

Use of a Powerline Corridor by Breeding and Wintering Birds in Giles County, Virginia

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ABSTRACT

Powerline corridors can provide an opportunity to create shrubland habitat for early successional bird species. In March 1994, the Forest Service planted 1.5 meter tall crabapple and dogwood shrubs (*Malus spp.*, *Cornus sericia*) in 3 patches approximately 300 meters long within a powerline corridor in the George Washington-Jefferson National Forest near the White Rocks campground, Giles County, Virginia. We monitored the use of the powerline corridor by breeding and wintering birds during 1994 and 1995 and determined levels of nest success and predation during the breeding season. Nest success for both years was 57% (12/21) (% of nests from which at least one young fledged). One nest was parasitized by a Brown-headed Cowbird (*Molothrus ater*), giving frequency of parasitism of 4.7%. Six of the 21 nests were depredated, giving a frequency of predation of 28.5%. Most bird activity was observed along the edge of the powerline corridor. Bird use of the corridor itself was limited because of a lack of shrub growth within the corridor. Further monitoring of bird use of the planted shrubs is recommended.

INTRODUCTION

Recently, much attention has been focused on the decline of populations of forest dwelling Nearctic-Neotropical migrant songbirds. However, there is a more dramatic and clear decline in birds associated with early successional habitat in eastern North America, the majority of which are short distance migrants (Hagan et al., 1992; Askins, 1993). Results from the Breeding Bird Survey show that 16 out of 19 grassland or savanna species had declining population trends between 1966 and 1991, 11 of which were significant (Askins, 1993; Johnson and Schwartz, 1993; Knopf 1995). Of 16 shrubland species 12 declined in this same time period (6 significantly), while only 4 increased (Askins, 1993). These declines may reflect the loss of grassland and shrubland habitat with the growth of forest on abandoned farmland, increased efficiency of agriculture and increases in rural residential areas (Witham and Hunter, 1992; Askins, 1993). Many of these grassland and shrubland bird species have a high degree of habitat specialization and are dependent on habitats that are transient in the absence of continual management or disturbance (Askins, 1993).

Concerns over the effects of edges on avian nest success (Gates and Gysel, 1978) have led to further concerns over the fragmentation of forested habitat by development, roads and powerline corridors. Yet powerline corridors can provide an opportunity to provide shrubland habitat for early successional bird species. Bird community density and diversity within powerline corridors varies depending on shrub density and

patchiness, corridor width, and number of years following vegetation maintenance by cutting (Kroodsmas, 1982).

Our objectives were to determine the nesting density and success of early successional bird species breeding within a powerline right-of-way, and to determine if there is a greater diversity of species nesting in areas planted with shrubs as compared to areas dominated by grass and ferns. We also wished to determine levels of cowbird parasitism and levels of predation in both areas. Finally, we attempted to assess the value of the habitat improvement to wintering birds.

METHODS

In March 1994, the Forest Service planted 1.5 meter tall crabapple and dogwood shrubs (*Malus spp.*, *Cornus sericia*) in 3 patches approximately 300 meters long within the powerline corridor in the George Washington-Jefferson National Forest near the White Rocks campground, Giles County, Virginia (37° 26' 6", 80° 30' 36"). The patches of shrubs were alternated with similarly sized patches left in grass/ferns. This powerline corridor is approximately 12 meters wide and intersects mixed hardwood forest (approximately 80 years old). It is maintained through low volume foliar spray using glyphosate. Group selection harvesting was conducted to the north of the powerline in 1990 and to the south in 1993. Skid trails (designated travel lanes used to drag logs to the landings) bisect and at times parallel the right-of-way.

