

Scrub-shrub Birds

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Introduction

Scrub-shrub habitats are characterized by low, multi-stemmed woody vegetation in young or stunted stages of growth. Such habitats commonly result when mature woodlands are disturbed by wind, fire, flooding or commercial activities such as timber harvesting, farming, or maintenance of rights-of-way (ROW). The species composition is variable, depending on the location and length of time since disturbance, abandonment, or management. Scrub-shrub communities can be dense and impenetrable or can consist of a mosaic of low woody cover interspersed in herbaceous cover. Trees may be present but are widely spaced.

Scrub-shrub cover is extensive, occurring over approximately 20 percent of the 48 contiguous states; however, in most regions, habitats are severely degraded or threatened by land use patterns. Consequently, species of birds reliant on scrub-shrub habitat for nesting, cover, and other resources are rapidly declining. Scrub-shrub species include a wide assortment of species from song birds to hawks and owls to waterfowl and other game birds.

The objective of this leaflet is to familiarize readers with the habitat requirements of scrub-shrub birds and assist landowners and managers in preparing and executing efficient management plans to maintain or create scrub-shrub habitat.

Scrub-shrub habitats of the United States

General

Well-managed scrub-shrub habitats are critical for birds. Scrub-shrub includes many flowering plants that provide nectar, seeds, and insect foods needed by breeding birds. Tall herbs and grasses growing on the edge of shrubland offer shelter and nest sites, as well as hunting areas for predatory birds such as barn owls and kestrels. In agricultural areas, scrub-shrub can be implemented or maintained to buffer adjacent wood-



Virginia Department of Conservation and Recreation

Scrub is a rapidly declining habitat.

lands and waterways from agricultural contaminants and disturbances and reduce the harmful effects of habitat edges.

Scrub and shrubland categories

Shrubland in the United States is found in natural systems (forests, grasslands, wetlands and riparian areas), as well as in human-altered systems (ROWs and old fields).

Natural systems

Currently, forest land covers a third of the United States and is an important source of early successional habitat for many species of birds. Forest stands vary greatly by region but can naturally include early and late successional stages and soft and hardwood trees. Shrubland occurs in a forest after a disturbance such as wind, clearcutting, or fire. Without management, shrubland in forestland will close, and the shrub layer will disappear in favor of a more mature forest.

Temperate grasslands are characterized as having grasses as the dominant vegetation and are not always considered scrub-shrub habitat, depending on

the vegetative makeup of the area. Trees and large shrubs are generally absent; however, in some circumstances, some woody vegetation may be present. The seasonal and prolonged drought, occasional fires, and grazing by large mammals all tend to prevent woody shrubs and trees from becoming established. In grasslands, woody plants such as cottonwoods, oaks, and willows are generally confined to protected river valleys and hillsides. Control of fire and grazing enables scrub-shrub community to expand into grasslands.

Shrub wetlands are characterized by brushy, woody plants, typically with multiple trunks not growing above 20 feet in height. These wetlands come in many types. In northern regions or higher elevations, shrub bogs and alder swamps are common. Some dominant species in shrub swamps are willows (*Salix* spp.), dogwoods (*Cornus* spp.), arrowwoods (*Viburnum* spp.), highbush blueberries (*Vaccinium* spp.), button-bush (*Cephalanthus occidentalis*), swamp rose (*Rosa palustris*), and saplings of trees such as red maple (*Acer rubrum*).

Riparian scrub-shrub is found along the edges of lakes and streams with sandy soils. It is characterized by large native shrubs adapted to high moisture levels and frequent flooding. Common riparian scrub-shrub species include willow (*Salix* spp.) and cottonwoods (*Populus* spp.). Riparian scrub-shrub offers wildlife habitat similar to the other types of shrubland. However, certain species may be restricted by the more dense foliage or may benefit from the greater availability of water.

