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For information on the contents of this publication, contact Peter J. Blank, Department of Entomology, University of Maryland, 4112 Plant Sciences Building, College Park, MD 20742–4454; phone: (301) 405–3911; email: pb@umd.edu.

Cover photo: Warm-season grass buffer in summer. Photo by Peter J. Blank.

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Bird Community Response to Herbaceous Buffers in Maryland

Introduction

Herbaceous conservation buffers (filter strips) are strips of herbaceous vegetation that are generally planted on prior cropland immediately adjacent to streams, wetlands, and agricultural drainage ditches. They are designed to improve water quality by reducing nutrients, sediment, and other pollutants from surface runoff and subsurface flow, and to create, restore, or enhance herbaceous habitat for wildlife and beneficial insects. There are approximately 40,000 acres of filter strips enrolled in Maryland's Conservation Reserve Enhancement Program (CREP) as practice CP21 filter strips. The United States Department of Agriculture (USDA) Natural Resources Conservation Service's (NRCS) Conservation Practice Standards 393 (CP393) and 390 (CP390) provide technical information on the application of filter strips and riparian herbaceous cover.

Herbaceous buffers in Maryland are planted either to native warm-season grasses or cool-season grasses, with the addition of native wildflowers or introduced legumes, usually clovers. Common warm-season grasses (fig. 1) in Maryland buffers include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), and broomsedge bluestem (*Andropogon virginicus)*. The most common cool-season grass in Maryland buffers is the introduced orchardgrass (*Dactylis glomerata*) (fig. 2), but other cool-season grasses such as red fescue (*Festuca rubra*) and the introduced sheep fescue (*Festuca ovina*) are also planted.

Herbaceous buffers often represent the only early-successional habitat on farmland and therefore may be important to the survival of many game and non-game birds. Warm-season grasses are thought to provide better habitat for ground-nesting birds, such as northern bobwhite, because they grow in bunches and provide openings between plants that can be used for movement lanes and foraging, and because they provide concealment for nests (Burger et al. 1990). However, there is no consensus whether cool-season or warm-season grasses are preferable to most bird species that use herbaceous habitats (McCoy et al. 2001). The width of herbaceous buffers has been shown to affect bird density, species richness, and nest success (Best 2000). However, few studies have evaluated the bird response to herbaceous buffers greater than 131 feet wide (Clark and Reeder 2005) such as some buffers are in Maryland.

Under the rules of Maryland's CREP, herbaceous buffers may not be mowed during the primary nesting season of April 15 to August 15. Mowing of herbaceous buffers frequently occurs just after August 15, leaving the grass short until the following spring. The objectives of the study were to determine:

- Which breeding and wintering bird species are using herbaceous buffers in Maryland.

Figure 1 A warm-season grass buffer in winter between a soybean field and a forested wetland

Photo courtesy of Peter J. Blank, University of Maryland

Figure 2 A cool-season grass buffer planted with orchardgrass between a soybean field and a forested wetland

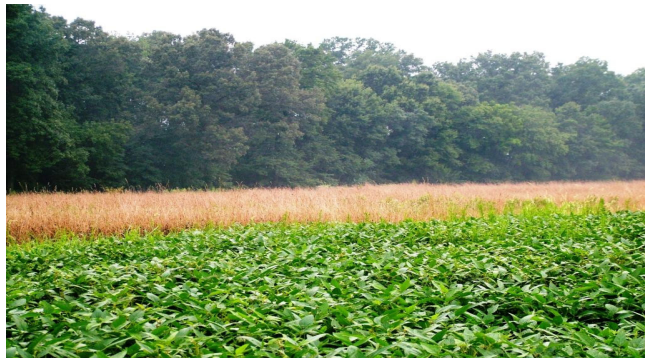

Photo courtesy of Peter J. Blank, University of Maryland

- How bird communities respond to the installation (buffers versus non-buffered crop field edges), grass type (cool-season versus warm-season grasses), width, and vegetation composition and structure of herbaceous buffers.
- How wintering bird communities respond to late summer or fall mowing of herbaceous buffers.

Particular attention was given to the response of grassland birds (e.g., grasshopper sparrow, bobolink, and eastern meadowlark) and scrub-shrub birds (e.g., yellow warbler, prairie warbler, and indigo bunting), two guilds that are of high conservation concern due to recent declines in their populations.

Study area and methods

The study was conducted on farms in three counties on Maryland's Eastern Shore: Caroline, Queen Anne's, and Talbot. Study sites were in warm-season and cool-season grass buffers and in non-buffered crop field edges (controls). All buffers surveyed were between row crops (corn or soybean) and a deciduous forested wetland. Buffers were classified as narrow (<100 ft), medium width (100–200 ft) or wide (>200 ft). Non-buffered field edges were also adjacent to deciduous wooded edges and surveys extended approximately 130 feet into the crop field.