We monitored the use of the powerline by breeding birds, determined levels of nest success, brood parasitism and nest predation. We also monitored use of the powerline by wintering and migrating birds. The powerline was visited once per week from mid May through July 1994 and 1995. In addition, it was visited once per month from October through April 1994 and September through November 1995. During the summer, we set up 6 to 8 mist nets during the morning hours from approximately 0700-1200. This provided from 24 to 37 net hours each week. Nets were placed in both the corridor itself and on the edge. Nets were never set more than 20 meters from the edge of the corridor. Nets were placed in a different section of the corridor each visit to ensure coverage of the entire study area. Any birds caught were banded, sexed, weighed and measured, and aged if possible. During the fall and winter, we attempted to mist net birds. However, our success was minimal, with 0 captures during the winter months. A species list of all birds heard or seen during each visit (4-6 hours/week) was also recorded.

Between net checks, we walked the powerline corridor and searched for nests in the corridor and along the edge. Any nests found were identified and marked with flagging on a nearby tree or shrub. Nests were then monitored at each subsequent visit to the powerline.

RESULTS

A total of 17 species were banded during the two years (Table 1). One male indigo bunting (refer to Table 1 and 3 for scientific names) was caught in June of 1994 and was recaptured during June of 1995. Many of the birds caught in early spring were in breeding condition (i.e. a vascularized brood patch or an enlarged cloacal protuberance), indicating some breeding activity.

We were able to find a total of 21 nests of 7 species. The greatest number of nests found belonged to indigo buntings, followed by red-eyed vireos (Table 2). Most of

TABLE 1. Species caught in or near the White Rocks powerline corridor (1994 and 1995), Giles County, Virginia.

SPECIES	NUMBER CAUGHT	SEASON*
red-eyed vireo (<i>Vireo olivaceus</i>)	12	summer
indigo bunting (<i>Passerina cyanea</i>)	11	summer
chestnut-sided warbler (<i>Dendroica pensylvanica</i>)	7	spring, summer
american redstart (<i>Setophaga ruticilla</i>)	5	summer
eastern wood pewee (<i>Contopus virens</i>)	4	summer
ruby-crowned kinglet (<i>Regulus calendula</i>)	4	fall
eastern towhee (<i>Pipilo erythrophthalmus</i>)	3	summer
dark-eyed junco (<i>Junco hyemalis</i>)	3	fall, summer
golden-crowned kinglet (<i>Regulus satrapa</i>)	3	fall
wood thrush (<i>Hylocichla mustelina</i>)	2	summer
solitary vireo (<i>Vireo solitarius</i>)	2	spring
scarlet tanager (<i>Piranga olivacea</i>)	2	summer
hairy woodpecker (<i>Picoides villosus</i>)	1	summer
swainson's thrush (<i>Catharus ustulatus</i>)	1	fall
acadian flycatcher (<i>Empidonax vireescens</i>)	1	summer
black-throated blue warbler (<i>Dendroica caerulescens</i>)	1	summer, fall
ovenbird (<i>Seiurus aurocapillus</i>)	1	summer

*seasons: spring (March-April)

summer (May-August)

fall (September-November)

these nests were in the forest on the edge of the powerline corridor. The nest success for both years for all species was 57% (% of nests from which at least one young fledged). One chestnut-sided warbler nest was parasitized by a brown-headed cowbird (*Molothrus ater*), giving a frequency of parasitism of 4.7% (Table 2). Six of the 21 nests were depredated, giving a frequency of predation of 28.5% (Table 2). Two nests were deserted during the incubation stage.

Many birds were observed using the shrubs and trees that had regenerated in and along skid trails. Twenty-eight percent (6/21) of nests found were within the powerline corridor itself. Only one nest (indigo bunting) was found in the planted shrubs in the corridor.

Several species of forest birds which we did not catch in mist nets were observed or heard along the edges of the powerline corridor or in the nearby forest (Table 3). We did not search for nests for these species and therefore do not have any information on reproductive success for these birds.

TABLE 2. Nesting success for bird species nesting in or near the White Rocks powerline corridor (1994 and 1995), Giles County, Virginia.

