MASSACHUSETTS WILDLIFE

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ANNIVERSARY

Massachusetts Endangered Species Act

Photo courtesy MassWildlife Archives

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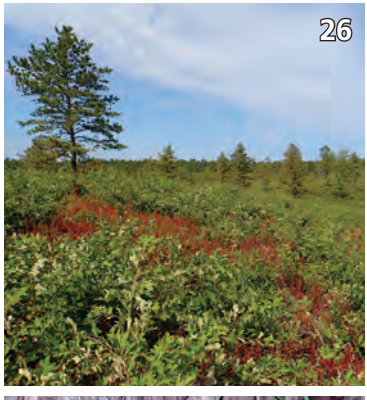

Photo by Chris Buelow/MassWildlife

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MASSACHUSETTS WILDLIFE

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FEATURES

On the Cover: There is perhaps no greater reminder of the vulnerability of species listed under the Massachusetts Endangered Species Act (MESA) and the great progress MassWildlife has made over the past 30 years under MESA than this recently hatched, ground-nesting seabird facing the dawn of a new day on a Bay State beach. This Least Tern (*Sternula antillarum*, Special Concern) is the smallest of our four breeding tern species. You can hear its squeak-toy calls on the sparsely vegetated coastal beaches where it nests. Photo © Dean Cerrati

LANDSCAPE-SCALE CONSERVATION

Increasing the populations of species listed under the Massachusetts Endangered Species Act (MESA) as Endangered, Threatened, or of Special Concern is the primary goal of conservation efforts. Several articles in this special issue of *Massachusetts Wildlife* describe such efforts. In particular places, however, scaling up to landscape-level conservation is possible. The opportunity for significant landscape-scale conservation occurs where two conditions are met: (1) a high level of biodiversity (a large number of species), including species ranging from rare and endangered to common; and (2) significant acreage of contiguous natural lands.

MassWildlife engages in landscape-scale conservation where opportunities are found, and as fiscal considerations allow. The three main activities through which such conservation is achieved are: (1) biological survey and monitoring; (2) land protection; and (3) ecological restoration and habitat management. We will now explore each of these critical components of landscape-scale conservation in turn, using one particular landscape as an example.

The pine barrens of Plymouth, Carver, and Wareham (PCW)—a collection of undeveloped lands anchored by Myles Standish State Forest—has been a focus of conservation efforts by state and private conservation partners for over a century. The pine barrens of Plymouth and adjacent towns have long been appreciated for their recreational opportunities, a destination for generations of people seeking a place of natural beauty for camping, hiking, bicycling, and horseback riding. In season, hunters stalk the woods for game animals. The ponds, with their sandy shorelines, attract swimmers, and boating and fishing are popular.

*The Frosted Elfin butterfly (*Callophrys irus, *Special Concern) is an indicator of high-quality Pitch Pine-Scrub Oak Barrens habitat.*

Biological Survey and Monitoring

One of the primary functions of MassWildlife's Natural Heritage and Endangered Species Program (NHESP) and its cooperators is survey and monitoring of MESA-listed species and the characteristics of the habitats in which they live. Surveys have been conducted since the inception of NHESP in 1978. The current NHESP database includes spatial (mapped) records of state-listed species spanning the past 42 years, as well as older records based on museum specimens and other reliable scientific sources. These data show that the pine barrens and ponds of PCW provide

by Michael W. Nelson, Chris Buelow

habitat for no fewer than 80 MESA-listed species. This unique and extraordinary concentration of rare species, along with more common species, places the Plymouth barrens among the top biodiversity "hotspots" in the state.

The pine barrens and ponds of PCW are situated on the Wareham pitted plain, as it is called by geologists, where soils consist largely of sand. The sand layer is up to 160 feet thick, and holds an enormous aquifer of clean, fresh water. Ponds occur where there are "kettle holes" (topographic depressions) in the sandplain deep enough to intersect the water table. Across most of this area, however, precipitation quickly seeps through the sand, below the reach of most plant or animal life. As a result, sand at the surface is very dry, and supports the rare and unique community of plant and animal life called Pitch Pine-Scrub Oak Barrens, or simply, pine barrens. Highlighted below is a sampling of the birds, mammals, insects, reptiles, amphibians, fish, freshwater mussels, and plants that live in the pine barrens and ponds of PCW.

