

Chapter 4. Managing Shrublands and Old Fields

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Shrublands and old fields are critical wildlife habitats that are essential for the survival of many wildlife species. The loss of these habitats through conversion to other land uses, residential development or through succession, is resulting in the decline and disappearance of some wildlife dependent on early-successional habitats. In eastern North America over the last 60 years, open habitats (grasslands, savannah, barrens, and shrublands) have declined by 98%, with shrubland communities comprising 24% of this decline. These habitat changes provide significant challenges for wildlife biologists who strive to maintain a biologically diverse mix of species and habitats on the landscape. If we are to address these declines, management practices must be employed to create and maintain sufficient early-successional habitats that provide the proper structure and size to meet the needs of associated species.

Importance of shrublands and old fields to wildlife

Old-field and shrubland communities provide vegetative structure and diversity that provide vital nesting, brood rearing, feeding, and escape habitats for early-successional wildlife. Shrubland communities are habitat patches with woody plants typically less than ten feet tall with scattered open patches of grasses and forbs that provide floristic diversity. Wildlife that occupy and make use of shrublands and old fields also inhabit power line rights-of-way, abandoned farmland, restored strip mines, and regenerating clearcuts.



Figure 1. Old-field and shrubland habitats attract a wide variety of early-successional dependent birds and mammals, including many ground and shrub nesting songbirds, American woodcock, and New England cottontails. Photo by Paul Fusco.

The vegetative make up of a shrubland or an old field is variable and dynamic depending on the length of time since abandonment, management history, and other factors that can affect the long-term stability and composition of plants that occupy the site. A habitat patch dominated by shrub species such as blueberry, arrowwood, and alder is quite different from that created by a clearcut dominated by regenerating late-successional tree species such as maples or oaks. Patches dominated by shrub clones (e.g., witchhazel, alder, and dogwood) are relatively stable and can last up to 40 years with little management. In contrast, patches dominated by late-successional tree species are short lived (10 to 15 years) and typically much more densely stocked. The greater longevity of a shrubland community is due in part to the ability that many shrub species have to suppress forest regeneration and tree development. Shrubs and shrub-like species having this characteristic include mountain laurel, great laurel, and scrub oak. The greater the longevity of the habitat patch, the greater the length of time that early-successional wildlife species will occupy the habitat patch.



Figure 2. Old-field habitats dominated by coppice growth, saplings, and small trees provide excellent stem density and vertical cover to protect wildlife from avian predation. Photo by Brian Tefft.

Old-field and shrubland habitats consisting of woody shrubs and herbaceous plants have structural diversity that provides nesting sites, escape cover, and food for wildlife. Cottontails and other small mammals benefit from shrub cover, which they use to escape detection from hawks and owls. American woodcock benefit from the protective nesting sites afforded by thick stands of alder and other small trees and shrubs. Turkeys, quail, kingbirds, and others benefit from the abundance of insects found in herbaceous openings.

Apple trees are also an important food source often found in abandoned fields and should be preserved. Apples provide a valuable food supply for many species of wildlife and can be released (opened up) and preserved when managing, mowing, or selectively removing unwanted species to maintain shrubland habitat cover. Refer to chapter 7 for more information on how to release and maintain apple trees. Other important fruiting trees and shrubs to preserve include highbush blueberry, winterberry, black cherry, and wild raisin.



Figure 3. Native, fruiting shrubs, such as winterberry provide important high-energy foods for many birds. Photo by Brian Tefft.

Of 40 bird species associated with shrubland habitats, 22 are undergoing significant population declines in eastern North America (Table 1). Additionally, 139 species of reptiles, amphibians, birds, and mammals either prefer (17 species) or utilize (122 species) shrub and old-field habitats. Shrubland habitats in the Northeast also contain higher proportions of state-listed butterflies and moths than other natural community types. Of 3,500 species of butterflies and moths in the Northeast, 58 are dependent upon shrublands, which provide sunny open areas in combination with desired host plants such as scrub oak and blueberry. Fifty-six of these are considered rare.

Management of shrublands and old field habitats

Patch size

Patch size and distribution on the landscape are important considerations in planning and managing habitats. Some species will use a range of patch sizes while others may require a certain minimum amount of habitat. For instance, small isolated patches less than two acres are not large enough for species such as New England cottontails, yellow-breasted chats, and field sparrows to survive. However, they are large enough for species that have small home ranges including various butterflies, dragonflies, and some songbirds such as chestnut-sided warblers. Small patches will also provide foraging opportunities for more mobile and wide-ranging species such as white-tailed deer and turkeys.

However, if managing shrublands to enhance the long-term survival of a variety of wildlife, generally speaking larger is better. Habitat patches in a range of sizes, from 5 to 25 acres and larger, will enhance reproduction and survival, may contribute surplus animals to the population, and will facilitate movements between larger habitat patches. Patches of at least 25 acres in size are required for yellow-breasted chats, golden-winged warblers, and New England cottontails.