Species	% Success*	% Depredation	% Parasitism
all	57% (12/21)	28.5% (6/21)	4.7% (1/21)
indigo bunting	60% (6/10)	40% (4/10)	0
red-eyed vireo	50% (2/4)	50% (2/4)	0

* success = % of nests which fledged at least one young

List of species for which nests were found:

- indigo bunting (*Passerina cyanea*) (n = 10)
- chestnut-sided warbler (*Dendroica pensylvanica*) (n = 2)
- wood thrush (*Hylocichla mustelina*) (n = 2)
- red-eyed vireo (*Vireo olivaceus*) (n = 4)
- dark-eyed junco (*Junco hyemalis*) (n = 1)
- ovenbird (*Seiurus aurocapillus*) (n = 1)
- yellow-billed cuckoo (*Coccyzus americanus*) (n = 1)

DISCUSSION

The powerline corridor itself was used little by breeding birds, perhaps because of a lack of dense shrubs for nesting, perching and foraging. We observed much more bird use in the areas that had once been skid trails and had now grown over to shrub cover. These habitats had a much greater amount of shrub growth than was observed within the corridor itself. This growth consisted mainly of stump sprouts of red maple (*Acer rubrum*), striped maple (*Acer pensylvanicum*) and oak (*Quercus* spp.) saplings. The corridor itself was kept clear of most tree growth and consisted mainly of grasses and ferns. There were however, scattered oak, maple, hemlock (*Tsuga canadensis*) and pine (*Pinus strobus*) saplings, as well as one area of hawthorn (*Crataegus* spp.).

Several studies have shown that it is possible to create relatively stable shrublands on rights-of-way that are resistant to tree seedling invasion and are beneficial to wildlife. Huckleberry (*Gaylussacia baccata*) and low blueberry (*Vaccinium vacillans*) can become communities resistant to tree invasion when developed by a selective herbicide approach (Bramble and Byrnes, 1972; Niering and Goodwin, 1974). In addition, mountain laurel (*Kalmia latifolia*), great laurel (*Rhododendron maximum*) and scrub oak (*Quercus ilicifolia*) are also known to resist tree establishment (Niering and Goodwin, 1974). In Pennsylvania, blueberry (*Vaccinium* spp.), scrub oak, goldenrod (*Solidago rugosa*) and bracken fern (*Pteridium aquilinum*) were the most highly resistant species (Bramble et al., 1990). Selective basal application of herbicide was the best method to produce a shrub-herb-grass cover type. Niering and Goodwin (1974) also found pure stands of little bluestem (*Andropogon scoparius*) to be resistant

TABLE 3. Additional bird species seen or heard during the breeding season (May-July) in or near the White Rocks powerline corridor (1994 and 1995), Giles County, Virginia.

black-and-white warbler (<i>Mniotilta varia</i>)
black-throated green warbler (<i>Dendroica virens</i>)
blackburnian warbler (<i>Dendroica fusca</i>)
chickadee (<i>Parus sp.</i>)
downy woodpecker (<i>Picoides pubescens</i>)
northern cardinal (<i>Cardinalis cardinalis</i>)
northern flicker (<i>Colaptes auratus</i>)
pileated woodpecker (<i>Dryocopus pileatus</i>)
rose-breasted grosbeak (<i>Pheucticus ludovicianus</i>)
tufted titmouse (<i>Parus bicolor</i>)
veery (<i>Catharus fuscescens</i>)
white-breasted nuthatch (<i>Sitta carolinensis</i>)
yellow-throated vireo (<i>Vireo flavifrons</i>)
brown-headed cowbird (<i>Molothrus ater</i>)

to tree invasion; however Rich et al. (1994) found that cowbirds exhibit significantly greater abundances associated with the presence of mowed grass in corridors.

