficial Insect Lab.

For common reed, eradication is the long-term objective. The structure of *Phragmites* — tall, individual stems with large, sparsely placed leaves — makes it very vulnerable to grazing. Livestock continuously nibbling on its leaves, which are central to the plant's ability to make energy, forces the *Phragmites* to tap into stored energy reserves in its roots. Because these reserves are limited, extended periods of constant grazing weakens the *Phragmites*, which either starves to death or is overtaken by other plants. At three sites where reed canary grass remains the dominant threat, grazing livestock prevent it from smothering other plants.

Bog turtles have responded favorably to habitat improvements. Indeed, at one grazed site, previously overrun with invasive plants and unsuitable for nesting, biologists discovered four bog turtle nests. In another habitat area restored by grazing livestock, biologists found the highest number of bog turtles since the grazing project began in 1999.

Meanwhile, as livestock-based agriculture becomes obsolete and grazing animals no longer maintain open, grassy wetlands, the menace of invasive plants in bog turtle habitat likely will worsen. Without intervention to prevent habitat loss, New Jersey stands to lose 40 percent of its bog turtle populations in the next 20 years. However, DEP's Division of Fish and Wildlife biologists remain hopeful that information generated through the grazing project will prove invaluable to the bog turtle's recovery and to protection of all unique wildlife that share its habitat.

^{*}Eurasian and native varieties of both common reed and reed canary grass occur in the United States. In both cases, the Eurasian variety seems more invasive, and more prevalent, than the native plants. But while it is possible to distinguish nonnative common reed from native forms, no reliable method of differentiation has yet been developed for reed canary grass.