Human-altered systems

ROWs are public or private areas that allow for passage of people or goods. These areas include free-ways, power lines, streets, bicycle paths, alleys, trails, and walkways. A public ROW is dedicated to the public for use under the control of a public agency. Utility companies have transmission and distribution lines that traverse hundreds, sometimes thousands, of miles across rural, suburban, and urban landscapes. Generally, ROWs are maintained in open early to mid-successional stages to minimize interference of intended purposes. Scrub-shrub cover is common in ROWs transecting forested areas.

Old field habitats result when pastureland is abandoned or cropland is retired. Old field succession proceeds from meadow to scrub-shrub to woodland. Meadow consists mostly of various native grasses and forbs (broad-leaved flowering plants). As succession progresses and the meadow is increasingly dominated by woody plants, the scrub-shrub stage of an old field develops. If woody plants larger than 4 inches in diame-



U.S. Geological Survey

This forest scrub/shrub habitat in Georgia was created after a significant disturbance. Forests cover nearly a third of the United States and are critical sources of habitat for many early successional scrub birds.



www.wetmap.org

Shrub wetlands provide a habitat for a variety of wetland birds. These habitats are characterized by brushy, woody plants not growing more than 20 feet high.



Sacramento Area Conservation Area

Willow is a common species found on riparian stream-banks. Riparian scrub-shrub generally has a denser foliage layer than other types of shrub habitats.



Preservation Society for Spring Creek Forest

Scrub-shrub cover is common in ROWs transecting forested regions.

ter constitute more than 50 percent of the canopy, the cover is classified as early woodland habitat. Habitat conditions for scrub-shrub birds are optional when low wood coverage is 10 to 30 percent and young trees are well distributed throughout the field. The remaining ground cover will be a mixture of grasses and forbs.

Decline of scrub-shrub habitat

Historical land cover

Before European settlement of North America, open early successional habitats such as scrub-shrub were commonplace and provided important habitat for wildlife. Settlement resulted in the widespread clearing of forests for agriculture, timber, and fuel wood. When farms were abandoned in the late 1800s and early 1900s, old fields rapidly succeeded to mature second growth forests.

Current land cover

Today, scrub-shrub is declining at an alarming rate. A variety of economic and social factors have contributed to the decline, including changing agricultural and forestry practices, fire suppression, habitat loss and fragmentation, excessive mowing, and public perception.

The suitability of modern farmland for wildlife has declined as a result of economic pressures, improvements in herbicides and equipment, and social factors. The drive for greater efficiency in agriculture and silviculture has contributed to the intensification of cultivation practices on larger, more uniformly shaped row crop fields with fewer weeds and less shrubby edge.

Commercial forestry operations typically produce early successional habitat for a short period of time. Understory grass and shrub cover decline with stand maturity and canopy closure. Without thinning or pruning, canopy cover closure typically occurs in 7 to 15 years after the harvest. Economic pressures, improvements in equipment and herbicides, and fast growing genetic strains of trees have reduced the amount of time to canopy closure in commercial stands. Additionally, intensive site-prep techniques in some regions reduce the quality and quantity of herbaceous cover during the early phases of stand establishment.

Suppression of wildfires and lack of controlled burning has eliminated an effective management tool for scrub-shrub habitat creation and maintenance. Controlled burns on private lands have been limited by concerns about uncontrolled fire, liability, air quality, social acceptance, smoke management, and lack of landowners with the necessary experience and equipment.

Human development in rural areas has caused losses and fragmentation of agriculture and forest lands and has hindered the use of prescribed fire for management. While some birds can use fragmented patches of scrub-shrub habitat, many are area sensitive and will not use small areas surrounded by development.

Frequent or poorly timed treatments may reduce the attractiveness and suitability of ROWs and idle land around residential areas for scrub-shrub birds. Ground near residential areas is frequently mowed to maintain a neat appearance, even when opportunities exist to convert these areas to suitable wildlife cover.



