

# Chapter 1. Introduction

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When we consider the tremendous diversity of habitats found in the northeastern United States (for the purposes of this publication, the “Northeast” refers to the geographic region that includes the following states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia), we must ask ourselves, “Why narrowly focus the attention of an entire guide on grassland, shrubland, and young forest habitats?”. The answer lies in the problems of species and habitat declines, which biologists have noted over the last few centuries, especially in recent decades. For instance, 22 of 40 shrubland birds have significant declining population trends in the Northeast; 7 grassland birds are listed as endangered or threatened in at least one state in the region; American woodcock populations have declined by 40% over the past 30 years; New England cottontails occur in only 20% of the area historically occupied; 5 species of butterflies are thought to be extirpated from New England and numerous others associated with shrubland habitats are dramatically declining throughout the region. But are these declines simply natural events or ones that have been influenced by human impact? Just how has our use of the land been a factor in these declines? Let’s explore these questions.

## Which habitats are we talking about?

“*Grasslands*” is a broad term that applies to many open land habitats. Typically we think of grassy areas with no shrubs or trees and no agriculture. However, even pastures and hayfields can provide adequate habitat for some grassland species (e.g., upland sandpipers and bobolinks, respectively). Their use by wildlife will depend on the vegetation height, density, and composition.

*Old fields* differ from grasslands in that they contain a mix of grasses and herbaceous plants along with shrubs and some tree seedlings and saplings. Old fields vary from upland meadows dominated by herbaceous plants such as goldenrod and meadowsweet to successional openings containing a large component of shrubs such as dogwoods, viburnums, and blueberries. The later stages of old fields are commonly referred to as *shrublands*. Shrublands also include those habitats typically found on sandy soils in coastal areas and ridge tops that contain a heavy component of scrub oak. Old fields and shrublands vary greatly in structure and composition of herbaceous and woody vegetation, depending on the soils, moisture, and time since last disturbance.

In contrast to both grasslands and old fields, *young forests* are dominated by woody seedlings and saplings. The tree species found on these sites is largely dependent on what was there before the area was disturbed either through a timber harvest or natural event. However, they are typically dominated by relatively shade tolerant late-successional species such as oak, beech, and maple. The young forest stage can last up to 40 or 50 years post-disturbance, depending on soil fertility, tree species, and other conditions.

Absent grazing, mowing, burning, or other type of disturbance, grasslands will turn into upland meadows and upland meadows will revert to old fields. In turn, these will eventually grow into young forest and eventually to climax forest. This process is referred to as *succession*. As such, grasslands, old fields, and young forests are often referred to as *early-successional habitats* (Figure 1).



Figure 1. The grasslands, shrublands and young forest habitats may be referred to as “early-successional habitats.” In this graphic showing the time sequence of plant succession, early-successional habitat would continue through 20+ years, fading out sometime during the 25- to 100-year phase. (Graphic provided by Paul Fusco, Connecticut Department of Environmental Protection.)

## Wildlife in need of habitat

Grassland wildlife species are declining. Of the ten grassland birds that are well sampled by Breeding Bird Survey routes in the Northeast, seven show significant declines since 1966 and none exhibit significant increases (Figure 2). Additionally, reptiles like black racers and wood turtles, which are grassland dependent, have shown declines in the Northeast.