Moth and butterfly caterpillars are abundant in pine barrens. During the breeding season, songbirds including the Prairie Warbler (*Setophaga discolor*), Pine Warbler (*Setophaga pinus*), and many others rely on caterpillars to feed their young. The Eastern Whip-poor-will (*Antrostomus vociferus*, Special Concern) feeds on adult moths and other insects at night, catching them on the wing like a bat. Indeed, the abundance of moths attracts bats to the pine barrens, including species that have declined as a result of the fungal disease called White-nose Syndrome, such as the Northern Long-eared Bat (*Myotis septentrionalis*, Endangered).

The abundance of moths and butterflies found in pine barrens includes many common species, and more rare and endangered species than any other habitat in the state. Most of these rare moths and butterflies inhabit open and shrubby pine barrens with a sparse tree canopy, where the caterpillars are specialized feeders on shrubs such as Scrub Oak (*Quercus ilicifolia*) and lowbush blueberries (*Vaccinium angustifolium* and *V. pallidum*). Others feed on herbaceous plants, for example, the Frosted Elfin butterfly (*Callophrys irus*, Special Concern), which specializes on Yellow Wild Indigo (*Baptisia tinctoria*). The sandy soil of pine barrens is ideal for a wide variety of other insects, especially bees, wasps, and ants that nest in the ground. Ants and other small insects provide food for predatory tiger beetles.

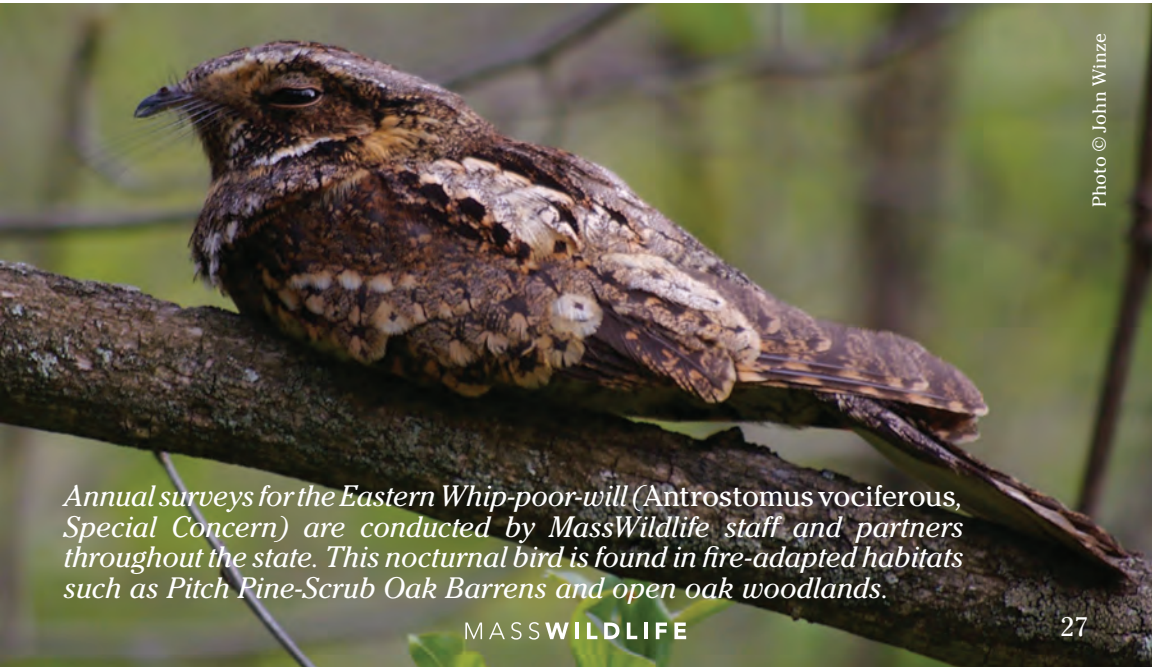


Photo © John Winze

*Annual surveys for the Eastern Whip-poor-will (*Antrostomus vociferous, *Special Concern) are conducted by MassWildlife staff and partners throughout the state. This nocturnal bird is found in fire-adapted habitats such as Pitch Pine-Scrub Oak Barrens and open oak woodlands.*

Of the 16 species of tiger beetles in Massachusetts, eight inhabit the pine barrens of Plymouth. The rarest of these is the iridescent-green Barrens Tiger Beetle (*Cicindela patruela*, Endangered), which was proclaimed Plymouth's "adopted endangered species" on Endangered Species Day on May 17, 2019.