U.S. Fish & Wildlife Service

The endangered Florida scrub-jay relies on scrub habitat for survival.

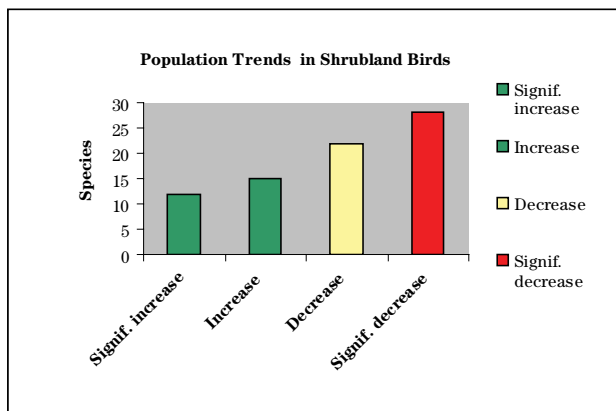
Declines in scrub-shrub-nesting birds

The loss and degradation of scrub-shrub habitat has had a profound effect on bird populations dependent this habitat for food, cover, and nesting. According to the Breeding Bird Survey, 50 of the 70 species associated with scrub-shrub habitat are declining and 24 have had significant recent declines. Since 1966, northern bobwhite populations have dropped by two-thirds, painted buntings by half, and Florida scrub-jays are at less than 10 percent of their pre-settlement numbers. The National Audubon Society has put 24 scrub-shrub birds on their watch list, the highest for any of the major habitat types. For more information on population declines, visit the National Audubon Society at <http://www.audubon.org/bird/stateofthebirds/shrublands.html>. Priority scrub-shrub species and associated physiographic regions as determined by Partners-in-Flight are provided in table 1. Partners-in-Flight Conservation plans for various bird conservation regions are available at <http://www.blm.gov/wildlife/pifplans.htm>.

Habitat requirements

General

Scrub-shrub is an important habitat for a number of breeding and wintering bird species. Individual species of scrub-shrub birds have unique habitat requirements for nesting and feeding. It is beyond the scope of this publication to identify them all; however, generalizations can be made that will prove suitable for many.



According to data from the Breeding Bird Survey 1966–2003, 50 of the 78 shrubland species surveyed are declining.

Food

Each species of scrub-shrub bird has its own set of nutritional requirements; however, several groups of food sources are commonly used by many scrub-shrub species. Invertebrate foods such as grasshoppers, crickets, beetles, dragonflies, ants, katydids, wasps, spiders, earthworms, and sow bugs are abundant in healthy scrub-shrub habitat. Native fruits and seeds, as well as cultivated crops like wheat, barley, and other small grains are used by a variety of species. Additionally, prey items such as mice, gophers, voles, shrews, moles, prairie dogs, rabbits, snakes, lizards, and small songbirds that aggregate in scrub-shrub habitat are important prey for raptors.

Habitat structure

Habitat use by scrub-shrub birds is highly complex. Vegetation structure may influence habitat use to a greater extent than plant species composition. So, bird species richness is likely to be greatest in stands of mixed species with different growth forms. Mixed species stands support a wider range of invertebrates and produce a greater variety of fruits; hence, they may provide enhanced foraging opportunities for birds. Most fruit-eating birds will feed on a range of shrub species, but food selection is influenced by availability of fruits in the area. Invertebrate density can also vary with structural complexity.



South Florida Water Management District

Mixed species and growth stages in scrub habitat will provide the highest diversity of scrub-nesting birds.