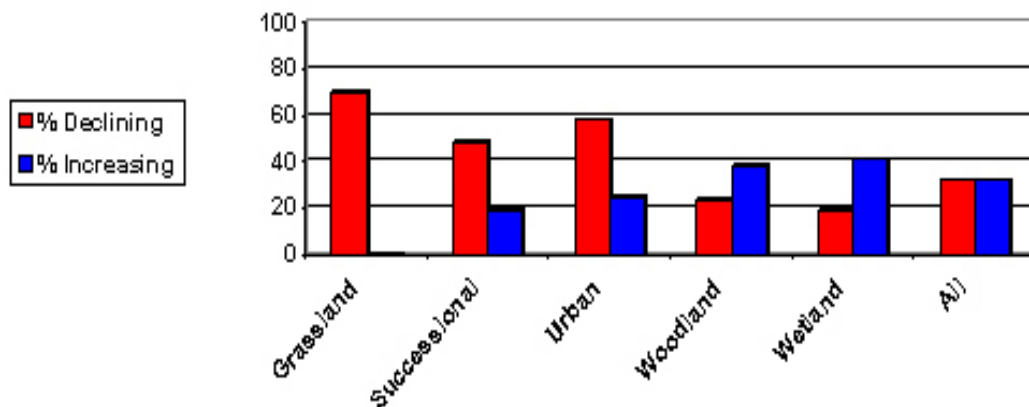


Figure 2. Northeastern United States bird population trends from Breeding Bird Surveys, 1966-2000, with birds grouped by primary breeding season habitat (Sauer et al. 2001). Data are provided for species encountered on more than 14 routes within U.S. Fish and Wildlife Service Region 5 (northeastern U.S.). Percent declining or increasing includes only those species with statistically significant ( $P < 0.1$ ) trend estimates.

Many shrubland and young forest birds are also declining (Figure 2). Nearly half (48%) of the 27 shrubland birds covered by Breeding Bird Survey routes have significantly declining population trends in the last 35 years; whereas, only 19% have demonstrated population increases. Other animals like New England cottontails and many butterfly species (e.g., Karner blue and Persius duskywing) are declining and/or rare in the northeastern U.S.

## How much habitat then and now?

Among early-successional habitats, grasslands in the northeastern United States have declined the most significantly in the past one hundred years. One study found that of those ecosystems in eastern North America that have been nearly wiped out (e.g., experienced greater than 98% decline), 55% are grassland, savannah, and barren communities. Few wildlife-friendly grasslands exist today. They have been mostly replaced by forest, intensive agriculture, or commercial or residential development. The grasslands that do remain are typically fragmented, isolated, and too small to be of significant use by many wildlife species.

As you might expect, the amount of shrubland and young forest habitat in the Northeast has fluctuated widely through history. Because of their dynamic nature, it is difficult to pinpoint a number for what percent of the northeastern landscape these habitats represented prior to European colonization. Instead, biologists look at the historic “range of variability,” to try to estimate what the landscape looked like over time.

Prior to European colonization, early-successional habitat was not well represented (3 to 5% of the landscape) in the northern spruce-hardwood forests (Table 1). As one moved further south, the northern hardwood forest saw 4 to 28% of the landscape in an early-successional state (this includes small gaps of just over an acre in size caused by moderate disturbances). Moving further south and toward the coast, interior oak woodlands, away from most hurricane influence, had the lowest percentage of young forest (1 to 3%). Coastal oak woodlands, on the other hand, showed tremendous variability of regenerating habitat, from less than 3% if it was more than 15 years after a hurricane, to as much as 40 to 50% in the years following a hurricane. Finally, pine-oak barrens show a historic range of 10 to 31% early-successional habitat.

So, how does our current state of shrubland and young forest compare to those historic figures? It varies considerably from lows of 4 to 6% of timberland in early-successional habitat in Massachusetts, Connecticut and Rhode Island, to highs of 24% in Ohio and 25% in Maine (Table 2). States with a great deal of Atlantic coastal influence, such as Massachusetts, Connecticut, and Rhode Island likely historically had a much higher percentage of young forest habitat than they do today; perhaps averaging closer to the 15 to 20% range, depending on forest type and proximity to the coast. On the other hand, states away from the coast, like Ohio and Vermont, may have averaged in the 5 to 15% range.

Two things are important to note here. One, the average percent for a state doesn't tell you much about how you should manage your specific property. You really have to think about the range of variability within the forest type(s) in your area. Two, just because your region has young forest habitat equal to historic levels doesn't mean that the same complement of wildlife species can survive there. Why? Because of the dominance of people and our built infrastructure (e.g., roads and buildings). The remaining successional habitat in an area is likely fragmented, making it difficult for animals such as New England cottontails and black racers to sustain a population. Finding ways to connect existing grassland, shrubland, and young forest habitat by creating new patches of similar habitat should improve the likelihood that populations of dependent wildlife will survive through time.

## Changes over time

Certainly there have been changes in the land over the eons, both due to natural causes and humans. Just 12,000 years ago there were thick sheets of ice over much of northern New England. Imagine the open areas (grasslands, wet meadows, and young forest habitats) that flourished as these glaciers receded. We would expect that wildlife associated with these habitats thrived at this time, perhaps reaching their peak population numbers.