From 2004 to 2007, breeding birds were surveyed in 67 buffers and 15 non-buffered field edges, and wintering birds were surveyed in 40 buffers and 16 non-buffered field edges. All surveys were conducted using a strip-transect method with multiple observers. Nest searching and monitoring and surveys of vegetation composition and structure were also conducted in a subset of buffers in the breeding season.

In 13 buffers in the fall of 2006, a section of the buffer was mowed to 4 to 6 inches high and another section was kept unmowed (fig. 3). Birds were surveyed three times in winter 2007 in each of the mowed and unmowed sections.

Figure 3 Mowed (right) and unmowed (left) sections of a warm-season grass buffer in winter

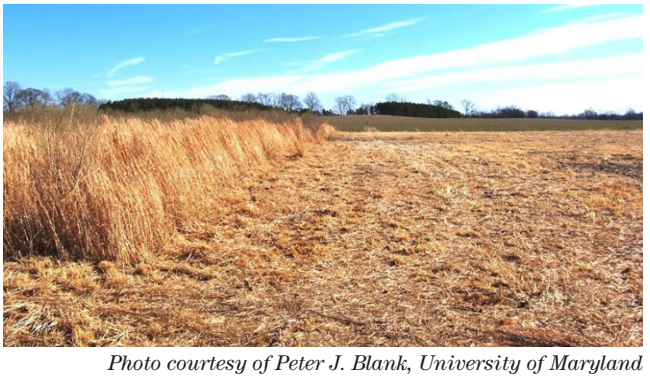

Photo courtesy of Peter J. Blank, University of Maryland

Herbaceous buffers have improved habitat for birds in agricultural fields

A total of 65 bird species were recorded using buffers in Maryland: 56 in summer and 23 in winter. The most abundant species in buffers in summer were indigo bunting (22%), red-winged blackbird (15%) (fig. 4), and common yellowthroat (12%), and the most abundant species in winter were song sparrow (38%), Savannah sparrow (17%) (fig. 5), and field sparrow (16%).

Total bird density, species richness, and the density of grassland and scrub-shrub species was higher in buffers than in non-buffered field edges in summer and winter, indicating that the installation of grass buffers has improved habitat for birds in agricultural fields.

Figure 4 Red-winged blackbirds were among the most abundant species in buffers in summer

Photo used with permission © George Jett, Waldorf, MD

Figure 5 Savannah sparrows were among the most abundant species in buffers in winter

Photo used with permission © George Jett, Waldorf, MD

Buffers dominated by orchardgrass were avoided by some birds

Bird community measurements did not differ between cool-season and warm-season grass buffers. However, there were fewer birds in buffers dominated by orchardgrass. Orchardgrass is non-native, highly competitive, and its wildlife value is considered very low.

Longer and wider buffers had more birds, and wide buffers had more obligate grassland birds

Total bird abundance was positively associated with longer and wider buffers. Most birds were by the wooded edge of buffers, except for obligate grassland species (such as grasshopper sparrow and Savannah sparrow) that avoided the wooded edges and were mostly observed greater than 230 feet away from the wooded edge. Grassland bird nest density was highest in wide, warm-season grass buffers.

Bird species in buffers prefer shorter, more diverse, and less dense stands of grass

Most bird community measurements were positively associated with shorter, less dense grasses, higher plant species diversity, and higher numbers of forbs. Most nests were located in relatively tall and sturdy forbs and shrubs, such as goldenrod and blackberry.

Very few wintering birds were in mowed buffers

Wintering birds need habitat for foraging, roosting, and escape cover. In response to the mowing experiment, 98 percent of all birds were seen in unmowed buffers, indicating that fall mowing dramatically reduces the use of buffers by wintering birds and removes valuable habitat that wintering birds could otherwise exploit.

Management recommendations

- Federal and State conservation agencies should continue to encourage landowners to install herbaceous buffers on agricultural field edges.
- Buffers greater than 200 feet wide will likely provide better habitat for grassland birds.
- Avoid planting orchardgrass in herbaceous buffers, or periodically decrease the percent cover of orchardgrass through management practices.
- Plant shorter, less dense grasses, and encourage plant species diversity and high numbers of forbs.
- To provide habitat for wintering birds, delay maintenance mowing of buffers as late as possible (preferably March) after the end of the primary nesting season. On cool-season grass buffers, if it is infeasible to delay mowing, mow early enough after the end of the nesting season to provide time for re-growth. In all cases, mow on a 2- or 3-year rotation to leave a portion of each buffer unmowed through winter.

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