Although most habitat management will be conducted at the parcel level, managers should be aware of what is going on at the landscape level and provide a sufficient mix of shrubland patches. In general, maintaining 10 to 20% of a landscape in an open condition (grassland, old field/shrubland, regenerating forest, and even scrub-shrub wetlands) should be sufficient to meet wildlife diversity needs.

For old-field and shrubland habitats, managers should evaluate the opportunities available at the parcel scale and use available techniques to maintain the habitats that are present while keeping patch size considerations in mind. Old-field and shrubland habitats can be maintained for decades with minimal management. However, development and restoration of shrublands requires considerable effort. New shrublands can be created by clearcutting and then reentering the stand at short intervals (one to three years) to aid in conversion from regenerating late-successional trees to relatively stable shrubland. Powerline rights-of-way are shrublands that have been created in such a manner and require only periodic maintenance.

Management plan

A management plan for any wildlife habitat project requires careful consideration of goals and objectives for the proposed project. A manager should consider patch size and distribution and the proportion of forests and other habitats contributing to wildlife diversity. A variety of management options, including mechanical mowing, herbicides, selective removal of trees, prescribed burning, and grazing may be considered to manage old-field and shrubland habitats. Frequency and timing of such techniques must also be considered. Invasive exotic plants (see chapter 8) should be addressed, since some of these species are aggressive and will displace desirable native species if not controlled. These and other factors must be addressed in the management plan.

Frequency and timing of management

Most early-successional habitats are temporary and dynamic in nature; constantly changing as more shade-tolerant trees replace sun-loving shrub species. Since old-field and shrubland habitats are relatively short lived, 20 to 25 years in most cases, periodic management must be conducted to maintain the desired habitat structure.

The frequency of vegetation management activities necessary to maintain old-field and shrubland habitat conditions will depend on several factors. Old fields and shrublands that are relatively stable still require monitoring and occasional selective cutting, mowing, or herbiciding of small trees that invade the area (e.g., every five years). Patches dominated by regenerating trees will require aggressive management for several years to aid in conversion to a more stable shrubland. This may include stumping and mowing every one to three years, perhaps coupled with an herbicide application to control trees attempting to resprout. Reclamation

of old fields and pastures that have begun to succeed to forest will initially require aggressive management using land clearing equipment such as a hydroaxe, Brown Brontosaurus, or even a tree shear (see chapter 10 for equipment descriptions) to remove larger unwanted trees followed by less frequent action (e.g., every three to five years) to maintain the habitats. Once shrublands become well established they may require only periodic management (every five to ten years or longer). In areas with patches of shrubs interspersed with openings of grasses and forbs, management may only be required every two to four years to prevent these openings from reverting to forest. Monitoring of your habitat patch will be required to determine when management is necessary to maintain the desired habitat condition.

Timing is another important management consideration. Generally, if possible, mowing should not be done during the nesting and brood rearing portion of the year (April 15 to August 15) to minimize impacts to wildlife. However, if trying to control invading tree species, mowing should take place as soon after August 1 as possible since mowing during the growing season helps to minimize resprouting. Mowing can also take place without serious impacts to wildlife during late fall and winter, but it is not as effective at controlling resprouting.

The control of invasive species (see chapter 8) requires annual inspection and employment of control measures to keep old fields and shrublands free of these aggressive plants. In parts of southern New England, invasive species such as autumn olive and multiflora rose are so aggressive that they can become well established and dominant in two to three years. Without diligence, invasive species can rapidly get out of hand at the expense of native shrubs. Managing to prevent invasive exotic plants from becoming dominant must become a routine part of the land manager's job to maintain good old-field wildlife habitat. By combining techniques, particularly mowing and herbicide application, managers can obtain good control. Refer to chapter 8 and the herbiciding section of chapter 10 for more information on controlling invasive exotic plants.

Techniques

Selective clearing and herbicides

Power utilities have pioneered the use of selective clearing and herbicide application to maintain stable shrub communities that will not interfere with power lines. Relatively stable shrub communities can be created and maintained by eliminating trees with selective cutting, followed by selective herbicide application. Dense shrub clones can actually discourage invasion by trees for 15 years or more and result in stable shrub communities once they have become established. Herbicides (see herbicide section of chapter 10) can be successfully employed in the management of old fields.



Figure 4. Power line rights-of-way are often maintained using selective tree removal and herbicides to maintain stable shrub communities that attract a wide variety of birds. Photo by Brian Tefft.

Mechanical methods

Mechanical methods include clearcutting or selective mowing of unwanted trees and shrubs to maintain desired conditions. There is a wide range of capabilities in mowing equipment, from hand-held brush cutters to tractor-mounted mowing decks often referred to as brush hogs, to tree shears and commercial grade mowers such as skid steer mowers, hydro-ax, and the Brontosaurus mower. The Brontosaurus is a mower mounted on the boom of a tracked excavator. In this format, the Brontosaurus has few terrain limitations and has the

power to mow small- to medium-sized trees up to 12 inches in diameter. This equipment is costly to rent or acquire but is widely available through private contractors and does an admirable job because of its ability to be selective. Refer to the mechanical tools section of chapter 10 to obtain information on the Brontosaurus and other mowing/land clearing machines.

