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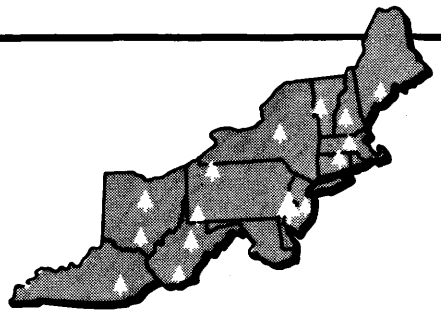

FOREST SERVICE, U.S. DEPT. OF AGRICULTURE, 6816 MARKET STREET, UPPER DARBY, PA. 19082

FOREST HABITAT MANAGEMENT FOR NON-GAME BIRDS IN CENTRAL APPALACHIA

Abstract.—To woodland owners or managers who are interested in bird-habitat improvement, the authors suggest managing for: (1) people with slight to moderate knowledge of birds; (2) high numbers of both individual birds and bird species, particularly the conspicuous species; (3) seeing and hearing birds near trails and other human-activity areas; (4) bird nesting; and (5) natural-appearing habitat. The nesting-habitat preferences of 31 representative species are listed. Guidelines are offered for trails, sites, plants, growth stages, dimensions and lay-out, and treatments.

Birds and other wildlife are part of the outdoor experiences of nature observers, hikers, picnickers, and even Sunday drivers. For example, bird-watching and photography recently accounted for 9,900,600 use-days on the national forests, almost one-quarter of the total estimated wildlife-oriented use (*Hooper and Crawford 1969*). Songbirds add color, movement, and pleasing sound to the landscape, and thus contribute much to the enjoyment of woodland experiences.

Approximately 240 species of birds occur regularly in central Appalachia (*Hall 1971*). This exceptional diversity and abundance corresponds to the complexity and abundance of the forest vegetation, particularly the rich and varied shrub understory (*Brooks 1943*). Because the central Appalachian region contains such abundant and diverse wildlife and habitat, suitable habitat can expose the forest visitor to many species in a relatively small area. This potential is the reason for the management that we propose.

Management Objectives

Nearly everyone has some appreciation of birds, even though he may be able to identify only the most common species. We believe the goal in managing bird habitat should be to enhance the quality of woodland experiences of the kinds of people who may be only nominally aware of the birds they encounter. A bird-watcher who wants to increase his list of birds he has seen will be greatly rewarded if he glimpses one relatively rare species. But most people may derive the greatest reward from seeing and hearing *many* individual birds and species at close range and enjoying the activity and song around them.

If we manage habitat for common birds, we should put emphasis on increasing the num-

bers of both species and individuals, particularly those species that are conspicuous for their boldness (chickadee, *Parus atricapillus*), bright color (cardinal, *Cardinalis cardinalis*), song (wood thrush, *Hylocichla mustelina*), or size (pileated woodpecker, *Dryocopus pileatus*).

The general habitat requirements of a representative group of such birds, 31 species, is presented in table 1. We selected these species because they all breed in central Appalachia and they represent birds adapted to all of the common forest habitats. Nearly all forest-dwelling birds that are not on the list have habitat requirements similar to those of some of the listed species. Management, including the development of a thick understory to favor the listed species, can also be expected to benefit other animals such as ruffed grouse, white-tailed deer, and rabbits.

The first question is: Where to manage? To benefit people, habitat management must be concentrated in places where people go: along secondary roads, trails, and streams, and especially around attractive recreational sites. Because most songbirds are relatively immobile during the breeding season (*Pettingill 1970:311*) and fairly tolerant of human activity, good bird habitat can be maintained near travel routes or sites of human activity. Actually, many of the candidate species for management (table 1) are those that inhabit edge habitats—the borders between different habitat types. Man's activities have created such habitats and the complex mix of types is conducive to diversity of bird species.

Of course, habitat management near human activity centers may require compromise, because some of the conditions that benefit birds are unsightly to people who lack appreciation of wildlife-habitat relationships (*Burr and Jones 1968*). Such management practices as tree cutting or deadening to increase the understory, or the retention of dead trees, may not gain easy acceptance.

The next question is: When? Management efforts should concentrate on breeding-season