Table 1 Partners-in-Flight list of priority scrub-shrub species and associated physiographic areas

Common name	Physiographic areas	Common name	Physiographic areas	Common name	Physiographic areas	Common name	Physiographic areas
Abert's Towhee	84	California Towhee	89	Greater Prairie-chicken	8	Olive-sided Flycatcher	26, 28
Allen's Hummingbird	89	Canyon Towhee	56, 82, 85	Greater Roadrunner	81	Orchard Oriole	4, 13
American Woodcock	9, 10, 15, 18, 24, 26, 28	Cassin's Kingbird	86	Greater Sage-grouse	62, 64, 66, 69, 80, 86, 87, 88	Painted Bunting	3, 5, 6, 8, 33
Anna's Hummingbird	89	Cassin's Sparrow	54, 55, 56, 85	Green-tailed Towhee	69	Phainopepla	83, 89
Ash-throated Flycatcher	81	Chestnut-sided Warbler	26, 27, 28	Gunnison Sage-grouse	62, 87	Prairie Falcon	80, 83, 86, 88
Bachman's Sparrow	11	Common Poorwill	81	Harris's Sparrow	33	Prairie Warbler	3, 9, 10, 11, 12, 13, 21, 22
Bell's Vireo	5, 6, 8, 31, 33, 54, 84	Connecticut Warbler	20	Henslow's Sparrow	11	Rufous-winged Sparrow	82
Bendire's Thrasher	56, 81, 82, 83, 84, 86	Costa's Hummingbird	81, 82, 83, 84, 89	Inca Dove	82	Sage Sparrow	80, 86, 87, 88
Bewick's Wren	4, 8, 11, 12, 13, 19, 21, 22	Crissal Thrasher	56, 81, 83	Ladder-backed Woodpecker	81	Sage Thrasher	86, 88
Black-capped Vireo	54, 56	Curve-billed Thrasher	81, 82	Le Conte's Sparrow	4, 82, 83, 89	Scaled Quail	54, 55, 56, 81, 85
Black-chinned Hummingbird	88	Dusky Flycatcher	66	Lesser Prairie-chicken	54, 55	Scissor-tailed Flycatcher	8, 33, 54
Black-chinned Sparrow	56, 85, 89	Elf Owl	81, 82, 84	Lewis's Woodpecker	86	Scott's Oriole	56
Black-tailed Gnatcatcher	56, 82, 83	Ferruginous Pygmy-owl	82	Loggerhead Shrike	33	Short-eared Owl	80
Black-throated Sparrow	81	Ferruginous Hawk	55, 80, 86	Long-billed curlew	55, 80, 88	Spotted Towhee	89
Blue-winged Warbler	9, 13	Field Sparrow	10, 19, 22	Lucifer Hummingbird	56, 81	Varied Bunting	56
Brewer's Sparrow	86, 88	Florida Scrub-jay	2	Lucy's Warbler	84	Verdin	82
Burrowing Owl	55, 82	Gambel's Quail	81, 82, 83	McCown's Longspur	54	Virginia's Warbler	62, 69, 86, 87, 88
Cactus Wren	82, 83	Gila Woodpecker	81, 82	Mountain Bluebird	69	Western Screech-owl	82
California Gnatcatcher	89	Gilded Flicker	82, 84	Mountain Plover	54, 55	Western Scrub-jay	89
California Quail	88	Golden-winged Warbler	9, 12, 15, 16, 17, 18, 20, 21, 22, 24, 25, 26, 30	Mountain Quail	66	Whip-poor-will	10, 12
California Thrasher	89	Gray Flycatcher	80, 88	Northern Bobwhite	8, 10	Wrentit	89



Fermilab

The chestnut-sided warbler is one of the many scrub-shrub birds suffering apparent long-term population declines.

Habitat size or patch size also should be taken into consideration in planning and managing habitats for scrub-shrub birds. Some species will use a range of patch sizes, but all require a certain minimum amount of space. For instance, patches less than 2 acres are not enough for yellow-breasted chats and field sparrows; however, they are large enough for other songbirds such as chestnut-sided warblers and wild turkeys. In New Hampshire, one study found that open patches as small as 1 acre supported breeding chestnut-sided warblers if the smaller patches were adjacent to large source populations or surrounded by numerous small patches. However, if managing shrublands to enhance the long-term survival of a variety of birds, generally larger is better. Habitat patches greater than 5 acres will enhance reproduction and survival and may facilitate movements between patches.