Another major influence on the land was Native Americans. Burning to maintain open areas was widespread among native people up to and during the colonial period. Historians have noted, however, that these maintained open areas were more widespread as you went nearer the coast. The spruce-fir and northern hardwood forests of the great north were not typically subjected to burning by Native Americans.



Increasing numbers of colonists expanded agriculture more intensively in coastal regions, as well as further inland from the 1700s through most of the 1800s. Many grassland wildlife populations increased their numbers at this time, and even extended their ranges further inland. However, due to land clearing, shrubland and young forest habitat actually declined in the Northeast during this time period, and the wildlife associated with those habitats declined along with them (Figure 3).



*Figure 3. Farm abandonment, 1850, as depicted in the Harvard Forest dioramas, showing New England land use history. Used with permission of Harvard University Press. Photo by John Green.*

But something happened after the Civil War. The westward expansion began as fertile, rock-free prairies showed greater promise than the rocky soils of the Northeast. Farms were abandoned, fields lay fallow and then reverted to forest. Grassland birds and other grassland-associated wildlife declined over this time; whereas shrubland and young forest animals abounded. But young forests are fleeting, and after the early to mid-1900s, the maturing forests lost their appeal to the corresponding suite of wildlife found therein. Since that time, most wildlife species in all the habitats covered in this guide have declined significantly.

The intensification of agriculture, with haying two or three times each season, pesticide use, and the fragmentation of remaining fields has exacerbated problems for grassland birds. For shrubland and young forest species, the suppression of fires due to property and human safety concerns has led to the loss of one major natural factor that formerly supported those species. So, instead of Native Americans starting fires and actively managing open lands for agricultural use, berry production, and game species, modern Americans are taught to prevent fires and suppress them at first sight. Prescribed fire for management purposes is but one tool that is described in the following pages.

## **Addressing the issues**

The following chapters will provide the details needed to help landowners and managers address the many issues of managing grasslands, shrublands, and young forest habitats. Whether you own a 5-acre grassland, a 20-acre old field, or a woodlot of 100 acres or larger, there is something you can take away from this publication. The authors of these chapters have thought long and hard about the management issues that must be dealt with if the target habitats and associated wildlife are going to improve.

Each chapter contains detailed information about managing these habitats. You will also find case studies that perhaps will serve as models for you to follow. Finally, since you may not have the financial ability to undertake the management prescriptions outlined in this guide, there is a chapter devoted to funding opportunities. So, please read on and find out what you can do to better manage our region's grasslands, shrublands, and young forests.

## Suggested reading

- Litvaitis, J.A., D.L. Wagner, J.L. Confer, M.D. Tarr, and E.J. Snyder. 1999. Early-successional forests and shrub-dominated habitats: land-use artifacts or critical community in the northeastern United States. *Northeast Wildlife* 54:101-118.
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## Biography

Darrel F. Covell is Assistant Extension Professor and Specialist of Wildlife at the University of New Hampshire Cooperative Extension. He earned a B.S. degree in Wildlife Management from the University of New Hampshire in 1989 and a M.S. degree in Wildlife Ecology from the University of Wisconsin in 1992. Darrel worked as a wildlife outreach specialist for seven years for the University of Wisconsin's Department of Wildlife Ecology. He served as executive director of the New Hampshire Wildlife Federation for two years prior to assuming his current position in 2001.

**Table 1. Historic range of the percent of early-successional habitat among forest types in the northeastern United States (Lorimer and White 2003).**

	Historic percent of early-successional habitat	
	Range	Mid-point
Interior oak woodlands	1-3%	2%
Spruce-hardwoods	3-5%	4%
Northern hardwoods (including small gaps just over an acre in size)	4-28%	16%
Pine-oak barrens	10-31%	20%
Coastal oak woodlands	1-50%	25%
All forest types above	1-50%	13% (avg)

**Table 2. Current percentage of timberland in seedling-sapling for each of the Northeastern states. Data collected from 1986-1998 as per Trani et al. (2001).**

State and subregion	Percent seedling-sapling
Massachusetts	4
Connecticut	5
Rhode Island	6
New Hampshire	9
Vermont	10
Maine	25
New England subregion	17
Maryland	10
West Virginia	10
New Jersey	13
Pennsylvania	15
New York	16
Delaware	18
Ohio	24
Middle Atlantic subregion	15
Northeast region	16