Table 1.—*Typical nesting habits of selected non-game forest-dwelling birds*

Species	Usual nest height, feet	Concealment	Remarks
Louisiana waterthrush	0	Roots, logs, banks	Near water
Ovenbird	0	Dead leaves	Usually in dry soil
Whip-poor-will	0	Dead leaves, brush	Deep woods, ravines
Brown thrasher	0- 7	Thickets	Prefers thorny vines
Carolina wren	0-10	Cavities, thickets	Often in a building
Rufous-sided towhee	0- 3	Grass, forbs	Brushy openings or deep woods
Song sparrow	0- 6	Grass, thickets	Edges of woods
Yellowthroat	0- 2	Grass, vines	Moist locations
American goldfinch	5-15	—	Forks of shrubs, saplings, vines
American redstart	5-15	—	Forks of shrubs, saplings, vines
Cardinal	3-15	Thickets	Prefers vine tangles
Gray catbird	2-15	Thickets	Prefers vine tangles
Chipping sparrow	1- 4	Thickets	Often near building
Indigo bunting	1- 3	Thickets	Brushy areas in, near woods
Yellow-breasted chat	3-10	Thickets	Often in thorny vines
Yellow warbler	2-10	—	In shrubs, saplings
Red-eyed vireo	2-15	—	Suspended from forks
Robin	2-15	—	Often on a building
Wood thrush	4-15	Thickets	In forks or on a limb
Black-capped chickadee	8+	Cavities	Often in old woodpecker hole, bird box
Downy woodpecker	6-30	Cavities	Dead tree or dead part of live tree
Screech owl	6-30	Cavities	Woodpecker hole, tree cavity, building, bird box
Tufted titmouse	8+	Cavities	Often in old woodpecker hole, bird box
White-breasted nuthatch	2-60	Cavities	Stump, snag, old woodpecker hole, bird box
Northern (Baltimore) oriole	20+	None	Prefers broad-crowned trees
Blue jay	10-15	—	May prefer conifers
Broad-winged hawk	20-80	None	Builds in a large crotch
Crow	20-80	None	Usually in a large crotch
Eastern wood pewee	20-60	None	Often on edge of clearing
Great crested flycatcher	6-15	Cavities	Tree or stump, woodpecker hole, bird box
Scarlet tanager	16-55	None	Usually in mature woods

habitat, for several reasons. Habitat requirements during the breeding season (April to July) are more likely to limit bird populations than requirements during other seasons. This is due largely to the territorial defense behavior of birds during spring and early summer (*Lack 1933*). Then, most birds prefer the same kind of habitat for nesting and escape cover, although other kinds of habitat may be used for feeding (*Dunlavy 1935*). Secondly, more species of birds are conspicuous and recognizable during spring and summer because they are in their brightest plumage then. Spring is also the time when great numbers of migrant species may be observed; and this, combined with the warming weather, encourages people to visit areas managed for bird-watching.

Songbird habitat can be managed through treating the existing habitat or through artifices such as providing nest boxes, planting exotic or native plants, or providing supplementary feed. Esthetic, economic, and labor considerations generally favor treatment of existing habitat over artificial management that may require intensive effort, needs frequent maintenance, and tends to look out of place in a natural woodland.

Such artificial practices can be used to provide habitat where it may not be immediately available during more "natural" management. For example, nest boxes may be provided for hole-nesters in stands that are too young to provide nesting places. There are other circumstances where such practices may be justified, but we confess to a bias against management practices that look unnatural.

To be successful, management need not increase total bird populations. Because the central Appalachian bird fauna is so diverse, all kinds of forest habitat support some species of birds. Changing a certain habitat usually changes the numbers and species of birds using the area, but the change carries virtually no risk of eliminating all birds or of threatening any species.

Newly created habitat will usually be occupied within one to three years by birds that otherwise would have nested elsewhere or would have failed to find breeding habitat of a quality equal to that of the new site (*Hagar 1960, Lack 1933*). Many species populations include surplus non-breeding individuals (*Hensley and Cope 1951*). For management purposes, it may be immaterial to ask whether or not birds attracted to managed habitat produce an addition to the overall population. What is significant is whether birds and appreciative people are brought together.

The primary habitat characteristic to which management should be directed is the structure of the vegetation. Life form of vegetation is more important to bird-habitat management than individual plant species.

> The main reason one habitat supports more bird species than another is that the first has a greater internal variation in vegetation profile (that is, a greater variety of different kinds of patches). A second reason is of course that a forest with vegetation at many heights above the ground will simultaneously support ground dwellers, shrub dwellers and canopy dwellers. With a few exceptions, the variety of plant species has no direct effect on the diversity of bird species. (*MacArthur et al 1962*).

The specific measures needed to manage bird habitat will differ among forest properties. Such differences preclude the development of a standard prescription that will work everywhere. Nevertheless, knowledge of the general habitat conditions that favor birds will help in planning for a specific area. A knowledge of the existing bird population is helpful; and the land manager who doesn't know his birds can get help from a local birder, or can enrich his own experience by familiarizing himself with birds and their habitats.

Management Practices

Here are some suggestions on forest-habitat management that favors birds for enjoyment by people:

Trails. Trails are the key to bringing people and birds together in good bird habitat. They should be located to take advantage of terrain, scenery, and existing habitat. Effective trail planning and layout can enhance the learning and esthetic aspects of outdoor recreation by providing easy access to varied habitats. There are three basic types of trails: general hiking or walking trails, guided or self-guided interpretive trails, and special-use trails (horseback, off-road-vehicle, etc.). We

are primarily concerned with general walking trails. The following considerations are essential to good trail planning:

- Trail layout requires thorough familiarity with the physical characteristics of the site, ensuring that no important site features are omitted.
- Trails should accommodate to people who may be unfamiliar with nature, and must be safe as well as exciting.
- Trails must also provide for protection of the site from the people who use the trail.

Walking trails allow people to pursue their own interests at their own pace. Specifications for walking trails usually can be less rigorous than those for other kinds of trails; thus the walking trail is more primitive, and possibly more exciting. It is certainly less of an intrusion on the landscape than an interpretive trail with signs.