Management tools

Diverse scrub-shrub vegetation is the most valuable to birds; therefore, management should focus on scrub-shrub vegetation of varied ages, species, and structures. When managing for many different bird species, it is important to maintain all growth stages from bare ground through young and old growth to decaying wood.

If left unmanaged, scrub-shrub will eventually develop back into woodland, thereby limiting the attractiveness of the site for species dependent on early successional habitats. Scrub-shrub habitat requires periodic maintenance to retain its character and value to wildlife. It may also need managing to prevent it from threatening other wildlife, human, or landscape interests.

Management of scrub-shrub habitats should start with the establishment of the goals of the project. In general, project planning should establish resource goals including targeted wildlife, techniques appropriate for achievement of objectives, alternative procedures, special considerations (archeological features), and benchmarks for measuring accomplishments of resource goals.

Natural regeneration

After disturbance, a scrub-shrub community may become established without active interventions. Woody covers commonly spread from the edge of open fields towards the center. Scrub-shrub that develops along forested edge is valuable because it creates a rare, gradual transition between mature forest and open ground. Natural regeneration can be effective in establishing scrub-shrub where there is an existing source of seed or sucker roots and no constraint on their development. Seeding commonly takes place gradually, resulting in a diversity of age classes appropriately dispersed throughout the stand. The process of natural regeneration is slow, inexpensive, and, where not constrained by other considerations, should be the favored option. A disturbance such as grazing, lightly disking, burning, or mowing, may be necessary to begin this process. After scrub-shrub has been established, periodic management is necessary to maintain it in an early successional stage.

Planting

Planting should only be done where there is no natural source of regeneration or when a rapid result is required. To maximize the survival of new plants, planting should be completed between November and March, depending on the area. Planting in rows creates wind tunnels, so plants should be placed randomly or in clumps, allowing gaps to fill in naturally. Species should be mixed randomly to create diversity in the community which will fulfill the needs of many bird species. Only local stocks of native plants should be used. Native plants developed from local sources are important because they are best adapted to local soil and climate conditions.

Livestock grazing

Grazing and browsing will influence the balance between woody and herbaceous plants, thereby affecting plant composition and structure and openness of the site. Intensive grazing can dramatically reduce woody plants and limit their regeneration.

Alternatively, grazing may be used to establish or maintain scrub-shrub community. Specifically, herbivores can:

- browse accessible and palatable scrub-shrub to maintain the stand at a finer level than can be achieved with machinery
- limit scrub-shrub encroachment by browsing seedlings, re-growth, and accessible scrub-shrub
- disperse seeds of scrub-shrub species by picking them up on cots, hooves, and passing through digestion

Some potential downfalls of using livestock as a management tool include:

- Unpalatable shrubs may gain a competitive edge and ultimately dominate the stand.
- Excessive browsing damages habitat structure and prevents regeneration.
- Grazing requires skill and time to properly manage.
- Rare species of birds may be vulnerable to grazing.

Rotational grazing can eliminate most of the negatives associated with livestock grazing. In this system, livestock is allowed to graze in one area for a predetermined length of time and then moved to a new area to allow the previously grazed location to reestablish. Generally, warm-season grasses should be grazed over only once per season (leaving grass to be maintained at the height of 8 to 10 inches) before the herd is moved. Light grazing is recommended because such systems enable plants to develop wider root systems, ultimately strengthening desirable forage plants. Rangelands can be maintained in good condition, providing quality forage and suitable grassland habitat for many species by practicing the following measures:

- Provide 30 to 50 days of rest between grazing periods in each location.
- Defer grazing in some nesting areas until late in the nesting season.
- Restrict livestock from grazing in sensitive nesting areas.
- Graze entire pasture at a light rate all summer, and put the entire herd on just one half of pasture during the late season.
- Avoid heavy continuous grazing.
- Rotationally graze cool-season grasses in spring and fall and warm-season grasses in

midsummer to maximize productivity while minimizing habitat disturbance.