The creation of a stable shrubland depends on which plant species are present and which species will grow well on the soil type in the right-of-way. The cover type chosen should also benefit wildlife as well. Shrubs should be chosen that not only provide food, but nesting or wintering cover. Huckleberry and blueberry both provide food sources for songbirds including chickadees (*Parus* spp.), towhees (*Pipilo* spp.), eastern phoebes (*Sayornis phoebe*), and several thrush species (*Hylocichla* spp.) (Martin et al., 1951). The shrubs planted in this study were chosen to provide a food source for songbirds. Birds nesting near the right-of-way used plant species such as chestnut oak (*Quercus prinus*), striped maple (*Acer pensylvanicum*), hemlock (*Tsuga canadensis*) and red oak (*Quercus rubra*). However these are all tree species which could not be left in the right-of-way. We found solitary vireos (*Vireo solitarius alticola*) in some nearby areas nesting in mountain laurel (pers. obs.), which has been found to resist tree establishment (Niering and Goodwin, 1974).

As our results have shown, few birds were found nesting in the powerline corridor itself. The planted shrubs had not acquired enough growth over the duration of this study to be beneficial to birds or other wildlife. The shrubs were planted in rows, approximately one meter apart and had very little horizontal growth. In addition, we observed only one of the shrubs produce fruit over the duration of the study. Therefore we recommend that further monitoring be conducted at a later date to determine if these shrubs are of benefit to songbirds. Yet evidence from the use of skid trails in this study, as well as evidence from other studies, indicates that the creation of a stable shrubland within the right-of-way would provide food and nesting cover for songbirds, and make the right-of-way a higher quality habitat for shrubland birds.

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LITERATURE CITED

- Askins, R.A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North America. *Current Ornithology*. 11: 1-34.
- Bramble, W.C. and W.R. Byrnes. 1972. A long term ecological study of game food and cover on a sprayed utility right-of-way. *Purdue Univ. Agric. Exp. Stn. Res. Bull.* 885: 1-20.
- Bramble, W.C., W.R. Byrnes, and R.J. Hutnik. 1990. Resistance of plant cover types to tree seedling invasion on an electric transmission right-of-way. *J. Arboriculture*. 16(5): 130-135.
- Gates, J.E. and L.W. Gysel. 1978. Avian nest dispersion and fledging success in field-forest ecotones. *Ecology*. 59(5):871-883.
- Hagan, J.M. III, T.L. Lloyd-Evans, J.L. Atwood and D.S. Wood. 1992. Long term changes in migratory landbirds in the northeastern United States. Evidence from migration capture data, *in* J.M. Hagan and D.W. Johnson (eds.) *Ecology and Conservation of Neotropical Migrant Landbirds*, Smithsonian Inst. Press, Washington, D.C., pp. 115-130.
- Johnson, D.H. and M.D. Schwartz. 1993. The Conservation Reserve Program and grassland birds. *Cons. Biol.* 7(4):934-937.
- Knopf, F.L. 1995. Declining grassland birds, *in* E.T. LaRoe, G.S. Farris, C.E., Puckett, P.D. Doran and M.J. Mac (eds.) *Our Living Resources*, Washington, D.C. National Biological Service, pp. 296-298.
- Kroodsma, R.L. 1982. Bird community ecology on power-line corridors in east Tennessee. *Biol. Conserv.* 23:79-94.
- Martin, A.C., H.S. Zim and A.L. Nelson. 1951. *American wildlife and plants: A guide to wildlife food habits*. Dover Publications, Inc. New York, New York.
- Niering, W.A. and R.H. Goodwin. 1974. Creation of relatively stable shrublands with herbicides: arresting "succession" on rights-of-way and pastureland. *Ecology*. 55:784-795.
- Rich, A.C., D. S. Dobkin, and L.J. Niles. 1994. Defining forest fragmentation by corridor width: the influence of narrow forest-dividing corridors on forest-nesting birds in southern New Jersey. *Conserv. Biol.* 8(4): 1109-1121.
- Witham, J.W. and M.L. Hunter, Jr.. 1992. Population trends of Neotropical migrant landbirds in northern coastal New England, *in* J.M. Hagan and D.W. Johnson, (eds.) *Ecology and Conservation of Neotropical Migrant Landbirds*, Smithsonian Inst. Press, Washington, D.C., pp. 85-95.