Perhaps the best-known endangered species to inhabit the ponds of Plymouth County is the Northern Red-bellied Cooter (*Pseudemys rubriventris,* Endangered), also known as the Plymouth Redbelly Turtle. As a result of a "headstart" population recovery program conducted by NHESP since 1980, their numbers have increased significantly in the past few decades. There is also a healthy population of the Eastern Hog-nosed Snake (*Heterodon platirhinos*, Special Concern) in the pine barrens of PCW. The hog-nosed snake's primary prey is toads, which are particularly abundant in this area due to the sandy soil in which they burrow, and the numerous ponds and other wetlands in which they breed.

*The Plymouth Gentian (*Sabatia kennedyana*, Special Concern) is one of many rare and endangered plants that inhabit sandy Coastal Plain Pond shores.*

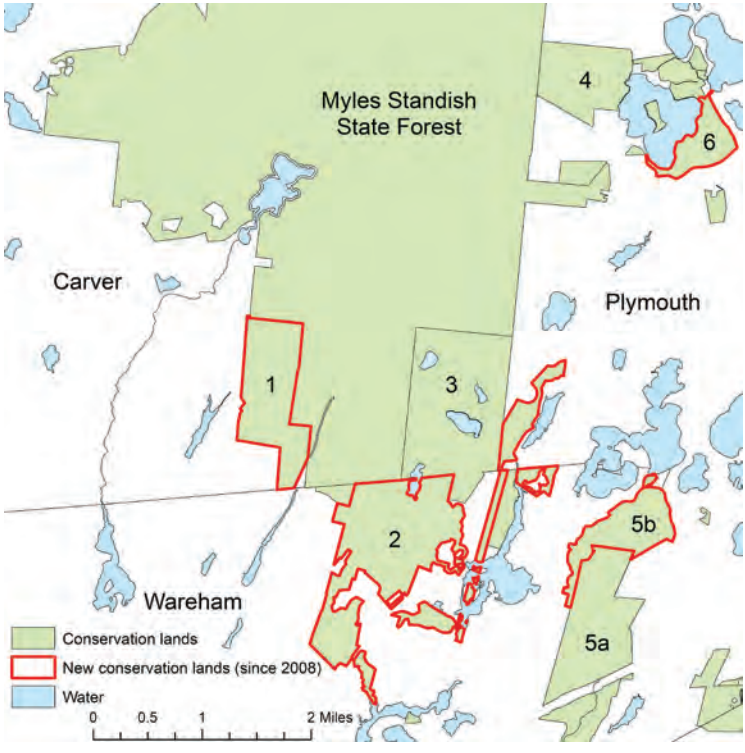
The larger of the ponds of PCW provide fish for Bald Eagles (*Haliaeetus leucocephalus*, Special Concern) and their young. The Bald Eagle population is recovering both nationally and in Massachusetts. In 2012, Bald Eagles resumed breeding in the Plymouth area, after nearly 100 years of being only transient winter visitors. In addition to the ponds, the pine barrens of PCW feature a number of coldwater rivers and streams, fed by springs flowing out of the aquifer deep in the sand. Flowing south to Buzzards Bay, these rivers and streams provide habitat for anadromous fish such as Alewife (*Alosa pseudoharengus*) and sea-run Brook Trout (*Salvelinus fontinalis*), as well as several species of freshwater mussels.

Many of the ponds in the pine barrens of Plymouth County are of a special kind called Coastal Plain Ponds. These ponds occur where kettle holes in the outwash plain intersect the water level of the aquifer. The water level fluctuates both annually and over periods of many years. In late summer and particularly in low-water years, some of the ponds have wide, gently sloping, exposed stretches of sandy shoreline. A diversity of rare and endangered plants exclusively inhabits such sandy pond shores, including the Plymouth Gentian (*Sabatia kennedyana*, Special Concern). This habitat is maintained by fluctuations in the water level in the spring, and particularly in high-water years when encroaching trees and shrubs are flooded and killed.

Land Protection

Biological survey and monitoring has shown the pine barrens and ponds of PCW to be a unique natural resource of local, state, regional, and even global significance. However, landscape-scale conservation also requires significant blocks of undeveloped land. This is because scattered, poorly planned development fragments the remaining landscape to a degree that the natural processes upon which native biodiversity depends,

such as disturbance (see Ecological Restoration and Habitat Management, below) and undisrupted hydrology, are lost. In addition, small habitat fragments and habitat in proximity to development cannot support viable populations of many species. For this reason, conservation of the pine barrens and ponds of PCW, along with their full complement of biological diversity, requires a large, contiguous area isolated and buffered from development. Fortunately, the hub of such a reserve has existed in Myles Standish State Forest for over a century.