Early successional habitat in woodlands

A blend of cutting, regeneration, tending, and protection can be used to re-establish early successional scrub-shrub habitat in mature stands. These methods can also be used to rejuvenate and open mature scrub-shrub stands. Because application of one regeneration method is unlikely to provide the range of habitat conditions favored by the scrub-shrub bird community, application of multiple practices across the treatment area is recommended.

In clearcutting, most trees of commercial value are removed from the site. To protect water quality and habitat for birds, fish and other animals, strips of uncut forest frequently are left along rivers and lakes and around known nesting sites. In addition, patches of living trees are left uncut to emulate the structure left following a wildfire. This residual material provides wildlife habitat, maintains biodiversity in the forest, and allows for the continuation of natural ecosystem processes.

In a shelterwood cut, mature trees are harvested in a series of two or more operations. The first cut removes part of the original stand to promote the growth and seeding ability of the remaining trees. Regeneration usually takes place naturally from seeds provided by the remaining trees. When regeneration is well established, the remaining mature trees are removed. Seed-tree cutting is similar to shelterwood cutting except fewer trees are left behind as a seed source.



Brian Lockhart, Louisiana State University: www.forestimages.org

Shelterwood cuts allow regeneration to take place naturally from seeds provided from the remaining trees.



www.gov.ns.ca

The cavities seen in this snag were used for shelter for nesting birds. Snags can also be used as singing perches and to provide food resources for scrub-shrub species.

The key to managing forests to benefit scrub-shrub-nesting birds is that forest treatments must remove enough canopy to encourage growth of a thick shrub layer and treatment needs to occur frequently enough to maintain scrub-shrub habitat in the stand. Clearcuts and shelterwood cuts are suitable for producing shrubland habitats for birds. Harvesting trees can provide a source of ephemeral shrubland and early successional forest habitat in the first 10 to 15 years post cut. Additional techniques for creating or enhancing scrub-shrub habitat are:

- **Do not harvest all trees.** If at all possible, retain some live overstory trees in a variety of species and size classes. More birds will use harvested stands that contain residual trees because of the perching, nesting, and foraging opportunities they provide. In particular, retain trees that produce fruits, seeds, acorns, or nuts. If wintering species are of special concern, retaining small groups of conifers (such as pine and spruce) that provide winter cover and food sources is recommended.
- **Retain decaying and standing dead trees (snags).** Woodland owners often remove dead

or decaying trees to control the spread of diseases and promote growth of commercially viable trees. Nonetheless, these trees are important to wildlife. For wildlife use, snags should be greater than 8 inches in diameter at breast height. Leaving all standing dead trees is best for wildlife, but at least one large (greater than 18 inches at breast height) cavity tree per few acres is recommended for large cavity nesting birds such as wood duck, pileated woodpecker, and mergansers. Where cowbirds are a problem, snags should be clustered in harvest units to minimize cowbirds' use of snags for courtship or locating host nests. A professional forester can evaluate any safety threats posed by a particular snag and recommend actions that can be taken to minimize any risks.

- **Leave large patches of forest close to other forest patches.** Habitat fragmentation reduces the size of patches of shrubland. This reduces the total area of contiguous habitat available to birds and increases the isolation of the habitat. Fragmentation also leads to an increase in edge habitat that is detrimental to the survival and reproductive success of many birds. Nonnative birds like European Starlings, common in urban and suburban areas, compete with native cavity nesting birds for nest sites along edges. Brown-headed cowbird parasitism is greater in fragmented than unfragmented habitats. Non-native invasive plants encroach into smaller habitat fragments, limiting the growth of native plants, disrupting natural succession and limiting vegetative and structural diversity. This in turn negatively impacts populations of birds associated with the habitat. Small woodlots have a lot of edges and generally have less diverse and less abundant bird communities than in large forest areas. As result, landowners trying to manage for forest wildlife should try to harvest in a way to leave the largest patch size possible.
- **Create irregular edges.** Edge effects are especially pronounced along boundaries between structurally contrasting habitats like mature forests and agricultural land. Reducing the structural contrast between forest and open habitats can be accomplished by allowing shrub saplings and some overstory trees to remain along the harvest boundary. Edge contrasts also can be dampened by adjusting harvest intensity to retain more trees closer to the uncut forest.