Trail layout should follow a closed-loop design, beginning and ending at the same point. A one-way traffic flow on the loop avoids interference between people and the need to retrace steps. Long, straight stretches should be avoided. Trails with curves and bends at frequent intervals allow a longer trail length at a given site, inject an element of surprise and anticipation, and provide a feeling of remoteness for the walker. Straight stretches of trails should not exceed 100 feet. For more detailed information on trail planning and layout see Ashbough and Kordish (*1965*).

Sites. Management should be concentrated around the more moist and fertile sites. All bird species will visit water occasionally, and moist or wet sites serve as activity centers for many. Development of a swampy or marshy site would be very effective in songbird management. The more lush growth of vegetation in wet places and on the more fertile sites is conducive to more rapid response by birds to management.

Some drier sites may be equally valuable however, particularly if they are capable of supporting a rich understory. Of course, there are bird species that are adapted to each kind of site; blue jays and ovenbirds are found in dry woodlands, whereas song sparrows and catbirds prefer more moist sites. Therefore, a bird-walk trail should traverse most of the available kinds of sites.

Plants. A plant's life form is usually more important to birds than its species (*Pitelka 1941*). Management should favor the most vigorous species of the needed growth form. Other things being equal, management should favor vines of all species, thicket formers, species with showy flowers or foliage, species bearing nuts or fleshy fruits, mixtures of evergreen and deciduous plants, and standing dead or dying trees. Management information about the most important shrubs and woody vines has been compiled by Gill and Healy (*1974*).

Herbaceous vegetation should also be encouraged. Particularly in open areas, it provides home for hosts of insects in the summer and provides many seeds for autumn and winter feeding. In wet areas the aquatic vegetation is useful to many bird species.

Growth stages. The growth stages of the woodland are an important consideration. A moderate to dense understory is desirable among all stages of forest growth from brush to sawtimber. Extensive stands should be multilayered, or be broken into small interspersed units of single or two-layer stands. Poletimber (5 to 11 inches dbh) is usually abundant. If some other stages are scarce, increase them in this priority order:

1. Vines, shrubs, seedlings.
2. Sawtimber (11 + inches dbh).
3. Saplings (1 to 5 inches dbh).
4. Herbaceous growth (on logging roads, landings, and other openings, herbaceous growth takes first priority).

This mix of forest growth stages is important because many of the non-game birds are edge species, which live at the interfaces of forest growth stages. Thus, to achieve the greatest wildlife potential, the amount of edges usually should be increased.

Such edges exist between meadows and brushy areas, between forest and meadow or brush, and between forest types or age groups. Edges of this sort provide variety in plant species, vegetation heights, and growth forms. This variety means more different kinds of cover and food, and therefore more possibili-

ties for songbirds with different diet and cover requirements (*Twight and Minckler 1972*). A meadow provides food for seed eaters, but cover only for a few bird species, such as the meadowlark. A meadow with brushy patches or edges and berry vines provides much more food and cover variety. Nests can be sheltered in brush or vines. Trees increase the vegetative variety further, and dead trees provide cavities for hole-nesting birds and a host of insect foods.

Dimensions and lay-out. The mix or interspersion of the habitat conditions we have discussed should be on a smaller scale than is customary in managing timber or habitat of game animals. This smaller scale for nongame birds stems from the size of their home ranges or territories during the breeding season. Although birds like the crow and broad-winged hawk range over large areas, most species do not, and many stay within a half-acre or less—say a roughly oval-shaped area equivalent to that of a circle having a radius of about 80 feet.

To achieve small-scale interspersion, narrow stands—say 75 to 150 feet wide—are preferable to wider blocks because the narrow shape maximizes the amount of edge habitat. Curving or wavy stand borders further increase the edge, and have the additional advantage of a more natural appearance than straight edges.

The travel route or trail should enter and leave stands at angles that allow the walker to sense a transition rather than abrupt change from one habitat to another. An oblique entry to the stand allows greater opportunity to observe bird activity along the stand edge.

Treatments. The maintenance of early stages of forest growth necessitates frequent cutting or girdling. Cutting in fall or winter disturbs birds less than cutting in spring or summer. In general, an overstory canopy closure of about 50 percent and not more than 75 percent should be maintained. Crown thinning usually works better than a low thinning to open the canopy and leave as many trees and shrubs as possible.

Livestock usually should be kept out because grazing tends to have a negative effect on woodland birds (*Dambach and Good 1940*). However, limited grazing may be useful in certain circumstances such as where walking trails are being choked by thorny vines or where other desirable openings are closing in.

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—JOHN D. GILL
RICHARD M. DEGRAAF
JACK WARD THOMAS

The authors are research wildlife biologists in the USDA Forest Service. Gill is stationed at the Northeastern Forest Experiment Station's laboratory at Morgantown, West Virginia, and DeGraaf at the Station's research unit at Amherst, Massachusetts. Thomas, who formerly served at both Morgantown and Amherst, is now with the Pacific Northwest Forest and Range Experiment Station, La-Grande, Oregon.

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