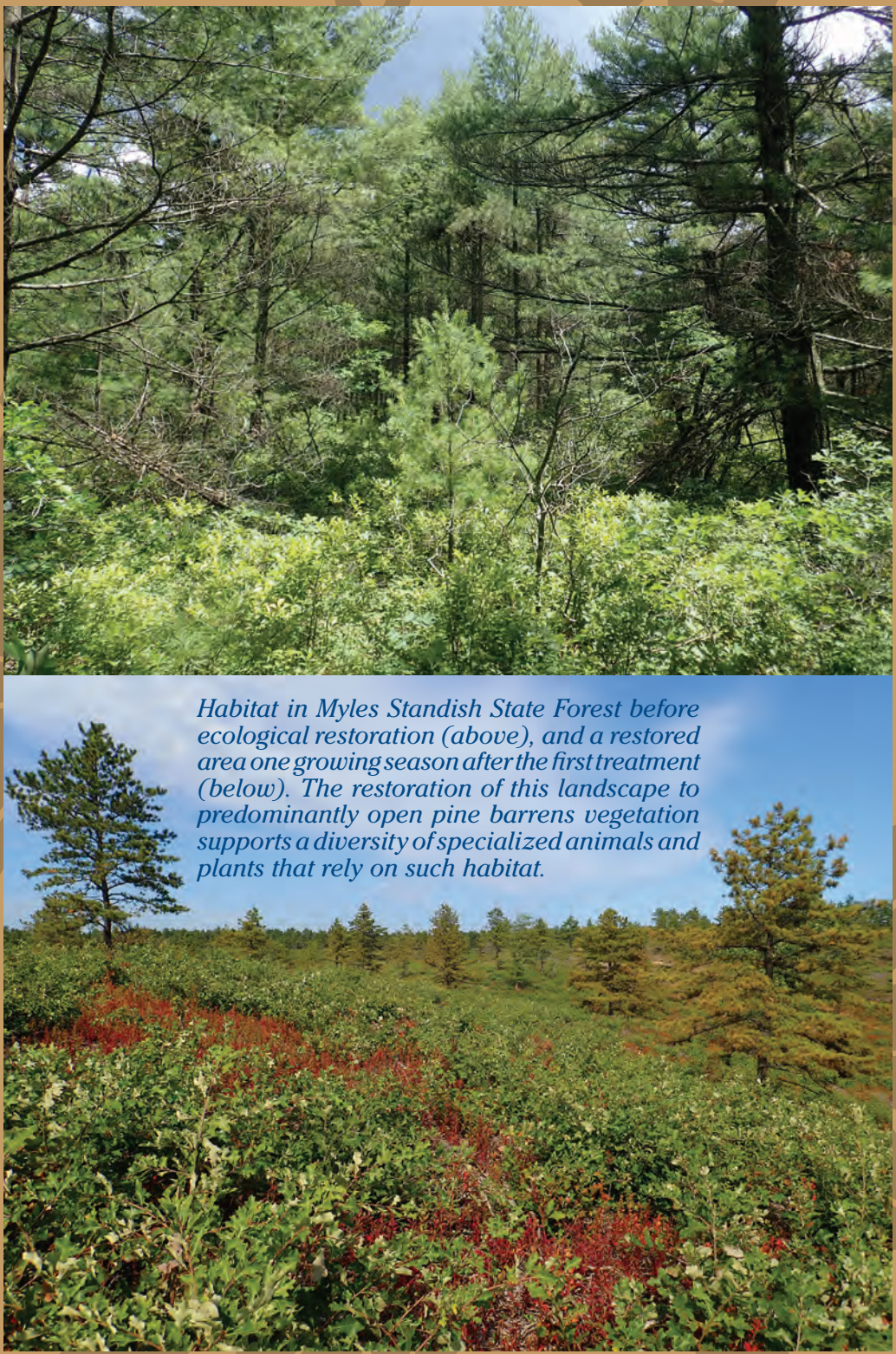


However, the long-term health and viability of the pine barrens and ponds of PCW, with their full complement of native biological diversity, can only be assured by additional conservation. This was first recognized in 1929, in a recommendation to enlarge Myles Standish State Forest made by the Governor's Committee on Needs and Uses of Open Spaces. In 2001, MassWildlife's *BioMap* project identified Myles Standish and adjacent lands as a top conservation priority, and this was reiterated in the Massachusetts State Wildlife Action Plan (SWAP) in 2005, MassWildlife's *BioMap2* in 2010, and the 2015 SWAP update. The need for additional land protection in the pine barrens and ponds of PCW was also emphasized in *Massachusetts Wildlife*, No. 1, 2008, "Fire and Water: The Pine Barrens and Ponds of Plymouth."