Field borders

By taking out of agricultural production up to 50 feet of field edge adjacent to permanent cover (a woodlot, tree line, or hedgerow), farmers can significantly increase the amount of scrub-shrub habitat for birds. These areas generally have low crop productivity because of root competition and shading from adjacent woody growth. Additional advantages of field borders include:

- reducing planting time and costs
- providing turn rows and convenient field access
- reducing or eliminating equipment damage from overhead limbs
- creating a pesticide-free buffer in the area used by upland wildlife

Every 3 years, this border should be mowed and lightly disked to prevent invasion by saplings and brush. Another option is to treat a third of the border each year, rotating strips every 3 years; this will create the widest range of diversity. Field-border management can make a dramatic difference in wildlife use of fields. While this type of management can favor many species, birds are the biggest benefactor of field-border management. One study found that dickcissels and indigo buntings were twice as common in areas with field borders than in areas without. Wintering sparrows (such as the song sparrow and swamp sparrow) and northern bobwhites also increased, as borders provided forage and shelter from early successional plants.



National Aeronautics and Space Administration

Prescribed burns provide many ecological benefits.

Live dropping can be used to further blend field edges into forest. With this technique, trees along the edge of fields are partially cut and allowed to fall out into the border area. These trees remain alive and provide instant shrubby habitat. The size of the field border will determine if this is a feasible option.

Herbicides

Applications of herbicides to a young forest (4 to 6 years old) have been shown to improve conditions for birds that forage on the ground such as mourning doves and northern bobwhites. Current herbicide formulations temporarily reduce hardwood browse and resprouting. Herbicide-resistant hardwoods and untreated skip areas may result in dense shrub patches that are attractive to shrub-dwelling birds. Herbicides are one of the primary tools used to manage woody plants in utility ROWs in the north-eastern United States. Selective herbicide treatments used in combination with cutting and stump treatment of individual trees are necessary to protect overhead wires and maintain access for line repair. Near waterways, spraying is often replaced by cutting. It is recommended that state or local wildlife professionals be consulted before a treatment program begins. For more information, refer to *Fish and Wildlife Habitat Management Leaflet Number 24: Wildlife and Integrated Pest Management (IPM)*.

Prescribed burns

Burns are often the preferred method for maintaining disturbance-adapted plant communities. In addition to creating early successional habitat like scrub-shrub, burns also control pests and disease, return nutrients to the soil, aid in plant germination, and remove accumulated litter. The objective of burning scrub-shrub is to remove much or all of the standing vegetation and accumulated leaf litter but leave the rootstock and seed bank intact. With careful planning and execution, frequency and intensity of burns can be adjusted to achieve the desired plant structure.

In general, burns should be conducted from February to April on a 2- to 5-year rotational basis, depending on the region. Because of rapid growth rates of the shrubs in the Southeast, areas will need to be burned more frequently (2- to 3-year cycle) than in northern areas. Too frequent burning can permanently alter the plant community in favor of fire-tolerant species and render future burns ineffective. Dividing the burn area into strips or plots and leaving some strips on plots untreated provide escape and nesting cover for wildlife adjacent to burned plots. Disked firebreaks should be created around burn areas to maintain control of

prescribed burns. In wetlands, burning alone can actually increase the growth of invasive reed and canarygrass and is ineffective for control of river bulrush and cattails. However, in combination with other practices such as disking or grazing, burning can be a useful management option in wetlands, too. Refer to the *Fish and Wildlife Habitat Management Leaflet Number 37: The Importance of Disturbance in Habitat Management*.