Small projects involving maintenance of old fields containing shrubs and trees less than three inches in diameter can be handled with a farm tractor and brush hog. Skid steers combine low ground pressure and high maneuverability and have wide applicability. These machines minimize ground disturbance and permit access to soft or moist areas that would mire rubber-tired vehicles. They can provide a highly selective means for removing undesirable species to create openings or reclaim old-field habitats.

Prescribed burning

Periodic controlled burning (see prescribed burning section of chapter 10) is a valuable method for manipulation of the herbaceous component of the old-field community and will assist in the control of woody encroachment. Short burning rotations (every two to four years) will help restore or reclaim shrublands with a heavy tree component. Once restoration is complete, longer rotations of five years or longer will favor and maintain upland shrub communities, yet stimulate grass and forb production.

Prescribed grazing

Grazing (see grazing section of chapter 10) can be used to control some species of woody vegetation, reduce litter build-up and reduce vegetation height and density. Grazing results in a more diverse vegetation structure in shrub habitats than either mowing or burning because of the uneven pattern of grazing cattle, due to distribution of preferred plants.

Shrubland birds, which have a high percentage of their North American breeding population occurring in the region, have been experiencing significant population declines. Additionally, the vast majority of moths and butterflies that require shrubland habitats are considered rare in the region. Lastly, the New England cottontail, the only cottontail native to New England, has declined to such a point that it is being considered for federal listing under the Endangered Species Act. Active management by private and public landowners is required to help reverse these trends. By using the management techniques and principles outlined in this chapter and this habitat guide as a whole, we may be able to provide enough shrubland and old-field habitat to keep these species around long into the future.

Suggested reading

- DeGraaf, R.M. and M. Yamasaki. 2001. New England wildlife: habitat, natural history, and distribution. University Press of New England, Hanover, NH. 482 pp.
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Biography

Brian C. Tefft received a B.S. degree in Natural Resources Management from the University of Rhode Island in 1978 and an M.S. in Wildlife Management from Frostburg State University in 1981. He is a Principal Wildlife Biologist with the Rhode Island Division of Fish and Wildlife. He supervises habitat planning and restoration, as well as the upland game species projects on wild turkey, ruffed grouse, and woodcock for the Division. Other significant duties include wildlife habitat management planning and restoration on all state and private lands.

Table 1. Selected list of wildlife that use shrubland and old-field habitats, including seasonal use and population trends in New England. Reprinted from DeGraaf and Yamasaki (2001).

Common Name	Habitat Preference ^a	Seasonal Use ^b	Population Trend ^c
Spotted turtle	Preferred	B/NB	Locally common
Black rat snake	Preferred	B/NB	Locally common
Northern harrier	Utilized	W	Decreasing
American kestrel	Utilized	W	Decreasing
Ring-necked pheasant	Preferred	B/W	-----
Northern bobwhite	Utilized	B/W	Decreasing
American woodcock	Utilized	B	Decreasing
Mourning dove	Utilized	B/W	Decreasing
Black-billed cuckoo	Utilized	B	Decreasing
Yellow-billed cuckoo	Utilized	B	Decreasing
Common nighthawk	Utilized	B	Decreasing
Whip-poor-will	Utilized	B	Decreasing
Willow flycatcher	Preferred	B	Trend uncertain
Eastern kingbird	Utilized	B	Decreasing
Loggerhead shrike	Utilized	B	Decreasing
Northern mockingbird	Preferred	B/W	-----
Blue-winged warbler	Preferred	B	Stable
Golden-winged warbler	Preferred	B	Decreasing
Chestnut-sided warbler	Utilized	B	Decreasing
Prairie warbler	Preferred	B	Decreasing
Mourning warbler	Utilized	B	Decreasing
Common yellowthroat	Utilized	B	Decreasing
Yellow-breasted chat	Utilized	B	Decreasing
American tree sparrow	Utilized	W	Decreasing
Field sparrow	Utilized	B/W	Decreasing
Vesper sparrow	Utilized	B	Decreasing
Fox sparrow	Preferred	W	Stable
Song sparrow	Preferred	B/W	-----
White-throated sparrow	Preferred	B/W	Decreasing
American goldfinch	Utilized	B/W	Decreasing
Eastern cottontail	Preferred	B/W	Common
New England cottontail	Preferred	B/W	Rare
Snowshoe hare	Preferred	B/W	Common
White-footed mouse	Preferred	B/W	Common
Ermine	Preferred	B/W	Common

^a Habitat preference as described by DeGraaf and Yamasaki (2001).

^b Seasonal use of habitats: B = Breeding, NB = Non-breeding W = Wintering, as described by DeGraaf and Yamasaki (2001)

^c Continental population trend taken from Breeding Bird Survey data for avian species (Hunter et al. 2001); New England status after DeGraaf and Yamasaki (2001) all others.