So, what has been done thus far? The answer is illustrated by the map above. Established in 1916, the 13,212-acre Myles Standish State Forest is managed by the Massachusetts Department of Conservation and Recreation (DCR). Adjacent conservation lands include: (1) the Southeast Pine Barrens Wildlife Management Area (WMA), managed by MassWildlife (437 acres); (2) Maple Springs WMA/Wildlife Conservation Easement (WCE)/Wildlife Conservation Restriction (WCR), MassWildlife (1,009 acres); (3) Camp Cachalot WCE, Boy Scouts of America (734 acres); (4) Halfway Pond Conservation Area, Wildlands Trust (418 acres); (5a,b) Red Brook WMA, MassWildlife (705 acres); and (6) Halfway Pond WMA/WCE, MassWildlife (153 acres). In total, these lands represent 16,668 acres of landscape-scale conservation for the benefit of both people and wildlife.

Ecological Restoration and Habitat Management

Land protection is a critical component of most conservation initiatives, but land protection alone is not enough to ensure the persistence of the unique and specialized biological legacy of natural communities such as pine barrens. The pine barrens ecosystem has been shaped



Habitat in Myles Standish State Forest before ecological restoration (above), and a restored area one growing season after the first treatment (below). The restoration of this landscape to predominantly open pine barrens vegetation supports a diversity of specialized animals and plants that rely on such habitat.

Photos by Chris Buelow/MassWildlife

and maintained by periodic disturbance events, particularly fire, for millennia. Occasional disturbance events keep the vegetation structure open, while also promoting growth of fire-tolerant pine barrens vegetation. Disturbance events also reduce generalist, fire-intolerant vegetation such as White Pine and Red Maple. In the absence of disturbance, the integrity of the pine barrens community is dramatically reduced over time as vegetation becomes dense, and specialized barrens obligate species decline. Eventually, without disturbance, the entire pine barrens community may be lost.

Photo by Chris Buelow/MassWildlife

*An Eastern Towhee (*Pipilo erythrophthalmus*) gathers nesting material at Montague Plains WMA.*

Since 2015, MassWildlife has collaborated with DCR, the DCR Fire Bureau, and the Boy Scouts of America to plan and implement landscape-scale pine barrens restoration at Myles Standish State Forest and adjacent conservation lands, including the Southeast Pine Barrens WMA, Maple Springs WMA, and Camp Cachalot. MassWildlife and DCR have been working on similar restoration and habitat management projects in pine barrens communities for nearly two decades: most notably at Frances A. Crane WMA, Montague Plains WMA, and Manuel Correllus State Forest. The success of those projects enabled the plan for Myles Standish and adjacent conservation lands to develop quickly and with consensus, resulting in a truly unique opportunity for landscape-scale ecological restoration and biodiversity conservation.

The outcome of this collaboration is a 10-year plan for phased pine barrens restoration across a nearly 2,500-acre contiguous area in the southern part of Myles Standish and adjacent conservation lands. The goal is to restore an open landscape dominated by pine barrens vegetation to support the diversity of specialized animals that inhabit this natural community. For much of the restoration area, this means a savanna-like structure of emergent Pitch Pine and oak trees above a layer of Scrub Oak, lowbush blueberries, and other shrubs, with smaller openings of native warm-season grasses (See page 30, bottom image).

Because there hasn't been significant disturbance in the restoration area in five to six decades, the first phase of restoration is to thin the tree canopy and remove generalist species, particularly White Pine (See page 30, top image). This is accomplished by a one-time cut-mow-mulch operation that opens the canopy around desired retention trees, mimicking historical disturbance events that have perpetuated the pine barrens community. To date, MassWildlife and DCR have conducted initial canopy thinning and mowing on nearly 1,000 acres. Following thinning and mowing, prescribed fire will be used to maintain the habitat over the long term. Prescribed fire was initiated in the restoration area in 2019.

About the Authors

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TRUE GREEN

Can you identify these MESA-listed species? See answers on page 41.

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