Although beneficial, prescribed burning is a highly regulated activity and should only be conducted in cooperation with state fish and wildlife agencies and with assistance from licensed burners. Qualified agencies, nongovernment offices, and individuals can help in the development of a burn plan, provide necessary tools, equipment, supervision, and assist in obtaining all required permits.

Assistance available

Technical and financial assistance for the management of fish and wildlife habitat is available to landowners through a variety of government agencies and other organizations. Assistance programs available through various sources are listed in table 2.

Conclusion

The future of early successional habitats such as scrub-shrub depends on active management. Clearly, efforts to create and maintain early successional habitat must be conducted as part of a conservation program that includes sensitivity to the habitat needs of wildlife associated with mature forest, as well as other values of the forest. The key to these efforts is recognition of the vital role of disturbance in maintaining healthy forest systems and associated wildlife.

Table 2 Programs to assist landowners in wildlife habitat creation

Program	Land eligibility	Opportunities for early successional management	Type of assistance	Contact
Conservation Reserve Program (CRP)	Highly erodible land, wetland, and certain other lands with cropping history. Streamside areas in pasture land	Annual rental payments may include an additional amount up to \$5 per acre per year as an incentive to perform certain maintenance obligations including disturbance management for early successional scrub habitat	50% cost-share for establishing permanent cover and conservation practices and annual rental payments for land enrolled in 10- to 15-year contracts. Additional financial incentives are available for some practices	NRCS or FSA State or local office
Environmental Quality Incentives Program (EQIP)	Cropland, range, grazing land and other agricultural land in need of treatment	Incentive payments may be provided for up to 3 years to encourage producers to carry out management practices, such as prescribed burning, that may not otherwise be carried out	Up to 75% cost-share for conservation practices in accordance with 5- to 10-year contracts. Incentive payments for certain management practices	NRCS State or local office
Partners for Fish and Wildlife Program (PFW)	Most degraded fish and/or wildlife habitat	Restoration projects may include restoring wetland hydrology or performing prescribed burning to restore habitat back to an early successional state	Up to 100% financial and technical assistance to restore wildlife habitat under minimum 10-year cooperative agreements	Local office of the U.S. Fish and Wildlife Service
Wildlife at Work	Corporate land	Can provide State-specific advice and/or contracts for prescribed burning, managed grazing, or other practices for scrub habitat management	Technical assistance on developing habitat projects into a program that will allow companies to involve employees and the community	Wildlife Habitat Council
Wildlife Habitat Incentives Program (WHIP)	High-priority fish and wildlife habitats	Technical assistance is provided to help the participant maintain wildlife habitat, which may include scrub habitat managed with mechanical means	Up to 75% cost-share for conservation practices under 5- to 10-year contracts	NRCS State or local office

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**Natural Resources Conservation
Service**

Mailing address:

P.O. Box 2890
Washington, D.C. 20013

Street address:

14th and Independence Avenue SW
Washington, DC 20250

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www.nrcs.usda.gov

Wildlife Habitat Council

8737 Colesville Road, Suite 800
Silver Spring, Maryland 20910
(301) 588-8994

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Primary author: **Erika T. Smith**. Drafts reviewed by **Raissa Marks**, Wildlife Habitat Council; **William Hohman**, Natural Resources Conservation Service; **Frank Thompson**, U.S. Department of Agriculture; **William DeLuca**, Smithsonian Migratory Bird Center; **Mark Johns**, North Carolina Wildlife Resources Commission; **Richard DeGraaf**, U.S. Department of Agriculture; **Mary Garvin**, Oberlin College; **Ellen Paul**, The Ornithological Council.

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